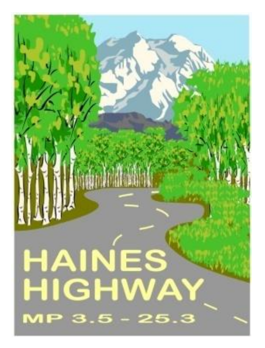

HAINES HIGHWAY
MILEPOST 3.5-25.3

FINAL GEOTECHNICAL REPORT

VOLUME I OF II

SUBSURFACE INVESTIGATION AND GEOTECHNICAL RECOMMENDATIONS

January 2009

DOT&PF PROJECT NO. 68606
HAINES, ALASKA

FINAL GEOTECHNICAL REPORT
HAINES HIGHWAY, MP 3.5 TO 25.3
VOLUME I OF II
STATE PROJECT NO. 68606
HAINES, ALASKA

Prepared for:

State of Alaska
Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, Alaska 99801-7999

Prepared by:

Maria E. Kampsen, P.E.
Geotechnical Engineer

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Appendix C....Laboratory Test Results
Appendix D....Debris Flows

1.0 INTRODUCTION

This report presents the results of the geotechnical field exploration and laboratory soil-testing program in support of the Haines Highway, Milepost (MP) 3.5 to 25.3 project near Haines, Alaska (Figure 1). This work was performed for the State of Alaska Department of Transportation and Public Facilities (DOT&PF).

1.1 Planned Development

The DOT&PF, in partnership with the Federal Highway Administration, plans to upgrade the Haines Highway from MP 3.5 to 25.3. The Haines Highway, a designated Scenic Byway, connects the communities of Haines, Alaska and Haines Junction, Yukon Territory. This highway is one of only several major highways out of the Southeast Alaska region, and is an important international transportation system, as it connects the Alaska Marine Highway in Haines with Canada.

The highway, which was originally constructed in 1943, has been periodically upgraded over the years, with the section from the Bluffs (MP 25.3) to the Canadian border (MP 40) having been most recently completed. During the last upgrades, the design speed for the Haines Highway was designated as 55 miles per hour (mph) in order to make the U.S. and Canadian highways compatible.

The project goal is to bring the MP 3.5 to 25.3 section of the Haines Highway up to National Highway System standards for a design speed of 55 mph by realigning, widening, and straightening portions of the roadway. DOT&PF is also considering possible relocation of the existing Chilkat River Bridge, and potential long-term solutions to debris flow problems near MPs 19 and 23. The upgrades are to provide a safe, consistent, and efficient roadway.

This report documents observed subsurface geotechnical conditions, and provides analyses and interpretations of anticipated subsurface conditions along the alignment. It also presents recommendations for design and construction of the project elements. This report and subsequent recommendations are based on and valid only for, the planned development, as it is currently understood as of August 17, 2006. Any changes to the planned development may impact the recommendations contained herein and should be evaluated by the project geotechnical engineer.

1.2 Purpose of Investigation

The purpose of this investigation was to determine soil and rock stratigraphy along the existing road and proposed realignment areas. This information was compiled and interpreted to make design and construction recommendations for the project.

1.3 Scope of Work

DOWL HKM began this phase of the project by obtaining historical documents from DOT&PF. The information was compiled and reviewed and a scope of work/exploration plan developed. The plan was submitted to DOT&PF in early August 2005 for review and comment. Upon receipt of the comments, a final plan was developed and submitted to DOT&PF on September 19, 2005.

The scope of work for the geotechnical investigation included:

- Permitting
- Geologic mapping
- Evaluation of debris flows
- Subsurface investigation

1.3.1 Permitting

Due to the project location, multiple permits were required to conduct the geotechnical investigation. The required permits included a U.S. Army Corps of Engineers (USACE) Nationwide 6 permit, State of Alaska Department of Natural Resources Title 41 permit, State of Alaska Parks Special Park Use permit, State of Alaska Department of Natural Resources Coastal Consistency Review, and Rights-of-Entry for all privately owned parcels. All permits were obtained prior to conducting the subsurface investigation.

Coordination and Section 106 consultation with the State Historic Preservation Office (SHPO) and tribes was also required, resulting in an archaeological monitor being present during Phase II of the geotechnical investigation.

1.3.2 Geologic Mapping

Geologic mapping of bedrock exposures was conducted in areas of proposed realignments or widening. Information to include strikes, dips, trends, plunges, bedrock type, and fracture frequency was obtained. Stereonets were created and kinematic analyses performed. The information was analyzed for maximum rock slopes, access, and related construction issues.

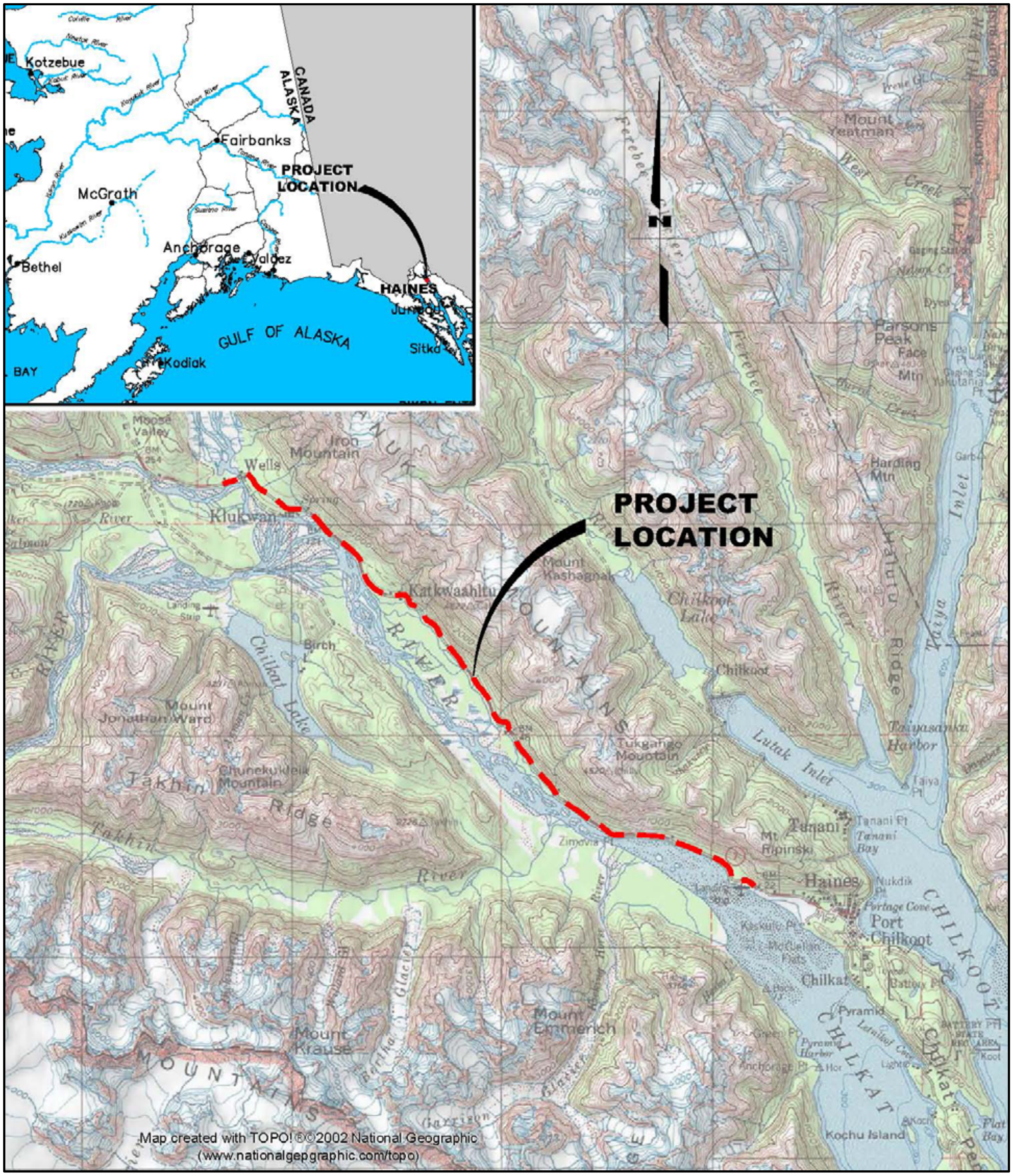
1.3.3 Evaluation of Debris Flows

Two recurring debris flow areas exist along the alignment, at MP 19 and MP 23. As part of this project, documents pertaining to these two areas were reviewed. In addition, a site visit was conducted with the Haines DOT&PF Maintenance Foreman, Mr. Roger Ingledue. This task required an evaluation of the site conditions, development of construction options and corresponding cost estimates, and recommendations.

1.3.4 Subsurface Investigation

The subsurface investigation was planned to be completed in two phases; truck accessible test borings, test pits, and hand probes followed by tracked drill rig test borings. An estimated 100 test borings and 50 test pits were planned. The use of flaggers and the subsequent laboratory testing program was also outlined in the scope of work. Due to archeological concerns in selected areas, some of the test borings and pits have not yet been completed. A third phase has been proposed for completion in the near future.

A separate phase of fieldwork for the proposed bridge site at MP 24 was also included in the exploration plan. Test borings and penetrometers were planned at each abutment to depths of 100 feet. This phase was later removed from the project scope due to budget issues and not completed.



Map created with TOPO! ®©2002 National Geographic
(www.nationalgepgraphic.com/topo)

Figure 1: Vicinity Map

2.0 REGIONAL INFORMATION

Haines is located on the western shore of the Lynn Canal, at the northern end of the Chilkat Peninsula between Chilkat and Chilkoot Inlets in Southeast Alaska, approximately 75 air miles northwest of Juneau. The Haines Highway, MP 3.5 to 25.3 project spans from the airport (MP 3.5) to the Bluffs (MP 25.3) near Haines, Alaska.

2.1 Regional Geology

The Haines Highway lies within the Chatham Trough physiographic province of southeast Alaska. The area is dominated by the steep glaciated mountains and deep glacially scoured fjords. Haines occupies a low saddle area bounded by the bedrock slopes of Mount Ripinski to the north and the bedrock hills of the Chilkat Peninsula to the south. The dominant geologic feature of the region is the Chilkat River valley, which follows the Chilkat River Fault and divides the geologic terrains. The project area is on the east side of the fault and composed of ultramafic and igneous rocks of Cretaceous (Mzm/Mzp) and Tertiary age. The rock includes metamorphosed ultramafics with varying amounts of pyroxene, hornblende, gabbro, dunite, magnetite bearing pyroxenite and metamorphosed basalt. Younger intrusive veins and bodies of igneous rocks such as quartz diorite and mixed felsic volcanics are also present.

The existing road and proposed realignments follow the toe of the steep mountains with slope faces and foliation trends dipping 60 to 85 degrees westward toward the Chilkat River and the Haines Highway. The ultramafic complex trends in a northerly direction, and extends eastward from the Chilkat River Fault to the eastern mountain peaks of 4,000 to 6,000 feet high and beyond into unmapped territory.

The surficial geology of the Haines area has previously been mapped by Richard W. Lemke and Lynn A. Yehle of the U.S. Geological Survey (USGS) as part of a study on geologic hazards in communities in Southeast Alaska.

The surficial deposits are dominated by a unit designated “Qem” and described as “elevated fine-grained marine deposits”. These deposits are thought to have been deposited in a fjord environment by the settling of fine-grained silts and clays derived from glacial action. Subsequent to the retreat of the last glaciation from the Haines area, the land has been rebounding from the effect of loading by glacial ice 5,000 feet or more in thickness. The USGS estimates that the land has been uplifted by as much as 600 feet in the last 10,000 years, and that uplift is still occurring at a rate of about 1 inch per year.

Thus, the upper surface of the fine-grained fjordal sediments in the Haines area has now been elevated to a position well above sea level. The USGS report points out that one to several feet of muskeg commonly overlies these fine-grained marine deposits.

The "Qem" unit is also capped in some places by a "Qeb" unit, which is a veneer of elevated beach deposits consisting of well-sorted and stratified gravel, sand, and cobbles.

2.2 Climate

Haines is located in a maritime climate zone characterized by cool summers and mild winters. The climatological data presented below was taken from a range of sources; including the Department of Commerce, Community, and Economic Development Community Database and the Environmental Atlas of Alaska.

Mean Annual Precipitation	52 in
Mean Annual Snowfall	133 in
Mean Maximum Temperature July	65.9°F
Mean Maximum Temperature January	28.2°F
Mean Minimum Temperature July	51.1°F
Mean Minimum Temperature January	18.4°F
Average Summer Temperature Range	46°F - 66°F
Average Winter Temperature Range	10°F - 36°F
Haines Freezing Degree Days (°F-day)	900
Haines Thawing Degree Days (°F-day)	3,000
Haines Heating Degree Days (°F-day)	8,638

Average monthly temperatures and precipitation amounts for Haines and the vicinity, for the period between 1971 and 2000 are shown in Table 1.

Table 1: Average Monthly Temperatures and Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°F)	23.3	27.7	33.3	41.6	49.5	56.0	58.5	57.0	50.4	41.6	30.8	26.0
Precipitation (including snowfall) (in)	5.45	4.56	2.91	2.40	1.55	1.36	1.36	2.45	5.21	9.13	5.98	5.27

2.3 Topography and Drainage

The roadway was constructed at or near the base of the Takshanuk Mountains adjacent to the Chilkat River. The initial few miles of the project are largely flat, following the river floodplain at the base of the mountains. The road then transitions to rolling topography reflective of the undulating nature of the lower mountainside. Looking toward the end of the project, the overall slope of the road trends to the left across the roadway. Drainage from the mountains flows south to the river, crossing the roadway. Runoff is accommodated by the numerous creeks and culverts that provide cross drainage along the alignment. A hydrology study of the alignment was completed by Interfluve of Hood River, Oregon, under separate cover.

2.4 Notable Features

The road passes through previously developed areas as well as undeveloped areas. Residential structures are periodically present on the both sides of the road, pullouts and eagle-viewing areas have been developed, recreational and subsistence-fishing areas are accessible, and the village of Klukwan is located just past MP 21. Other notable features include archaeological sites, debris flows, the Wells Bridge, a pedestrian walking trail, buried utilities, and an abandoned fuel oil pipeline.

2.4.1 Archaeological Sites

As part of the Haines Highway Improvements, an archaeological survey was performed along the project corridor. Numerous areas of historical significance were identified and are addressed in the report Haines Highway Archaeological Reconnaissance Report, dated October 31, 2005, by Cultural Resource Consultants, LLC.

2.4.2 Debris Flows

Two debris flows are present along the alignment at MP 19 and MP 23. The two flows are considered active with the most recent large flow movement occurring at MP 19 in October 2005. Over 50,000 cubic yards of material were transported over the road, resulting in road closures and a significant cleanup effort.

2.4.3 Wells Bridge

At MP 23.8, the Wells Bridge crosses the Chilkat River. The bridge is a two-lane, concrete-decking, multi-span structure about 500 feet in length. The bridge replaced a wooden structure and was completed in 1958.

2.4.4 Pedestrian Walking Trail

From Station 1010+00 to 1082+00, there is an asphalt paved walking trail situated between the highway and the river. The trail is designed to allow pedestrians to observe the eagles, safely move between designated rest areas, and access eagle viewing platforms that have been constructed.

2.4.5 Haines Military Pipeline

In 1953, the military constructed a petroleum pipeline parallel to the highway. The purpose of the pipeline was to supply fuel to the military bases in the Interior. The fuel line still exists although portions of the pipeline are now used as a conduit to house telephone and electric utility lines.

2.4.6 Buried Utilities

Along the alignment, electric and telephone utilities are present. These utilities serve the residents of Haines and the Chilkat Valley. Alaska Power and Telephone is responsible for the fiber optic and telephone cable along the entire project corridor and for the electric service to MP 10. From MP 10 to MP 25, Inside Passage Electric Company maintains the electrical service. Cable television is also present along the alignment from MP 3 to MP 5 as an overhead coaxial cable.

2.5 Permafrost

No permafrost was encountered in any of the test borings, nor is any known to exist in the general vicinity of the project corridor. In addition, no unusually cold soil temperatures were observed in the samples. Therefore, the risk of permafrost being present along the alignment is low. The contractor should be aware that if any evidence of frozen soil is encountered in any of the excavations, we should be notified immediately to evaluate the situation.

3.0 RESEARCH AND FIELD EXPLORATION

This section presents the technical data obtained from office research and the field investigation. The methods and procedures used in obtaining the data are presented. The data should be considered accurate only at the locations specified and only to the degree implied by the methods used.

3.1 Research

Several subsurface investigations have been conducted along the project corridor over the last several decades. These investigations included an environmental assessment, reconnaissance level investigations, bridge investigation, and a geologic evaluation of the debris flows. These investigations were reviewed in order to obtain information on original construction methods, subsurface conditions and to help establish an appropriate drilling program, and are not included in this report. Refer to Section 7.0, References for a list of publications reviewed.

3.2 Field Exploration

The field investigation completed to date was performed between September 2005 and May 2006. The project was divided into three phases as detailed below.

- Geologic Mapping and Alignment Observations,
- Phase I Test Boring Exploration, and
- Phase II Test Boring/Test Pit Exploration

The information obtained during the field explorations is presented graphically on the test pit and test boring logs found in Appendix B. The Test Hole Explanation Guide presented prior to the test boring/pit logs, should be reviewed to help understand the information presented on the test pit/test boring logs. Abbreviated versions of the logs are shown on the plan and profile sheets, Appendix A.

The test boring locations were staked and painted prior to drilling or excavating. In some instances, site conditions necessitated offsetting the test boring/pit locations from the previously staked locations. The offsets were measured and the elevations were estimated from a topographic map. The test borings and test pit locations have not been surveyed but their approximate locations are shown on Figures 1 through 44, Plan and Profile Sheets, Appendix A.

3.2.1 Geologic Mapping/Alignment Observations

There are a number of locations along the alignment, where road widening or relocation will result in rock cuts. At these locations, the existing bedrock exposures were mapped in general accordance with DOT&PF's "*Alaska Field Rock Classification and Structural Mapping Guide.*" It is important to note that during the mapping phase, the presence of snow limited observations. Fifty-five baselines were established and the following information obtained:

- strikes, dips, trends, plunges,
- type of bedrock, fracture frequency,
- presence of water/runoff,
- digital photographs, and
- recorded observations.

The information obtained was used to complete stereonets and kinematic analyses of rock cuts. Details regarding the geologic mapping are located in Volume II, Geologic Mapping, Haines Highway, MP 3.5 to MP 25.3.

Observations were recorded along the alignment and probable realignment areas as identified in the Alignment Study dated October 2005 by DOWL HKM. These observations began in October and continued throughout the duration of the fieldwork. Tasks included photographs of outcrops, exploring potential access routes to the top of bedrock exposures, walking realignments, and hand probes. Hand probes were completed along the entire alignment and along potential realignments in an effort to delineate the depth and extent of surface organics. The probes were performed by hand probing with a steel rod until an unyielding surface was encountered. The average depth of organics encountered in each area was recorded and is shown on the plan sheets.

3.2.2 Phase I Test Boring Exploration Program

The Phase I investigation was initially planned to address all truck accessible test borings and test pits adjacent to the road where flaggers and traffic control would be required. Due to a delayed start to the fieldwork and winter weather conditions, some of the road test borings were not completed during Phase I. In addition, archaeological concerns moved the test pit program to Phase II, pending completion of the archaeological survey.

During October and November 2005, a total of 43 test borings were drilled along the alignment. The test borings were drilled using a Mobile B-61, truck-mounted drill rig fitted with hollow-stem auger. The drill rig is owned and operated by Denali Drilling, Inc. of Anchorage, Alaska. The test borings were drilled to explore and sample the existing road section and underlying material, while minimizing damage to the existing section. The samples collected were evaluated for their potential for reuse. The test borings ranged in depth from 2.5 feet to 16.5 feet and were logged by Mr. John Rego, Jr., a geologist with DOWL HKM.

Several types of sampling were conducted; bulk, grab, and disturbed. Bulk samples were obtained from selected test borings from below the asphalt pavement to a depth of three feet. These samples were typically 15,000 to 30,000 gram samples obtained for proctor tests. In some instances, grab samples were obtained at a depth of two feet or two and a half feet from the auger flights. These samples were typically 3,000 to 6,000 gram samples for mechanical analyses. Split spoon samples were typically obtained at depths of two and a half feet, five feet, and then at five-foot intervals thereafter.

The sampling intervals and frequency were dictated by the test boring location and conditions encountered and determined in the field. Either Standard Penetration Tests (SPT) or modified penetration tests were performed in each of the test borings. The results are an indication of the relative density or consistency of the subsoil.

The SPT was performed in 20 of the test borings by driving a two-inch outside-diameter, split-spoon sampler a distance of 18 inches ahead of the auger with a 140-pound hammer falling 30 inches in accordance with American Society for Testing and Materials (ASTM) D1586. The standard penetration resistance (N) value shown on the test boring logs indicates the number of blows required to drive the sampler the last 12 inches. The N-values shown in the logs are raw data from the field and have not been adjusted for overburden pressure.

The penetration test is a modification of the SPT in that the hammer weight and sampler are larger and are often used to retrieve larger samples of soil. The penetration test was performed in the remainder of the test borings. The penetration test is performed by driving a two and one-half inch inside-diameter, split-spoon sampler a distance of 18 inches ahead of the auger with a 340-pound hammer falling 30 inches. The blow counts shown on the test boring logs indicate the number of blows required to drive the sampler for each six-inch interval. N-values are not shown in the logs, as there is not a direct accepted correlation between the larger sampler/hammer and the SPT.

As the soil samples were recovered, they were visually classified and sealed in plastic bags to preserve the natural water content. The samples were then transported to DOWL HKM's laboratory, Alaska Testlab, in accordance with ASTM 4220, for further testing.

Slotted PVC pipe was installed in the majority of the test borings and the depth to the groundwater was measured after the water levels appeared to have stabilized.

3.2.3 Phase II Test Boring/Pit Exploration Program

The Phase II investigation was initially planned to address all test borings requiring track-mounted rig access. Due to changes during Phase I, truck accessible test borings that were not completed during Phase I were also drilled during Phase II and test pits were completed. Flaggers and traffic control were required for most of the second phase. The number of test pits planned was reduced due to utilities, accessibility, and budgetary concerns. With the completion of the archaeological survey, several test pits were changed to test borings and a number of test borings were not drilled, pending approval/permission from native corporations. These test borings requiring approval were moved into a Phase III, which has not been completed.

Test Borings. During April and May 2006, a total of 63 test borings were drilled along the alignment. The test borings were drilled utilizing two drill rigs:

- Mobile B-61 truck-mounted drill rig
- CME-45 skid-mounted drill rig on a Nodwell

Both drill rigs were fitted with continuous flight, hollow-stem auger. The rigs are owned and operated by Denali Drilling, Inc. The drilling was supervised and the samples logged by Ms. Keri Nutter, a geologist with DOWL HKM.

The test borings in the road and shoulder areas were drilled to explore and sample the existing road section and underlying material while minimizing damage to the existing section. The samples collected were evaluated for their potential for reuse. The test borings drilled outside of the road prism were used to determine depths of peat and soil conditions where road realignments would occur. The test borings ranged in depth from 2.5 feet to 17 feet. Sampling intervals and frequencies were consistent with what occurred in Phase I.

Slotted PVC pipe was installed in the majority of the test borings and the depth to the groundwater was measured after the water levels appeared to have stabilized.

Test Pits. During April 2006, a total of 21 test pits were excavated along the alignment. Each test pit was excavated to rock, to competent mineral soils, or to the limits of the excavator. The test pits varied in depth with a maximum depth of 14.5 feet.

The test pits were excavated using a Hitachi Z-Axis 135 backhoe owned and operated by Mr. Donnie Turner of Turner Construction, Haines, Alaska. Ms. Nutter supervised the test pit exploration and obtained samples of the distinct soil layers.

As the soil samples were recovered, they were visually classified and sealed in plastic bags to preserve the natural water content. The samples were then transported to DOWL HKM’s Anchorage laboratory for further testing.

No environmental testing or monitoring was conducted as a part of this investigation. However, a strong hydrocarbon odor and sheen were encountered in two test borings (101 and 102) located at Stations 825+00 and 828+50, respectively.

It was later discovered that this is a known previous fuel spill site, and the USACE is investigating it as part of their Formerly Used Defense Site (FUDS) program. The USACE plans to take responsibility of any cleanup necessary at this site.

4.0 LABORATORY TESTING

This section of the report presents the technical data obtained during the soil laboratory testing in narrative, tabular, and graphic form. The methods and procedures used in obtaining the data are described herein. The data should be considered accurate only to the degree implied by the methods used.

An engineering technician visually classified each sample recovered and the natural water content was measured. Index tests were performed on selected samples and consisted of grain size analyses, plasticity index tests, organic content tests, and maximum soil density tests.

4.1 Visual Classification

In the laboratory, an engineering technician visually classified each soil sample obtained from the field exploration. The visual classification procedure consists of:

- identifying the color of the soil,
- estimating the percentages of gravel, sand, and minus No. 200 particle sizes,
- estimating the maximum particle size,
- estimating the size range of the sand particles,
- identifying the shape of the particles,
- estimating the dry strength of the soil when a water content test is performed,
- estimating the plasticity description of the soil and plasticity index,
- comparing the natural water content with respect to the Atterberg limits, and
- identifying the Unified Soil Classification System group.

4.2 Moisture Content

The natural water content of each sample was determined in accordance with ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock. The water contents are reported on the graphic test boring/pit logs, Appendix B.

4.3 Particle Size Distribution

Ninety particle-size distribution tests were performed on selected soil samples in accordance with ASTM D422, Standard Test Method for Particle-Size Analysis of Soils. These tests consisted of mechanical sieving, the results of which are presented graphically as Appendix C.

4.4 Plasticity Index

Seven plasticity index tests were performed in accordance with ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. The liquid limit, plastic limit, and plasticity index numbers obtained from the test are plotted and used to classify the cohesive soil as silts or clays. In addition, the limits are used to estimate strength and settlement characteristics of these soils.

The liquid limit is the water content (in percent) of a soil passing the boundary between the liquid and plastic states. If the *in situ* moisture content of the soil is higher than the liquid limit, the soil will be difficult to properly compact.

The plastic limit of a soil is the lowest water content at which the soil is plastic. The difference between the liquid and plastic limits is the plasticity index or the range of water contents where a soil will behave plastically. All of the plasticity index tests determined the material to be "nonplastic" and the selected samples tested are identified in the table below.

Table 2: Plasticity Index Tests

Test Boring No.	Sample No.	Depth (ft)	Measured Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Classification of Finer Fraction
10	1	0.5-2	34	Non-Plastic		----	Silt
25	3	5-6.5	36	Non-Plastic		----	Silt
43	1	0-2	62	Non-Plastic		----	Silt
49	3	7.5-9.5	44	Non-Plastic		----	Silt
50	2	5-7	37	Non-Plastic		----	Silt
84	1	0-2	53	Non-Plastic		----	Silt
91	4	10-11.5	36	Non-Plastic		----	Silt

4.5 Organic Content

Three organic content tests were performed on selected soil samples in accordance with ASTM D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic

Soils. These tests were conducted to determine the ***quantity*** of organic matter in the material ***by weight***. The results of these tests are presented on the test boring logs. The percentage of organics shown in the narrative on the test boring logs is the percentage ***by volume,*** visually estimated in the field.

Table 3: Organic Content Tests

Test Boring/Pit No.	Sample No.	Sample Depth (ft)	Organic Content (%)
52	1A	1.0-2.0	4
86	1A	0.5-2	16
110	2	3-3.5	62

4.6 Maximum Soil Density (Proctor)

Twelve modified proctors were performed in accordance with one of three test methods:

> AASHTO T-180B - Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop, Method B
>
> ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
>
> ASTM D4253 - Maximum Index Density of Soils - Vibratory Table

These tests are designed to determine the relationship between water content and dry unit weight of soils using laboratory compaction procedures. These tests provide the basis for determining the percent compaction and water content needed to achieve the required engineering properties for the project.

Table 4: Proctor Tests

Test Boring No.	Sample No.	Depth (ft)	Maximum Index Density (pcf)	Optimum Moisture Content (%)	*In-Situ* Moisture Content (%)
15	1	0.5-3	156.5	4	5
31	1	0-3	115	13	7
55	1	0.3-2.5	148.5	4	6
90	1	0.3-3	148.5	5	6
103	1	0-3	154.5	3.5	4
116	1	0.3-3	142	6	10
122	1	0-3	141	5.5	13
129	1	0.2-3	147	5	6
134	1	0.2-3	151	5.5	6
146	1	0.3-3	159	4.5	6
150	1	0-3	150	----	5
155	1	0.6-3	147.5	3.5	7

5.0 ENGINEERING ANALYSIS AND GENERAL RECOMMENDATIONS

This section of the report includes interpretations and opinions concerning the interaction of the planned development with the surface and subsurface conditions detected by the field exploration and laboratory tests. It reflects an evaluation of the data collected during the field exploration and soil laboratory tests, and an understanding of the planned development. The analysis is valid for the data collected within the scope of work. The collection of additional data, or a change in the development plans, could provide information, which would alter some or all the interpretations and opinions expressed herein.

These general recommendations are based on professional judgment and experience and the data collected during the site exploration and soil laboratory tests. These recommendations generally are not the only design options available; there may be several acceptable alternatives. These recommendations are not intended to represent the only way, but rather to indicate one appropriate option based on the information available.

5.1 Existing Roadway Section

The existing roadway consists of two 10-foot-wide paved travel lanes with two-foot-wide paved shoulders. Along the majority of the alignment, vegetation has been cleared along both sides of the road with guardrail in areas lacking sufficient safety area.

Along the route, the thickness of the pavement section varied depending on the subsurface conditions. The road section was founded on one or more of the following soil conditions; floodplain deposits of soft silts and loose sands, alluvial deposits of sands and gravels, and bedrock. On average, the road section appeared to consist of the following:

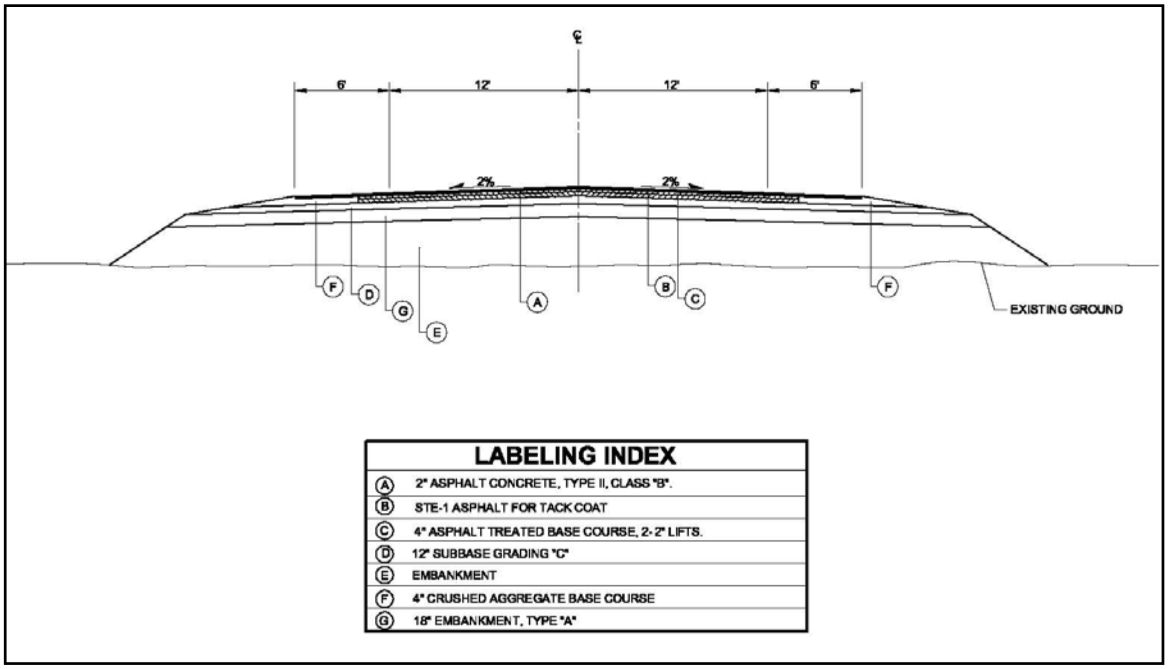
- three inches of asphalt pavement, over
- three feet of Selected Material, Type A, over
- Selected Material, Type B as needed.

No crushed aggregate base course was encountered during the field explorations. In a number of areas, it appeared that Type A material had degraded to Type B. The road embankment appears to have been constructed after the removal of the surficial organics. Any settlement that likely occurred over the years due to the soft, floodplain deposit was probably addressed during pavement repairs over the years.

5.2 New Embankment

The new embankment should be designed and constructed utilizing appropriate procedures that account for anticipated traffic loads that may increase during the life of the road, as well as variable soil conditions along the alignment. The method should account for the reduction in subgrade soil strength during annual spring thaw, acknowledging that differential frost heave may not be eliminated.

Current plans for the flexible pavement design for this project will follow what was previously done on other sections of the highway for design continuity. The overall design follows the procedure in the AASHTO Guide for Design of Pavement Structures in conjunction with an analysis using BERG2, developed by DOT&PF. The design is based on the project design life and anticipated traffic loads for that period, the roadbed material at the site, and the annual depth of frost, estimated to be a maximum of two feet. Since the roadbed material will vary from bedrock to frost susceptible silts, the thickness of the road section will vary. Figure 2 shows the typical section for the roadway.



LABELING INDEX	
Ⓐ	2" ASPHALT CONCRETE, TYPE II, CLASS "B".
Ⓑ	STE-1 ASPHALT FOR TACK COAT
Ⓒ	4" ASPHALT TREATED BASE COURSE, 2- 2" LIFTS.
Ⓓ	12" SUBBASE GRADING "C"
Ⓔ	EMBANKMENT
Ⓕ	4" CRUSHED AGGREGATE BASE COURSE
Ⓖ	18" EMBANKMENT, TYPE "A"

Figure 2: Typical Pavement Section

5.3 Excavation

Excavation. All existing fill, peat, organic silt, and frozen soil should be removed from beneath the embankment and replaced with Selected Material. In some locations, fill material varies in depth from less than three feet to more than eight feet. Much of this fill has been in place for decades. The blow counts in the fill material are generally 20 or higher, and the material appears to meet or exceed the requirements for Selected Material Type B. Therefore, it does not appear to be advantageous or economical to remove all of the existing fill, nor does it appear that complete removal and replacement of all fill will significantly improve the long-term performance of the road section. Therefore, where site grades remain close to existing grades, we recommend that fill material sufficient to construct a three-foot pavement section be removed. The exposed underlying fill material should then be scarified and compacted as specified herein and viewed as the subgrade.

Reuse of Material. Much of the existing fill along the alignment will be reusable in deeper excavations as Selected Material, Type B embankment. The peat, organic silt, and any debris are not reusable and should be wasted off-site. Some of these materials might be suitable for processing to provide topsoil for use within the project.

Surcharge. In some areas, the roadway embankment will be constructed over soft floodplain deposits and elastic settlement is likely. In order to reduce the potential for settlement, one option is to surcharge these areas. This generally requires the placement of sufficient gravel to bring the traffic area to grade (estimated to be about three to six feet) plus an additional two to three feet of gravel. The additional gravel would remain in place for one to two months and the amount of settlement monitored. Once the surcharge is removed, final grading and paving could occur.

Settlement monuments consisting of rebar placed after the surcharge in place can be used to monitor the rate of settlement of the soft material during the construction window. By monitoring actual settlements, reasonable decisions regarding paving and annual maintenance can be made.

Excavation in Sands/Gravels. For excavations where the pavement section is expected to be founded on sands and gravels (GP, GM, SP, SM), the excavation should be made utilizing a backhoe with a smooth-bladed bucket from outside the excavation to minimize disturbance of the subgrade soils. Soils, which are disturbed, pumped, or rutted by the construction activity, should be re-densified as outlined herein, if possible, or completely removed and replaced with structural fill.

Excavation in Silts. For excavations where the pavement section is expected to be founded on silty soils (ML), the approach to excavation is similar to what was previously described. However, pumped or rutted silts are difficult to impossible to recompact when wet or disturbed. There were a number of samples recovered that classified as “non-plastic” yet had very high moisture contents. The soils will be difficult to impossible to compact, will not be able to support heavy loads, will settle, and will have a tendency to pump. In most cases, once disturbed, these soils must be over excavated. These types of soils will be encountered on both sides of the road from the start of the project to about MP 17.5.

Running Sands. Clean sands can present difficulties when excavating below the water table. The sands may be stable when confined by surrounding soils, but seepage forces can create a “quick” condition and wash the sands into the excavation, resulting in slumping and caving of the sides. This phenomenon is locally referred to as a *running sand* or *heaving sand* condition, and can greatly increase the size of an excavation. Deeper excavations may encounter this condition.

The condition can be controlled by drawing the elevation of the water table down to below the bottom of the planned excavation, and with an appropriate dewatering system prior to excavation, maintain the dewatering until the backfill is above the level of the water table.

Clearing and Grubbing. Cut all trees and brush to a maximum height of six inches above the existing ground surface, and a distance of 10 feet beyond slope limits. Remove all woody debris, organics and other objectionable material to an appropriate disposal site outside the project area. Any holes due to extraction of stumps, roots, or other material should be backfilled with Selected Material.

Geotextiles. A geotextile is used to permanently separate two distinct layers of soil in a roadway. For this project, a separation/stabilization geotextile such as LINQ GTF-300, Propex 2006, or equivalent could be used where Selected Material will overlie soft silts.

Frozen Soils. Do not place fill or asphalt pavement over frozen soils. Do not fill or backfill with frozen soils. All frozen soils encountered within the roadway section must be removed.

Selected Material. Two different materials may be used to construct portions of the road embankment; Selected Material Type A and Type B.

At a minimum, the upper 2.5 feet of the subbase should meet the gradation shown in the DOT&PF Standard Specifications for Highway Construction, Table 703-2.07, Selected Material, Type A.

In deeper excavations, Selected Material Type B may be used, as outlined in the DOT&PF Specifications Book, Section 703-2.07, Selected Material, Type B.

Fill Placement. Selected Material should be placed and compacted in lifts not exceeding eight inches in thickness. Each lift of structural fill should be compacted throughout its entire depth to a density of at least 95 percent of the laboratory maximum index density determined in accordance with AASHTO T 180, Method D (Modified Proctor) or Alaska T-12. All excavations should be dewatered before placement of structural fill.

Where the initial lift of fill is situated on soft silts, the lift thickness should be increased to a minimum of 18 inches. The compactive effort should also be reduced to 90 percent. This thicker lift and lower compactive effort helps to reduce the potential for pumping of the soils.

Fill Limits. Structural fill beneath the pavement section is constructed as a prism. The structural fill should extend laterally from the edge of the pavement one foot for each foot of fill beneath the pavement.

Fill Testing. Frequent, in-place density tests (Alaska T-3 or T-11) should be performed in each lift of fill to verify that the fill has been properly compacted prior to placing subsequent lifts. The number of tests performed in each lift should be commensurate with the size of the area worked by the contractor, the variability of the soil types used as fill, and the amount of time an inspector spends on site observing the work.

5.4 Dewatering and Drainage

The reconstruction of the alignment and the construction of realignment areas must take surface drainage into account. As the Haines area receives more than 50 inches of rain a year, surface drainage is a significant concern as runoff can interfere with traffic, cause erosion, or damage the subgrade.

Dewatering. Depending on the measured depth of the groundwater table, the planned construction, and the weather at the time of construction, construction dewatering may be necessary in deeper excavations. Groundwater can likely be removed from excavations with the use of pumps. High infiltration rates of groundwater may require the use of well points or alternate techniques. It is essentially impossible to adequately place and compact structural fill if there is standing water in an excavation. Therefore, it is important that water be removed from excavations until they are properly backfilled. It should be the contractor’s responsibility to determine the appropriate dewatering techniques for construction methods he chooses to use and for the soil and water conditions encountered.

Drainage. The surface water gradient follows the topography. Culverts should be installed periodically along the toe of the embankment to allow for passage of surface runoff. The designer should verify that the culverts could accommodate flood flows to avoid damming along the embankment. Surface drainage should be designed to collect and to carry precipitation and snowmelt away from the road surface.

Surface runoff will likely be present around most excavations and may impact construction efforts. Small shallow trenches or soil berms on the up-slope sides of the excavation can be used to help channel water away from the excavation area.

5.4.1 Runoff

Runoff can be removed from the sides of the alignment by the use of ditch lines, ditch relief culverts, or in-sloping or out-sloping the road surface.

Ditch lines. Surface runoff is a significant consideration for construction of the roadway. The existing alignment typically has a drainage ditch parallel to the road on the up-slope side. The depth and width of the ditch line varies depending on terrain. In areas of the alignment where a hill or cut face abuts the road section, drainage ditches should be constructed to accommodate higher quantities of runoff and should be a minimum of one foot deep. Areas where the topography is flat and more open could have shallower ditch lines. The ditch lines would then parallel the road until a ditch relief culvert in encountered.

Ditch Relief Culverts. Ditch relief culverts are placed periodically along the alignment to intercept the flow of water in the ditch lines. These culverts pipe water to the opposite side of the road where the flow disperses away from the pavement section. The spacing of ditch relief culverts depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effect of water concentrations on slopes below the road.

5.4.2 Groundwater

Some test pits and test borings encountered shallow groundwater along the existing road alignment. It should be anticipated that locally low areas where the vegetation consists of muskeg, would have a high water table. Some of these areas include:

- Stations 280+00 - 290+00 (Plan Sheets 3 and 4),
- Stations 510+00 – 532+00 (Plan Sheets 12 and 13),
- Stations 732+-00 to 740+00 (Plan Sheet 21), and
- Stations 813+00 – 828+00 (Plan Sheet 24)

In general, along the alignment, groundwater will tend to flow in one of three areas:

- along the peat/soil interface in areas of poor drainage (TB 38 – Plan Sheet 12)
- through the alluvium (sands and gravels) (TPs 159 and 156 – Plan Sheet 41)
- along the soil/bedrock interface

The water level will tend to fluctuate by several feet seasonally, especially during periods of heavy precipitation and spring “break-up.”

5.5 Soil Slope Stability

Temporary cut slopes and trenches in both granular and fine-grained soils have been known to stand temporarily at very steep angles; however, they also have been known to fail suddenly and without warning thereby claiming lives. It is the responsibility of the contractor to determine appropriate temporary cut slopes or shoring for excavations and trenches for the site soils, water conditions, and surface loading conditions. As a minimum, the contractor should be in full compliance with all appropriate federal, state, and local safety requirements for trenching and shoring.

Permanent cut slopes in soil should be no steeper than 2:1 (horizontal:vertical), and should be protected from surface erosion as soon as possible after cutting. Permanent erosion protection may be accomplished with healthy landscaping such as grass, plants, or coarse gravel. Temporary protection with plastic sheets, straw, wood cellulose fiber mulch, or jute matting may be required if heavy rains occur before the plants are established.

5.6 Excavations in Rock

There are a significant number of areas where bedrock will require removal along the alignment. This investigation indicates that the bedrock will require blasting. Much of the blasted material should be reusable as roadbed material, if care is exercised during blasting. It is important that the blasting be done by a qualified licensed blaster with at least three years experience in the Haines and Southeast Alaska.

The blasting program should be designed to produce a neat cut face with minimal over-blast and loosening of the finished rock face. The blasting program should be designed to generally produce shot rock with a gradation that varies from sand sized particles to stones no larger than 12 inches. Pre-split blasting may be necessary. Any rock in the finished face of the cut loosened by blasting should be removed to control the potential for falling rock and debris at the toe of the slope before the excavation progresses downward. A plan should be in place for the control of flyrock to ensure the safety of the workers.

5.6.1 Cut Slopes in Rock

Fifty baselines were mapped. In addition, kinematic analyses were performed on the existing slopes and on 0.5:1 and 0.25:1 (H:V) slopes. The analyses show that in some areas there is a potential for planar, wedge, or toppling failures to occur as the slopes become steeper. Discussions with DOT&PF personnel were held to identify general practices in Southeast regarding back slopes, catchment widths, and benching. Based on these discussions, the rock type encountered along the alignment, and examples of similar rock cuts across Southeast, we recommend the following:

- Back slope - 0.25:1
- Catchment Widths - varies based on slope height and 80 percent retention
- Benching - 1.5- to 2-foot benches every 30 feet

Slopes cut into the competent bedrock should stand nearly vertical with pre-splitting. However, the bedrock is variable in its quality and fracture frequency. A rock slope cut in highly fractured bedrock may not have the integrity to stand nearly vertical. Each rock cut, after blasting, will need to be evaluated for its stability and appropriateness of the selected slope. The contractor should be prepared to employ stabilization methods, if necessary.

Any overburden at the top of the rock cut should be removed for a minimum distance of 10 feet from the face of the rock and then laid back at a 2:1 slope. A clear zone should be maintained at the toe of the rock cut to protect the public from falling rock and debris. All overburden exposed at the top of the cut should be seeded as soon as is practical after the cut is made to control erosion of the soil.

5.6.2 Rock Slope Stability

Several modes of slope instability were evaluated using Rockpack III, including sliding out of the plane of the cut face and toppling. The bedding planes of the rock units and joint sets were also evaluated to determine if sliding of the rock along those planes is possible or if wedge-type failure modes were possible. The analyses were performed on the existing slope angle as well as slope angles of 63º and 76º. The results of these analyses are provided in Volume II, Geologic Mapping and specific recommendations are provided in Section 6.0, Station-to-Station

Descriptions. It should be noted that the kinematic analyses performed only indicate the potential for rockfalls, are based on generalized data, and are subjective.

There may be local areas of instability at the face of the cuts due to joints and fractures that may become exposed during blasting and excavation. If subsequent investigations show these local areas of instability, the face of the cut should be laid back to safe slope as determined. With cuts in rock, there is also a possibility of local wedge-type failures at the intersection of joint sets and fractures as the rock is excavated. Any zones of local instability should be removed as the excavation progresses or stabilized with rock anchors drilled into stable rock behind loose zones.

5.6.3 Rock Catchment Ditches

At the base of slopes, rock catchment ditches should be constructed (Figure 3). The appropriate width and depth of the ditch depends on the discontinuities of the rock slope, the height of the rock face, and the percentage of rocks retained. Table 5 provides general recommendations based on 0.25:1 slopes, but it should be recognized that some site-specific changes may be required, depending on the resultant rock face. Recommendations based on maximum slopes are provided in the Station-to-Station Descriptions.

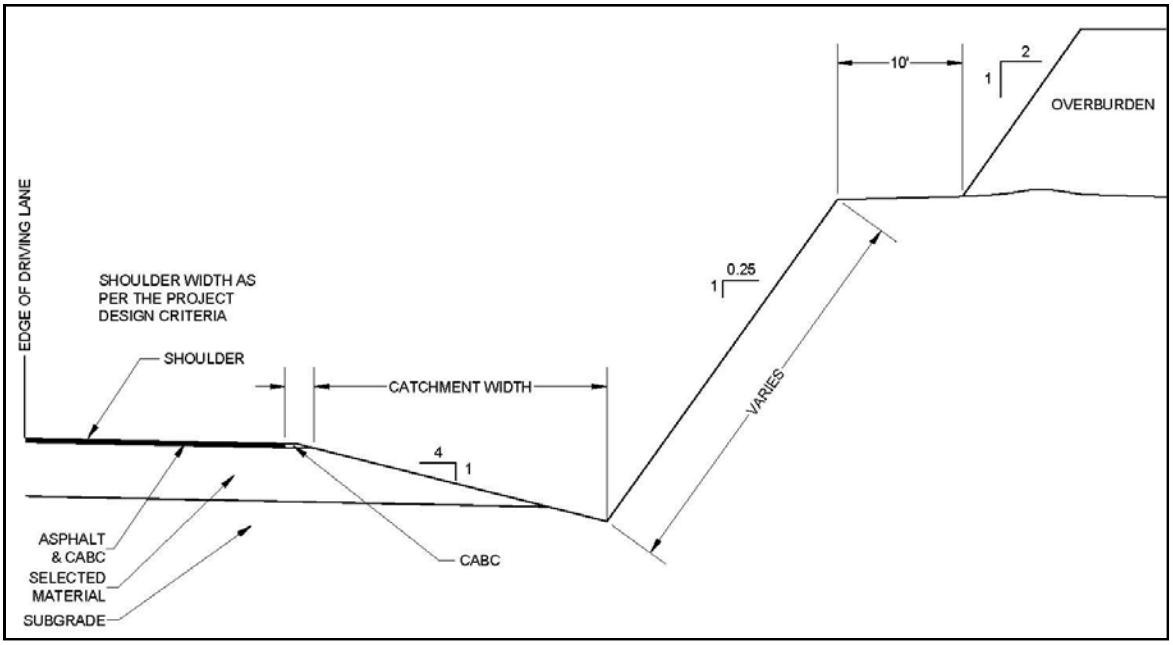


Figure 3: Rock Catchment Ditch

Table 5: Catchment Ditches

Slope Ratio (H:V)	Rock Slope Height (ft)	(80% Retained) Catchment Width (ft)	Catchment Depth at 4:1 (ft)
0.25:1	40	7*	1.75
0.25:1	50	10*	2.5
0.25:1	60	12.5	3.13
0.25:1	70	15	3.75
0.25:1	80**	18	4.5***

* Catchment widths less than 12 feet require guardrail per design criteria for clear zones.

** Add three feet of catchment width for every 10 feet of rock slope height over 80 feet.

*** Catchment depth increases 0.75 feet for every 10 feet of rock slope height (i.e., 200-foot rock slope height = catchment 54 feet wide and 13.5 feet deep.

5.6.4 Access

During the geologic mapping phase, each baseline area was investigated for equipment access routes to the top of the slopes. It was assumed that access would be required for blasting. Areas where potential routes were identified are shown on the Plan and Profile Sheets as arrows.

5.7 Rock Stabilization Methods

Once the slopes have been laid back to their design slopes, the new rock face may indicate localized areas of instability. Stabilization of these areas may be required however; the method of stabilization will likely vary from one location to the next. In general, there are three categories of stabilization:

- Reinforcement
- Rock removal
- Protection

The decision regarding which method to use must address construction issues such as cost, required equipment, access, as well as topography and environmental issues. There is no one method that addresses all instabilities.

5.7.1 Reinforcement

If the cause of instability is potentially loose rock, reinforcement may be required. There are a number of different methods to use. Each has its own advantages and disadvantages and is appropriate under certain circumstances. Figure 4 shows the different methods that can be used for reinforcement to include:

- Rock Bolts – Tensioned to prevent further movement or sliding along the fracture face. Installed across potential failure areas or anchored into competent rock.
- Dowels – Untensioned bolts grouted at the crest of a cut before excavation. Adds stability beforehand to help prevent the rock from moving along the fracture zones. Quicker installation and lower cost than rock bolts.
- Tieback Walls – These types of walls are good for areas where there is a sliding failure in fractured rock. A reinforced concrete wall is constructed over the fracture area and then reinforced rock bolts are placed through the wall and into competent rock. This prevents raveling of the fractured rock over time.
- Shotcrete – The primary purpose of shotcrete is to protect the face of the slope from degrading rock or very closely spaced fractured areas. However, it does not protect against sliding failure. The use of shotcrete should include reinforcement with either welded-wire mesh or steel fibers. Weepholes must be drilled to prevent the buildup of water.
- Buttresses – There are areas where weak rock may fall, creating a cavity. Buttresses can be constructed, where concrete is used to fill the cavity. This protects the weak rock and supports the overhanging rock, preventing further failure. In order for the buttress to perform well, the top of the buttress must be in contact with the rock above and the buttress must be formed such that the rock above supports the buttress in compression.
- Drainage – One of the most common causes of slope failure is groundwater. The typical method of addressing drainage is to drill weepholes into the rock at specified intervals. The weepholes are drilled at the toe of the slope in order to catch water flowing through the fractures and provide an outlet for the water. The angle of the weepholes will vary from exposure to exposure and should be drilled so that they intersect the discontinuities dipping from the rock face.

If excessive runoff flows from the top of the slope and into large fractures, other methods to control drainage could include filling the cracks with shotcrete, or constructing lined drainage ditches at the top of the slope to intercept water and route away from the area.

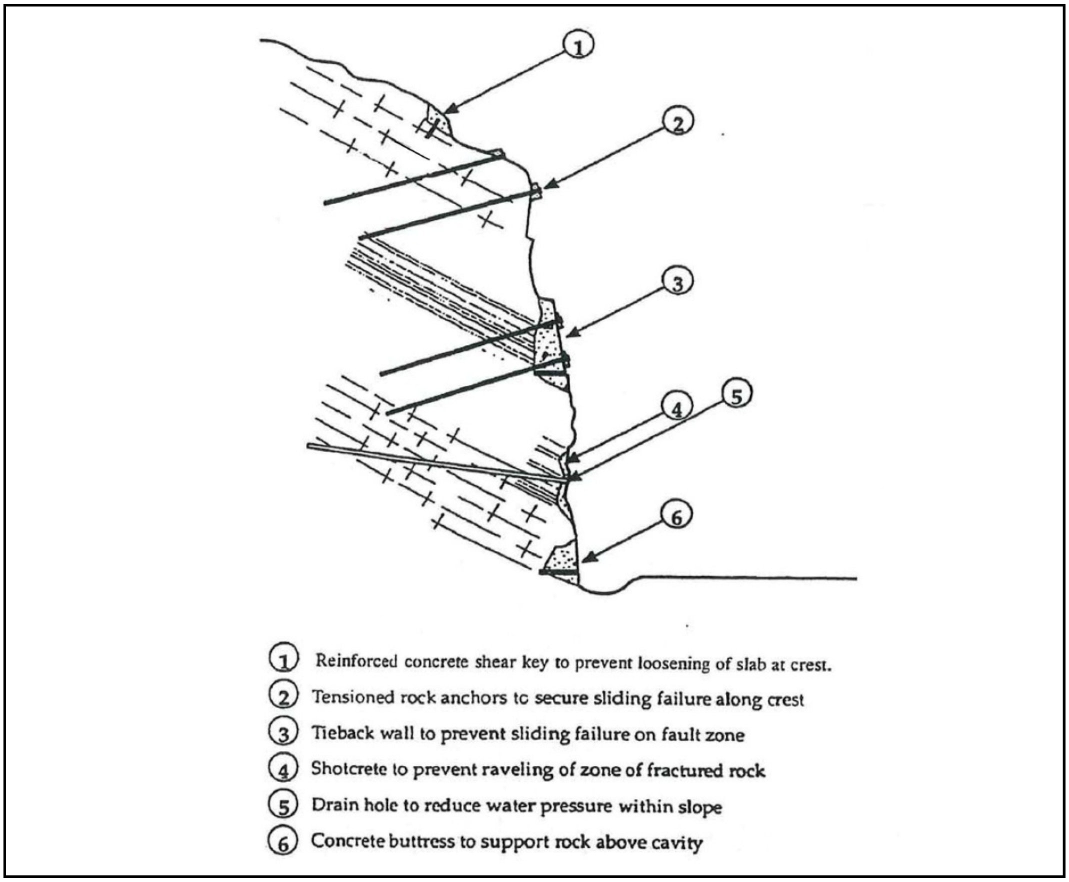


Figure 4: Reinforcement Methods (Wyllie and Mah, 1998)

5.7.2 Rock Removal

There may be areas where there is potential unstable rock and removal is the best option. Typically this can be done in one of three ways and depends of the cause for the instability:

- Resloping. This is primarily done on the upper portions of slopes where weathered rock or overburden is present. If material is not removed for a sufficient distance back from the slope, this adds an unnecessary load to the rock face.
- Trimming. There are occasions where rock will form an overhang on a rock face due to previous failures or weathering. In this case, removal of the rock should be done to prevent future failure. This can be done with controlled, cushioned blasting that only removes small areas of rock.
- Scaling. In areas where there is small rock raveling or vegetation that must be removed, personnel with chain saws and bars can scale from the top of the slope using ropes to

remove these areas. On short slopes, mechanical lifts from the base of the slope can be used.

These methods are shown on Figure 5 below.

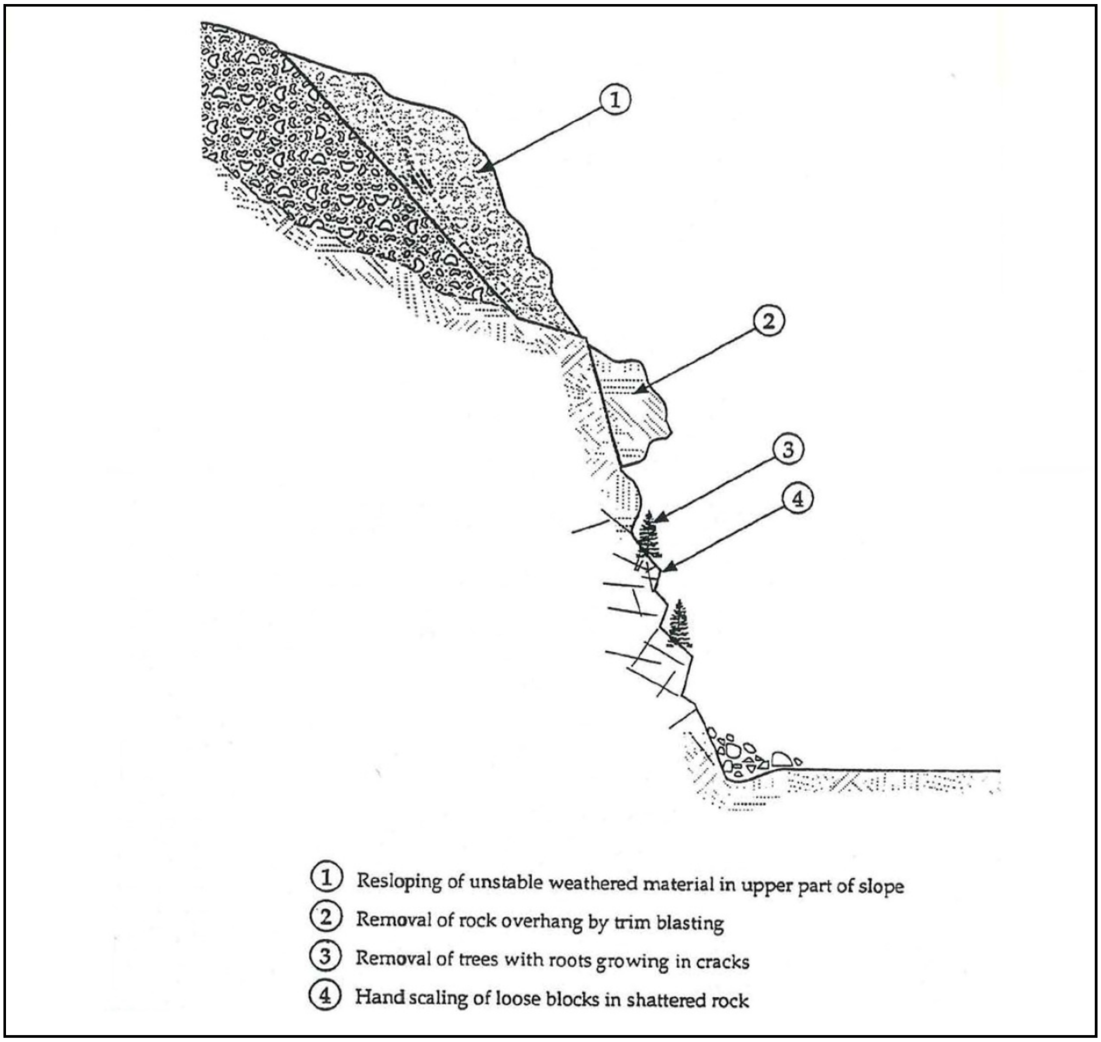


Figure 5: Rock Removal (Wyllie and Mah, 1998)

5.7.3 Protection

In many instances, allowing the rock to fall, but preventing it from impacting traffic or moving too far from the slope is the best option. There are numerous methods that can be used to protect the public from the rock falls. Methods include catchment ditches, mesh hanging from the slope, and barriers some distance from the toe of the slope. The use of the protection must include an analysis into the type of rockfall in order to determine the most appropriate protection measure to employ.

6.0 STATION TO STATION DESCRIPTIONS

6.1 Station 204+00 (BOP) to 235+00 (Sheets 1 and 2 of 44)

This section of the roadway falls within a culturally sensitive area. Permission to access the area for drilling or excavating was not obtained before the Phase I and Phase II fieldwork were completed, and to date, no subsurface exploration has been performed. Test Borings/Pits 1 through 5 have been moved to a future Phase III.

6.1.1 Topography

This section is level and the road extends around a bedrock hill, adjacent to the Chilkat River.

6.1.2 Vegetation

Both sides of the road have been previously cleared. The cleared distance varies depending on which side of the road and topographical features, such as bedrock outcrops, but in general, the cleared setback is at least ten feet. Grass and occasional low shrubs were observed.

6.1.3 Surface Drainage

Ditchlines are present on both sides of the road although occasionally overgrown. Drainage tends to flow from the north to the south.

6.1.4 Proposed Alignment

The new road section will be widened but will still follow the current alignment through a majority of this section. At Station 220+00, the roadway will deviate to the north from the existing section, and cut into the bedrock hill.

6.1.5 Bedrock

Baselines 1 and 2 were completed in this section. The measured discontinuities are as follows:

Table 6: Baseline Data (Station 204+00 – 235+00)

Baseline No.	No. of Joints	Dip Direction (Degrees)	Dip Angle (Degrees)
1	4	125 - 324	25 - 72
2	8	55 - 230	12 - 50

Kinematic analyses indicate that the potential for wedge, sliding, or toppling failures increases for slopes steeper than 50 degrees. Large pieces of rock do fall from the face periodically. A rockfall was observed this spring when a boulder approximately two feet in diameter fell from a distance of about 15 feet at Station 225+00. The rockfall was an impact type fall and retained by the existing catchment.

Recommendations

1. At least one or two test borings should be drilled in this area to confirm suspected subsurface conditions below the roadway.

2. The rock slope angles and catchment depths for this section of the alignment are as follows:

Table 7: Rock Slopes/Catchment Depths (Station 204+00 – 235+00)

Begin Station	End Station	Existing Rock Slope Height (ft)	Existing Slope Angle (degrees)	Existing Slope Ratio (H:V)	Maximum Proposed Rock Slope Height (ft)	Proposed Slope Ratio (H:V)	(80% Retained) Catchment Width (ft)
220+50	226+50	40	49 - 69	0.75:1 to 0.50:1	35	0.25:1	7

3. Water seeps were not observed in the rock faces so weephole locations have not been specified. New rock slopes should be carefully examined for water seeps after a heavy rainfall. As a precaution, weepholes could be installed every 20 to 30 feet along the base of the slope face.

6.2 Station 235+00 to 400+00 (Sheets 2 through 8 of 44)

Within this section, 10 test borings (TBs 9–14, 16, 17, 22, and 23) were completed off both sides of the existing roadway, five test borings (TBs 15, 18–20, and 29) were drilled in the roadway, and TB 25 was drilled on the gravel road shoulder. Test Borings 6–8, 21, 24 and 27 were not drilled and Test Pits 26 and 28 were not excavated.

6.2.1 Topography

This section is level and winds along the Chilkat River at the base of the hills between elevation 25 feet and 35 feet.

6.2.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas.

6.2.3 Surface Drainage

Ditchlines are present in select areas. However, the road section is built up such that the road slopes away from centerline. Drainage tends to flow from the north to the south. At Stations 316+00 and 338+00, heavy flood flows during the winter-transported gravels, sands, and silts down the mountainside and onto the roadway. Remnants of the debris are evident as clogged ditchlines adjacent to the road and newly deposited gravels on the opposite side of the roadway.

Waterfalls over the rock face at Stations 313+08 and 324+34 were observed. Water seeps in the rock face were observed at Station 331+05.

6.2.4 Proposed Alignment

This section of the new roadway is a series of minor realignments while still generally following the current roadway. At Station 301+00, the widening of the road will result in scaling the rock face back less than five feet. At Station 325+00, the roadway deviates slightly to the north from the existing section, and cuts into the bedrock slope a distance of about 30 feet. At Station 375+00, the roadway deviates slightly to the north from the existing section, and cuts into the bedrock hill about 15 feet.

6.2.5 Subgrade Soils

The existing road is a fill section. Poorly and well-graded gravels ranging in thickness from three feet to seven feet have been placed over the floodplain deposits of silts, sands, and silty sands. Off the sides of the road section, peat is present to depths not observed to exceed two feet. The floodplain deposits in the upper five feet of the soil column have low (less than 10) N –values, and more often, less than five.

6.2.6 Bedrock

Baselines 3 through 11 were completed in this section. A ditchline is located at the bases of the rock faces. The measured discontinuities are as follows:

Table 8: Baseline Data (Station 235+00 – 400+00)

Baseline No.	No. of Joints	Dip Direction (Degrees)	Dip Angle (Degrees)
3	10	0 - 30	42 - vertical
4	8	60 - 336	55 - 85
5	5	140 -336	60 - 77
6	11	36 - 336	28 - 81
7	3	225 - 331	50 - 76
8	6	254 - 320	50 - 82
9	9	251 - 340	48 - 86
10	3	50 - 330	62 - 75
11	6	15 - 304	55 - vertical

Kinematic analyses indicate that the potential for wedge, sliding, or toppling failures increases for slopes steeper than 56 degrees. Large pieces of rock fall from the face periodically.

6.2.7 Groundwater Conditions

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column.

Table 9: Groundwater Measurements (Station 235+00 – 400+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 16, 2005 April 24, 2006 April 29, 2006) Depth to Water (ft)	Measured Depth (Nov. 22, 2005 April 27, 2006 May 1, 2006) Depth to Water (ft)
9	19.5	5.5	No PVC
10	19.5	5.5	1
11	25	0	0
12	23	4	No PVC
13	28	1' above ground surface	No PVC
14	27	0	No PVC
15	24	4	1
16	27	0	No PVC
17	22	5	1.5
18	23	5	5.5
19	23	7	2
20	22	8	5
22	28	0	No PVC
23	28	0	No PVC
25	24	9	7
29	29	5	6.5

Recommendations

1. Drainage should be improved in the vicinity of Stations 316+00 and 338+00, where heavy rainfall transports large quantities of water and soil into the ditchline and across the road. This could be accomplished with oversized culverts and deeper ditches.

2. In the vicinity of Stations 240+00, 260+00, 345+00 and 390+00, much of the new roadway will be constructed over soft floodplain deposits with the overall site grades raised by three feet or more. Settlement on the order of two to four inches could occur due to the placement of the gravels. In order to reduce the potential for cracking of the asphalt, fill should be placed early during the construction sequence and paving should be one of the last items completed. This will allow as much settlement as possible to occur before the pavement is placed. It should be assumed that about half of the total settlement would occur before the paving is placed if this sequence is followed. An alternate method of construction is to surcharge with two to three feet of gravel until monitoring indicates the surcharge can be removed.

3. The rock slope angles and catchment depths for this section of the alignment are as follows:

Table 10: Rock Slopes/Catchment Depths (Station 235+00 – 400+00)

Begin Station	End Station	Existing Rock Slope Height (ft)	Existing Slope Angle (degrees)	Existing Slope Ratio (H:V)	Maximum Proposed Rock Slope Height (ft)	Proposed Slope Ratio (H:V)	(80% Retained) Catchment Width (ft)
301+50	304+00	60	63 - 65	0.50:1	70	0.25:1	15
306+00	308+50	30	45 - 56	0.75:1 to 1:1	30	0.25:1	5
312+00	315+00	50	70	0.33:1	45	0.25:1	10
319+00	321+50	45	55	0.75:1	55	0.25:1	12
322+00	334+00	40 - 50	54 - 69	0.75:1 to 0.50:1	65	0.25:1	14
376+00	384+00	25 - 35	51 - 68	0.75:1 to 0.50:1	65	0.25:1	14

4. Water is seeping through the rock near the base of the existing slope at Station 331+05. Weepholes should be installed through this section. The weepholes should be spaced at 10-foot intervals at least 10 feet deep at a shallow angle that intersects the discontinuities. The holes should be lined with perforated casing.

5. In areas where water seeps were not observed in the rock faces, weepholes could be installed every 20 – 30 feet along the base of the slope face as a precaution. New rock slopes should be carefully examined for water seeps after a heavy rainfall.

6.3 Station 400+00 to 520+00 (Sheets 8 through 13 of 44)

Within this section, six test borings (TBs 38–43) were completed off both sides of the existing roadway, five test borings (TBs 30, 32–34, and 37) were drilled in the roadway, and two test borings (TBs 31 and 35) were drilled on the gravel road shoulder. Test Pit 36 was not excavated.

6.3.1 Topography

The topography of this section is similar to the previous section, winding along the Chilkat River at the base of the hills between elevation 35 feet and 45 feet.

6.3.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.3.3 Surface Drainage

Ditchlines are present in select areas. However the road section is built up such that the sides slope away from both sides of the road. Drainage tends to flow from the north to the south. Between Station 453+00 and 454+00, heavy flood flows during the winter-transported gravels, sands, and silts down the mountainside and onto the roadway in this area. Remnants of this debris are evident as clogged ditchlines adjacent to the road and newly deposited gravels on the opposite side of the roadway.

A waterfall over the rock face at Station 461+00 was observed. No water seeps in the rock face were noted through this section of the alignment.

6.3.4 Planned Alignment

The new road section will be widened but will still follow the current alignment through a majority of this section. Between Stations 402+00 and 413+00, the road begins to deviate to the south about 30 feet into the Chilkat River. Other minor alignments where the road cuts into the bedrock to the north occur:

- Between Station 428+00 and 436+00, cutting into the bedrock a maximum distance of about 60 feet,
- Between Station 457+00 and 484+00, cutting in the bedrock a maximum of 50 feet, and on average, less than 30 feet.

6.3.5 Subgrade Soils

The existing road is a fill section. Poorly and well-graded gravels ranging in thickness from 2.5 feet (Test Boring 32) to 10 feet (Test Boring 30) have been placed over the floodplain deposits of silts, sands, and silty sands. Off the sides of the road section, peat is present to depths from two or three inches to five feet (Test Boring 38), but averages less than one foot. The floodplain deposits in the upper five feet of the soil column have low (less than 10) N –values, and more often, less than five. Bedrock was encountered in several of the test borings as shallow as 2.5 feet.

6.3.6 Bedrock

Baselines 12 through 23 were completed in this section. The slope of the bedrock varies from 37 degrees to 71 degrees. Ditchlines are located at the base of the rock faces. The measured discontinuities are as follows:

Table 11: Baseline Data (Station 400+00 – 520+00)

Baseline No.	No. of Joints	Dip Direction (degrees)	Dip Angle (degrees)
12	7	45 - 350	40 - 70
13	7	5 - 330	10 - 81
14	3	40 - 325	50 - 85
15	10	12 - 355	15 - 70
16	6	269 - 345	15 - 74
17	3	185 - 340	37 - 51
18	13	40 - 340	18 - 78
19	7	0 - 305	40 - 85
20	10	234 - 325	17 - 88
21	11	35 - 326	20 - 75
22	3	55 - 338	50 - 87
23	14	157 - 322	38 - 75

Kinematic analyses indicate that the potential for wedge, sliding, or toppling failures increases for slopes steeper than 56 degrees. Large pieces of rock periodically fall from the face.

6.3.7 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column. In the table below, “N.O.” signifies that groundwater was “not observed” while drilling.

Table 12: Groundwater Measurements (Station 400+00 – 520+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 17, 2005, April 23, 2006 through May 1, 2006) Depth to Water (ft)	Measured Depth (Nov. 22, 2005 and April 23, 2006) Depth to Water (ft)
30	28	8	8.5
31	26	4	No PVC
32	----	N.O.	No PVC
33	----	N.O.	N.O.
34	----	N.O.	No PVC
35	----	N.O.	No PVC
37	----	N.O.	No PVC
38	35	N.O.	5
39	35	5	No PVC
40	35	5	No PVC
41	35	5	No PVC
42	35	5	No PVC
43	35	5	No PVC

Recommendations

1. Drainage should be improved between Stations 453+00 and 454+00, where heavy rainfall transports large quantities of water and soil into the ditchline and across the road.

2. The rock slope angles and catchment depths for this section of the alignment are as follows:

Table 13: Rock Slopes/Catchment Depths (Station 400+00 – 520+00)

Begin Station	End Station	Existing Rock Slope Height (ft)	Existing Slope Angle (degrees)	Existing Slope Ratio (H:V)	Maximum Proposed Rock Slope Height (ft)	Proposed Slope Ratio (H:V)	(80% Retained) Catchment Width (ft)
426+00	436+00	35	27 - 61	2:1 to 0.50:1	80	0.25:1	18
458+00	462+00	25 - 35	51 - 60	0.75:1	120	0.25:1	30
462+00	468+00	30	45 - 60	1:1 to 0.75:1	60	0.25:1	12.5
468+00	483+00	35 - 60	37 - 71	1:1 to 0.50:1	130	0.25:1	33

3. Between Stations 402+00 and 413+00, 448+00 and 456+00, and 490+00 and 517+00, much of the new roadway will be constructed over soft floodplain deposits with the overall site grades raised by one to five feet. Settlement on the order of two to four inches could occur due to the placement of the gravels. In order to reduce the potential for cracking of the asphalt, fill should be placed early during the construction sequence and paving should be one of the last items completed. This will allow as much settlement as possible to occur before the pavement is placed. It should be assumed that about half of the total settlement would occur before the paving is placed if this sequence is followed. An alternate method of construction is to surcharge with two to three feet of gravel until monitoring indicates the surcharge can be removed.

4. From Stations 402+00 to 413+00, armor or the use of riprap should be considered for the river side of the embankment to reduce the potential for scour from the river. In addition, the planned alignment shows a low road elevation of about 27 feet, which is very close to the elevation of the water in the river. Raising the road grade through this realignment area should be considered.

5. Water seeps were not observed in the rock faces so weephole locations have not been specified. New rock slopes should be carefully examined for water seeps after a heavy rainfall. As a precaution, weepholes could be installed every 20 – 30 feet along the base of the slope face.

6.4 Station 520+00 to 906+00 (Sheets 13 through 27 of 44)

Within this section, 26 test borings (TBs 45–53, 62–67, 76–78, 82–87, 101, 102,) were completed off both sides of the existing roadway, 16 test borings (TBs 55, 57, 60, 61, 71, 74, 81, 88, 90-93, 104, and 107-109) were drilled in the roadway, three test borings (TBs 44, 68, and 103) were drilled on the gravel road shoulder, and two test pits (TP 80, 106) were excavated.

Test Borings 56, 58, 59, 70, 89, and 95 – 100 were not drilled. Test Pits 54, 56, 58, 59, 69, 72 – 75, and 94 were not excavated.

6.4.1 Topography

This section of the roadway deviates from the main channel of the Chilkat River and begins to gain elevation from elevation 45 feet to about elevation 80. The roadway is situated between the mountains and an overflow branch of the river.

6.4.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.4.3 Surface Drainage

Ditchlines are present in select areas. However the road section is built up such that the sides slope away from both sides of the road. Drainage tends to flow from the north to the south.

No waterfalls or water seeps were noted through this section of the alignment.

6.4.4 Planned Alignment

In this area, the new roadway contains numerous minor realignments and two major realignments required to meet the new design criteria while still generally following the current roadway. Minor realignments are planned at the following stations:

- Between Station 524+00 and 533+00, crossing a low-lying area,
- Between Station 534+00 and 552+00, with a segment cutting into the bedrock a maximum distance of about 30 feet,

- Between Station 612+00 and 623+00, crossing a low-lying area,
- Between Station 643+00 and 662+00, cutting into the bedrock ,
- Between Station 703+00 and 753+00, with some bedrock cuts and crossing a low-lying area,
- Between Station 758+00 and 780+00, cutting into the bedrock,
- Between Station 785+00 and Station 812+00, cutting into the rock about 20 feet,
- Between Station 830+00 and 837+00, cutting into the rock about 30 feet,
- Between Station 840+00 and 851+00, cutting into the rock about 40 feet, and
- Between Station 861+00 and 876+00, cutting into the talus slope.

Major Realignments are planned at the following locations:

- Between Station 665+00 and 692+00, and
- Between Station 879+00 and 906+00.

6.4.5 Subgrade Soils

The existing road through this area continues to be a fill section. Poorly and well-graded gravels ranging in thickness from 2.5 feet to seven feet have been placed over the floodplain deposits of silts, sands, and silty sands. Off the sides of the road section, peat is present to depths from two or three inches to five feet, but averages less than one foot. The floodplain deposits in the upper five feet of the soil column have low (less than 10) N –values, and more often, less than five. Bedrock was encountered in two of the test borings as shallow as 2.5 feet.

6.4.6 Bedrock

Baselines 24 through 55 were completed in this section. The bedrock has a variable slope throughout this area. Ditchlines are located at the base of the rock. The measured discontinuities are as follows:

Table 14: Baseline Data (Station 520+00 – 906+00)

Baseline No.	No. of Joints	Dip Direction (degrees)	Dip Angle (degrees)
24	13	0 - 339	26 - vertical
25	10	3 - 320	28 - 87
26	5	6 - 319	40 - 81
27	12	19 - 325	32 - vertical
28	18	10 - 350	31 - vertical
29	10	195 - 355	51 - 83
30	9	12 - 320	20 - 75
31	14	0 - 350	49 - 81
32	22	0 - 355	17 - vertical
33	4	0 - 331	26 - 89
34	3	55 - 345	59 - 75
35	15	0 - 355	15 - 87
36	22	0 - 358	15 - vertical
37	4	5 - 284	60 - vertical
38	12	45 - 358	27 - vertical
39	14	45 - 334	1 - vertical
40	7	52 - 353	55 - vertical
41	9	98 - 350	5 - 88
42	7	187 - 343	32 - vertical
43	24	17 - 347	32 - vertical
44	4	30 - 333	30 - 75
45	11	4 -338	6 - vertical
46	12	5 - 338	35 - 87
47	4	210 - 355	32 - 77
48	10	18 - 340	36 - 83
49	10	245 - 348	34 - 79
50	11	15 - 359	51 - vertical
51	3	265 - 353	41 - 76
52	10	45 - 350	33 - 87
53	1	333	82
54	22	11 - 343	6 - vertical
55	1	340	50

Kinematic analyses indicate that the potential for wedge, sliding, or toppling failures increases for slopes steeper than 56 degrees. Large pieces of rock periodically fall from the face.

6.4.7 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column. In the table below, “N.O.” signifies that groundwater was “not observed” while drilling/excavating.

Table 15: Groundwater Measurements (Station 520+00 – 906+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 17, 2005, April 25, 2006 through May 1, 2006) Depth to Water (ft)	Measured Depth (Nov. 22, 2005, April 23, 2006 through May 1, 2006) Depth to Water (ft)
44	37	N.O.	5
45	35	5	4.5
46	34	6	No PVC
47	35.5	4.5	No PVC
48	35	5	3
49	40	0	No PVC
50	35.5	4.5	0
51	35	5	No PVC
52	40	5	0.3
53	40.5	4.5	No PVC
55	36	9	9
57	41	5	6.5
60	----	N.O.	No PVC
61	46	N.O.	4
62	41	4	4.5
63	37.5	7.5	4.3
64	40	5	No PVC
65	40	5	PVC not found
66	44	6	No PVC
67	39.5	5.5	6.5
68	42	8	8
71	49.7	N.O.	4.3
76	54	6	No PVC
77	54	6	0.3
78	55	5	0
79	----	N.O.	No PVC
80	53.5	6.5	No PVC
81	46	14	8.5
82	59.5	5.5	2.5
83	52.5	7.5	No PVC
84	54.5	5.5	4.5
85	53	7	No PVC
86	52	8	5
87	----	N.O.	No PVC
88	----	N.O.	No PVC
90	----	N.O.	PVC obstructed
91	49	11	9
92	55	7	9
93	55	5	PVC obstructed
101	----	N.O.	No PVC
102	55	5	1
103	----	N.O.	PVC not found
104	----	N.O.	PVC obstructed
106	----	N.O.	No PVC
107	----	N.O.	No PVC
108	72	8	8
109	----	N.O.	PVC obstructed

Recommendations

1. Between Stations 525+00 and 531+00, 539+00 and 543+00, 614+00 and 620+50, 686+00 and 690+00, and 730+00 and 734+00, much of the new roadway will be constructed over soft floodplain deposits with the overall site grades raised by one to five feet. Settlement on the order of two to four inches could occur due to the placement of the gravels. In order to reduce the potential for cracking of the asphalt, fill should be placed early during the construction sequence and paving should be one of the last items completed. This will allow as much settlement as possible to occur before the pavement is placed. It should be assumed that about half of the total settlement would occur before the paving is placed if this sequence is followed. An alternate method of construction is to surcharge with two to three feet of gravel until monitoring indicates the surcharge can be removed.

2. The rock slope angles and catchment depths for this section of the alignment are as follows:

Table 16: Rock Slopes/Catchment Depths (Station 520+00 – 906+00)

Begin Station	End Station	Existing Rock Slope Height (ft)	Existing Slope Angle (degrees)	Existing Slope Ratio (H:V)	Maximum Proposed Rock Slope Height (ft)	Proposed Slope Ratio (H:V)	(80% Retained) Catchment Width (ft)
543+50	547+50	20 - 30	38	2:1	50	0.25:1	10
564+50	569+50	25 - 35	34 - 54	2:1 to 0.75:1	55	0.25:1	12
573+50	601+50	15 - 40	30 - 50	2:1 to 0.75:1	55	0.25:1	12
608+00	612+00	30	58	0.75:1	55	0.25:1	12
635+50	640+50	30 - 60	45 - 56	1:1 to 0.75:1	55	0.25:1	12
640+50	651+00	70 - >150	49 - 62	1:1 to 0.50:1	220	0.25:1	60
651+00	662+50	25 - 40	33 - 43	3:1 to 2:1	45	0.25:1	9
662+50	685+00	0	10	N/A	90	0.25:1	21
692+50	698+00	20 - 40	40	3:1 to 2:1	85	0.25:1	20
703+50	706+50	20	15	3:1	25	0.25:1	5
706+50	714+00	20 - 80	53 - 59	0.75:1	100	0.25:1	24
714+00	729+50	20 - 80	49	1:1	50	0.25:1	10
762+00	772+00	15 - 50	40 - 53	2:1 to 0.75:1	80	0.25:1	18
772+00	777+50	15	30	3:1	60	0.25:1	12.5
777+50	780+50	20	45	1:1	120	0.25:1	30
780+50	782+00	150	63	0.50:1	225	0.25:1	62
782+00	794+50	60	63	0.50:1	85	0.25:1	20
794+50	799+00	80	63	0.50:1	100	0.25:1	24
799+00	808+50	30	45	1:1	40	0.25:1	7
808+50	812+00	60	63	0.50:1	100	0.25:1	24
830+00	836+50	50	59	0.75:1	120	0.25:1	30
841+00	850+00	50-60	45-57	1:1 to 0.75:1	120	0.25:1	30

3. Water seeps were not observed in the rock faces so weephole locations have not been specified. New rock slopes should be carefully examined for water seeps after a heavy rainfall. As a precaution, weepholes could be installed every 20 to 30 feet along the bases of the rock slopes.

6.5 Station 906+00 to 1020+00 (Sheets 27 through 32 of 44)

Within this section, four test borings (TBs 116–120) were drilled in the roadway, one test boring (TB 122) was drilled on the gravel road shoulder, and ten test pits (TP 110-115, 121, 123, 124 and 126) were excavated. Test Pits 119, 125 and 127 were not excavated.

6.5.1 Topography

This section of the roadway begins with a major realignment from the main roadway across a low lying area about 10 feet lower in elevation that the existing roadway. After the realignment, the roadway climbs in elevation to about elevation 130 while crossing an alluvial fan. The fan contains the MP 19 debris flow, which the roadway crosses before sloping down to elevation 110 feet and the Chilkat River below.

6.5.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.5.3 Surface Drainage

Ditchlines are present and the roadway is crowned such that water drains away from the roadway and side slopes. Drainage tends to flow from the north to the south.

6.5.4 Planned Alignment

At the start of this segment, the planned alignment deviates to the northwest in a substantial realignment that extends from Station 906+00 to 928+00. The new roadway then generally follows the current alignment throughout the rest of this section. There is a minor realignment at the Mile 19 debris flow, where the planned roadway shifts to the west about 60 feet.

6.5.5 Subgrade Soils

The existing road through this area continues to be a fill section. Gravels and sands ranging in thickness from 2.5 feet to eight feet have been placed over the alluvial deposits of gravels and sands. The thickness of the fill material is difficult to determine due to the similarity of the "native" soils below.

In the vicinity of the planned realignment, the soils consist of silts, organic silts, and silty sands that are soft and loose and covered in as much as two feet of peat. Bedrock should not be encountered through this section, although cobbles and boulders will be present.

6.5.6 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column. In the table below, "N.O." signifies that groundwater was "not observed" while drilling/excavating.

Table 17: Groundwater Measurements (Station 906+00 – 1020+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 20, 2005, April 18, 2006) Depth to Water (ft)	Measured Depth Depth to Water (ft)
110	65	7	No PVC
111	----	N.O.	No PVC
112	72	4	No PVC
113	75	3	No PVC
114	82	3	No PVC
115	88	7	No PVC
116	----	N.O.	PVC frozen at 4 ft
117	----	N.O.	PVC frozen at 4 ft
118	----	N.O.	No PVC
120	----	N.O.	N.O.
121	----	N.O.	No PVC
122	----	N.O.	N.O.
123	----	N.O.	No PVC
124	----	N.O.	No PVC
126	----	N.O.	No PVC

Recommendations

1. Between Stations 906+00 and 924+00, a new roadway will be constructed over soft floodplain deposits consisting of silts, organic silts, and sands. In some areas, the site grades will be raised by about three feet. Settlement on the order of two to six inches could occur due to the placement of the gravels. In order to reduce the potential for cracking of the asphalt, fill should be placed early during the construction sequence and paving should be one of the last items completed. This will allow as much settlement as possible to occur before the pavement is placed. It should be assumed that about half of the total settlement would occur before the paving is placed if this sequence is followed. An alternate method of construction is to surcharge with two to three feet of gravel until monitoring indicates the surcharge can be removed.

2. Improvements to the MP 19 debris flow area have been evaluated and are addressed in Appendix D, Debris Flows.

6.6 Station 1020+00 to 1100+00 (Sheets 32 through 35 of 44)

Within this section, one test boring (TB 135) were completed off the side of the existing roadway, and four test borings (TBs 129, 131, 133, and 134) were drilled in the roadway. Test Boring 128 was not drilled and Test Pits 130 and 132 were not excavated.

6.6.1 Topography

This section of the roadway generally follows the existing roadway and steadily climbs in elevation from about elevation 110 to elevation 130. The roadway is situated at the base of the hills and adjacent to the Chilkat River.

6.6.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.6.3 Surface Drainage

Ditchlines are present in select areas. However, the road section is built up such that the sides slope away from both sides of the road. Drainage tends to flow from the north to the south. At Station 1021+50 and 1065+00, heavy flood flows during the winter transported gravels, sands, and silts down the mountainside and onto the roadway in these areas. Remnants of the debris are evident as clogged ditchlines adjacent to the road and newly deposited gravels on the opposite side of the roadway.

6.6.4 Planned Alignment

The planned alignment generally follows the current alignment throughout this section with minor modifications at curves. The largest realignment occurs between Station 1062+00 and 1079+00 where the road shifts inland approximately 100 feet.

6.6.5 Subgrade Soils

The existing road through this area continues to be a fill section. Gravels and sands ranging in thickness from 2.5 feet to five feet have been placed over alluvial deposits of gravels and sands.

In the vicinity of the planned realignment (Station 1062+00 and 1079+00), no excavations were completed. However, it appears that this area consists of alluvial soils and bedrock is not expected to be encountered. Cobbles and boulders will be present.

6.6.6 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column. In the table below, “N.O.” signifies that groundwater was “not observed” while drilling/excavating.

Table 18: Groundwater Measurements (Station 1020+00 – 1100+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 20, 2005) Depth to Water (ft)	Measured Depth (April 17, 2006) Depth to Water (ft)
129		N.O.	No PVC
131	100	----	8
133	113	----	3
134	----	N.O.	No PVC
135	----	N.O.	No PVC

Recommendations

1. Drainage should be improved in the vicinity of Stations 1021+50 and 1065+00, where heavy rainfall transports large quantities of water and soil into the ditchline and across the road.

6.7 Station 1100+00 to 1220+00 (Sheets 35 through 40 of 44)

Within this section, eight test borings (TBs 137, 139, 142–144, and 146-148) were drilled in the roadway, and two test pits (TPs 138 and 149) were excavated. Test Boring 145 was not drilled and Test Pits 136, 140, and 141 were not excavated.

6.7.1 Topography

This section of the roadway moves away from the Chilkat River at elevation 135 and begins a steep winding climb to elevation 168, drops down to elevation 130, and then begins to climb again, passing above the village of Klukwan and the MP 23 debris flow to elevation 318 feet. The roadway then descends to the river crossing below.

6.7.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.7.3 Surface Drainage

Ditchlines are present in select areas. However, the road section is built up such that the sides slope away from both sides of the road. Drainage tends to flow from the north to the south. At Station 1103+50 and 1208+00, heavy flood flows during the winter transported gravels, sands, and silts down the mountainside and onto the roadway in these areas. Remnants of the debris are evident as clogged ditchlines adjacent to the road and newly deposited gravels on the opposite side of the roadway. At Station 1208+00, the amount of debris carried adjacent to the road extended to the river (next section) and across the road at the curve before the river.

6.7.4 Planned Alignment

The planned alignment follows the current alignment throughout this section.

6.7.5 Subgrade Soils

The existing road through this area continues to be a fill section. Gravels and sands ranging in thickness from 2.5 feet to four feet have been placed over alluvial deposits of gravels and sands with the occasional silt layer.

Test Pit 138, excavated at the intersection of the Haines Highway and Village of Klukwan Road indicted about four feet of sandy fill material over four feet of organic silt. It is unlikely that bedrock will be encountered through this segment; however, cobbles and boulders will be present.

6.7.6 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column.

Table 19: Groundwater Measurements (Station 1100+00 – 1220+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 21, 2005, April 22, 2006) Depth to Water (ft)	Measured Depth (Nov. 22, 2005) Depth to Water (ft)
137	----	N.O.	N.O.
139	----	N.O.	N.O.
142	----	N.O.	PVC obstructed
143	249	N.O.	15
144	----	N.O.	No PVC
146	----	N.O.	N.O.
147	----	N.O.	N.O.
148	----	N.O.	N.O.
149	----	N.O.	No PVC

Recommendations

1. Drainage should be improved in the vicinity of Stations 1103+50 and 1208+00, where heavy rainfall transports large quantities of water and soil into the ditchline and across the road.

6.8 Station 1220+00 to 1260+00 (Sheets 40 through 42 of 44)

Within this section, one test boring (TB 154) was drilled in the roadway, one test boring (TB 150) was drilled on the gravel road shoulder, and seven test pits (TPs 151–153, 156–159) were excavated.

6.8.1 Topography

This section of the roadway continues sloping down to the river from elevation 220 to elevation 130. Across the river, the area is at a relatively constant elevation of about 130 feet.

6.8.2 Vegetation

This area is undeveloped and is well forested with old growth trees.

6.8.3 Surface Drainage

On both sides of the river, the areas naturally slope down towards the river. Design of the realignment should incorporate a similar sloping condition as well as ditchlines. The ditchlines on the east side of the river should be designed to incorporate some of the debris that will flow from MP 23 to the river.

6.8.4 Planned Alignment

The planned alignment is a proposed realignment that descends to and crosses the Chilkat River before merging with the existing roadway.

6.8.5 Subgrade Soils

The soils through this area will be a combination of alluvial material and outwash deposits of sands and gravels with near surface silts below the organic mat. Bedrock is unlikely; however, cobbles and boulders will be present.

6.8.6 Groundwater

Within the existing roadway, the groundwater elevations were observed or measured within the upper five feet of the soil column. In the table below, "N.O." signifies that groundwater was "not observed" while drilling/excavating.

Table 20: Groundwater Measurements (Station 1220+00 – 1260+00)

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (April 19, 2006 through April 22, 2006) Depth to Water (ft)	Measured Depth (April 3, 2006) Depth to Water (ft)
150	----	N.O.	N.O.
151	----	N.O.	No PVC
152	----	N.O.	No PVC
153	----	N.O.	No PVC
154	----	N.O.	PVC frozen at 4 ft
156	116	9	No PVC
157	117	8	No PVC
158	119	6	No PVC
159	115	10	No PVC

Recommendations

1. Drainage should be constructed to allow for debris from MP23 to flow towards the river.

6.9 Station 1260+00 to 1317+59 (EOP) (Sheets 42 through 44 of 44)

Within this section, one test boring (TB 155) was drilled in the roadway.

6.9.1 Topography

This section of the roadway generally follows the existing roadway and steadily climbs in elevation. The roadway is situated at the base of the hills away from the river.

6.9.2 Vegetation

Both sides of the road have been previously cleared for a distance of about 10 to 20 feet. Secondary brush is present in some areas. Beyond the road prism and clear zones, the area is well forested with old growth trees.

6.9.3 Surface Drainage

Currently drainage is to the east. No ditchlines are present within the undeveloped area. Ditchlines are present on both sides of the roadway from Station 1265+00 to the end of the project.

6.9.4 Planned Alignment

The planned alignment extends from the river, about 400 feet downstream of Wells Bridge and merges with the existing highway at Station 1265+00.

6.9.5 Subgrade Soils

The existing road through this area continues to be a fill section about seven feet thick and comprised of gravels and sands over alluvial and floodplain deposits of silty sands and silts.

Based on the limited subsurface information collected, it appears that this area consists of alluvial/floodplain soils and bedrock is not expected to be encountered. Cobbles and boulders will be present.

6.9.6 Groundwater

Within the existing roadway, the groundwater elevation was observed or measured within the upper ten feet of the soil column.

Table 21: Groundwater Measurements (Station 1260+00 – 1317+60 (EOP))

Test Boring No.	Estimated Groundwater Elevation (ft)	While Drilling (Nov. 22, 2005) Depth to Water (ft)	Measured Depth (April 3, 2006) Depth to Water (ft)
155	124	7	PVC obstructed

Recommendations

1. Drainage should be constructed to allow for runoff to flow towards the river.

7.0 REFERENCES

Beikman, Helen M., 1975, Preliminary Geologic Map of Southeastern Alaska, Miscellaneous Field Studies Map, MF-673, U.S. Geological Survey.

Brew, David A. and Morrell, Robert P., 1980, Intrusive Rocks and Plutonic Belts of Southeastern Alaska, U.S.A., Open file report 80-78, U.S. Department of the Interior, Geological Survey, 34p.

DOT&PF, 1993, Engineering Geology and Geotechnical Exploration Procedures Manual, Engineering and Operations Standards, Headquarters Materials Section, Engineering Geology/Geotechnical Section, Anchorage, Alaska, 98p.

DOT&PF, 2003, Alaska Field Rock Classification and Structural Mapping Guide, Engineering and Operations Standards, Headquarters Materials Section, Engineering Geology/Geotechnical Section, Anchorage, Alaska, 60p.

DOWL HKM, 2005, Alignment Study, Haines Highway, MP 3.5 to MP 25.3, ADOT&PF Project No. 68606, DOWL HKM, Anchorage, Alaska, 24p.

Elphic, Lance G., Schraeder, Robert L., 1998, Haines Highway, MP 26.5 to Muncaster Creek, Geotechnical Report, MP 26.5 to MP 28.6, Federal Project Number NH-F-093-6(16), Project Number 71872, Volume I of II, Alaska Department of Transportation and Public Facilities, Southeast Region Geotechnical Section, Juneau, Alaska, 26p.

Elphic, Lance G., Schraeder, Robert L., 1998, Haines Highway, Wells Bridge to Milepost 26.5, Geotechnical Report, MP 23.9 to MP 26.5, Project No. 71873, Volume I of II, Alaska Department of Transportation and Public Facilities, Southeast Region Geotechnical Section, Juneau, Alaska, Appendix B.

Johnson & Hartman, 1984, Environmental Atlas of Alaska, 2nd Ed. Revised: Institute of Water Resources, University of Alaska, Fairbanks, 95p.

Lemke, Richard W. and Yehle, Lynn A., 1972, Reconnaissance Engineering Geology of the Haines Area, Alaska, with Emphasis on Evaluation of Earthquake and Other Geologic

Hazards, Open file report 72-229, U.S. Department of the Interior, Geological Survey, 109p.

MacKevett, E.M., Jr., Robertson, E.C., and Winkler, G.R., 1974, Geology of the Skagway B-3 and B-4 Quadrangles, Southeastern Alaska, Professional Paper 832, U.S. Geological Survey.

Migliaccio, Ralph R., 1968, Bridge Foundation Report on the Chilkat River Crossing, Project No. S-0961(7), Bridges 1162 and 1163, Engineering Geology Section, Alaska Department of Highways, 12p.

Pewe, T.L., 1975, Quaternary Geology of Alaska, U.S. Geological Survey, Professional Paper 835, U.S. Government Printing Office, Washington, 145p., 1 map, 2 tables in pocket.

Pierson, Lawrence A., et al.), 2001, Rockfall Catchment Area Design Guide, Final Report, SPR-3(032), Metric Edition, Landslide Technology and Oregon Department of Transportation – Research Group, 91p.

R&M Consultants, Inc., 1992, Haines Highway, MP 24 to the Border, Rock Slope Evaluation, Volume 1, Main Report, Alaska Department of Transportation and Public Facilities, Anchorage, Alaska, 68p.

Slater, W. H. 1978, Haines to Canadian Border, Project No. RF09510(5), Southeastern Region, Alaska Department of Transportation and Public Facilities, Engineering Geology Section, 8p.

Staff, 1958, Plan and Profile – Proposed Highway Project, No. F-095-5(i), Chilkat River Bridge, U.S. Department of Commerce, Bureau of Public Roads, Region 10, 8p.

Staff, 1971, Haines to Canadian Border, Reconnaissance Report, Project F-095-10(4), State of Alaska, Department of Highways, Southeastern District, Reconnaissance Section, 1971, 58p.

Staff, 1992, Haines Highway, Little Boulder Creek to Big Boulder Creek, MP 31.6 to MP 33.8, Geotechnical Report, Federal Project Number NH-095-6(13), Project No. 71071, Alaska

Departement of Transportation and Public Facilities, Southeast Region Geotechnical Section, Juneau, Alaska, Appendix B.

Staff, 1996, Community Information Summary - Haines Department of Commerce, Community, and Economic Development, Research and Analysis Section, Anchorage, Alaska.

Staff, 1999, Haines Highway, Big Boulder Creek to Station 775+00 and Station 775+00 to the Border, Geotechnical Report, MP 33.8 to MP 40.3, Project Nos. 71874 and 71875, Volume I of II, Alaska Department of Transportation and Public Facilities, Southeast Region Geotechnical Section, Juneau, Alaska, Appendix B.

Taylor, H.P., Jr., and Noble, J.A., 1960, Origin of the Ultramafic Complexes in Southeastern Alaska, International Geological Conference, 21st, Copenhagen, part 13, p. 175 – 187.

URS Corporation, 1986, Haines Highway, MP 24 to Canadian Border, Appendix C, Draft Reconnaissance Report, Project No. 68800, Juneau, Alaska, 109p.

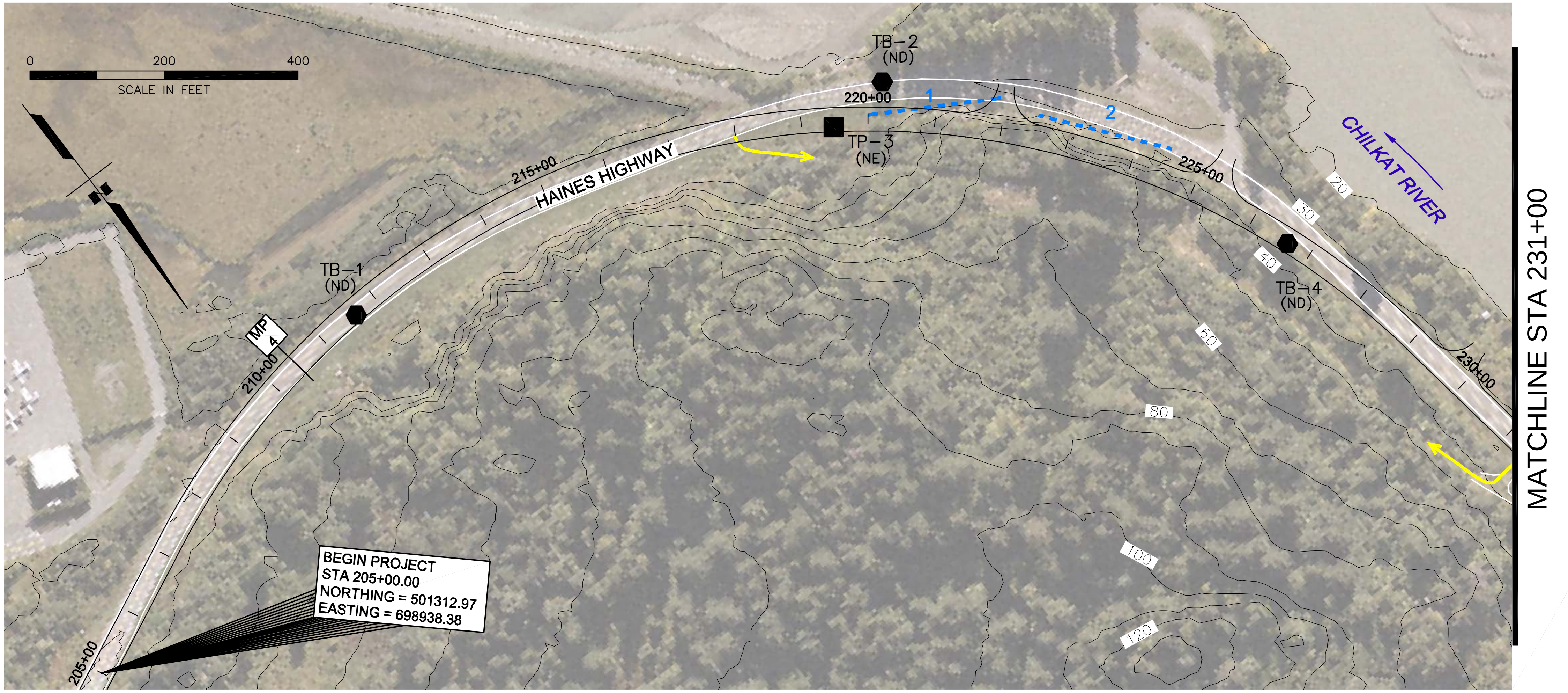
Wahrhaftig, Clyde, 1965. Physiographic Divisions of Alaska, US Geological Survey Professional Paper 482, US Government Printing Office, Washington D.C., 52p., 6 plates.

Watts, C.F, PhD, CPG, Gilliam, Marc D,.2003, Rockpack III for Windows, Part One – Stereonet Analyses, Hrovatic, and Han Hong, Copyright.

Wyllie, Duncan and Mah, Chris, 1998, Rock Slopes Reference Manual, Parsons Brinckerhoff Quade and Douglas, Inc., One Penn Plaza, New York, New York, and National Highway Institute, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., 393p.

