



**ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES**

P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

BR. 147.4 PIER #2 REPLACEMENT

LATITUDE: 61.4947°, LONGITUDE: -149.2394°

DRAWING INDEX

- | | |
|--|---|
| 1. COVER SHEET | 9. CLOSURE PLATE LAYOUT |
| 2. GENERAL NOTES | 10. PRECAST CONCRETE SUB CAP |
| 3. GENERAL ARRANGEMENT | 11. STRUCTURAL STEEL DETAILS (SHEET 1 OF 4) |
| 4. PHASING DETAILS (SHEET 1 OF 2) | 12. STRUCTURAL STEEL DETAILS (SHEET 2 OF 4) |
| 5. PHASING DETAILS (SHEET 2 OF 2) | 13. STRUCTURAL STEEL DETAILS (SHEET 3 OF 4) |
| 6. PIER #2 FOUNDATION PLAN | 14. STRUCTURAL STEEL DETAILS (SHEET 4 OF 4) |
| 7. SECTIONS AND DETAILS (SHEET 1 OF 2) | 15. MISCELLANEOUS STEEL DETAILS |
| 8. SECTIONS AND DETAILS (SHEET 2 OF 2) | 16. BORING LOG |

REFERENCES

- ALASKA RAILROAD CORPORATION - 26' BALLAST DECK APPROACH SPAN
- ALASKA RAILROAD CORPORATION - 123' STANDARD TPG BRIDGE REPLACEMENT



**ISSUED FOR
CONSTRUCTION**

LETTER SERIES

SHEET NO. CUT ON SHEET NO. SHOWN ON

SECTION DESIGNATION

ALASKA RAILROAD CORPORATION ENGINEERING SERVICES P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500		
PROJECT: BR. 147.4 PIER #2 REPLACEMENT		
TITLE: COVER SHEET		
DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 1 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		

WILSON & COMPANY					
REV.	DATE	BY		REVISION	

GENERAL NOTES

- All work requirements on these drawings and not otherwise detailed shall be accomplished as specified in the current edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering.
- Field verify all dimensions and elevations prior to start of construction.
- Information used to prepare this drawing:
 - Location survey prepared by All Points North, dated 5/27/2020.
 - Geotechnical investigation and recommendations prepared by Northern Geotechnical Engineering, Inc. d.b.a. Terra Firma Testing, dated 7/15/2020.
- Horizontal Datum: NAD83 (2011)
Vertical Datum: NAVD88
- See Survey Existing Site Conditions Sheet 1 for control point locations: Control Point #1: Elev. 31.68, 5/8" rebar W/YPC in concrete.
Control Point #2: Elev. 38.12, 2" Aluminum cap set in abutment.
Control Point #3: Elev. 38.27, 2" Aluminum cap set in abutment.

DESIGN NOTES

- The proposed pier replacement has been designed in accordance with the AREMA Manual for Railway Engineering, Chapter 8: Concrete Structures and Foundations, Chapter 9: Seismic Design for Railway Structures and Chapter 15: Steel Structures.
- This structure was designed for Cooper E80 Live Load plus Impact.

STRUCTURAL STEEL NOTES

- Materials, fabrication and shop assembly shall be in accordance with Chapter 15: Steel Structures of the current AREMA Manual for Railway Engineering.
- Fabrication of structural steel shall be performed by a Fabricator certified under the following AISC Quality Certifications: IBR and FCE.
- Material shall conform to the following requirements:

Girder Webs and Bottom Flanges	ASTM A709 Gr. 50W F3
All Other Structural Steel	ASTM A709 Gr. 50W F3
Anchor Rods	ASTM F1554 Gr. 105
- All steel surfaces shall be cleaned to a minimum SSPC-SP6, commercial blast cleaning.
- Structural steel shall not be painted.
- Steel designated as fracture critical (FCM) shall comply with the requirements of AREMA Chapter 15, Section 1.14. Testing shall be performed for a minimum service temperature corresponding to Zone 3.
- Structural steel shall be of the type and quality as designated on the drawings. Material supplied shall meet the longitudinal Charpy V-notch requirements for Zone 3 as specified in the AREMA Manual for Railway Engineering.
- All shop and field bolted connections shall use high strength bolts (including nuts and washers) conforming to ASTM A325 Type 3, except as otherwise noted. Nuts shall conform to ASTM A563. All bolts shall be 1" diameter unless noted otherwise. Diameter of bolt holes shall be 1/16" larger than nominal bolt diameter, unless noted otherwise. All bolts shall have one hardened steel washer conforming to ASTM F436 per bolt under the element to be turned.
- High strength steel bolts shall be installed in accordance with the "Turn of the Nut Method". The procedure for installation is as specified by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation. Alternative bolt installation methods are subject to approval by the Railroad.
- Bolts and nuts shall be furnished by the same supplier to ensure proper fit.
- Bolts shall be of such length that they will extend entirely through their nuts and approximately 1/4" beyond them and the full threads shall extend no more than 3/8" into the grip.
- Any open bolt hole shall be filled in with high strength steel bolt if not used.
- Bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or any other interposed compressible material.
- When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of scale, except tight mill scale; and shall also be free of dirt, loose scale, burrs, other foreign material and other defects that would prevent solid seating of the parts.
- Contact surfaces within the joints shall be free of oil, paint, lacquer or rust inhibitor.
- When tested with the inspecting wrench, each fastener shall provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown in Table 15-3-2 of AREMA Chapter 15, Section 15.3.2.3 for the size of fastener used.
- Bolts shall be installed so that the bolt heads are on the outside (exposed) surface of the member unless shown otherwise on the drawings. Threads shall be excluded from the shear plane in all connections.
- Any machine bolts required for shipment shall be ASTM A307.
- All welding shall be in accordance with the Bridge Welding Code, AWS D1.5. Welding of fracture critical members shall also conform to the applicable provisions of the current AREMA Manual for Railway Engineering, Chapter 15: Steel Structures. Welding to be allowed only as shown on the drawings and approved shop drawings.
- No temporary or permanent welds, if not shown on the plans, shall be made without specific written authorization by the engineer. No electroslag or electrogas welding shall be used.
- The use of recycled flux will not be permitted in welds to fracture critical members.

- Welded joints are to be AWS prequalified. Alternate joint details are subject to approval by the Railroad. All welding shall be done to minimize distortion. The welding sequence and procedures to be used shall be submitted for approval to the Railroad.
- Fully automatic submerged arc welding shall be required for this project. Manual shielded arc welding or semi-automatic submerged arc welding shall be allowed only if fully automatic submerged arc welding is not practical. Alternate welding methods are subject to approval by the Railroad.
- When welding A709 Grade 50W steel, weld metal shall be equivalent to A709, Grade 50W steel in strength, corrosion resistance and weathered appearance.
- The Fabricator shall submit copies of welders' certificates for all welding processes. Welders shall possess valid qualifications.
- The fabricator shall develop a distortion control plan for weld-up of the pile cap assembly. Steel struts extending between the backing bars of the flange groove.

Welds will be allowed. If used, the struts must be welded to the backing bars using the same AWS and AREMA requirements as all other welds. Tolerance requirements are included in AREMA Chapter 15, Section 3.1.7 and AWS D1.5, Section 3.5, the more restrictive criteria shall control.
- The fabricator shall, at his own cost, provide an approved inspection service for nondestructive testing of all welds as specified. Nondestructive testing of welds shall be performed in accordance with the AREMA Manual for Railway Engineering Chapter 15: Steel Structures, the Bridge Welding Code, AWS D1.5, Section 3.5 and as follows:
 - 100% RT inspection of full penetration welds in girder webs and flanges.
 - 100% MP inspection of all flange to web welds.
 - 100% MP inspection of fillet welds on bearing stiffeners.
 - 25% UT or MP inspection of all other welds. If any defects are found, then 100% UT or MP inspection shall be required.

