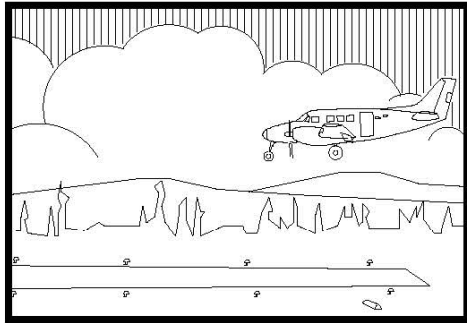


# DESIGN STUDY REPORT

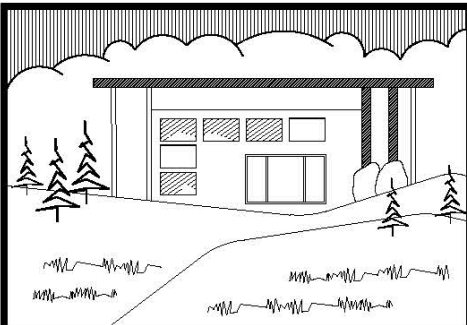
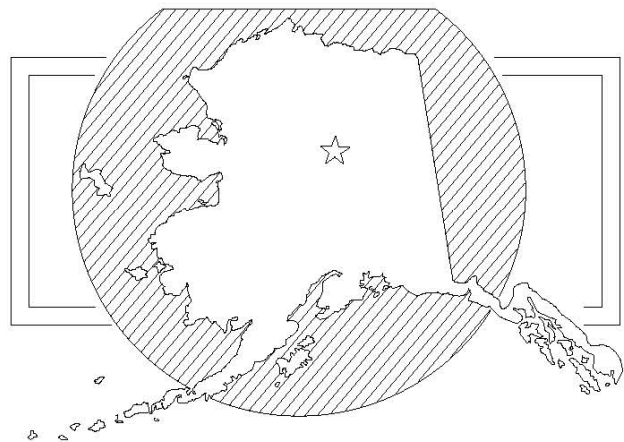
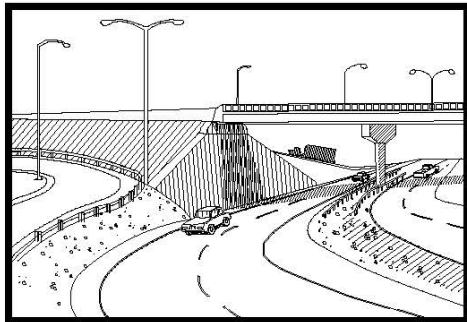
## Burma Pit Road Little Tonsina Bridge Replacement

NSHWY00479



# STATE OF ALASKA

Department of Transportation  
and Public Facilities



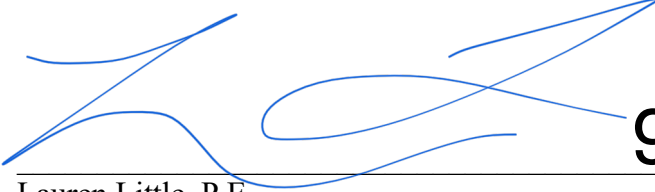
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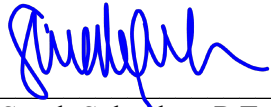
*September 2020*

DESIGN APPROVAL

BURMA PIT ROAD LITTLE TONSINA BRIDGE REPLACEMENT

PROJECT NO. NSHWY00479

Requested by:  **9/25/2020**  
\_\_\_\_\_  
Lauren Little, P.E. Date  
Group Chief  
Northern Region

Design Approval  
Granted:  **10/5/2020**  
\_\_\_\_\_  
Sarah Schacher, P.E. Date  
Preconstruction Engineer  
Northern Region

Distribution: NR Design Directive 20-01 Distribution

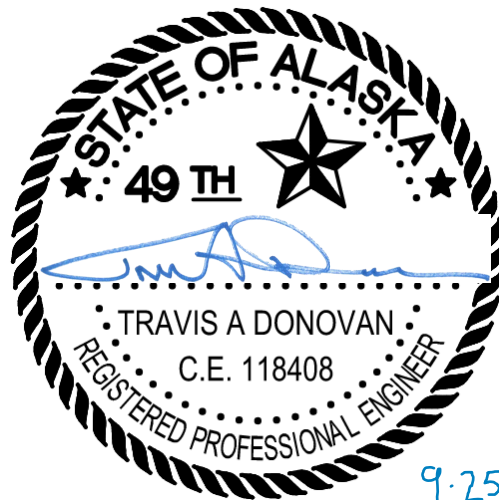
DESIGN STUDY REPORT  
FOR

BURMA PIT ROAD LITTLE TONSINA BRIDGE REPLACEMENT

PROJECT NO. NSHWY00479

PREPARED BY: Travis Donovan, P.E.

UNDER THE SUPERVISION OF: David Arvey, P.E.



9.25.20

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES  
NORTHERN REGION DESIGN AND ENGINEERING SERVICES  
SEPTEMBER, 2020

BURMA PIT ROAD LITTLE TONSINA BRIDGE REPLACEMENT  
PROJECT NO, NSHWY00479

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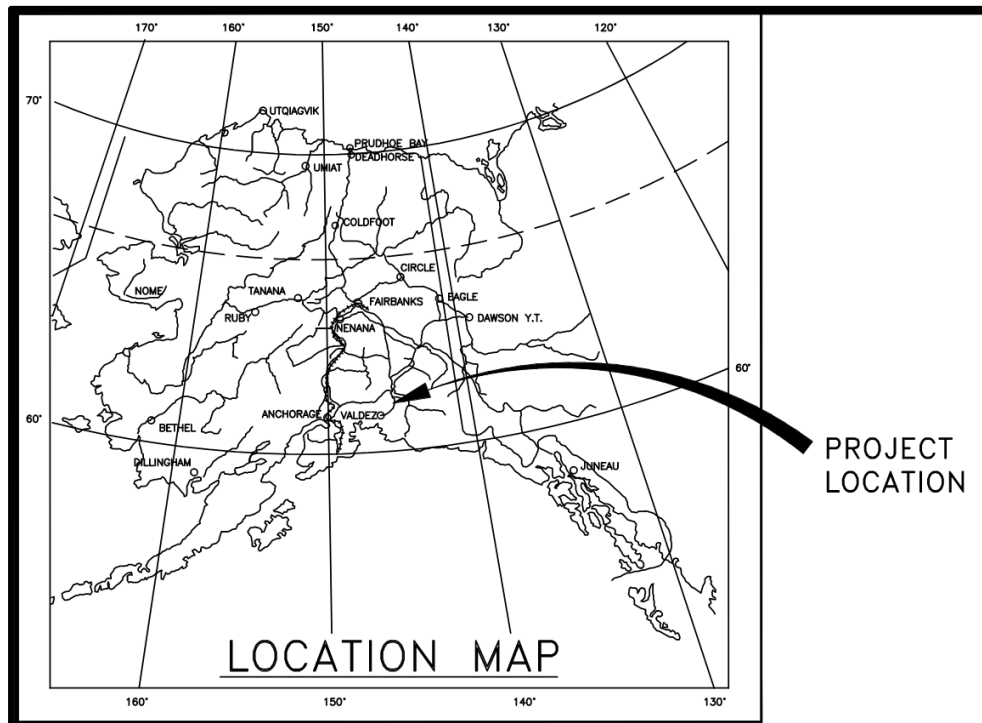
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## INTRODUCTION/HISTORY

The Alaska Department of Transportation and Public Facilities (DOT&PF) in partnership with the Copper River Watershed Project proposes to construct a new bridge and realigned road to replace two culverts on Burma Pit Road across the Little Tonsina River near Richardson Highway MP 74.2.

The existing gravel access road is used by the Alyeska Pipeline Corporation to access the pipeline, by the DOT&PF to access a material pit, and by homeowners in the area.

The size of the two existing culverts result in an obstruction to fish passage and are restrictive to flood passage and the natural stream conveyance. Hydrologic analysis of the crossing suggests that prior to the construction of the Richardson Highway, the confluence of the Little Tonsina with the main fork of the Tonsina River was 1.5 miles to the north, and highway construction likely cut off approximately 1 mile of the river length, straightening the river and causing a headcut to the travel upstream. Major flooding occurred in the area in 2006 and required an emergency repair contract to make necessary repairs.



*Figure 1*

## PROJECT DESCRIPTION

The DOT&PF in partnership with the Copper River Watershed Project proposes to construct a new bridge over the Little Tonsina River, on Alyeska Pipeline Access Road 14APL4 (Burma Road) approximately 300 feet west of the Richardson Highway Milepost (MP) 74.4, and approximately 41 miles south of Glennallen, Alaska.

The current crossing at the Little Tonsina River site comprises two culverts (Bridge #568), approximately seven feet tall by eleven feet wide. The two culverts have been determined to be a likely fish passage barrier by the Alaska Department of Fish and Game (ADF&G) for excessive gradient, constriction ratio, and outlet and inlet perch. The existing culverts are frequently over topped with high stream flows during break-up and heavy fall precipitation and frequently get plugged with debris.

The new proposed crossing of the Little Tonsina River will be a concrete deck bulb tee single span bridge, 103 feet long by 27 feet 4 inches wide. The new crossing will create viable fish passage, better flood mitigation, and form a more natural stream.

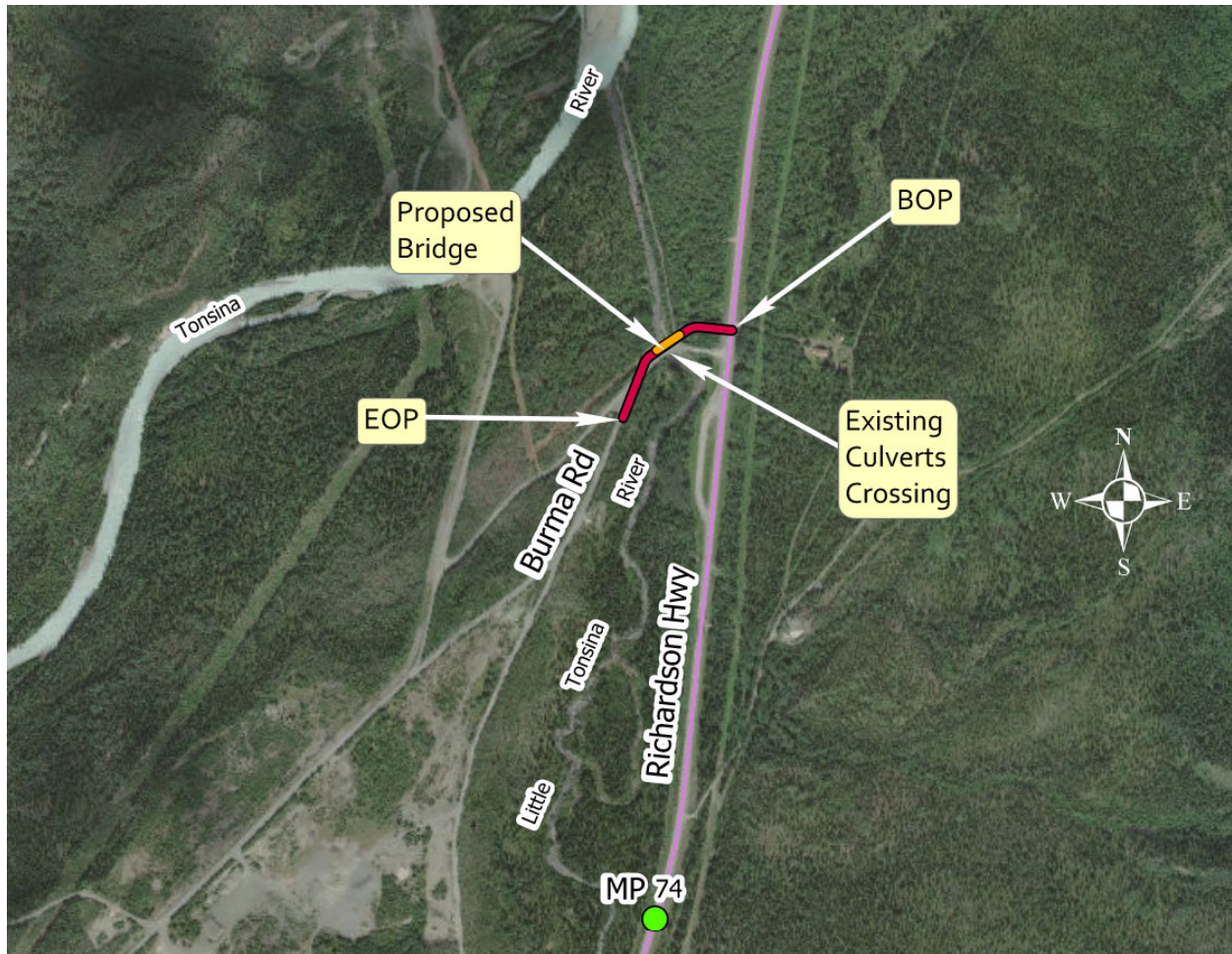


Figure 2

## **DESIGN STANDARDS**

Design standards and guidelines which apply to the Burma Pit Road Little Tonsina Bridge Replacement are contained in the following publications:

- *Guidelines for Geometric Design of Very Low-Volume Local Roads (GDVLVLR)*. AASHTO, 2001.
- *A Policy on Geometric Design of Highways and Streets* (“Green Book”). American Association of State Highway and Transportation Officials (AASHTO), 2011.
- *Alaska Highway Preconstruction Manual (HPCM)*. State of Alaska Department of Transportation and Public Facilities.
- *AASHTO LRFD Bridge Design Specifications, Ninth Edition*. AASHTO, 2020.
- *AASHTO Guide Specifications for LRFD Seismic Bridge Design, second edition*, AASHTO, 2011.
- *Alaska Traffic Manual (ATM)*, ADOT&PF, 2016.
- *Roadside Design Guide*, 4<sup>th</sup> edition, 2010, AASHTO.
- *Alaska DOT&PF Standard Specifications for Highway Construction*, 2020, ADOT&PF.

A Design Speed of 25 miles per hour was selected for this road in accordance with GDVLVR and HPCM guidance. The road serves as a materials site access and Alyeska Pipeline access.

The project will not require the information from the Design Designation process and will be designed to the approved design criteria. The Design Criteria worksheet is attached

## **DESIGN EXCEPTIONS AND DESIGN WAIVERS**

There are no design waivers or design exceptions for this project. The design criteria and design designation waiver are attached in Appendix A.

## **DESIGN ALTERNATIVES**

Replace the existing river crossing with a bridge or culverts.

### **PREFERRED DESIGN ALTERNATIVE**

Replace existing culvert crossing with a new bridge structure.

In order to provide an adequate culvert design to accommodate fish passage, a 35’-4” span by 20’ rise high profile arch with a 10’ diameter overflow culvert would have to be constructed. This configuration would require an approximate 6 foot grade raise at the crossing. It is anticipated that a new culvert crossing would cost the same or more than a new bridge.

Benefits of the bridge allow for the existing crossing to remain in place to accommodate access to pipeline, area residents, and the material site from existing road during construction of the new bridge on new alignment. A new bridge is also more optimal for fish passage and flood

mitigation than a culvert configuration. For these reasons, a new alignment and bridge crossing was selected and the preferred design alternative.

### 3R ANALYSIS

Not applicable. This is a reconstruction project.

### TRAFFIC ANALYSIS

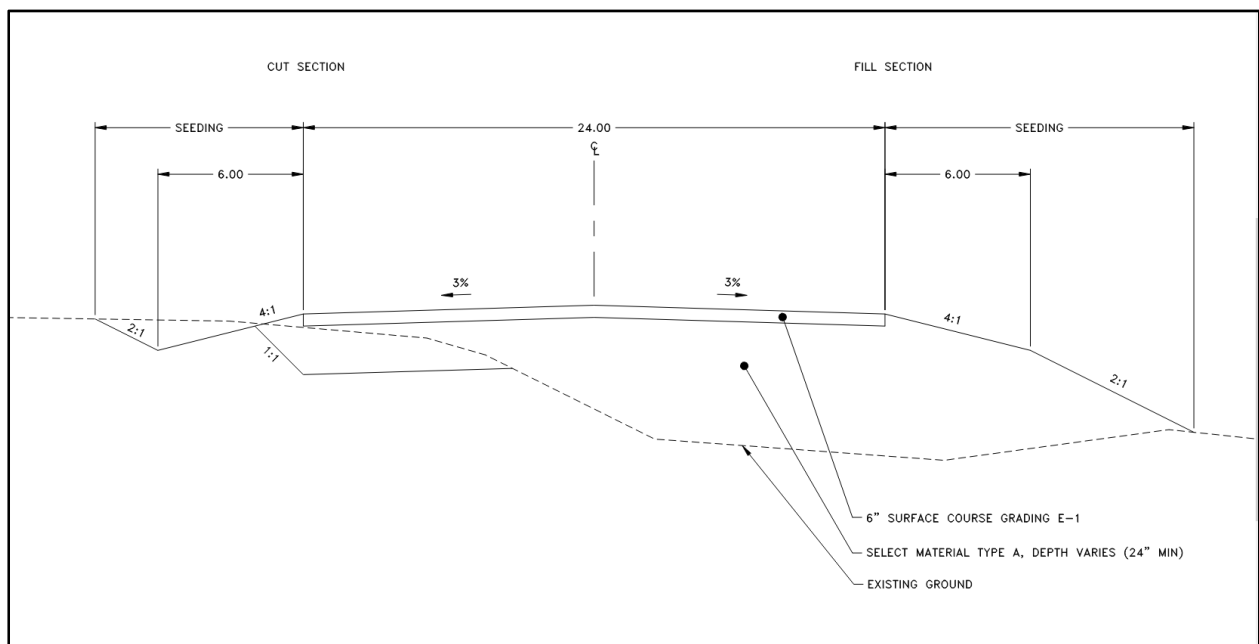
No Traffic Analysis has been performed on this roadway.

### HORIZONTAL/VERTICAL ALIGNMENT

The grades and all the horizontal and vertical curves for the project will meet AASHTO design standards for a design speed of 25 mph. The maximum grade on this project will be 5 percent, and the minimum radius of curvature will be 185 feet. See the attached project Design Criteria Worksheet and preliminary plan and profile sheets.

### TYPICAL SECTION(S)

A new road alignment will be constructed for this project. The typical section will feature 10 ft wide lanes with 2 ft shoulders, 6 ft wide 4:1 foreslopes that hinge to a 2:1 foreslope/backslope to the fill/cut catch point. The new road section will consist of 6 inches of Surface Course Grading E-1 over a varying depth of Select Material Type A. The barn roof style embankment foreslopes allow for shallower recoverable slopes while also reducing the overall footprint of the new alignment.





## **PAVEMENT DESIGN**

Not Applicable, finished project will be a gravel road.

## **PRELIMINARY BRIDGE LAYOUT**

The new bridge will be a 27'-4" (total width), 24' (clear width), 103 ft. long single span prestressed concrete bulb-tee girder bridge. Preliminary bridge plans are in Appendix X.

## **RIGHT-OF-WAY REQUIREMENTS**

The new road alignment and bridge will require ROW from Chugach Native Corporation. It is anticipated that the ROW needed will be donated or a land swap will be implemented. Existing road is a shared easement with Alyeska.

## **MAINTENANCE CONSIDERATIONS**

Existing gravel road is currently maintained by DOT Maintenance. The realigned roadway will be comparable in length and width as the existing roadway.

The new bridge will be an added structure to DOT's inventory for biannual inspection. The bridge will allow for debris to pass freely under the bridge.

There will be a 6 inch layer of E-1 surface course added to the entire new alignment to help facilitate ease of maintenance.