APPENDIX A

Plan and Profile Sheets



LEGEND

40
60
CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00
PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB–5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP–28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1
GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP
4
HAINES HIGHWAY MILE POST MARKERS

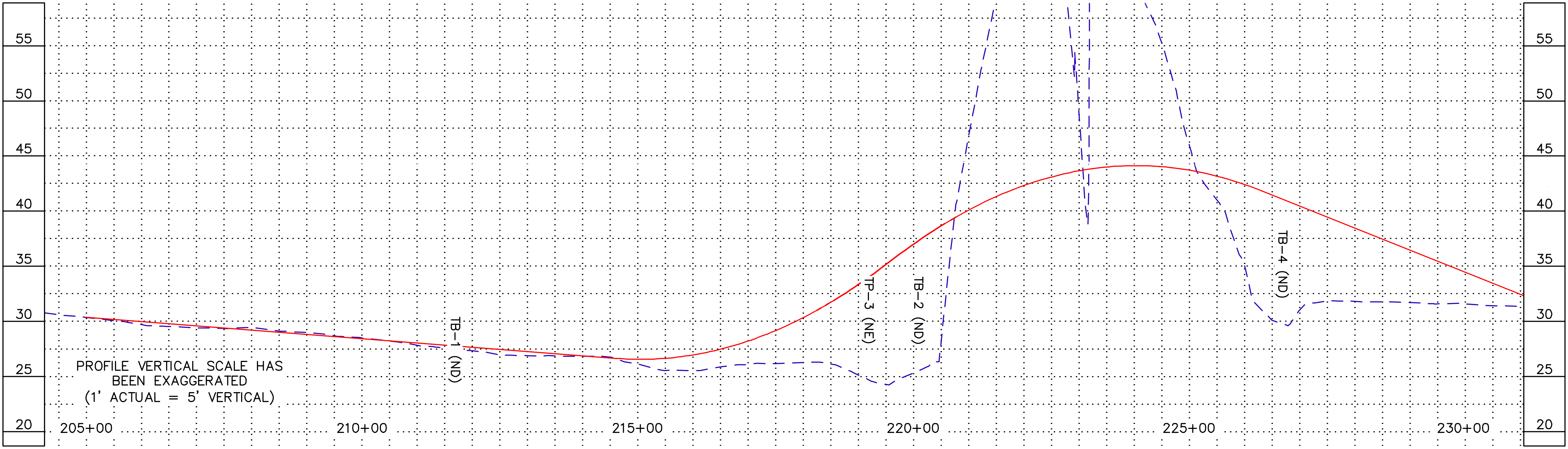
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



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BRIAN P. O'QUINN
TAB: 1 TUESDAY, JANUARY 06, 2008

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ATTACHMENT NUMBER

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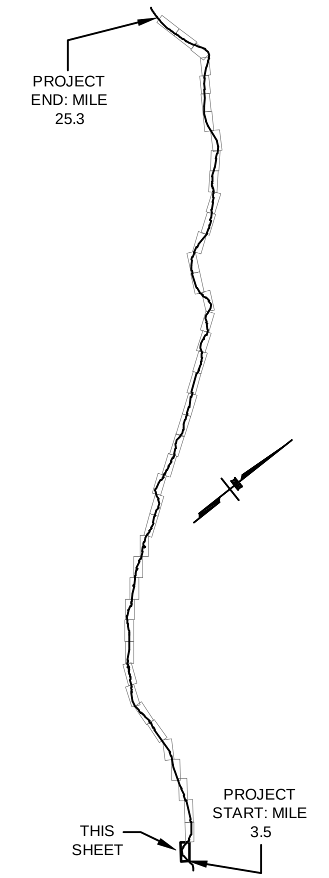

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
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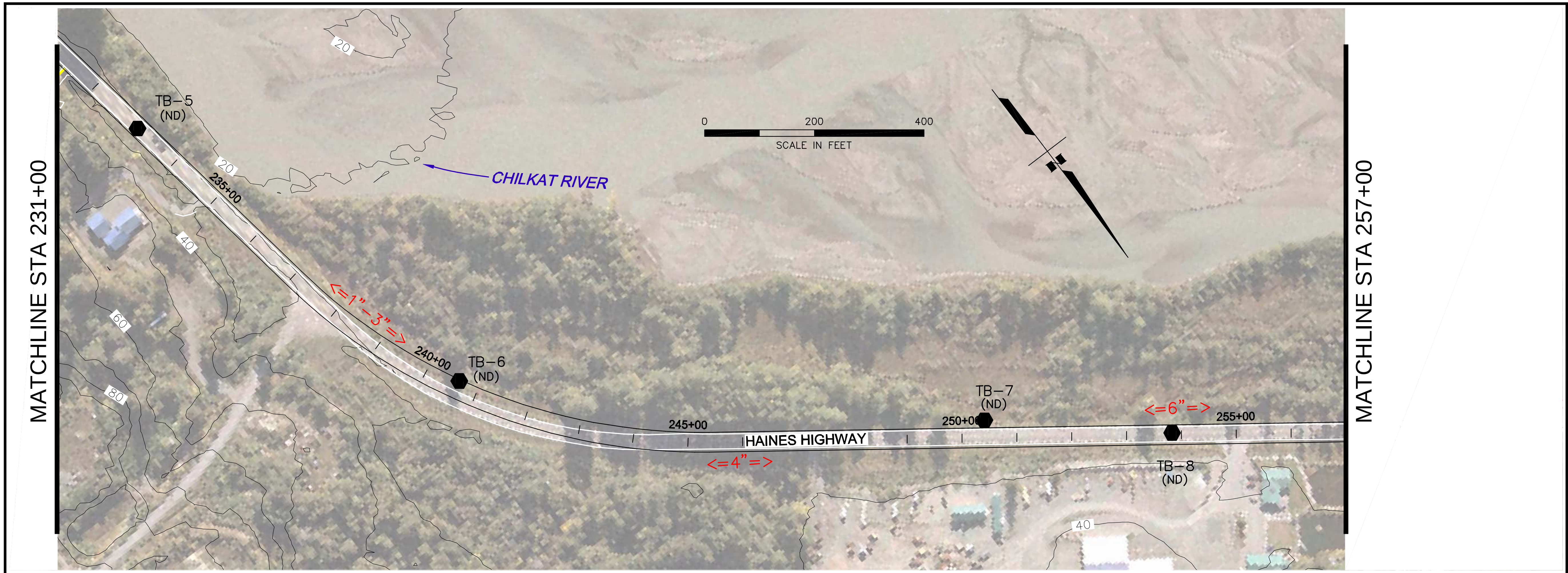

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EXISTING ROAD ALIGNMENT

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■ TP−28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

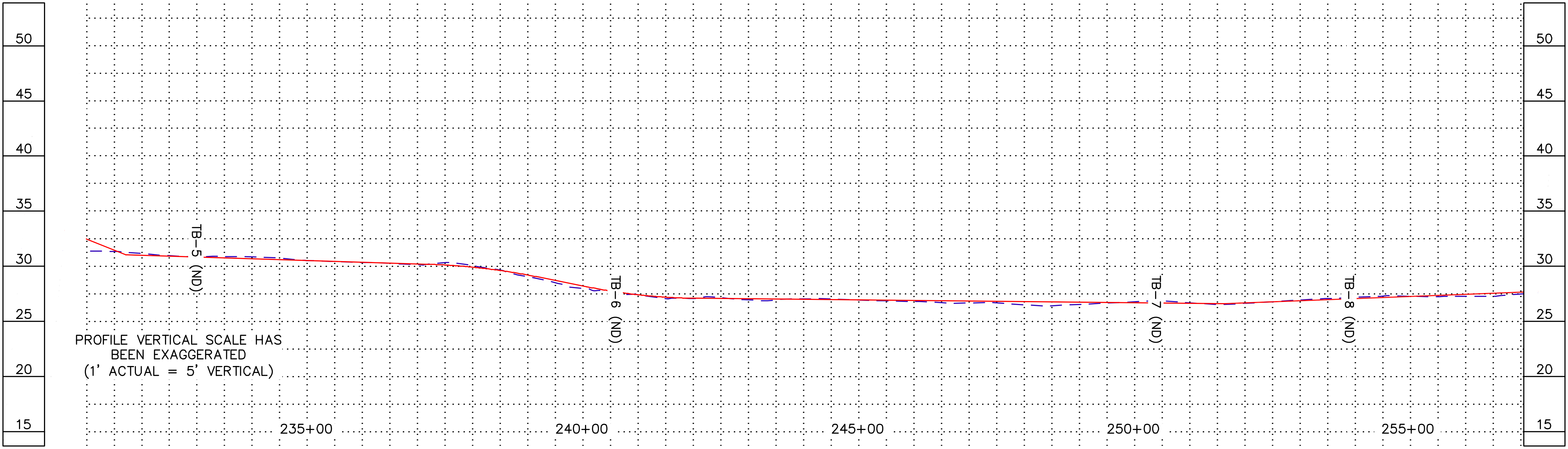
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



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(1' ACTUAL = 5' VERTICAL)

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MICHAEL J. BAUER
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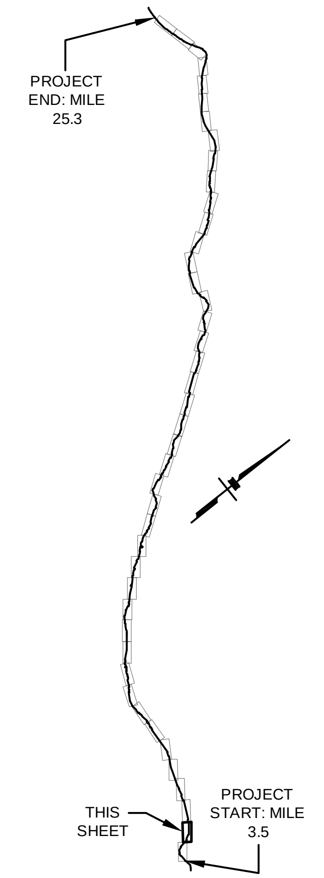

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DESIGNED BY: KAN

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STATE OF ALASKA
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HAINES HIGHWAY
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FINAL
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PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
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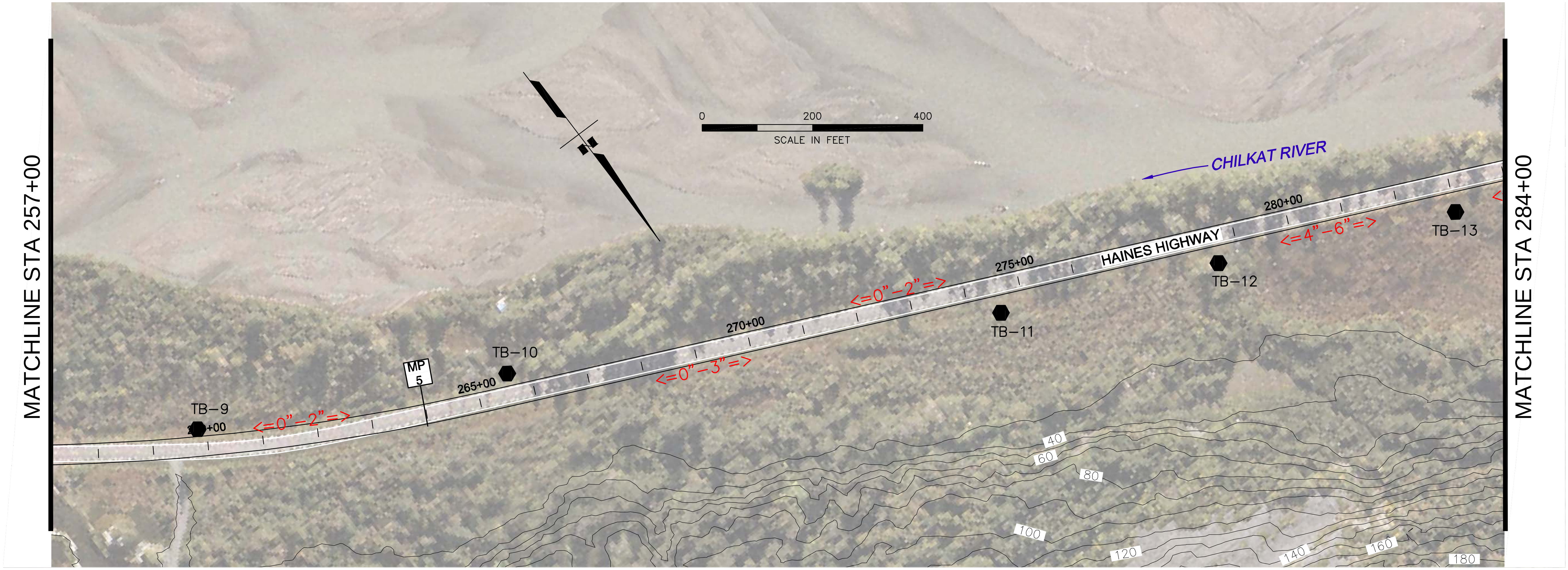

LEGEND	
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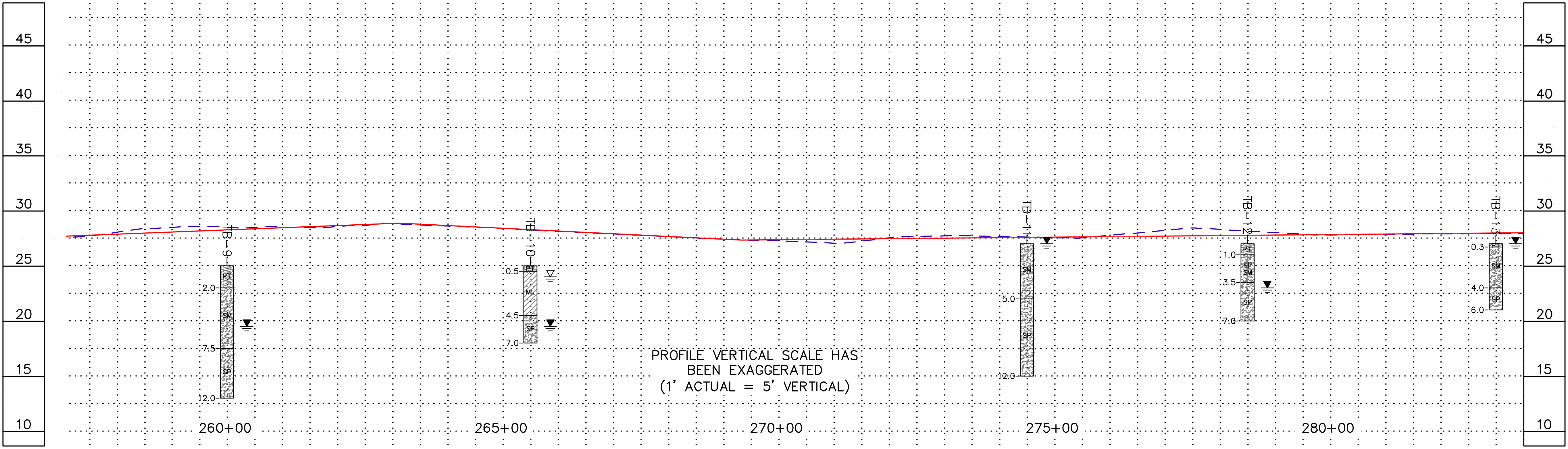
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP−28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS
PROFILE	
— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



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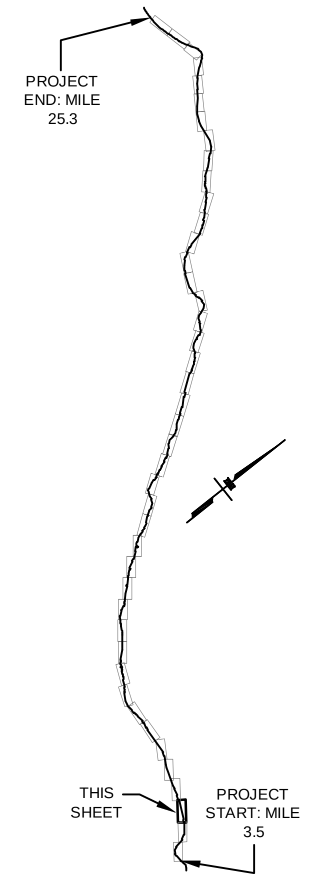

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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
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DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

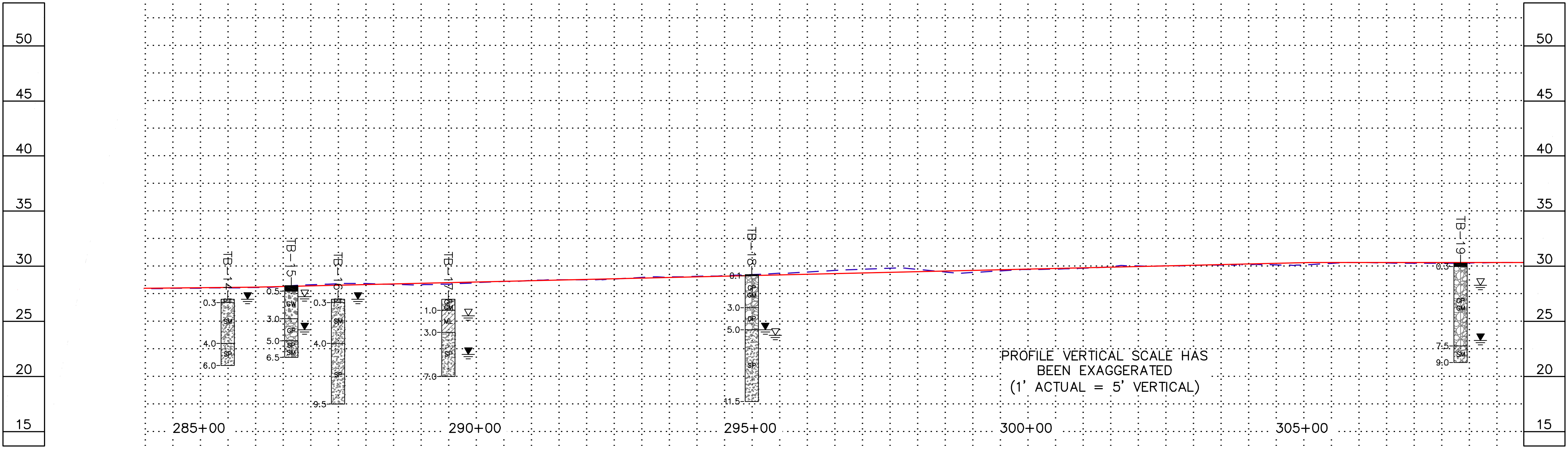
SHEET NUMBER	TOTAL SHEETS
3	**44**

LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬣ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
⟵	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
───	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

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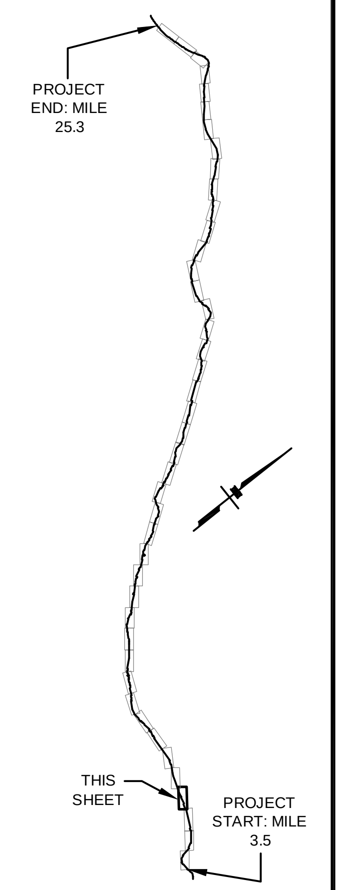

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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

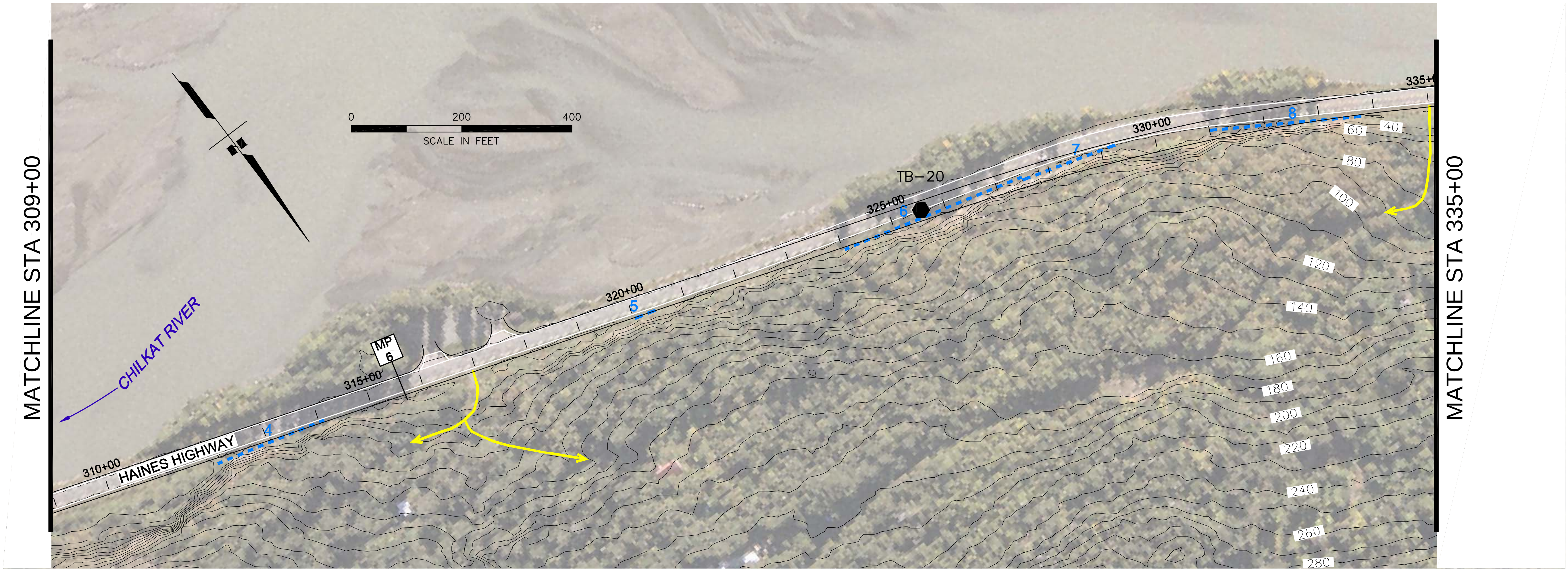
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
4	44



LEGEND

40 / 60 — CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 — PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB–5 (ND) — APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP–28 (NE) — APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> — HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

- - - 1 — GEOLOGIC MAPPING BASELINE

← — POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

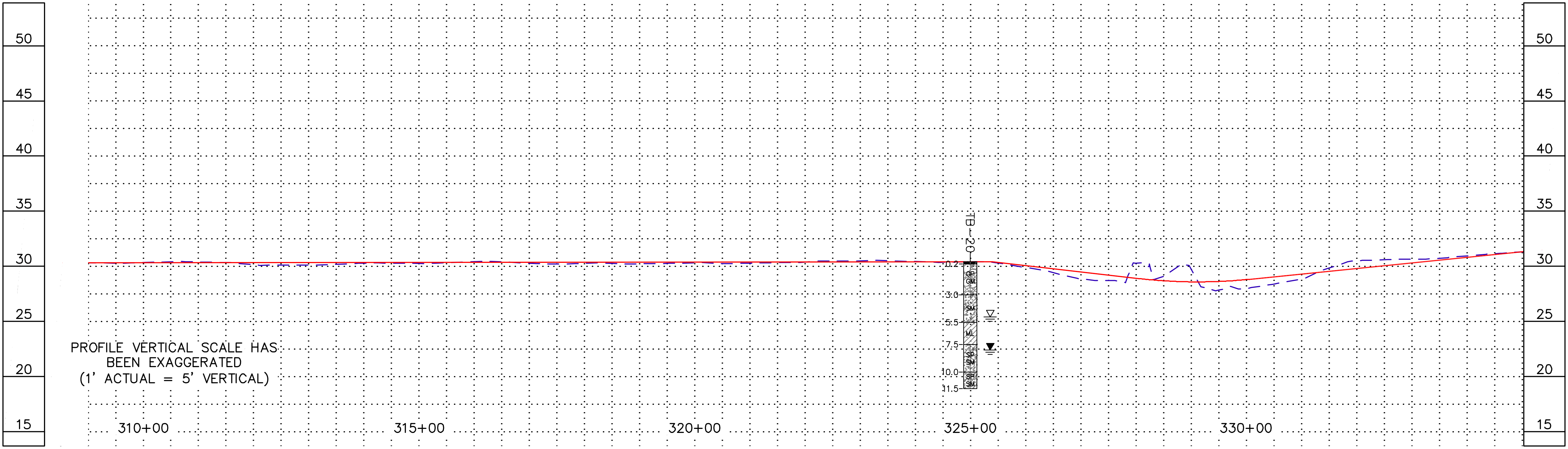
PROFILE

– – – — EXISTING GROUND

—— — PROPOSED ROAD CENTERLINE

▼ — GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▽ — GROUNDWATER MEASURED AFTER DRILLING



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(1' ACTUAL = 5' VERTICAL)

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MICHAEL J. BAUER
TAB: 5 TUESDAY, JANUARY 06, 2008

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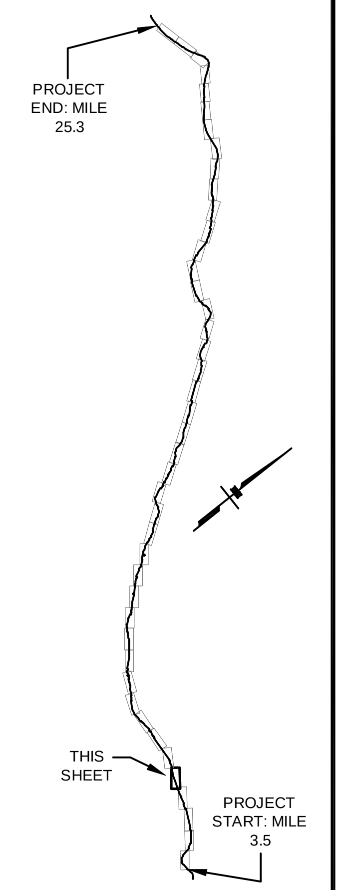
ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

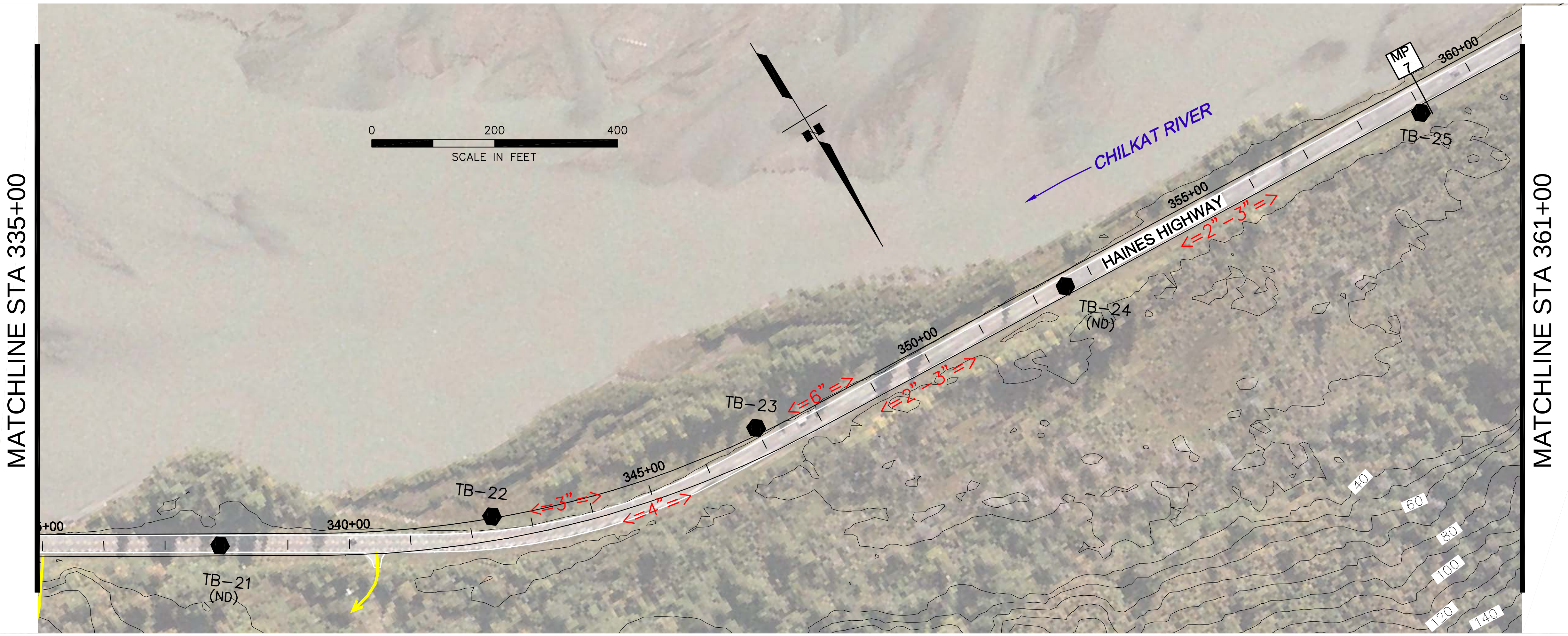
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
5	44

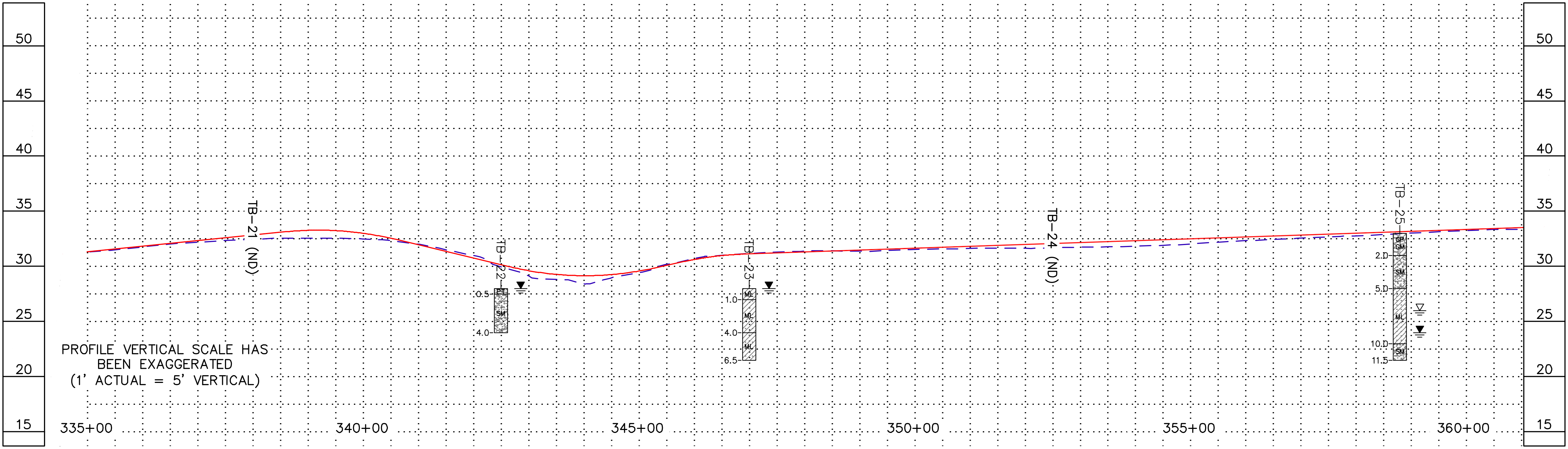


LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

– – –	EXISTING GROUND
──	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

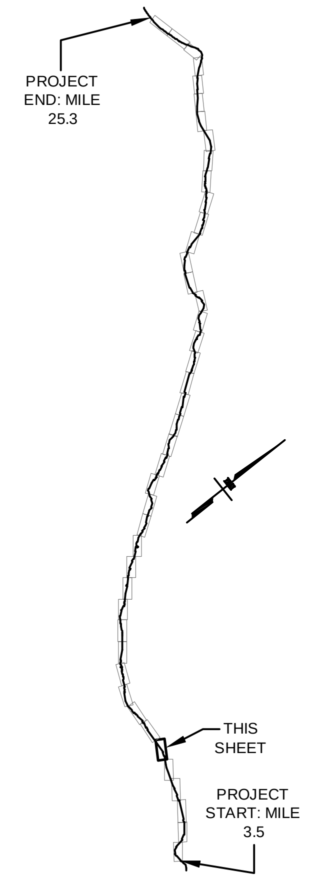
MICHAEL J. BAUER
TAB: 6 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

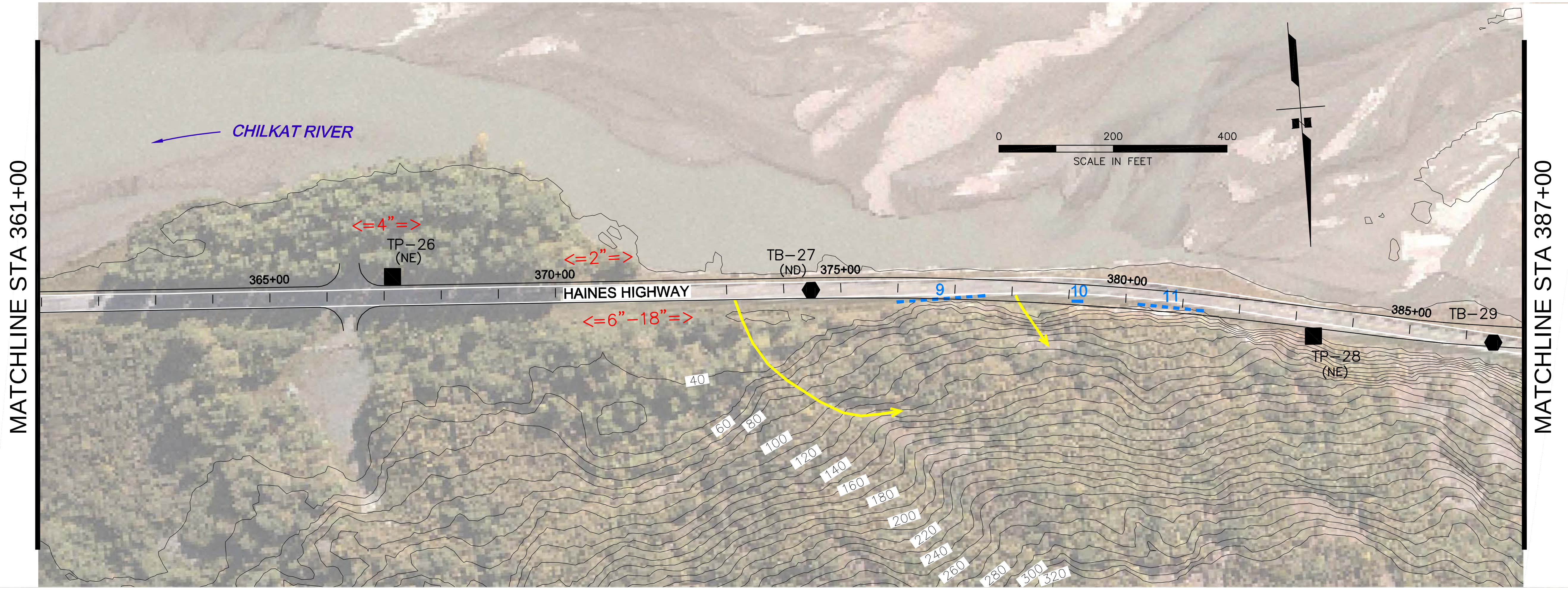
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
6	44

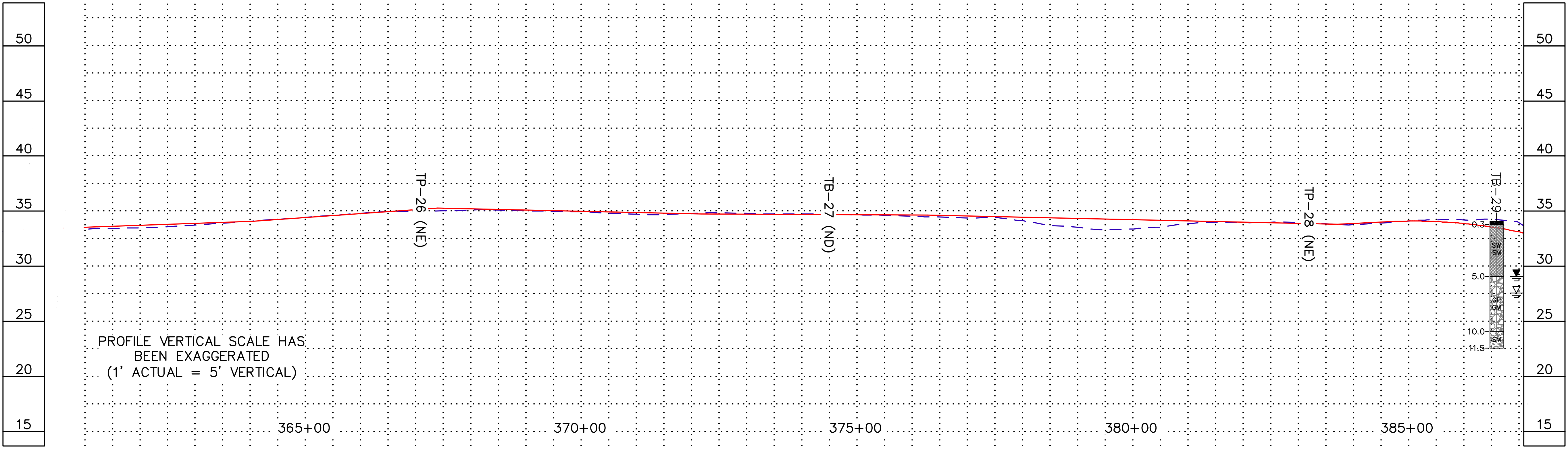


LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

– – –	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

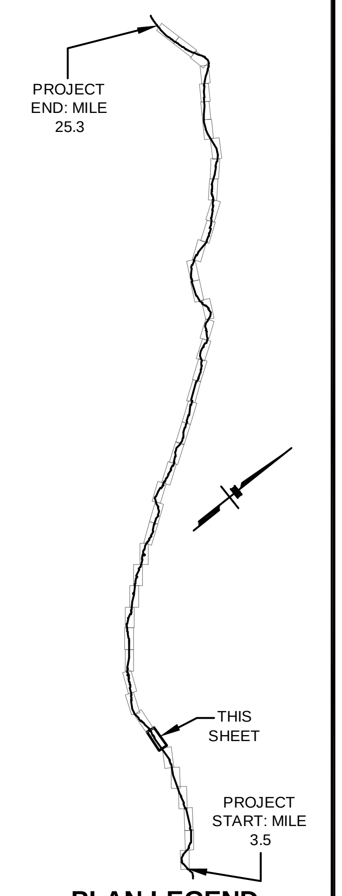
MICHAEL J. BAUER
TAB: 7 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
7	44

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

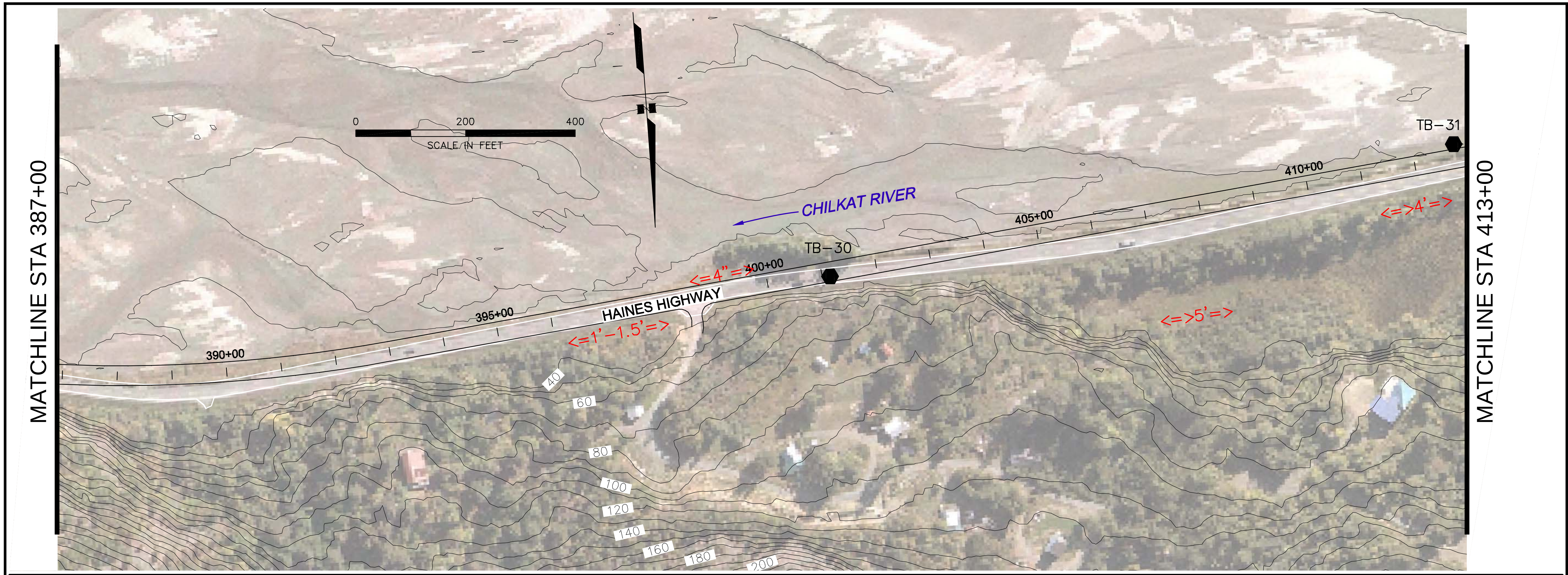
MICHAEL J. BAUER
TAB: 8 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



LEGEND

40 / 60 CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB–5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP–28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

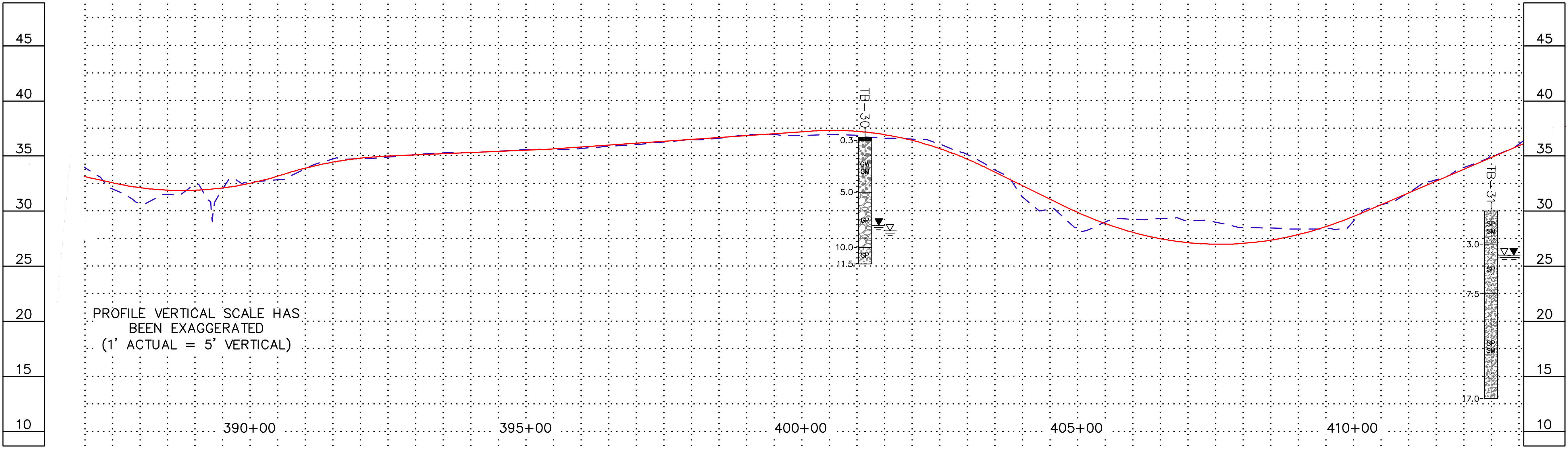
PROFILE

EXISTING GROUND

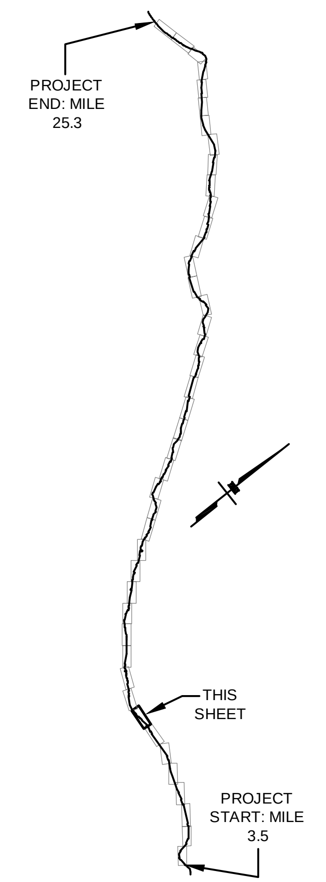
PROPOSED ROAD CENTERLINE

▼ GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▽ GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
8	44

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

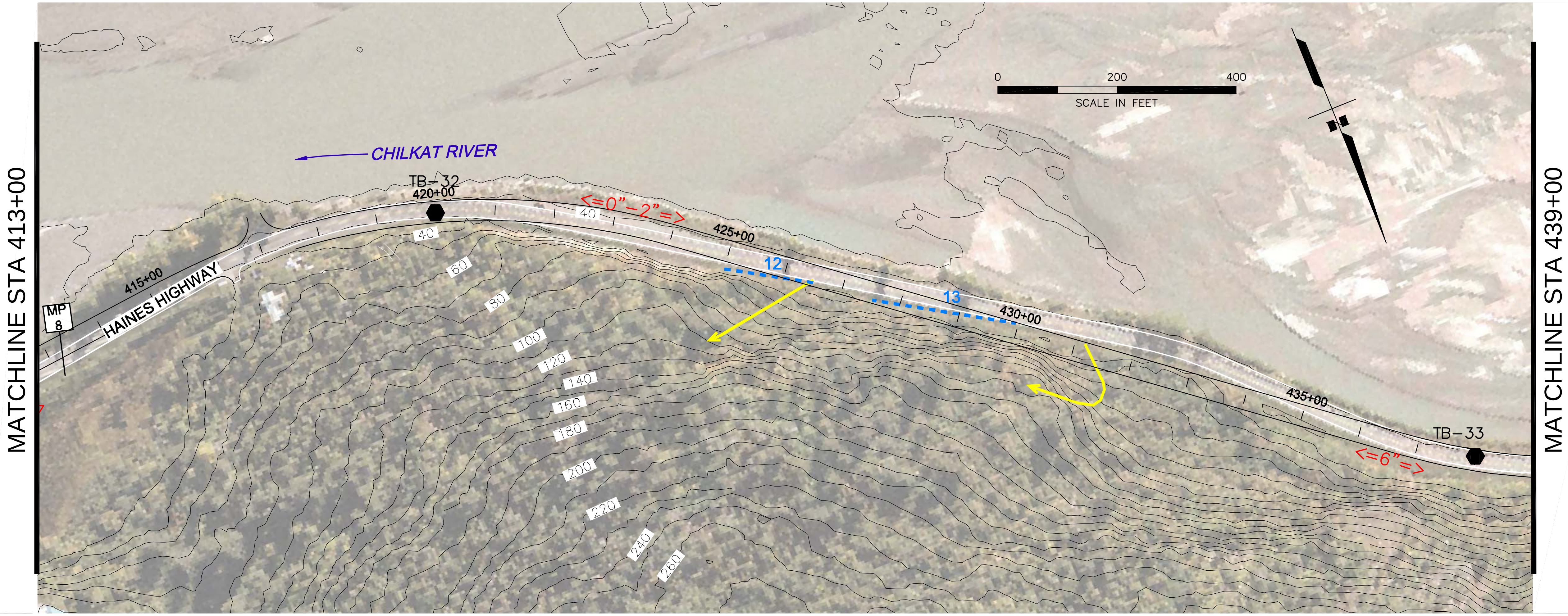
MICHAEL J. BAUER
TAB: 9 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION

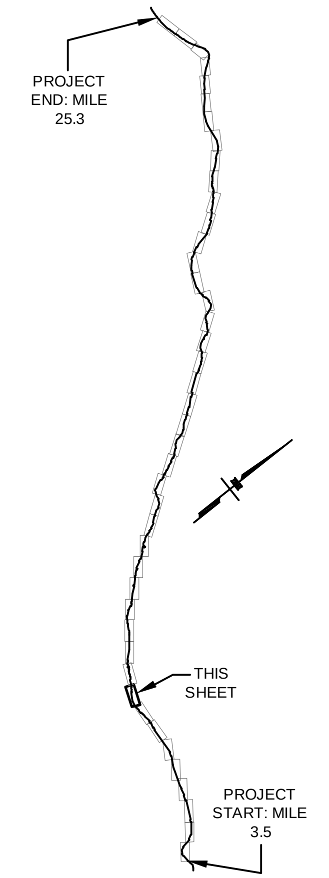


LEGEND

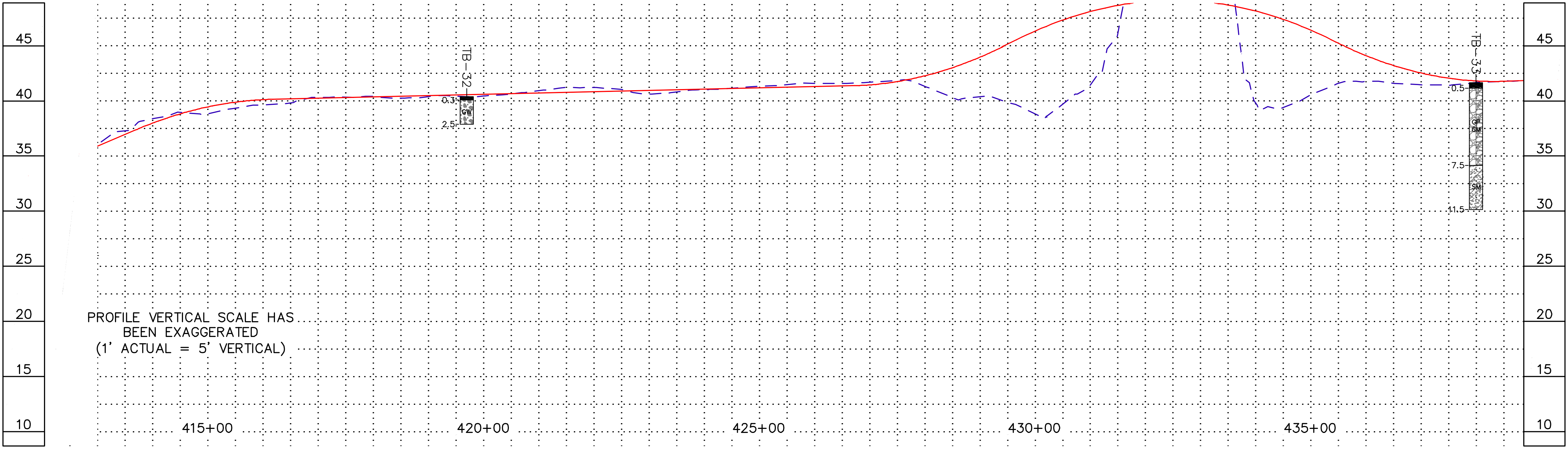
40 / 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬣ TB-5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP-28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
⊻	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
⊻	GROUNDWATER MEASURED AFTER DRILLING



PLAN LEGEND



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
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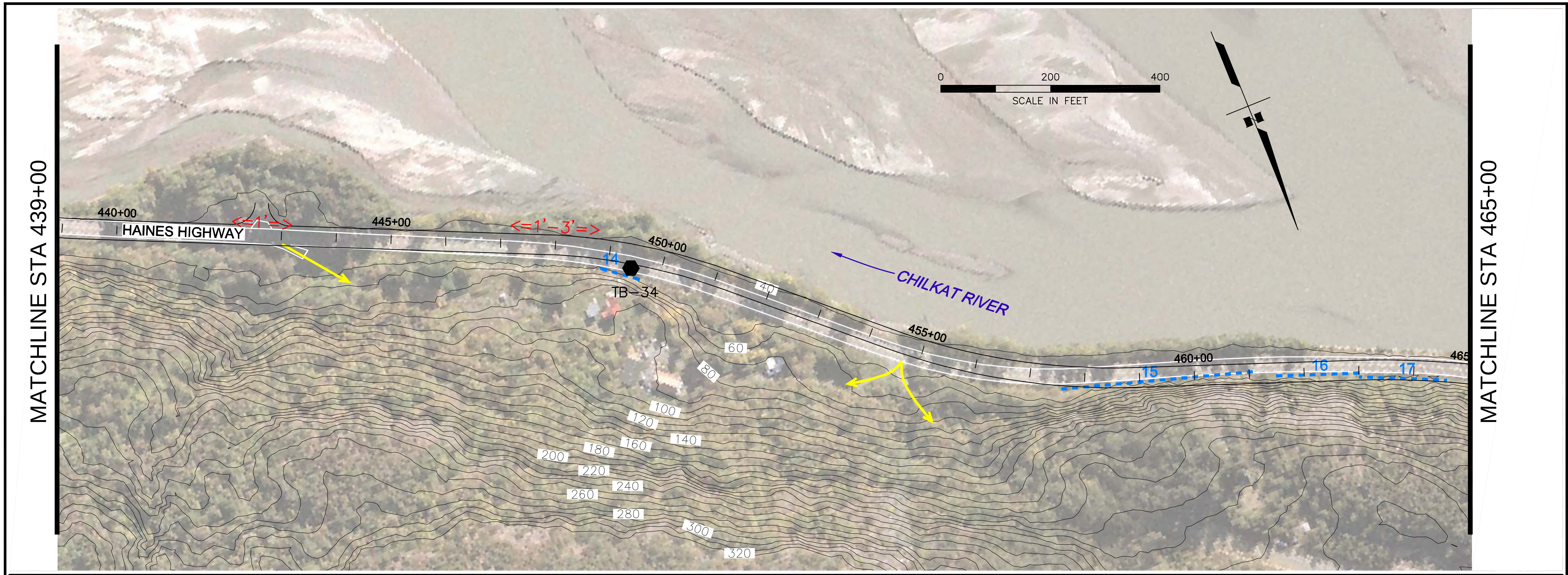
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
9	44



LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB-5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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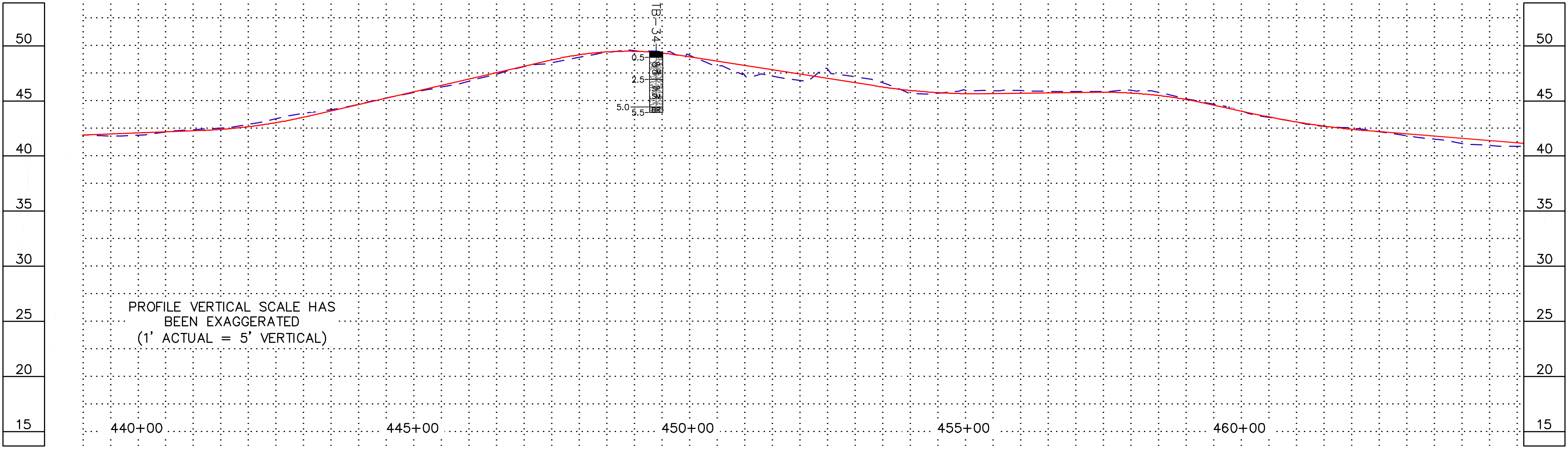
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
———	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

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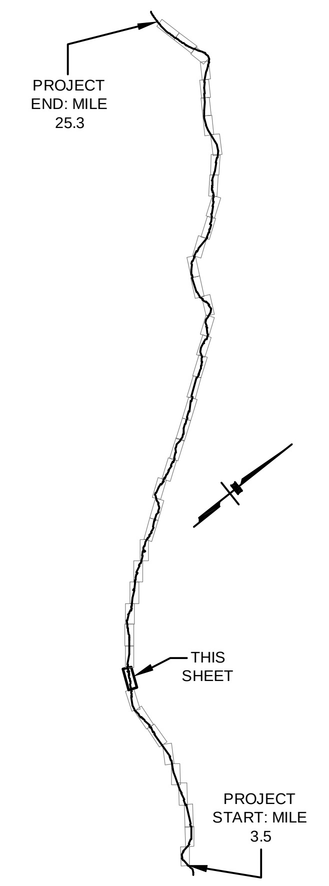
MICHAEL J. BAUER
TAB: 10 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN
DRAWN BY: BPO

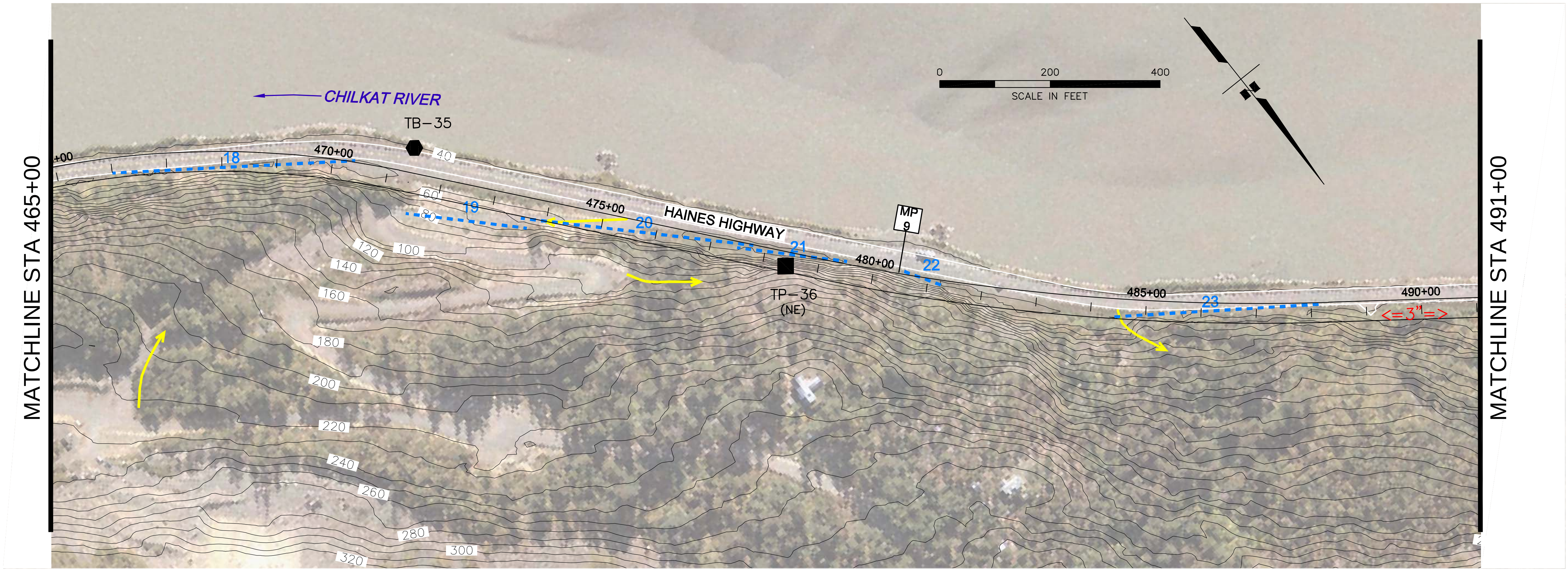
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008
SHEET NUMBER	TOTAL SHEETS
10	44



LEGEND

40
60
CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00
PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB-5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP-28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

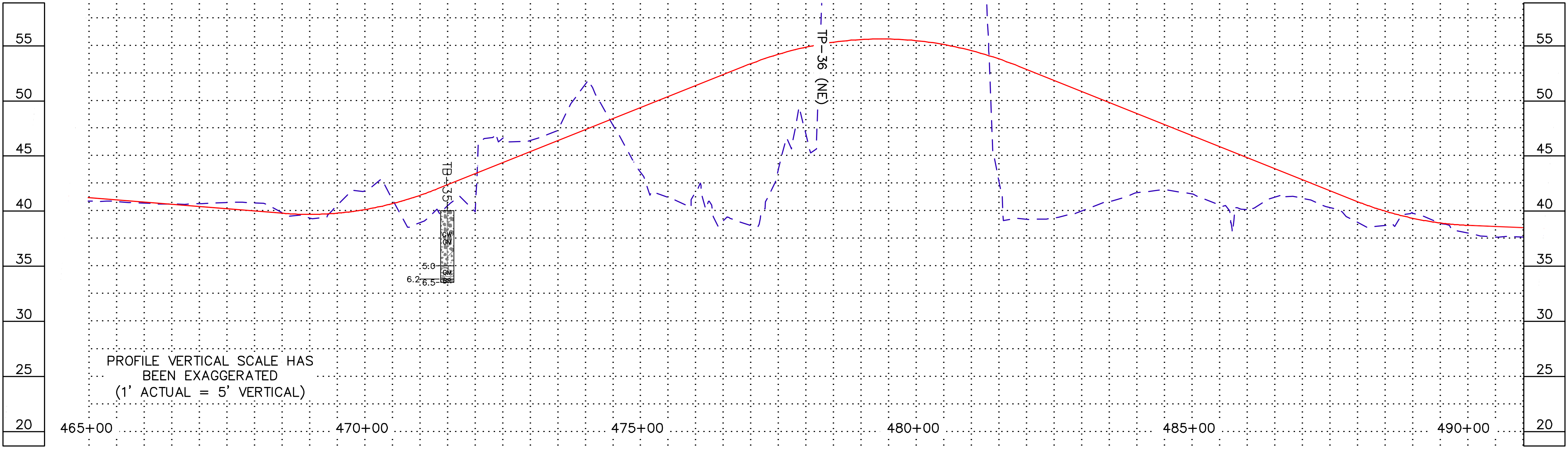
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

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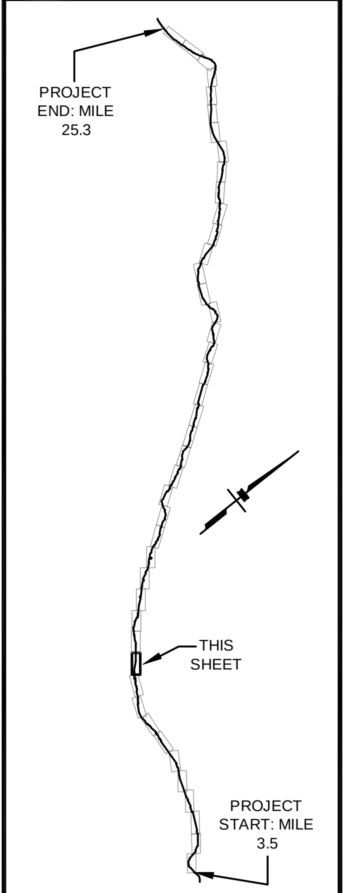
MICHAEL J. BAUER
TAB: 11 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

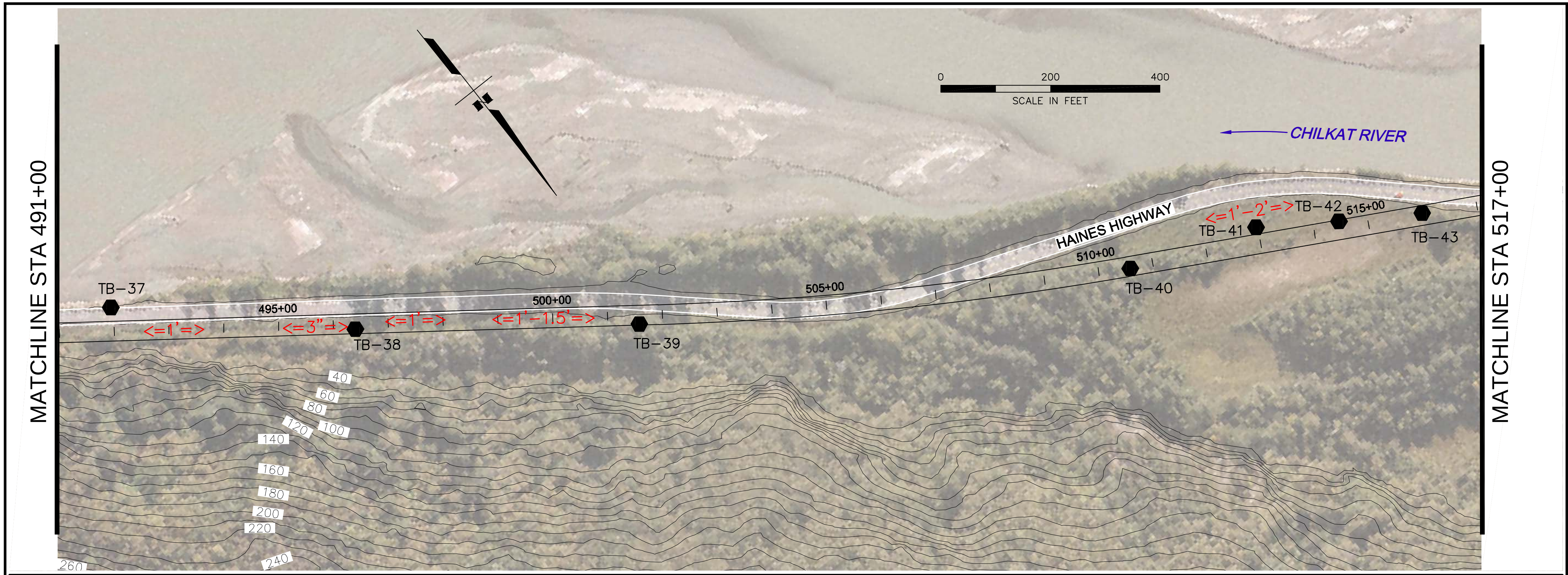
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

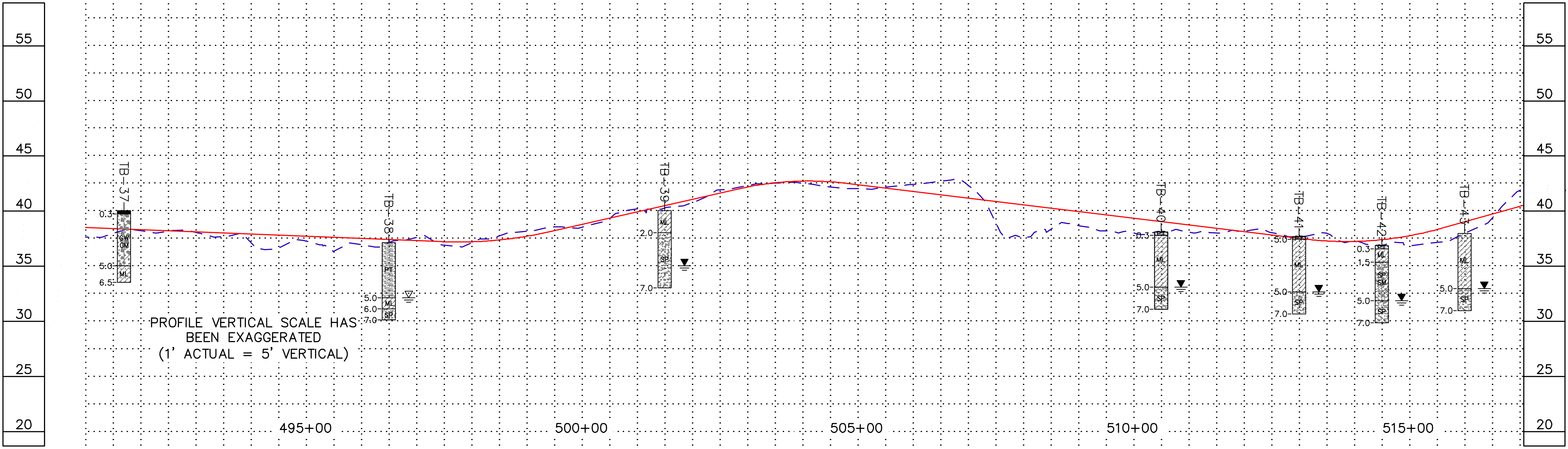
PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

SHEET NUMBER	TOTAL SHEETS
11	**44**



LEGEND	
40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB-5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP-28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS
PROFILE	
– – –	EXISTING GROUND
—	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING


PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

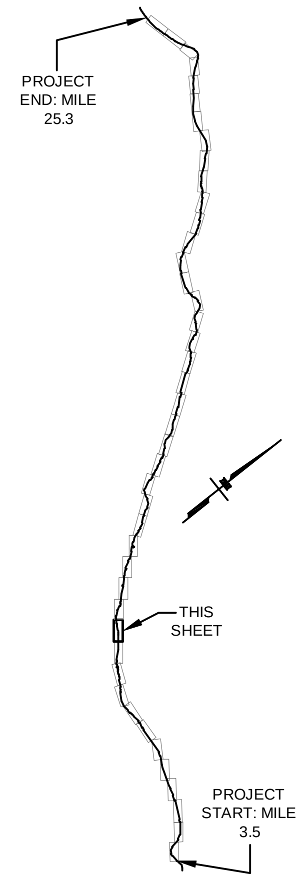
MICHAEL J. BAUER
TAB: 12 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

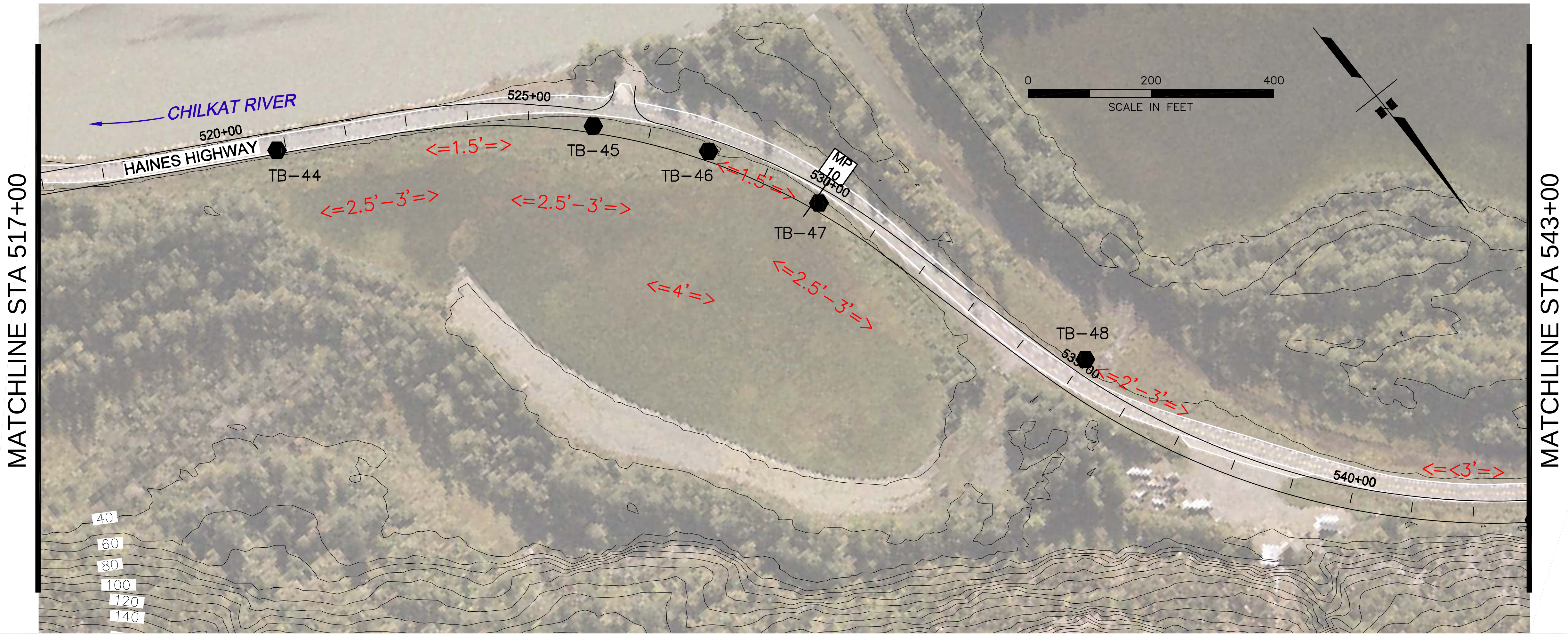
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

SHEET NUMBER	TOTAL SHEETS
12	**44**

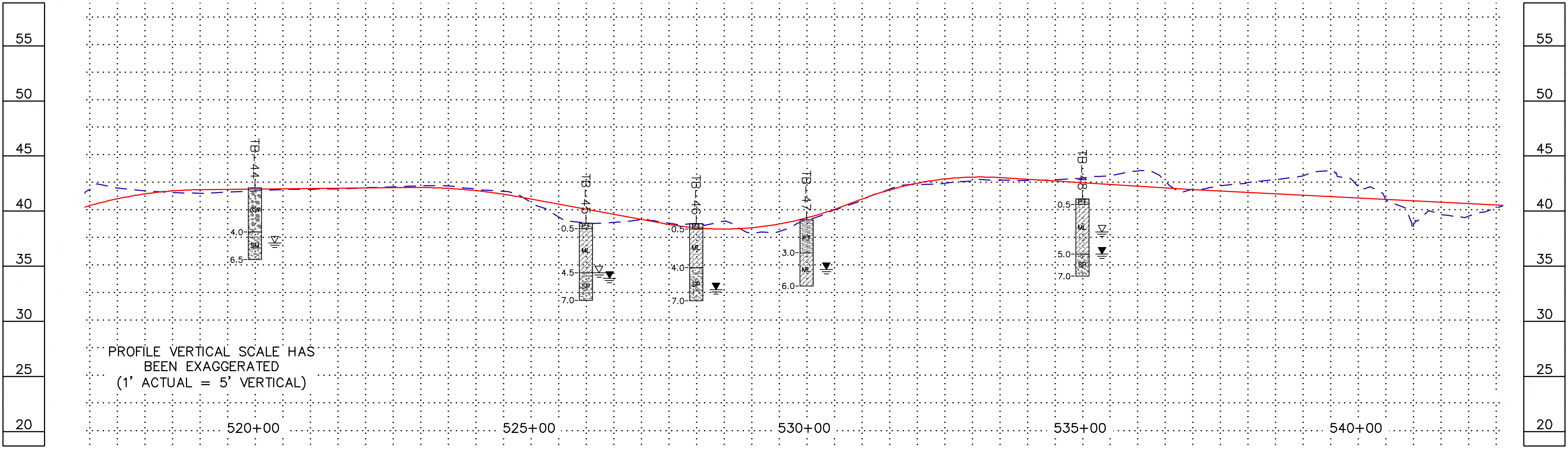


LEGEND

40 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP−28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS
BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

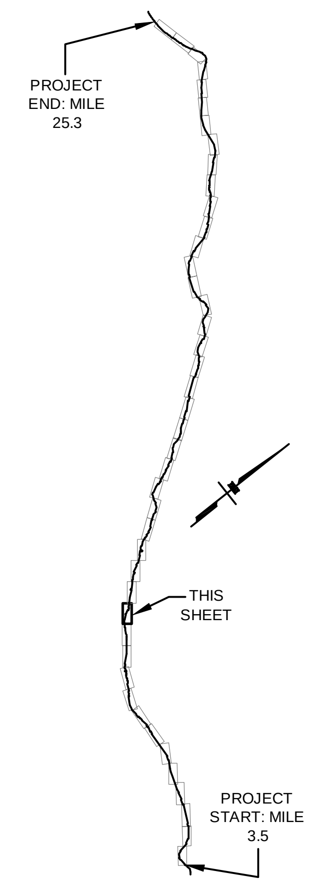
MICHAEL J. BAUER
TAB: 13 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

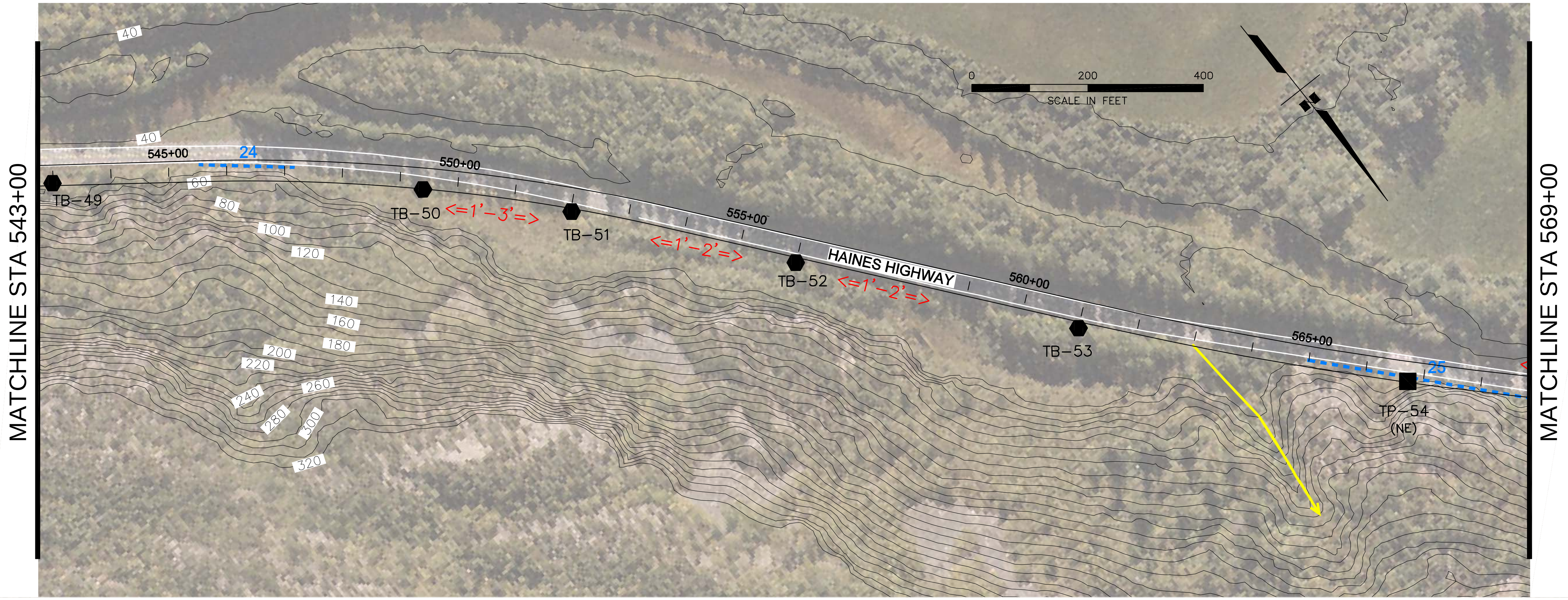
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
13	44



LEGEND

40 / 60 — CONTOUR INTERVAL IS 10 FEET

═ EXISTING ROAD ALIGNMENT

210+00 220+00 — PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB-5 (ND) — APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP-28 (NE) — APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> — HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

- - - 1 — GEOLOGIC MAPPING BASELINE

← — POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

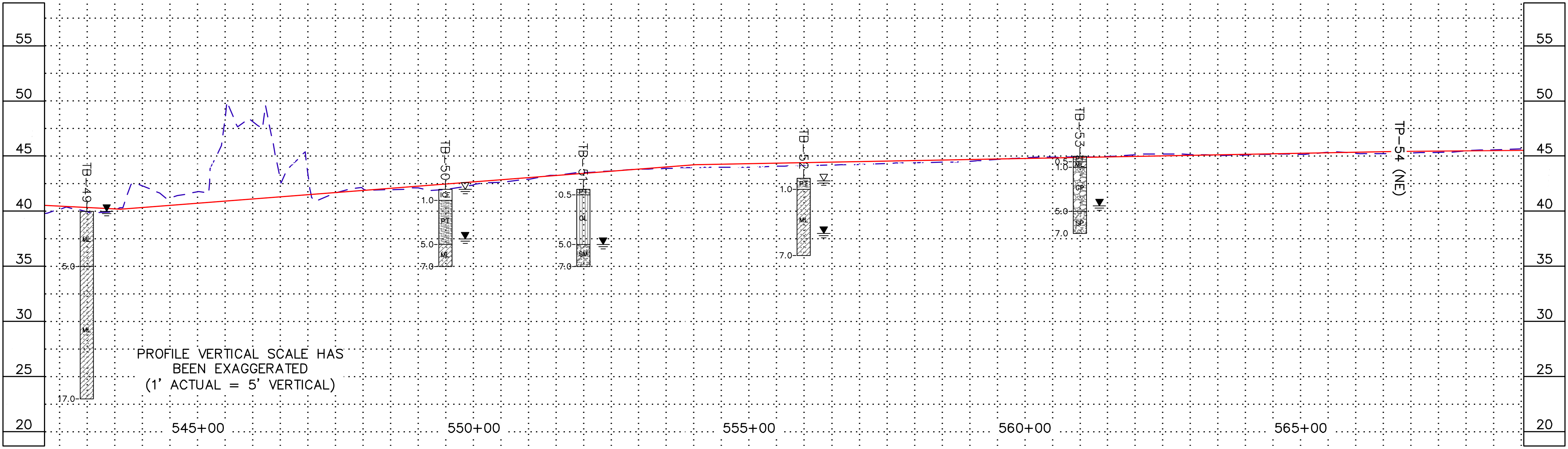
PROFILE

— — — EXISTING GROUND

—— PROPOSED ROAD CENTERLINE

▼ GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▽ GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

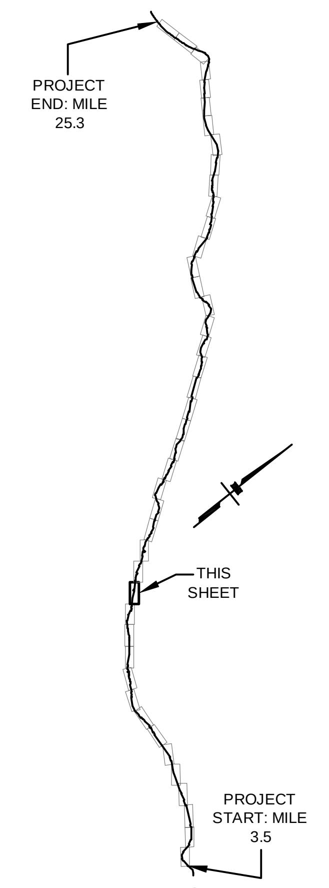
MICHAEL J. BAUER
TAB: 14 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

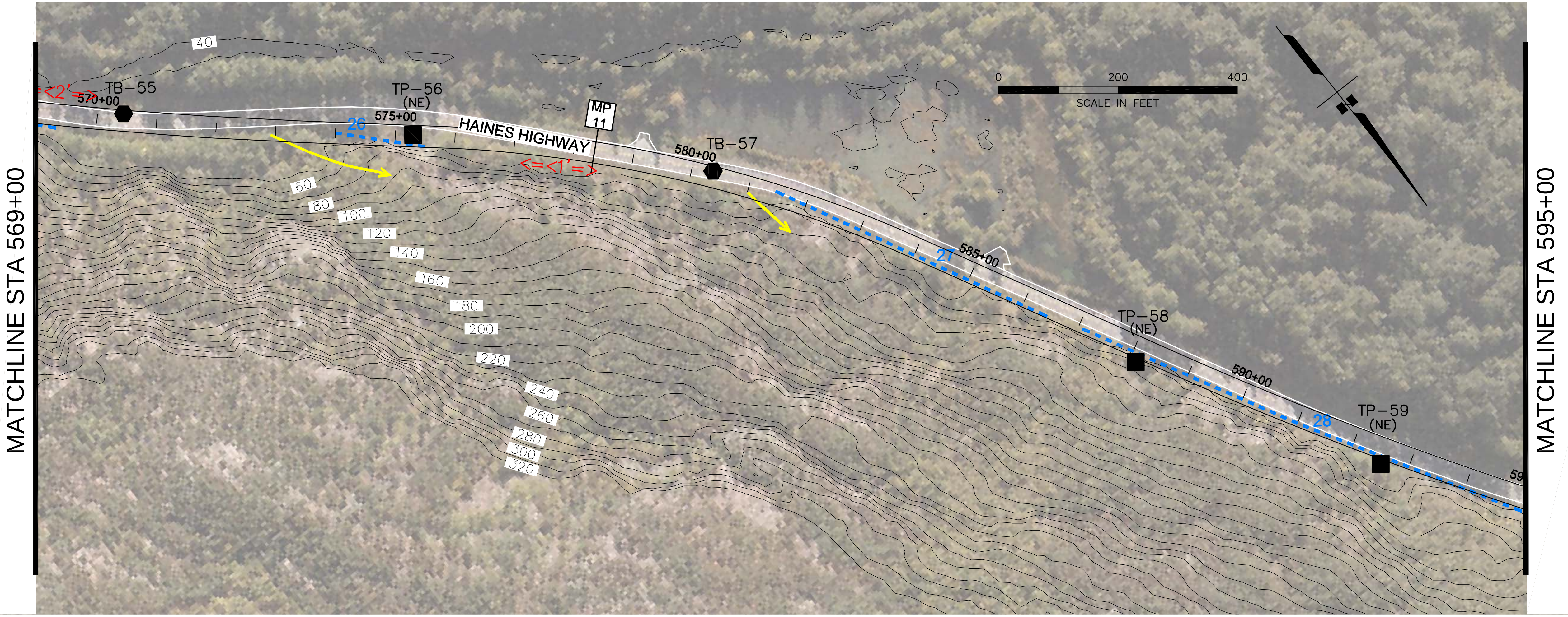
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
14	44



LEGEND

CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB−5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP−28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

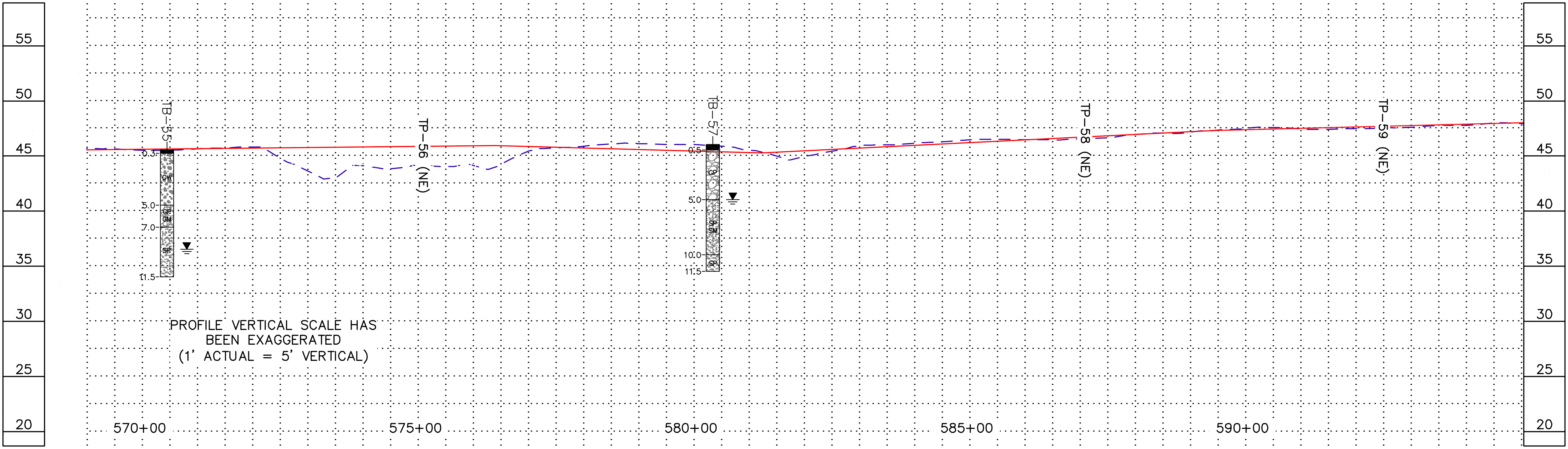
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

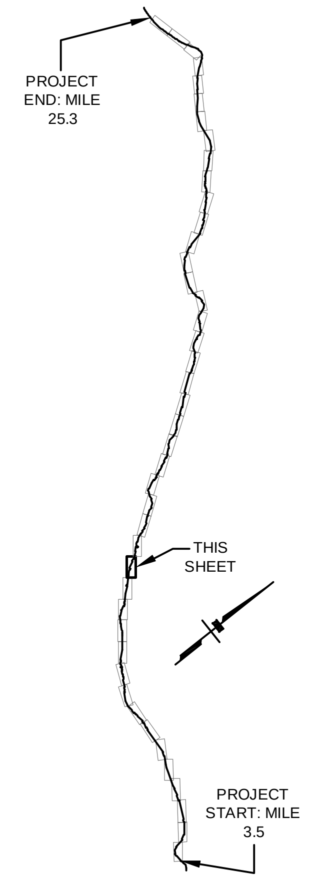
MICHAEL J. BAUER
TAB: 15 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

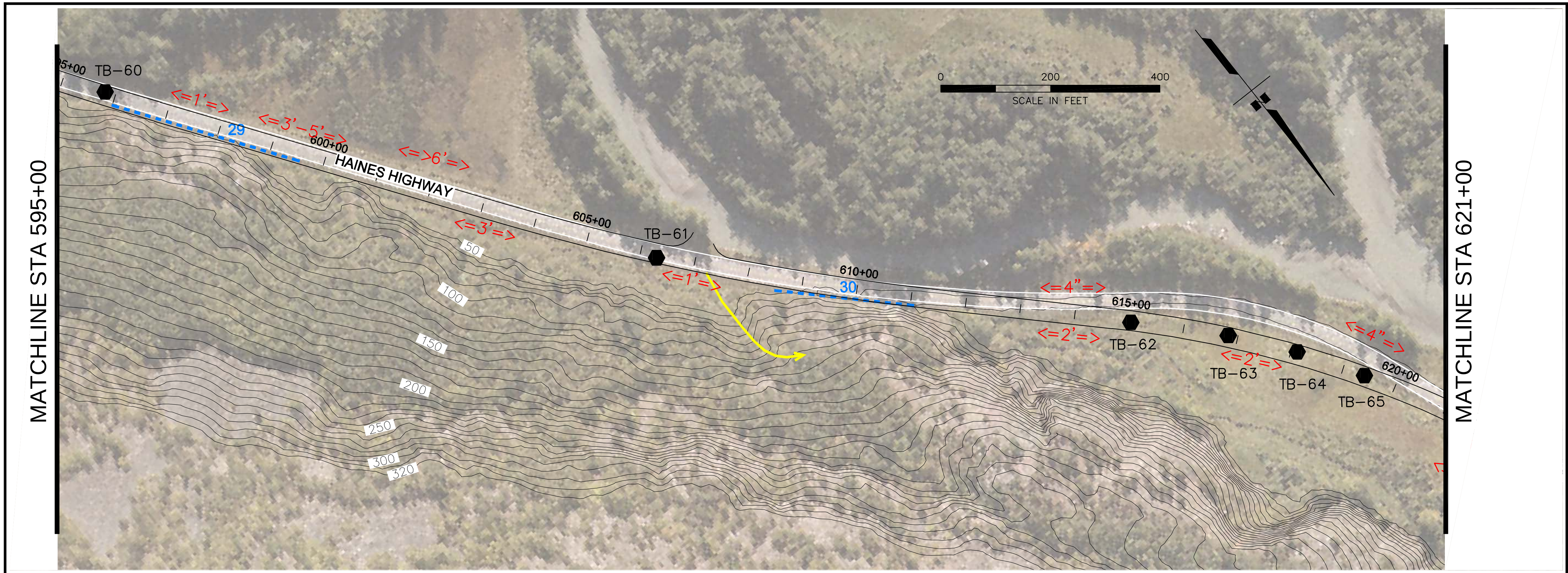
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
15	44



LEGEND

40 / 60 — CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 — PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB−5 (ND) — APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP−28 (NE) — APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> — HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 — GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

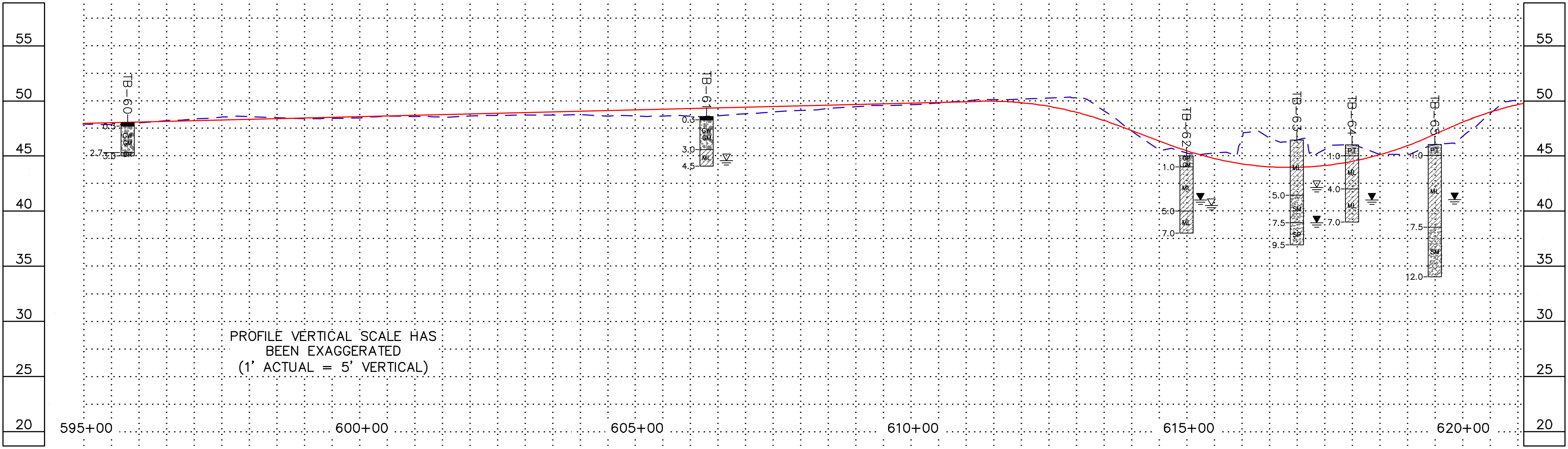
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



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MICHAEL J. BAUER

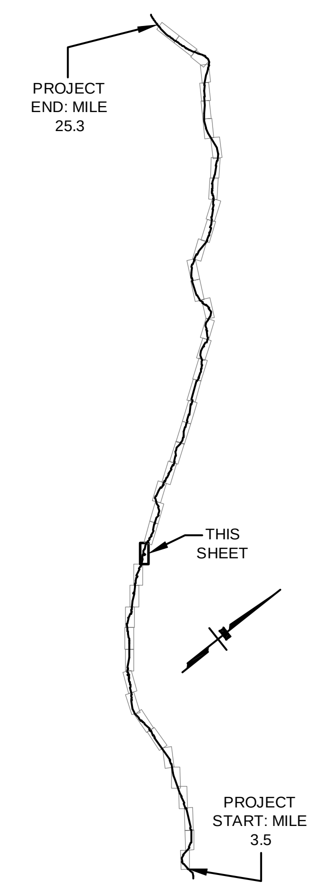
TAB: 16 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

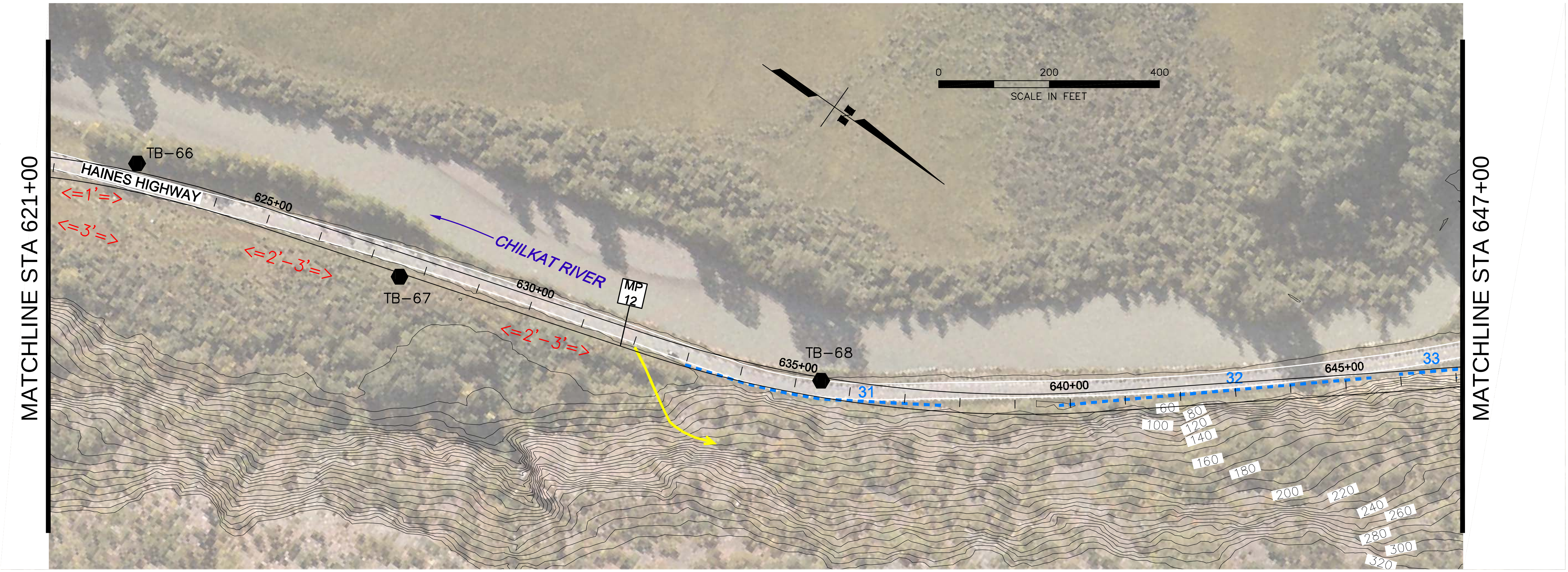
FINAL
PLAN & PROFILE

PROJECT DESIGNATION

68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
16	44

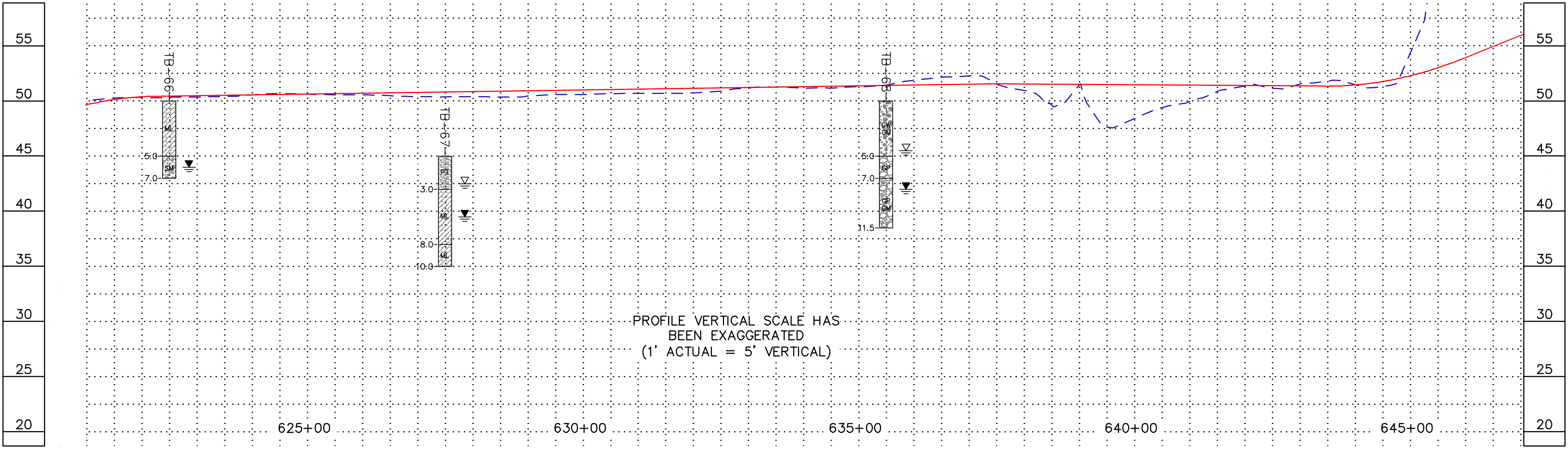


LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

- - -	EXISTING GROUND
──	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

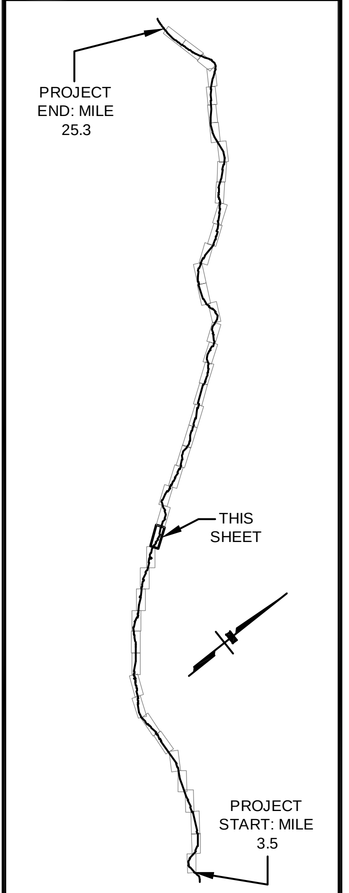
MICHAEL J. BAUER
TAB: 17 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

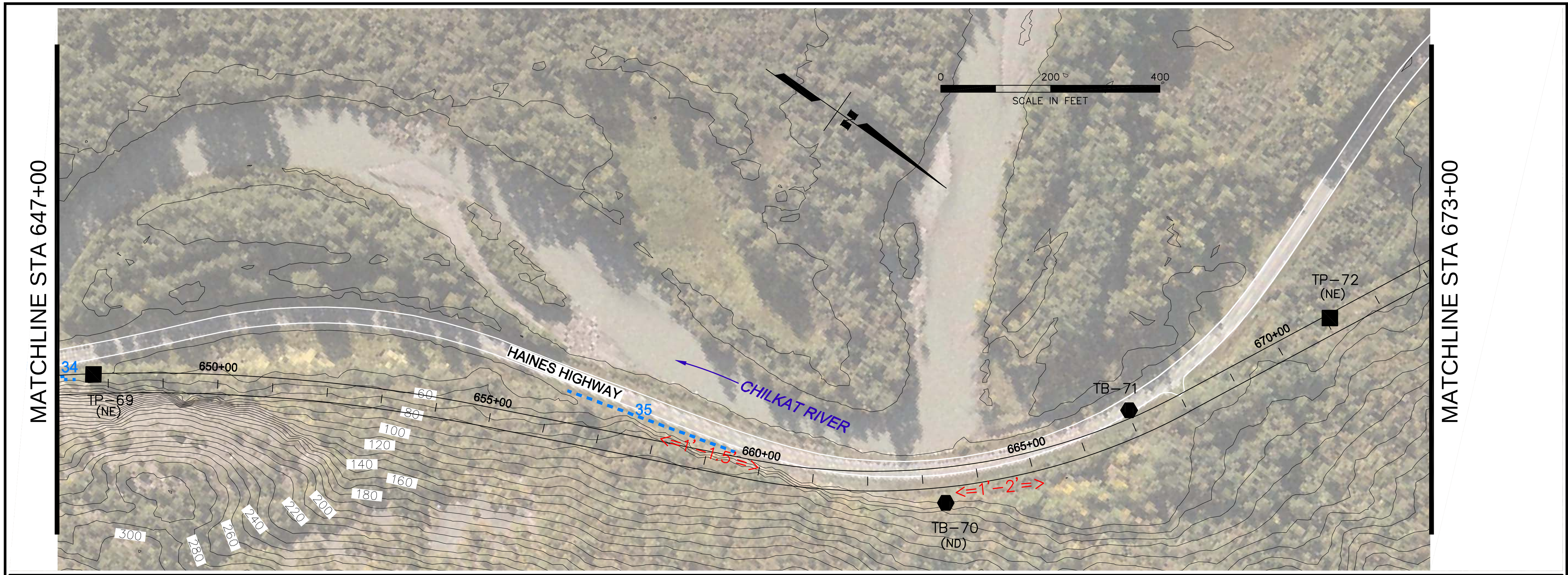
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008
SHEET NUMBER	TOTAL SHEETS
17	44



LEGEND

40 60 CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB-5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP-28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

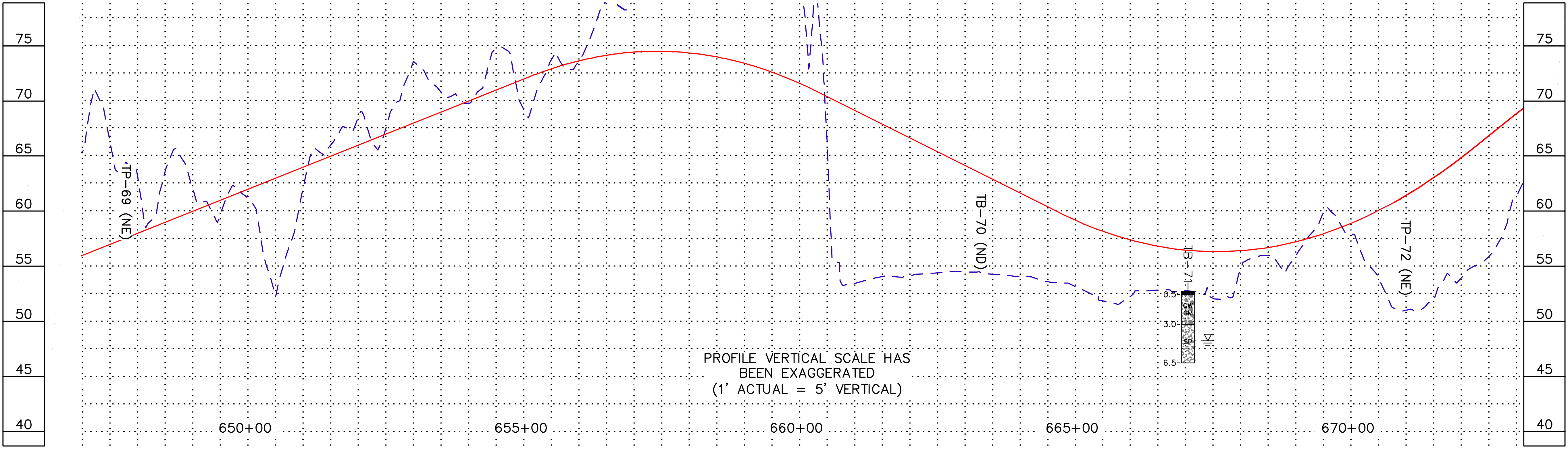
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER

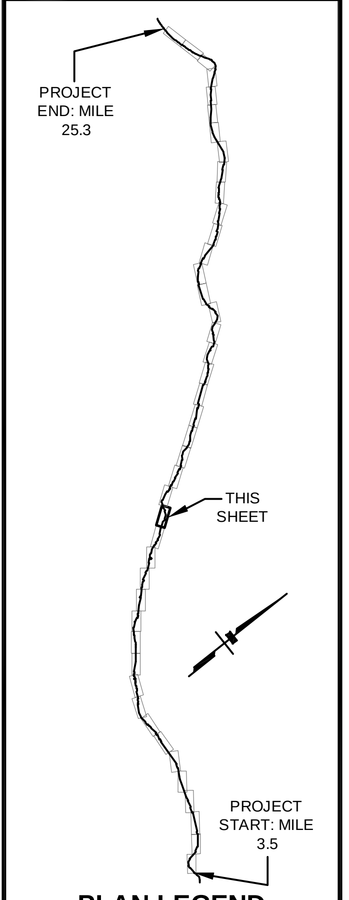
TAB: 18 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

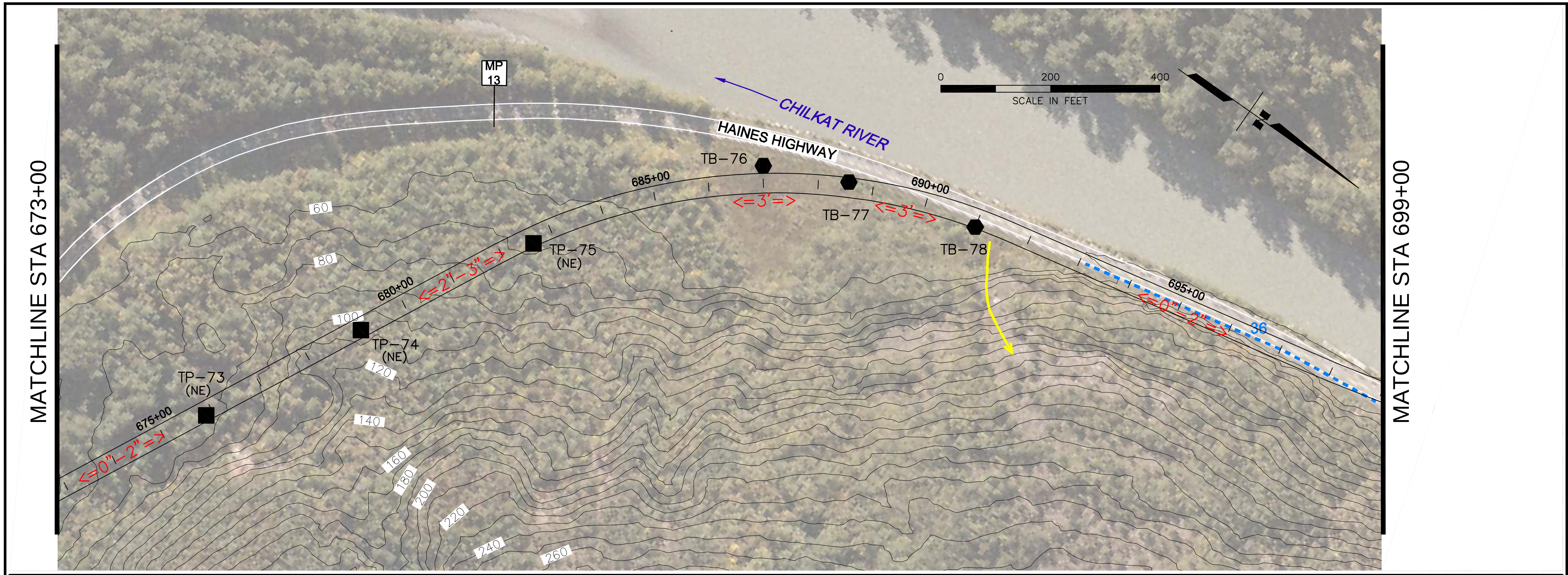
FINAL
PLAN & PROFILE

PROJECT DESIGNATION

68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
18	44



LEGEND

CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB−5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP−28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

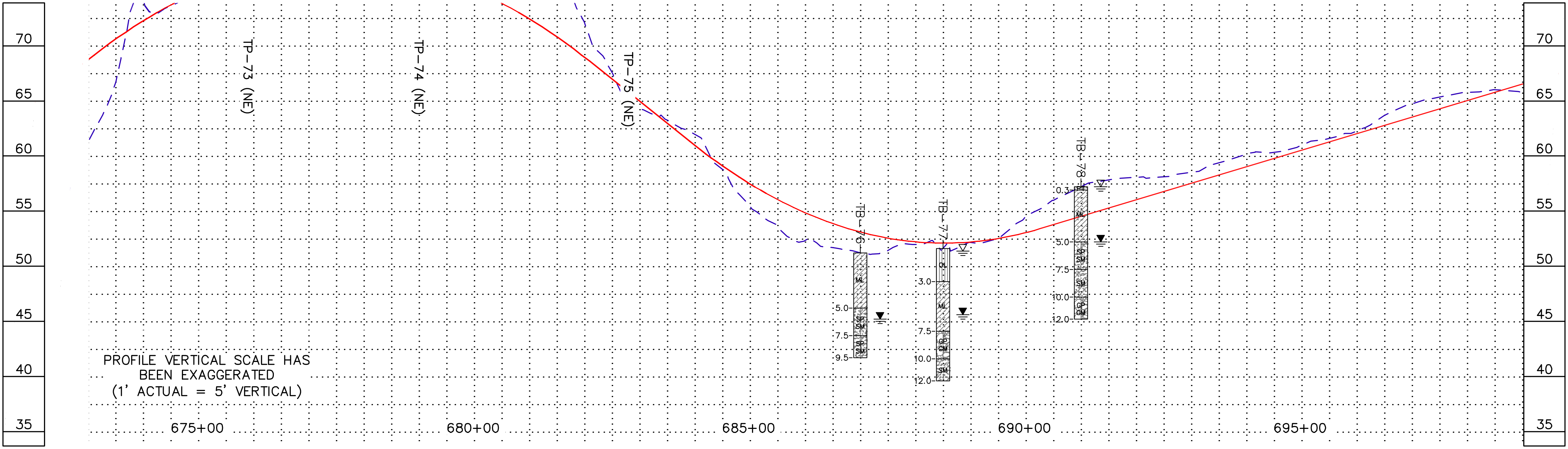
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

▽ GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▼ GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

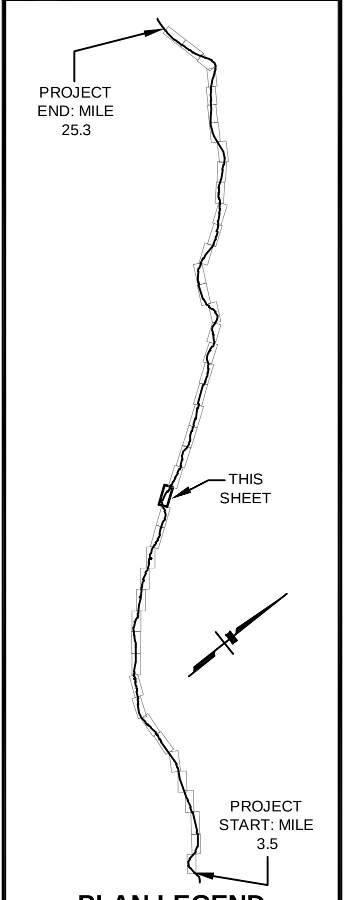
MICHAEL J. BAUER
TAB: 19 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

