



ALASKA
Department of Transportation and
Public Facilities
Statewide Geotechnical Services

FOUNDATION GEOLOGY REPORT

**University Ave. - Chena River Bridge
No. 263**

July 2009



FOUNDATION GEOLOGY REPORT

University Ave. - Chena River Bridge No. 263

University Ave. Rehabilitation and Widening Project
No. 63213 / RS-M-0617(3)

July 2009

Compiled by:



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Approved By:



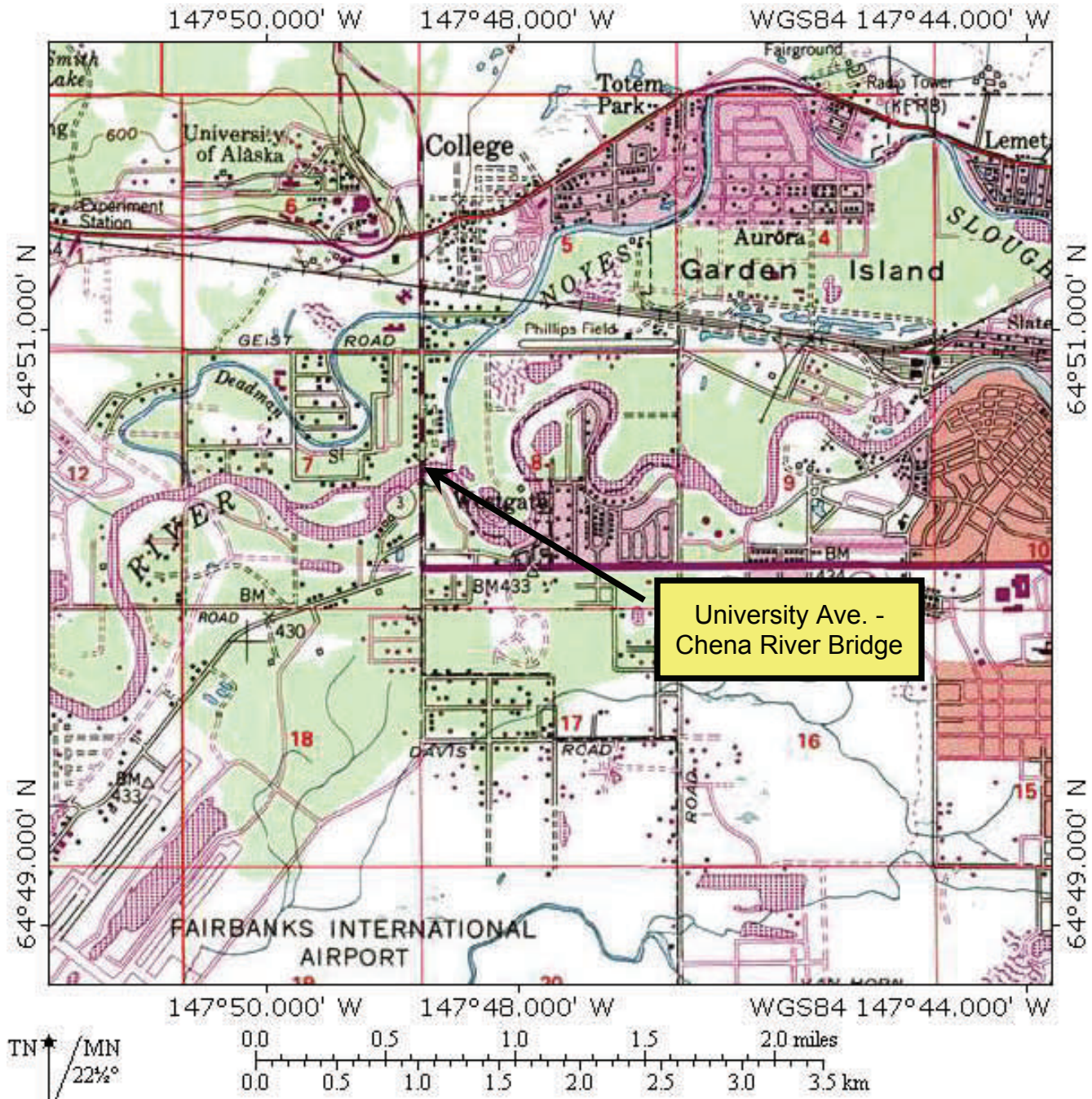
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**Project Vicinity Map
Figure I.**



University Ave. -
Chena River Bridge



State of Alaska
Dept. of Transportation and Public Facilities
Statewide Geotechnical Services

Chena River Bridge No. 263
University Ave. Rehab. and Widening Project
63213 / RS-M-0617(3)

INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) plans to replace the Chena River Bridge No. 263 at University Avenue in Fairbanks. The new bridge will be in the same location, as part of the University Avenue Rehabilitation and Widening Project, No. 63213 / RS-M-0617(3).

As currently proposed, the new bridge will be a three-span structure, 276 feet long and 98 feet wide. It will accommodate wider lane separation and pedestrian ways.

The existing University Avenue Bridge was built in 1964 and remains in service. It is 267 feet long, with three steel-girder spans supported by sets of driven steel piles.



Figure 2. University Ave. Chena River Bridge, looking north.

Purpose and scope

The purpose of this investigation is to measure and characterize geotechnical conditions for bridge design and construction, as follows:

1. Develop a soil profile,
2. Support selection of an adequate and economic foundation design,
3. Provide subsurface information for construction.

This report explains the exploration and testing methods and describes site conditions at the time of exploration. This report will compile 2008 and earlier data from 1993 and 1999 and interpret the findings together.

Drilling program 2008

Statewide Geotechnical Services personnel did the field investigation between November 13 and November 25, 2008. Engineering geologist Gary Fitch directed the field work and Statewide Materials Section drillers, Ryan Ruth, Ed Carman and Jason Love operated drilling equipment.

The 2008 test holes completed coverage and extended the depth of information as needed at foundation elements.

Previous investigations

Alaska DOT conducted drilling programs for this proposed University Ave. Bridge in 1993 and 1999. Data was not finalized into reports at that time and is compiled with updated format and included in this report. Geotechnical information and construction records were collected in the 1960's, for the existing bridge.

REGION GEOLOGY AND TOPOGRAPHY

Fairbanks is in the historic floodplain of the Chena and Tanana Rivers. It has low-relief, nearly flat or gently sloping topography and vague remnant features of abandoned river courses. The Chena has slow to moderate current, a fall of less than a foot per mile and a meandering course to its junction with the Tanana about five miles southwest. Water levels fluctuate seasonally, with peak flow moderated by a flood-control diversion system near North Pole, Alaska.

This is near the northern margin of the broad Tanana Basin alluvial plain that extends to the fore slope of the Alaska Range. Bedrock-elevated hills less than a mile to the north mark the beginning of the Yukon-Tanana Uplands province that stretches northward to the Yukon drainage.

The project site and most of the Fairbanks area sit on thick Holocene to Pleistocene deposits of unconsolidated alluvium. Alluvial layers are well-sorted gravel and sand, deposited by the meandering Chena River and Tanana Rivers. During glacial advances, ice fields in the Alaska Range contributed vast amounts of outwash to the basin. Large outwash fans that spread from mountains to the south crowded the Tanana River northward to its present location. At the project site, materials are distantly transported from original sources of outwash or from bedrock in the upper Chena drainage, rounded and well-sorted in the process.

Bedrock depth is not known at the bridge location and was not reached in boreholes drilled to a maximum depth of 223 feet. The nearest outcrops are $\frac{3}{4}$ of a mile north at bluffs near the University of Alaska.

Natural top soils in the area are brown silt (loess) and sandy deposits from flooding near the river. Near-surface organic layers or discontinuous peat beds exist in the region, more commonly in tundra areas and where fine upper soils are relatively thick. Filled or graded topography and pavement is more common in the more densely developed areas near the project site.

Mature spruce, birch and cottonwood forest originally covered areas near the river, patches of which remain. Open moss, grass and black spruce-covered tundra (permafrost) is common, particularly in the lowland areas or north-facing slopes.

Permafrost in the region is classified as discontinuous. Ground near the site is typically well drained and permeable where not frozen. In permafrost areas, and during the annual period of seasonal frost, drainage is poor.

At the project site, ground water flows in permeable aquifer soils and water table elevation may vary in relation to fluctuating flow in the Chena River.

SEISMICITY

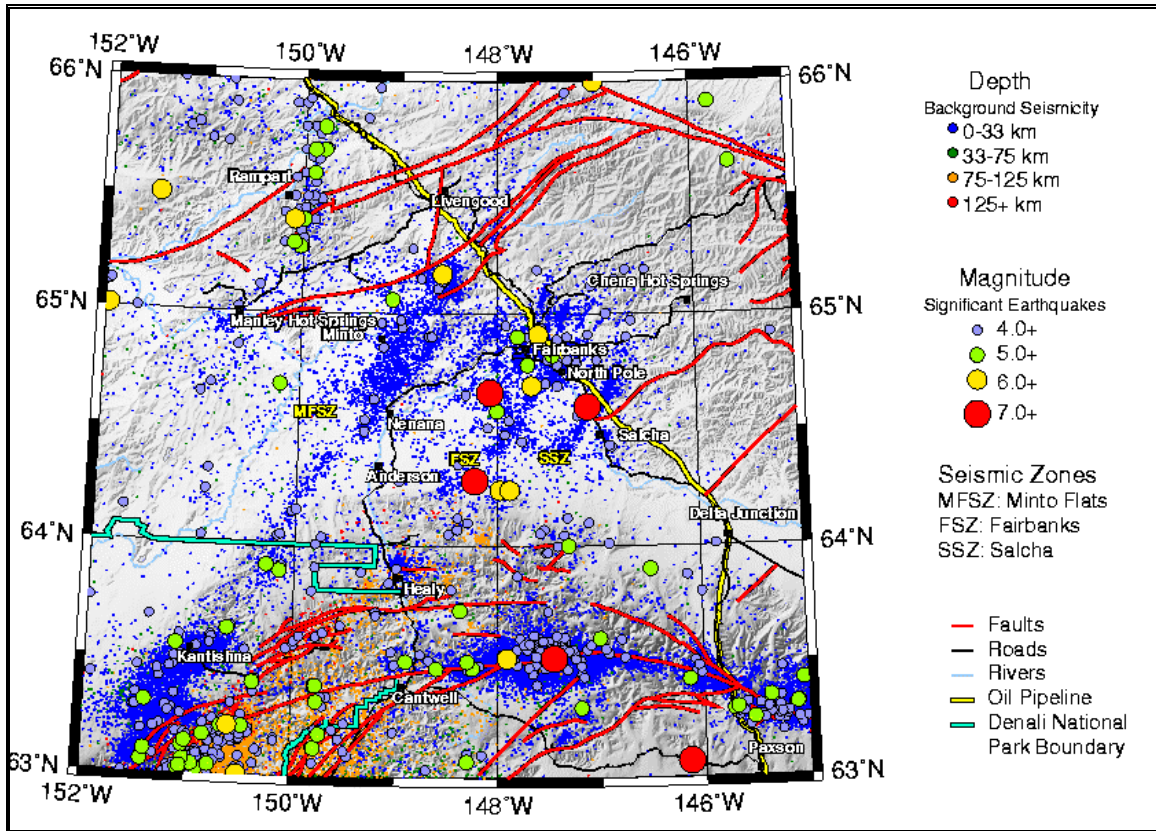


Figure 3. Recorded epicentral events in the Fairbanks region.

Fairbanks is in an area of high seismic potential. Within about fifty miles of the project site, eight epicenter events in the range Mw 6.2 to 7.3 occur in the period of record.

The USGS National Seismic Earthquake Hazards programs provide ground motion parameters for design with interactive web site calculators:

<http://eqint.cr.usgs.gov/deaggint/1996/index.php>

<http://earthquake.usgs.gov/research/hazmaps/design/>

These predict:

Max. PGA .29g (975 year mean return time, 5% probability of exceedance in 50 yrs).

64.84° Lat. by -147.81° (west) Long.

The USGS website calculators available at this time are configured to access a 1996 or 1998 data set. As such, they do not factor subsequent activity including a Mw 7.9 Denali Fault major event in 2002.

METHODS AND PROCEDURES

The 2008 drilling program consists of three sampled boreholes and one penetrometer test (see location plan, Appendix C). Boreholes and penetrometer tests done in 1993 and 1999 are included in this analysis.

Methods in the older investigations are comparable to those in 2008 with the exception of the hammer systems employed in 1993. In that year, drillers used a 30-inch drop, 340-pound “Safety Hammer” for driving casing and the 2.5” closed-end penetrometer tests. With this method, a friction winch (cat-head) and rope is used to raise and drop the hammer. Drillers used the modern-standard 140 pound CME Automatic Hammer for the SPT tests. Apply energy efficiency corrections accordingly.

Methods and equipment (2008)

- Drilling machinery was a truck-mounted CME 75 rotary drill, driven over the highway from Anchorage.
- We drilled holes for sampling by driving an NW flush-threaded, 3.5” O.D. open-ended (with drive shoe) casing with a 340-lb pound, 30-inch drop CME Automatic Hammer. After driving, cuttings were removed from the casing with a tricone bit and water circulation. At each sampling depth, intact material below the casing tip was sampled by SPT or other direct methods.
- Return water and cuttings recirculated through a settling tub, using no drilling fluid additives. We delivered water to the site with a trailer-mounted tank.
- Standard Penetration Tests (SPT) use a 24-inch, 1.4 inch I.D. x 2.0 inch O.D. split-tube sampler according to ASTM D-1586. It is driven 18 or 24 inches into intact soil below the casing tip with a 140-pound, 30-inch drop CME Automatic Hammer. Blow counts are recorded for each 6 inches. N values are the sum of the second and third 6-inch intervals, reported as blows per foot, uncorrected.
- We collected samples from material retained in the split tube sampler. These were sealed in numbered polyethylene (Ziploc®) bags for inspection or analysis.
- The Central Region Materials Laboratory analyzed samples for particle size gradation, moisture and organic content or other properties as requested.
- Continuous Penetrometer tests measure penetration resistance by driving a 2.5-inch diameter, closed-end, blunt-tip, steel drill rod with a 30-inch drop, 340-pound CME automatic hammer. Blow counts are recorded for each 12-inch interval. Technical refusal terminates the test at 1000 blows per foot. Note: 1993 tests used a “safety hammer” system, as described above.
- We measured pull-out force required to release the rod from its terminal depth either by a 60-ton hydraulic rod-pulling jack or by the hydraulic draw-works of the drill. Hydraulic pressure is recorded, acting against two 2.5-inch rams in the jack or two 1.75-inch rams in the draw-works system. Friction resistance is reported as pounds of force.

Utilities

The dense array of utilities across this site complicated drilling work. These are overhead, buried in the approach embankments, in conduits attached to the underside of the bridge and cast into the bridge deck itself. We could not drill through approach embankments near to the footings as originally planned because buried utilities were too numerous and complex to locate precisely enough to do so. Drill holes to address Abutments 1 and 4 had to be sited on the bridge deck where items could be located visually. The following list describes utility elements we identified in the course of 2008 work. This should not be taken as a complete list:

- Overhead lines are 15 to 25 feet outside of the west guard rail. This includes a high-voltage GVEA power line and GCI cables.
- A 12-inch fresh water main in an insulated sheath is under the deck on the northbound side. Outside the bulkheads, it angles to the east side of University Ave. and follows the ditch in either direction. An electric line for the heat tapes comes from a drop pole on the east side.
- A 20-inch steel casing is suspended in the second girder bay on the west side. It encloses a group of 12, four-inch polyethylene conduits that carry a variety of telephone lines, including fiber optics and other cables. In the approach embankments at either end the conduits fan out individually and angle downward and westward to man-hole utility boxes under the west sidewalk. Telephone company technicians were not successful in detecting these lines accurately with instruments. As-built plans for this utility were found at the City of Fairbanks engineering office.
- Six, individual four and six-inch(?) aluminum conduits are hung in the first girder bay on the west side. At least two contain large packets of active telephone lines. Others contain a variety of unknown or abandoned conductors.
- Wiring for illumination on the bridge is in small steel conduits cast into the concrete deck.
- A complete utility locate procedure is necessary before any work. Note that Alaska Digline or Alaska One-call or other third-party location services do not cover water and sewer or storm drain systems (Golden Heart Utilities or College Utilities etc.) in Fairbanks.

SITE DESCRIPTION

For reference, the existing bridge deck is about 436 feet elevation (above sea level). The river elevation was 418 feet (river ice at the time of drilling).

University Avenue has four non-separated lanes and heavy urban traffic. The roadway has curbs and sidewalks on both sides. Existing approach embankments are 5 to 12 feet above the surrounding areas. Numerous utilities are within the project limits. See the explanation in the previous section.

The river channel at this location is about 250 feet wide, nearly symmetrical in cross-section and about 10 to 12 feet deep at the mid-point (el. 407 ft.). The bottom is gravel and sand, with discontinuous masses or coverings of silt and few particles larger than 2 inches. Above an average water line, both sides are cut-banks, up to 10 feet high on the north and more gradual on the south. Some segments of the banks were reshaped by developments.

North of the river is an urban residential area. Houses are within 150 feet of the bridge on both north diagonals and a parking lot and boat ramp occupies the area beside the bridge on the southeast. The southwest diagonal has a forested “green buffer” area beyond which is a Federal office complex.

Both stream banks contain riprap, placed when the bridge was built. Constructed banks and bedding at both existing abutments have eroded, exposing H-piles beneath the concrete caps.