Test results shall be furnished to the Railroad.

- Any fabrication errors including unacceptable welds shall be reported to the Railroad. Along with a notice of non-compliance the fabricator shall submit a remediation/repair procedure to be approved.
- All joints and edge preparation, removal of unacceptable weld or base metal, and backgouging shall be completed by machining. Rough removals may be completed by non-mechanical means.
- The Fabricator shall submit detailed shop drawings prior to beginning fabrication. Fabrication shall not begin until shop drawings are approved.
- The fabricator is responsible for the design and detailing of lifting devices. Details for all lifting devices required for handling and shipping shall be submitted with the shop drawings.
- Photographs of Fabricator's progress shall be submitted to the Railroad.
- The Fabricator shall shop assemble the steel framing prior to shipping. All bolts shall be placed in holes as work progresses to assure proper fit.
- Shop assembled steel framing shall be made available for inspection by the Railroad at the Fabricator's plant before the steel is disassembled and shipped to the erection site at the Railroad's discretion. Units and pieces shall be match-marked as required. The Railroad shall be given a minimum 14 day notice to when the steel assembly is available for inspection.
- Reaming of holes during field erection is not allowed, unless approved by the Railroad.
- All steel components shall be inspected by the Fabricator before shipment.
- All material certifications and quality control test results shall be submitted to the Railroad for approval.
- Steel plate girders need not be cambered, but shall be fabricated with natural camber up.
- All materials shall be carefully loaded so as to avoid damage in transit. Members weighing more than three tons shall have the weight marked thereon. All small parts such as bolts, pins washers and small connection plates shall be packed in containers of adequate strength. The contents of each unit shall be plainly marked on the top of each container.
- Payment for structural steel will be made at the lump sum price quoted for "Structural Steel", which shall be full compensation for fabricating, shipping and installing the metalwork and shall be full compensation for furnishing all labor, materials, tools, supplies, equipment and incidentals necessary to complete the work indicated in this plan set. This price paid shall include anchor bolts, elastomeric bearing pads, fracture critical testing, weld inspection services, surface preparation, cleaning, and galvanizing where required. No additional payment will be made for falsework used in steel assembly during fabrication or for any metal added for erection or other purposes unless otherwise approved by the Engineer.

CONSTRUCTION NOTES

- Contractor is responsible for the stability of the structure during erection and the design and detailing of lifting accessories per ASME BTH-1-2011 based on contractor's proposed erection plan. Contractor shall submit lifting plan details and calculations to the engineer for approval. The erection plan shall be coordinated with the Railroad, and final erection plan and details shall be submitted to the engineer and the Railroad for approval, signed and sealed by an Alaska professional engineer.
- Field welding of any kind is prohibited unless specifically called out for in the plans or approved by the engineer.
- Contractor shall apply for and obtain all construction permits necessary to perform the work.
- Summary of Estimated Quantities and Schedules are provided for information only. Contractor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

FIELD WELDING

- Welding shall be accomplished with the SMAW or FCAW Process.
- Welding shall be in compliance with the requirements specified in AWS D1.5, except 5/16" fillet welds may be made with a single pass.
- Welding electrodes shall be E7018 for SMAW or E70T-5 for FCAW.
- Welders shall possess valid qualifications, which shall be furnished to the Railroad.

PRECAST CONCRETE NOTES

CONCRETE

- All concrete materials, placement and workmanship shall be in accordance with Chapter 8: Concrete Structures and Foundations of the AREMA Manual for Railway Engineering.
- Minimum compressive strength at 28 days shall be 4000 psi.
- Exposed surfaces shall be formed in a manner which shall produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90° or less are to be chamfered 3/4" x 3/4". Top surface to have a smooth finish, free of all float or trowel marks.
- Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete shall contain a minimum of 6/2 sacks of cement per cubic yard of concrete.
- Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
- Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be size no. 67. Fine aggregate shall be natural sand.
- Air content shall be between 5% and 7% (by volume).
- Admixtures shall not be used without approval by the Railroad.
- Curing shall be accomplished by wet curing or application of a Type 2 membrane.
- The Fabricator shall stencil the Fabricator's name, date of fabrication, bridge number and piece mark at location shown on the drawings.
- Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Prestressed Concrete Institute's Manual MNL 116 for Quality Control.
- Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast Concrete Institute's Manual MNL 116 for Quality Control for the appropriate shape. Tolerance for location of lifting devices shall be +/- 1/2".
- The Fabricator shall be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the Fabricator's plant prior to shipment, at the Railroad's discretion.

REINFORCING STEEL

- Reinforcing steel shall be deformed, new billet bars per ASTM A615 specifications and meet Grade 60 requirements.
- Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of Standard Practice. Dimensions of bending details are out of bar.
- Reinforcing steel shall be blocked and tied to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcing not otherwise noted shall meet the AREMA Manual for Railway Engineering requirements.

EMBEDDED STEEL

- Steel plates shall conform to ASTM A36 or A709-Grade 36 specifications.
- Studs shall be C1015, C1017 or C1020 cold drawn steel which conforms to ASTM A108 specifications.
- Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
- Where galvanizing is not indicated, material shall be plain.

LIFTING ANCHORS

- Swift lift anchors shall be Dayton Richmond P-52 anchors or approved alternate with a safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

BEARING NOTES

- Bearing fabrication, finishing, tolerances, testing requirements and installation requirements shall conform to AREMA Chapter 15, Part 5.
- Elastomeric bearings shall be previously vulcanized 100 percent virgin polyisoprene (natural rubber), 60 durometer with low temperature properties equal to AASHTO Grade 5. Steel laminates shall be ASTM A1011, Grade 36.
- Sole plates shall be in full contact with elastomeric bearings.
- Methyl Ethyl Ketone for use in cleaning of elastomeric bearings shall conform to ASTM D740, Type I or Type 2.

**WILSON
& COMPANY**

EST. LIFTING WEIGHT OF EXISTING SPANS	
125' TPG W/ BALLAST, TIES AND RAIL	= 690,000 LB. (345.0 TON)
26' BMOD W/ TIES AND RAIL	= 34,000 LB. (17.0 TON)
26' BMOD (STEEL ONLY)	= 15,800 LB. (7.9 TON)

EST. LIFTING WEIGHTS	
26' BM SPAN W/ BALLAST, TIES, RAIL AND OTM	= 101,500 LB. (50.8 TON)
PRECAST CONCRETE SUB CAP	= 70,000 LB. (35.5 TON)
26' BM SPAN (STEEL ONLY)	= 38,500 LB. (19.3 TON)
STEEL PLATE GIRDERS w/ ATTACHMENTS	= 60,600 LB. (30.3 TON)



**ISSUED FOR
CONSTRUCTION**

ALASKA RAILROAD CORPORATION ENGINEERING SERVICES P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500			
PROJECT: BR. 147.4 PIER #2 REPLACEMENT		DWG NO. 2 OF 16	
TITLE: GENERAL NOTES			
DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO.	
DRAWN BY: DTP	DATE: 11/3/2020	2 OF 16	
CHECKED BY: BWB/MLB	DATE: 11/3/2020		
APPROVED BY: BWB			

SUMMARY OF ESTIMATED QUANTITIES			
DESCRIPTION	ESTIMATING UNIT	QUANTITY	ORDERED BY
26' BALLAST DECK APPROACH SPAN (PER REF. 1)	EA.	1	RAILROAD
CLOSURE PLATE MATERIAL (PER SCHEDULE, SHEET NO. 15)	LOT	1	RAILROAD
STEEL PIPE PILE 24" DIA. x 5/8" THICKNESS, 60'-0" LENGTH, ONE END BEVELED, GALVANIZED, (ASTM A252, GRADE 3)	EA.	8	CONTRACTOR
STEEL PIPE PILE 24" DIA. x 5/8" THICKNESS, 60'-0" LENGTH, NO END BEVELS, WITH CUTTING SHOE 0-14001, OR APPROVED ALTERNATE, SHOP ATTACHED, (ASTM A252, GRADE 3)	EA.	8	CONTRACTOR
PRECAST CONCRETE SUB CAP	EA.	2	CONTRACTOR
STRUCTURAL STEEL (PER SCHEDULE, SHEET NO. 11)	LOT	1	CONTRACTOR
4,000 PSI CAST-IN-PLACE CONCRETE PIPE FILL	CU.YD.	26	CONTRACTOR
4,000 PSI NON-SHRINK CEMENTITIOUS GROUT	LOT	1	CONTRACTOR

EST. WT. OF STEEL PIPE PILE = 149,925 LB.
EST. WT. OF STRUCTURAL STEEL (NOT INCL. BOLTS) = 60,600 LB.

