ALASKA
Department of Transportation and Public Facilities

Southcoast Region Design & Engineering Services- Materials

GEOLOGY DATA REPORT

GUSTAVUS-AIRPORT APRON, RUNWAY, AND TAXIWAY PAVEMENT REHABILITATION

Z675170000

November 16, 2016

"Keep Alaska Moving through service and infrastructure"

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Project No. Z675170000

November 16, 2016

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State of Alaska
Department of Transportation and Public Facilities
Southcoast Region Materials Section

"Keep Alaska Moving through service and infrastructure"

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INTRODUCTION

The Alaska Department of Transportation and Public Facilities – Southcoast Region (DOT&PF) is proposing improvements for the Gustavus Airport in Juneau, Alaska. At the request of design project manager, Chuck Tripp, P.E., a geotechnical subsurface investigation was conducted on May 17-18, 2016. The investigation included a total of fourteen (14) borings. Boring depths were 6.5 feet below ground surface (bgs). This report serves as the Geology Data Report (GDR) and is intended to be included in the construction contract documents. It contains only factual information.

PROJECT SETTING

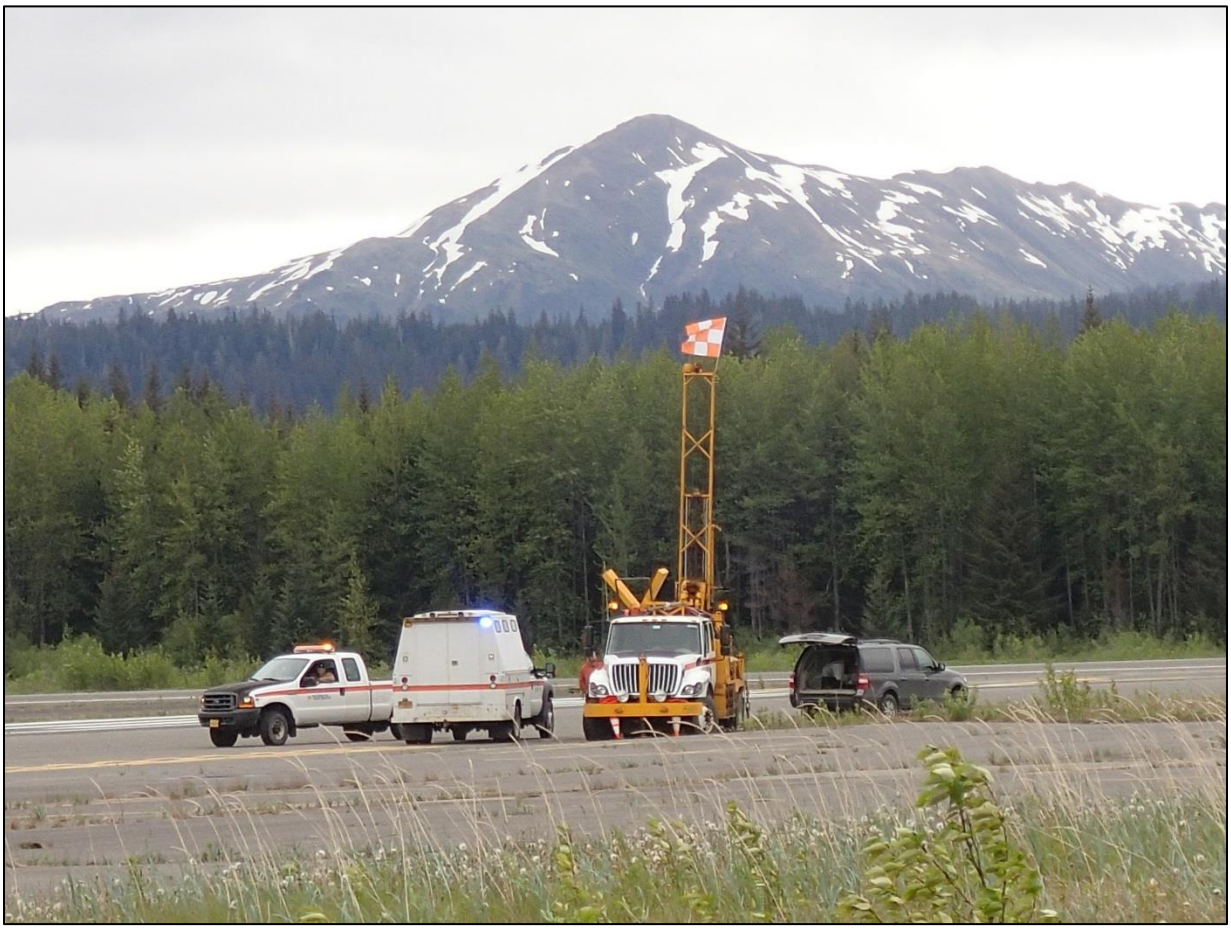
Site Description

The primary purpose of the project is to provide structurally acceptable aprons, runways, and taxiways that will meet current FAA standards to the greatest extent practicable (Figure 1).

Figure 1: Vicinity map

Topography

The Gustavus Airport lies on a broad, level alluvial plain at the mouth of Glacier Bay. The plain is comprised of glacial outwash deposits formed from the most recent glacial advances associated with the Little Ice Age. Numerous relict channels are apparent from aerial photography. It is bordered to the west by Glacier Bay, with Icy Straits to the south and the southern end of the Chilkat Mountains to the east. The Salmon River and Rink Creek meander across the flat plain surrounding the airport. Several manmade drainage channels control the runoff in the airport area.



Tectonic Setting

The tectonics is the area is controlled by the northwest motion of the Pacific plate with respect to the North America plate. Offshore of British Columbia, the Pacific margin is one of the more active seismic zones in North America and has accommodated a number of large earthquakes (Hayes, et al. 2014). The project area is in an area of moderate tectonic activity; the two most active faults in the region are the Denali-Chatham Straights system 22 miles east and the Queen Charlotte -Fairweather fault 45 miles west of the project area (Figure 2). From 1899 to the present the Alaska Earthquake Information Center list ten (10) events with magnitudes greater than 6.0 occurring within 100 miles of the project.

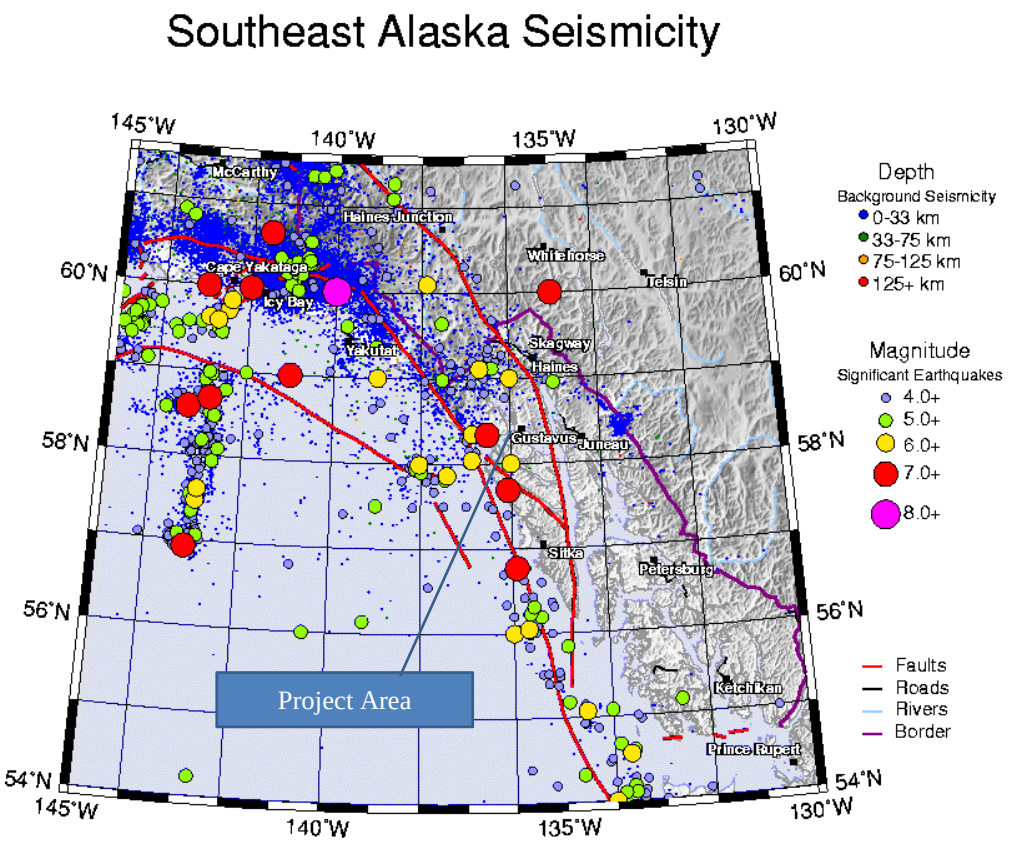


Figure 2: Tectonic map. A tectonic map showing the locations of the Quaternary faults and seismicity that has occurred in the area. Ten (10) earthquakes with a magnitude 6.0 or greater have occurred within 100-mile radius of the project area.

Geology

Gustavus occupies a broad flat plain along the boundary between the Glacier Bay and Alsek Ranges Subsections of the Chilkat-Baranof Mountains Division. This division forms the southernmost end of the greater physiographic area known as the Pacific Border Ranges Province. While the Glacier Bay subsection is a low lying, emerging coastal plain with some rounded mountains, the adjacent Alsek Ranges are characterized by steep, glaciated peaks and ridges rising 4,000-7,500 feet above sea level. Deposits in the Glacier Bay Subsection are Quaternary glacial outwash sediments, with no known bedrock occurrences within the immediate vicinity of the Gustavus Airport. The Alsek Ranges Subsection includes the Chilkat Range, whose western flanks intersect the Glacier Bay plains approximately 1.5 miles northeast of the Gustavus Airport. This mountain range is comprised largely of Silurian Sedimentary rocks, described as graywacke and mudstone turbidites, some olistostromal deposits, layers and lenses of limestone and conglomerates (*Geologic Map of Southeastern Alaska, 1992*). These rocks are known to be overlain by variable thickness of glacial deposits, in areas of existing development.