## **MATERIAL SOURCES**

Potential sources include:

### MS 71-1-014-5:

Tonsina River Pit, Located ~MP 74.5 Richardson Highway - Potential source of Type A and B materials. Current knowledge indicates this site may be pretty well depleted. This site is authorized under a ROW grant on Chugach land. Pit use for anything other than material extraction will require coordination with Chugach. Pit expansion will most likely be required to provide materials to meet project requirements.

### MS 71-1-006-5:

Burma Road Quarry Pit, Located ~3 miles down Burma Pit Rd accessed from MP 74.5 Richardson Highway – Potential source of Rip Rap. There is a current contract for this pit that

expires December 2020. The renewal for this contract is being reviewed by the Director before it can be signed off on. Timeline for renewal is unknown.

MS 71-1-024-5: Tonsina Lodge Pit:

Located ~MP 78.5 Richardson Hwy. Potential source of Type A and B Materials. Site has previously produced concrete and paving aggregate as well as Base, Surface Coarse, and Subbase. Site has a current ROW grant and is non-expiring and available for use. Much of the material from this site is moisture sensitive and unstable due to the relatively high portion of the P200 consisting of clay-size particles. Site is not recommended for use on this project.

MS 71-1-015-5:

Located ~MP 67 of Richardson Hwy. Potential source of Type A and B Materials. Site has previously produced concrete and paving aggregate as well as Base, Surface Coarse, and Subbase. Site has a current ROW grant and is non-expiring and available for use.

MS 850-036-5:

Located ~MP 5 Edgerton Highway - Potential Source of Type A and B materials. DNR pit. Current material sale contract expires January 31, 2024.

## **UTILITY RELOCATION & COORDINATION**

Existing overhead power owned by Copper Valley Electric Association (CVEA) and underground telecommunication owned by General Communication Inc, (GCI) utilities will be impacted by new road alignment and bridge and will need to be relocated prior to construction. The access road is used for Trans Alaska Oil Pipeline access and will require coordination with Alyeska. The project will have no impact on the Trans Alaska Oil Pipeline.

## **ACCESS CONTROL FEATURES**

No access control features are included. Burma Pit Road is not an access-controlled facility.

## **PEDESTRIAN/BICYCLE (ADA) PROVISIONS**

No separate facilities will be included for bicycle and pedestrian traffic. Pedestrians and bicycles will share the road with vehicular traffic.

## **SAFETY IMPROVEMENTS**

There are no specific safety improvements proposed on this project.

## **INTELLIGENT TRANSPORTATION SYSTEM FEATURES**

Not applicable. There are no intelligent transportation system features within the project limits.

## **DRAINAGE**

The Little Tonsina is an anadromous river near Tonsina, Alaska. The Little Tonsina flows into the main fork of the Tonsina which is a tributary of the Copper River. The Copper River outlets into Prince William Sound near Cordova, Alaska. The crossing is comprised of two seven foot tall by eleven foot wide CMP squashed arch culverts. The culverts have been documented as being in poor condition. Flooding, overtopping, and debris clogs have been observed at this site.

The new bridge crossing will allow for the river to form a more natural stream that mimics the natural stream characteristics, and allow for the unrestricted movement of all fish and wildlife, nutrients, sediment and woody debris to the greatest extent possible.

## **SOIL CONDITIONS**

The project site is located within the Continental Climate Zone of Alaska (Hartman and Johnson, 1984), characterized by short warm summers, long cold winters, and relatively low precipitation and humidity. Temperature extremes range from about -60 to 90 degrees Fahrenheit. The site receives as much as about 19.5 hours of sunlight in the summer (24 hours including twilight), and as little as about 5 hours in the winter.

The mean annual precipitation is 12.65 inches, the anticipated date of spring thaw is July 21 and fall freeze is August 21. (Western Regional Climate Center)

A foundation geology investigation was conducted in October of 2018 which consisted of one test hole in the proposed vicinity of the bridge structure abutment.

Groundwater was encountered in the test hole at 13.5 feet below the ground surface.

Permafrost or seasonally frozen ground was not observed in the test hole. Previous explorations in adjacent areas encountered permafrost in the shallow subsurface. If construction occurs during winter months, seasonally frozen ground could be expected at the site.

The test hole indicated approximately 13 feet of embankment fill consisting of silty sand with gravel, cobbles and boulders. Underlying the embankment material was silty gravel or silty sand material to a depth of 47.5 feet, transitioning to a coarse gravelly clay or clayey gravel to gravel with silt to 80 feet depth. Drilling indicated significant oversized material content, including large boulders. Underlying the coarse deposits, the test hole penetrated silt, silty sand and clayey sand to the hole bottom at 101.5 feet. Bedrock was not encountered in the test hole.

## **EROSION AND SEDIMENT CONTROL**

No Extraordinary conditions.

The contractor will develop a Storm Water Pollution Prevention Plan (SWPPP) based on the Alaska Storm Water Pollution Prevention Plan Guide. BMP's will be implemented to stabilize erodible soils.

The area of ground disturbance for this project is approximately 0.1 acres below ordinary high water.

## **ENVIRONMENTAL COMMITMENTS**

State Funded Categorical Exclusion. Currently, project is not FHWA funded but has the potential to be. Environmental Document will be finalized once final funding sources are determined.

## **WORK ZONE TRAFFIC CONTROL**

This project is not considered significant for traffic control per DOT&PF's Policy and Procedure 05.05.015.

During construction of the new bridge and portions of the new alignment, traffic will be maintained on the existing alignment. Some portions of the work may require intermittent lane closures and/or reduction of traveled way widths. The Contractor will develop traffic control plans for the work that will be submitted to the Department for approval prior to implementation.

## **VALUE ENGINEERING**

Not applicable. The project does not meet the criteria for a Value Engineering study.

## **COST ESTIMATE**

The estimated costs for this project are as follows:

Design	\$297,000
Utilities	\$150,000
Right of Way	\$0.00
Construction (Includes 20% Engineering)	\$2,141,725.00
Total Cost of Project	<hr/> \$2,588,725.00

Total Cost of Project

\$2,588,725.00

**APPENDIX A**

**DESIGN CRITERIA  
AND  
DESIGN DESIGNATION**

# MEMORANDUM

**State of Alaska**  
**Department of Transportation & Public Facilities**  
**Northern Region Design and Engineering Services**

**TO:** Sarah E. Schacher, P.E.  
Preconstruction Engineer  
Northern Region

**DATE:** July 20, 2020

**FILE NO:** H:\Projects\Rich\_Hwy\00479\_Little\_Tonsina\Design\Design  
Criteria\DesignDesignationWaiverMemo

**THRU:** Lauren Little, P.E. LL  
Group Chief  
Northern Region

**PHONE NO:** (907) 451-5371

**FAX NO:** (907) 451-5126

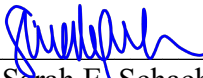
**FROM:** David Arvey, P.E. DA  
Engineering Manager  
Northern Region

**SUBJECT:** Burma Pit Road Little Tonsina  
Bridge Replacement  
NSHWY00479  
**Design Designation Waiver**

A waiver of the Highway Preconstruction Manual requirement for a Design Designation (HPM 1100.4.1) is requested.

The purpose of this project is to realign Burma Pit Road to construct a new bridge over the Little Tonsina River to replace two undersized culverts.

The project design will not require the information from the Design Designation process and will be designed to the approved design criteria.

Approved:  7/20/2020  
Sarah E. Schacher, P.E., Preconstruction Engineer Date

TAD/

cc: Scott Vockeroth, NR Planning

**ALASKA DOT&PF PRECONSTRUCTION MANUAL**  
**Chapter 11 - Design**  
**PROJECT DESIGN CRITERIA**

<b>Project Name: Burma Pit Road Little Tonsina Bridge Replacement</b>			
<input checked="" type="checkbox"/> New Construction/Reconstruction		<input type="checkbox"/> 3R	<input type="checkbox"/> PM
<b>Project Number: NSHWY00479</b>		<input type="checkbox"/> NHS	<input checked="" type="checkbox"/> Non NHS
<b>Functional Classification:</b>	Rural Local		
<b>Design Year:</b>	2040	<b>Present ADT:</b>	Less than 400 vpd
<b>Design Year ADT:</b>	Less than 400 vpd	<b>Mid Design Period ADT:</b>	n/a
<b>DHV:</b>	n/a	<b>Directional Split:</b>	50/50
<b>Percent Trucks:</b>	n/a	<b>Equivalent Axle Loading:</b>	n/a
<b>Pavement Design Year:</b>	n/a	<b>Design Vehicle:</b>	WB-40
<b>Terrain:</b>	Level	<b>Number of Roadways:</b>	1
<b>Design Speed:</b>	25		
<b>Width of Traveled Way:</b>	20		
<b>Width of Shoulders:</b>	<b>Outside:</b>	2	<b>Inside:</b> n/a
<b>Cross Slope:</b>	3%		
<b>Superelevation Rate:</b>	6% max		
<b>Minimum Radius of Curvature:</b>	185 (GDVLVLR Exhibit 3)		
<b>Min. K-Value for Vert. Curves:</b>	<b>Sag:</b>	17 (GB Ch.5 Table 5-3)	<b>Crest:</b> 7 (GDVLVLR Exhibit 12)
<b>Maximum Allowable Grade:</b>	7% (6% Bridge) (GB Ch.5 Table 5-2)		
<b>Minimum Allowable Grade:</b>	0% (0.5% Bridge)		
<b>Stopping Sight Distance:</b>	115 ft (GDVLVLR Exhibit 8)		
<b>Lateral Offset to Obstruction:</b>	2 ft Minimum		
<b>Vertical Clearance:</b>	20 ft min Power lines will cross new alignment		
<b>Bridge Width:</b>	24 ft (Clear Width)		
<b>Bridge Structural Capacity:</b>	HL-93 (AASHTO LRFD Bridge Design Specifications)		
<b>Passing Sight Distance:</b>	450 ft (GB Ch.3 Table 3-4)		
<b>Surface Treatment:</b>	<b>T/W:</b>	Gravel	<b>Shoulders:</b> Gravel
<b>Side Slope Ratios:</b>	<b>Foreshopes:</b>	4:1 (clear zone), 2:1	<b>Backslopes:</b> 2:1
<b>Degree of Access Control:</b>	DW Entrance Regulations		
<b>Median Treatment:</b>	N/A		
<b>Illumination:</b>	N/A		
<b>Curb Usage and Type:</b>	N/A		
<b>Bicycle Provisions:</b>	Shared Roadway		
<b>Pedestrian Provisions:</b>	Shared Roadway		
<b>Misc. Criteria:</b>	N/A		

Proposed - Designer/Consultant: \_\_\_\_\_  
 Endorsed - Engineering Manager: \_\_\_\_\_  
 Approved - Preconstruction Engineer: \_\_\_\_\_

Date: 7/15/20  
 Date: 7/17/20  
 Date: 7/20/2020

Shaded criteria are commonly referred to as the *FWHA 13 controlling criteria*. For NHS routes only, these criteria must meet the minimums established in the Green Book (*AASHTO A Policy on Geometric Design of Highways and Streets*). For all other routes, these criteria must meet the minimums established in the *Alaska Highway Preconstruction Manual*. Otherwise a Design Exception must be approved.

**Design Criteria marked with a " # " do not meet minimums and must have a Design Exception(s) and/or Design Waiver(s) approved. See the Design Study Report for Design Exception/Design Waiver approval(s) and approved design criteria values.**

**APPENDIX B**

**ENVIRONMENTAL DOCUMENT**  
**(only include the signature page of the FONSI or ROD)**

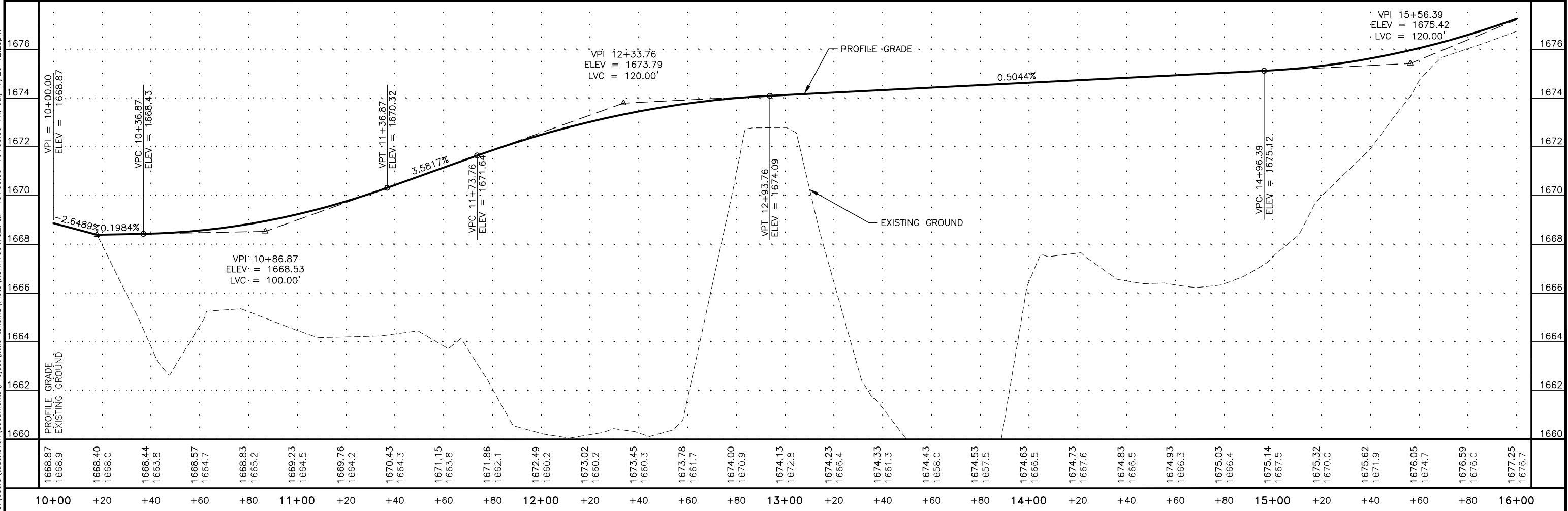
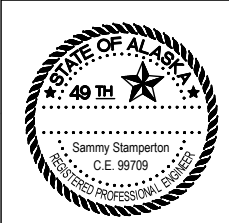
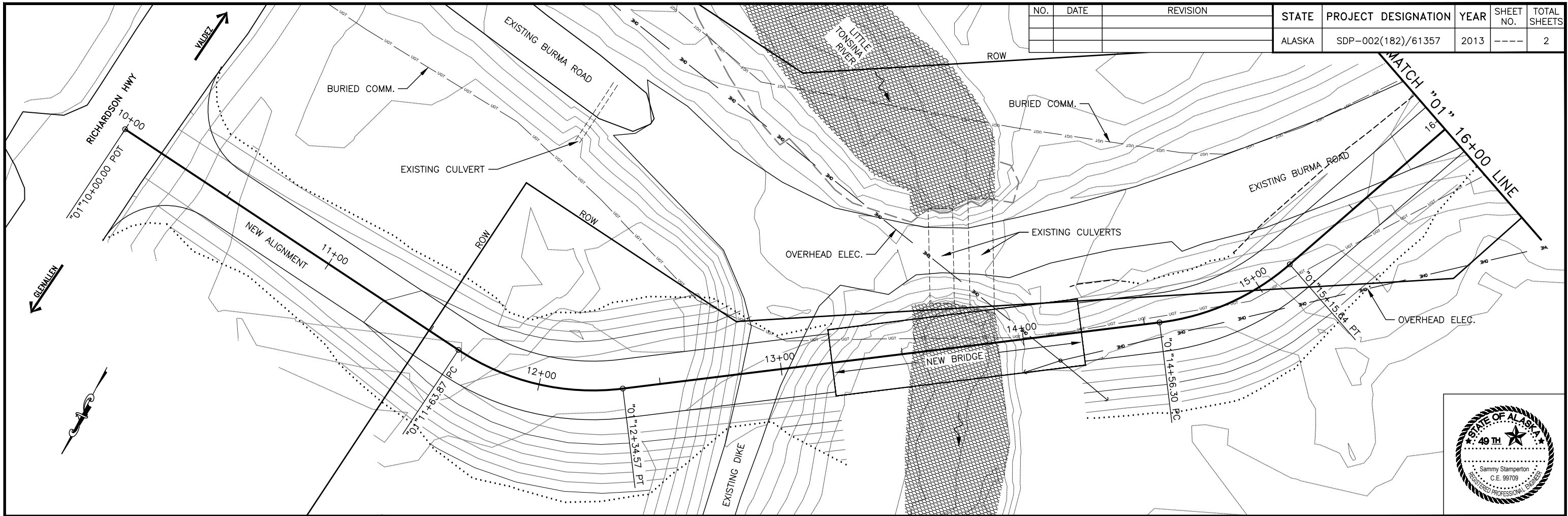
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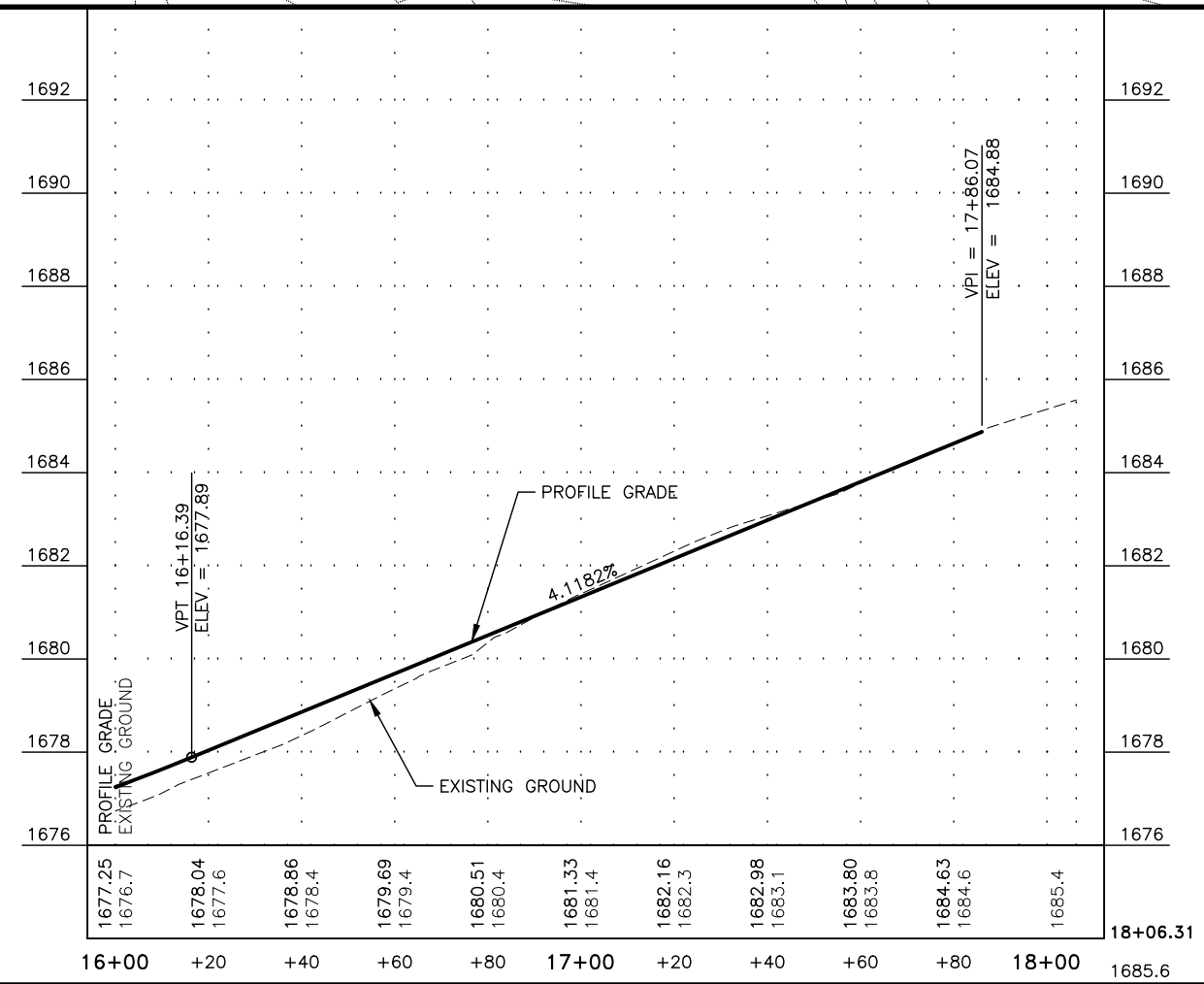
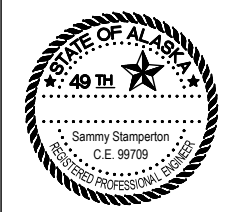
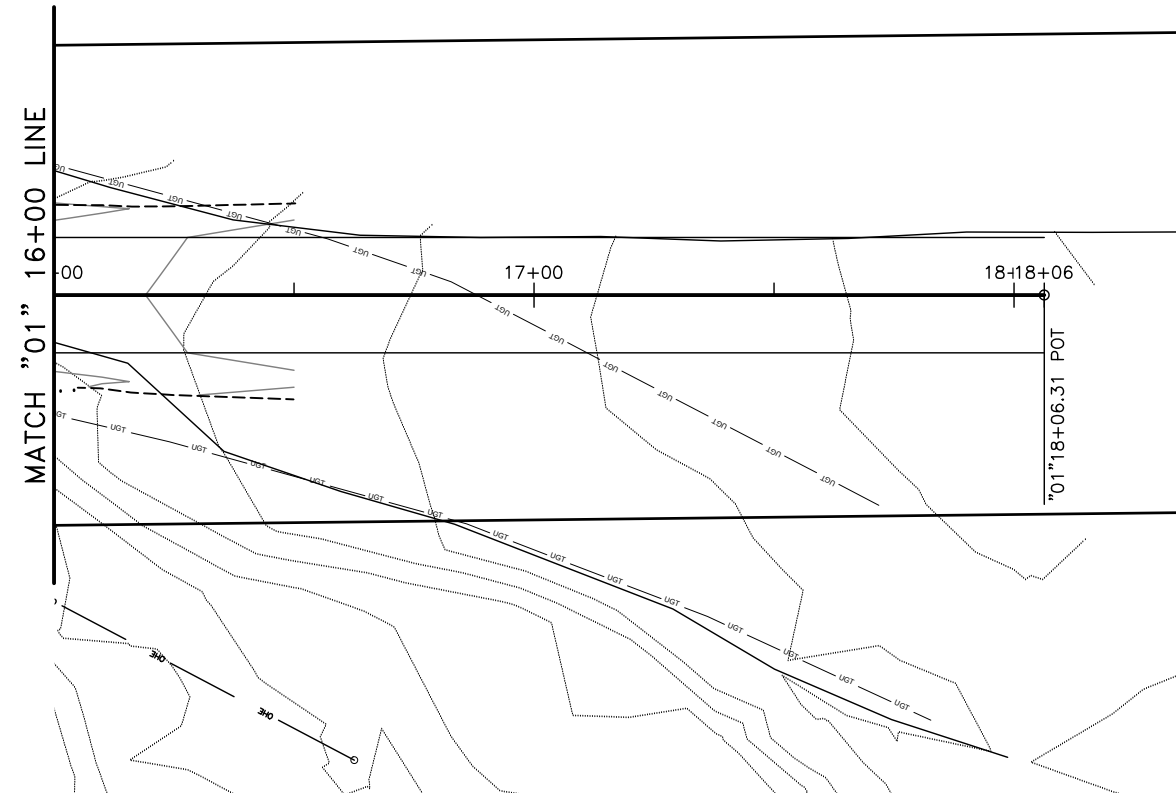
**APPENDIX C**