FOUNDATION CONDITIONS

Natural fine-grained top layers are up to ten feet thick, composed of silty loess and silt and sand flood water deposits. These do not exist within the incised river channel. The upper layers are not continuous across the project area where most of the original surface has been altered or filled in the course of development.

Over the project extent, deeper materials are alluvial, granular soils, in varying proportions of gravel and sand and silt beds, rarely. As a general description, materials below the upper fine soils are, gravel-rich for a thickness of 60 to 90 feet and sand rich in the deeper layers (within the depth of sampling). These are described for specific foundation elements in the profile charts in the next section.

We did not encounter permafrost in our drilling. Deep, pervasive permafrost is known within a half-mile of this location. The annual frost penetration was up to seven feet deep at time of 2008 drilling. Frozen ground that we did not find in sampling may occur at any location within the project limits.

Ground water elevation measurements across the site were from 418 feet to 421 feet, nearly matching the river elevation on various investigation dates. Aquifer soils are very permeable. The water table fluctuates in relation to changes in river level.

In all holes across project site, closed rod penetrometer blow counts average 38 blows per foot (bpf) in the upper 120 feet of depth and average 170 bpf from 120 feet to a maximum depth of 223 feet (not adjusted for depth, differing methods, incomplete holes, etc.).

Blow counts from the SPT display an erratic pattern. This might indicate a coarse particle effect on the SPT penetration measurements that can over-value in-situ density. Refer to ASTM D-1586 for applicability of blow counts in coarse-grained materials. Regardless of density indicated by blow counts, some material layers react to sampling disturbance in a loosely bound (liquefiable) manner. These suggest a cautious approach to interpreting the SPT results.

Materials, subsurface profiles

Abutment 1 and south approach

| Test holes : TH08-1, TH93-3, P08-1 | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------|--------------|
| Description | Top elev. (ft.)/ Thickness (ft.) | SPT (N, bpf**) | P200 |
| <i>South approach:</i> FILL , GW and SW (compacted embankment and asphalt pavement, up to 12 feet thick), Seasonal frost 6 ft. deep. | Surface (436) / | 68-90 | 9% |
| <i>Beneath the bridge:</i> FILL (Riprap, gravel bedding) | Surface (421) / | | |
| SILT , ML (loess and flood sediment) Natural layers remaining beneath sub-ex or entirely removed. | 424 (altered top surface) | 15 | 89.5% |
| GRAVEL w. sand , GP and SAND w. gravel , SP | 419 / | 9-50 (ave. 18) | 3.7- 7.5% |
| SAND and SAND w. gravel , SP and GRAVEL w. sand , GP | 398 / 28 | 9-35 (ave. 19) | 11% |
| SAND w. gravel , SP | 370 / 50 | 28-35 (ave. 27) | |
| SAND w. gravel , SP (* bottom of borehole at 275' el.) | 320 / 45* | 56-83 (ave. 68) | |
| (* bottom of pen. hole at 236' el.) | 275 / 39* | | |
| **Blow counts are as recorded in the field, uncorrected for depth or method. | | | |

Pier 2

| Test holes : TH93-2, P99-2 | | | |
|------------------------------------------------------------------------------|-------------------------------------|-------------------|--------------------|
| Description | Top elev. (ft.)/ Thickness (ft.) | SPT (N, bpf**) | P200 |
| Chena River waterline (Nov. 2008) | 418 / 11 | | |
| GRAVEL w. sand , GP | 407 / 80 | 4-17 | 13%(at 305'el.) |
| SAND w. gravel , SP (* bottom of borehole 248.5' el.) | 327 / 78.5* | 39-100+ | |
| **Blow counts are as recorded in the field, uncorrected for depth or method. | | | |

Pier 3

| Test holes : TH93-1, P08-2 | | | | |
|------------------------------------------------------------------------------|---------------------------------------------|---------------------------|-------------|--|
| Description | Top elev. (ft.)/ Thickness (ft.) | SPT (N, bpf**) | P200 | |
| Chena River waterline (Nov. 2008) | 418 / 12 | | | |
| GRAVEL w. sand, GP | 406 / 92 | 6-58 | | |
| SAND w. gravel, SP (* bottom of borehole at 270' el.) | 314 / 44* | 78-100+ | | |
| (* bottom of pen. hole at 213' el.) | 270 / 57* | | | |
| **Blow counts are as recorded in the field, uncorrected for depth or method. | | | | |

Abutment 4 and north approach

| Test holes: TH08-2, TH08-3, P99-1 | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------|-------------|--|
| Description | Top elev. (ft.)/ Thickness (ft.) | SPT (N, bpf**) | P200 | |
| <i>North approach:</i> FILL , GW and GW-GM (compacted embankment and asphalt pavement, up to 13 feet thick), Seasonal frost 8 ft. deep. | Road (436) / | 67-81 | 7.4% | |
| <i>Beneath the bridge:</i> FILL (Riprap, gravel bedding) Seasonal frost 4 ft. deep. | (426) / | | | |
| SILT - SAND , ML,SM (loess and flood sediment), Remnant of natural layers below sub-ex. elevation.). | Variable / | 4-12 | 21%, (+) | |
| Interlayered GRAVEL w. silt and sand , GP-GM and GW-GM, SAND w. gravel, SP and SILT , ML (minor) | 418 / 52 | 10-50 (ave. 20) | | |
| GRAVEL w. sand, GP | 366 / 28 | 28-34 (ave. 30) | 3-8.1% | |
| SAND w. silt, SP& SW-SM and SILT w. sand, ML | 338 / 67 | 28-39 (ave. 35) | 12-70% | |
| Interlayered GRAVEL w. sand, GP and SAND w.silt, SP & SW-SM | 271 / 31+ | 35-89 (ave. 55) | | |
| **Blow counts are as recorded in the field, uncorrected for depth or method. | | | | |

SELECTED REFERENCES

- Alaska Department of Transportation and Public Facilities; Alaska Geotechnical Procedures Manual, Oct. 2007.
- Alaska Earthquake Information Center (AEIC), (web site: www.aeic.alaska.edu), Geophysical Institute, University of Alaska Fairbanks
- George Plafker and Henry C. Berg, The Geology of Alaska, Geological Society of America, Volume G-1, 1994.
- NOAA National Weather Service, Alaska - Pacific River Forecast Center, web site: <http://aprfc.arh.noaa.gov/>
- USGS National Seismic Earthquake Hazards program, Interactive Deaggregations, 1996. Web site <http://eqint.cr.usgs.gov/deaggint/1996/index.php>.
- USGS National Water Information System - Web site, <http://waterdata.usgs.gov/ak/nwis/rt>
- USGS, Wilson, et al., Geologic Map of Central (Interior) Alaska, Open-file Report OF 98-133-A, p 39-42 and map.

Selected ASTM References

- D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
- D653 - Terminology Relating to Soil Rock, and Contained Fluids.
- D1586 - Test Method for Penetration Test and Split-Barrel Sampling of Soils.
- D2487 - Practice for Classification of Soils for Engineering Purposes.
- D3740 - Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

APPENDICES

Appendix A - Location plan and test hole logs

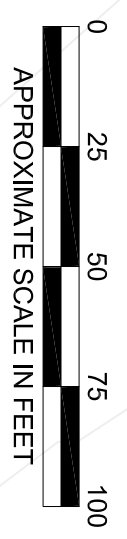
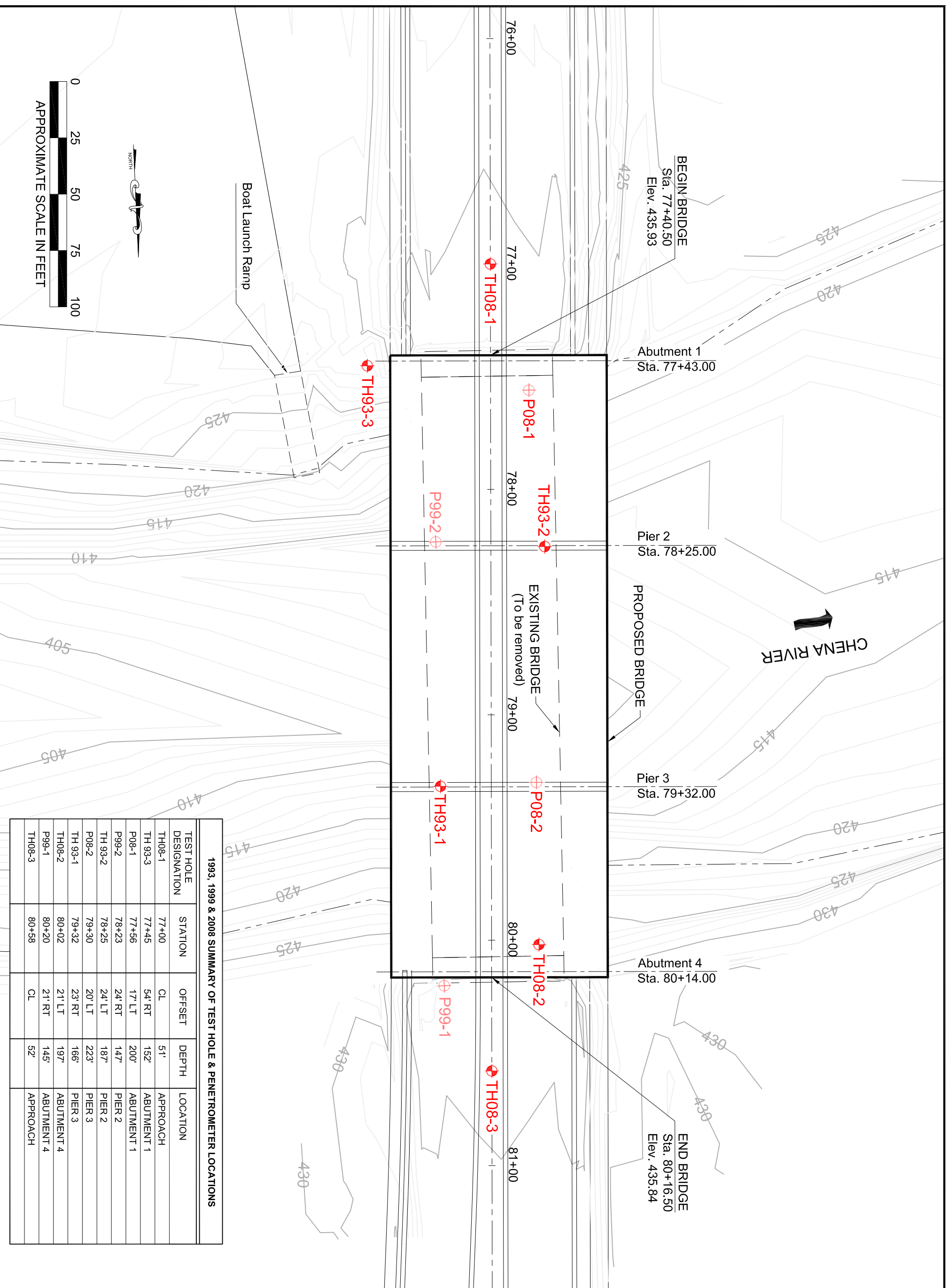
Geologic logs in Appendix B of this report are excerpted verbatim as a complete section, from the Structural Foundation Engineering Report.

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| No. | DATE | DESCRIPTION |
| | | |

LEGEND

 TEST HOLE

 PENETROMETER



1993, 1999 & 2008 SUMMARY OF TEST HOLE & PENETROMETER LOCATIONS

| TEST HOLE DESIGNATION | STATION | OFFSET | DEPTH | LOCATION |
|-----------------------|---------|--------|-------|------------|
| TH08-1 | 77+00 | CL | 51' | APPROACH |
| TH 93-3 | 77+45 | 54' RT | 152' | ABUTMENT 1 |
| P08-1 | 77+56 | 17' LT | 200' | ABUTMENT 1 |
| TH 93-2 | 78+23 | 24' RT | 147' | PIER 2 |
| P99-2 | 78+25 | 24' LT | 167' | PIER 2 |
| P08-2 | 79+30 | 20' LT | 223' | PIER 3 |
| TH 93-1 | 79+32 | 23' RT | 166' | PIER 3 |
| TH08-2 | 80+02 | 21' LT | 197' | ABUTMENT 4 |
| P99-1 | 80+20 | 21' RT | 145' | ABUTMENT 4 |
| TH08-3 | 80+58 | CL | 52' | APPROACH |

CHECKED BY:

DESIGNED BY: DR. DODGE

DRAWN BY: DR. DODGE

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
STATEWIDE MATERIALS

**CHENA RIVER Br # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING**

**TEST HOLE
LOCATION PLAN**


PROJECT DESIGNATION
63213

STATE
ALASKA

YEAR
2009

SHEET NUMBER
1

TOTAL SHEETS
12

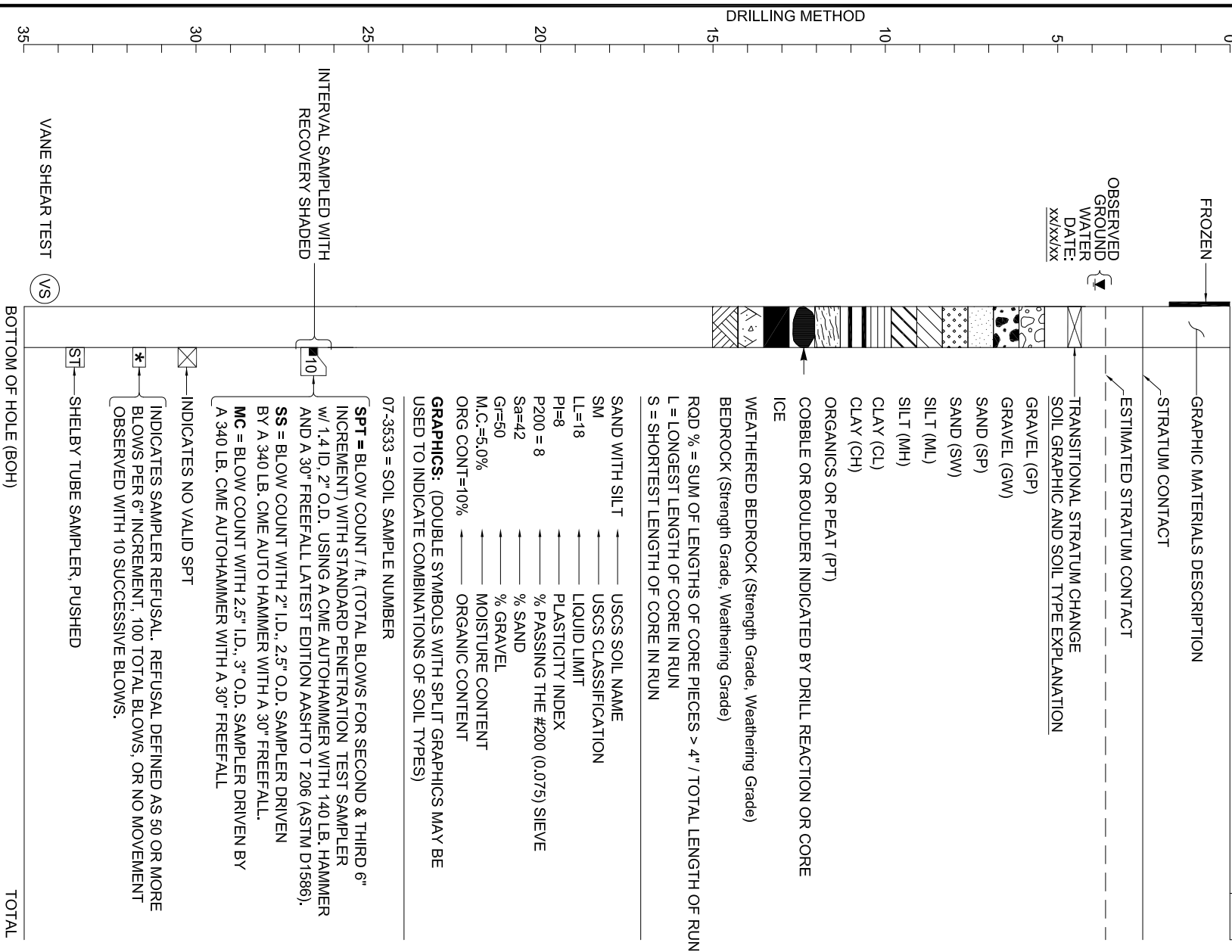


TYPICAL TEST HOLE LOG

DATE: DATE BEGUN - DATE COMPLETED
ELEVATION: GROUND ELEVATION AT TEST HOLE
STATION / LOCATION / OFFSET:

HOLE DIA.