QUANTITIES PROVIDED FOR ESTIMATING AND PLANNING PURPOSES ONLY.
CONTRACTOR IS RESPONSIBLE TO FURNISH ALL PROJECT MATERIAL TO MEET PLAN REQUIREMENTS.

- The surface finish of bearing and base plates and other bearing surfaces that are to come in contact with each other or with concrete shall meet the American National Standard Institute (ANSI) surface roughness requirements as defined in ANSI Standard B46.1, "Surface Roughness, Waviness, and Lay" and shown on the plans, or in the following listing:

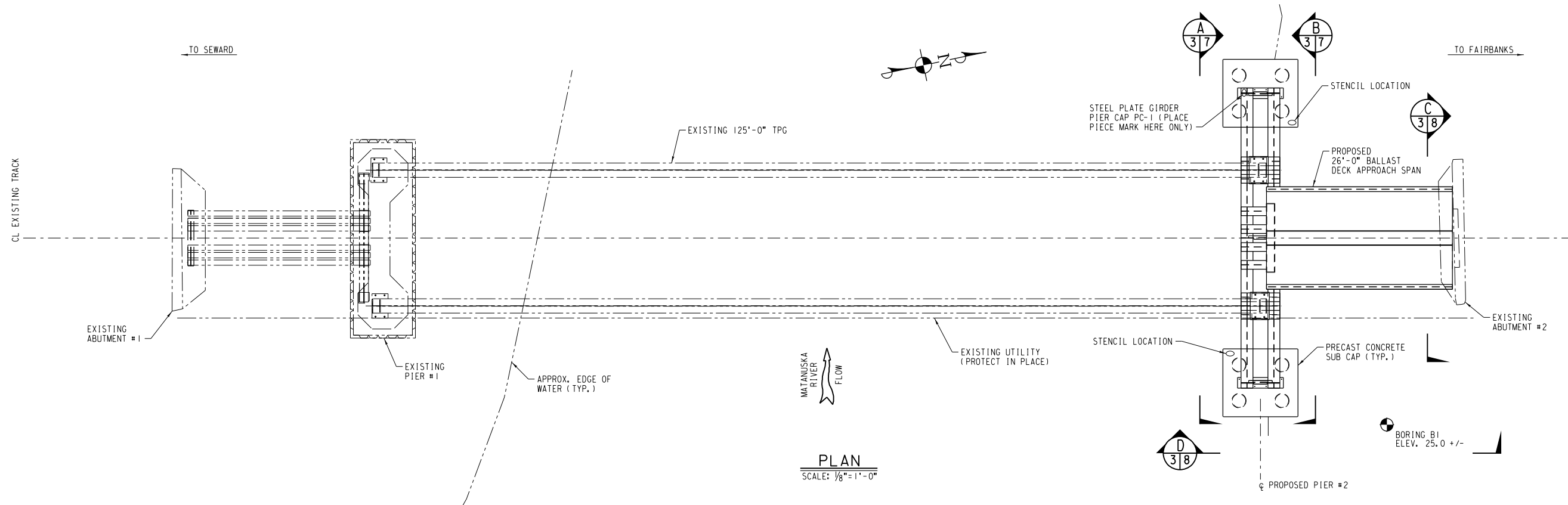
Bearing plates (surfaces in contact with rubber)	500
Heavy plates in contact to be welded or bolted	250

- All plates in bearing assemblies shall be flat and level.

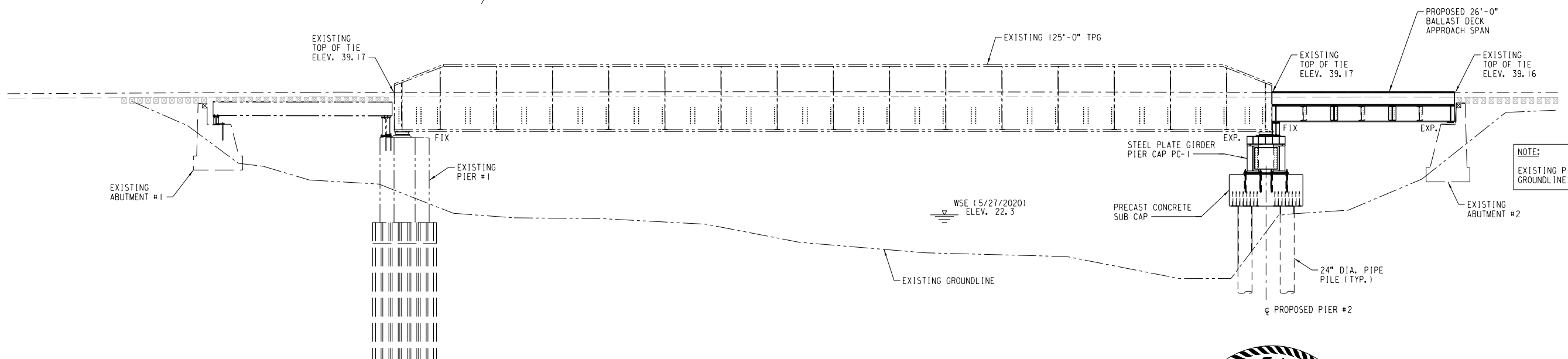
CAST-IN-PLACE CONCRETE NOTES

CONCRETE

- All concrete materials, placement and workmanship shall be in accordance with Chapter 8: Concrete Structures and Foundations of the AREMA Manual for Railway Engineering. This section of notes applies to all concrete work except for drilled shafts.
- Formwork tolerances shall be in accordance with ACI 347 specifications.
- Minimum compressive strength at 28 days shall be 4000 psi.
- Exposed surfaces shall be formed in a manner which shall produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90° or less are to be chamfered 3/4" x 3/4". Top surfaces to have a smooth finish, free of all float or trowel marks.
- Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete shall contain a minimum of 6 sacks of cement per cubic yard of concrete.
- Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
- Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be size no. 67. Fine aggregate shall be natural sand.
- Air content shall be between 5% and 7% (by volume).
- Admixtures shall not be used without approval by the Railroad.
- Curing shall be accomplished by wet curing or application of a Type 2 membrane.
- Apply Epogrip multipurpose structural bonding and grouting epoxy adhesive or approved alternate to existing concrete surfaces prior to placing new concrete against them. Follow manufacturer's instructions.
- Concrete work shall conform to all requirements of ACI 306.1, Standard Specification for Cold Weather Concreting. Contractor shall submit detailed procedures for the production, transportation, placement, protection, curing, and temperature monitoring of concrete during cold weather to the Railroad for approval.



PLAN
SCALE: 1/8"=1'-0"



ELEVATION
SCALE: 1/8"=1'-0"

NOTE:
EXISTING PIER #2 (TO BE REMOVED TO GROUNDLINE) NOT SHOWN FOR CLARITY.