**PRELIMINARY PLAN AND PROFILE SHEETS**

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	SDP-002(182)/61357	2013	----	2



NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	SDP-002(182)/61357	2013	----	2

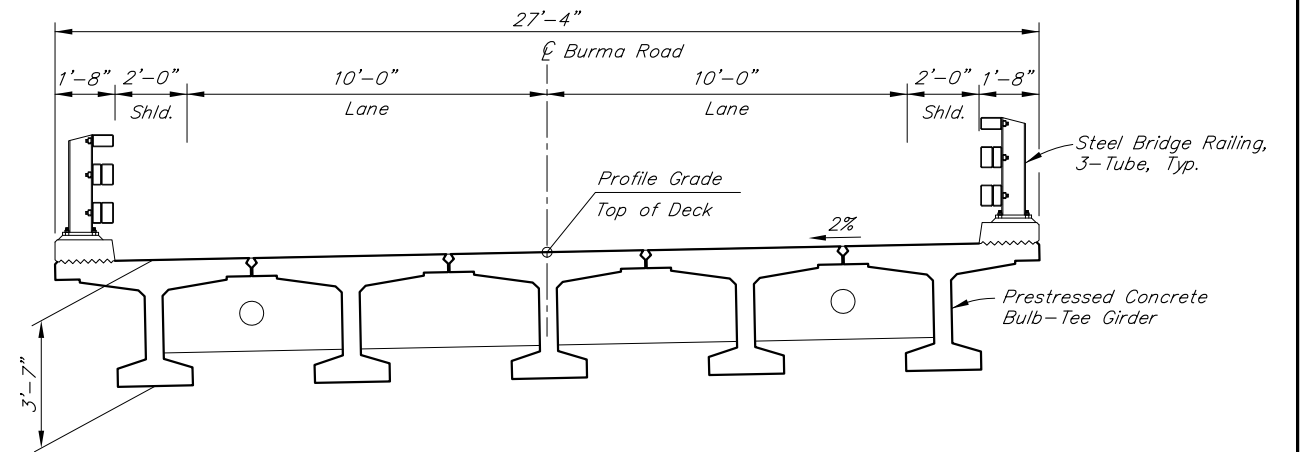
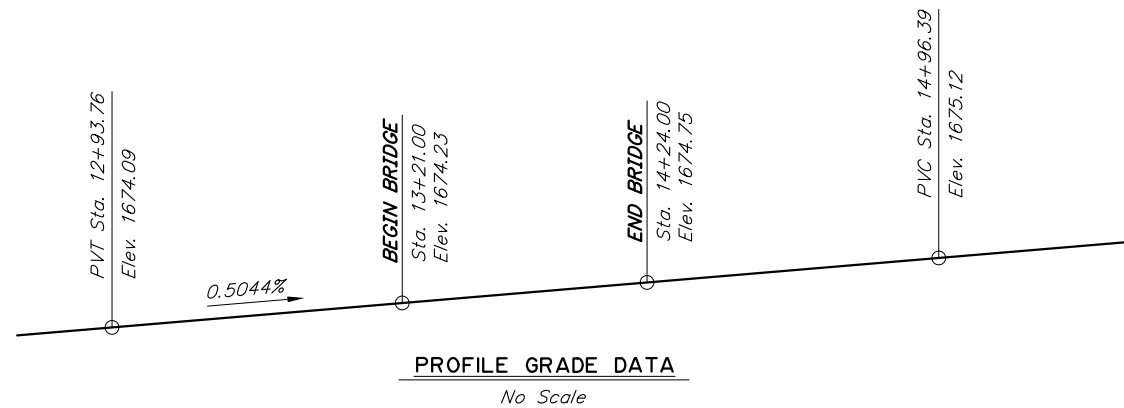


PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200  
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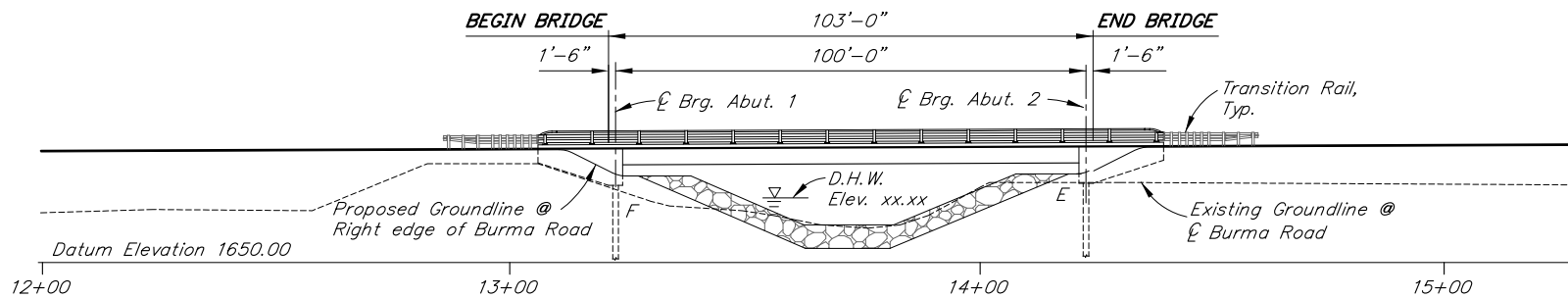
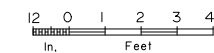
**APPENDIX D**

**PRELIMINARY BRIDGE PLANS**

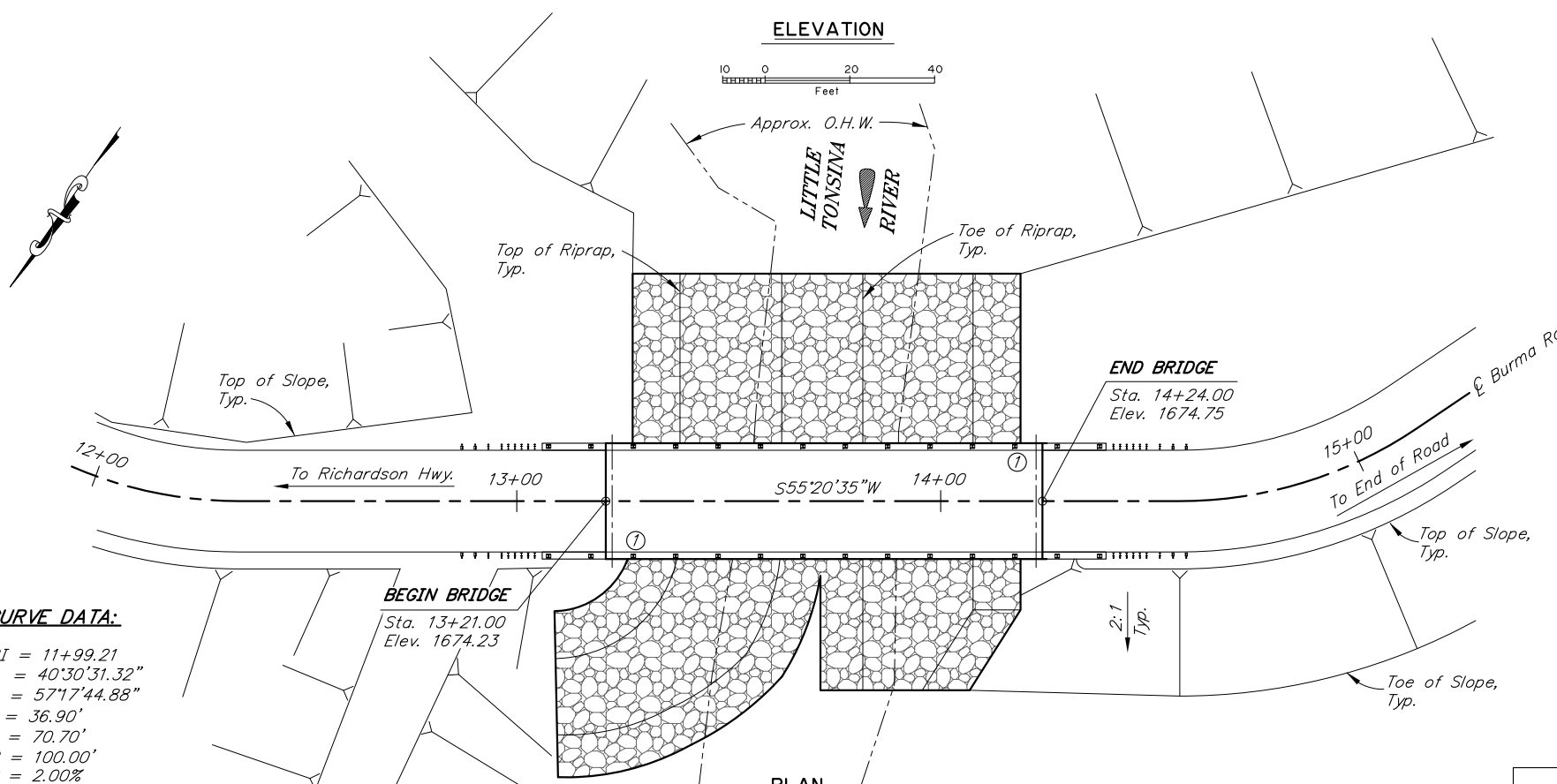
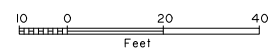
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWHY00479	2021	N1	N14



TYPICAL SECTION



ELEVATION



PLAN



**CURVE DATA:**

$PI = 14+85.97$   
 $\Delta = 33^{\circ}59'54.93''$   
 $D = 5717'44.88''$   
 $T = 30.57'$   
 $L = 59.34'$   
 $R = 100.00'$   
 $S = 2.00\%$

**PRELIMINARY PLAN**

**BRIDGE DRAWING INDEX**

TITLE	DWG. NO.
GENERAL LAYOUT	1
SITE PLAN	2
RIPRAP LAYOUT	3
RIPRAP DETAILS	4
ABUTMENT 1	5
ABUTMENT 2	6
WINGWALLS	7
FRAMING PLAN AND TYPICAL SECTION	8
GIRDERS	9
STEEL BRIDGE RAILING, 3-TUBE	10
TRANSITION RAIL, 3-TUBE	11
TEST HOLE LOGS AND LOCATIONS	12-14

**NOTES**

① Approximate location of Bridge Number Plate.

R:\cadd\568-GENERAL Frt. Jun/05/20 08:39am

DESIGNED BY: Elmer Marx	CHECKED BY: Checker	LAYOUT BY: Elmer Marx	CHECKED BY: Checker
DRAWN BY: Sam Sollie	CHECKED BY: Elmer Marx	SPECIFICATIONS BY: Elmer Marx	P S & E COMPARED: Checker
QUANTITIES BY: Elmer Marx	CHECKED BY: Checker	APPROVAL RECOMMENDED BY:	Rich Pratt

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

**LITTLE TONSINA RIVER**  
**BURMA ROAD**  
**GENERAL LAYOUT**



BRIDGE NO. 568  
DWG. NO. 1

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWHY00479	2021	N2	N14

**GENERAL NOTES**

DESIGN:..... AASHTO LRFD Bridge Design Specifications, 2020 Edition, with latest interim specifications.  
 Seismic design per AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2011 with latest interim revisions.

LIVE LOAD:..... HL-93

DEAD LOAD:..... Includes 50 psf for all wearing surfaces.

SEISMIC PARAMETERS:..... PGA = 0.35  
 S<sub>s</sub> = 0.79  
 S<sub>1</sub> = 0.30  
 Site Class = C  
 Liquefaction Potential = Low  
 AASHTO 7% probability of exceedance in 75 years.

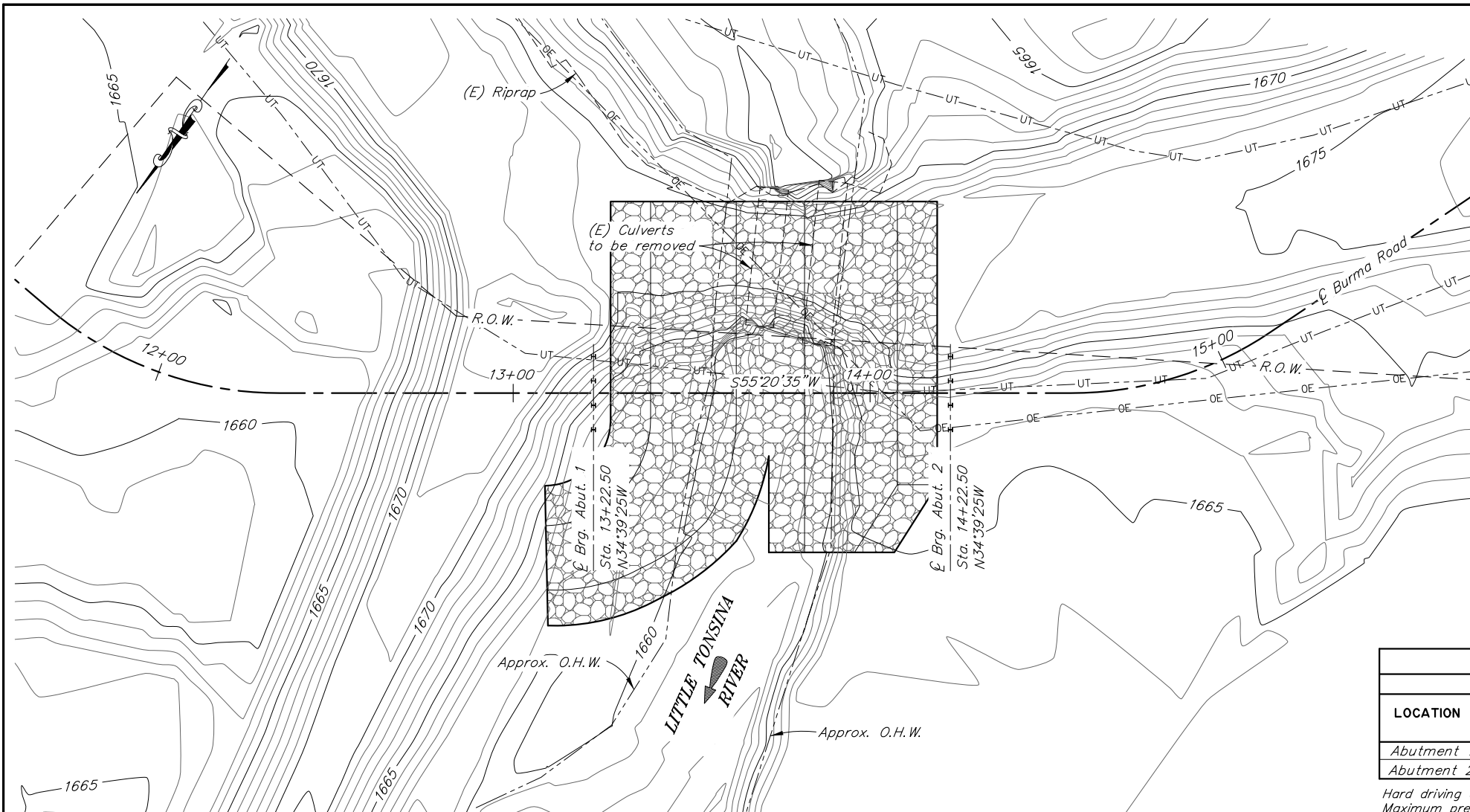
REINFORCEMENT:..... ASTM A706, Grade 60, F<sub>y</sub> = 60,000 psi  
 ASTM A970 Headed bars, Class HA.  
 Space reinforcement evenly unless otherwise noted.

PRESTRESSED CONCRETE:..... See "GIRDERS" Dwg.

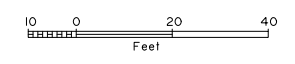
CONCRETE:..... Class A Concrete unless otherwise noted, f'<sub>c</sub> = 4,000 psi

STRUCTURAL STEEL:..... ASTM A709, Grade 36T3, F<sub>y</sub> = 36,000 psi  
 Galvanize structural steel in accordance with AASHTO M111 unless noted otherwise.