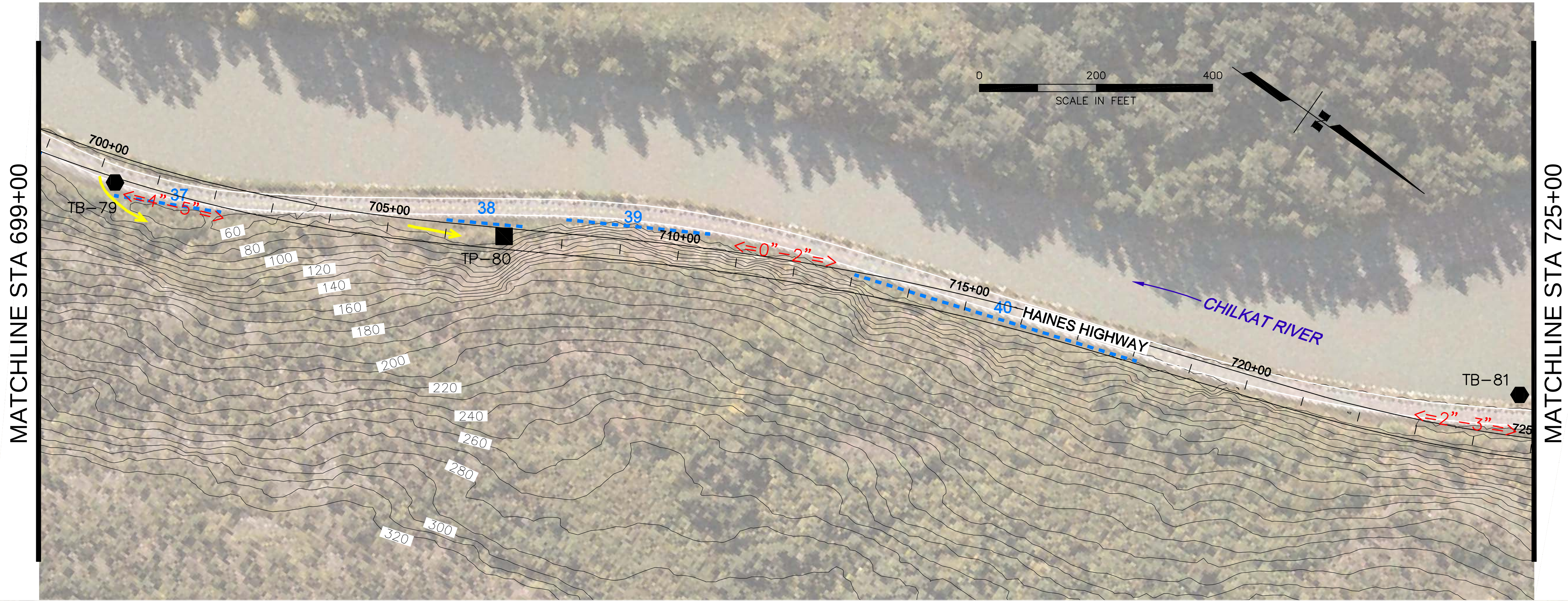
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

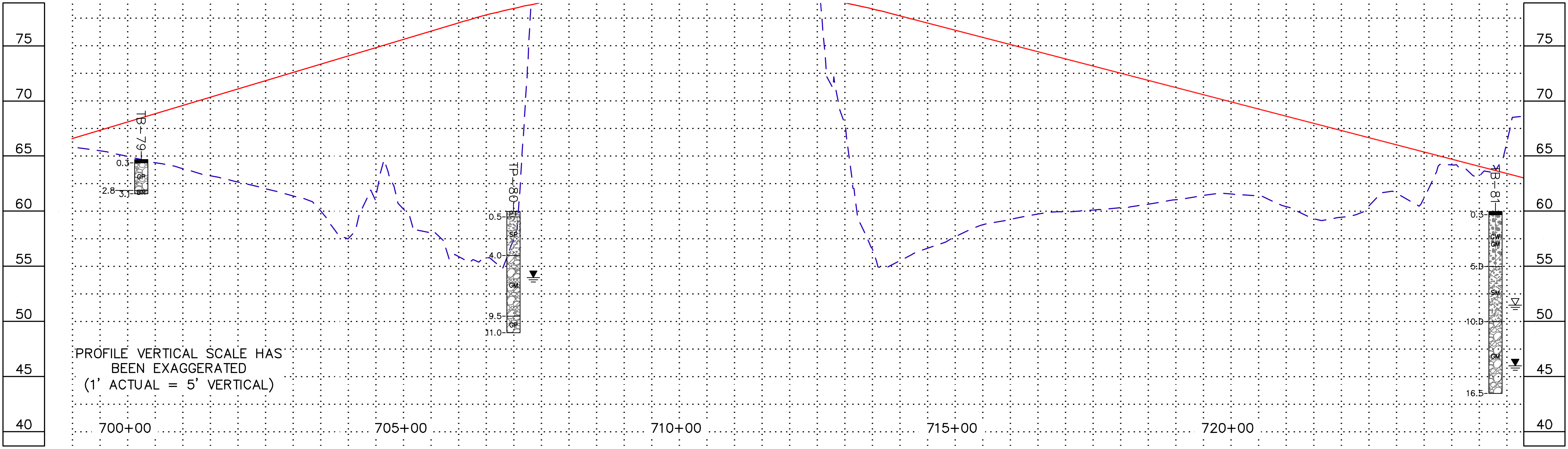
PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
19	44



LEGEND		⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED	- - - - -	GEOLOGIC MAPPING BASELINE	**PROFILE**	
40 / 60	CONTOUR INTERVAL IS 10 FEET	■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED	←	POSSIBLE ACCESS TO TOP OF OUTCROP	— — —	EXISTING GROUND
═══	EXISTING ROAD ALIGNMENT	<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS	MP 4	HAINES HIGHWAY MILE POST MARKERS	———	PROPOSED ROAD CENTERLINE
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING					▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
						▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

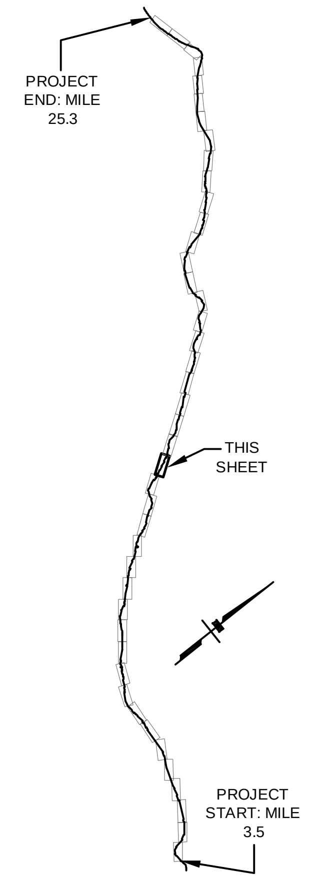
MICHAEL J. BAUER
TAB: 20 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

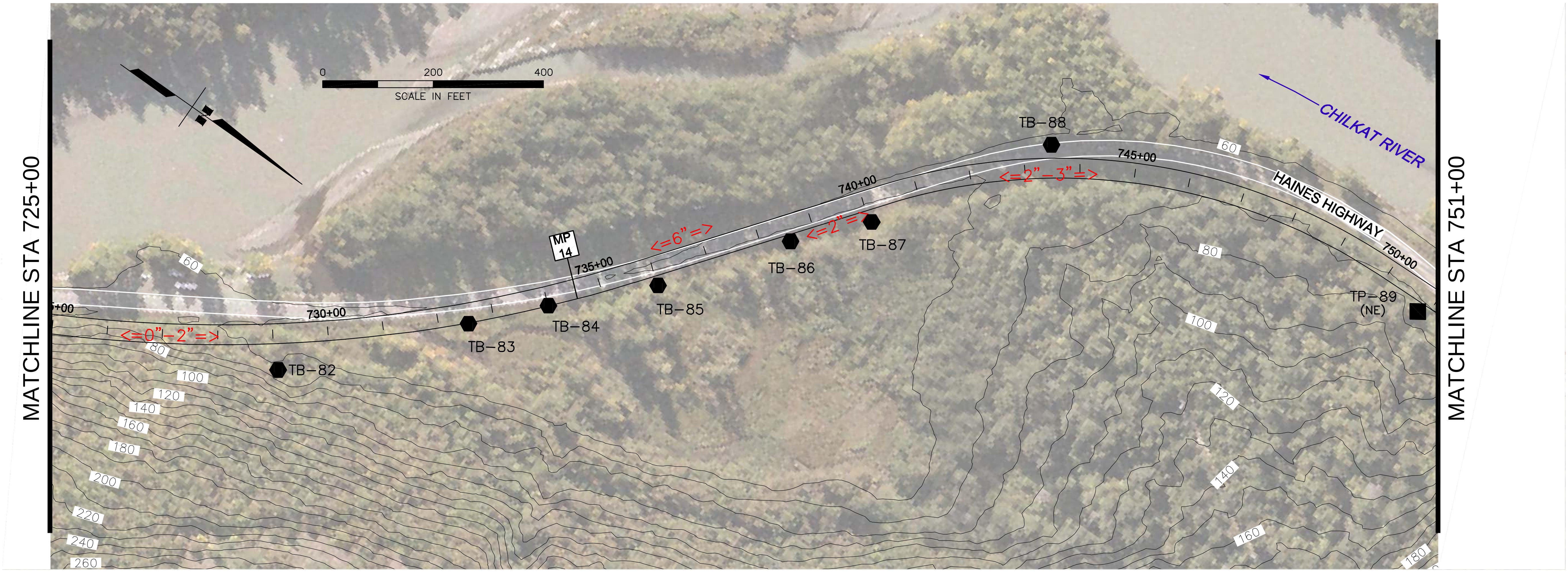
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

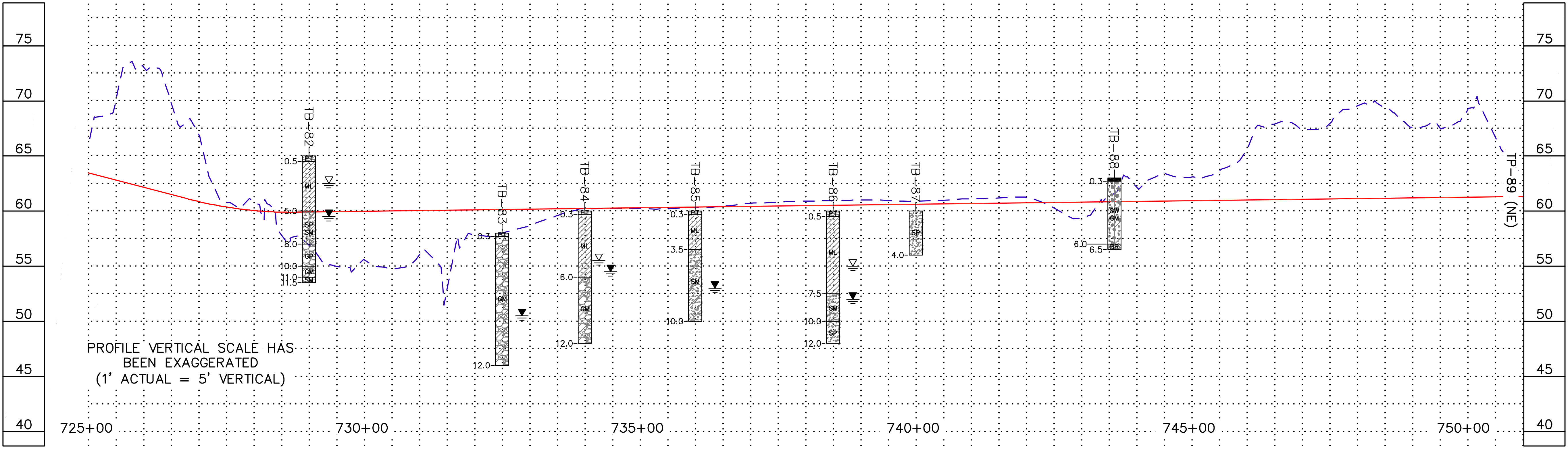
SHEET NUMBER	TOTAL SHEETS
20	**44**



LEGEND			
40 / 60	CONTOUR INTERVAL IS 10 FEET	⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
═	EXISTING ROAD ALIGNMENT	■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING	<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE	
— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

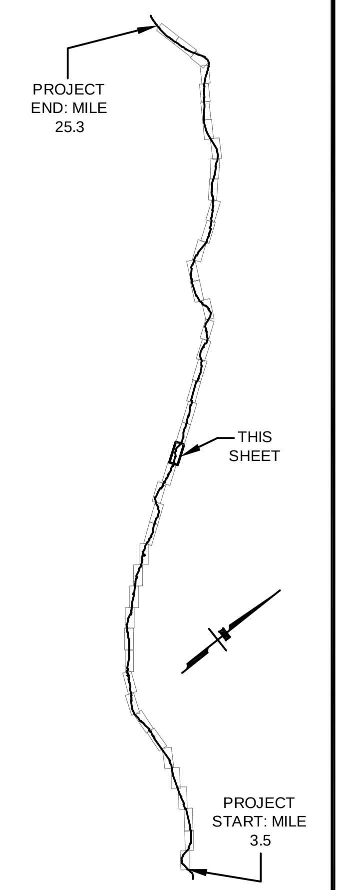
MICHAEL J. BAUER
TAB: 21 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

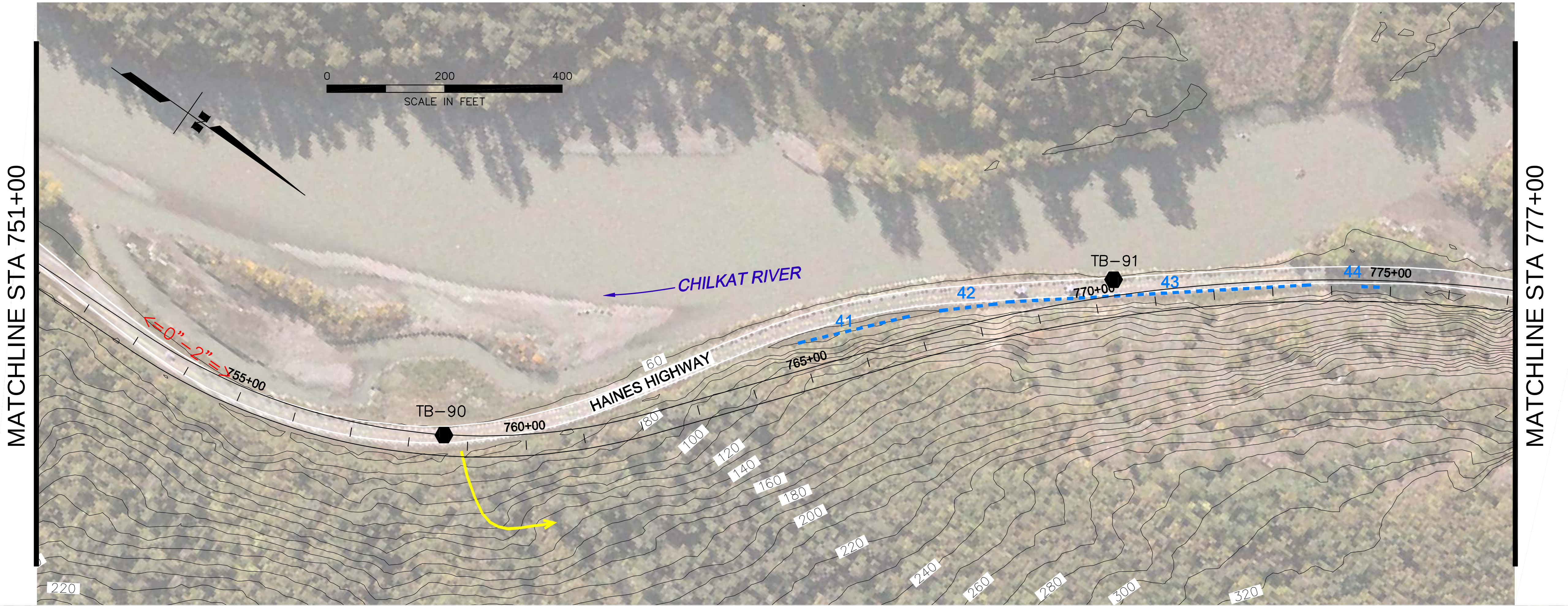
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
21	44

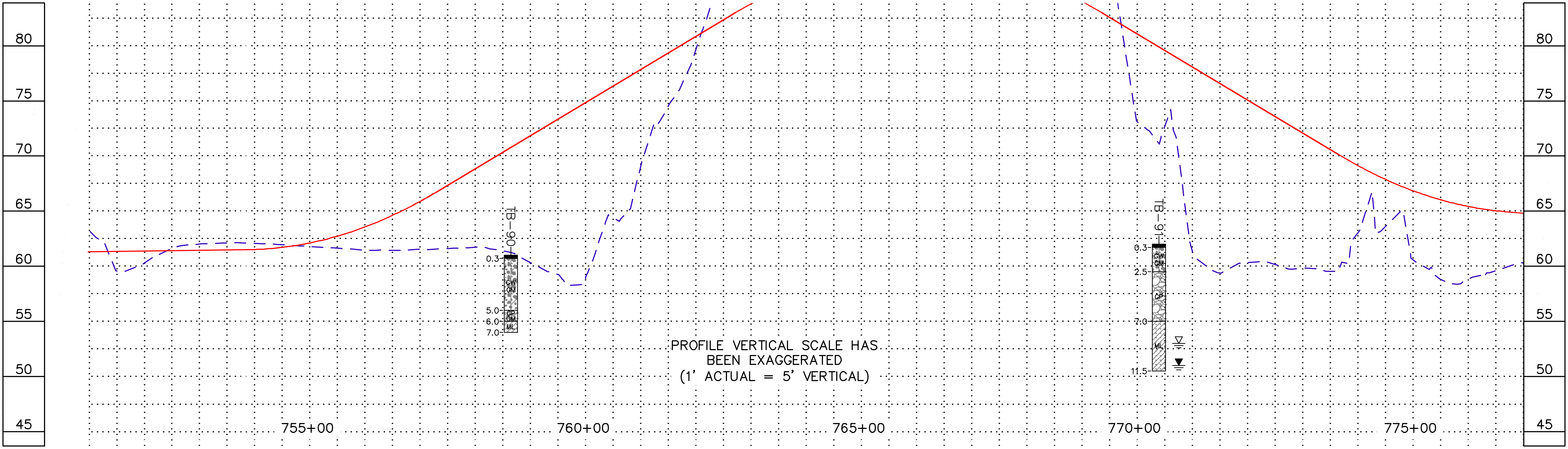


LEGEND

40 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP−28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
———	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

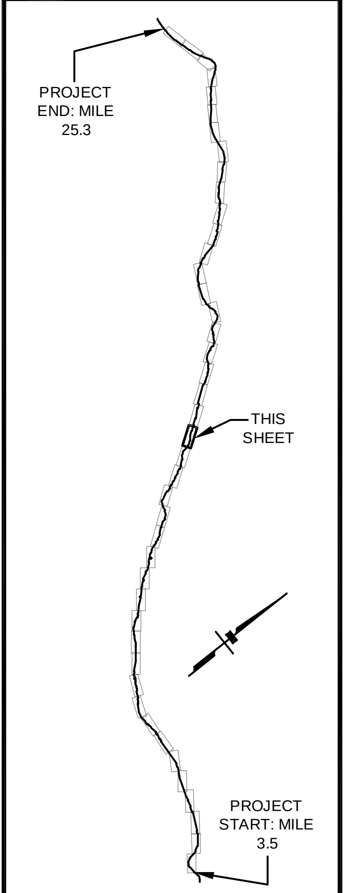
MICHAEL J. BAUER
TAB: 22 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

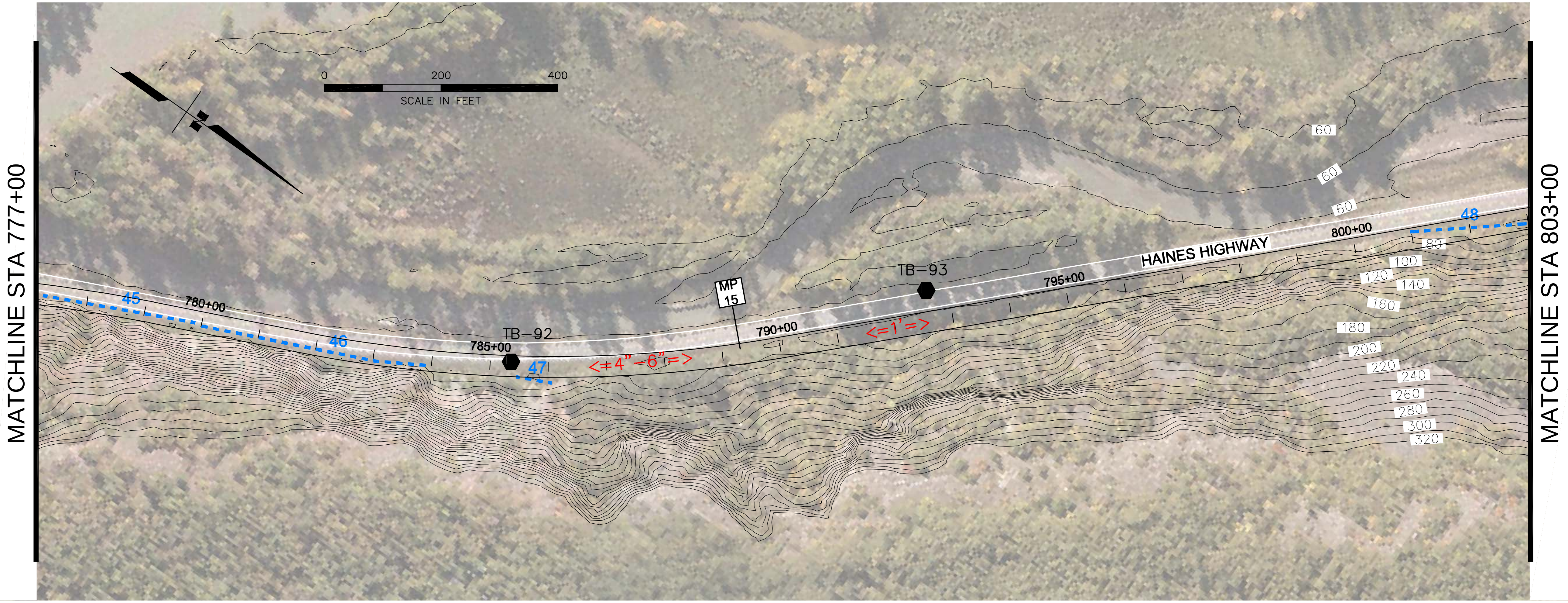
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
22	44

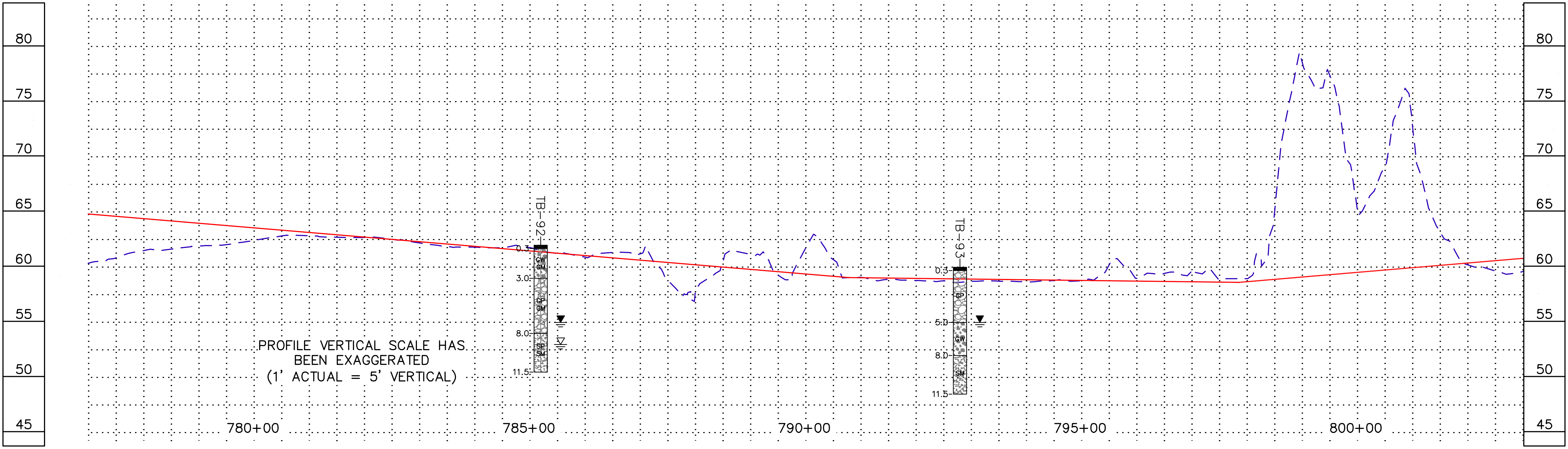


LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP−28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

– – –	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

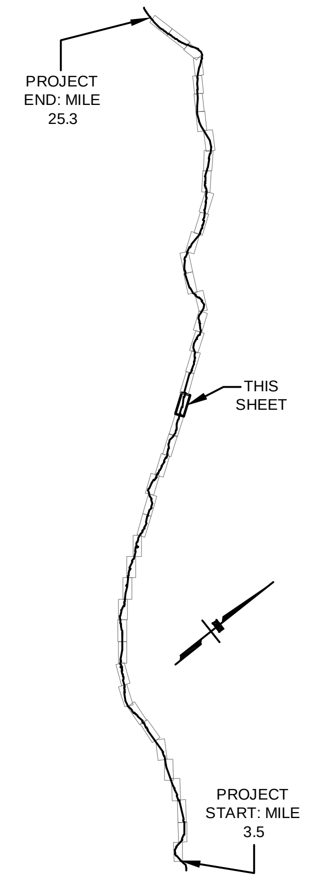
MICHAEL J. BAUER
TAB: 23 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

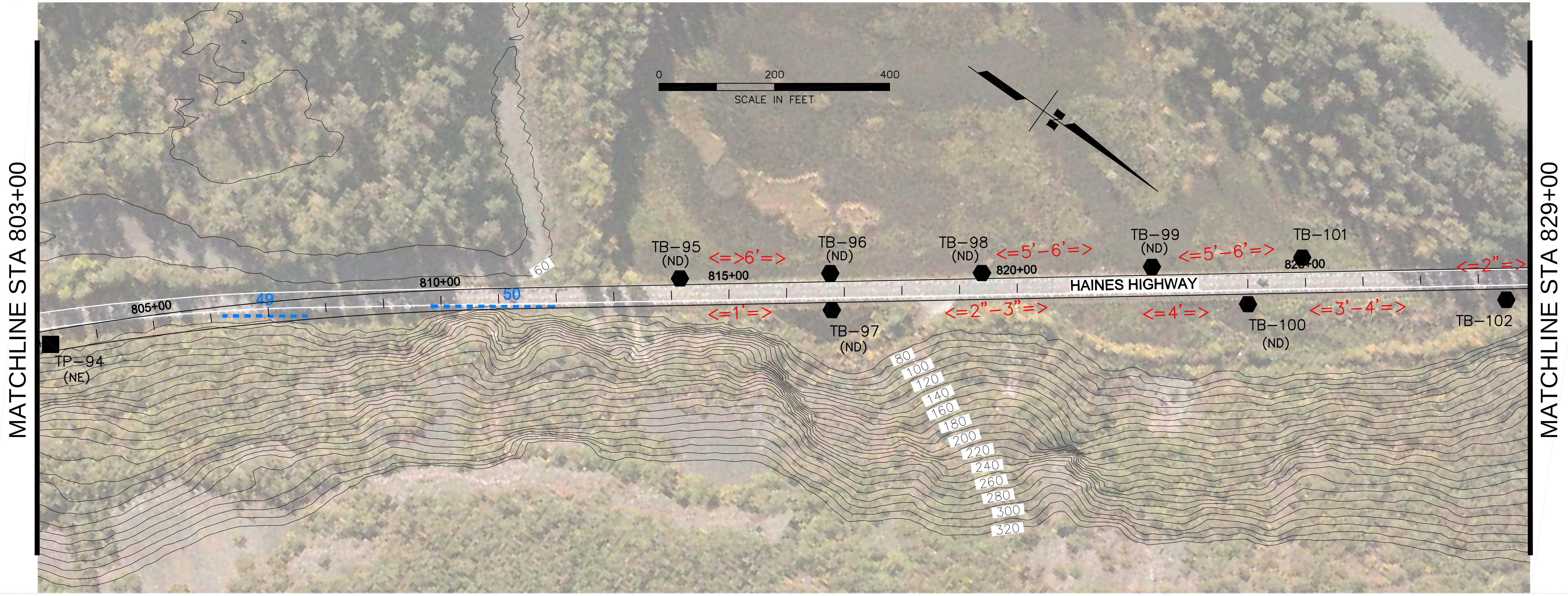
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

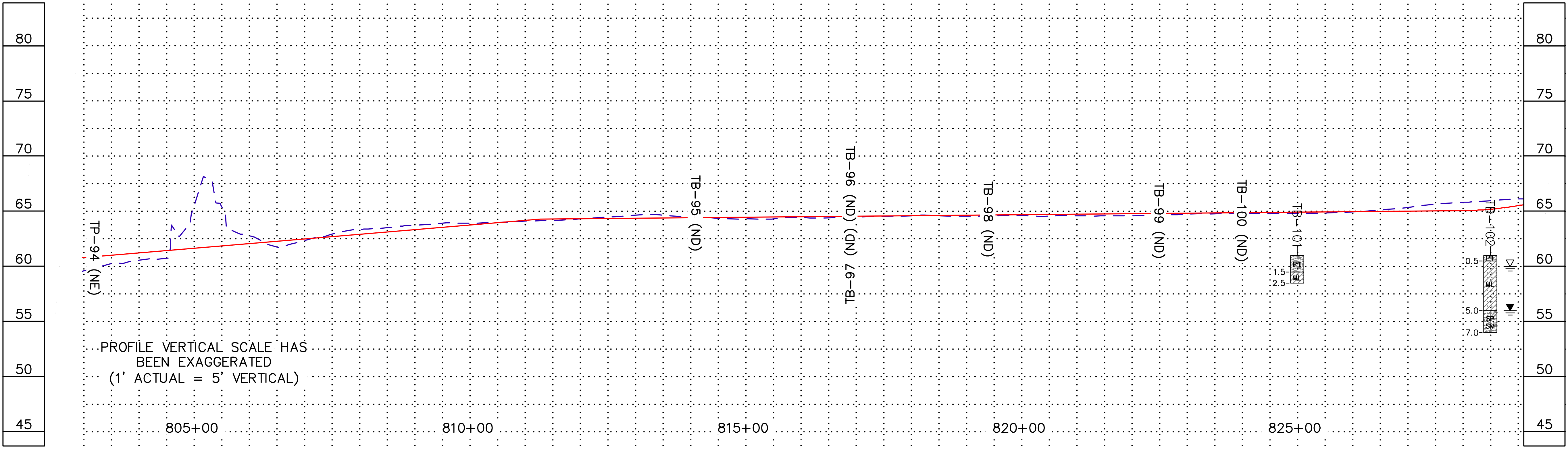
STATE	YEAR
ALASKA	**2008**

SHEET NUMBER	TOTAL SHEETS
23	**44**



LEGEND	
40 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE	
— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

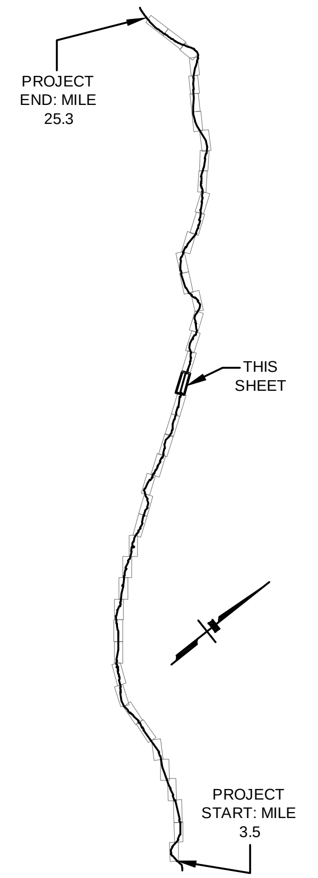
MICHAEL J. BAUER
TAB: 24 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

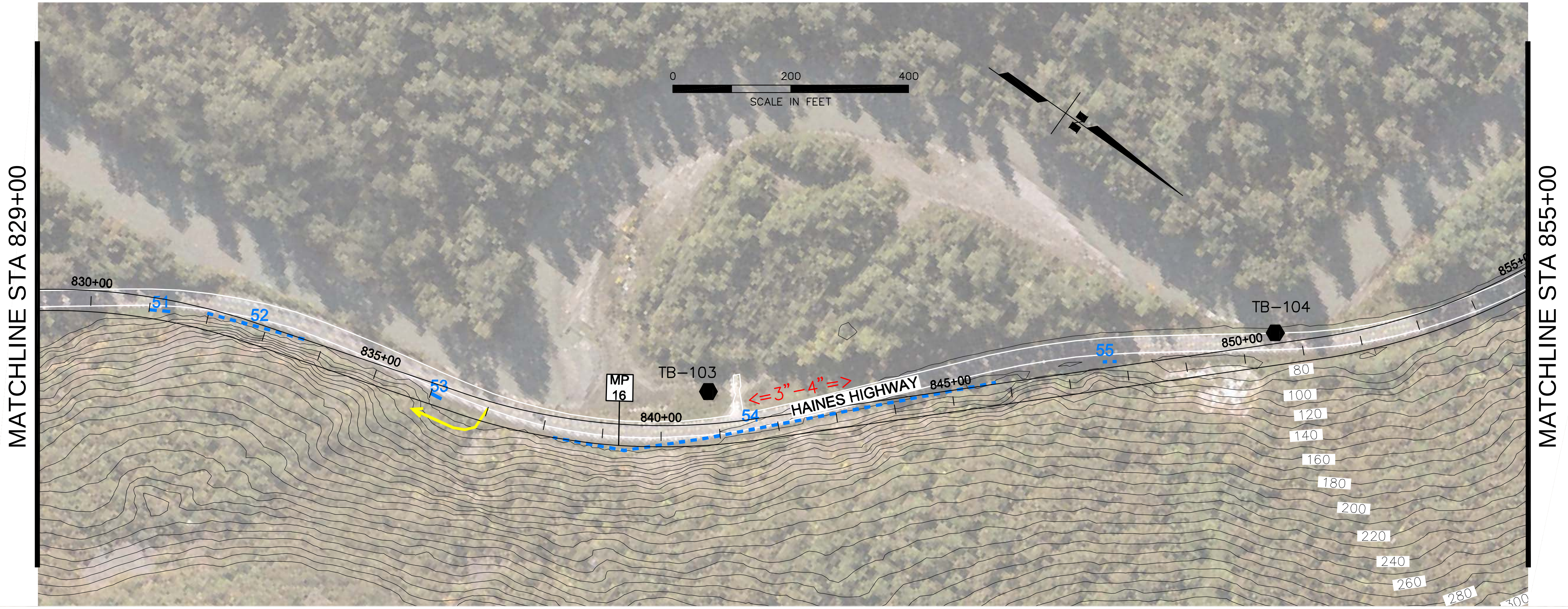
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
24	44

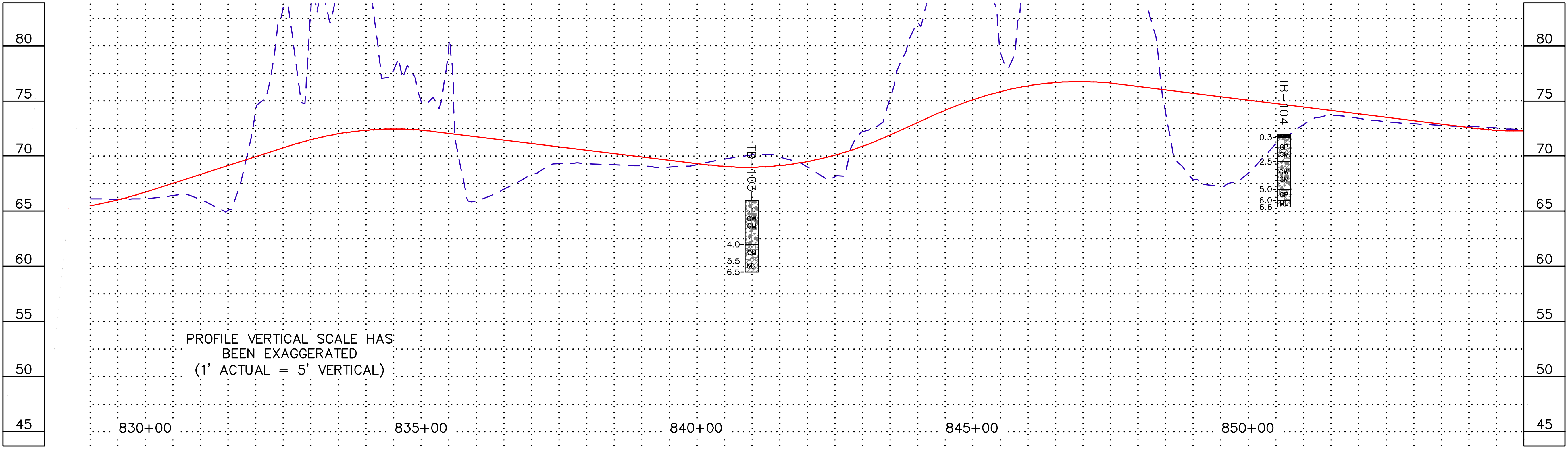


LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

– – –	EXISTING GROUND
―	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH: P:\PROJECTS\D59119\GEO\GTB-HN.DWG

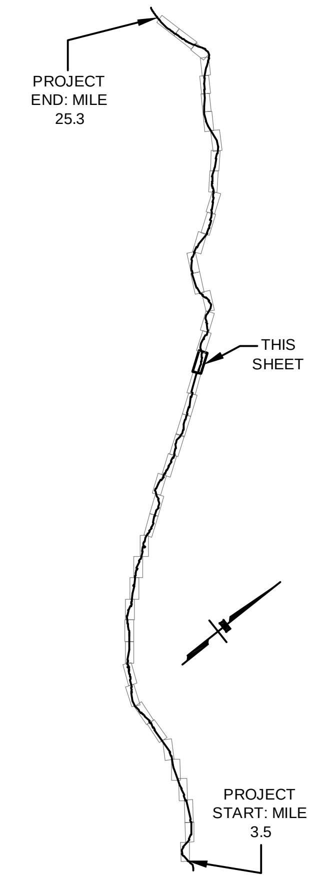
MICHAEL J. BAUER
TAB: 25 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

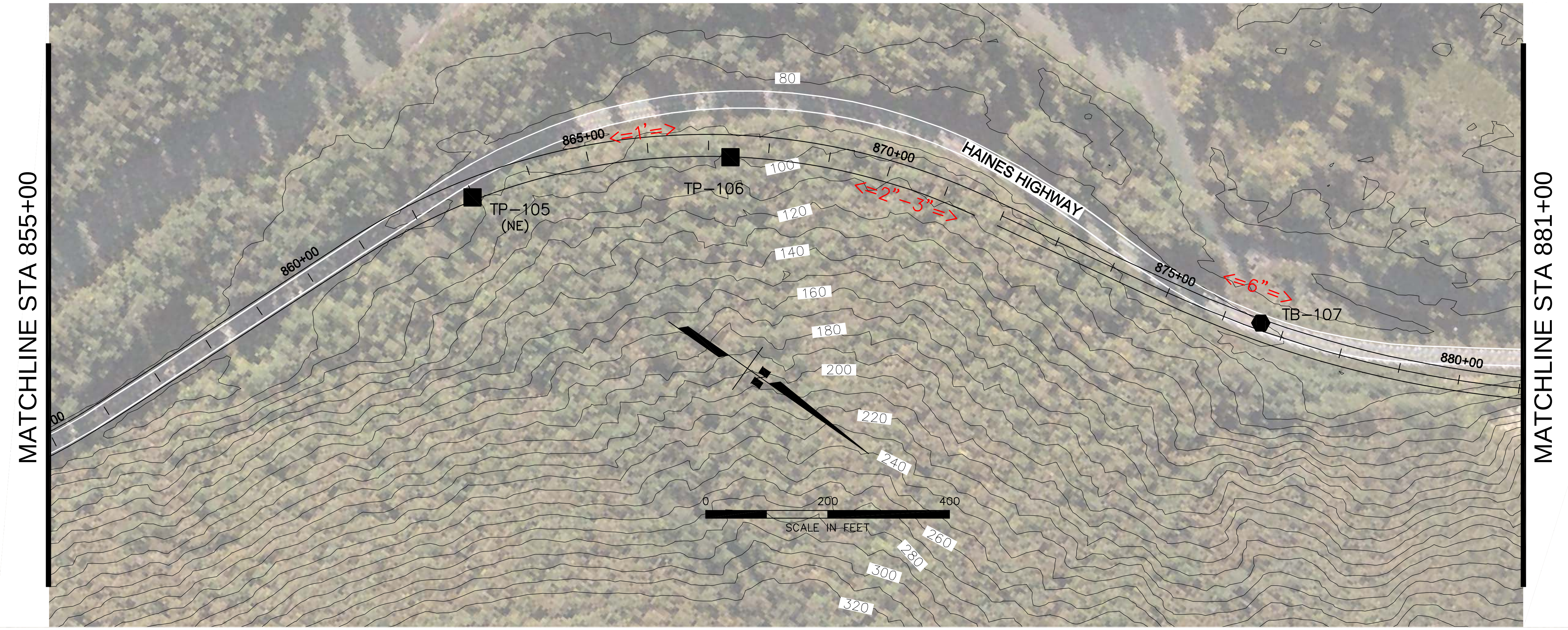
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
25	44



LEGEND

CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB-5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP-28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

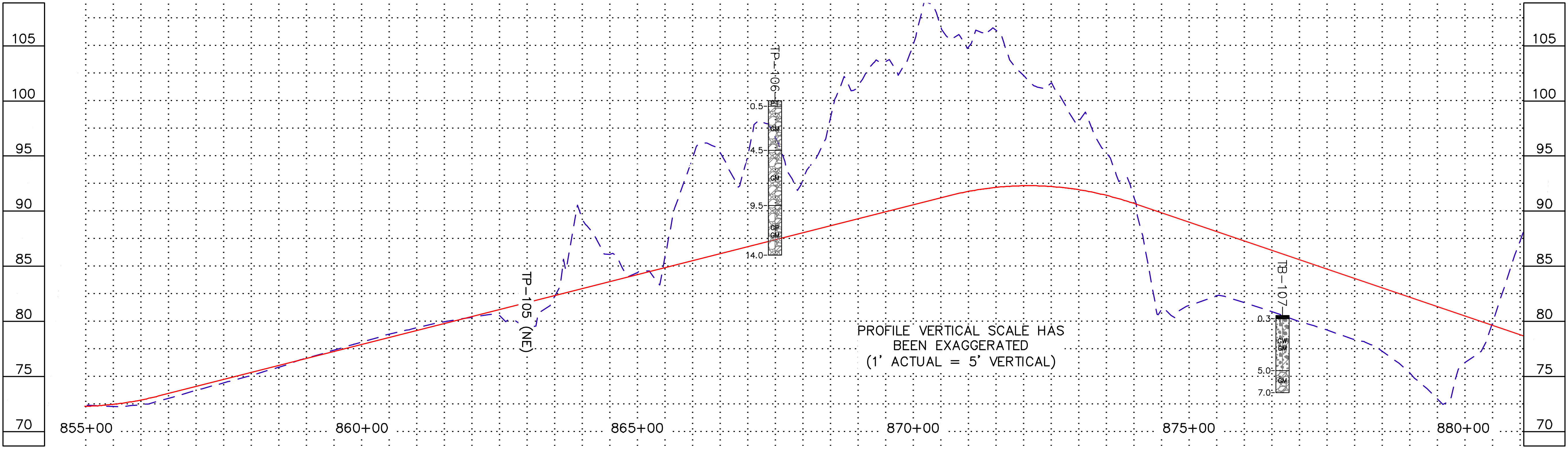
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

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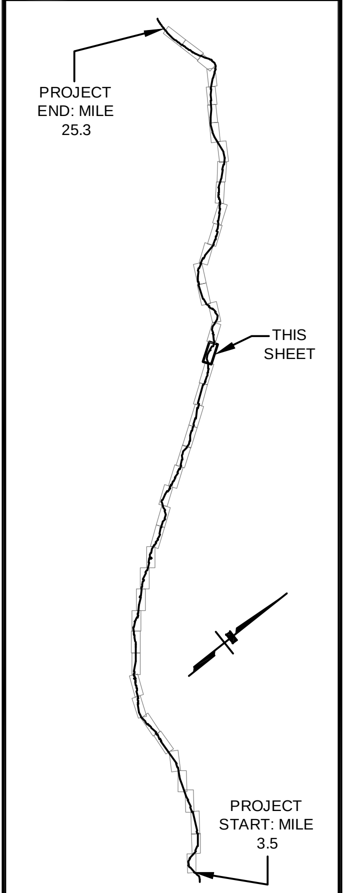
MICHAEL J. BAUER
TAB: 26 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

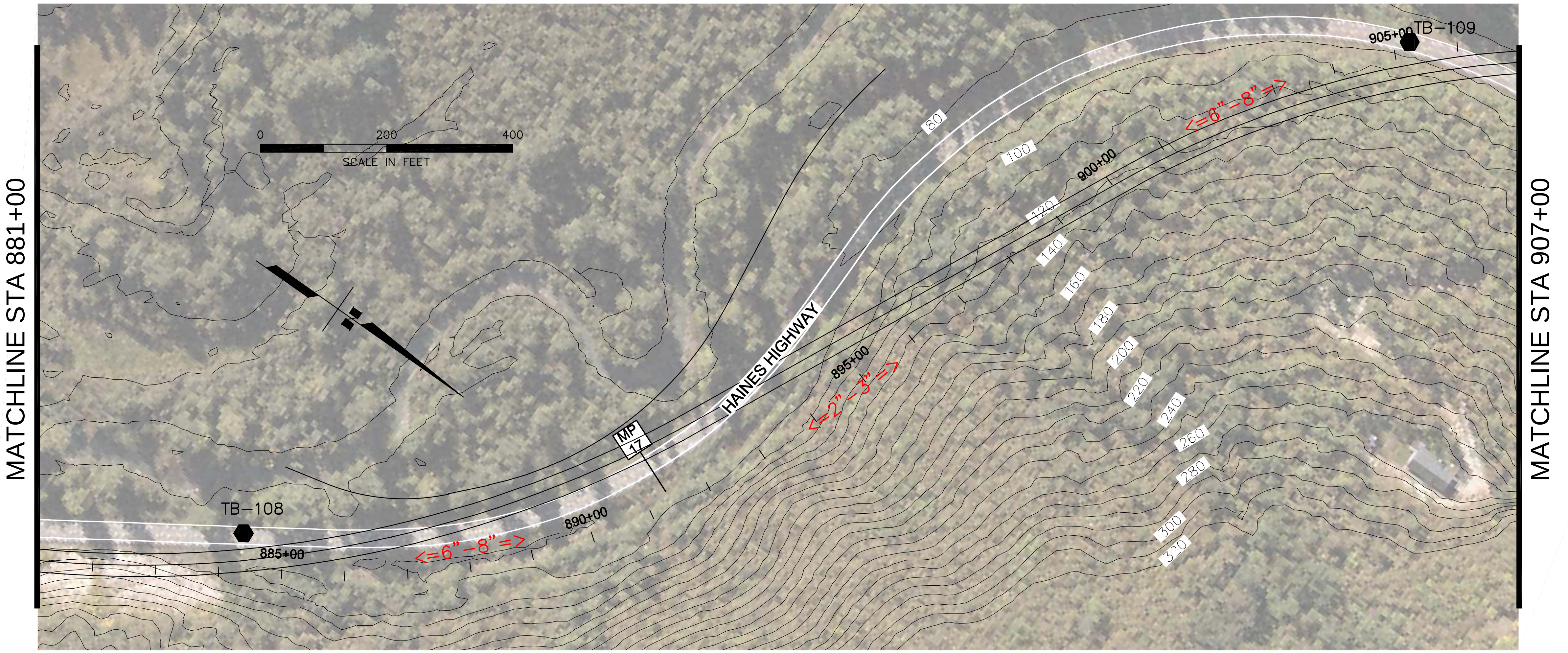
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
26	44



LEGEND

40 60 CONTOUR INTERVAL IS 10 FEET

═ EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB–5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP–28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

- - - 1 GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

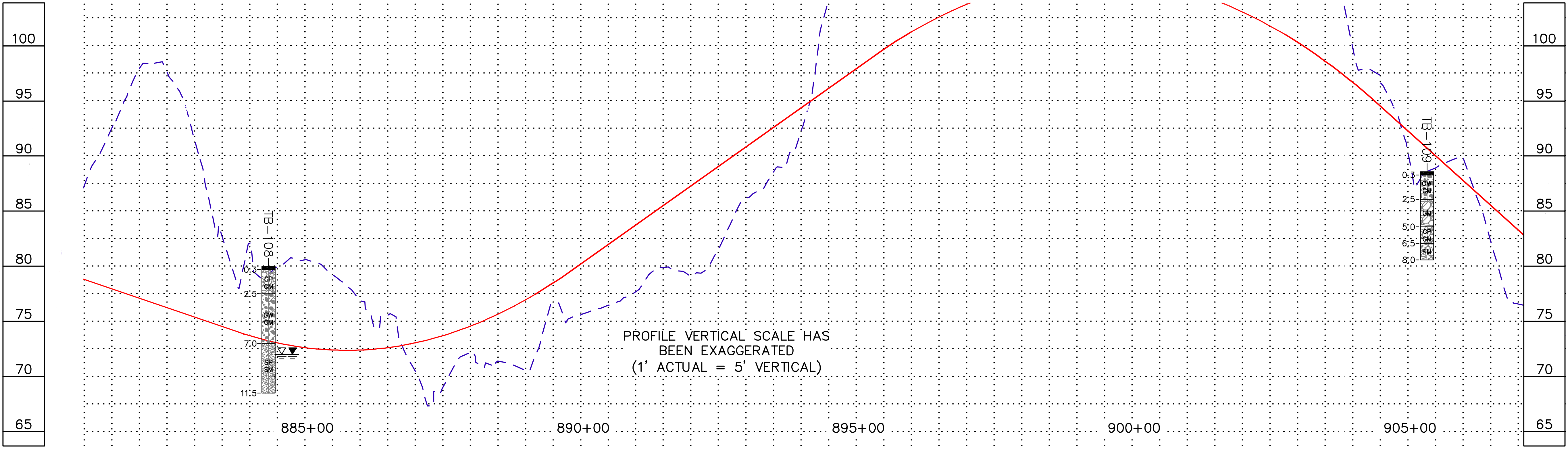
PROFILE

– – – EXISTING GROUND

— PROPOSED ROAD CENTERLINE

▼ GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▽ GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

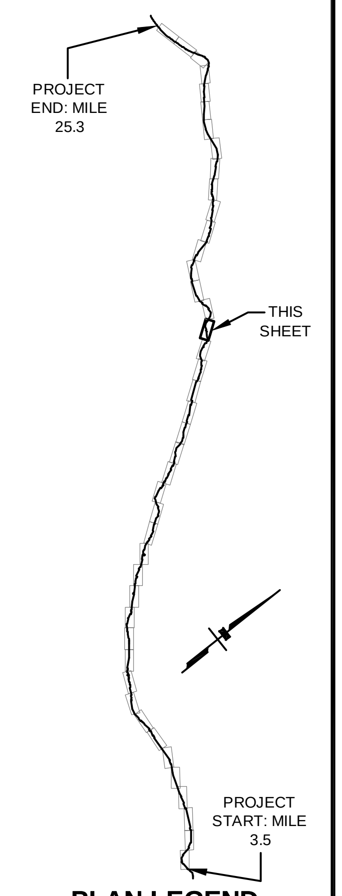
MICHAEL J. BAUER
TAB: 27 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

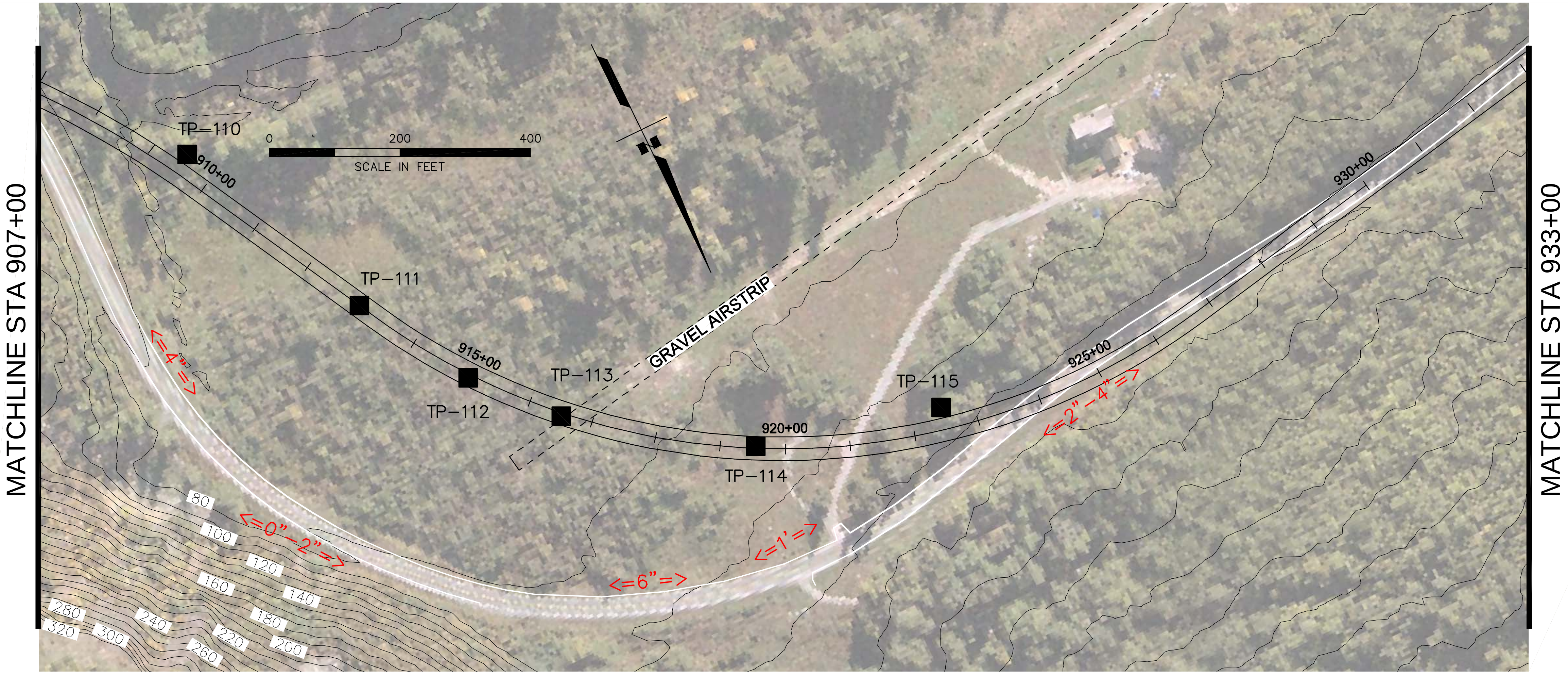
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
27	44



LEGEND

40 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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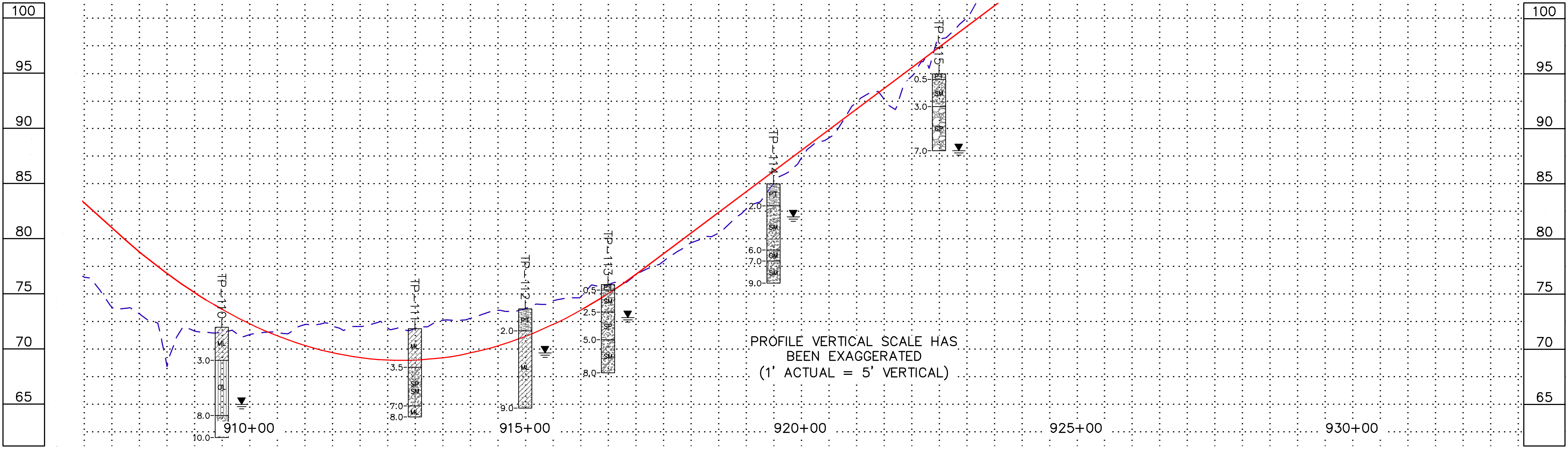
1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

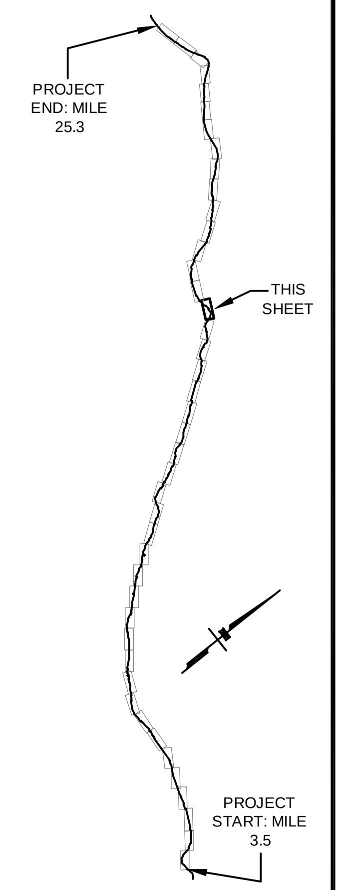
MICHAEL J. BAUER
TAB: 28 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN
DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

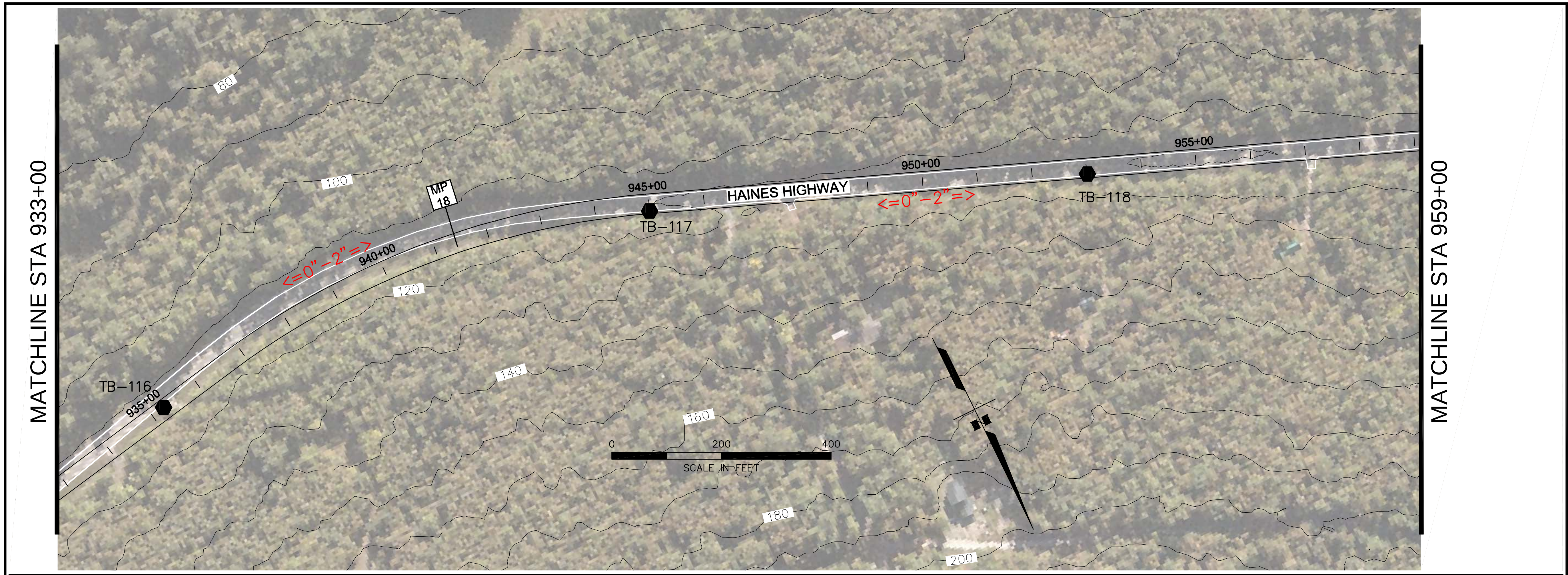
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
28	44



LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
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210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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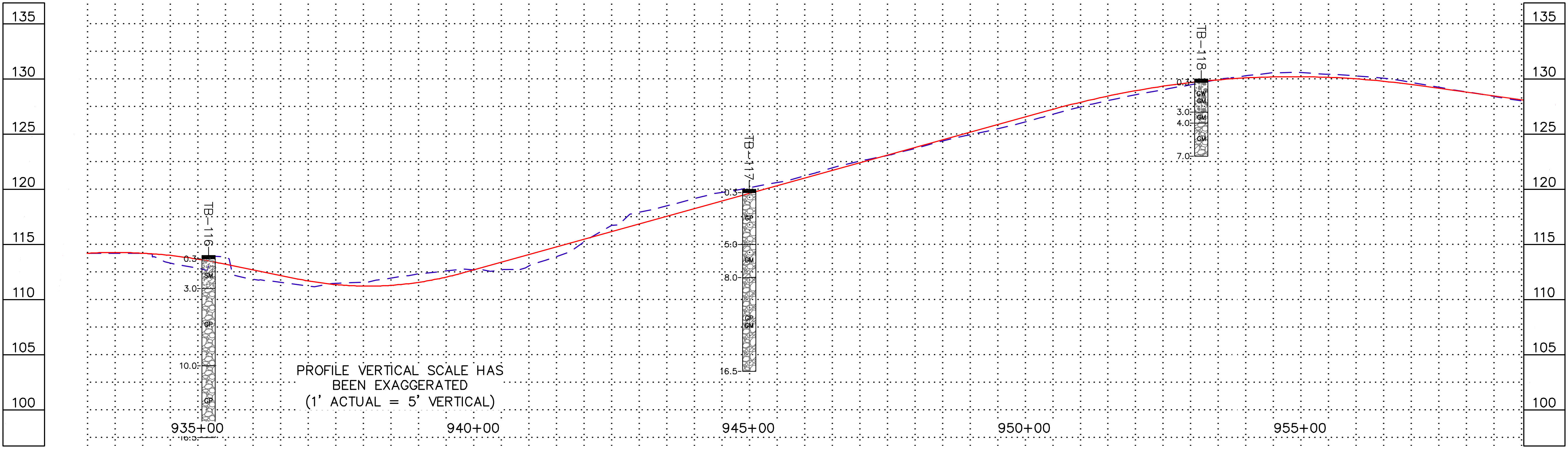
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

- - -	EXISTING GROUND
──	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS
BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

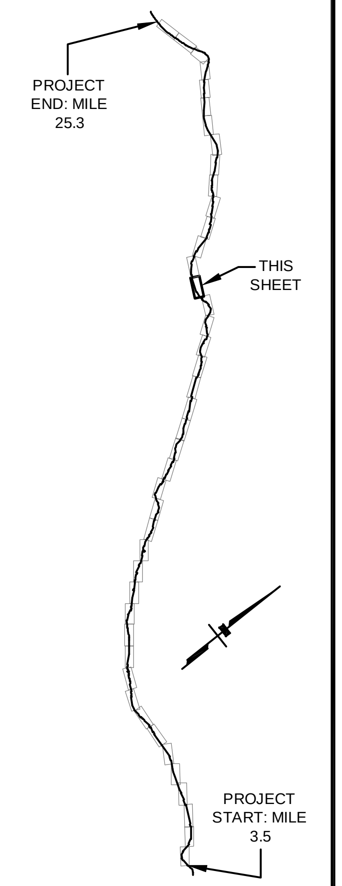
MICHAEL J. BAUER
TAB: 29 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

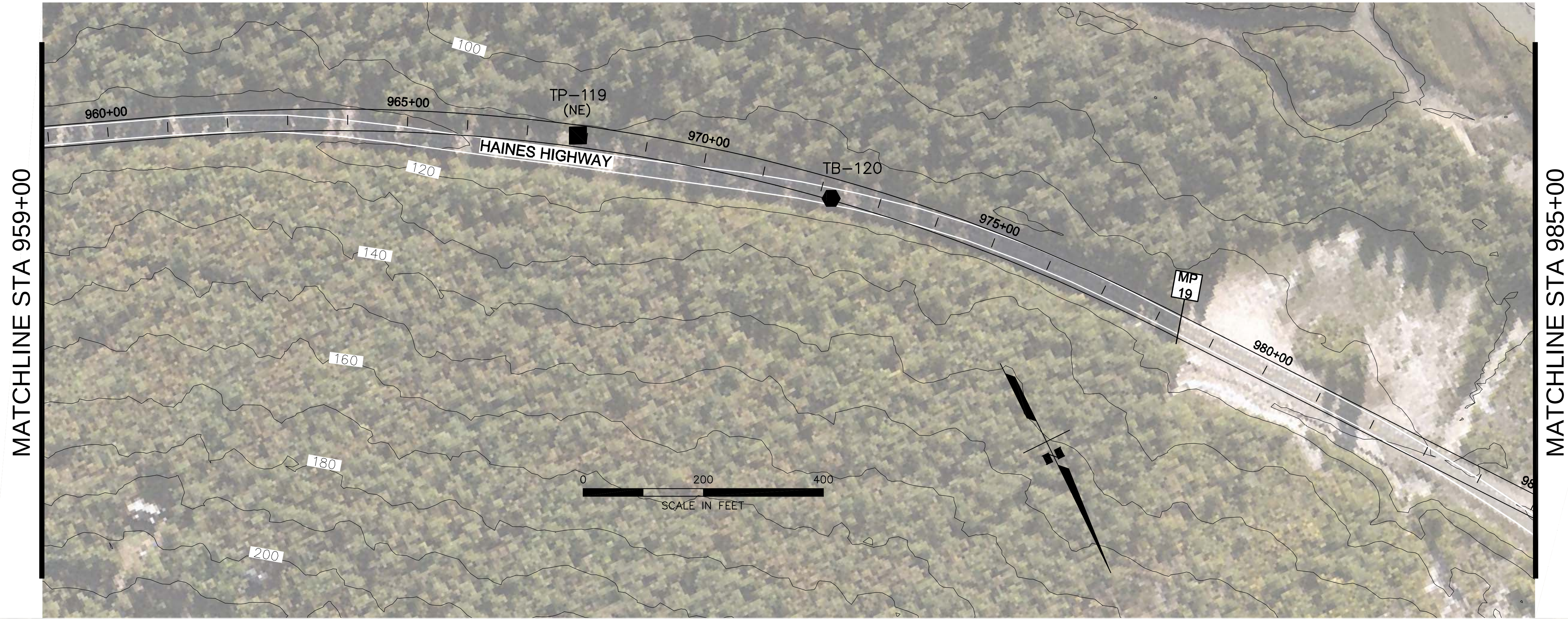
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

SHEET NUMBER	TOTAL SHEETS
29	**44**



LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
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210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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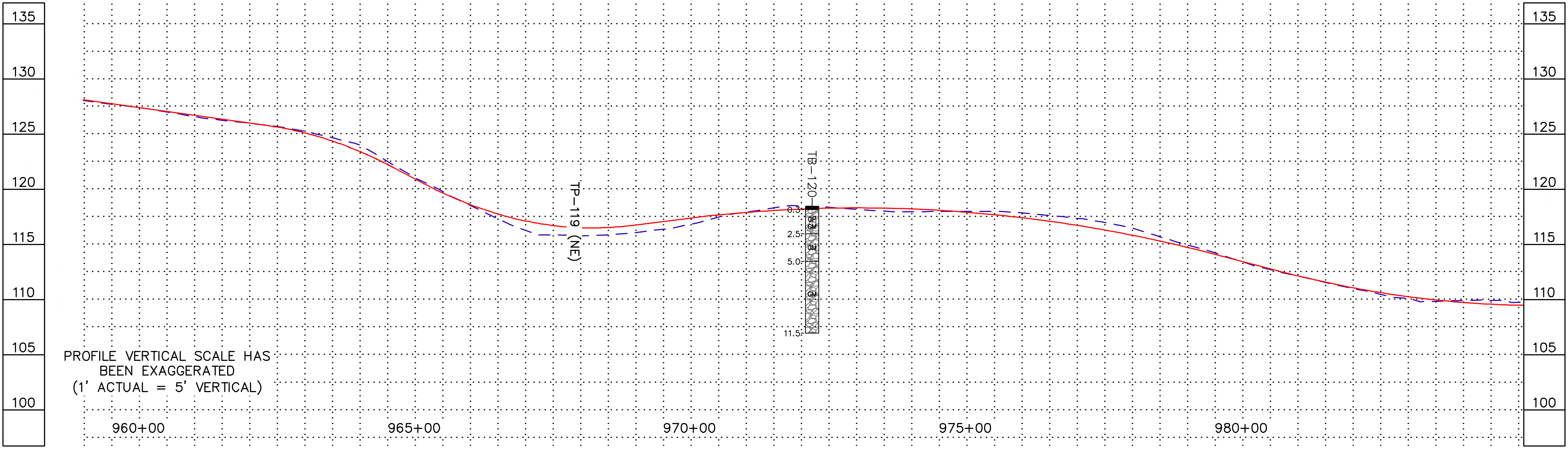
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

− − −	EXISTING GROUND
───	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

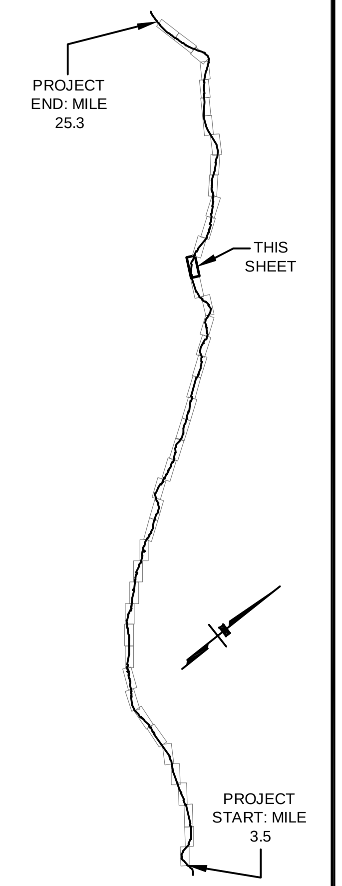
MICHAEL J. BAUER
TAB: 30 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

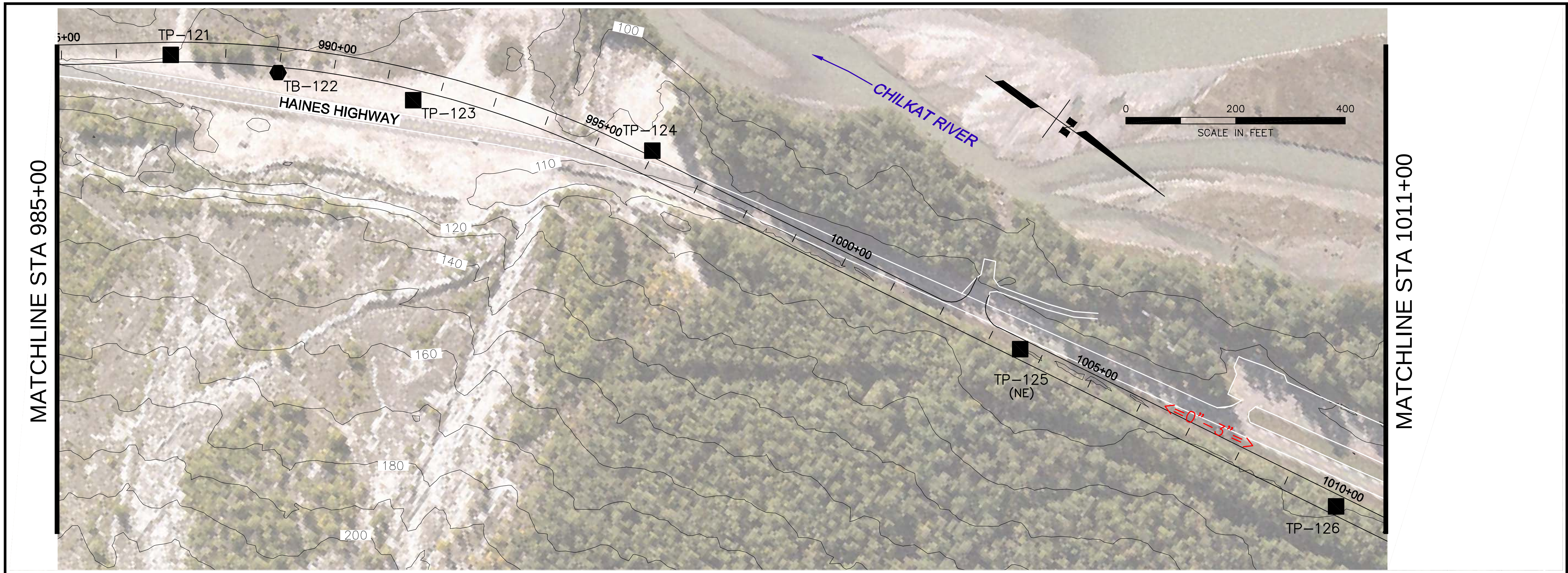
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008
SHEET NUMBER	TOTAL SHEETS
30	44



LEGEND

CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

TB–5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

TP–28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

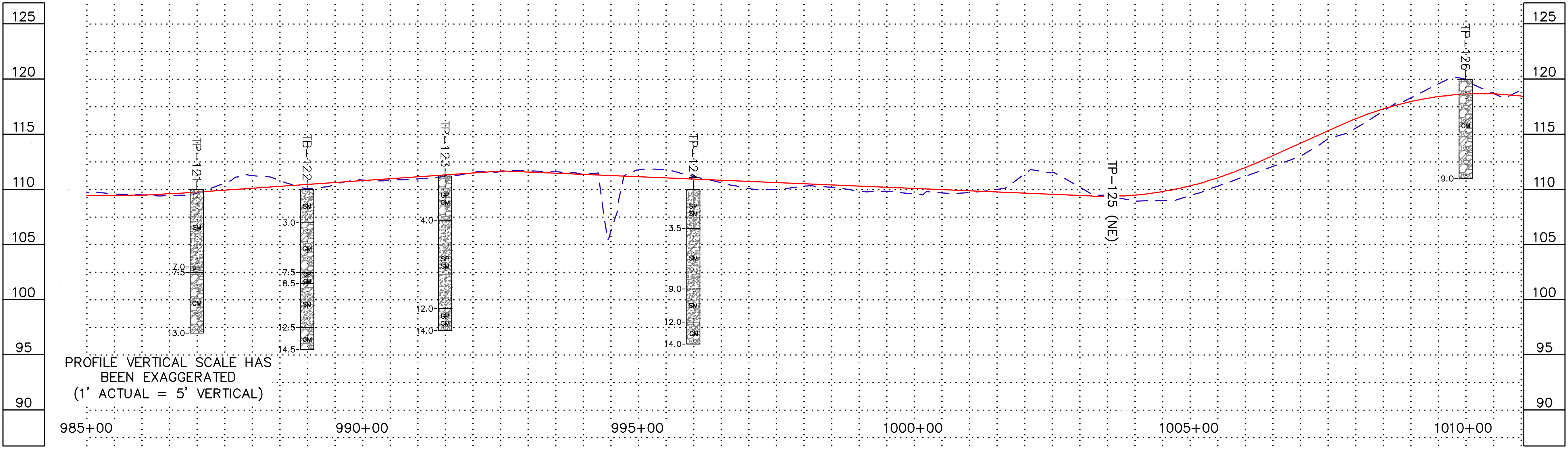
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

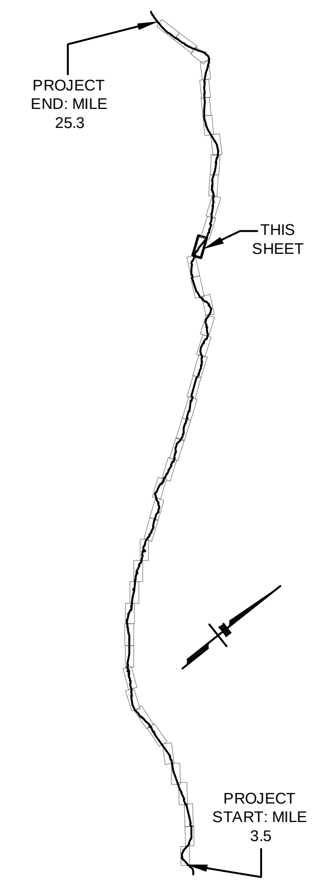
MICHAEL J. BAUER
TAB: 31 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

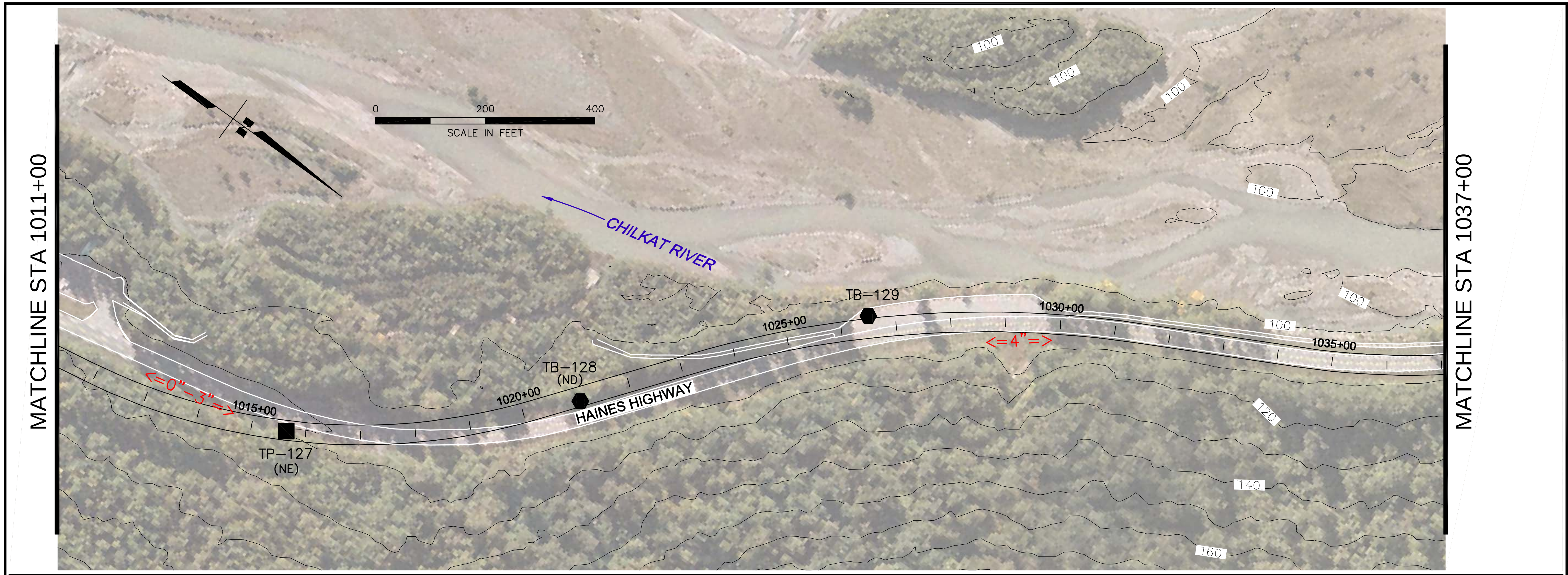
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
31	44



LEGEND

CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

TB–5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

TP–28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

GEOLOGIC MAPPING BASELINE

POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

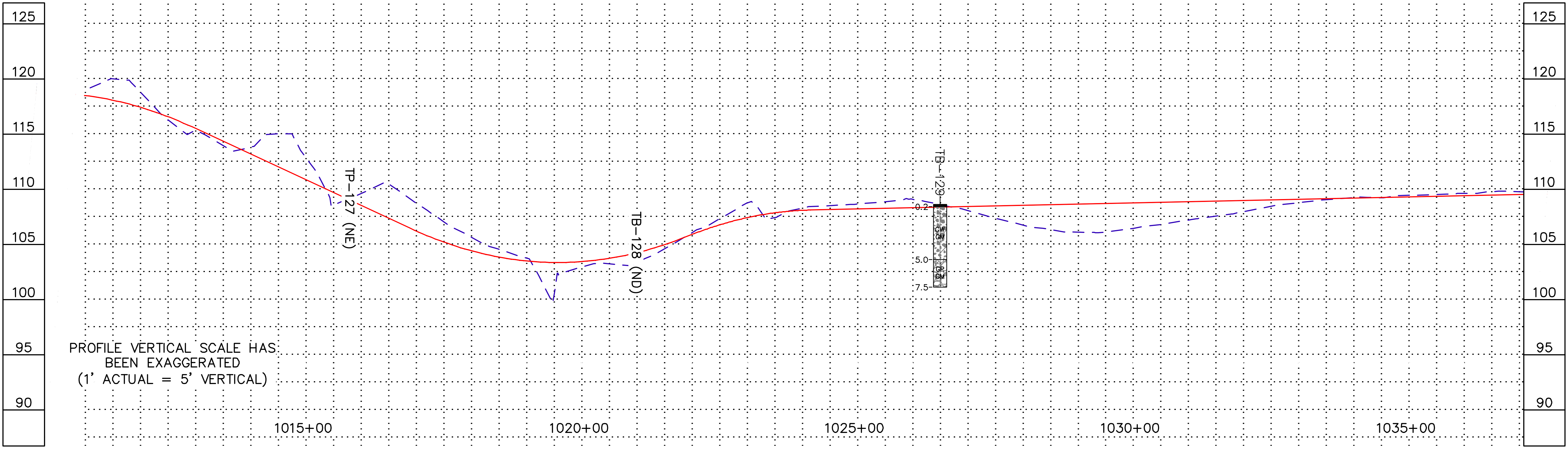
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH: P:\PROJECTS\D59119\GEO\GTB-HN.DWG

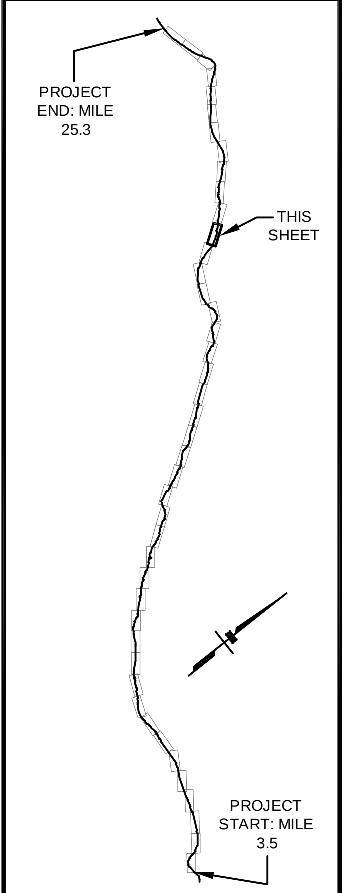
MICHAEL J. BAUER
TAB: 32 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

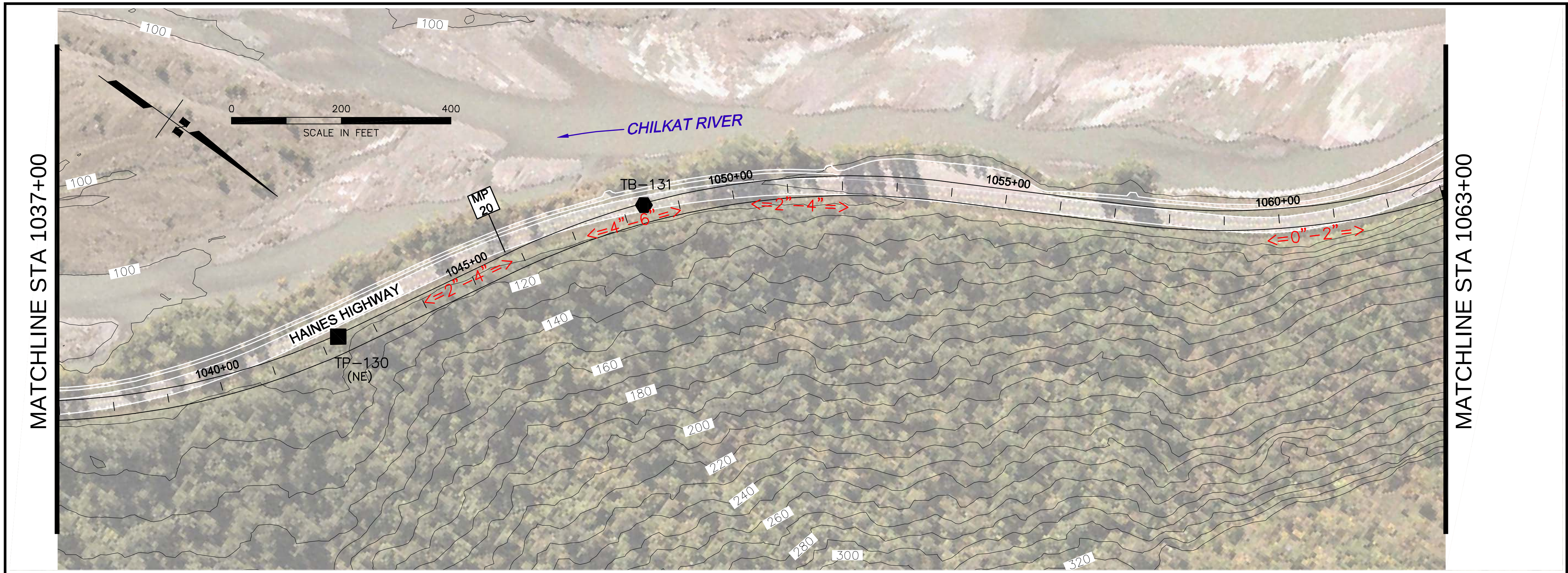
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008
SHEET NUMBER	TOTAL SHEETS
32	44



LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB−5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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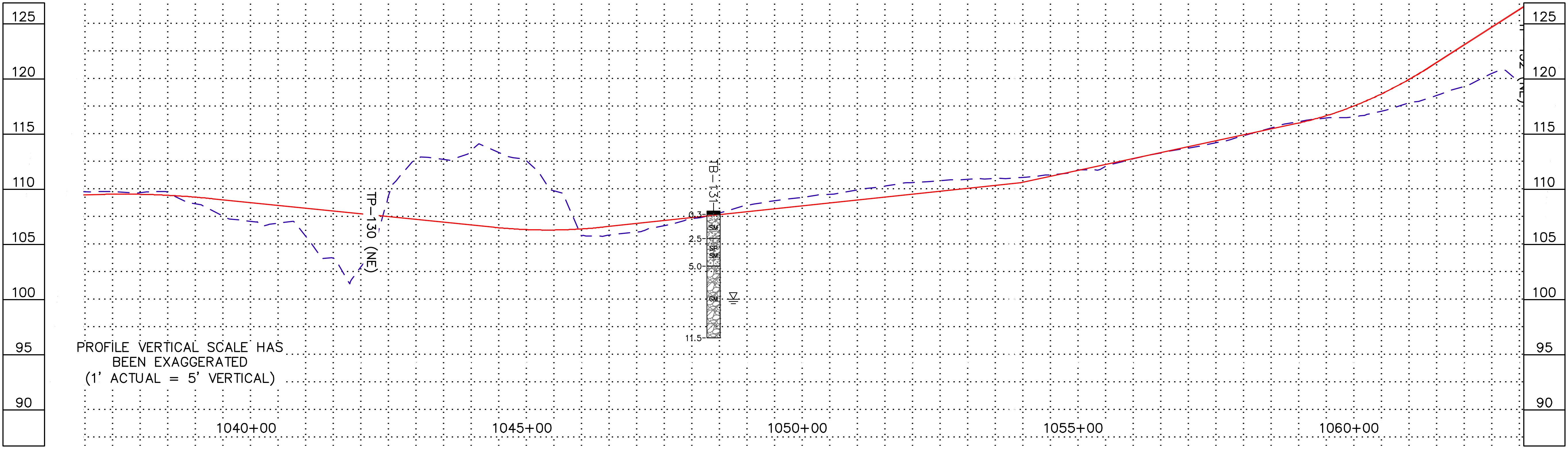
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

− − −	EXISTING GROUND
──	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH: P:\PROJECTS\D59119\GEO\GTB-HN.DWG

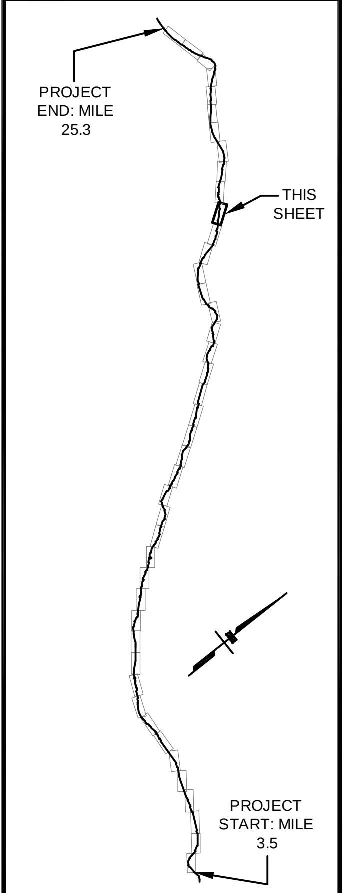
MICHAEL J. BAUER
TAB: 33 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

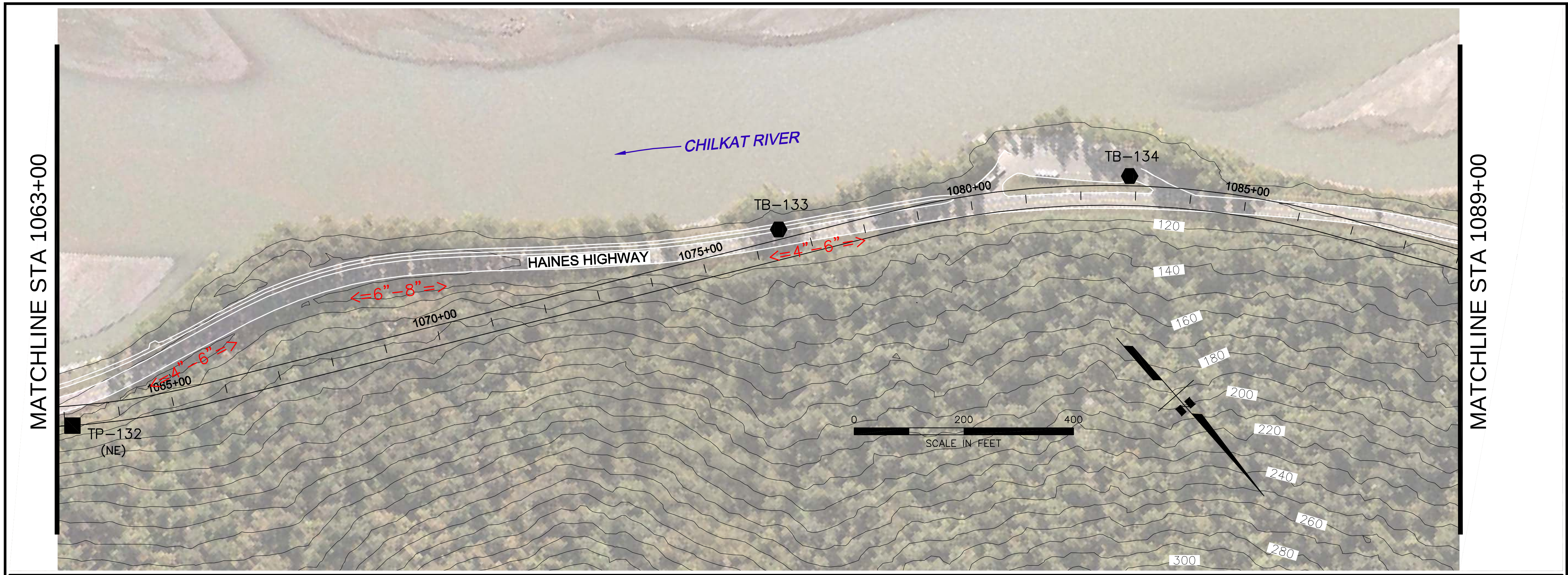
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
33	44



LEGEND

40 / 60 — CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 — PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB–5 (ND) — APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP–28 (NE) — APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> — HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

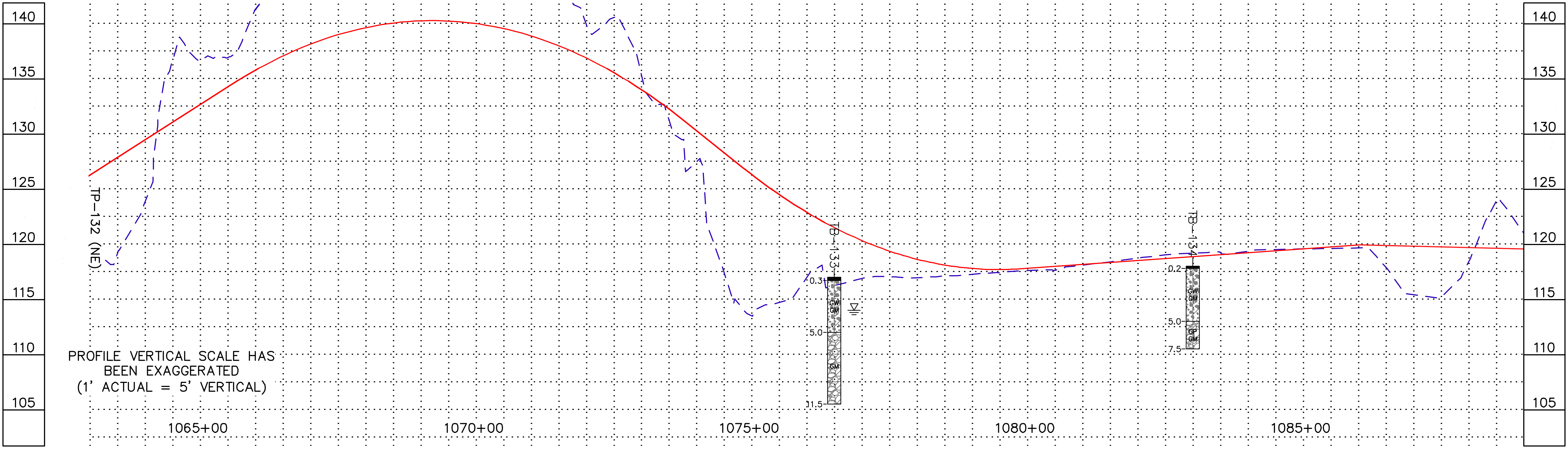
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

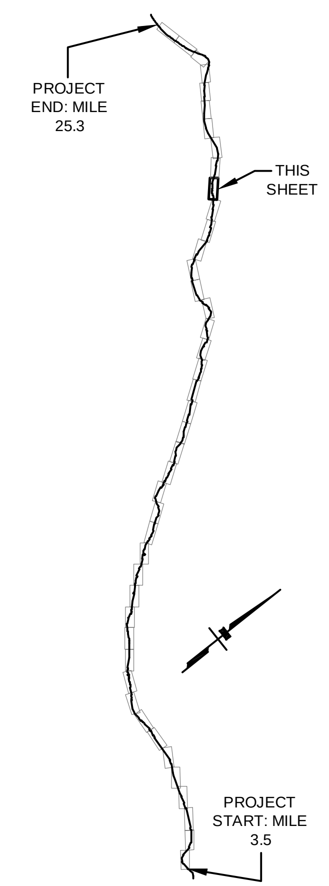
MICHAEL J. BAUER
TAB: 34 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

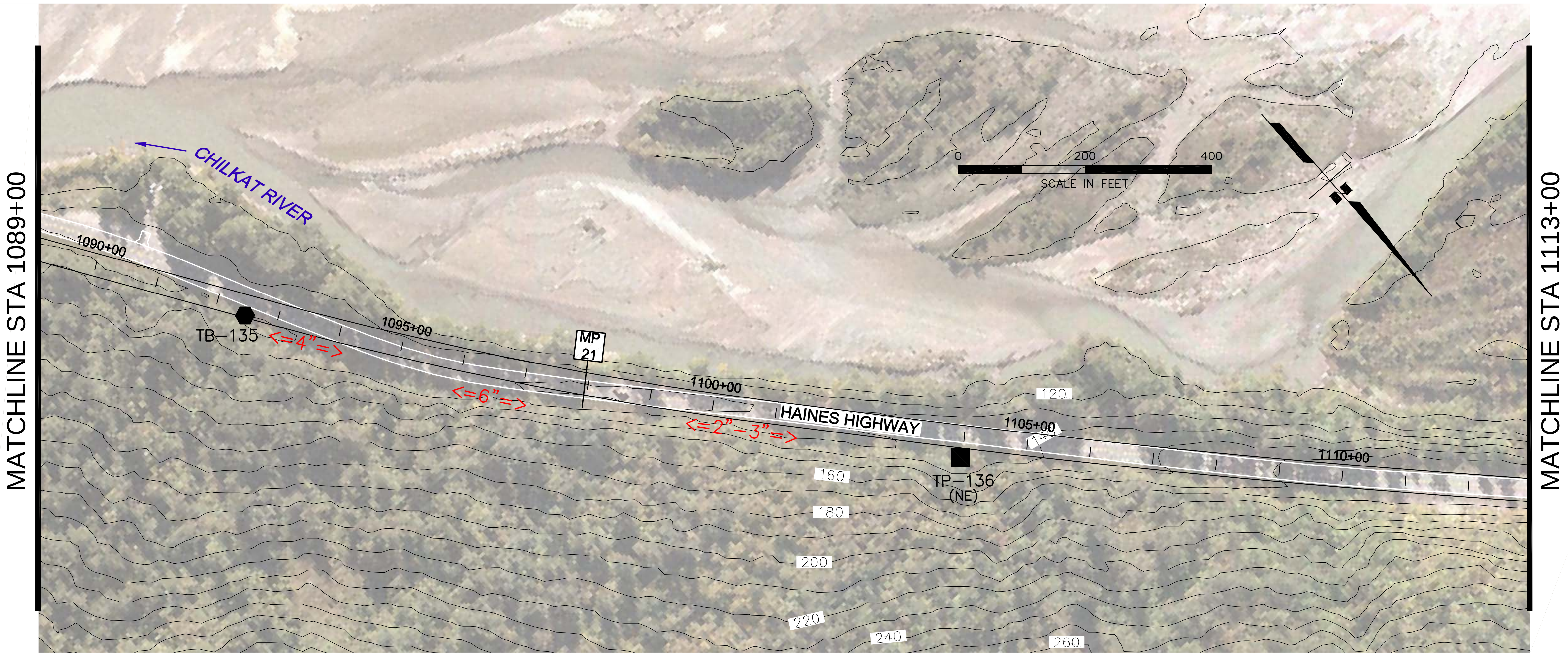
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
34	44

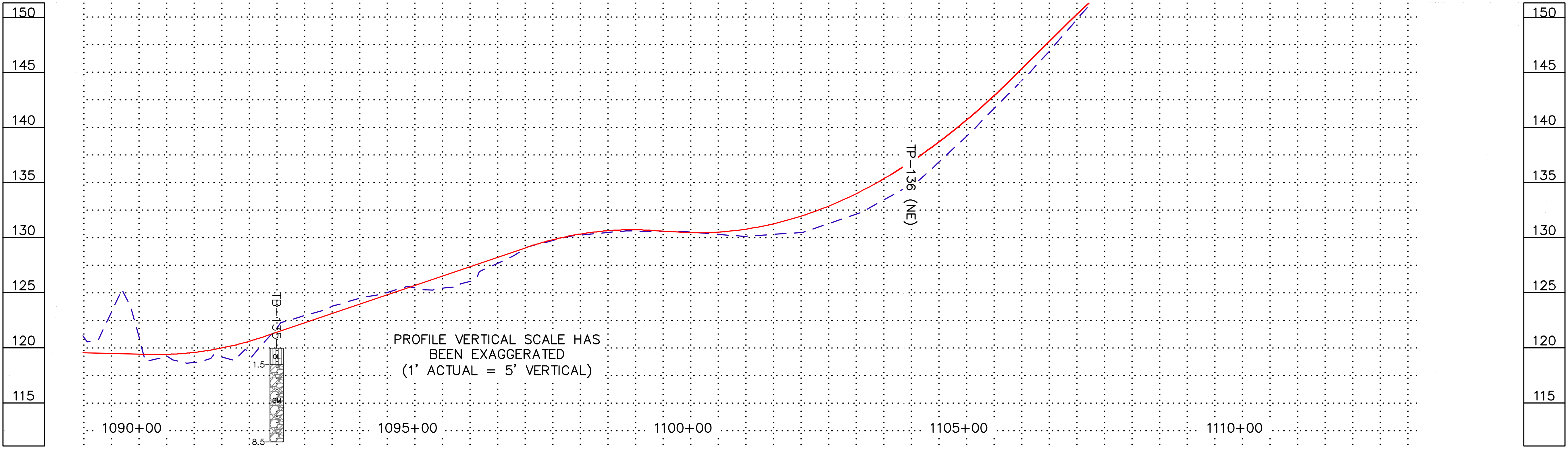


LEGEND

40 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
■ TP–28 (NE)	APPROXIMATE TEST PIT LOCATION NOT EXCAVATED
<=2"=>	HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
———	PROPOSED ROAD CENTERLINE
▽	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

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MICHAEL J. BAUER
TAB: 35 TUESDAY, JANUARY 06, 2008

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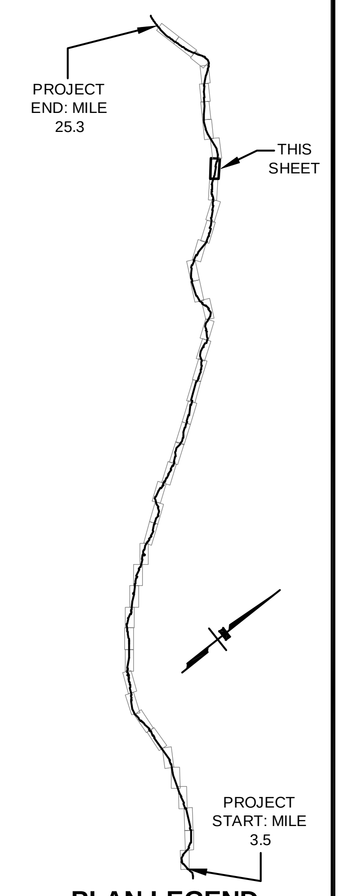

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
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FINAL
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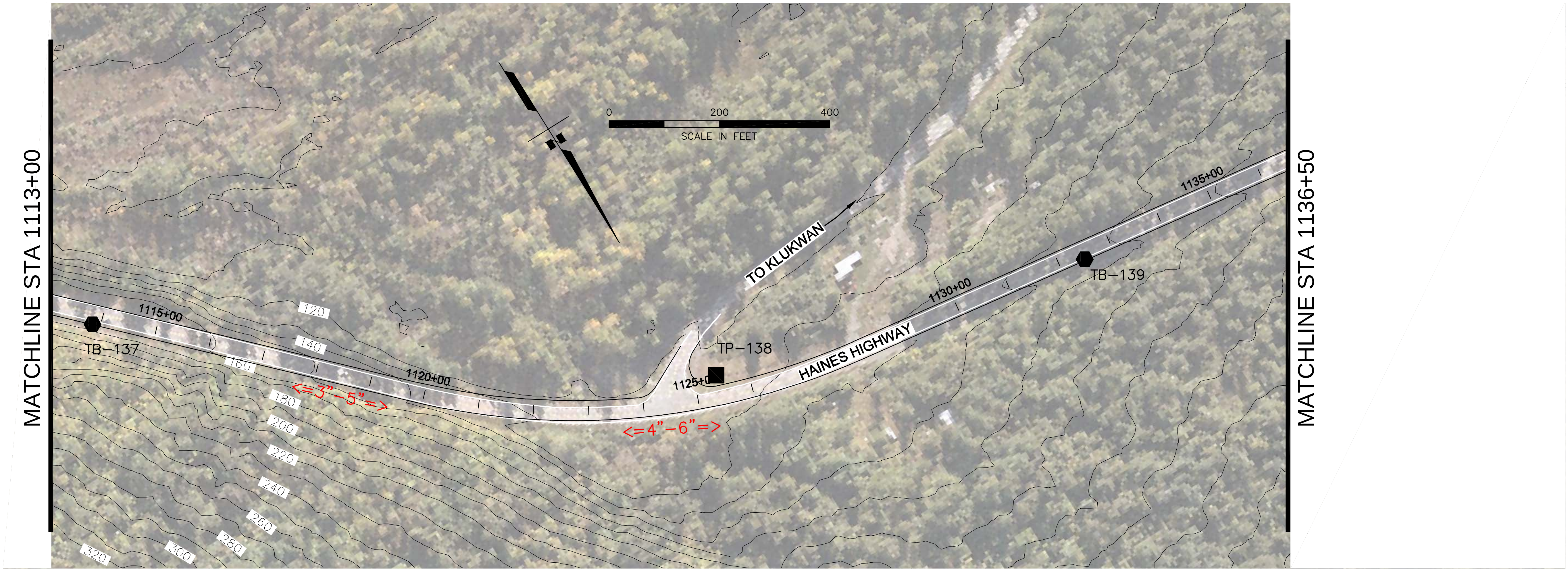
PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
35	44



LEGEND

40 / 60 — CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 — PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB-5 (ND) — APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP-28 (NE) — APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> — HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 — GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

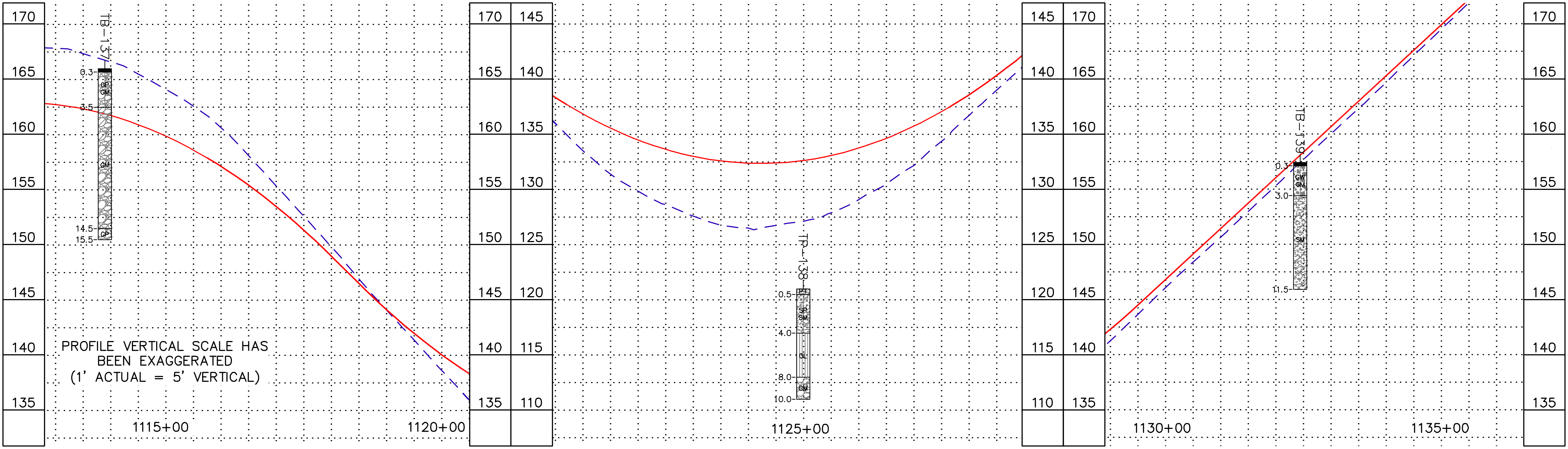
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



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(1' ACTUAL = 5' VERTICAL)

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MICHAEL J. BAUER
TAB: 36 TUESDAY, JANUARY 06, 2008