Climate

Gustavus is included in the Maritime Zone. Average temperatures vary from lows of 30°F in January and highs of 64°F in July. Rainfall averages 55 inches annually and is heaviest between September and December. Snowfall typical begins in November and ends in late March. The highest total snowfall of 117.3 inches was recorded in 1989.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg Max. Temp (F)	30.4	35.8	38.6	48.1	55.3	61.1	63.7	63.3	57.2	47.8	38.1	34.1	47.8
Avg Min. Temp (F)	18.7	23.1	25.0	31.8	38.0	44.5	48.3	46.9	41.9	35.7	27.2	24.5	33.8
Avg Total Precip (in.)	4.19	3.72	2.92	2.47	2.89	2.55	3.67	4.74	7.10	8.60	6.20	6.16	55.21
Avg Total Snow Fall (in)	18.6	14.6	11.6	1.9	0.2	0.0	0.0	0.0	0.0	0.8	9.4	17.0	74.2
Avg Snow Depth (in.)	6	6	4	1	0	0	0	0	0	0	1	4	2

Period of Record Monthly Climate Summary / Period of Record: 9/ 1/1949 to 1/20/2015
http://www.wrcc.dri.edu/summary/Climsmak.html

SUMMARY TABLES

Summary of Borings

Borings TH001-TH005 were drilled along the cross wind Runway 2/20, borings TH010-TH013 were drilled throughout the Heavy Aircraft Apron and boring TH014 was drilled on Taxiway A. All borings are intended to provide detailed delineation of the subsurface material and characterize soil strength. Borings TH006-TH008 were drilled in the proposed expanded area within the General Aviation Apron to provide subsurface conditions. Asphalt thickness measurements are approximate due to the destructive nature of the sampling method. No groundwater was encountered during the investigation and base and subbase could not be differentiated in the field.

Table 1: Summary of Borings

Station ID and offset from CL	Number (GUS16-)	Elevation (feet)	Depth (feet)	Asphalt (in)	Base (in)	Target
*17+09, 166’ L	***TH006	29	6.5	NA	NA	Subsurface data
*17+83, 83’ L	***TH005	33	6.5	7	4	Pavement data
*18+03, 291’ L	***TH007	30	6.5	NA	NA	Subsurface data
*21+53, 339’ L	***TH008	33	6.5	NA	NA	Subsurface data
*22+47, 99’ L	TH004	32	6.5	8	4.5	Pavement data
*28+55, 86’ L	TH003	32	6.5	5	3	Pavement data
*31+35, 256’ L	TH009	31	6.5	2.5	NA	Pavement data
*44+52, 85’ L	TH002	29	6.5	3.5	5	Pavement data
*46+86, 90’ R	TH001	31	6.5	3.5	5	Pavement data
**17+49, 536 L	TH014	30	6.5	7.0	6	Pavement data
**18+35, 46’ L	TH010	32	6.5	5.5	NA	Pavement data
**18+35, 240’ L	TH013	30	6.5	6.0	6	Pavement data
**20+66, 223’ L	TH012	30	6.5	6.5	6	Pavement data
**20+98, 38’ L	TH011	32	6.5	6.5	10.5	Pavement data

*L-Line Alignment, ** H-Line Alignment, ***New Taxiway.

PAVEMENT STRUCTURE DATA GRAPHS

The graphs include data for base course fines content for Runway 2/20 and the Heavy Aircraft Apron (Graphs 1-2). Base and subbase thicknesses could not be determined from the as-built information. In some borings it could be identified visually (Photos 2 and 3).

Soil Description

The soils were predominately sand containing varying amounts of gravel and silt. The P-200 content varied from 4% to 25.7%, gravel content ranged from 1% to 34%. See Appendixes A and B for boring logs and laboratory test results for detailed soil descriptions. Groundwater was not encountered during the investigation.

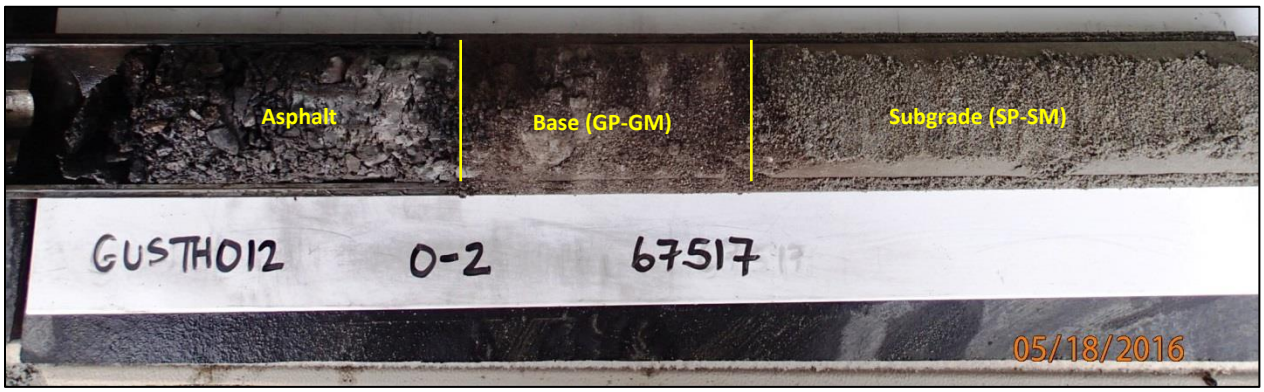


Photo 2: Sample GUS16-TH012 from 0-2' bgs showing the base and subgrade material. Base consists of poorly graded fine to coarse grained gravel with silt and sand fine (GP-GM) and subgrade consists of fine to coarse grained poorly graded sand with silt and fine rounded-subrounded gravel (SP-SM).

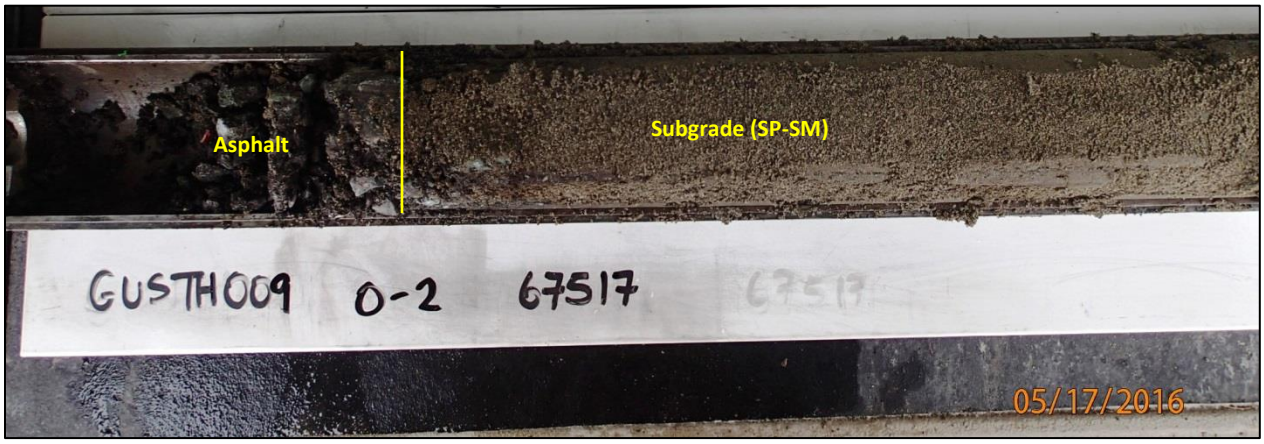
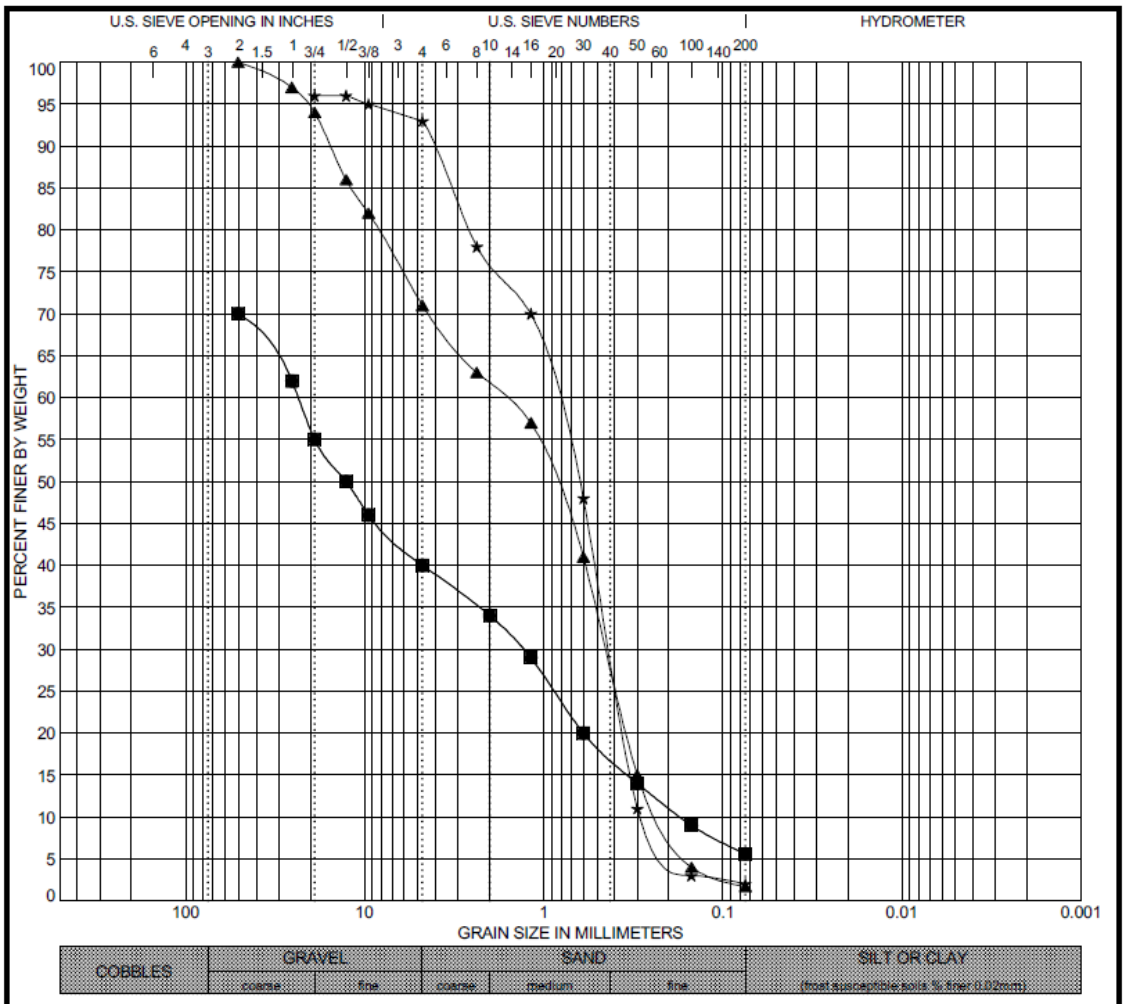


Photo 3: Sample GUS16-TH009 from 0-2' bgs showing the subgrade material. Subgrade consists of fine to coarse grained poorly graded sand with silt and fine rounded-subrounded gravel (SP-SM).



