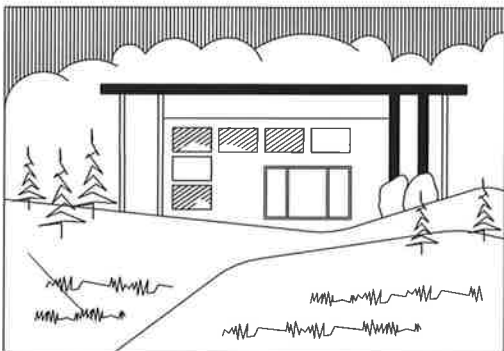
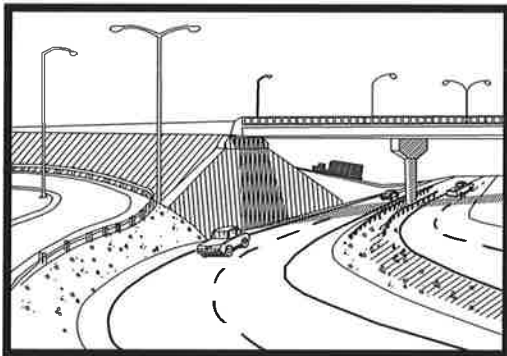
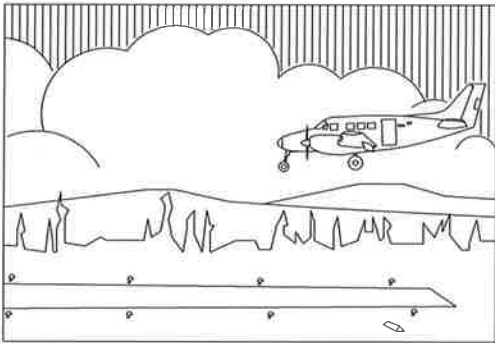


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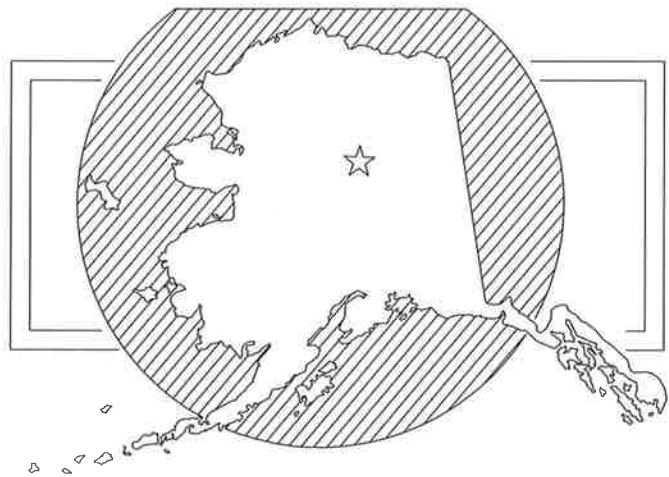
AMBLER AIRPORT REHABILITATION MATERIAL SITE REPORT

AKSAS 60851



STATE OF ALASKA

Department of Transportation
and Public Facilities



NORTHERN REGION

APRIL 2013

AMBLER AIRPORT REHABILITATION
MATERIAL SITE REPORT
APRIL 2013
AKSAS 60851

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"Get Alaska Moving through service and informed action"

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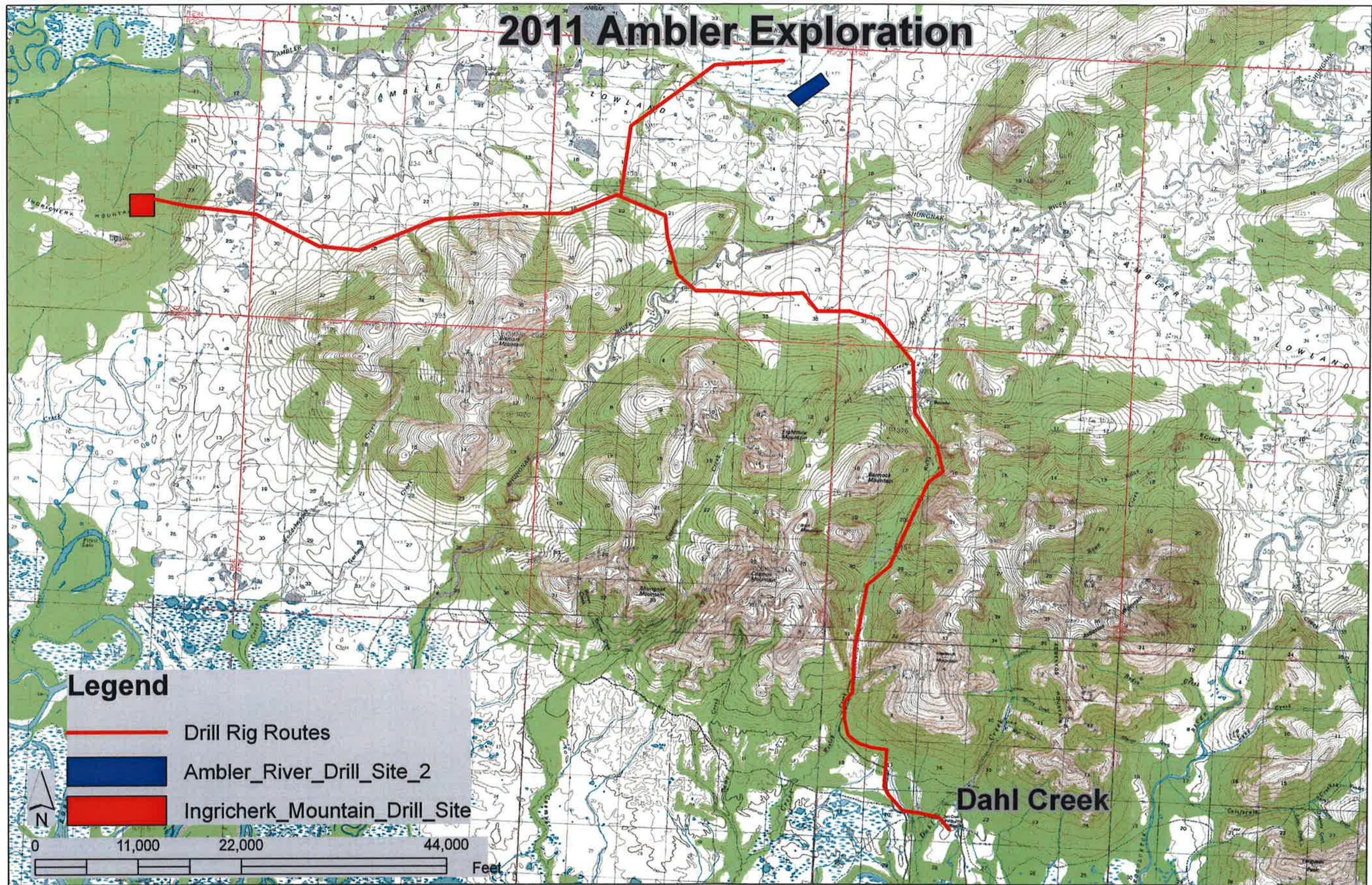


Figure 1. Ambler River material Site and Ingricherk Mountain Material Site

Material Site Investigation Ambler River and Ingricher Mountain

Summary

At the request of Ryan Anderson, P.E., Aviation Group Chief, Northern Region Materials Section (NRMS) personnel conducted drill exploration to evaluate Cretaceous sedimentary bedrock exposed at Ingricher Mountain and fluvial gravels exposed on the Ambler River to see if either site contains sufficient asbestos free material for project needs. Material is to be used for the Ambler Airport Rehabilitation Project (AKSAS 60851). NRMS personnel drilled 14 test holes at Ingricher Mountain with depths of 4 to 62 feet. NRMS personnel drilled 29 test holes on the Ambler River that ranged in depth from 12.5 to 37.5 feet. Drilling was conducted between August 29th and September 13th, 2011.

NRMS personnel completed 29 test holes at the Ambler River Material Site with depths of 17 to 37.5 feet at the locations shown on the attached figure. Drilling was conducted between August 29th and September 8^h, 2011.

NRMS personnel completed 14 test holes on Ingricher Mountain with depths of 4 to 61.5 feet at the locations shown on the attached figure. Drilling was conducted between September 12th and 13th, 2011.

Introduction

In Summer 2010 NRMS personnel conducted a widespread reconnaissance sampling program around the Ambler area to prospect for asbestos free deposits suitable for use as construction materials in the Ampler Airport Rehabilitation Project. Following analysis of samples from reconnaissance sampling two sites were selected for further exploration, the first on Ingricher Mountain and the second on the Ambler River. Ingricher Mountain is a bedrock site composed of sedimentary rocks including: sandstone, siltstone, and conglomerate. Sedimentary rocks on Ingricher Mountain are Cretaceous aged and are younger than, and therefore theoretically not contaminated by, mafic plutonic sills that typically contain serpentinite (serpentinite is an asbestos carrying alteration mineral). The Ambler River site is an alluvial site on the bank of the Ambler River. This location was chosen because it is located upstream of the most obvious serpentinite contaminated deposits in the Jade Mountains and Cosmos Hills.

Field Investigation

NRMS field personnel included Drillers J. Cline, G. Nelson, P. Lanigan and Engineering Geologist G. Speeter. Following material site reconnaissance and subsequent asbestos testing (completed summer 2010), material site drilling was conducted using a track-mounted CME-45C. Test holes on Ingricher Mountain were drilled with solid stem augers or a combination of solid stem auger (in colluvium and overburden) and core drilling (in bedrock). Test holes on the Ambler River were drilled with solid stem augers.

Soil samples and test hole conditions were logged in the field using the unified soil classification system. Selected samples were submitted to the Northern Regions Materials Laboratory for testing.

Lab results indicate that material from the Ambler River Material Site generally meets standard airport (and highway) material specifications for Select Material, Type C, Embankment, and quality specifications for Crushed Aggregate Base Course, Subbase Course, and Aggregate Surface Course. However, additional processing will be required to lower fines content (-#200) to meet requirements for fines content in the standard airport (and highway) material specifications for Aggregate Surface Course, Crushed Aggregate Base Course, and Subbase Course. Additional processing will be required to lower fines content to meet standard highway material specifications Select Material, Type A and Select Material, Type B.

Lab results indicated that bedrock from Ingricher Mountain will not meet Standard Airport Materials Specifications for Crushed Aggregate Base Course and Aggregate Surface Course. Bedrock material from this site also fails to meet Standard Highway Material Specifications for crushed aggregate products.

Samples for asbestos content were collected in 5 foot intervals in all test holes and analyzed by White Environmental or EMSL Analytical, Inc for asbestos content utilizing the TEM CARB 435 with a 0.01(White Environmental) or 0.001 analytical sensitivity (EMSL).

141 samples from the Ambler River Material Site were analyzed for asbestos content, 7 tested positive for asbestos. 121 samples from Ingricher Mountain were analyzed for asbestos content, 2 tested positive for asbestos. The highest asbestos detected in samples from the Ambler River was <1%. The highest asbestos detected in samples from Ingricher Mountain was 0.0319%.

Test holes were generally drilled with ~300 foot spacing. Locations were recorded using a Garmin hand-held GPS (datum NAD 83) with an accuracy of +/- 50-ft. Holes were backfilled with cuttings and marked with wood stakes.

The materials source information included in this section is for the purpose of assisting in the project design process. It does not signify that the sources are available or suitable for use during the construction of any current or future project. This Geotechnical Report does not determine source availability or suitability for any construction project; it only provides information that can be used to make that determination during the project design process. Sources available or suitable for use for a construction project will be specified in the appropriate section of the Plans and Specifications of the Contract Documents for the construction project.

Naturally Occurring Asbestos (NOA)

Naturally occurring asbestos is common in the area and several attempts at finding sites to mine asbestos free building materials have failed (see past reports section).

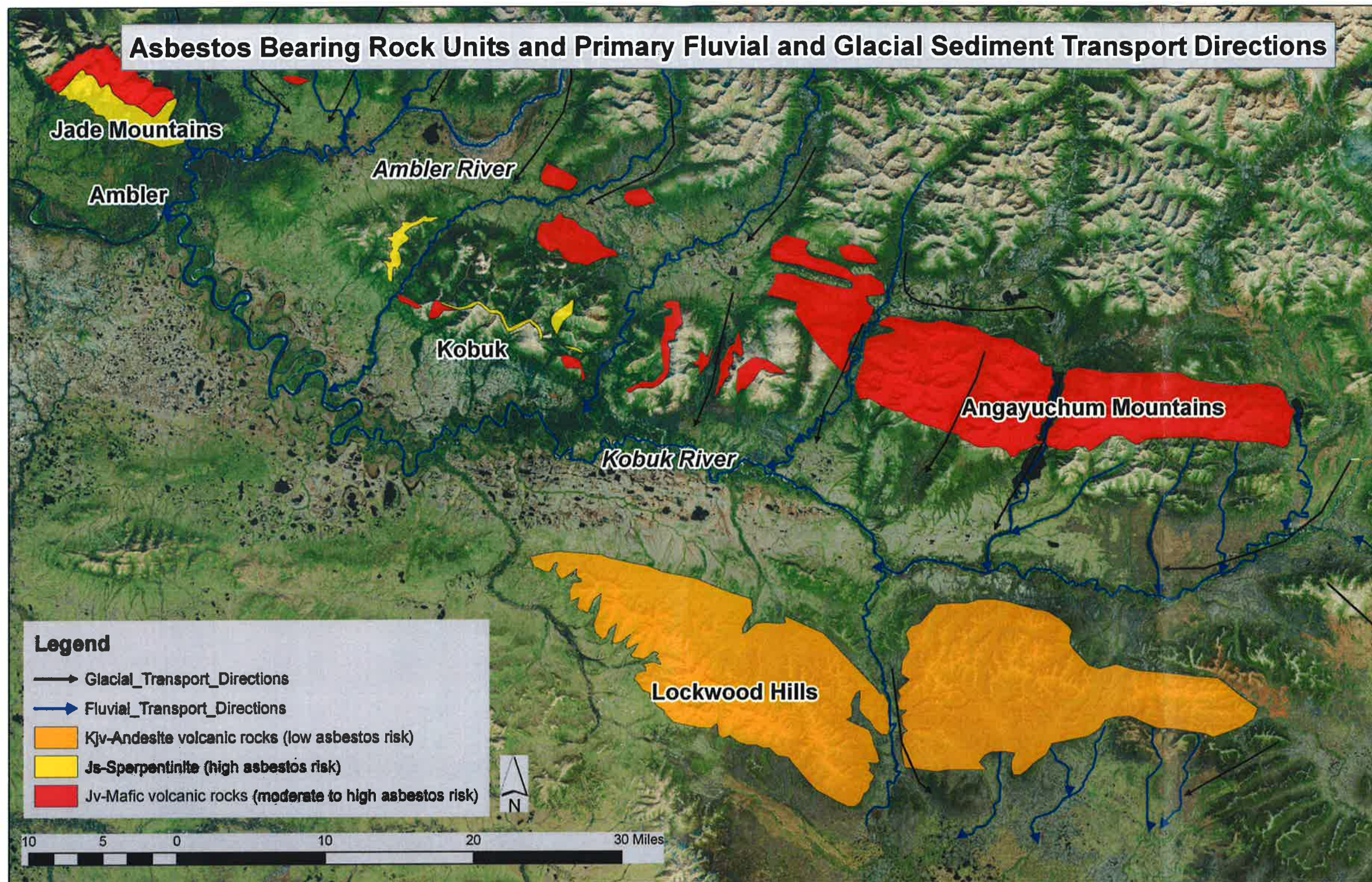


Figure 2. Generalized map of known asbestos sources and fluvial/ glacial sediment transport directions.

Asbestos bearing rocks

The major sources of asbestos in the area are partially serpentinized peridotite and dunite in the Jade Mountains (7.5 miles northwest of Ambler) and serpentinite in the Cosmos Hills (13.5 miles east of Ambler). The Jade Mountains and Cosmos Hills are Part of the Angayuchum Terrain. The Jade Mountains and Cosmos hills make up a NW trending belt of rock that is cut by the south flowing Ambler River. The Ambler River flows south from the Brooks Range (Baird Mountains) past Ambler and into the Kobuk River. The Kobuk River is a west flowing meandering stream that runs past the south flank of the Cosmos Hills to Ambler.

Downstream transportation of asbestos

The Ambler River runs through the Jade Mountains and Cosmos Hills on its way to Ambler. The Kobuk River runs along asbestos sources in the Cosmos Hills on its way to Ambler. Asbestos has been found in multiple places along the Ambler and Kobuk Rivers downstream of the Jade Mountains and Cosmos Hills (figure 1+2). It is logical to assume that asbestos is being transported to the Ambler area by the Kobuk and Ambler Rivers.

Transport of asbestos by prevailing wind

PREVAILING WIND DIRECTION

STATION AMBLER AIRPORT, AK. (PAFM)													
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	
NNE	NNE	NNE	NNE	NNE	W	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE

Table 1. Prevailing wind directions in Ambler area. Data from Ambler Airport courtesy of www.wrcc.dri.edu/htmlfiles/westwinddir.html

NNE (table 1) prevailing wind directions could potentially carry windblown asbestos from the Cosmos Hills to the Ambler Lowlands and subsequently deposit fine asbestos particles in overburden throughout the Ambler Lowlands including the Ambler River Material site.

Glacial transport of asbestos

South advancing glaciers passed through the Baird Mountains into the Ambler Lowlands (figure 2) during the last glacial maximum (approximately 20,000 years ago). There are scattered mafic and ultra-mafic rocks in the Baird Mountains. Glacial erosion could have scoured asbestos bearing rocks out of the Baird Mountains and subsequently deposited them in the Ambler Lowlands.

Asbestos testing

The State of Alaska has approved the use of the California Air Resources Board Method 435 with a detection limit of 0.25 percent using the 400 non-empty point calculation as a suitable test method for determining if soil/rock contains naturally occurring asbestos.

Asbestos testing for this investigation utilized the CARB 435 method and 0.1-0.001 percent detection limits.

Past reports

DOT&PF/ *Geotechnical Report*, Ambler Airport Rehabilitation, A.I.P. 3-02-0354-XX, State Project No. 61303. June 2004

DOT&PF/ Material Site Investigation, Ambler Airport Rehabilitation, AKSAS Project No. 61303, March 2005

R&M Consultants, Inc. (R&M). 2004. *Geotechnical Memorandum*, Task 6 - supplemental Airport Investigation.

2005a. Material Site Investigation, Ambler Airport Rehabilitation, AKSAS Project No. 61303. June

2005b. *Geotechnical Memorandum*, Task 8- Reconnaissance of New [Material] Sites; Kobuk River Bar Deposit.

2005c. *Geotechnical Memorandum*, Task 8- Reconnaissance of New Material Sites at Ambler, Alaska.

2007. *Geotechnical Memorandum*, Task 9- Review Native Allotments and Other Potential Sites for Material Sources.

2008. *Geotechnical Memorandum*, Task 11- Reconnaissance of New Material Sites [exploration Plan].

2009. *Geotechnical Memorandum*, Task 10- Additional Asbestos Testing [Area B].

2009. *Geotechnical Memorandum*, Task 11- Reconnaissance of New Material Sites

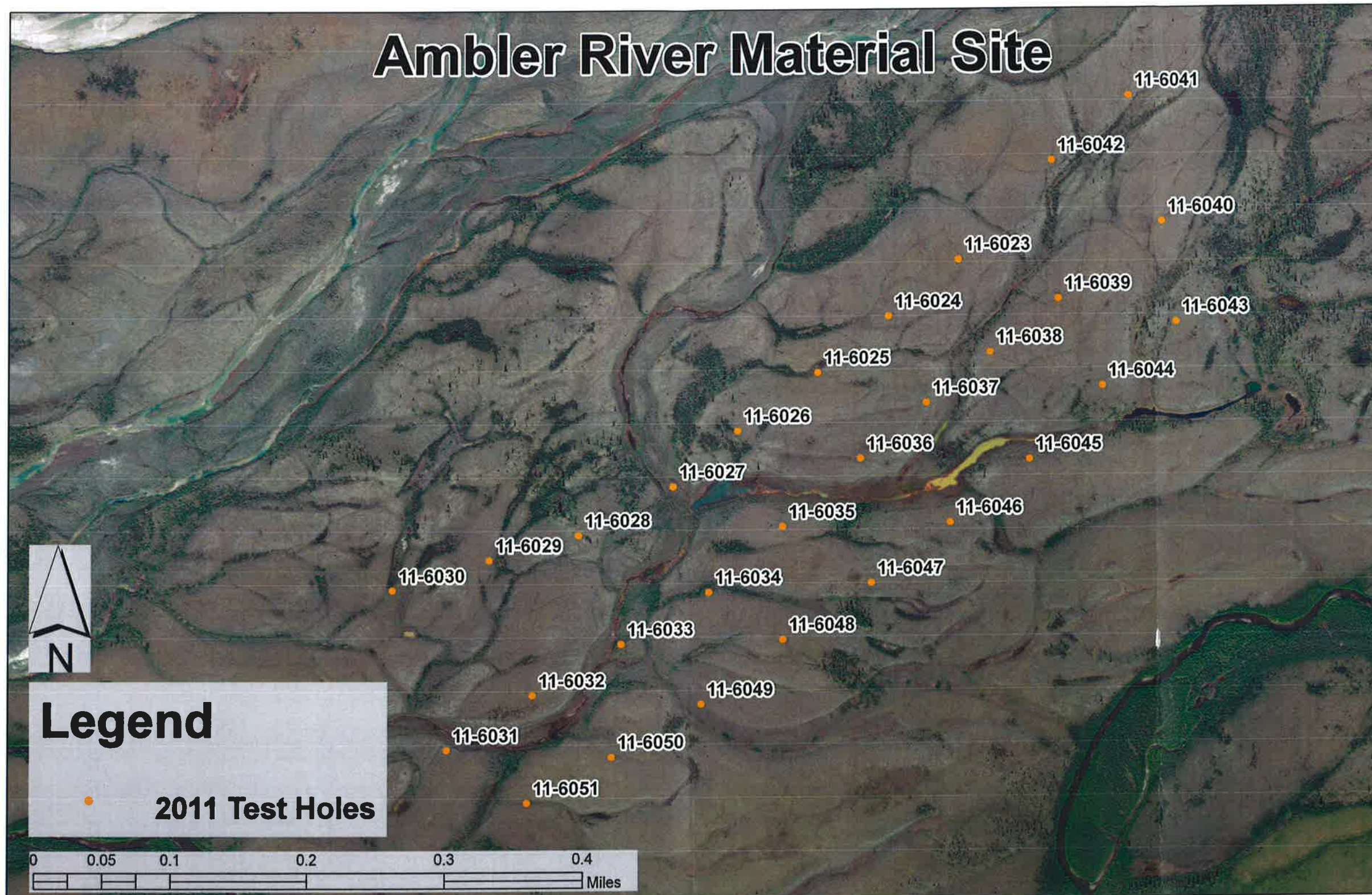


Figure 3. Map of the Ambler River Material Site

Ambler River site and subsurface conditions

Location and access

The Ambler River site is located approximately 32 miles upstream (to the northeast) of the Ambler Airport in Section 1 of Township 20N Range 8E of the Kateel River Meridian. NRMS personnel accessed the site with a track carrier mounted portable drill rig in the summer traveling overland from the Bornite Mine; this route is illustrated on figure 1. The Ambler River is a navigable river and shore lands in this location are State of Alaska lands. This site has no current access.