STRUCTURAL STEEL PILING:..... ASTM A709, GR50T3, F<sub>y</sub> = 50,000 psi.  
 Pile Tip reinforcing is required.



**SITE PLAN**



PILE DATA TABLE							
LOCATION	PILE TYPE	DRIVING CRITERIA			DESIGN DATA		
		MINIMUM PENETRATION (ft)	ESTIMATED PILE TIP ELEVATION (ft)	DRIVING RESISTANCE (K)	STRENGTH FACTORED LOAD (K)	NOMINAL RESISTANCE (K)	RESISTANCE FACTOR, φ
Abutment 1	HP14x117	35	1,591	445	290	445	0.65
Abutment 2	HP14x117	35	1,591	445	290	445	0.65

Hard driving conditions are expected. Pre-boring to minimum penetration depth is required. Maximum pre-bore hole diameter is 10 inches.

**ABBREVIATIONS:**

- ℄ = centerline
- ℄ = plate
- & = and
- @ = at
- ∅ = diameter
- ± = approximate
- Abut. = abutment
- Approx. = approximate
- b.f. = back/dirt face
- bot. = bottom
- Br. = bridge
- btwn. = between
- Brg. = bearings
- C.G. = center of gravity
- C.I.P. = cast in place
- CJP = complete joint penetration
- Clr. = clear, clearance
- CMP = corrugated metal pipe
- CY = cubic yard
- Dia. = diameter
- Dwg. = drawing
- E = expansion
- (E) = existing
- EA = each
- Elev. = elevation
- e.f. = each face
- e.w. = each way
- Ext. = exterior
- F = fixed
- f.f. = front/air face
- f'c = specified concrete compressive strength
- f'ci = specified concrete compressive strength at release
- Ft. = feet
- Fy = yield stress
- Galv. = galvanize
- H.S. = high strength
- Hwy. = highway
- ID = internal diameter
- Int. = interior
- Jt. = joint
- K = kips
- ksf = 1000 pounds per square foot
- ksi = 1000 pounds per square inch
- LBS or lb = pounds
- LF = linear foot
- LS = lump sum
- LT. = left
- max. = maximum
- min. = minimum
- MSE = mechanically stabilized earth
- n.f. = near face
- No. = number
- o.c. = on center
- O.H.W. = ordinary high water
- OE = overhead electrical line
- pcf = pounds per cubic foot
- psf = pounds per square foot
- psi = pounds per square inch
- R = radius
- R.O.W. = right of way
- RT. = right
- Rd. = road
- spcs. = space, spaces
- Sta. = station
- SF = square feet
- SY = square yard
- Std. = standard
- Symm. = symmetric
- Typ. = typical
- UT = underground telephone
- UT = ultrasonic testing
- VPC = point of vertical curve
- VPI = point of vertical intersection
- VPT = point of vertical tangent
- w/ = with

**ESTIMATE OF QUANTITIES**

ITEM NO.	ITEM	PAY UNIT	ESTIMATING UNIT	SUBST.	SUPERST.	TOTAL QUANTITY
202.0004.0000	Removal of Culvert Pipe	LS	SF	All Req'd	All Req'd	All Req'd
203.0003.0000	Unclassified Excavation	CY	CY	500	---	500
205.0006.0000	Structural Fill	CY	CY	400	---	400
501.0001.0000	Class A Concrete	LS	CY	41.3	20.3	61.6
501.0007.0000	Precast Concrete Member, 101'-6" Decked Bulb-Tee	EA	EA	---	5	5
503.0001.0000	Reinforcing Steel	LS	LBS	8,745	---	8,745
503.0002.0000	Epoxy-Coated Reinforcing Steel	LS	LBS	---	2,075	2,075
505.0005.1417	Furnish Structural Steel Piles, HP14x117	LF	LF	615.0	---	615.0
505.0006.1417	Drive Structural Steel Piles, HP14x117	EA	EA	8	---	8
507.0001.0003	Steel Bridge Railing, 3-Tube	LF	LF	---	266.0	266.0
606.0016.0000	Transition Rail	EA	EA	---	4	4
611.0001.0001	Riprap, Class I	CY	CY	1,500	---	1,500
631.0002.0001	Geotextile, Erosion Control, Class 1	SY	SY	1,500	---	1,500

Item numbers are for reference only. Quantities shown are not necessarily the pay quantities nor the total quantity of the particular item.

DESIGNED BY: Elmer Marx	CHECKED: Checker	FOUNDATIONS REVIEWED BY: Dave Hemstreet
DRAWN BY: Sam Sollie	CHECKED: Elmer Marx	
QUANTITIES BY: Elmer Marx	CHECKED: Checker	

**PRELIMINARY PLAN**

STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION  
 AND PUBLIC FACILITIES  
 BRIDGE SECTION  
 3132 Channel Drive  
 Juneau, Alaska 99801  
 907-465-2975

TBD

**LITTLE TONSINA RIVER**  
 BURMA ROAD  
 SITE PLAN



BRIDGE NO. 568  
 DWG. NO. 2

R:\cadd\568-SITE PLAN Wed, Jun 10/20 08:55am

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWHY00479	2021	N3	N14

R:\cadd\568-RR LAYOUT Fri, Jun/05/20 08:39am

DESIGNED BY:	<i>Designer</i>	CHECKED:	<i>Checker</i>
DRAWN BY:	<i>Sam Sallie</i>	CHECKED:	<i>Designer</i>
QUANTITIES BY:	<i>Designer</i>	CHECKED:	<i>Checker</i>

**PRELIMINARY PLAN**

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

LITTLE TONSINA BRIDGE  
BURMA ROAD  
RIPRAP LAYOUT



BRIDGE NO. 568  
DWG. NO. 3

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWO0479	2021	N4	N14

R:\cadd\568\568-RR DET.Fri, Jun/05/20 08:39am

DESIGNED BY:	<i>Designer</i>	CHECKED:	<i>Checker</i>
DRAWN BY:	<i>Sam Sallie</i>	CHECKED:	<i>Designer</i>
QUANTITIES BY:	<i>Designer</i>	CHECKED:	<i>Checker</i>

**PRELIMINARY PLAN**

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

LITTLE TONSINA BRIDGE  
BURMA ROAD  
RIPRAP DETAILS



BRIDGE NO. 568  
DWG. NO. 4

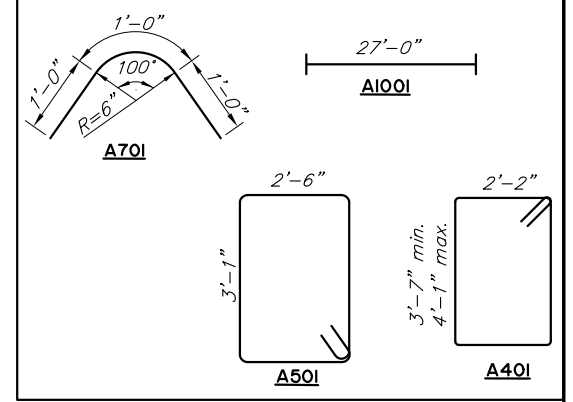


STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWHY00479	2021	N5	N14

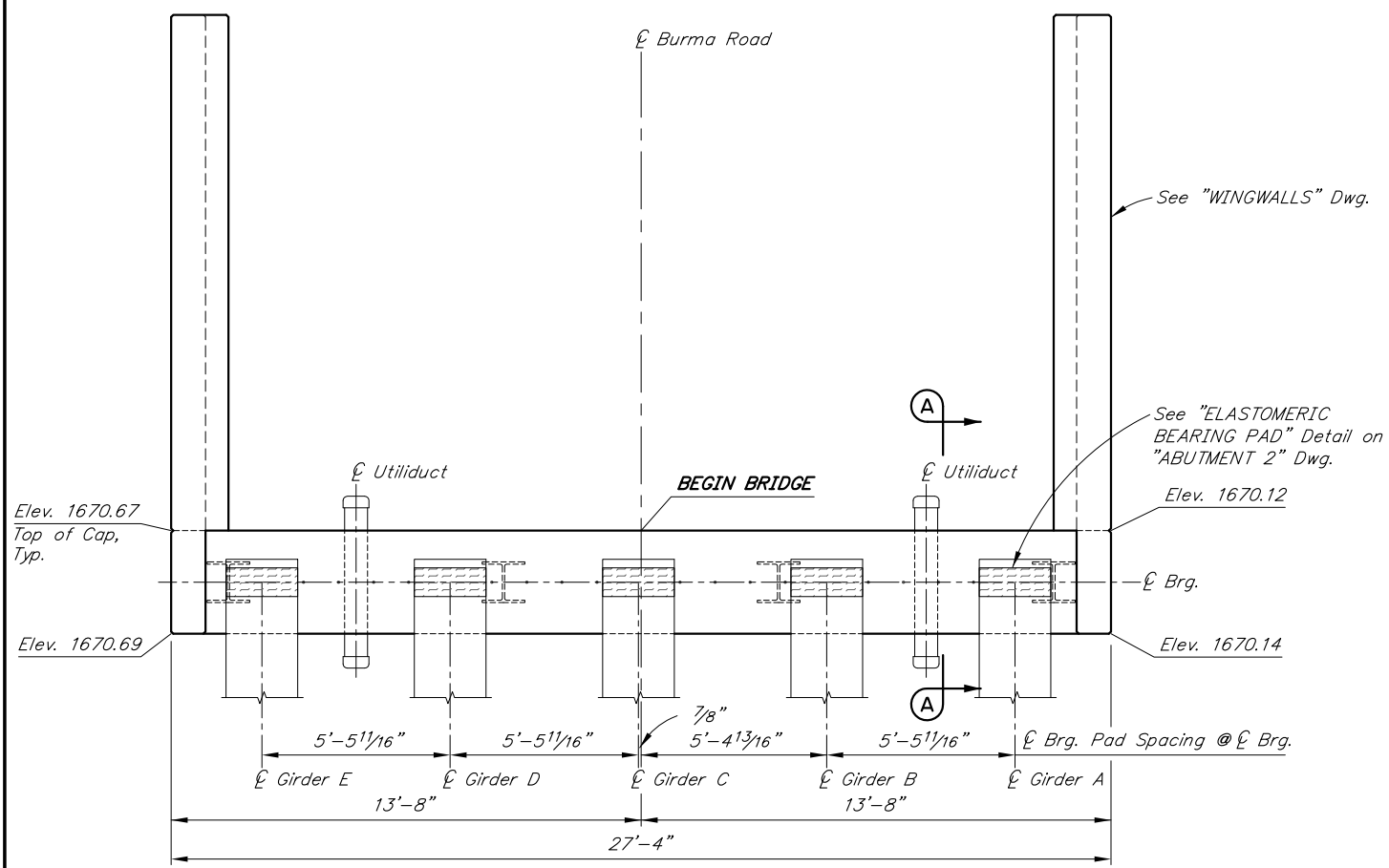
**REINFORCING STEEL - ABUTMENT 1**

MARK	NOTE	SIZE	NO.	LENGTH	TYPE
A401		4	90	VARIES	BENT
A501	E	5	26	12'-1"	BENT
A601		6	10	27'-0"	---
A602	E	6	5	24'-10"	---
A603	E	6	7	27'-0"	---
A604	E	6	4	3'-0"	---
A701	E	7	8	3'-0"	BENT
A801		8	16	6'-0"	---
A1001	H	10	10	27'-0"	HEADED

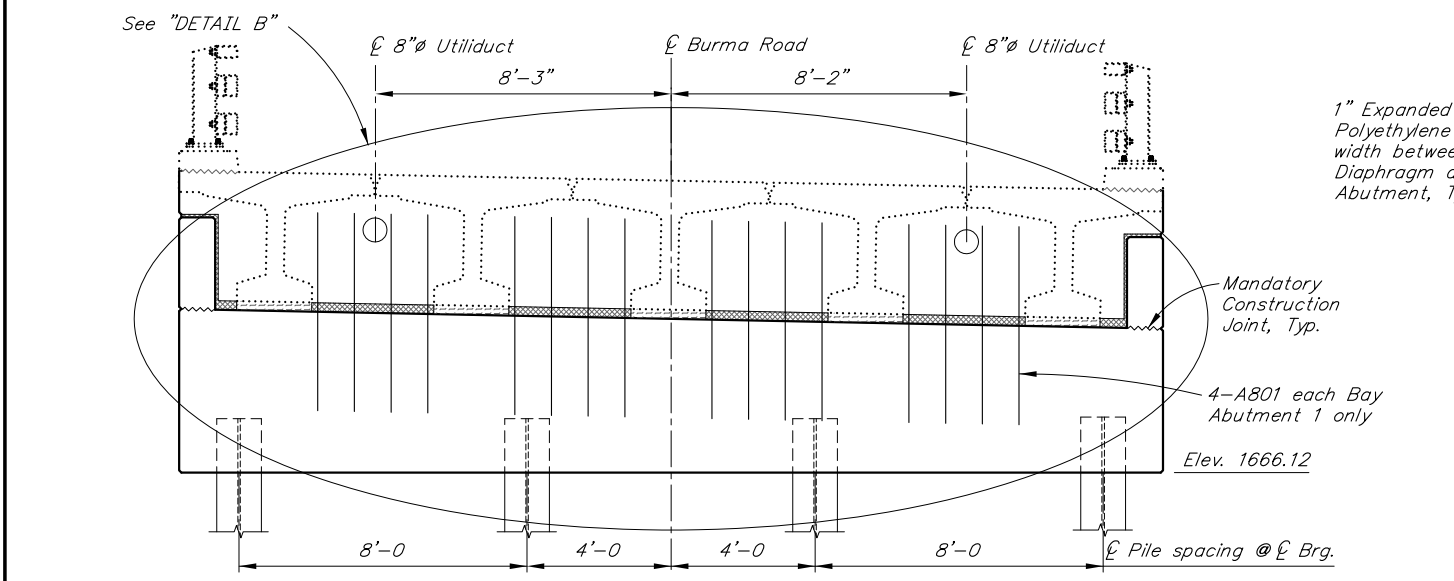
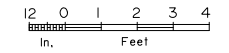
**BENDING DIAGRAM**



E - Epoxy-Coated  
H - Headed reinforcing steel

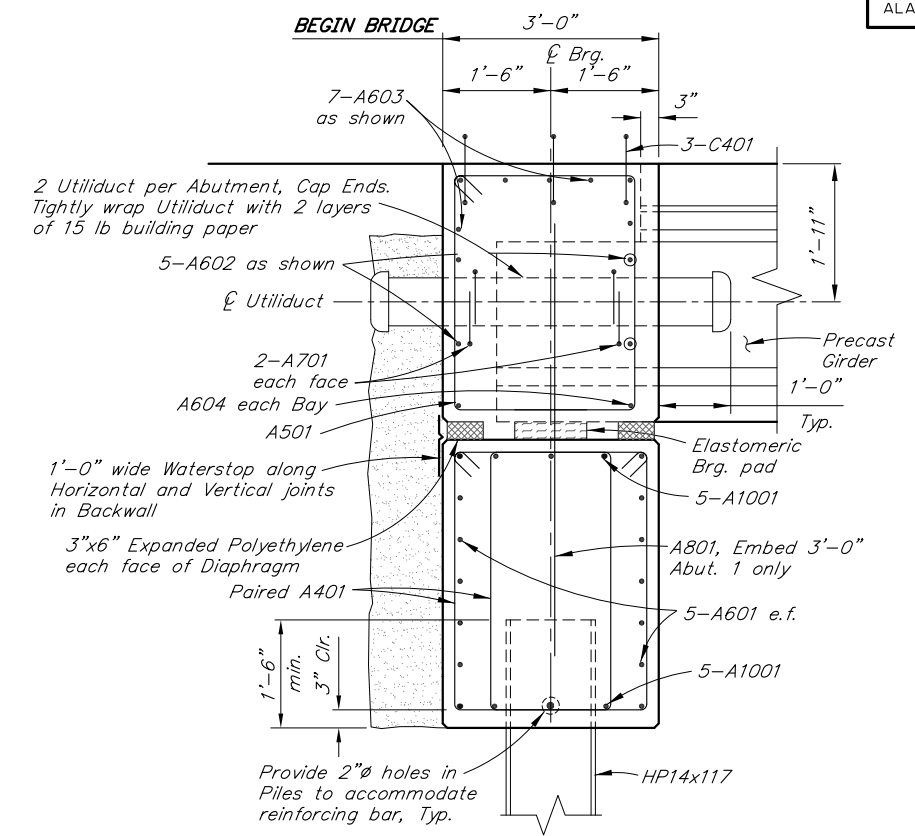
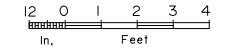


**PLAN**

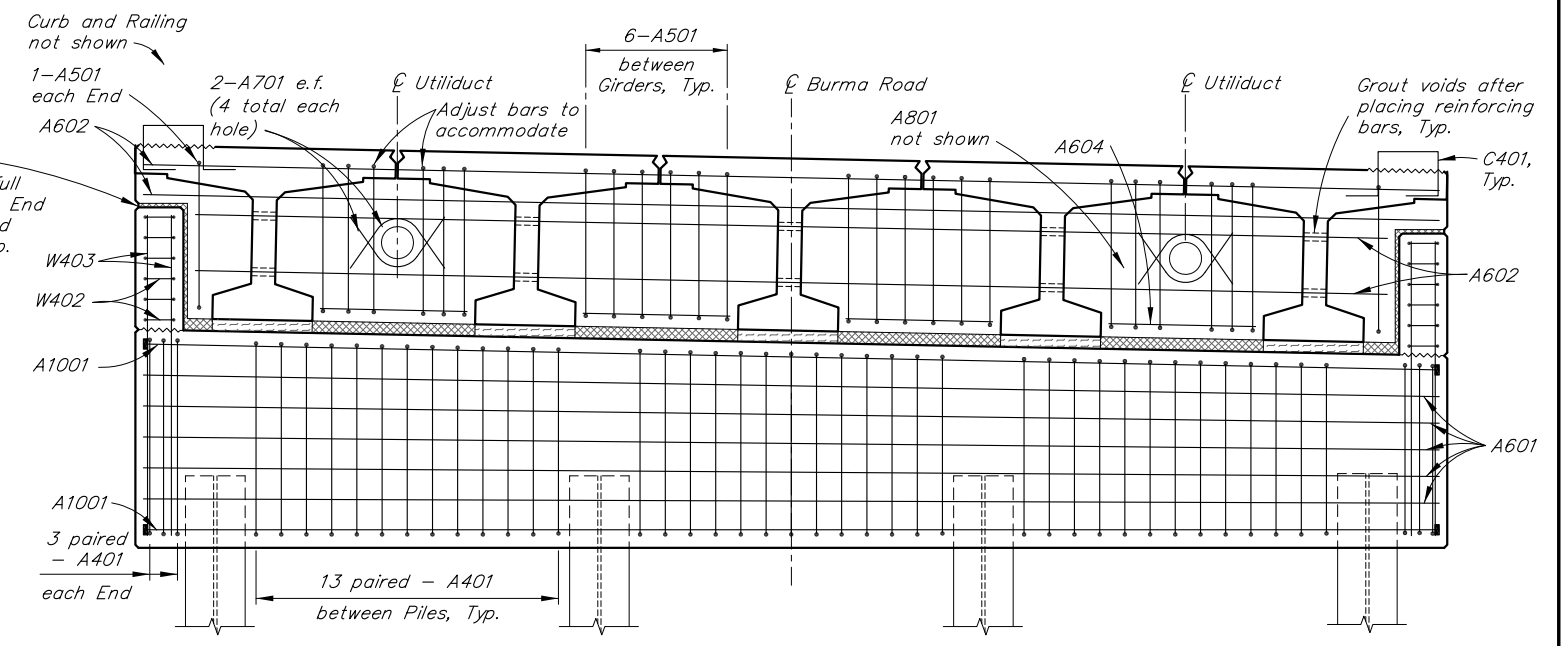
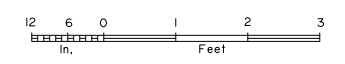