	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH001-S2	0.3	0.43	135.68	50.8	23.378	1.311	0.172	30.0	34.4	5.6		
■	TH002-S2	0.3	0.43	135.68	50.8	23.378	1.311	0.172	30.0	34.4	5.6		
▲	TH004-S2	0.7	0.55	7.62	50.8	1.669	0.447	0.219	29.0	69.3	1.7		
★	TH005-S2	0.6	0.77	3.15	19	0.868	0.428	0.275	3.0	91.0	2.0		

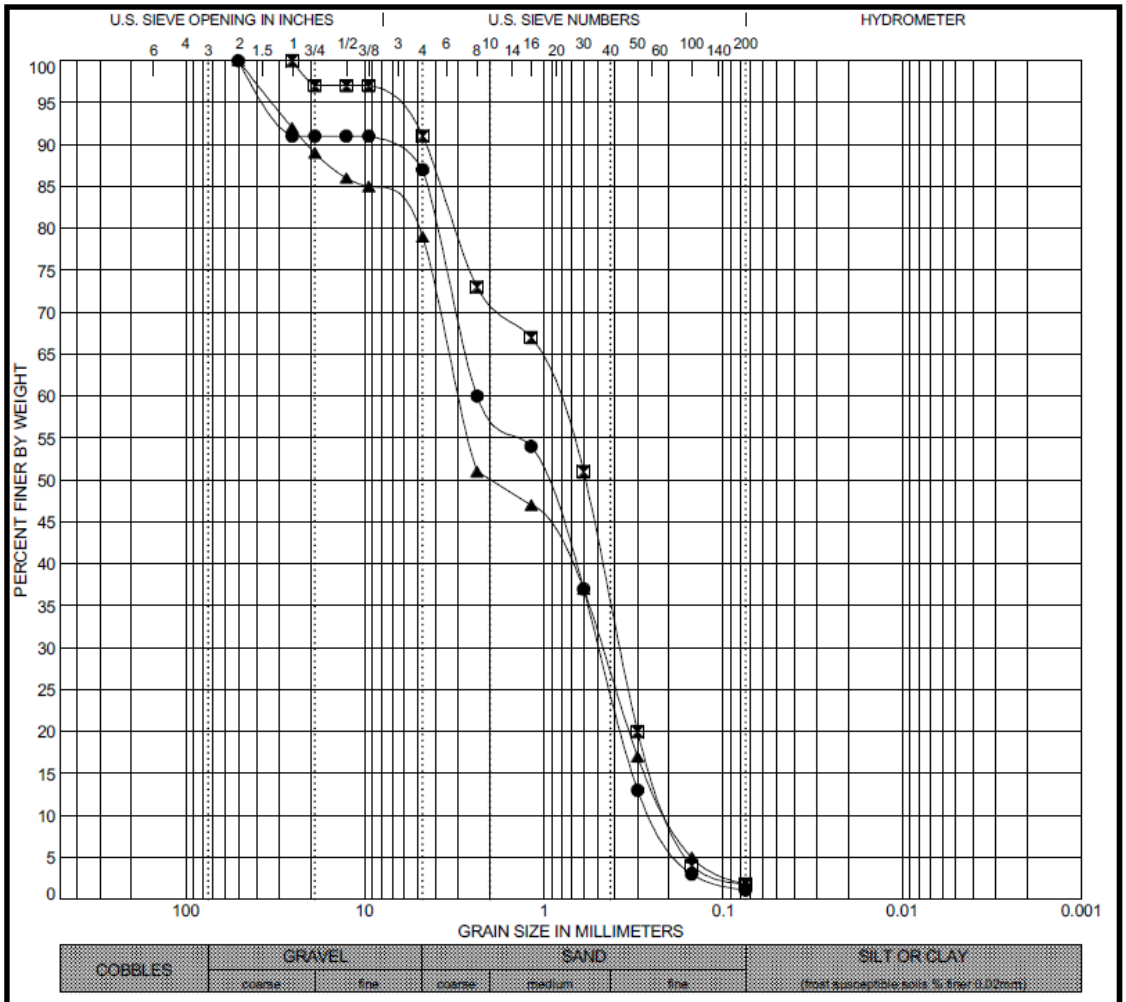
: Airport Apron, Runway and Taxiway Pavement Rehab

Existing Base Gradations- Gustavus Airport
Sheet 1 of 1

BULK GRADATIONS GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 10/4/16

- Samples TH001-S2 and TH002-S2 were combined.

Graph 1: Base Gradations for Runway 2/20



	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH012-S2	0.7	0.42	9.69	50.8	2.36	0.49	0.244	13.0	85.9	1.1		
⊠	TH013-S2	0.7	0.82	4.51	25.4	0.878	0.375	0.195	9.0	89.2	1.8		
▲	TH014-S2	0.7	0.37	14.76	50.8	2.955	0.471	0.2	21.0	77.2	1.8		

: Airport Apron, Runway and Taxiway Pavement Rehab

Existing Base Gradations- Gustavus Airport
Sheet 1 of 1

BULK GRADATIONS GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 10/4/16

Graph 2: Base Gradations for Heavy Aircraft Apron

PROCEDURES AND METHODS

Exploration Plan

The exploration plan was developed using guidance from the Alaska Geotechnical Procedures Manual and modified to suit the project scope. See Summary of Borings Table 1 for a complete listing of borings and their locations. The plan addressed the new taxiway, identified pavement structures on 20/2 and the cause of pavement rutting in the apron area.

Equipment and Drilling Methods

DOT&PF Statewide Drilling Services mobilized a truck-mounted, CME 45 drill from Juneau and a two man crew from Anchorage to perform the investigation. Based on anticipated subsurface conditions and expediency a hollow stem auger method was selected. The borings were backfilled with cuttings and pavement was repaired with cold mix asphalt.

Sampling

In each hollow stem auger boring Standard Penetration Tests (SPT) were performed in accordance with AASHTO T 206-87 to obtain soil samples for analysis and determine the relative density of the soil. All SPT's were conducted with a 140 pound, CME, auto-hammer. Samples from the drilling were described in accordance with the procedures outlined in the DOT&PF Alaska Field Guide for Soil Classification and transported to the Southcoast Region Materials Lab for additional testing.

Laboratory Testing

Samples were delivered to the Southcoast Region Materials Laboratory for testing. Individual samples were subjected to one or more of the following tests:

- Sieve Analysis of Soils (AASHTO T 27/T11)
- Moisture Content of Soils (AASHTO T 255 / T 265)
- Unified Soil Classification (ASTM D 2487)

Sample test results are included with this report in Appendix C-Laboratory Test Results. After testing was completed all remaining samples were stored at the Southcoast Region 7-Mile facility and will be retained until construction is completed.

Boring Logs

On-site geologists recorded all observations, drilling notes, and sample descriptions on field logs. Field logs were reviewed, compared to the results of the laboratory test data, and compiled into detailed final logs. These detailed final logs are included in Appendix A of this report.

SELECTED REFERENCES

- *Alaska Department of Transportation and Public Facilities, 2007, Alaska Geotechnical Procedures Manual*

- *Gehrels G. E. and Berg, H. C., 1992, Geologic Map of Southeastern Alaska, USGS Map 1-1876*

- *Hayes, G.P., Smoczyk, G. M., Ooms, J. G., McNamara, D. E., Furlong, K. P., Benz, H. M., and Villsenor, A., 2014, Seismicity of the Earth 1900-2013, Offshore British Columbia-Southeastern Alaska and Vicinity, U.S Geological Survey, Open-File Report 2010-1083-0*

- *Koehler, R.D., 2013, Quaternary Faults and Folds (QFF): Alaska Division of Geological & Geophysical Surveys Digital Data Series 3, http://maps.dggs.alaska.gov/qff/ Doi: 10.14509/24956*

Appendix A- Final Detailed Boring Logs

(Arranged in Boring Order)

GUS16-TH001
GUS16-TH002
GUS16-TH003
GUS16-TH004
GUS16-TH005
GUS16-TH006
GUS16-TH007
GUS16-TH008
GUS16-TH009
GUS16-TH010
GUS16-TH011
GUS16-TH012
GUS16-TH013
GUS16-TH014

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF

SE Region Materials

Geology Section

Hole No. TH001

Location Runway 2/20

Project : Airport Apron, Runway and Taxiway Pavement Rehab

Station 44+86, 90' R Align L-Line

Lat/Long 58.419505 / -135.719241 (WGS 1984)

Precision Recreational grade GPS, Accuracy 10'

Elevation 31 feet Depth 6.5 feet

Geologist M. Larsen

Field Crew R. Wagster/ J. Young

Date Begin 5-17-16

Date End 5-17-16

Weather Light Rain, 40° F

Equipment CME 45

Hammer CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH001-S1	15	0.3				**0-0.3': ASPHALT**	31
			SPT	TH001-S2	9	0.4		GP-GM M.C.=5.5% p200=5.6%		**0.3-0.7':** Loose, dark grayish brown, fine to medium grained **Poorly Graded GRAVEL with Silt and Sand (GP-GM)**, dry to moist, (Fill) Gravel: angular-subangular	
	1		SPT	TH001-S3	9 / 15	1.0	24	SW-SM M.C.=6.2% p200=10.1%		**0.7-4':** Medium dense, grayish brown, very fine to medium grained **Well Graded SAND with Silt (SW-SM)**, dry to moist	30
	2				10						29
	3		SPT	TH001-S4	12 / 11 / 12	1.6	23				28
Hollow-Stem Auger	4									**4-6.5':** Medium dense, grayish brown, fine to medium grained **Poorly Graded SAND (SP)**, moist, occasional fine grained, rounded-subrounded gravel	27
	5		SPT	TH001-S5	6 / 8 / 9 / 8	1.2	17	SP M.C.=10.7% p200=4.2%			26
	6								BOH	**Bottom Of Hole 6.5'**	25
	7										24
	8										23

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 incl

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF

SE Region Materials

Geology Section

Hole No. TH002

Location Runway 2/20

Project : Airport Apron, Runway and Taxiway Pavement Rehab

Station 44+52, 85' L Align L-Line

Lat/Long 58.41967 / -135.717743 (WGS 1984)

Precision Recreational grade GPS, Accuracy 10'