Geology and topography

The Ambler River material site is located in the alluvial plain of the Ambler River in the Ambler Lowlands. The site is covered with flat-topped alluvial terraces and shoals that range in height from 1 to 10 feet and are dissected by secondary streams that feed off the braided section of the nearby Ambler River. These alluvial terraces are lightly vegetated with tundra grasses and sporadic Black Spruce trees. This particular stretch along the Ambler River was selected because it offers a large volume of available material and it is located upstream of obvious asbestos containing bedrock deposits located in the Jade Mountains and Cosmos Hills.

Site and subsurface conditions

NRMS personnel drilled 29 test holes on site, which encompass 90 acres and reached depths that ranged from 12.5 to 37.5 feet. The site is located on the south bank of the Ambler River where a large, broad, floodplain allows easy access to 90 acres of alluvial gravel.

The following generalized soil profile was encountered in drilling the material site:

- 0-0.25 foot thick organic mat;
- 3-5.5 foot thick overburden silty sand or silt with sand;
- 7.5-20 feet of poorly or well-graded gravel with sand and silt, or silty sand with gravel;
- Underlain by sandy silt or silt with sand.

Gravel is silty and generally rounded, 3 inch minus sized material with occasional cobbles and coarse to fine sand.

Frozen Ground

Depth to permafrost ranged from 3 to 14 feet below the ground surface. Typically permafrost was intercepted at about 5 feet below the ground surface.

Groundwater

Groundwater perched on permafrost was encountered in test holes; 11-6049, 6048, 6044, 6043, 6040, 6039, 6034, 6033, 6030, 6028, 6026, and 6024.

Test holes that intercepted groundwater and no frozen soil were; 11-6027, 6030, and 6045. These test holes were all located adjacent secondary stream channels or small oxbow lake like ponds.

Quality of materials

Analysis of samples collected from auger cuttings during the 2011 investigation yielded the following test results:

Table 2. Summary of Laboratory data from the Ambler River Material Site

Site	% Gravel (+#4) Resource Material	% Sand (-#4, +#200) Resource Material	% Fines (-#200) Resource Material	USCS Classification Overburden/resource	LA Abrasion	Degradation	Liquid Limit / Plastic Index
Ambler River	32-93 (28)	3-61.3 (28)	3.5-22.4 (28)	(ML)/(GP-GM, GW-GM, SM, GM, GP, SW-SM, SP-SM) (13)/(7, 2, 3, 9, 4, 4, 1)	41-42 (2)	29-68 (2)	NV/NP (53)

Test results indicate that gravel material from the Ambler River meets Standard Airport Material Specifications for embankment material. 18 of 28 samples from the sand and gravel layer met Standard Airport Material Gradation Specifications for aggregate surface course. Results from most samples reported fines content >6% suggesting this material will not meet Standard Airport Materials Specifications for Crushed Aggregate Base Course and Subbase Course without additional processing. Fine gradation of this material will lead to high reject rates during aggregate production.

Asbestos

Samples for asbestos content were collected in 5 foot intervals and sent to White Environmental for asbestos content analysis by TEM CARB 435 method with 0.01 analytical sensitivity and EMSL Analytical, Inc for analysis by TEM CARB 435 method with 0.001 analytical sensitivity. One sample tested positive for asbestos content at the 0.01% detection limit and 7 samples tested positive for asbestos at the 0.001% detection limit. Asbestos testing results are available in Appendix E.

There is slight variability in asbestos testing results, for example Sample A139 from TH11-6037 tested negative for NOA 0.01% detection limit and positive under 0.001 limit.

Samples from the Ambler River Site with detectable naturally occurring asbestos were:

- Sample A139 taken from TH 11-6037 at depths of 0.25-2 feet tested positive for actinolite with 0.001% detected.
- Sample A137 taken from TH11-6036 at depths of 5-10 and 12-16.5 feet tested positive for actinolite with 0.001% detected..
- Sample A146 taken from TH 11-6040 at depths of 0-2.5 feet tested positive for actinolite with 0.005% detected..
- Sample A102 taken from TH 11-6024 at depths of 3.5-5 feet tested positive for actinolite with 0.042% detected..
- Sample A153 taken from TH 11-6042 at depths of 0-2 feet tested positive for actinolite with 0.002% detected..
- Sample A106 taken from TH 11-6025 at depths of 8-10 and 13-15 feet tested positive for actinolite with 0.017% detected.
- Sample A123 taken from TH 11-6031 at depths of 4.5-10.5 feet tested positive for actinolite with 0.003% detected.
- Sample A126 taken from TH11-6032 at depths of 5-10 feet tested positive for chrysotile with <0.1% detected.

None of the samples tested contained >0.25% NOA by either test method. The highest NOA content detected was <0.1% detected in TH11-6032 at depths of 5-10 feet.

Table 3. Summary of asbestos lab data from Ambler River site.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A109	11-6026/4-10	AR	0.01	WEC	ND	
A100	11-6023/19-20	AR	0.01	WEC	ND	
A101	11-6024/0.5-2	AR	0.01	WEC	ND	
A101	11-6024/0.5-2	AR	0.001	EMSL	ND	
A102	11-6024/3.5-5	AR	0.001	EMSL	0.042	Actinolite
A103	11-6024/8-15	AR	0.01	WEC	ND	
A103	11-6024/8-15	AR	0.001	EMSL	ND	
A103	11-6024/8-15	AR	0.001	EMSL	ND	
A104	11-6025/0.5-2	AR	0.01	WEC	ND	
A104	11-6025/0.5-2	AR	0.001	EMSL	ND	
A105	11-6025/3.5-5	AR	0.01	WEC	ND	
A105	11-6025/3.5-5	AR	0.001	EMSL	ND	
A106	11-6025/8-15	AR	0.01	WEC	ND	
A106	11-6025/8-15	AR	0.001	EMSL	ND	
A106	11-6025/8-15	AR	0.001	EMSL	0.017	Actinolite
A107	11-6026/18-20	AR	0.01	WEC	ND	
A107	11-6026/18-20	AR	0.001	EMSL	ND	
A107	11-6026/18-20	AR	0.001	EMSL	ND	
A109	11-6026/4-10	AR	0.001	EMSL	ND	
A110	11-6026/13-17	AR	0.01	WEC	ND	
A110	11-6026/13-17	AR	0.001	EMSL	ND	
A111	11-6027/0.5-1	AR	0.01	WEC	ND	
A111	11-6027/0.5-1	AR	0.001	EMSL	ND	
A112	11-6027/3.5-5	AR	0.01	WEC	ND	
A112	11-6027/3.5-5	AR	0.001	EMSL	ND	
A113	11-6027/8-10	AR	0.01	WEC	ND	
A113	11-6027/8-10	AR	0.001	EMSL	ND	
A114	11-6028/0.5-2	AR	0.01	WEC	ND	

Table 4. continued.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A114	11-6028/0.5-2	AR	0.001	EMSL	ND	
A115	11-6028/3-17	AR	0.01	WEC	ND	
A115	11-6028/3-17	AR	0.001	EMSL	ND	
A116	11-6029/0-2.5	AR	0.01	WEC	ND	
A116	11-6029/0-2.5	AR	0.001	EMSL	ND	
A117	11-6029/5-10	AR	0.01	WEC	ND	
A117	11-6029/5-10	AR	0.001	EMSL	ND	
A118	11-6029/14-23	AR	0.01	WEC	ND	
A118	11-6029/14-23	AR	0.001	EMSL	ND	
A120	11-6030/5-10	AR	0.01	WEC	ND	
A120	11-6030/5-10	AR	0.001	EMSL	ND	
A121	11-6030/15-20	AR	0.01	WEC	ND	
A121	11-6030/15-20	AR	0.001	EMSL	ND	
A123	11-6031/4.5-10	AR	0.01	WEC	ND	
A123	11-6031/4.5-10	AR	0.001	EMSL	0.003	Actinolite
A124	11-6031/14-20	AR	0.01	WEC	ND	
A125	11-6032/0-2	AR	0.01	WEC	ND	
A125	11-6032/0-2	AR	0.001	EMSL	ND	
A126	11-6032/5-10	AR	0.01	WEC	<0.1%	Chrysotile
A126	11-6032/5-10	AR	0.001	EMSL	ND	
A127	11-6032/14-20	AR	0.01	WEC	ND	
A127	11-6032/14-20	AR	0.001	EMSL	ND	
A129	11-6033/3-10	AR	0.01	WEC	ND	
A129	11-6033/3-10	AR	0.001	EMSL	ND	
A130	11-6034/0-3	AR	0.01	WEC	ND	
A130	11-6034/0-3	AR	0.001	EMSL	ND	
A131	11-6034/5-12.5	AR	0.01	WEC	ND	
A131	11-6034/5-12.5	AR	0.001	EMSL	ND	
A132	11-6034/15-22	AR	0.01	WEC	ND	
A132	11-6034/15-22	AR	0.001	EMSL	ND	
A133	11-6035/0.5-5	AR	0.01	WEC	ND	
A133	11-6035/0.5-5	AR	0.001	EMSL	ND	
A134	11-6035/10-13	AR	0.01	WEC	ND	
A134	11-6035/10-13	AR	0.001	EMSL	ND	
A135	11-6035/15-22	AR	0.01	WEC	ND	
A135	11-6035/15-22	AR	0.001	EMSL	ND	
A136	11-6036/0.5-2	AR	0.01	WEC	ND	
A136	11-6036/0.5-2	AR	0.001	EMSL	ND	
A136	11-6036/0.5-2	AR	0.001	EMSL	ND	
A137	11-6036/5-16.5	AR	0.01	WEC	ND	
A137	11-6036/5-16.5	AR	0.001	EMSL	0.001	Actinolite
A138	11-6036/20-22	AR	0.01	WEC	ND	
A139	11-6037/0-2	AR	0.01	WEC	ND	
A139	11-6037/0-2	AR	0.001	EMSL	0.001	Actinolite
A140	11-6037/5-20	AR	0.01	WEC	ND	
A140	11-6037/5-20	AR	0.001	EMSL	ND	
A141	11-6038/0-2	AR	0.01	WEC	ND	
A142	11-6038/5-16	AR	0.01	WEC	ND	
A142	11-6038/5-16	AR	0.001	EMSL	ND	
A143	11-6038/19-20	AR	0.01	WEC	ND	
A143	11-6038/19-20	AR	0.001	EMSL	ND	
A144	11-6039/0-2	AR	0.01	WEC	ND	
A144	11-6039/0-2	AR	0.001	EMSL	ND	
A145	11-6039/7-20	AR	0.01	WEC	ND	
A145	11-6039/7-20	AR	0.001	EMSL	ND	

Table 5. continued.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A145	11-6039/7-20	AR	0.001	EMSL	ND	
A146	11-6040/0-2.5	AR	0.001	EMSL	0.005	Actinolite
A147	11-6040/4-17	AR	0.01	WEC	ND	
A147	11-6040/4-17	AR	0.001	EMSL	ND	
A148	11-6041/0-2	AR	0.01	WEC	ND	
A148	11-6041/0-2	AR	0.001	EMSL	ND	
A149	11-6041/5-10	AR	0.01	WEC	ND	
A149	11-6041/5-10	AR	0.001	EMSL	ND	
A150	11-6041/13-16	AR	0.001	EMSL	ND	
A151	11-6041/18-20	AR	0.01	WEC	ND	
A151	11-6041/18-20	AR	0.001	EMSL	ND	
A152	11-6042/0-2	AR	0.01	WEC	ND	
A152	11-6042/0-2	AR	0.001	EMSL	ND	
A153	11-6042/5-10	AR	0.01	WEC	ND	
A153	11-6042/5-10	AR	0.001	EMSL	0.002	Actinolite
A154	11-6042/15-20	AR	0.01	WEC	ND	
A154	11-6042/15-20	AR	0.001	EMSL	ND	
A156	11-6043/4.5-10	AR	0.01	WEC	ND	
A156	11-6043/4.5-10	AR	0.001	EMSL	ND	
A157	11-6042/15-20	AR	0.01	WEC	ND	
A157	11-6042/15-20	AR	0.001	EMSL	ND	
A158	11-6044/0-3	AR	0.01	WEC	ND	
A158	11-6044/0-3	AR	0.001	EMSL	ND	
A159	11-6044/5-10	AR	0.01	WEC	ND	
A159	11-6044/5-10	AR	0.001	EMSL	ND	
A160	11-6044/15-17	AR	0.01	WEC	ND	
A160	11-6044/15-17	AR	0.001	EMSL	ND	
A161	11-6045/0-2	AR	0.01	WEC	ND	
A162	11-6045/4.5-10	AR	0.01	WEC	ND	
A162	11-6045/4.5-10	AR	0.001	EMSL	ND	
A163	11-6045/14-17	AR	0.001	EMSL	ND	
A164	11-6045/18-20	AR	0.01	WEC	ND	
A164	11-6045/18-20	AR	0.001	EMSL	ND	
A166	11-6046/5-10	AR	0.01	WEC	ND	
A166	11-6046/5-10	AR	0.001	EMSL	ND	
A167	11-6046/12-17	AR	0.01	WEC	ND	
A168	11-6046/20-22	AR	0.01	WEC	ND	
A170	11-6047/5-7	AR	0.01	WEC	ND	
A171	11-6047/10-15	AR	0.01	WEC	ND	
A171	11-6047/10-15	AR	0.001	EMSL	ND	
A172	11-6047/18-20	AR	0.01	WEC	ND	
A172	11-6047/18-20	AR	0.001	EMSL	ND	
A173	11-6048/0.5-2	AR	0.01	WEC	ND	
A173	11-6048/0.5-2	AR	0.001	EMSL	ND	
A174	11-6048/4-13	AR	0.01	WEC	ND	
A174	11-6048/4-13	AR	0.001	EMSL	ND	
A174	11-6048/4-13	AR	0.001	EMSL	ND	
A175	11-6048/14-17	AR	0.01	WEC	ND	
A175	11-6048/14-17	AR	0.001	EMSL	ND	
A177	11-6049/5-11	AR	0.01	WEC	ND	
A177	11-6049/5-11	AR	0.001	EMSL	ND	
A178	11-6050/0-2	AR	0.01	WEC	ND	
A178	11-6050/0-2	AR	0.001	EMSL	ND	
A182	11-6051/5-11	AR	0.01	WEC	ND	
A182	11-6051/5-11	AR	0.001	EMSL	ND	

Table 6. continued.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A97	11-6023/0-1.5	AR	0.01	WEC	ND	
A99	11-6023/4-5.5	AR	0.01	WEC	ND	
A99	11-6023/8.5-15	AR	0.001	EMSL	ND	
A109	11-6026/4-10	AR	0.01	WEC	ND	
A100	11-6023/19-20	AR	0.01	WEC	ND	
A101	11-6024/0.5-2	AR	0.01	WEC	ND	

Comments and recommendations

Expect limited access to this site (possibly only during winter months) due to its remote location and position on the bank of the Ambler River.

Lab data suggests that fines content varies considerably throughout the resource layer.

Positive test results for asbestos content warrant care during the mining process. During mining the Ambler River Site, and construction activities utilizing material from the Ambler River Site, follow all state and federal codes, procedures, and laws that regulate mining and building with geologic materials that contain naturally occurring asbestos must be followed.

Expect the water table to fluctuate with the seasons and water level in the Ambler River. The site may be flooded during high water on the Ambler River.

Anticipate the presence of several small secondary streams and lakes on site that may be flowing during flood stages of the Ambler River.

Expect difficulties drying material due to the short summer season.

Expect to find deep deposits of organics and silt within secondary drainages.

Expect frozen ground, either seasonally or perennially frozen within the project area at any time of the year.

Expect development of the potential material source to require underwater mining techniques.

Additional processing will be required to lower fines content (-#200) to meet requirements for fines content in the standard airport (and highway) material specifications for Aggregate Surface Course, Crushed Aggregate Base Course, and Subbase Course.

Additional processing will be required to lower fines content to meet standard highway material specifications Select Material, Type A and Select Material, Type B.

Appendix A- Ambler River test hole logs



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6023
 Project Number: AKSAS 57260 Total Depth: 20 feet
 Field Geologist: G. SPEETER Material Site: Ambler River Dates Drilled: 9/12/2011 - 9/12/2011
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C Station, Offset: _____
 TH Finalized By: G. Speeter Weather: 50F nice Latitude, Longitude: N67.19894°, W157.03078°
 Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling	
S-S Auger	0																	<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Bn-Gn ORG MAT <i>hi Org</i></p> <p>Bn Silty SAND moist</p> <p>Bn Well-graded GRAVEL w/ Silt & Sand moist to wet</p> <p>Bn Poorly-graded GRAVEL w/ Silt & Sand moist, Nbe, 2"-</p> <p>BOH</p>	
	1																		
	2																		
	3																		
	4																		
	5																		
	6																		
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		
	13																		
	14																		
	15																		
	16																		
	17																		
	18																		
	19																		
20																			

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6024
 Project Number AKSAS 57260 Total Depth 17 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15831°, W157.03259°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)
S-S Auger	0																<p>SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT moist, <i>hi Org</i></p> <p>Bn-Gy Sandy SILT moist, <i>Org</i></p> <p>SAMPLE 11-092 (0.5-2.0): ML, 79% -200, ORG 3.7%, NV, NP</p> <p>Bn Poorly-graded GRAVEL w/ Silt & Sand wet, 3"- rounded</p> <p>SAMPLE 11-094 (8.0-10.0): GP-GM, 11.5% -200, NV, NP</p> <p>Bn Well-graded GRAVEL w/ Silt & Sand w/ Cobbles wet, Nbe</p> <p>SAMPLE 11-095 (13.0-15.0): GW-GM, 12% -200, NV, NP</p> <p>BOH</p>
	1		AUGER	11-092													
	2																
	3																
	4																
	5																
	6																
	7																
	8			AUGER	11-094												
	9																
	10																
	11																
	12																
	13			AUGER	11-095												
	14																
	15																
	16																
17																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6025
 Project Number AKSAS 57260 Total Depth 20 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 TH Finalized By G. Speeter Weather 50F nice Latitude, Longitude N67.15763°, W157.03445°
 Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling	
S-S Auger	0		AUGER	11-096													SUBSURFACE MATERIAL 0 Rd-Gn ORG MAT moist, <i>hi Org</i> 1 Bn Silty SAND moist, <i>hi Org</i> 2 Bn Sandy SILT moist, <i>sl Org</i> 3 SAMPLE 11-096 (0.5-2.3): ML, 77.1% -200, ORG 2.5%, NV, NP 4 Bn Poorly-graded SAND w/ Silt & Gravel moist, Nbn, 3"- 5 SAMPLE 11-097 (3.5-5.0): SM, 40.3% -200, NV, NP 6 7 8 9 10 11 12 13 14 15 16 17 18 SAMPLE 11-100 (18.0-20.0): SP-SM, 11.9% -200, NV, NP 19 20 BOH		
	1																		
	2																		
	3																		
	4																		
	5																		
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	7																		
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	16																		
	17																		
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	19																		
20																			

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



STATE OF ALASKA DOT/PP
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6026
 Project Number AKSAS 57260 Total Depth 17.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15703°, W157.03653°
 TH Finalized By G. Specter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	White Drilling		After Drilling
	0																	
	1		AUGER	11-101														
	2		AUGER															
	3																	
	4		AUGER	11-102														
	5																	
	6																	
	7																	
S-S Auger	8																	
	9		AUGER	11-103														
	10																	
	11																	
	12																	
	13																	
	14		AUGER	11-104														
	15																	
	16																	
	17		AUGER	11-105														