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

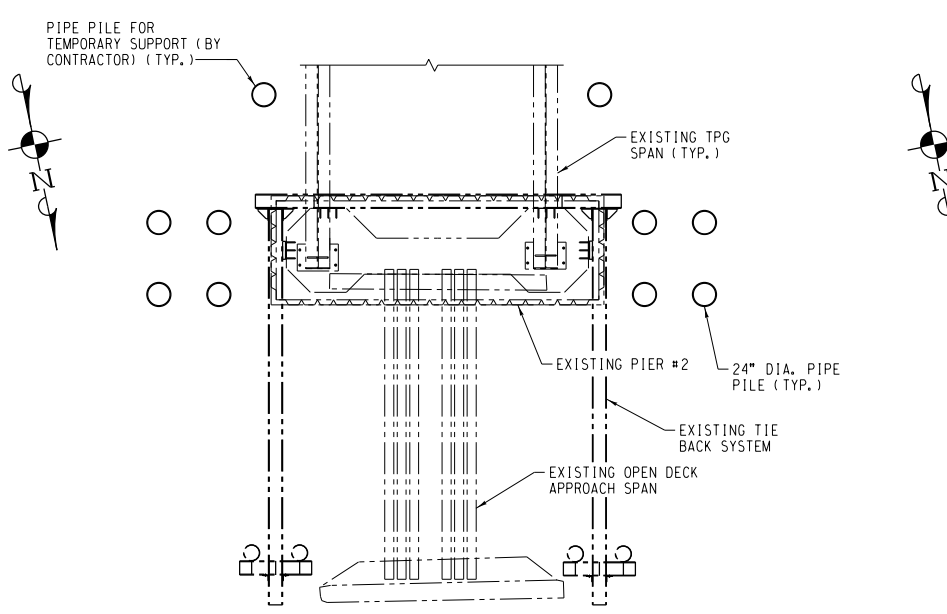
PROJECT: **BR. 147.4 PIER #2 REPLACEMENT**

TITLE: **GENERAL ARRANGEMENT**

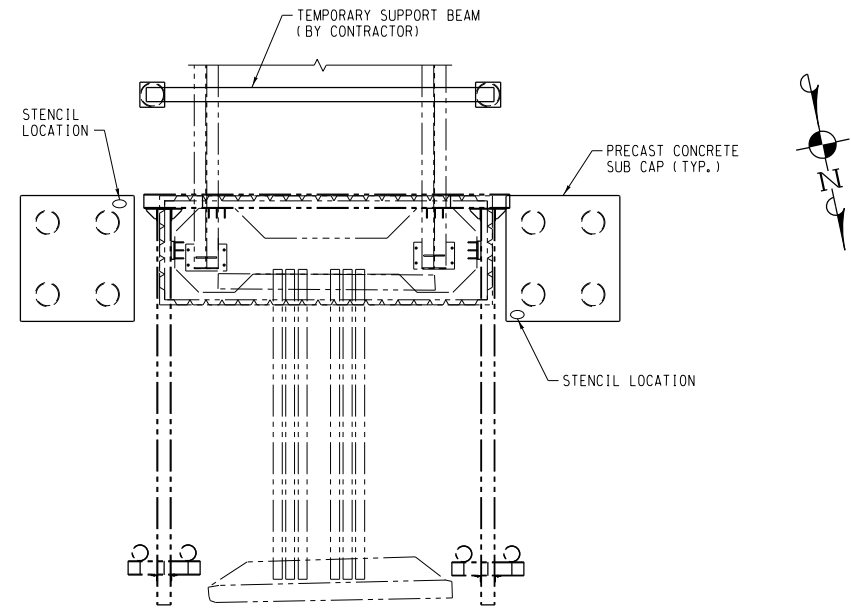
DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 3 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		



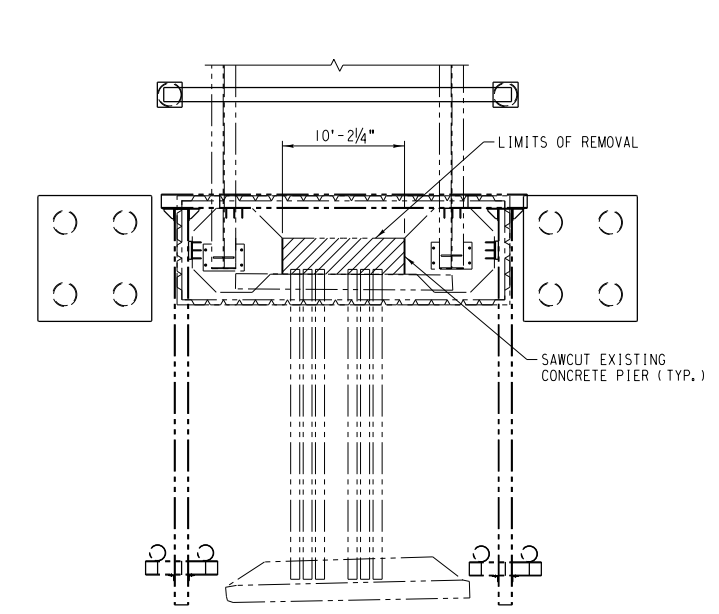
REV.	DATE	BY	REVISION



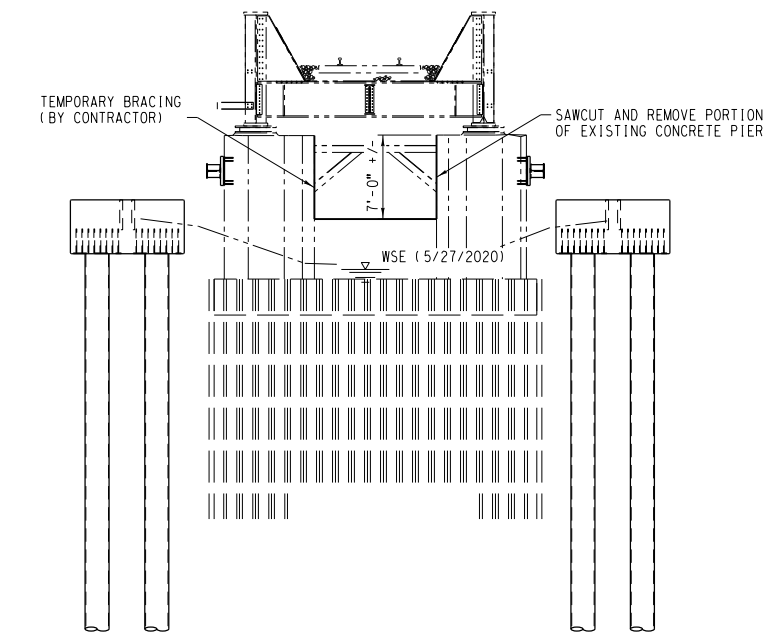
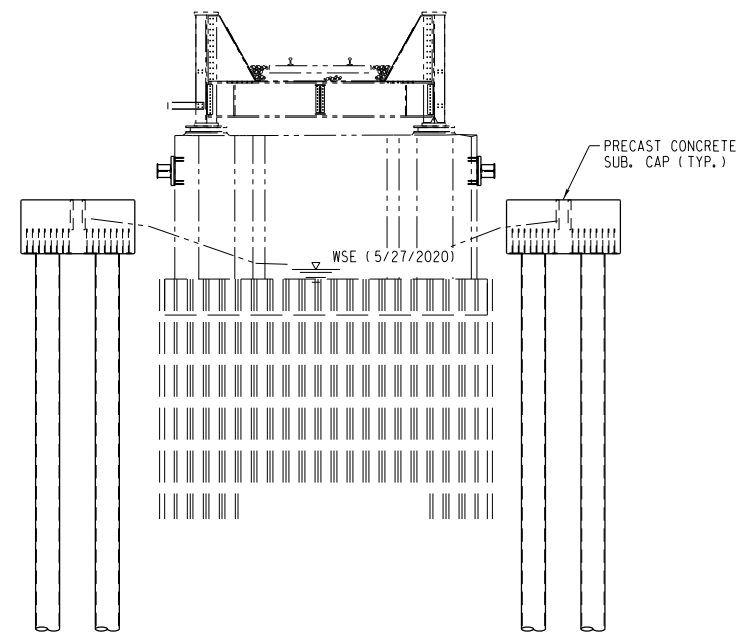
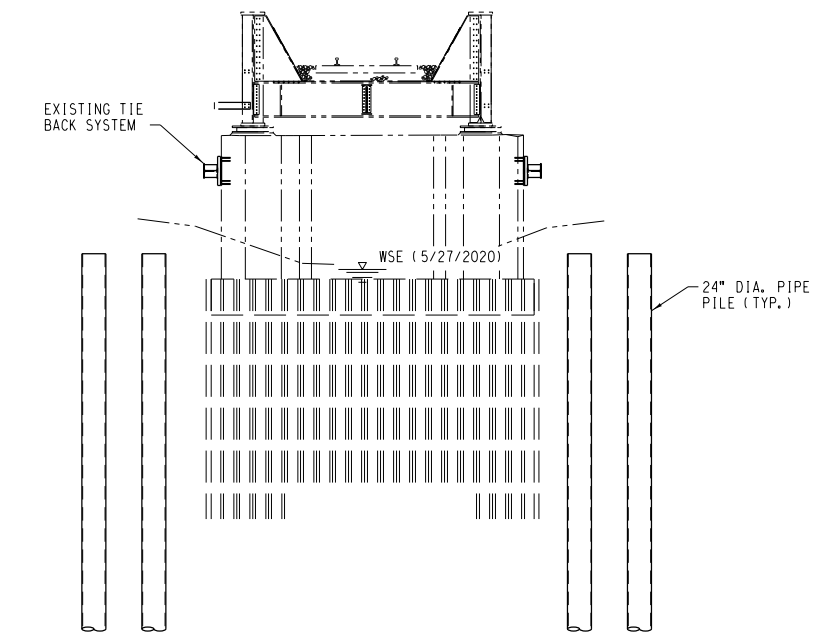
CONSTRUCTION SEQUENCE - PHASE 1
SCALE: 1/8" = 1'-0"