Elevation 29 feet Depth 6.5 feet

Geologist M. Larsen

Field Crew R. Wagster/ J. Young

Date Begin 5-17-16

Date End 5-17-16

Weather Light Rain, 40° F

Equipment CME 45

Hammer CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
											29
Continuous SPT Sampling			SPT	TH002-S1	12	0.3				**0-0.3': ASPHALT**	
			SPT	TH002-S2	7	0.4		GP-GM M.C.=5.5% p200=5.6%		**0.3-0.7':** Loose, dark grayish brown, fine to coarse grained **Poorly Graded GRAVEL with Silt and Sand (GP-GM)**, dry to moist, (Fill) Gravel: angular-subangular	
	1		SPT	TH002-S3	8 / 15	1.3	23			**0.7-6.5':** Medium dense, grayish brown, fine to coarse grained **SAND with Silt (SP-SM)**, dry to moist, occasional fine grained, rounded-subrounded gravel	28
	2				6 / 11			SP-SM M.C.=6.4% p200=11.8%			27
	3		SPT	TH002-S4	11 / 14	1.6	22				26
	4										25
Hollow-Stem Auger	5		SPT	TH002-S5	5 / 8 / 8 / 7	1.2	16				24
	6										23
									BOH	**Bottom Of Hole 6.5'**	
	7										22
	8										21

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF

SE Region Materials

Geology Section

Hole No. TH003

Location Runway 2/20

Project : Airport Apron, Runway and Taxiway Pavement Rehab

Station 28+55, 86' L Align L-Line

Lat/Long 58.422966 / -135.712272 (WGS 1984)

Precision Recreational grade GPS, Accuracy 10'

Elevation 32 feet Depth 6.5 feet

Geologist M. Larsen

Field Crew R. Wagster/ J. Young

Date Begin 5-17-16

Date End 5-17-16

Weather Light Rain, 40° F

Equipment CME 45

Hammer CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH003-S1	8	0.4				**0-0.4': ASPHALT**	32
			SPT	TH003-S2	10	0.2		SP-SM M.C.=7.6% p200=10.7%		**0.4-0.6':** Medium dense, dark grayish brown **Poorly Graded GRAVEL with Silt and Sand (GP-GM)**, dry to moist, Gravel: angular-subangular (FILL)	
	1		SPT	TH003-S3	10, 14	0.8	24			**0.6-6.5':** Medium dense, grayish brown, fine to medium grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, Gravel: fine, rounded-subrounded	31
	2				6, 8			SP-SM M.C.=7.1% p200=9.3%			30
	3		SPT	TH003-S4	10, 12	1.5	18				29
Hollow-Stem Auger	4										28
	5		SPT	TH003-S5	5, 7, 7, 8	1.5	14				27
	6								BOH	**Bottom Of Hole 6.5'**	26
	7										25
	8										24

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH004
Location Runway 2/20

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	22+47, 99' L — Align L-Line
Lat/Long	58.424197 / -135.710139 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	32 feet — Depth 6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-17-16
Date End	5-17-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH004-S1	20	0.7				**0-0.65': ASPHALT**	32
			SPT	TH004-S2	16	0.4		SP M.C.=4.5% p200=1.7%		**0.65-1':** Medium dense, dark grayish brown, fine to coarse grained **Poorly Graded SAND with Gravel (SP)**, dry to moist, Gravel: angular-subangular (FILL)	31
	1		SPT	TH004-S3	14, 17	0.7				**1-6.5':** Medium dense, grayish brown, very fine to medium grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, Gravel: fine, rounded-subrounded gravel	
	2				7			SP-SM M.C.=7.6% p200=11.6%			30
	3		SPT	TH004-S4	8, 10, 12	1.7	18				29
Hollow-Stem Auger	4										28
	5		SPT	TH004-S5	9, 10, 12, 10	1.4	22				27
	6								BOH	**Bottom Of Hole 6.5'**	26
	7										25
	8										24

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH005
Location Runway 2/20

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	17+83, 83' L Align L-Line
Lat/Long	58.42518 / -135.708608 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	33 feet Depth 6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-17-16
Date End	5-17-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH005-S1	20	0.6				**0-0.6': ASPHALT**	33
			SPT	TH005-S2	16	0.4		SP M.C.=4.2% p200=2.0%		**0.6-1':** Medium dense, dark grayish brown, fine to coarse grained **Poorly Graded SAND with Gravel (SP)**, dry to moist, (Fill) Gravel: fine, angular-subangular	
	1		SPT	TH005-S3	14, 14	0.8		SP-SM M.C.=4.5% p200=5.9%		**1-6.5':** Medium dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt and Gravel (SP-SM)**, dry to moist, Gravel: fine-medium grained, rounded-subrounded	32
	2				10						31
	3		SPT	TH005-S4	7, 8, 4	1.7	15				30
	4										29
Hollow-Stem Auger	5		SPT	TH005-S5	8, 6, 6, 5	1.5	12				28
	6										27
									BOH	**Bottom Of Hole 6.5'**	
	7										26
	8										25

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH006
Location Expansion Area

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	17+09, 166' L
Align	L-Line
Lat/Long	58.425185 / -135.708028 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	29 feet
Depth	6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-17-16
Date End	5-17-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Grass surface, pavement extension on apron

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH006-S1	1	0.4		SP-SM M.C.=10.3% p200=7.4%		**0-0.4':** Loose, grayish brown, fine to medium grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, Grass and roots.	29
					2					**0.4-4':** Loose, grayish brown, fine to medium grained **SILTY SAND (SM)**, dry to moist	
	1		SPT	TH006-S2	4	1.5	10				28
					6						
	2							SM M.C.=12.8% p200=19.7%			27
					4						
					5						
	3		SPT	TH006-S3		1.8	10				26
					5						
					6						
	4									**4-6.5':** Loose, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, moist	25
Hollow-Stem Auger					4						
	5				5						24
			SPT	TH006-S4		1.3	10				
					5						
	6				5						23
									BOH	**Bottom Of Hole 6.5'**	
	7										22
	8										21

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF

SE Region Materials

Geology Section

Hole No. TH007

Location Expansion Area

Project : Airport Apron, Runway and Taxiway Pavement Rehab

Station 18+03, 291' L Align L-Line

Lat/Long 58.424766 / -135.707859 (WGS 1984)

Precision Recreational grade GPS, Accuracy 10'

Elevation 30 feet Depth 6.5 feet

Geologist M. Larsen

Field Crew R. Wagster/ J. Young

Date Begin 5-17-16

Date End 5-17-16

Weather Light Rain, 40° F

Equipment CME 45

Hammer CME Auto Hammer (140 lbs)

Drilling_Notes:
Grass surface, pavement extension on apron

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH007-S1	1, 3	0.7		SP-SM M.C.=5.5% p200=8.2%		**0-4':** Medium dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	30
	1		SPT	TH007-S2	3, 3	1.1					29
	2		SPT	TH007-S3	5, 6, 6, 8	1.7	12				28, 27
Hollow-Stem Auger	4									**4-6.5':** Medium dense, grayish brown, fine to coarse grained **SILTY SAND (SM)**, moist	26
	5		SPT	TH007-S4	5, 6, 6, 6	1.8	12	SM M.C.=8.8% p200=13.3%			25
	6								BOH	**Bottom Of Hole 6.5'**	24
	7										23
	8										22

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH008
Location Expansion Area

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	21+53, 339' L Align L-Line
Lat/Long	58.423959 / -135.708871 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	33 feet Depth 6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-17-16
Date End	5-17-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Grass surface, pavement extension on apron

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH008-S1	2, 3, 5	1.3	8	SP-SM M.C.=6.0% p200=7.0%		**0-1.3':** Loose, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	33
	1										32
			SPT	TH008-S2	6	0.7		SP M.C.=4.4% p200=2.6%		**1.3-4':** Loose, grayish brown, fine to coarse grained **Poorly Graded SAND (SP)**, dry to moist, (occasional fine grained, rounded-subrounded gravel)	
	2										31
			SPT	TH008-S3	4, 5, 5, 6	1.7	10				30
	4									**4-6.5':** Medium dense, grayish brown, very fine to fine grained **SILTY SAND (SM)**, moist	29
Hollow-Stem Auger	5		SPT	TH008-S4	3, 6, 7, 7	1.4	13				28
	6										27
									BOH	**Bottom Of Hole 6.5'**	
	7										26
	8										25

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH009
Location General Aviation Apron

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	31+35, 256' L
Align	L-Line
Lat/Long	58.422083 / -135.712562 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	31 feet
Depth	6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-17-16
Date End	5-17-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH009-S1	12	0.4				**0-0.4': ASPHALT**	31
			SPT	TH009-S2	9, 8, 11	1.4	19	SP-SM M.C.=11.1% p200=8.9%		**0.4-6.5':** Medium dense, grayish brown, very fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	
	1										30
	2		SPT	TH009-S3	3, 7, 7, 7	1.8	14				29
	3										28
Hollow-Stem Auger	4		SPT	TH009-S4	4, 6, 5, 4	1.5	11	SP-SM M.C.=15.3% p200=5.1%			27
	5										26
	6								BOH	**Bottom Of Hole 6.5'**	25
	7										24
	8										23

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH010
Location Heavy Aircraft Apron

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	18+35, 698' R — Align H-Line
Lat/Long	58.421896 / -135.702033 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	32 feet — Depth 6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-18-16
Date End	5-18-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH010-S1	26	0.7				**0-0.95': ASPHALT**	32
	1		SPT	TH010-S2	26	0.5				**0.95-6.5':** Dense, gray, fine to coarse grained **Poorly Graded SAND (SP)**, dry to moist, Gravel: fine grained, rounded-subrounded	31
			SPT	TH010-S3	22	0.7		SP M.C.=1.6% p200=4.0%			
	2				24						30
					12						
					16						
	3		SPT	TH010-S4		1.5	34				29
					18						
					20						
	4										28
Hollow-Stem Auger					5						
	5				9						27
			SPT	TH010-S5		1.5	19				
					10						
	6				9						26
									BOH	**Bottom Of Hole 6.5'**	
	7										25
	8										24

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH011
Location Heavy Aircraft Apron

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Project	: Airport Apron, Runway and Taxiway Pavement Rehab
Station	20+98, 705' R Align H-Line
Lat/Long	58.42137 / -135.701097 (WGS 1984)
Precision	Recreational grade GPS, Accuracy 10'
Elevation	32 feet Depth 6.5 feet