SUBSURFACE MATERIAL

Rd-Gn ORG MAT
moist, hi Org

Bn Sandy SILT
moist, Org

SAMPLE 11-101 (1.0-2.0): 66.7% -200, NM 29.0%, ORG 1.3%

Gy-Bn Poorly-graded GRAVEL
w/ Silt & Sand
wet, Nbe, 2.5"- rounded

SAMPLE 11-102 (4.0-5.0): GP-GM, 11.8% -200, ORG 0.6%, NV, NP

SAMPLE 11-103 (9.0-10.0): GP-GM, 7.2% -200, SSc 5.5, SSf 2.5, LA 41, DEG 68, NV, NP

SAMPLE 11-104 (13.0-15.0): GP-GM, 6.7% -200, NV, NP

SAMPLE 11-105 (16.5-17.0): GP-GM, 6.4% -200, NV, NP

BOH

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6027
 Project Number AKSAS 57260 Total Depth 12.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.1564°, W157.03821°
 TH Finalized By G. Speeter Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0		AUGER	11-106													<p align="center">SUBSURFACE MATERIAL</p> <p>Rd-Bn ORG MAT moist, <i>hi Org</i></p> <p>Gy-Bn Silty GRAVEL w/ Sand moist, <i>sl Org</i> SAMPLE 11-106 (0.5-1.3): GM, 31% -200, ORG 1.9%, NV, NP</p> <p>Bn Poorly-graded SAND w/ Silt & Gravel moist</p> <p>Bn Poorly-graded GRAVEL w/ Silt & Sand wet SAMPLE 11-108 (8.0-10.0): GP, 3.7% -200, NV, NP</p>	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
12																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6028
 Project Number AKSAS 57260 Total Depth 17.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15585°, W157.04071°
 TH Finalized By G. Specter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0																	
	1		AUGER	11-109														
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10			AUGER	11-110													
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
17																		

SUBSURFACE MATERIAL

0
1
2
3
4
5
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7
8
9
10
11
12
13
14
15
16
17

Rd-Bn ORG MAT
moist, *hi Org*

Bn Sandy SILT
moist

SAMPLE 11-109 (0.5-2.0): ML, 57% -200, ORG 1.7%,
NV, NP

SAMPLE 11-110 (3.0-17.5): GM, 22.4% -200, NV, NP

Gy-Bn Poorly-graded GRAVEL
w/ Silt & Sand
w/ Cobbles
wet, Nbe, 3"- rounded

BOH

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6029
 Project Number AKSAS 57260 Total Depth 22.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15554°, W157.04308°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling		
S-S Auger	0																			
	1		AUGER	11-111																
	2																			
	3																			
	4																			
	5																			
	6																			
	7		AUGER	11-112																
	8																			
	9																			
	10																			
	11																			
	12																			
	13																			
	14																			
	15																			
	16																			
	17																			
	18		AUGER	11-113																
	19																			
	20																			
	21																			
22																				

SUBSURFACE MATERIAL

Rd-Bn ORG MAT
moist, *hi Org*

Bn Sandy SILT
moist, *Org*

SAMPLE 11-111 (0.1-2.5): ML, 70.9% -200, ORG 2.5%,
NV, NP

Gy-Bn Silty SAND
w/ Gravel
w/ Cobbles
moist, Nbe, 3"- rounded

SAMPLE 11-112 (5.0-10.0): SM, 16.5% -200, NV, NP

SAMPLE 11-113 (14.0-22.5): SP-SM, 10.7% -200, NV,
NP

BOH

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6030
 Project Number: AKSAS 57260 Total Depth: 22.5 feet
 Field Geologist: G. SPEETER Material Site: Ambler River Dates Drilled: 9/12/2011 - 9/12/2011
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C Station, Offset: _____
 Weather: 50F nice Latitude, Longitude: N67.15517°, W157.04564°
 TH Finalized By: G. Speeter Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)
S-S Auger	0		AUGER	11-114													<p>SUBSURFACE MATERIAL</p> <p>Bn-Rd ORG MAT moist, <i>hi Org</i></p> <p>Bn Sandy SILT moist, <i>Org</i> SAMPLE 11-114 (0.5-1.0): 72.7% -200, NM 55.4%, ORG 6.1%</p> <p>Bn Sandy SILT w/ Gravel moist</p> <p>Bn Silty GRAVEL w/ Sand wet SAMPLE 11-115 (5.0-10.0): GM, 15.5% -200, NV, NP</p> <p>SAMPLE 11-116 (15.0-20.0): GP, 3.8% -200, ORG 2.0%, NV, NP</p> <p>Bn Silty SAND moist to wet, Nbe</p> <p>Bn Well-graded GRAVEL w/ Sand Nbe</p>
	1																
	2																
	3																
	4																
	5																
	6			AUGER	11-115												
	7																
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15																
	16																
	17																
	18			AUGER	11-116												
	19																
	20																
	21																
22																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6031
 Project Number: AKSAS 57260 Total Depth: 22.5 feet
 Field Geologist: G. SPEETER Material Site: Ambler River Dates Drilled: 9/12/2011 - 9/12/2011
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C Station, Offset: _____
 Weather: 50F nice Latitude, Longitude: N67.15351°, W157.04399°
 TH Finalized By: G. Speeter Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling
S-S Auger	0		AUGER	11-117														<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Bn ORG MAT moist, <i>hi Org</i></p> <p>Bn Sandy SILT moist, <i>Org</i></p> <p>SAMPLE 11-117 (0.1-1.5): 61.1% -200, NM 39.6%, ORG 3.4%</p> <p>Gy-Bn Silty SAND w/ Gravel w/ Cobbles moist, Nbe, 3"- rounded</p> <p>SAMPLE 11-119 (14.5-20.0): SM, 27.4% -200, NV, NP</p> <p style="text-align: right;">BOH</p>
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17			AUGER	11-119													
	18																	
	19																	
	20																	
	21																	
22																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
 Northern Region Materials
 Geology Section

FINAL TEST HOLE LOG

Field Geologist	<u>G. SPEETER</u>	Project	<u>Ambler Airport Rehabilitation</u>	Test Hole Number	<u>TH11-6032</u>
Field Crew	<u>J. CLINE, P. LANIGAN</u>	Project Number	<u>AKSAS 57260</u>	Total Depth	<u>20 feet</u>
TH Finalized By	<u>G. Speeter</u>	Material Site	<u>Ambler River</u>	Dates Drilled	<u>9/12/2011 - 9/12/2011</u>
		Equipment Type	<u>CME 45C</u>	Station, Offset	
		Weather	<u>50F nice</u>	Latitude, Longitude	<u>N67.15413°, W157.04176°</u>
		Vegetation	<u>Sporatic Black Spruce trees, willows, flat grass</u>	Elevation	

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0		AUGER	11-120													<p align="center">SUBSURFACE MATERIAL</p> <p>0 - 1: Rd-Bn ORG MAT moist, <i>hi Org</i></p> <p>1 - 2: Bn SILT w/ Sand moist, <i>Org</i></p> <p>2 - 4: SAMPLE 11-120 (0.1-2.0): ML, 83.3% -200, ORG 3.6%, NV, NP</p> <p>4 - 5: Gy-Bn Silty SAND w/ Gravel moist, Nbe, 3"- rounded</p> <p>14 - 15: SAMPLE 11-122 (14.0-20.0): SM, 12.7% -200, NV, NP</p>	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
20																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6033
 Project Number AKSAS 57260 Total Depth 12.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 TH Finalized By G. Speeter Weather 50F nice Latitude, Longitude N67.15471°, W157.03943°
 Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (ft.)		While Drilling
S-S Auger	0																SUBSURFACE MATERIAL 0 1 2 3 4 5 6 7 8 9 10 11 12 ROH
	1																
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
	11																
12																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PP
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6034
 Project Number: AKSAS 57260 Total Depth: 22.5 feet
 Field Geologist: G. SPEETER Material Site: Ambler River Dates Drilled: 9/12/2011 - 9/12/2011
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C Station, Offset: _____
 TH Finalized By: G. Speeter Weather: 50F nice Latitude, Longitude: N67.1553°, W157.03712°
 Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0																	SUBSURFACE MATERIAL 0 Rd-Bn ORG MAT dry to moist, <i>hi Org</i> 1 Bn Sandy SILT moist SAMPLE 11-125 (0.1-3.0): ML, 75.1% -200, NV, NP 2 3 4 Bn-Gy Silty GRAVEL w/ Sand wet, 3"- rounded SAMPLE 11-126 (5.0-12.5): GM, 16.3% -200, SS _c 5.6, SS _f 3.0, LA 42, DEG 29, NV, NP 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 BOH
	1																	
	2		AUGER	11-125														
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9			AUGER	11-126													
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
22																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6035
 Project Number AKSAS 57260 Total Depth 37.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15603°, W157.03522°
 TH Finalized By G. Specter Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		White Drilling	After Drilling	
S-S Auger	0																SUBSURFACE MATERIAL		
	1		AUGER	11-128													Rd-Bn ORG MAT dry to moist, <i>hi Org</i>		
	2																Bn Sandy SILT moist, <i>sl Org</i>		
	3																SAMPLE 11-128 (0.5-1.5): ML, 60.2% -200, NM 27.3%, ORG 2.5%, NV, NP		
	4																		
	5																		
	6																	Bn Silty SAND w/ Gravel moist, Nbe	
	7																		
	8																		
	9																		
	10			AUGER	11-130														SAMPLE 11-128 (0.5-1.5): ML, 60.2% -200, NM 27.3%, ORG 2.5%, NV, NP
	11																		
	12																		
	13																		
	14																		
	15																		SAMPLE 11-131 (15.0-22.0): SM, 22.9% -200, NV, NP
	16																		
	17																		
	18			AUGER	11-131														
	19																		Gy SILT w/ Sand moist, Nbe
	20																		Gn Silty SAND moist, Nbe
	21																		
	22																		
	23																		
	24																		
	25																		
	26																		
	27																		
	28																		
	29																		
	30																		
	31																		
	32																		
	33																		
	34																		
35																			

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS 06_28_07.GDT 11/30/12
S-S Auger

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6036
 Project Number AKSAS 57260 Total Depth 22.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15678°, W157.03319°
 TH Finalized By G. Speeter Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	White Drilling		After Drilling	
S-S Auger	0																	SUBSURFACE MATERIAL	
	1																	Rd-Bn ORG MAT dry to moist, <i>hi Org</i>	
	2																	Bn Sandy SILT moist, <i>Org</i>	
	3																		
	4																		
	5																		
	6																		Gy Poorly-graded GRAVEL w/ Silt & Sand moist
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		
	13																		
	14																		
	15																		
	16																		
	17																		
	18																		
	19																		
	20																		
	21																		
22																			

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6037
 Project Number AKSAS 57260 Total Depth 20 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/12/2011 - 9/12/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15741°, W157.03146°
 TH Finalized By G. Speeter Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:				
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling		
S-S Auger	0																			
	1																			
	2																			
	3																			
	4																			
	5																			
	6																			
	7																			
	8																			
	9																			
	10																			
	11																			
	12																			
	13																			
	14																			
	15																			
	16																			
	17																			
	18																			
	19																			
20																				

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project	Amble Airport Rehabilitation	Test Hole Number	TH11-6038
Project Number	AKSAS 57260	Total Depth	20 feet
Material Site	Amble River	Dates Drilled	9/12/2011 - 9/12/2011
Field Geologist	G. SPEETER	Equipment Type	CME 45C
Field Crew	J. CLINE, P. LANIGAN	Weather	50F nice
TH Finalized By	G. Specter	Vegetation	Sporadic Black Spruce trees, willows, flat grass
		Station, Offset	
		Latitude, Longitude	N67.15797°, W157.02982°
		Elevation	

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0																SUBSURFACE MATERIAL	
	1		AUGER	11-141													Bn-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-141 (0.0-2.0): ML, 71.9% -200, NV, NP	
	2																Bn Sandy SILT moist, <i>sl Org, Nbe</i>	
	3																	
	4																	
	5																	
	6																	Bn-Gy Silty SAND w/ Gravel moist, <i>Nbe</i>
	7		AUGER	11-142														SAMPLE 11-142 (5.0-10.0): GM, 13.4% -200, SS _c 5.4, SS _f 4.4, LA 36, DEG 73, NV, NP
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14		AUGER	11-143														SAMPLE 11-143 (12.0-16.0): GM, 13.7% -200, NV, NP
	15																	
	16																	
	17																	
	18																	
	19		AUGER	11-144														SAMPLE 11-144 (19.0-20.0): SM, 12.5% -200, NV, NP
20																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6039
 Project Number AKSAS 57260 Total Depth 20 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15852°, W157.02803°
 TH Finalized By G. Speeter Vegetation Sporatic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)
S-S Auger	0																<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-145 (0.0-2.0): ML, 78.1% -200, ORG 4.7% NV, NP</p> <p>Bn Silty SAND moist, <i>hi Org</i></p> <p>Bn Silty SAND moist, <i>sl Org</i></p> <p>Gy-Bn Silty GRAVEL w/ Sand moist, Nbe SAMPLE 11-146 (7.0-12.0): SM, 17.6% -200, NV, NP</p> <p>SAMPLE 11-147 (15.0-20.0): GM, 12.8% -200, NV, NP</p>
	1		AUGER	11-145													
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10			AUGER	11-146												
	11																
	12																
	13																
	14																
	15																
	16																
	17																
	18			AUGER	11-147												
	19																
20																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method

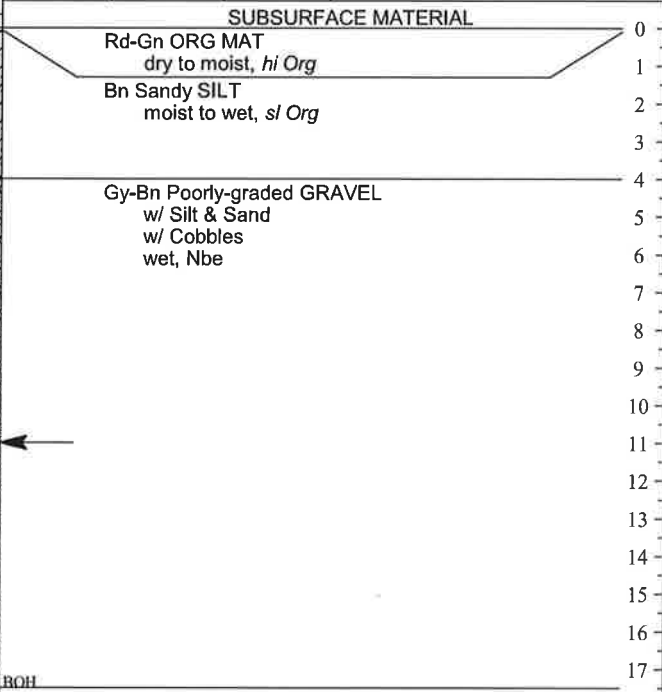


STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6040
 Project Number AKSAS 57260 Total Depth 17.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15942°, W157.02533°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling	
S-S Auger	0																		
	1																		
	2																		
	3																		
	4																		
	5																		
	6																		
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		
	13																		
	14																		
	15																		
	16																		
17																			



NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6041
 Project Number AKSAS 57260 Total Depth 20 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.16075°, W157.02637°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		White Drilling	After Drilling	
S-S Auger	0		AUGER	11-150													<p align="center">SUBSURFACE MATERIAL</p> <p>ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-150 (0.0-2.0): ML, 66.8% -200, ORG 2.4%, NV, NP</p> <p>Bn Sandy SILT w/ Silt moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist, <i>sl Org</i></p> <p>Gy-Bn Well-graded SAND w/ Silt & Gravel w/ Cobbles moist, Nbe</p> <p>SAMPLE 11-152 (13.0-16.0): SW-SM, 11.8% -200, NV, NP</p> <p>SAMPLE 11-153 (18.0-20.0): SP-SM, 11.3% -200, NV, NP</p> <p>BOH</p>		
	1																		
	2																		
	3																		
	4																		
	5																		
	6																		
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		
	13																		
	14																		
	15																		
	16																		
	17																		
	18																		
	19																		
20																			

NR_AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6042
 Project Number: AKSAS 57260 Total Depth: 20 feet
 Material Site: Ambler River Dates Drilled: 9/13/2011 - 9/13/2011
 Field Geologist: G. SPEETER Equipment Type: CME 45C Station, Offset: _____
 Field Crew: J. CLINE, P. LANIGAN Weather: 50F nice Latitude, Longitude: N67.16003°, W157.02837°
 TH Finalized By: G. Specter Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	Depth in (ft.)		While Drilling
S-S Auger	0																	<p align="center">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-154 (0.0-2.0): ML, 69.1% -200, ORG 2.7% NV, NP</p> <p>Bn Sandy SILT moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Silty GRAVEL w/ Sand moist, Nbe SAMPLE 11-155 (5.0-10.0): GM, 14.7% -200, NV, NP</p> <p>SAMPLE 11-156 (15.0-20.0): SM, 13.2% -200, NV, NP</p>
	1		AUGER	11-154														
	2																	
	3																	
	4																	
	5																	
	6																	
	7			AUGER	11-155													
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17			AUGER	11-156													
	18																	
	19																	
20																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6043
 Project Number AKSAS 57260 Total Depth 20 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15837°, W157.02481°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
S-S Auger	0		AUGER	11-158													<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-158 (0.0-2.0): ML, 81.8% -200, ORG 2.1%, NV, NP</p> <p>Bn Sandy SILT w/ Silt moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Poorly-graded GRAVEL w/ Silt & Sand moist, Nbe</p>	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
20																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Amblor Airport Rehabilitation Test Hole Number TH11-6044
 Project Number AKSAS 57260 Total Depth 17.5 feet
 Material Site Amblor River Dates Drilled 9/13/2011 - 9/13/2011
 Field Geologist G. SPEETER Equipment Type CME 45C Station, Offset _____
 Field Crew J. CLINE, P. LANIGAN Weather 50F nice Latitude, Longitude N67.15766°, W157.02675°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)
S-S Auger	0																<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-161 (0.0-3.0): ML, 68.8% -200, ORG 2.2%, NV, NP</p> <p>Bn Sandy SILT moist, <i>Org</i></p> <p>Bn Silty GRAVEL w/ Sand moist to wet</p> <p>Bn-Gy Poorly-graded GRAVEL w/ Silt & Sand moist to wet, Nbe SAMPLE 11-162 (5.0-10.0): GP-GM, 8.6% -200, NV, NP</p> <p>BOH</p>
	1		AUGER	11-161													
	2																
	3																
	4																
	5																
	6																
	7			AUGER	11-162												
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15																
	16																
17																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project	Ambler Airport Rehabilitation	Test Hole Number	TH11-6045
Project Number	AKSAS 57260	Total Depth	20 feet
Material Site	Ambler River	Dates Drilled	9/13/2011 - 9/13/2011
Field Geologist	G. SPEETER	Equipment Type	CME 45C
Field Crew	J. CLINE, P. LANIGAN	Weather	50F nice
TH Finalized By	G. Speeter	Vegetation	Sporadic Black Spruce trees, willows, flat grass
		Station, Offset	
		Latitude, Longitude	N67.15685°, W157.02864°
		Elevation	

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)
S-S Auger	0		AUGER	11-164													<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-164 (0.0-2.0): ML, 74.9% -200, ORG 3.0%, NV, NP</p> <p>Bn SILT w/ Sand moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Poorly-graded GRAVEL w/ Silt & Sand moist</p> <p>SAMPLE 11-166 (14.5-17.0): GP, 3.5% -200, NV, NP</p> <p>BOH</p>
	1																
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15			AUGER	11-166												
	16																
	17																
	18																
	19																
20																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6046
 Project Number AKSAS 57260 Total Depth 22.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15614°, W157.0307°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling
S-S Auger	0																<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-168 (0.0-2.0): 78% -200</p> <p>Bn Poorly-graded SAND w/ Silt moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist, Nbe</p> <p>Gy-Bn Silty SAND w/ Gravel moist, Nbe</p> <p>SAMPLE 11-170 (12.5-17.0): SM, 15.3% -200, NV, NP</p> <p>SAMPLE 11-171 (20.0-22.5): ML, 57.1% -200, NV, NP</p> <p>Gy Sandy SILT moist, Nbe</p> <p>BOH</p>
	1		11-168														
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
22																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project	Ambler Airport Rehabilitation	Test Hole Number	TH11-6047
Project Number	AKSAS 57260	Total Depth	20 feet
Material Site	Ambler River	Dates Drilled	9/13/2011 - 9/13/2011
Equipment Type	CME 45C	Station, Offset	
Weather	50F nice	Latitude, Longitude	N67.15547°, W157.03275°
TH Finalized By	G. Speeter	Vegetation	Sporadic Black Spruce trees, willows, flat grass
		Elevation	

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:				
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	ROD				Recovery	Longest Pc. (in.)		Depth in (ft.)	White Drilling	After Drilling	
S-S Auger	0		AUGER	11-172																
	1																			
	2																			
	3																			
	4																			
	5																			
	6																			
	7																			
	8																			
	9																			
	10			AUGER	11-174															
	11																			
	12																			
	13																			
	14																			
	15																			
	16																			
	17																			
	18																			
	19																			
20																				

SUBSURFACE MATERIAL

Rd-Gn ORG MAT
dry to moist, *hi Org*
SAMPLE 11-172 (0.0-1.0): 70.3% -200, NM 28.4%