3.5 in



NOTES:

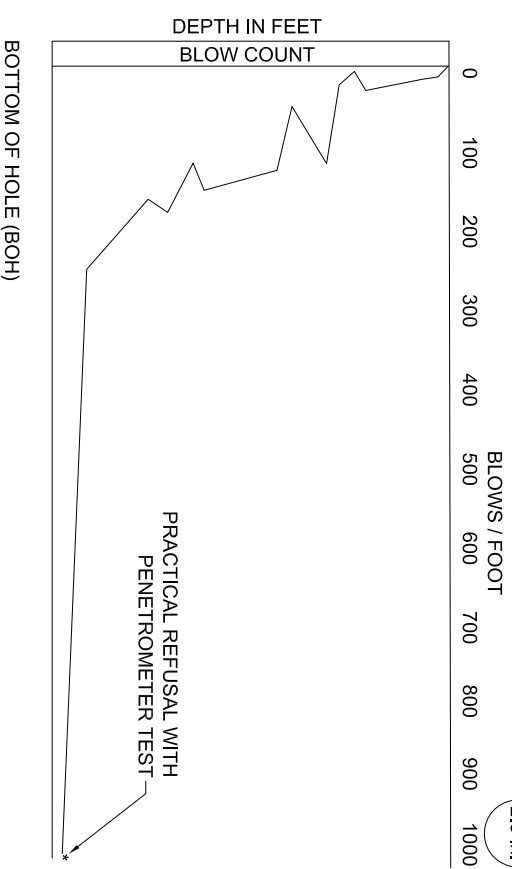
- 1) THE TEST HOLE LOGS DEPICTED GRAPHICALLY IN THESE DRAWINGS ARE DISTILLATIONS OF THE ORIGINAL FIELD LOGS. BASED ON POST-FIELD INVESTIGATION REVIEW AND ANALYSIS. THESE DRAFTED LOGS INCLUDE CHANGES MADE TO FIELD DESCRIPTIONS BASED UPON LABORATORY TEST DATA, REVIEW AND ANALYSIS. DETAILED FIELD OBSERVATIONS OF ROCK AND SOIL SAMPLED DURING THE DRILLING PROGRAM ARE NOT REPRODUCED IN THE DRAFTED LOGS.
- 2) DESCRIPTION AND CLASSIFICATION OF FROZEN SOILS FOLLOWS **ALASKA GEOTECHNICAL PROCEDURES MANUAL**. FOR AN EXPLANATION SEE **FIELD GUIDE FOR SOIL CLASSIFICATION**.
- 3) THE TEST HOLE LOGS FROM 1993, 1999 AND 2008 IN THESE SHEETS ARE AN INTEGRAL PART OF THE **FOUNDATION GEOLOGY REPORT - UNIVERSITY AVENUE - CHENA RIVER BRIDGE No. 263 - FEBRUARY 2009**. SEE CONSTRUCTION CONTRACT BID DOCUMENTS - INVITATION TO BID/NOTICE TO BIDDERS. IMPORTANT INFORMATION ABOUT THE TEST HOLE LOGS AND THE FOUNDATION INVESTIGATION IS CONTAINED IN THE REPORT. THE TEST HOLE LOGS ARE NOT SEVERABLE FROM AND CANNOT BE COMPLETELY AND CORRECTLY INTERPRETED WITHOUT REFERENCE TO THE FOUNDATION GEOLOGY REPORT.

TYPICAL PENETROMETER TEST LOG

DATE: DATE BEGUN - DATE COMPLETED
ELEVATION: GROUND ELEVATION AT TEST HOLE
STATION / LOCATION / OFFSET:

HOLE DIA.

2.5 in.



TEST HOLE LOG EXPLANATION

PROJECT DESIGNATION

63213

STATE YEAR

ALASKA 2009

SHEET NUMBER TOTAL SHEETS

2 12



DESIGNED BY:

DRAWN BY:

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
STATEWIDE MATERIALS

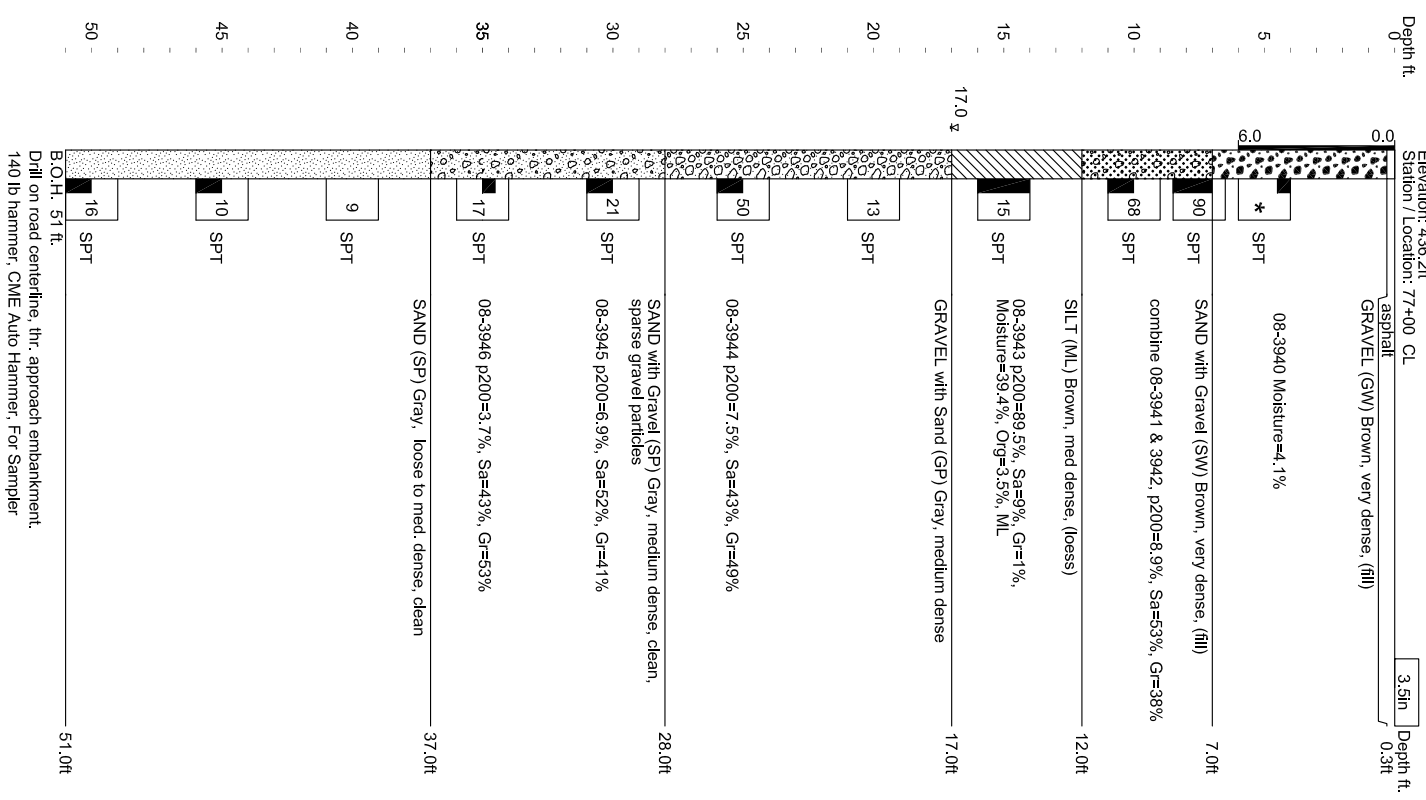
CHENA RIVER Br. # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING

TH08-1

Date: 11/23/08 - 11/23/08

Elevation: 436.2ft

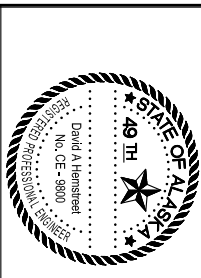
Station / Location: 77+00 CL



B.O.H. 51 ft.
 Drill on road centerline, thr. approach embankment.
 140 lb hammer, CME Auto Hammer, For Sampler

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| RECORD OF REVISIONS | | |
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| | | |

CHECKED BY:



DESIGNED BY:

DRAWN BY:

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS
**CHENA RIVER BR # 263
 UNIVERSITY AVENUE
 REHABILITATION & WIDENING**

**2008
 TEST HOLE LOG**

PROJECT DESIGNATION
63213

STATE YEAR
ALASKA 2009

SHEET NUMBER TOTAL SHEETS
3 12

TH93-3

Date: 10/21/93 - 10/23/93

Elevation: 426.9ft

Station / Location: 77+45 / 54 RT

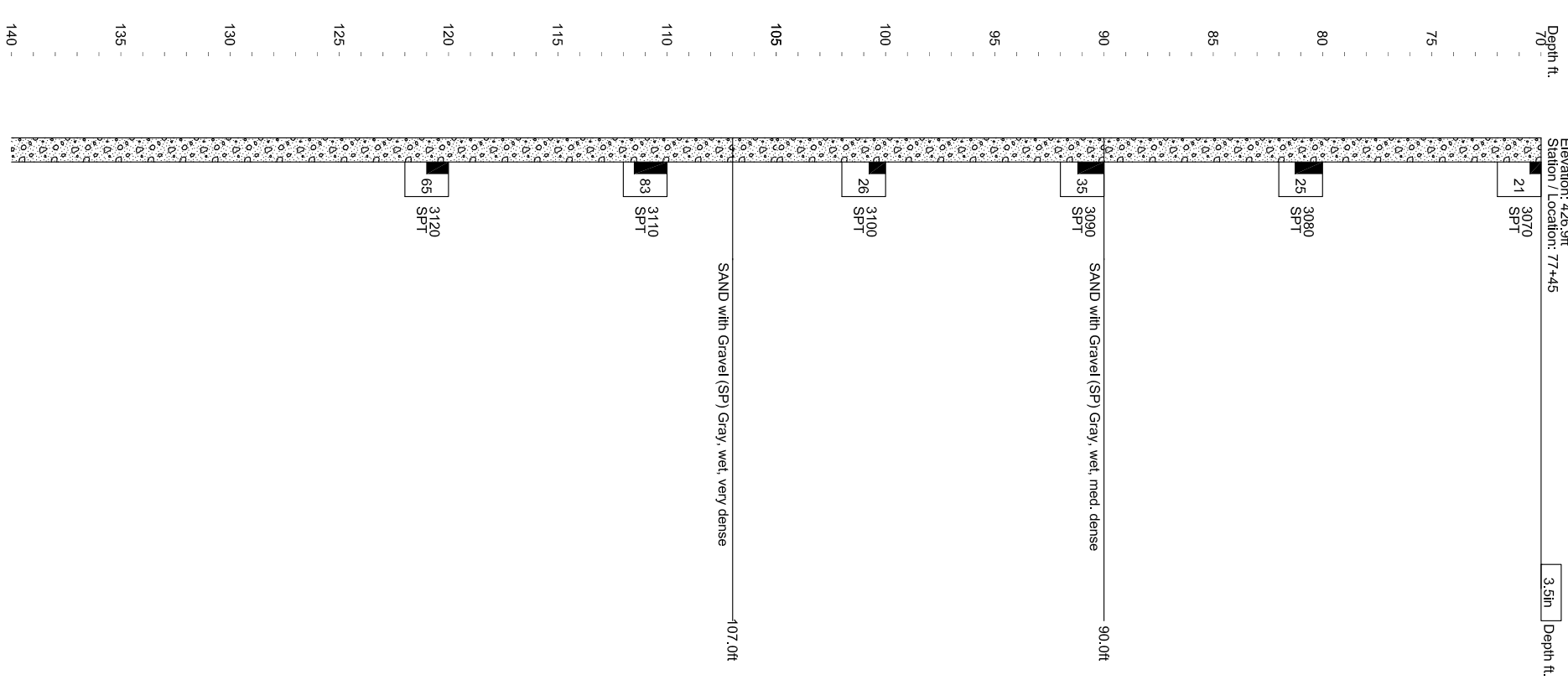


TH93-3 (Cont.)

Date: 10/21/93 - 10/23/93

Elevation: 426.9ft

Station / Location: 77+45

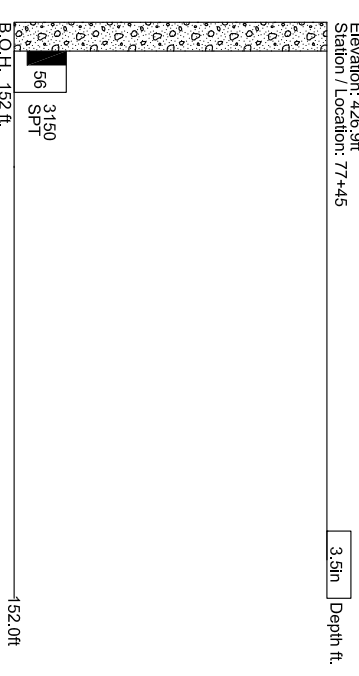


TH93-3 (Cont.)

Date: 10/21/93 - 10/23/93

Elevation: 426.9ft

Station / Location: 77+45



Notes:
 B.O.H.: 152 ft
 1800 PSI pull-out NW casing,
 140 lb Hammer, Cathead Rope Method, For Sampler

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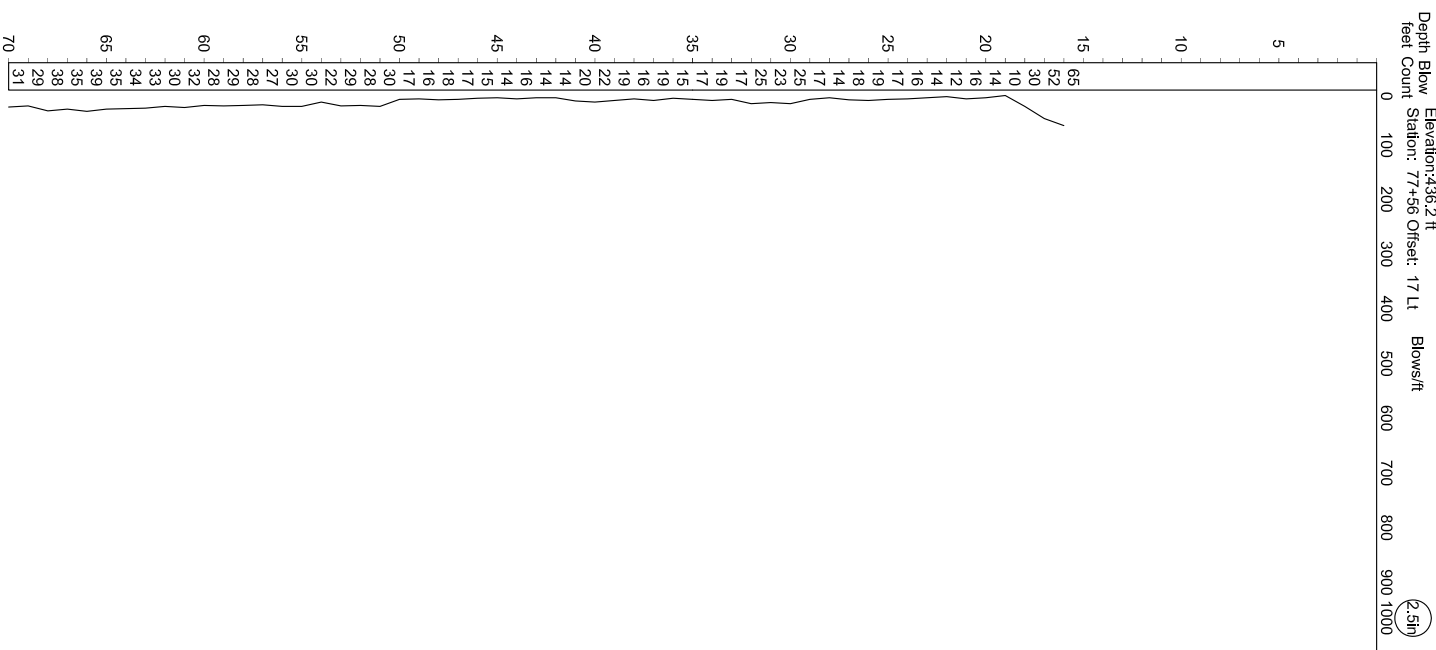
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS
**CHENA RIVER BR # 263
 UNIVERSITY AVENUE
 REHABILITATION & WIDENING
 2008
 PENETROMETER LOG**

| | |
|---------------------|--------------|
| PROJECT DESIGNATION | |
| 63213 | |
| STATE | YEAR |
| ALASKA | 2009 |
| SHEET NUMBER | TOTAL SHEETS |
| 4 | 12 |

P08-1

Date: 11/15/2008 - 11/16/2008

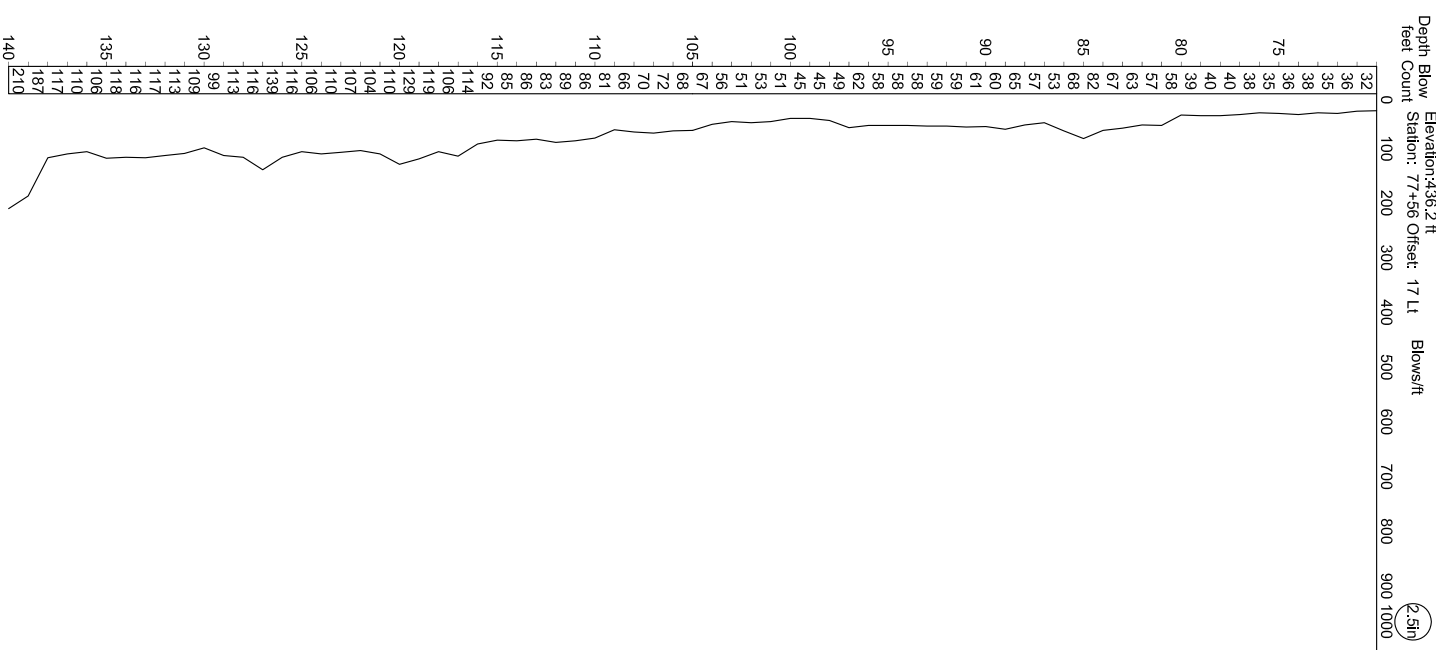
Depth Blow Elevation: 436.2 ft
Station: 77+56 Offset: 17 Lt Blows/ft



P08-1 (Cont.)