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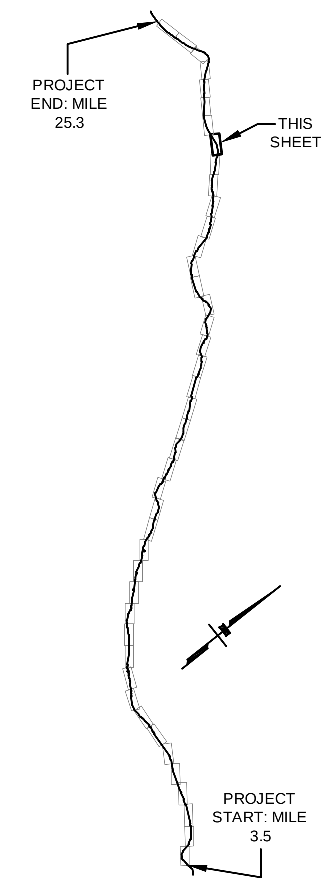

PLAN LEGEND

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DRAWN BY: BPO

STATE OF ALASKA
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HAINES HIGHWAY
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STATE	YEAR
ALASKA	2008
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36	44

LEGEND

40 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
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1	GEOLOGIC MAPPING BASELINE
	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

	EXISTING GROUND
	PROPOSED ROAD CENTERLINE
	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
	GROUNDWATER MEASURED AFTER DRILLING

PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

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MICHAEL J. BAUER
TAB: 37 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

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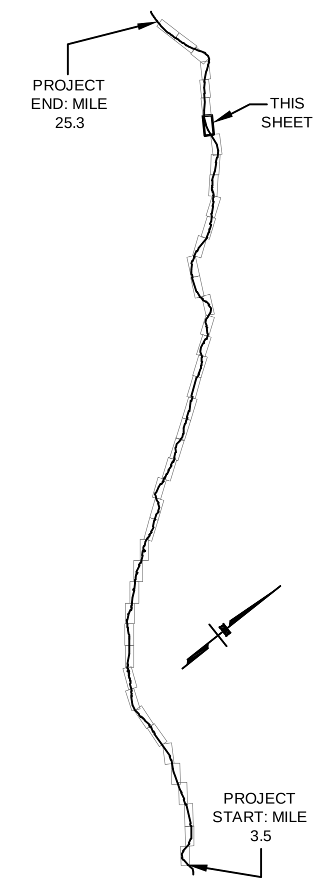

PLAN LEGEND

CHECKED BY: MEK

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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
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HAINES HIGHWAY
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POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 — HAINES HIGHWAY MILE POST MARKERS

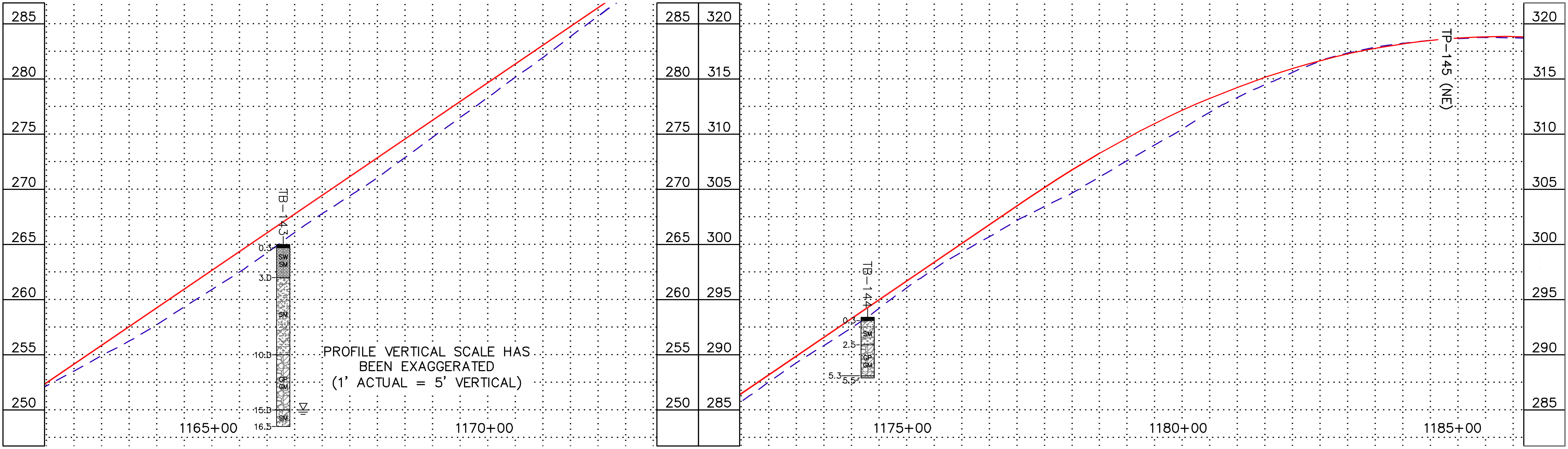
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER
TAB: 38 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

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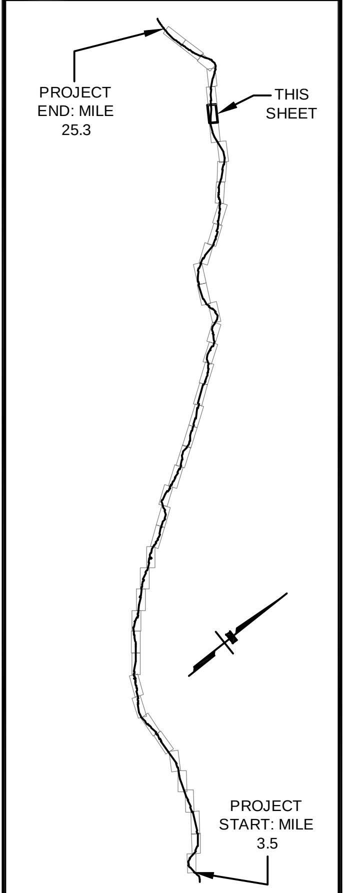

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
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PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
38	44

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

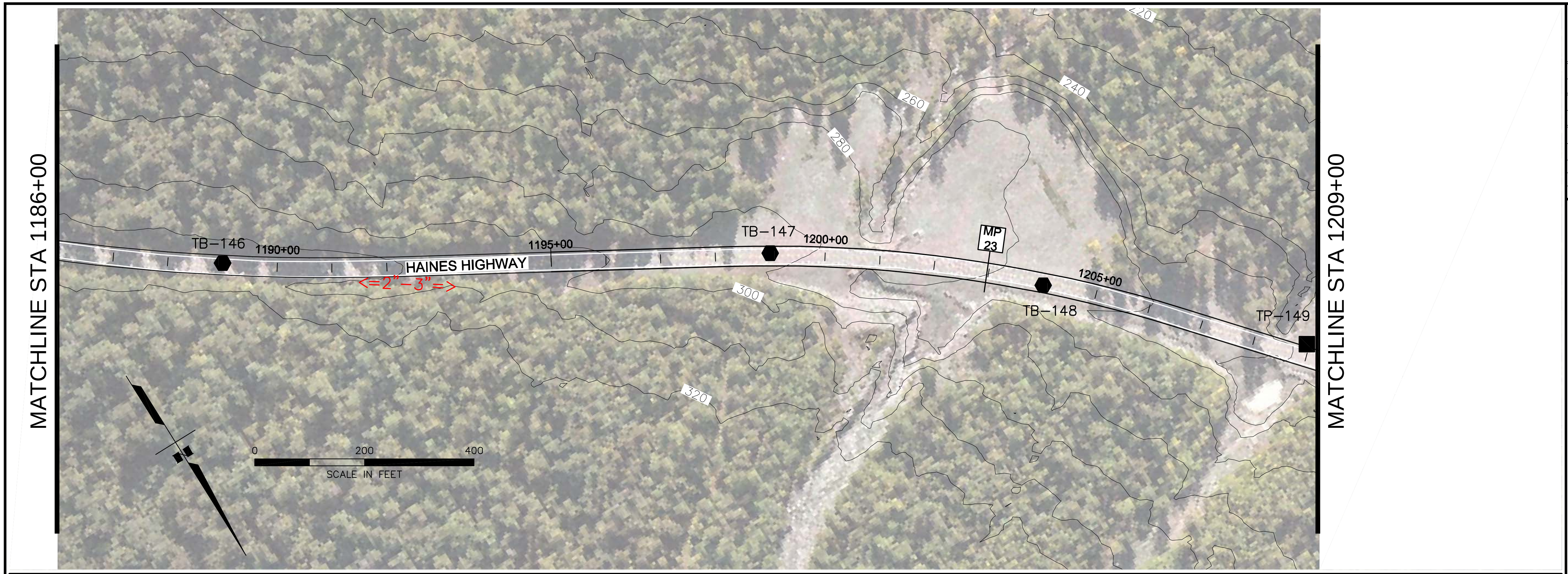
BRIAN P. O'QUINN
TAB: 39 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION



LEGEND

40 / 60 CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

⬢ TB−5 (ND) APPROXIMATE TEST BORING LOCATION NOT DRILLED

■ TP−28 (NE) APPROXIMATE TEST PIT LOCATION NOT EXCAVATED

<=2"=> HAND PROBE AREA - APPROXIMATE DEPTH OF ORGANICS

1 GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILEPOST MARKERS

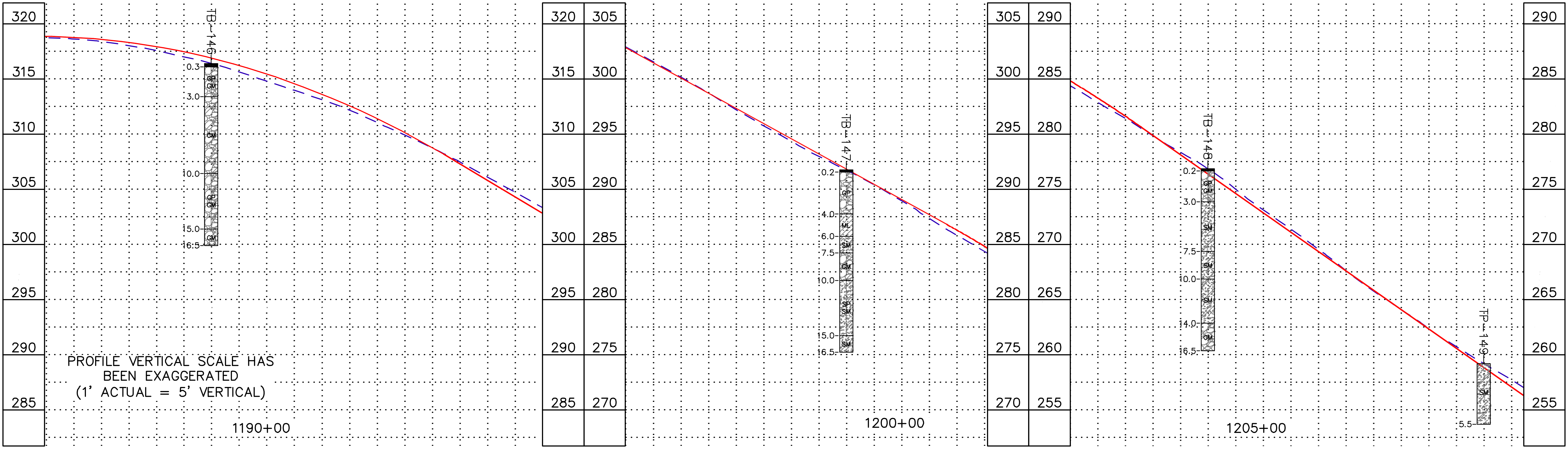
PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING



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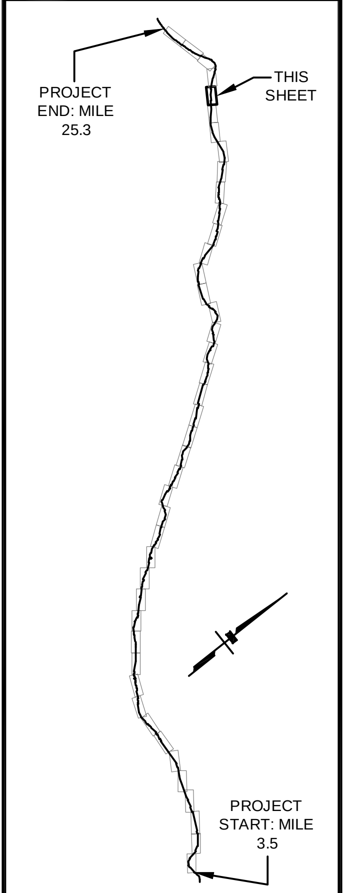

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008
SHEET NUMBER	TOTAL SHEETS
39	44

PATH: P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER
TAB: 40 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

No.	DATE	DESCRIPTION

LEGEND

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═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
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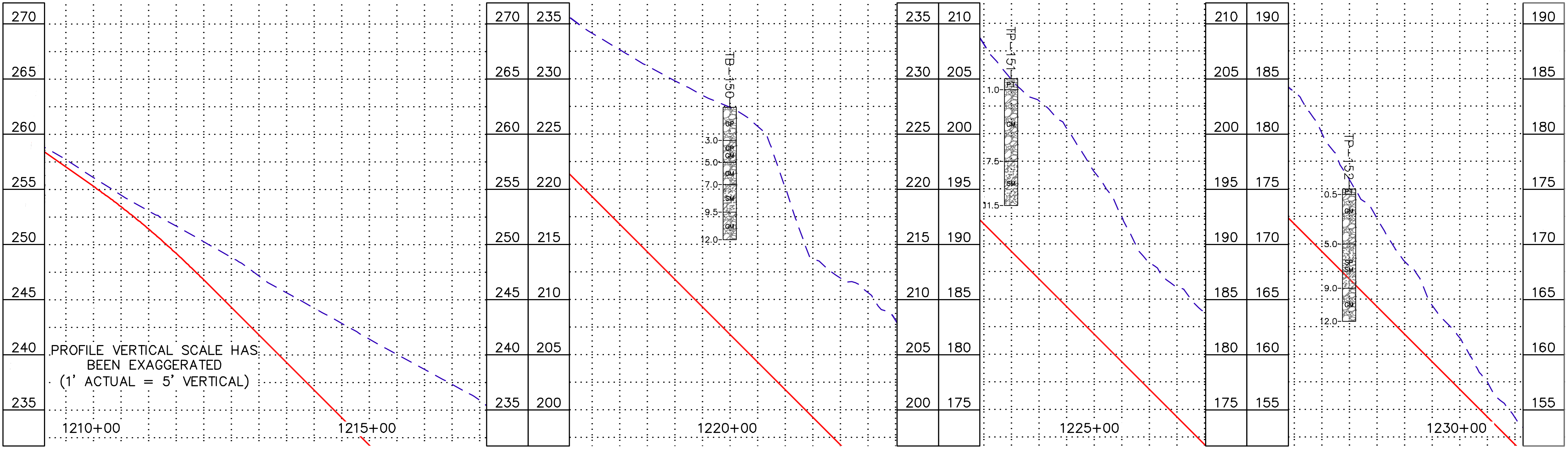
- - - 1	GEOLOGIC MAPPING BASELINE
←	POSSIBLE ACCESS TO TOP OF OUTCROP
MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

- - -	EXISTING GROUND
—	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
▽	GROUNDWATER MEASURED AFTER DRILLING



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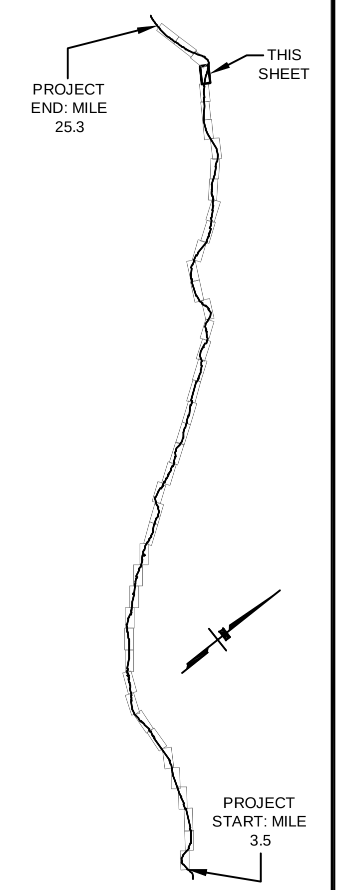


PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN
DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

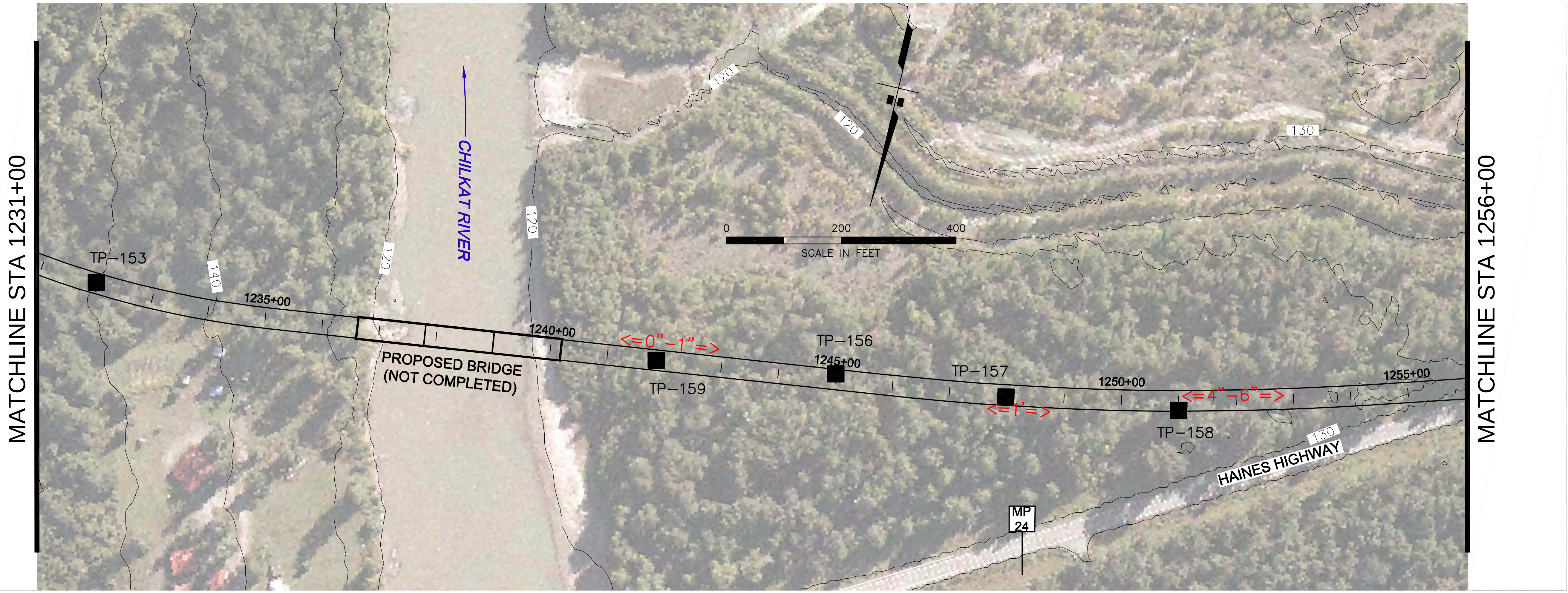
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
40	44



LEGEND

40 / 60 CONTOUR INTERVAL IS 10 FEET

═ EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

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- - - 1 GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

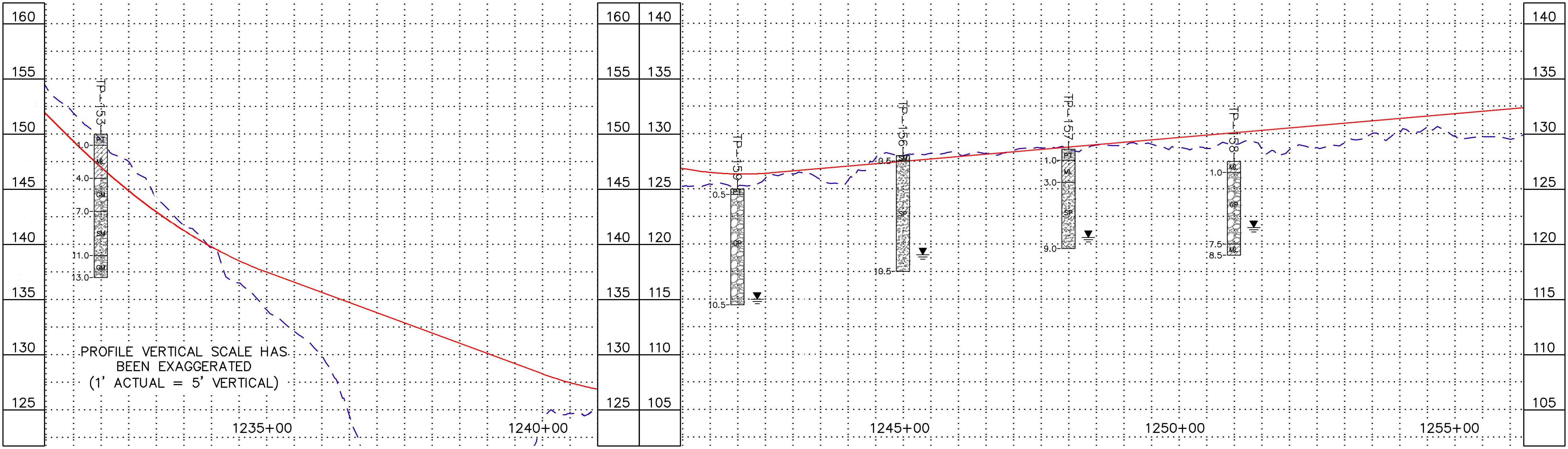
PROFILE

- - - EXISTING GROUND

─── PROPOSED ROAD CENTERLINE

▼ GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

▽ GROUNDWATER MEASURED AFTER DRILLING



PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED
(1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER
TAB: 41 TUESDAY, JANUARY 06, 2008

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ATTACHMENT NUMBER

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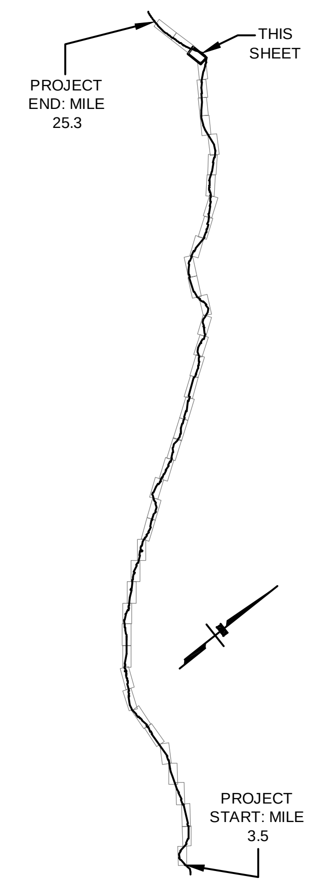

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

DRAWN BY: BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	**2008**

SHEET NUMBER	TOTAL SHEETS
41	**44**

LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
⬢ TB–5 (ND)	APPROXIMATE TEST BORING LOCATION NOT DRILLED
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MP 4	HAINES HIGHWAY MILE POST MARKERS

PROFILE

— — —	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
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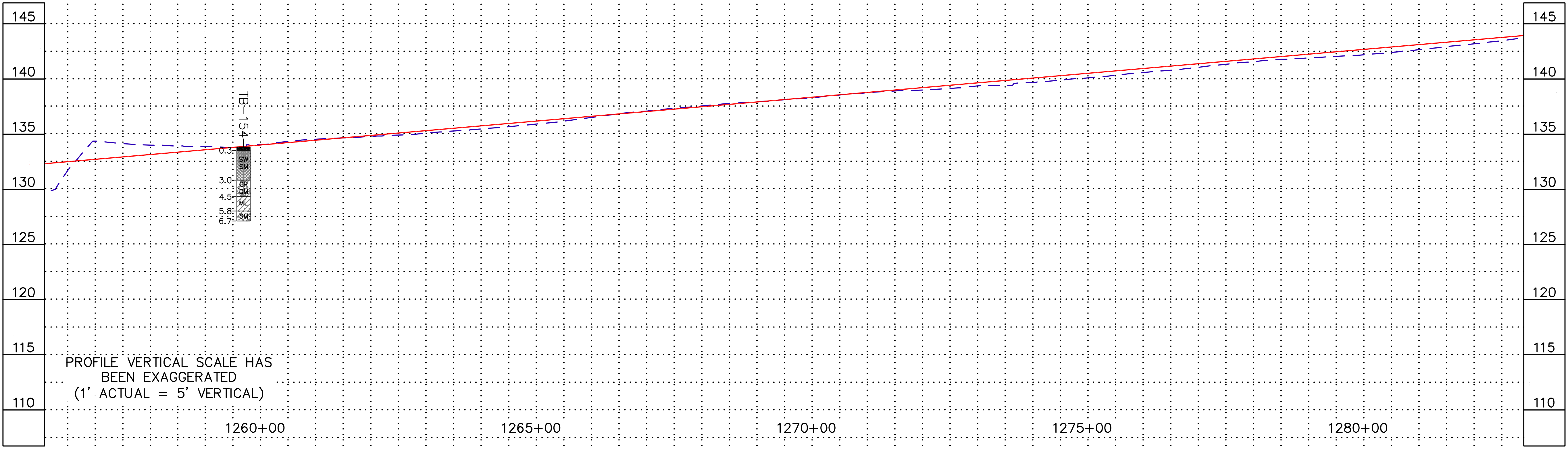

PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER
TAB: 42 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

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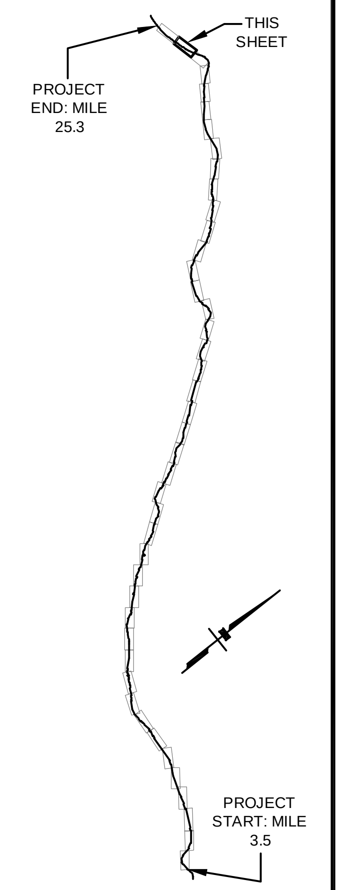


PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
DESIGN & ENGINEERING SERVICES
DIVISION-SOUTHEAST REGION

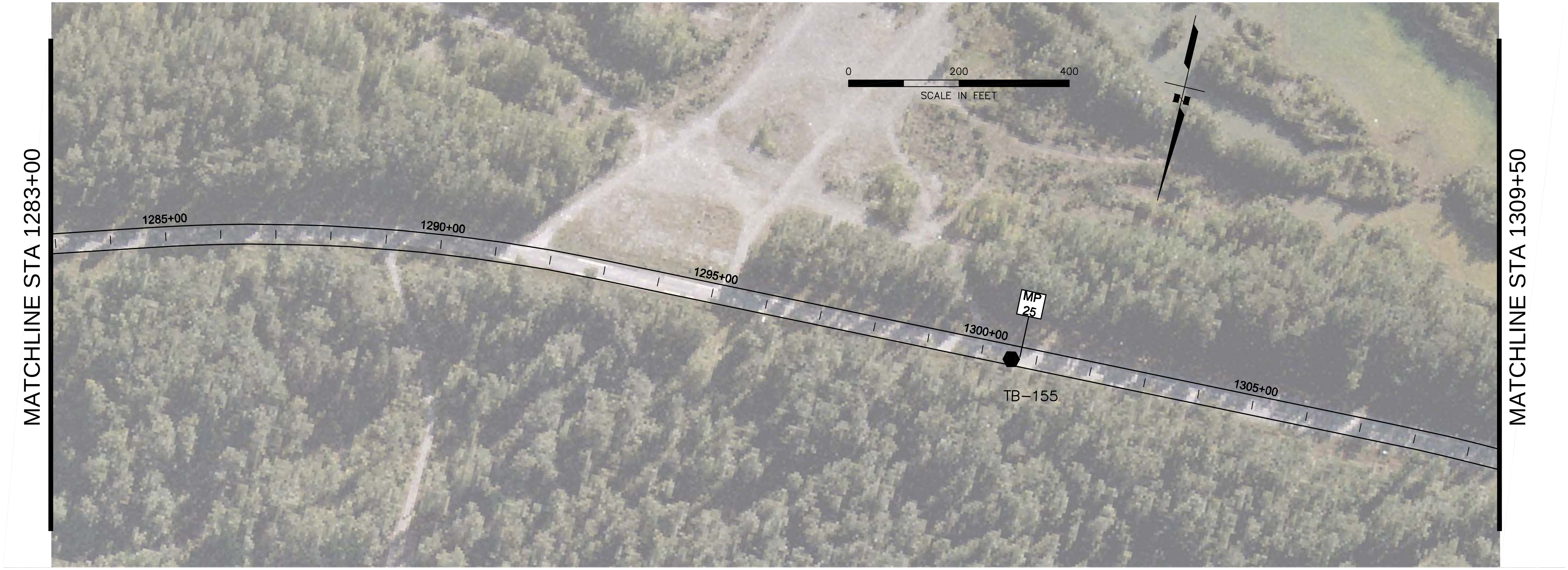
HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
42	44



LEGEND

40 / 60	CONTOUR INTERVAL IS 10 FEET
═	EXISTING ROAD ALIGNMENT
210+00 220+00	PROPOSED ROAD ALIGNMENT WITH STATIONING
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PROFILE

– – –	EXISTING GROUND
——	PROPOSED ROAD CENTERLINE
▼	GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION
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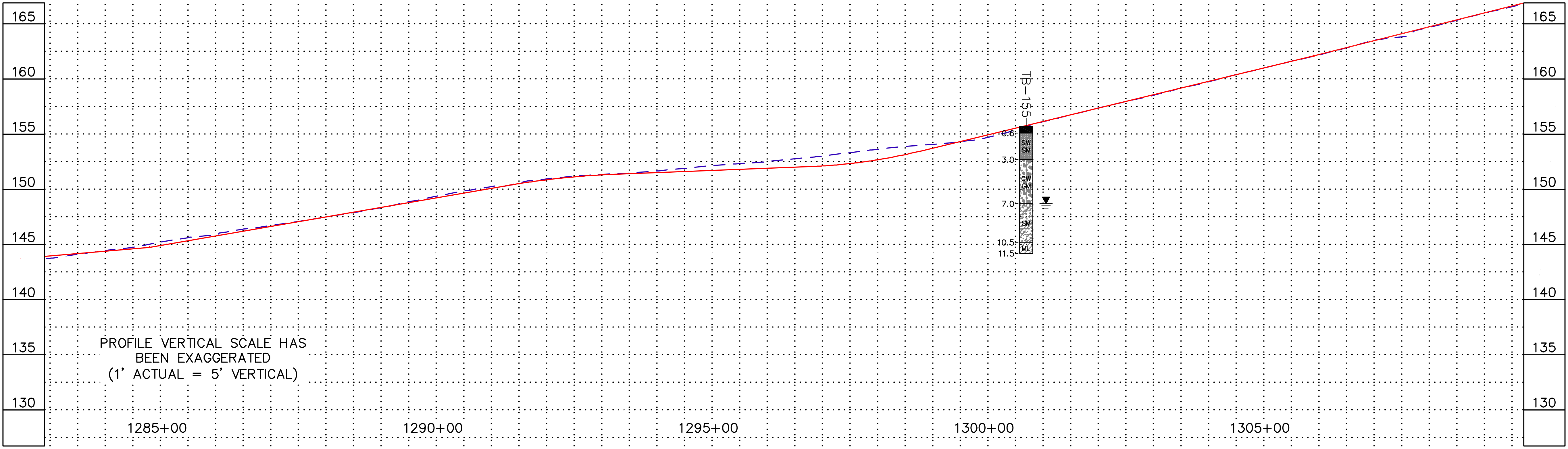

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PATH: P:\PROJECTS\D59119\GEO\GTB-HN.DWG

MICHAEL J. BAUER
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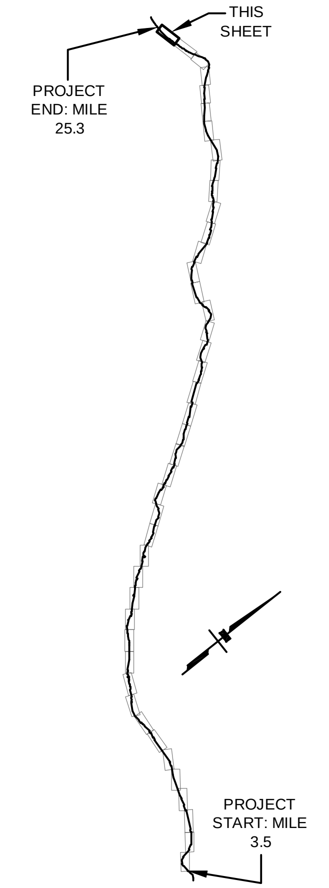

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
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DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
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STATE	YEAR
ALASKA	2008

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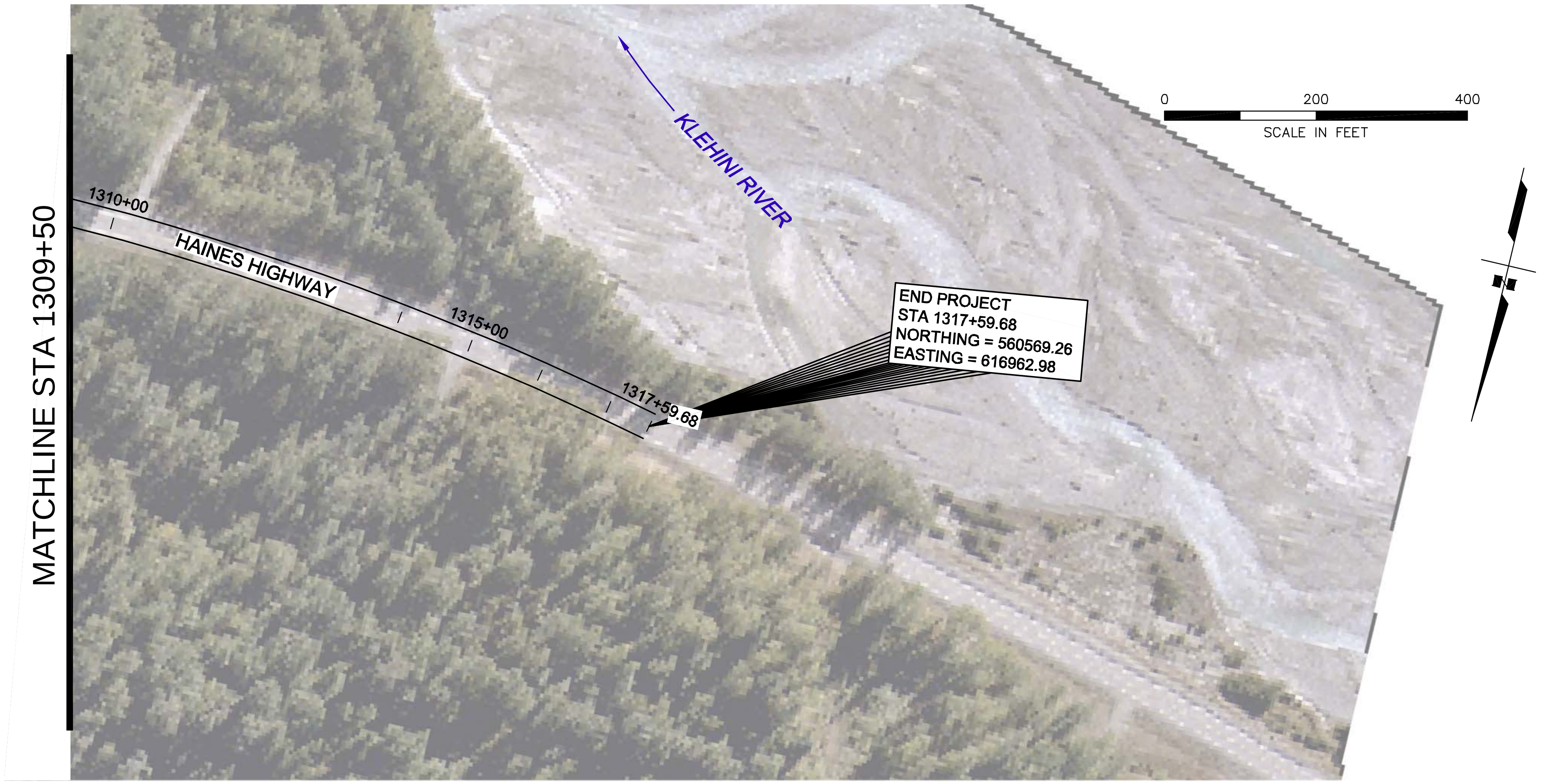

END PROJECT
STA 1317+59.68
NORTHING = 560569.26
EASTING = 616962.98

LEGEND

40 / 60 CONTOUR INTERVAL IS 10 FEET

EXISTING ROAD ALIGNMENT

210+00 220+00 PROPOSED ROAD ALIGNMENT WITH STATIONING

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1 GEOLOGIC MAPPING BASELINE

← POSSIBLE ACCESS TO TOP OF OUTCROP

MP 4 HAINES HIGHWAY MILE POST MARKERS

PROFILE

EXISTING GROUND

PROPOSED ROAD CENTERLINE

GROUNDWATER OBSERVED DURING DRILLING/EXCAVATION

GROUNDWATER MEASURED AFTER DRILLING

PROFILE VERTICAL SCALE HAS BEEN EXAGGERATED (1' ACTUAL = 5' VERTICAL)

PATH:P:\PROJECTS\D59119\GEO\GTB-HN.DWG

BRIAN P. O'QUINN
TAB: 44 TUESDAY, JANUARY 06, 2008

ADDENDUM NUMBER

ATTACHMENT NUMBER

RECORD OF REVISIONS

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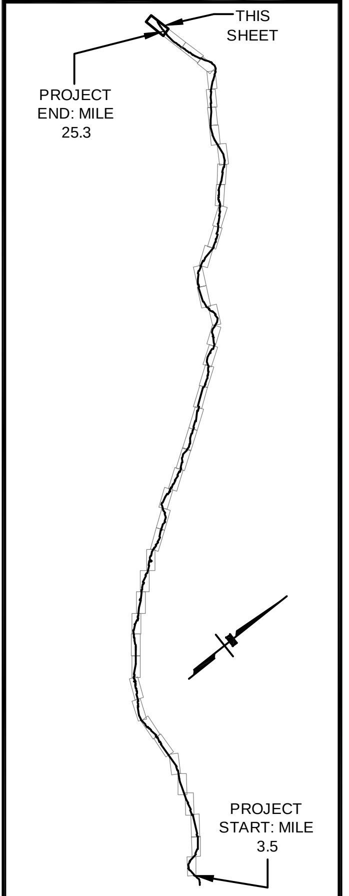

PLAN LEGEND

CHECKED BY: MEK

DESIGNED BY: KAN

BPO

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES
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DIVISION-SOUTHEAST REGION

HAINES HIGHWAY
MILEPOST 3.5 TO
MILEPOST 25.3
PROJECT #68606

FINAL
PLAN & PROFILE

PROJECT DESIGNATION
68606/SHAK-095-6(28)

STATE	YEAR
ALASKA	2008

SHEET NUMBER	TOTAL SHEETS
44	44

APPENDIX B

Test Hole Explanation Guide and Test Boring/Pit Logs

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 9

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 260+00
Offset: 30L
Elevation: 25.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 12.0 feet
Date: 4/29/2006 - 4/29/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	5.5	
Time		
Date	4/29/06	
Symbol	▼	

Weather: Overcast

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0	SPT	1	5 1 0 2	1	PT	**Peat** (PT) dark brown, Vx 1 Moisture=310%	0.0
2						unfrozen sand at tip of shoe	2.0
5	SPT	2	4 2 3 4	5	SM	**SILTY SAND** (SM) fine gravel, nonplastic, no dry strength, gray, moist to wet, loose, Groundwater encountered at 5.5' while drilling 2 p200=15%, Sa=81%, Gr=4%, Moisture=34%	5.0
7.5						float spoon - ~1' of heave	7.5
8	SPT		11 35/3"			no sample recovered , sampler full with heaving sand - blow counts may not be representative	8.0
9.5						float spoon - ~1' of heave	9.5
10	SPT	3	19 12 11 11	23	SP	**SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=95%, Gr=0% 3 Moisture=26%	10.0
12					BOH 12	Notes:	12.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 10

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *265+50*
Offset: *40L*
Elevation: *25.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5.5	1.0
Time		
Date	4/29/06	5/1/06
Symbol	▼	▽

Weather: Overcast

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	Depth
0							PT			**Peat** (PT) brown, moist, fibrous	0.0
0.5–2.5 (▽ at 1)	SPT	1	2 11 9 6	☒	■	20	ML			**SANDY SILT** (ML) coarse gravel, nonplastic, low dry strength, gray brown, moist, field observation indicates p200=60%, Sa=35%, Gr=5% 1 Moisture=34%	0.5
4.5										cuttings change to gray and sandier Groundwater observed at 5.5' while drilling	4.5
5–7 (▼ at 5.5)	SPT	2	3 5 4 5	☒	■	9	SP			**SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, moist to wet, loose, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=21%	5.0
7									BOH 7	Notes: PVC standpipe installed Groundwater measured at 1' on 05/01/06	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 11

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *274+50*
Offset: *50R*
Elevation: *27.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *12.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	0	0.0
Time		
Date	4/29/06	5/1/06
Symbol	▼	▽

Weather: Overcast

Grass Surface

Sample Data

Sample Type	Number	Blow Count	N-Value	USCS Classification
SPT	1	2 2 2 2	4	SM
SPT	2	6 5 4 4	9	
SPT	3	6 20 50/4"		SP
SPT	4	20 9 10 50/4"	19	

SUBSURFACE MATERIAL

0.0 — 2" standing water, 1" **ORGANIC mat**

0.5 — **SILTY SAND** (SM) medium grained sand, nonplastic, low dry strength, dark gray, wet, very loose, field observation indicates p200=20%, Sa=80%, Gr=0%, trace of **ORGANICS** (roots)
1 Moisture=39%

2.5 — becoming sandier, loose, field observation indicates p200=15%, Sa=85%, Gr=0%
2 Moisture=38%

5.0 — **SAND** (SP) medium grained sand, poorly graded, no dry strength, gray brown, wet, very dense, field observation indicates p200=5%, Sa=95%, Gr=0%
3 Moisture=20%

6.5 — Sampler filled with heave - blow counts may not be representative

9.5 — Float spoon - ~1' of heaving sand

10.0 — medium dense
4 Moisture=22%

12.0 — BOH 12

Notes:
PVC standpipe installed
Groundwater measured at the surface on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 12

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *278+50*
Offset: *50R*
Elevation: *27.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	4	
Time		
Date	4/29/06	
Symbol	▼	

Weather: Overcast

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0			6 20	☒	■		PT	■	
1	SPT	1 1A	7 6	☒	■		SP-SM	■	
2								■	
3									
4 ▼									
5			8	☒	■		SP		
6	SPT	2	6 4	☒	■	10			
7			4	☒					BOH 7

SUBSURFACE MATERIAL

Peat (PT) brown, fibrous, **FROZEN Ice as Vx** (~10% ice by volume) 1 Moisture=126%	0.0
SAND (SP-SM) medium grained sand, poorly graded, no dry strength, brown, field observation indicates p200=10%, Sa=90%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~30% by volume (plants, rootlets) 1A Moisture=31%	1.0
	3.5
Groundwater encountered at 4' while drilling	4.0
SAND (SP) medium grained sand, poorly graded, no dry strength, gray, wet, loose, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=26%	5.0
Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 13

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *283+00*
Offset: *55R*
Elevation: *27.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *6.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Overcast

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0							PT			**Peat** (PT) brown	0.0
1 2 3	SPT	1	2 1 1 2	☒	■	2	SM			**SILTY SAND** (SM) fine grained sand, nonplastic, low dry strength, gray, wet, very loose, field observation indicates p200=35%, Sa=65%, Gr=0% 1 Moisture=38%	0.3
4 5	SPT	2	1 1 2 2	☒	■	3	SP			**SAND** (SP) medium grained sand, no dry strength, gray, wet, very loose, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=29%	4.0
6									BOH 6	Notes: Groundwater observed 1' above ground surface	6.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 14

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *285+50*
Offset: *50R*
Elevation: *27.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *6.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	0	
Time		
Date	4/29/06	
Symbol	▼	

Weather: Overcast

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL
0.0					PT		**Peat** (PT) brown, Groundwater encountered at the surface while drilling
0.3	SPT	1	1 1 2 2		SM		**SILTY SAND** (SM) fine grained sand, no dry strength, gray, wet, very loose, field observation indicates p200=25%, Sa=75%, Gr=0% 1 Moisture=40%
4.0	SPT	2	3 3 3 5	6	SP		**SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, wet, loose, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=31%
6.0					BOH 6		Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Geology Section

LOG OF TEST HOLE

HOLE # 15

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *286+65*
Offset: *10L*
Elevation: *28.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/16/2005 - 11/16/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	4	1.0
Time		
Date	11/16/05	11/22/05
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0							**6" Asphalt Concrete** (no CABC observed)	0.0
0.5–3.0	GRAB	1			GW		**GRAVEL with Sand** (GW) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=4%, Sa=36%, Gr=60%, Moisture=5%, Max. Dry Dens=156.5pcf, Opt. Moisture=4%	0.5
3.0–5.0	SPT	2	16 11 25	36	GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist to wet, dense, **FILL**, field observation indicates p200=5%, Sa=15%, Gr=80% 2 Moisture=6% Groundwater encountered at 4' while drilling	3.0 4.0
5.0–6.5	SPT	3	2 6 9	15	SP-SM		**SAND with Silt** (SP-SM) medium grained sand, poorly graded, nonplastic, no dry strength, brown, wet, medium dense, field observation indicates p200=10%, Sa=85%, Gr=5% 3 Moisture=25%	5.0 6.5

BOH 6.5

Notes:
PVC standpipe installed
Groundwater measured at 1' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 16

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 287+50
Offset: 50R
Elevation: 27.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 9.5 feet
Date: 4/29/2006 - 4/29/2006
Geologist: Keri A. Nutter

Groundwater Data		
Depth in (ft.)	0	
Time		
Date	4/29/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0 ▼			2	☒	■		PT			**Peat** (PT) brown, wet, Groundwater encountered at the surface while drilling	0.0
			1/12"				SM			**SILTY SAND** (SM) medium grained sand, nonplastic, no dry strength, gray, wet, very loose, field observation indicates p200=20%, Sa=80%, Gr=0%, **ORGANICS** present to ~20% by volume (roots, wood, plants) 1 Moisture=70%	0.3
1	SPT	1									
2			2								
3											
4			3	☒							4.0
5	SPT		3 3 3			6				no sample recovered	5.0
6											
7											
7.5			4	☒	■		SP			**SAND** (SP) medium grained sand, poorly graded, no dry strength, dark gray, wet, medium dense, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=23%	7.5
8			5								
9	SPT	2	9 24			14					
9.5									BOH 9.5	Notes:	9.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 17

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Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *289+50*
Offset: *50R*
Elevation: *27.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

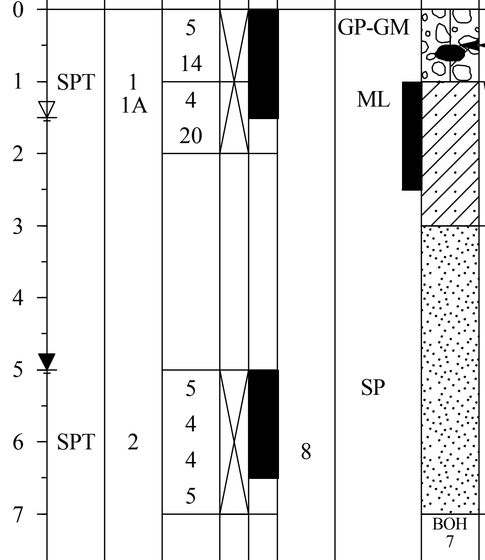
Total Depth: *7.0 feet*
Date: *4/29/2006 - 4/29/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	1.5
Time		
Date	4/29/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface



Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0			5 14				GP-GM		
1	SPT	1 1A	4 20				ML		
5	SPT	2	5 4 4 5			8	SP		
7									BOH 7

SUBSURFACE MATERIAL

0.0
0.5

GRAVEL with Silt and Sand (GP-GM) coarse gravel, poorly graded, no dry strength, gray, moist, medium dense, **FILL,** field observation indicates p200=10%, Sa=35%, Gr=55%, trace of **ORGANICS** (roots, plants), cobbles to 10" (~5%)
1 Moisture=7%

1.0

SANDY SILT with Gravel (ML) fine gravel, nonplastic, low dry strength, brown, field observation indicates p200=50%, Sa=35%, Gr=15%, **FROZEN Ice as Vc** (~10% ice by volume), **ORGANICS** present to ~25% by volume (roots, plants)
1A Moisture=26%

3.0

4.5

Groundwater encountered at 5' while drilling

5.0

SAND (SP) medium grained sand, poorly graded, no dry strength, gray, wet, loose, field observation indicates p200=5%, Sa=95%, Gr=0%
2 Moisture=26%

7.0

Notes:
PVC standpipe installed to 5.5'
Groundwater measured at 1.5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 18

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *295+00*
Offset: *10R*
Elevation: *28.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *11.5 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	5.5
Time		
Date	4/24/06	4/27/06
Symbol	▼	▽

Weather: Partly Cloudy

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**1.5" Asphalt Concrete** (no CABC observed)	0.0
0.1	GRAB	1					GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, no dry strength, gray, moist, **FILL** 1 p200=8%, Sa=40%, Gr=52%, Moisture=3%	0.1
3.0	SS	2	12 10 8				GP			**GRAVEL with Sand** (GP) coarse gravel, poorly graded, no dry strength, gray, moist, medium dense, **FILL,** field observation indicates p200=5%, Sa=25%, Gr=70% 2 Moisture=5%	3.0
5.0	SS		10 13 10							Groundwater encountered at 5' while drilling	5.0
5.5										no sample recovered - driving a rock ahead of sampler	5.5
7.5	SS	3	5 8 10				SP			**SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=95%, Gr=0% 3 Moisture=22%	7.5
10.0	SS	4	3 4 6							loose, sampler full with heave 4 Moisture=18%	10.0
11.5									BOH 11.5	Notes: PVC standpipe installed to 11' Groundwater measured at 5.5' on 04/27/06	11.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 19

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *307+85*
Offset: *10R*
Elevation: *30.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *9.0 feet*
Date: *11/16/2005 - 11/16/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	7	2.0
Time		
Date	11/16/05	11/22/05
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0.3–1	GRAB	1			GP-GM
2.5–4	SPT	2	11 19 22	41	
5–6.5	SPT	3	9 11 15	26	
7.5–9	SPT	4	6 13 17	30	SM

SUBSURFACE MATERIAL

0.0	**4" Asphalt Concrete** (no CABC observed)
0.3	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=8%, Sa=38%, Gr=54%, Moisture=6%
2.5	Becoming more gravelly dense, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60% 2 Moisture=7%
5.0	dense, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60% 3 Moisture=14%
7.0	Groundwater encountered at 7' while drilling
7.5	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, brown, wet, medium dense, field observation indicates p200=15%, Sa=45%, Gr=40% 4 Moisture=14%
9.0	BOH 9

Notes:
PVC standpipe installed
Groundwater measured at 2' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 20

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *325+50*
Offset: *10R*
Elevation: *30.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *11.5 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Weather: Partly Cloudy

Asphalt Surface

Groundwater Data

Depth in (ft.)	8	5.0
Time		
Date	4/24/06	4/27/06
Symbol	▼	▽

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–3	GRAB	1			GP-GM
3–4.5	SS	2	5 21 30		SM
5–6.5	SS	3 3A	6 2 4		ML
7.5–9	SS	4	3 5 6		SP-SM
10–11.5	SS	5	12 20 23		SP-SM

Frozen Zone: approx. 3.5–4.5

SUBSURFACE MATERIAL

0.0–0.2 **2.5" Asphalt Concrete** (no CABC observed)

0.2–3.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, low dry strength, gray, moist, **FILL,** field observation indicates p200=10%, Sa=40%, Gr=50%
1 Moisture=5%

3.0 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, gray, **FROZEN Ice as Vc**
2 p200=13%, Sa=45%, Gr=42%, Moisture=10%

4.8 moist, loose, field observation indicates p200=15%, Sa=45%, Gr=40%
3 Moisture=21%

5.5 **SILT** (ML) fine grained sand, low plasticity, low dry strength, gray, moist, firm, field observation indicates p200=90%, Sa=10%, Gr=0%, **ORGANICS** present to ~30% by volume
3A Moisture=59%

7.5 **SAND with Silt** (SP-SM) fine grained sand, poorly graded, no dry strength, gray, moist to wet, medium dense, field observation indicates p200=10%, Sa=90%, Gr=0%
4 Moisture=30%

8.5 Groundwater encountered at 8' while drilling

10.0 **SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, no dry strength, gray, wet, dense, field observation indicates p200=10%, Sa=45%, Gr=45%, sampler full with heave - blow counts may not be representative
5 Moisture=10%

11.5 BOH 11.5

Notes:
PVC standpipe installed to 10'
Groundwater measured at 5' on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 22

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *342+50*
Offset: *40L*
Elevation: *28.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *4.0 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	0	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0 ▼							PT			**Peat** (PT) brown, wet, Groundwater encountered at the surface while drilling	0.0 0.5
1											
2											
3	SPT	1	8 6 5	☒	■	11	SM			**SILTY SAND** (SM) medium grained sand, no dry strength, gray, wet, medium dense, field observation indicates p200=40%, Sa=60%, Gr=0%, trace of **ORGANICS** (roots) 1 Moisture=30%	2.5
4									BOH 4	Notes:	4.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 23

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *347+00*
Offset: *35L*
Elevation: *28.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *6.5 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data		
Depth in (ft.)	0	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	Depth
0 ▼	SPT	1 1A	11 7 7	☒	■		ML	■	▨	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown gray, field observation indicates p200=85%, Sa=15%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~30% by volume (rootlets), Groundwater encountered at the surface while drilling 1 Moisture=36%	0.0
1							ML		▨	**SANDY SILT** (ML) fine grained sand, nonplastic, low dry strength, brown, wet, field observation indicates p200=60%, Sa=40%, Gr=0%, **ORGANICS** present to ~15% by volume (rootlets) 1A Moisture=33%	1.0
4									▨		4.0
5	SPT	2	3 3 3	☒	■	6	ML		▨	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown, wet, field observation indicates p200=75%, Sa=25%, Gr=0%, **ORGANICS** present to ~10% by volume (rootlets) 2 Moisture=39%	5.0
									BOH 6.5	Notes:	6.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 25

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *358+80*
Offset: *30R*
Elevation: *33.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/14/2005 - 11/14/2005*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	9	7.0
Time		
Date	11/14/05	4/23/06
Symbol	▼	▽

Weather: Snow

Gravel Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0	GRAB	1		▩	■		GP-GM		
2	SPT	2	5 7 8	☒	■	15	SM		
5	SPT	3	3 3 3	☒	■	6	ML		
7 ▽									
9 ▼									
10	SPT	4	5 6 8	☒	■	14	SM		
11.5									BOH 11.5

SUBSURFACE MATERIAL

0.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, trace of **organics** (grass, rootlets)
1 p200=7%, Sa=29%, Gr=64%, Moisture=9%

2.0 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, brown, moist, medium dense, **FILL**, field observation indicates p200=15%, Sa=50%, Gr=35%, trace of **ORGANICS** (rootlets)
2 Moisture=17%

5.0 **SANDY SILT** (ML) fine to medium grained sand, low plasticity, low dry strength, slow dilatancy, gray, moist to wet, firm, field observation indicates p200=65%, Sa=35%, Gr=0%, trace of *in situ* **ORGANICS** (rootlets, interbedded)
3 Moisture=36%

9.0 Groundwater encountered at 9' while drilling

10.0 **SILTY SAND** (SM) medium grained sand, nonplastic, low dry strength, gray, wet, medium dense, field observation indicates p200=25%, Sa=75%, Gr=0%
4 Moisture=31%

11.5 Notes:
PVC standpipe installed
Groundwater measured at 7' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 29

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *386+60*
Offset: *0*
Elevation: *34.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/16/2005 - 11/16/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	5	6.5
Time		
Date	11/16/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0.3–2.5	GRAB	1			SW-SM
2.5–4.0	SPT	2	17 18 16	34	
5.0–6.5	SPT	3	6 13 11	24	GP-GM
10.0–11.5	SPT	4	8 12 14	26	SM

BOH 11.5

SUBSURFACE MATERIAL

0.0 **4" Asphalt Concrete** (no CABC observed)

0.3 **SAND with Silt and Gravel** (SW-SM) coarse gravel, well graded, nonplastic, no dry strength, brown, dry, **FILL**
1 p200=8%, Sa=47%, Gr=45%, Moisture=6%

2.5 Becoming sandier dense, **FILL**, field observation indicates p200=10%, Sa=60%, Gr=30%
2 Moisture=5%

4.6 Groundwater encountered at 5' while drilling

5.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, wet, medium dense, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60%
3 Moisture=6%

10.0 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, brown, wet, medium dense, field observation indicates p200=20%, Sa=50%, Gr=30%, trace of *in situ* **ORGANICS** (rootlets, interbedded)
4 Moisture=14%

11.5

Notes:
PVC standpipe installed
Groundwater measured at 6.5' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 30

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *401+15*
Offset: *0*
Elevation: *36.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	8	8.5
Time		
Date	11/17/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
0.3–1.3	GRAB	1		▨	■		GW-GM	
2.5–4.0	SPT	2	13 15 21	☒	■	36	GW-GM	
5.0–6.5	SPT	3	15 11 9	☒	■	20	GP	
10.0–11.5	SPT	4	4 8 13	☒	■	21	SP	

SUBSURFACE MATERIAL

Depth	Description
0.0	**4" Asphalt Concrete** (no CABC observed)
0.3	**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=6%, Sa=28%, Gr=66%, Moisture=6%
2.5	Becoming more gravelly (GW-GM) dense, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60% 2 Moisture=5%
5.0	**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, medium dense, **FILL**, field observation indicates p200=5%, Sa=30%, Gr=65% 3 Moisture=4%
7.0	gravel increasing to 3", subangular, indicated by cuttings
8.0	Groundwater encountered at 8' while drilling
10.0	**SAND with Gravel** (SP) coarse gravel, poorly graded, nonplastic, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=65%, Gr=30% 4 Moisture=22%
11.5	BOH 11.5

Notes:
PVC standpipe installed
Groundwater measured at 8.5' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 31

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *412+50*
Offset: *45L*
Elevation: *30.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *17.0 feet*
Date: *5/1/2006 - 5/1/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	4	
Time		
Date	5/1/06	
Symbol	▼	

Weather: Partly Cloudy

Sand Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–3	GRAB	1			SP-SM
3–5	SPT	2	3 2 2 2	4	SP
5–7	SPT	3	4 3 3 0	6	
7.5–9.5	SPT	4	2 4 5 6	9	SP-SM
10–12	SPT	5	3 2 5 7	7	
15–17	SPT	6	5 5 9 10	14	

BOH 17

SUBSURFACE MATERIAL

Depth	Description
0.0	**SAND with Silt** (SP-SM) fine gravel, poorly graded, no dry strength, gray, moist 1 p200=6%, Sa=81%, Gr=13%, Moisture=7%, Max. Dry Dens=115pcf, Opt. Moisture=13%
3.0	**SAND** (SP) fine gravel, poorly graded, gray, moist to wet, very loose, field observation indicates p200=5%, Sa=85%, Gr=10% 2 Moisture=22%
4.0	Groundwater encountered at 4' while drilling
5.0	becoming sandier, wet, loose, field observation indicates p200=5%, Sa=90%, Gr=5% 3 Moisture=23%
7.5	**SAND with Silt** (SP-SM) medium grained sand, poorly graded, no dry strength, gray, wet, loose, field observation indicates p200=10%, Sa=90%, Gr=0% 4 Moisture=28%
	5 Moisture=37%
15.0	medium dense, sampler full with heave - blow counts may not be representative 6 Moisture=23%
17.0	Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 32

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *419+70*
Offset: *5R*
Elevation: *40.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *2.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
				▨	■		GW			**GRAVEL with Sand** (GW) coarse gravel, well graded, nonplastic, no dry strength, brown, dry, **FILL**	0.3
1	GRAB	1								1 p200=5%, Sa=35%, Gr=60%, Moisture=5%	
2										Difficulty while drilling	1.8
										Auger refusal at 2.5' in competent **Bedrock**	2.5
									BOH 2.5	Notes: No groundwater observed while drilling	

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 33

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 438+00
Offset: 10L
Elevation: 43.0 feet

Equipment Type: Mobile B-61 Nodwell
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 11.5 feet
Date: 4/23/2006 - 4/23/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**5" Asphalt Concrete** (no CABC observed)	0.0
1 2	GRAB	1					GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, low dry strength, gray brown, moist, **FILL** 1 p200=7%, Sa=39%, Gr=54%, Moisture=6%	0.5
3 4	SS	2	7 18 7				GP			**GRAVEL with Sand** (GP) medium dense, **FILL,** field observation indicates p200=5%, Sa=40%, Gr=55% 2 Moisture=4%	3.0
5 6 7	SS	3	11 9 7							becoming more gravelly, **FILL,** field observation indicates p200=5%, Sa=30%, Gr=65% 3 Moisture=3%	5.0
8 9	SS	4	4 4 3				SM			**SILTY SAND with Gravel** (SM) coarse gravel, loose, field observation indicates p200=15%, Sa=45%, Gr=40%, trace of **ORGANICS** (rootlets) 4 Moisture=12%	7.5
10 11	SS	5	3 4 4							becoming siltier, field observation indicates p200=20%, Sa=45%, Gr=35% 5 Moisture=14%	10.0
									BOH 11.5	Notes: No groundwater observed while drilling PVC standpipe installed No measurable groundwater to 11.5' on 04/23/06	11.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 34

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *449+40*
Offset: *35R*
Elevation: *48.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *5.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**6" Asphalt Concrete** (no CABC observed)	0.0
1	GRAB	1					GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, no dry strength, gray, moist, **FILL** 1 p200=7%, Sa=35%, Gr=58%, Moisture=4%	0.5
3	SPT	2	30 21 30			51	SP-SM			**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, no dry strength, gray, moist, very dense, field observation indicates p200=10%, Sa=55%, Gr=35% 2 Moisture=6%	2.5
										difficulty drilling	4.5
5	SPT	3	50/1"				BR			**Bedrock,** (BR) no sample recovered, auger refusal at 5.5'	5.0
									BOH 5.5	Notes: No groundwater observed while drilling	5.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 35

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *471+50*
Offset: *20L*
Elevation: *40.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Gravel Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	SUBSURFACE MATERIAL	
0	GRAB	1		GW-GM	**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, gray, moist, **FILL** 1 p200=9%, Sa=43%, Gr=48%, Moisture=8%	0.0
2.5	SPT	2	31 50/1"		No sample recovered -bouncing on a cobble, **FILL**	2.5
5	SPT	3	3 5 50/3"	GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray brown, moist, very dense, blow counts not representative -bouncing on **Bedrock** 3 p200=35%, Sa=32%, Gr=33%, Moisture=4%	5.0
6.2				BR	**Bedrock,** (BR) auger refusal at 6.5'	6.2
6.5					BOH 6.5	6.5

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 37

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *491+70*
Offset: *15L*
Elevation: *40.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0									**4" Asphalt Concrete** (no CABC observed)	0.0
1	GRAB	1		▨	■		GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, gray, moist, **FILL** 1 p200=7%, Sa=39%, Gr=54%, Moisture=6%	0.3
3	SPT	2	32 35 23	☒	■	58			becoming siltier very dense, **FILL**, field observation indicates p200=10%, Sa=35%, Gr=55% 2 Moisture=4%	2.5
5	SPT	3	7 12 14	☒	■	26	ML		**SANDY SILT** (ML) fine gravel, low plasticity, no dry strength, no to slow dilatancy, gray, moist, stiff, contains **ORGANICS** ~5% by volume (plants) 3 **F4** from sieve analysis, p200=65%, Sa=28%, Gr=7%, Moisture=29%	5.0
6.5									BOH 6.5 Notes: No groundwater observed while drilling	6.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 38

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *496+50*
Offset: *40R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/30/2006 - 4/30/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		5.0
Time		
Date		5/1/06
Symbol		⊽

Weather: Partly Cloudy

Alder Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0			8 17		PT
1	SPT	1 1A	7 3	24	
5 ⊽			4 4		ML
6	SPT	2 2A	5 5		SP
7					BOH 7

SUBSURFACE MATERIAL

0.0 **Peat** (PT) dark brown, **Frozen Ice as Vx** (~25% ice by volume, crystals ~1/8" diameter)
1 Moisture=107%

1A Moisture=99%

5.0 **SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray light brown, moist, soft, field observation indicates p200=75%, Sa=25%, Gr=0%
2 Moisture=36%

6.0 **SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, moist, loose
2A p200=3%, Sa=94%, Gr=3%, Moisture=21%

7.0

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 39

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *501+50*
Offset: *40R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/30/2006 - 4/30/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/30/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	SPT	1	1 1 2 4	☒	■	3	ML		▨	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, light brown, moist, soft, field observation indicates p200=80%, Sa=20%, Gr=0% 1 Moisture=33%	0.0
2									░	cuttings becoming sandier	2.0
4.5									░	Groundwater encountered at 5' while drilling	4.5
5 ▼	SPT	2	5 7 6 6	☒	■	13	SP		░	**SAND with Gravel** (SP) poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=80%, Gr=15% 2 Moisture=13%	5.0
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 40

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *510+50*
Offset: *80R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0							PT	■		**Peat** (PT) brown, **FROZEN Ice as Vx** (~5% ice by volume)	0.0
1	SPT	1	6 13 9 5	☒	■		ML	■		**SILT with Sand** (ML) fine grained sand, nonplastic, no dry strength, gray brown, field observation indicates p200=75%, Sa=25%, Gr=0%, **FROZEN Ice as Vx** (~5% ice by volume), **ORGANICS** present to ~10% by volume (rootlets) 1 Moisture=67%	0.3
4										Groundwater encountered at 5' while drilling	4.5
5 ▼											5.0
6	SPT	2	6 9 8 6	☒	■	17	SP			**SAND with Gravel** (SP) fine gravel, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=60%, Gr=35% 2 Moisture=17%	
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 41

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *513+00*
Offset: *70R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	Depth
0			7	☒	■		PT	■		**Peat** (PT) brown, **FROZEN Ice as Vx** (~10% ice by volume)	0.0
			5				ML			**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown gray, field observation indicates p200=75%, Sa=25%, Gr=0%, **FROZEN Ice as Vx** (~10% ice by volume), **ORGANICS** present to ~10% by volume (rootlets) 1 Moisture=56%	0.3
1	SPT	1	2								
			4								
2											
3											
4										Groundwater encountered at 5' while drilling	4.5
5 ▼			5	☒	■		SP			**SAND with Gravel** (SP) coarse gravel, poorly graded, no dry strength, gray, wet, medium dense 2 p200=3%, Sa=63%, Gr=34%, Moisture=13%	5.0
			5								
6	SPT	2	8			13					
			7								
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Central Region Materials
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LOG OF TEST HOLE

HOLE # 42

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *514+500*
Offset: *65R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/24/2006 - 4/24/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0		1	1	☒	■		PT	■		**Peat** (PT) brown, **FROZEN Ice**	0.0
							ML	■		**SILT with Sand** (ML) fine grained sand, nonplastic, gray brown, field observation indicates p200=85%, Sa=15%, Gr=0%, **FROZEN Ice as Vr** (~50% ice by volume, crystals ~1/4" thick), **ORGANICS** present to 5% by volume 1 Moisture=63%	0.3
1	SPT		6	☒	■						
			3	☒	■						
		1A	4	☒	■		SP-SM			**SAND with Silt** (SP-SM) fine grained sand, poorly graded, nonplastic, no dry strength, brown, moist, loose, field observation indicates p200=10%, Sa=90%, Gr=0%, trace of **ORGANICS** (rootlets) 1A Moisture=11%	1.5
2											
3											
4										Groundwater encountered at 5' while drilling	4.5
5 ▼			7	☒	■		SP			**SAND with Gravel** (SP) fine gravel, poorly graded, nonplastic, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=50%, Gr=45% 2 Moisture=14%	5.0
			8	☒	■						
6	SPT	2	7	☒	■	15					6.0
			7	☒							
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 43

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *516+00*	Equipment Type: *CME Skid - 45*	Total Depth: *7.0 feet*
Offset: *40R*	Drilling Method: *Hollow-Stem Auger*	Date: *4/24/2006 - 4/24/2006*
Elevation: *40.0 feet*	Field Crew: *N. Braeutigam/S. Anderson*	Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/24/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0 – 2	SPT	1	10 8 4 6	☒	■	12	ML	■	▨	**SANDY SILT** (ML) fine grained sand, nonplastic, medium dry strength, gray brown, field observation indicates p200=70%, SA=30%, Gr=0%, **FROZEN Ice as Vx** (~5% ice by volume), **ORGANICS** present to 10% by volume (roots) 1 Moisture=62%	0.0
4.5										Groundwater observed at 5' while drilling	4.5
5 – 7	SPT	2	6 9 8 6	☒	■	17	SP		░	**SAND with Gravel** (SP) coarse gravel, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=75%, Gr=20% 2 Moisture=14%	5.0
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Geology Section

LOG OF TEST HOLE

HOLE # 44

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *520+80*
Offset: *10R*
Elevation: *42.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data		
Depth in (ft.)		5.0
Time		
Date		11/22/05
Symbol		⊻

Weather: Rain

Gravel Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone
0					GW	
1	GRAB	1				
3	SPT	2	14 20 14	34		
5 ⊻						
6	SPT	3	6 8 7	15	SM	

SUBSURFACE MATERIAL

0.0 **GRAVEL with Sand** (GW) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL**
1 p200=5%, Sa=38%, Gr=57%, Moisture=5%

2.5 becoming sandier no dry strength, dense, **FILL**, field observation indicates p200=5%, Sa=40%, Gr=55%, SP-SM present bottom 1" of sample
2 Moisture=7%

4.0

5.0 **SILTY SAND** (SM) fine gravel, nonplastic, no dry strength, brown, moist, medium dense
3 p200=38%, Sa=60%, Gr=2%, Moisture=22%

6.5

BOH 6.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 5' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 45

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *526+00*
Offset: *35R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	4.5
Time		
Date	4/25/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	N-Value
0 – 0.5		1	1	PT	
0.5 – 2	SPT	1A	8 15 6	ML	
5 – 7	SPT	2	4 5 8 7	SP	13

Frozen Zone: 0.5 – 2

SUBSURFACE MATERIAL

Depth	Description
0.0	**Peat** (PT) dark brown, moist, fibrous 1 Moisture=55%
0.5	**SANDY SILT** (ML) fine grained sand, nonplastic, low dry strength, gray brown, field observation indicates p200=70%, Sa=30%, GR=0%, **FROZEN Ice as Nb, ORGANICS** present to ~15% by volume (roots, rootlets) 1A Moisture=34%
4.5	Groundwater encountered at 5' while drilling
5.0	**SAND with Gravel** (SP) fine gravel, poorly graded, 3/4, no dry strength, dark gray, wet, medium dense, field observation indicates p200=5%, Sa=65%, Gr=30% 2 Moisture=14%
7.0	BOH 7

Notes:
PVC standpipe installed to 7'
Groundwater measured at 4.5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 46

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *528+00*
Offset: *35R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	6	
Time		
Date	4/25/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	
0			1		PT	**Peat** (PT) dark brown, moist	0.0
1	SPT	1	3 14 5		ML	**SANDY SILT** (ML) fine grained sand, nonplastic, no dry strength, gray brown, field observation indicates p200=70%, Sa=30%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~10% by volume (rootlets) 1 Moisture=31%	0.5
4						cuttings becoming sandier at 4'	4.0
5							
6	▼ SPT	2	4 3 5 7	8	SP	**SAND** (SP) medium grained sand, poorly graded, no dry strength, dark gray, moist to wet, loose, field observation indicates p200=5%, Sa=95%, Gr=0% 2 Moisture=22% Groundwater encountered at 6' while drilling	5.0 6.0
7					BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 47

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 530+00
Offset: 30R
Elevation: 40.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 6.0 feet
Date: 4/25/2006 - 4/25/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	4.5	
Time		
Date	4/25/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	SPT	1	5 1 1 1	☒	■	2	PT	■		**Peat** (PT) dark brown, **FROZEN Ice as Vx** (~10% ice by volume), fibrous (rootlets present to ~30% by volume) 1 Moisture=817%	0.0
3										change in cuttings at 3'	3.0
4	SPT	2	1 1 4 3	☒	■	5	ML			**SANDY SILT** (ML) fine grained sand, nonplastic, no dry strength, gray, moist to wet, firm 2 p200=54%, Sa=46%, Gr=0%, Moisture=44% Groundwater encountered at 4.5' while drilling	4.0 4.5
6									BOH 6	Notes:	6.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 48

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *535+00*
Offset: *40L*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	3.0
Time		
Date	4/25/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0		1	1	☒	■		OL		
1	SPT	1A	12 23 18				ML	■	
3 ▽									
5 ▼									
6	SPT	2	6 6 10 9	☒	■	16	SP		
7									BOH 7

SUBSURFACE MATERIAL

Depth	Description
0.0	**ORGANIC SILT** (OL) fine grained sand, nonplastic, low dry strength, dark brown, moist, very soft, field observation indicates p200=80%, Sa=20%, Gr=0%, **ORGANICS** present (roots, peat) 1 Moisture=56%
0.5	**SANDY SILT** (ML) fine grained sand, nonplastic, low dry strength, gray brown, field observation indicates p200=65%, Sa=35%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~5% by volume (rootlets) 1A Moisture=33%
4.5	Groundwater encountered at 5' while drilling
5.0	**SAND with Gravel** (SP) fine gravel, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=70%, Gr=25% 2 Moisture=14%
7.0	Notes: PVC standpipe installed to 7' Groundwater measured at 3' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 49

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *543+00*
Offset: *40R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *17.0 feet*
Date: *5/1/2006 - 5/1/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	0	
Time		
Date	5/1/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–2	SPT	1	1/18" 2		ML
5–7	SPT	2	4 2 3 3	5	ML
7.5–9.5	SPT	3	1/18" 1		
15–17	SPT	4	2 2 4 4	6	ML

SUBSURFACE MATERIAL

Depth	Description
0.0	**SILT** (ML) fine grained sand, low plasticity, medium dry strength, gray, wet, very soft, field observation indicates p200=90%, Sa=10%, Gr=0%, **ORGANICS** present to ~15% by volume (rootlets, plants) 1 Moisture=65%
1.5	Groundwater encountered at the surface while drilling
5.0	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray, wet, soft, field observation indicates p200=80%, Sa=20%, Gr=0% 2 Moisture=36%
7.0	sampler sank 6" under weight of hammer
7.5	becoming siltier, medium dry strength, very soft, field observation indicates p200=85%, Sa=15%, Gr=0% 3 Moisture=44%
10.0	very soft, pushed auger to 15'
15.0	**SILT with Sand** (ML) fine grained sand, nonplastic, no dry strength, gray, wet, soft, field observation indicates p200=75%, Sa=25%, Gr=0% 4 Moisture=23%
17.0	BOH 17

Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 50

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 549+50
Offset: 30R
Elevation: 40.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 7.0 feet
Date: 4/25/2006 - 4/25/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	4.5	0.0
Time		
Date	4/25/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0–2	SPT	1	6 11 1 1	☒	■		PT	■ (0–2)	
5–7	SPT	2	4 2 2 3	☒	■	4	ML		
7									BOH 7

SUBSURFACE MATERIAL

Ice, soft, cloudy, colorless, trace roots and peat	0.0
Peat (PT) dark brown, **FROZEN Ice as Vx** (~25% ice by volume, random crystals) 1 Moisture=295%	1.0
pushed auger to 5'	3.5
Groundwater encountered at 4.5' while drilling	4.5
SILT (ML) fine grained sand, nonplastic, low dry strength, gray, wet, soft, field observation indicates p200=90%, Sa=10%, Gr=0% 2 Moisture=37%	5.0
Notes: PVC standpipe installed to 7' Groundwater measured at the surface on 05/01/06	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 51

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *552+00*
Offset: *30R*
Elevation: *40.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/25/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0		1	3	☒	■		PT			**Peat** (PT) dark brown, moist, fibrous 1 Moisture=374%	0.0
1	SPT	1A	25 18 7	☒	■		OL	■		**ORGANIC SILT** (OL) coarse gravel, nonplastic, low dry strength, brown gray, field observation indicates p200=60%, Sa=30%, Gr=10%, **FROZEN Ice as Nb, ORGANICS** present to ~50% by volume (rootlets) 1A Moisture=33%	0.5
2											
3											
4										Groundwater encountered at 5' while drilling	4.5
5 ▼			7		■		SM			**SILTY SAND** (SM) fine grained sand, nonplastic, low dry strength, gray, wet, field observation indicates p200=40%, Sa=60%, Gr=0%	5.0
6		2	5 4 4							2 Moisture=45%	
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 52

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *556+00*
Offset: *30R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	0.3
Time		
Date	4/25/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0			6		PT	■	**Peat** (PT) brown, **FROZEN Ice as Nb** 1 Moisture=323%	0.0
			5					
1	SPT	1 1A	1		ML		**SILT with Sand** (ML) fine grained sand, no to low plasticity, low dry strength, gray, moist, very soft 1A p200=84%, Sa=16%, Gr=0%, Moisture=34%, Org=4%	1.0
			1					
2								
3								
4							Groundwater encountered at 5' while drilling	4.5
5			3				low plasticity, medium dry strength, wet, firm, field observation indicates p200= 80%, Sa=20%, Gr=0%, trace of **ORGANICS** (rootlets) 2 Moisture=34%	5.0
			5					
6	SPT	2	4	9				
			5					
7						BOH 7	Notes: PVC standpipe installed to 9' Groundwater measured at 3" on 05/01/06	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 53

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *561+00*
Offset: *30R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/25/2006 - 4/25/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	4.5	
Time		
Date	4/25/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0		1	4	☒	■		PT		**Peat** (PT) brown, moist, fibrous	0.0
			3	☒	■		ML	■	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray brown, field observation indicates p200=75%, Sa=325%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~20% by volume (roots) 1 Moisture=54%	0.5
1	SPT	1A	8	☒	■		GP		**GRAVEL with Sand** (GP) fine gravel, poorly graded, no dry strength, brown, moist, medium dense, field observation indicates p200=5%, Sa=45%, Gr=50% 1A Moisture=9%	1.0
			8	☒	■					
4.5 ▼									Groundwater encountered at 4.5' while drilling	4.5
5			6	☒	■		SP		**SAND with Gravel** (SP) fine gravel, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=55%, Gr=45% 2 Moisture=15%	5.0
6	SPT	2	7	☒	■	13				
			6	☒	■					
			5	☒						
7							BOH 7		Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 55

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *570+45*
Offset: *10L*
Elevation: *45.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	9	9.0
Time		
Date	11/17/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0.3–2.5	GRAB	1			GW
2.5–4.0	SPT	2	11 13 10	23	
5.0–6.5	SPT	3	6 6 5	11	GP-GM
10.0–11.5	SPT	4	6 7 9	16	SP

SUBSURFACE MATERIAL

0.0 **4" Asphalt Concrete** (no CABC observed)

0.3 **GRAVEL with Sand** (GW) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL**
1 p200=4%, Sa=43%, Gr=53%, Moisture=6%, Max. Dry Dens=148.5pcf, Opt. Moisture=4%

2.5 becoming sandier medium dense, **FILL**, field observation indicates p200=5%, Sa=40%, Gr=55%
2 Moisture=2%

5.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, medium dense, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60%
3 Moisture=9%

7.0 drilling becoming easier

9.0 ▼ Groundwater encountered at 9' while drilling

10.0 **SAND with Gravel** (SP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, wet, medium dense, field observation indicates p200=5%, Sa=80%, Gr=15%
4 Moisture=13%

11.5 BOH 11.5

Notes:
PVC standpipe installed
Groundwater measured at 9' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 57

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *580+35*
Offset: *0*
Elevation: *46.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/17/2005 - 11/17/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	5	6.5
Time		
Date	11/17/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone
1	GRAB	1			GP	
3	SPT	2	12 23 24	47		
6	SPT	3	7 8 9	17	SP-SM	
11	SPT	4	2 6 35	41	SP	

SUBSURFACE MATERIAL

0.0 **6" Asphalt Concrete** (no CABC observed)

0.5 **GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, field observation indicates p200=5%, Sa=30%, Gr=65%
1 Moisture=5%

2.5 becoming sandier dense, **FILL**, field observation indicates p200=5%, Sa=40%, Gr=55%
2 Moisture=4%

4.6 Groundwater encountered at 5' while drilling

5.0 **SAND with Silt and Gravel** (SP-SM) fine gravel, poorly graded, nonplastic, no dry strength, brown, wet, medium dense, field observation indicates p200=10%, Sa=55%, Gr=35% **HYDROCARBON ODOR**
3 Moisture=9%

10.0 **SAND** (SP) fine gravel, poorly graded, nonplastic, no dry strength, brown, wet, dense
4 **NFS** from sieve analysis, p200=2%, Sa=86%, Gr=12%, Moisture=18%

11.5

BOH 11.5

Notes:
PVC standpipe installed
Groundwater measured at 6.5' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 60

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 595+80
Offset: 0
Elevation: 48.0 feet

Equipment Type: Mobile B-61 Truck
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/T. McMichael

Total Depth: 3.0 feet
Date: 11/18/2005 - 11/18/2005
Geologist: John Rego

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
1	GRAB	1		▨	■		GW-GM	
3	SPT	2	30/0"				BR	

SUBSURFACE MATERIAL

0.0 **4" Asphalt Concrete** (no CABC observed)

0.3 **GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL**

1 p200=8%, Sa=40%, Gr=52%, Moisture=6%

2.3 difficulty drilling

2.7 **Bedrock,** (BR) no sample recovered, auger refusal at 3'

3.0 BOH 3

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 61

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Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *606+30*
Offset: *10R*
Elevation: *50.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *4.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		4.0
Time		
Date		4/23/06
Symbol		▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1		▒	■		GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, gray, moist, **FILL** 1 p200=7%, Sa=39%, Gr=54%, Moisture=6%	0.3
3	SPT	2	10 9 9	☒	■	18	ML			**SANDY SILT** (ML) fine gravel, low plasticity, no dry strength, no to slow dilatancy, gray, moist, very stiff, contains **ORGANICS** ~5% by volume (plants) 2 **F4** from sieve analysis, p200=67%, Sa=32%, Gr=1%, Moisture=28%	3.0
4 ▽									BOH 4.5	Notes: No groundwater observed while drilling PVC standpipe installed Groundwater measured at 4' on 04/23/06	4.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 62

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PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *615+00*
Offset: *40R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	4	4.5
Time		
Date	4/26/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0			3	☒	■					3" **ORGANIC mat** (roots, grass)	0.0
			9				GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, no dry strength, brown, moist, medium dense, field observation indicates p200=10%, Sa=35%, Gr=50% 1 Moisture=8%	0.5
1	SPT	1 1A	5 5	☒	■		ML	■		**SANDY SILT** (ML) fine grained sand, nonplastic, low dry strength, brown gray, moist, stiff, field observation indicates p200=60%, Sa=40%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~10% (rootlets) 1A Moisture=52%	1.0
2											
3											
4 ▼ ▽										Groundwater encountered at 4' while drilling	4.0
5			3	☒	■					becoming sandier, wet, firm, field observation indicates p200=55%, Sa=45%, Gr=0% 2 Moisture=24%	5.0
6	SPT	2	3 3 5			6					
7									BOH 7	Notes: PVC standpipe installed to 7' Groundwater measured at 4.5' on 05/01/06	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 63

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *617+00*
Offset: *45R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *9.5 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	7.5	4.3
Time		
Date	4/26/06	5/1/06
Symbol	▼	∇

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0–2	SPT	1	4 7 1 1	☒	■	8	ML	■	▨	**SANDY SILT** (ML) medium grained sand, nonplastic, low dry strength, brown gray, moist, firm, **FROZEN Ice as Vx** (~10% ice by volume), **ORGANICS** present to ~15% by volume (rootlets) 1 p200=67%, Sa=33%, Gr=0%, Moisture=65%	0.0
4 ∇											
5–7	SPT	2	3 2 2 3	☒	■	4	SM		▨	**SILTY SAND** (SM) medium grained sand, nonplastic, no dry strength, gray, moist to wet, loose, field observation indicates p200=35%, Sa=65%, Gr=0%, wood at tip of shoe 2 Moisture=32%	5.0
7.5 ▼										Groundwater encountered at 7.5' while drilling	7.0
7.5–9.5	SPT	3	3 2 4 4	☒	■	6	SP		▨	**SAND with Gravel** (SP) fine gravel, poorly graded, no dry strength, gray, wet, loose, field observation indicates p200=5%, Sa=70%, Gr=25% 3 Moisture=14%	7.5
9.5									BOH 9.5	Notes: PVC standpipe installed to 9' Groundwater measured at 4.3' on 05/01/06	9.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 64

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *618+00*
Offset: *50R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/26/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0			10 14	☒	■		PT	■		**Peat** (PT) dark brown, **FROZEN Ice as Vx** (~10% ice by volume), fibrous 1 Moisture=233%	0.0
1	SPT	1 1A	4 2	☒	■		ML	■	▨	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown gray, field observation indicates p200=80%, Sa=20%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to 20% by volume (rootlets) 1A Moisture=44%	1.0
2									▨		
3									▨		
4									▨		4.0
									▨	Groundwater encountered at 5' while drilling	4.5
5 ▼			2 2	☒	■		ML		▨	**SILT** (ML) fine grained sand, low plasticity, low dry strength, gray, moist, soft, field observation indicates p200=10%, Sa=90%, Gr=0%, **ORGANICS** present to ~30% (rootlets) by volume 2 Moisture=38%	5.0
6	SPT	2	1 5	☒	■	3			▨		
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 65

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *619+50*
Offset: *35R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *12.0 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	
Time		
Date	4/26/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0	SPT	1 1A	5 17 13 2	☒	■		PT	■	**Peat** (PT) brown, **FROZEN Ice as Vx** (~10% ice by volume) 1 Moisture=141%	0.0
1							ML	■	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray brown, field observation indicates p200=80%, Sa=20%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~30% by volume (roots, plants) 1A Moisture=45%	1.0
5 ▼	SPT	2	5 4 2 2	☒	■	6			Groundwater encountered at 5' while drilling becoming sandier, low plasticity, gray, wet, firm, field observation indicates p200=75%, Sa=25%, Gr=0% 2 Moisture=35%	4.8 5.0
7.5	SPT	3	3 4 4 6	☒	■	8	SM		**SILTY SAND** (SM) fine grained sand, nonplastic, no dry strength, gray, wet, loose, field observation indicates p200=45%, Sa=55%, Gr=0% 3 Moisture=31%	7.5
10	SPT	4	4 4 3 4	☒	■	7			becoming sandier, nonplastic, field observation indicates p200=35%, Sa=65%, Gr=0% 4 Moisture=35%	10.0
12									BOH 12 Notes: PVC standpipe installed to 10' PVC not found - no measurement obtaned	12.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 66

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *622+50*
Offset: *35L*
Elevation: *50.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	6	
Time		
Date	4/26/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	SPT	1	3 6 5 6	☒	■	11	ML	■	▨	**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown gray, field observation indicates p200=85%, Sa=15%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to 15% by volume (rootlets, plants) 1 Moisture=37%	0.0
5	SPT	2	5 6 9 13	☒	■	15	SM		▨	**SILTY SAND** (SM) coarse gravel, nonplastic, no dry strength, brown gray, wet, medium dense, field observation indicates p200=25%, Sa=70%, Gr=5%, **ORGANICS** present to ~5% by volume (plants, wood) Groundwater encountered at 6' while drilling 2 Moisture=32%	5.0
7									BOH 7	Notes:	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 67

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *627+50*
Offset: *40R*
Elevation: *45.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *10.0 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5.5	2.5
Time		
Date	4/26/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0	SPT	1	2 1 2 2	3	PT	■	**Peat** (PT) brown, moist, 6" **FROZEN Ice as Nb** 1 Moisture=79%	0.0
3								3.0
5	SPT	2	3 3 2 2	5	ML		**SANDY SILT** (ML) fine grained sand, nonplastic, no dry strength, gray, moist to wet, firm, **ORGANICS** present to ~20% by volume (roots, plants) 2 p200=61%, Sa=39%, Gr=0%, Moisture=29% Groundwater encountered at 5.5' while drilling	5.0 5.5
8	SPT	3	1 1 2 3	3			fine grained sand, wet, soft, field observation indicates p200=60%, Sa=40%, Gr=0%, **ORGANICS** present to 20% by volume (plants, rootlets) 3 Moisture=47%	8.0
10							BOH 10	10.0

Notes:
PVC standpipe installed to 10'
Groundwater measured at 2.5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 68

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *635+50*
Offset: *15L*
Elevation: *50.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Weather: Rain

Gravel Surface

Groundwater Data		
Depth in (ft.)	8	8.0
Time		
Date	11/18/05	4/23/06
Symbol	▼	∇

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	GRAB	1		▨	■		GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=12%, Sa=39%, Gr=49%, Moisture=7%	0.0
2.5										difficulty drilling auger action indicates cobbles	2.5
5	SPT	2	8 17 15	☒	■	32	GP			**GRAVEL with Sand** (GP) coarse grained sand, poorly graded, nonplastic, no dry strength, brown, moist, dense, **FILL**, field observation indicates p200=5%, Sa=25%, Gr=70% 2 Moisture=9%	5.0
7										Drilling becoming easier	7.0
8 ▼										Groundwater encountered at 8' while drilling	8.0
10	SPT	3	13 22 20	☒	■	42	GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse grained sand, poorly graded, nonplastic, no dry strength, gray, wet, dense, field observation indicates p200=10%, Sa=20%, Gr=70% 3 Moisture=10%	10.0
11.5									BOH 11.5	Notes: PVC standpipe installed Groundwater measured at 8' on 04/23/06	11.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 71

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Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *667+05*
Offset: *20L*
Elevation: *54.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		4.3
Time		
Date		4/23/06
Symbol		▽

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
0.3–3.0	GRAB	1		▨	■		GW-GM	
3.0–4.5	SPT	2	13 26 19	☒	■	45	SP	
5.0–6.25	SPT	3	14 23 50/3"	☒				

SUBSURFACE MATERIAL

	Depth
4" Asphalt Concrete (no CABC observed)	0.0
GRAVEL with Silt and Sand (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=9%, Sa=45%, Gr=46%, Moisture=7%	0.3
SAND with Gravel (SP) coarse grained sand, poorly graded, nonplastic, no dry strength, brown, moist, dense, field observation indicates p200=5%, Sa=55%, Gr=40% 2 Moisture=10%	3.0
no sample recovered -rock stuck in end of sampler	5.0
difficulty drilling	5.8
auger refusal at 6.5' in competent **Bedrock**	6.5

BOH 6.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 4.3' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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LOG OF TEST HOLE

HOLE # 76

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 687+00
Offset: 50R
Elevation: 60.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 9.5 feet
Date: 4/30/2006 - 4/30/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	6	
Time		
Date	4/30/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–2	SPT	1	2 3 1 1	4	ML
5–7	SPT	2	1 1 4 1	5	SP-SM
7.5–9.5	SPT	3	8 8 9 4	17	SP-SM

BOH 9.5

SUBSURFACE MATERIAL

Depth	Description
0.0	**SILT** (ML) fine grained sand, low plasticity, low dry strength, gray, moist, soft, field observation indicates p200=95%, Sa=5%, Gr=0% 1 Moisture=44%
5.0	**SAND with Silt** (SP-SM) fine gravel, poorly graded, no dry strength, gray, moist to wet, loose, field observation indicates p200=10%, Sa=85%, Gr=5% 2 Moisture=21%
6.0	Groundwater encountered at 6' while drilling
7.5	**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, nonplastic, low dry strength, gray, wet, medium dense 3 p200=7%, Sa=71%, Gr=22%, Moisture=19%
9.5	Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

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Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 77

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 688+50
Offset: 40R
Elevation: 60.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 12.0 feet
Date: 4/30/2006 - 4/30/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	6	0.3
Time		
Date	4/30/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–2	SPT	1	9 5 2 9	7	OL
5–7	SPT	2	3 3 4 5	7	ML
7.5–9.5	SPT	3	6 3 5 7	8	GP-GM
10–12	SPT	4	7 6 4 5	10	SM

SUBSURFACE MATERIAL

Depth	Description
0.0	**ORGANIC SILT** (OL) fine grained sand, nonplastic, dark brown, field observation indicates p200=75%, Sa=10%, Gr=15%, **FROZEN Ice as VC** (~10% ice by volume), **ORGANICS** present to ~35% by volume (roots, plants, wood) 1 Moisture=161%
3.0	
5.0	**SILT** (ML) fine grained sand, low plasticity, low dry strength, gray, moist to wet, stiff, field observation indicates p200=90%, Sa=10%, Gr=0%, **ORGANICS** present to ~20% by volume (rootlets) 2 Moisture=42%
6.5	Groundwater encountered at 6' while drilling
7.5	**GRAVEL with Silt and Sand** (GP-GM) fine gravel, poorly graded, low dry strength, gray, wet, loose, field observation indicates p200=10%, Sa=40%, Gr=50% 3 Moisture=16%
10.0	**SILTY SAND with Gravel** (SM) fine gravel, low dry strength, gray, wet, loose 4 p200=15%, Sa=70%, Gr=15%, Moisture=20%
12.0	BOH 12

Notes:
PVC standpipe installed to 10'
Groundwater measured at 0.3' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 78

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *691+00*
Offset: *30R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *12.0 feet*
Date: *4/30/2006 - 4/30/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	0.0
Time		
Date	4/30/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0							PT			**Peat** (PT) brown, moist	0.0
0–2	SPT	1	1 1 2 1				ML			**SILT with Sand** (ML) fine gravel, nonplastic, low dry strength, gray, moist, soft, field observation indicates p200=80%, Sa=15%, Gr=5%, **ORGANICS** present to ~20% by volume (rootlets) 1 Moisture=60%	0.3
4.5										Groundwater encountered at 5' while drilling	4.5
5–7	SPT	2	2 3 3 3			6	SP-SM			**SAND with Silt** (SP-SM) medium grained sand, poorly graded, nonplastic, low dry strength, gray, wet, loose, field observation indicates p200=10%, Sa=90%, Gr=0% 2 Moisture=40%	5.0
7.5–9.5	SPT	3	3 3 1 11			4	SM			**SILTY SAND with Gravel** (SM) fine gravel, nonplastic, low dry strength, brown, wet, very loose, field observation indicates p200=15%, Sa=50%, Gr=35% 3 Moisture=20%	7.5
10–12	SPT	4	11 16 12 11			28	GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, no dry strength, gray, wet, medium dense, field observation indicates p200=10%, Sa=40%, Gr=50% 4 Moisture=17%	10.0
12									BOH 12	Notes: PVC standpipe installed to 10' Groundwater measured at the surface on 05/01/06	12.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 79

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *700+25*
Offset: *15R*
Elevation: *66.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *3.0 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
							GP			**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=4%, Sa=45%, Gr=51%, Moisture=4%	0.3
1	GRAB	1		▨	■						
2											
	SPT	2	50/4"	☒						No sample recovered -bouncing on **Bedrock**	2.4
3							BR		BOH 3	**Bedrock** (BR) auger refusal at 3'	2.8 3.0

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 80

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *707+00*
Offset: *50R*
Elevation: *60.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

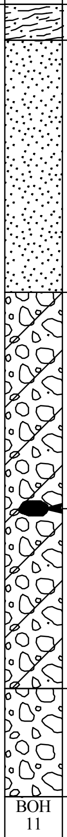
Total Depth: *11.0 feet*
Date: *4/21/2006 - 4/21/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	6.5	
Time		
Date	4/21/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface



Depth (Feet)	Sample Data: Sample Type	Sample Data: Field Number	Sample Data: Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0				PT		**Peat** (PT) dark brown, moist	0.0
							0.5
1	GRAB	1	▨	SP		**SAND with Gravel** (SP) coarse gravel, poorly graded, medium dry strength, brown gray, moist p200=4%, Sa=52%, Gr=44%, Moisture=6%	1.0
4				GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, brown, moist to wet, field observation indicates p200=25%, Sa=20%, Gr=55%	4.0
6						Groundwater encountered at 6.5' while excavating	6.0
7	GRAB	2	▨			becoming siltier, no dry strength, wet, field observation indicates p200=35%, Sa=15%, Gr=50%, cobbles to 4" (~2%) Moisture=39%	7.0
							9.5
10	GRAB	3	▨	GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, no dry strength, brown, wet, field classification indicates p200=5%, Sa=15%, Gr=75% Moisture=14%	10.0
11						Notes:	11.0

LOG OF TEST HOLE

HOLE # 81

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *724+80*
Offset: *45L*
Elevation: *60.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *16.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	14	8.5
Time		
Date	11/18/05	11/22/05
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0							**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1			GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=7%, Sa=40%, Gr=53%, Moisture=6%	0.3
3	SPT	2	17 55 23	78			becoming siltier no dry strength, very dense, **FILL**, field observation indicates p200=10%, Sa=40%, Gr=50% 2 Moisture=7%	3.0
5	SPT	3	6 8 6	14	SM		**SILTY SAND with Gravel** (SM) fine gravel, nonplastic, low dry strength, brown, moist, medium dense, field observation indicates p200=15%, Sa=65%, Gr=20% 3 Moisture=14%	5.0
10	SPT	4	9 7 5	12	GM		**SILTY GRAVEL with Sand** (GM) fine gravel, nonplastic, no dry strength, brown, moist, medium dense, field observation indicates p200=20%, Sa=15%, Gr=65% 4 Moisture=13%	10.0
14							Groundwater encountered at 14' while drilling	14.0
15	SPT	5	11 10 11	21	GM		becoming sandier (GM) no dry strength, wet, field observation indicates p200=15%, Sa=20%, Gr=65% 5 Moisture=13%	15.0
							BOH 16.5	16.5

Notes:
PVC standpipe installed
Groundwater measured at 8.5' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 82

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *729+00*
Offset: *110R*
Elevation: *65.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *11.5 feet*
Date: *4/26/2006 - 4/26/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5.5	2.5
Time		
Date	4/26/06	5/1/06
Symbol	▼	▽

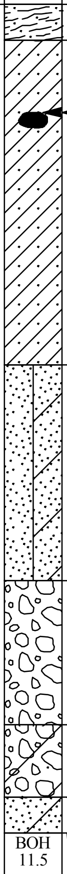
Weather: Partly Cloudy

Forest Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
0							PT	
2.5–4	SPT	1	2 7 29	☒	■	36	ML	
5–6.5	SPT	2	16 14 16	☒	■	30	SP-SM	
8–9.5	SPT	3	16 31 54	☒	■	85	GP	
10–11.5	SPT	4 4A	17 16 12	☒	■		GM SM	

Soil Graphic



SUBSURFACE MATERIAL

0.0	**Peat** (PT) dark brown, moist	0.5
1.5	drill action indicates cobbles	
2.5	**SILT with Sand** (ML) coarse gravel, medium plasticity, medium dry strength, light brown, moist, hard, field observation indicates p200=75%, Sa=20%, Gr=5% 1 Moisture=31%	5.0
5.0	**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, no dry strength, brown, moist to wet, dense 2 p200=8%, Sa=58%, Gr=34%, Moisture=13% Groundwater encountered at 5.5' while drilling	6.0
8.0	**GRAVEL with Sand** (GP) coarse gravel, poorly graded, low dry strength, brown, wet, very dense, field observation indicates p200=5%, Sa=40%, Gr=55%, sampler full with heave - blow counts may not be representative 3 Moisture=9%	10.0
10.0	**SILTY GRAVEL with Sand** (GM) fine gravel, medium dry strength, brown, wet, medium dense, field observation indicates p200=15%, Sa=40%, Gr=45% 4 Moisture=10%	11.0
11.0	**SILTY SAND** (SM) fine gravel, no dry strength, brown, wet, medium dense, field observation indicates p200=15%, Sa=75%, Gr=10% 4A Moisture=23%	11.5

Notes:
PVC standpipe installed to 11'
Groundwater measured at 2.5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 83

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *732+50*
Offset: *40R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *12.0 feet*
Date: *4/28/2006 - 4/28/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	7.5	
Time		
Date	4/28/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0 – 2	SPT	1	5 7 1 2	☒	■		PT GM	■	
5 – 7	SPT		3 2 4 3	☒		6			
7.5 – 9.5	SPT		6 7 6 3	☒		13			
10 – 12	SPT	2	2 5 4 3	☒	■	9			BOH 12

SUBSURFACE MATERIAL

Description	Depth
Peat (PT) brown	0.0
SILTY GRAVEL with Sand (GM) coarse gravel, nonplastic, low dry strength, brown, field observation indicates p200=35%, Sa=30%, Gr=35%, **FROZEN Ice as Nb** 1 Moisture=46%	0.3
no sample recovered - driving a rock ahead of sampler	5.0
Groundwater encountered at 7.5' while drilling	7.5
no sample recovered - driving a rock ahead of sampler	8.5
becoming sandier, field observation indicates p200=25%, Sa=35%, Gr=40% 2 Moisture=36%	10.0
	12.0

Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 84

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *734+00*
Offset: *30R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *12.0 feet*
Date: *4/28/2006 - 4/28/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5.5	4.5
Time		
Date	4/28/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
0–2	SPT	1	2 1 1 4	☒	■		PT ML	
5–7	SPT		2 9 7 5	☒				
7–9	SPT		3 1 6 6	☒		7		
10–12	SPT	2	3 4 5 6	☒	■	9	GM	

Groundwater symbols: ▽ at 4.5; ▼ at 5.5

SUBSURFACE MATERIAL

Depth	Description
0.0	**Peat** (PT) brown
0.3	**SILT** (ML) fine grained sand, nonplastic, low dry strength, brown gray, moist, very soft, field observation indicates p200=90%, Sa=10%, Gr=0% 1 Moisture=53%
5.0	no sample recovered - driving a rock ahead of sampler
5.5	Groundwater encountered at 5.5' while drilling
6.0	
6.5	drilling action indicates gravel
8.0	no sample recovered - driving a rock ahead of sampler
10.0	**SILTY GRAVEL with Sand** (GM) fine grained sand, nonplastic, low dry strength, brown, wet, loose, field observation indicates p200=25%, Sa=40%, Gr=45% 2 Moisture=19%
12.0	BOH 12

Notes:
PVC standpipe installed to 9.5'
Groundwater measured at 4.5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 85

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *736+00*
Offset: *40R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *10.0 feet*
Date: *4/28/2006 - 4/28/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	7	
Time		
Date	4/28/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–2	SPT	1	10 2 2 2		PT ML
5–7	SPT	2	2 3 3 4	6	SM
8–10	SPT	3	3 3 3 4	6	

SUBSURFACE MATERIAL

Depth	Description
0.0	**Peat** (PT) brown
0.3	**SANDY SILT** (ML) fine grained sand, nonplastic, low dry strength, brown, **FROZEN Ice as Vx** (~5% ice by volume), **ORGANICS** present to ~10% by volume (roots, plants) 1 p200=66%, Sa=34%, Gr=0%, Moisture=73%
3.5	
5.0	**SILTY SAND** (SM) fine grained sand, nonplastic, low dry strength, gray, moist to wet, field observation indicates p200=45%, Sa=55%, Gr=0% 2 Moisture=29%
7.0	Groundwater encountered at 7' while drilling
8.0	becoming sandier, wet, field observation indicates p200=25%, Sa=75%, Gr=0%, trace of **ORGANICS** (plants) 3 Moisture=32%
10.0	BOH 10

Notes:

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 86

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 738+50
Offset: 30R
Elevation: 60.0 feet

Equipment Type: CME Skid - 45
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/S. Anderson

Total Depth: 12.0 feet
Date: 4/28/2006 - 4/28/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	8	5.0
Time		
Date	4/28/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0–2	SPT	1 1A	9 16 8 3		PT ML
5–7	SPT	2	2 3 4 5	7	
7.5–9.5	SPT	3	3 4 5 5	9	SM
10–12	SPT	4	8 8 6 4	14	SP

SUBSURFACE MATERIAL

0.0
Peat (PT) brown,
1 Moisture=180%

0.5
SANDY SILT (ML) fine grained sand, nonplastic, low dry strength, brown gray, **FROZEN Ice as Nb, ORGANICS** present to ~15% by volume (roots, plants)
1A p200=64%, Sa=36%, Gr=0%, Moisture=77%, Org=16%

2.0

3.0
grinding on a boulder at 3' - moved hole 2' to the east

5.0
becoming sandier, moist, stiff, field observation indicates p200=55%, Sa=45%, Gr=0%, **ORGANICS** present to ~5% by volume (plants)
2 Moisture=30%

7.5
SILTY SAND (SM) fine grained sand, nonplastic, no dry strength, gray brown, moist to wet, loose, field observation indicates p200=20%, Sa=80%, Gr=0%, trace of **ORGANICS** (rootlets)
Groundwater encountered at 8' while drilling
3 Moisture=31%

10.0
SAND with Gravel (SP) medium grained sand, poorly graded, nonplastic, no dry strength, gray, wet, medium dense, field observation indicates p200=5%, Sa=65%, Gr=30%
4 Moisture=13%

12.0
BOH 12

Notes:
PVC standpipe installed to 9.5'
Groundwater measured at 5' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 87

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *740+00*
Offset: *35R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *4.0 feet*
Date: *4/27/2006 - 4/27/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL		
0			6				SP			**SAND** (SP) medium grained sand, poorly graded, nonplastic, low dry strength, brown, field observation indicates p200=5%, Sa=95%, Gr=0%, **FROZEN Ice as Nb** 1 Moisture=19%	0.0	0
1	SPT	1	16 5 9			21						1
2												2
3										grinding on a rock, moved hole 2' to the east	3.0	3
										grinding on a rock at 4', no sample attempted	3.5	
4									BOH 4	Notes: No groundwater observed while drilling	4.0	4

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 88

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *743+60*
Offset: *25L*
Elevation: *62.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1		▨	■		GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=8%, Sa=38%, Gr=54%, Moisture=3%	0.3
	SPT	2	50/3"	☒						no sample recovered -bouncing on a cobble auger action indicates cobbles	2.5 2.7
5	SPT	3	28 50/4"	☒	■					becoming siltier very dense, **FILL**, field observation indicates p200=10%, Sa=35%, Gr=55%, blow counts not representative -bouncing on a cobble 3 Moisture=9%	5.0
6							BR			**Bedrock,** (BR) auger refusal at 6.5'	6.0
									BOH 6.5	Notes: No groundwater observed while drilling	6.5

A USCS LOG OF TEST HOLE 59119DADOT.GPJ 2006DATATEMPLATE.GDT 1/8/09

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 90

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *758+65*
Offset: *0*
Elevation: *61.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *7.0 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1		▒	■		GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=7%, Sa=43%, Gr=50%, Moisture=6%, Max. Dry Dens=148.5pcf, Opt. Moisture=5%	0.3
3	SPT	2	55	☒						no sample recovered -bouncing on a cobble	3.0
5	SPT	3	8 9	☒	■		GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse grained sand, poorly graded, nonplastic, medium dry strength, brown, moist, field observation indicates p200=10%, Sa=30%, Gr=60%, 3 Moisture=8%	5.0
6		3A	7 2	☒	■		ML			**SILT with Sand** (ML) medium grained sand, medium plasticity, medium dry strength, gray, moist, field observation indicates p200=80%, Sa=20%, Gr=0%, **ORGANICS** present ~5% by volume (plants), 3A Moisture=36%	6.0
7									BOH 7	Notes: No groundwater observed while drilling PVC standpipe installed PVC obstructed -no measurement obtained	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 91

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *770+40*
Offset: *20L*
Elevation: *62.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/18/2005 - 11/18/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	11	9.0
Time		
Date	11/18/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0							**Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1			GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, no dry strength, brown, moist, **FILL** 1 p200=5%, Sa=36%, Gr=59%, Moisture=6%	0.3
2.5	SPT	2	38 58/3"		GP		**GRAVEL with Sand** (GP) fine gravel, poorly graded, no dry strength, brown, moist, very dense, **FILL,** field observation indicates p200=5%, Sa=40%, Gr=55%, blow counts not representative - bouncing on a cobble 2 Moisture=6%	2.5
5.0	SPT	3	9 17 15	32			becoming sandier, coarse gravel, dense, **FILL,** field observation indicates p200=5%, Sa=45%, Gr=50% 3 Moisture=6%	5.0
7.0							drilling becoming easier	7.0
9 ▽								
10.0	SPT	4	1 3 4	7	ML		**SILT with Sand** (ML) medium grained sand, medium plasticity, medium dry strength, gray, moist to wet, firm, field observation indicates p200=85%, Sa=15%, Gr=0% 4 Moisture=36%	10.0
11 ▼							Groundwater encountered at 11' while drilling	11.0
11.5							BOH 11.5	11.5

Notes:
PVC standpipe installed
Groundwater measured at 9' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 92