CONSTRUCTION SEQUENCE - PHASE 2
SCALE: 1/8" = 1'-0"



CONSTRUCTION SEQUENCE - PHASE 3
SCALE: 1/8" = 1'-0"

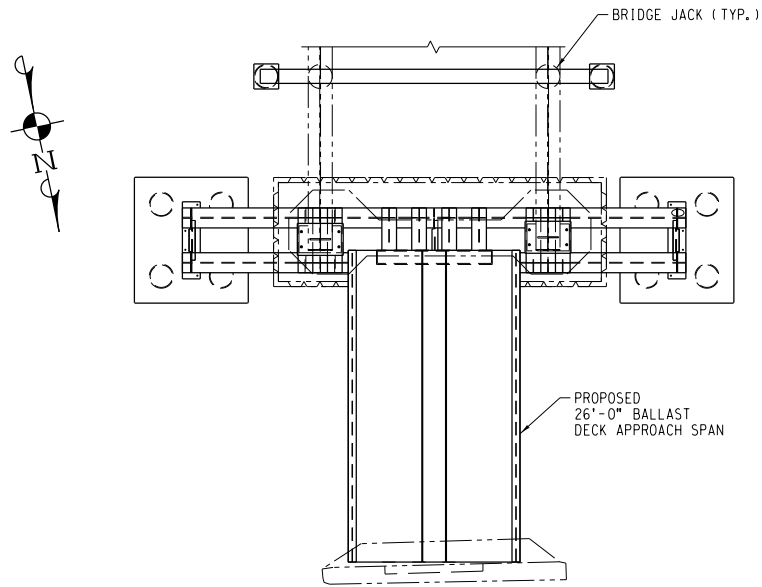


ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION ENGINEERING SERVICES P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500	
PROJECT: BR. 147.4 PIER #2 REPLACEMENT	
TITLE: PHASING DETAILS (SHEET 1 OF 2)	
DESIGNED BY: JBH	SCALE: AS NOTED
DRAWN BY: DIP	DWG NO. 4 OF 16
CHECKED BY: BWB/MLB	DATE: 11/3/2020
APPROVED BY: BWB	

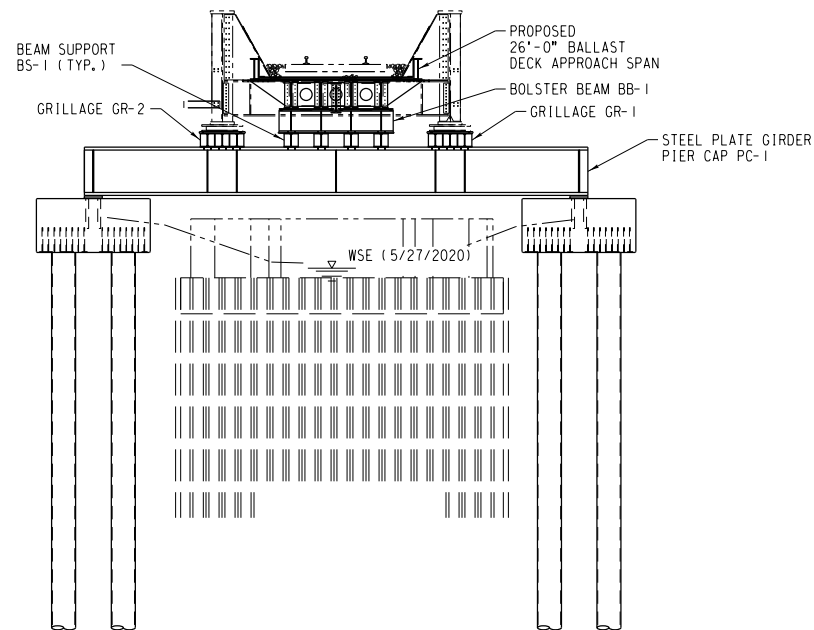


REV.	DATE	BY	REVISION



PIER #2 PROPOSED CONSTRUCTION SEQUENCE

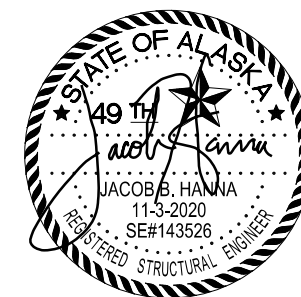
- PHASE 1
1. DRIVE ALL REQUIRED PIPE PILE.
- PHASE 2
2. INSTALL PRECAST CONCRETE SUB CAPS.
 3. ERECT TEMPORARY SUPPORT BEAM.
- PHASE 3
4. PROVIDE TRACK CLOSURE (ARRC).
 5. SAWCUT AND REMOVE PORTION OF EXISTING CONCRETE PIER AND INSTALL TEMPORARY BRACING AS REQUIRED.
 6. REOPEN BRIDGE TO RAILROAD TRAFFIC WITH SLOW ORDER (ARRC).
- PHASE 4
7. PROVIDE TRACK CLOSURE (ARRC).
 8. INSTALL BRIDGE JACKS AND JACK THE TPG SPAN.
 9. REMOVE EXISTING 26' APPROACH SPAN.
 10. REMOVE PORTION OF EXISTING PIER AS REQUIRED TO INSTALL STEEL PLATE GIRDER CAP.
 11. INSTALL STEEL PLATE GIRDER PIER CAP.
 12. RE-SET EXISTING TPG ON STEEL PLATE GIRDER PIER CAP.
 13. INSTALL BOLSTER BEAM.
 14. INSTALL BALLAST DECK APPROACH SPAN.
 15. REOPEN BRIDGE TO RAILROAD TRAFFIC WITH SLOW ORDER (ARRC).
 16. REMOVE REMAINING EXISTING PIER REMNANTS.
 17. RESTORE AREA TO ORIGINAL CONDITION OR BETTER.