Bn Sandy SILT
w/ Silt
moist, *hi Org*

Bn Poorly-graded SAND
w/ Silt
moist

Gy-Bn Poorly-graded GRAVEL
w/ Silt & Sand
moist, Nbe

SAMPLE 11-174 (10.0-11.0): GM, 15.1% -200, NV, NP

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6048
 Project Number AKSAS 57260 Total Depth 17.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15483°, W157.03508°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling
S-S Auger	0																<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist, <i>hi Org</i> SAMPLE 11-176 (0.5-1.5): 88.5% -200, NM 37.6%</p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Silty GRAVEL w/ Sand moist, Nbe</p> <p>SAMPLE 11-178 (9.0-13.0): GM, 15.8% -200, NV, NP</p>
	1		AUGER	11-176													
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10			AUGER	11-178												
	11																
	12																
	13																
	14																
	15																
	16																
17																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Amblor Airport Rehabilitation Test Hole Number TH11-6049
 Project Number AKSAS 57260 Total Depth 18 feet
 Field Geologist G. SPEETER Material Site Amblor River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15411°, W157.03722°
 TH Finalized By G. Speeter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		Depth in (ft.)	While Drilling
S-S Auger	0		AUGER	11-181													<p align="center">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i></p> <p>SAMPLE 11-181 (0.0-2.0): GM, 40.9% -200, NM 23.6%, ORG 4.4%, NV, NP</p> <p>Bn Sandy SILT w/ Silt & Gravel moist, <i>hi Org</i></p> <p>Gy-Bn Poorly-graded GRAVEL w/ Silt & Sand moist, Nbe</p> <p>SAMPLE 11-182 (9.5-11.0): GP, 4% -200</p> <p>Gy-Gn Silty SAND moist</p> <p>ROH</p>	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9			AUGER	11-182													
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
18																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6050
 Project Number: AKSAS 57260 Total Depth: 32 feet
 Field Geologist: G. SPEETER Material Site: Ambler River Dates Drilled: 9/13/2011 - 9/13/2011
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C Station, Offset: _____
 TH Finalized By: G. Speeter Weather: 50F nice Latitude, Longitude: N67.15351°, W157.03955°
 Vegetation: Sporadic Black Spruce trees, willows, flat grass Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling
S-S Auger	0																	<p style="text-align: center;">SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i> SAMPLE 11-184 (0.0-2.0): ML, 65.8% -200, NM 35.2% ORG 2.8%, NV, NP</p> <p>Bn Sandy SILT w/ Silt moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Well-graded GRAVEL w/ Silt & Sand moist, Nbe</p> <p>SAMPLE 11-185 (14.0-15.0): GW-GM, 10% -200, NV, NP</p> <p>SAMPLE 11-186 (20.0-21.0): SM, 20.5% -200, NV, NP</p> <p>Gn-Gy Silty SAND moist, Nbe</p> <p>BOH</p>
	1		AUGER	11-184														
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14			AUGER	11-185													
	15																	
	16																	
	17																	
	18																	
	19																	
	20			AUGER	11-186													
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
32																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6051
 Project Number AKSAS 57260 Total Depth 22.5 feet
 Field Geologist G. SPEETER Material Site Ambler River Dates Drilled 9/13/2011 - 9/13/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 50F nice Latitude, Longitude N67.15298°, W157.04178°
 TH Finalized By G. Specter Vegetation Sporadic Black Spruce trees, willows, flat grass Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling
S-S Auger	0																	<p>SUBSURFACE MATERIAL</p> <p>Rd-Gn ORG MAT dry to moist, <i>hi Org</i></p> <p>Bn Sandy SILT w/ Silt moist, <i>hi Org</i></p> <p>Bn Poorly-graded SAND w/ Silt moist</p> <p>Gy-Bn Poorly-graded SAND w/ Silt & Gravel moist, Nbe SAMPLE 11-188 (5.5-6.5): SP-SM, 6.7% -200, NM 11.3%, ORG 0.3%, NV, NP</p> <p>Gn-Gy Silty SAND moist, Nbe SAMPLE 11-190 (14.0-15.0): ML, 56.8% -200, NM 34.2%, ORG 3.8%, NV, NP</p> <p>SAMPLE 11-191 (19.5-21.0): SM, 41.1% -200, NM 21.9%, ORG 0.6%, NV, NP</p>
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
22																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method

Appendix B- Ambler River lab data

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6024	TH11-6024	TH11-6024	TH11-6025	TH11-6025	TH11-6025	TH11-6026
DEPTH (feet)	0.5-2.0	8.0-10.0	13.0-15.0	0.5-2.3	3.5-5.0	18.0-20.0	1.0-2.0
LATITUDE	N67.15831°	N67.15831°	N67.15831°	N67.15763°	N67.15763°	N67.15763°	N67.15703°
LONGITUDE	W157.03259°	W157.03259°	W157.03259°	W157.03445°	W157.03445°	W157.03445°	W157.03653°
LAB NUMBER	11-092	11-094	11-095	11-096	11-097	11-100	11-101
DATE SAMPLED	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11
% Passing							
3"							
2"							
1.5"		100	100				
1.0"		86	86		100	100	
0.75"		72	75		98	97	
0.5"		51	62		92	90	
0.375"		42	54		88	82	
#4		29	42		82	56	
#8		25	35		81	38	
#10		25	34		81	36	
#16		23	30	100	80	29	
#30		21	26	99	80	24	100
#40	100	20	24	99	79	22	99
#50	99	18	21	98	76	20	96
#60	99	18	20	98	73	19	94
#80	97	16	17	97	65	17	88
#100	96	16	17	96	59	16	85
Silt/Clay #200	79.0	11.5	12.0	77.1	40.3	11.9	66.7
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV	NV	NV	
PLASTIC INDEX	NP	NP	NP	NP	NP	NP	
USCS CLASSIFICATION	ML	GP-GM	GW-GM	ML	SM	SP-SM	
USCS SOIL DESCRIPTION							
NATURAL MOISTURE							29.0
ORGANICS							1.3
SP. GR. (FINE)	3.7			2.5			
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS	sl Org ¹			sl Org ¹			
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6026	TH11-6026	TH11-6026	TH11-6026	TH11-6027	TH11-6027	TH11-6028
DEPTH (feet)	4.0-5.0	9.0-10.0	13.0-15.0	16.5-17.0	0.5-1.3	8.0-10.0	0.5-2.0
LATITUDE	N67.15703°	N67.15703°	N67.15703°	N67.15703°	N67.1564°	N67.1564°	N67.15585°
LONGITUDE	W157.03653°	W157.03653°	W157.03653°	W157.03653°	W157.03821°	W157.03821°	W157.04071°
LAB NUMBER	11-102	11-103	11-104	11-105	11-106	11-108	11-109
DATE SAMPLED	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11
% Passing							
3"							
2"	100		100	100			
1.5"	98	100	96	96	100	100	
1.0"	91	96	79	75	99	86	
0.75"	80	86	64	53	91	69	
0.5"	62	66	41	34	82	35	
0.375"	52	54	33	27	75	22	
#4	38	36	23	19	65	10	
#8	32	29	19	16	62	8	
#10	31	28	19	16	61	8	
#16	29	26	17	15	60	8	
#30	27	22	16	14	59	7	100
#40	25	19	15	13	59	7	99
#50	23	15	13	12	57	6	97
#60	21	14	12	11	55	6	95
#80	18	11	10	10	50	5	89
#100	17	10	9	9	46	5	85
Silt/Clay #200	11.8	7.2	6.7	6.4	31.0	3.7	57.0
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX	NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION	GP-GM	GP-GM	GP-GM	GP-GM	GM	GP	ML
USCS SOIL DESCRIPTION							
NATURAL MOISTURE							
ORGANICS	0.6				1.9		1.7
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION		41					
DEGRAD. FACTOR		68					
SODIUM SULF. (CRSE)		6					
SODIUM SULF. (FINE)		3					
NORDIC ABRASION							
REMARKS							
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. † Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6028	TH11-6029	TH11-6029	TH11-6029	TH11-6030	TH11-6030	TH11-6030
DEPTH (feet)	3.0-17.5	0.1-2.5	5.0-10.0	14.0-22.5	0.5-1.0	5.0-10.0	15.0-20.0
LATITUDE	N67.15585°	N67.15554°	N67.15554°	N67.15554°	N67.15517°	N67.15517°	N67.15517°
LONGITUDE	W157.04071°	W157.04308°	W157.04308°	W157.04308°	W157.04564°	W157.04564°	W157.04564°
LAB NUMBER	11-110	11-111	11-112	11-113	11-114	11-115	11-116
DATE SAMPLED	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11
% Passing							
3"							
2"	100					100	100
1.5"	99			100		99	97
Gravel 1.0"	93		100	99		90	82
0.75"	89			98		79	60
0.5"	77			93		59	25
0.375"	70			87		49	14
#4	60	100		58		35	7
Sand #8	55	99	55	47		32	6
#10	54	99	54	45		32	6
#16	52	99	48	40	99	29	6
#30	49	99	42	35	94	26	5
#40	47	98	39	31	91	24	5
#50	44	98	33	25	89	22	5
#60	42	97	31	22	87	21	5
#80	38	95	27	17	85	19	5
#100	35	93	24	15	84	19	4
Silt/Clay #200	22.4	70.9	16.5	10.7	72.7	15.5	3.8
Hydro 0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV		NV	NV
PLASTIC INDEX	NP	NP	NP	NP		NP	NP
USCS CLASSIFICATION	GM	ML	SM	SP-SM		GM	GP
USCS SOIL DESCRIPTION							
NATURAL MOISTURE					55.4		
ORGANICS		2.5			6.1		2.0
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS		sl Org ¹			Org ¹		
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6031	TH11-6031	TH11-6032	TH11-6032	TH11-6033	TH11-6034	TH11-6034
DEPTH (feet)	0.1-1.5	14.5-20.0	0.1-2.0	14.0-20.0	3.0-10.0	0.1-3.0	5.0-12.5
LATITUDE	N67.15351°	N67.15351°	N67.15413°	N67.15413°	N67.15471°	N67.1553°	N67.1553°
LONGITUDE	W157.04399°	W157.04399°	W157.04176°	W157.04176°	W157.03943°	W157.03712°	W157.03712°
LAB NUMBER	11-117	11-119	11-120	11-122	11-124	11-125	11-126
DATE SAMPLED	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11
% Passing							
3"					100		
2"					99		
1.5"					92		100
1.0"		100		100	98		88
Gravel					80		75
0.75"		98		98	63		55
0.5"		94		84	55		47
0.375"		88		58	44		38
#4		69					
#8		57		41	40		35
#10	100	55		39	40		34
#16	99	49		32	38		33
#30	97	45		26	36		31
Sand			100	24	34	100	30
#40	96	42	100	22	31	99	28
#50	95	38	99	21	29	99	26
#60	94	37	99	19	26	96	24
#80	91	34	98	17	23	94	23
#100	88	33	97				
Silt/Clay							
#200	61.1	27.4	83.3	12.7	15.4	75.1	16.3
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV
PLASTIC INDEX		NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION		SM	ML	SM	GM	ML	GM
USCS SOIL DESCRIPTION							
NATURAL MOISTURE	39.6						
ORGANICS	3.4		3.6				
SP. GR. (FINE)							2.70
SP. GR. (COARSE)							2.72
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							42
DEGRAD. FACTOR							29
SODIUM SULF. (CRSE)							6
SODIUM SULF. (FINE)							3
NORDIC ABRASION							
REMARKS	sl Org ¹		sl Org ¹				
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6035	TH11-6035	TH11-6035	TH11-6037	TH11-6037	TH11-6037	TH11-6041
DEPTH (feet)	0.5-1.5	10.0-11.5	15.0-22.0	5.0-10.0	15.0-17.0	18.5-20.0	0.0-2.0
LATITUDE	N67.15603°	N67.15603°	N67.15603°	N67.15741°	N67.15741°	N67.15741°	N67.16075°
LONGITUDE	W157.03522°	W157.03522°	W157.03522°	W157.03146°	W157.03146°	W157.03146°	W157.02637°
LAB NUMBER	11-128	11-130	11-131	11-138	11-139	11-140	11-150
DATE SAMPLED	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	12-Sep-11	13-Sep-11
% Passing							
3"							
2"							
1.5"				100		100	
1.0"		100	100	98	100	99	
0.75"		98	98	95	98	99	
0.5"		90	92	83	88	95	
0.375"		83	86	76	79	89	
#4		64	71	59	49	63	
#8		48	56	47	33	42	
#10		46	54	45	32	41	
#16	100	38	46	38	27	34	
#30	99	31	38	30	23	28	
#40	98	28	35	26	21	24	
#50	96	24	32	22	19	21	99
#60	94	22	31	21	18	20	98
#80	89	18	29	18	16	18	91
#100	85	17	28	16	14	17	88
Silt/Clay #200	60.2	10.7	22.9	10.7	10.4	13.0	66.8
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX	NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION	ML	SW-SM	SM	SW-SM	GP-GM	SM	ML
USCS SOIL DESCRIPTION							
NATURAL MOISTURE	27.3						
ORGANICS	2.5						2.4
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS	sl Org ¹						sl Org ¹
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6041	TH11-6041	TH11-6042	TH11-6042	TH11-6042	TH11-6043	TH11-6044
DEPTH (feet)	13.0-16.0	18.0-20.0	0.0-2.0	5.0-10.0	15.0-20.0	0.0-2.0	0.0-3.0
LATITUDE	N67.16075°	N67.16075°	N67.16003°	N67.16003°	N67.16003°	N67.15837°	N67.15766°
LONGITUDE	W157.02637°	W157.02637°	W157.02837°	W157.02837°	W157.02837°	W157.02481°	W157.02675°
LAB NUMBER	11-152	11-153	11-154	11-155	11-156	11-158	11-161
DATE SAMPLED	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11
% Passing							
3"							
2"							
1.5"		100					
1.0"	100	99		100	100		
0.75"	99	97		98	98		
0.5"	90	89		91	90		
0.375"	81	80		82	81		
#4	58	56		57	58		
#8	44	38		45	44		
#10	42	36		43	42		
#16	35	28		38	35	100	
#30	29	24	100	33	29	99	
#40	26	21	99	31	26	99	
#50	22	19	99	27	23	98	100
#60	21	18	98	26	22	97	99
#80	18	16	96	22	19	95	96
#100	16	15	94	21	18	93	94
Silt/Clay #200	11.8	11.3	69.1	14.7	13.2	81.8	68.8
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX	NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION	SW-SM	SP-SM	ML	GM	SM	ML	ML
USCS SOIL DESCRIPTION							
NATURAL MOISTURE							
ORGANICS			2.7			2.1	2.2
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS			sl Org ¹			sl Org ¹	sl Org ¹
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6044	TH11-6045	TH11-6045	TH11-6046	TH11-6046	TH11-6046	TH11-6047
DEPTH (feet)	5.0-10.0	0.0-2.0	14.5-17.0	0.0-2.0	12.5-17.0	20.0-22.5	0.0-1.0
LATITUDE	N67.15766°	N67.15685°	N67.15685°	N67.15614°	N67.15614°	N67.15614°	N67.15547°
LONGITUDE	W157.02675°	W157.02864°	W157.02864°	W157.0307°	W157.0307°	W157.0307°	W157.03275°
LAB NUMBER	11-162	11-164	11-166	11-168	11-170	11-171	11-172
DATE SAMPLED	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11
% Passing	3"						
	2"	100					
	1.5"	99					
Gravel	1.0"	83	81		100		
	0.75"	65	56		98		
	0.5"	45	23		91	100	
	0.375"	38	14		83	99	
	#4	28	9		62	95	
	#8	25	8		44	90	
	#10	25	8	100	42	90	
	#16	23	100	99	36	87	
Sand	#30	20	99	8	31	84	100
	#40	19	99	7	28	83	99
	#50	16	98	6	25	81	98
	#60	15	97	6	23	80	98
	#80	13	95	5	21	77	96
	#100	13	94	5	20	75	94
Silt/Clay	#200	8.6	74.9	3.5	78.0	15.3	70.3
	0.02						
Hydro	0.005						
	0.002						
	0.001						
LIQUID LIMIT	NV	NV	NV		NV	NV	
PLASTIC INDEX	NP	NP	NP		NP	NP	
USCS CLASSIFICATION	GP-GM	ML	GP		SM	ML	
USCS SOIL DESCRIPTION							
NATURAL MOISTURE							28.4
ORGANICS		3.0					
SP. GR. (FINE)	2.75						
SP. GR. (COARSE)	2.72						
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS		sl Org ¹					
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6047	TH11-6048	TH11-6048	TH11-6049	TH11-6049	TH11-6050	TH11-6050
DEPTH (feet)	10.0-11.0	0.5-1.5	9.0-13.0	0.0-2.0	9.5-11.0	0.0-2.0	14.0-15.0
LATITUDE	N67.15547°	N67.15483°	N67.15483°	N67.15411°	N67.15411°	N67.15351°	N67.15351°
LONGITUDE	W157.03275°	W157.03508°	W157.03508°	W157.03722°	W157.03722°	W157.03955°	W157.03955°
LAB NUMBER	11-174	11-176	11-178	11-181	11-182	11-184	11-185
DATE SAMPLED	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11
% Passing							
3"							
2"							
1.5"			100		100		
1.0"			96	100	82		
Gravel							
0.75"	100		92	91	54		100
0.5"	92		83	74	22		95
0.375"	82		75	63	13		83
#4	57		54	53	7		55
#8	43		42	50	6		40
#10	42		41	50	6		38
#16	35		36	49	6	100	31
#30	30		31	48	6	99	25
Sand							
#40	28	100	28	47	5	98	22
#50	25	99	25	47	5	97	18
#60	24	99	24	46	5	97	17
#80	21	98	22	45	5	95	14
#100	20	98	21	45	5	92	14
Silt/Clay							
#200	15.1	88.5	15.8	40.9	4.0	65.8	10.0
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV		NV	NV		NV	NV
PLASTIC INDEX	NP		NP	NP		NP	NP
USCS CLASSIFICATION	GM		GM	GM	GP	ML	GW-GM
USCS SOIL DESCRIPTION							
NATURAL MOISTURE		37.6		23.8		35.2	
ORGANICS				4.4		2.8	
SP. GR. (FINE)	2.75						
SP. GR. (COARSE)	2.73						
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS				sl Org ¹		sl Org ¹	
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ambler River
 MATERIAL SOURCE:

TEST HOLE NUMBER	TH11-6050	TH11-6051	TH11-6051	TH11-6051			
DEPTH (feet)	20.0-21.0	5.5-6.5	14.0-15.0	19.5-21.0			
LATITUDE	N67.15351°	N67.15298°	N67.15298°	N67.15298°			
LONGITUDE	W157.03955°	W157.04178°	W157.04178°	W157.04178°			
LAB NUMBER	11-186	11-188	11-190	11-191			
DATE SAMPLED	13-Sep-11	13-Sep-11	13-Sep-11	13-Sep-11			
% Passing							
3"							
2"							
1.5"		100					
1.0"		96					
Gravel							
0.75"	100	96					
0.5"	94	92	100				
0.375"	89	89	99				
#4	73	68	94	99			
Sand							
#8	61	55	91	99			
#10	60	53	90	99			
#16	52	47	88	98			
#30	45	38	85	94			
#40	41	28	83	88			
#50	37	19	80	77			
#60	35	16	78	71			
#80	32	12	74	61			
#100	30	11	72	56			
Silt/Clay							
#200	20.5	6.7	56.8	41.1			
Hydro							
0.02							
0.005							
0.002							
0.001							
LIQUID LIMIT	NV	NV	NV	NV			
PLASTIC INDEX	NP	NP	NP	NP			
USCS CLASSIFICATION	SM	SP-SM	ML	SM			
USCS SOIL DESCRIPTION							
NATURAL MOISTURE		11.3	34.2	21.9			
ORGANICS		0.3	3.8	0.6			
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION							
DEGRAD. FACTOR							
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS			sl Org ¹				
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

Ingricher Mountain Material Site

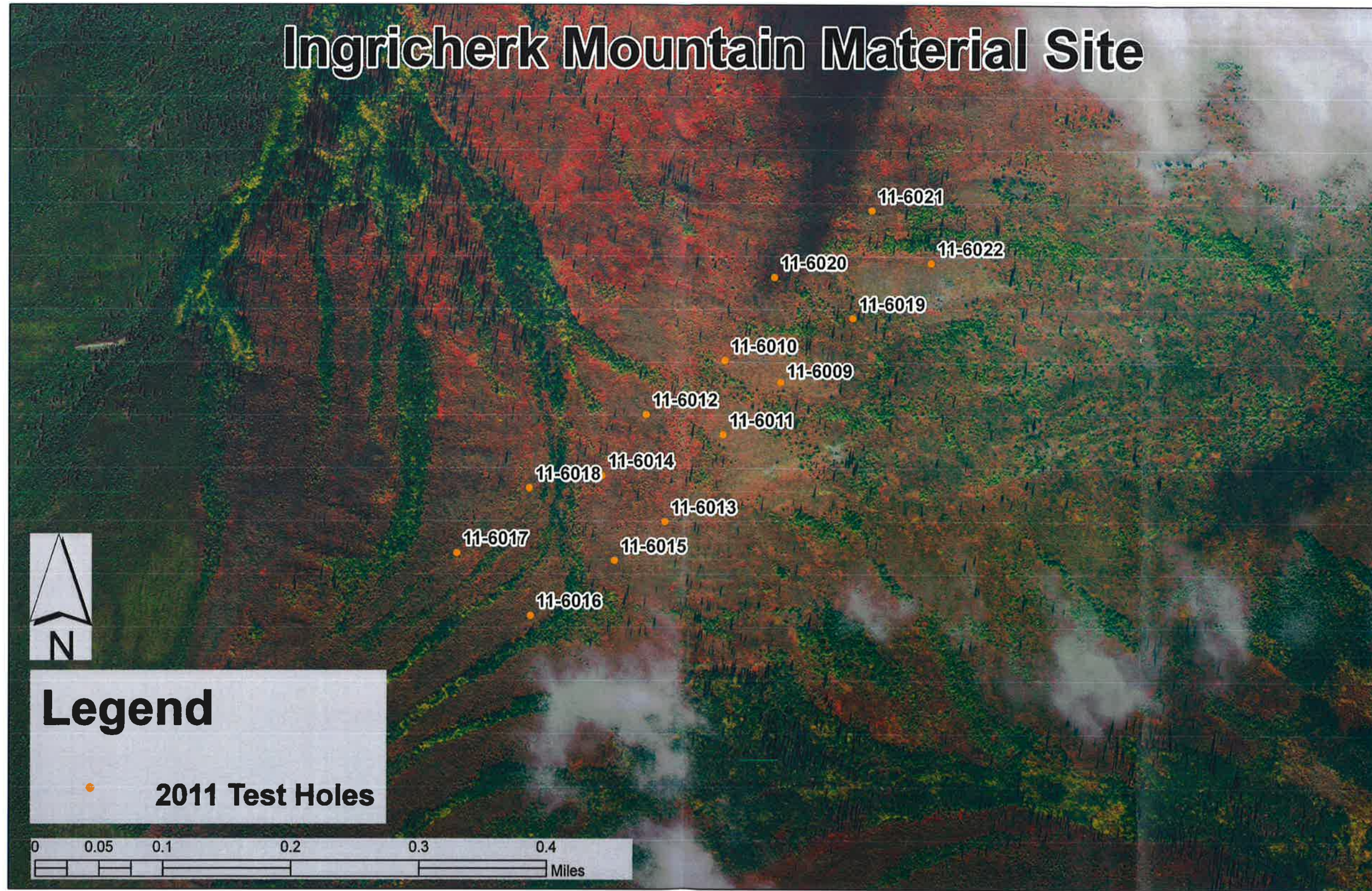


Figure 4. Map of the Ingricher Mountain Material Site

Ingricher Mountain site and subsurface conditions

Location and access

Ingricher Mountain is located south of the Ambler River approximately 8 miles east of Ambler, in Section 27 of Township 20N, Range 6E in the Kateel River Meridian. The land on site is patented to NANA Regional Corporation. No overland access is currently available to the site.