**ELEVATION**

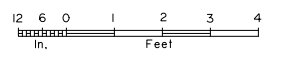
(Looking back on station)



**SECTION A-A**



**DETAIL B**




DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Solite	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

**PRELIMINARY PLAN**

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

**LITTLE TONSINA BRIDGE**  
BURMA ROAD  
**ABUTMENT 1**



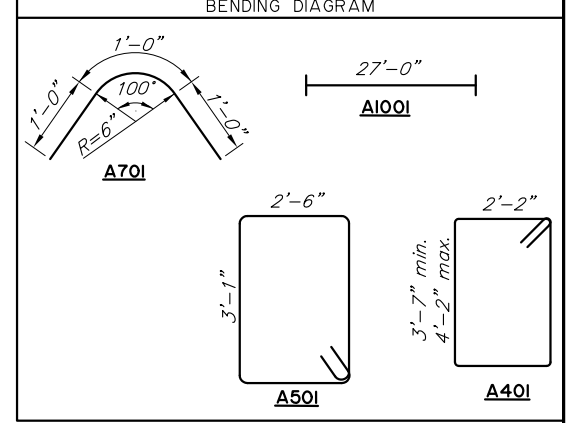
BRIDGE NO. 568  
DWG. NO. 5

R:\cadd\568\568-1-ABUT 1 Wed, Jun/10/20 07:16am

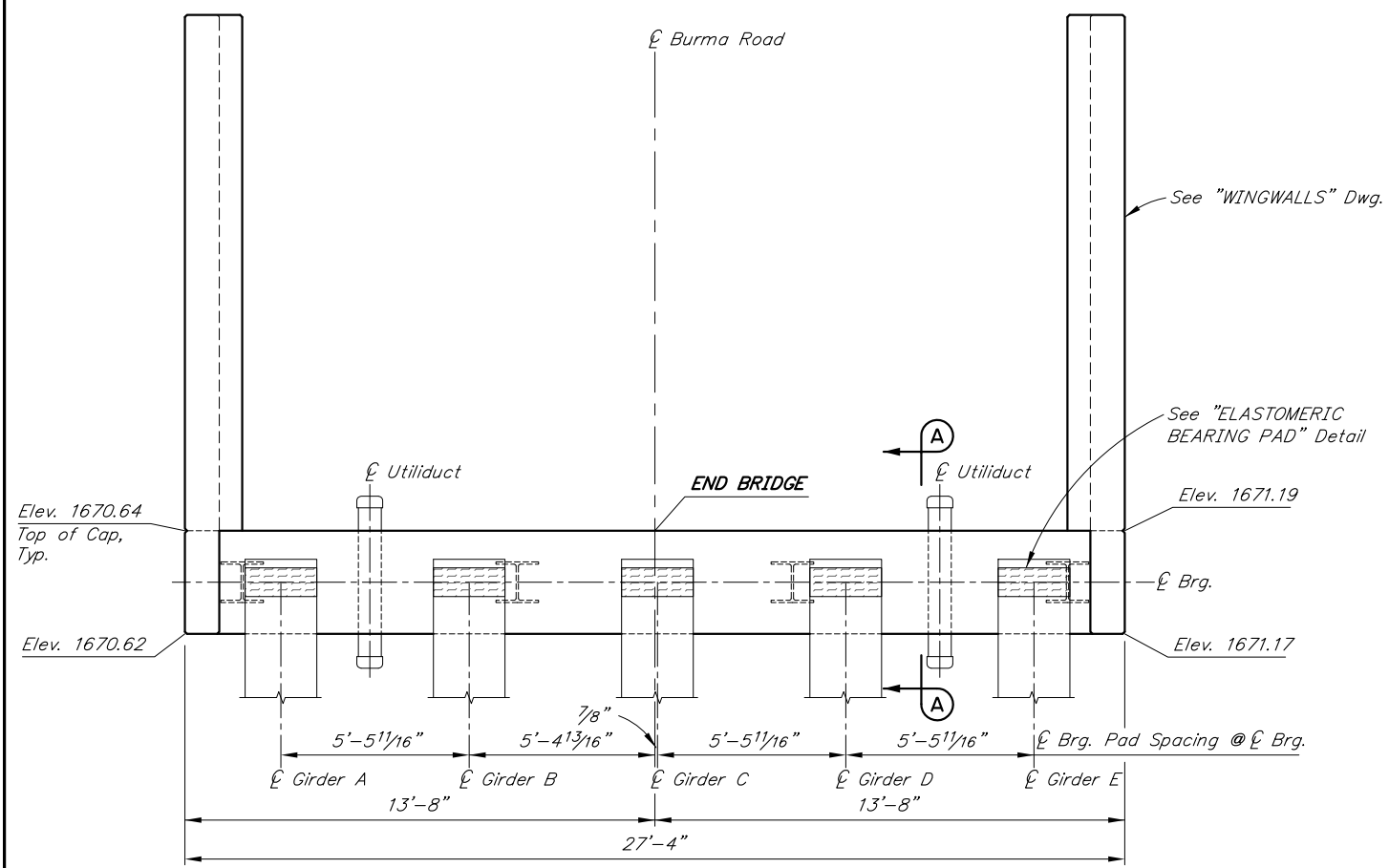
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWHY00479	2021	N6	N14

**REINFORCING STEEL - ABUTMENT 2**

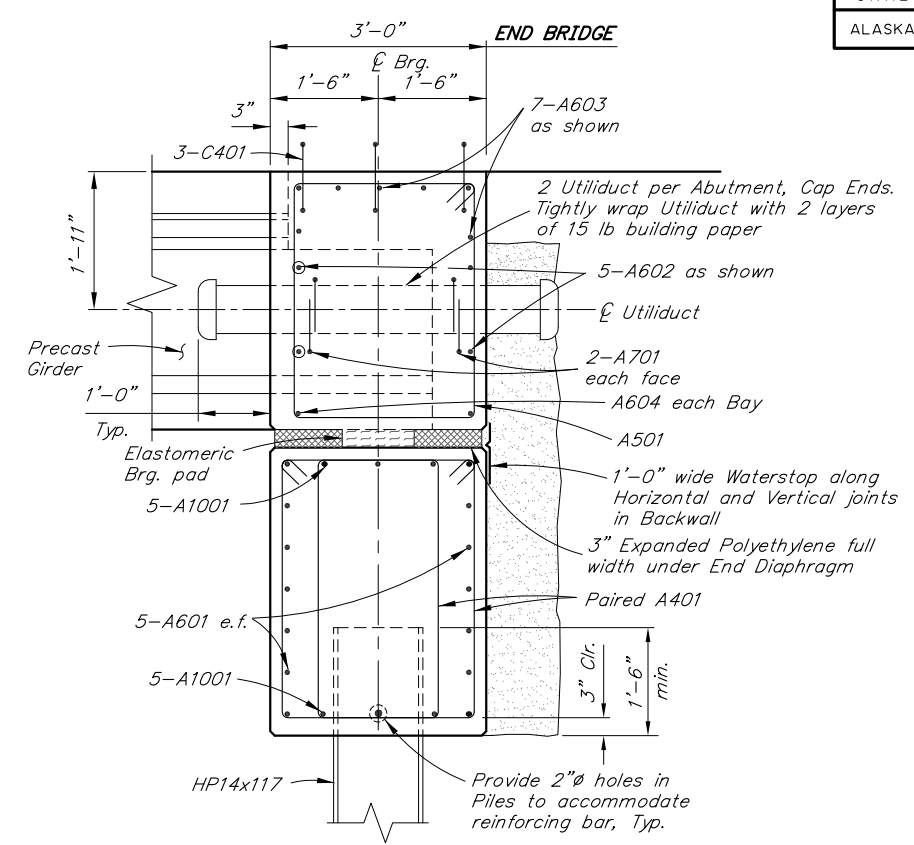
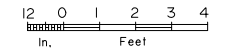
MARK	NOTE	SIZE	NO.	LENGTH	TYPE
A401		4	90	VARIES	BENT
A501	E	5	26	12'-1"	BENT
A601		6	10	27'-0"	---
A602	E	6	5	24'-10"	---
A603	E	6	7	27'-0"	---
A604	E	6	4	3'-0"	---
A701	E	7	8	3'-0"	BENT
A1001	H	10	10	27'-0"	HEADED



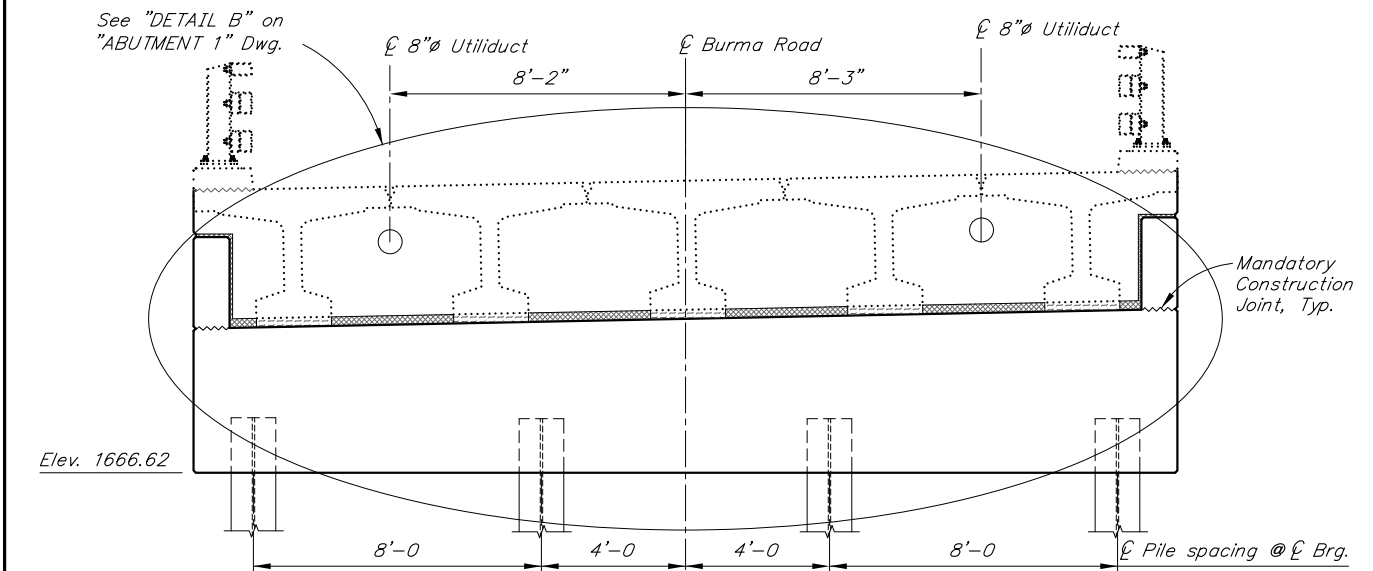
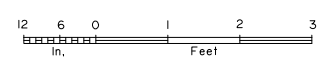
E - Epoxy-Coated  
H - Headed reinforcing steel



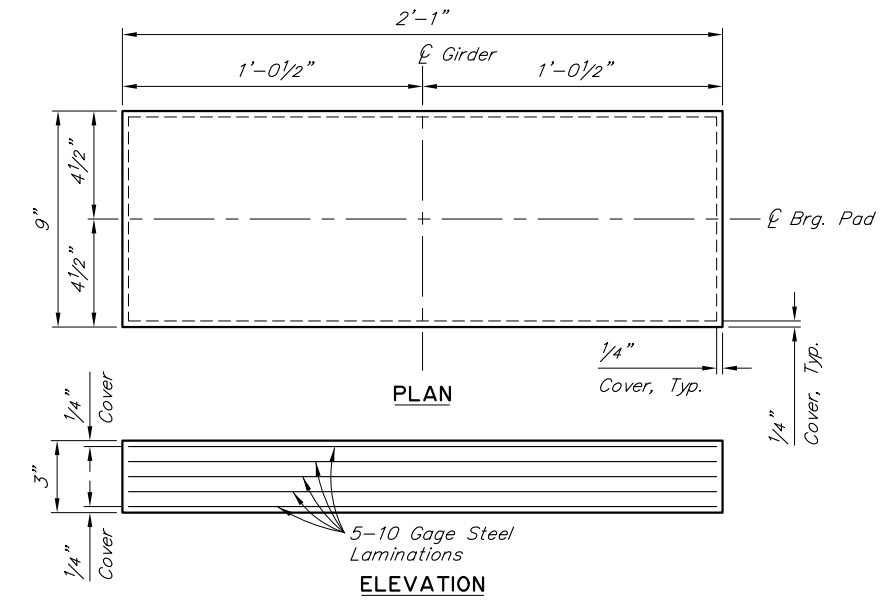
**PLAN**



**SECTION A-A**



**ELEVATION**



**ELASTOMERIC BEARING PAD**

Grade 5  
Dead Load = 76 k  
Live Load = 63 k  
Shear Modulus = 115 psi



DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Solie	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

**PRELIMINARY PLAN**

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

**LITTLE TONSINA BRIDGE**  
BURMA ROAD  
**ABUTMENT 2**



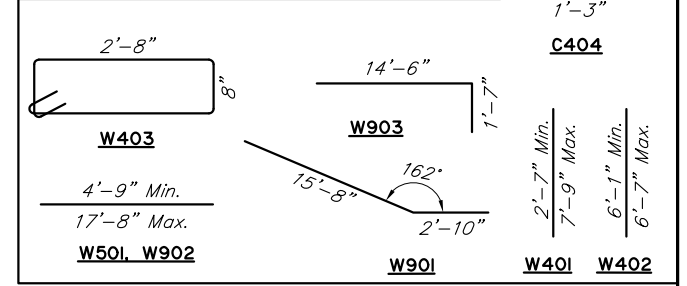
BRIDGE NO. 568  
DWG. NO. 6

R:\cadd\568\568-1-ABUT-2 Wed, Jun/10/20 07:17am

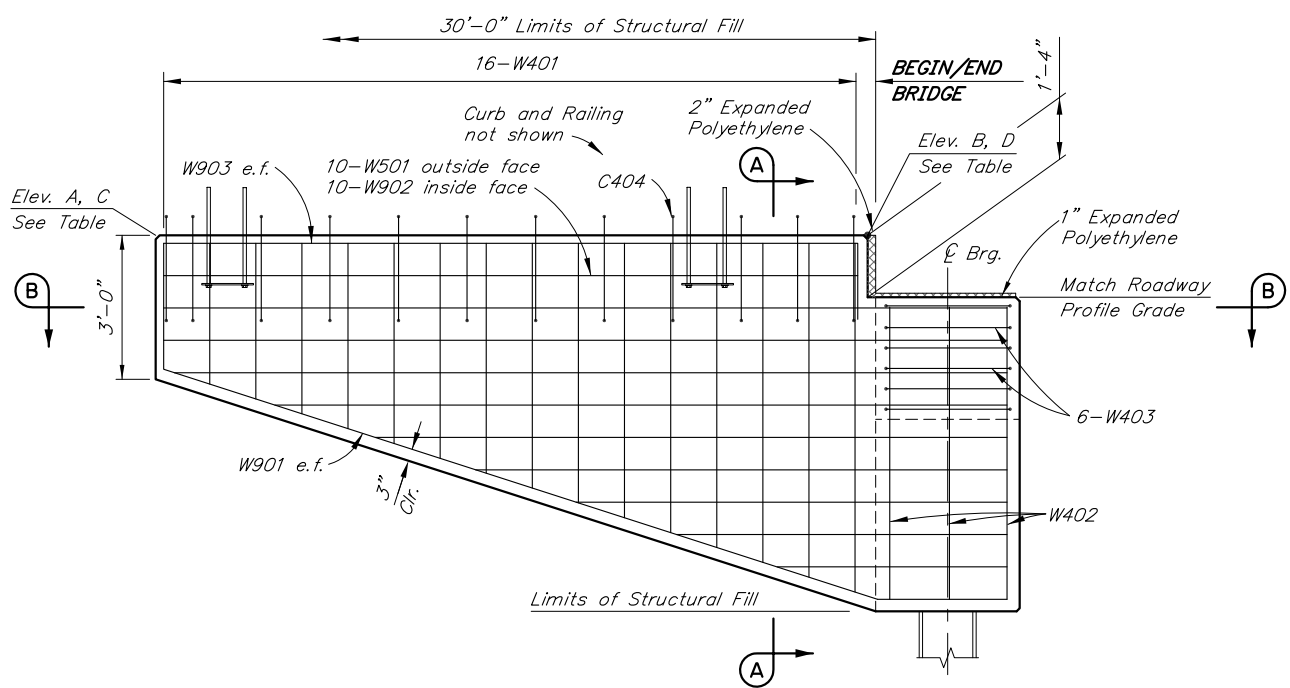
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFWY00479	2021	N7	N14

**REINFORCING STEEL - ONE ABUTMENT**

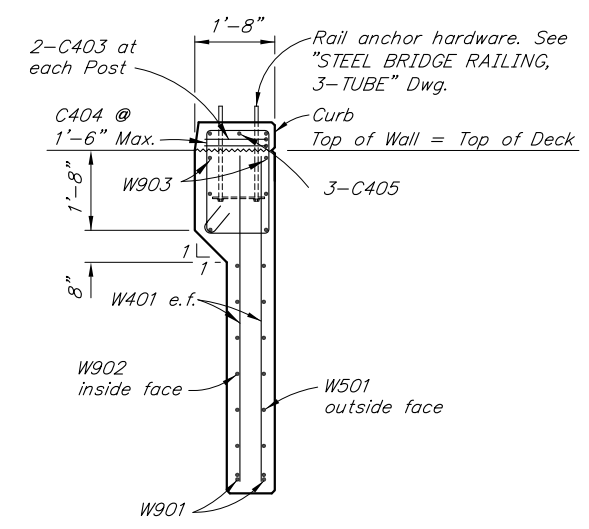
MARK	NOTE	SIZE	NO.	LENGTH	TYPE	BENDING DIAGRAM
W401		4	64	VARIABLES	---	1'-3"
W402		4	12	VARIABLES	---	
W403		4	12	7'-5"	STIRRUP	
W501		5	20	VARIABLES	---	1'-4"
W901		9	4	18'-6"	BENT	
W902		9	20	VARIABLES	---	
W903		9	4	16'-1"	BENT	2'-2"
C403	E	4	8	3'-10"	BENT	
C404	E	4	24	7'-7"	STIRRUP	
C405	E	4	6	14'-6"	---	1'-3"