CONSTRUCTION PLAN AND JACKING NOTES

1. THE SUGGESTED CONSTRUCTION SEQUENCE PROVIDED IN THESE PLANS IS CONCEPTUAL. THE CONTRACTOR SHALL SUBMIT A DETAILED CONSTRUCTION PLAN FOR APPROVAL. ALL TEMPORARY BRACING REQUIRED TO ENSURE THE STABILITY OF THE STRUCTURE DURING ERECTION IS THE RESPONSIBILITY OF THE CONTRACTOR.
2. THE CONTRACTOR SHALL SUBMIT DETAILED JACKING PLANS AND CALCULATIONS, INCLUDING TEMPORARY SUPPORT DESIGN TO THE RAILROAD FOR APPROVAL. PLANS AND CALCULATIONS SHALL BE SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF ALASKA.

CONSTRUCTION SEQUENCE - PHASE 4
SCALE: 1/8" = 1'-0"



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT: BR. 147.4 PIER #2 REPLACEMENT

TITLE: PHASING DETAILS (SHEET 2 OF 2)

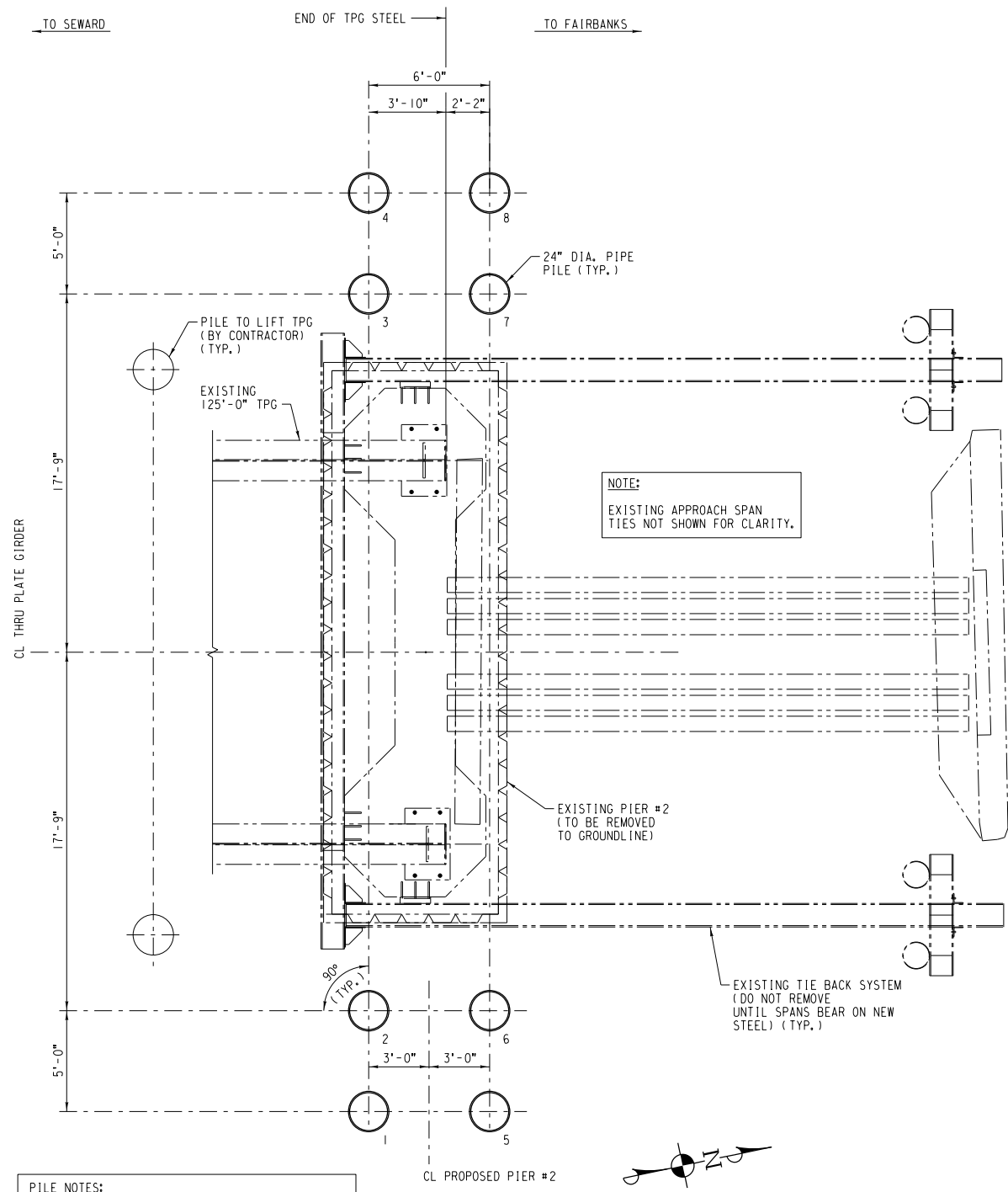
DESIGNED BY: JBH
DRAWN BY: DTP
CHECKED BY: BWB/MLB
APPROVED BY: BWB

SCALE: AS NOTED
DATE: 11/3/2020

DWG NO. 5 OF 16

WILSON & COMPANY

REV.	DATE	BY	REVISION

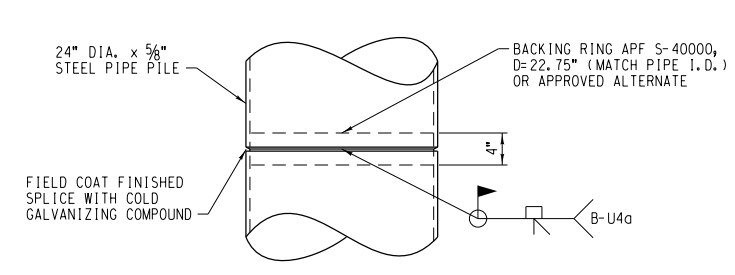


NOTE:
EXISTING APPROACH SPAN
TIES NOT SHOWN FOR CLARITY.

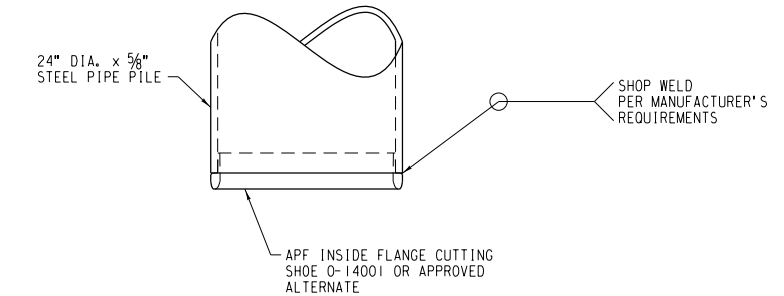
PILE NOTES:

- TOP PILE SECTION SHALL BE GALVANIZED. THE GALVANIZED PILE SECTION SHALL EXTEND A MINIMUM OF 10' BELOW GROUND. FIELD COAT FINISHED WELD AND UNCOATED REGION OF PILE WITH COLD GALVANIZING COMPOUND.
- TOP 30'-0" OF PIPE PILE SHALL BE FILLED WITH 4,000 PSI CONCRETE.