Geology and topography

The site is composed of Cretaceous sedimentary bedrock consisting of sandstone, siltstone, and conglomerate. These rocks are younger than the ultra-mafic dikes and sills in the area that often contain serpentinite which suggests that they will be asbestos free. Ingricher Mountain is approximately 1,550 feet tall and covers 9,500 acres.

Site and subsurface conditions

NRMS personnel drilled 14 test holes on site, which fenced in 23 acres. TH11-6009, 6010, 6011, 6013, 6015, 6019, and 6022 were all drilled utilizing solid stem augers until competent bedrock was encountered. After encountering competent bedrock NRMS personnel changed to core drilling. Test holes ranged from 4 to 61.5 feet deep. TH11-6012, 6014, 6016, 6017, 6018, 6020, and 6021 were all drilled with solid stem augers.

The following generalized soil/rock profile was encountered in drilling the material site:

- 0 to 0.25 foot thick organic mat;
- 0 to 13.25 foot thick over burden silty sand with gravel;
- 5 to 20 foot thick colluvial layer composed of cobbles and boulders with silty sand;
- Underlain by sedimentary bedrock composed of sandstone, siltstone, and conglomerate.

Frozen Ground

When present, frozen soil was typically encountered between 0.5 and 6 feet below the ground surface. Test holes 11-6009, 6010, 6011, 6012, 6016, 6017, and 6018 all intercepted frozen ground. Test Holes 11-6013, 6014, 6015, 6019, 6020, 6021, and 6022 did not intercept frozen soils. Analyzing frozen soil/rock while core drilling is difficult due to the fact that water is used to clean/lubricate the test hole. There may be discrepancies between logged depth to frozen soil/rock and actual depth to frozen soil/rock.

Groundwater

TH11-6018 intercepted groundwater beneath frozen solid at a depth of 19 feet below the ground surface. This test hole is located adjacent a mountain spring that drains off the northeast flank of Ingricher Mountain.

Quality of materials

Analyses of samples collected from auger cuttings and core samples during the 2011 investigation yielded the following test results:

Table 7. Summary of Laboratory data from the Ambler River Material Site

Site	% Gravel (+#4)	% Sand (-#4, +#200)	% Fines (-#200)	USCS Classification	LA Abrasion	Degradation	Liquid Limit / Plastic Index
Ingricher Mountain	-	-	-	-	31 (2)	3 (3)	-

Test results from core taken from Ingricher Mountain suggest that the material may meet Standard Airport Materials Specifications for Subbase Course and Embankment material.

LA Abrasion and Degradation results from bedrock samples/core collected from Ingricher Mountain suggest that bedrock will not meet Standard Airport Materials Specifications for Crushed Aggregate Base Course or Aggregate Surface Course. It will also not meet Standard Highway Materials Specifications for Subbase, Base Course, or Surface Course.

Asbestos

Samples for asbestos content were collected in 5 foot intervals and sent to White Environmental for asbestos content analysis by TEM CARB 435 method with 0.01 analytical sensitivity and EMSL Analytical, Inc for analysis by TEM CARB 435 method with 0.001 analytical sensitivity. 2 samples tested positive for asbestos at the 0.001% detection limit.

There is slight variability in asbestos testing results, for example Sample A63 from TH11-6016 tested negative for NOA 0.01% detection limit and positive under 0.001% limit with three different detection percentages (0.319% tremolite, 0.003% actinolite, and no asbestos detected) from the same sample medium.

Samples from Ingrecher Mountain with detectable naturally occurring asbestos were:

- Sample A63 taken from TH 11-6016 at depths of 8.5-10 and 13-15 feet tested positive for tremolite and actinolite.
- Sample A75 taken from TH11-6018 at depths of 8.5-10 feet tested positive for chrysotile asbestos.

One sample tested contained >0.25% NOA. This sample was sample number A63 from TH11-6016 at depths of 8.5-10 and 13-15 feet. Three samples were submitted from this interval and different results were achieved each time. Sample A63 1/3 had 0.319% asbestos (tremolite) detected. Sample A63 2/3 had no asbestos detected. Sample A63 3/3 had 0.003 % asbestos (actinolite) detected.

Table 8. Summary of asbestos lab data for Ingricherk Mountain site

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A33	11-6012/0-1	ING	0.01	WEC	ND	
A10	11-6011/46-47	ING	0.001	EMSL	ND	
A11	11-6011/51-52	ING	0.001	EMSL	ND	
A15	11-6009/28-29	ING	0.001	EMSL	ND	
A16	11-6009/32-33	ING	0.001	EMSL	ND	
A17	11-6009/37-38	ING	0.001	EMSL	ND	
A18	11-6009/42-43	ING	0.001	EMSL	ND	
A19	11-6009/47-48	ING	0.001	EMSL	ND	
A2	11-6011/8-12	ING	0.001	EMSL	ND	
A20	11-6009/51-52	ING	0.001	EMSL	ND	
A22	11-6009/60-61	ING	0.001	EMSL	ND	
A25	11-6010/16-17	ING	0.001	EMSL	ND	
A26	11-6010/22-23	ING	0.001	EMSL	ND	
A29	11-6010/36-37	ING	0.001	EMSL	ND	
A3	11-6011/12-13	ING	0.001	EMSL	ND	
A30	11-6010/42-43	ING	0.001	EMSL	ND	
A31	11-6010/44-45	ING	0.001	EMSL	ND	
A32	11-6010/50-51	ING	0.001	EMSL	ND	
A33	11-6012/0-5.5	ING	0.001	EMSL	ND	
A35	11-6012/15-22	ING	0.01	WEC	ND	
A35	11-6012/15-22	ING	0.001	EMSL	ND	
A36	11-6012/32-35	ING	0.01	WEC	ND	
A36	11-6012/32-35	ING	0.001	EMSL	ND	
A37	11-6013/3-10	ING	0.01	WEC	ND	
A37	11-6013/3-10	ING	0.001	EMSL	ND	
A37	11-6013/3-10	ING	0.001	EMSL	ND	
A38	11-6013/13-14	ING	0.01	WEC	ND	
A38	11-6013/13-14	ING	0.001	EMSL	ND	
A39	11-6013/18-19	ING	0.001	EMSL	ND	
A4	11-6011/17-18	ING	0.001	EMSL	ND	
A40	11-6013/22-23	ING	0.001	EMSL	ND	
A41	11-6013/28-29	ING	0.001	EMSL	ND	
A42	11-6013/32-33	ING	0.001	EMSL	ND	
A43	11-6013/37-38	ING	0.001	EMSL	ND	
A44	11-6013/42-44	ING	0.001	EMSL	ND	
A45	11-6013/47-48	ING	0.001	EMSL	ND	
A46	11-6013/51-52	ING	0.01	WEC	ND	
A46	11-6013/51-52	ING	0.001	EMSL	ND	
A47	11-6014/0.5-2	ING	0.001	EMSL	ND	
A48	11-6014/4-10	ING	0.01	WEC	ND	
A48	11-6014/4-10	ING	0.001	EMSL	ND	
A49	11-6014/13-20	ING	0.01	WEC	ND	
A49	11-6014/13-20	ING	0.001	EMSL	ND	
A5	11-6011/22-23	ING	0.001	EMSL	ND	
A50	11-6014/23-25	ING	0.01	WEC	ND	
A50	11-6014/23-25	ING	0.001	EMSL	ND	
A51	11-6014/28-35	ING	0.01	WEC	ND	
A51	11-6014/28-35	ING	0.001	EMSL	ND	

Table 9.Continued.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A52	11-6014/38-40	ING	0.01	WEC	ND	
A52	11-6014/38-40	ING	0.001	EMSL	ND	
A54	11-6015/4-10	ING	0.01	WEC	ND	
A54	11-6015/4-10	ING	0.001	EMSL	ND	
A55	11-6015/12-13	ING	0.01	WEC	ND	
A55	11-6015/12-13	ING	0.001	EMSL	ND	
A56	11-6015/17-18	ING	0.001	EMSL	ND	
A57	11-6015/21-22	ING	0.001	EMSL	ND	
A58	11-6015/26-27	ING	0.001	EMSL	ND	
A59	11-6015/32-33	ING	0.001	EMSL	ND	
A6	11-6011/26-27	ING	0.001	EMSL	ND	
A60	11-6016/36-37	ING	0.001	EMSL	ND	
A61	11-6016/41-42	ING	0.001	EMSL	ND	
A62	11-6016/2-5	ING	0.01	WEC	ND	
A62	11-6016/2-5	ING	0.001	EMSL	ND	
A63	11-6016/8.5-13	ING	0.01	WEC	ND	
A63 1/3	11-6016/8.5-13	ING	0.001	EMSL	0.319	Tremolite
A63 2/3	11-6016/8.5-13	ING	0.001	EMSL	ND	
A63 3/3	11-6016/8.5-13	ING	0.001	EMSL	0.003	Actinolite
A64	11-6016/18-24	ING	0.001	EMSL	ND	
A65	11-6016/24-30	ING	0.01	WEC	ND	
A66	11-6016/33-34	ING	0.01	WEC	ND	
A66	11-6016/33-34	ING	0.001	EMSL	ND	
A68	11-6017/4-10	ING	0.01	WEC	ND	
A68	11-6017/4-10	ING	0.001	EMSL	ND	
A69	11-6017/13-15	ING	0.01	WEC	ND	
A69	11-6017/13-15	ING	0.001	EMSL	ND	
A7	11-6011/32-33	ING	0.001	EMSL	ND	
A70	11-6017/18.5-25	ING	0.01	WEC	ND	
A70	11-6017/18.5-25	ING	0.001	EMSL	ND	
A70	11-6017/18.5-25	ING	0.001	EMSL	ND	
A71	11-6017/29-30	ING	0.01	WEC	ND	
A71	11-6017/29-30	ING	0.001	EMSL	ND	
A72	11-6017/33.5-40	ING	0.01	WEC	ND	
A72	11-6017/33.5-40	ING	0.001	EMSL	ND	
A73	11-6017/43-47	ING	0.01	WEC	ND	
A73	11-6017/43-47	ING	0.001	EMSL	ND	
A74	11-6018/1-5	ING	0.01	WEC	ND	
A74	11-6018/1-5	ING	0.001	EMSL	ND	
A75	11-6018/9-10	ING	0.01	WEC	ND	
A75 1/3	11-6018/9-10	ING	0.001	EMSL	0.001	Chrysotile
A75 2/3	11-6018/9-10	ING	0.001	EMSL	<0.001	Chrysotile
A75 3/3	11-6018/9-10	ING	0.001	EMSL	ND	
A76	11-6018/13.5-20	ING	0.01	WEC	ND	
A76	11-6018/13.5-20	ING	0.001	EMSL	ND	
A78	11-6019/1-10	ING	0.01	WEC	ND	
A78	11-6019/1-10	ING	0.001	EMSL	ND	
A79	11-6019/13-14	ING	0.01	WEC	ND	
A79	11-6019/13-14	ING	0.001	EMSL	ND	
A8	11-6011/37-38	ING	0.001	EMSL	ND	
A80	11-6019/18-19	ING	0.001	EMSL	ND	
A81	11-6019/23-24	ING	0.001	EMSL	ND	
A82	11-6019/28-29	ING	0.001	EMSL	ND	
A83	11-6019/32-33	ING	0.001	EMSL	ND	
A84	11-6019/37-38	ING	0.001	EMSL	ND	

Table 10.Continued.

Sample #	Test Hole/depth(ft)	Site	Detection limit %	Consultant lab	Asbestos detected	Asbestos species
A85	11-6019/42-43	ING	0.001	EMSL	ND	
A86	11-6019/47-48	ING	0.001	EMSL	ND	
A87	11-6019/50-51	ING	0.001	EMSL	ND	
A89	11-6019/4-10	ING	0.01	WEC	ND	
A89	11-6019/4-10	ING	0.001	EMSL	ND	
A9	11-6011/41-42	ING	0.001	EMSL	ND	
A90	11-6020/13-19	ING	0.01	WEC	ND	
A90	11-6020/13-19	ING	0.001	EMSL	ND	
A91	11-6021/0.5-5	ING	0.01	WEC	ND	
A91	11-6021/0.5-5	ING	0.001	EMSL	ND	
A92	11-6021/8.5-10	ING	0.01	WEC	ND	
A92	11-6021/8.5-10	ING	0.001	EMSL	ND	
A93	11-6021/14-20	ING	0.01	WEC	ND	
A93	11-6021/14-20	ING	0.001	EMSL	ND	
A94	11-6021/23-25	ING	0.01	WEC	ND	
A94	11-6021/23-25	ING	0.001	EMSL	ND	
A95	11-6021/29-38	ING	0.01	WEC	ND	
A95	11-6021/29-38	ING	0.001	EMSL	ND	
A96	11-6022/0-1.5	ING	0.01	WEC	ND	
A96	11-6022/0-1.5	ING	0.001	EMSL	ND	
A33	11-6012/0-5.5	ING	0.01	WEC	ND	
A10	11-6011/46-47	ING	0.001	EMSL	ND	
A11	11-6011/51-52	ING	0.001	EMSL	ND	

Comments and recommendations

Expect limited access to this site (possibly only during winter months) due to its remote location and position on the bank of the ambler River.

Positive test results for asbestos content warrant care during the mining process. During mining the Ingricher Mountain Site and construction activities utilizing material from the Ingricher Mountain Site, follow all state and federal codes, procedures, and laws that regulate mining and building with geologic materials that contain naturally occurring asbestos.

Expect shallow water table near natural spring located north of TH11-6081.

Expect frozen ground, either seasonally or perennially frozen within the project area at any time of the year.

Expect upper 10 feet of bedrock to be highly weathered, weak, and closely fractured.

Laboratory data suggests bedrock available at Ingricher Mountain is poor quality, expect a large amount of fines (passing #200) to be produced during mining. Processing may be needed to reduce fines content for some products.

Appendix C- Ingricherk Mountain test hole logs



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6009
 Project Number AKSAS 57260 Total Depth 61.5 feet
 Material Site Ingricher Mountain Dates Drilled 8/29/2011 - 8/29/2011
 Field Geologist G. SPEETER Equipment Type CME 45C Station, Offset _____
 Field Crew J. CLINE, P. LANIGAN, G. NELSON Weather 65F nice Latitude, Longitude N67.11165°, W157.52791°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling
	0																SUBSURFACE MATERIAL
	1																Gn-Bk ORG MAT moist, <i>hi Org</i>
	2																SAMPLE 11-6009 (0.0-61.5): LA 31, DEG 1
	3																Bn Silty SAND moist
	4																Bn Silty SAND w/ Gravel moist
	5																Gy-Bn BOULDERS AND COBBLES w/ Silt & Sand dry to moist, Colluvium
	6																
	7																
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
	22																
	23																
	24																
	25																
	26																
	27																
	28							1	28	33	52	0.5					
	29																
	30																
	31																
	32																
	33																
	34																
	35							2	27	28	57	6					

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12
S-S Auger
Coring

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



NR_AKDOT_TEST_CORE_LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log	
Coring	35														SUBSURFACE MATERIAL	
	36															
	37														Gy-Bk BEDROCK, soft(Mudstone and siltstone) dry to moist, Has minor coal seams, weak	
	38														Gy BEDROCK, soft(Sandstone) dry to moist, Weak	
	39														Gy-Bk BEDROCK, hard(Quartz pebble conglomerate) dry, Clast supported with sandstone matrix, strong	
	40			CORE				3	31	40	60	6				Gy-Bk BEDROCK, hard(Sandstone) dry, Med weak
	41															
	42															
	43															
	44			CORE					4	21	65	59	17.5			Gy-Bk BEDROCK, hard(Quartz pebble conglomerate) dry, Strong, clast supported with sandstone matrix
	45															
	46															
	47															
	48															
	49			CORE					5	24	18	54	5			Gy BEDROCK, hard(Sandstone) dry, Strong
	50															Gy-WH BEDROCK, hard(Quartz pebble conglomerate) dry, Strong, clast supported with sandstone matrix
51																
52			CORE					6	2	100	6	6			Gy BEDROCK, hard(Sandstone) dry, Strong	
53																
54																
55			CORE					7	42	61	59	12				
56																
57																
58																
59			CORE					8	37	20	48	9.5				
60																
61																
															BOH	
															Drilling Notes: Started hole with 6" SS auger	



Project Ambler Airport Rehabilitation Test Hole Number TH11-6010
 Project Number AKSAS 57260 Total Depth 54 feet
 Material Site Ingricherik Mountain Dates Drilled 8/31/2011 - 8/31/2011
 Field Geologist G. SPEETER Equipment Type CME 45C Station, Offset _____
 Field Crew J. CLINE, P. LANIGAN, G. NELSON Weather 50F rain Latitude, Longitude N67.11207°, W157.52954°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
	0																	SUBSURFACE MATERIAL
	1																	Gn-Bn ORG MAT dry to moist, <i>hi Org</i>
	2																	SAMPLE 11-6010 (0.0-54.0): LA 31, DEG 1
	3																	Gy BOULDERS AND COBBLES w/ Silt & Sand dry to moist, Colluvium
	4																	
	5																	
	6																Gy BEDROCK, soft(Closely fractured sedimentary rocks) dry	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18							1	7	42	14	6					Gy-WH BEDROCK, hard(Quartz pebble conglomerate) dry, Slightly weathered, strong	
	19																Gy BEDROCK, hard(Sandstone) dry, Slightly weathered, Med weak	
	20																	
	21																	
	22							2	28	61	59	11.5					Gy-WH BEDROCK, hard(Quartz pebble conglomerate) dry, Slightly weathered, strong	
	23																Gy BEDROCK, hard(Sandstone) dry, Slightly weathered, Med weak	
	24																Gy-WH BEDROCK, hard(Quartz pebble conglomerate) dry, Slightly weathered, strong	
	25																	
	26							3	38	13	46	6						
	27																	
	28																	
	29							4	4	50	10	5						
	30																Gy BEDROCK, hard(Sandstone) dry, Strong, fresh , cross bedded	
	31																	
	32							5	29	32	58	8						
	33																	
	34																	
	35																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log			
Coring	35		CORE															
	36																	
	37							6	34	17	50.4	7						
	38																	
	39																	
	40																	
	41																	
	42							7	32	59	60	11						
	43																	
	44																	
45																		
46						8	37	55	60	8								
47																		
48																		
49																		
50																		
51						9	28	57	60	11.5								
52																		
53																		
54																		

SUBSURFACE MATERIAL

Gy BEDROCK, hard(Sandstone with occasional siltstone seams)
dry to moist, Med weak
, fresh

Gy-Wh BEDROCK, hard(Quartz pebble conglomerate)
dry, Fresh, strong

Bk BEDROCK, hard(Coarse sandstone with occasional conglomerate layers)
dry, Fresh, strong

Gy-Wh BEDROCK, hard(Quartz pebble conglomerate)
dry, Fresh, strong

Drilling Notes: Started hole with 6" SS auger



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6011
 Project Number AKSAS 57260 Total Depth 53 feet
 Material Site Ingricherk Mountain Dates Drilled 9/1/2011 - 9/1/2011
 Field Geologist G. SPEETER Equipment Type CME 45C Station, Offset _____
 Field Crew J. CLINE, P. LANIGAN, G. NELSON Weather 50F fog Latitude, Longitude N67.1123°, W157.52946°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling
	0																SUBSURFACE MATERIAL
	1																Gn-Bn ORG MAT moist, <i>hi Org</i> SAMPLE 11-6011 (0.0-53.0): DEG 1
	2																Gy-Bn Silty SAND w/ Gravel dry to moist
	3																
	4																
	5																
	6																Gy BOULDERS AND COBBLES w/ Silt & Sand dry to moist, Colluvium
	7																
	8																
	9																
	10																
	11																Gy-Wh BEDROCK, soft(Closely fractured quartz pebble conglomerate) dry
	12																
	13																
	14																Gy-Wh BEDROCK, hard(Quartz pebble conglomerate) dry, Fresh, strong, clast supported with sandstone matrix.
	15						1	25	0	36	3						Gy BEDROCK, hard(Sandstone) dry to moist, Strong, close fractures cross bedded
	16																
	17																
	18						2	10	0	12	2						
	19																
	20						3	15	0	36.2	3						Gy BEDROCK, soft(Siltstone) dry to moist, Moderately strong to weak, close fractures, slightly weathered
	21																
	22						4	7	0	20	2						Gy BEDROCK, soft(Sandstone with occasional siltstone seams) dry to moist, Close fractures, moderately strong, fresh
	23																
	24																
	25																
	26						5	22	63	58.8	20.5						Gy-Wh BEDROCK, hard(Quartz pebble conglomerate) dry, Fresh, strong, moderate fracturing, clast supported with sandstone matrix
	27																
	28																Gy BEDROCK, hard(Sandstone) dry, Strong, cross bedded
	29																
	30						6	23	0	24	3						Gy BEDROCK, soft(Siltstone with occasional coal seams) dry to moist, Weak, close fractures, slightly weathered
	31																
	32						7	17	48	30	10.2						Gy-Wh BEDROCK, hard(Quartz pebble conglomerate) dry, Fresh, strong, moderate fracturing, clast supported with sandstone matrix.
	33																
	34																
	35																Gy BEDROCK, hard(Sandstone with alternating coarse and fine layers) dry, Fresh, strong, close to moderate fractures,