E - Epoxy-Coated



**ELEVATION**

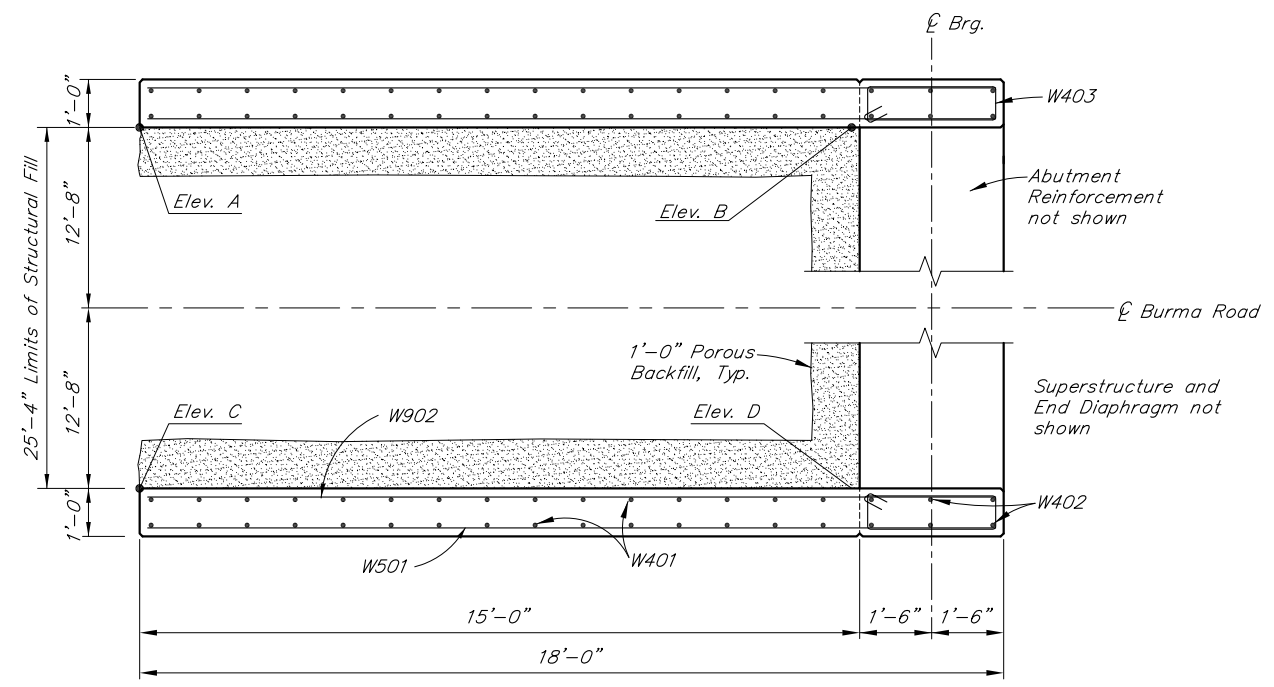


**SECTION A-A**

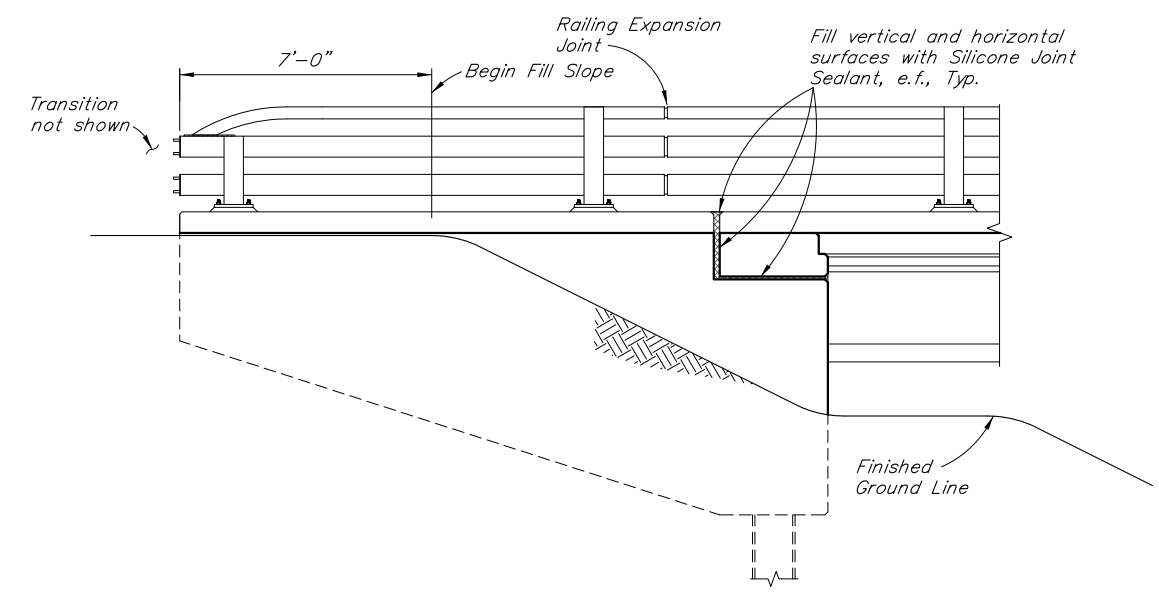


**TOP OF WINGWALL ELEVATION TABLE (FT)**

LOCATION	A UPSTREAM	B UPSTREAM	C DOWNSTREAM	D DOWNSTREAM
ABUTMENT 1	1673.92	1673.99	1674.40	1674.47
ABUTMENT 2	1674.59	1674.51	1675.07	1674.99



**SECTION B-B**



**FINISHED ELEVATION**



R:\cadd\568\568-1-WINGWALLS Wed, Jun/10/20 07:18am

DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Sollie	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

**PRELIMINARY PLAN**

STATE OF ALASKA  
**DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES**  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

**LITTLE TONSINA BRIDGE**  
BURMA ROAD  
**WINGWALLS**



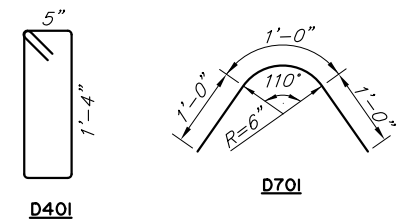
BRIDGE NO. 568  
DWG. NO. 7

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00479	2021	N8	N14

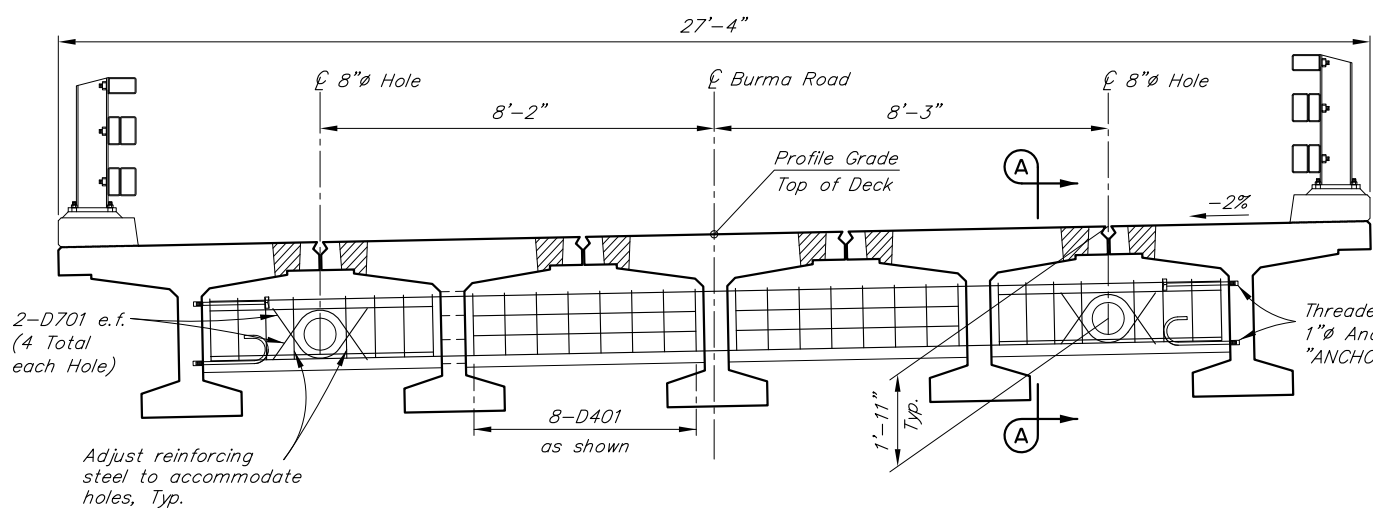
**REINFORCING STEEL - ONE DIAPHRAGM**

MARK	NOTE	SIZE	NO.	LENGTH	TYPE
D401	E	4	32	4'-3"	STIRRUP
D501	E	5	16	4'-7"	---
D601	E	6	4	21'-0"	---
D701	E	7	8	3'-0"	BENT

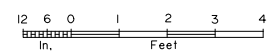
BENDING DIAGRAM



E - Epoxy-Coated

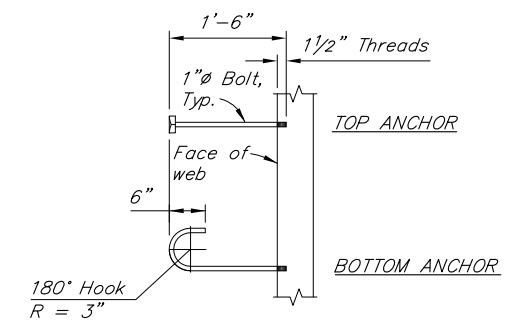


TYPICAL SECTION



Adjust reinforcing steel to accommodate holes, Typ.

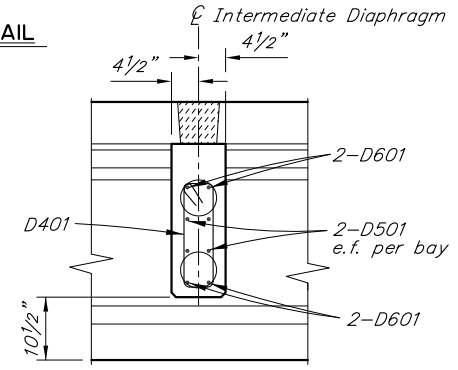
Threaded Anchor Insert for 1" Anchor Bolts. See "ANCHOR DETAIL"



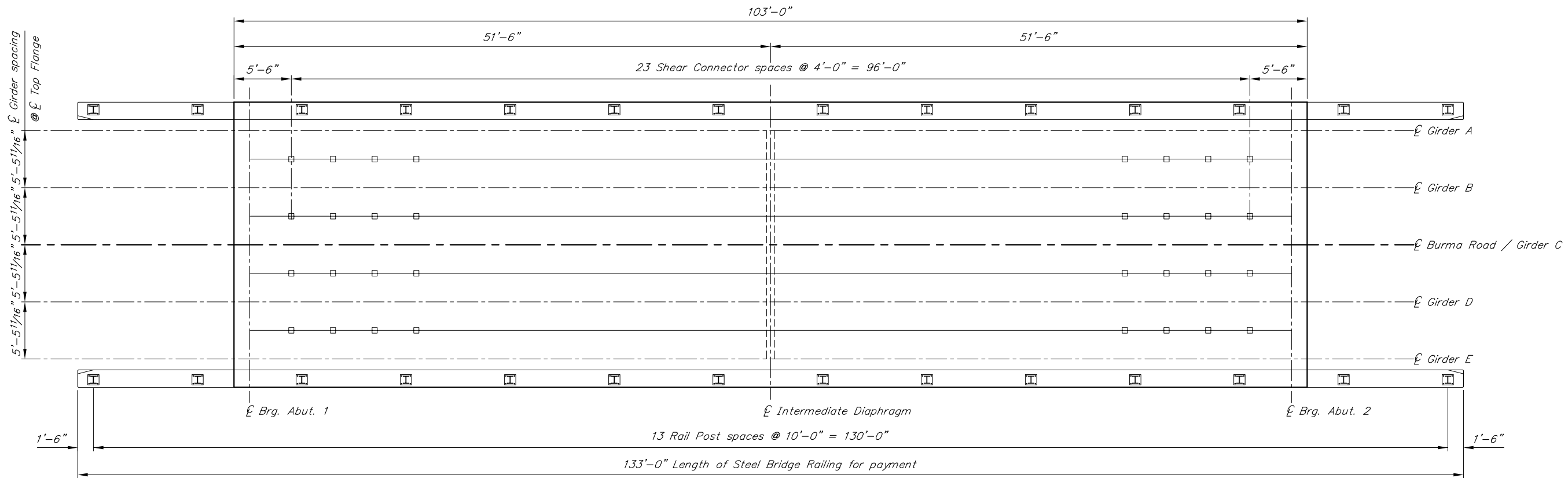
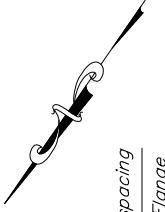
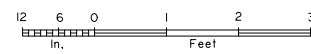
ASTM A307 GALVANIZED

ANCHOR DETAIL

No Scale



SECTION A-A



FRAMING PLAN



DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Sollie	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

**PRELIMINARY PLAN**

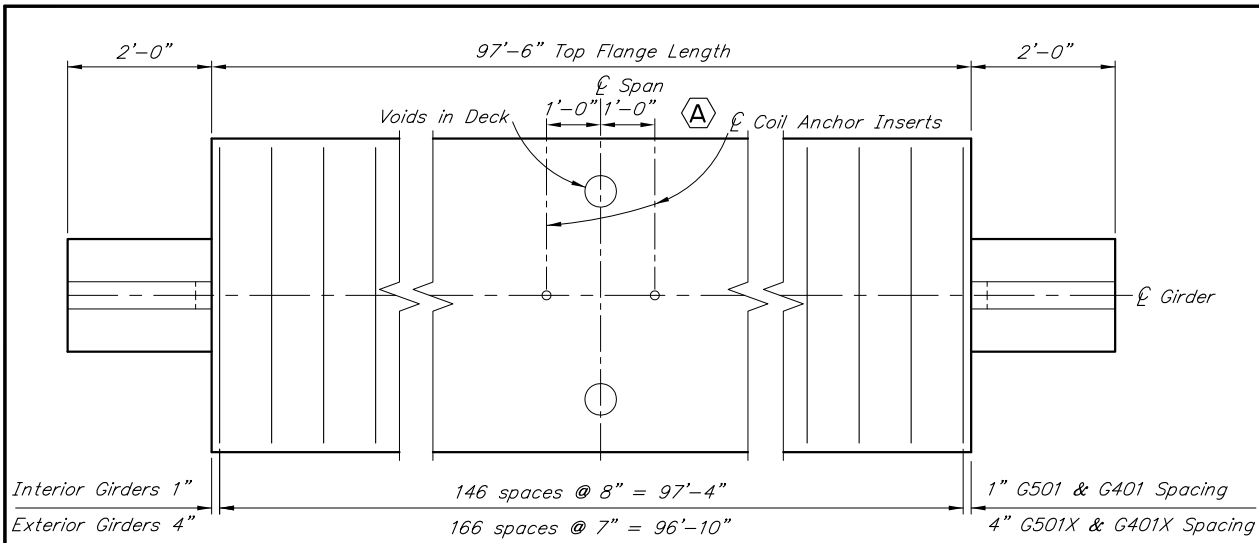
STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION  
 AND PUBLIC FACILITIES  
 BRIDGE SECTION  
 3132 Channel Drive  
 Juneau, Alaska 99801  
 907-465-2975

LITTLE TONSINA BRIDGE  
 BURMA ROAD  
 FRAMING PLAN AND TYPICAL SECTION

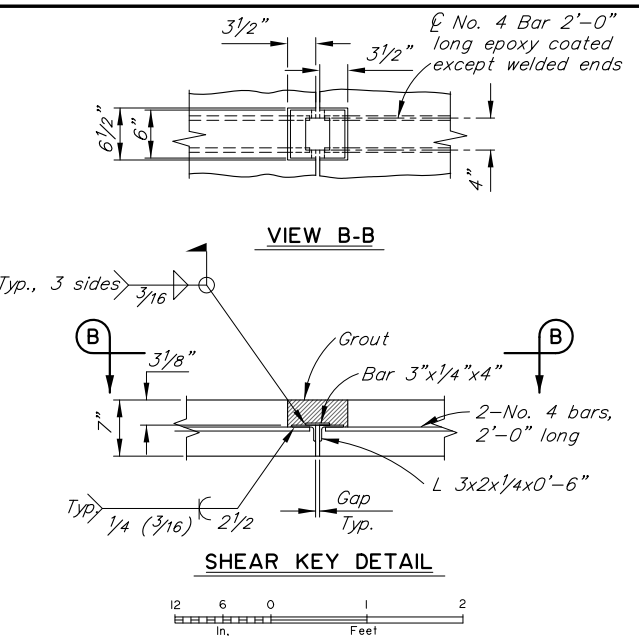


BRIDGE NO. 568  
 DWG. NO. 8

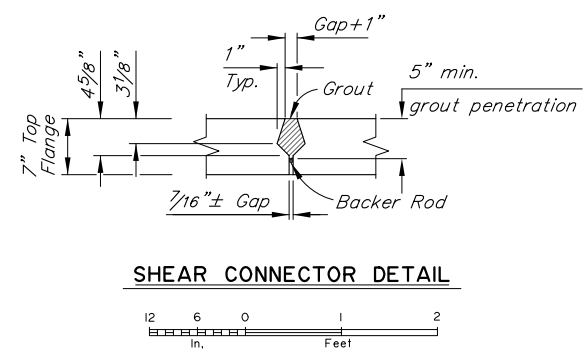
R:\cadd\568\568-1-TYPICAL.Fri., Jun/05/20 08:18am



**PLAN**  
No Scale



**SHEAR KEY DETAIL**

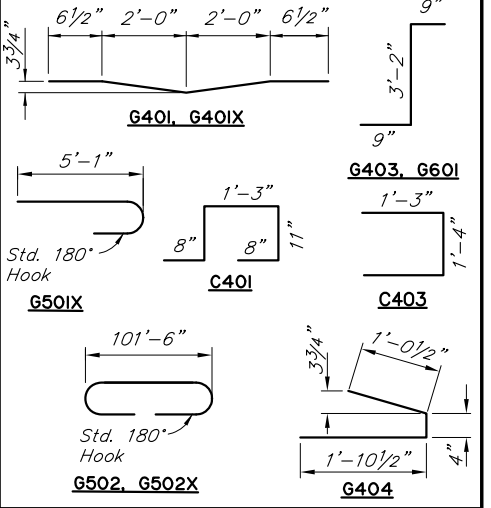


**SHEAR CONNECTOR DETAIL**

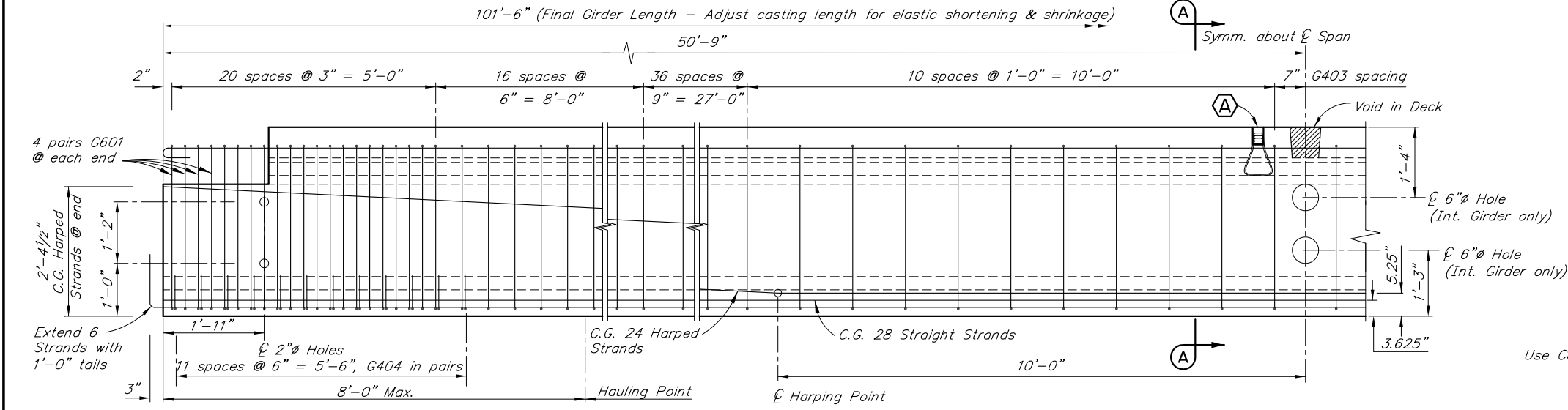
**REINFORCING STEEL-ONE GIRDER**

MARK	NOTE	SIZE	NO.	LENGTH	TYPE
G401	E	4	147	5'-2"	BENT
G401X	E	4	167	5'-2"	BENT
G402	E,L	4	8	97'-2"	---
G402X	E,L	4	8	97'-2"	---
G403	E	4	308	4'-8"	BENT
G404	E	4	48	3'-3"	BENT
G501	E	5	147	5'-0"	---
G501X	E	5	167	5'-8"	BENT
G502	E,L	5	8	102'-8"	BENT
G502X	E,L	5	8	102'-8"	BENT
G601	E	6	16	4'-8"	BENT
C401	E,S	4	71	4'-5"	BENT
C402	E,L	4	3	102'-8"	---
C403	E,L	4	20	3'-10"	BENT