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *785+20*
Offset: *20L*
Elevation: *62.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

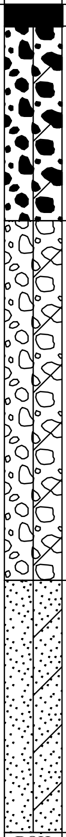
Total Depth: *11.5 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	7	9.0
Time		
Date	11/19/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface



Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0							**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1			GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=8%, Sa=37%, Gr=55%, Moisture=5%	0.3
3	SS	2	27 23 14		GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, dense, **FILL**, field observation indicates p200=10%, Sa=25%, Gr=65% 2 Moisture=9%	3.0
5	SS	3	10 13 6				becoming sandier medium dense, **FILL** 3 p200=8%, Sa=33%, Gr=59%, Moisture=11%	5.0
7 ▼							Groundwater encountered at 7' while drilling	7.0
8							drilling becoming easier	8.0
9 ▽								
10	SS	4	7 3 1		SP-SM		**SAND with Silt and Gravel** (SP-SM) fine gravel, poorly graded, nonplastic, low dry strength, brown, wet, very loose, field observation indicates p200=10%, Sa=60%, Gr=30% 4 Moisture=16%	10.0
11.5								11.5

Notes:
PVC standpipe installed
Groundwater measured at 9' on 04/23/2006

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 93

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 792+80
Offset: 20L
Elevation: 60.0 feet

Equipment Type: Mobile B-61 Truck
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/T. McMichael

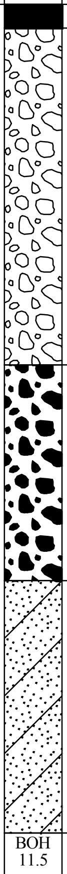
Total Depth: 11.5 feet
Date: 11/19/2005 - 11/19/2005
Geologist: John Rego

Groundwater Data

Depth in (ft.)	5	
Time		
Date	11/19/05	
Symbol	▼	

Weather: Rain

Asphalt Surface



Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	SUBSURFACE MATERIAL	Depth
0					**4" Asphalt Concrete** (no CABC observed)	0.0
0.3				GP	**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, low dry strength, gray, moist, **FILL**, field observation indicates p200=5%, Sa=40%, Gr=55% 1 Moisture=4%	0.3
1	GRAB	1				
2.5					becoming sandier no dry strength, medium dense, **FILL**, field observation indicates p200=5%, Sa=45%, Gr=50% 2 Moisture=7%	2.5
3	SS	2	8 7 6			
4.6					Groundwater observed at 5' while drilling	4.6
5	SS	3	4 6 10	GW	**GRAVEL with Sand** (GW) coarse gravel, well graded, nonplastic, no dry strength, gray, wet, medium dense 3 p200=3%, Sa=25%, Gr=72%, Moisture=10%	5.0
8					drilling becoming easier SM indicated by cuttings	8.0
10	SS	4	2 4 5	SM	**SILTY SAND** (SM) coarse gravel, nonplastic, low dry strength, gray, wet, loose 4 p200=16%, Sa=77%, Gr=7%, Moisture=19%	10.0
11.5						11.5

BOH 11.5

Notes:
PVC standpipe installed
PVC obstructed at 4' - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 101

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *825+00*
Offset: *40L*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *2.5 feet*
Date: *4/30/2006 - 4/30/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0			2							0.0
			1/12"						no sample recovered, grab sample from auger flights attempted	0.5
1	SPT					PT			**Peat** (PT) brown, **FROZEN Ice as Vx** (~10% ice by volume)	1.0
			2			ML			**SANDY SILT** (ML) fine grained sand, nonplastic, gray, moist, very soft, trace of **ORGANICS**	1.5
2	GRAB								very strong **HYDROCARBON ODOR,** no sample obtained	
								BOH 2.5		2.5

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 102

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *828+50*
Offset: *40R*
Elevation: *60.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *7.0 feet*
Date: *4/30/2006 - 4/30/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	5	1.0
Time		
Date	4/30/06	5/1/06
Symbol	▼	▽

Weather: Partly Cloudy

Grass Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone
0		1A	1		PT	■
1	▽ SPT	1	1 1 4		ML	
5	▼		10		SP-SM	
6	SPT	2	9 5 13	14		
7					BOH 7	

SUBSURFACE MATERIAL

Depth	Description
0.0	**Peat** (PT) dark brown, **FROZEN Ice as Vx** (~10% ice by volume) 1 Moisture=488%
0.5	**SILT with Sand** (ML) fine grained sand, low plasticity, low dry strength, gray brown, moist, very soft, field observation indicates p200=85%, Sa=15%, Gr=0%, **ORGANICS** present to ~15% by volume (plants, rootlets)
2.0	1A Moisture=32% drill action indicates cobbles
4.5	Groundwater encountered at 5' while drilling
5.0	**SAND with Silt and Gravel** (SP-SM) fine gravel, poorly graded, gray, wet, medium dense, field observation indicates p200=10%, Sa=75%, Gr=15% very strong **HYDROCARBON ODOR**, rainbow sheen on sample observed
7.0	

Notes:
PVC standpipe installed
Groundwater measured at 1' on 05/01/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 103

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *841+00*
Offset: *60L*
Elevation: *66.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Gravel Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	GRAB	1					GW-GM			**GRAVEL with Silt** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=5%, Sa=28%, Gr=67%, Moisture=4%, Max. Dry Dens=154.5pcf, Opt. Moisture=3.5%	0.0
4										drilling becoming easier, cuttings indicate GM	4.0
							GM			**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, medium dense, field observation indicates p200=30%, Sa=25%, Gr=45% 2 Moisture=10%	4.4
5	SS	2 2A	2 4 8				ML			**SILT with Sand** (ML) coarse gravel, low plasticity, medium dry strength, gray brown, moist, stiff, 2A **F4** from sieve analysis, p200=78%, Sa=13%, Gr=9%, Moisture=35%	5.5
									BOH 6.5	Notes: No groundwater observed while drilling PVC standpipe installed PVC not found - no measurement obtained	6.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 104

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *850+65*
Offset: *10L*
Elevation: *72.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0										**4" Asphalt Concrete** (no CABC observed)	0.0
1	GRAB	1					GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, field observation indicates p200=10%, Sa=30%, Gr=60% 1 Moisture=5%	0.3
3	SS	2	14 9 7				GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, medium dense, **FILL** 2 p200=9%, Sa=29%, Gr=62%, Moisture=5%	2.5
5	SS	3	8 8				GP			**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, dense, **FILL**, field observation indicates p200=5%, Sa=45%, Gr=50% 3 Moisture=7%	5.0
6		3A	35				ML		BOH 6.5	**SILT with Sand** (ML) fine gravel, low plasticity, no dry strength, gray brown, moist, hard, field observation indicates p200=80%, Sa=15%, Gr=5% 3A Moisture=44%	6.0 6.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC obstructed - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

A USCS LOG OF TEST HOLE 59119DADOT.GPJ 2006DATATEMPLATE.GDT 1/8/09

LOG OF TEST PIT

TEST PIT # 106

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *867+50*
Offset: *90R*
Elevation: *100.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *14.0 feet*
Date: *4/21/2006 - 4/21/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Forest Surface

Depth (Feet)	Sample Type	Field Number	USCS Classification Frozen Zone	SUBSURFACE MATERIAL	Depth
0			PT	**Peat** (PT) dark brown	0.0
0.5			GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, low dry strength, brown, moist, field observation indicates p200=15%, Sa=30%, Gr=55%, trace of **ORGANICS** (roots), cobbles to 12" (~15%), boulders to 28" (~5%) Moisture=16%	0.5
1	GRAB	1			1.0
4				boulder to 5' in diameter	4.0
4.5			GM	4" **ORGANIC mat** (peat, roots)	4.5
6				**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, light brown, moist, field observation indicates p200=15%, Sa=25%, Gr=60%, cobbles to 12" (~15%), boulders to 24" (~5%)	6.0
9.5				1" **ORGANIC mat** (roots)	9.5
10	GRAB	2	GP-GM	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, low dry strength, brown, moist p200=8%, Sa=25%, Gr=67%, Moisture=7%	10.0
14			BOH 14	Notes: No groundwater observed while excavating	14.0

LOG OF TEST HOLE

HOLE # 107

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *876+70*
Offset: *0*
Elevation: *80.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *7.0 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	Depth
0										**~4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1					GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, no dry strength, brown, moist, **FILL** 1 p200=7%, Sa=41%, Gr=52%, Moisture=6%	0.3
3	SS	2	10 18 26				GW-GM			becoming sandier (GW-GM) low dry strength, dense, **FILL**, field observation indicates p200=10%, Sa=45%, Gr=45% 2 Moisture=12%	3.0
5	SS	3	10 13 14				GM			**GRAVEL with Sand** (GM) coarse gravel, low dry strength, brown, moist, medium dense, **FILL** 3 p200=19%, Sa=40%, Gr=41%, Moisture=18%	5.0
										auger refusal at 7' in competent **Bedrock**	6.6
7									BOH 7	Notes: No groundwater observed while drilling	7.0

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 108

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *884+35*
Offset: *45L*
Elevation: *80.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	8	8.0
Time		
Date	11/19/05	4/23/06
Symbol	▼	▽

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Frozen Zone
0.5–1.5	GRAB	1		GP-GM	
2.5–4.0	SS	2	11 9 20	GW-GM	
5.0–6.5	SS	3	24 20 15		
10.0–11.5	SS	4	5 9 10	SP-SM	

SUBSURFACE MATERIAL

Depth	Description
0.0	**4" Asphalt Concrete** (no CABC observed)
0.3	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, field observation indicates p200=10%, Sa=40%, Gr=50% 1 Moisture=6%
2.5	**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, medium dense, **FILL** 2 p200=6%, Sa=32%, Gr=62%, Moisture=6%
5.0	becoming siltier, dense, field observation indicates p200=10%, Sa=30%, Gr=60% 3 Moisture=8%
7.0	SP-SM indicated by cuttings
8.0	Groundwater encountered at 8' while drilling
10.0	**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, wet, medium dense 4 p200=6%, Sa=53%, Gr=41%, Moisture=12%
11.5	BOH 11.5

Notes:
PVC standpipe installed
Groundwater measured at 8' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 109

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *905+35*
Offset: *0*
Elevation: *88.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *8.0 feet*
Date: *11/19/2005 - 11/19/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	Depth
0										**4" Asphalt Concrete** (no CABC observed)	0.0
1	GRAB	1					GW-GM			**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=9%, Sa=43%, Gr=48%, Moisture=8%	0.3
3	SS	2	9 12 7				GM			**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, medium dense, **FILL**, field observation indicates p200=15%, Sa=15%, Gr=70% 2 Moisture=13%	2.5
6	SS	3	8 22 11				GP-GM			**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, dense, **FILL**, field observation indicates p200=10%, Sa=40%, Gr=50% 3 Moisture=11%	5.0
7							SM			SM observed in cuttings	6.5
	GRAB	4								**SILTY SAND with Gravel** (SM) coarse gravel, low plasticity, medium dry strength, light brown, moist, very dense 4 p200=25%, Sa=47%, Gr=28%, Moisture=14%	6.7
8	SS		50/0"							no SS sample obtained, auger refusal at 8' in competent **Bedrock**	7.6
									BOH 8		8.0

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC obstructed at 7' - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST PIT

TEST PIT # 110

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *909+50*
Offset: *200L*
Elevation: *72.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *10.0 feet*
Date: *4/18/2006 - 4/18/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	7	
Time		
Date	4/18/06	
Symbol	▼	

Weather: Partly Cloudy

Forest Surface

Depth (Feet)	Sample Type	Field Number	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0				■	2" **ORGANIC mat**	0.0
1	GRAB	1	ML		**SILT with Sand** (ML) fine grained sand, nonplastic, no dry strength, brown gray, moist, field classification indicates p200=85%, Sa=15%, Gr=0%, **FROZEN Ice as Vx** (~20% ice by volume, free ice to ~5%), **ORGANICS** present to ~15% (roots, branches to 4" in diameter) Moisture=45%	1.0
3	GRAB	2	OL		**ORGANIC SILT** (OL) fine grained sand, nonplastic, brown, moist to wet p200=95%, Sa=4%, Gr=1%, Moisture=129%, Org=62%	3.0
7 ▼					Groundwater encountered at 7' while excavating	7.0
8						8.0
9	GRAB	3	SP		**SAND** (SP) medium grained sand, poorly graded, no dry strength, gray, wet, trace of **ORGANICS** (wood) Moisture=19%	9.0
10					BOH 10	10.0

Notes:

LOG OF TEST PIT

TEST PIT # 111

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *913+00*
Offset: *310L*
Elevation: *74.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *8.0 feet*
Date: *4/18/2006 - 4/18/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Forest Surface

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Subsurface Material	Depth
0					■ (0–1)	Water flowing into pit from surface	0.0
2	GRAB	1	▨	ML		**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown gray, moist, field observation indicates p200=80%, Sa=20%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~30% (roots, branches to ~3" in diameter) Moisture=44%	2.0
3.5							3.5
4	GRAB	2	▨	SP-SM		**SAND with Silt** (SP-SM) medium grained sand, poorly graded, no dry strength, gray, moist, trace of **ORGANICS** (wood, bark) p200=7%, Sa=92%, Gr=1%, Moisture=25%	4.0
7	GRAB	3	▨	ML		**SILT with Sand** (ML) fine grained sand, low plasticity, medium dry strength, gray, moist, field observation indicates p200=85%, Sa=15%, Gr=0%, **ORGANICS** present to ~ 10% by volume (rootlets) Moisture=34%	7.0
8				BOH 8			8.0

Notes:
No groundwater observed while excavating

LOG OF TEST PIT

TEST PIT # 112

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *915+00*
Offset: *310L*
Elevation: *76.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *9.0 feet*
Date: *4/18/2006 - 4/18/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	4	
Time		
Date	4/18/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0					■		0.0
1	GRAB	1	▨	PT	■	**Peat** (PT) brown, **FROZEN Ice as Vx** (~30% ice by volume, crystals ~1/4" in diameter) Moisture=178%	1.0
2	GRAB	2	▨	ML		**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray, moist to wet, field observation indicates p200=75%, Sa=25%, Gr=0%, **ORGANICS** present to ~30% by volume (rootlets) Moisture=44%	2.0
4 ▼						Groundwater encountered at 4' while excavating	4.0
7						test pit walls collapsing at 7'	7.0
8	GRAB	3	▨			**ORGANICS** present to ~20% by volume (rootlets) Moisture=28%	8.0
9						BOH 9 Notes:	9.0

B USCS LOG OF TEST PIT 59119DADOT.GPJ 2006DATATEMPLATE.GDT 1/8/09

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 113

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *916+50*
Offset: *290L*
Elevation: *78.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *8.0 feet*
Date: *4/18/2006 - 4/18/2006*
Geologist: *Keri A. Nutter*

Groundwater Data		
Depth in (ft.)	3	
Time		
Date	4/18/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0				PT	■		**Peat** (PT) brown, **FROZEN Ice as Nb**	0.0 0.5
1–2	GRAB	1	▨	SM	■		**SILTY SAND** (SM) fine and coarse grained sand, nonplastic, no dry strength, light brown gray, field observation indivates p200=20%, Sa=80%, Gr=0%, **FROZEN Ice as Nb, ORGANICS** present to ~25% by volume (rootlets) Moisture=28%	1.0 2.5
3 ▼				SP			Groundwater encountered at 3' while excavating **SAND** (SP) medium grained sand, poorly graded, light brown, wet, field observation indicates p200=5%, Sa=95%, Gr=0%, **ORGANICS** present to ~10% by volume (rootlets, bark)	3.0 3.5
5							test pit walls collapsing at 5'	5.0
7–8	GRAB	2	▨	SM			**SILTY SAND** (SM) fine grained sand, nonplastic, no dry strength, gray, wet, trace of **ORGANICS** present (rootlets) p200=26%, Sa=74%, Gr=0%, Moisture=20%	7.0 8.0
						BOH 8	Notes:	

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 114

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *919+50*
Offset: *200L*
Elevation: *85.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

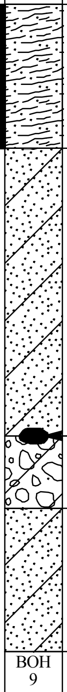
Total Depth: *9.0 feet*
Date: *4/18/2006 - 4/18/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	3	
Time		
Date	4/18/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface



Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0				PT	■	**Peat** (PT) brown, **FROZEN Ice as Nb,** fibrous	0.0
2	GRAB	1	▨	SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, brown gray, moist to wet, **ORGANICS** present to ~15% by volume (rootlets) p200=26%, Sa=57%, Gr=17%, Moisture=30% Groundwater encountered at 3' while excavating	2.0
3 ▼							3.0
6	GRAB	2	▨	GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray brown, wet, field observation indicates p200=15%, Sa=40%, Gr=45%, cobbles to 4" (~2%) Moisture=15%	6.0
7							7.0
8	GRAB	3	▨	SM		**SILTY SAND** (SM) fine grained sand, nonplastic, no dry strength, gray, wet, field observation indicates p200=15%, Sa=85%, Gr=0% Moisture=18%	8.0
9						Notes:	9.0

BOH
9

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

TEST PIT # 115

Station / Location: 922+50
Offset: 100L
Elevation: 95.0 feet

Equipment Type: Hitachi Z-Axis 135 Backhoe
Hole Type: Test Pit
Field Crew: Donnie Turner

Total Depth: 7.0 feet
Date: 4/18/2006 - 4/18/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	7	
Time		
Date	4/18/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Soil Graphic	Subsurface Material	Depth
0				PT	■		**Peat** (PT) brown, **FROZEN Ice as Nb**	0.0
0.5				SM	■		**SILTY SAND with Gravel** (SM) fine gravel, nonplastic, light brown, moist, field observation indicates p200=20%, Sa=60%, Gr=20%, 6" **FROZEN Ice as Nb, ORGANICS** present to ~20% by volume (roots, plants)	0.5 2.5
3							**ORGANIC mat** (roots)	3.0
4	GRAB	1	▨	GP			**GRAVEL with Sand** (GP) coarse gravel, no dry strength, brown gray, moist, cobbles to 4" (~5%) p200=3%, Sa=35%, Gr=62%, Moisture=8%	4.0
							Groundwater encountered at 7' while excavating	6.5
7 ▼						BOH 7	Notes:	7.0

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 116

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *935+20*
Offset: *20R*
Elevation: *114.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *16.5 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0						**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1		SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, light brown, moist, **FILL** 1 p200=13%, Sa=46%, Gr=41%, Moisture=10%, Max. Dry Dens=142pcf, Opt. Moisture=6%	0.3
3	SS	2	10 28 18	GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, dense, field observation indicates p200=5%, Sa=40%, Gr=55% 2 Moisture=13%	3.0
5	SS	3	15 20 6			becoming sandier medium dense, field observation indicates p200=5%, Sa=45%, Gr=50% 3 Moisture=7%	5.0
7						drill action indicates cobbles	7.0
10	SS	4	7 6 6	GP		**GRAVEL** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, medium dense, field observation indicates p200=5%, Sa=10%, Gr=85% 4 Moisture=10%	10.0
15	SS	5	19 36 27			no sample recovered -driving cobble ahead of sampler, cuttings indicate same	15.0
16.5						BOH 16.5	16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC frozen at 4' - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 117

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 945+00
Offset: 15R
Elevation: 120.0 feet

Equipment Type: Mobile B-61 Truck
Drilling Method: Hollow-Stem Auger
Field Crew: N. Braeutigam/T. McMichael

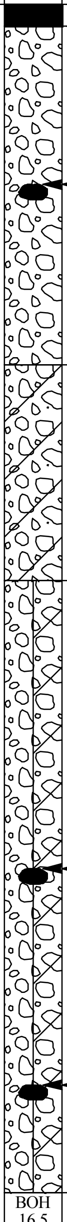
Total Depth: 16.5 feet
Date: 11/20/2005 - 11/20/2005
Geologist: John Rego

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface



Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
						4" Asphalt Concrete (no CABC observed)	0.0
GRAB	1			GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, field observation indicates p200=5%, Sa=35%, Gr=60% 1 Moisture=4%	0.3
SS		13 19 25				no sample recovered -driving cobble ahead of sampler	2.5
SS	2	7 12 18		GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, medium dense, **FILL** 2 p200=13%, Sa=36%, Gr=51%, Moisture=7%	5.0
						drilling becoming easier	8.0
SS	3	1 2 6		GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, loose, field observation indicates p200=10%, Sa=60%, Gr=30% 3 Moisture=11%	10.0
						drill action indicates cobbles	12.0
SS		22 23 12				no sample recovered -driving cobble ahead of sampler, cuttings indicate same	15.0
							16.5

BOH 16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC frozen at 4' - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 118

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *953+20*
Offset: *10R*
Elevation: *130.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *7.0 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Frozen Zone	Soil Graphic
0–3	GRAB	1		GW-GM		
3–4.5	SS	2	15 30 45	GM		
5–6.5	SS	3	11 31 19	GM		
7						BOH 7

SUBSURFACE MATERIAL

0.0 **4" Asphalt Concrete** (no CABC observed)

0.3 **GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, gray, moist, **FILL**
1 p200=12%, Sa=42%, Gr=46%, Moisture=6%

3.0 **SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, very dense, **FILL**, field observation indicates p200=15%, Sa=35%, Gr=50%
2 Moisture=5%

4.0

5.0 **SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, dense, field observation indicates p200=15%, Sa=15%, Gr=70%
3 Moisture=12%

6.6 auger refusal at 7' in competent **Bedrock**

7.0

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 120

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *972+20*
Offset: *25R*
Elevation: *115.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	SUBSURFACE MATERIAL	Depth
0					**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1		GP-GM	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, **FILL**, field observation indicates p200=10%, Sa=35%, Gr=55% 1 Moisture=4%	0.3
3	SS	2	23 26 20	GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, dense, **FILL** 2 p200=13%, Sa=30%, Gr=57%, Moisture=3%	2.5
5	SS	3	11 22 13	GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, dense, field observation indicates p200=15%, Sa=20%, Gr=65% 3 Moisture=7%	5.0
7					cuttings change to light brown	7.0
10	SS	4	33 16 14		becoming sandier coarse gravel, nonplastic, no dry strength, light brown, moist, medium dense 4 p200=16%, Sa=40%, Gr=44%, Moisture=12%	10.0
					BOH 11.5	11.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
No measurable groundwater to 10' on 04/23/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST PIT

TEST PIT # 121

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *987+00*
Offset: *55L*
Elevation: *110.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *13.0 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

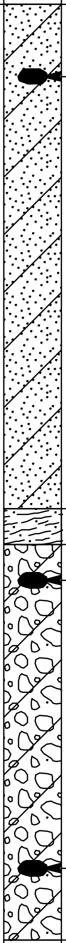
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Gravel Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification Frozen Zone	SUBSURFACE MATERIAL	
0						0.0
1	GRAB	1	▒	SM	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, medium dry strength, gray, moist, trace of **ORGANICS** present (wood, roots), cobbles to 12" (~15%), boulders to 34" (~5%) p200=20%, Sa=44%, Gr=36%, Moisture=9%	1.0
7				PT	**Peat** (PT) brown, branches	7.0
						7.5
8	GRAB	2	▒	GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, field observation indicates p200=15%, Sa=35%, Gr=50%, cobbles to 4" (~10) Moisture=7%	8.0
12	GRAB	3	▒	GM	becoming siltier, (GM) field observation indicates p200=20%, Sa=30%, Gr=50%, cobbles to 4" (~5%) Moisture=14%	12.0
13						13.0

Soil Graphic



BOH
13

Notes:
No groundwater observed while excavating

LOG OF TEST HOLE

HOLE # 122

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *989+00*
Offset: *50L*
Elevation: *110.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *14.5 feet*
Date: *4/22/2006 - 4/22/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Gravel Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification
0.0–3.0	GRAB	1		SM
3.0–4.5	SS	2	12 26 19	GM
5.0–6.5	SS	3	13 14 20	GM
7.5–9.0	SS	4 4A	7 5 5	SP-SM SM
10.0–11.5	SS	5	5 12 20	SM
12.5–14.0	SS	6	10 38 15	GM

SUBSURFACE MATERIAL

Depth	Description
0.0	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, medium dry strength, gray, moist, trace of **ORGANICS** (roots) 1 p200=22%, Sa=44%, Gr=34%, Moisture=13%, Max. Dry Dens=141pcf, Opt. Moisture=5.5%
3.0	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, dense, field observation indicates p200=15%, Sa=40%, Gr=45% 2 Moisture=6%
5.0	becoming more gravelly, field observation indicates p200=15%, Sa=30%, Gr=55%, drill action indicates cobbles 3 Moisture=6%
7.5	**SAND with Silt and Gravel** (SP-SM) coarse gravel, no dry strength, gray, moist, loose, field observation indicates p200=10%, Sa=60%, Gr=30% 4 Moisture=4%
8.5	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, gray, moist, loose, field observation indicates p200=30%, Sa=50%, Gr=20%, **ORGANICS** present to ~10% by volume (roots) 4A Moisture=14%
10.0	becoming more gravelly, dense, field observation indicates p200=15%, Sa=50%, Gr=35% 5 Moisture=8%
12.5	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, very dense, field observation indicates p200=15%, Sa=40%, Gr=45% 6 Moisture=6%
14.0	grinding on a boulder - auger refusal
14.5	BOH 14.5

Notes:
No groundwater observed while drilling
PVC standpipe installed to 14.5'
No measureable groundwater to 14.5' on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST PIT

TEST PIT # 123

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *991+50*
Offset: *50L*
Elevation: *110.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *14.0 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Gravel Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0							0.0
2	GRAB	1	▨	GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, no dry strength, gray, moist, field observation indicates p200=10%, Sa=35%, Gr=55%, cobbles to 12", boulders to 24" Moisture=6%	2.0
4					■		4.0
5	GRAB	2	▨	SP-SM	■	**SAND with Silt** (SP-SM) coarse gravel, poorly graded, no dry strength, gray, moist, field observation indicates p200=10%, Sa=80%, Gr=10%, **FROZEN Ice as Nb** Moisture=5%	5.0
9						**DEBRIS** present (aluminum can)	9.0
12				GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, gray, moist, field observation indicates p200=10%, Sa=30%, Gr=60%	12.0
						DEBRIS present (aluminum can)	13.5
14						BOH 14	14.0

Notes:
No groundwater observed while excavating

LOG OF TEST PIT

TEST PIT # 124

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *996+00*
Offset: *40L*
Elevation: *110.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *14.0 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Gravel Surface

Depth (Feet)	Sample Data			USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
	Sample Type	Field Number	Sample					
0								0.0
1	GRAB	1	▨	SP-SM			**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, no dry strength, gray, moist, field observation indicates p200=10%, Sa=60%, Gr=30%, cobbles to 10" (~20%) Moisture=9%	1.0
					■		roots	3.5
4	GRAB	2	▨	SM	■		**SILTY SAND** (SM) coarse gravel, nonplastic, no dry strength, gray, moist, **FROZEN Ice as Nb,** trace of **ORGANICS** (roots) p200=19%, Sa=71%, Gr=10%, Moisture=4%	4.0
9				SM			**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, gray, moist, field observation indicates p200=20%, Sa=60%, Gr=20%	9.0
12								12.0
				GM			**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, gray, moist, field observation indicates p200=20%, Sa=25%, Gr=55%, cobbles to 8" (~10%)	12.5
14						BOH 14	Notes: No groundwater observed while excavating	14.0

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 126

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *1010+00*
Offset: *50R*
Elevation: *120.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *9.0 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0								0.0
3	GRAB	1	▒	GM			**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, low dry strength, gray, moist, trace of **ORGANICS** present to 2' (roots), cobbles to 12" (~20%) p200=15%, Sa=34%, Gr=51%, Moisture=8%	3.0
6							boulders to 36"	6.0
9						BOH 9	Notes: No groundwater observed while excavating	9.0

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 129

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *1026+50*
Offset: *40L*
Elevation: *108.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *7.5 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0–0.2							GW-GM		
0.3–3.0	GRAB	1							
3.0–4.5	SS	2	11 17 13						
5.0–6.5	SS	3	12 14 10				GP-GM		
7.5									BOH 7.5

SUBSURFACE MATERIAL

0.0 **2" Asphalt Concrete** (no CABC observed)

0.2 **GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, brown, moist, **FILL**
1 p200=8%, Sa=42%, Gr=50%, Moisture=6%, Max. Dry Dens=147pcf, Opt. Moisture=5%

3.0 becoming sandier medium dense, **FILL**, field observation indicates p200=10%, Sa=45%, Gr=45%
2 Moisture=13%

5.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, medium dense, field observation indicates p200=10%, Sa=40%, Gr=50%
3 Moisture=5%

6.5 difficulty drilling

7.1 auger refusal at 7.5' in competent **Bedrock**

7.5

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 131

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1048+40*
Offset: *5L*
Elevation: *108.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		8.0
Time		
Date		4/17/06
Symbol		∇

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	SUBSURFACE MATERIAL	
0					**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1		SM	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, brown, moist, **FILL** 1 p200=14%, Sa=43%, Gr=43%, Moisture=5%	0.3
2.5	SS	2	5 14 29	SP-SM	**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, nonplastic, no dry strength, brown, moist, dense, **FILL**, field observation indicates p200=10%, Sa=35%, Gr=55% 2 Moisture=10%	2.5
5.0	SS	3	14 13 10	GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, brown, moist, medium dense, field observation indicates p200=15%, Sa=35%, Gr=50% 3 Moisture=8%	5.0
8 ∇						
10.0	SS	4	3 11 6		no sample recovered -driving cobble ahead of sampler, cuttings indicate same	10.0
11.5					BOH 11.5	11.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 8' on 04/17/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 133

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1076+50*
Offset: *15L*
Elevation: *116.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		3.0
Time		
Date		4/17/06
Symbol		∇

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0						**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1		GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, Gray, moist, **FILL** 1 p200=7%, Sa=38%, Gr=55%, Moisture=4%	0.3
3.0	SS	2	13 22 23			becoming more gravelly dense, **FILL**, Field observation indicates p200=10%, Sa=30%, Gr=60% 2 Moisture=16%	3.0
5.0	SS	3	19 13 10	GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, Gray, moist, medium dense, Field observation indicates p200=15%, Sa=35%, Gr=50% 3 Moisture=9%	5.0
10.0	SS	4	12 22 19			becoming siltier Field observation indicates p200=25%, Sa=30%, Gr=45% 4 Moisture=18%	10.0
11.5						BOH 11.5	11.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 3' on 04/17/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 134

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1083+00*
Offset: *45L*
Elevation: *116.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *7.5 feet*
Date: *11/20/2005 - 11/20/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic
0–3	GRAB	1		▨	■		GW-GM		
3–3.5	SS	2	60 20/0"	⧗	■				
5–6.5	SS	3	14 21 21	⧗	■		GP-GM		BOH 7.5

SUBSURFACE MATERIAL

2" Asphalt Concrete (no CABC observed)	0.0	0
GRAVEL with Silt and Sand (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, Gray, moist, **FILL** 1 p200=11%, Sa=41%, Gr=48%, Moisture=6%, Max. Dry Dens=151pcf, Opt. Moisture=5.5%	0.2	1
becoming more gravelly very dense, **FILL**, Field observation indicates p200=10%, Sa=35%, Gr=55% 2 Moisture=5%	3.0	3
Blowcounts not representative -bouncing on a cobble	4.0	4
GRAVEL with Silt and Sand (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Gray, moist, dense, Field observation indicates p200=10%, Sa=30%, Gr=60% 3 Moisture=10%	5.0	5
Difficulty drilling	6.0	6
Auger refusal at 7.5' in competent **Bedrock**	7.1	7
	7.5	

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 135

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1092+50*
Offset: *30R*
Elevation: *120.0 feet*

Equipment Type: *CME Skid - 45*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *8.5 feet*
Date: *5/1/2006 - 5/1/2006*
Geologist: *Keri A. Nutter*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0			2	☒	■		OL	■		**ORGANIC SILT** (OL) fine gravel, nonplastic, medium dry strength, brown, field observation indicates p200=70%, Sa=20%, Gr=10%, **FROZEN Ice as Nb, ORGANICS** present (roots, peat) 1 Moisture=59%	0.0
1	SPT	1	10 20 31								
											1.5
2									●	drill action indicates cobles	2.0
3											
4									●	drill action indicates cobles	4.0
5			12 17	☒							
6	SPT		10 5			27				no sample recovered - driving a rock ahead of sampler	6.0
7			6	☒	■		GM			**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, medium dry strength, brown, moist, dense, field observation indicates p200=15%, Sa=35%, Gr=50% 2 Moisture=6%	7.0
8	SPT	2	10 15			25					
									BOH 8.5	Notes: No groundwater observed while drilling	8.5

☐ CME Auto Hammer ☒ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 137

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *1113+90*
Offset: *20R*
Elevation: *166.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *15.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone
0.5					GP-GM	
1	GRAB	1				
3–4	SS	2 2A	17 18 15		GM	
5–6.5	SS	3	9 13 6			
10	SS	4	50/0"			
15	SS	5	62		GP	

SUBSURFACE MATERIAL

Depth	Description
0.0	**4" Asphalt Concrete** (no CABC observed)
0.3	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Gray, moist, **FILL**, Field observation indicates p200=10%, Sa=25%, Gr=65% 1 Moisture=7%
2.5	becoming sandier dense, **FILL**, Field observation indicates p200=10%, Sa=40%, Gr=50% 2 Moisture=8%
3.5	**SILTY GRAVEL with Sand** (GM) coarse gravel, no to low plasticity, low dry strength, Brown, moist, dense, Field observation indicates p200=15%, Sa=35%, Gr=50% 2A Moisture=17%
5.0	becoming sandier nonplastic, no dry strength, medium dense 3 p200=16%, Sa=39%, Gr=45%, Moisture=13%
10.0	No sample recovered -driving cobble ahead of sampler
14.5	**GRAVEL with Sand** (GP) coarse gravel, poorly graded, nonplastic, no dry strength, Brown, moist, very dense, Field observation indicates p200=5%, Sa=15%, Gr=80% 5 Moisture=16%
15.5	BOH 15.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
No measurable groundwater to 14.8' on 04/17/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

LOG OF TEST HOLE

HOLE # 138

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1125+00*
Offset: *50L*
Elevation: *120.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Drilling Method: *Test Pit*
Field Crew: *Donnie Turner*

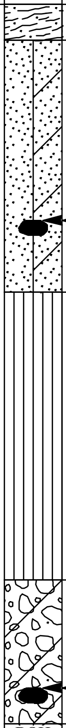
Total Depth: *10.0 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Grass Surface



Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL
0.0									**6" ORGANIC MAT**
0.5	GRAB	1		▨	■		SP-SM		**SAND with Silt** (SP-SM) fine gravel, poorly graded, no dry strength, gray, moist, **FILL,** field observation indicates p200=10%, Sa=85%, Gr=5%, trace of **ORGANICS** (roots) 1 Moisture=4%
3.0									boulders to 24" in diameter (~2%)
3.5									**ORGANIC mat** (roots)
4.0	GRAB	2		▨	■		OL		**ORGANIC SILT** (OL) fine gravel, nonplastic, brown, moist, field observation indicates p200=65%, Sa=30%, Gr=5%, **ORGANICS** present to ~30% by volume 2 Moisture=73%
8.0	GRAB	3		▨	■		GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, low dry strength, brown, moist, field observation indicates p200=15%, Sa=25%, Gr=60% 3 Moisture=9%
9.5									boulders to 2.5' in diameter
10.0									Notes: No groundwater observed while excavating

BOH 10

☐ CME Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 139

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1132+45*
Offset: *15R*
Elevation: *158.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0						**3" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1		GW-GM		**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, Gray, moist, **FILL** 1 p200=7%, Sa=43%, Gr=50%, Moisture=5%	0.3
3	SS	2	13 20 19	SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, Gray, moist, dense, Field observation indicates p200=15%, Sa=50%, Gr=35% 2 Moisture=6%	3.0
5	SS	3	9 21 20			becoming siltier low dry strength, dense 3 p200=18%, Sa=51%, Gr=31%, Moisture=10%	5.0
10	SS	4	47 19 20			becoming siltier dense, Field observation indicates p200=20%, Sa=50%, Gr=30% 4 Moisture=12%	10.0
						BOH 11.5	11.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
No measurable groundwater to 11' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 142

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1160+10*
Offset: *20R*
Elevation: *246.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0							**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1			SW-SM		**SAND with Silt and Gravel** (SW-SM) coarse gravel, well graded, nonplastic, low dry strength, Brown, moist, **FILL** 1 p200=9%, Sa=51%, Gr=40%, Moisture=10%	0.3
2.5	SS	2	8 7 23		SM		**SILTY SAND** (SM) fine gravel, nonplastic, no dry strength, Brown, moist, medium dense 2 p200=24%, Sa=71%, Gr=5%, Moisture=14%	2.5
5.0	SS	3	17 18 7		GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Brown, moist, medium dense, Field observation indicates p200=10%, Sa=15%, Gr=75% 3 Moisture=9%	5.0
10.0	SS	4	11 39 39		SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, medium dry strength, Brown, moist, very dense, Field observation indicates p200=15%, Sa=65%, Gr=20% 4 Moisture=15%	10.0
11.5					BOH 11.5			11.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC obstructed -no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 143

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1166+30*
Offset: *15R*
Elevation: *264.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *16.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)		15.0
Time		
Date		11/22/05
Symbol		∇

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	SUBSURFACE MATERIAL	
0					**4" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1		SW-SM	**SAND with Silt and Gravel** (SW-SM) coarse gravel, well graded, nonplastic, no dry strength, Brown, moist, **FILL** 1 p200=10%, Sa=54%, Gr=36%, Moisture=6%	0.3
3	SS	2	11 14 15	SM	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, Brown, moist, medium dense, Field observation indicates p200=15%, Sa=50%, Gr=35% 2 Moisture=12%	3.0
5	SS	3	45 45 29		No sample recovered -rock stuck in end of sampler	5.0
10	SS	4	32 32 32	GP-GM	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Brown, moist, very dense, Field observation indicates p200=10%, Sa=40%, Gr=50% 4 Moisture=5%	10.0
15 ∇	SS	5	11 6 20	SM	**SILTY SAND with Gravel** (SM) coarse gravel, no to low plasticity, low dry strength, Brown, moist, medium dense, Field observation indicates p200=20%, Sa=55%, Gr=25% 5 Moisture=10%	15.0
16.5				BOH 16.5		16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
Groundwater measured at 15' on 11/22/05

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # 144

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *1174+30*
Offset: *10R*
Elevation: *294.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *5.5 feet*
Date: *11/21/2005 - 11/21/2005*
Geologist: *John Rego*

Groundwater Data

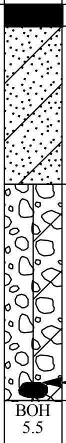
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone
0–2	GRAB	1					SM	
2.5–3.5	SS	2	15 80				GP-GM	
5–5.3	SS	3	95/4"					



SUBSURFACE MATERIAL

0.0 **4" Asphalt Concrete** (no CABC observed)

0.3 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, Gray, moist, **FILL**
1 p200=14%, Sa=43%, Gr=43%, Moisture=6%

2.5 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Gray, moist, very dense, field observation indicates p200=10%, Sa=15%, Gr=75%,
3.3 2 Moisture=15%
blowcounts not representative -bouncing on a cobble

4.9 no sample recovered -bouncing on a boulder
5.3 boulder encountered - auger refusal at 5.5'
5.5

Notes:
No groundwater observed while drilling

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 146

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1189+00*
Offset: *10L*
Elevation: *315.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *16.5 feet*
Date: *4/22/2006 - 4/22/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0						**3" Asphalt Concrete** (no CABC observed)	0.0
0.3	GRAB	1			GW-GM	**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, medium dry strength, gray, **FROZEN Ice as Vx** (~10% ice by volume) 1 p200=10%, Sa=43%, Gr=47%, Moisture=6%, Max. Dry Dens=159pcf, Opt. Moisture=4.5%	0.3
2.5						harder drilling at 3'	2.5
3	SS	2	22 27 13		GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, very dense, field observation indicates p200=15%, Sa=35%, Gr=50% 2 Moisture=3%	3.0
5	SS	3	11 26 55			dark gray 3 Moisture=6%	5.0
7.5	SS	4	25 38 26/1"			becoming sandier, field observation indicates p200=15%, Sa=40%, Gr=45% 4 Moisture=2%	7.5
10	SS	5	28 26 35		GP-GM	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, no dry strength, dark gray, moist, very dense, field observation indicates p200=10%, Sa=40%, Gr=50% 5 Moisture=2%	10.0
15	SS	6	9 6 18		GM	**SILTY GRAVEL with Sand** (GM) coarse gravel, no dry strength, dark gray, moist, medium dense, field observation indicates p200=20%, Sa=35%, Gr=45% 6 Moisture=7%	15.0
16.5					BOH 16.5		16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed to 16.5'
No measurable groundwater observed on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 147

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1199+00*
Offset: *10L*
Elevation: *295.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *16.5 feet*
Date: *4/22/2006 - 4/22/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Asphalt Surface

Sample Data

Sample Type	Number	Blow Count	USCS Classification
GRAB	1		GW
SS	2	19 12 6	
SS	3 3A	6 7 29	ML SM
SS	4	25 23 16	GM
SS	5	4 12 14	SP-SM
SS	6	23 34 39	SM

SUBSURFACE MATERIAL

0.0 **2.5" Asphalt Concrete** (no CABC observed)

0.2 **GRAVEL with Sand** (GW) coarse gravel, well graded, no dry strength, gray, **FILL, FROZEN Ice as Nb**

1 p200=3%, Sa=34%, Gr=63%, Moisture=5%

2.5 low dry strength, moist, medium dense, **FILL,** field observation indicates p200=5%, Sa=40%, Gr=55%

2 Moisture=6%

4.0 easier drilling

4.5 **SILT with Sand** (ML) fine gravel, nonplastic, low dry strength, brown, moist, firm, field observation indicates p200=75%, Sa=20%, Gr=5%, trace of **ORGANICS** present (rootlets)

3 Moisture=37%

6.0 **SILTY SAND with Gravel** (SM) fine gravel, nonplastic, low dry strength, gray, moist, dense, field observation indicates p200=20%, Sa=45%, Gr=35%

3A Moisture=5%

7.5 **SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, low dry strength, gray, moist, dense, field observation indicates p200=15%, Sa=40%, Gr=45%

4 Moisture=4%

9.5 grinding on a boulder

10.0 **SAND with Silt and Gravel** (SP-SM) coarse gravel, no dry strength, gray, moist, medium dense, field observation indicates p200=10%, Sa=60%, Gr=30%

5 Moisture=5%

11.0

12.0

13.0 drill action indicates cobbles between 10' and 15'

14.0

15.0 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, gray, moist, very dense, field observation indicates p200=15%, Sa=45%, Gr=40%

6 Moisture=4%

16.5

BOH 16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed to 16.5'
No measurable groundwater observed on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 148

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1204+00*
Offset: *10R*
Elevation: *275.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

Total Depth: *16.5 feet*
Date: *4/22/2006 - 4/22/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Asphalt Surface

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification
0.2–3.0	GRAB	1			GP-GM
3.0–4.5	SS	2	7 4 5		SM
5.0–6.5	SS	3	8 10 8		
7.5–9.0	SS	4	4 2 2		SM
10.0–11.4	SS	5	56 10 52/5"		SM
15.0–16.5	SS	6	55 27 18		GM

SUBSURFACE MATERIAL

Depth	Description
0.0	**2.5" Asphalt Concrete** (no CABC observed)
0.2	**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, low dry strength, gray, moist, **FILL,** field observation indicates p200=10%, Sa=40%, Gr=50%, **FROZEN Ice as Nb,** trace of **ORGANICS** (roots) 1 Moisture=7%
3.0	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, gray, moist, loose, **FILL,** field observation indicates p200=20%, Sa=55%, Gr=25%, trace of **ORGANICS** (peat, wood, roots) 2 Moisture=10%
5.0	becoming more gravelly, medium dense, **FILL,** field observation indicates p200=15%, Sa=50%, Gr=35% 3 Moisture=10%
7.5	**SILTY SAND** (SM) fine gravel, nonplastic, no dry strength, gray, moist, very loose, field observation indicates p200=15%, Sa=80%, Gr=5%, **ORGANICS** present to ~10% by volume (roots) 4 Moisture=16%
10.0	**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, gray, moist, very dense, field observation indicates p200=20%, Sa=65% Gr=15%, **ORGANICS** present to ~10% by volume (roots) 5 Moisture=9%
14.0	
15.0	**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, dense, field observation indicates p200=15%, Sa=35%, Gr=50% 6 Moisture=5%
16.5	BOH 16.5

Notes:
No groundwater observed while drilling
PVC standpipe installed to 16.5'
No measurable groundwater observed on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 149

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1209+00*
Offset: *20L*
Elevation: *260.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *5.5 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Gravel Surface

Depth (Feet)	Sample Data: Sample Type	Sample Data: Field Number	Sample Data: Sample	USCS Classification	Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0								0.0
2							boulders to 15" in diameter	2.0
3	GRAB	1	▨	SM			**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, low dry strength, gray, moist, trace of **ORGANICS** (roots) p200=16%, Sa=53%, Gr=31%, Moisture=8%	3.0
5							very difficult excavating	5.0
						BOH 5.5	Notes: No groundwater observed while excavating	5.5

LOG OF TEST HOLE

HOLE # 150

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1220+00*
Offset: *25L*
Elevation: *220.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/S. Anderson*

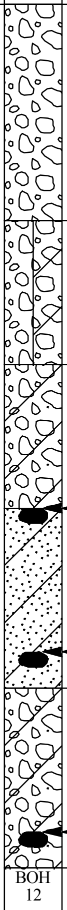
Total Depth: *12.0 feet*
Date: *4/22/2006 - 4/22/2006*
Geologist: *Keri A. Nutter*

Weather: Partly Cloudy

Gravel Surface

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification
0	GRAB	1		GP
3	SS	2	5 5 4	GP-GM
5	SS	3	6 23 15	GM
7.5	SS	4	50	SM
9.5	SS	5	16 14 6	GM



SUBSURFACE MATERIAL

0.0 **GRAVEL with Sand** (GP) coarse gravel, poorly graded, no dry strength, gray, moist
1 p200=3%, Sa=25%, Gr=72%, Moisture=5%, Max. Dry Dens=150pcf

3.0 **GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, no dry strength, gray, moist, loose, field observation indicates p200=10%, Sa=35%, Gr=55%
2 Moisture=3%

5.0 **SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, dense, field observation indicates p200=15%, Sa=30%, Gr=55%
3 Moisture=8%

7.0 drilling action indicates cobbles

7.5 **SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, gray, moist, very dense, field observation indicates p200=25%, Sa=40%, Gr=35%
4 Moisture=6%

9.0 grinding on a boulder

9.5 **SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, medium dense, field observation indicates p200=25%, Sa=35%, Gr=40%
5 Moisture=3%

11.5 grinding on a boulder at 12' - auger refusal

12.0

Notes:
No groundwater observed while drilling
PVC standpipe installed to 12'
No measurable groundwater observed on 04/27/06

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST PIT

TEST PIT # 151

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1223+50*
Offset: *110L*
Elevation: *205.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *11.5 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

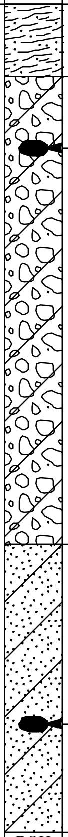
Weather: Partly Cloudy

Forest Surface

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Subsurface Material	Depth
0				PT		**Peat** (PT) brown, moist	0.0
1						**ORGANIC mat** (roots)	1.0
2	GRAB	1	▨	GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, field observation indicates p200=20%, Sa=25%, Gr=55%, trace of **ORGANICS** (roots), boulders to 36" (~5%) Moisture=9%	2.0
7.5						2" **ORGANIC mat**	7.5
10	GRAB	2	▨	SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, gray, moist, trace of **COAL,** cobbles to 6" (~15%) p200=16%, Sa=43%, Gr=41%, Moisture=11%	10.0
11.5							11.5

Soil Graphic



BOH
11.5

Notes:
No groundwater observed while excavating

LOG OF TEST PIT

TEST PIT # 152

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: *1228+00*
Offset: *520L*
Elevation: *175.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *12.0 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Forest Surface

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	Subsurface Material	Depth
0				PT	■	**Peat** (PT) brown, **FROZEN Ice as Vx**	0.0
0.5							0.5
2				GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, gray, moist, field observation indicates p200=15%, Sa=35%, Gr=50%, cobbles to 8" (~15%), boulders to 24" (~10%)	2.0
5						2" **ORGANIC mat** (branches and roots)	5.0
6	GRAB	1	▨	SP-SM		**SAND with Silt and Gravel** (SP-SM) coarse gravel, poorly graded, no dry strength, gray, moist, cobbles to 8" (~5%) p200=9%, Sa=54%, Gr=37%, Moisture=7%	6.0
9						2" **ORGANIC mat** (branches and roots)	9.0
10				GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, gray, moist, field observation indicates p200=15%, Sa=40%, Gr=45%, cobbles to 10" (~10%), boulders to 14" (~2%)	10.0
12					BOH 12	Notes: No groundwater observed while excavating	12.0

LOG OF TEST PIT

TEST PIT # 153

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1232+00*
Offset: *800L*
Elevation: *150.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

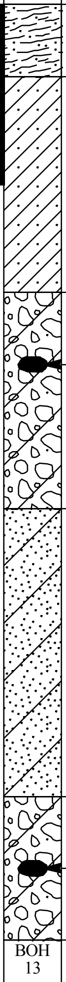
Total Depth: *13.0 feet*
Date: *4/20/2006 - 4/20/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Partly Cloudy

Forest Surface



Depth (Feet)	Sample Data: Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0				PT	■	**Peat** (PT) brown, **FROZEN Ice as Vx** (~20% ice by volume), branches and roots to 4" in diameter	0.0
1	GRAB	1	▨	ML	■ (to ~2.5)	**SANDY SILT** (ML) fine gravel, nonplastic, low dry strength, gray, field classification indicates p200=55%, Sa=35%, Gr=10%, **FROZEN Ice as Nb, ORGANICS** present to ~15% by volume (roots) Moisture=29%	1.0
4						2" **ORGANIC mat** (roots)	4.0
5				GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, gray, moist, field observation indicates p200=15%, Sa=40%, Gr=45%, boulders to 24" (~5%)	5.0
7						1" **ORGANIC mat** (roots)	7.0
8	GRAB	2	▨	SM		**SILTY SAND with Gravel** (SM) coarse gravel, nonplastic, no dry strength, dark gray, moist p200=17%, Sa=77%, Gr=6%, Moisture=10%	8.0
11						1" **ORGANIC mat** (roots)	11.0
12	GRAB	3	▨	GM		**SILTY GRAVEL with Sand** (GM) coarse gravel, nonplastic, no dry strength, gray, moist, field observation indicates p200=15%, Sa=30%, Gr=55%, cobbles to 6" (~10%) Moisture=9%	12.0
13						Notes: No groundwater observed while excavating	13.0

BOH 13

LOG OF TEST HOLE

HOLE # 154

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1259+70*
Offset:
Elevation: *132.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *6.5 feet*
Date: *11/22/2005 - 11/22/2005*
Geologist: *John Rego*

Groundwater Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Weather: Rain

Asphalt Surface

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	
0									**4" Asphalt Concrete** (no CABC observed)	0.0
	GRAB	1					SW-SM		**SAND with Silt and Gravel** (SW-SM) coarse gravel, well graded, nonplastic, no dry strength, Brown, moist, **FILL** 1 p200=8%, Sa=47%, Gr=45%, Moisture=6%	0.3
3	SS	2	13 24 18				GP-GM		**GRAVEL with Silt and Sand** (GP-GM) coarse gravel, poorly graded, nonplastic, no dry strength, Brown, moist, dense, **FILL**, Field observation indicates p200=10%, Sa=45%, Gr=45% 2 Moisture=4%	3.0
							ML		**SILT with Sand** (ML) low plasticity, low dry strength, Gray Brown, moist, stiff, Field observation indicates p200=75%, Sa=25%, Gr=0%, **Organics** present ~5% by volume (rootlets) 3 Moisture=42%	4.5
5	SS	3 3A	5 7 8				SM		**SILTY SAND** (SM) medium grained sand, nonplastic, no dry strength, Light brown, moist, medium dense, Field observation indicates p200=25%, Sa=75%, Gr=0% 3A Moisture=19%	5.8
							BOH 6.5			6.5

Notes:
No groundwater observed while drilling
PVC standpipe installed
PVC frozen at 4' on 04/17/06 - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # 155

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *MP 25*
Offset:
Elevation: *131.0 feet*

Equipment Type: *Mobile B-61 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *N. Braeutigam/T. McMichael*

Total Depth: *11.5 feet*
Date: *11/22/2005 - 11/22/2005*
Geologist: *John Rego*

Groundwater Data

Depth in (ft.)	7	
Time		
Date	11/22/05	
Symbol	▼	

Weather: Rain

Asphalt Surface

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Number	Blow Count	USCS Classification	Subsurface Material	Depth
0.0					**7" Asphalt Concrete** (no CABC observed)	0.0
0.6	GRAB	1		SW-SM	**SAND with Silt and Gravel** (SW-SM) coarse gravel, well graded, nonplastic, no dry strength, Brown, moist, **FILL** 1 p200=10%, Sa=49%, Gr=41%, Moisture=7%, Max. Dry Dens=147.5pcf, Opt. Moisture=3.5%	0.6
3.0	SS	2	15 27 21	GW-GM	**GRAVEL with Silt and Sand** (GW-GM) coarse gravel, well graded, nonplastic, no dry strength, Brown, moist, dense, **FILL**, field observation indicates p200=10%, Sa=35%, Gr=55% 2 Moisture=12%	3.0
5.0	SS	3	11 17 14		becoming more gravelly dense, **FILL** 3 p200=7.5%, Sa=31.5%, Gr=61%, Moisture=13%	5.0
6.6					Groundwater observed at 7' while drilling	6.6
7.0					drilling becoming easier SM indicated by cuttings	7.0
9.5	SS	4	4	SM	**SILTY SAND with Gravel** (SM) fine gravel, nonplastic, no dry strength, Light brown, wet, loose, field observation indicates p200=20%, Sa=65%, Gr=15% 4 Moisture=13%	9.5
10.5		4A	3 4	ML	**SILT with Sand** (ML) low plasticity, low dry strength, slow dilatancy, Gray, wet, firm, field observation indicates p200=65%, Sa=35%, Gr=0%, **ORGANICS** present ~5% by volume (rootlets), 4A Moisture=52%	10.5
11.5				BOH 11.5		11.5

Notes:
PVC standpipe installed
PVC obstructed at 3.5' on 04/17/06 - no measurement obtained

☐ CME Auto Hammer ☒ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☒ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 156

PROJECT NUMBER: *68606*
PROJECT: *Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1245+00*
Offset: *440L*
Elevation: *125.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *10.5 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

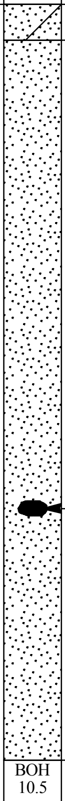
Groundwater Data

Depth in (ft.)	9	
Time		
Date	4/19/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface

Depth (Feet)	Sample Data: Sample Type	Sample Data: Field Number	Sample Data: Sample	USCS Classification Frozen Zone	SUBSURFACE MATERIAL	Depth
0				SM	**SILTY SAND** (SM) medium grained sand, nonplastic, light brown, moist, field observation indicates p200=20%, Sa=80%, Gr=0%, trace of **ORGANICS** (roots)	0.0 0.5
2	GRAB	1	▨	SP	**SAND with Gravel** (SP) coarse gravel, poorly graded, no dry strength, gray, moist p200=1%, Sa=65%, Gr=34%, Moisture=4%	2.0
7					becoming more gravelly, field observation indicates p200=5%, Sa=50%, Gr=45%, cobbles to 6" (~10%)	7.0
9 ▼					Groundwater encountered at 9' while excavating	9.0
10.5						10.5



Notes:

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 157

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1248+00*
Offset: *280L*
Elevation: *125.0 feet*

Equipment Type:
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

Total Depth: *9.0 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	8	
Time		
Date	4/19/06	
Symbol	▼	

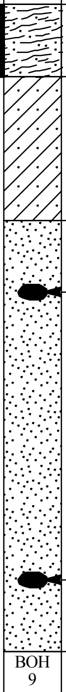
Weather: Partly Cloudy

Forest Surface

Sample Data

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone
0				PT	■
1	GRAB	1	▨	ML	
3				SP	
8	GRAB	2	▨		
9					

Soil Graphic



SUBSURFACE MATERIAL

0.0 **Peat** (PT) brown, **FROZEN Ice as Vx** (~5% ice by volume)

1.0 **SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, brown, moist, field observation indicates p200=75%, Sa=25%, Gr=0%, **ORGANICS** present to ~15% by volume (roots)
Moisture=41%

3.0

4.0 **SAND with Gravel** (SP) coarse gravel, poorly graded, gray, moist, field observation indicates p200=5%, Sa=40%, Gr=55%, cobbles to 5" (~5%)

7.5 Groundwater encountered at 8' while excavating

8.0 becoming more gravelly, field observation indicates p200=5%, Sa=30%, Gr=65%, cobbles to 6" (~2%)
Moisture=6%

9.0

Notes:

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST PIT

TEST PIT # 158

PROJECT NUMBER: 68606
PROJECT: Haines Highway, MP 3.5 to MP 25.3

Station / Location: 1251+00
Offset: 150L
Elevation: 125.0 feet

Equipment Type: Hitachi Z-Axis 135 Backhoe
Hole Type: Test Pit
Field Crew: Donnie Turner

Total Depth: 8.5 feet
Date: 4/19/2006 - 4/19/2006
Geologist: Keri A. Nutter

Groundwater Data

Depth in (ft.)	6	
Time		
Date	4/19/06	
Symbol	▼	

Weather: Partly Cloudy

Forest Surface

Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification	Frozen Zone	SUBSURFACE MATERIAL	Depth
0				ML	■	**SILT with Sand** (ML) fine grained sand, nonplastic, brown gray, field observation indicates p200=80%, Sa=20%, Gr=0%, **FROZEN Ice as Vx** (~30% ice by volume)	0.0
1	GRAB	1	▨	GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, no dry strength, brown gray, moist, cobbles to 4" (~10%) p200=3%, Sa=39%, Gr=58%, Moisture=6%	1.0
5.5						Groundwater encountered at 6' while excavating	5.5
6 ▼	GRAB	2	▨			becoming more gravelly, wet, field observation indicates p200=5%, Sa=30%, Gr=65% Moisture=6%	6.0
7.5	GRAB	3	▨	ML		**SILT with Sand** (ML) fine grained sand, nonplastic, low dry strength, gray, wet, field observation indicates p200=75%, Sa=25%, Gr=0%, **ORGANICS** present to 25% by volume (rootlets) Moisture=32%	7.5
8.5						BOH 8.5	8.5

Notes:

LOG OF TEST PIT

TEST PIT # 159

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

***PROJECT NUMBER**: 68606*
***PROJECT**: Haines Highway, MP 3.5 to MP 25.3*

Station / Location: *1242+00*
Offset: *560L*
Elevation: *125.0 feet*

Equipment Type: *Hitachi Z-Axis 135 Backhoe*
Hole Type: *Test Pit*
Field Crew: *Donnie Turner*

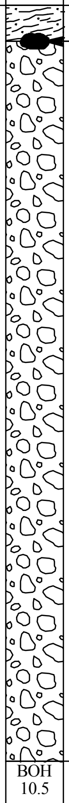
Total Depth: *10.5 feet*
Date: *4/19/2006 - 4/19/2006*
Geologist: *Keri A. Nutter*

Groundwater Data

Depth in (ft.)	10	
Time		
Date	4/19/06	
Symbol	▼	

Weather: Partly Cloudy

Grass Surface



Depth (Feet)	Sample Type	Field Number	Sample	USCS Classification Frozen Zone	Soil Graphic	SUBSURFACE MATERIAL	
0				PT		**Peat** (PT) brown	0.0
				GP		**GRAVEL with Sand** (GP) coarse gravel, poorly graded, no dry strength, gray, moist, field observation indicates p200=5%, Sa=35%, Gr=60%, cobbles to 4" (~5%) Moisture=5%	0.5
1	GRAB	1	▨				
7						becoming more gravelly, field observation indicates p200=5%, Sa=20%, Gr=75%	7.0
10 ▼						Groundwater encountered at 10' while excavating	10.0
					BOH 10.5	Notes:	10.5

APPENDIX C

Laboratory Test Results

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 9
Sample 2
Depth 5' - 7'

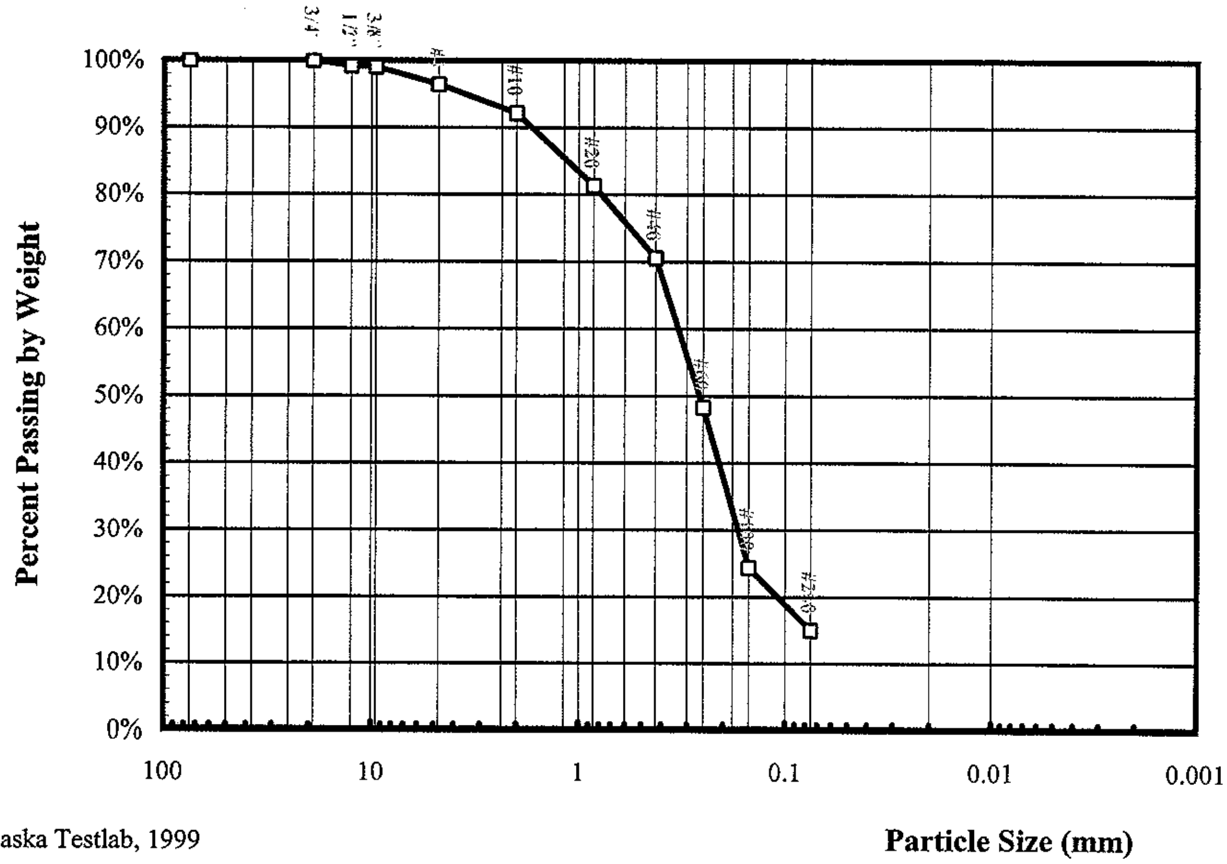
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-684
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	99%	
3/8"	99%	
No. 4	96%	
Total Wt. = 317.2g		
No. 8		
No. 10	92%	
No. 16		
No. 20	81%	
No. 30		
No. 40	71%	
No. 50		
No. 60	48%	
No. 80		
No. 100	24%	
No. 200	15%	
Total Wt. of Fine Fraction = 305.6g		
0.02 mm		



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David L. Andersen, P.E., Technical Advisor

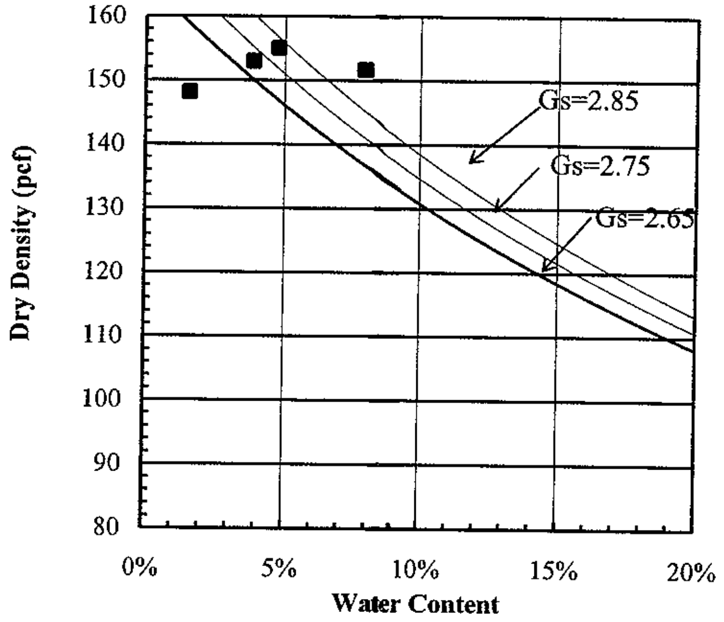
ALASKA TESTLAB
A Division of DOWL LLC

MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 15
Sample 1
Depth 0.5'-3'

W.O. D59119D
Lab No. 2005-2940
Received: 12/2/05
Reported: 12/19/05

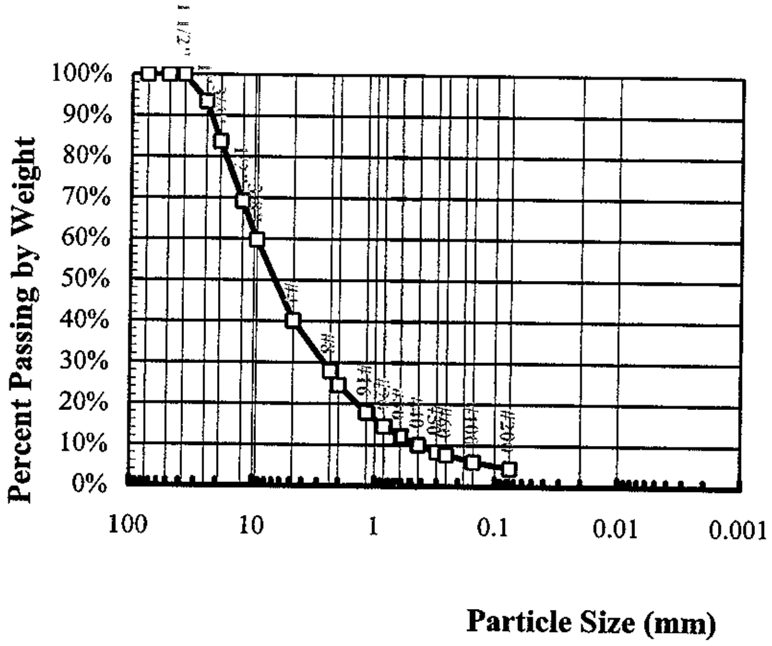
Engineering Classification: Well Graded GRAVEL with Sand, GW
Frost Classification: Not Measured



Uncorrected
Maximum Density: 155.1 pcf
Optimum Water Content: 4.8 %

Corrected Density: 156.5 pcf
Corrected Optimum: 4 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"		
1 1/2"	100%	
1"	93%	
3/4"	84%	
1/2"	69%	
3/8"	60%	
No. 4	40%	
Total Wt. = 16065g		
No. 8	28%	
No. 10		
No. 16	18%	
No. 20	15%	
No. 30	12%	
No. 40	10%	
No. 50	8%	
No. 60	8%	
No. 80		
No.100	6%	
No.200	4.4%	
Total Wt. of Fine Fraction = 566.2g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

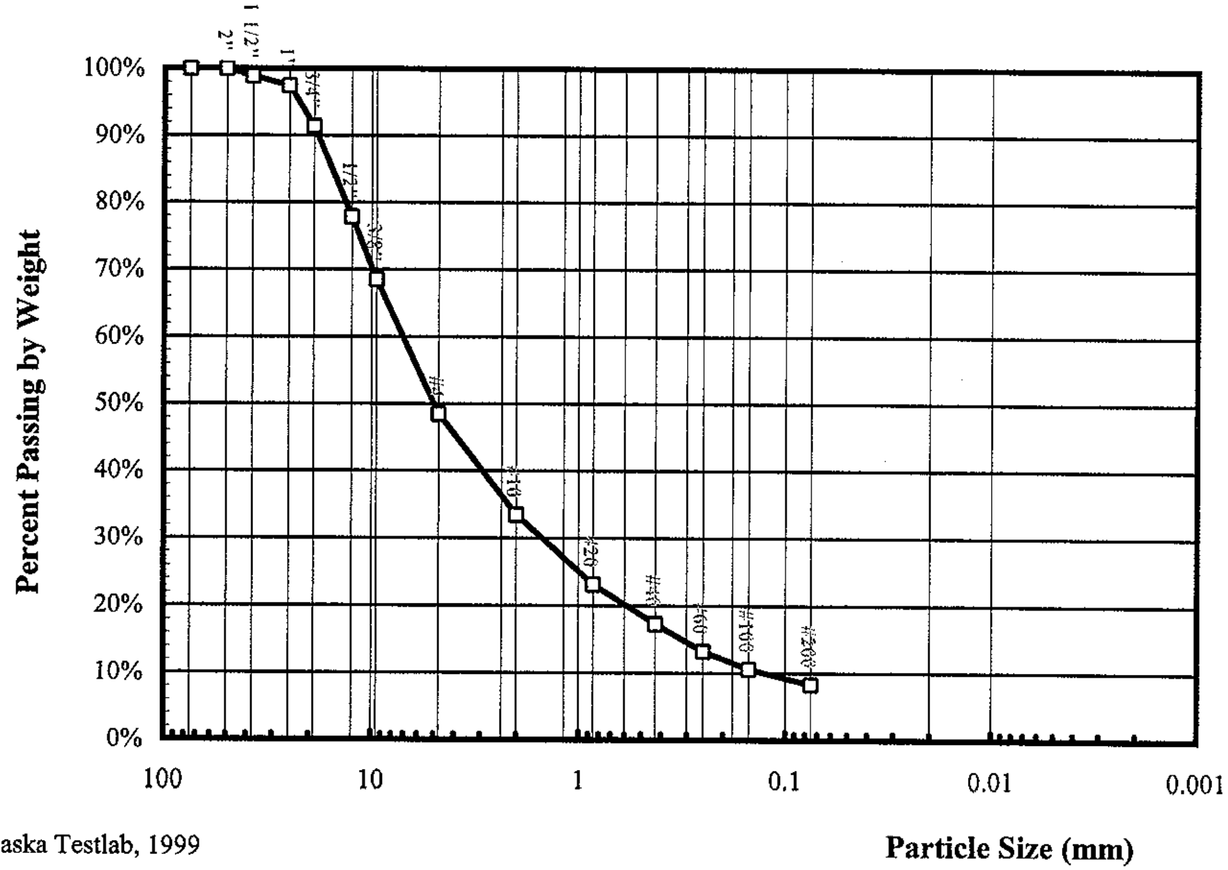
PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-686
Received: 6/1/06
Reported: 6/12/06

Location: Test Boring 18
Sample 1
Depth 0.1' - 3'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"	100%	
1 1/2"	99%	
1"	97%	
3/4"	91%	
1/2"	78%	
3/8"	69%	
No. 4	48%	
Total Wt. = 29371g		
No. 8		
No. 10	33%	
No. 16		
No. 20	23%	
No. 30		
No. 40	17%	
No. 50		
No. 60	13%	
No. 80		
No. 100	11%	
No. 200	8.3%	
Total Wt. of Fine Fraction = 353g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 19
Sample 1
Depth 0.3'-1'

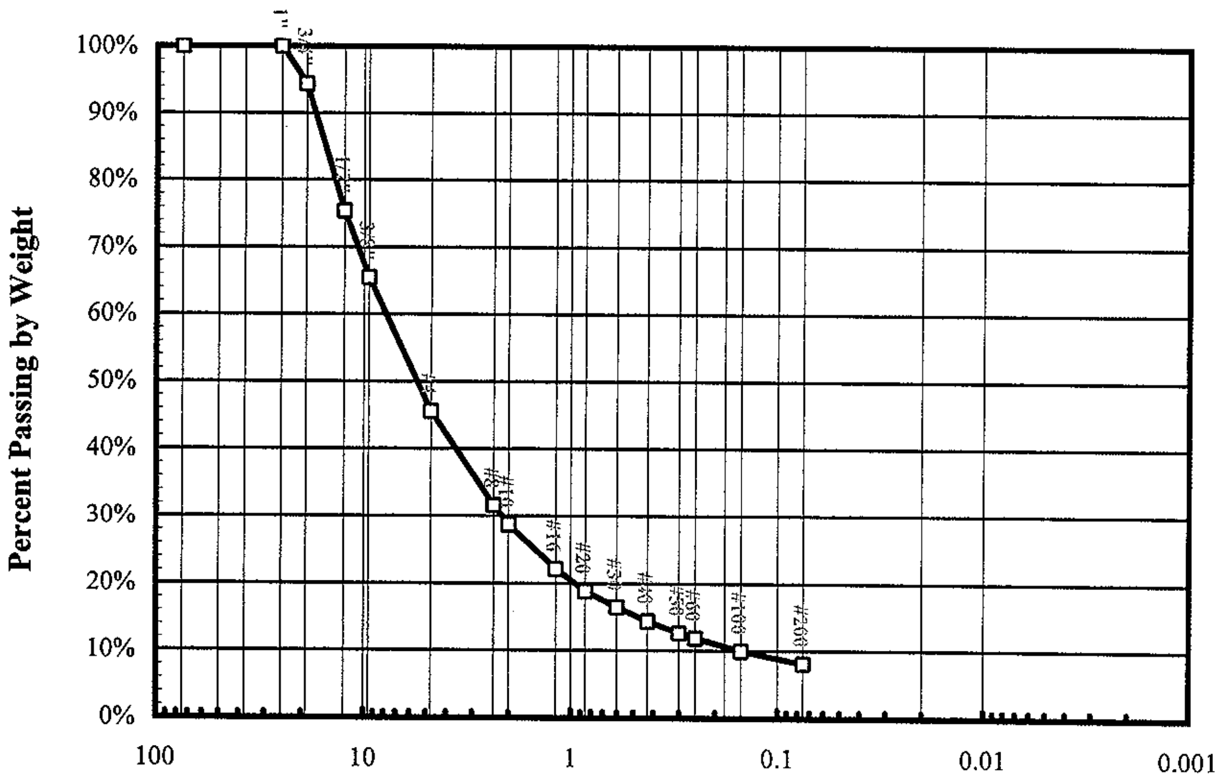
Engineering Classification: Poorly Graded GRAVEL with Silt and Sand, GP-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2941
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	94%	
1/2"	75%	
3/8"	65%	
No. 4	46%	
Total Wt. = 2636g		
No. 8	32%	
No. 10	29%	
No. 16	22%	
No. 20	19%	
No. 30	16%	
No. 40	14%	
No. 50	13%	
No. 60	12%	
No. 80		
No. 100	10%	
No. 200	8.1%	
Total Wt. of Fine Fraction = 538.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 20
Sample 2
Depth 3' - 4.5'

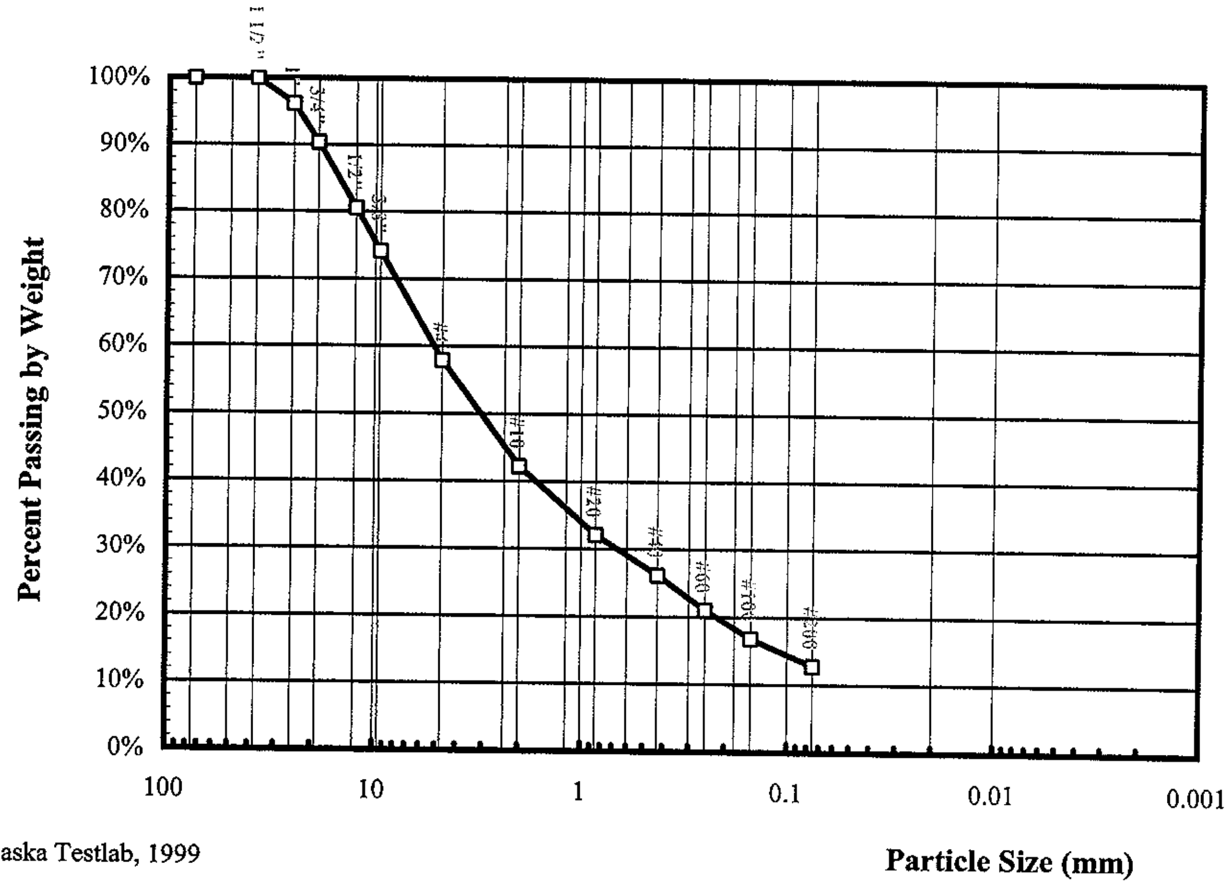
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-687
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"		
1 1/2"	100%	
1"	96%	
3/4"	90%	
1/2"	81%	
3/8"	74%	
No. 4	58%	
Total Wt. = 1392g		
No. 8		
No. 10	42%	
No. 16		
No. 20	32%	
No. 30		
No. 40	26%	
No. 50		
No. 60	21%	
No. 80		
No. 100	17%	
No. 200	13%	
Total Wt. of Fine Fraction = 381.1g		
0.02 mm		



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ALASKA
T E S T L A B
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

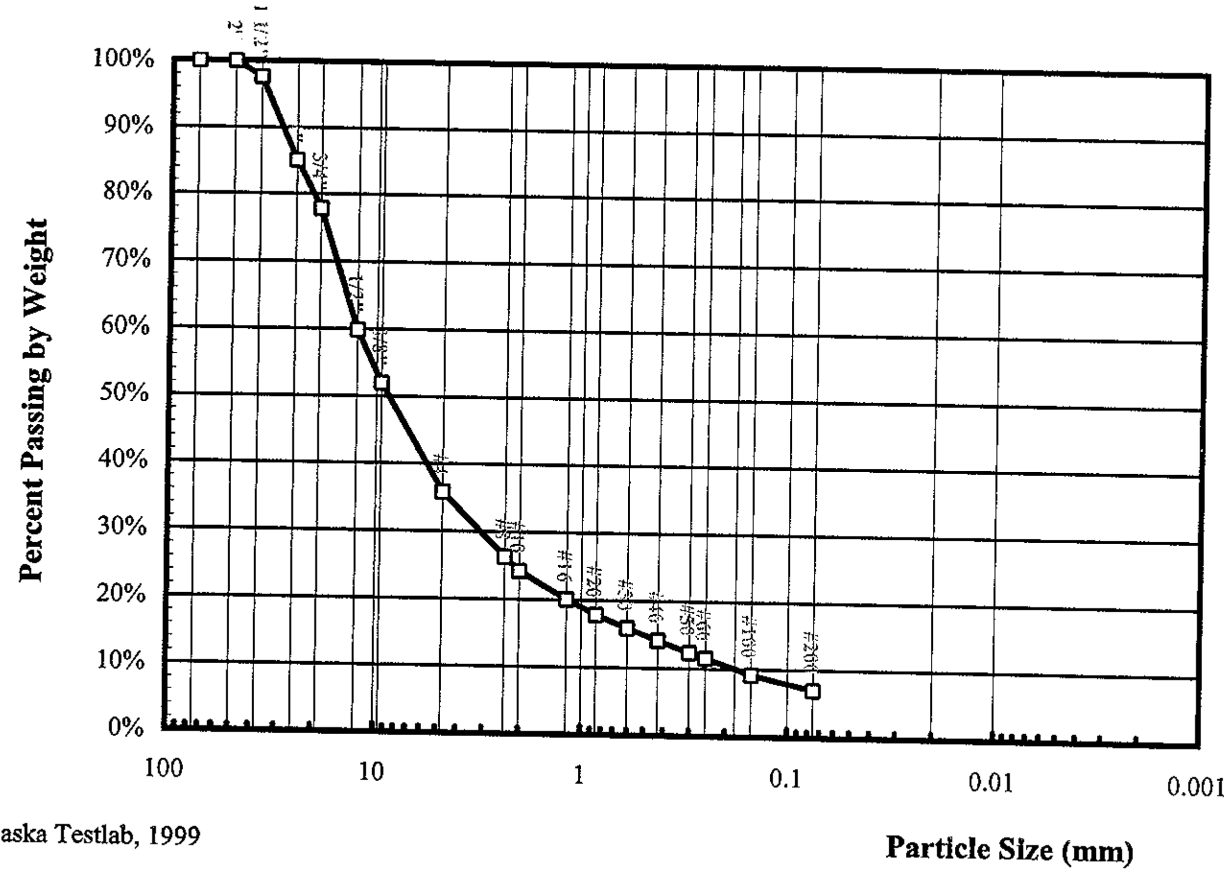
Location: Test Boring 25
Sample 1
Depth 0'-1'

Engineering Classification: Poorly Graded GRAVEL with Silt and Sand, GP-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2942
Received: 12/2/05
Reported: 12/19/05



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	98%	
1"	85%	
3/4"	78%	
1/2"	60%	
3/8"	52%	
No. 4	36%	
Total Wt. = 4931g		
No. 8	26%	
No. 10	24%	
No. 16	20%	
No. 20	18%	
No. 30	16%	
No. 40	14%	
No. 50	12%	
No. 60	12%	
No. 80		
No. 100	9%	
No. 200	7%	
Total Wt. of Fine Fraction = 510.6g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 29

Sample 1

Depth 0.3' - 2.5'

Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM

Frost Classification: Not Measured

PARTICLE-SIZE

DIST. ASTM D422

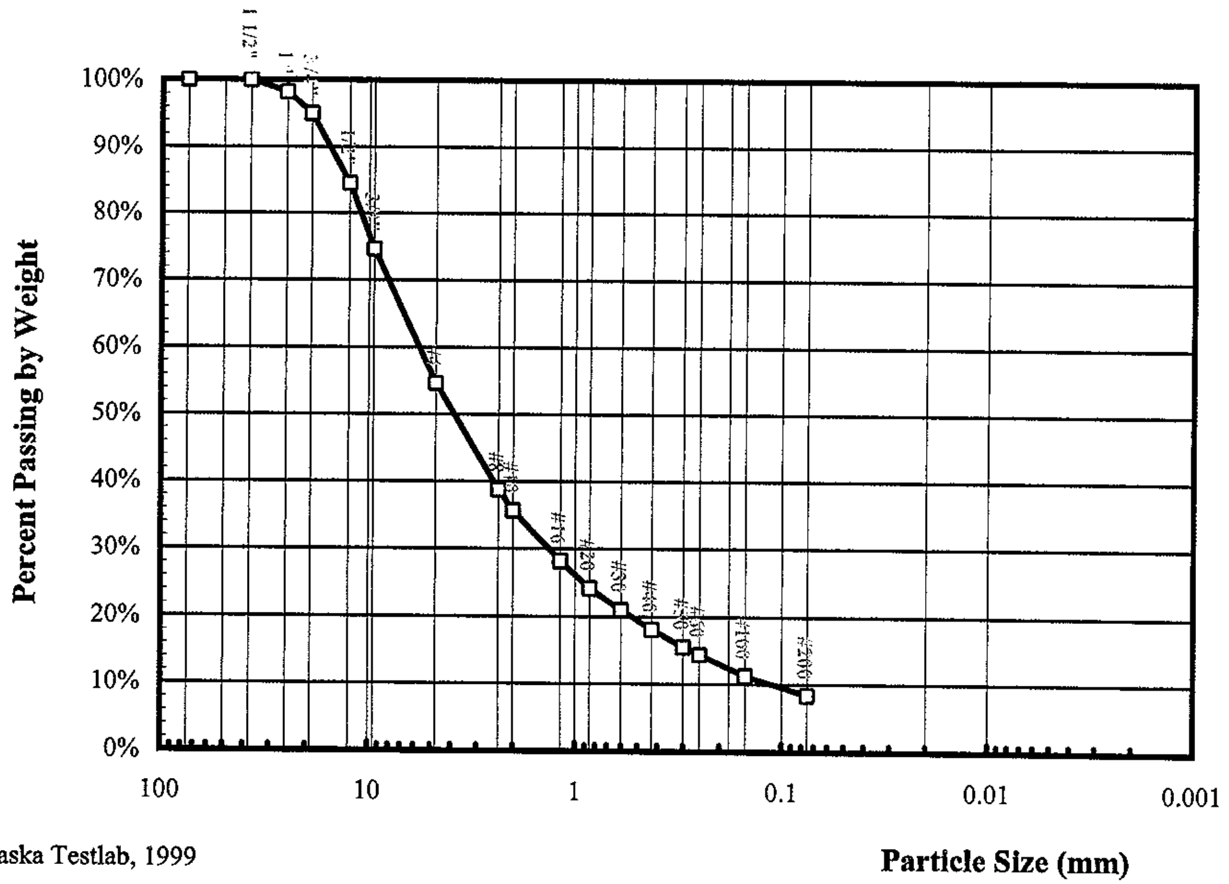
W.O. D59119D

Lab No. 2005-2944

Received: 12/2/05

Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	95%	
1/2"	85%	
3/8"	75%	
No. 4	55%	
Total Wt. = 18909g		
No. 8	39%	
No. 10	36%	
No. 16	28%	
No. 20	24%	
No. 30	21%	
No. 40	18%	
No. 50	16%	
No. 60	14%	
No. 80		
No. 100	11%	
No. 200	8.4%	
Total Wt. of Fine Fraction = 566.6g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 30
Sample 1
Depth 0.3'-1'

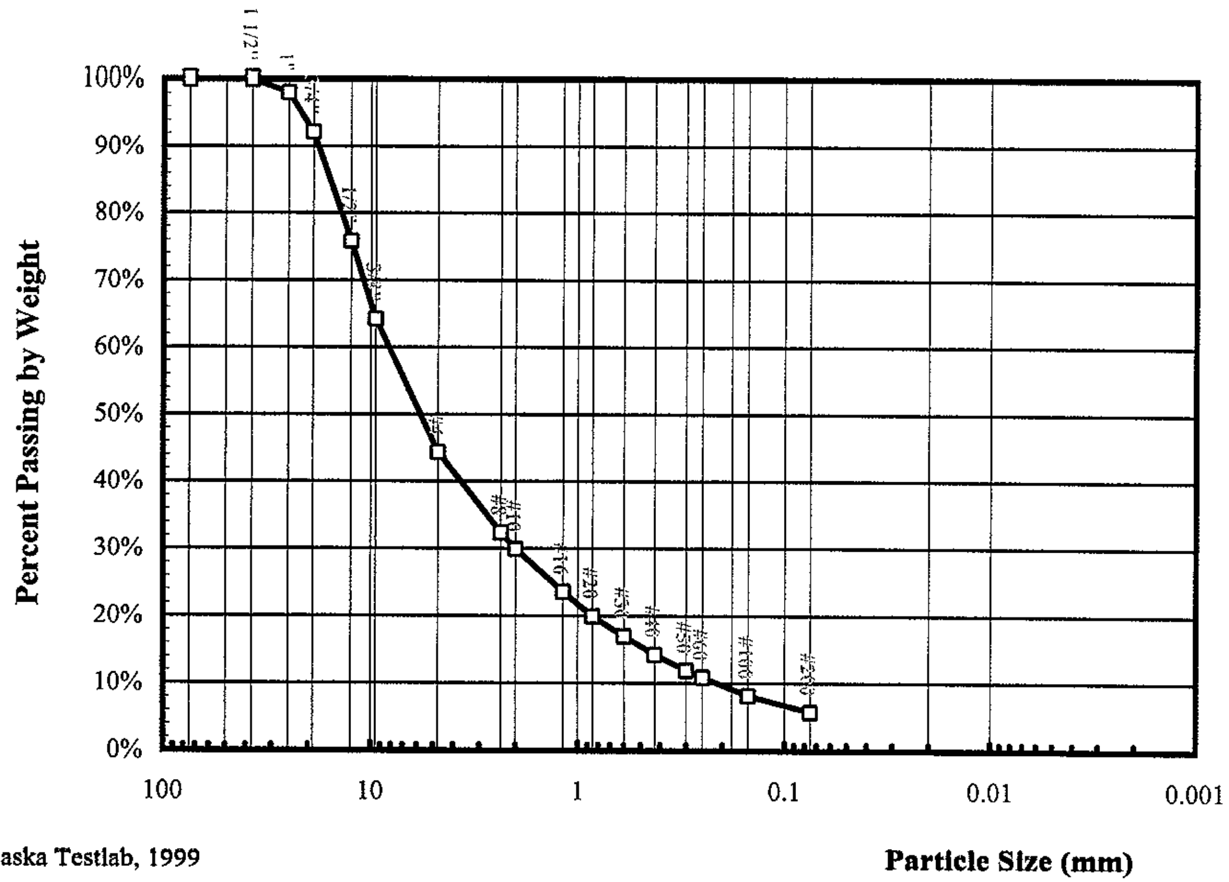
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2945
Received: 12/2/05
Reported: 12/19/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	92%	
1/2"	76%	
3/8"	64%	
No. 4	44%	
Total Wt. = 4063g		
No. 8	32%	
No. 10	30%	
No. 16	24%	
No. 20	20%	
No. 30	17%	
No. 40	14%	
No. 50	12%	
No. 60	11%	
No. 80		
No. 100	8%	
No. 200	5.7%	
Total Wt. of Fine Fraction = 547.1g		
0.02 mm		



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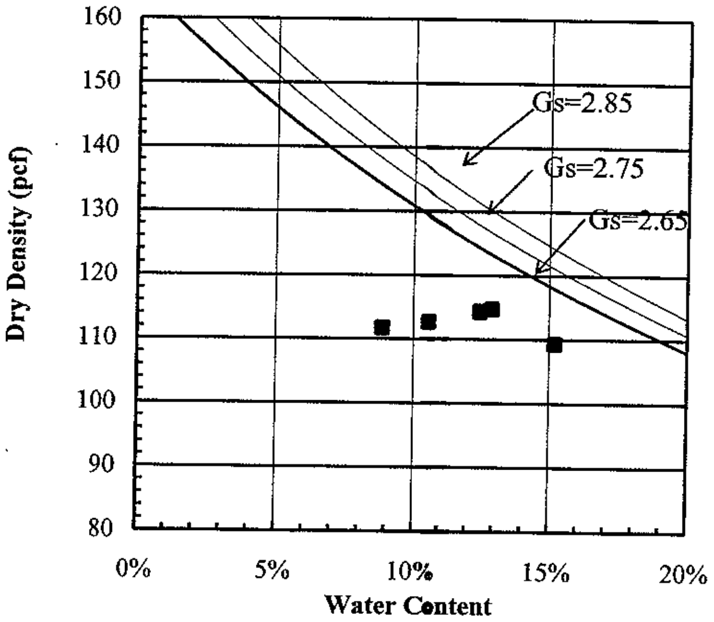
MODIFIED PROCTOR
ASTM D 1557 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 31
Sample 1
Depth 0' - 3'

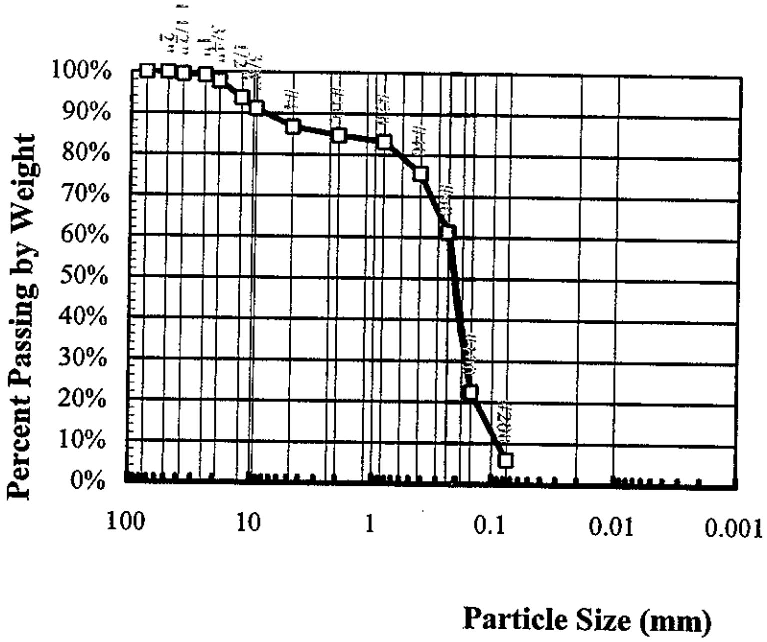
W.O. D59119D
Lab No. 2006-688
Received: 6/1/06
Reported: 6/8/06

Engineering Classification: Poorly Graded SAND with Silt , SP-SM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 115 pcf
Optimum Water Content: 13 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"	100%	
1 1/2"	100%	
1"	99%	
3/4"	98%	
1/2"	94%	
3/8"	91%	
No. 4	87%	
Total Wt. = 32015g		
No. 8		
No. 10	85%	
No. 16		
No. 20	83%	
No. 30		
No. 40	76%	
No. 50		
No. 60	61%	
No. 80		
No.100	22%	
No.200	6%	
Total Wt. of Fine Fraction = 401.4g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 32
Sample 1
Depth 0.3'-2.5'

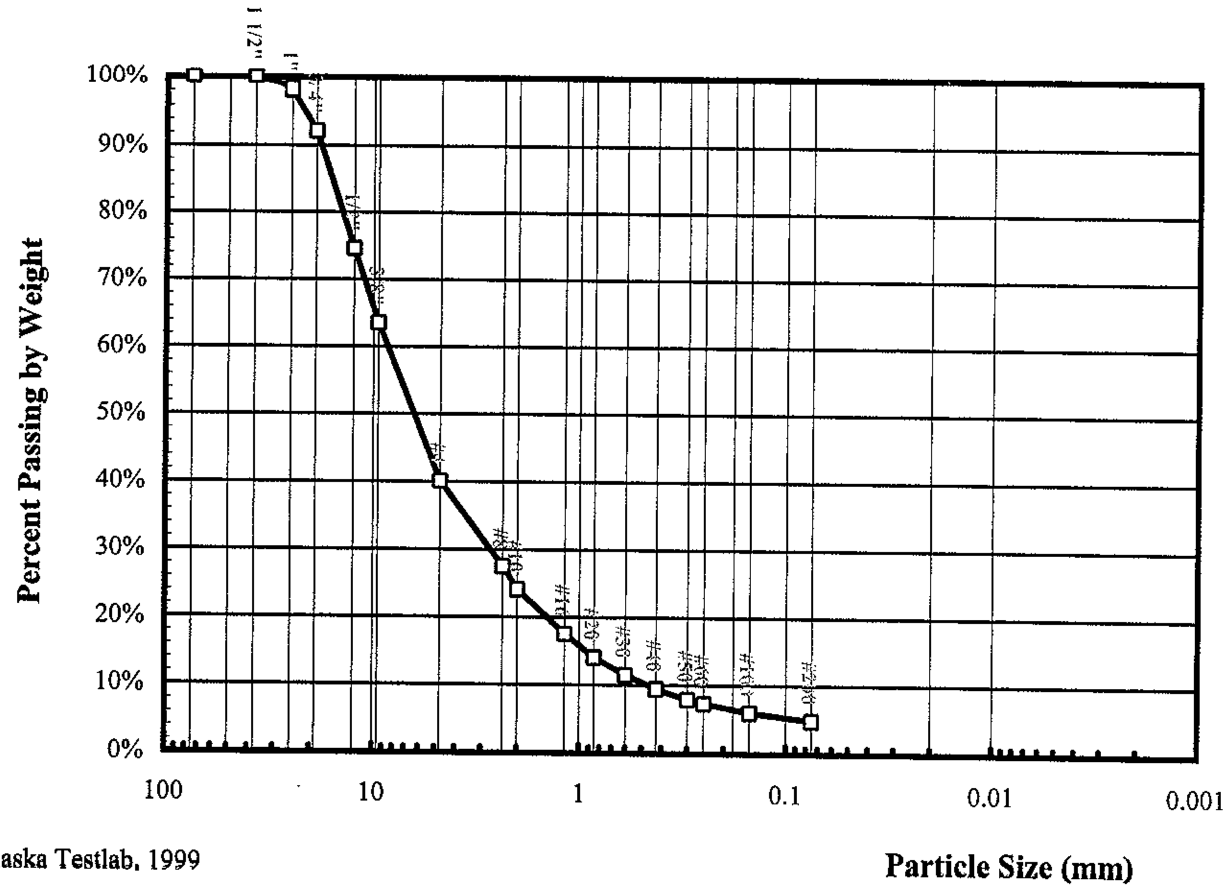
Engineering Classification: Well Graded GRAVEL with Sand, GW

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2946
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	92%	
1/2"	75%	
3/8"	64%	
No. 4	40%	
Total Wt. = 23976g		
No. 8	27%	
No. 10	24%	
No. 16	18%	
No. 20	14%	
No. 30	11%	
No. 40	9%	
No. 50	8%	
No. 60	7%	
No. 80		
No. 100	6%	
No. 200	4.8%	
Total Wt. of Fine Fraction = 503.8g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 33

Sample 1

Depth 0.5' - 3'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

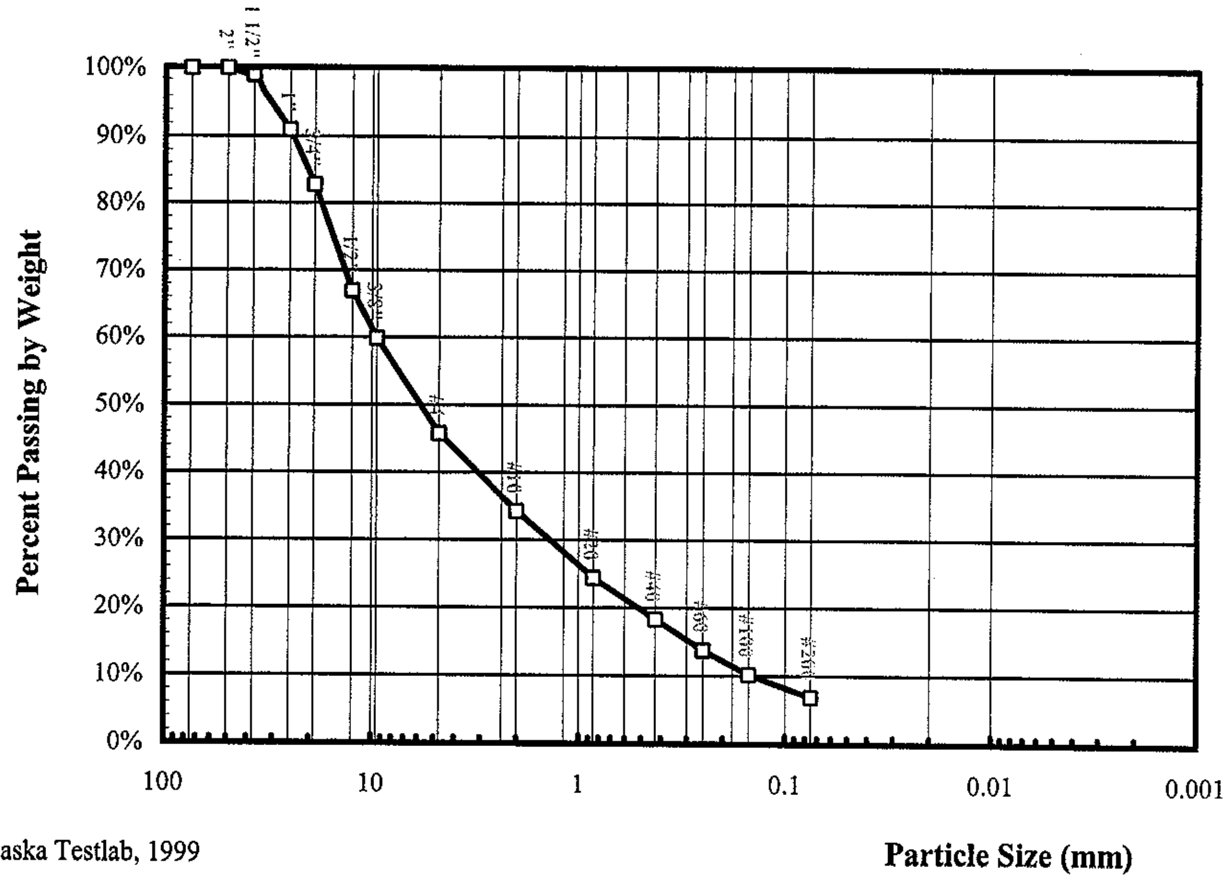
W.O. D59119D

Lab No. 2006-689

Received: 6/1/06

Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	99%	
1"	91%	
3/4"	83%	
1/2"	67%	
3/8"	60%	
No. 4	46%	
Total Wt. = 22683g		
No. 8		
No. 10	34%	
No. 16		
No. 20	24%	
No. 30		
No. 40	18%	
No. 50		
No. 60	14%	
No. 80		
No. 100	10%	
No. 200	6.9%	
Total Wt. of Fine Fraction = 575g		
0.02 mm		



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David L. Andersen, P.E., Technical Advisor

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 34
Sample 1
Depth 0.5'-1.5'

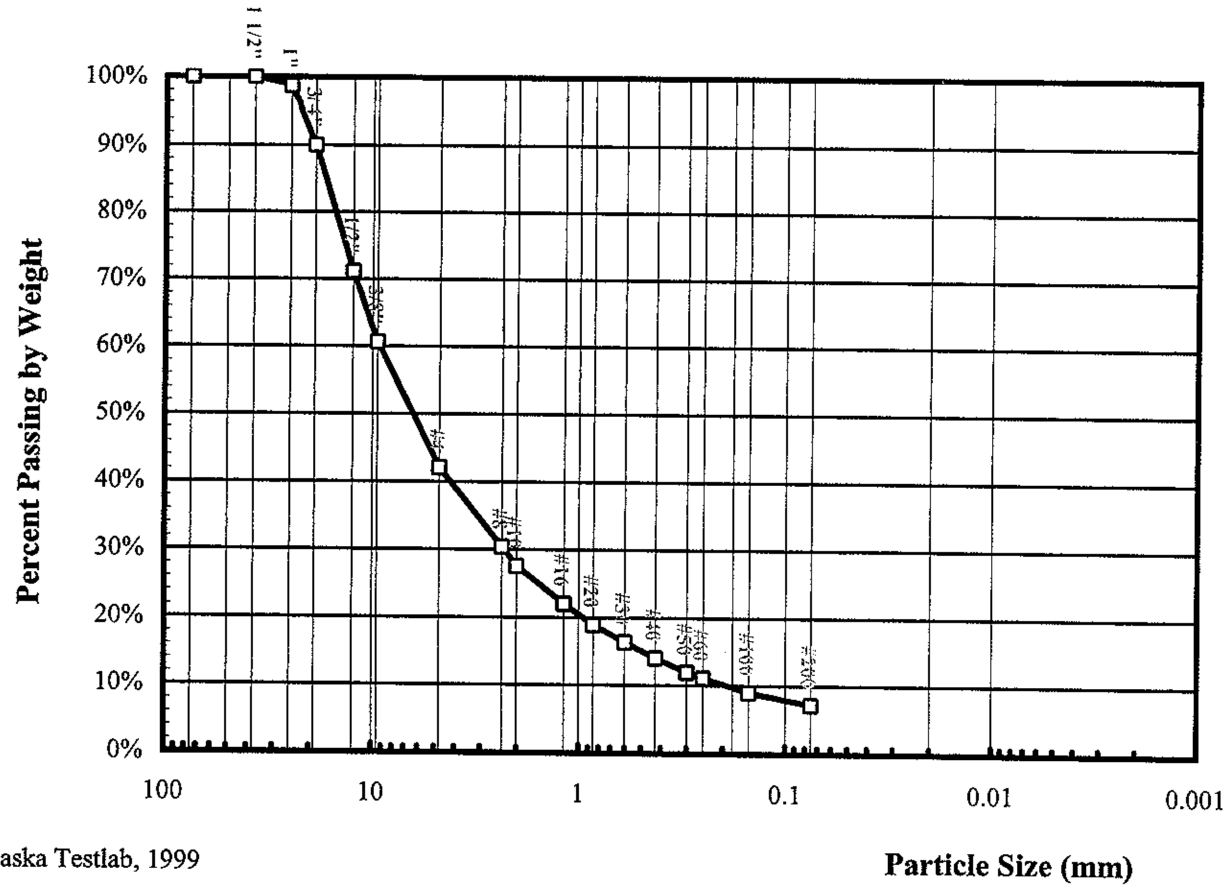
Engineering Classification: Poorly Graded GRAVEL with Silt and Sand, GP-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2947
Received: 12/2/05
Reported: 12/19/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	99%	
3/4"	90%	
1/2"	71%	
3/8"	61%	
No. 4	42%	
Total Wt. = 5135g		
No. 8	30%	
No. 10	28%	
No. 16	22%	
No. 20	19%	
No. 30	16%	
No. 40	14%	
No. 50	12%	
No. 60	11%	
No. 80		
No. 100	9%	
No. 200	7.2%	
Total Wt. of Fine Fraction = 606.8g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 35
Sample 1
Depth 0'-2.5'

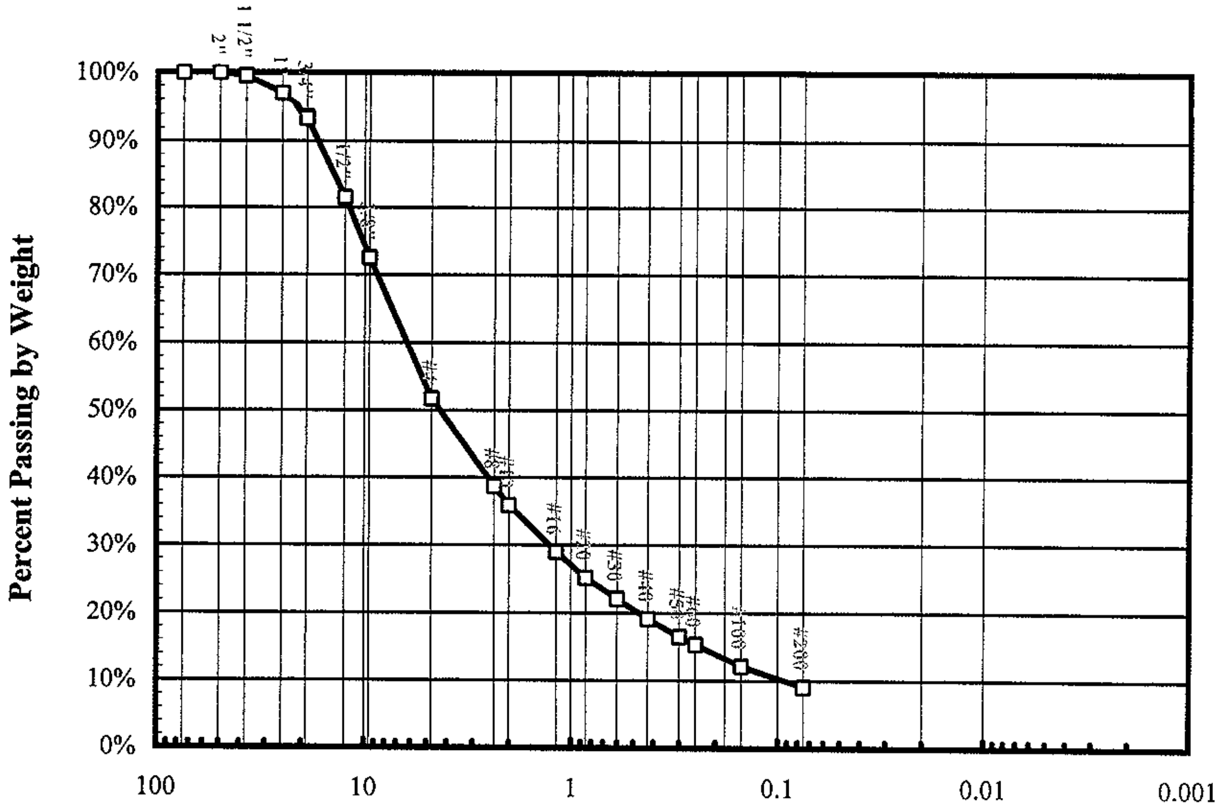
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2948
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	100%	
1"	97%	
3/4"	93%	
1/2"	82%	
3/8"	73%	
No. 4	52%	
Total Wt. = 27599g		
No. 8	39%	
No. 10	36%	
No. 16	29%	
No. 20	25%	
No. 30	22%	
No. 40	19%	
No. 50	17%	
No. 60	15%	
No. 80		
No. 100	12%	
No. 200	9.1%	
Total Wt. of Fine Fraction = 527.8g		
0.02 mm		