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log	
	35		CORE					8	21	36	60	9.6				SUBSURFACE MATERIAL
	36															coarse layers are cross bedded, ripple cross laminae in fine sandstone layers
	37															
	38															
	39		CORE					9	35	46	60	9.6				
	40															
	41															
	42															
	43															
	44		CORE					10	28	31	53	7.2				
	45															
	46															Gy BEDROCK, soft(Siltstone)
	47															dry to moist, Fresh, weak to mod strong, close fractures
	48															Gy BEDROCK, hard(Sandstone)
	49															dry, Slightly weathered, close fractures, strong, cross bedded
	50		CORE					11	30	58	66	7.2				
	51															
	52															
	53															BOH
																Drilling Notes: Started hole with 6" SS auger



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6012
 Project Number AKSAS 57260 Total Depth 36.5 feet
 Field Geologist G. SPEETER Material Site Ingricher Mountain Dates Drilled 9/1/2011 - 9/1/2011
 Field Crew J. CLINE, P. LANIGAN, G. NELSON Equipment Type CME 45C Station, Offset _____
 TH Finalized By G. Speeter Weather 50F sunny Latitude, Longitude N67.11141°, W157.53171°
 Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling	
	0																		
	1																		
	2																		
	3																		
	4																		
	5																		
	6																		
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		
	13																		
	14																		
	15																		
	16																		
	17																		
	18																		
	19																		
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	21																		
	22																		
	23																		
	24																		
	25																		
	26																		
	27																		
	28																		
	29																		
	30																		
	31																		
	32																		
	33																		
	34																		
	35																		

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS 06_28_07.GDT 11/30/12
S-S Auger

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb, hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



FINAL TEST HOLE LOG

Test Hole Number TH11-6012

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log
	35														
	36													?	?
															BOH

SUBSURFACE MATERIAL

35
36



FINAL TEST HOLE LOG

Project Amblor Airport Rehabilitation Test Hole Number TH11-6013
 Project Number AKSAS 57260 Total Depth 52.5 feet
 Field Geologist G. SPEETER Material Site Ingricherk Mountain Dates Drilled 9/2/2011 - 9/2/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 55F sunny Latitude, Longitude N67.11021°, W157.53101°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		White Drilling	After Drilling
S-S Auger	0																SUBSURFACE MATERIAL	
	1																Gn-Bn ORG MAT dry to moist, <i>hi Org</i>	
	2																SAMPLE 11-6013 (0.0-52.5): LA 35, DEG 1	
	3																Gy Sandy SILT w/ Gravel moist	
	4																Gy COBBLES AND BOULDERS w/ Silt & Sand moist, Colluvium	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	Gy BEDROCK, soft(Sandstone and conglomerate) dry
	12																	
	13																	
	14																	Gy BEDROCK, hard(Sandstone) dry, Fresh, close fractures, weak to mod strong, cross bedded
	15																	
	16								1	14	10	47	5					
	17																	
	18																	
	19																	
	20																	
	21								2	28	34	56	9.5					Gy-WH BEDROCK, hard(Quartz pebble conglomerate) dry, Fresh, close to moderate fractures, very strong, Clast supported with sandstone matrix
	22																	
	23																	
	24																	
	25																	
	26								3	22	48	60	13					
	27																	
	28																	
	29																	
	30																	
	31								4	23	41	59	7					
	32																	
	33																	
	34																	
35								5	13	50	36	18						

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS 06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



NR_AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log		
Coring	35															<p>SUBSURFACE MATERIAL strong, close to moderate fracture spacing, sandstone matrix</p> <p>Gy BEDROCK, hard(Sandstone with occasional siltstone seams) dry to moist, Fresh to slightly weathered, mod strong, close fractures</p> <p>Gy BEDROCK, hard(Sandstone) dry, Fresh, strong, close to moderate fracture spacing, cross bedded</p>	35
	36																36
	37		CORE					6	10	0	24	0					37
	38																38
	39		CORE														39
	40							7	44	56	32.2	11					40
	41		CORE														41
	42							8	6	0	16.8	3.5					42
	43		CORE														43
	44																44
	45		CORE					9	31	28	46.8	7					45
	46																46
47		CORE													47		
48							10	6	40	13	5				48		
49		CORE													49		
50															50		
51		CORE					11	22	44	53	6				51		
52															52		
<p>BOH</p> <p>Drilling Notes: Started hole with 6" SS auger</p>																	



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6014
 Project Number AKSAS 57260 Total Depth 40 feet
 Field Geologist G. SPEETER Material Site Ingricher Mountain Dates Drilled 9/4/2011 - 9/4/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 55F sunny Latitude, Longitude N67.11069°, W157.53287°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest P.c. (in.)	While Drilling		After Drilling
	0																	SUBSURFACE MATERIAL
	1																	Gn-Bn ORG MAT dry to moist, <i>hi Org</i>
	2																	Bn Silty SAND w/ Gravel moist
	3																	Bn Sandy SILT w/ Gravel moist
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	Gy COBBLES AND BOULDERS w/ Silt & Sand dry to moist
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	Gy BEDROCK (Sandstone, siltstone, and conglomerate) dry to moist
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	
	33																	
	34																	
	35																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS 06_28_07.GDT 11/30/12
S-S Auger

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



FINAL TEST HOLE LOG

Test Hole Number TH11-6014

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log	
S-S Auger	35														<p align="center">SUBSURFACE MATERIAL</p> <p align="center">Gy BEDROCK (Sandstone, siltstone, and conglomerate) dry to moist</p>	
	36															
	37															
	38															
	39															
	40														<p>BOH</p>	



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6015
 Project Number AKSAS 57260 Total Depth 42.5 feet
 Field Geologist G. SPEETER Material Site Ingricher Mountain Dates Drilled 9/4/2011 - 9/4/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 55F sunny Latitude, Longitude N67.10973°, W157.53236°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest P.c. (in.)	While Drilling		After Drilling	
Coring	0																	SUBSURFACE MATERIAL	
	1																	Gn-Bn ORG MAT <i>hi Org</i>	
	2																	SAMPLE 11-6015 (0.0-42.5): LA 35, DEG 1	
	3																	Bn Sandy SILT w/ Gravel moist, <i>Org</i>	
	4																	Gy COBBLES AND BOULDERS(Colluvium) w/ Silt & Sand	
	5																		
	6																		
	7																		
	8																		
	9																		
	10																		
	11																		
	12																		Gy-Wh BEDROCK(Conglomerate)
	13																		
	14																		
	15								1	14	50	34							Gy BEDROCK(Quartz pebble conglomerate) Slightly weathered to fresh, strong, close fractures. Sandstone matrix with quartz, schist, and sandstone clasts.
	16																		
	17																		
	18																		
	19																		
	20								2	26	67	49							
	21																		Gy BEDROCK(Sandstone) Fresh, strong, close to moderate fracture spacing
	22																		Gy BEDROCK(Mudstone) Slightly weathered, close fracture spacing, mod strong
	23																		
	24																		Gy-Wh BEDROCK(Coarse sandstone and conglomerate) Fresh, strong, moderate to wide fracture spacing
	25																		
	26																		Gy-Wh BEDROCK(Quartz pebble conglomerate) Fresh, wide fracture spacing, very strong, sandstone matrix, matrix supported
	27																		
	28																		
	29																		Gy-Wh BEDROCK(Coarse sandstone with conglomerate layers) Fresh, strong to very strong, wide fracture spacing
	30																		
	31																		Gy BEDROCK(Mudstone) Slightly weathered, weak to strong, close fractures
	32																		
	33																		Gy BEDROCK(Sandstone) Fresh, mod strong, close fractures
	34																		
35								5	29		48								

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method

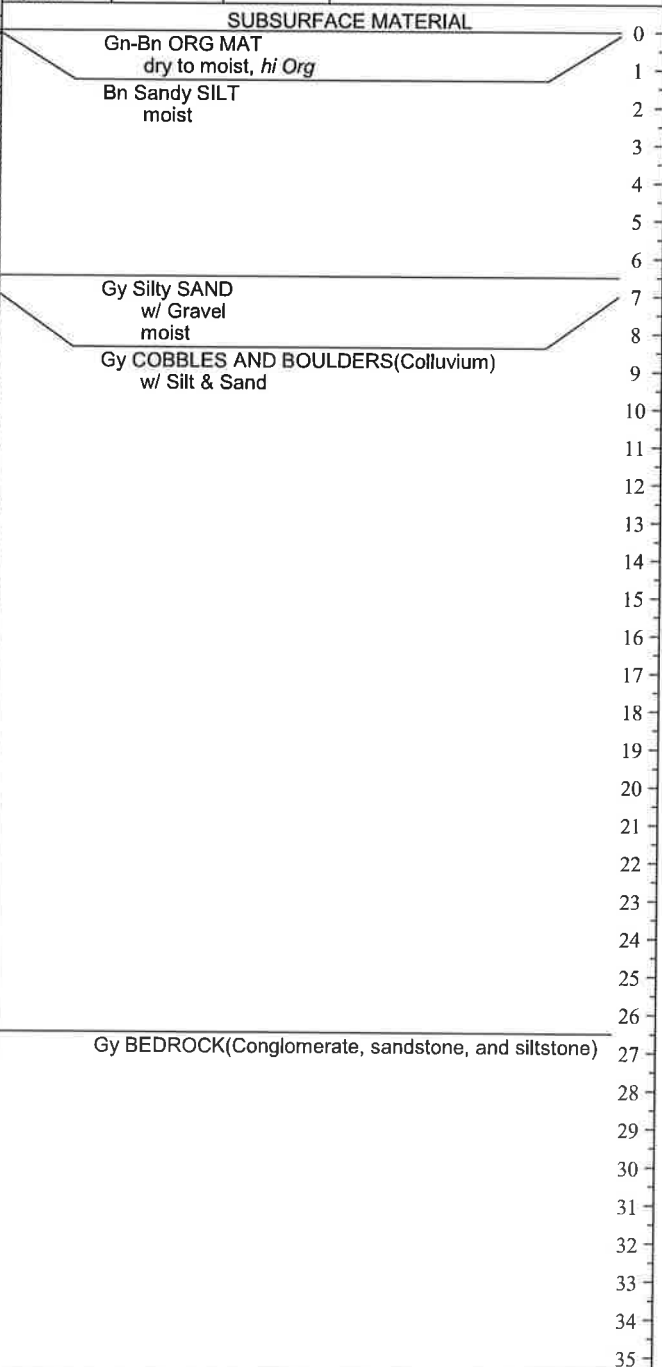


FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6016
 Project Number AKSAS 57260 Total Depth 37 feet
 Field Geologist G. SPEETER Material Site Ingricherk Mountain Dates Drilled 9/5/2011 - 9/5/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 55F sunny Latitude, Longitude N67.10905°, W157.53471°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
	0																	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	
	33																	
	34																	
	35																	

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS 06_28_07.GDT 11/30/12
S-S Auger



Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



FINAL TEST HOLE LOG

Test Hole Number TH11-6016

NR AKDOT TEST CORE LOG - USCS: AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log		
	35															SUBSURFACE MATERIAL	
	36													?	?		36
	37													?	?		37
																BOH	



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6017
 Project Number AKSAS 57260 Total Depth 47 feet
 Material Site Ingricherk Mountain Dates Drilled 9/5/2011 - 9/5/2011
 Field Geologist G. SPEETER Equipment Type CME 45C Station, Offset _____
 Field Crew J. CLINE, P. LANIGAN Weather 55F sunny Latitude, Longitude N67.10973°, W157.53693°
 TH Finalized By G. Specter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12
S-S Auger

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
	0																	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	
	33																	
	34																	
	35																	

SUBSURFACE MATERIAL

Gn-Bk ORG MAT
Org

Bn SILT
w/ Sand
moist, *s/ Org*

Gy BOULDERS AND COBBLES
w/ Silt & Sand
moist

Gy BEDROCK, soft(Sandstone and siltstone)

Gy BEDROCK, hard(Conglomerate, sandstone, and siltstone)

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



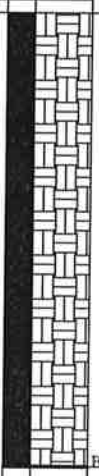
FINAL TEST HOLE LOG

Test Hole Number TH11-6017

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery	Longest Pc. (in.)	Structural Data	Frozen	Graphic Log
S-S Auger	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														
	46														
	47														

SUBSURFACE MATERIAL



BOH



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6018
 Project Number AKSAS 57260 Total Depth 32 feet
 Field Geologist G. SPEETER Material Site Ingricher Mountain Dates Drilled 9/5/2011 - 9/5/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 55F sunny wind Latitude, Longitude N67.1105°, W157.53494°
 TH Finalized By G. Specter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:		
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling
	0																	
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	

NR_AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Calhead Rope Method



FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6019
 Project Number AKSAS 57260 Total Depth 56 feet
 Field Geologist G. SPEETER Material Site Ingricherk Mountain Dates Drilled 9/6/2011 - 9/6/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 45F windy Latitude, Longitude N67.11263°, W157.52594°
 TH Finalized By G. Speeter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:			
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling		
S-S Auger	0																	SUBSURFACE MATERIAL 0 Gn-Bn ORG MAT <i>moist, hi Org</i> SAMPLE 11-6019 (0.0-56.0); LA 33, DEG 0 1 Gy Silty SAND <i>moist, Org</i> 2 Gy COBBLES AND BOULDERS(Colluvium) <i>moist</i> 3 4 5 6 7 8 9 10 11 12		
	13																		13 Gy BEDROCK, hard(Coarse sandstone) <i>dry, Slightly weathered, moderately strong, close fractures</i>	
	14																		14 Gy-Wh BEDROCK, hard(Quartz pebble conglomerate) <i>dry, Slightly weathered, strong, close fractures</i>	
	17																		17 Gy BEDROCK, hard(Sandstone and siltstone) <i>dry to moist, Fresh, mod strong to strong, close fracture spacing</i>	
	23																		23 Gy BEDROCK, hard(Siltstone) <i>dry, Fresh, mod strong, close fracture spacing, fossiliferous (plant fossils)</i>	
	29																			29 Gy BEDROCK, hard(Sandstone) <i>dry, Fresh, strong, moderate fracture spacing, massive</i>
	31																			31 Gy-Wh BEDROCK, hard(Quartz pebble conglomerate) <i>dry, Fresh, strong, wide fracture spacing, sandstone matrix, clast supported</i>
	33																			33 Gy BEDROCK, hard(Coarse sandstone with conglomerate layers) <i>dry, Fresh, strong to very strong, close to wide fracture spacing</i>
	34																			34
	35																			35

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project Ambler Airport Rehabilitation Test Hole Number TH11-6020
 Project Number AKSAS 57260 Total Depth 19 feet
 Field Geologist G. SPEETER Material Site Ingricherk Mountain Dates Drilled 9/6/2011 - 9/6/2011
 Field Crew J. CLINE, P. LANIGAN Equipment Type CME 45C Station, Offset _____
 Weather 45F Latitude, Longitude N67.11304°, W157.52826°
 TH Finalized By G. Specter Vegetation Blue berry bushes, willow, alder, tundra grasses Elevation _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data				Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS:					
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD				Recovery	Longest Pc. (in.)		While Drilling	After Drilling			
S-S Auger	0																				
	1																				
	2																				
	3																				
	4																				
	5																				
	6																				
	7																				
	8																				
	9																				
	10																				
	11																				
	12																				
	13																				
	14																				
	15																				
	16																				
	17																				
	18																				
19																					

SUBSURFACE MATERIAL

Gn-Bn ORG MAT
moist, *hi Org*

Bn Silty SAND
moist, *hi Org*

Gy COBBLES AND BOULDERS (Conglomerate,
sandstone, mudstone)
w/ Silt & Sand
Colluvium

Gy-Wb BEDROCK, hard (Conglomerate)
refusal

BOH

NR AKDOT TEST CORE LOG - USCS - AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method



STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

FINAL TEST HOLE LOG

Project: Ambler Airport Rehabilitation Test Hole Number: TH11-6022
 Project Number: AKSAS 57260 Total Depth: 4 feet
 Material Site: Ingricherk Mountain Dates Drilled: 9/7/2011 - 9/8/2011
 Field Geologist: G. SPEETER Station, Offset: _____
 Field Crew: J. CLINE, P. LANIGAN Equipment Type: CME 45C
 Weather: 50F windy Latitude, Longitude: N67.1133°, W157.5238°
 TH Finalized By: G. Specter Vegetation: Blue berry bushes, willow, alder, tundra grasses Elevation: _____

Drilling Method	Depth in (Feet)	Casing Size Blows / ft	Sample Data					Run Data				Structural Data	Frozen	Graphic Log	Ground Water Data		GENERAL COMMENTS: Stopped drilling due to time constraints	
			Method	Number	Blow Count	Sample Interval	N-Value	Run Number	Time (minutes)	RQD	Recovery				Longest Pc. (in.)	While Drilling		After Drilling
S-S Auger	0																	
	1																	
	2																	
	3																	
	4																	

SUBSURFACE MATERIAL

- 0 - 1: ORG MAT
dry, hi Org
- 1 - 2: Bn SILT
w/ Sand
moist, hi Org
- 2 - 3: Gy COBBLES AND BOULDERS (Conglomerate)
dry to moist, Colluvium
- 3 - 4: Gy-Wh BEDROCK (Quartz pebble conglomerate)

Drilling Notes: started hole with 6" SS auger

NR AKDOT TEST CORE LOG - USCS AMBLER EXPLORATION.GPJ NR_AKDOT_PRECON_USCS_06_28_07.GDT 11/30/12

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. CME Auto Hammer Cathead Rope Method

Appendix C- Ingricher Mountain lab data

**STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT**

PROJECT NAME: Ambler Airport Rehabilitation
 PROJECT NUMBER: 57260
 AKSAS NUMBER: G. Speeter
 SAMPLED BY: Ingricherk Mountain
 MATERIAL SOURCE:

TEST HOLE NUMBER	0.0-61.5	0.0-54.0	0.0-53.0				
DEPTH (feet)							
LATITUDE	N67.11165°	N67.11207°	N67.1123°				
LONGITUDE							
LAB NUMBER	11-6009	11-6010	11-6011				
DATE SAMPLED							
% Passing							
3"							
2"							
1.5"							
Gravel 1.0"							
0.75"							
0.5"							
0.375"							
#4							
#8							
#10							
#16							
Sand #30							
#40							
#50							
#60							
#80							
#100							
Silt/Clay #200							
0.02							
Hydro 0.005							
0.002							
0.001							
LIQUID LIMIT							
PLASTIC INDEX							
USCS CLASSIFICATION							
USCS SOIL DESCRIPTION							
NATURAL MOISTURE							
ORGANICS							
SP. GR. (FINE)							
SP. GR. (COARSE)							
MAX. DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION	31	31					
DEGRAD. FACTOR	1	1	1				
SODIUM SULF. (CRSE)							
SODIUM SULF. (FINE)							
NORDIC ABRASION							
REMARKS							
GENERAL COMMENTS	Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7. ¹ Organic content determination is based on the results of the ATM T-6 test method. (Soil descriptions shown in parentheses are based on field determinations.) USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat						

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- 2005a. Material Site Investigation, Ambler Airport Rehabilitation, AKSAS Project No. 61303. June
- 2005b. *Geotechnical Memorandum*, Task 8- Reconnaissance of New [Material] Sites; Kobuk River Bar Deposit.
- 2005c. *Geotechnical Memorandum*, Task 8- Reconnaissance of New Material Sites at Ambler, Alaska.
2007. *Geotechnical Memorandum*, Task 9- Review Native Allotments and Other Potential Sites for Material Sources.
2008. *Geotechnical Memorandum*, Task 11- Reconnaissance of New Material Sites [exploration Plan].

2009. *Geotechnical Memorandum*, Task 10- Additional Asbestos Testing [Area B].