Date: 11/15/2008 - 11/16/2008

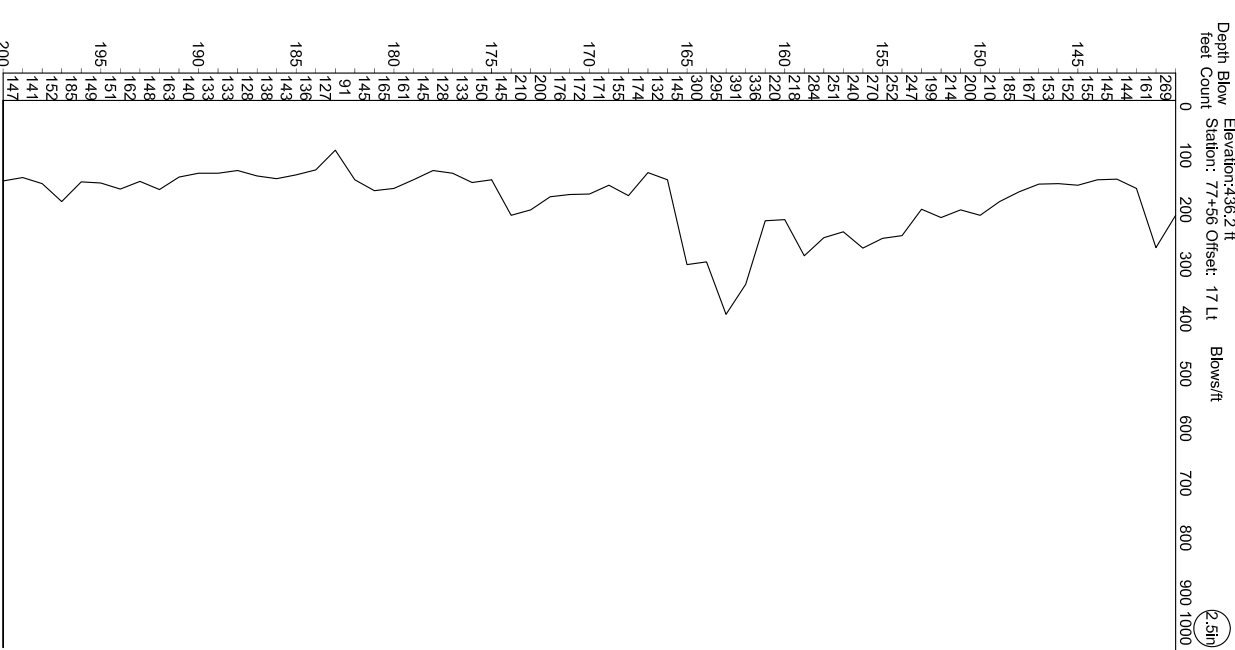
Depth Blow Elevation: 436.2 ft
Station: 77+56 Offset: 17 Lt Blows/ft



P08-1 (Cont.)

Date: 11/15/2008 - 11/16/2008

Depth Blow Elevation: 436.2 ft
Station: 77+56 Offset: 17 Lt Blows/ft



BOH: 200 ft
Notes: Drill thr. bridge deck
Pulld. force (galled) with drawworks) 20 min. after driving
8.2 k pounds release force at BOH
Hammer: CME Auto Hammer 340 lb hammer
Equipment: CME 75 Truck
Drilling Method: Penetrometer
Field Crew: Ruth, Love, Carman
Geologist: G. Fitch

| RECORD OF REVISIONS | |
|---------------------|-------------|
| No. | DESCRIPTION |
| | |
| | |



DESIGNED BY:
DRAWN BY:

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
STATEWIDE MATERIALS

**CHENA RIVER BR # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING**

**2008
PENETROMETER LOG**

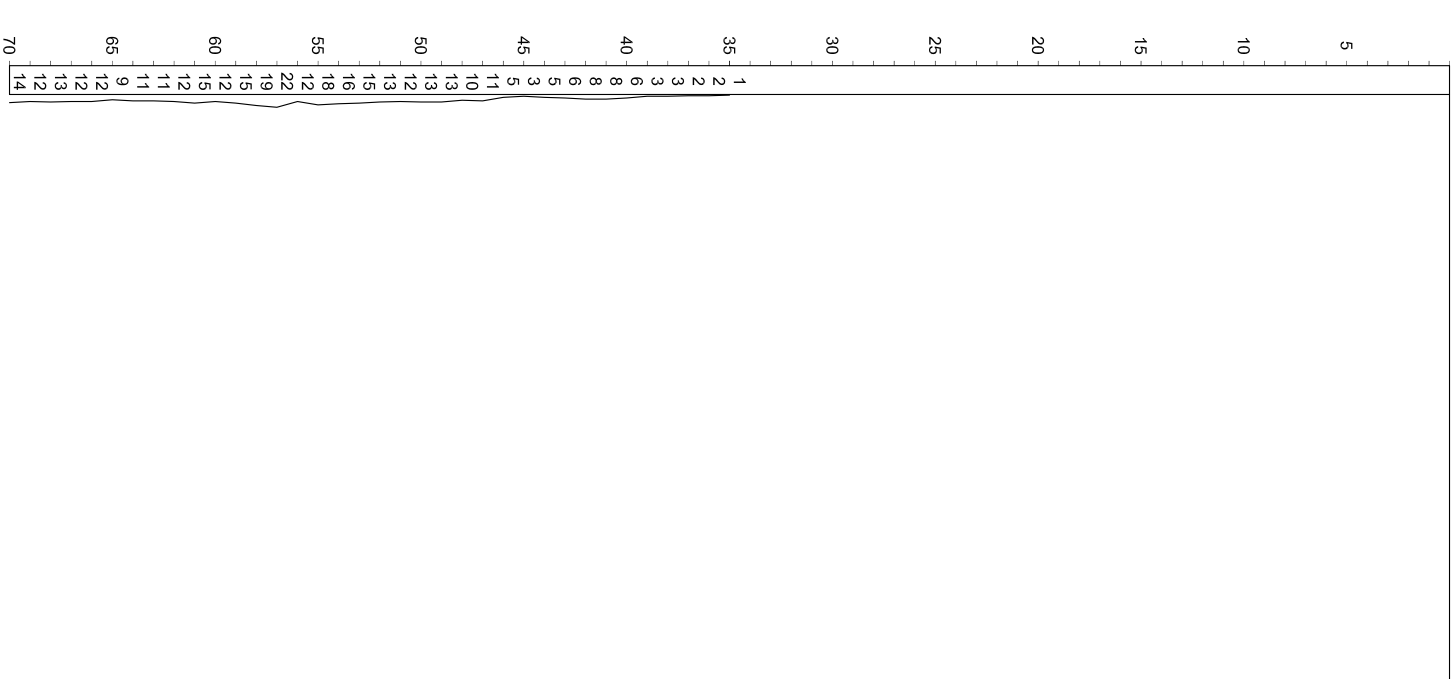
PROJECT DESIGNATION
63213

| STATE | YEAR |
|---------------|--------------|
| ALASKA | 2009 |
| SHEET NUMBER | TOTAL SHEETS |
| 5 | 12 |

P99-2

Date: 7/18/1999 - 7/18/1999

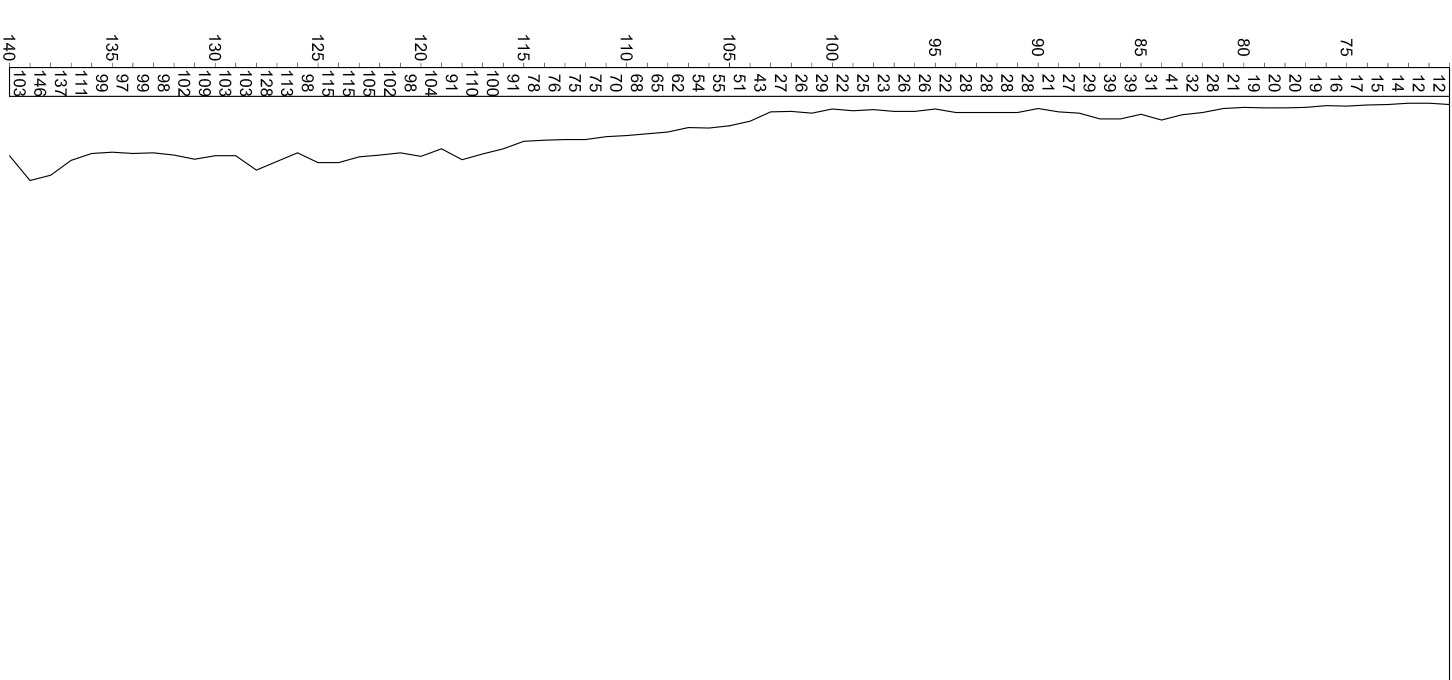
Depth Blow Elevation: 436.2 ft
Station: 78+23 Offset: 24 Rt Blows/ft
Feet Count



P99-2 (Cont.)

Date: 7/18/1999 - 7/18/1999

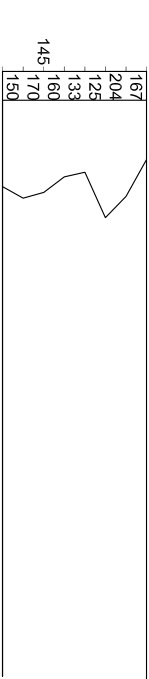
Depth Blow Elevation: 436.2 ft
Station: 78+23 Offset: 24 Rt Blows/ft
Feet Count



P99-2 (Cont.)

Date: 7/18/1999 - 7/18/1999

Depth Blow Elevation: 436.2 ft
Station: 78+23 Offset: 24 Rt Blows/ft
Feet Count



BOH: 147 ft
Notes:
1800 psi (hyd. pressure)
Hammer: CME Auto Hammer 340 lb hammer
Equipment: CME 75 Truck
Drilling Method: Penetrometer
Field Crew: Mitchell, Jones
Geologist: C. Boeckman

| ATTACHMENT NUMBER | | |
|---------------------|------|-------------|
| RECORD OF REVISIONS | | |
| No. | DATE | DESCRIPTION |
| | | |
| | | |

CHECKED BY:



DESIGNED BY:
DRAWN BY:

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
STATEWIDE MATERIALS
**CHENA RIVER Br # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING**

**2008
TEST HOLE LOG**

PROJECT DESIGNATION
63213

STATE YEAR
ALASKA 2009

SHEET NUMBER TOTAL SHEETS
6 12

TH93-2

Date: 10/9/93 - 10/12/93

Elevation: 436.1ft

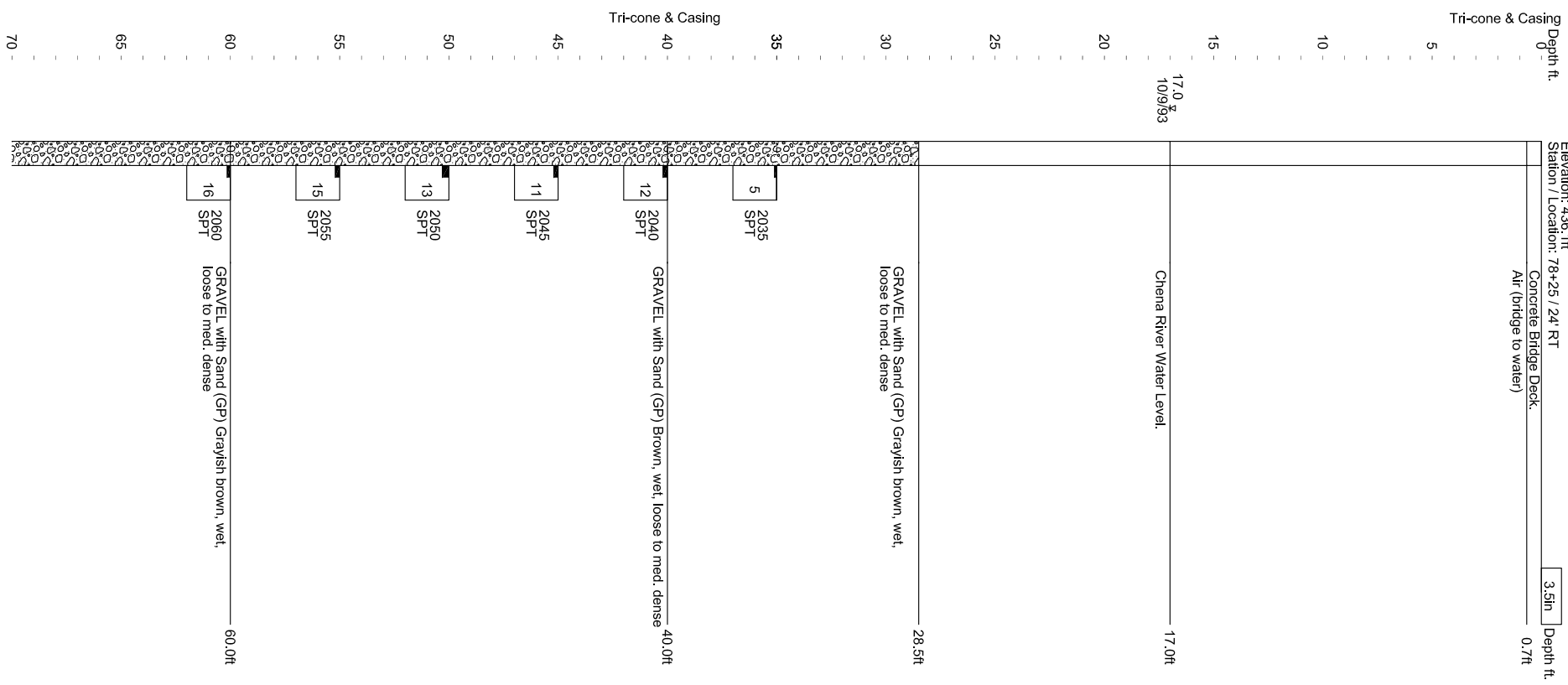
Station / Location: 78+25 / 24 RT

Concrete Bridge Deck

Air (bridge to water)

3.5in Depth ft.