Geologist	M. Larsen
Field Crew	R. Wagster/ J. Young
Date Begin	5-18-16
Date End	5-18-16
Weather	Light Rain, 40° F
Equipment	CME 45
Hammer	CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH011-S1	110	0.7				**0-1.2': ASPHALT**	32
	1		SPT	TH011-S2	32	0.5					31
			SPT	TH011-S3	25 / 40	0.8				**1.2-2':** Dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	
	2		SPT	TH011-S4	12 / 12 / 12	1.2	24	SM M.C.=6.7% p200=25.7%		**2-3.5':** Medium dense, grayish brown, fine to coarse grained **SILTY SAND (SM)**, dry to moist, occasional fine, rounded-subrounded gravel	30
	3										29
			SPT	TH011-S5	8	0.5		GM M.C.=16.7% p200=13.5%		**3.5-4':** Loose, gray, fine to medium grained **SILTY GRAVEL with Sand (GM)**, dry to moist, Sand: fine to medium grained, rounded-subrounded	
	4									**4-6.5':** Medium dense, gray, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, moist, occasional fine, rounded-subrounded gravel	28
Hollow-Stem Auger	5		SPT	TH011-S6	5 / 5 / 6 / 5	1.5	11				27
	6										26
									BOH	**Bottom Of Hole 6.5'**	
	7										25
	8										24

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF

SE Region Materials

Geology Section

Hole No. TH012

Location Heavy Aircraft Apron

Project : Airport Apron, Runway and Taxiway Pavement Rehab

Station 20+66, 522' R Align H-Line

Lat/Long 58.42179 / -135.700534 (WGS 1984)

Precision Recreational grade GPS, Accuracy 10'

Elevation 30 feet Depth 6.5 feet

Geologist M. Larsen

Field Crew R. Wagster/ J. Young

Date Begin 5-18-16

Date End 5-18-16

Weather Light Rain, 40° F

Equipment CME 45

Hammer CME Auto Hammer (140 lbs)

Drilling_Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH012-S1	90	0.7				**0-0.7': ASPHALT**	30
	1		SPT	TH012-S2	30	0.5		SP M.C.=0.7% p200=1.1%		**0.7-1.2':** Medium dense, brown, fine to coarse grained **Poorly Graded SAND (SP)**, dry to moist, occasional fine, rounded-subrounded gravel	29
			SPT	TH012-S3	22, 24	0.8		SP-SM M.C.=3.4% p200=5.9%		**1.2-4':** Medium dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	
	2										28
	3		SPT	TH012-S4	9, 11, 11, 12	1.9	22				27
	4									**4-6.5':** Medium dense, grayish brown, very fine to medium grained **SILTY SAND (SM)**, moist	26
Hollow-Stem Auger	5		SPT	TH012-S5	7, 7, 9, 10	1.5	16	SM M.C.=17.6% p200=12.6%			25
	6										24
									BOH	**Bottom Of Hole 6.5'**	
	7										23
	8										22

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Hole No. TH013
Location Heavy Aircraft Apron
Project : Airport Apron, Runway and Taxiway Pavement Rehab
Station 18+35, 504' R Align H-Line
Lat/Long 58.422268 / -135.701322 (WGS 1984)
Precision Recreational grade GPS, Accuracy 10'
Elevation 30 feet Depth 6.5 feet

Geologist M. Larsen
Field Crew R. Wagster/ J. Young
Date Begin 5-18-16
Date End 5-18-16
Weather Light Rain, 40° F
Equipment CME 45
Hammer CME Auto Hammer (140 lbs)

Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
											30
Continuous SPT Sampling			SPT	TH013-S1	100	0.7				**0-0.7': ASPHALT**	
	1		SPT	TH013-S2	20	0.4		SP M.C.=1.7% p200=1.8%		**0.7-1.2':** Medium dense, brown, fine to coarse grained **Poorly Graded SAND (SP)**, dry to moist, occasional fine, rounded-subrounded gravel	29
			SPT	TH013-S3	24, 22	0.7				**1.2-4':** Dense, grayish brown, fine to coarse grained **SILT with Sand (SM)**, dry to moist	
	2				14			SM M.C.=7.9% p200=13.2%			28
			SPT	TH013-S4	12, 12, 14	1.8	24				27
	4									**4-6.5':** Medium dense, gray, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	26
Hollow-Stem Auger					6			SP-SM M.C.=16.6% p200=11.2%			
	5		SPT	TH013-S5	9, 9, 11	1.6	18				25
	6								BOH	**Bottom Of Hole 6.5'**	24
	7										23
	8										22

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

LOG OF TEST HOLE

Hole No. TH014
Location Taxiway A
Project : Airport Apron, Runway and Taxiway Pavement Rehab
Station 17+49, 201' R Align H-Line
Lat/Long 58.423003 / -135.700553 (WGS 1984)
Precision Recreational grade GPS, Accuracy 10'
Elevation 30 feet Depth 6.5 feet

STATE OF ALASKA DOT/PF
SE Region Materials
Geology Section

Geologist M. Larsen
Field Crew R. Wagster/ J. Young
Date Begin 5-18-16
Date End 5-18-16
Weather Light Rain, 40° F
Equipment CME 45
Hammer CME Auto Hammer (140 lbs)

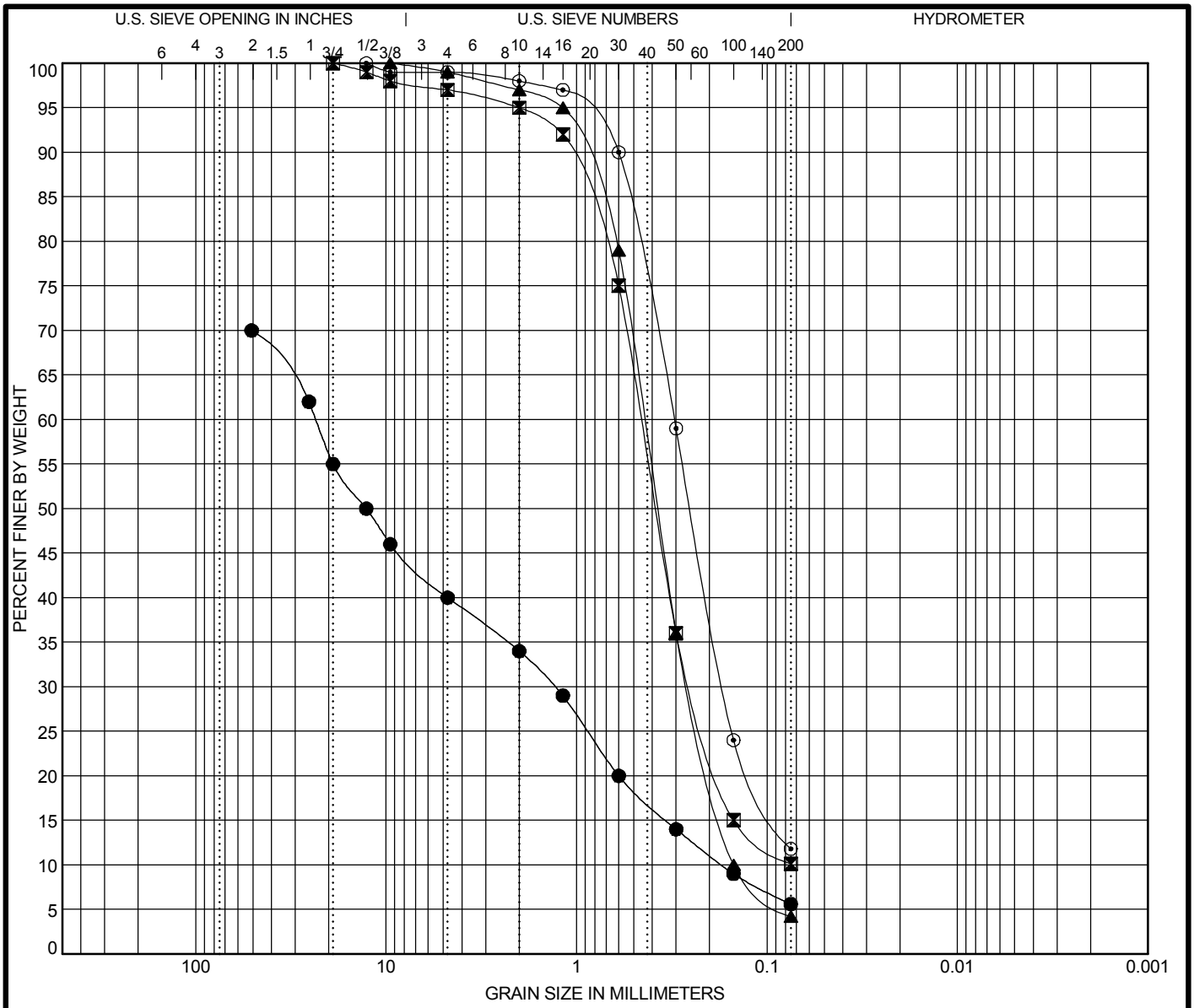
Drilling Notes:
Asphalt surface, pavement data

Drilling Method	Depth in (Feet)	Casing Blows / ft.	Sample Method	Sample Number	SPT Blow Count	Recovery (feet)	N-Value	Sample Data	Soil Graph	SUBSURFACE MATERIAL	Elevation in (Feet)
Continuous SPT Sampling			SPT	TH014-S1	100	0.7				**0-0.7': ASPHALT**	30
	1		SPT	TH014-S2	28	0.5		SP M.C.=1.6% p200=1.8%		**0.7-1.2':** Medium dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Gravel (SP)**, dry to moist, Gravel: fine-medium grained, rounded-subrounded	29
			SPT	TH014-S3	22, 24	0.8		SP-SM M.C.=2.6% p200=5.6%		**1.2-4':** Dense, grayish brown, fine to coarse grained **Poorly Graded SAND with Silt (SP-SM)**, dry to moist, occasional fine, rounded-subrounded gravel	
	2				8						28
			SPT	TH014-S4	13, 14, 14	1.5	27				27
Hollow-Stem Auger	4									**4-6.5':** Medium dense, gray, medium to coarse grained **Poorly Graded SAND (SP)**, moist, occasional fine, rounded-subrounded gravel	26
			SPT	TH014-S5	3, 7, 6, 5	1.3	13	SP M.C.=6.0% p200=4.1%			
	5										25
	6										24
									BOH	**Bottom Of Hole 6.5'**	
	7										23
	8										22

Sample Definition: **SPT** - 1.5' long, 2" O.D. split spoon without a liner driven with a 140 lb. hammer dropped 30 inches. **MPT** - 2' long, 2.5" O.D. split spoon driven with a 340 lbs hammer dropped 30 inch