PILE LAYOUT
SCALE: 1/4" = 1'-0"



SINGLE BEVEL SPLICE DETAIL
SCALE: 1" = 1'-0"



CUTTING SHOE DETAIL
SCALE: 1" = 1'-0"

PILE DRIVING NOTES

- DESIGN**
- All piles shall be driven to 135 ton capacity. Minimum pile penetration depth = 80' below pile cutoff. Estimated design pile depth = 120' from top of tie.
 - Estimated capacity of driven piles shall be calculated using the Modified ENR formula, with Factor of Safety of 5. Pile driving records and estimated capacities shall be submitted to the engineer. Alternate methods such as Gates or PDA testing may also be considered at the Railroad's discretion.
 - Vibratory hammers are only permitted for 20' max of pile advancement, measured from pile cutoff.
 - Mark every pile with a dimension indicating the pile depth from cutoff to point of pile. The dimension shall be rounded to the nearest foot. The mark shall be welded on the outside face, low mile post side on the pile, approximately 1'-0" below the bottom of the cap, and in numbers of approximately 3" in height. If a pile is not exposed, no mark is required.

- STEEL**
- Piles - ASTM A252, GRADE 3, SPLIT SEAM WELDED
 - Pile splices - ASTM A572 GRADE 50

- GALVANIZED PIPE PILE**
- Where specified, galvanized coating for pipe piles shall conform to ASTM A123. Pickle per SSPC No. 8 and Hot-Dipped Galv. per current ASTM A123. Coating weight 2.3 oz. per sq. ft.
 - Provide 3" Mask on Each end of Pile.

- SPLICES**
- Splices shall be made a sufficient distance above the ground or water (not less than one foot) so that the splice can be observed during driving. The number of splices shall be kept to a minimum. Splicing cut-offs or short pieces to make a main bearing pile is not permitted. The pile shall be driven so that the upper splice is at least 10 feet below the ground surface.

- TOLERANCE**
- Variations greater than 1/4" per foot from vertical or batter line shall not be allowed. The deviation of the top of the piles in a bent shall not exceed one inch from the plan location. Piles not meeting tolerance requirements or out of line as to impair usefulness, or piles that are damaged in driving as to impair structural capacity, shall be pulled and redriven or an additional pile shall be driven to provide added support.



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

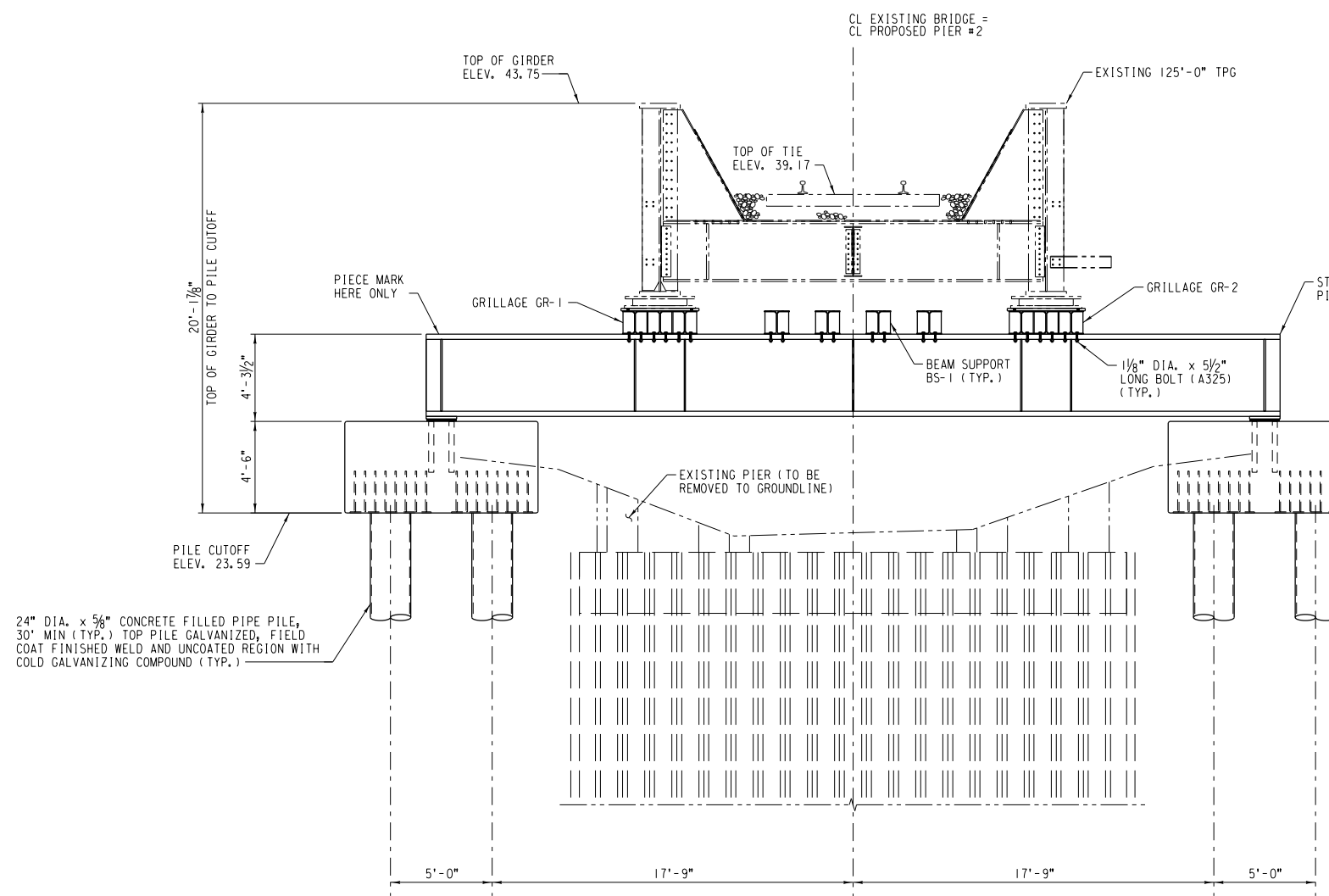
PROJECT: **BR. 147.4 PIER #2 REPLACEMENT**

TITLE: **PIER #2 FOUNDATION PLAN**

DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 6 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		