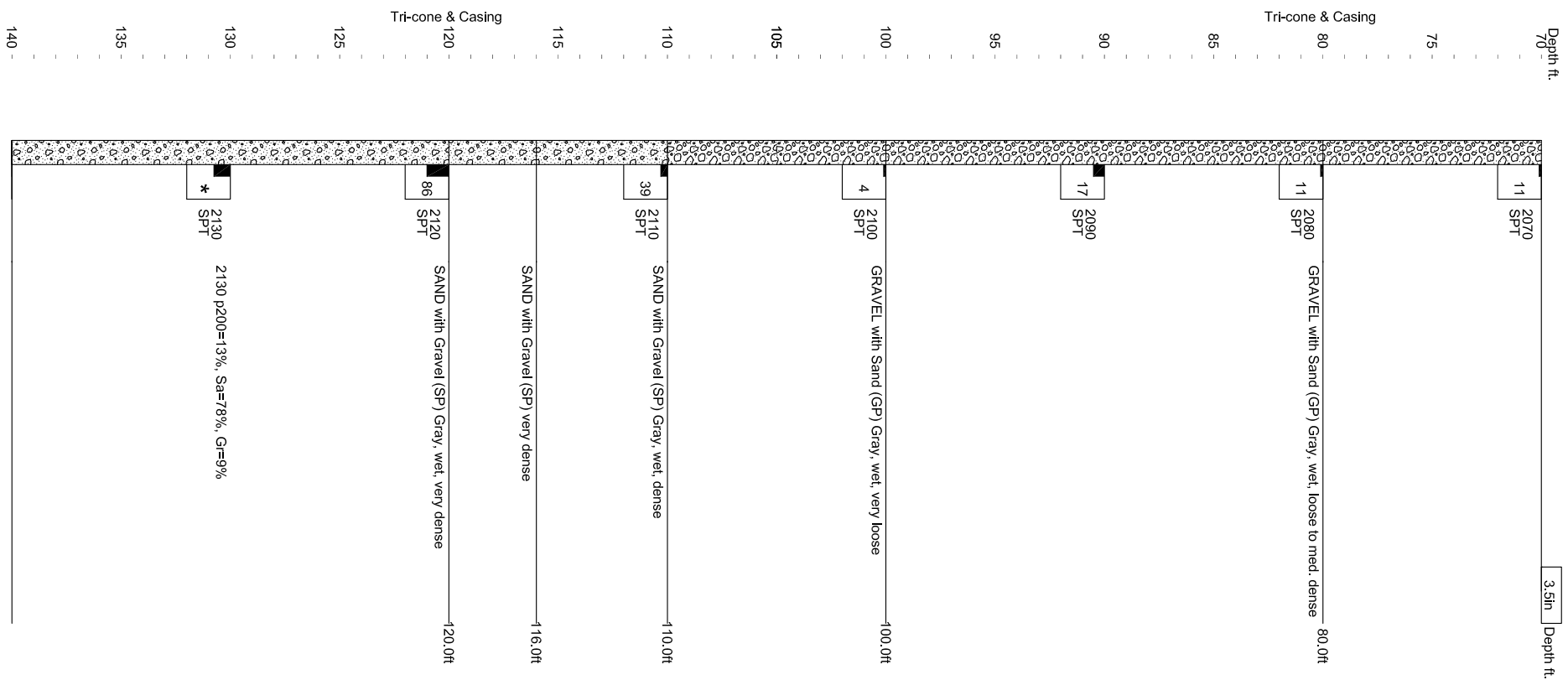
0.7ft



TH93-2 (Cont.)

Depth ft.

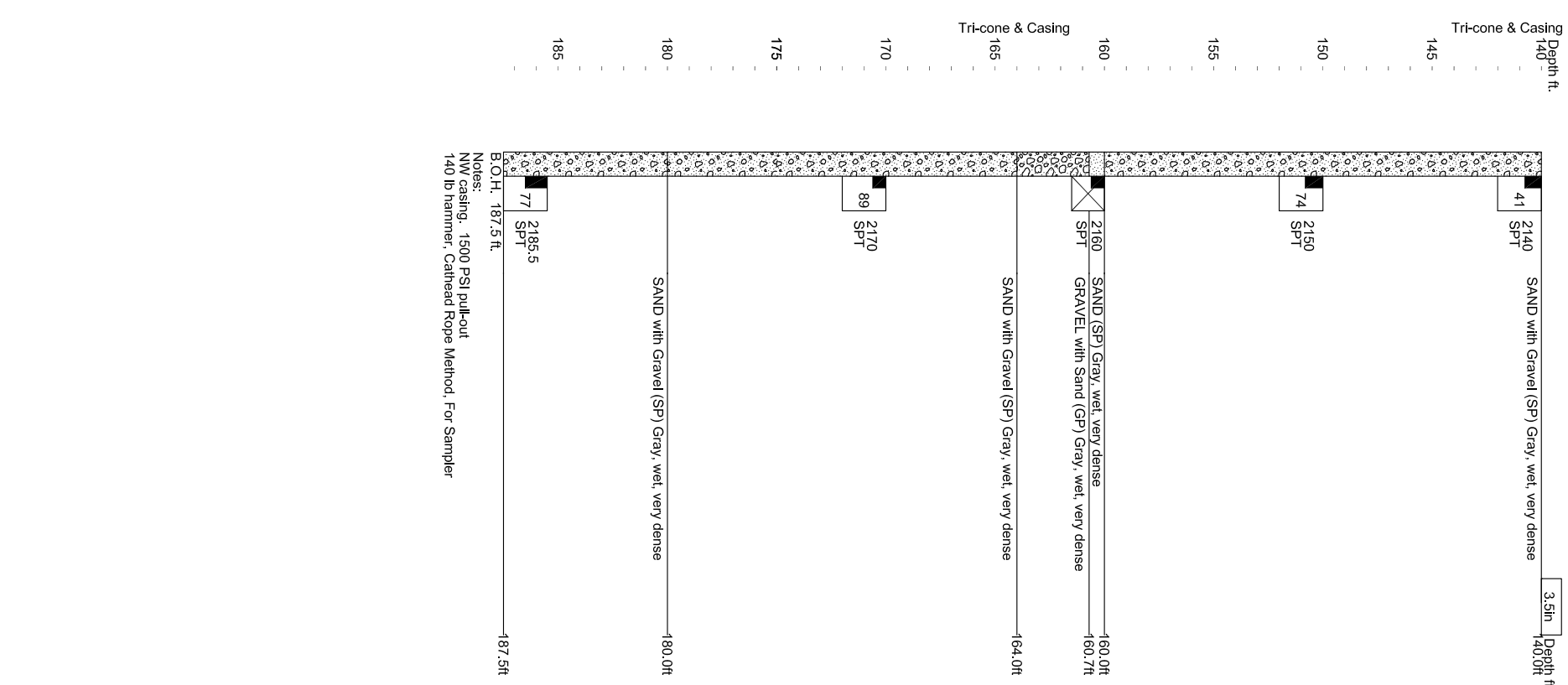
3.5in Depth ft.



TH93-2 (Cont.)

Depth ft.

3.5in Depth ft.



| ADDENDUM NUMBER | | |
|---------------------|------|-------------|
| ATTACHMENT NUMBER | | |
| RECORD OF REVISIONS | | |
| No. | DATE | DESCRIPTION |
| | | |

CHECKED BY:



DESIGNED BY:

DRAWN BY:

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STATEWIDE MATERIALS

CHENA RIVER BR. # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING

2008
TEST HOLE LOG

PROJECT DESIGNATION
63213

STATE
ALASKA

YEAR
2009

SHEET NUMBER
7

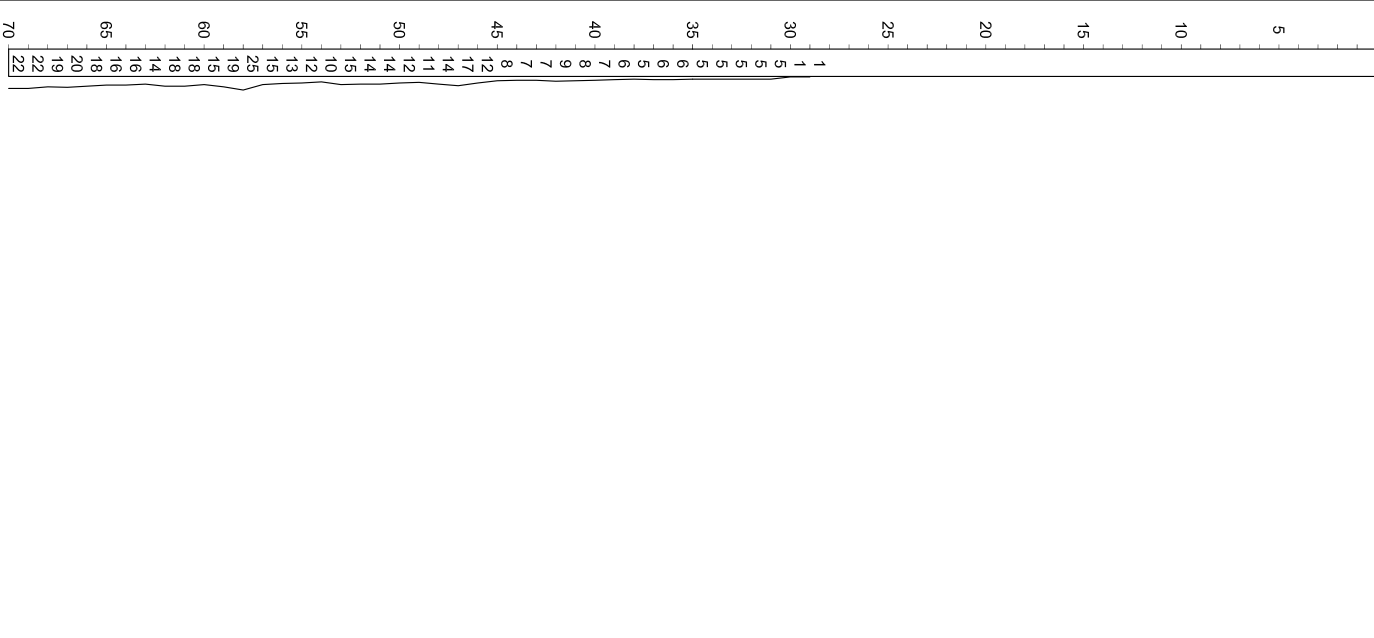
TOTAL SHEETS
12

P08-2

Date: 11/16/2008 - 11/17/2008

Elevation: 436.1 ft

Station: 79+30 Offset: 20 Lt

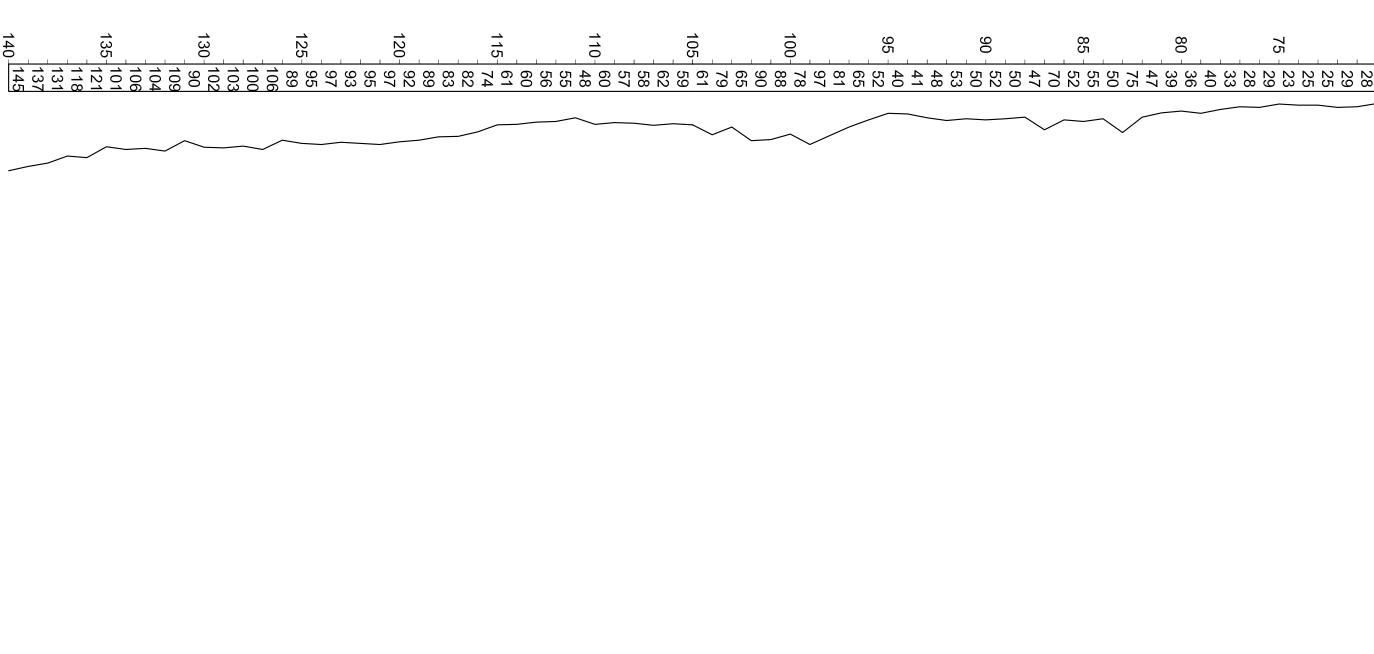


P08-2 (Cont.)

Date: 11/16/2008 - 11/17/2008

Elevation: 436.1 ft

Station: 79+30 Offset: 20 Lt

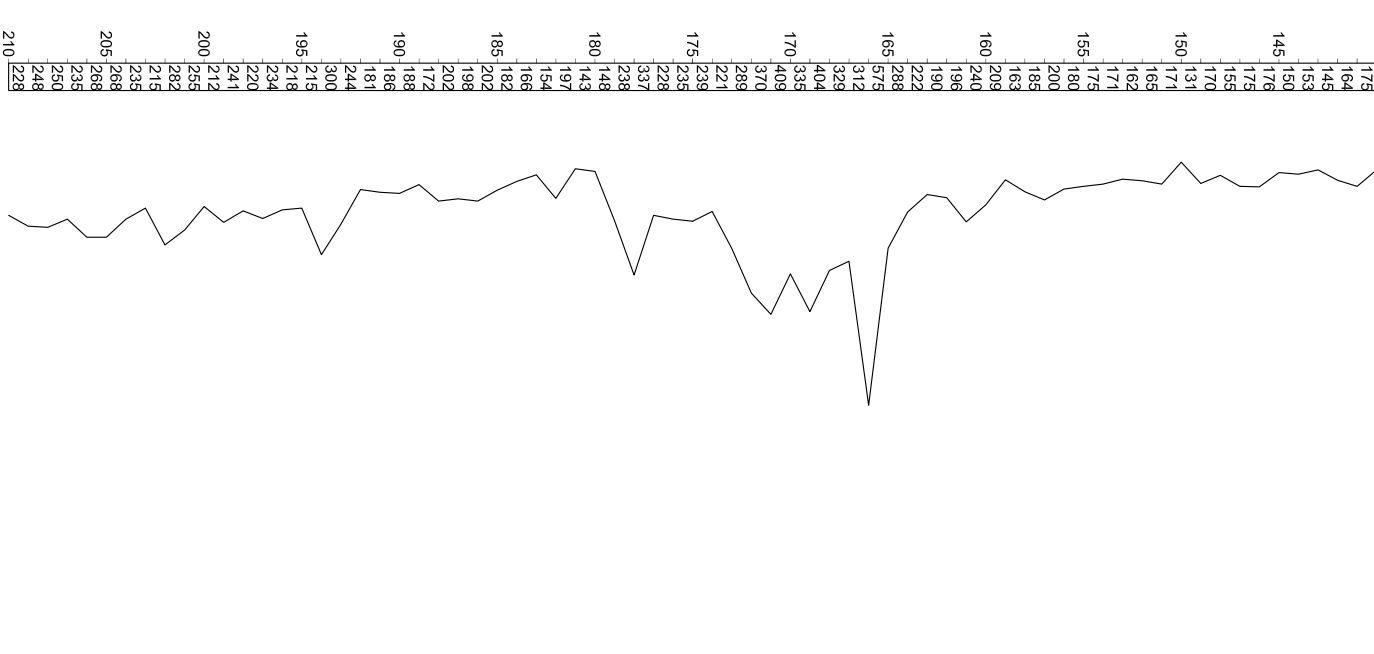


P08-2 (Cont.)

Date: 11/16/2008 - 11/17/2008

Elevation: 436.1 ft

Station: 79+30 Offset: 20 Lt

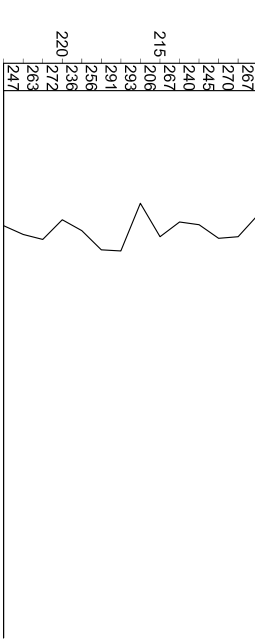


P08-2 (Cont.)