Appendix B- Laboratory Test Results

(Arranged in Numerical Order)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH001-S2	0.3		**POORLY GRADED GRAVEL with SILT and SAND(GP-GM)**		5.5		NV	NP	NP
⊠	TH001-S3	0.7		**WELL-GRADED SAND with SILT(SW-SM)**		6.2		NV	NP	NP
▲	TH001-S5	4.5		**POORLY GRADED SAND(SP)**		10.7		NV	NP	NP
★	TH002-S2	0.3		**POORLY GRADED GRAVEL with SILT and SAND(GP-GM)**		5.5	2.7	NV	NP	NP
⊙	TH002-S4	2.0		**POORLY GRADED SAND with SILT(SP-SM)**		6.4		NV	NP	NP

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH001-S2	0.3	0.43	135.68	50.8	23.378	1.311	0.172	30.0	34.4	5.6		
⊠	TH001-S3	0.7	1.78	6.22	19	0.46	0.246		3.0	86.9	10.1		
▲	TH001-S5	4.5	0.99	2.94	9.5	0.442	0.256	0.15	1.0	94.8	4.2		
★	TH002-S2	0.3	0.43	135.68	50.8	23.378	1.311	0.172	30.0	34.4	5.6		
⊙	TH002-S4	2.0	1.37	4.53	12.7	0.307	0.169		1.0	87.2	11.8		

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Juneau AK 99801
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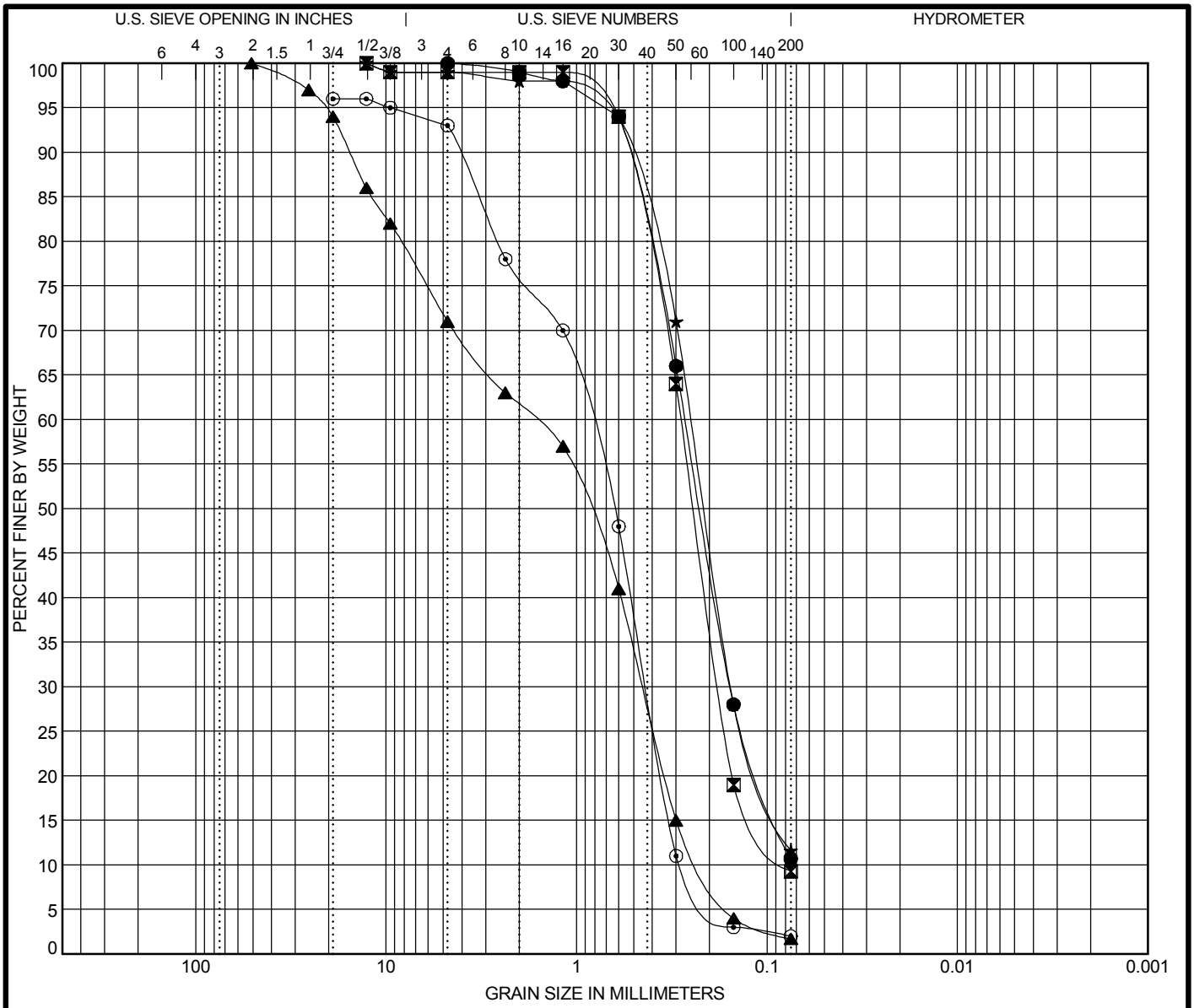
SUBSURFACE DATA:: Results of Laboratory Testing Sheet 1 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD3_GUS_67517.GPJ_71100_SE_AKDOT_MOD_DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH003-S3	0.6		**POORLY GRADED SAND with SILT(SP-SM)**		7.6		NV	NP	NP
⊠	TH003-S4	2.0		**POORLY GRADED SAND with SILT(SP-SM)**		7.1		NV	NP	NP
▲	TH004-S2	0.7		**POORLY GRADED SAND with GRAVEL(SP)**		4.5	2.3	NV	NP	NP
★	TH004-S4	2.0		**POORLY GRADED SAND with SILT(SP-SM)**		7.6		NV	NP	NP
⊙	TH005-S2	0.6		**POORLY GRADED SAND(SP)**		4.2		NV	NP	NP

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH003-S3	0.6	1.23	3.69	4.75	0.269	0.156		0.0	89.3	10.7		
⊠	TH003-S4	2.0	1.42	3.58	12.7	0.282	0.178	0.079	1.0	89.7	9.3		
▲	TH004-S2	0.7	0.55	7.62	50.8	1.669	0.447	0.219	29.0	69.3	1.7		
★	TH004-S4	2.0	1.36	3.58	12.7	0.251	0.155		1.0	87.4	11.6		
⊙	TH005-S2	0.6	0.77	3.15	19	0.868	0.428	0.275	3.0	91.0	2.0		

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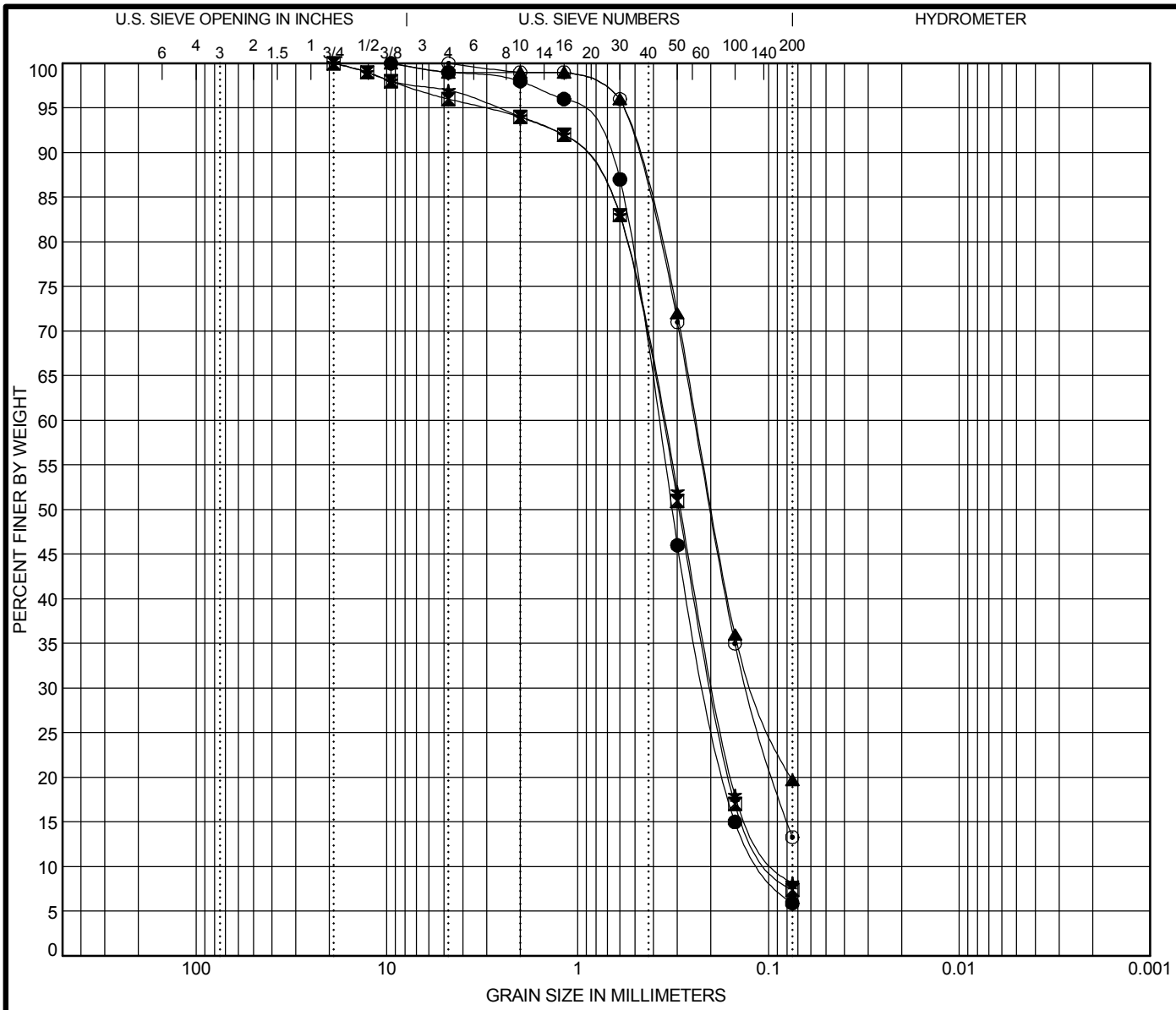
SUBSURFACE DATA:: Results of Laboratory Testing Sheet 2 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US GRAIN SIZE MOD 3 GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH005-S3	1.0		**POORLY GRADED SAND with SILT(SP-SM)**		4.5		NV	NP	NP
⊠	TH006-S1	0.0		**POORLY GRADED SAND with SILT(SP-SM)**		10.3		NV	NP	NP
▲	TH006-S3	2.0		**SILTY SAND(SM)**		12.8		NV	NP	NP
★	TH007-S1	0.0		**POORLY GRADED SAND with SILT(SP-SM)**		5.5		NV	NP	NP
⊙	TH007-S4	4.5		**SILTY SAND(SM)**		8.8		NV	NP	NP