2009. *Geotechnical Memorandum*, Task 11- Reconnaissance of New Material Sites

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Appendix E-Core photographs

COMPANY AK DOT PROPERTY INGRICHK MOUNTAIN

BX HOLE NO. 11-6009 BOX NO. 1

INTERVAL 27.5' TO 37'

TH 11-6009 N67.11185 W 157.52791



COMPANY AK DOT PROPERTY INGRICHK MT

BX HOLE NO. 11-6009 BOX NO. 1

INTERVAL 37' TO 45'





COMPANY AE DOT PROPERTY INBRIQUEX MT

BX HOLE NO. 11-6010 BOX NO. 1

INTERVAL 17 TO 27.5

N 67.11207

W 157.52954



COMPANY AE DOT PROPERTY INBRIQUEX MT

BX HOLE NO. 11-6010 BOX NO. 2

INTERVAL 27.5 TO 39



COMPANY AK DOT PROPERTY INDIAN ROCK
BX HOLE NO. 11-6010 BOX NO. 3
INTERVAL 38 TO 47.5



COMPANY AK DOT PROPERTY INDIAN ROCK MI
BX HOLE NO. 11-6010 BOX NO. 4
INTERVAL 47.5 TO 54





COMPANY AKDOT PROPERTY INRIHERK MT
BX HOLE NO. 11-6011 BOX NO. 3
INTERVAL 31.5 TO 40.5



COMPANY AKDOT PROPERTY INRIHERK MT
BX HOLE NO. 11-6011 BOX NO. 4
INTERVAL 40.5 TO 49.3



COMPANY AK DOT PROPERTY INERICHGRK
BX HOLE NO. 11-6011 BOX NO. 5
INTERVAL 49.3 TO 53

COMPANY AK DOT PROPERTY INERICHGRK MT
BX HOLE NO. 11-6013 BOX NO. 1
INTERVAL 14 TO 23
NGT-11021 W1375101





COMPANY AR DOT PROPERTY IN RICHES

BX HOLE NO. 11-6013 BOX NO. 4

INTERVAL 33 TO 49



COMPANY AR DOT PROPERTY IN RICHES

BX HOLE NO. 11-6013 BOX NO. 5

INTERVAL 49 TO 52.5



COMPANY AKDOT PROPERTY INGRICHERR

BOX HOLE NO. 11-6015 BOX NO. 1

INTERVAL 14' TO 22
N 67.10973 W 157.53236



AKDOT INGRICHERR MT
TH 11-6015 Box 5
30.5 to ~40.5





AKDOT
TH 11-6015
40.5

INBRICHERK MT
BOX 4
42.5



AKDOT
TH 11-6019
from 13'
N67.11263

INBRICHERK MT
BOX 1
to 22'
W 157.52544

AKDOT
TH-6019
from 22

INGRICHK MT
BOX 2

to 30.3



AKDOT
TH 11-6019
from 30.3

INGRICHK MT
BOX 3
to 38'



AKDOT
TH 11-6019
38

to

INGRICKERK MT
Box 4

41



AK DOT
TH 11-6019
41'

to

INGRICKERK MT
Box 5

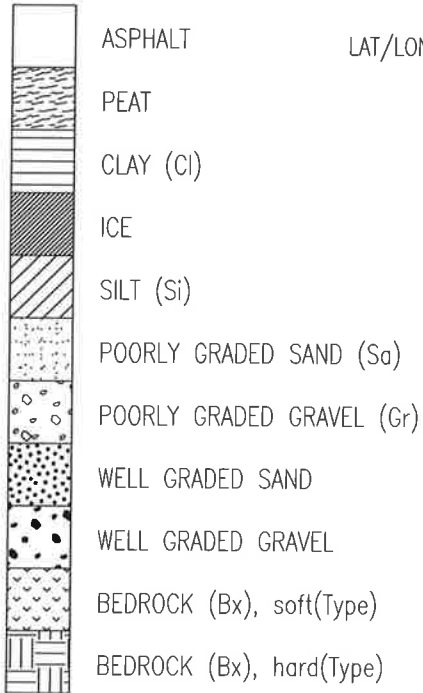
56



Appendix F- Symbols and definitions

SYMBOLS AND DEFINITIONS

BASIC MATERIAL SYMBOLS

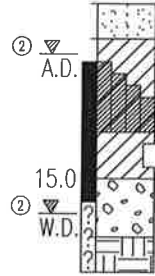


YEAR-HOLE NUMBER
LAT/LONG OR STATION, OFFSET
ELEVATION (ft)
DATE LOGGED

TYPICAL LOG

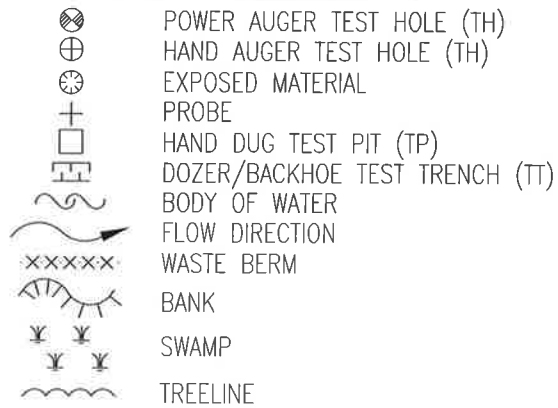
05-41
① Sta 210+53, Lt 3
Elev 375
16 JUN

WATER TABLE
FROZEN
DEPTH (FEET)
POSSIBLY FROZEN



- ① Station value may also be on centerline e.g. Sta 210+53, CL or lat-long format e.g. N64.56789°, W145.67890°
- ② W.D.= WHILE DRILLING, A.D.= AFTER DRILLING
- ③ "N VALUE" INDICATES STANDARD PENETRATION TEST (1.4" I.D., 2.0" O.D. SAMPLER DRIVEN WITH 140 LB. HAMMER, 30" FREE FALL) AND IS SUM OF 2nd AND 3rd 6" OF PENETRATION.

PLAN VIEW SYMBOLS



SOFT OR HARD BEDROCK BASED ON DRILLING RATE
NOTE

MAIN COMPONENT (UPPER CASE ... SOLID LINES)
MINOR COMPONENT (Title Case ... DASHED LINES
OR SPARSER PATTERN)

USCS SIZE DEFINITIONS

BOULDERS (Boulders)	12"+
COBBLES (Cobbles)	3" TO 12"
GRAVEL	#4 TO 3"
ANGULAR FRAGMENTS	#10 +
SAND	#200 TO #4
SILT	#200 TO 0.005 mm
CLAY	MINUS 0.005 mm

TEST RESULTS

__% -200	= % PASSING #200 SIEVE
NM __%	= NATURAL MOISTURE
ORG __%	= ORGANIC CONTENT
SSc _	= SODIUM SULFATE LOSS(coarse)
SSf _	= SODIUM SULFATE LOSS(fine)
LA _	= LOS ANGELES ABRASION
DEG _	= DEGRADATION
LL _	= LIQUID LIMIT (NV = no value)
PI _	= PLASTIC INDEX (NP = non-plastic)

MISC.

Tr	= TRACE
sl	= SLIGHTLY
hi	= HIGHLY
w/_	= WITH UNSPECIFIED AMOUNT
X'tls	= CRYSTALS
TH	= TEST HOLE
TT	= TEST TRENCH
TP	= TEST PIT

SOIL DENSITY/CONSISTENCY DESCRIPTORS

NON-COHESIVE		COHESIVE	
RELATIVE DENSITY	BLOWS/FOOT (N) VALUE	CONSISTENCY	BLOWS/FOOT (N) VALUE
VERY LOOSE	< 4	VERY SOFT	< 2
LOOSE	5-10	SOFT	2-4
MEDIUM DENSE	11-30	FIRM	5-8
DENSE	31-50	STIFF	9-15
VERY DENSE	> 50	VERY STIFF	16-30
		HARD	> 30

COLOR

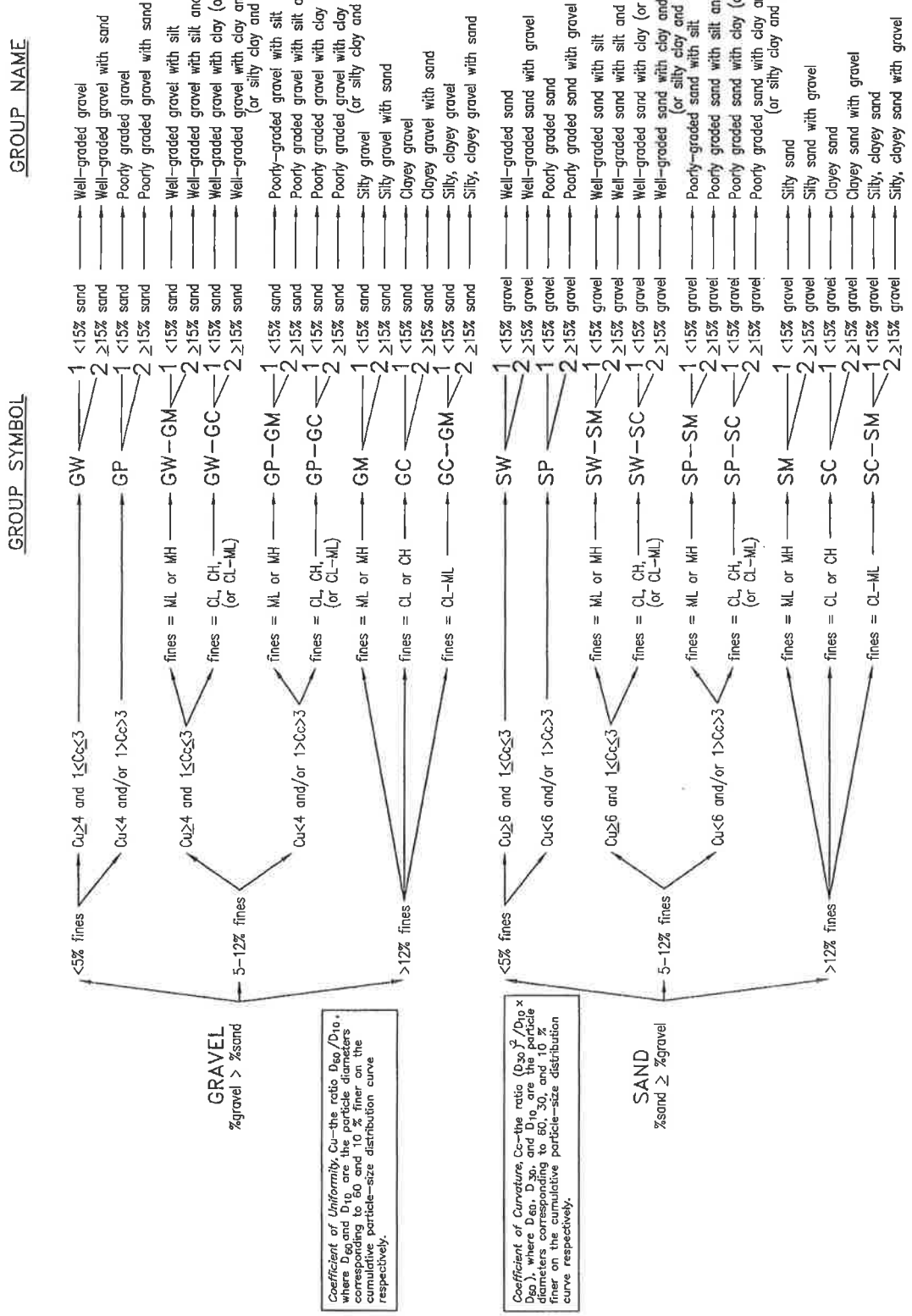
Bk = BLACK	Gy = GRAY	Tn = TAN
Bl = BLUE	Or = ORANGE	Wh = WHITE
Bn = BROWN	Rd = RED	Yw = YELLOW
Gn = GREEN		

MOISTURE

dry	= < OPTIMUM*	DUSTY, DRY TO THE TOUCH
moist	~ OPTIMUM*	DAMP, NO VISIBLE WATER
wet	= > OPTIMUM*	VISIBLE FREE WATER

* OPTIMUM MOISTURE FOR MAXIMUM DENSITY

Classification of Soils for Engineering Purposes (Unified Soil Classification System)



Flow Chart for Classifying Coarse-Grained Soil (More Than 50% Retained on No. 200 Sieve)

GRAVEL
%gravel > %sand

Coefficient of Uniformity, $U = \frac{D_{60}}{D_{10}}$, where D_{60} and D_{10} are the particle diameters corresponding to 60 and 10% finer on the cumulative particle-size distribution curve respectively.

Coefficient of Curvature, $C_c = \frac{(D_{30})^2}{D_{60} \times D_{10}}$, where D_{60} , D_{30} , and D_{10} are the particle diameters corresponding to 60, 30, and 10% finer on the cumulative particle-size distribution curve respectively.

SAND
%sand \geq %gravel

DESCRIPTION AND CLASSIFICATION OF FROZEN SOILS

Part I Description of Soil Phase (a) (Independent of Frozen State)	Major Group		Sub-Group		Field Identification (6)	Pertinent Properties of Frozen Materials which may be measured by physical tests to supplement field identification. (7)	Guide for Construction on Soils Subject to Freezing and Thawing	
	Description (2)	Designation (3)	Description (4)	Designation (5)			Thaw Characteristics (8)	Criteria (9)
Part II Description of Frozen Soil	Segregated ice is not visible by eye (b)	N	Poorly Bonded or Friable	Nf	Identify by visual examination. To determine presence of excess ice, use procedure under note (c) below and hand magnifying lens as necessary. For soils not fully saturated, estimate degree of ice saturation: Medium, Low. Note presence of crystals, or of ice coatings around larger particles.	In-Place Temperature Density and Void Ratio a) In Frozen State b) After Thawing in Place Water Content (Total H ₂ O, including ice) a) Average b) Distribution Strength a) Compressive b) Tensile c) Shear d) Adfreeze	← Usually Thaw-Stable →	The potential intensity of ice segregation in a soil is dependent to a large degree on its void sizes and may be expressed as an empirical function of grain size as follows: Most inorganic soils containing 3 percent or more of grains finer than 0.02 mm in diameter by weight are frost-susceptible. Gravels, well-graded sands and silty sands, especially those approaching the theoretical maximum density curve, which contain 1.5 to 3 percent finer than 0.02 mm by weight without being frost-susceptible. However, their tendency to occur interbedded with other soils usually makes it impractical to consider them separately. Soils classed as frost-susceptible under the above criteria are likely to develop significant ice segregation and frost heave if frozen at normal rates with free water readily available. Soils so frozen will fall into the thaw-unstable category. However, they may also be classed as thaw-stable if frozen with insufficient water to permit ice segregation.
			No excess ice	n				
	Well Bonded	Nb	For ice phase, record the following as applicable: Location Orientation Spacing Length Hardness Structure Color Estimate volume of visible segregated ice present as percent of total sample volume	Vx	Size Shape Thickness Pattern of arrangement	Elastic Properties Plastic Properties Thermal Properties Ice Crystal Structure (using optional instruments.) a) Orientation of Axes b) Crystal size c) Crystal shape d) Pattern of Arrangement	←	Soils classed as non-frost-susceptible ("NFS") under the above criteria usually occur without significant ice segregation and are not exact and may be inadequate for some structure applications; exceptions may also result from minor soil variations.
	Excess ice	Ne						
Segregated ice is visible by eye, (Ice 1 inch or less in thickness) (b)	V	Random or irregularly oriented ice formations	Vr	Hardness Structure Color Admixtures e.g.: Contains Thin Silt Inclusions Gray Blue Stratified	Ice Crystal Structure (using optional instruments.) a) Orientation of Axes b) Crystal size c) Crystal shape d) Pattern of Arrangement	←	Soils classed as non-frost-susceptible ("NFS") under the above criteria usually occur without significant ice segregation and are not exact and may be inadequate for some structure applications; exceptions may also result from minor soil variations.	
(Greater than 1 inch in thickness)		Stratified or distinctly oriented ice formations	Vs					Ice Crystal Structure (using optional instruments.) a) Orientation of Axes b) Crystal size c) Crystal shape d) Pattern of Arrangement
Part III Description of Substantial Ice Strata		Ice	Ice with soil inclusions	Ice + Soil Type	Designate material as ICE (d) and use descriptive terms as follows, usually one item from each group, as applicable: Hardness Structure Color Admixtures e.g.: Contains Thin Silt Inclusions Gray Blue Stratified	Ice Crystal Structure (using optional instruments.) a) Orientation of Axes b) Crystal size c) Crystal shape d) Pattern of Arrangement	←	
		Ice	Ice without soil inclusions	Ice				Same as Part II above, as applicable, with special emphasis on Ice Crystal Structure.

DEFINITIONS:

Ice Coatings on Particles are discernible layers of ice found on or below the larger soil particles which have grown into voids produced by the freezing action.

Ice Crystals are a frozen soil mass. They are sometimes associated with hoarfrost crystals, which have grown into voids produced by the freezing action.

Clear Ice is transparent and contains only a moderate number of air bubbles (e) from melting at air bubbles or along crystal interfaces from presence of salt or other materials in the water, or from the freezing of saturated snow. Though porous, the mass retains its structural unity.

Candled Ice is ice which has rotted or otherwise formed into long columnar crystals, very loosely bonded together.

Granular Ice is composed of coarse, more or less equidimensional, ice crystals weakly bonded together.

Ice Lenses are lenticular ice formations in soil occurring essentially parallel to each other, generally normal to the direction of heat loss and commonly in repeated layers.

Ice Segregation is the growth of ice as distinct lenses, layers, veins and masses in soils, commonly but not always oriented normal to direction of heat loss.

Well-bonded signifies that the soil particles are strongly held together by the ice and that the frozen soil possesses relatively high resistance to chipping or breaking.

Poorly-bonded signifies that the soil particles are weakly held together by the ice and that the frozen soil consequently has poor resistance to chipping or breaking.

Friable denotes a condition in which material is easily broken up under light to moderate pressure.

Thaw-Stable frozen soils do not, on thawing, show loss of strength below normal, long-time thawed values nor produce detrimental settlement.

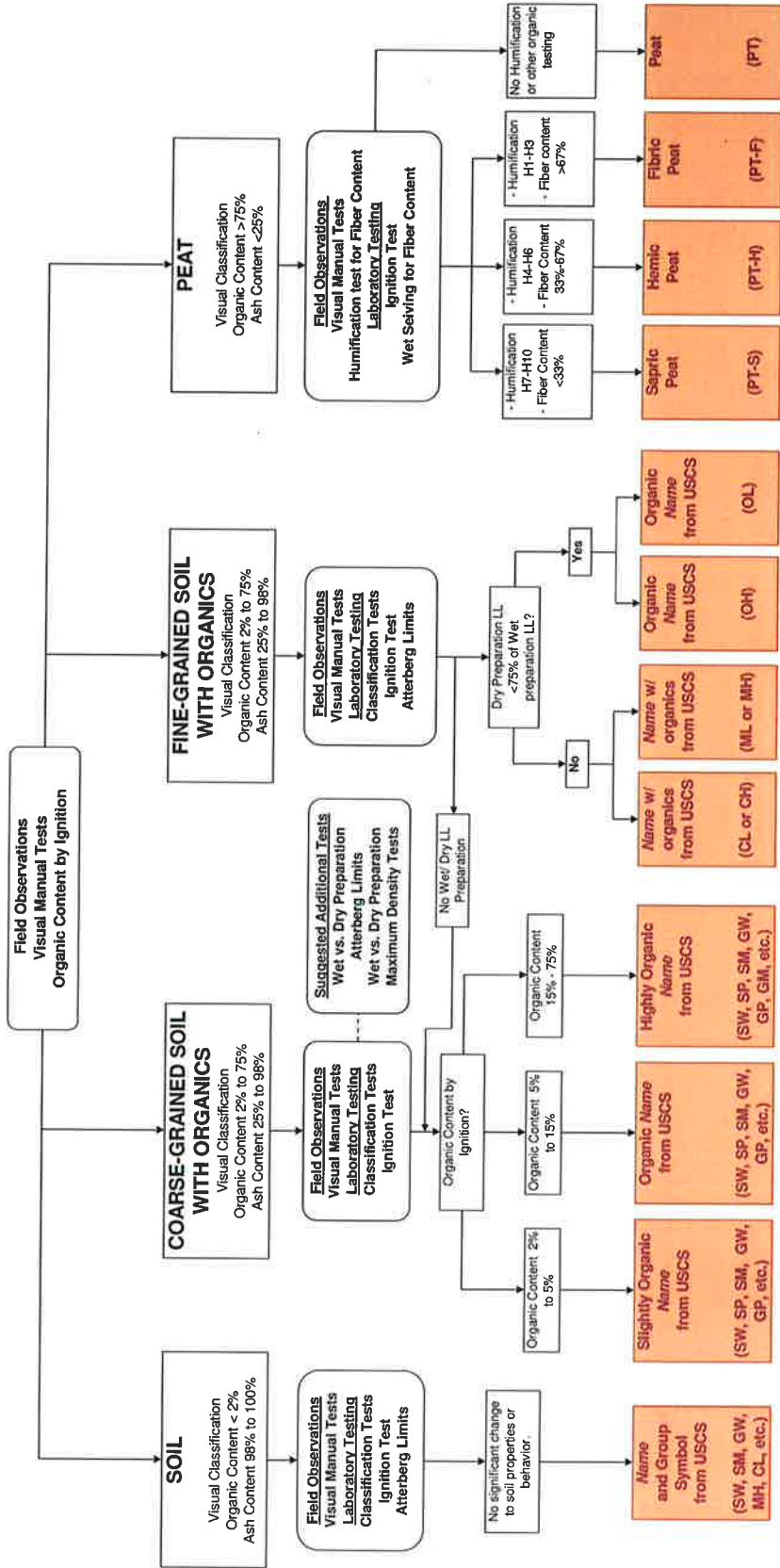
Thaw-Unstable frozen soils show on thawing, significant loss of strength below normal, long-time thawed values and/or significant settlement, as a direct result of the melting of the excess ice in the soil.

NOTES:

- (a) When rock is encountered, standard rock classification terminology should be used.
- (b) Frozen soils in the N group may on close examination indicate presence of ice within the voids of the material by crystalline reflections or by a sheen on fractured or trimmed surfaces. However, the impression to the unaided eye is that none of the frozen water occupies space in excess of the original voids in the soil. The opposite is true of frozen soils in the V group.
- (c) When visual methods may be inadequate, a simple field test to aid evaluation of volume of excess ice can be made by placing some frozen soil in a small jar, allowing it to melt and observing the quantity of supernatant water as a percent of total volume.
- (d) Where special forms of ice, such as hoarfrost, can be distinguished, more explicit description should be given.
- (e) Observer should be careful to avoid being misled by surface scratches or frost coating on the ice.

Modified from: Linell, K. A. and Kaplan, C. W., 1966, *Description and Classification of Frozen Soils*, Proc. International Conference on Permafrost (1963), Lafayette, IN, U.S. National Academy of Sciences, Publ. 1287, pp 481-487.