Particle Size (mm)

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ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 35
Sample 2
Depth 5'-6.2'

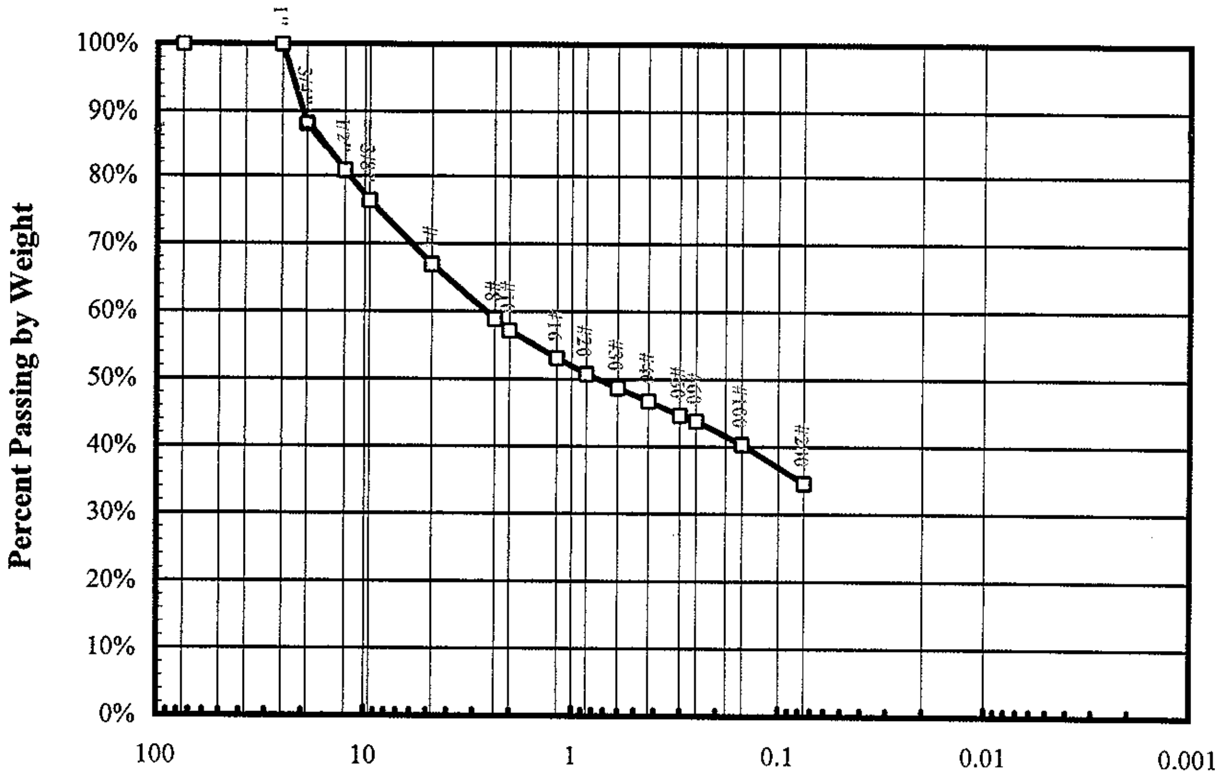
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2949
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	88%	
1/2"	81%	
3/8"	76%	
No. 4	67%	
Total Wt. = 245g		
No. 8	59%	
No. 10	57%	
No. 16	53%	
No. 20	51%	
No. 30	49%	
No. 40	47%	
No. 50	45%	
No. 60	44%	
No. 80		
No. 100	40%	
No. 200	35%	
Total Wt. of Fine Fraction = 163.7g		
0.02 mm		



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ALASKA TESTLAB
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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 37
Sample 1
Depth 0.5'-1.5'

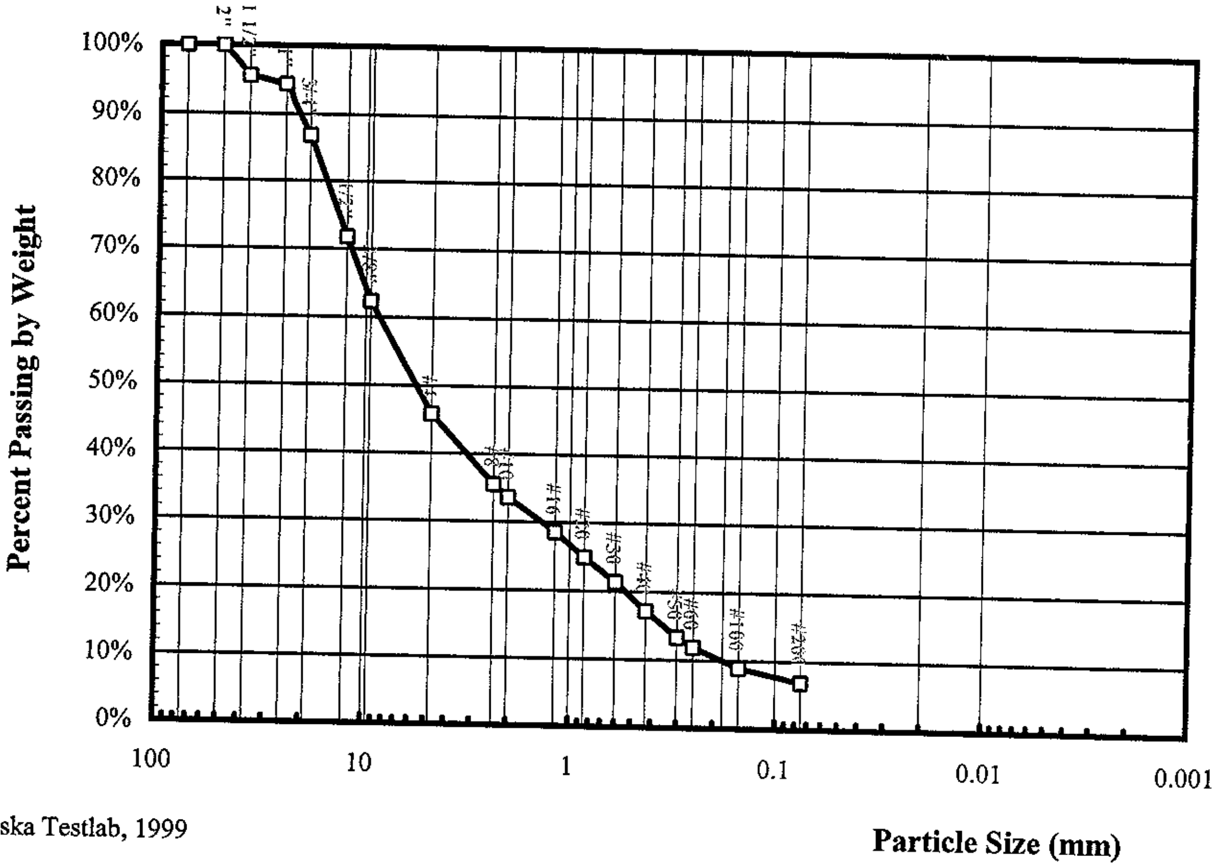
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2950
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	95%	
1"	94%	
3/4"	87%	
1/2"	72%	
3/8"	62%	
No. 4	46%	
Total Wt. = 5353.2g		
No. 8	36%	
No. 10	34%	
No. 16	29%	
No. 20	25%	
No. 30	21%	
No. 40	17%	
No. 50	13%	
No. 60	12%	
No. 80		
No. 100	9%	
No. 200	6.9%	
Total Wt. of Fine Fraction = 510.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 37
Sample 3
Depth 5'-6.5'

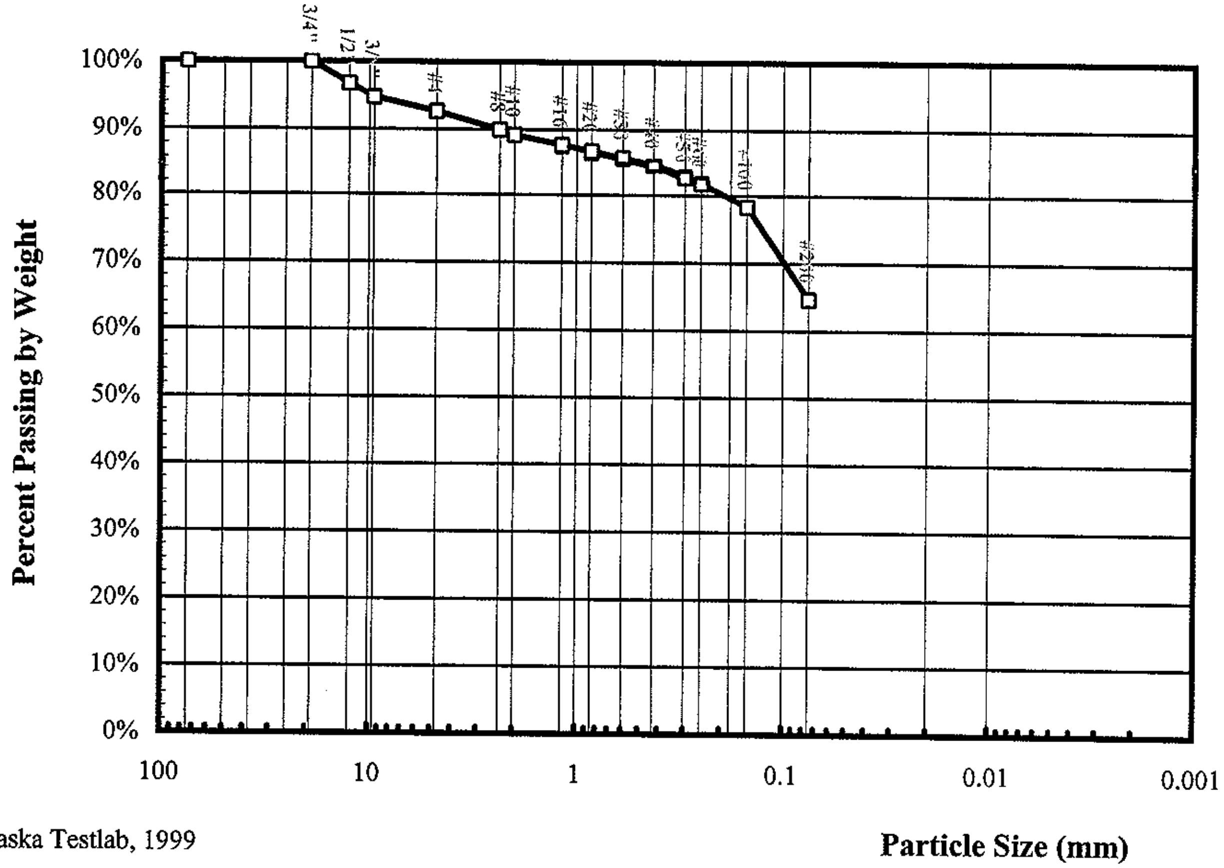
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2951
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	97%	
3/8"	95%	
No. 4	93%	
Total Wt. = 378.1g		
No. 8	90%	
No. 10	89%	
No. 16	88%	
No. 20	87%	
No. 30	86%	
No. 40	85%	
No. 50	83%	
No. 60	82%	
No. 80		
No. 100	78%	
No. 200	65%	
Total Wt. of Fine Fraction = 350.3g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 38
Sample 2A
Depth 6' - 7'

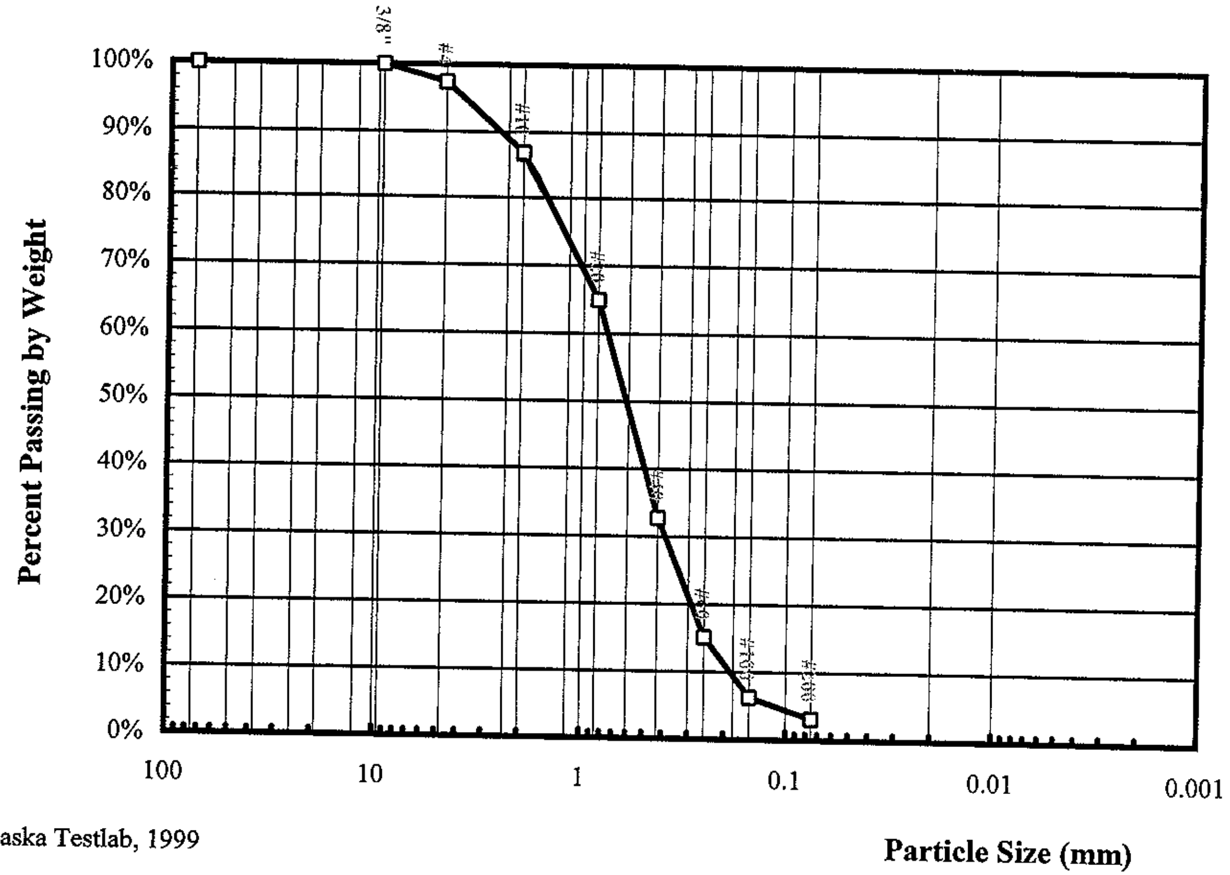
Engineering Classification: Poorly Graded SAND , SP

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-690
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"	100%	
No. 4	97%	
Total Wt. = 359.5g		
No. 8		
No. 10	87%	
No. 16		
No. 20	65%	
No. 30		
No. 40	33%	
No. 50		
No. 60	15%	
No. 80		
No. 100	6%	
No. 200	3.1%	
Total Wt. of Fine Fraction = 350.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 41
Sample 2
Depth 5' - 7'

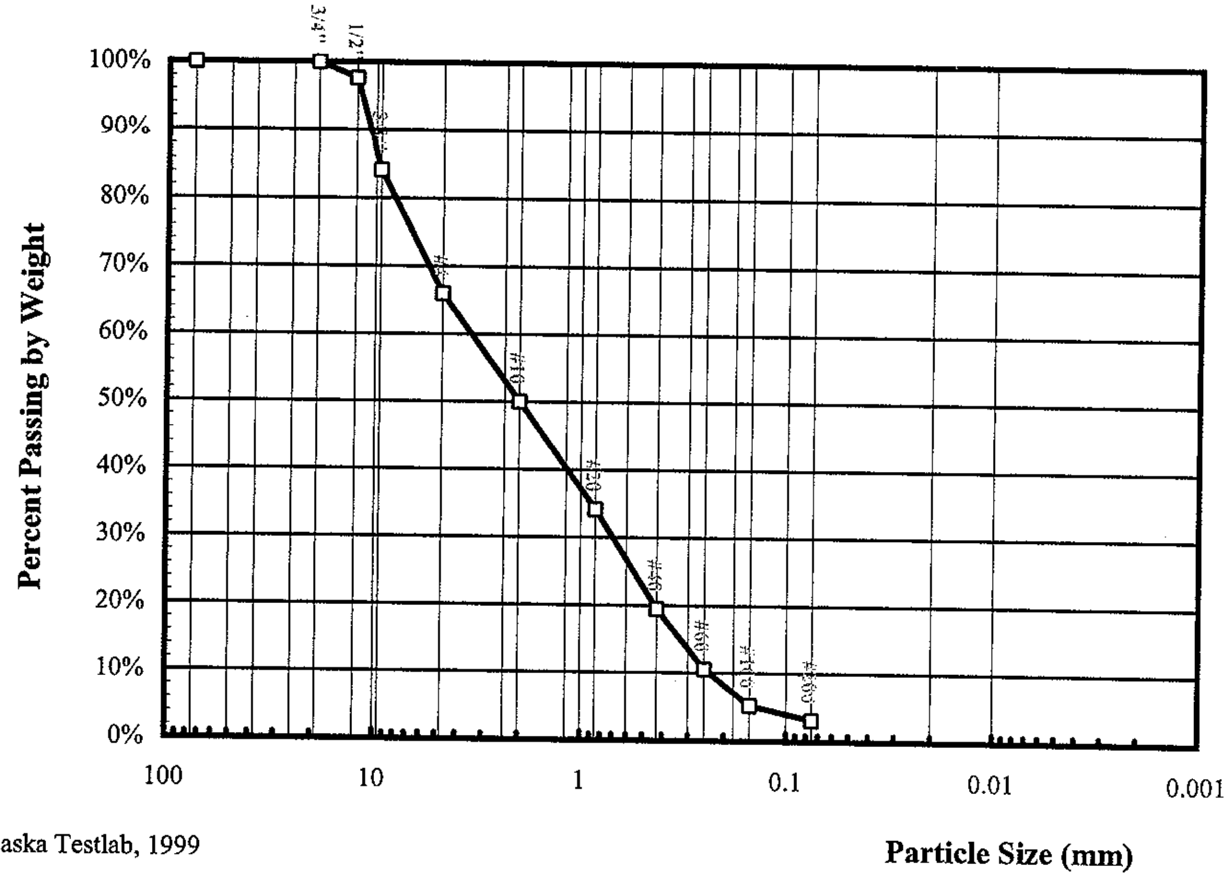
Engineering Classification: Poorly Graded SAND with Gravel, SP

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-691
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	98%	
3/8"	84%	
No. 4	66%	
Total Wt. = 270.9g		
No. 8		
No. 10	50%	
No. 16		
No. 20	34%	
No. 30		
No. 40	19%	
No. 50		
No. 60	11%	
No. 80		
No. 100	5%	
No. 200	3.1%	
Total Wt. of Fine Fraction = 178.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 44
Sample 1
Depth 0.5'-1.5'

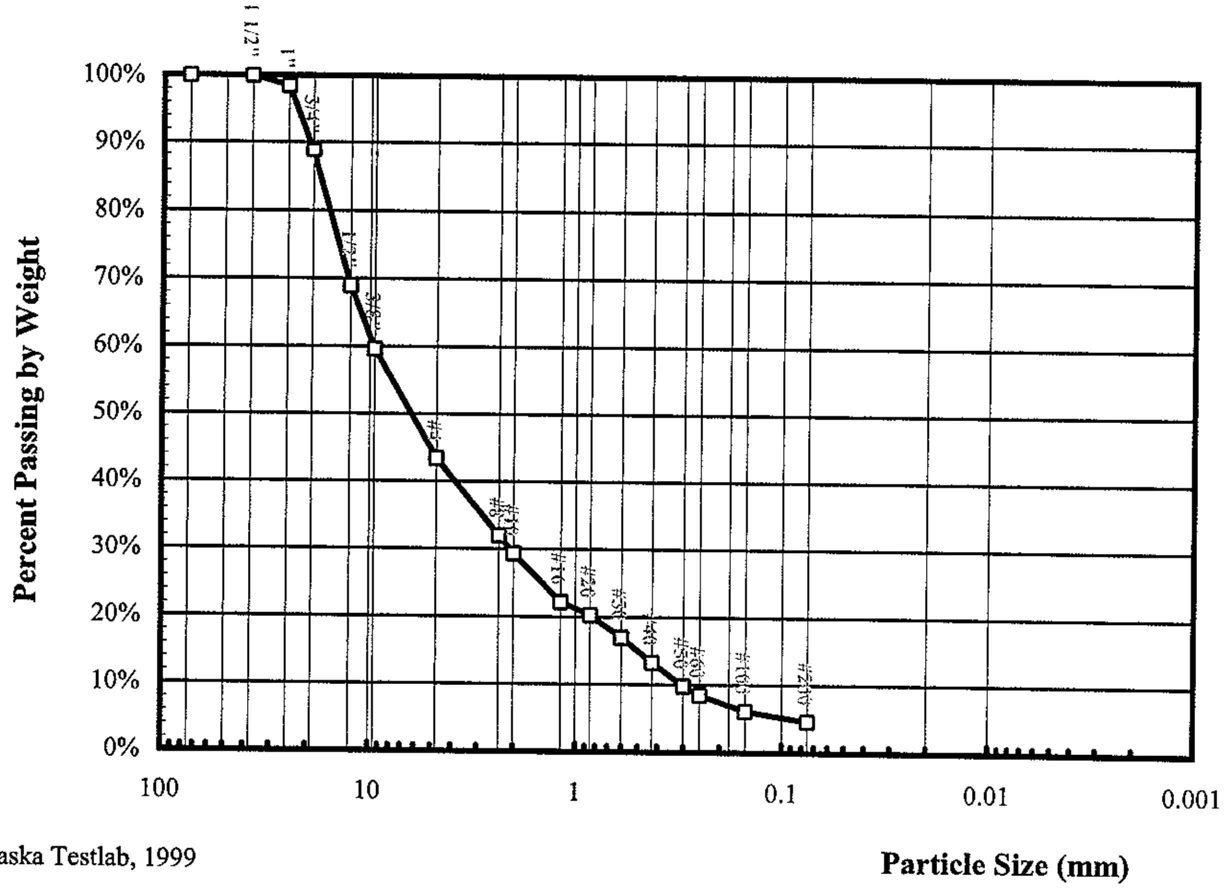
Engineering Classification: Well Graded GRAVEL with Sand, GW

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2952
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	89%	
1/2"	69%	
3/8"	60%	
No. 4	43%	
Total Wt. = 7353g		
No. 8	32%	
No. 10	29%	
No. 16	22%	
No. 20	20%	
No. 30	17%	
No. 40	13%	
No. 50	10%	
No. 60	8%	
No. 80		
No. 100	6%	
No. 200	4.6%	
Total Wt. of Fine Fraction = 541.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 44
Sample 3
Depth 5'-6.5'

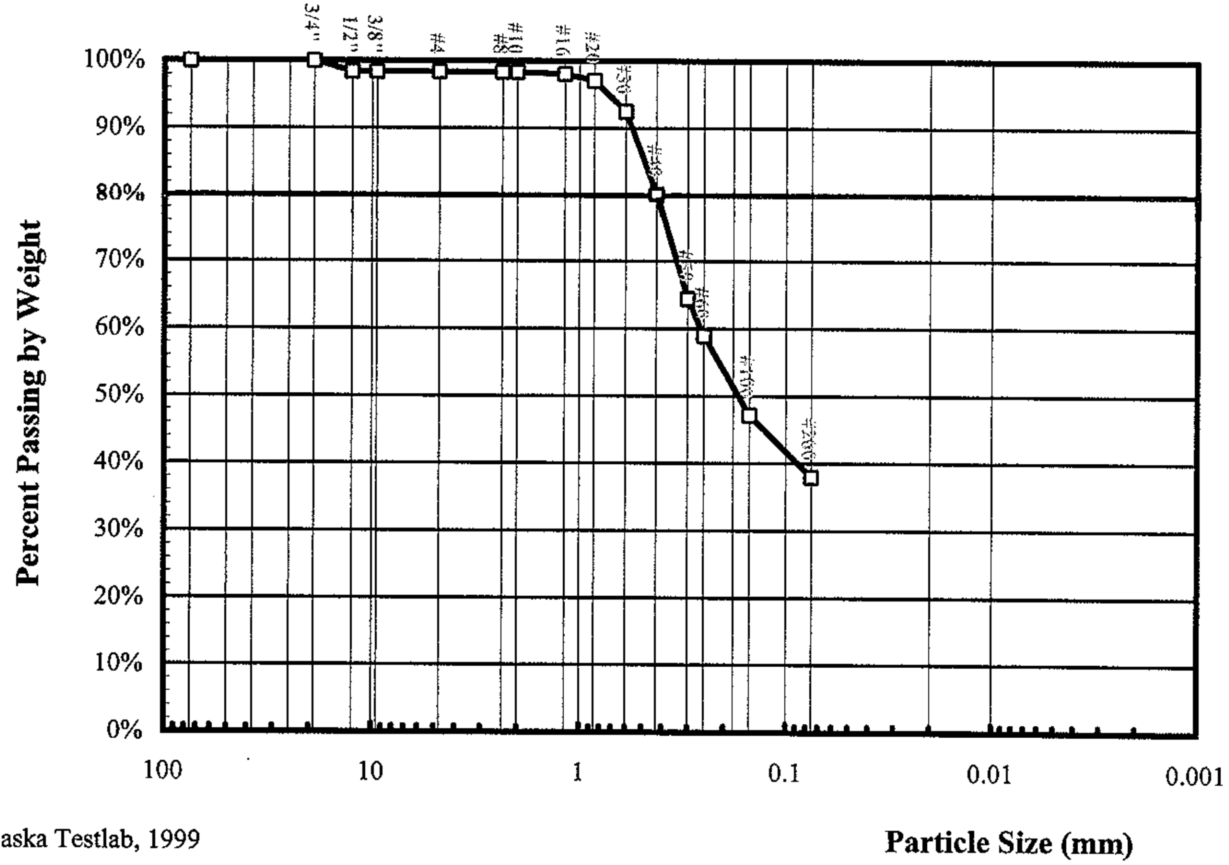
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2953
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	98%	
3/8"	98%	
No. 4	98%	
Total Wt. = 424.1g		
No. 8	98%	
No. 10	98%	
No. 16	98%	
No. 20	97%	
No. 30	92%	
No. 40	80%	
No. 50	64%	
No. 60	59%	
No. 80		
No. 100	47%	
No. 200	38%	
Total Wt. of Fine Fraction = 416.8g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 47
Sample 2
Depth 4' - 6'

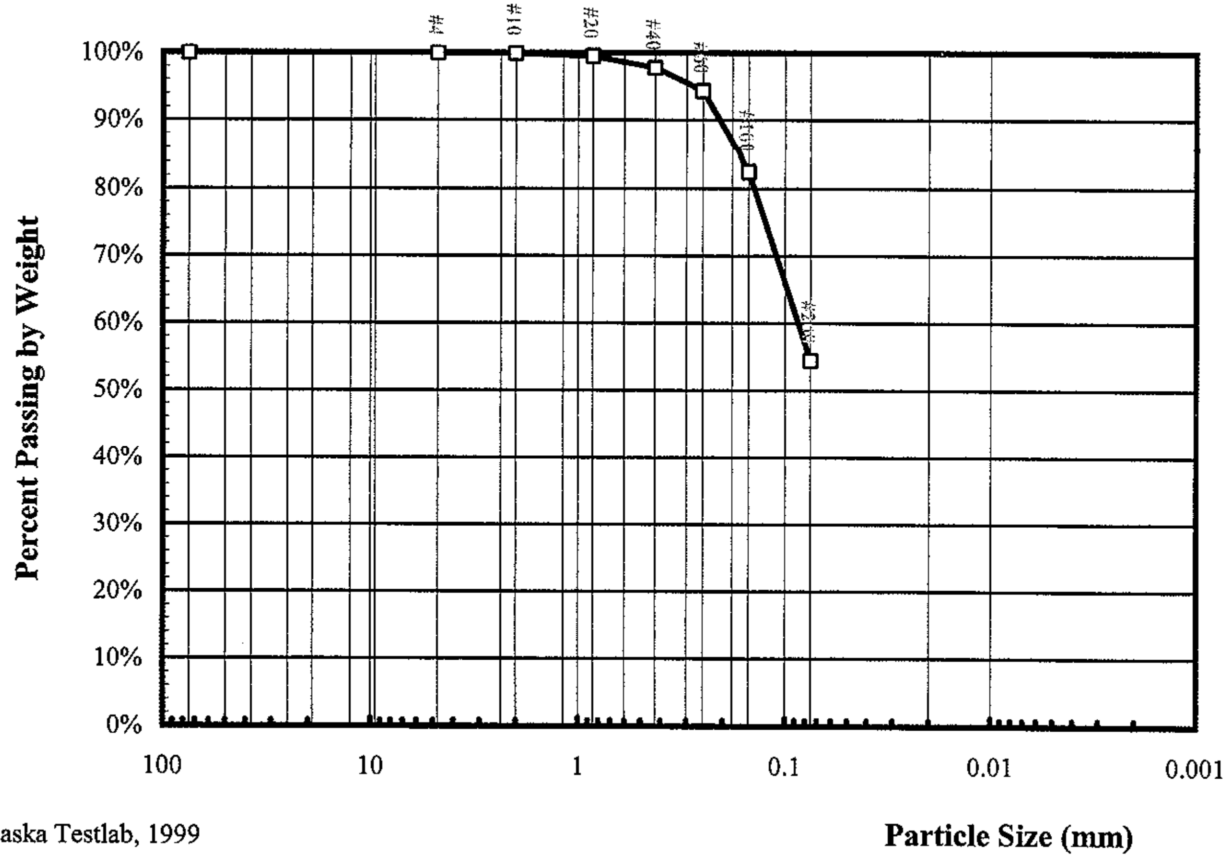
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-693
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"		
No. 4	100%	
Total Wt. = 333.6g		
No. 8		
No. 10	100%	
No. 16		
No. 20	100%	
No. 30		
No. 40	98%	
No. 50		
No. 60	94%	
No. 80		
No. 100	83%	
No. 200	54%	
Total Wt. of Fine Fraction = 333.6g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 52
Sample 1A
Depth 1' - 2'

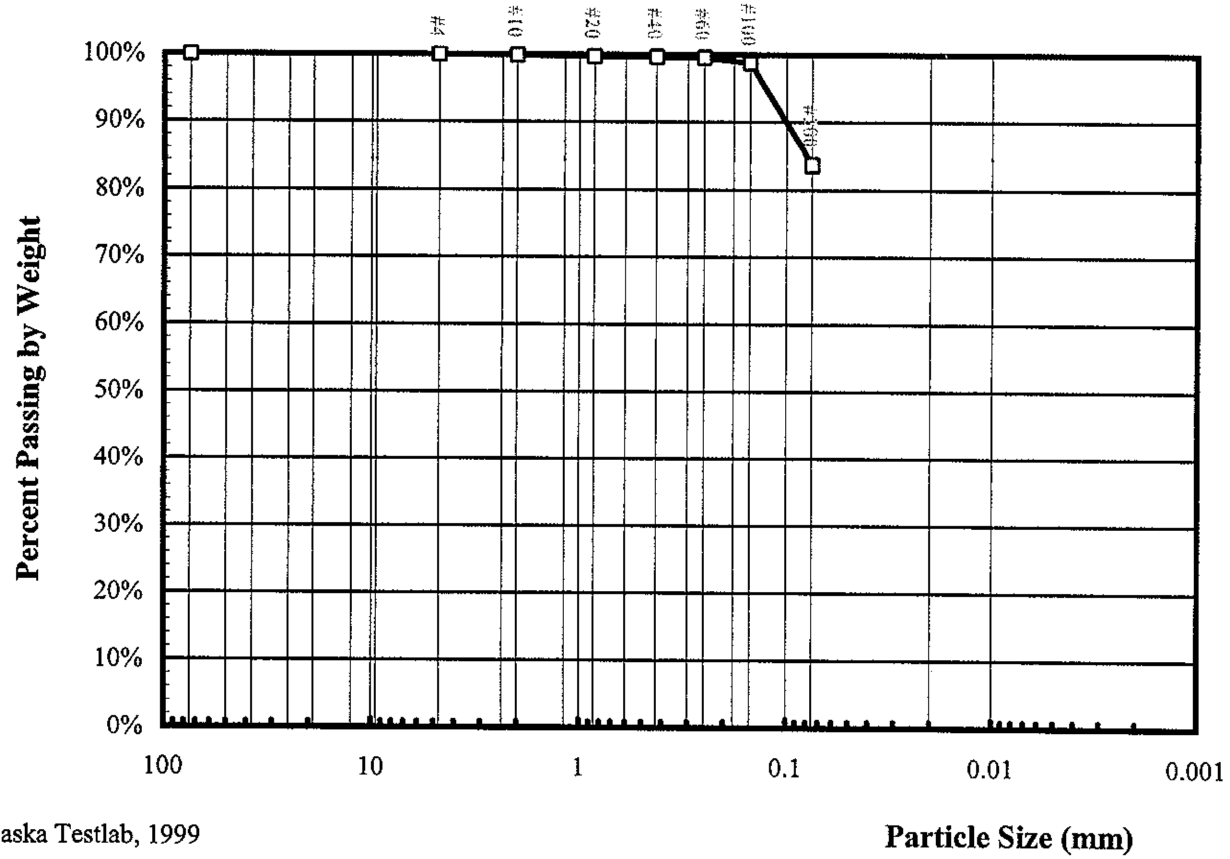
Engineering Classification: SILT with Sand, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-696
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"		
No. 4	100%	
Total Wt. = 301.8g		
No. 8		
No. 10	100%	
No. 16		
No. 20	100%	
No. 30		
No. 40	100%	
No. 50		
No. 60	100%	
No. 80		
No. 100	99%	
No. 200	84%	
Total Wt. of Fine Fraction = 112.5g		
0.02 mm		



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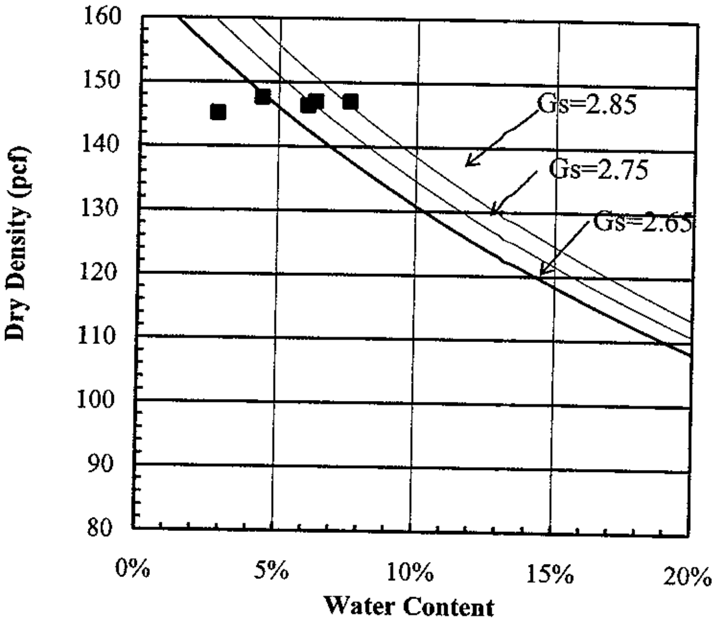
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 55
Sample 1
Depth 0.3'-2.5'

W.O. D59119D
Lab No. 2005-2954
Received: 12/2/05
Reported: 12/20/05

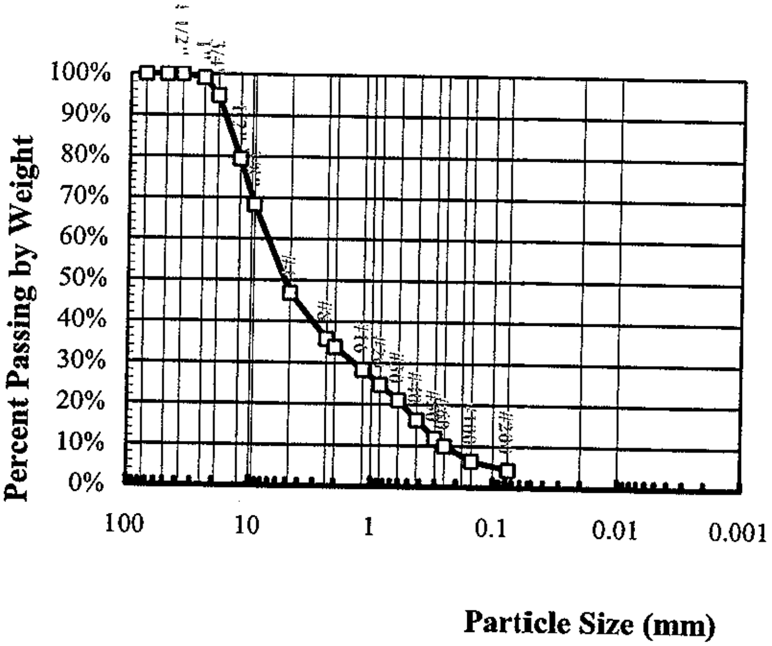
Engineering Classification: Well Graded GRAVEL with Sand, GW
Frost Classification: Not Measured



Uncorrected
Maximum Density: 147.7 pcf
Optimum Water Content: 4.4 %

Corrected Density: 148.5 pcf
Corrected Optimum: 4 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -0%		
3"		
2"		
1 1/2"	100%	
1"	99%	
3/4"	95%	
1/2"	79%	
3/8"	68%	
No. 4	47%	
Total Wt. = 13665g		
No. 8	36%	
No. 10		
No. 16	28%	
No. 20	25%	
No. 30	21%	
No. 40	16%	
No. 50	12%	
No. 60	10%	
No. 80		
No.100	6%	
No.200	4.3%	
Total Wt. of Fine Fraction = 556.2g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 57
Sample 4
Depth 10'-11.5'

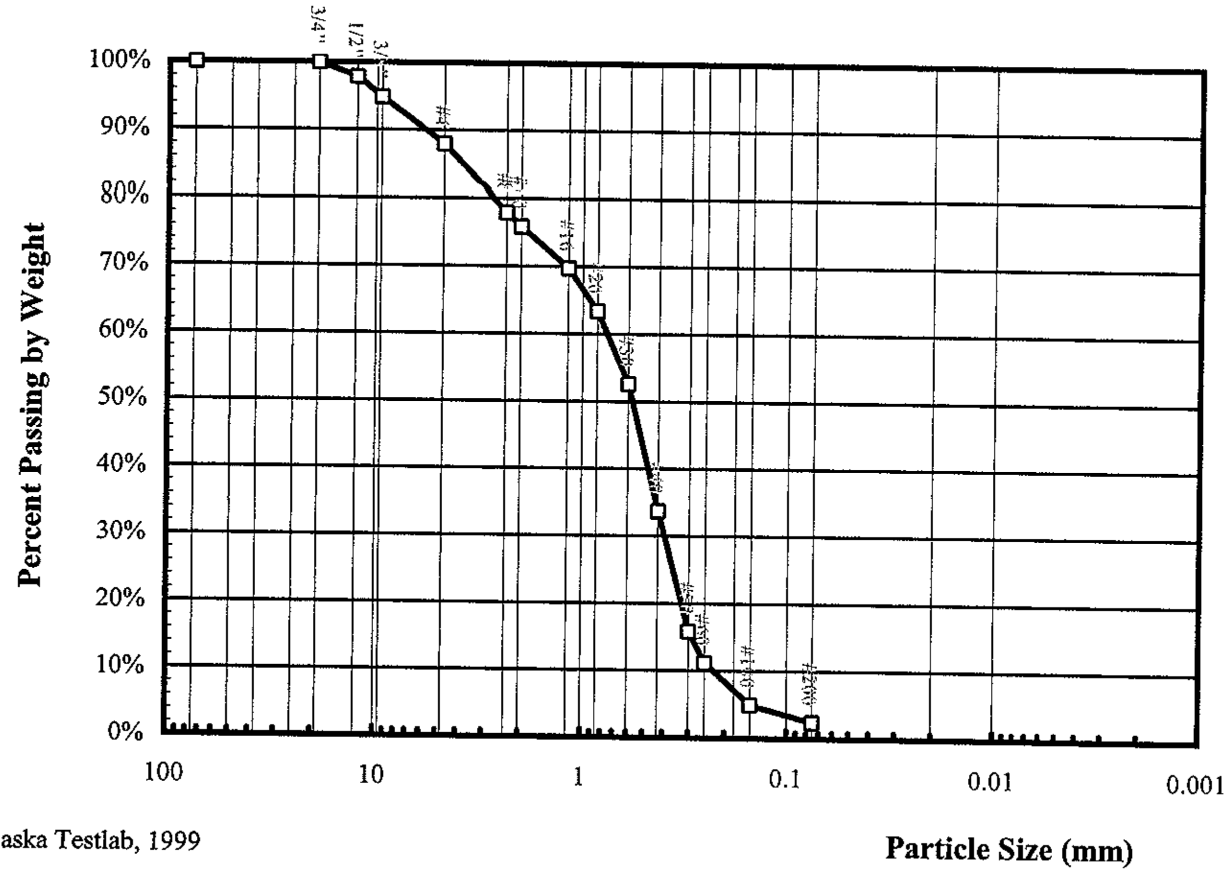
Engineering Classification: Poorly Graded SAND , SP

Frost Classification: NFS MOA

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2955
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	98%	
3/8"	95%	
No. 4	88%	
Total Wt. = 495.9g		
No. 8	78%	
No. 10	76%	
No. 16	70%	
No. 20	63%	
No. 30	53%	
No. 40	34%	
No. 50	16%	
No. 60	11%	
No. 80		
No. 100	5%	
No. 200	2.4%	
Total Wt. of Fine Fraction = 435.8g		
0.02 mm		



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T E S T L A B
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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 60
Sample 1
Depth 0.3'-1'

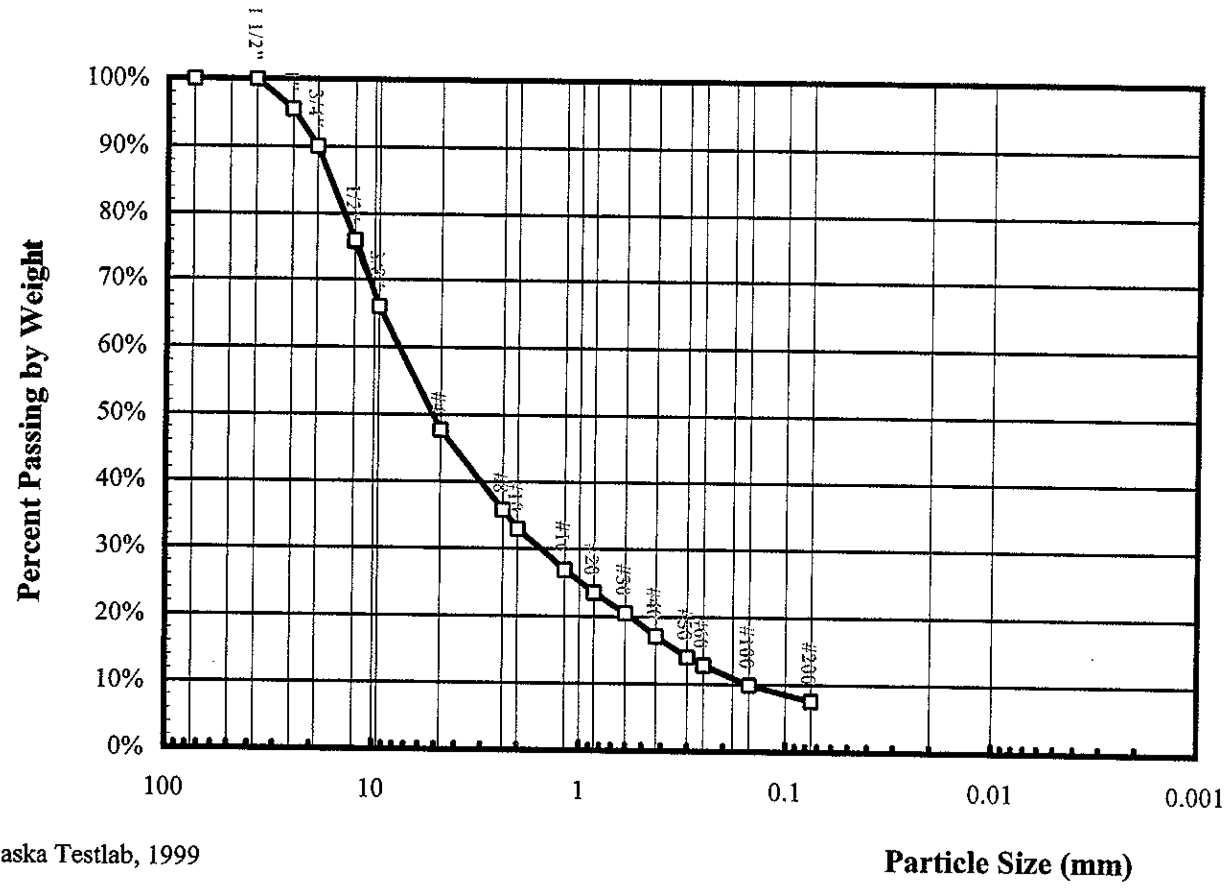
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2956
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	95%	
3/4"	90%	
1/2"	76%	
3/8"	66%	
No. 4	48%	
Total Wt. = 4727g		
No. 8	36%	
No. 10	33%	
No. 16	27%	
No. 20	24%	
No. 30	21%	
No. 40	17%	
No. 50	14%	
No. 60	13%	
No. 80		
No. 100	10%	
No. 200	7.6%	
Total Wt. of Fine Fraction = 564.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 61

Sample 1

Depth 0.3'-3'

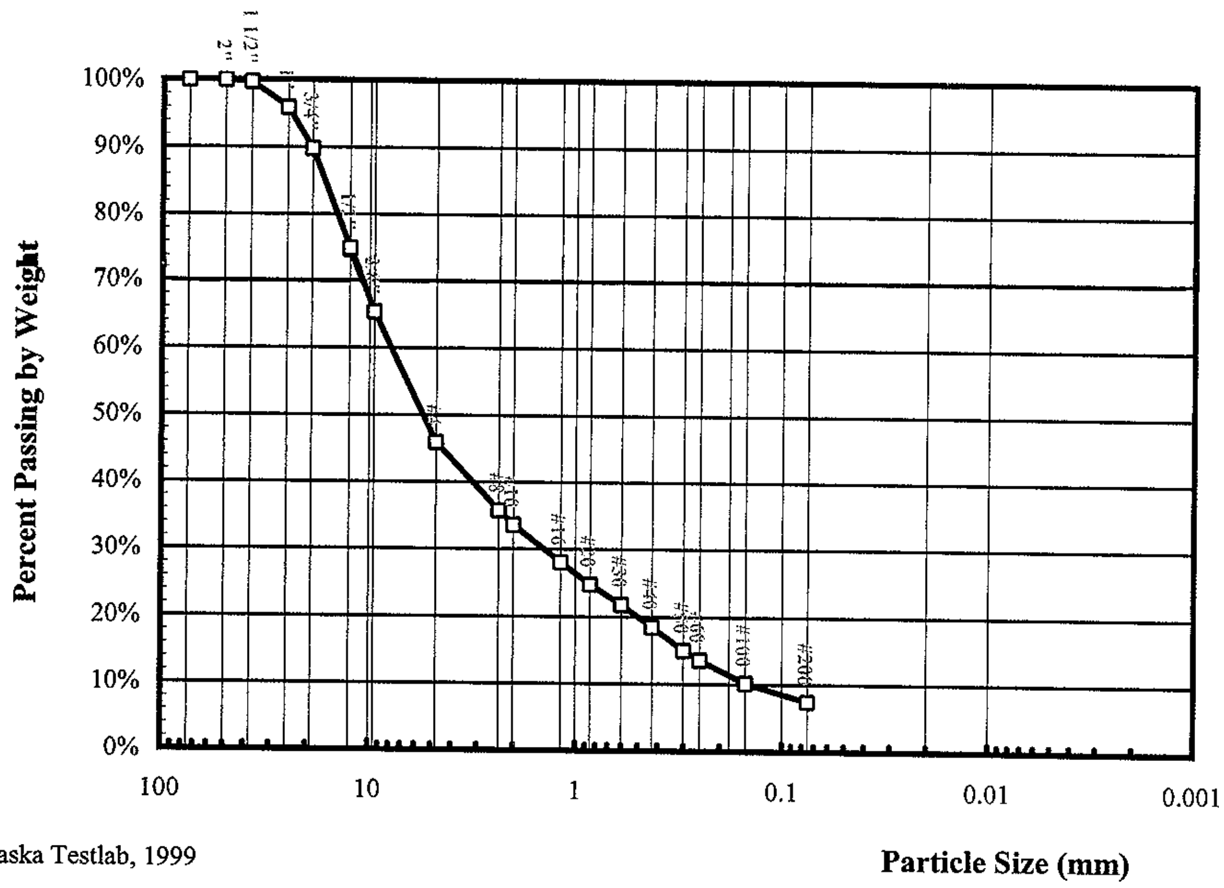
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2957
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	100%	
1"	96%	
3/4"	90%	
1/2"	75%	
3/8"	65%	
No. 4	46%	
Total Wt. = 32873g		
No. 8	36%	
No. 10	34%	
No. 16	28%	
No. 20	25%	
No. 30	22%	
No. 40	18%	
No. 50	15%	
No. 60	14%	
No. 80		
No. 100	10%	
No. 200	7.4%	
Total Wt. of Fine Fraction = 509.8g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 61
Sample 2
Depth 3'-4.5'

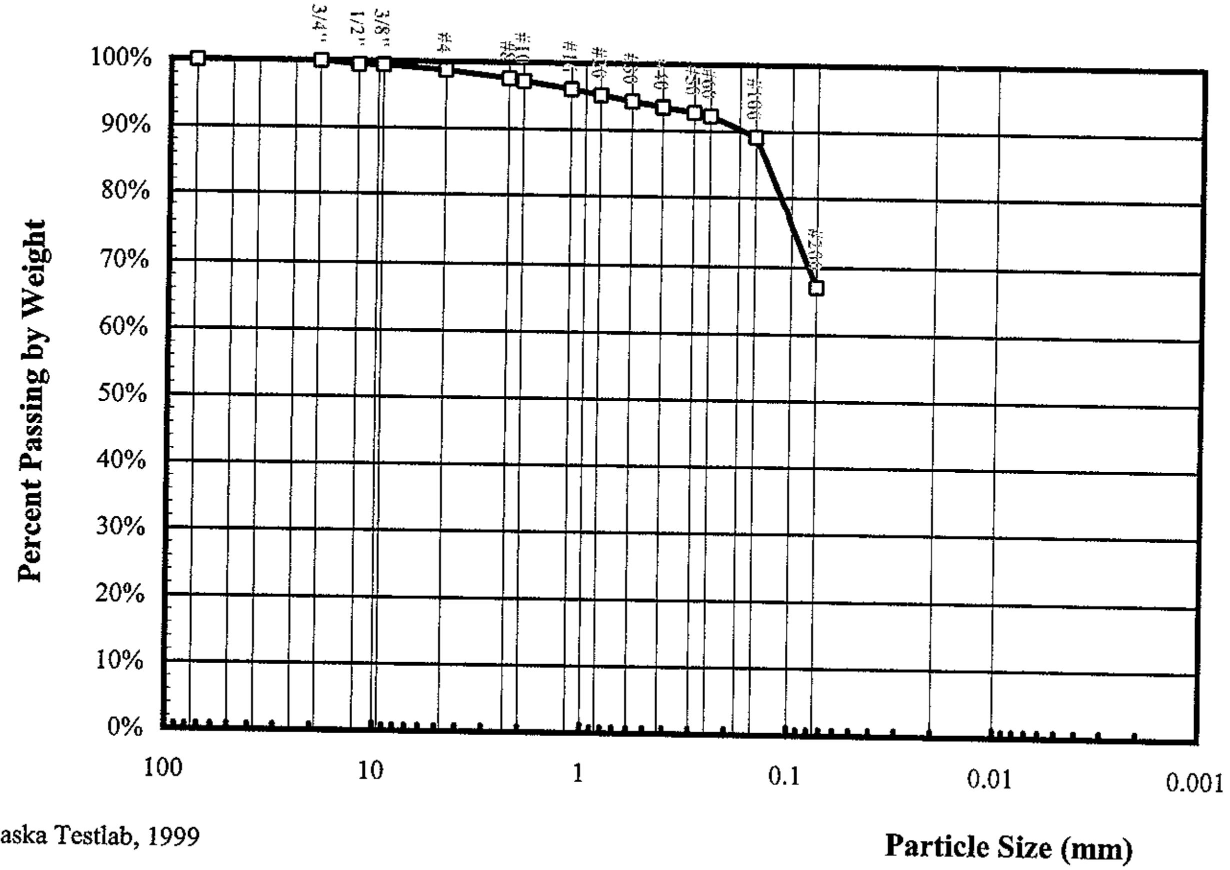
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2958
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	99%	
3/8"	99%	
No. 4	99%	
Total Wt. = 245.1g		
No. 8	98%	
No. 10	97%	
No. 16	96%	
No. 20	95%	
No. 30	94%	
No. 40	94%	
No. 50	93%	
No. 60	92%	
No. 80		
No. 100	89%	
No. 200	67%	
Total Wt. of Fine Fraction = 241.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 63
Sample 1
Depth 0' - 2'

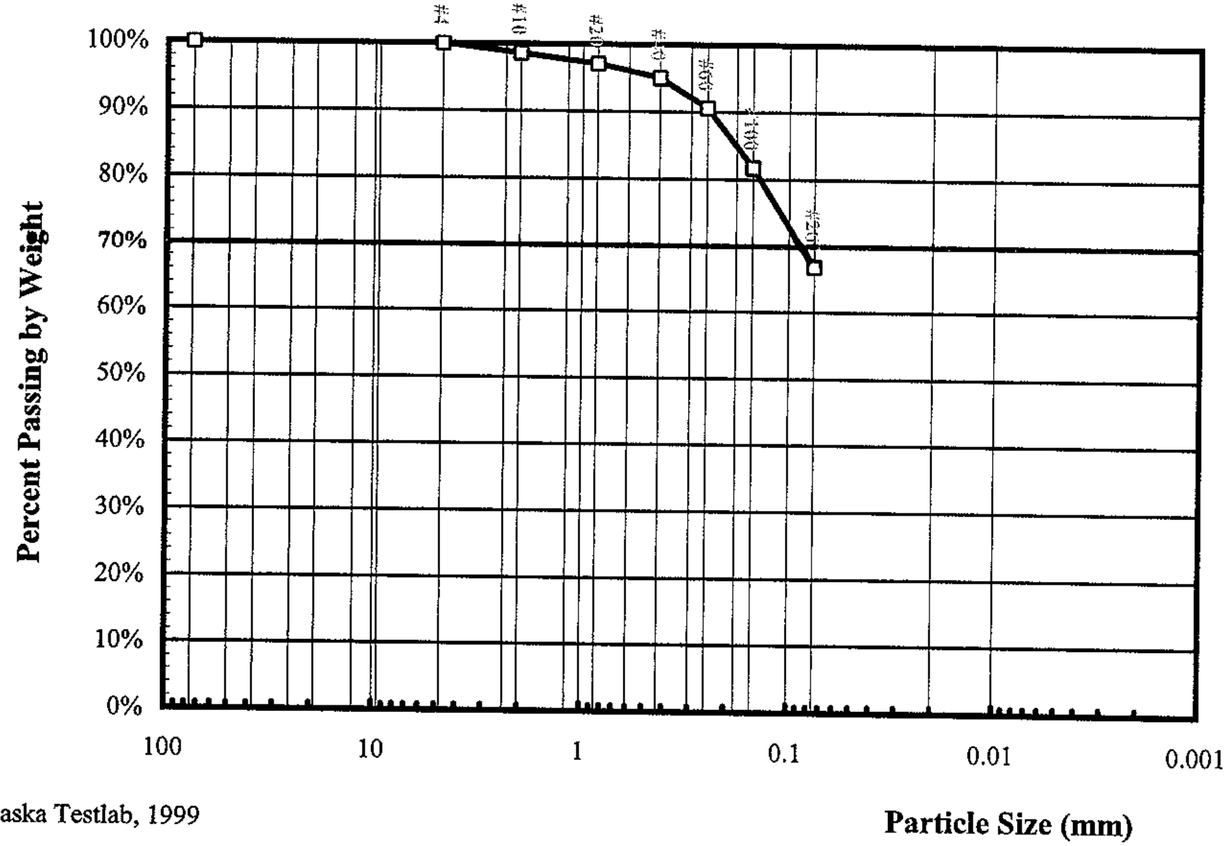
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-697
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"		
No. 4	100%	
Total Wt. = 131.5g		
No. 8		
No. 10	99%	
No. 16		
No. 20	97%	
No. 30		
No. 40	95%	
No. 50		
No. 60	91%	
No. 80		
No. 100	82%	
No. 200	67%	
Total Wt. of Fine Fraction = 131.5g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 67
Sample 2
Depth 5' - 7'

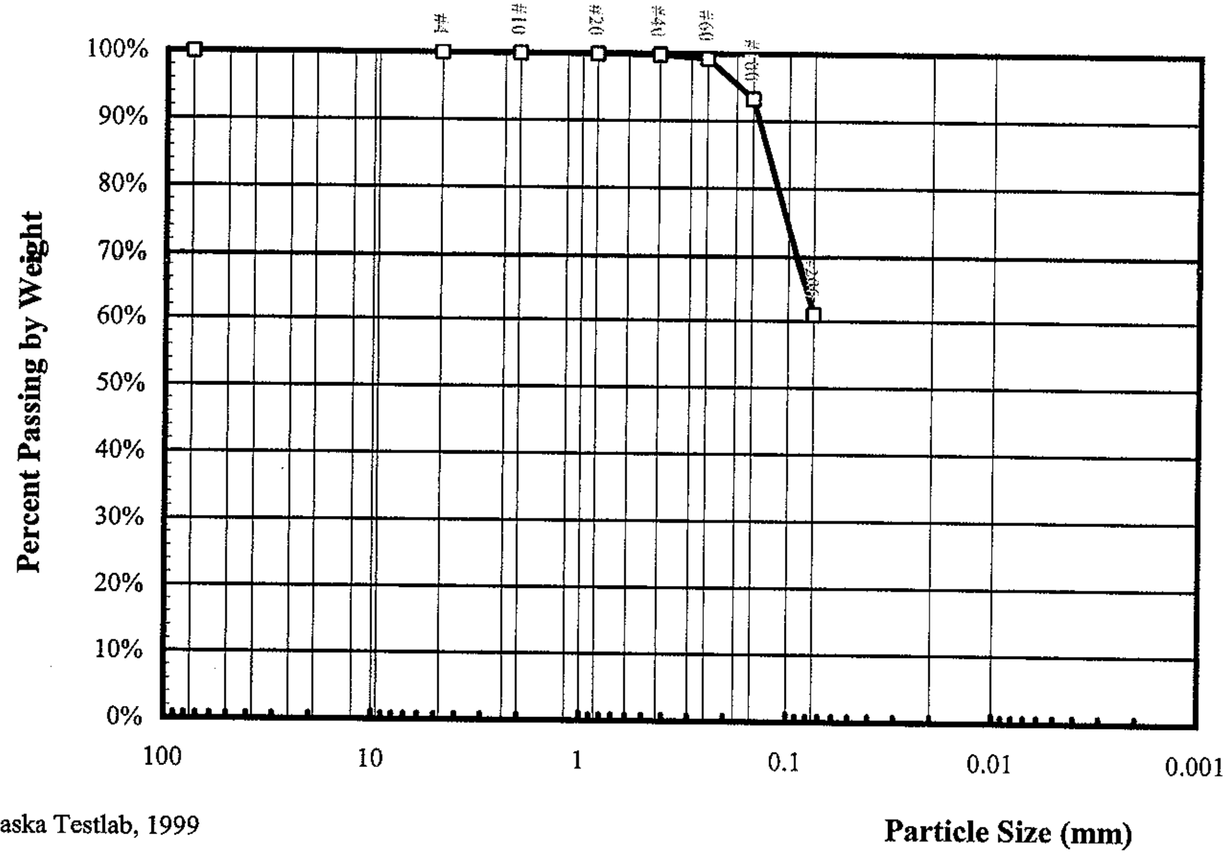
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-698
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"		
No. 4	100%	
Total Wt. = 329.8g		
No. 8		
No. 10	100%	
No. 16		
No. 20	100%	
No. 30		
No. 40	100%	
No. 50		
No. 60	99%	
No. 80		
No. 100	93%	
No. 200	61%	
Total Wt. of Fine Fraction = 327.5g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 68
Sample 1
Depth 0'-1'

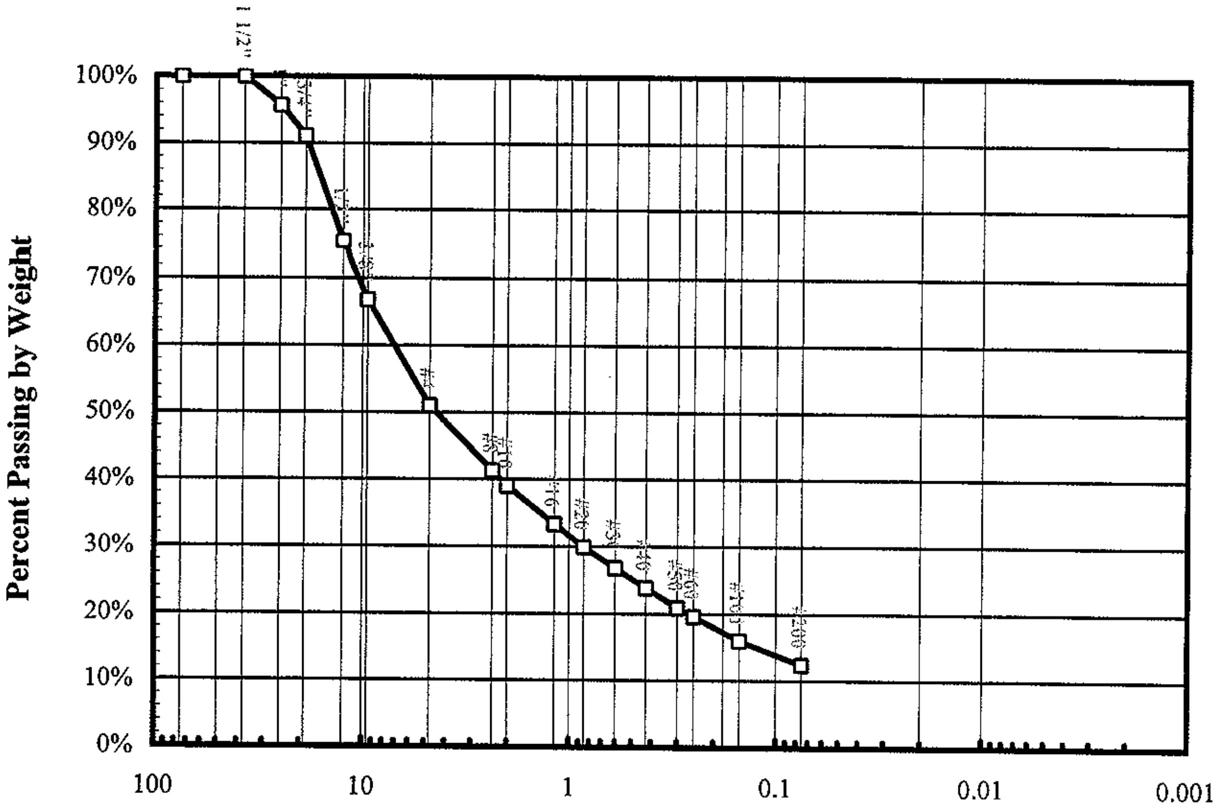
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2959
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	96%	
3/4"	91%	
1/2"	75%	
3/8"	67%	
No. 4	51%	
Total Wt. = 3572g		
No. 8	41%	
No. 10	39%	
No. 16	33%	
No. 20	30%	
No. 30	27%	
No. 40	24%	
No. 50	21%	
No. 60	20%	
No. 80		
No. 100	16%	
No. 200	12%	
Total Wt. of Fine Fraction = 549.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 71
Sample 1
Depth 0.3'-3'

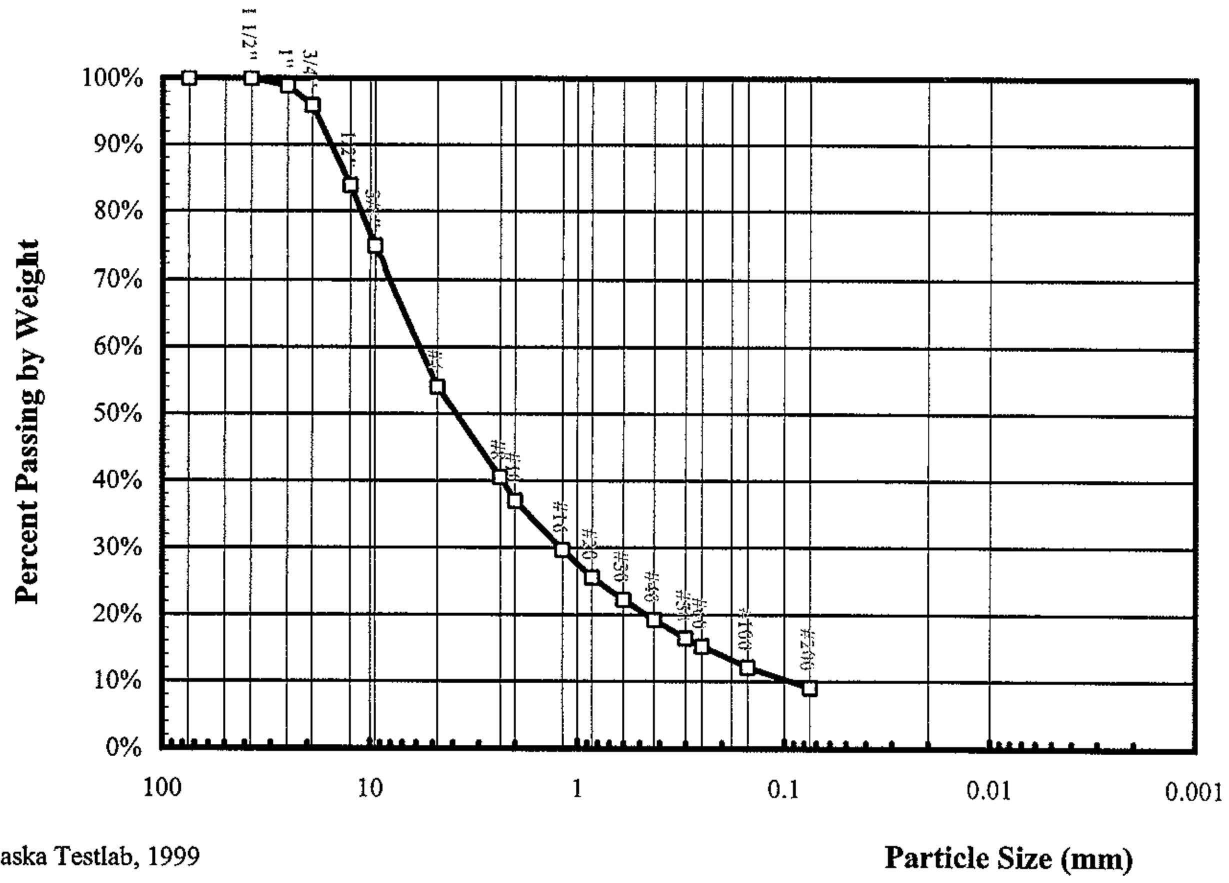
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2960
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	99%	
3/4"	96%	
1/2"	84%	
3/8"	75%	
No. 4	54%	
Total Wt. = 23764g		
No. 8	41%	
No. 10	37%	
No. 16	30%	
No. 20	26%	
No. 30	22%	
No. 40	19%	
No. 50	16%	
No. 60	15%	
No. 80		
No. 100	12%	
No. 200	9.1%	
Total Wt. of Fine Fraction = 619.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 76
Sample 3
Depth 7.5' - 9.5'

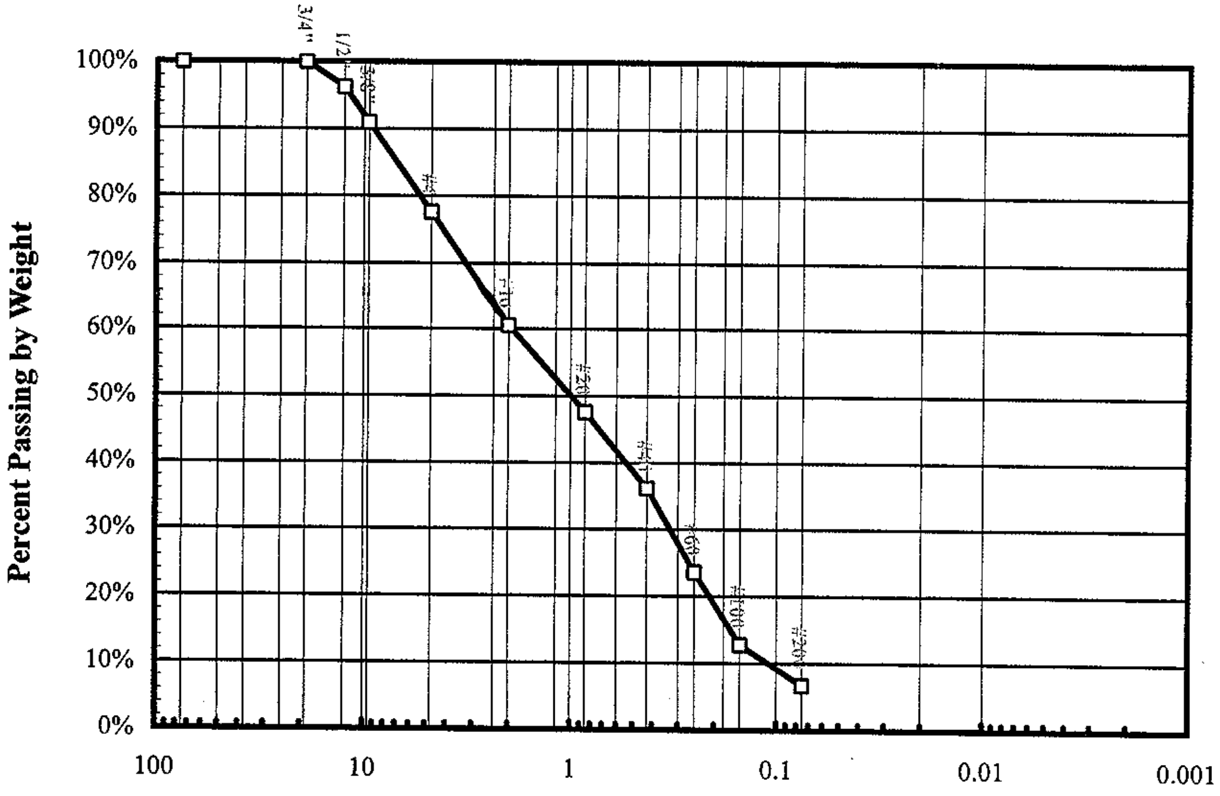
Engineering Classification: Poorly Graded SAND with Silt and Gravel, SP-SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-699
Received: 6/1/06
Reported: 6/12/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	96%	
3/8"	91%	
No. 4	78%	
Total Wt. = 425.4g		
No. 8		
No. 10	61%	
No. 16		
No. 20	48%	
No. 30		
No. 40	36%	
No. 50		
No. 60	24%	
No. 80		
No. 100	13%	
No. 200	6.7%	
Total Wt. of Fine Fraction = 329.9g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

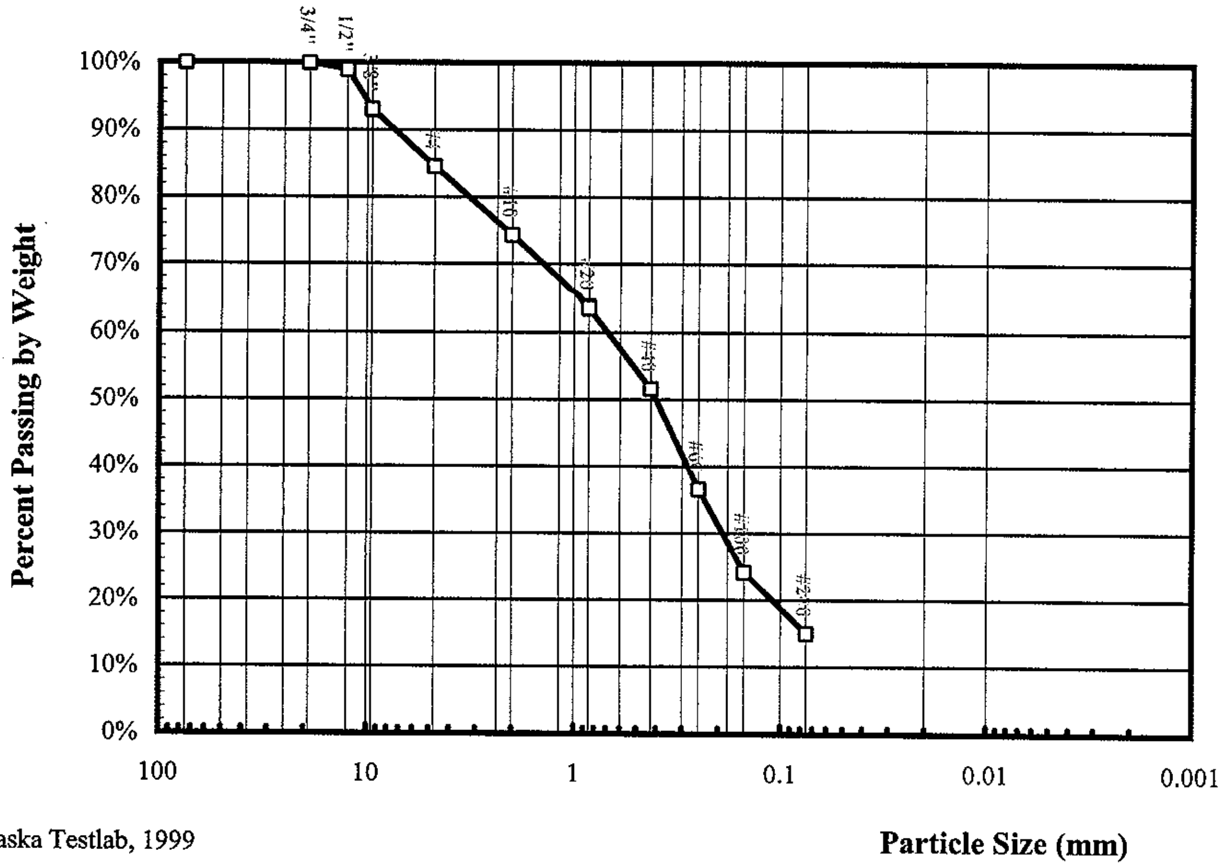
Location: Test Boring 77
Sample 4
Depth 10' - 12'

Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-700
Received: 6/1/06
Reported: 6/12/06



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	99%	
3/8"	93%	
No. 4	85%	
Total Wt. = 347.2g		
No. 8		
No. 10	74%	
No. 16		
No. 20	64%	
No. 30		
No. 40	52%	
No. 50		
No. 60	37%	
No. 80		
No. 100	24%	
No. 200	15%	
Total Wt. of Fine Fraction = 293.5g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 79
Sample 1
Depth 0.5'-1.5'

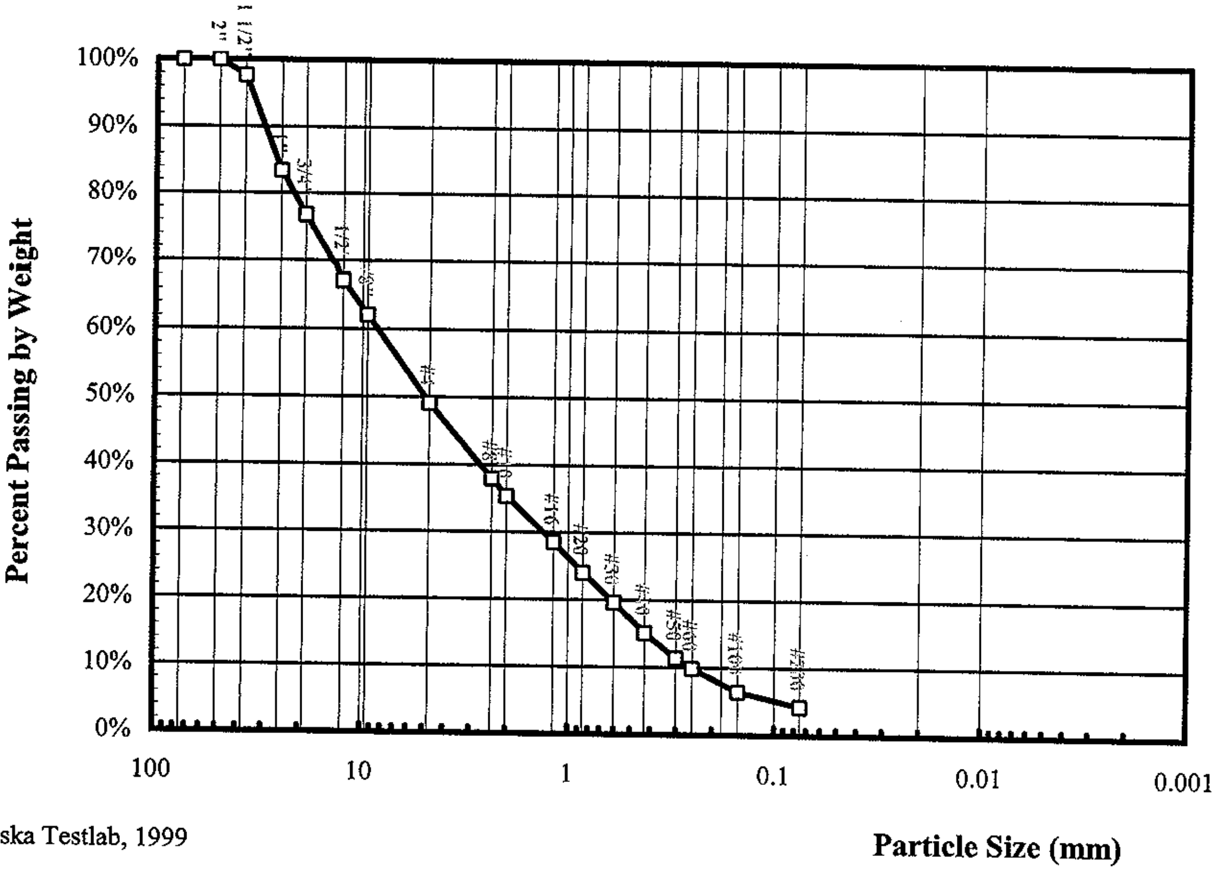
Engineering Classification: Poorly Graded GRAVEL with Sand, GP

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2961
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	98%	
1"	83%	
3/4"	77%	
1/2"	67%	
3/8"	62%	
No. 4	49%	
Total Wt. = 3860g		
No. 8	38%	
No. 10	35%	
No. 16	29%	
No. 20	24%	
No. 30	20%	
No. 40	15%	
No. 50	11%	
No. 60	10%	
No. 80		
No. 100	6%	
No. 200	4.3%	
Total Wt. of Fine Fraction = 553.4g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 80

Sample 1

Depth 1' - 2'

Engineering Classification: Poorly Graded SAND with Gravel, SP

Frost Classification: Not Measured

PARTICLE-SIZE

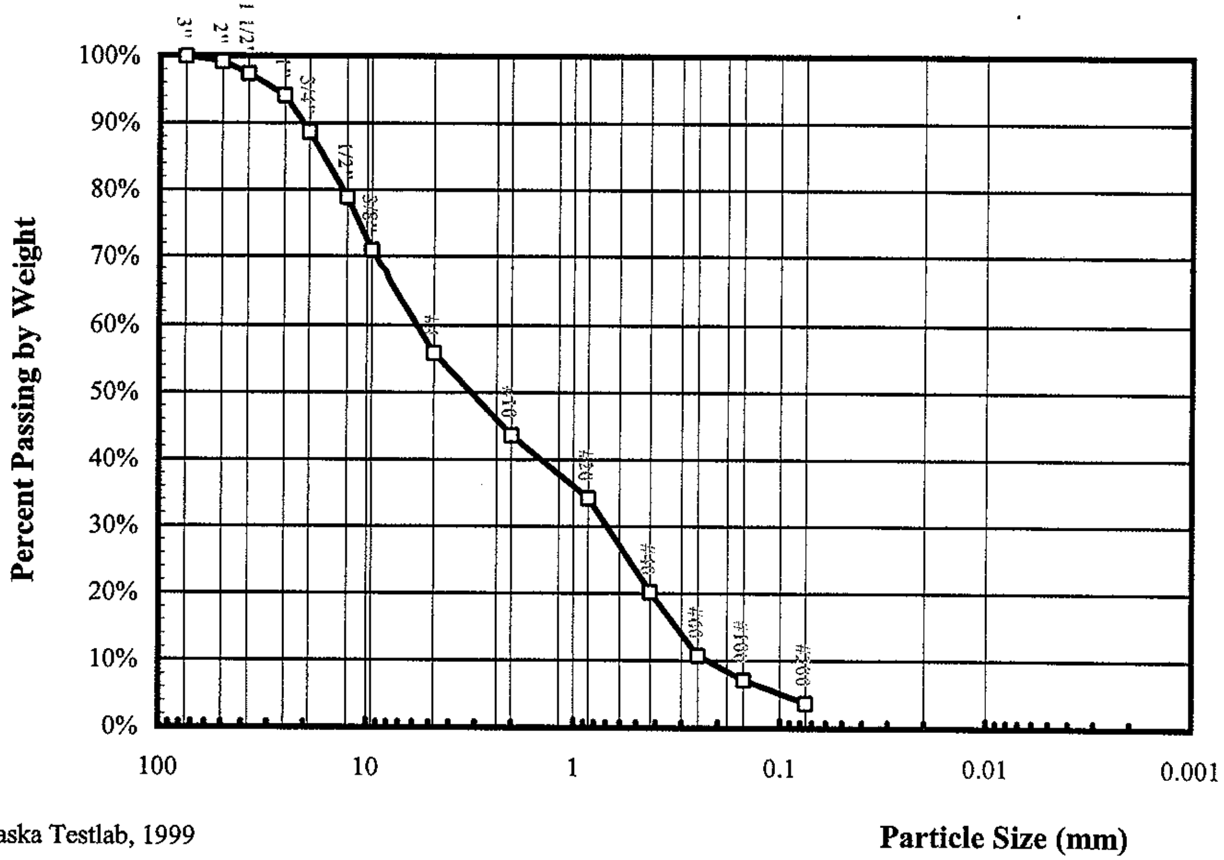
DIST. ASTM D422

W.O. D59119D

Lab No. 2006-701

Received: 6/1/06

Reported: 6/12/06



SIZE	PASSING	SPECIFICATION
+3 In Not Included in Test = -%		
3"	100%	
2"	99%	
1 1/2"	97%	
1"	94%	
3/4"	89%	
1/2"	79%	
3/8"	71%	
No. 4	56%	
Total Wt. = 28912g		
No. 8		
No. 10	44%	
No. 16		
No. 20	34%	
No. 30		
No. 40	20%	
No. 50		
No. 60	11%	
No. 80		
No. 100	7%	
No. 200	3.7%	
Total Wt. of Fine Fraction = 426g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 81
Sample 1
Depth 0.3'-3'

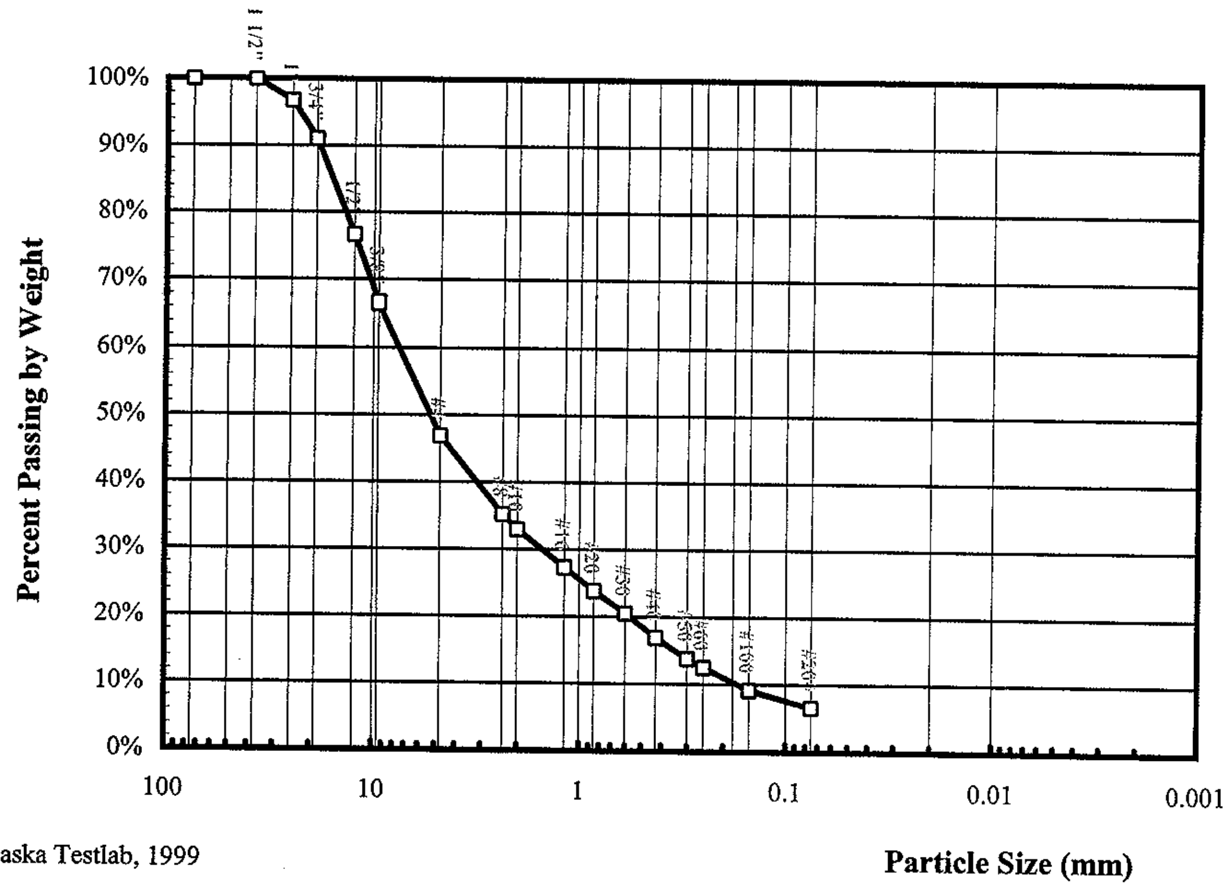
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2962
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	97%	
3/4"	91%	
1/2"	77%	
3/8"	67%	
No. 4	47%	
Total Wt. = 26287g		
No. 8	35%	
No. 10	33%	
No. 16	27%	
No. 20	24%	
No. 30	20%	
No. 40	17%	
No. 50	14%	
No. 60	12%	
No. 80		
No. 100	9%	
No. 200	6.6%	
Total Wt. of Fine Fraction = 548.3g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

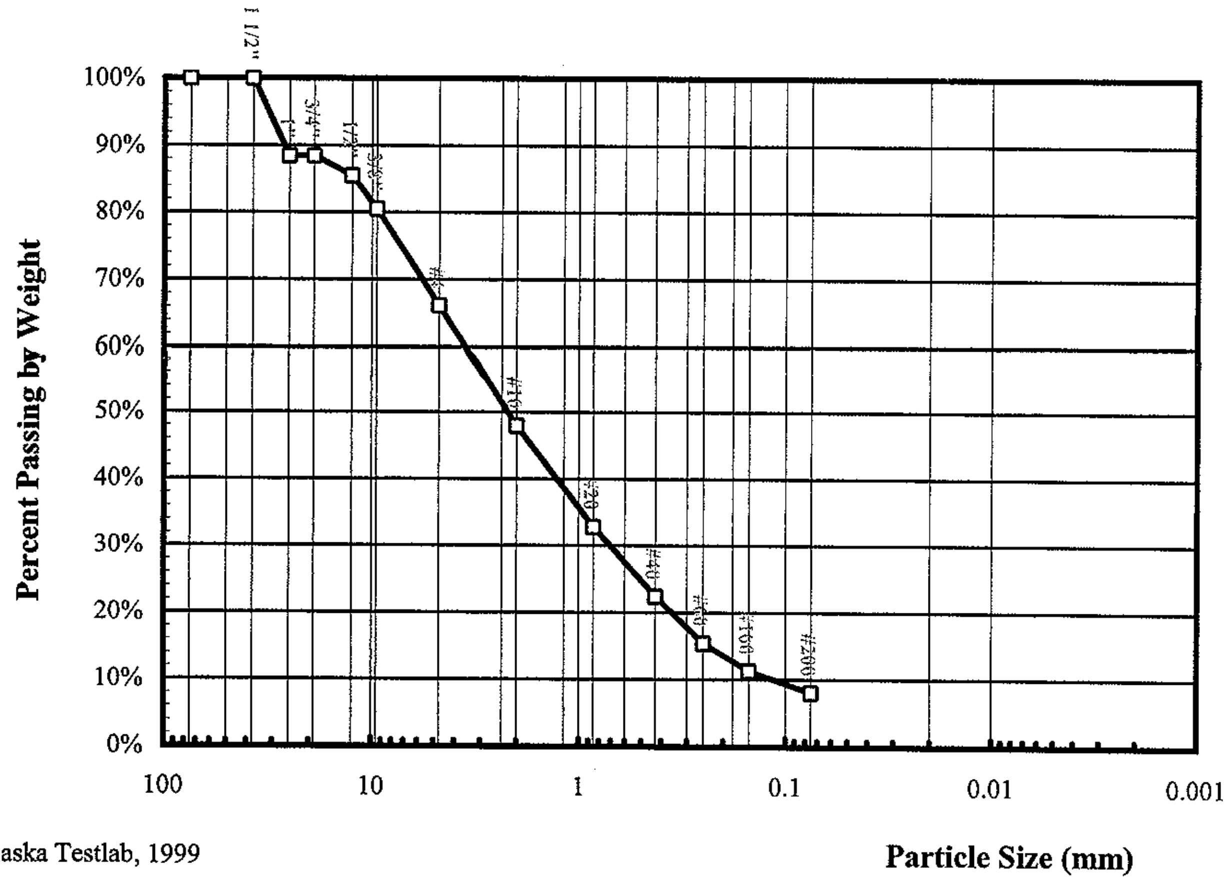
PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-702
Received: 6/1/06
Reported: 6/8/06

Location: Test Boring 82
Sample 2
Depth 5' - 6.5'

Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM

Frost Classification: Not Measured



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"		
1 1/2"	100%	
1"	88%	
3/4"	88%	
1/2"	85%	
3/8"	81%	
No. 4	66%	
Total Wt. = 337.1g		
No. 8		
No. 10	48%	
No. 16		
No. 20	33%	
No. 30		
No. 40	22%	
No. 50		
No. 60	15%	
No. 80		
No. 100	11%	
No. 200	8.1%	
Total Wt. of Fine Fraction = 223.1g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 85
Sample 1
Depth 0.3' - 2'

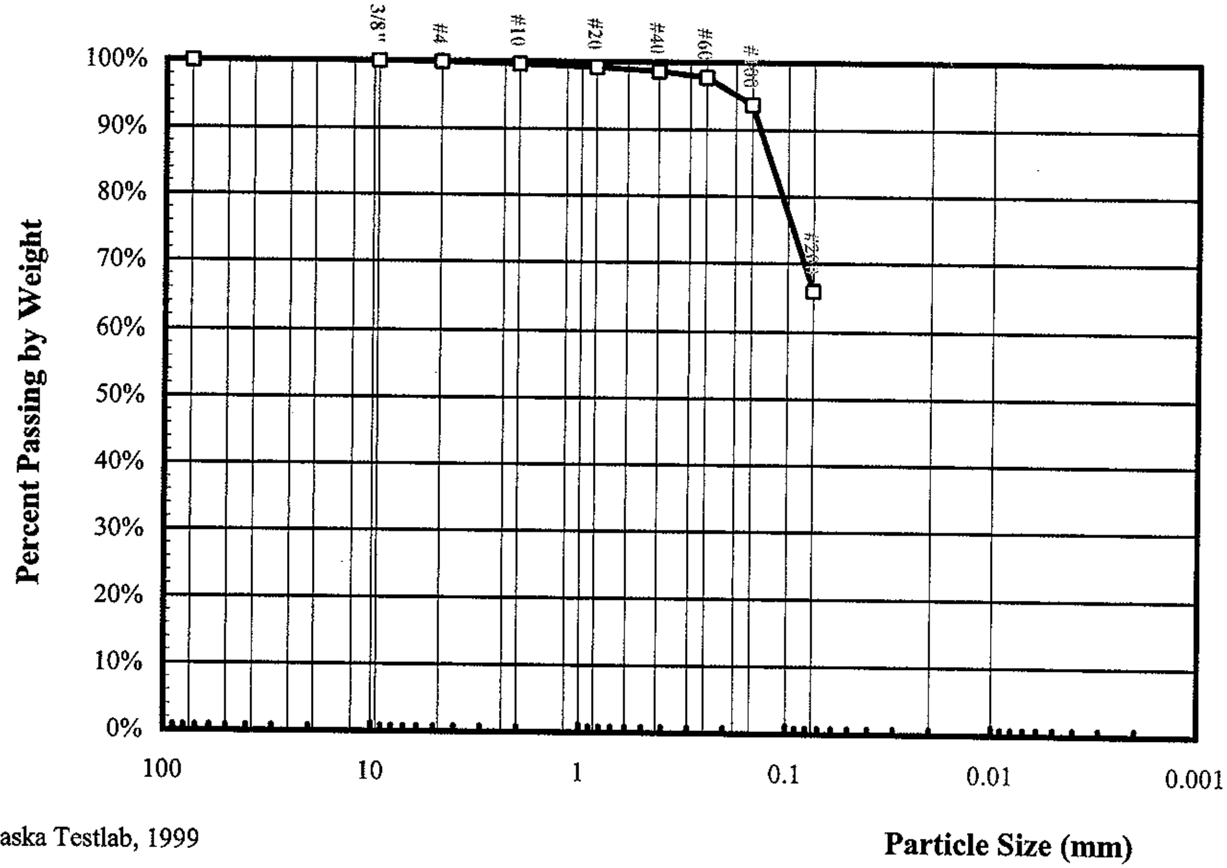
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-704
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"	100%	
No. 4	100%	
Total Wt. = 108.2g		
No. 8		
No. 10	100%	
No. 16		
No. 20	99%	
No. 30		
No. 40	99%	
No. 50		
No. 60	98%	
No. 80		
No. 100	94%	
No. 200	66%	
Total Wt. of Fine Fraction = 107.9g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 86
Sample 1A
Depth 0.5' - 2'

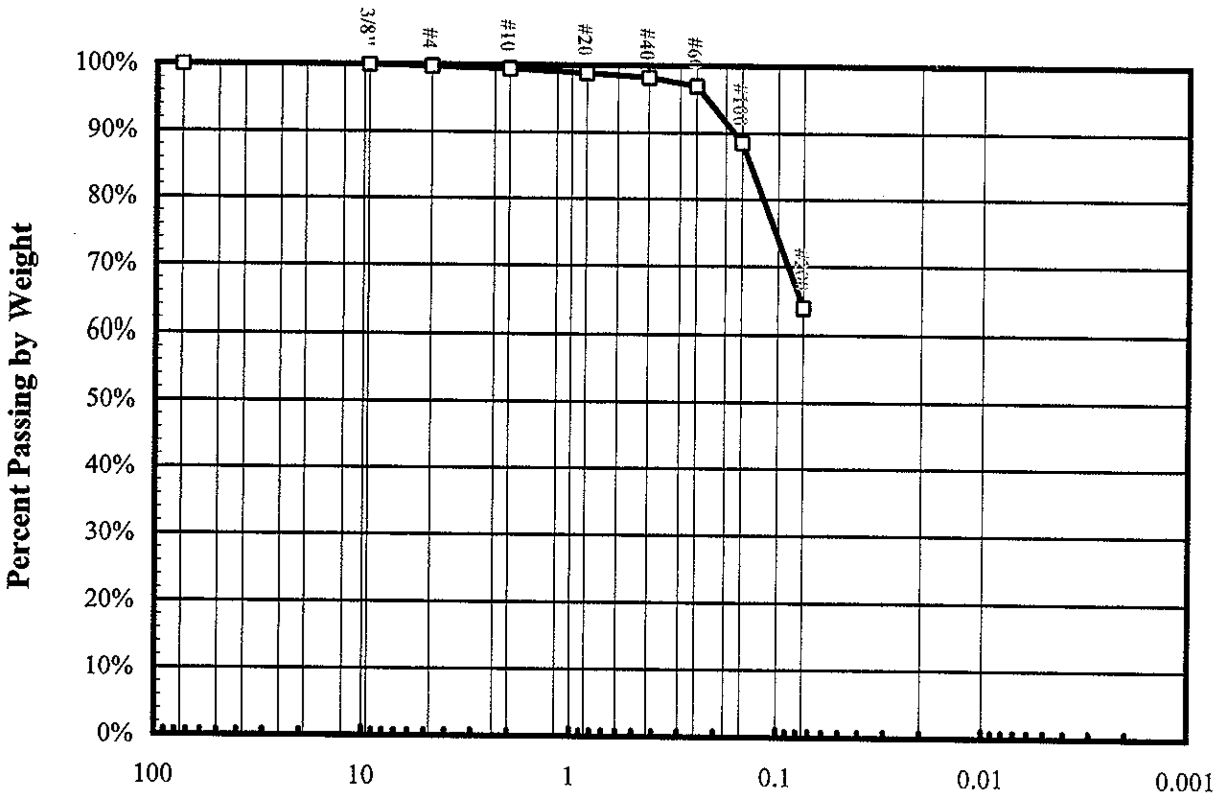
Engineering Classification: Sandy SILT, ML

Frost Classification: F4

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-705
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"	100%	
No. 4	100%	
Total Wt. = 261.7g		
No. 8		
No. 10	99%	
No. 16		
No. 20	99%	
No. 30		
No. 40	98%	
No. 50		
No. 60	97%	
No. 80		
No. 100	89%	
No. 200	64%	
Total Wt. of Fine Fraction = 118.1g		
0.02 mm		



Particle Size (mm)

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 88
Sample 1
Depth 0.3'-1'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

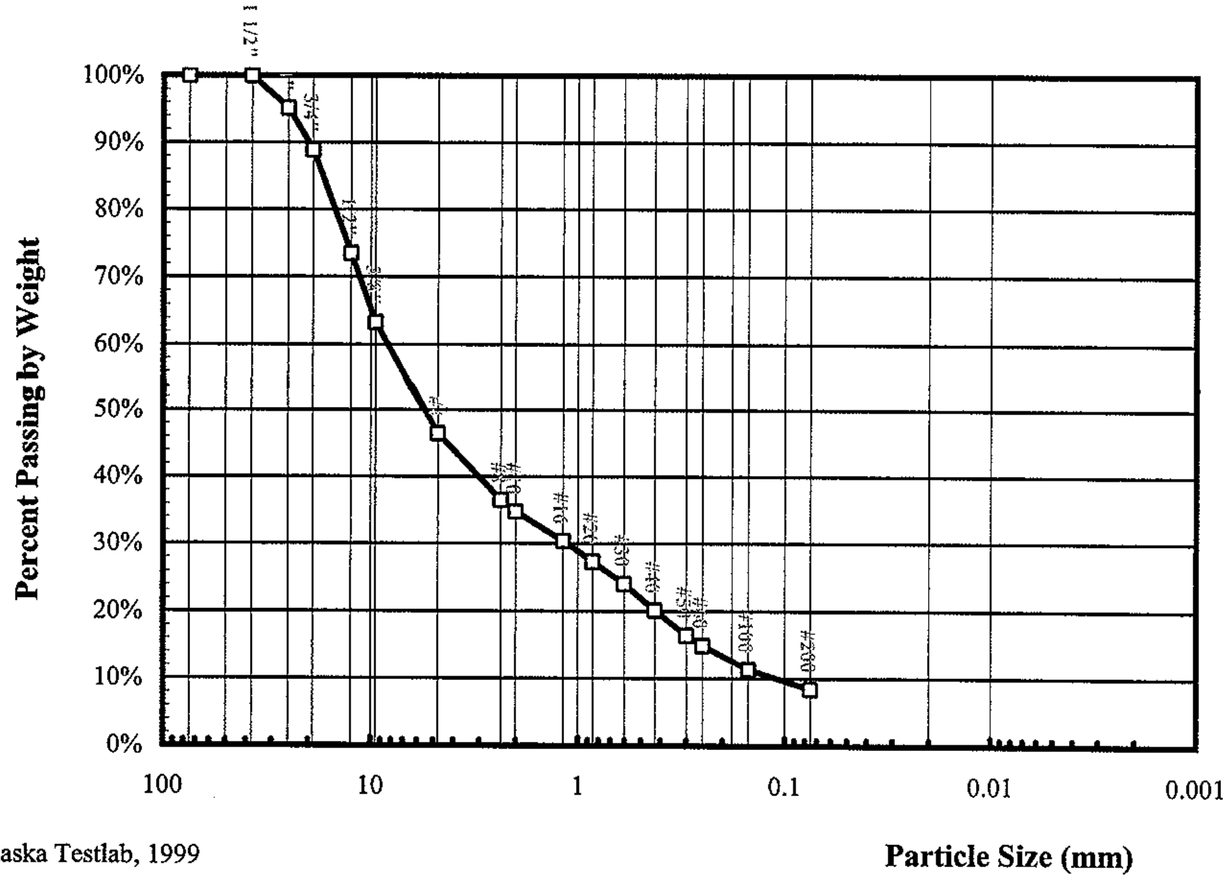
Frost Classification: Not Measured

PARTICLE-SIZE

DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2963
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	95%	
3/4"	89%	
1/2"	74%	
3/8"	63%	
No. 4	46%	
Total Wt. = 3929g		
No. 8	36%	
No. 10	35%	
No. 16	30%	
No. 20	27%	
No. 30	24%	
No. 40	20%	
No. 50	16%	
No. 60	15%	
No. 80		
No. 100	11%	
No. 200	8.4%	
Total Wt. of Fine Fraction = 529.5g		
0.02 mm		



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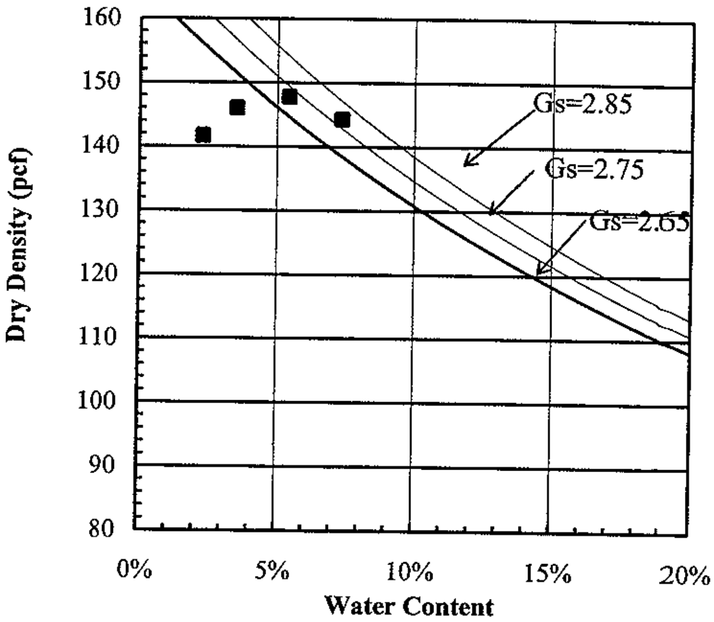
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 90
Sample 1
Depth 0.3'-3'

W.O. D59119D
Lab No. 2005-2964
Received: 12/2/05
Reported: 12/19/05

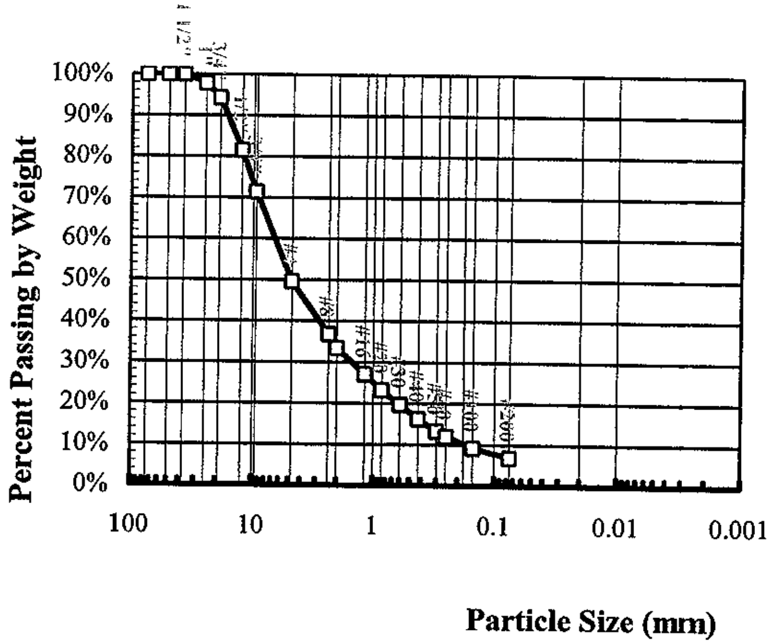
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 147.8 pcf
Optimum Water Content: 5.4 %

Corrected Density: 148.5 pcf
Corrected Optimum: 5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	94%	
1/2"	81%	
3/8"	71%	
No. 4	50%	
Total Wt. = 24979g		
No. 8	37%	
No. 10		
No. 16	27%	
No. 20	23%	
No. 30	20%	
No. 40	16%	
No. 50	13%	
No. 60	12%	
No. 80		
No.100	9%	
No.200	6.8%	
Total Wt. of Fine Fraction = 530.2g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 91
Sample 1
Depth 0.3'-1'