**BENDING DIAGRAM**



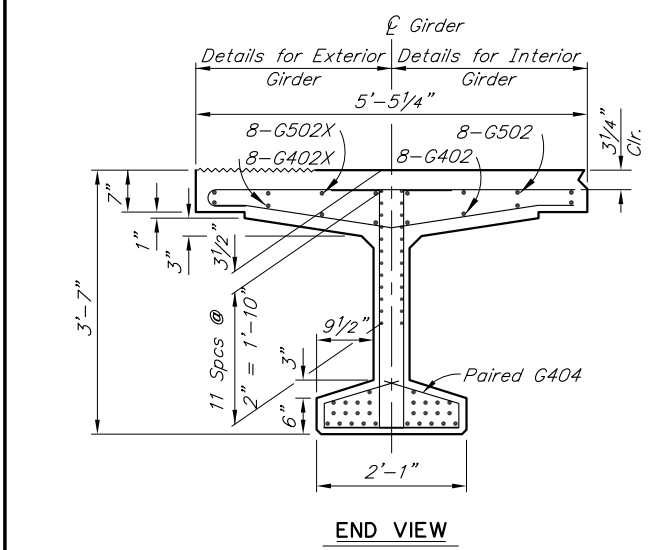
E - Epoxy-Coated  
L - Length does not include splices  
S - Ship 6 loose for diaphragms  
X - Exterior Girders only



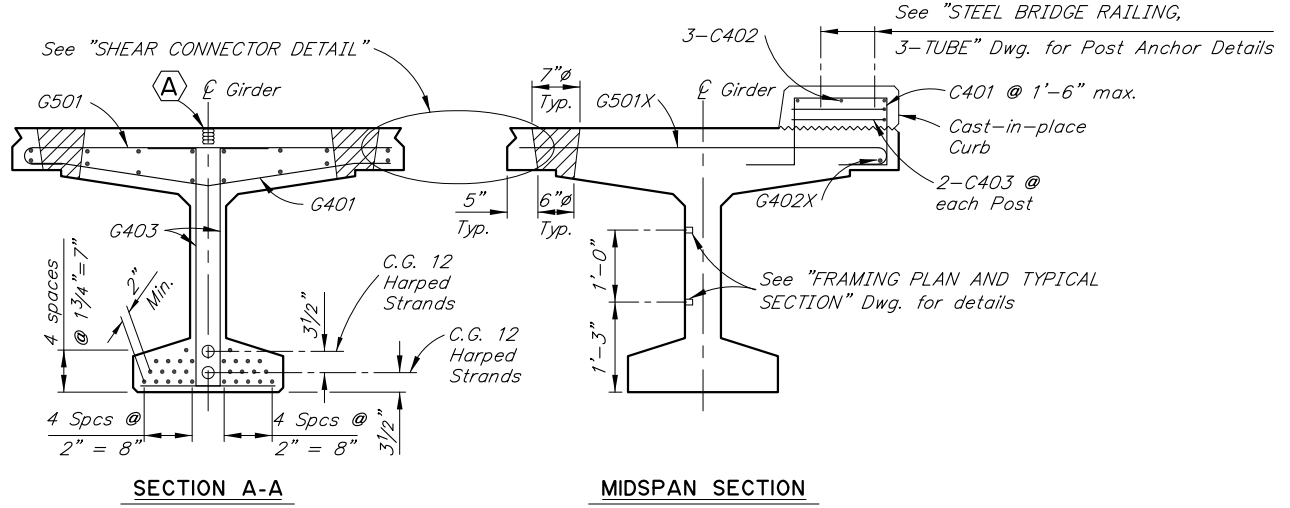
**ELEVATION**  
No Scale

**GIRDER NOTES**

- Use Class P concrete with the following strengths:  
At Stress Transfer  $f'_{ci} = 6,500$  psi  
At 28 days  $f'_c = 8,000$  psi
- Use 1/2" round low relaxation strands with an ultimate strength of 270 ksi and a cross section area of 0.153 in<sup>2</sup>.
- Design is based on the following steel stresses:  
Pretensioning - Jacking Stress 189 ksi  
After initial losses - 169 ksi  
After all losses - 139 ksi
- Deflect forms to compensate for camber and roadway grade.
- Galvanize all steel embedded in girders except for shear connectors.
- 1" clear on all reinforcing except as noted.
- Finish top flange surface with heavy broom finish. Roughen the surface under the curb.
- Omit Shear Key, Shear Connector, and Deck Voids on outside of exterior girders.
- Cast Girder ends plumb with respect to roadway grade. Install web holes and web anchor inserts parallel to bearing.
- 1"x1'-0" Coil Anchor Insert for vertical adjustment of girders. Recess 2". Prevent concrete from filling hole.
- See "FRAMING PLAN AND TYPICAL SECTION" Dwg. for shear connector spacing.



**END VIEW**



**SECTION A-A**

**MIDSPAN SECTION**

DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Solie	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

**PRELIMINARY PLAN**

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

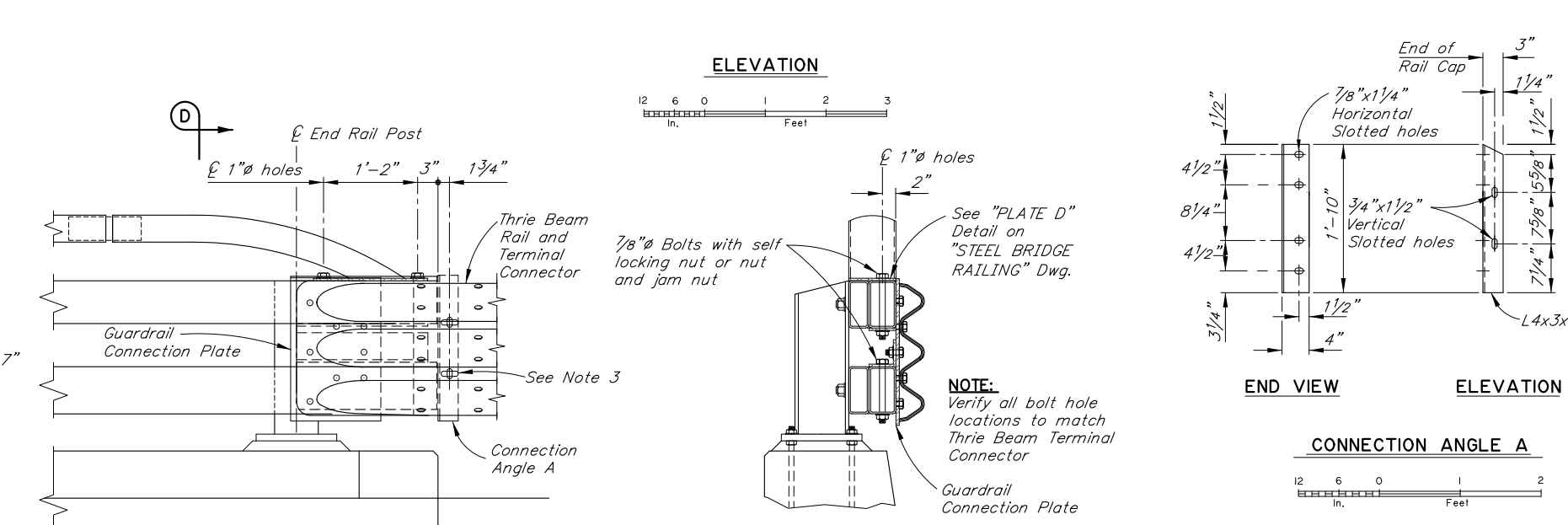
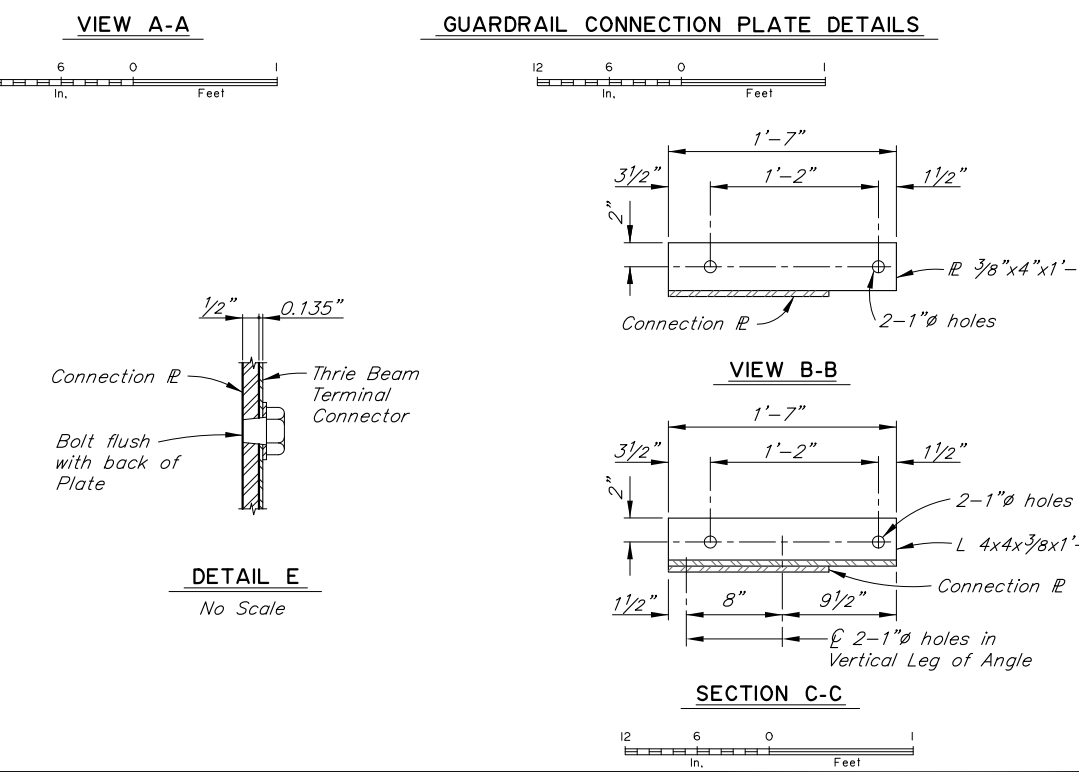
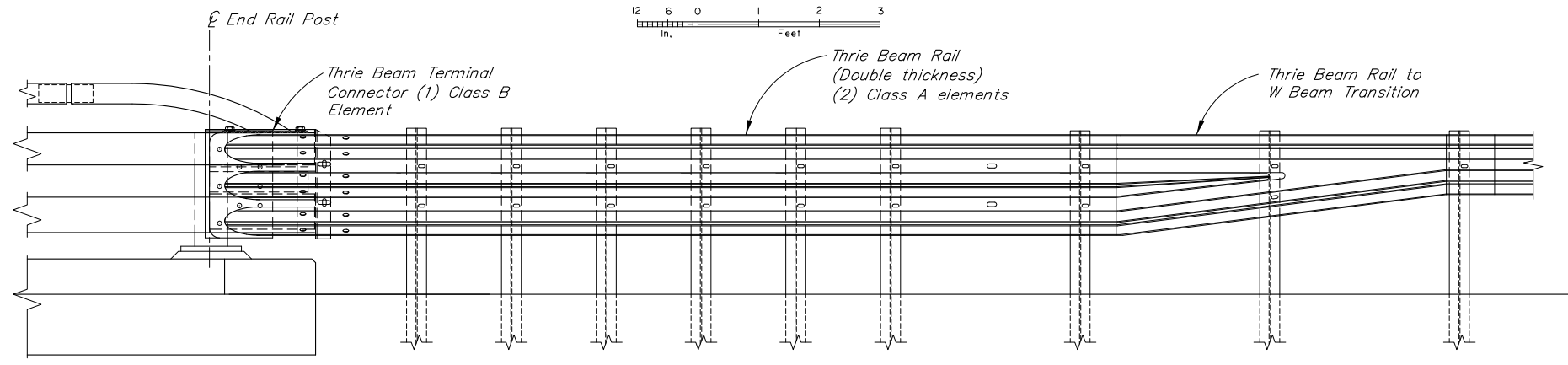
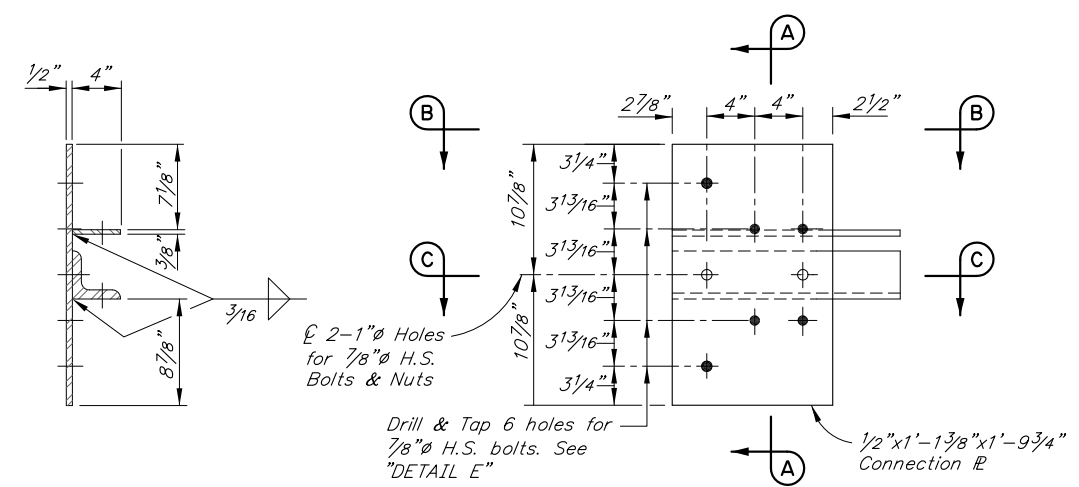
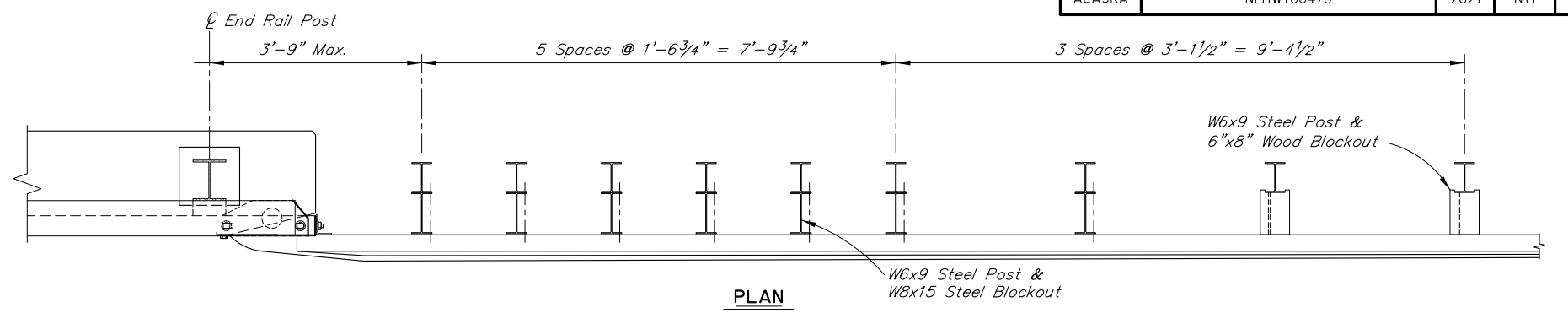
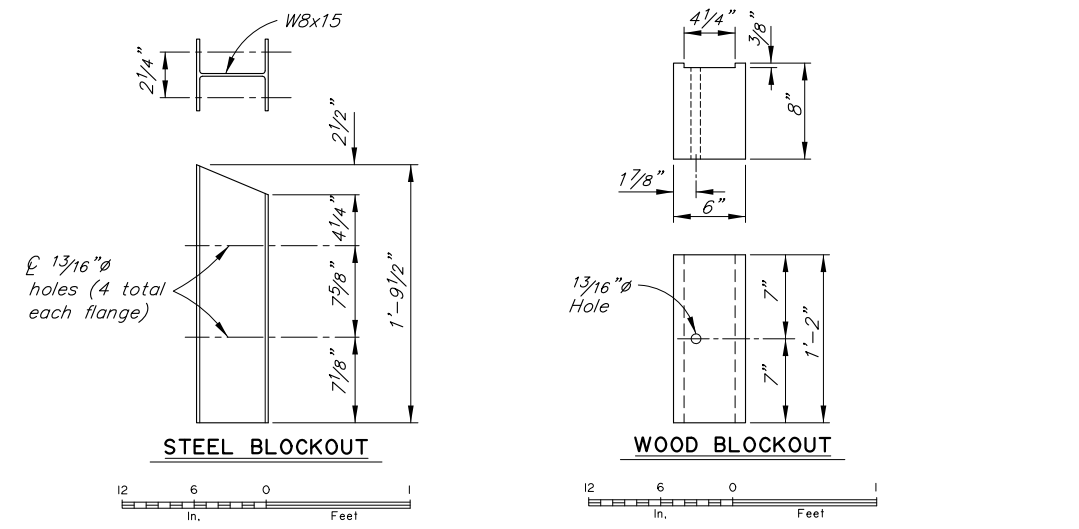
**LITTLE TONSINA BRIDGE**  
BURMA ROAD  
**GIRDERS**

  
BRIDGE NO. 568  
DWG. NO. 9

R:\cadd\568\568-1-GIRDERS Fri Jun/05/20 08:18am



STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00479	2021	N11	N14



- NOTES:**
1. Conform to G-00, G-05 and G-10 for all guardrail details not shown.
  2. Lap approach guardrail to prevent snags from oncoming traffic.
  3. Provide 4 1/2 inch horizontal slots in approach guardrail. Adjust guardrail bolts for sliding fit.