Date: 11/16/2008 - 11/17/2008

Elevation: 436.1 ft

Station: 79+30 Offset: 20 Lt



BOH: 223 ft
 Notes: Drill thr. bridge deck
 Pullout force (gulled with draw-works) 10 min. after driving
 9.0 k pounds release force at BOH
 8.2 k pounds pull force at 3' above BOH
 Hammer: CME Auto Hammer 340 lb hammer
 Equipment: CME 75 Truck
 Drilling Method: Penetrometer
 Field Crew: Ruth, Love, Carman
 Geologist: G. Fitch

DRAFTERS NOTE:
 SCALE FACTOR FOR THIS
 PENETROMETER NO. P08-2
 HAS BEEN REDUCED TO FT.

| ATTACHMENT NUMBER | | |
|---------------------|------|-------------|
| RECORD OF REVISIONS | | |
| No. | DATE | DESCRIPTION |
| | | |
| | | |

CHECKED BY:



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STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS

**CHENA RIVER BR # 263
 UNIVERSITY AVENUE
 REHABILITATION & WIDENING**

**1993
 TEST HOLE LOG**

PROJECT DESIGNATION
63213

STATE YEAR
ALASKA 2009

SHEET NUMBER TOTAL SHEETS
8 12

TH93-1

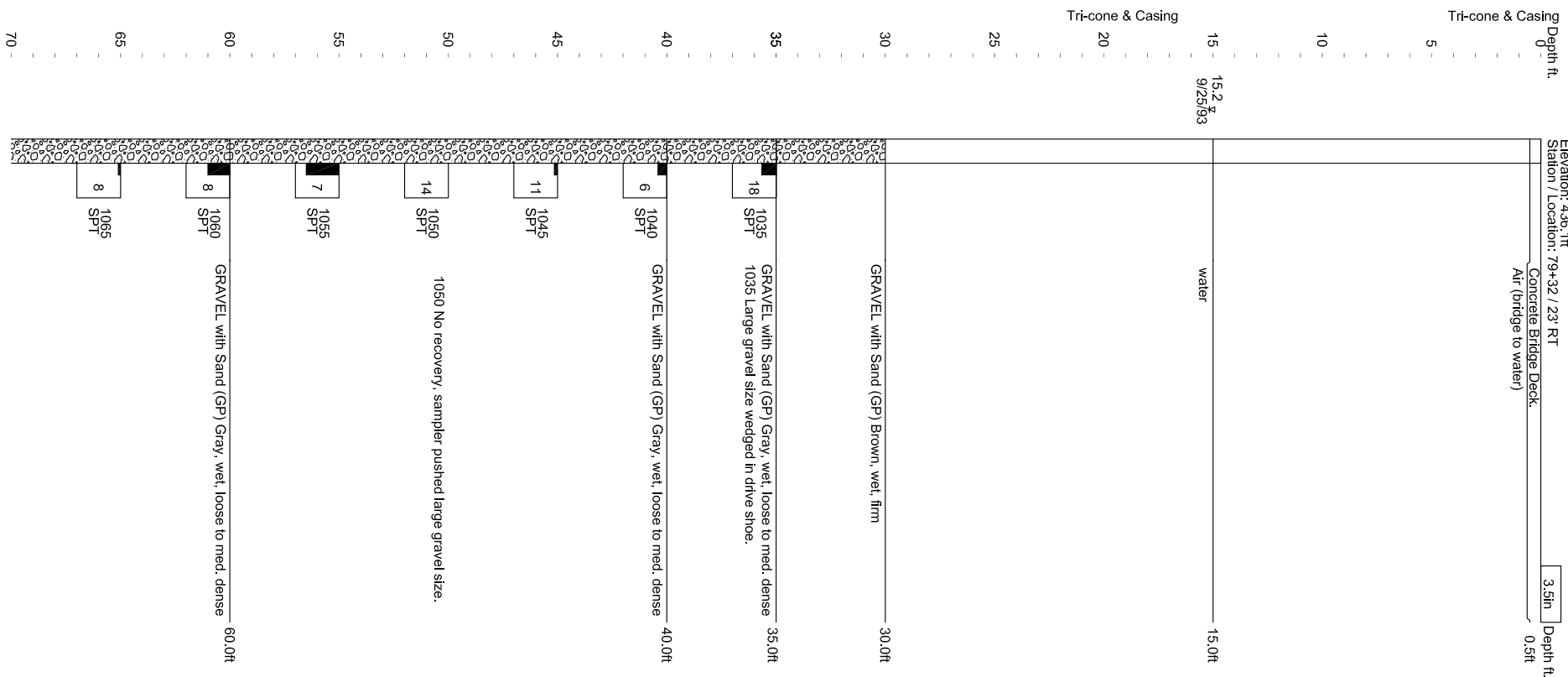
Date: 9/25/93 - 10/8/93

Elevation: 436.1ft

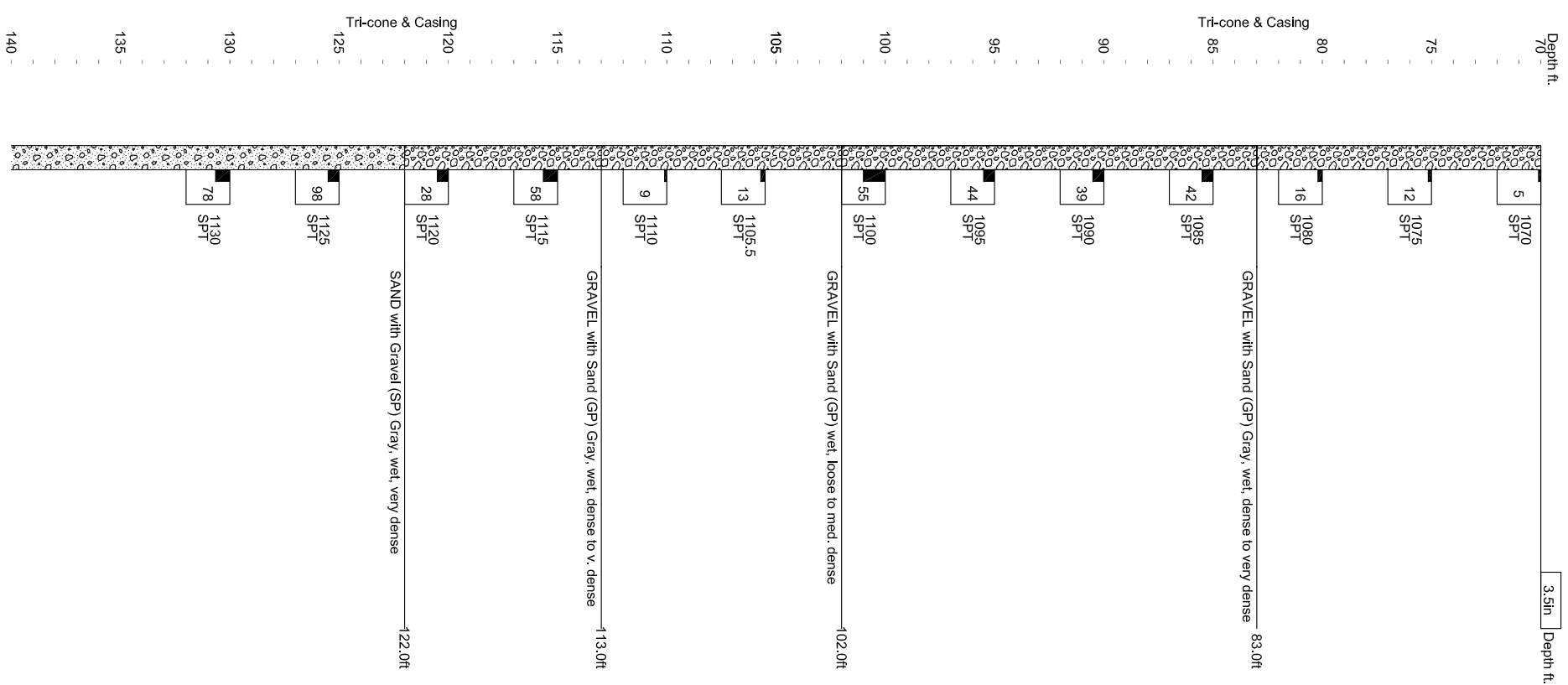
Station / Location: 79+32 / 23' RT

Concrete Bridge Deck

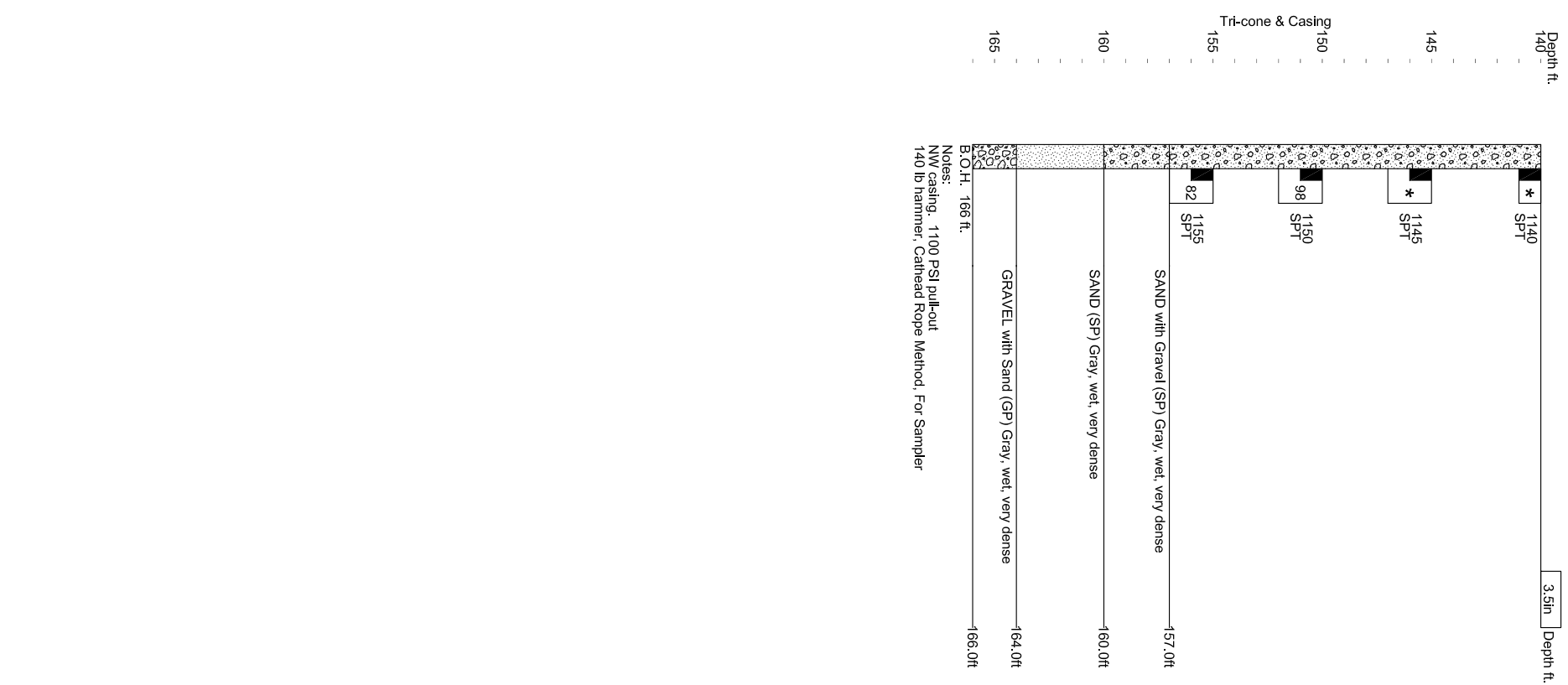
Air (bridge to water)



TH93-1 (Cont.)



TH93-1 (Cont.)



Notes:
 NW casing - 1100 PSI pull-out
 140 lb hammer, Cathead Rope Method, For Sampler
 B.O.H. 166 ft.

| APPENDIX NUMBER | | |
|---------------------|------|-------------|
| ATTACHMENT NUMBER | | |
| RECORD OF REVISIONS | | |
| No. | DATE | DESCRIPTION |
| | | |

CHECKED BY:



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 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS