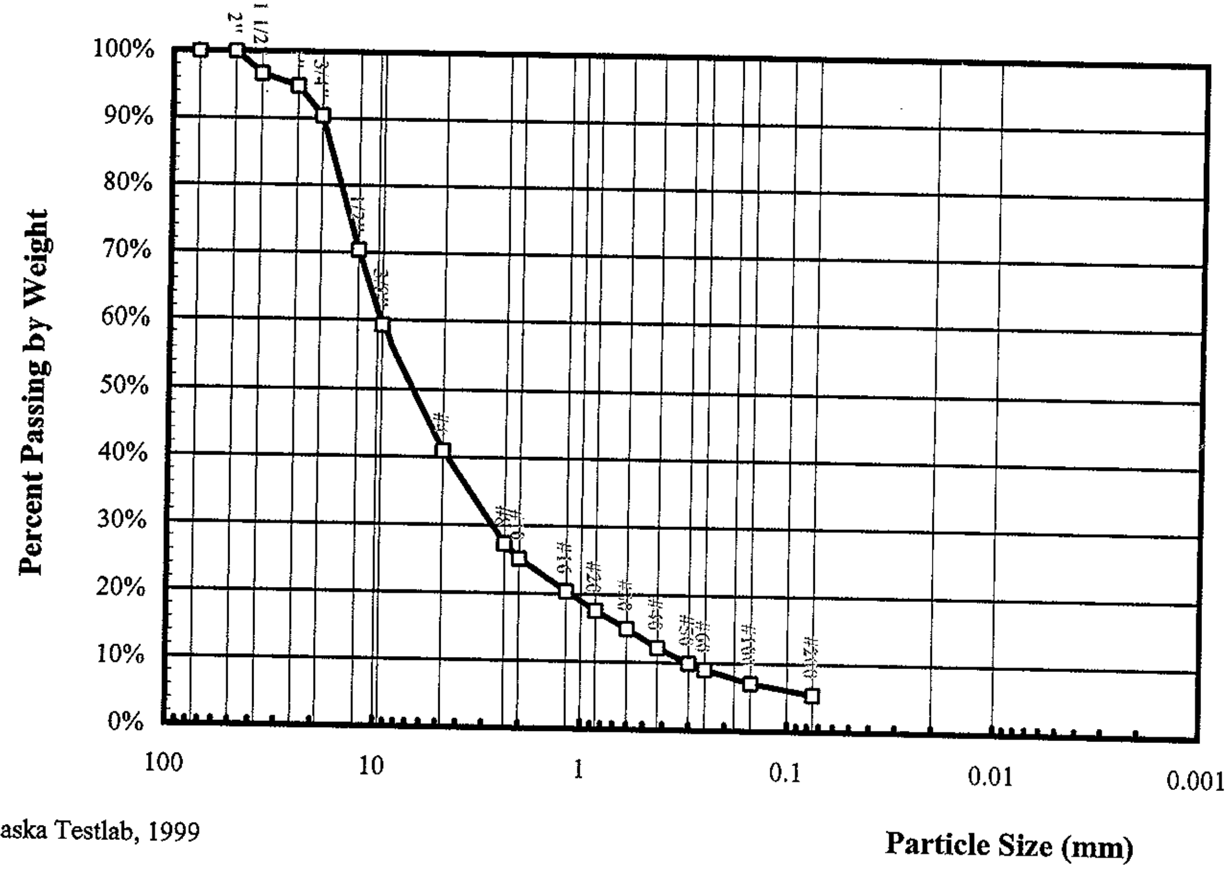
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2965
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	97%	
1"	95%	
3/4"	90%	
1/2"	70%	
3/8"	59%	
No. 4	41%	
Total Wt. = 5222.1g		
No. 8	27%	
No. 10	25%	
No. 16	20%	
No. 20	18%	
No. 30	15%	
No. 40	12%	
No. 50	10%	
No. 60	9%	
No. 80		
No. 100	7%	
No. 200	5.4%	
Total Wt. of Fine Fraction = 517g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 92

Sample 1

Depth 0.3'-3'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE

DIST. ASTM D422

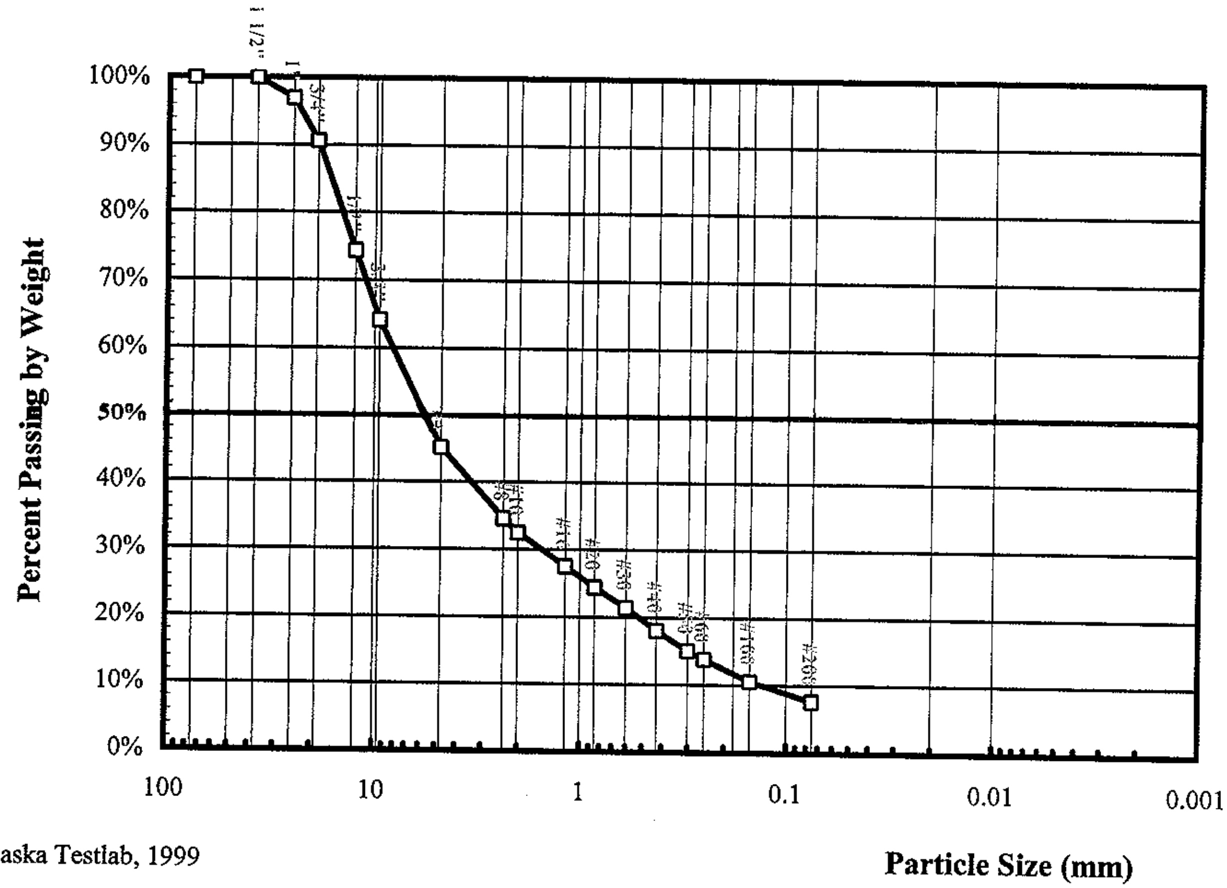
W.O. D59119D

Lab No. 2005-2967

Received: 12/2/05

Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	97%	
3/4"	91%	
1/2"	74%	
3/8"	64%	
No. 4	45%	
Total Wt. = 27623g		
No. 8	35%	
No. 10	32%	
No. 16	28%	
No. 20	24%	
No. 30	21%	
No. 40	18%	
No. 50	15%	
No. 60	14%	
No. 80		
No. 100	11%	
No. 200	7.6%	
Total Wt. of Fine Fraction = 606.9g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 92

Sample 3

Depth 5'-6.5'

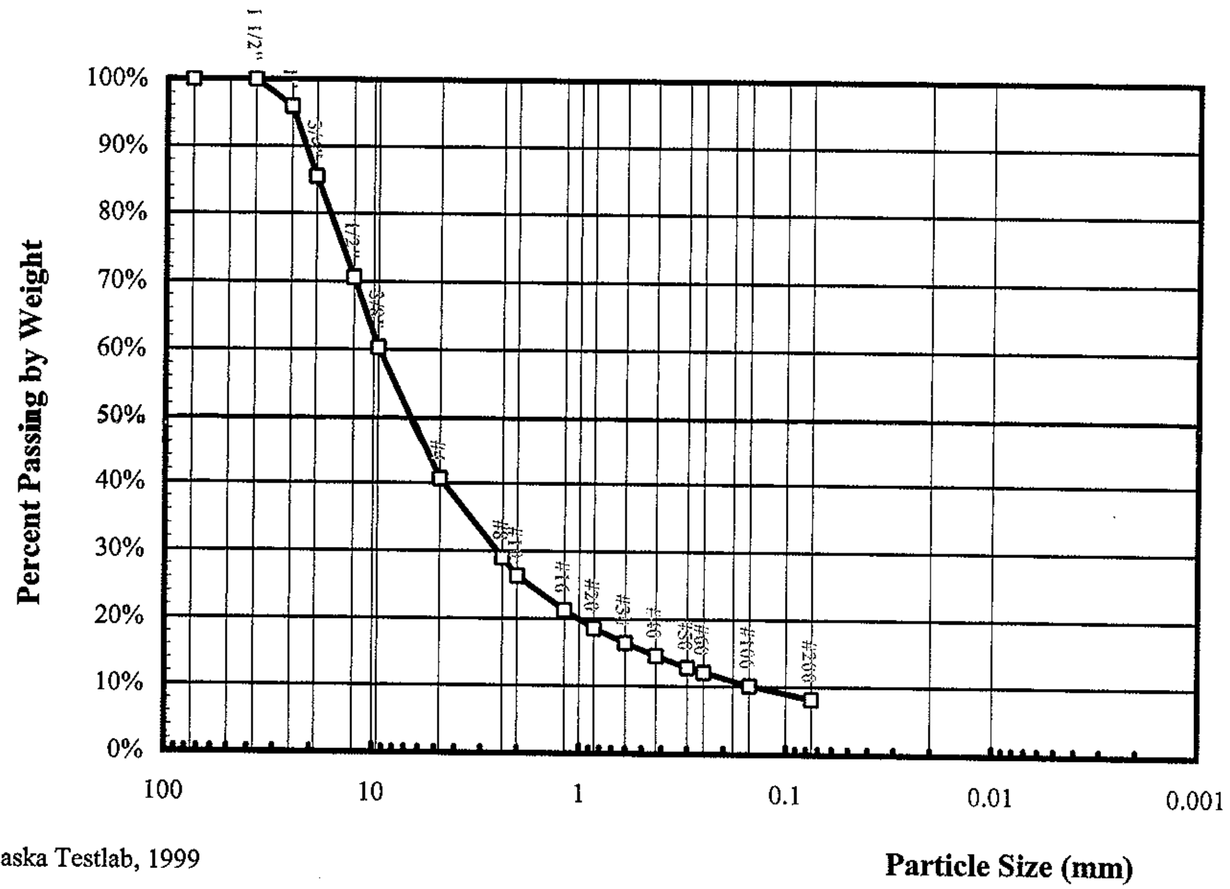
Engineering Classification: Poorly Graded GRAVEL with Silt and Sand, GP-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2968
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	96%	
3/4"	86%	
1/2"	71%	
3/8"	60%	
No. 4	41%	
Total Wt. = 1143.9g		
No. 8	29%	
No. 10	26%	
No. 16	21%	
No. 20	19%	
No. 30	16%	
No. 40	15%	
No. 50	13%	
No. 60	12%	
No. 80		
No. 100	10%	
No. 200	8.2%	
Total Wt. of Fine Fraction = 464.5g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 93
Sample 3
Depth 5'-6.5'

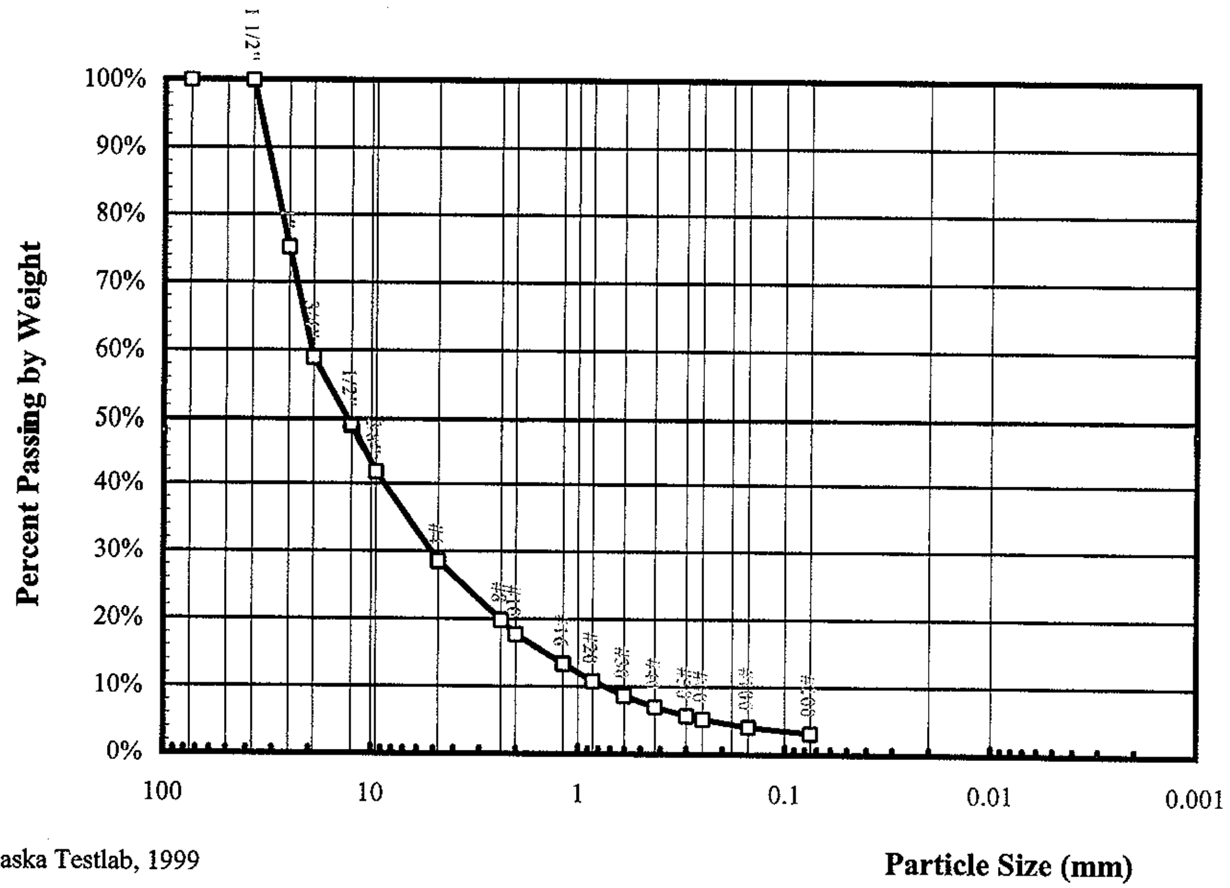
Engineering Classification: Well Graded GRAVEL with Sand, GW

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2969
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	75%	
3/4"	59%	
1/2"	49%	
3/8"	42%	
No. 4	28%	
Total Wt. = 1072g		
No. 8	20%	
No. 10	18%	
No. 16	13%	
No. 20	11%	
No. 30	9%	
No. 40	7%	
No. 50	6%	
No. 60	5%	
No. 80		
No. 100	4%	
No. 200	3.1%	
Total Wt. of Fine Fraction = 304.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 93
Sample 4
Depth 10'-11.5'

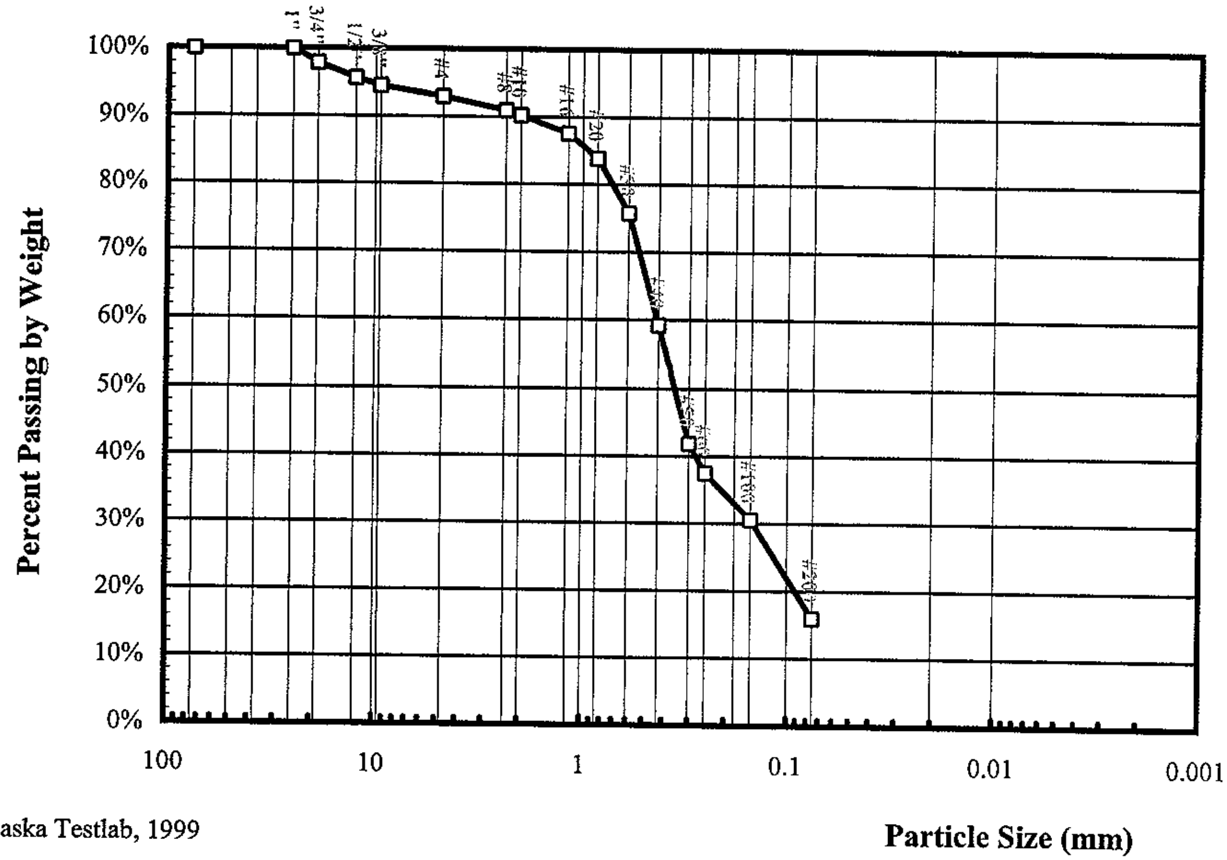
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2970
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	98%	
1/2"	96%	
3/8"	95%	
No. 4	93%	
Total Wt. = 1341.9g		
No. 8	91%	
No. 10	90%	
No. 16	88%	
No. 20	84%	
No. 30	76%	
No. 40	59%	
No. 50	42%	
No. 60	37%	
No. 80		
No. 100	31%	
No. 200	16%	
Total Wt. of Fine Fraction = 517.6g		
0.02 mm		



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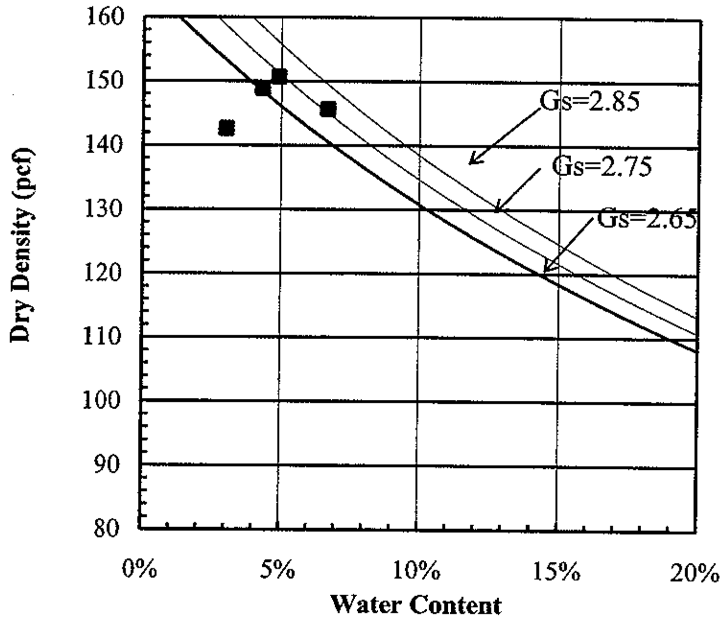
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 103
Sample 1
Depth 0'-3'

W.O. D59119D
Lab No. 2005-2971
Received: 12/2/05
Reported: 12/19/05

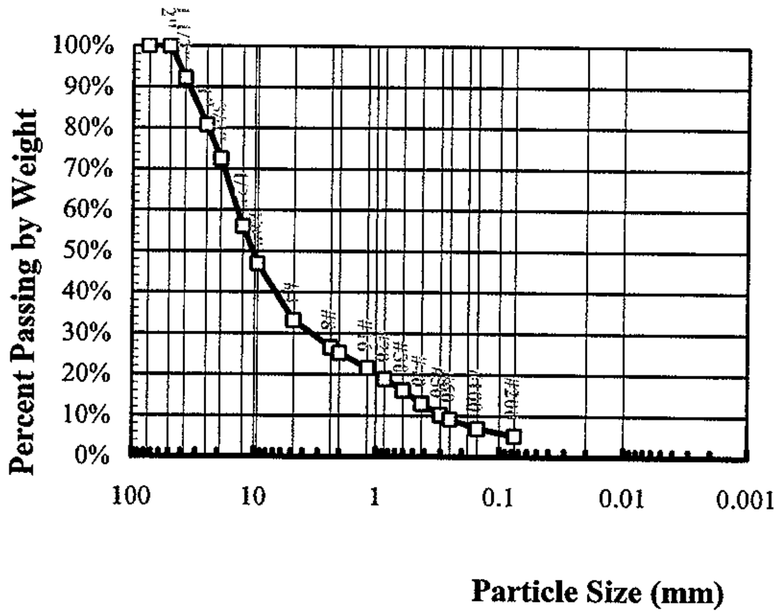
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 150.7 pcf
Optimum Water Content: 4.9 %

Corrected Density: 154.5 pcf
Corrected Optimum: 3.5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"	100%	
1 1/2"	92%	
1"	81%	
3/4"	72%	
1/2"	56%	
3/8"	47%	
No. 4	33%	
Total Wt. = 19860g		
No. 8	27%	
No. 10		
No. 16	22%	
No. 20	19%	
No. 30	16%	
No. 40	13%	
No. 50	10%	
No. 60	9%	
No. 80		
No.100	7%	
No.200	5.1%	
Total Wt. of Fine Fraction = 549.1g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 103
Sample 2A
Depth 5.5'-6.5'

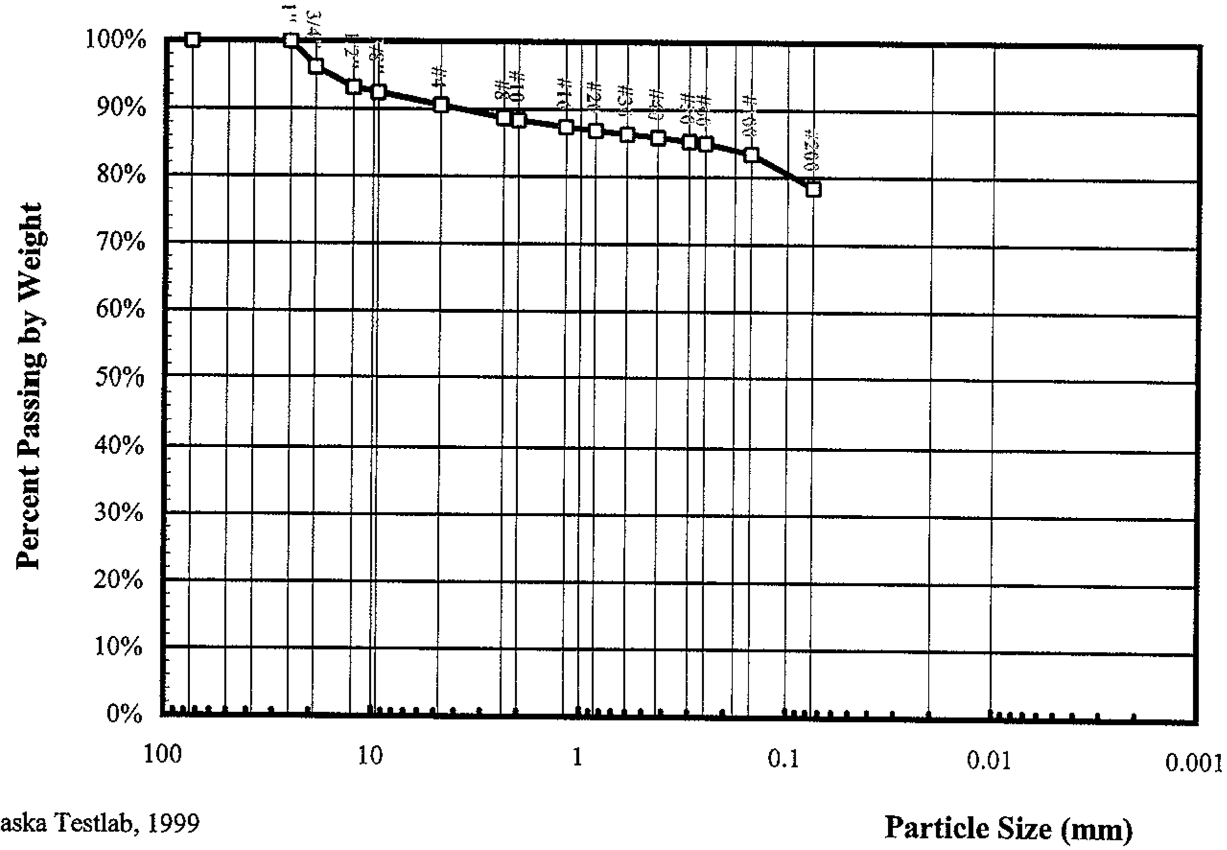
Engineering Classification: SILT with Sand, ML

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2972
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	96%	
1/2"	93%	
3/8"	92%	
No. 4	91%	
Total Wt. = 553.5g		
No. 8	89%	
No. 10	88%	
No. 16	87%	
No. 20	87%	
No. 30	86%	
No. 40	86%	
No. 50	85%	
No. 60	85%	
No. 80		
No. 100	83%	
No. 200	78%	
Total Wt. of Fine Fraction = 499.7g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 104
Sample 2
Depth 2.5'-4'

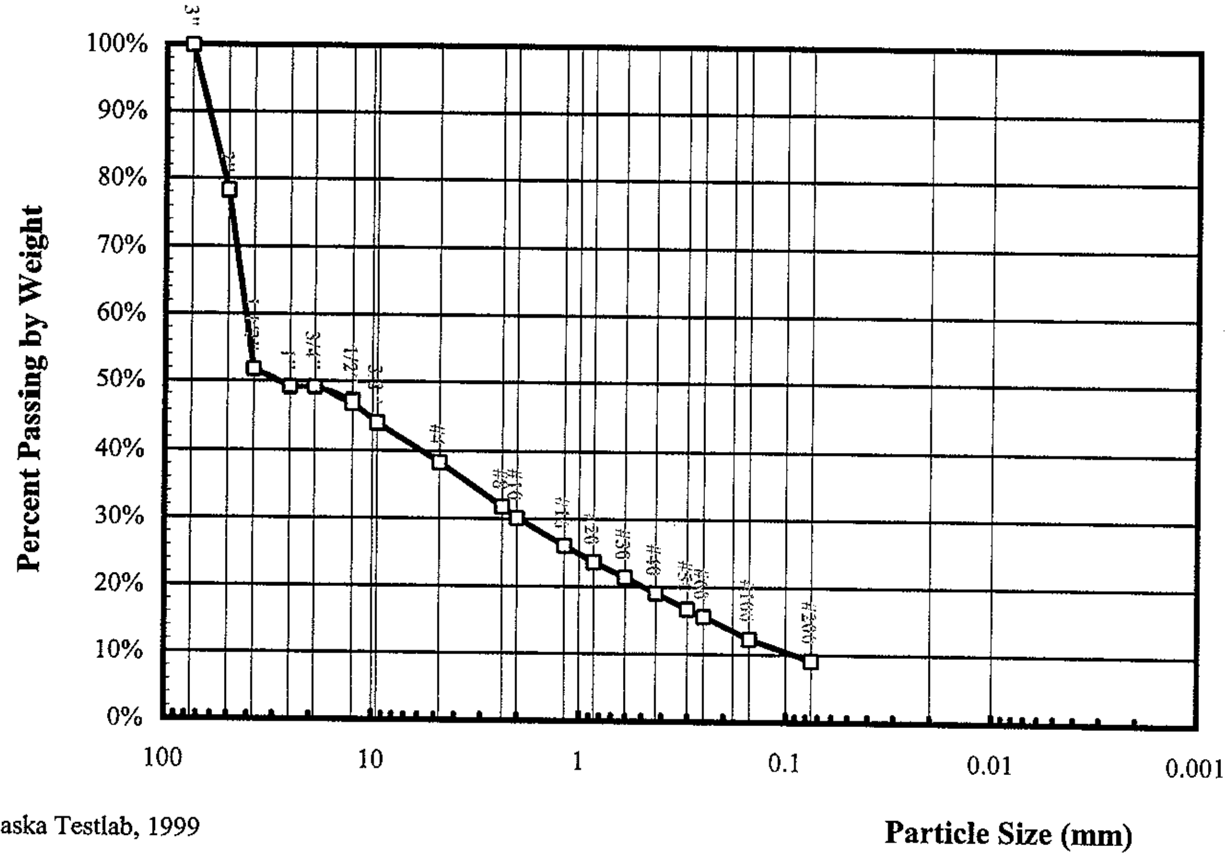
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2973
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	78%	
1 1/2"	52%	
1"	49%	
3/4"	49%	
1/2"	47%	
3/8"	44%	
No. 4	38%	
Total Wt. = 1317.2g		
No. 8	32%	
No. 10	30%	
No. 16	26%	
No. 20	24%	
No. 30	21%	
No. 40	19%	
No. 50	17%	
No. 60	16%	
No. 80		
No. 100	12%	
No. 200	9.2%	
Total Wt. of Fine Fraction = 503g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

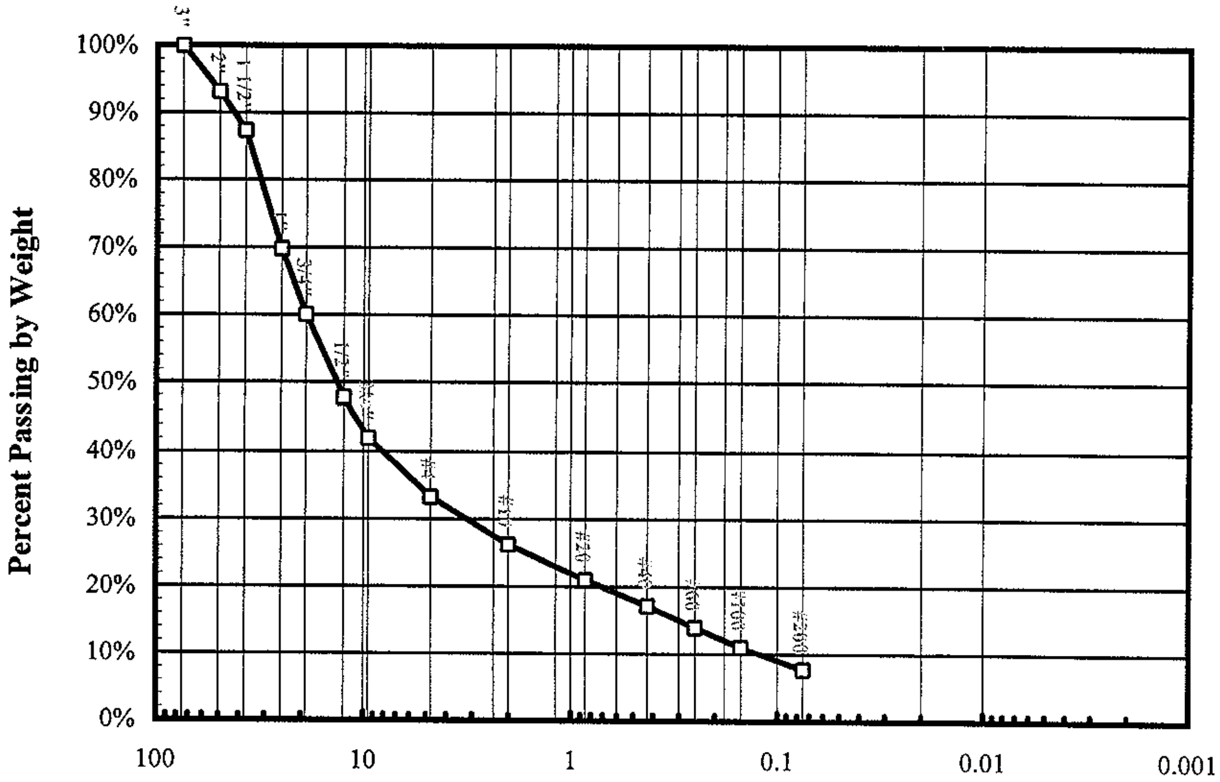
PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-706
Received: 6/1/06
Reported: 6/8/06

Location: Test Boring 106
Sample 2
Depth 10' - 11'

Engineering Classification: Poorly Graded GRAVEL with Silt and Sand, GP-GM

Frost Classification: Not Measured



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	93%	
1 1/2"	87%	
1"	70%	
3/4"	60%	
1/2"	48%	
3/8"	42%	
No. 4	33%	
Total Wt. = 23935g		
No. 8		
No. 10	26%	
No. 16		
No. 20	21%	
No. 30		
No. 40	17%	
No. 50		
No. 60	14%	
No. 80		
No. 100	11%	
No. 200	7.7%	
Total Wt. of Fine Fraction = 370.8g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 107
Sample 1
Depth 0.3'-3'

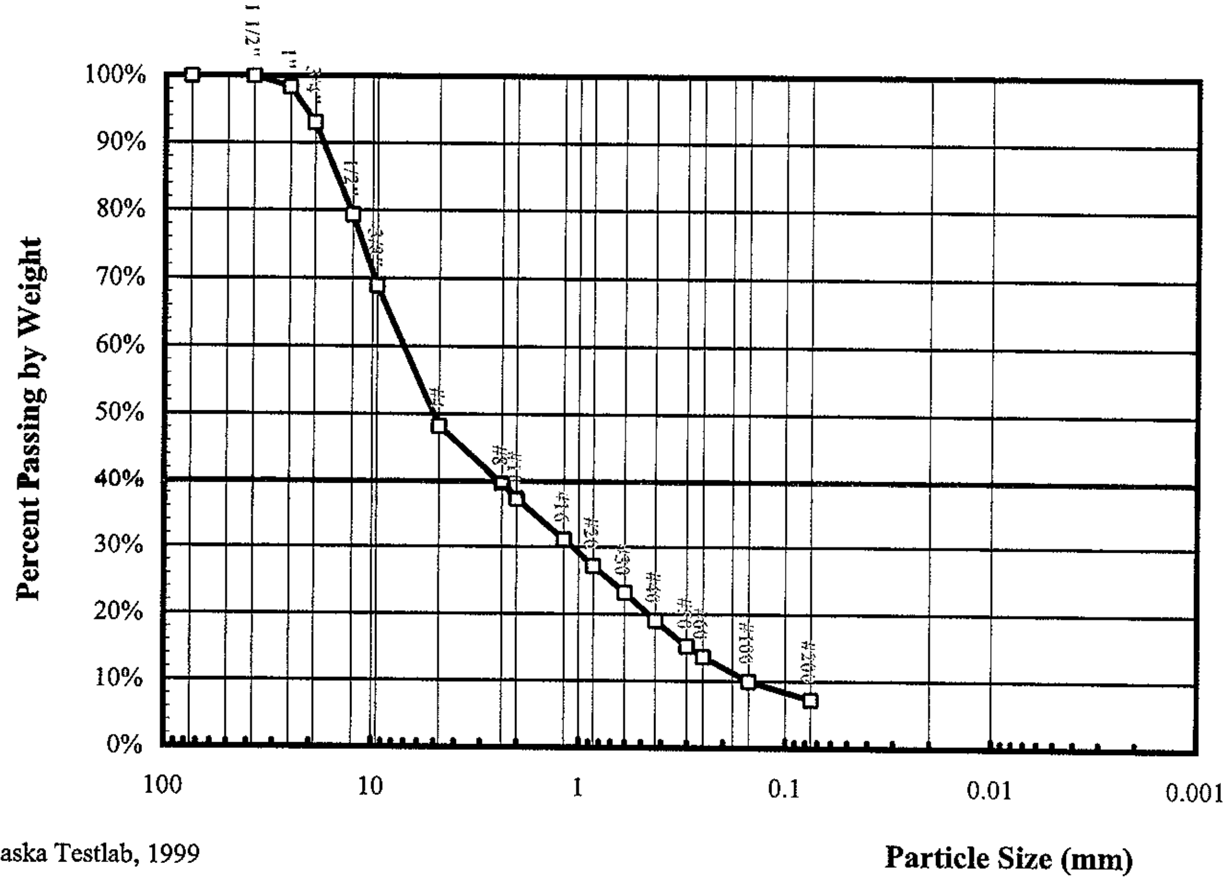
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2974
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	93%	
1/2"	79%	
3/8"	69%	
No. 4	48%	
Total Wt. = 21607g		
No. 8	40%	
No. 10	37%	
No. 16	31%	
No. 20	27%	
No. 30	23%	
No. 40	19%	
No. 50	15%	
No. 60	14%	
No. 80		
No. 100	10%	
No. 200	7.2%	
Total Wt. of Fine Fraction = 563.5g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 107
Sample 3
Depth 5'-6.5'

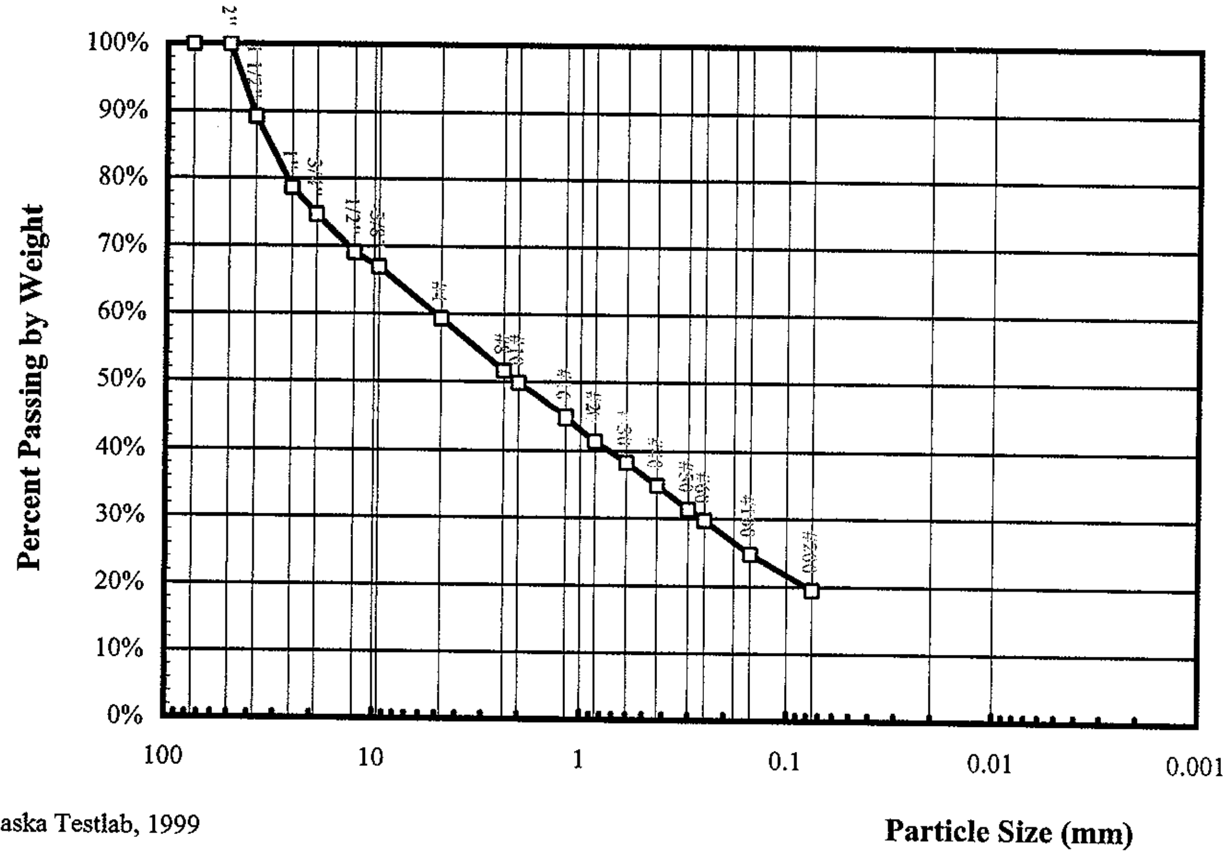
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2975
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	89%	
1"	79%	
3/4"	75%	
1/2"	69%	
3/8"	67%	
No. 4	59%	
Total Wt. = 1399g		
No. 8	52%	
No. 10	50%	
No. 16	45%	
No. 20	41%	
No. 30	38%	
No. 40	35%	
No. 50	31%	
No. 60	30%	
No. 80		
No. 100	25%	
No. 200	19%	
Total Wt. of Fine Fraction = 539.2g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 108
Sample 2
Depth 2.5'-4'

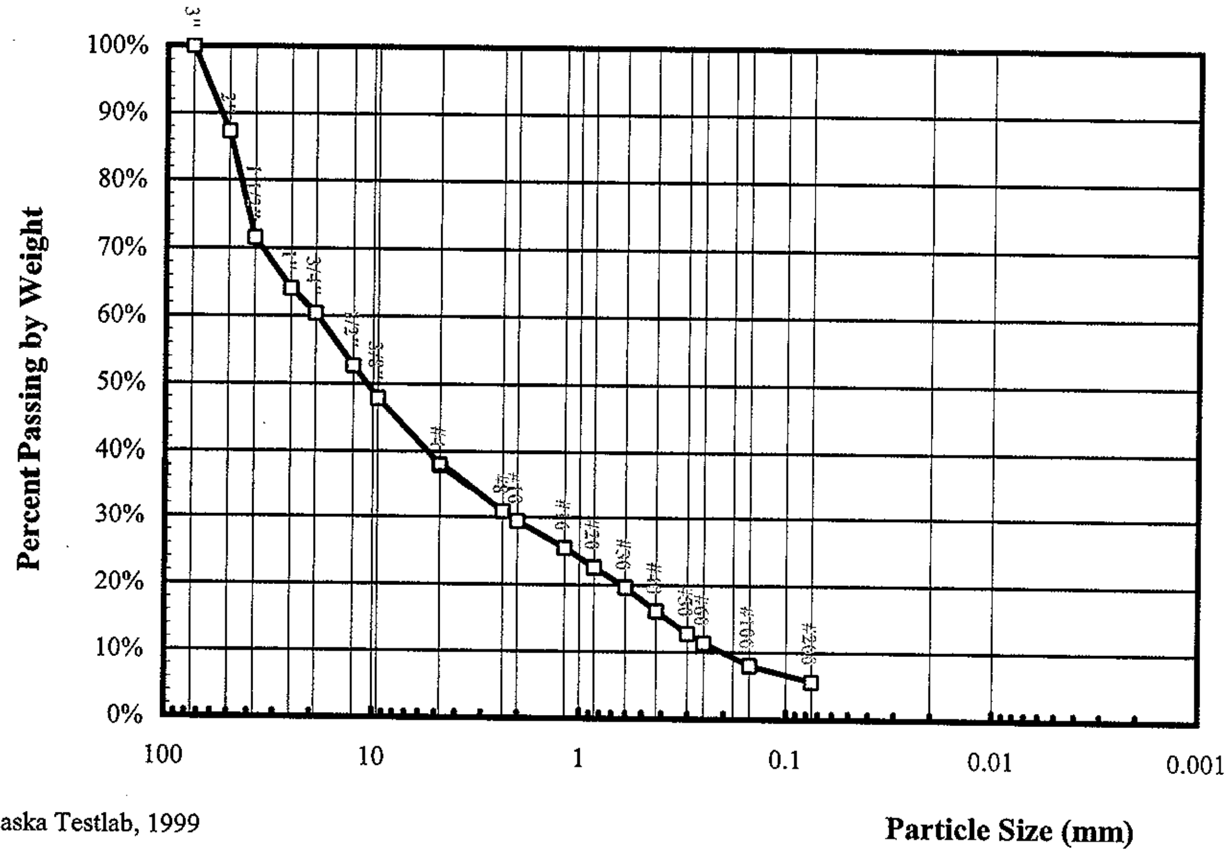
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2976
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	87%	
1 1/2"	72%	
1"	64%	
3/4"	60%	
1/2"	53%	
3/8"	48%	
No. 4	38%	
Total Wt. = 1660.1g		
No. 8	31%	
No. 10	29%	
No. 16	25%	
No. 20	23%	
No. 30	20%	
No. 40	16%	
No. 50	13%	
No. 60	11%	
No. 80		
No. 100	8%	
No. 200	5.7%	
Total Wt. of Fine Fraction = 631.9g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 108
Sample 4
Depth 10'-11.5'

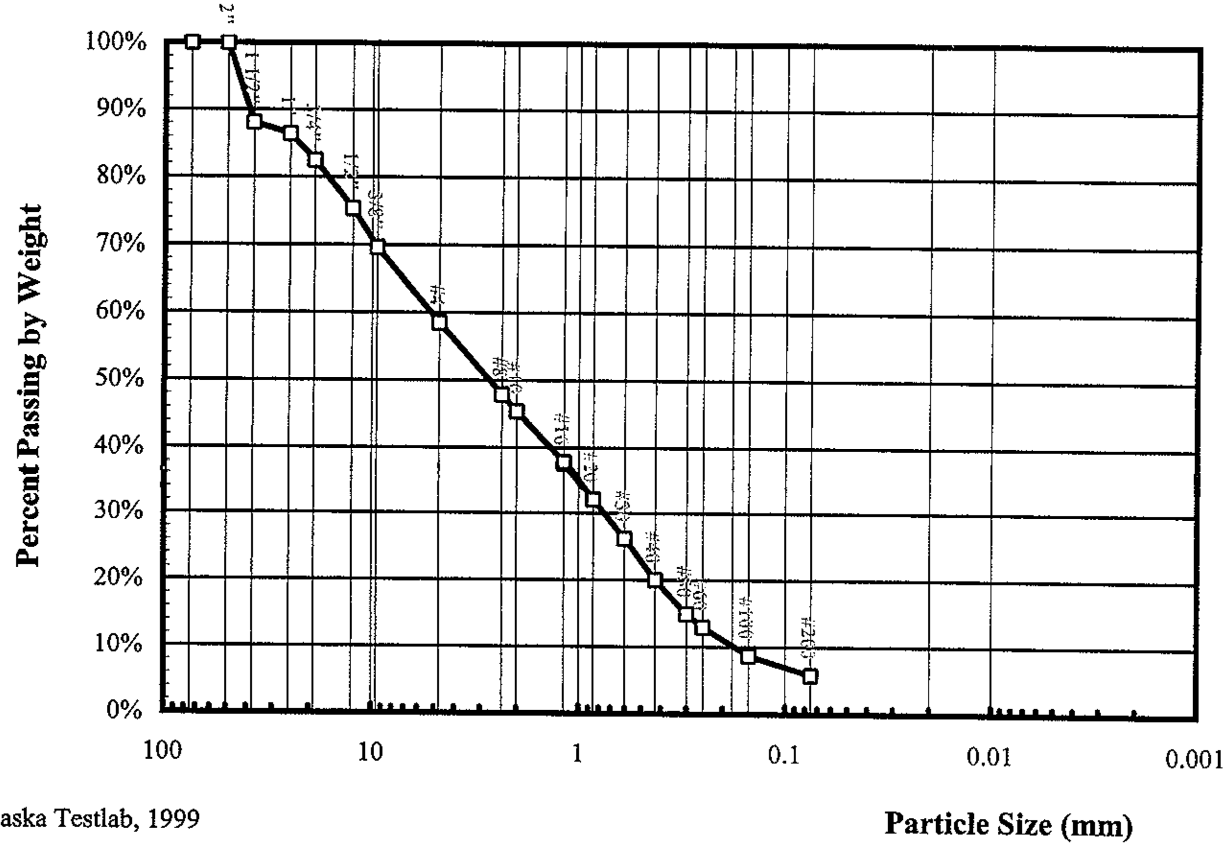
Engineering Classification: Poorly Graded SAND with Silt and Gravel, SP-SM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2977
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	88%	
1"	86%	
3/4"	82%	
1/2"	75%	
3/8"	70%	
No. 4	59%	
Total Wt. = 2214.2g		
No. 8	48%	
No. 10	45%	
No. 16	38%	
No. 20	32%	
No. 30	26%	
No. 40	20%	
No. 50	15%	
No. 60	13%	
No. 80		
No. 100	9%	
No. 200	5.8%	
Total Wt. of Fine Fraction = 528.2g		
0.02 mm		



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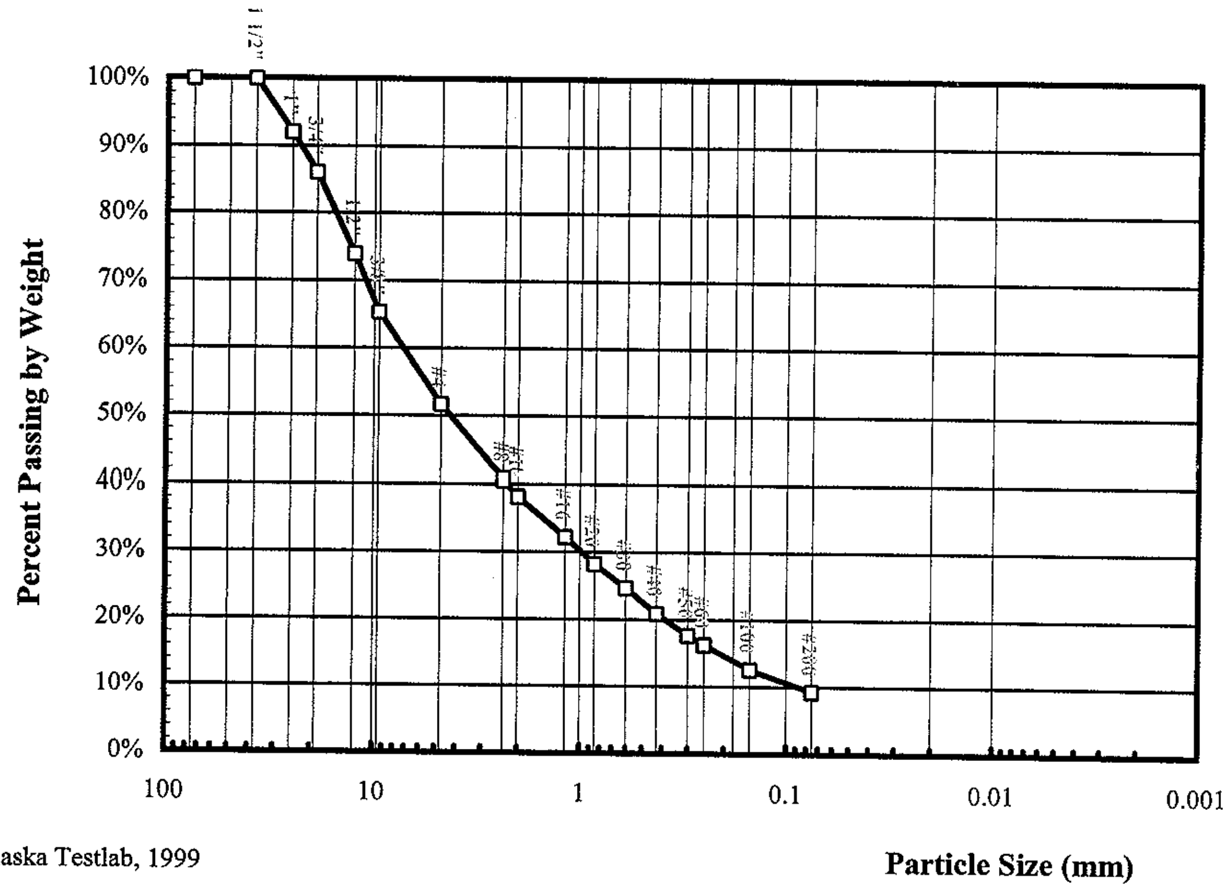
Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 109
Sample 1
Depth 0.5'-1.5'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured



PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2978
Received: 12/2/05
Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	92%	
3/4"	86%	
1/2"	74%	
3/8"	65%	
No. 4	52%	
Total Wt. = 4857g		
No. 8	41%	
No. 10	38%	
No. 16	32%	
No. 20	28%	
No. 30	25%	
No. 40	21%	
No. 50	18%	
No. 60	16%	
No. 80		
No. 100	13%	
No. 200	9.3%	
Total Wt. of Fine Fraction = 521.6g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 109

Sample 4

Depth 7'-8'

Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE

DIST. ASTM D422

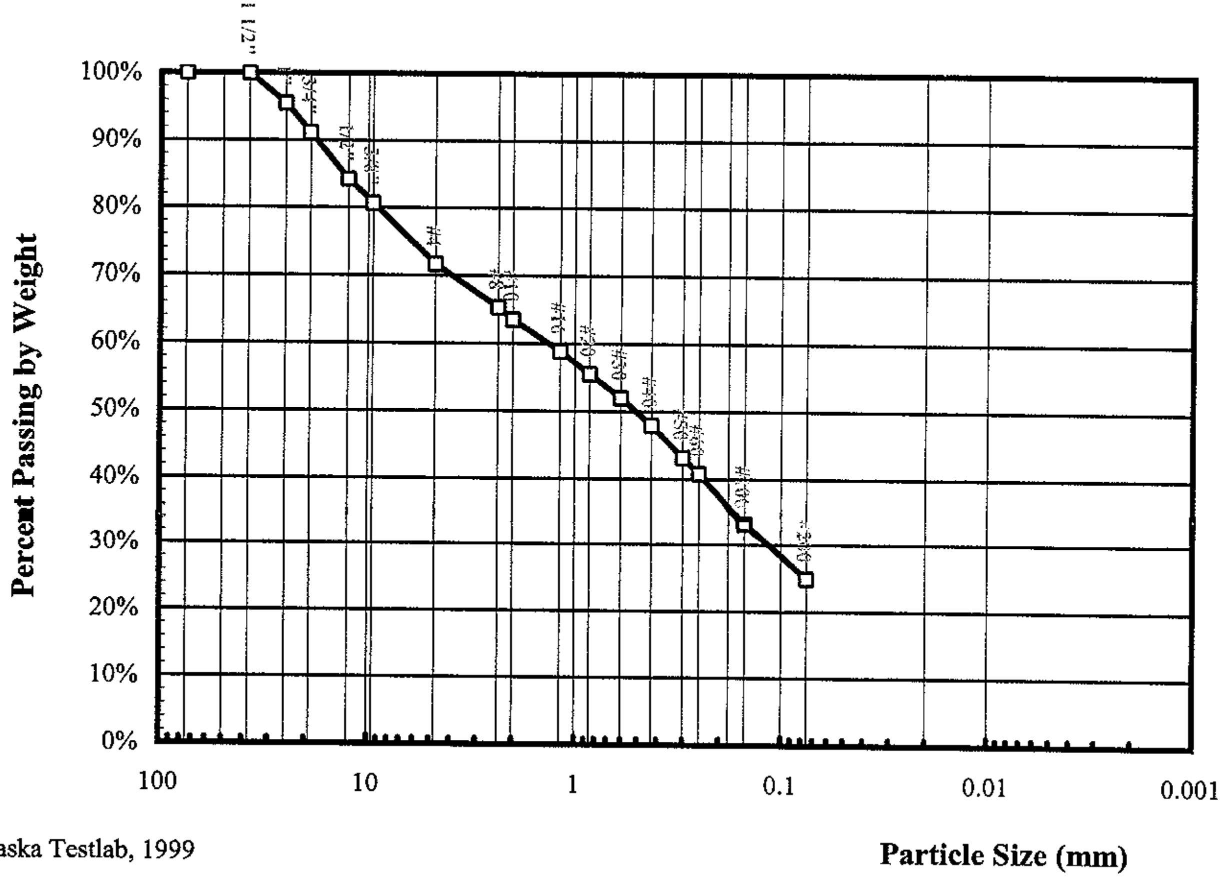
W.O. D59119D

Lab No. 2005-2979

Received: 12/2/05

Reported: 12/19/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	95%	
3/4"	91%	
1/2"	84%	
3/8"	81%	
No. 4	72%	
Total Wt. = 3664.4g		
No. 8	65%	
No. 10	64%	
No. 16	59%	
No. 20	55%	
No. 30	52%	
No. 40	48%	
No. 50	43%	
No. 60	41%	
No. 80		
No. 100	33%	
No. 200	25%	
Total Wt. of Fine Fraction = 518.3g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 110
Sample 2
Depth 3' - 3.5'

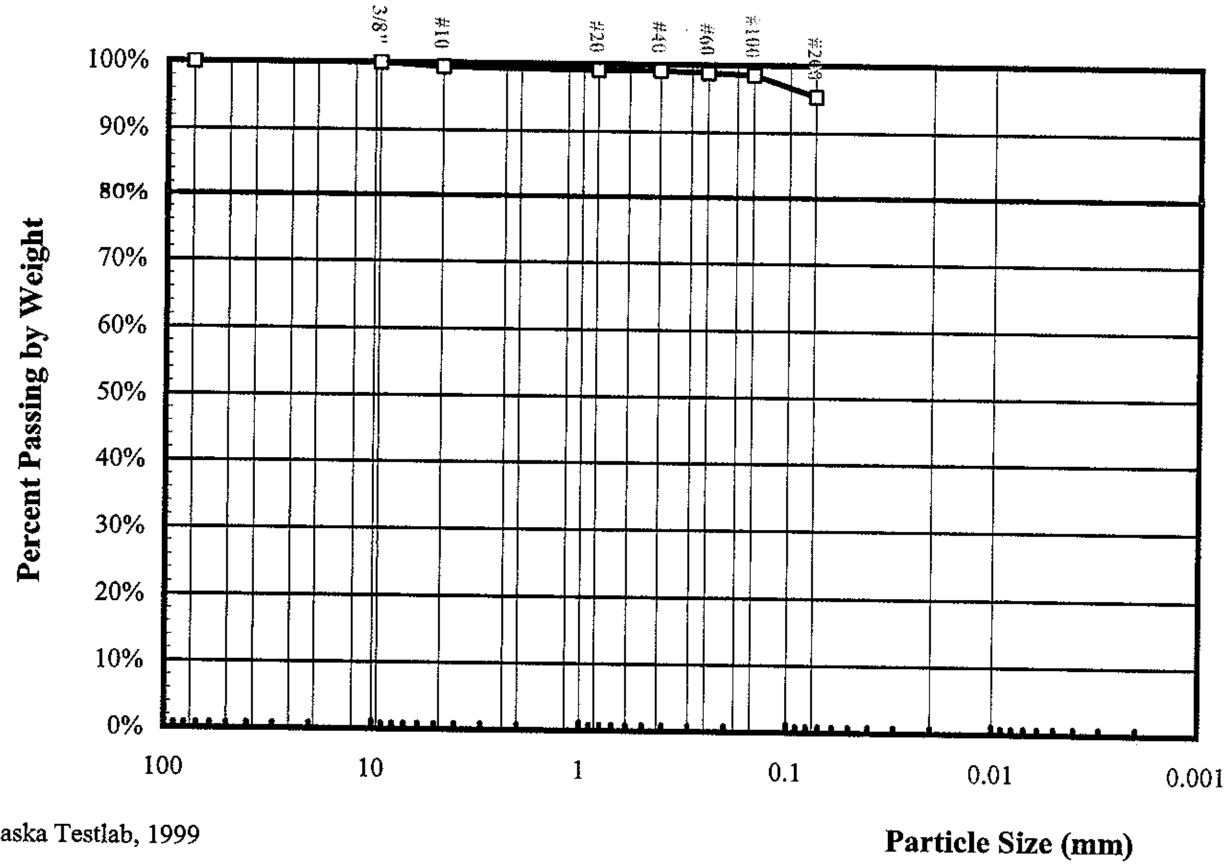
Engineering Classification: Organic SILT (OL)

Frost Classification: F4

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-707
Received: 6/1/06
Reported: 6/08/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"	100%	
No. 4		
Total Wt. = 432.1g		
No. 8		
No. 10	99%	
No. 16		
No. 20	99%	
No. 30		
No. 40	99%	
No. 50		
No. 60	99%	
No. 80		
No. 100	99%	
No. 200	95%	
Total Wt. of Fine Fraction = 34.4g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 111
Sample 2
Depth 4' - 5'

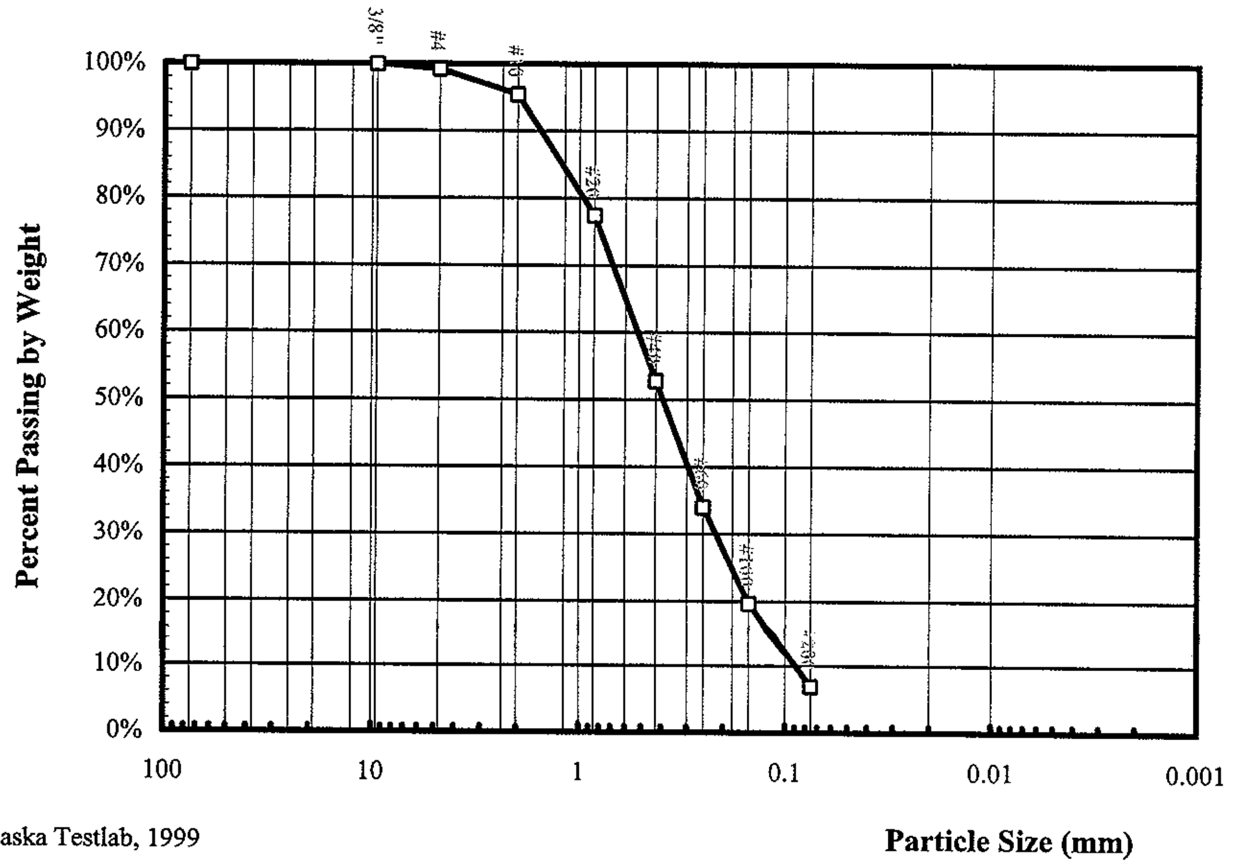
Engineering Classification: Poorly Graded SAND with Silt , SP-SM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-708
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"	100%	
No. 4	99%	
Total Wt. = 1975g		
No. 8		
No. 10	95%	
No. 16		
No. 20	77%	
No. 30		
No. 40	53%	
No. 50		
No. 60	34%	
No. 80		
No. 100	20%	
No. 200	6.9%	
Total Wt. of Fine Fraction = 483.8g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 113
Sample 2
Depth 7' - 8'

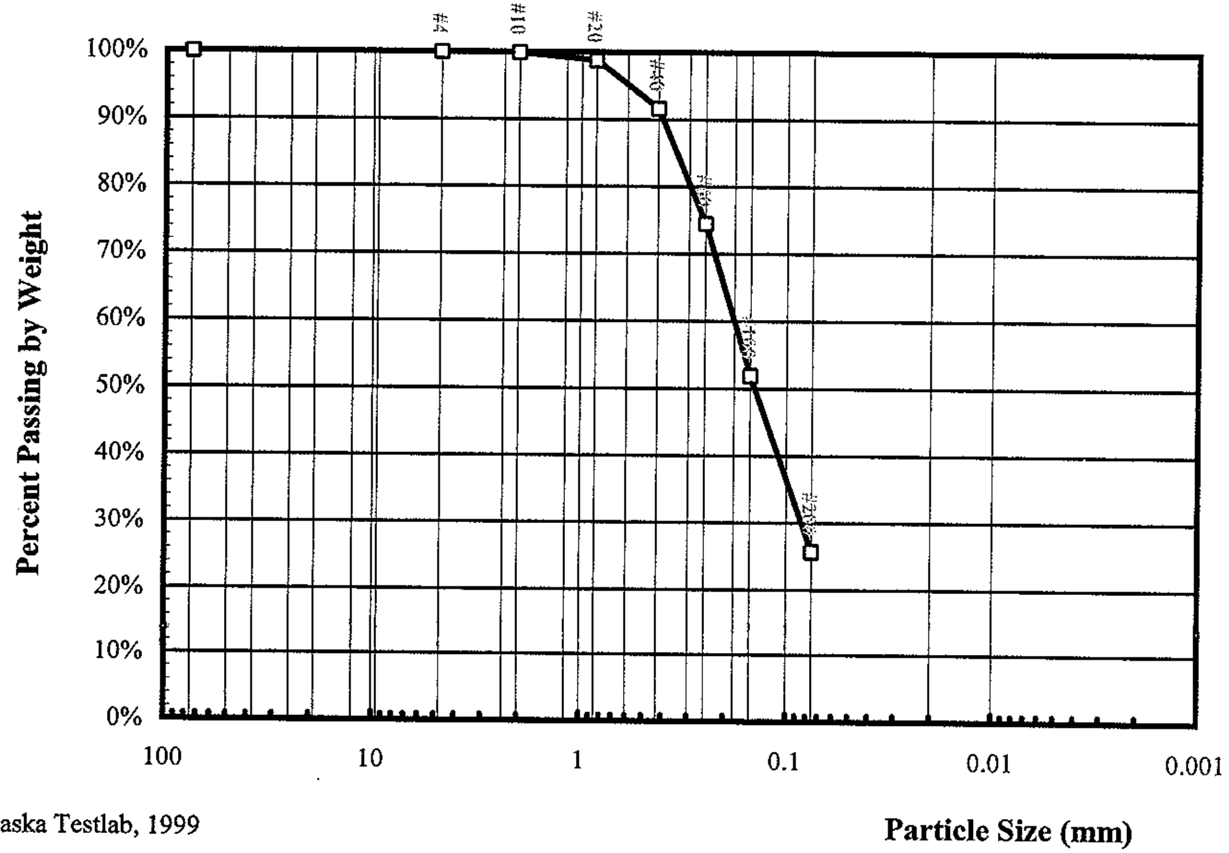
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-709
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"		
1/2"		
3/8"		
No. 4	100%	
Total Wt. = 1723g		
No. 8		
No. 10	100%	
No. 16		
No. 20	99%	
No. 30		
No. 40	92%	
No. 50		
No. 60	74%	
No. 80		
No. 100	52%	
No. 200	26%	
Total Wt. of Fine Fraction = 462.3g		
0.02 mm		



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T E S T L A B
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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 114
Sample 1
Depth 2' - 3'

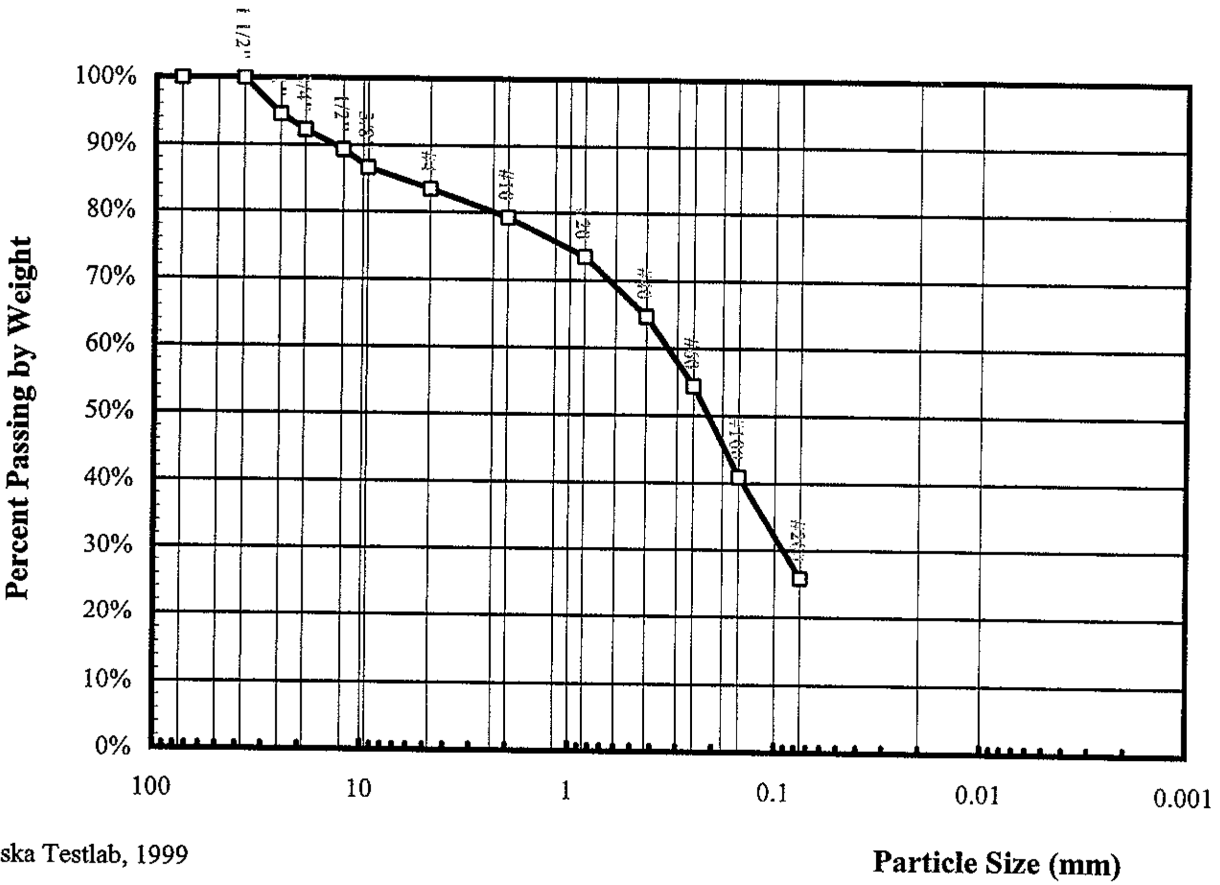
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-710
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	95%	
3/4"	92%	
1/2"	89%	
3/8"	87%	
No. 4	83%	
Total Wt. = 2148g		
No. 8		
No. 10	79%	
No. 16		
No. 20	74%	
No. 30		
No. 40	65%	
No. 50		
No. 60	54%	
No. 80		
No. 100	41%	
No. 200	26%	
Total Wt. of Fine Fraction = 436.5g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 115
Sample 1
Depth 4' - 5'

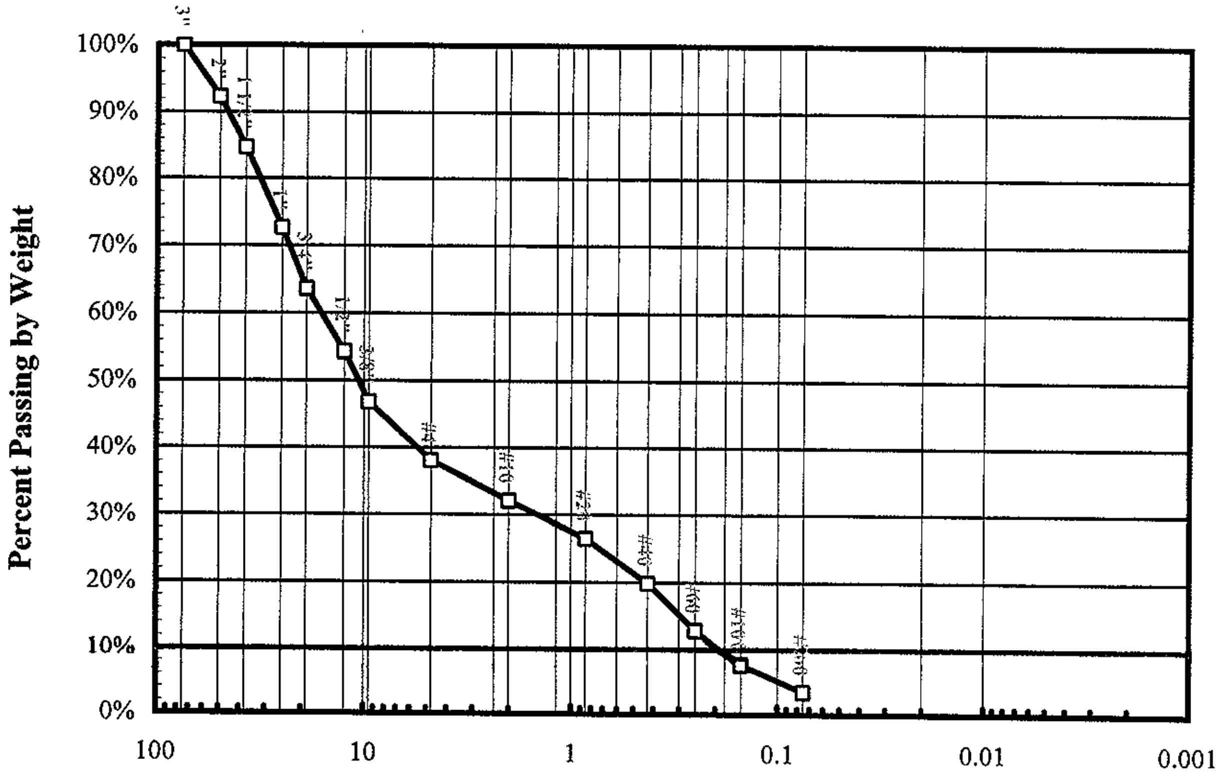
Engineering Classification: Poorly Graded GRAVEL with Sand, GP

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-711
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	92%	
1 1/2"	85%	
1"	73%	
3/4"	64%	
1/2"	54%	
3/8"	47%	
No. 4	38%	
Total Wt. = 68521g		
No. 8		
No. 10	32%	
No. 16		
No. 20	26%	
No. 30		
No. 40	20%	
No. 50		
No. 60	13%	
No. 80		
No. 100	7%	
No. 200	3.4%	
Total Wt. of Fine Fraction = 386.3g		
0.02 mm		



Particle Size (mm)

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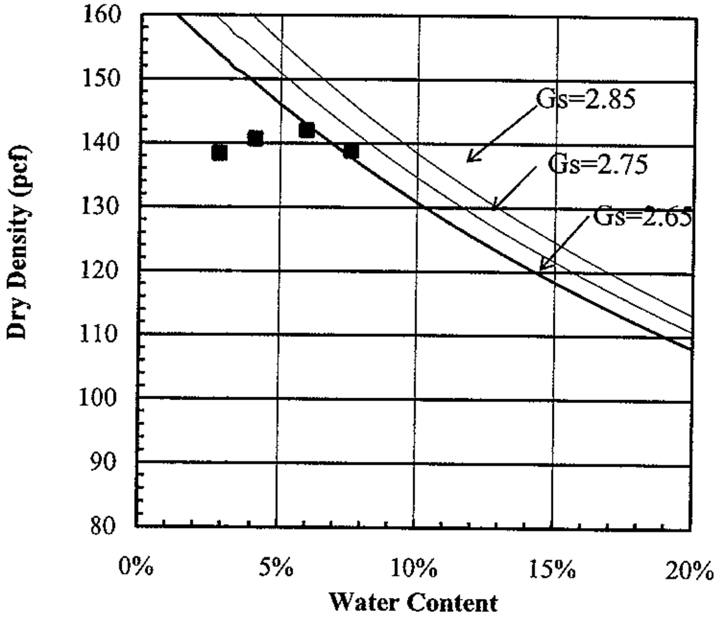
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 116
Sample 1
Depth 0'-3'

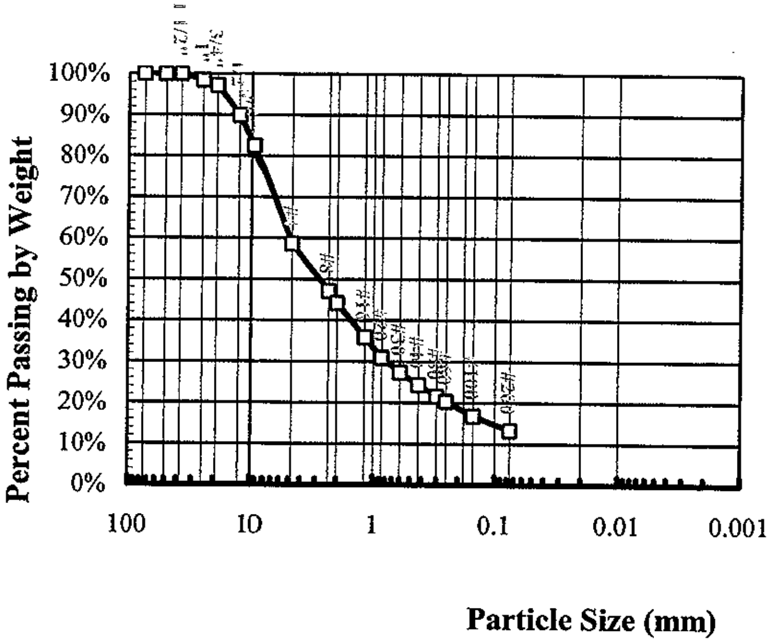
W.O. D59119D
Lab No. 2005-2980
Received: 12/2/05
Reported: 12/20/05

Engineering Classification: Silty SAND with Gravel, SM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 142 pcf
Optimum Water Content: 6 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	97%	
1/2"	90%	
3/8"	82%	
No. 4	59%	
Total Wt. = 21453g		
No. 8	47%	
No. 10		
No. 16	36%	
No. 20	31%	
No. 30	27%	
No. 40	24%	
No. 50	22%	
No. 60	20%	
No. 80		
No.100	17%	
No.200	13%	
Total Wt. of Fine Fraction = 597.8g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 117
Sample 2
Depth 5'-6.5'

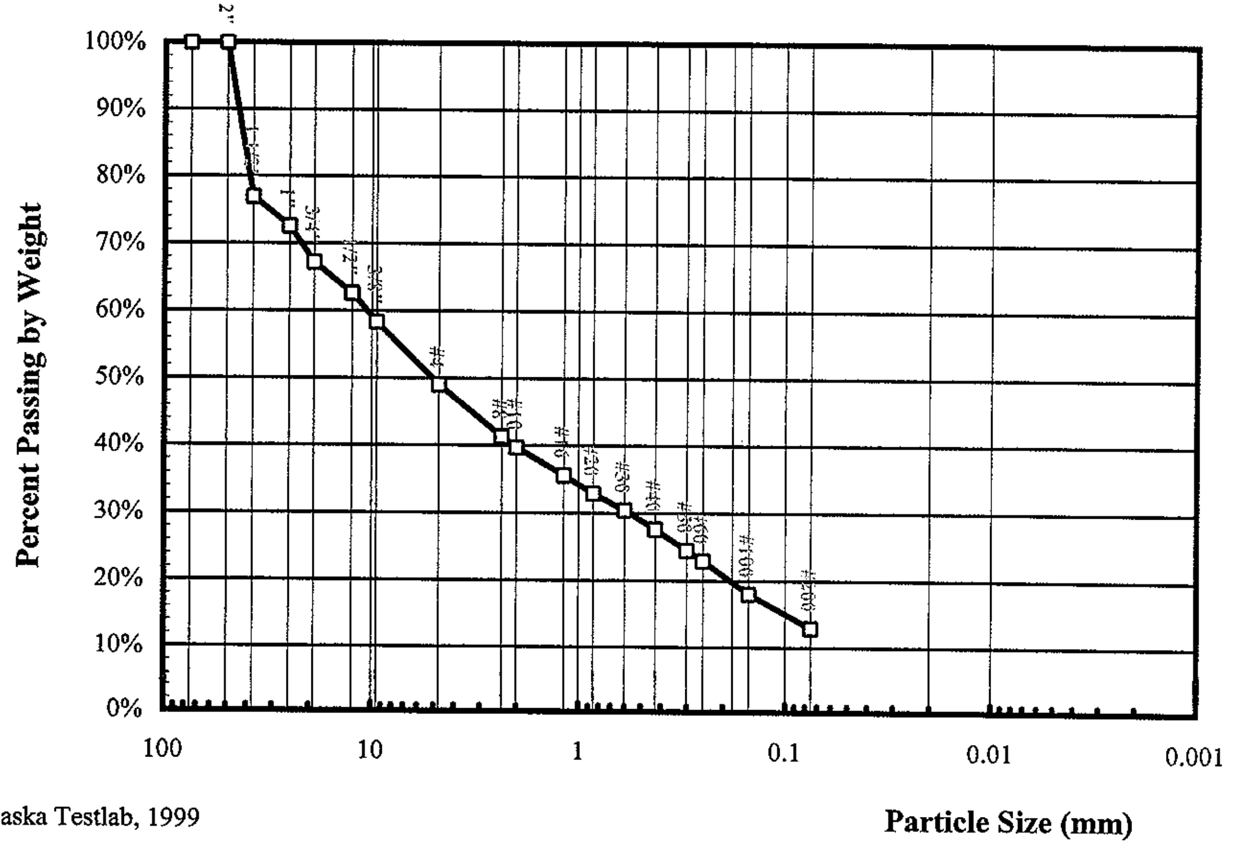
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2981
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	77%	
1"	73%	
3/4"	67%	
1/2"	63%	
3/8"	58%	
No. 4	49%	
Total Wt. = 1893.6g		
No. 8	41%	
No. 10	40%	
No. 16	36%	
No. 20	33%	
No. 30	30%	
No. 40	28%	
No. 50	25%	
No. 60	23%	
No. 80		
No. 100	18%	
No. 200	13%	
Total Wt. of Fine Fraction = 530.3g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

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ALASKA TESTLAB
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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 118
Sample 1
Depth 0.3'-3'

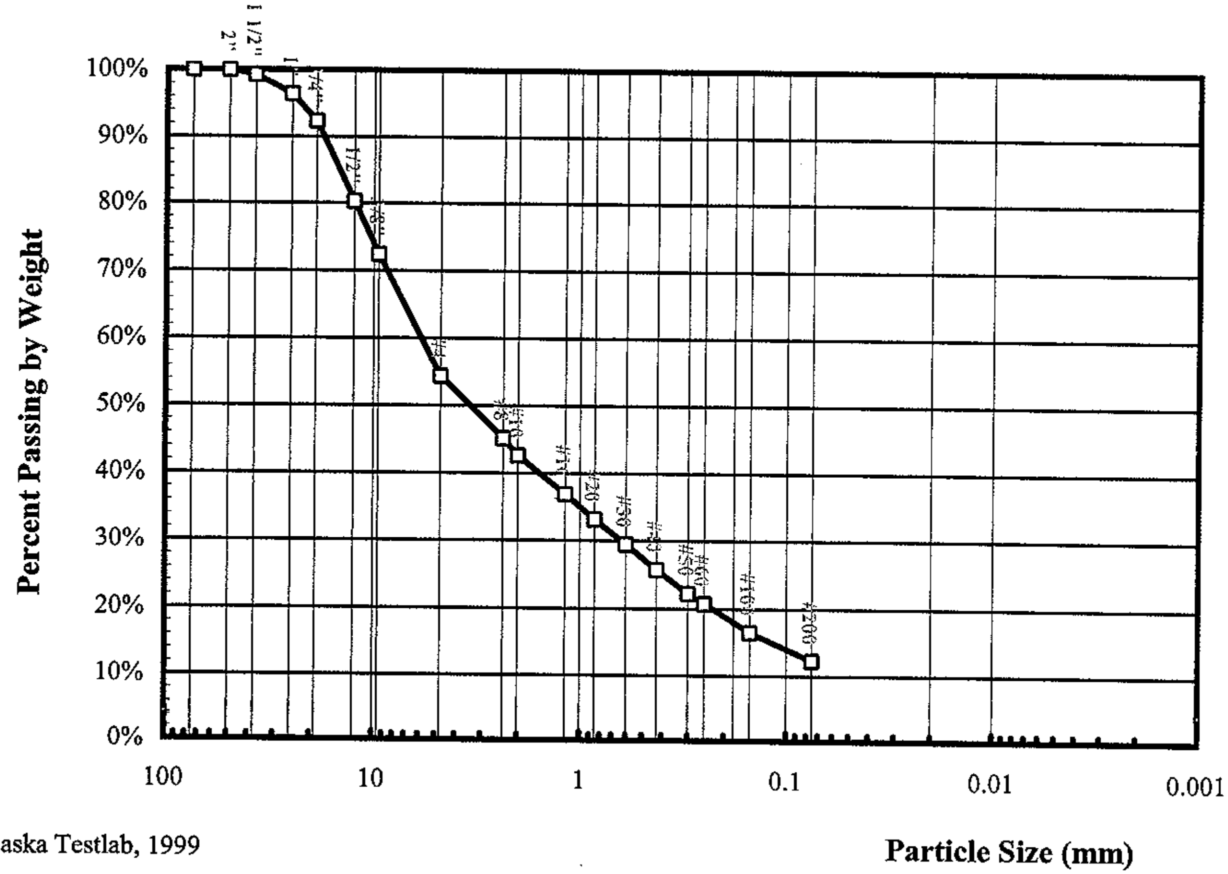
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2982
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	99%	
1"	96%	
3/4"	92%	
1/2"	80%	
3/8"	72%	
No. 4	54%	
Total Wt. = 16739g		
No. 8	45%	
No. 10	43%	
No. 16	37%	
No. 20	33%	
No. 30	29%	
No. 40	26%	
No. 50	22%	
No. 60	21%	
No. 80		
No. 100	16%	
No. 200	12%	
Total Wt. of Fine Fraction = 512.4g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 120
Sample 2
Depth 2.5'-4'

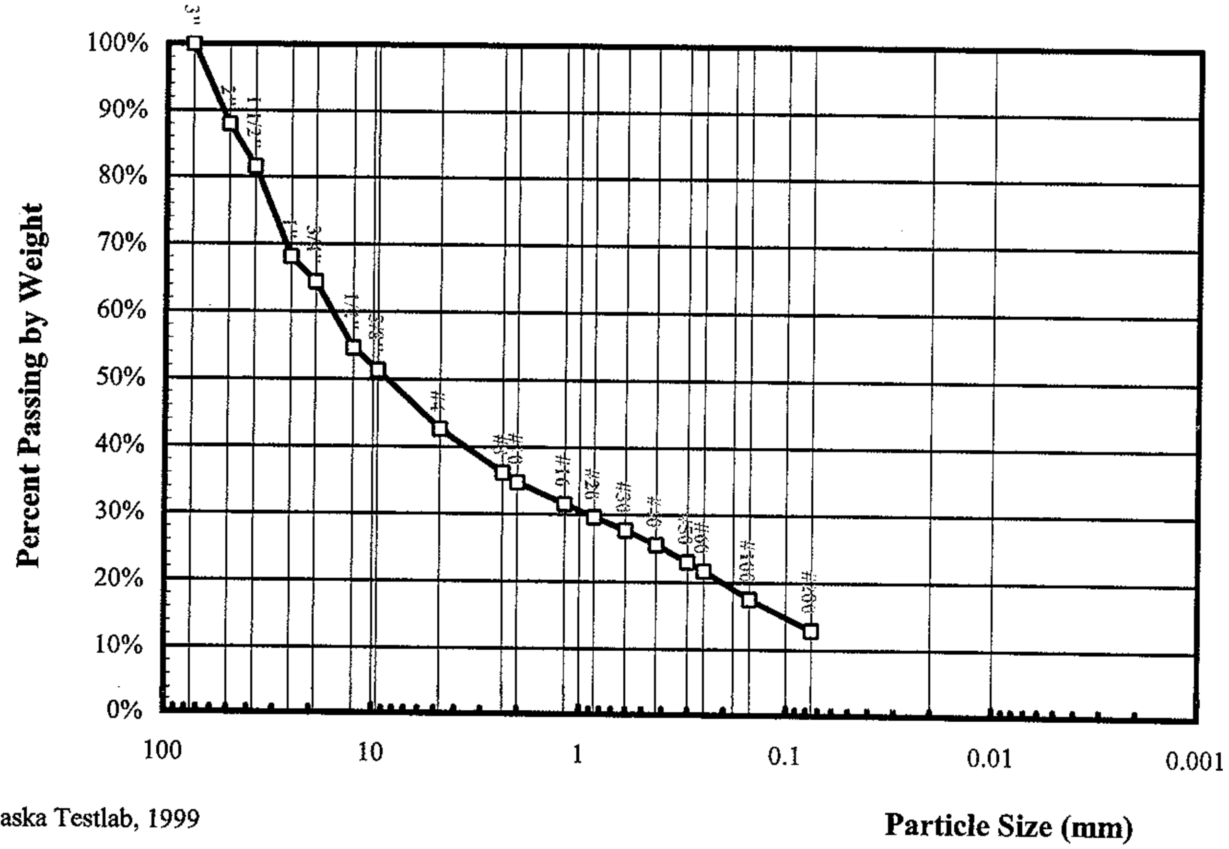
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2983
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	88%	
1 1/2"	82%	
1"	68%	
3/4"	64%	
1/2"	55%	
3/8"	51%	
No. 4	43%	
Total Wt. = 2537g		
No. 8	36%	
No. 10	35%	
No. 16	32%	
No. 20	30%	
No. 30	28%	
No. 40	26%	
No. 50	23%	
No. 60	22%	
No. 80		
No. 100	18%	
No. 200	13%	
Total Wt. of Fine Fraction = 559g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 120
Sample 4
Depth 10'-11.5'

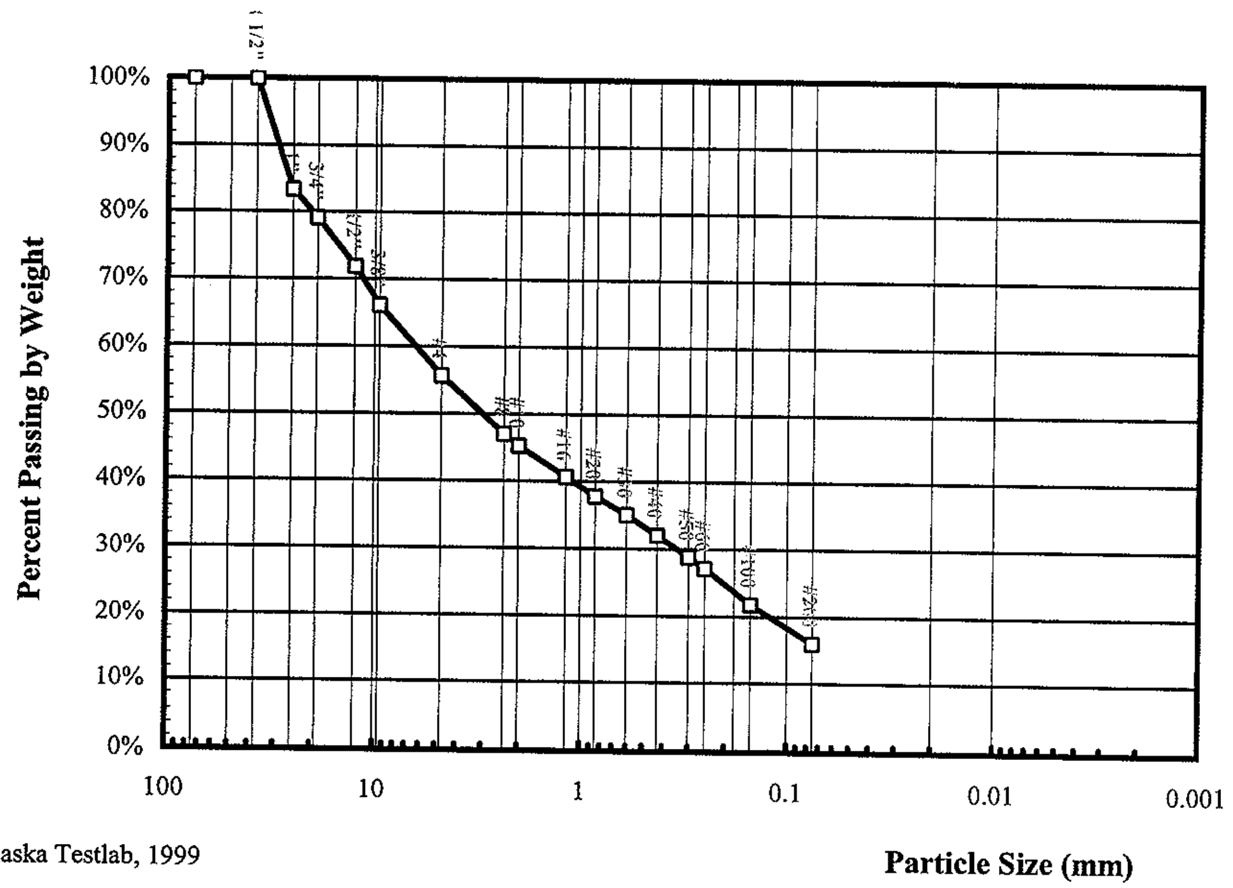
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2984
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 In Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	83%	
3/4"	79%	
1/2"	72%	
3/8"	66%	
No. 4	56%	
Total Wt. = 2066g		
No. 8	47%	
No. 10	45%	
No. 16	41%	
No. 20	38%	
No. 30	35%	
No. 40	32%	
No. 50	29%	
No. 60	27%	
No. 80		
No. 100	22%	
No. 200	16%	
Total Wt. of Fine Fraction = 564.8g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 121
Sample 1
Depth 1' - 2'

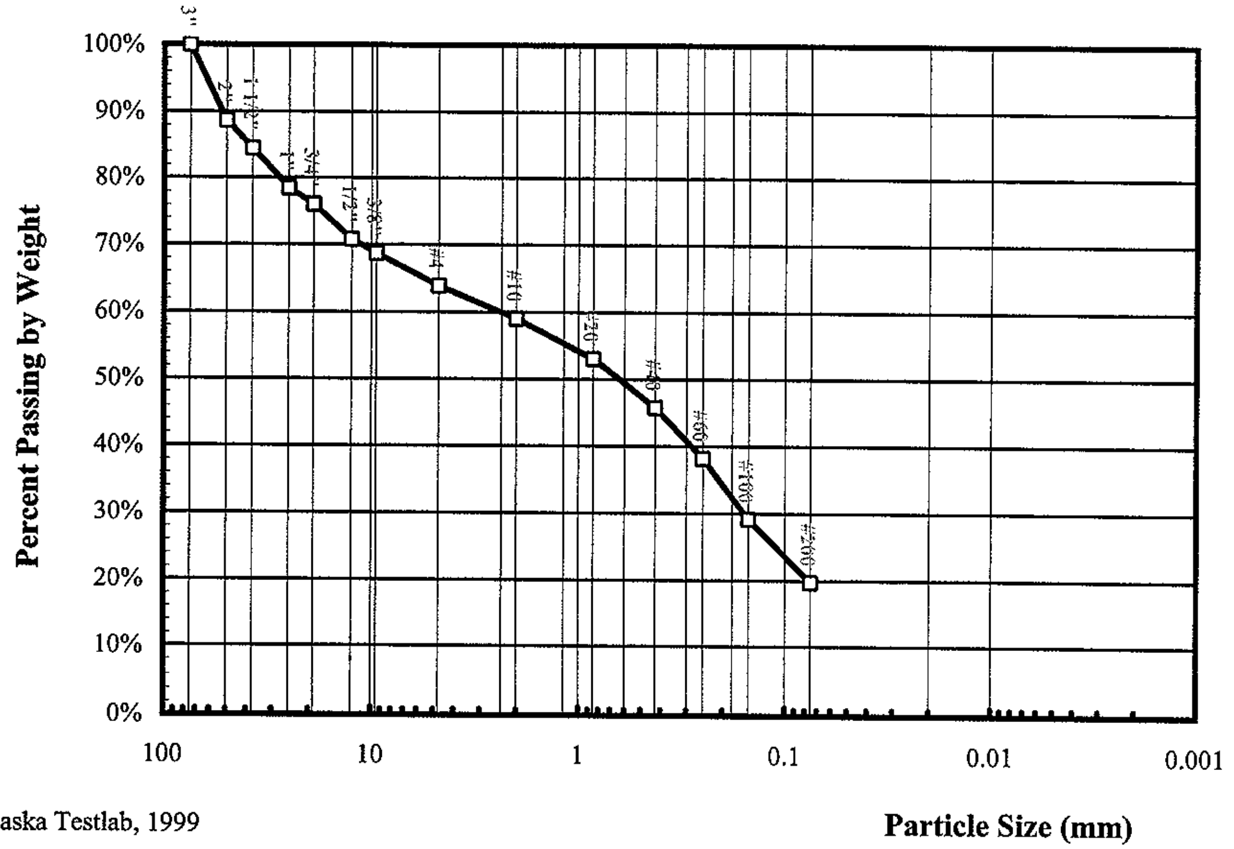
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-712
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	89%	
1 1/2"	84%	
1"	78%	
3/4"	76%	
1/2"	71%	
3/8"	69%	
No. 4	64%	
Total Wt. = 18241g		
No. 8		
No. 10	59%	
No. 16		
No. 20	53%	
No. 30		
No. 40	46%	
No. 50		
No. 60	38%	
No. 80		
No. 100	29%	
No. 200	20%	
Total Wt. of Fine Fraction = 375.6g		
0.02 mm		



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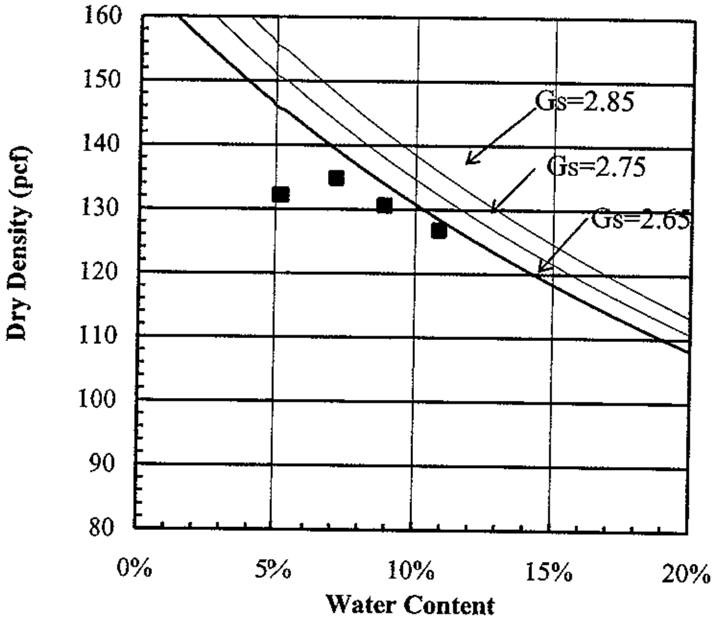
MODIFIED PROCTOR
ASTM D 1557 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Pit 122
Sample 1
Depth 0' - 3'

Engineering Classification: Silty SAND with Gravel, SM
Frost Classification: Not Measured

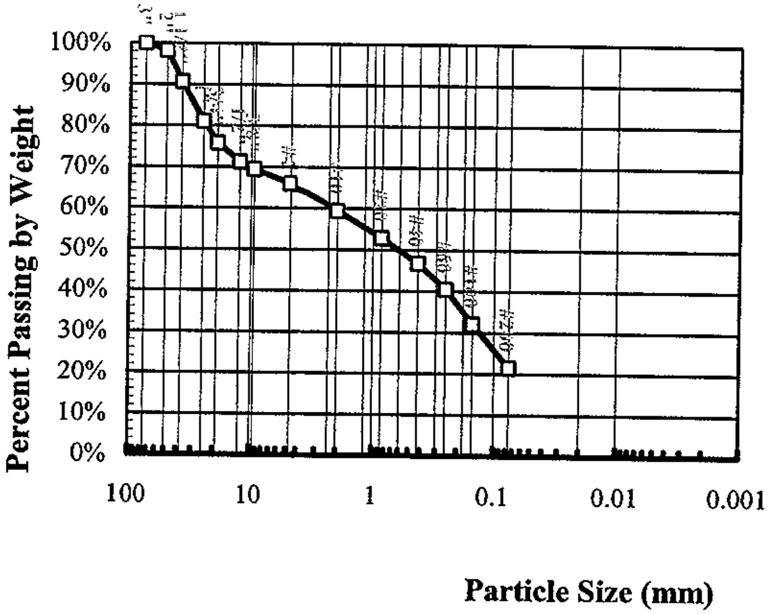
W.O. D59119D
Lab No. 2006-713
Received: 6/1/06
Reported: 6/8/06



Uncorrected
Maximum Density: 134.9 pcf
Optimum Water Content: 7.1 %

Corrected Density: 141 pcf
Corrected Optimum: 5.5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"	100%	
2"	98%	
1 1/2"	91%	
1"	81%	
3/4"	76%	
1/2"	71%	
3/8"	69%	
No. 4	66%	
Total Wt. = 14489g		
No. 8		
No. 10	59%	
No. 16		
No. 20	53%	
No. 30		
No. 40	47%	
No. 50		
No. 60	40%	
No. 80		
No.100	32%	
No.200	22%	
Total Wt. of Fine Fraction = 752.1g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 124
Sample 2
Depth 4' - 5'

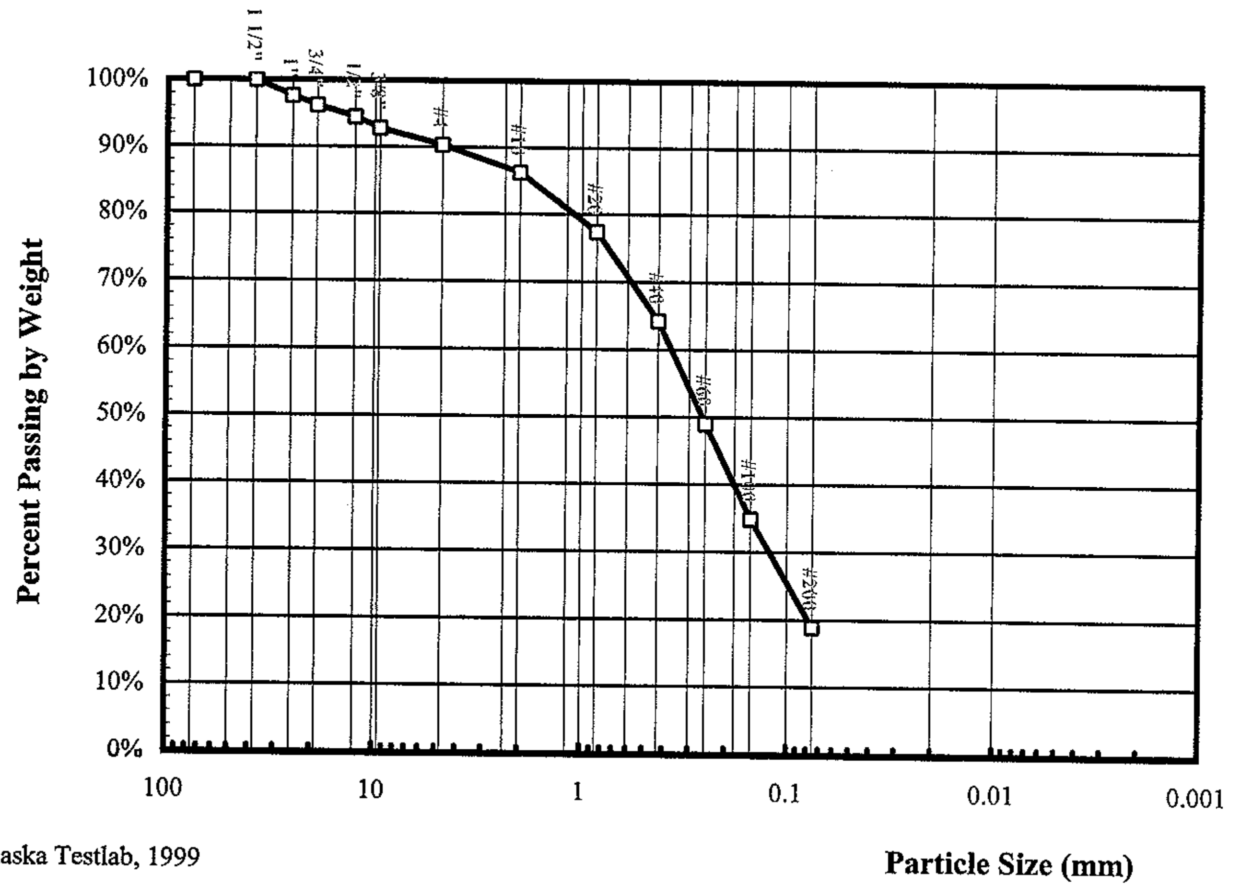
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-673
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	96%	
1/2"	94%	
3/8"	93%	
No. 4	90%	
Total Wt. = 3088g		
No. 8		
No. 10	86%	
No. 16		
No. 20	77%	
No. 30		
No. 40	64%	
No. 50		
No. 60	49%	
No. 80		
No. 100	35%	
No. 200	19%	
Total Wt. of Fine Fraction = 421.4g		
0.02 mm		



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David L. Andersen, P.E., Technical Advisor

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 126
Sample 1
Depth 3' - 4'

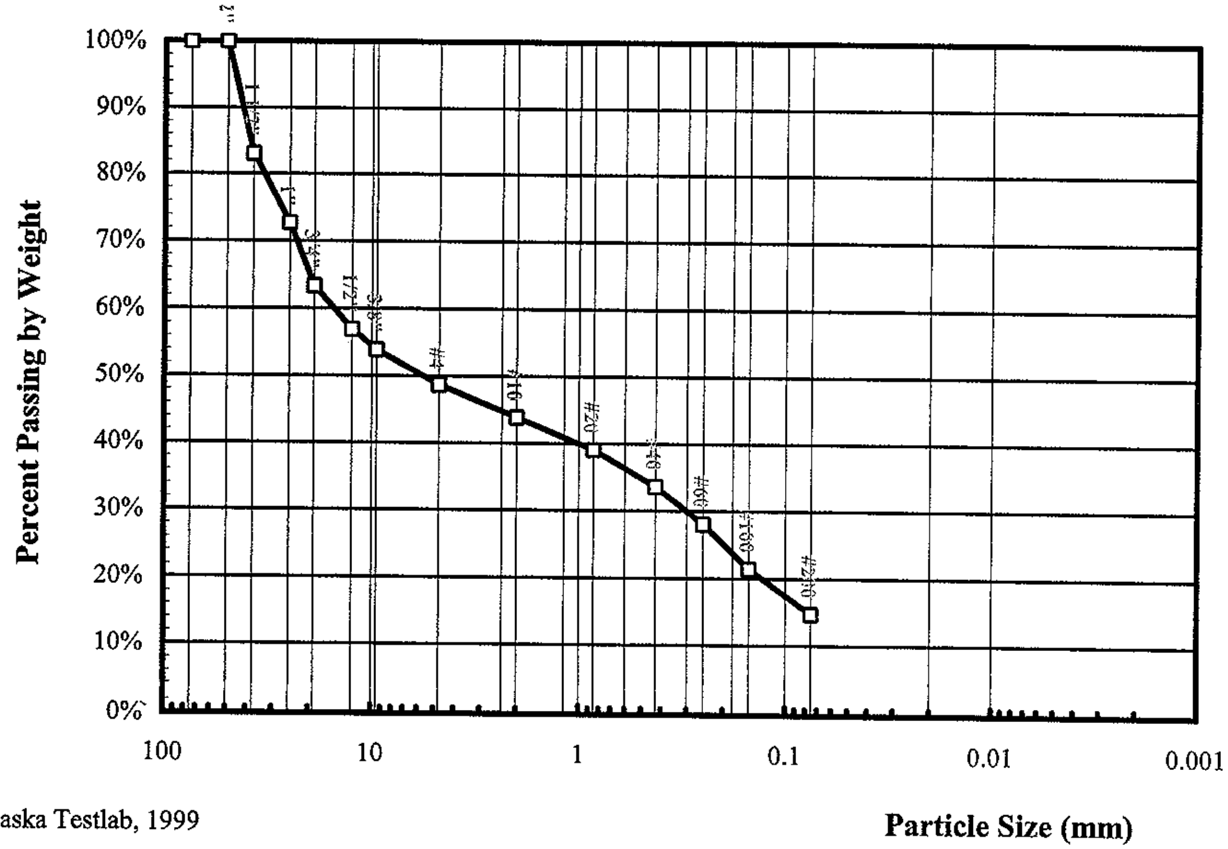
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-674
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	83%	
1"	73%	
3/4"	63%	
1/2"	57%	
3/8"	54%	
No. 4	49%	
Total Wt. = 4251g		
No. 8		
No. 10	44%	
No. 16		
No. 20	39%	
No. 30		
No. 40	34%	
No. 50		
No. 60	28%	
No. 80		
No. 100	21%	
No. 200	15%	
Total Wt. of Fine Fraction = 314.8g		
0.02 mm		