R:\cadd\568\568-1-TRANSITION Fri, Jun/05/20 11:38am

DESIGNED BY:	Elmer Marx	CHECKED:	Checker
DRAWN BY:	Sam Sallie	CHECKED:	Elmer Marx
QUANTITIES BY:	Elmer Marx	CHECKED:	Checker

PRELIMINARY PLAN

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
BRIDGE SECTION  
3132 Channel Drive  
Juneau, Alaska 99801  
907-465-2975

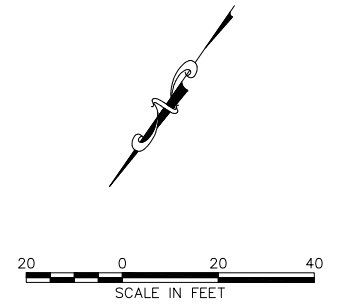
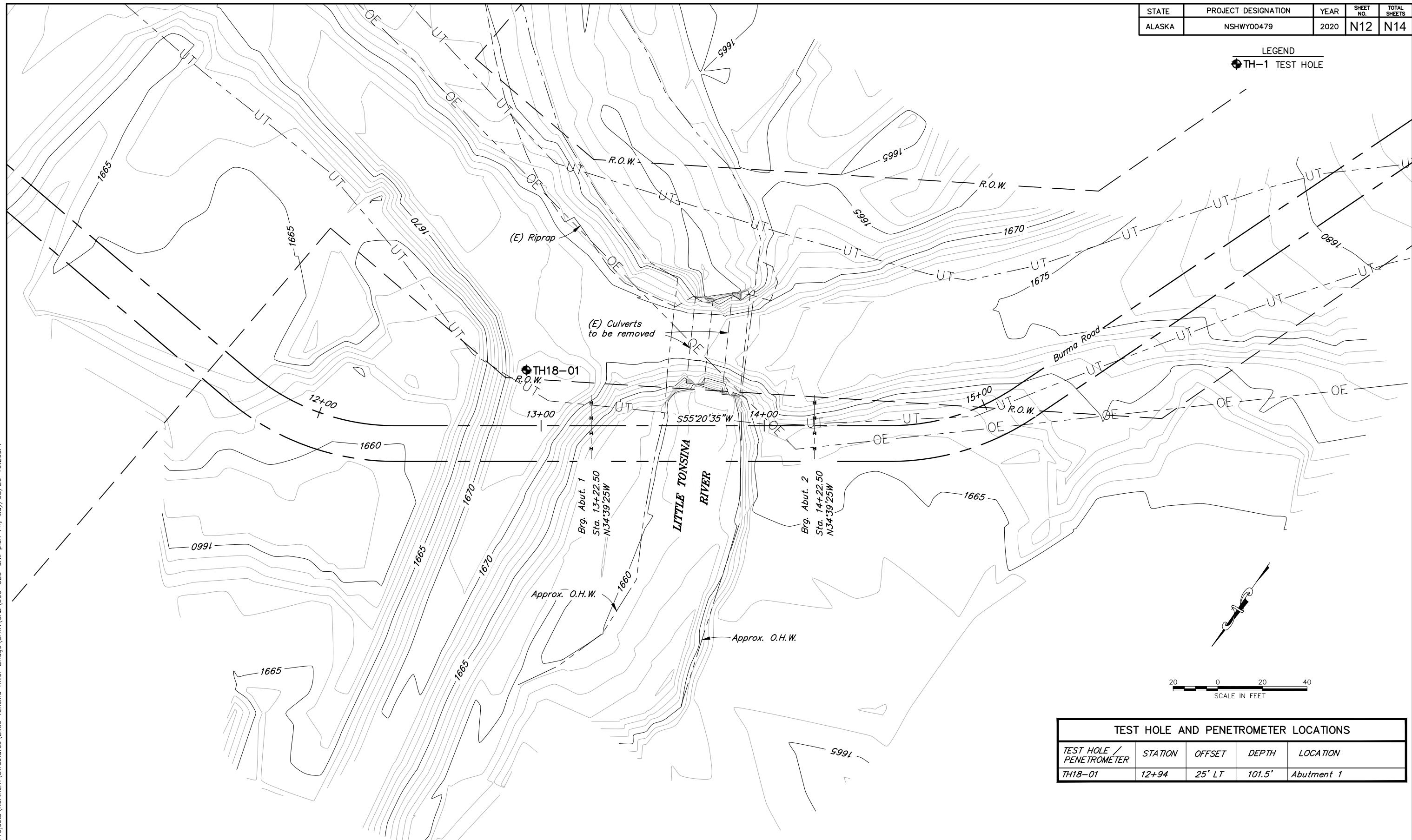
LITTLE TONSINA BRIDGE  
BURMA ROAD  
TRANSITION RAIL, 3-TUBE



BRIDGE NO. 568  
DWG. NO. II

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NSHWY00479	2020	N12	N14

LEGEND  
 ● TH-1 TEST HOLE




TEST HOLE AND PENETROMETER LOCATIONS				
TEST HOLE / PENETROMETER	STATION	OFFSET	DEPTH	LOCATION
TH18-01	12+94	25' LT	101.5'	Abutment 1

\\DOTATUF504\Data\Crm\Projects\Northern\Structures\Little Tonsina River Bridge\DATA\CAD\568-GEO-drill plan Fri, May/08/20 10:26am

DESIGNED BY:	<i>Designed</i>	CHECKED:	<i>Engineer</i>
DRAWN BY:	<i>Drafter</i>	CHECKED:	<i>Engineer</i>
QUANTITIES BY:	<i>Engineer</i>	CHECKED:	<i>Engineer</i>

STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION  
 AND PUBLIC FACILITIES  
 STATEWIDE MATERIALS

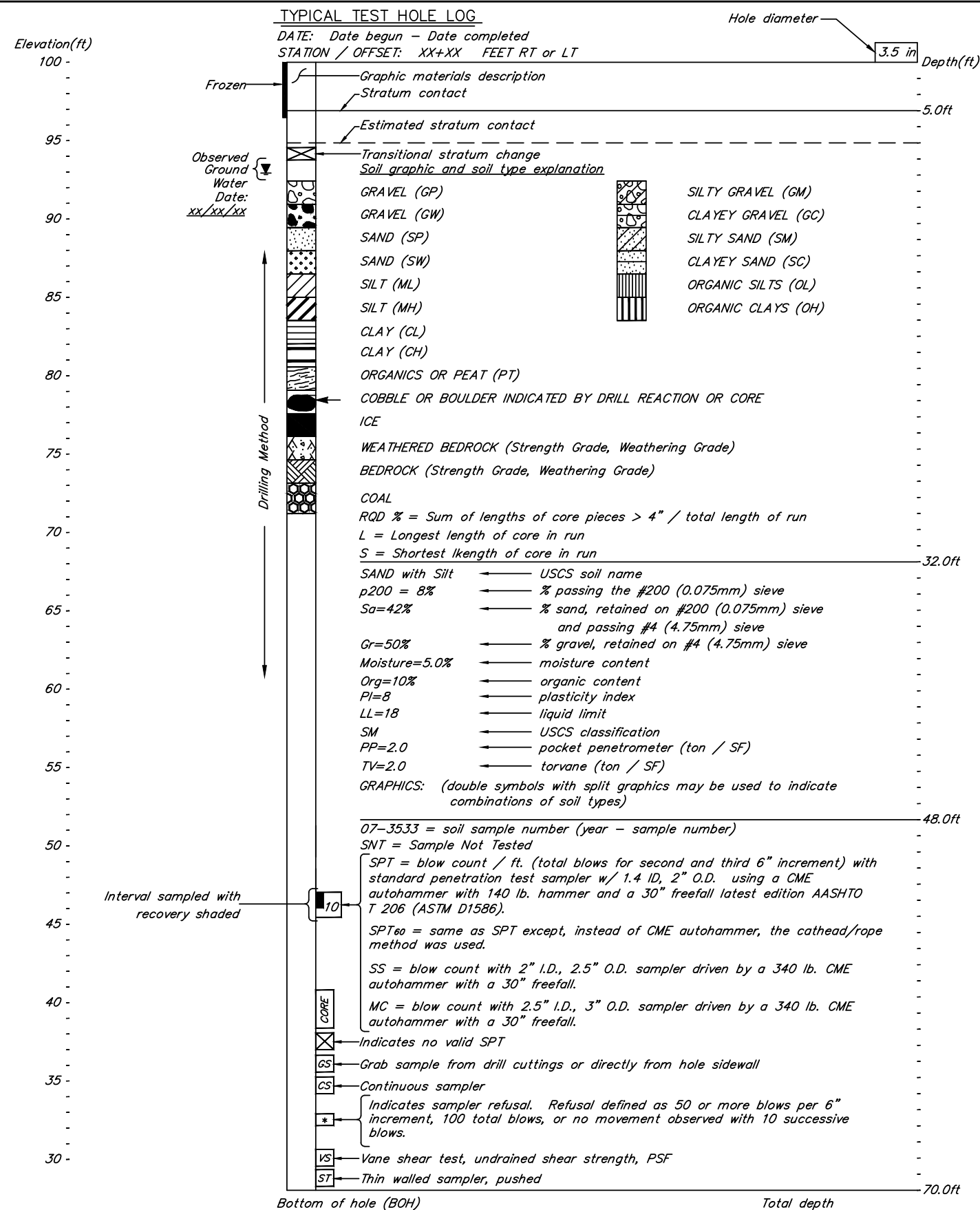
LITTLE TONSINA BRIDGE  
 BURMA ROAD  
 TEST HOLE & PENETROMETER LOCATION



BRIDGE NO. 0568  
 DWG. NO. 12



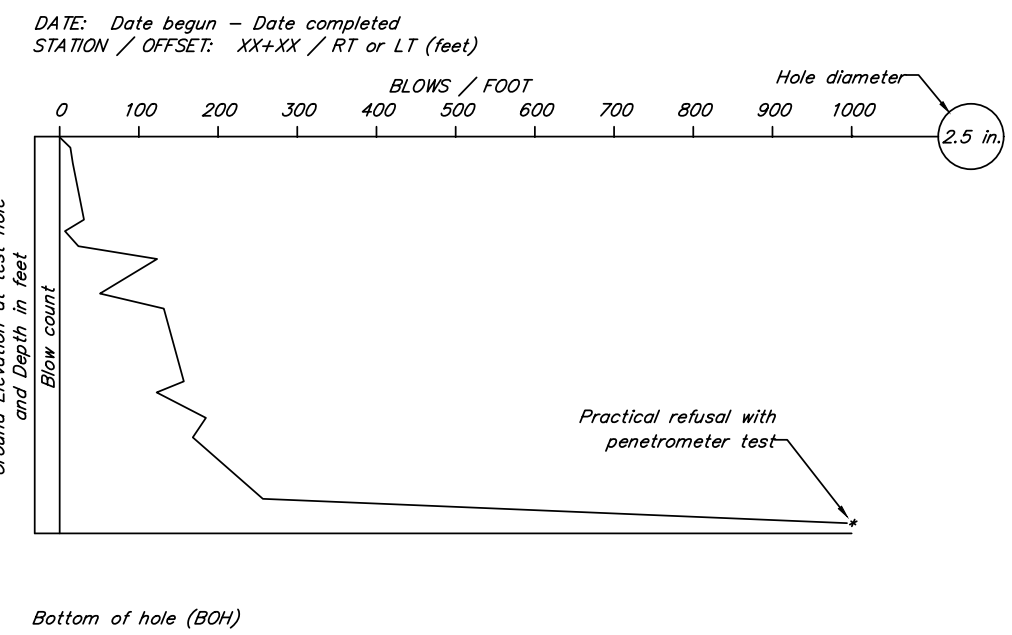
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NSHWY00479	2020	N13	N14



**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 of soils follows Alaska Geotechnical Procedures manual. Classification of soils follows Unified Soil Classification System (ASTM D2487).
- 3) The test hole logs from these sheets are an integral part of the Foundation Geology Report. 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




**NOTES:**  
 Penetrometer W/2.5" O.D., with a CME AUTOMATIC Hammer using a 340 lb. weight and a 30" freefall

\\DOTATUF504\Data\Crm\Projects\Northern\Structures\Little Tonsina River Bridge\CAD\568-GEO-legend Fri, May/08/20 10:26am

DESIGNED BY:	Designed	CHECKED:	Engineer
DRAWN BY:	Drafter	CHECKED:	Engineer
QUANTITIES BY:	Engineer	CHECKED:	Engineer

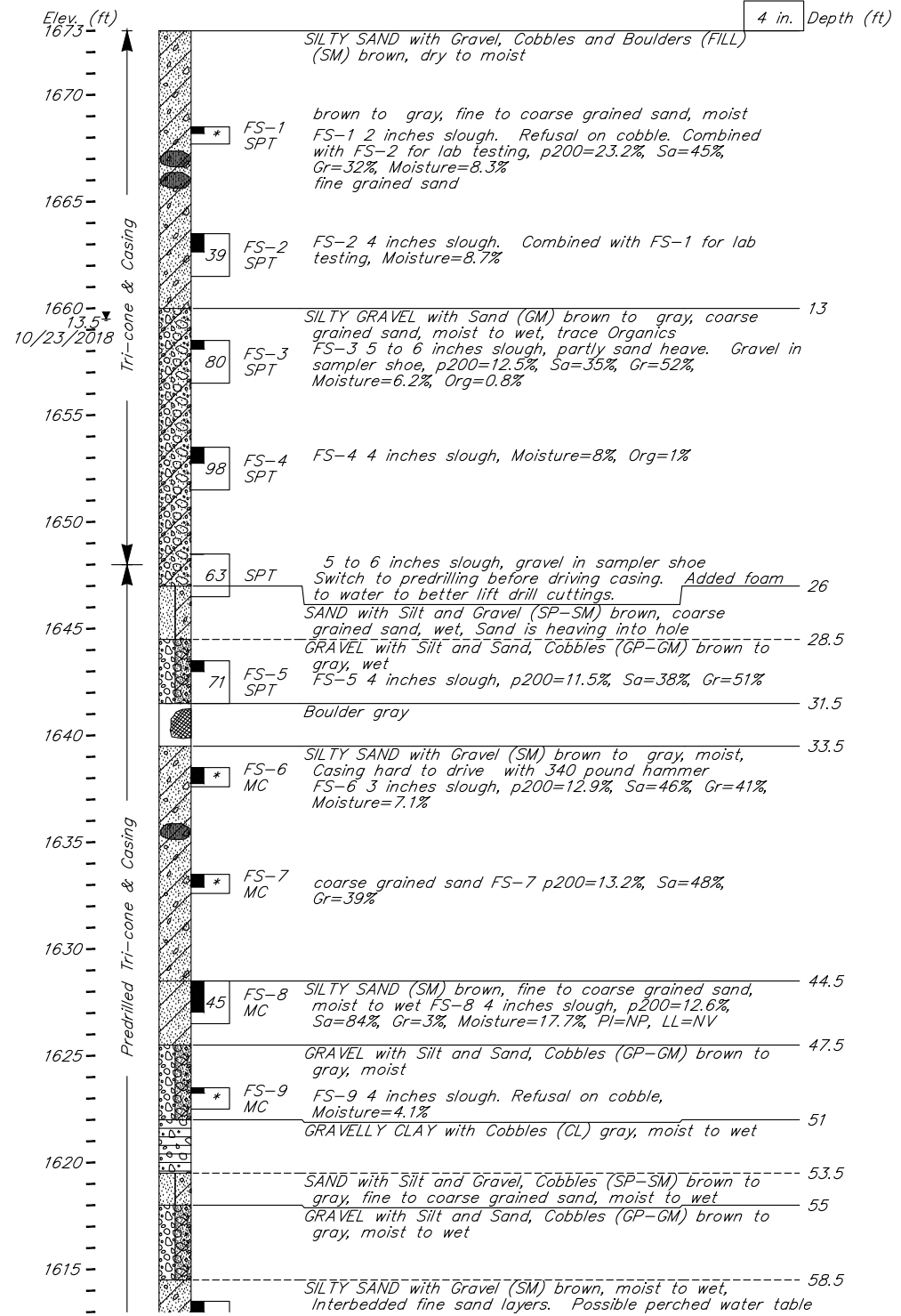
STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION  
 AND PUBLIC FACILITIES  
 STATEWIDE MATERIALS

**LITTLE TONSINA BRIDGE**  
 BURMA ROAD  
**TEST HOLE & PENETROMETER LEGEND**

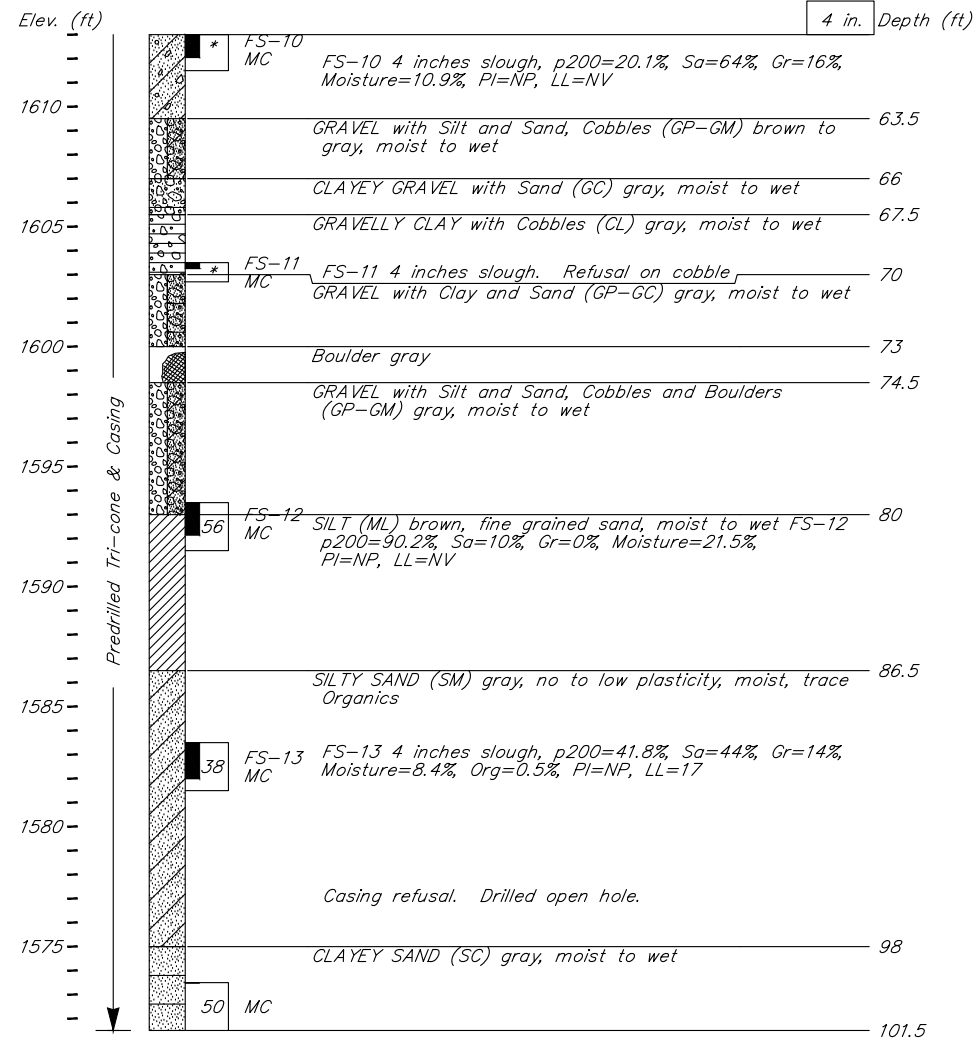


BRIDGE NO. 0568  
 DWG. NO. 13

TH18-01  
Date: 10/23/18 - 10/25/18  
Station: 12+94 Offset: 25' LT



TH18-01 (cont.)  
Date: 10/23/18 - 10/25/18  
Station: 12+94 Offset: 25' LT



B.O.H. 101.5 ft.  
Notes: Two 8 to 10 foot diameter existing culverts. Drilled on ATV trail at 10 to 12 feet above river. 38 feet right of existing road centerline.  
Hammer: CME Auto Hammer both 140 and 340 lb hammer  
Equipment: CME 75 Truck  
Drilling Method: 4 inch casing and tricone water drilling  
Geologist: T. Weiss  
Latitude: 61.59445 Longitude: -145.22287

\\DOT\ATUF504\Data\Crms\Projects\Northern\Structures\Little Tonsina River Bridge\CAD\568-GEO-th log Fri, May/08/20 10:26am

DESIGNED BY:	Designed	CHECKED:	Engineer
DRAWN BY:	Drafter	CHECKED:	Engineer
QUANTITIES BY:	Engineer	CHECKED:	Engineer

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES  
STATEWIDE MATERIALS

LITTLE TONSINA BRIDGE  
BURMA ROAD  
TEST HOLE & PENETROMETER LOGS