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH005-S3	1.0	1.13	3.71	9.5	0.38	0.21	0.102	1.0	93.1	5.9		
⊠	TH006-S1	0.0	1.16	4.03	19	0.365	0.196	0.09	4.0	88.6	7.4		
▲	TH006-S3	2.0			9.5	0.238	0.116		1.0	79.3	19.7		
★	TH007-S1	0.0	1.20	4.21	19	0.359	0.192	0.085	3.0	88.8	8.2		
⊙	TH007-S4	4.5			4.75	0.243	0.128		0.0	86.7	13.3		

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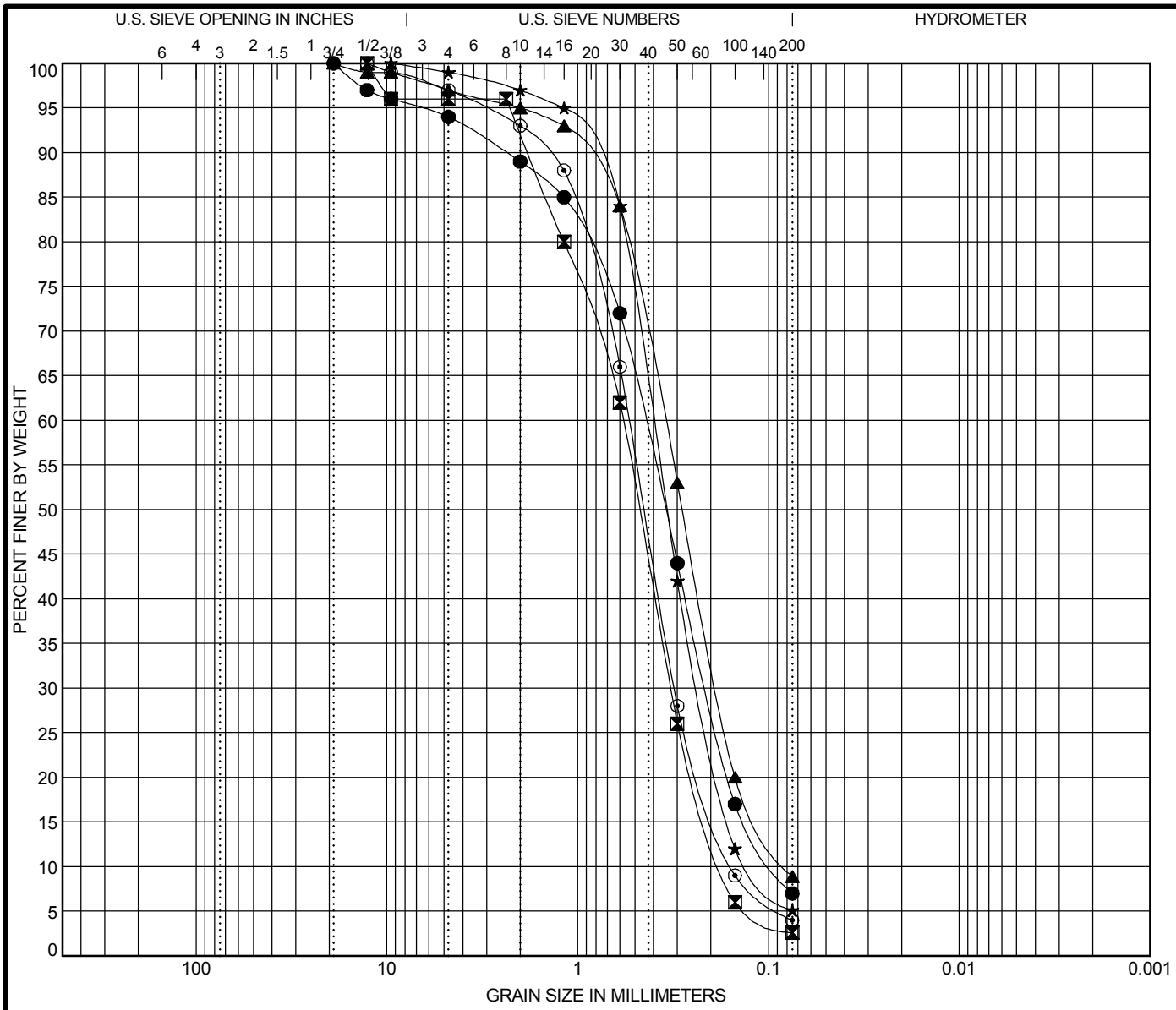
SUBSURFACE DATA:: Results of Laboratory Testing

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD3 GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH008-S1	0.0		**POORLY GRADED SAND with SILT(SP-SM)**		6.0		NV	NP	NP
⊠	TH008-S2	1.3		**POORLY GRADED SAND(SP)**		4.4		NV	NP	NP
▲	TH009-S2	0.4		**POORLY GRADED SAND with SILT(SP-SM)**		11.1		NV	NP	NP
★	TH009-S4	4.5		**POORLY GRADED SAND with SILT(SP-SM)**		15.3		NV	NP	NP
⊙	TH010-S3	1.2		**POORLY GRADED SAND(SP)**		1.6				

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH008-S1	0.0	1.07	4.83	19	0.446	0.209	0.092	6.0	87.0	7.0		
⊠	TH008-S2	1.3	1.06	3.35	12.7	0.577	0.324	0.172	4.0	93.4	2.6		
▲	TH009-S2	0.4	1.22	4.37	19	0.351	0.185	0.08	3.0	88.1	8.9		
★	TH009-S4	4.5	1.04	3.29	9.5	0.404	0.227	0.123	1.0	93.9	5.1		
⊙	TH010-S3	1.2	1.16	3.46	12.7	0.538	0.311	0.156	3.0	93.0	4.0		

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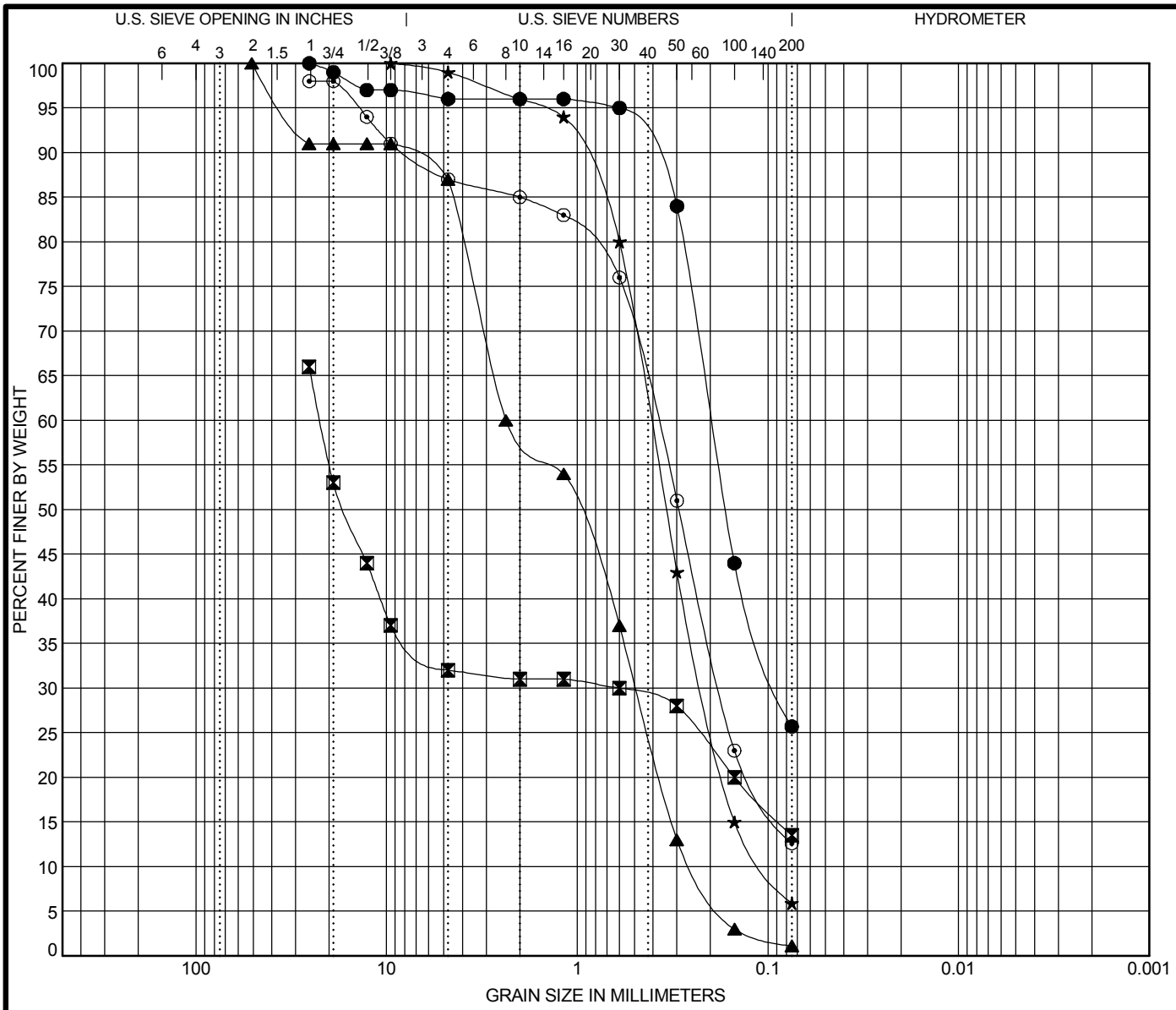
SUBSURFACE DATA:: Results of Laboratory Testing Sheet 4 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD3 GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH011-S4	2.0		**SILTY SAND(SM)**		6.7		NV	NP	NP
⊠	TH011-S5	3.5		**SILTY GRAVEL with SAND(GM)**		16.7		NV	NP	NP
▲	TH012-S2	0.7		**POORLY GRADED SAND(SP)**		0.7		NV	NP	NP
★	TH012-S3	1.2		**POORLY GRADED SAND with SILT(SP-SM)**		3.4		NV	NP	NP
⊙	TH012-S5	4.5		**SILTY SAND(SM)**		17.6		NV	NP	NP