David L Andersen
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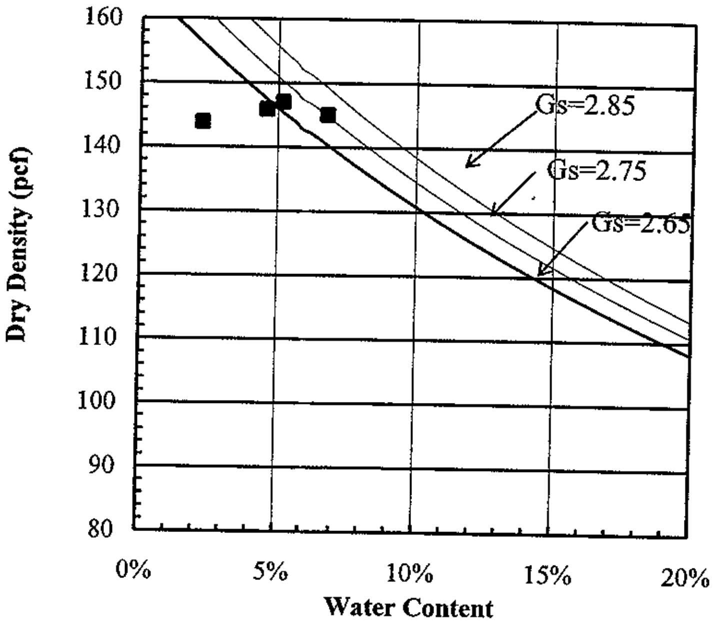
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 129
Sample 1
Depth 0.2'-3'

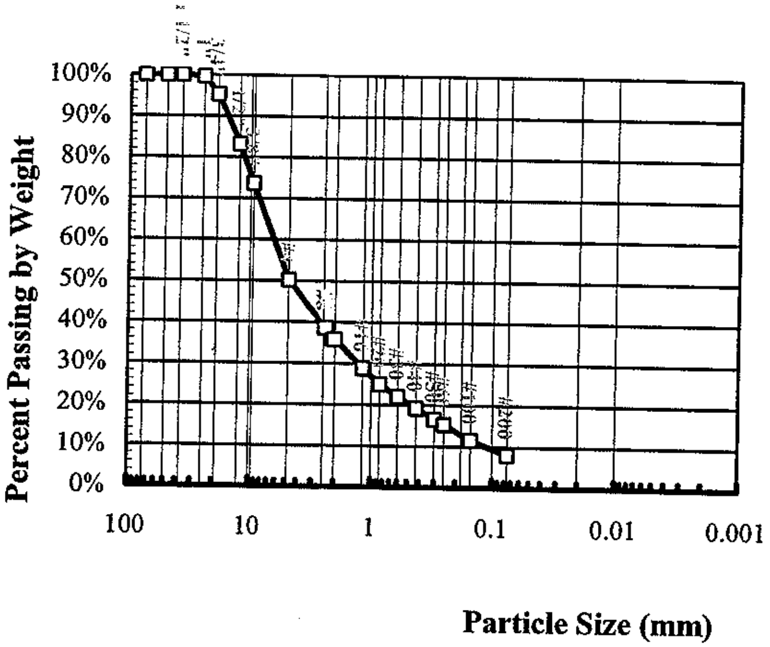
W.O. D59119D
Lab No. 2005-2985
Received: 12/2/05
Reported: 12/20/05

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 147 pcf
Optimum Water Content: 5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -0%		
3"		
2"		
1 1/2"	100%	
1"	100%	
3/4"	95%	
1/2"	83%	
3/8"	74%	
No. 4	50%	
Total Wt. = 20974g		
No. 8	39%	
No. 10		
No. 16	29%	
No. 20	25%	
No. 30	22%	
No. 40	19%	
No. 50	17%	
No. 60	15%	
No. 80		
No.100	12%	
No.200	8%	
Total Wt. of Fine Fraction = 615.8g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 131
Sample 1
Depth 0.3'-1'

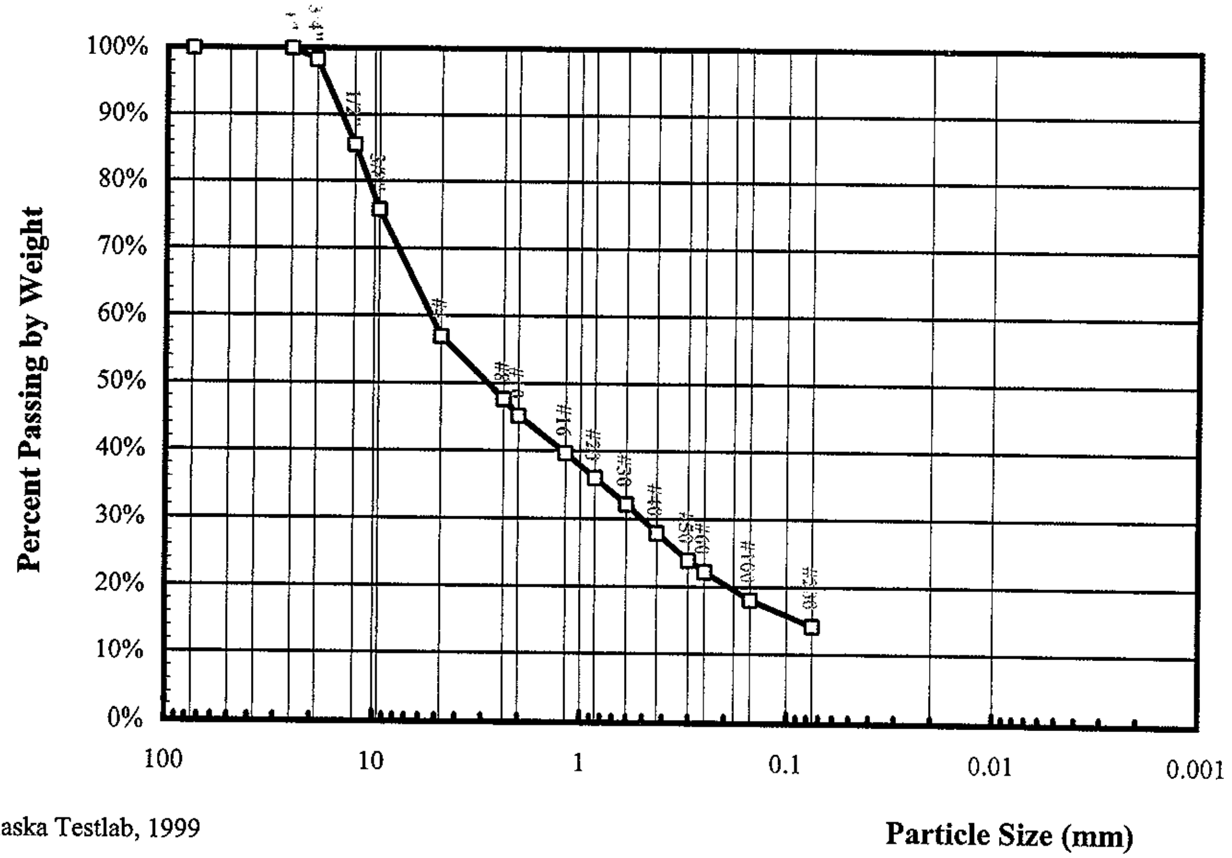
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2986
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	98%	
1/2"	85%	
3/8"	76%	
No. 4	57%	
Total Wt. = 3746.9g		
No. 8	48%	
No. 10	45%	
No. 16	40%	
No. 20	36%	
No. 30	32%	
No. 40	28%	
No. 50	24%	
No. 60	22%	
No. 80		
No. 100	18%	
No. 200	14%	
Total Wt. of Fine Fraction = 531.2g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 133
Sample 1
Depth 0.3'-3'

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

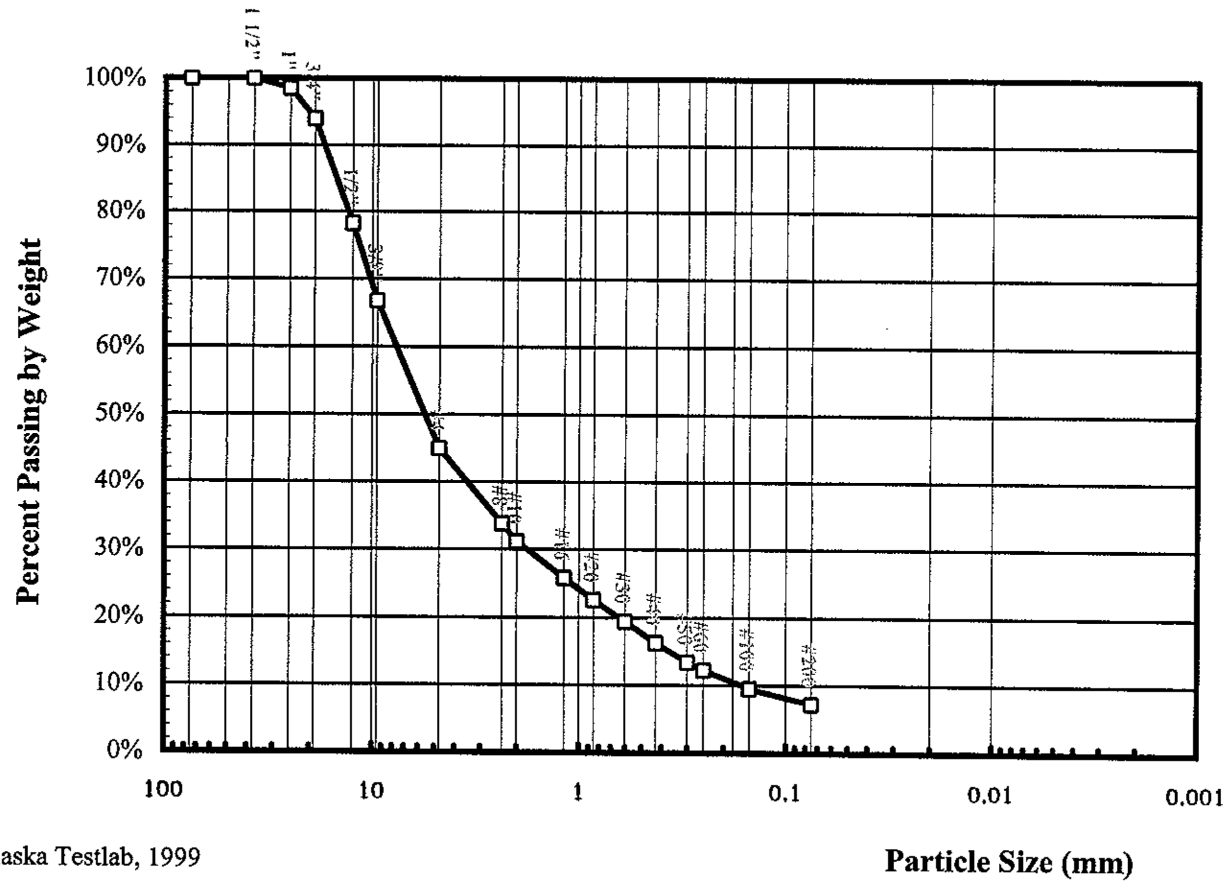
Frost Classification: Not Measured

PARTICLE-SIZE

DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2987
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	99%	
3/4"	94%	
1/2"	78%	
3/8"	67%	
No. 4	45%	
Total Wt. = 21867g		
No. 8	34%	
No. 10	31%	
No. 16	26%	
No. 20	23%	
No. 30	19%	
No. 40	16%	
No. 50	13%	
No. 60	12%	
No. 80		
No. 100	10%	
No. 200	7.3%	
Total Wt. of Fine Fraction = 584.7g		
0.02 mm		



David L Andersen
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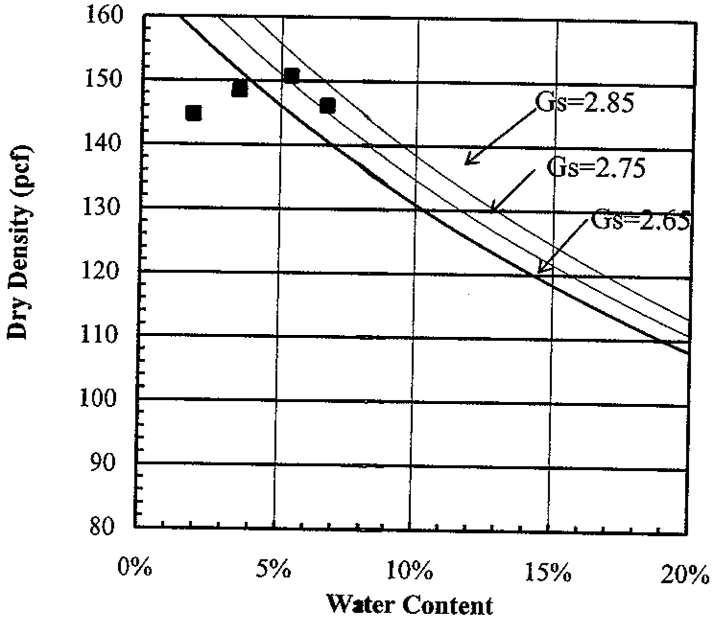
MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 134
Sample 1
Depth 0.2'-3'

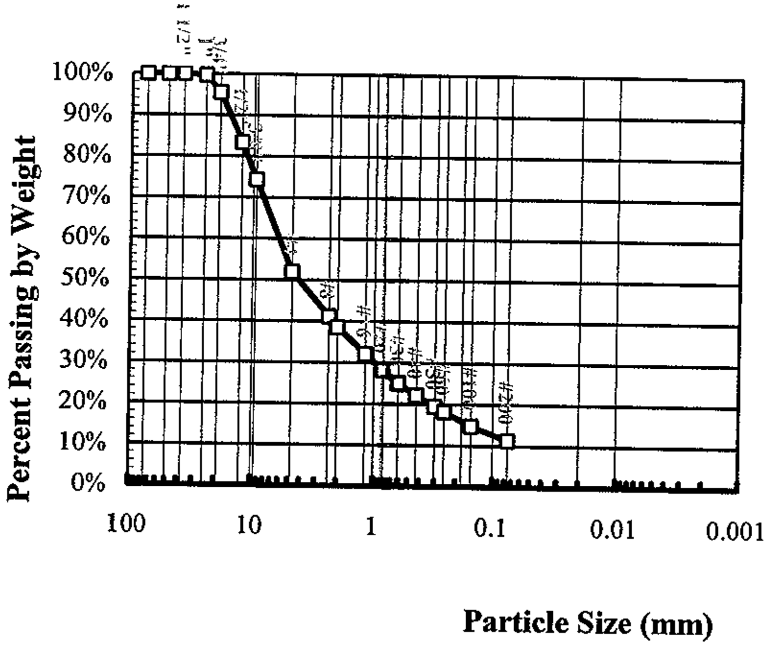
W.O. D59119D
Lab No. 2005-2988
Received: 12/12/05
Reported: 12/16/05

Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 151 pcf
Optimum Water Content: 5.5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"		
2"		
1 1/2"	100%	
1"	100%	
3/4"	95%	
1/2"	83%	
3/8"	74%	
No. 4	52%	
Total Wt. = 21702g		
No. 8	41%	
No. 10		
No. 16	32%	
No. 20	28%	
No. 30	25%	
No. 40	22%	
No. 50	19%	
No. 60	18%	
No. 80		
No.100	15%	
No.200	11%	
Total Wt. of Fine Fraction = 559.9g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 137
Sample 3
Depth 5'-6.5'

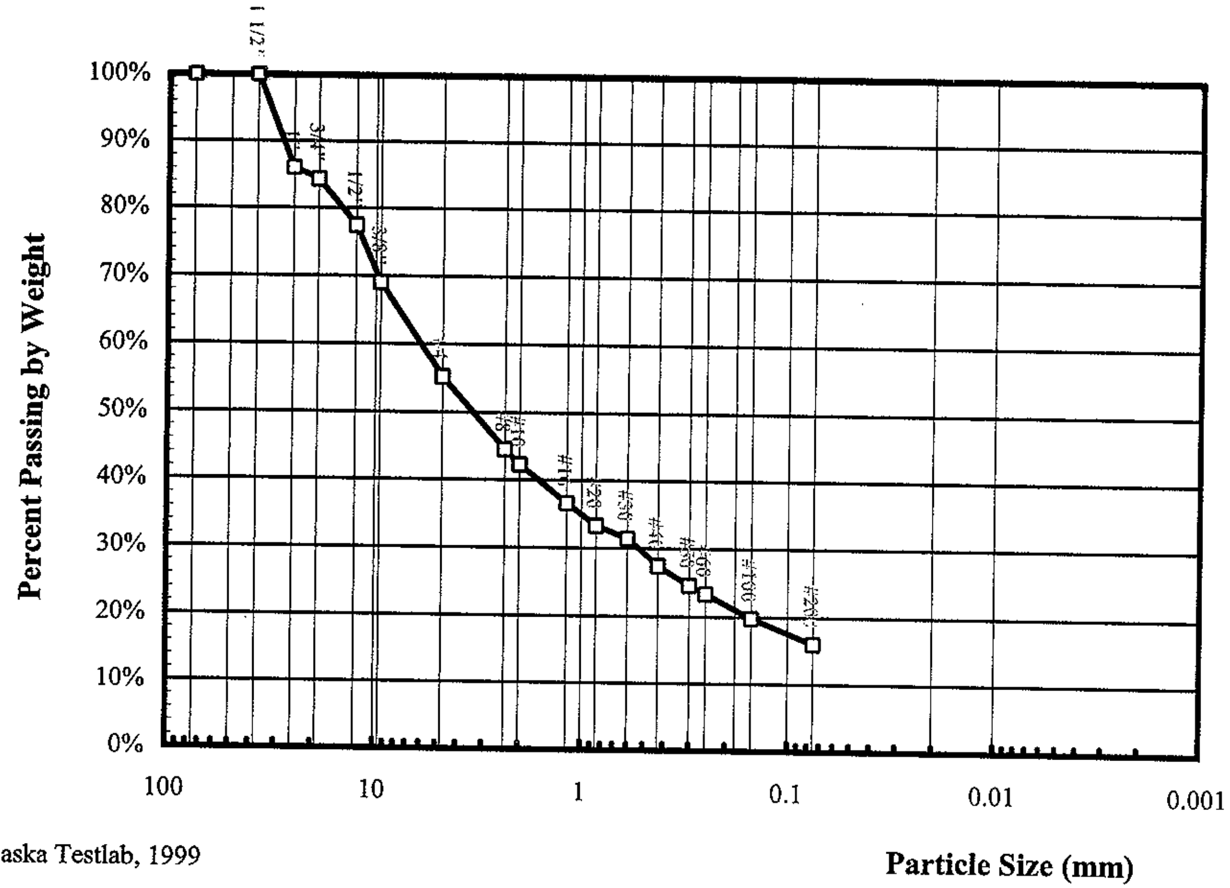
Engineering Classification: Silty GRAVEL with Sand, GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2989
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	86%	
3/4"	84%	
1/2"	77%	
3/8"	69%	
No. 4	55%	
Total Wt. = 1034g		
No. 8	45%	
No. 10	42%	
No. 16	37%	
No. 20	33%	
No. 30	31%	
No. 40	27%	
No. 50	25%	
No. 60	23%	
No. 80		
No. 100	20%	
No. 200	16%	
Total Wt. of Fine Fraction = 570.4g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 139
Sample 1
Depth 0.3'-3'

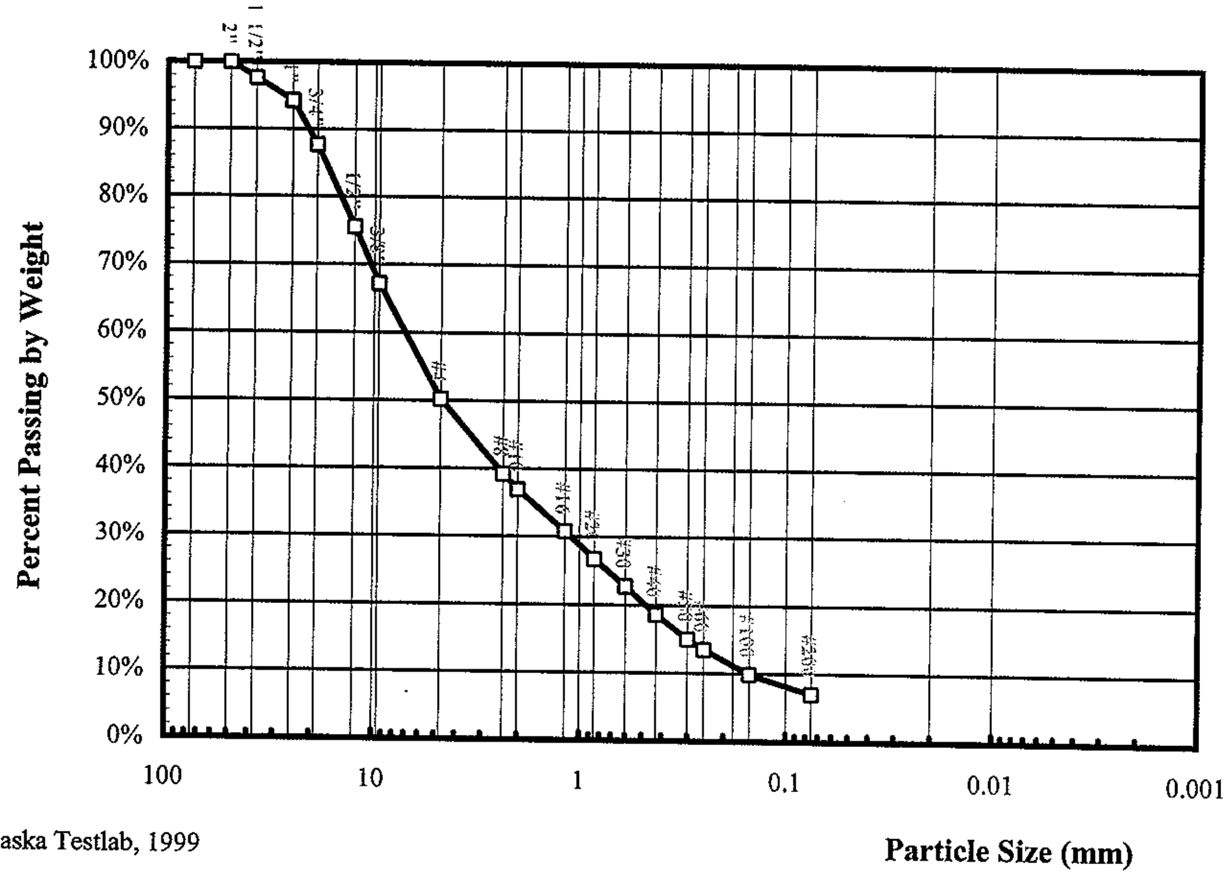
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2990
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	98%	
1"	94%	
3/4"	88%	
1/2"	76%	
3/8"	67%	
No. 4	50%	
Total Wt. = 22119g		
No. 8	39%	
No. 10	37%	
No. 16	31%	
No. 20	27%	
No. 30	23%	
No. 40	19%	
No. 50	15%	
No. 60	13%	
No. 80		
No. 100	10%	
No. 200	7%	
Total Wt. of Fine Fraction = 531.3g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 139
Sample 3
Depth 5'-6.5'

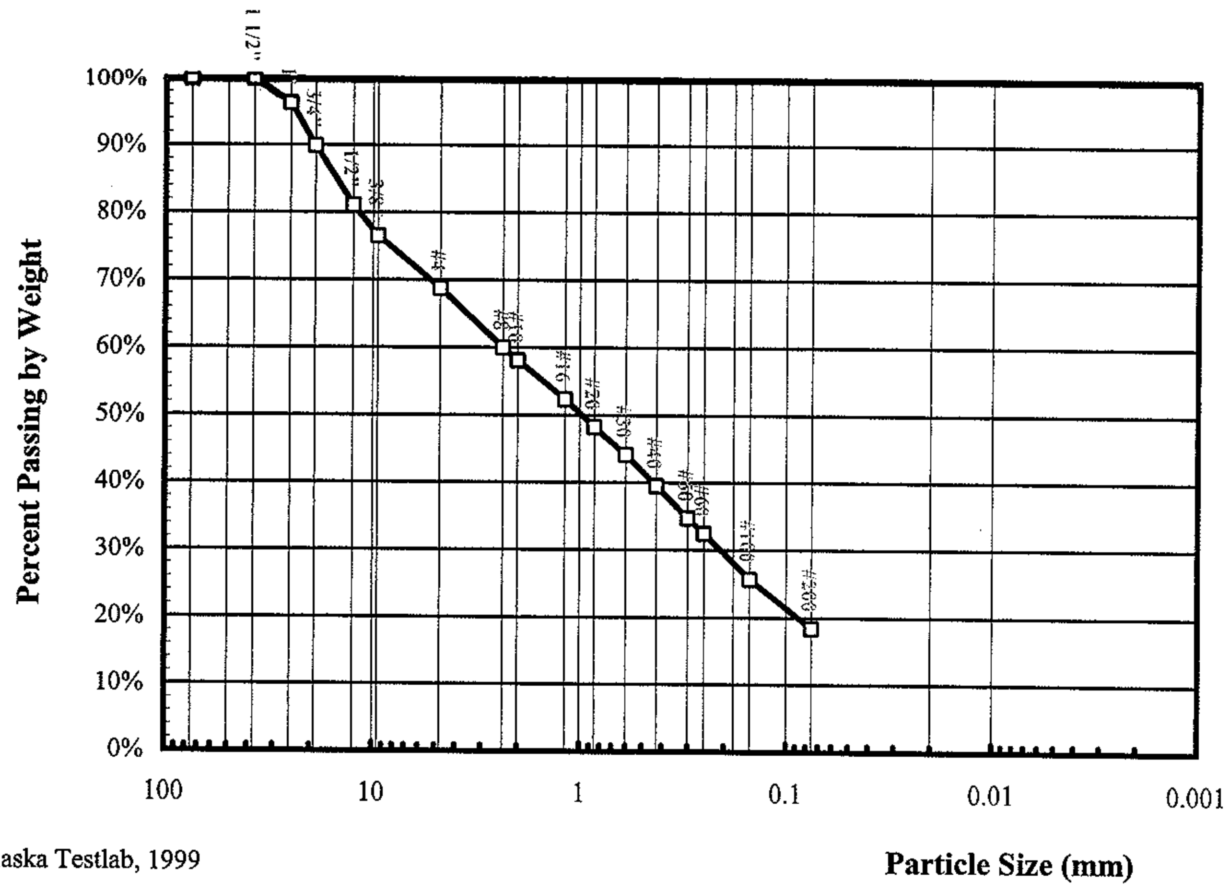
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2991
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	96%	
3/4"	90%	
1/2"	81%	
3/8"	77%	
No. 4	69%	
Total Wt. = 1954g		
No. 8	60%	
No. 10	58%	
No. 16	52%	
No. 20	48%	
No. 30	44%	
No. 40	40%	
No. 50	35%	
No. 60	32%	
No. 80		
No. 100	26%	
No. 200	18%	
Total Wt. of Fine Fraction = 505.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 142
Sample 1
Depth 0.5'-1.5'

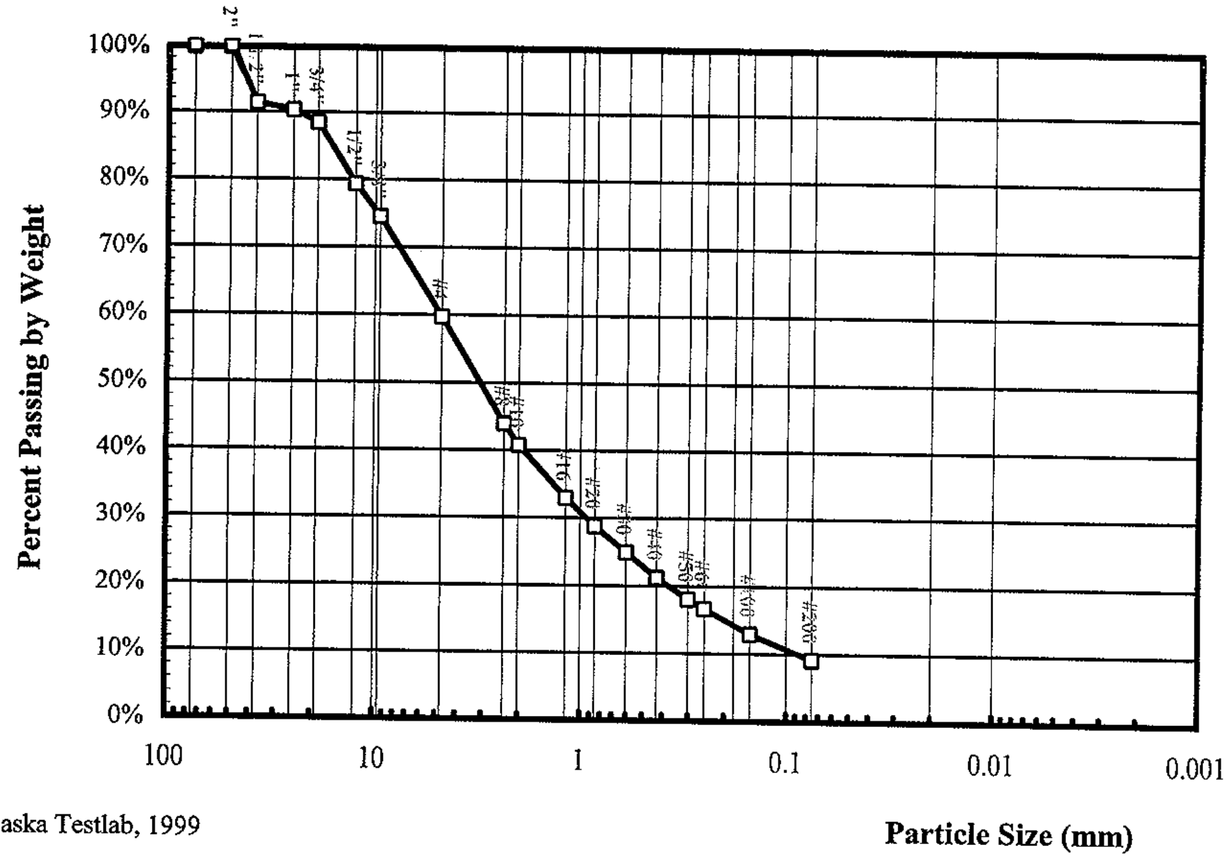
Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2992
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"	100%	
1 1/2"	91%	
1"	90%	
3/4"	88%	
1/2"	79%	
3/8"	75%	
No. 4	60%	
Total Wt. = 2909g		
No. 8	44%	
No. 10	41%	
No. 16	33%	
No. 20	29%	
No. 30	25%	
No. 40	21%	
No. 50	18%	
No. 60	17%	
No. 80		
No. 100	13%	
No. 200	9.2%	
Total Wt. of Fine Fraction = 529.1g		
0.02 mm		



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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 142
Sample 2
Depth 2.5'-4'

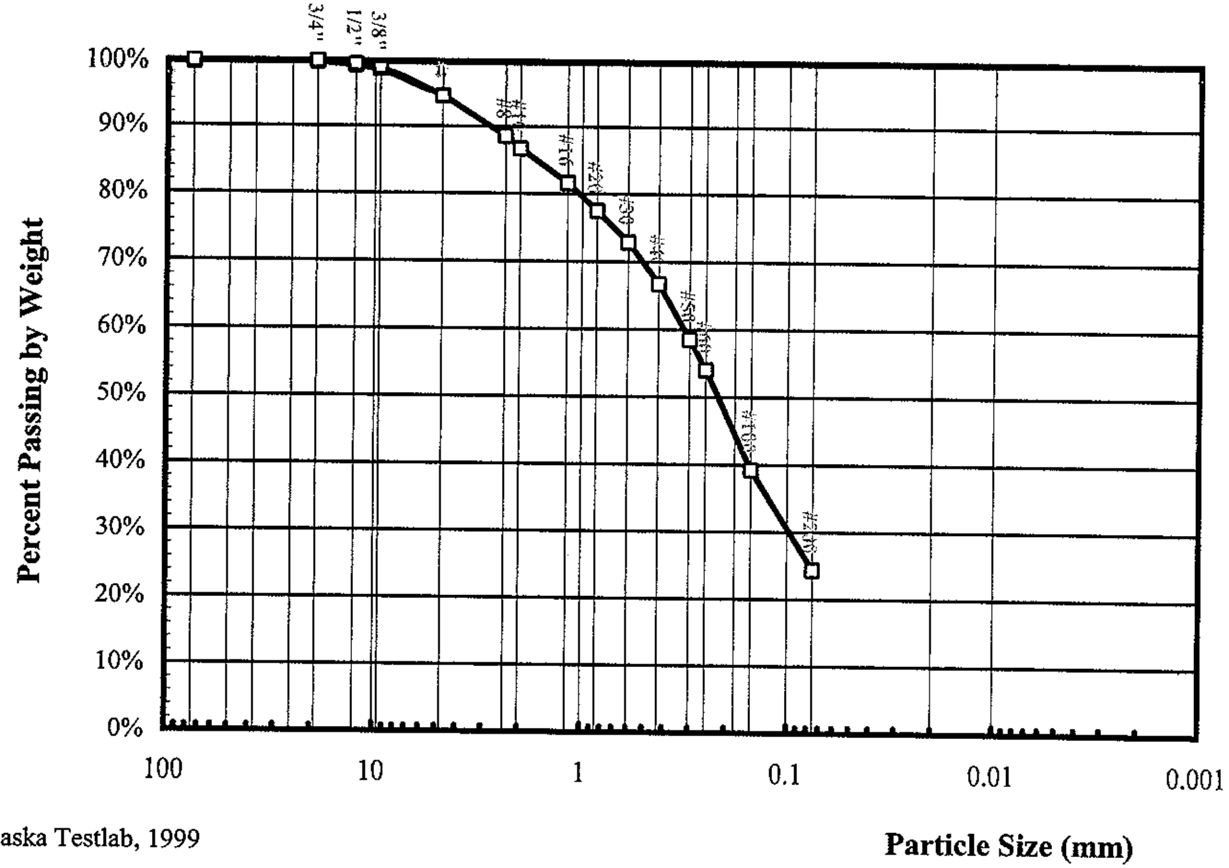
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2993
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"		
3/4"	100%	
1/2"	99%	
3/8"	99%	
No. 4	95%	
Total Wt. = 1413.8g		
No. 8	89%	
No. 10	87%	
No. 16	82%	
No. 20	78%	
No. 30	73%	
No. 40	67%	
No. 50	58%	
No. 60	54%	
No. 80		
No. 100	39%	
No. 200	24%	
Total Wt. of Fine Fraction = 501.2g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

4040 B Street Anchorage Alaska 99503 • 907/562-2000 • 907/563-3953

ALASKA TESTLAB
A Division of DOWL LLC

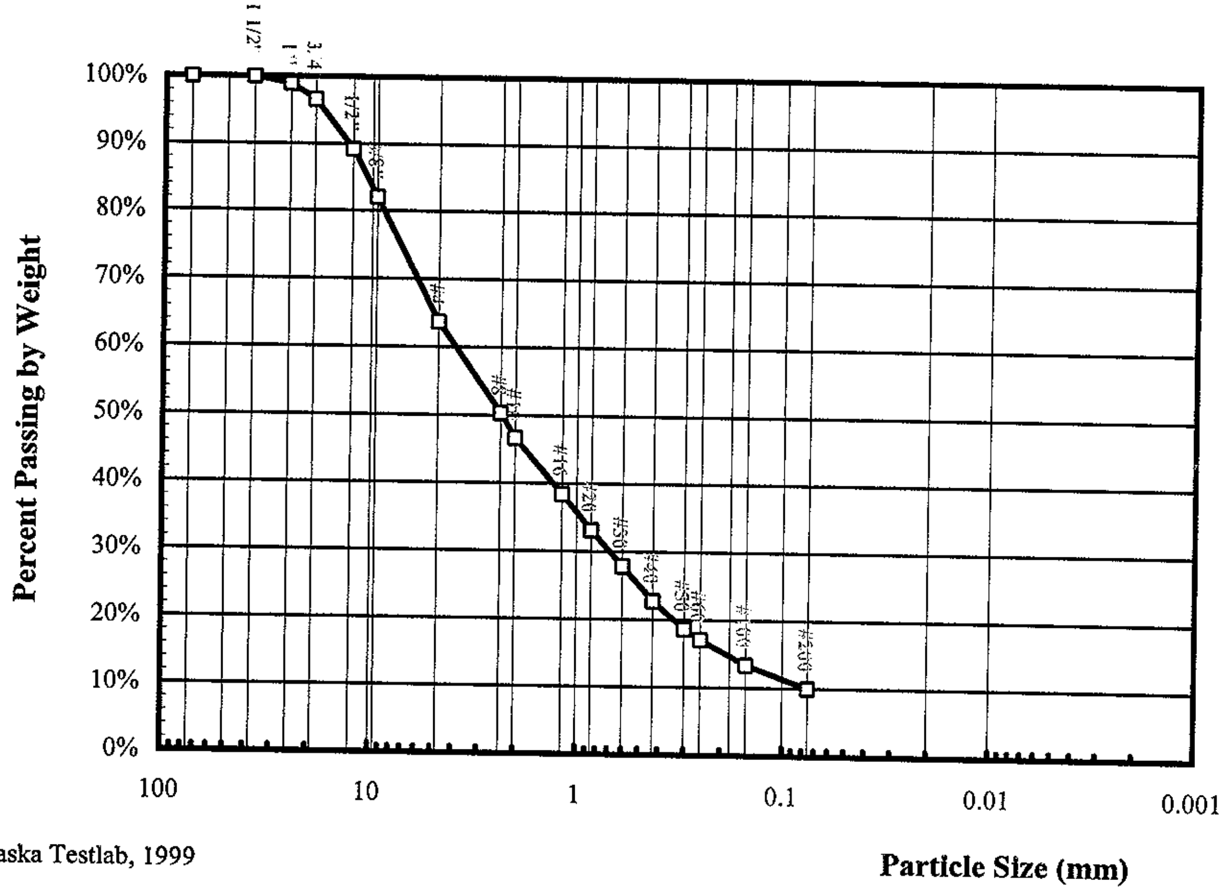
Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 143
Sample 1
Depth 0.3'-3'

Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM
Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2994
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	99%	
3/4"	97%	
1/2"	89%	
3/8"	82%	
No. 4	64%	
Total Wt. = 18281g		
No. 8	50%	
No. 10	47%	
No. 16	38%	
No. 20	33%	
No. 30	28%	
No. 40	23%	
No. 50	19%	
No. 60	17%	
No. 80		
No. 100	13%	
No. 200	10%	
Total Wt. of Fine Fraction = 595.1g		
0.02 mm		



David L Andersen
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ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 144
Sample 1
0.5'-2'

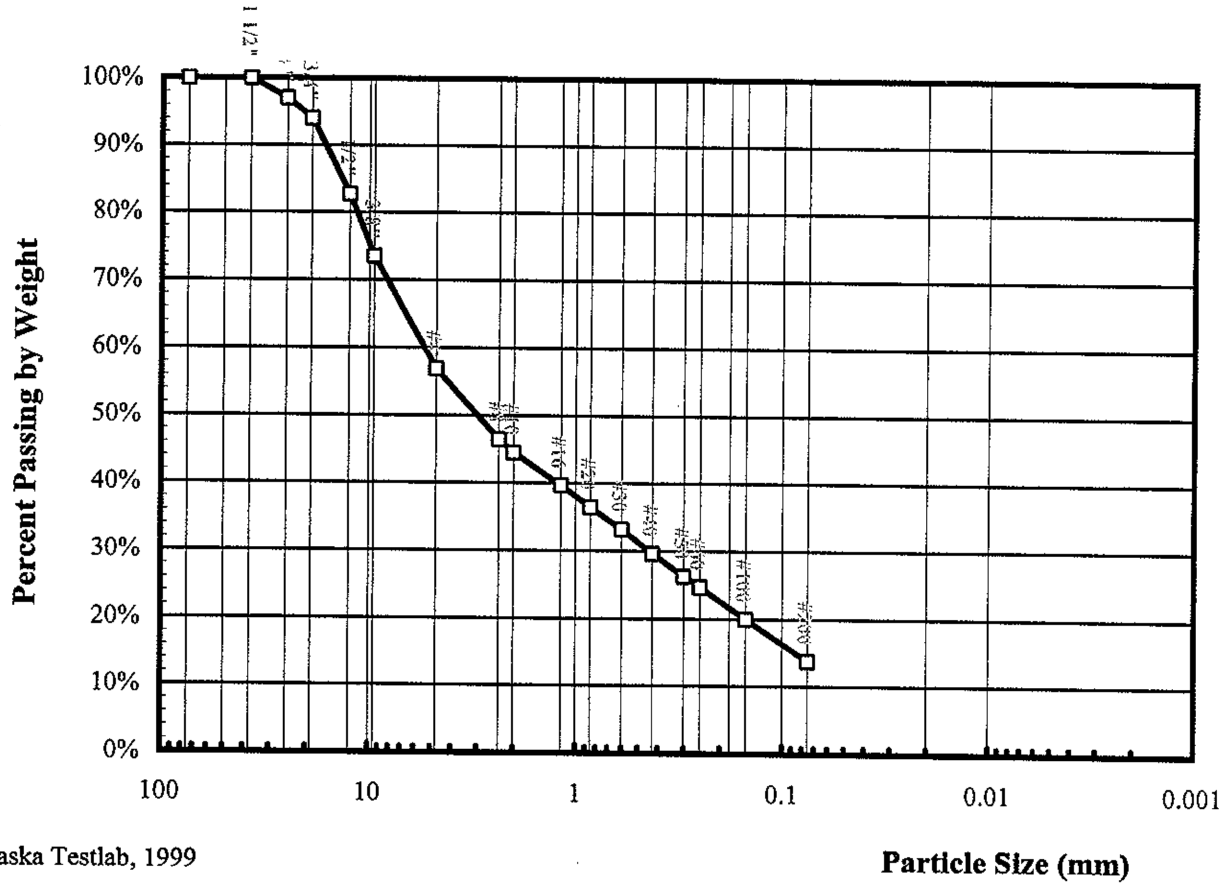
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2995
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	97%	
3/4"	94%	
1/2"	83%	
3/8"	74%	
No. 4	57%	
Total Wt. = 3348.7g		
No. 8	46%	
No. 10	44%	
No. 16	40%	
No. 20	36%	
No. 30	33%	
No. 40	30%	
No. 50	26%	
No. 60	25%	
No. 80		
No. 100	20%	
No. 200	14%	
Total Wt. of Fine Fraction = 565.1g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

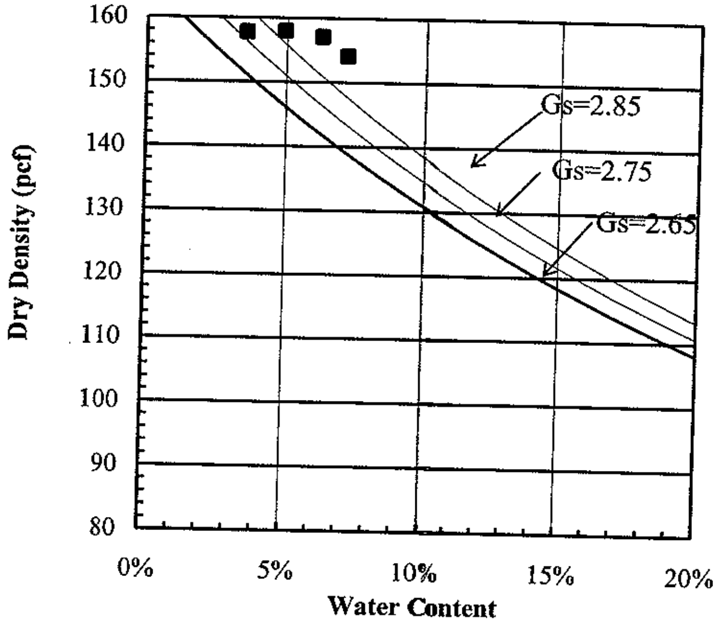
ALASKA TESTLAB
A Division of DOWL LLC

MODIFIED PROCTOR
ASTM D 1557 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 146
Sample 1
Depth 0.3' - 3'

W.O. D59119D
Lab No. 2006-675
Received: 6/1/06
Reported: 6/7/06

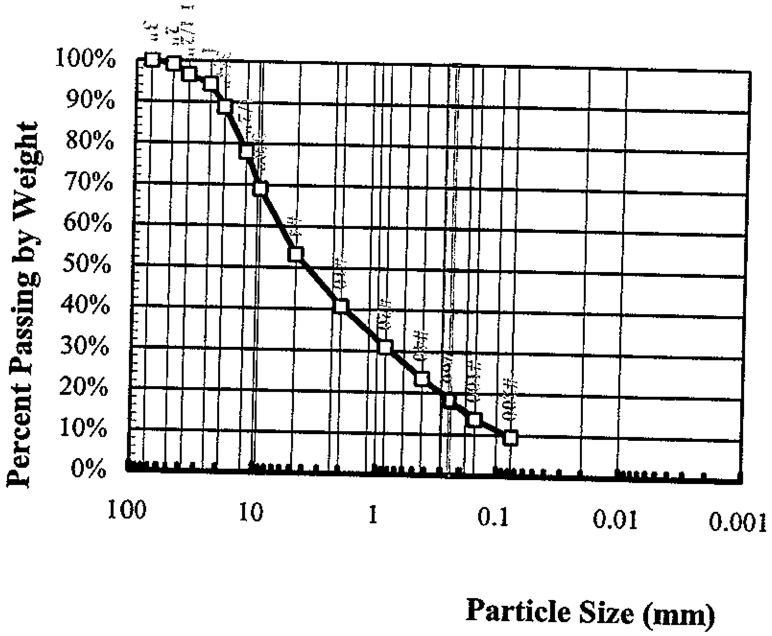
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 158 pcf
Optimum Water Content: 4.9 %

Corrected Density: 159 pcf
Corrected Optimum: 4.5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~0%		
3"	100%	
2"	99%	
1 1/2"	97%	
1"	94%	
3/4"	89%	
1/2"	78%	
3/8"	69%	
No. 4	53%	
Total Wt. = 29865g		
No. 8		
No. 10	41%	
No. 16		
No. 20	31%	
No. 30		
No. 40	23%	
No. 50		
No. 60	18%	
No. 80		
No.100	14%	
No.200	9.5%	
Total Wt. of Fine Fraction = 788.7g		
0.02 mm		

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Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 147
Sample 1
Depth 0.2' - 1.2'

Engineering Classification: Well Graded GRAVEL with Sand, GW

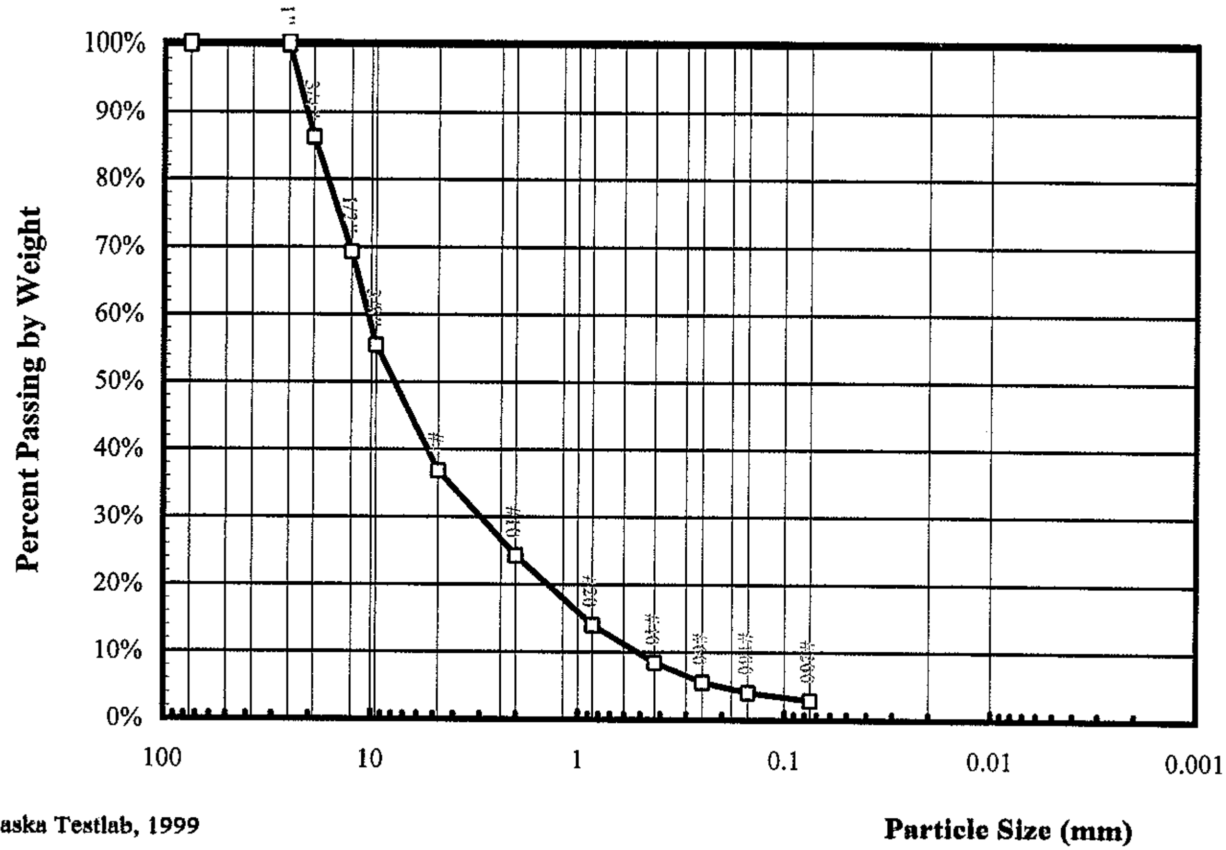
Frost Classification: NFS MOA

PARTICLE-SIZE

DIST. ASTM D422

W.O. D59119D
Lab No. 2006-676
Received: 6/1/06
Reported: 6/9/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"		
1"	100%	
3/4"	86%	
1/2"	69%	
3/8"	55%	
No. 4	37%	
Total Wt. = 6475g		
No. 8		
No. 10	24%	
No. 16		
No. 20	14%	
No. 30		
No. 40	8%	
No. 50		
No. 60	6%	
No. 80		
No. 100	4%	
No. 200	2.9%	
Total Wt. of Fine Fraction = 543.6g		
0.02 mm		



David L Andersen
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ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 149
Sample 1
Depth 3' - 4'

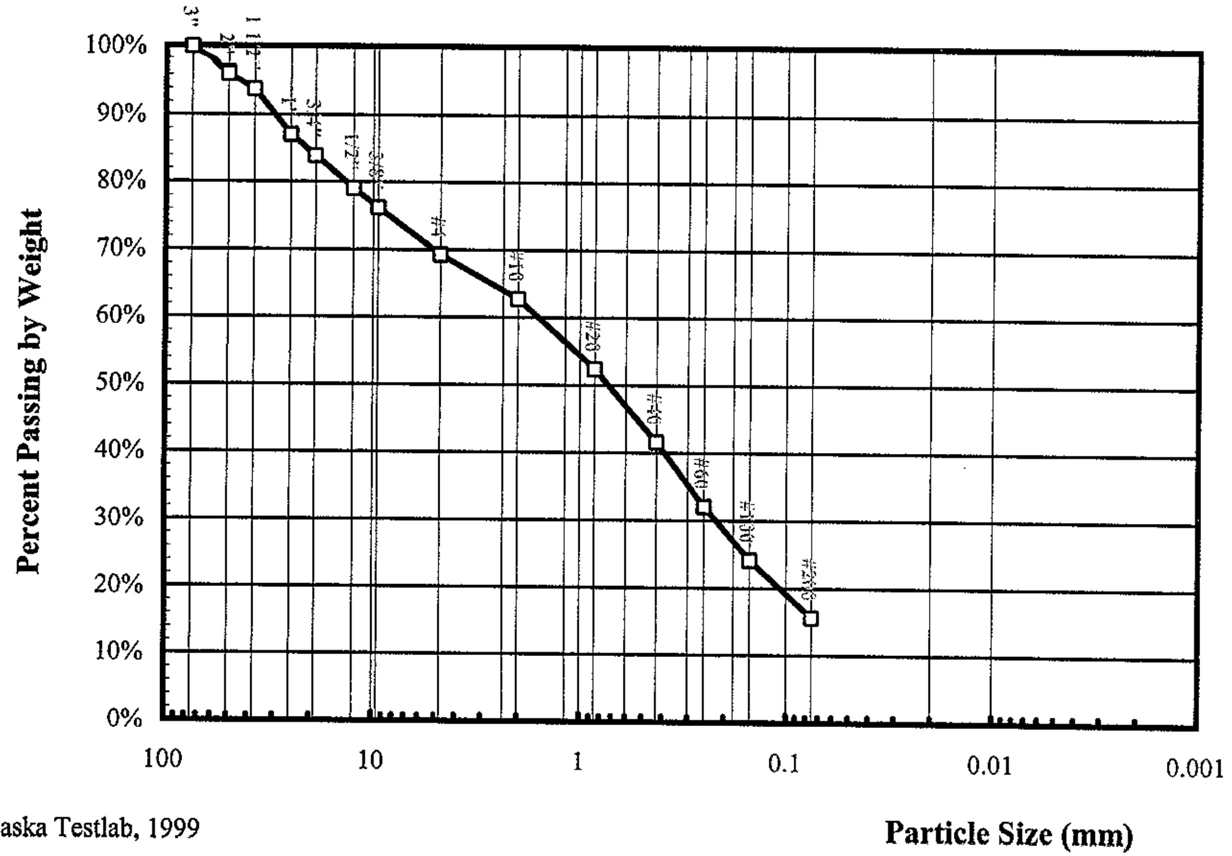
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-677
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	96%	
1 1/2"	94%	
1"	87%	
3/4"	84%	
1/2"	79%	
3/8"	76%	
No. 4	69%	
Total Wt. = 46218g		
No. 8		
No. 10	63%	
No. 16		
No. 20	52%	
No. 30		
No. 40	42%	
No. 50		
No. 60	32%	
No. 80		
No. 100	24%	
No. 200	16%	
Total Wt. of Fine Fraction = 730.9g		
0.02 mm		



David L Andersen
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ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 150

Sample 1, Depth 0' - 3'

Maximum Index Density ASTM D4253 = 150.0 pcf

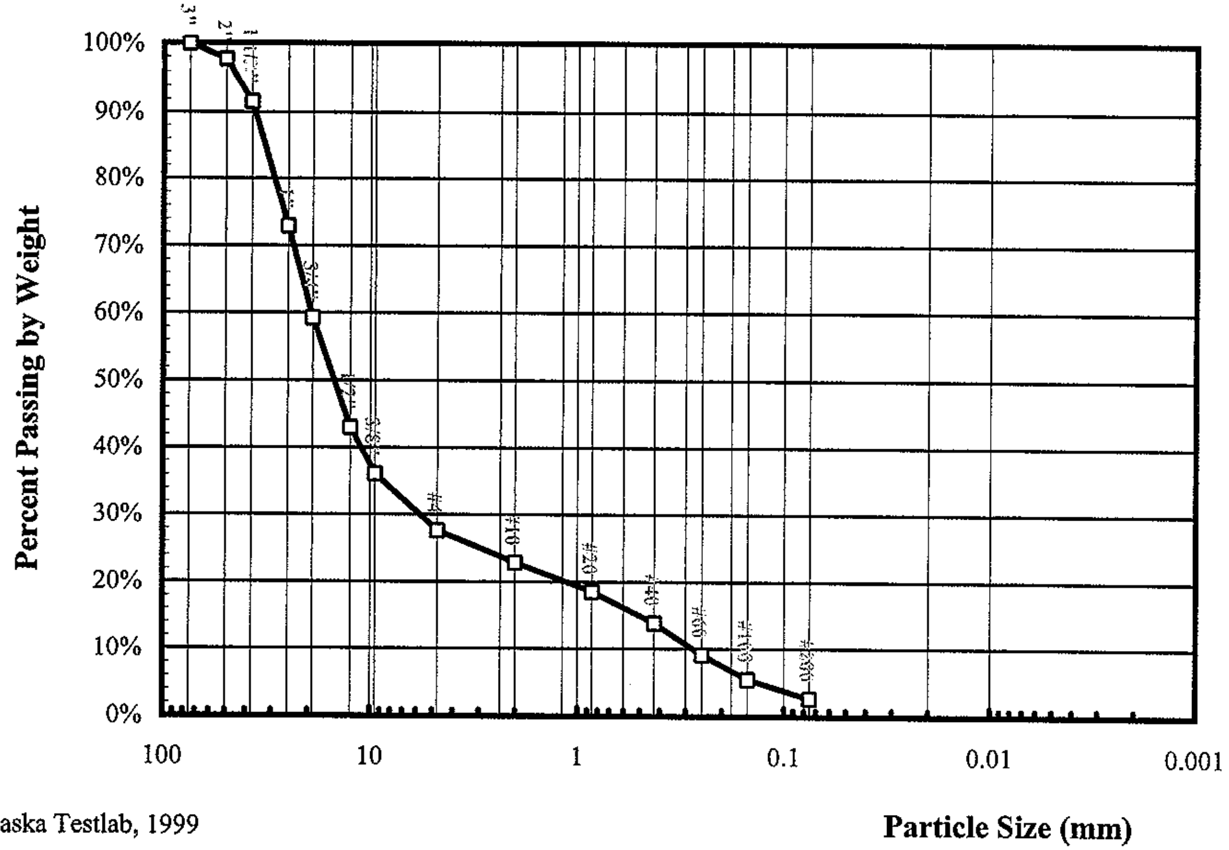
Engineering Classification: Poorly Graded GRAVEL with Sand, GP

Frost Classification: NFS MOA

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-678
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"	100%	
2"	98%	
1 1/2"	92%	
1"	73%	
3/4"	59%	
1/2"	43%	
3/8"	36%	
No. 4	28%	
Total Wt. = 25722g		
No. 8		
No. 10	23%	
No. 16		
No. 20	19%	
No. 30		
No. 40	14%	
No. 50		
No. 60	9%	
No. 80		
No. 100	6%	
No. 200	2.7%	
Total Wt. of Fine Fraction = 519g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

ALASKA
T E S T L A B
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 151
Sample 2
Depth 10' - 11'

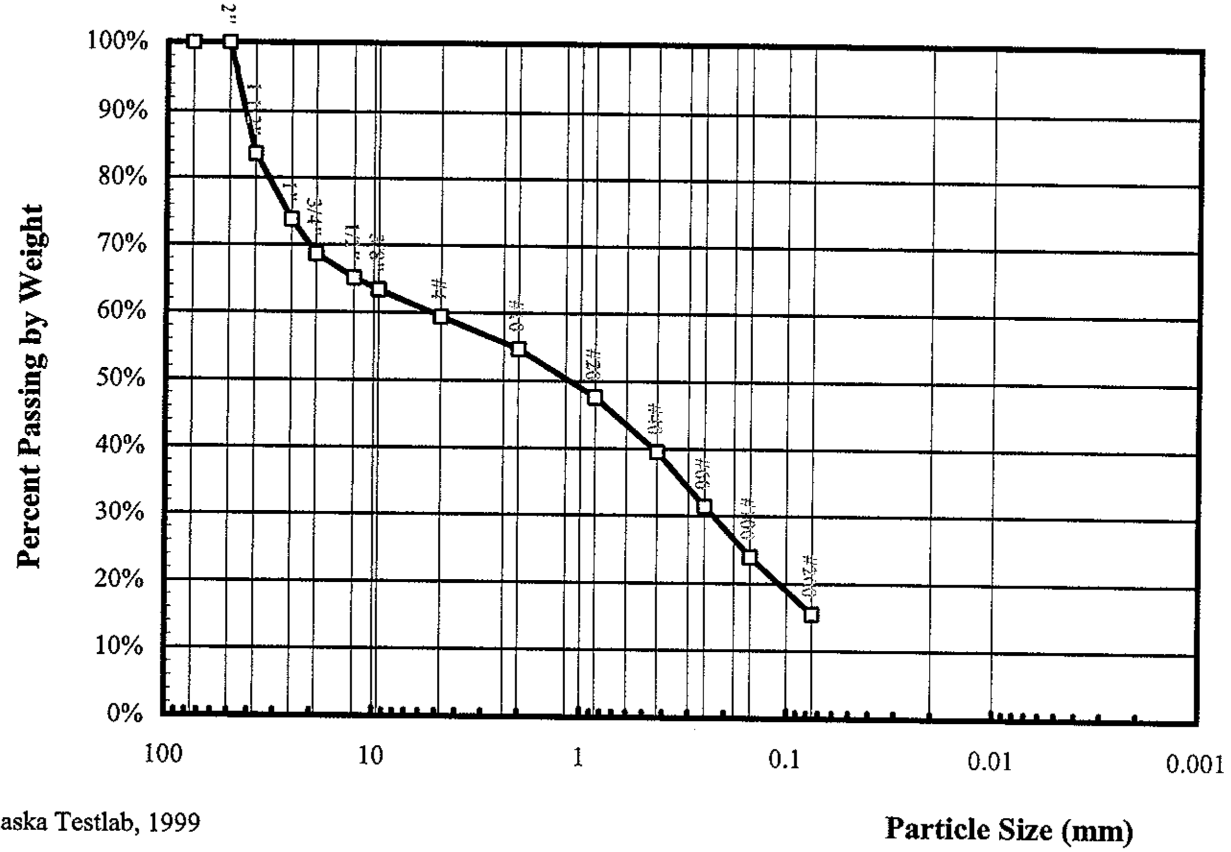
Engineering Classification: Silty SAND with Gravel, SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-679
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	84%	
1"	74%	
3/4"	69%	
1/2"	65%	
3/8"	63%	
No. 4	59%	
Total Wt. = 3164g		
No. 8		
No. 10	55%	
No. 16		
No. 20	48%	
No. 30		
No. 40	40%	
No. 50		
No. 60	31%	
No. 80		
No. 100	24%	
No. 200	16%	
Total Wt. of Fine Fraction = 334g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 152
Sample 1
Depth 6' - 7'

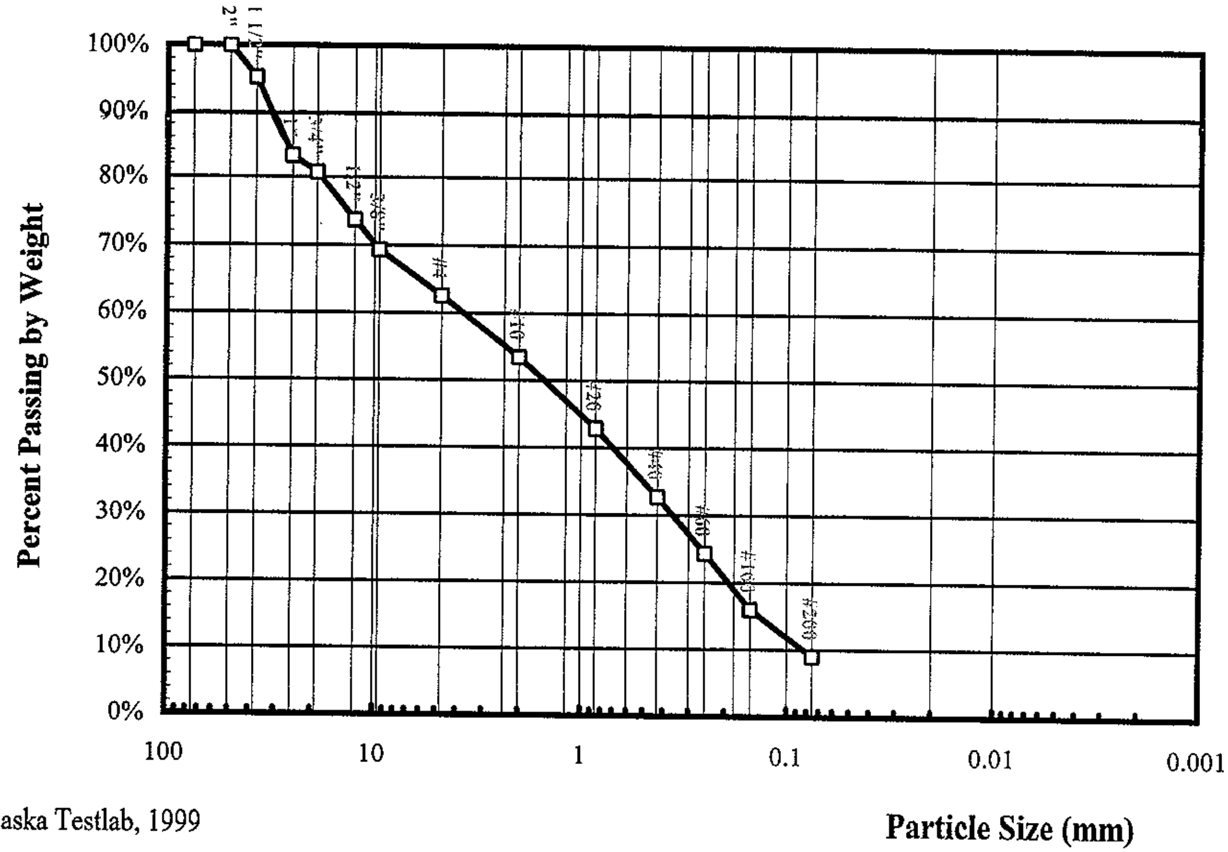
Engineering Classification: Poorly Graded SAND with Silt and Gravel, SP-SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-680
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = ~%		
3"		
2"	100%	
1 1/2"	95%	
1"	83%	
3/4"	81%	
1/2"	74%	
3/8"	69%	
No. 4	63%	
Total Wt. = 3979g		
No. 8		
No. 10	53%	
No. 16		
No. 20	43%	
No. 30		
No. 40	33%	
No. 50		
No. 60	24%	
No. 80		
No. 100	16%	
No. 200	9%	
Total Wt. of Fine Fraction = 326.6g		
0.02 mm		



David L Andersen
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ALASKA
T E S T L A B
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 153
Sample 2
Depth 8' - 9'

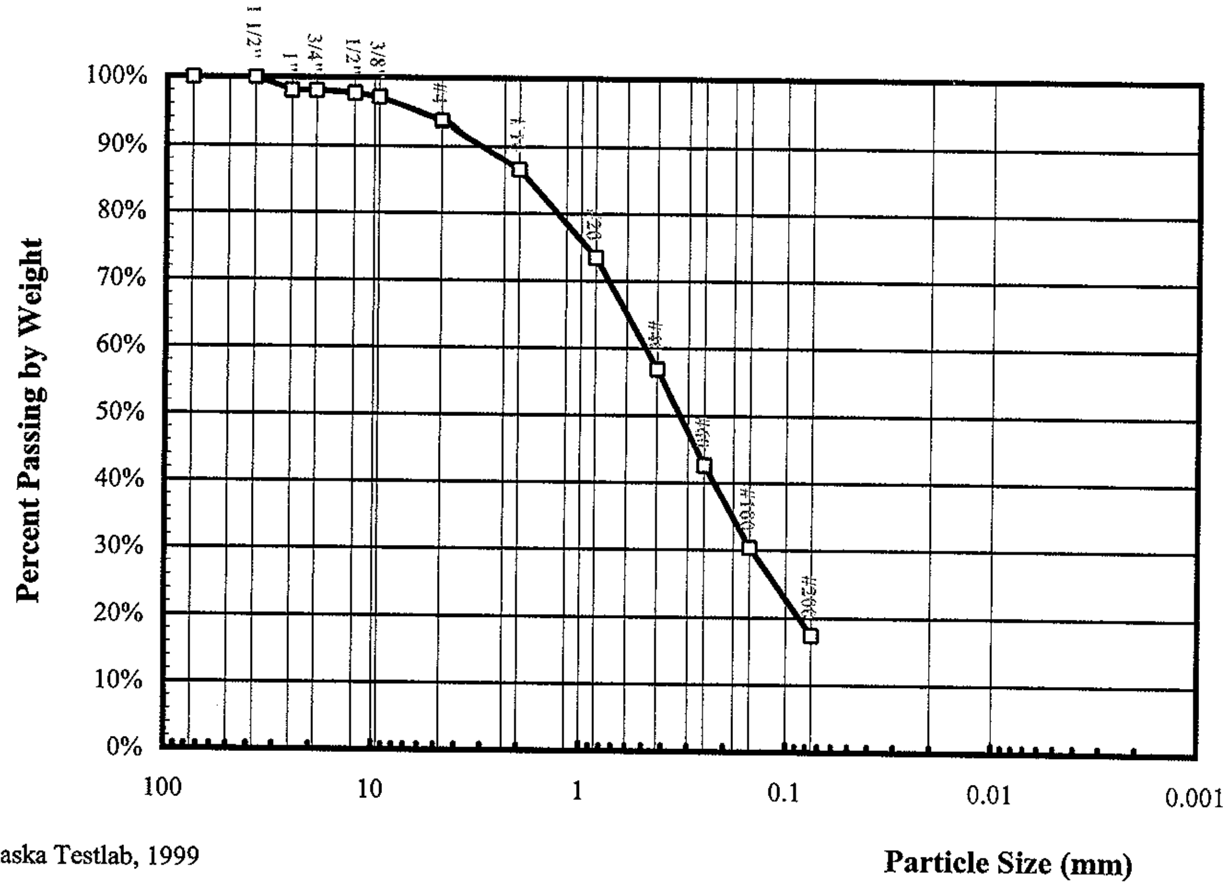
Engineering Classification: Silty SAND , SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-681
Received: 6/1/06
Reported: 6/7/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	98%	
1/2"	98%	
3/8"	97%	
No. 4	94%	
Total Wt. = 3104g		
No. 8		
No. 10	87%	
No. 16		
No. 20	73%	
No. 30		
No. 40	57%	
No. 50		
No. 60	43%	
No. 80		
No. 100	30%	
No. 200	17%	
Total Wt. of Fine Fraction = 363.7g		
0.02 mm		



David L Andersen
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ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 154
Sample 1
Depth 0.3'-3'

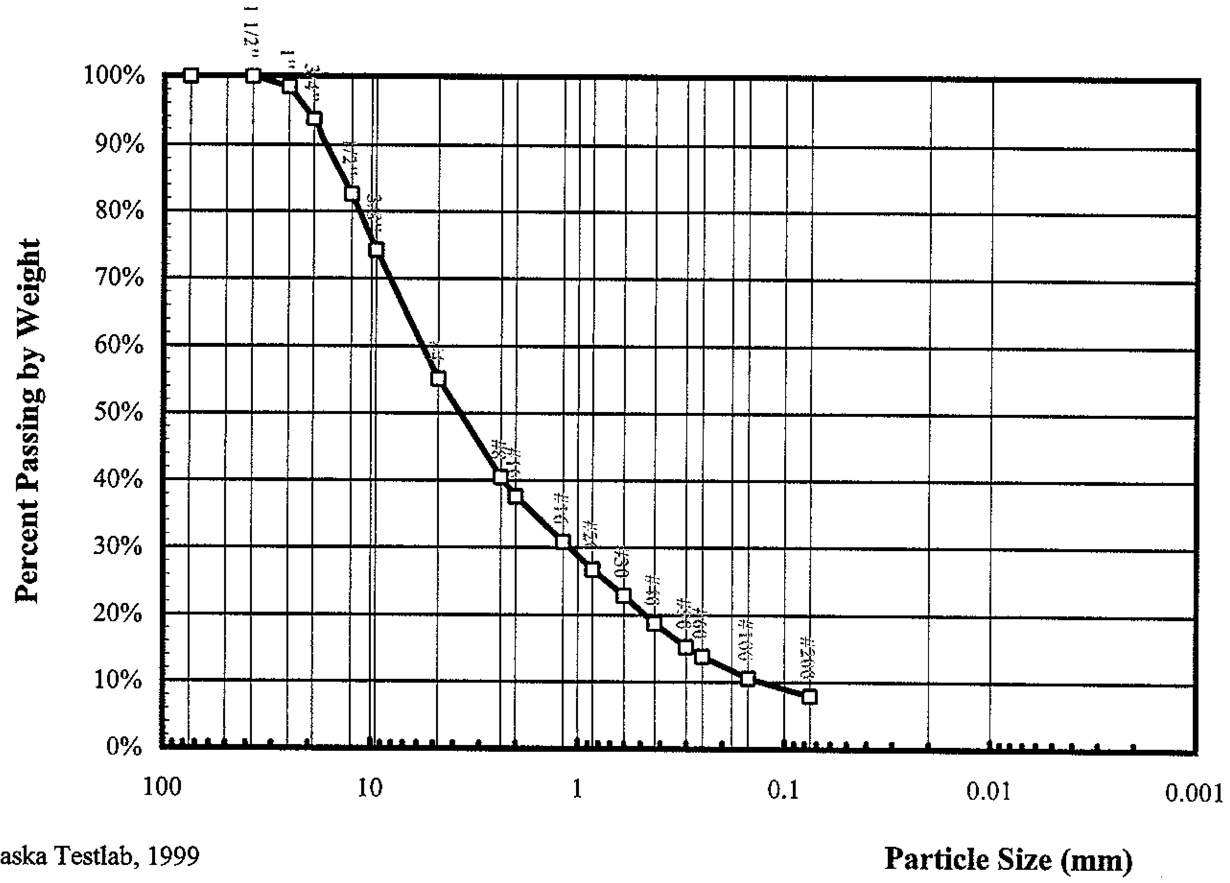
Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2996
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	98%	
3/4"	93%	
1/2"	83%	
3/8"	74%	
No. 4	55%	
Total Wt. = 21660g		
No. 8	41%	
No. 10	38%	
No. 16	31%	
No. 20	27%	
No. 30	23%	
No. 40	19%	
No. 50	15%	
No. 60	14%	
No. 80		
No. 100	11%	
No. 200	8%	
Total Wt. of Fine Fraction = 565.9g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

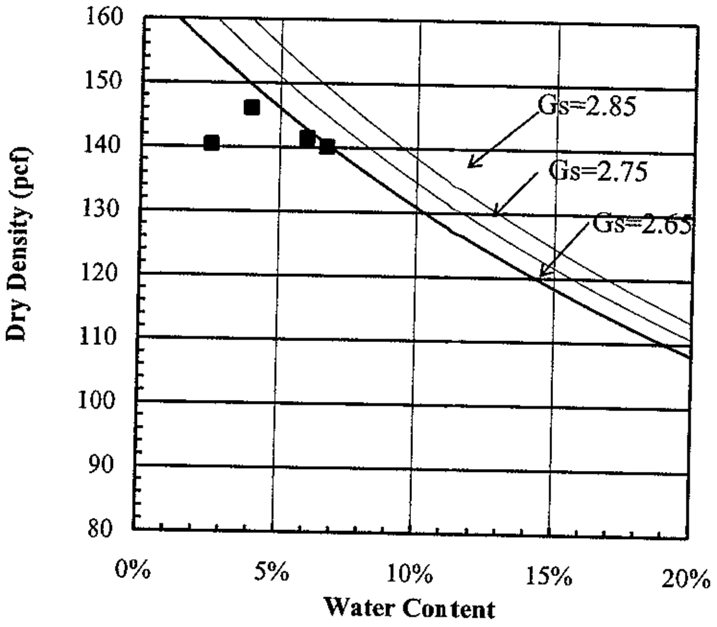
ALASKA TESTLAB
A Division of DOWL LLC

MODIFIED PROCTOR
AASHTO T-180 B

Client: ADOT&PF Southeast Region
Project: Haines Highway
Location: Test Boring 155
Sample 1
Depth 0.6'-3'

W.O. D59119D
Lab No. 2005-2997
Received: 12/2/05
Reported: 12/19/05

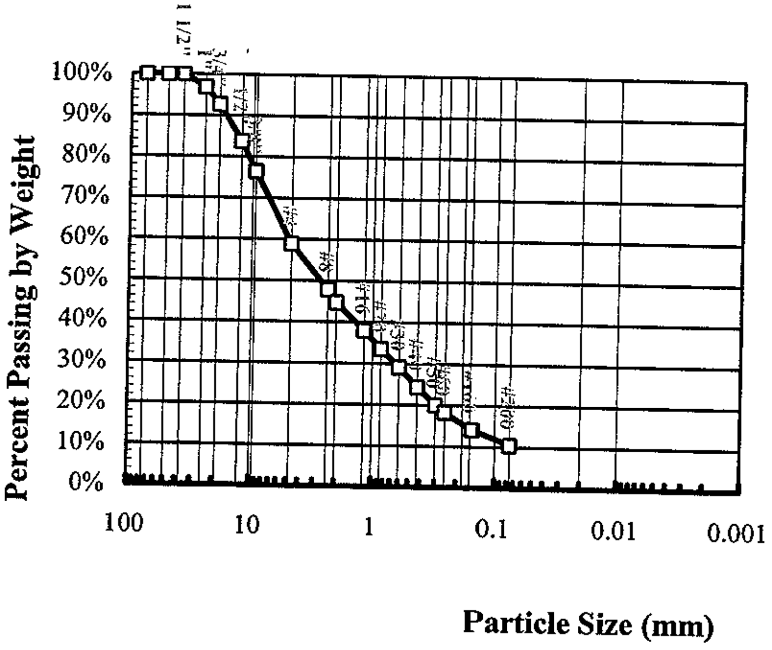
Engineering Classification: Well Graded SAND with Silt and Gravel, SW-SM
Frost Classification: Not Measured



Uncorrected
Maximum Density: 146.1 pcf
Optimum Water Content: 4 %

Corrected Density: 147.5 pcf
Corrected Optimum: 3.5 %

Moist Preparation
Mechanical Compaction



SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -0%		
3"		
2"		
1 1/2"	100%	
1"	97%	
3/4"	93%	
1/2"	84%	
3/8"	76%	
No. 4	59%	
Total Wt. = 22618g		
No. 8	48%	
No. 10		
No. 16	38%	
No. 20	33%	
No. 30	29%	
No. 40	24%	
No. 50	20%	
No. 60	18%	
No. 80		
No.100	14%	
No.200	10%	
Total Wt. of Fine Fraction = 577g		
0.02 mm		

David L Andersen

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 155
Sample 3
Depth 5'-6.5'

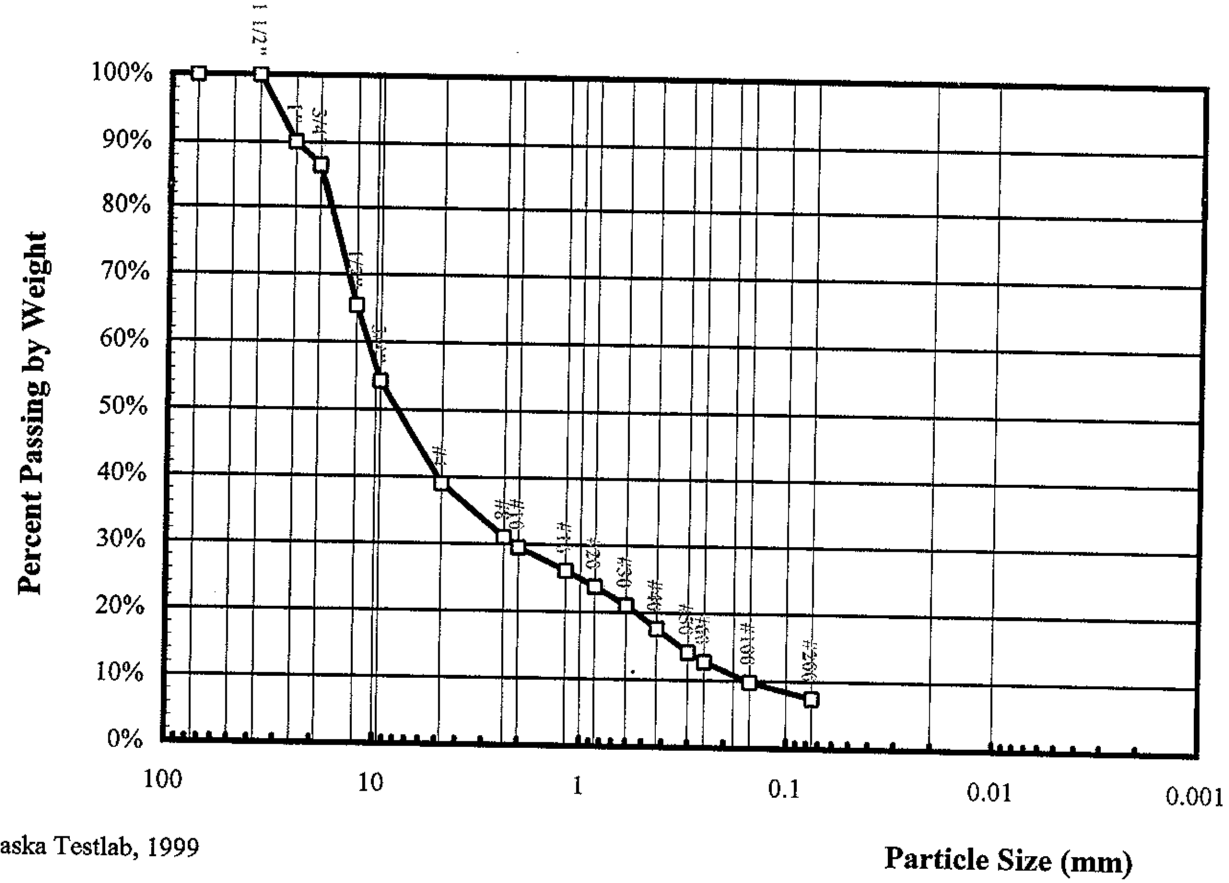
Engineering Classification: Well Graded GRAVEL with Silt and Sand, GW-GM

Frost Classification: Not Measured

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2005-2998
Received: 12/2/05
Reported: 12/20/05

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	90%	
3/4"	87%	
1/2"	65%	
3/8"	54%	
No. 4	39%	
Total Wt. = 1471.7g		
No. 8	31%	
No. 10	30%	
No. 16	26%	
No. 20	24%	
No. 30	21%	
No. 40	18%	
No. 50	14%	
No. 60	13%	
No. 80		
No. 100	10%	
No. 200	7.5%	
Total Wt. of Fine Fraction = 574.3g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 156
Sample 1
Depth 2' - 3'

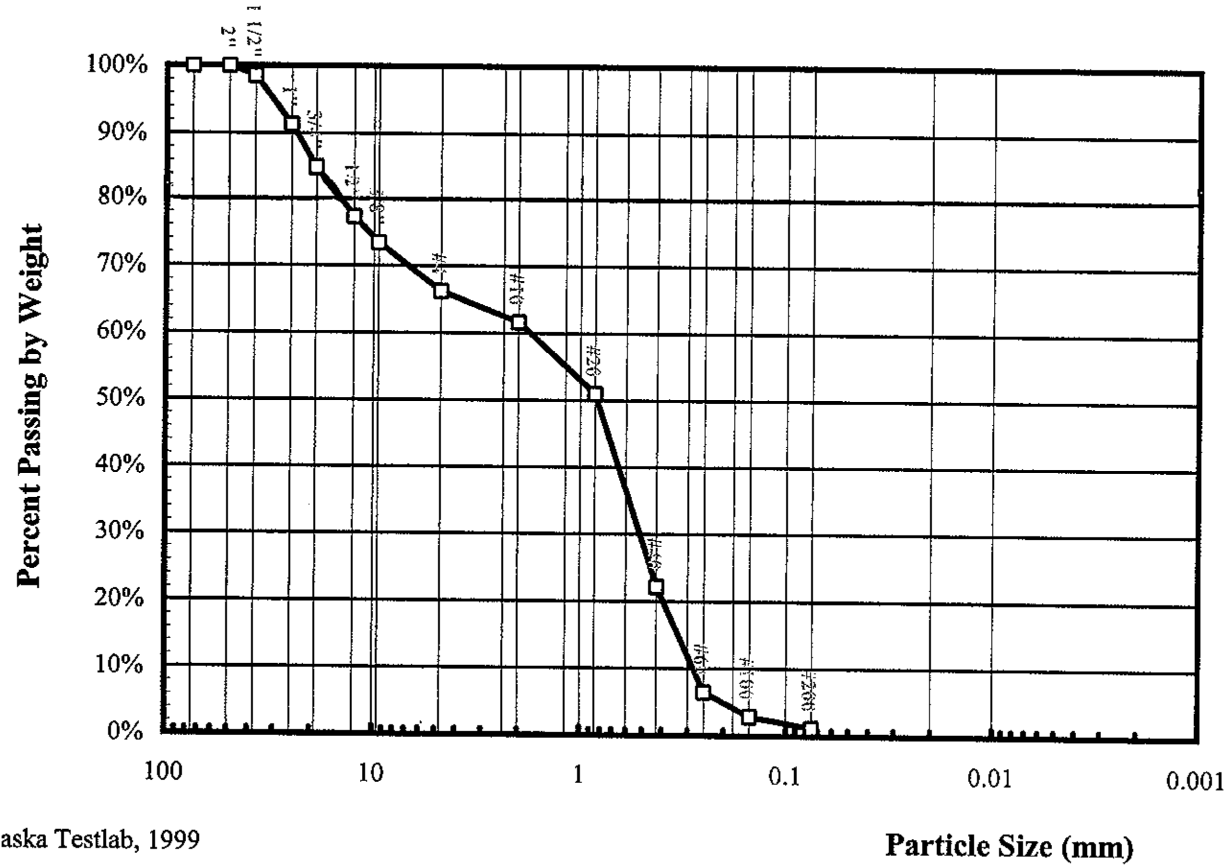
Engineering Classification: Poorly Graded SAND with Gravel, SP

Frost Classification: NFS MOA

PARTICLE-SIZE
DIST. ASTM D422

W.O. D59119D
Lab No. 2006-682
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"	100%	
1 1/2"	98%	
1"	91%	
3/4"	85%	
1/2"	77%	
3/8"	73%	
No. 4	66%	
Total Wt. = 19712g		
No. 8		
No. 10	62%	
No. 16		
No. 20	51%	
No. 30		
No. 40	22%	
No. 50		
No. 60	6%	
No. 80		
No. 100	3%	
No. 200	1.2%	
Total Wt. of Fine Fraction = 363.1g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

ALASKA TESTLAB
A Division of DOWL LLC

Client: ADOT&PF Southeast Region

Project: Haines Highway

Location: Test Boring 158
Sample 1
Depth 1' - 2'

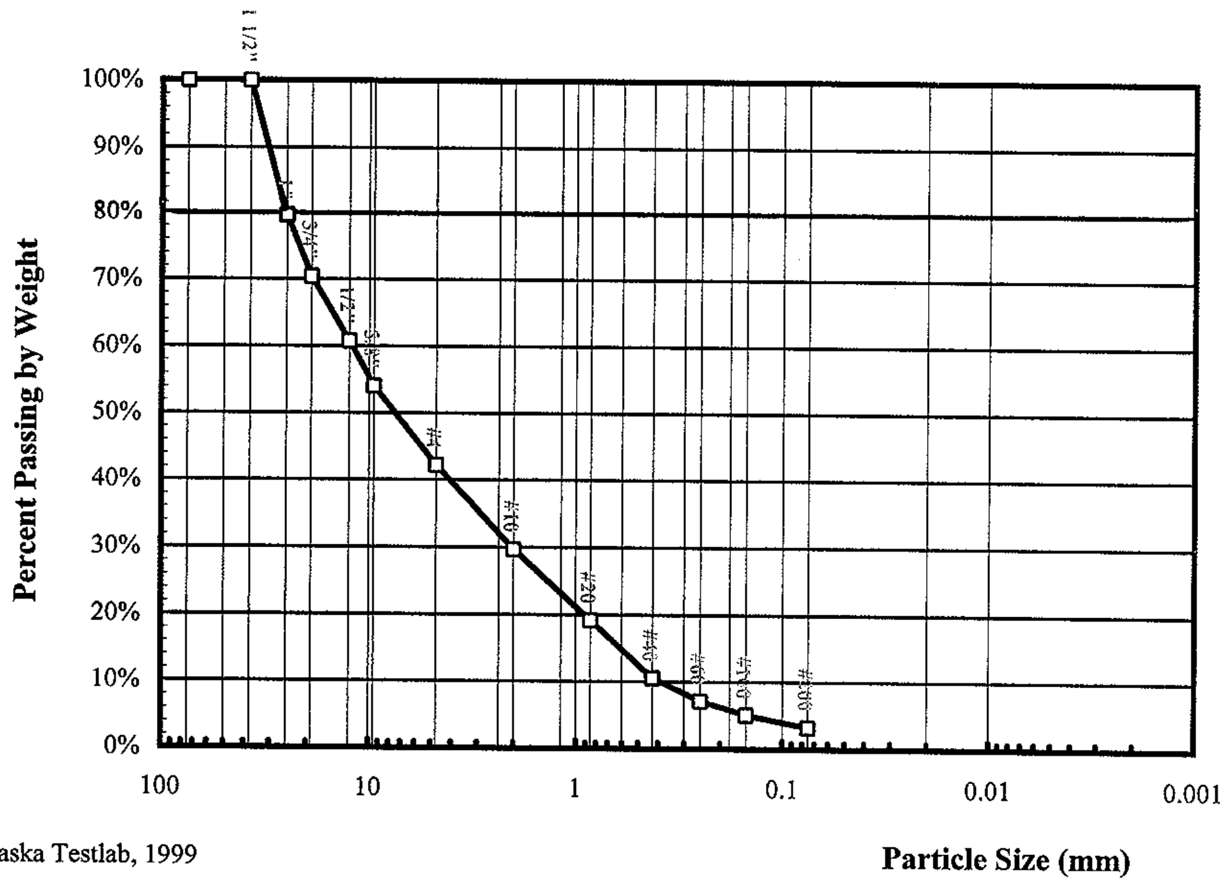
Engineering Classification: Poorly Graded GRAVEL with Sand, GP

Frost Classification: Not Measured

PARTICLE-SIZE DIST. ASTM D422

W.O. D59119D
Lab No. 2006-683
Received: 6/1/06
Reported: 6/8/06

SIZE	PASSING	SPECIFICATION
+3 in Not Included in Test = -%		
3"		
2"		
1 1/2"	100%	
1"	80%	
3/4"	70%	
1/2"	61%	
3/8"	54%	
No. 4	42%	
Total Wt. = 5399g		
No. 8		
No. 10	30%	
No. 16		
No. 20	19%	
No. 30		
No. 40	11%	
No. 50		
No. 60	7%	
No. 80		
No. 100	5%	
No. 200	3.3%	
Total Wt. of Fine Fraction = 494.1g		
0.02 mm		



David L Andersen
David L. Andersen, P.E., Technical Advisor

APPENDIX D

Debris Flows

HAINES HIGHWAY DEBRIS FLOWS

MP 19 AND MP 23

Debris Flow Areas

The section of the Haines Highway currently planned for upgrades traverses two alluvial fans – one at about Milepost (MP) 19 and one at about MP 23. Both fans began to form after the last retreat of the glaciers that formed the Chilkat River valley, and are active geologic features that periodically produce large flow slides that cover portions of the highway. The fans were formed by deposition of eroded materials whose sources are in the valleys and cirques above the steep walls of the Chilkat River valley. This valley is bordered on the east by the steep walls of the Takshanuk Mountains, which rise abruptly from an elevation of about 100 feet to over 5,000 feet above sea level in a distance of about 9,000 feet. The surface slopes of the cones are fairly gentle and vary from about 10 percent to about 15 percent. The apexes of the cones are at about elevation 1,000 feet. The base of the fan at MP 19 is about 1.5 miles wide, and the fan at MP 23 is about 2.0 miles wide at its base. Both fans terminate on the banks of the Chilkat River (Figure 1).

The soils that comprise the alluvial deposits of the fans come from the steep rock walls of the incised valleys above the fans. They generally are loose and well graded, and are composed of particles that range in size from fine sand and silt to boulders up to six feet or more in diameter. The creeks that produced the fans normally flow at low volumes and velocities in well defined channels (Figure 2). However, during periodic storms that occur over the barren watersheds above the fans or on the remnants of winter snow packs in those areas, the flows of the streams increase dramatically can produce flow slides that reach the highway. The forces developed in the floodway during those times are large enough to dislodge and transport boulders up to six feet in diameter. This process has been occurring since the retreat of the glaciers in the Chilkat River valley, and will continue to occur for the foreseeable future. The amount of material that reaches the highway during these annual events typically is constrained within the catchment areas and does not impact the normal use of the highway. However, occasionally large slides occur and significant volumes (100,000+ cubic yards) of soil and rock scoured from the stream channels flow down the fans and across the highway. Debris flows which have crossed the highway during those rare events have been reported to reach depths of six to twelve feet at the center of their leading edge and have had breadths of up to 900 feet.

State of Alaska, Department of Transportation and Public Facilities (DOT&PF) personnel responsible for maintenance of the highway indicate minor flow slides, of which limited quantities of material may overtop the road, generally are annual occurrences. However, major slides, such as the November 2005 event, where as much as 12 feet of debris covered the road, are rare – perhaps on the order of 30 to 50 years between occurrences.

Effects of Slides

The effects of flow slides on the highway are threefold:

1. Safety to the traveling public,
2. Disruption of surface transportation, and
3. Costs of clean up and repairs to the highway.

When debris flows are large enough to overtop and cross the highway, it is possible that vehicles could be struck causing injury to the occupants and damage to vehicles. Apparently this occurred during the last major slide at MP 23 (November 2005). A passenger car was caught in the slow moving debris flow and its lone occupant was barely able to get out of the car and reach safety with help of other travelers stopped near the perimeter of the slide. It is our understanding that no one has been seriously injured to date, but the unpredictability of the slides suggests that debris being suddenly washed onto the road could cause a danger to motorists.

When flow slides cross the road embankment, traffic is disrupted until the debris is removed. Disruption of traffic on this highway can have serious impact on the normal flow of people and goods in Alaska.

Current Control Measures

During recent years the DOT&PF has made attempts to control the flooding and periodic debris flows in these areas by excavating catchments upstream of and adjacent to the highway and by installing large diameter culverts below the highway (Figure 3). The arch culvert at MP 19 is about 10' by 6.5" and the culvert at MP 23 is about 8' by 6'. They also created a catchment berm (Figure 4) near the top of the fan at MP 23 in hopes of reducing the amount of debris that would reach the highway. Reportedly, these measures have been successful in stopping the smaller, more frequent debris flows from covering the highway. However, an unusually large event in November 2005, filled the roadside catchment at Mile 23 and covered the highway to depths up to 12 feet (Figure 5).

When small events occur, DOT&PF personnel remove the accumulated debris adjacent to the road embankment and within the pipe culverts. The culverts in these areas are significantly oversized to allow equipment to remove the debris that may fill and plug the culverts. Generally, it only takes a few days to remove the slide material, and there is little or no impact to the traveling public. However, during the major slide that occurred in November 2005, it took maintenance crews two and a half days to reopen just one lane of the highway. Moreover, it took another two to three weeks to clear the rest of the debris from the highway because of the onset of freezing weather. Removal of material within the catchment area took about three months because of weather constraints.

Optional Control Measures

There are four options for dealing with the debris flows that periodically cross the highway:

1. Do nothing more than continue with the current mitigation and control measures,
2. Improve the size and extent of the catchments and increase the number and size of culverts,
3. Elevate the road along its current alignment where it crosses the areas susceptible to debris slides, and
4. Relocate the road upslope from its current alignment and construct a bridge over the streams that are the sources of the flow slides.

Each option has different initial costs and long-term maintenance costs. Typically the options with the lower initial construction costs will have higher maintenance costs.

Option 1 – Continue with Current Control Measures

This option would be limited to incorporating the current mitigation measures into the new highway improvements with little or no change to the current configuration of catchments and culverts. Maintenance of the upper and lower catchment areas would remain essentially the same as the current program.

Option 2 – Improve Catchments and Culverts

The current single culverts at MP 19 and MP 23 are in place only to allow passage of the streams below the road. They are not intended to allow passage of slide materials and to protect the road from being overtopped. They were sized principally to allow maintenance crews to use small equipment to remove debris that fills the culverts when slides occur. The performance of culverts during debris flows could be improved by including cast-in-place concrete headwalls at the upstream ends of the culverts. However, this improvement would only be a help in cleaning out the culvert after a slide.

Installation of additional culverts likely would only make cleanup after a slide more difficult and more costly, since small equipment would be required to remove the debris out of the additional culverts. The additional culverts would have little effect on mitigating the potential for a large debris slide to overtop the road.

Two measures could be taken to lessen the chance of debris slides overtopping the road during construction of the new highway improvements. The catchments adjacent to the road could be extended in length, widened and perhaps deepened to accommodate a larger volume of debris, and the centerline grade of the road could be raised as much as is practical in the areas currently subject to debris slides. These two improvements would be relatively inexpensive to construct and would allow larger volumes of slide debris to accumulate before crossing the road. These simple measures would lessen the probability of overtopping the road during the more frequent, smaller events, but still would require removal of slide debris after each event.

Option 3 – Elevated Road

The surest way to mitigate the likelihood of slide debris covering the highway in the future would be to elevate the road in the areas subject to debris flows. This approach would have high initial construction costs, but could be designed to allow future debris flows to pass below the highway and not pose a danger to the traveling public nor close the road to traffic.

Two approaches to elevating the sections of the road subject to overtopping by flow slides are:

Option 3A - Conventional bridge structures, and
Option 3B - Precast component arch bridges.

Option 3A. If a conventional bridge were utilized to allow the passage of flow slides, the bridge span(s) would have to be long enough to accommodate potentially large slides. It is likely bridges would have to span 100 to 200 feet to allow large slides to pass. Furthermore, some stream training and long-term maintenance of those improvements likely would be required to insure flow slides would remain in a path directed to the elevated section of the road.

Bridge supports (piers and abutments) would have to be continuous walls essentially perpendicular to the direction of potential debris flow to minimize the dynamic forces of flowing slide debris on the structures. Individual column supports are not recommended because of the potential for damage during the passage of slide debris. Furthermore, bridge piers of this nature and location would have to be founded deep enough below grade to mitigate the potential for scour of their foundations during passage of debris flows. For this reason pile foundations may have to be used to support the bridge abutments and piers.

It is likely the bottom of bridge deck components would have to be on the order of 12 to 15 feet above the surrounding ground to allow passage of slide debris. This situation would require approach ramps at each end of the elevated sections. The sides of the approach ramps might have to be supported by retaining walls if the available right-of-way and/or the surrounding topography limit the width of ramp embankment fills. In addition to high construction costs this approach also would significantly lengthen the time of construction beyond that of an earthwork only approach.

Option 3B. Precast concrete arch structures (Figure 6) would serve the same purposes as conventional bridges; however, they would have advantages of somewhat lower costs and much shorter construction periods. The other elements of conventional bridge design and construction also would apply to the precast arch approach.

Option 4 – Realign Road Upslope

Another way to control the likelihood of debris flows crossing the highway would be to realign the road well upslope from its current location at both areas affected by debris flows, and to construct bridges across the streams that flow down the alluvial fans. We do not believe this approach has practical merit for several reasons:

- The length of bridges would not be significantly shorter that those at the current location of the road;
- This approach would require hundreds of feet of new road up and down the alluvial fans;
- It is likely new right-of-way would have to be acquired; and
- Construction costs of both the bridges and the approaches likely would be significantly more than those along the current alignment.

Each option also would have to account for any environmental factors and restrictions that might affect construction of planned improvements.

Recommendations

Table D-1 compares the relative costs and impacts on maintenance costs and on public safety of the four options discussed above. Based on this summary, we recommend Option 2. This option requires a substantial amount of earthwork, but by raising the elevation of the roadway and increasing the catchment size, the frequency of debris flowing across the road should decrease, thus increasing public safety.

Whichever option is selected, we recommend:

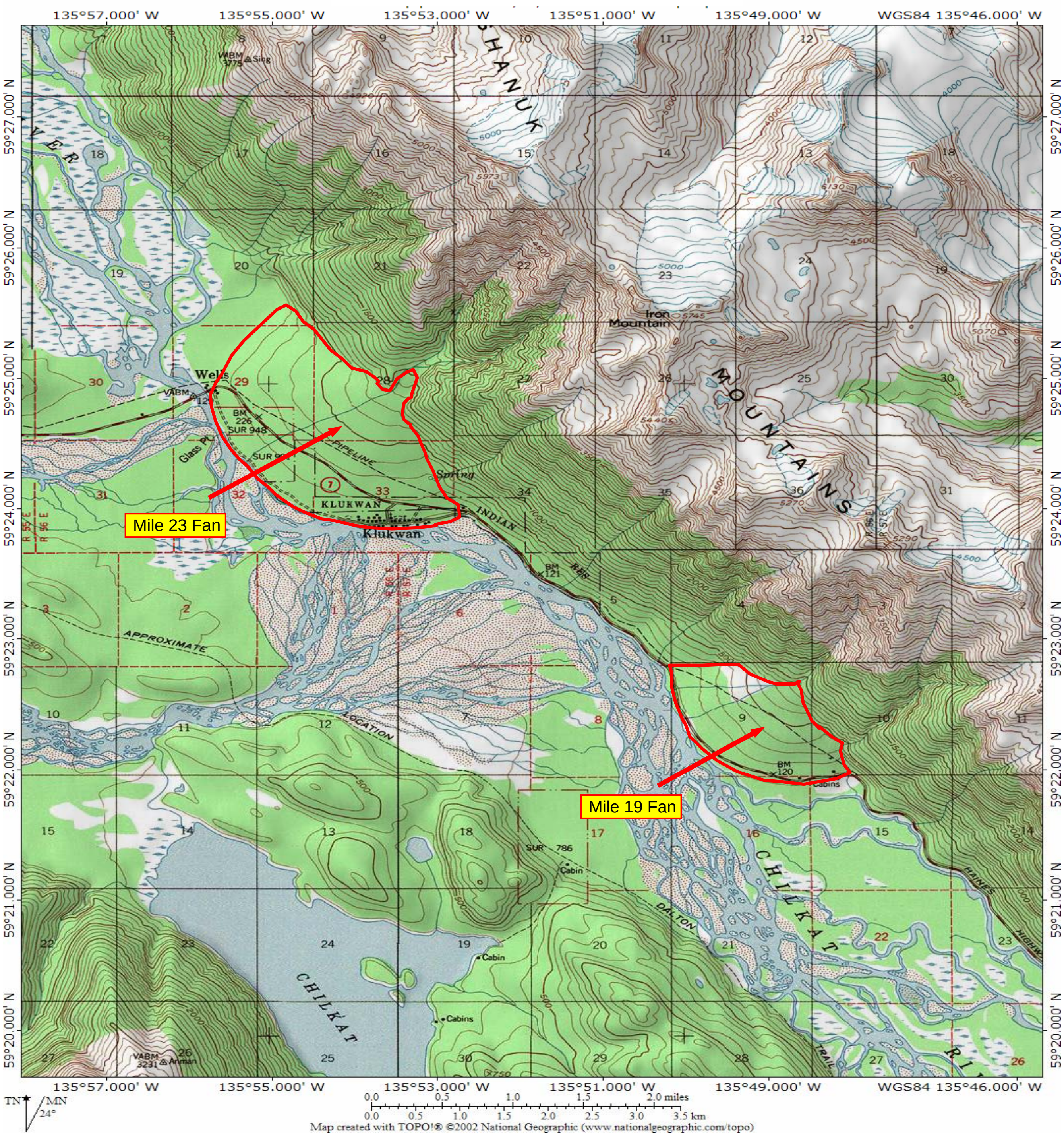
1. The catchment areas on the upstream side of the highway be expanded in length and breadth to allow larger storage areas for slide debris, and

2. A topographic survey (aerial) of the two alluvial fans be provided to evaluate the need and the practicality of performing stream training upslope from the highway. Stream training may be required to control the path of future flows to insure they reach the catchment areas.

Table D-1

	Option	Initial Costs	Annual O&M Costs	Earthwork and Construction	Additional Construction Time (weeks)	Closure Time (per Slide) (days)	Safety Improvement Over Existing
1.	Do Nothing	$0	$50,000 to $100,000	$0	None	1 to 2	None
2.	Improve Catchments and Culverts	$50,000	$50,000	$250,000	2	1 to 2	Minor
3.	Elevate Road (Bridges)						
	A. Conventional Bridge (100 ft to 200 ft)	$3,000,000 to $6,000,000	$25,000	$500,000	4 to10	0	Higher
	B. Precast Arch Bridges (100 ft to 200 ft)	$1,500,000 to $3,000,000	$25,000		2 to 4		Higher
4.	Realign Road Upslope and Bridge Creeks	$10,000,000+	Unknown	$1,000,000	12 to 16	0	Higher

FIGURES



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STATE OF ALASKA
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W.O. D59119D

Alluvial Fan Locations

Figure D-1

A. Creek Floodway and Channel Upstream of Mile 23 Fan.

B. Creek at Period of Low Flow.

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Creek at Mile 23 Fan

Figure D-2

A. Creek Passing through Culvert Below Highway (Upstream).

B. Creek Passing through Culvert Below Highway (Downstream).

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Creek at Mile 23 Fan

Figure D-3

A. Catchment Berm (Note Size of Boulder Left of Center).

B. Catchment Berm (Nearby View).

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Up-valley Catchment Berm Above Mile 23 Fan

Figure D-4

A. Culvert Plugged with Debris and Flood Waters Overtopping Road.

B. Roadside Catchment Filled with Flow Slide Debris and Road Buried.

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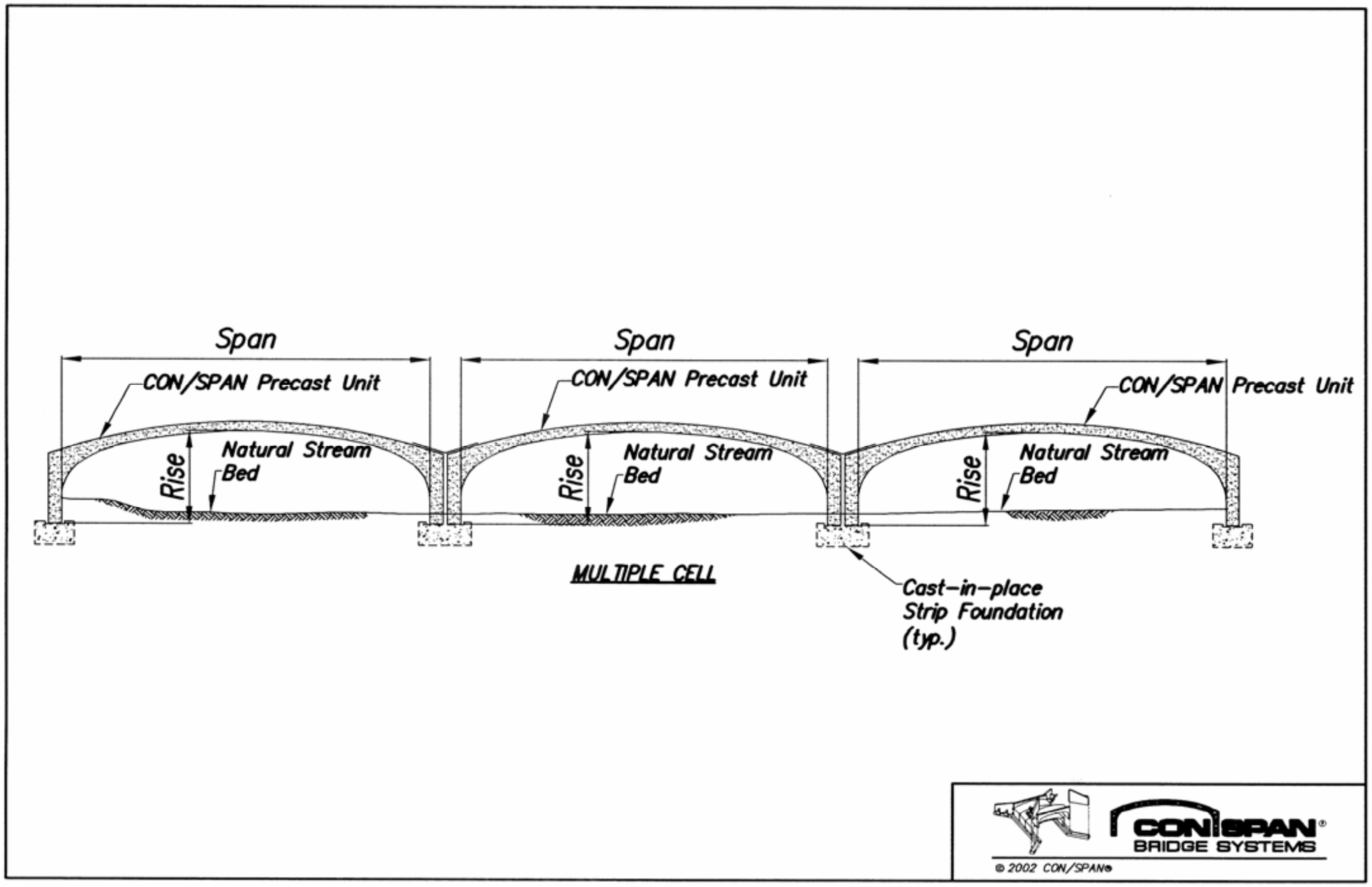
2005 Flooding at Mile 23 Fan

Figure D-5



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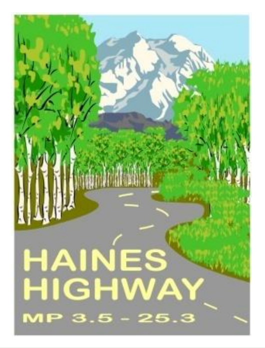
Arch Bridge Cross Section

Figure D-6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