CHENA RIVER BR # 263
 UNIVERSITY AVENUE
 REHABILITATION & WIDENING

1993
 TEST HOLE LOG

PROJECT DESIGNATION
 63213

STATE
 ALASKA

YEAR
 2009

SHEET NUMBER
 9

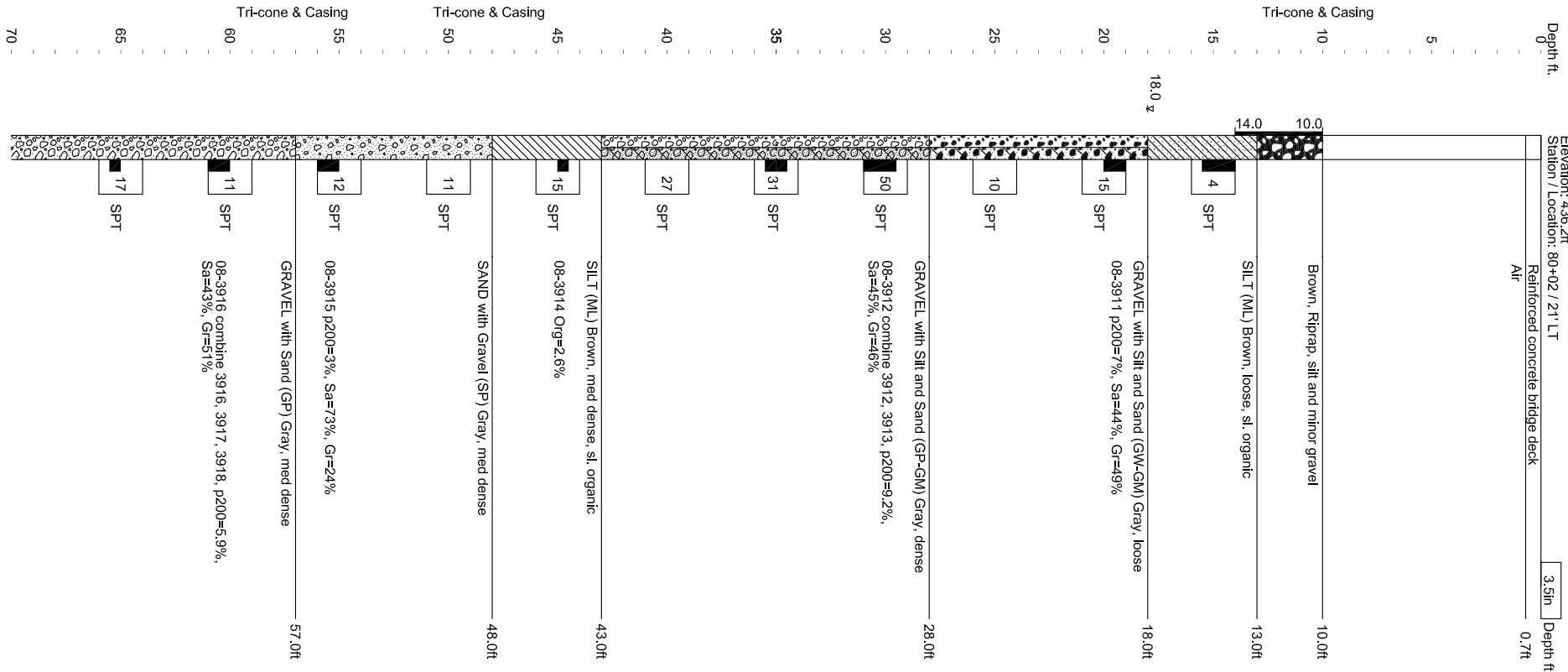
TOTAL SHEETS
 12

TH08-2

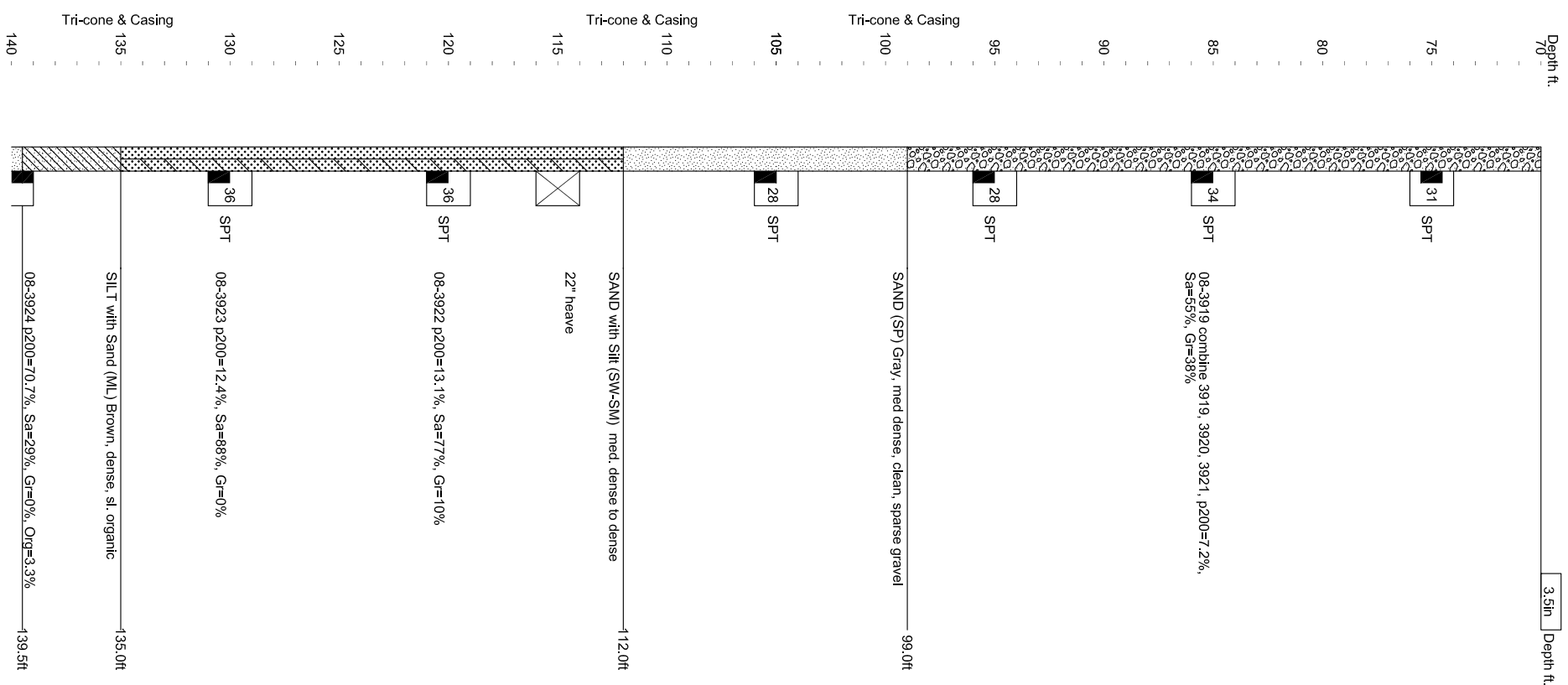
Date: 1/18/08 - 11/21/08

Elevation: 436.2ft

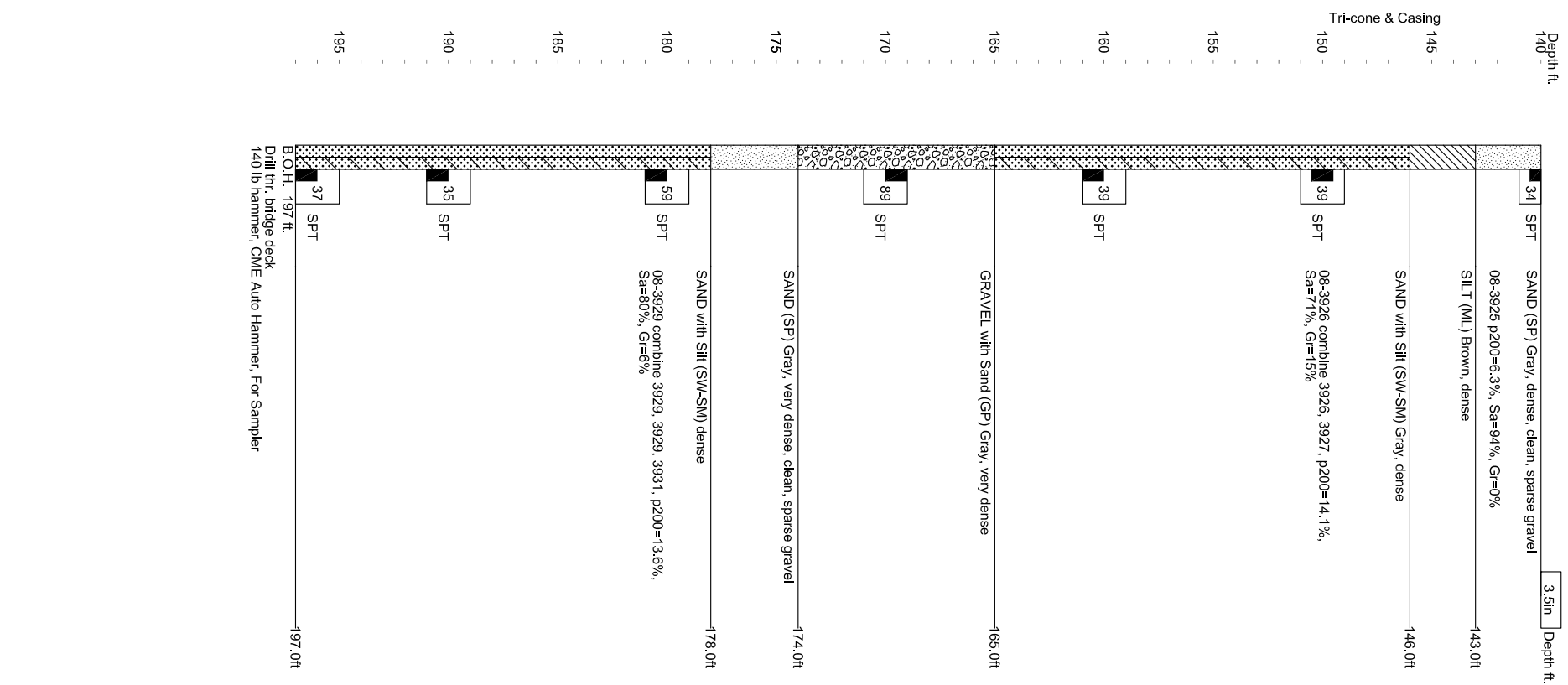
Station / Location: 80+02 / 211 LT



TH08-2 (Cont.)



TH08-2 (Cont.)



| ADDENDUM NUMBER | | |
|---------------------|------|-------------|
| ATTACHMENT NUMBER | | |
| RECORD OF REVISIONS | | |
| No. | DATE | DESCRIPTION |
| | | |

CHECKED BY:

DESIGNED BY:

DRAWN BY:



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
STATEWIDE MATERIALS

**CHENA RIVER BR # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING**

**1999
PENETROMETER LOG**

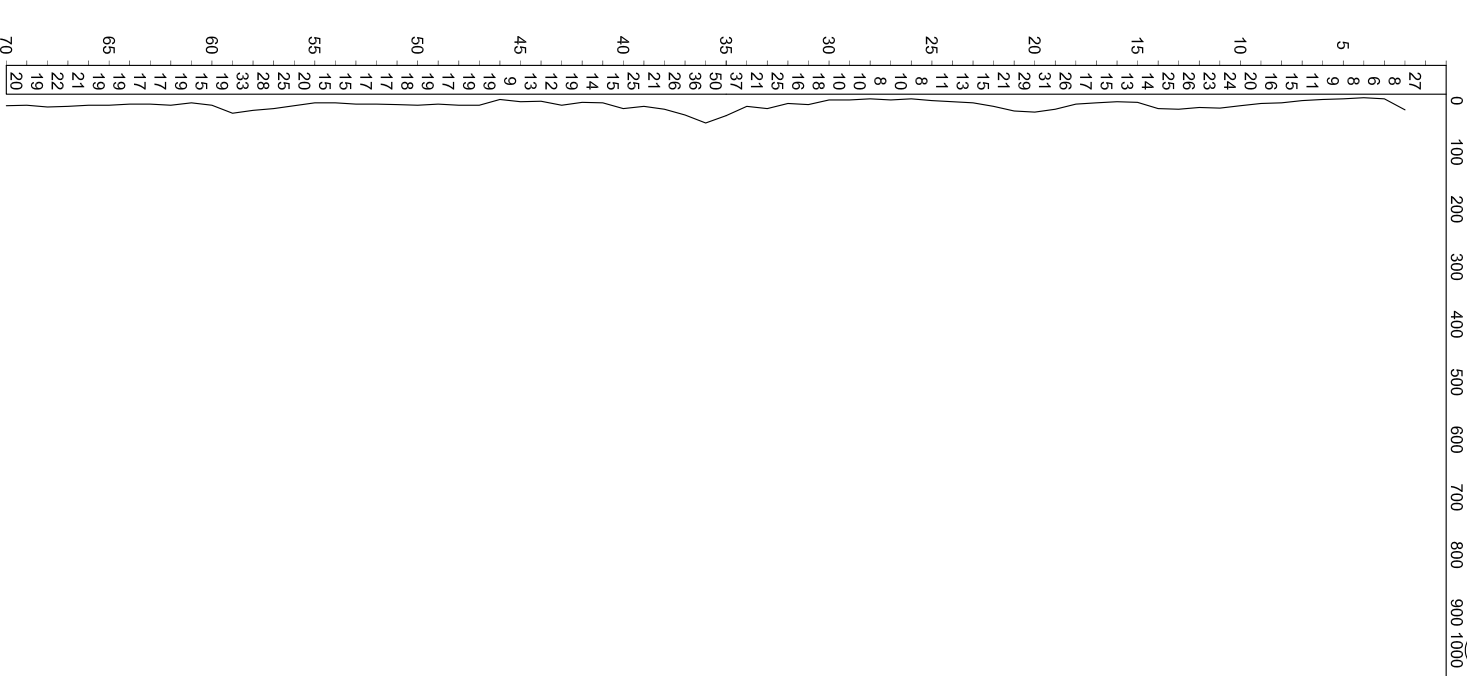
PROJECT DESIGNATION
63213

| | |
|---------------|--------------|
| STATE | YEAR |
| ALASKA | 2009 |
| SHEET NUMBER | TOTAL SHEETS |
| 10 | 12 |

P99-1

Date: 7/17/1999 - 7/17/1999

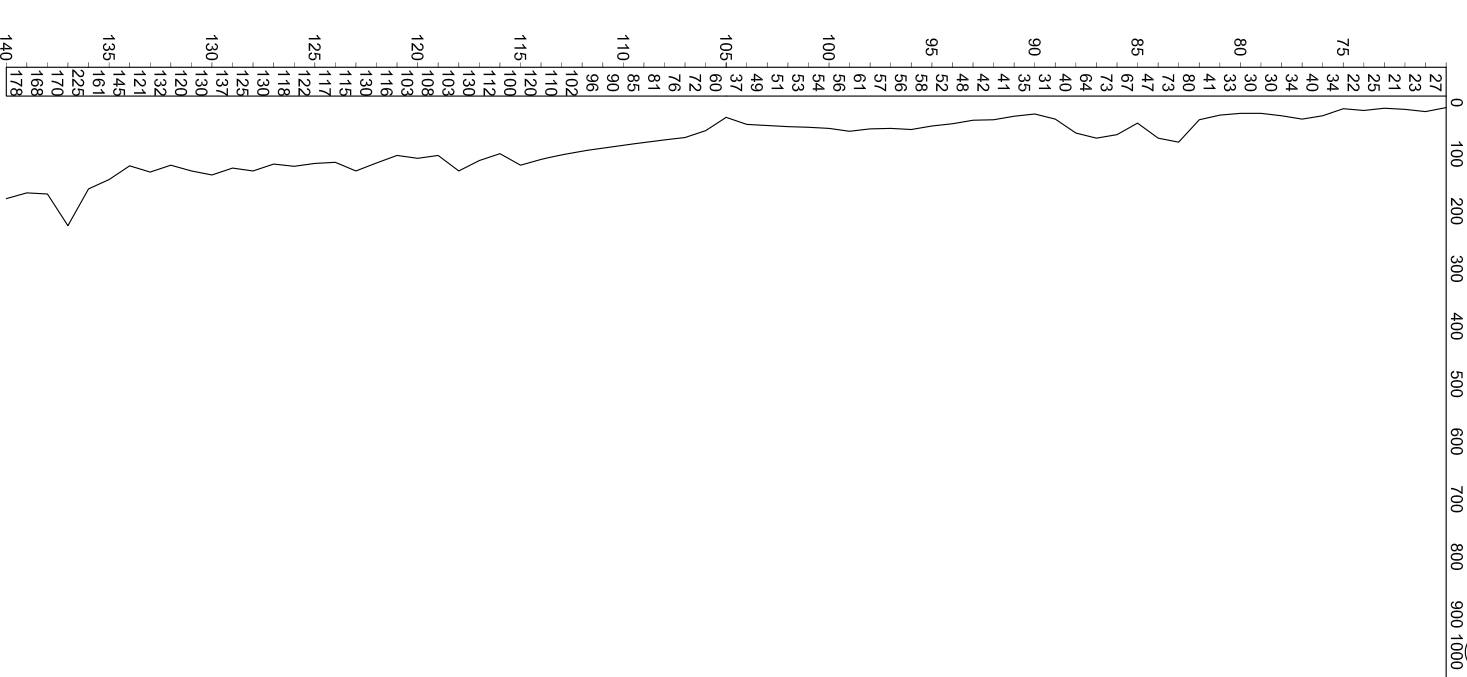
Elevation: 436.2 ft
Station: 80+20 Offset: 21 Rt



P99-1 (Cont.)

Date: 7/17/1999 - 7/17/1999

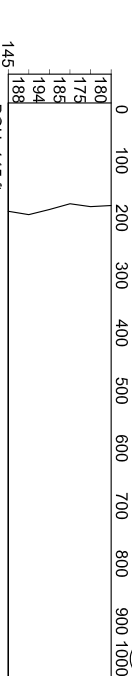
Elevation: 436.2 ft
Station: 80+20 Offset: 21 Rt



P99-1 (Cont.)

Date: 7/17/1999 - 7/17/1999

Elevation: 436.2 ft
Station: 80+20 Offset: 21 Rt



BOH: 145 ft
 Notes:
 2000 psi pull-out (hyd. pressure)
 Hammer: CME Auto Hammer 340 lb hammer
 Equipment: CME 75 Truck
 Drilling Method: Penetrometer
 Field Crew: Mitchell, Jones
 Geologist: C. Bookman

| RECORD OF REVISIONS | |
|---------------------|-------------|
| No. | DESCRIPTION |
| | |
| | |

| ATTACHMENT NUMBER | |
|-------------------|--|
| | |
| | |

CHECKED BY: _____
 DESIGNED BY: _____
 DRAWN BY: _____



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS

**CHENA RIVER Br # 263
 UNIVERSITY AVENUE
 REHABILITATION & WIDENING**

**1993
 TEST HOLE LOG**

PROJECT DESIGNATION
63213

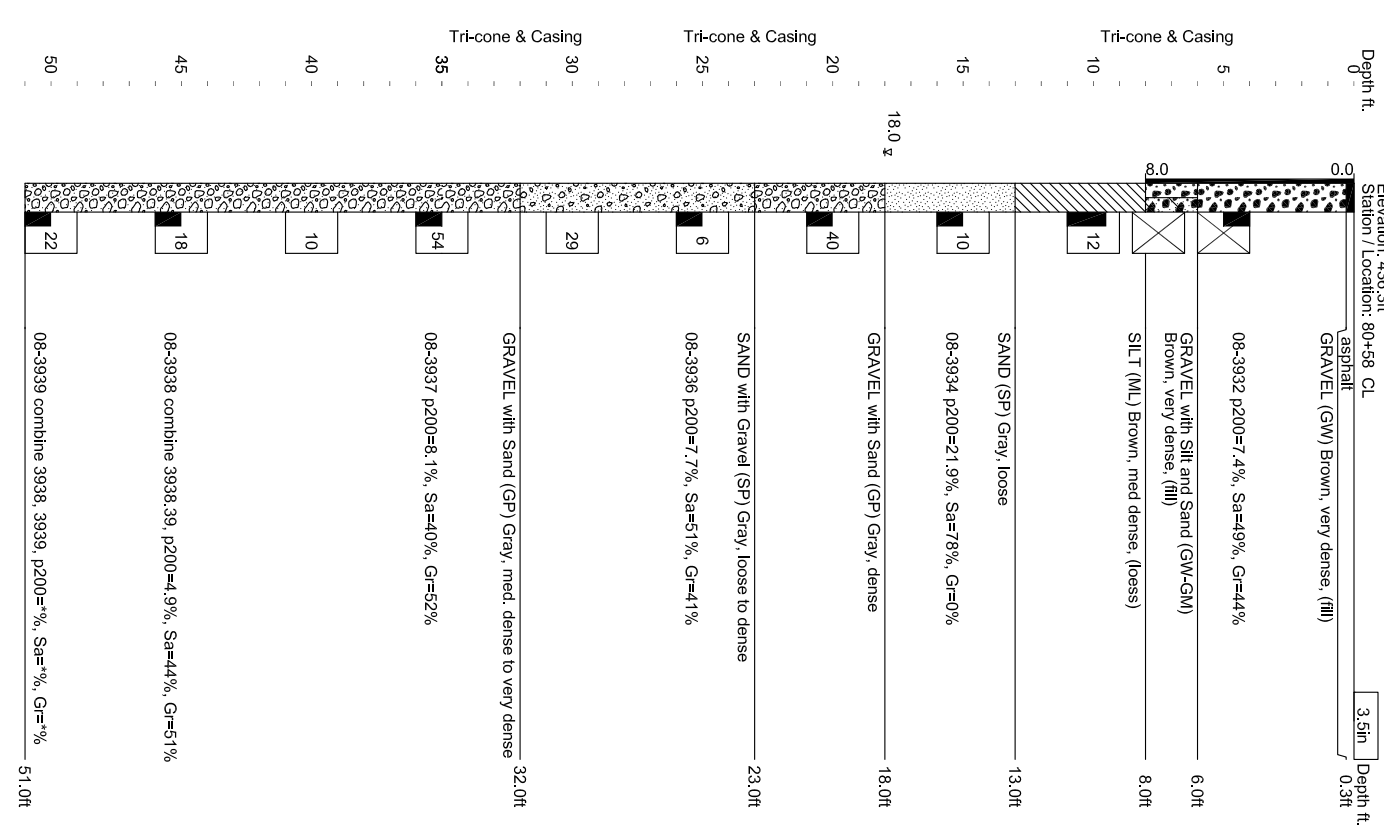
| STATE | YEAR |
|---------------|--------------|
| ALASKA | 2009 |
| SHEET NUMBER | TOTAL SHEETS |
| 11 | 12 |

TH08-3

Date: 11/22/08 - 11/22/08

Elevation: 436.3ft

Station / Location: 80+58 CL



B.O.H. 51 ft.
 Drill on road centerline, thr. approach embankment.
 140 lb hammer, CME Auto Hammer, For Sampler

PAT: HPR1 NoRedStStructUnleashy Ave 021313ACAD063213 Unh/Ave TH Locat 03-18-08.dwg

| ADDENDUM NUMBER | |
|---------------------|------|
| ATTACHMENT NUMBER | |
| RECORD OF REVISIONS | |
| No. | DATE |
| | |
| | |

CHECKED BY:



DESIGNED BY:

DRAWN BY:

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 STATEWIDE MATERIALS
CHENA RIVER BR # 263
UNIVERSITY AVENUE
REHABILITATION & WIDENING