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH011-S4	2.0			25.4	0.198	0.088		4.0	70.3	25.7		
⊠	TH011-S5	3.5			25.4	22.215	0.6		34.0	18.5	13.5		
▲	TH012-S2	0.7	0.42	9.69	50.8	2.36	0.49	0.244	13.0	85.9	1.1		
★	TH012-S3	1.2	1.12	4.02	9.5	0.413	0.217	0.102	1.0	93.1	5.9		
⊙	TH012-S5	4.5			25.4	0.385	0.178		11.0	74.4	12.6		

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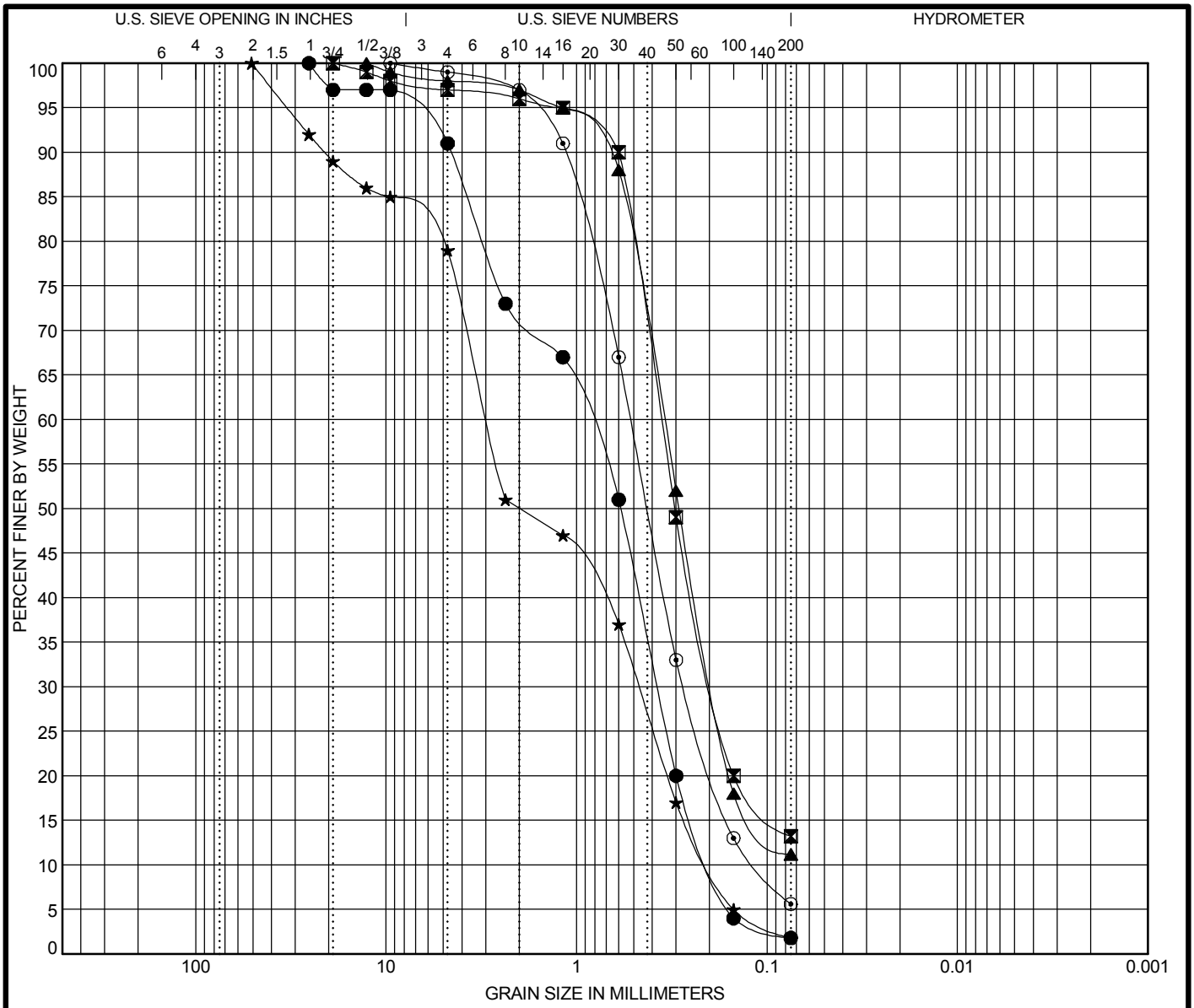
SUBSURFACE DATA:: Results of Laboratory Testing Sheet 5 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD 3 GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

	Sample # / Depth		Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
●	TH013-S2	0.7		**POORLY GRADED SAND(SP)**		1.7		NV	NP	NP
⊠	TH013-S4	2.0		**SILTY SAND(SM)**		7.9		NV	NP	NP
▲	TH013-S5	4.5		**POORLY GRADED SAND with SILT(SP-SM)**		16.6		NV	NP	NP
★	TH014-S2	0.7		**POORLY GRADED SAND with GRAVEL(SP)**		1.6		NV	NP	NP
⊙	TH014-S3	1.2		**POORLY GRADED SAND with SILT(SP-SM)**		2.6		NV	NP	NP

	Sample # / Depth		Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
●	TH013-S2	0.7	0.82	4.51	25.4	0.878	0.375	0.195	9.0	89.2	1.8		
⊠	TH013-S4	2.0			19	0.361	0.19		3.0	83.8	13.2		
▲	TH013-S5	4.5	1.58	5.27	12.7	0.35	0.192		2.0	86.8	11.2		
★	TH014-S2	0.7	0.37	14.76	50.8	2.955	0.471	0.2	21.0	77.2	1.8		
⊙	TH014-S3	1.2	1.24	4.59	9.5	0.52	0.27	0.113	1.0	93.4	5.6		

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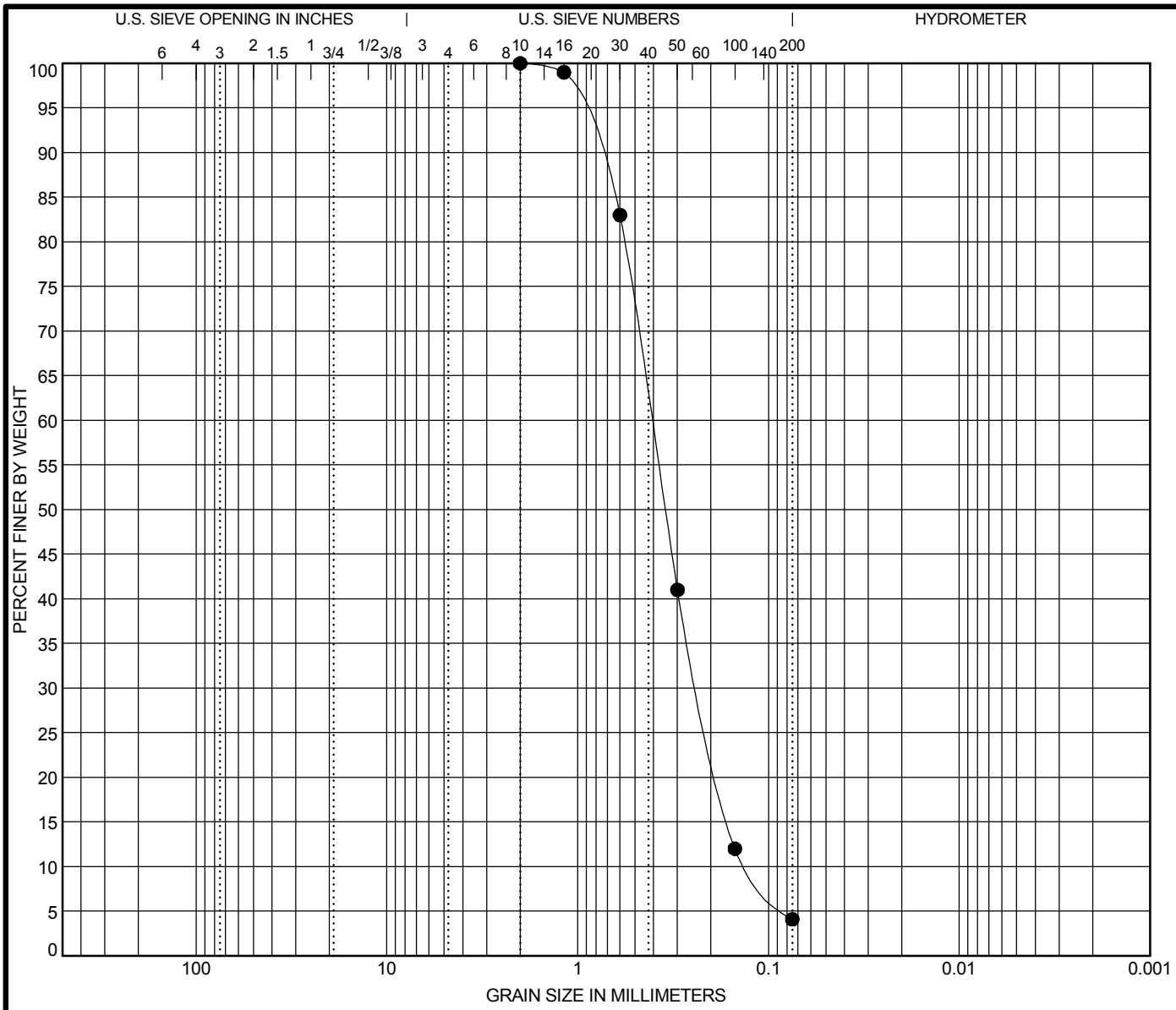
SUBSURFACE DATA:: Results of Laboratory Testing Sheet 6 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD 3 GUS 67517.GPJ 71100 SE AKDOT MOD DEC 2005.GDT 9/1/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	(frost susceptible soils % finer 0.02mm)

Sample # / Depth	Lab #	USCS Classification	%Org	% MC	SpG	LL	PL	PI
● TH014-S5 4.5		**POORLY GRADED SAND(SP)**		6.0		NV	NP	NP

Sample # / Depth	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Frost Susceptible Soils (% finer 0.02mm)
● TH014-S5 4.5	1.03	3.26	2	0.41	0.231	0.126	0.0	95.9	4.1		

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SUBSURFACE DATA:: Results of Laboratory Testing Sheet 7 of 7

Location:

Project: Airport Apron, Runway and Taxiway Pavement Rehab

Number:

US_GRAIN_SIZE_MOD 3_GUS_67517.GPJ_71100_SE_AKDOT_MOD_DEC 2005.GDT 9/1/16

Appendix C- Boring Location Maps

Sheet 1

BORING LOCATION

Airport, Apron, Runway, and Taxiway Pavement Rehabilitation
Gustavus, Alaska

State of Alaska
Department of Transportation and Public Facilities
Southcoast Region

Sheet 1