Peat and Organic Soil Classification System



INCREASING ORGANIC CONTENT

Appendix E- Asbestos lab test results

EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077 Phone: 800-220-3675 Fax: 856-858-4960

Client: State of Alaska
SOA, DOT&PF, SUPPLY
2301 Peger Road
Fairbanks, AK 99709

Attention: Garrett Speeter
Phone:
Project:

EMSL Reference: 041202951

Date Received: 02/07/12
Date Analyzed: 2/10-3/11
Date Reported: 03/12/11

**Asbestos Analysis of Soil Samples via Modified EPA 600/R-93/116 Method Utilizing
Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling)
Level D for 0.001% Target Analytical Sensitivity**

Client Sample ID	Lab Sample ID	Sample Location	Asbestos Type(s)	# of Asbestos Structures Detected	Analytical Sensitivity %	Asbestos Weight %	Comments
A131	041202951-0001	Soil	None Detected	0	0.001	<0.001	
A136	041202951-0002	Soil	None Detected	0	0.001	<0.001	
A90	041202951-0003	Soil	None Detected	0	0.001	<0.001	
A37 2/2	041202951-0004	Soil	None Detected	0	0.001	<0.001	
A35	041202951-0005	Soil	None Detected	0	0.001	<0.001	
A47 2/2	041202951-0006	Soil	None Detected	0	0.001	<0.001	
A142	041202951-0007	Soil	None Detected	0	0.001	<0.001	
A143	041202951-0008	Soil	None Detected	0	0.001	<0.001	
A144	041202951-0009	Soil	None Detected	0	0.001	<0.001	
A139	041202951-0010	Soil	Actinolite	1	0.001	<0.001	
A137	041202951-0011	Soil	Actinolite	1	0.001	0.005	
A79	041202951-0012	Soil	None Detected	0	0.001	<0.001	
A96	041202951-0013	Soil	None Detected	0	0.001	<0.001	
A94	041202951-0014	Soil	None Detected	0	0.001	<0.001	
A55	041202951-0015	Soil	None Detected	0	0.001	<0.001	
A93	041202951-0016	Soil	None Detected	0	0.001	<0.001	
A73	041202951-0017	Soil	None Detected	0	0.001	<0.001	
A91	041202951-0018	Soil	None Detected	0	0.001	<0.001	
A89	041202951-0019	Soil	None Detected	0	0.001	<0.001	
A51	041202951-0020	Soil	None Detected	0	0.001	<0.001	
A62	041202951-0021	Soil	None Detected	0	0.001	<0.001	
A78	041202951-0022	Soil	None Detected	0	0.001	<0.001	
A36	041202951-0023	Soil	None Detected	0	0.001	<0.001	
A69	041202951-0024	Soil	None Detected	0	0.001	<0.001	
A52	041202951-0025	Soil	None Detected	0	0.001	<0.001	
A75- Sample Portion 1	041202951-0026	Soil	Chrysotile	1	0.001	0.001	
A75- Sample Portion 2	041202951-0026a	Soil	Chrysotile	2	0.001	<0.001	
A75- Sample Portion 3	041202951-0026b	Soil	None Detected	0	0.001	<0.001	
A173	041202951-0027	Soil	None Detected	0	0.001	<0.001	
A114	041202951-0028	Soil	None Detected	0	0.001	<0.001	
A152	041202951-0029	Soil	None Detected	0	0.001	<0.001	
A159	041202951-0030	Soil	None Detected	0	0.001	<0.001	
A106	041202951-0031	Soil	None Detected	0	0.001	<0.001	

EMSL Analytical, Inc.

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Fairbanks, AK 99709

Attention: Garrett Speeter

Phone:

Project:

EMSL Reference: 041202951

Date Received: 02/07/12
Date Analyzed: 2/10-3/11
Date Reported: 03/12/11

**Asbestos Analysis of Soil Samples via Modified EPA 600/R-93/116 Method Utilizing
Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling)
Level D for 0.001% Target Analytical Sensitivity**

Client Sample ID	Lab Sample ID	Sample Location	Asbestos Type(s)	# of Asbestos Structures Detected	Analytical Sensitivity %	Asbestos Weight %	Comments
A95	041202951-0032	Soil	None Detected	0	0.001	<0.001	
A64	041202951-0033	Soil	None Detected	0	0.001	<0.001	
A33	041202951-0034	Soil	None Detected	0	0.001	<0.001	
A164	041202951-0035	Soil	None Detected	0	0.001	<0.001	
A49	041202951-0036	Soil	None Detected	0	0.001	<0.001	
A178	041202951-0037	Soil	None Detected	0	0.001	<0.001	
A103 2/2	041202951-0038	Soil	None Detected	0	0.001	<0.001	
A107	041202951-0039	Soil	None Detected	0	0.001	<0.001	
A145 2/2	041202951-0040	Soil	None Detected	0	0.001	<0.001	
A70	041202951-0041	Soil	None Detected	0	0.001	<0.001	
A66	041202951-0042	Soil	None Detected	0	0.001	<0.001	
A72	041202951-0043	Soil	None Detected	0	0.001	<0.001	
A74	041202951-0044	Soil	None Detected	0	0.001	<0.001	
A76	041202951-0045	Soil	None Detected	0	0.001	<0.001	
A148	041202951-0046	Soil	None Detected	0	0.001	<0.001	
A157	041202951-0047	Soil	None Detected	0	0.001	<0.001	
A182	041202951-0048	Soil	None Detected	0	0.001	<0.001	
A174 1/1	041202951-0049	Soil	None Detected	0	0.001	<0.001	
A147	041202951-0050	Soil	None Detected	0	0.001	<0.001	
A68	041202951-0051	Soil	None Detected	0	0.001	<0.001	
A70	041202951-0052	Soil	None Detected	0	0.001	<0.001	
A171	041202951-0053	Soil	None Detected	0	0.001	<0.001	
A154	041202951-0054	Soil	None Detected	0	0.001	<0.001	
A166	041202951-0055	Soil	None Detected	0	0.001	<0.001	
A104	041202951-0056	Soil	None Detected	0	0.001	<0.001	
A120	041202951-0057	Soil	None Detected	0	0.001	<0.001	
A63- Sample Portion 1	041202951-0058	Soil	Tremolite	1	0.001	0.319	
A63- Sample Portion 2	041202951-0058a	Soil	None Detected	0	0.001	<0.001	
A63- Sample Portion 3	041202951-0058b	Soil	Actinolite	1	0.001	0.003	
A107	041202951-0059	Soil	None Detected	0	0.001	<0.001	
A99	041202951-0060	Soil	None Detected	0	0.001	<0.001	
A175	041202951-0061	Soil	None Detected	0	0.001	<0.001	
A103 1/1	041202951-0062	Soil	None Detected	0	0.001	<0.001	

EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077 Phone: 800-220-3675 Fax: 856-858-4960

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Fairbanks, AK 99709

Attention: Garrett Speeter
Phone:
Project:

EMSL Reference: 041202951

Date Received: 02/07/12
Date Analyzed: 2/10-3/11
Date Reported: 03/12/11

**Asbestos Analysis of Soil Samples via Modified EPA 600/R-93/116 Method Utilizing
Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling)
Level D for 0.001% Target Analytical Sensitivity**

Client Sample ID	Lab Sample ID	Sample Location	Asbestos Type(s)	# of Asbestos Structures Detected	Analytical Sensitivity %	Asbestos Weight %	Comments
A129	041202951-0063	Soil	None Detected	0	0.001	<0.001	
A111	041202951-0064	Soil	None Detected	0	0.001	<0.001	
A127	041202951-0065	Soil	None Detected	0	0.001	<0.001	
A136	041202951-0066	Soil	None Detected	0	0.001	<0.001	
A115	041202951-0067	Soil	None Detected	0	0.001	<0.001	
A135	041202951-0068	Soil	None Detected	0	0.001	<0.001	
A141	041202951-0069	Soil	None Detected	0	0.001	<0.001	
A146	041202951-0070	Soil	Actinolite	1	0.001	0.005	
A102	041202951-0071	Soil	Actinolite	1	0.001	0.042	
A109	041202951-0072	Soil	None Detected	0	0.001	<0.001	
A125	041202951-0073	Soil	None Detected	0	0.001	<0.001	
A113	041202951-0074	Soil	None Detected	0	0.001	<0.001	
A92	041202951-0075	Soil	None Detected	0	0.001	<0.001	
A121	041202951-0076	Soil	None Detected	0	0.001	<0.001	
A126	041202951-0077	Soil	None Detected	0	0.001	<0.001	
A112	041202951-0078	Soil	None Detected	0	0.001	<0.001	
A145	041202951-0079	Soil	None Detected	0	0.001	<0.001	
A140	041202951-0080	Soil	None Detected	0	0.001	<0.001	
A121	041202951-0081	Soil	None Detected	0	0.001	<0.001	
A132	041202951-0082	Soil	None Detected	0	0.001	<0.001	
A118	041202951-0083	Soil	None Detected	0	0.001	<0.001	
A130	041202951-0084	Soil	None Detected	0	0.001	<0.001	
A134	041202951-0085	Soil	None Detected	0	0.001	<0.001	
A153	041202951-0086	Soil	Actinolite	1	0.001	0.002	
A106	041202951-0087	Soil	Actinolite	3	0.001	0.017	
A133	041202951-0088	Soil	None Detected	0	0.001	<0.001	
A123	041202951-0089	Soil	Actinolite	1	0.001	0.003	
A110	041202951-0090	Soil	None Detected	0	0.001	<0.001	
A160	041202951-0091	Soil	None Detected	0	0.001	<0.001	
A172	041202951-0092	Soil	None Detected	0	0.001	<0.001	
A105	041202951-0093	Soil	None Detected	0	0.001	<0.001	
A150	041202951-0094	Soil	None Detected	0	0.001	<0.001	
A50	041202951-0095	Soil	None Detected	0	0.001	<0.001	

EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077 Phone: 800-220-3675 Fax: 856-858-4960

Client: State of Alaska
SOA, DOT&PF, SUPPLY
2301 Peger Road
Fairbanks, AK 99709
Attention: Garrett Speeter
Phone:
Project:

EMSL Reference: 041202951

Date Received: 02/07/12
Date Analyzed: 2/10-3/11
Date Reported: 03/12/11

**Asbestos Analysis of Soil Samples via Modified EPA 600/R-93/116 Method Utilizing
Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling)
Level D for 0.001% Target Analytical Sensitivity**

Client Sample ID	Lab Sample ID	Sample Location	Asbestos Type(s)	# of Asbestos Structures Detected	Analytical Sensitivity %	Asbestos Weight %	Comments
A151	041202951-0096	Soil	None Detected	0	0.001	<0.001	
A158	041202951-0097	Soil	None Detected	0	0.001	<0.001	
A177	041202951-0098	Soil	None Detected	0	0.001	<0.001	
A149	041202951-0099	Soil	None Detected	0	0.001	<0.001	
A174 2/2	041202951-0100	Soil	None Detected	0	0.001	<0.001	
A71	041202951-0101	Soil	None Detected	0	0.001	<0.001	
A162	041202951-0102	Soil	None Detected	0	0.001	<0.001	
A101	041202951-0103	Soil	None Detected	0	0.001	<0.001	
A54	041202951-0104	Soil	None Detected	0	0.001	<0.001	
A116	041202951-0105	Soil	None Detected	0	0.001	<0.001	
A117	041202951-0106	Soil	None Detected	0	0.001	<0.001	
A38	041202951-0107	Soil	None Detected	0	0.001	<0.001	
A37 1/2	041202951-0108	Soil	None Detected	0	0.001	<0.001	
A156	041202951-0109	Soil	None Detected	0	0.001	<0.001	
A163	041202951-0110	Soil	None Detected	0	0.001	<0.001	
A48	041202951-0111	Soil	None Detected	0	0.001	<0.001	

Debbie Little/Wayne Froehlich/Frank Craig
Analysts


Stephen Siegel, CIH or Approved EMSL Signatory

EMSL maintains liability limited to cost of analysis. This method requires the laboratory to analyze the sample until the first fiber found compromises 5% of the total mass. Due to the size and mass of different asbestos fibers, the analytical sensitivity will vary between samples and may prevent the laboratory from achieving the target sensitivity on all samples. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client.



**Determination of Asbestos Content
by Transmission Electron Microscopy
Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants
731 I St. Ste 203
Anchorage AK 99501

Attn: Joel Hicklin

Lab Order ID: 1116562

Date Received: 11/21/2011

Date Reported: 12/06/2011

Page: 1 of 9

Project: AK DOT Contract

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
Lab Sample ID	Lab Notes			
A97		None Detected	N/A	<0.1
1116562_CAR1				
A99		None Detected	N/A	<0.1
1116562_CAR2				
A100		None Detected	N/A	<0.1
1116562_CAR3				
A101		None Detected	N/A	<0.1
1116562_CAR4				
A103		None Detected	N/A	<0.1
1116562_CAR5				
A104		None Detected	N/A	<0.1
1116562_CAR6				
A105		None Detected	N/A	<0.1
1116562_CAR7				

Notes: The CARB 435 method was designed as applicable to the determination of asbestos in ultramafic or serpentine rock aggregates.

**The detection limit of 0.1% is based on TEM analysis of gravimetrically reduced residue, of a representative rock flour of the sample(s) submitted. These results apply only to the material as submitted to SAI, Inc.*

Matt Thomas
Analyst

Approved Signatory



**Determination of Asbestos Content
by Transmission Electron Microscopy
Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562
Project: AK DOT Contract		Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 2 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
Lab Sample ID	Lab Notes			
A106		None Detected	N/A	<0.1
1116562_CAR8				
A107		None Detected	N/A	<0.1
1116562_CAR9				
A111		None Detected	N/A	<0.1
1116562_CAR10				
A112		None Detected	N/A	<0.1
1116562_CAR11				
A113		None Detected	N/A	<0.1
1116562_CAR12				
A114		None Detected	N/A	<0.1
1116562_CAR13				
A115		None Detected	N/A	<0.1
1116562_CAR14				

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Matt Thomas
Analyst



Approved Signatory



Determination of Asbestos Content by Transmission Electron Microscopy Modified California Air Resource Board (CARB) Method 435

Client: White Environmental Consultants **Attn:** Joel Hicklin **Lab Order ID:** 1116562
731 I St. Ste 203
Anchorage AK 99501

Project: AK DOT Contract

Date Received: 11/21/2011
Date Reported: 12/06/2011
Page: 3 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
Lab Sample ID	Lab Notes			
A118		None Detected	N/A	<0.1
1116562_CAR15				
A120		None Detected	N/A	<0.1
1116562_CAR16				
A121		None Detected	N/A	<0.1
1116562_CAR17				
A123		None Detected	N/A	<0.1
1116562_CAR18				
A124		None Detected	N/A	<0.1
1116562_CAR19				
A125		None Detected	N/A	<0.1
1116562_CAR20				
A126		<1% Chrysotile	<0.1	<0.1
1116562_CAR21				

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Matt Thomas
Analyst



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by Transmission Electron Microscopy
Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562
Project: AK DOT Contract		Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 4 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
Lab Sample ID	Lab Notes			
A127		None Detected	N/A	<0.1
1116562_CAR22				
A129		None Detected	N/A	<0.1
1116562_CAR23				
A130		None Detected	N/A	<0.1
1116562_CAR24				
A131		None Detected	N/A	<0.1
1116562_CAR25				
A132		None Detected	N/A	<0.1
1116562_CAR26				
A133		None Detected	N/A	<0.1
1116562_CAR27				
A134		None Detected	N/A	<0.1
1116562_CAR28				

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Analyst



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Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562
Project: AK DOT Contract		Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 5 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
<i>Lab Sample ID</i>	<i>Lab Notes</i>			
A135		None Detected	N/A	<0.1
1116562_CAR29				
A138		None Detected	N/A	<0.1
1116562_CAR30				
A141		None Detected	N/A	<0.1
1116562_CAR31				
A145		None Detected	N/A	<0.1
1116562_CAR32				
A147		None Detected	N/A	<0.1
1116562_CAR33				
A148		None Detected	N/A	<0.1
1116562_CAR34				
A149		None Detected	N/A	<0.1
1116562_CAR35				

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Analyst



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Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562
Project: AK DOT Contract		Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 6 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
<i>Lab Sample ID</i>	<i>Lab Notes</i>			
A151		None Detected	N/A	<0.1
1116562_CAR36				
A152		None Detected	N/A	<0.1
1116562_CAR37				
A153		None Detected	N/A	<0.1
1116562_CAR38				
A154		None Detected	N/A	<0.1
1116562_CAR39				
A156		None Detected	N/A	<0.1
1116562_CAR40				
A157		None Detected	N/A	<0.1
1116562_CAR41				
A158		None Detected	N/A	<0.1
1116562_CAR42				

Notes: The CARB 435 method was designed as applicable to the determination of asbestos in ultramafic or serpentine rock aggregates.

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Approved Signatory



**Determination of Asbestos Content
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Client: White Environmental Consultants **Attn:** Joel Hicklin
731 I St. Ste 203
Anchorage AK 99501

Lab Order ID: 1116562

Date Received: 11/21/2011

Date Reported: 12/06/2011

Page: 7 of 9


Project: AK DOT Contract

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
<i>Lab Sample ID</i>	<i>Lab Notes</i>			
A159		None Detected	N/A	<0.1
1116562_CAR43				
A160		None Detected	N/A	<0.1
1116562_CAR44				
A161		None Detected	N/A	<0.1
1116562_CAR45				
A162		None Detected	N/A	<0.1
1116562_CAR46				
A164		None Detected	N/A	<0.1
1116562_CAR47				
A166		None Detected	N/A	<0.1
1116562_CAR48				
A167		None Detected	N/A	<0.1
1116562_CAR49				

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Matt Thomas
Analyst



Approved Signatory



Determination of Asbestos Content
by Transmission Electron Microscopy
Modified California Air Resource Board (CARB) Method 435

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562 Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 8 of 9
Project: AK DOT Contract		

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
<i>Lab Sample ID</i>	<i>Lab Notes</i>			
A168		None Detected	N/A	<0.1
1116562_CAR50				
A170		None Detected	N/A	<0.1
1116562_CAR51				
A171		None Detected	N/A	<0.1
1116562_CAR52				
A172		None Detected	N/A	<0.1
1116562_CAR53				
A173		None Detected	N/A	<0.1
1116562_CAR54				
A174		None Detected	N/A	<0.1
1116562_CAR55				
A175		None Detected	N/A	<0.1
1116562_CAR56				

Notes: The CARB 435 method was designed as applicable to the determination of asbestos in ultramafic or serpentine rock aggregates.

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 Matt Thomas
Analyst



Approved Signatory



**Determination of Asbestos Content
by Transmission Electron Microscopy
Modified California Air Resource Board (CARB) Method 435**

Client: White Environmental Consultants 731 I St. Ste 203 Anchorage AK 99501	Attn: Joel Hicklin	Lab Order ID: 1116562
Project: AK DOT Contract		Date Received: 11/21/2011 Date Reported: 12/06/2011 Page: 9 of 9

Sample ID	Description	Asbestos Percent in Residue %	Calculated Concentration %	Asbestos Weight Percent %
Lab Sample ID	Lab Notes			
A177		None Detected	N/A	<0.1
1116562_CAR57				
A178		None Detected	N/A	<0.1
1116562_CAR58				
A182		None Detected	N/A	<0.1
1116562_CAR59				

Notes: The CARB 435 method was designed as applicable to the determination of asbestos in ultramafic or serpentine rock aggregates.

**The detection limit of 0.1% is based on TEM analysis of gravimetrically reduced residue, of a representative rock flour of the sample(s) submitted. These results apply only to the material as submitted to SAI, Inc.*

Matt Thomas
Analyst



Approved Signatory

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

731 I.St. Ste. 203, Anchorage AK 99501
Phone: (907) 258-8661 (907) 258-8662

1116562

PROJECT NAME AK 10T Contract
 LOCATION _____ PROJECT NO. 116-852
 CLIENT _____ DATE _____
 CLIENT PROJECT# _____ SHEET NO. 1 OF 1

CHAIN OF CUSTODY RECORD - ANALYTICAL REQUEST

ANALYSIS REQUEST (circle) PCM PLM (TEM) LEAD	TURNAROUND REQUESTED <u>As Negotiated</u>	NO. OF SAMPLES <u>59</u>	COLLECTION DATE: <u>11-1-11</u>
RELINQUISHED BY: <u>J Hicklin</u>	DATE/TIME	SAMPLES RECEIVED BY: <u>JTH</u>	DATE/TIME <u>11-18-11 11AM</u>
SHIPPING METHOD: <u>Fed Ex</u>	COURIER (signature)	SAMPLES RECEIVED BY:	DATE/TIME

COMMENTS

Carb Level B w/TEM
45435

SAMPLE ID#	MATERIAL	LOCATION	COMMENTS
A 97			
A 98 99			
A 100			
A 101			
A 103			
A 104			
A 105			
A 108			
A 107			
A 111			
A 112			
A 113			
A 114			
A 115			
A 118			



WHITE ENVIRONMENTAL CONSULTANTS INC.

731 I. St. Ste. 203, Anchorage AK 99501
Phone: (907) 258-8661 (907) 258-8662

1116502

PROJECT NAME _____
LOCATION _____ PROJECT NO. _____
CLIENT _____ DATE _____
CLIENT PROJECT _____ SHEET NO. 7 OF 5

CHAIN OF CUSTODY RECORD - ANALYTICAL REQUEST

ANALYSIS REQUESTED (circle) PCM PLM TEM LEAD	TURNAROUND REQUESTED	NO. OF SAMPLES	COLLECTION DATE:
RELINQUISHED BY:	DATE / TIME	SAMPLES RECEIVED BY	DATE / TIME
SHIPPING METHOD:	COURIER (signature)	SAMPLES RECEIVED BY	DATE / TIME

COMMENTS

SAMPLE ID#	MATERIAL	LOCATION	COMMENTS
A 141			
A 145			
A 147			
A 148			
A 149			
A 151			
A 152			
A 153			
A 154			
A 156			
A 157			
A 158			
A 159			
A 160			
A 161			

11/6/02

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

731 I. St. Ste. 203, Anchorage AK 99501
Phone: (907) 258-8661 (907) 258-8662

PROJECT NAME _____
LOCATION _____ PROJECT NO. _____
CLIENT _____ DATE _____
CLIENT PROJECT _____ SHEET NO. 4 OF 5

CHAIN OF CUSTODY RECORD - ANALYTICAL REQUEST

ANALYSIS REQUESTED (circle) PCM PLM TEM LEAD	TURNAROUND REQUESTED	NO. OF SAMPLES	COLLECTION DATE:
RELINQUISHED BY:	DATE / TIME	SAMPLES RECEIVED BY	DATE / TIME
SHIPPING METHOD:	COURIER (signature)	SAMPLES RECEIVED BY	DATE / TIME

COMMENTS

SAMPLE ID#	MATERIAL	LOCATION	COMMENTS
A162			
A164			
A166			
A167			
A168			
A170			
A171			
A172			
A173			
A174			
A175			
A177			
A178			
A182			