1999
PENETROMETER LOG

PROJECT DESIGNATION
63213

STATE
ALASKA

YEAR
2009

SHEET NUMBER
12

TOTAL SHEETS
12

Appendix B - Laboratory test summary reports

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263

Materials Site _____

| Station | | 4-4.5' | 7-11' | 14-16' | 25-26' | 30-31' | 50-51' |
|------------------------|--------|------------|--------------|--------------|-------------|-------------|-------------|
| Offset (feet) | | 4-4.5' | 7-11' | 14-16' | 25-26' | 30-31' | 50-51' |
| Depth (feet) | | | | | | | |
| Test Site ID | | TH08-1 | TH08-1 | TH08-1 | TH08-1 | TH08-1 | TH08-1 |
| Field No. | | 08-3940 | 08-3941 & 42 | 08-3943 | 08-3944 | 08-3945 | 08-3948 |
| Submitted By | | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch |
| Date Sampled | | 39775 | 39775 | 39775 | 39775 | 39775 | 39775 |
| Lab No. | | 2008A-2618 | 2008A-2619 | 2008A-2620 | 2008A-2621 | 2008A-2622 | 2008A-2623 |
| Percent | 3" | | | | | | |
| | 2" | | | | | | |
| Passing | 1" | | 99 | | 97 | | 100 |
| | 3/4" | | 95 | 100 | 86 | 100 | 95 |
| Sieve | 1/2" | | 88 | 99 | 73 | 89 | 80 |
| | 3/8" | | 80 | 99 | 67 | 80 | 69 |
| Size | #4 | | 62 | 99 | 51 | 59 | 47 |
| | #10 | | 46 | 99 | 37 | 41 | 33 |
| | #40 | | 32 | 98 | 25 | 29 | 21 |
| | #80 | | | | | | |
| | #200 | | 8.9 | 89.5 | 7.5 | 6.9 | 3.7 |
| | .02mm | | | | | | |
| | .002mm | | | | | | |
| FSV Class | | | | | | | |
| AASHTO / DOTSD | | / | / | A-4(0) / | / | / | / |
| Unified Class | | | | ML | | | |
| USCSD Class | | | | Silt | | | |
| Atterburg LL/PL/PI | | / / | / / | NV / NV / NP | / / | / / | / / |
| Fracture 1 / 2 / All | | / / | / / | / / | / / | / / | / / |
| Nat Moist / Organic | | 4.1 / | / | 39.4 / 3.5 | / | / | / |
| % Gravel / Sand / Silt | | / / | 38 / 53 / 9 | 1 / 9 / 90 | 49 / 43 / 8 | 41 / 52 / 7 | 53 / 43 / 4 |
| Opt Mois/Max Dry Den | | / | / | / | / | / | / |
| SpG Bulk Coarse/Fine | | / | / | / | / | / | / |
| SpG SSD Coarse/Fine | | / | / | / | / | / | / |
| SpG App Coarse/Fine | | / | / | / | / | / | / |
| Absorption Coarse/Fine | | / | / | / | / | / | / |
| Degradation Value | | | | | | | |
| LA / LA Low / Nordic | | / / | / / | / / | / / | / / | / / |
| Sulfate Soundness C/F | | / | / | / | / | / | / |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263

Materials Site _____

| Station | | 19-20' | 29.5-36' | 44.5-45' | 55-56' | 60-76' | 85-106' |
|-------------------------------------|------|-------------|--------------|------------|-------------|------------------|------------------|
| Offset (feet) | | 19-20' | 29.5-36' | 44.5-45' | 55-56' | 60-76' | 85-106' |
| Depth (feet) | | | | | | | |
| Test Site ID | | TH08-2 | TH08-2 | TH08-2 | TH08-2 | TH08-2 | TH08-2 |
| Field No. | | 08-3911 | 08-3912 & 13 | 08-3914 | 08-3915 | 08-3916, 17 & 18 | 08-3919, 20 & 21 |
| Submitted By | | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch |
| Date Sampled | | 39770 | 39770 | 39770 | 39770 | 39770 | 39770 |
| Lab No. | | 2008A-2599 | 2008A-2600 | 2008A-2601 | 2008A-2602 | 2008A-2603 | 2008A-2604 |
| Percent Passing Sieve Size | 3" | | | | | | |
| | 2" | | | | | | |
| | 1" | 93 | 89 | | 100 | 95 | 100 |
| | 3/4" | 91 | 81 | | 92 | 92 | 94 |
| | 1/2" | 79 | 74 | | 87 | 79 | 85 |
| | 3/8" | 71 | 69 | | 84 | 71 | 79 |
| | #4 | 51 | 54 | | 76 | 49 | 62 |
| | #10 | 37 | 41 | | 69 | 33 | 49 |
| | #40 | 26 | 29 | | 55 | 19 | 37 |
| | #80 | | | | | | |
| #200 | 7 | 9.2 | | 3 | 5.9 | 7.2 | |
| .02mm | | | | | | | |
| .002mm | | | | | | | |
| FSV Class | | | | | | | |
| AASHTO / DOTSD | | / | / | / | / | / | / |
| Unified Class | | | | | | | |
| USCSD Class | | | | | | | |
| Atterburg LL/PL/PI | | // | // | // | // | // | // |
| Fracture 1 / 2 / All | | // | // | // | // | // | // |
| Nat Moist / Organic | | / | / | / 2.6 | / | / | / |
| % Gravel / Sand / Silt | | 49 / 44 / 7 | 46 / 45 / 9 | // | 24 / 73 / 3 | 51 / 43 / 6 | 38 / 55 / 7 |
| Opt Mois/Max Dry Den | | / | / | / | / | / | / |
| SpG Bulk Coarse/Fine | | / | / | / | / | / | / |
| SpG SSD Coarse/Fine | | / | / | / | / | / | / |
| SpG App Coarse/Fine | | / | / | / | / | / | / |
| Absorption Coarse/Fine | | / | / | / | / | / | / |
| Degradation Value | | | | | | | |
| LA / LA Low / Nordic | | // | // | // | // | // | // |
| Sulfate Soundness C/F | | / | / | / | / | / | / |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263

Materials Site _____

| | | | | | | | |
|-------------------------------------|--------------|-------------|-------------|------------|--------------|------------------|----|
| Station | | | | | | | |
| Offset (feet) | 120-121' | 130-131' | 139-139.5' | 139.5-141' | 160-181' | 180-197' | |
| Depth (feet) | | | | | | | |
| Test Site ID | TH08-2 | TH08-2 | TH08-2 | TH08-2 | TH08-2 | TH08-2 | |
| Field No. | 08-3922 | 08-3923 | 08-3924 | 08-3925 | 08-3926 & 27 | 08-3929, 30 & 31 | |
| Submitted By | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch | |
| Date Sampled | 39771 | 39771 | 39771 | 39771 | 39772 | 39773 | |
| Lab No. | 2008A-2605 | 2008A-2606 | 2008A-2607 | 2008A-2608 | 2008A-2609 | 2008A-2610 | |
| Percent Passing Sieve Size | 3" | | | | | | |
| | 2" | | | | | | |
| | 1" | | | | | | |
| | 3/4" | | | | 100 | 100 | |
| | 1/2" | 100 | | | 95 | 98 | |
| | 3/8" | 97 | 100 | | 100 | 97 | |
| | #4 | 90 | 100 | 100 | 100 | 85 | 94 |
| | #10 | 83 | 100 | 100 | 100 | 79 | 88 |
| | #40 | 61 | 92 | 97 | 85 | 70 | 68 |
| | #80 | | | | | | |
| #200 | 13.1 | 12.4 | 70.7 | 6.3 | 14.1 | 13.6 | |
| .02mm | | | | | | | |
| .002mm | | | | | | | |
| FSV Class | | | | | | | |
| AASHTO / DOTSD | / | / | / | / | / | / | |
| Unified Class | | | | | | | |
| USCSD Class | | | | | | | |
| Atterburg LL/PL/PI | // | // | // | // | // | // | |
| Fracture 1 / 2 / All | // | // | // | // | // | // | |
| Nat Moist / Organic | / | / | / 3.3 | / | / | / | |
| % Gravel / Sand / Silt | 10 / 77 / 13 | 0 / 88 / 12 | 0 / 29 / 71 | 0 / 94 / 6 | 15 / 71 / 14 | 6 / 80 / 14 | |
| Opt Mois/Max Dry Den | / | / | / | / | / | / | |
| SpG Bulk Coarse/Fine | / | / | / | / | / | / | |
| SpG SSD Coarse/Fine | / | / | / | / | / | / | |
| SpG App Coarse/Fine | / | / | / | / | / | / | |
| Absorption Coarse/Fine | / | / | / | / | / | / | |
| Degradation Value | | | | | | | |
| LA / LA Low / Nordic | // | // | // | // | // | // | |
| Sulfate Soundness C/F | / | / | / | / | / | / | |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263

Materials Site _____

| Station | | 4-5' | 10-11' | 15-16' | 20-21' | 25-26' | 35-36' |
|-------------------------------------|--------|-------------|-----------------------------------------------|-------------|-------------|-------------|-------------|
| Offset (feet) | | 4-5' | 10-11' | 15-16' | 20-21' | 25-26' | 35-36' |
| Depth (feet) | | | | | | | |
| Test Site ID | | TH08-3 | TH08-3 | TH08-3 | TH08-3 | TH08-3 | TH08-3 |
| Field No. | | 08-3932 | 08-3933 | 08-3934 | 08-3935 | 08-3936 | 08-3937 |
| Submitted By | | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch | G. Fitch |
| Date Sampled | | 39774 | 39774 | 39774 | 39774 | 39774 | 39774 |
| Lab No. | | 2008A-2611 | 2008A-2612 | 2008A-2613 | 2008A-2614 | 2008A-2615 | 2008A-2616 |
| Percent Passing Sieve Size | 3" | | | | | | |
| | 2" | | | | | | |
| | 1" | 100 | 100 | | | 97 | 90 |
| | 3/4" | 92 | 92 | | | 93 | 84 |
| | 1/2" | 81 | 78 | | | 84 | 73 |
| | 3/8" | 73 | 97 | | | 79 | 64 |
| | #4 | 56 | 58 | 100 | 100 | 59 | 48 |
| | #10 | 43 | 47 | 100 | 100 | 42 | 36 |
| | #40 | 33 | 38 | 94 | 99 | 30 | 25 |
| | #80 | | | | | | |
| | #200 | 7.4 | 8.7 | 21.9 | 81.7 | 7.7 | 8.1 |
| | .02mm | | | | | | |
| | .002mm | | | | | | |
| FSV Class | | | | | | | |
| AASHTO / DOTSD | | / | A-1-b(0) / | / | / | / | / |
| Unified Class | | | SP-SM | | | | |
| USCSD Class | | | Poorly graded sand with silt and gravel | | | | |
| Atterburg LL/PL/PI | | / / | NV / NV / NP | / / | / / | / / | / / |
| Fracture 1 / 2 / All | | / / | / / | / / | / / | / / | / / |
| Nat Moist / Organic | | 10.6 / | 9.9 / 1.7 | / | / | / | / |
| % Gravel / Sand / Silt | | 44 / 49 / 7 | 42 / 49 / 9 | 0 / 78 / 22 | 0 / 18 / 82 | 41 / 51 / 8 | 52 / 40 / 8 |
| Opt Mois/Max Dry Den | | / | / | / | / | / | / |
| SpG Bulk Coarse/Fine | | / | / | / | / | / | / |
| SpG SSD Coarse/Fine | | / | / | / | / | / | / |
| SpG App Coarse/Fine | | / | / | / | / | / | / |
| Absorption Coarse/Fine | | / | / | / | / | / | / |
| Degradation Value | | | | | | | |
| LA / LA Low / Nordic | | / / | / / | / / | / / | / / | / / |
| Sulfate Soundness C/F | | / | / | / | / | / | / |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263

Materials Site _____

| Station | | 45-51' | 12.5-14.5' | 35-37' | 50-52' | 120-122' | 130-132' |
|------------------------|--------|--------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| Offset (feet) | | 45-51' | 12.5-14.5' | 35-37' | 50-52' | 120-122' | 130-132' |
| Depth (feet) | | | | | | | |
| Test Site ID | | TH08-3 | TH 1 Bridge No. 1944 | TH 1 Bridge No. 1944 | TH 1 Bridge No. 1944 | TH 1 Bridge No. 1944 | TH 2 Bridge No. 263 |
| Field No. | | 08-3938 & 39 | 1012.5 | 1035 | 1050 | 1120 | 2130 |
| Submitted By | | G. Fitch | Pavey | Pavey | Pavey | Pavey | Pavey |
| Date Sampled | | 39774 | 34255 | 34255 | 34255 | 34257 | 34253 |
| Lab No. | | 2008A-2617 | 1994A-0300 | 1994A-0301 | 1994A-0302 | 1994A-0303 | 1994A-0306 |
| Percent | 3" | | | | | | |
| | 2" | | | | | | |
| Passing | 1" | 95 | | 100 | 100 | | |
| | 3/4" | 87 | | 92 | 98 | | 100 |
| Sieve | 1/2" | 77 | | 82 | 95 | | 98 |
| | 3/8" | 68 | | 69 | 89 | | 97 |
| Size | #4 | 49 | | 49 | 66 | 100 | 93 |
| | #10 | 36 | 100 | 37 | 49 | 99 | 91 |
| Size | #40 | 23 | 98 | 29 | 35 | 89 | 83 |
| | #80 | | 70 | 10 | 16 | 28 | 28 |
| | #200 | 4.9 | 14.8 | 5 | 10.3 | 15 | 12.8 |
| | .02mm | | | | | | |
| | .002mm | | | | | | |
| FSV Class | | | | | | | |
| AASHTO / DOTSD | | / | / Si Sa | / Sa Grl | / SI Si Sa Grl | / Si Sa | / Si Sa |
| Unified Class | | | | | | | |
| USCSD Class | | | | | | | |
| Atterburg LL/PL/PI | | // | // | // | // | // | // |
| Fracture 1 / 2 / All | | // | // | // | // | // | // |
| Nat Moist / Organic | | / | / | / | / | / | / |
| % Gravel / Sand / Silt | | 51 / 44 / 5 | / 85 / 15 | 51 / 44 / 5 | 34 / 56 / 10 | 0 / 85 / 15 | 7 / 80 / 13 |
| Opt Mois/Max Dry Den | | / | / | / | / | / | / |
| SpG Bulk Coarse/Fine | | / | / | / | / | / | / |
| SpG SSD Coarse/Fine | | / | / | / | / | / | / |
| SpG App Coarse/Fine | | / | / | / | / | / | / |
| Absorption Coarse/Fine | | / | / | / | / | / | / |
| Degradation Value | | | | | | | |
| LA / LA Low / Nordic | | // | // | // | // | // | // |
| Sulfate Soundness C/F | | / | / | / | / | / | / |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

PRECONSTRUCTION SAMPLE SUMMARY

Project No. 63213 Project Name Univ. Ave. Chena River Bridge 263
 Materials Site _____

| | | | | | | |
|-------------------------------------|---------------------|---------------------|-----|-----|-----|-----|
| Station | | | | | | |
| Offset (feet) | 15-17' | 45-47' | | | | |
| Depth (feet) | | | | | | |
| Test Site ID | TH 3 Bridge No. 263 | TH 3 Bridge No. 263 | | | | |
| Field No. | 3015 | 3045 | | | | |
| Submitted By | Pavey | Pavey | | | | |
| Date Sampled | 34263 | 34264 | | | | |
| Lab No. | 1994A-0304 | 1994A-0305 | | | | |
| Percent Passing Sieve Size | 3" | | | | | |
| | 2" | | | | | |
| | 1" | 100 | | | | |
| | 3/4" | 92 | 100 | | | |
| | 1/2" | 75 | 97 | | | |
| | 3/8" | 67 | 95 | | | |
| | #4 | 47 | 86 | | | |
| | #10 | 32 | 81 | | | |
| | #40 | 20 | 76 | | | |
| | #80 | 9 | 29 | | | |
| | #200 | 4 | 11 | | | |
| | .02mm | | | | | |
| .002mm | | | | | | |
| FSV Class | | | | | | |
| AASHTO / DOTSD | / Sa GrI | / SI SI Sa | / | / | / | / |
| Unified Class | | | | | | |
| USCSD Class | | | | | | |
| Atterburg LL/PL/PI | / / | / / | / / | / / | / / | / / |
| Fracture 1 / 2 / All | / / | / / | / / | / / | / / | / / |
| Nat Moist / Organic | / | / | / | / | / | / |
| % Gravel / Sand / Silt | 53 / 43 / 4 | 14 / 75 / 11 | / / | / / | / / | / / |
| Opt Mois/Max Dry Den | / | / | / | / | / | / |
| SpG Bulk Coarse/Fine | / | / | / | / | / | / |
| SpG SSD Coarse/Fine | / | / | / | / | / | / |
| SpG App Coarse/Fine | / | / | / | / | / | / |
| Absorption Coarse/Fine | / | / | / | / | / | / |
| Degradation Value | | | | | | |
| LA / LA Low / Nordic | / / | / / | / / | / / | / / | / / |
| Sulfate Soundness C/F | / | / | / | / | / | / |

Gradation tests based on minus 3" material. AASHTO Class may be inappropriate if Organic Content > 5%.

Appendix C - Explanation, USCS classification of soils

Appendix D - Site photographs



Photo 1. University Ave. southbound. Overhead powerlines along west side.



Photo 2. Pier 3 Pen test in progress. Suspended conduits visible. Chena River flow is to the right.



Photo 3. South abutment, looking west. Erosion under cap.



Photo 4. North abutment. Conduits overhead. Erosion under cap.