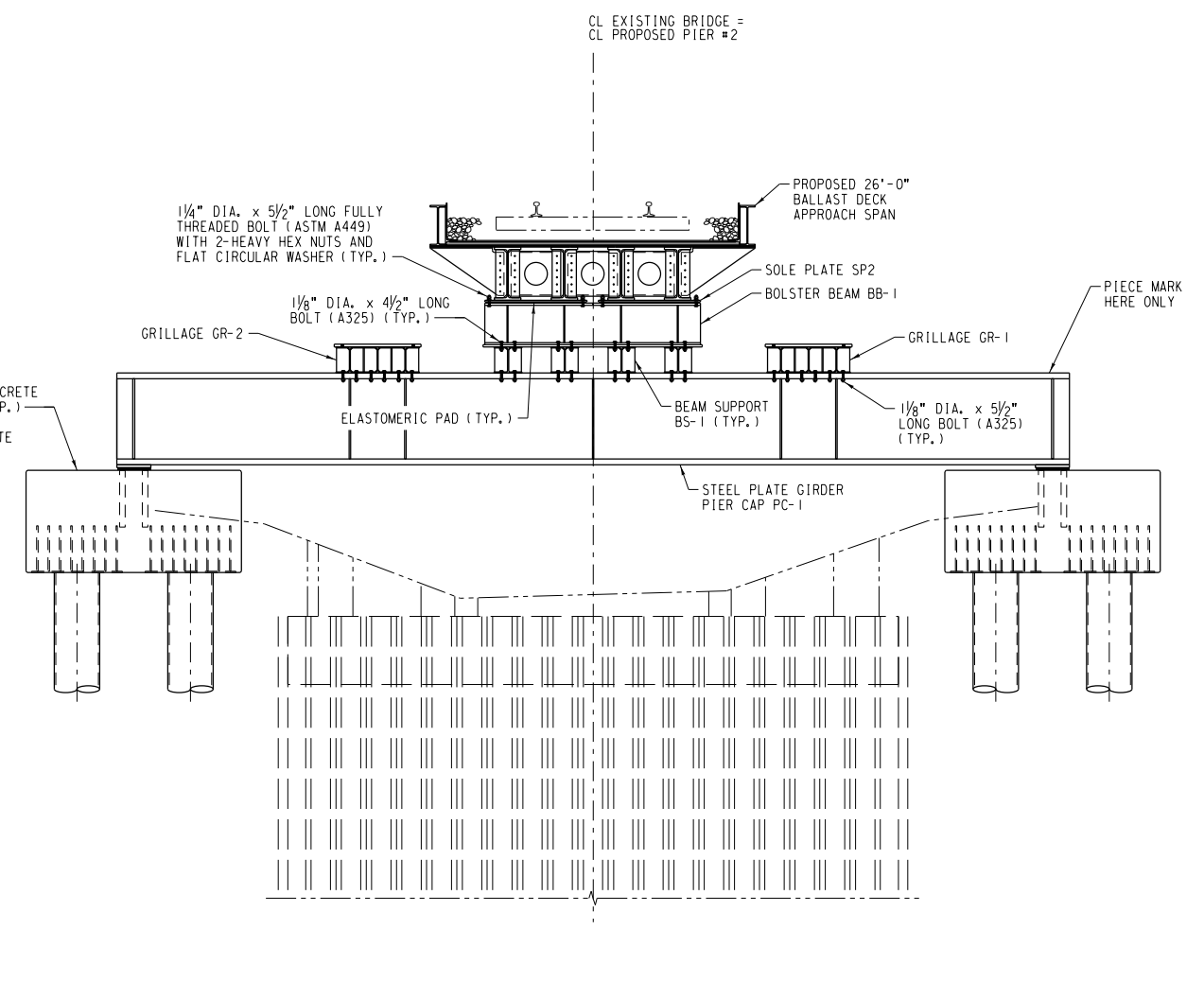


REV.	DATE	BY	REVISION

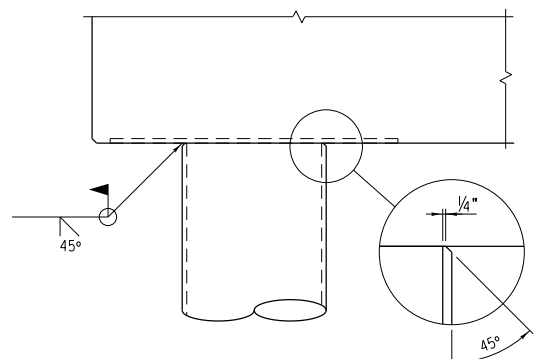


24" DIA. x 5/8" CONCRETE FILLED PIPE PILE, 30' MIN (TYP.) TOP PILE GALVANIZED, FIELD COAT FINISHED WELD AND UNCOATED REGION WITH COLD GALVANIZING COMPOUND (TYP.)

SECTION A
SCALE: 1/4"=1'-0" 3/7



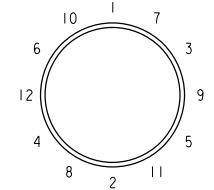
SECTION B
SCALE: 1/4"=1'-0" 3/7



PIPE PILE WELD DETAIL
SCALE: 3/4"=1'-0"

PIPE PILE WELD NOTES:

1. Contractor shall submit weld plan to control heat build up and monitoring of heat to the Railroad for approval.
2. Contractor shall weld in a radial pattern. No more than 6" at one time.



SUGGESTED WELD PATTERN



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

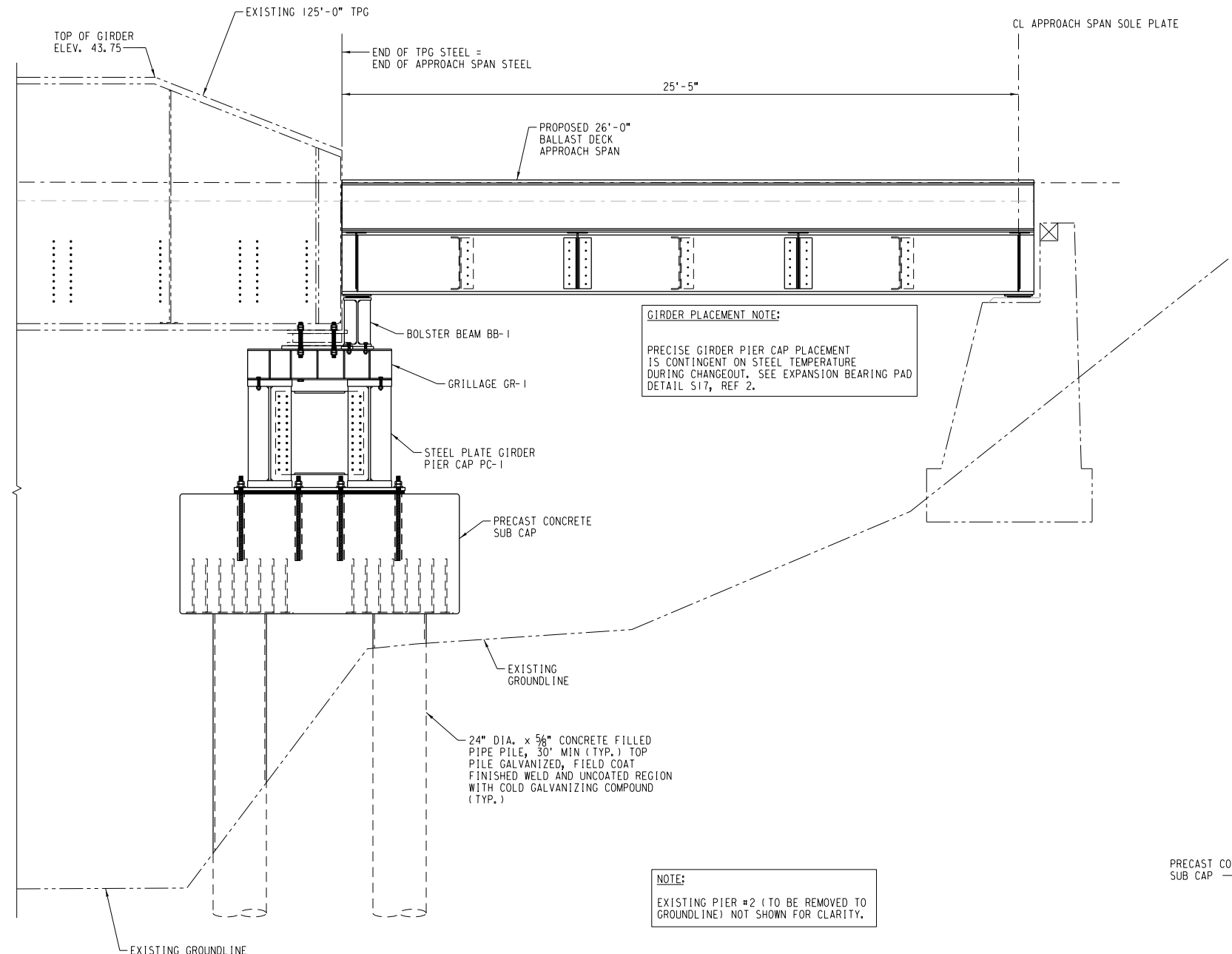
PROJECT: **BR. 147.4 PIER #2 REPLACEMENT**

TITLE: **SECTIONS AND DETAILS (SHEET 1 OF 2)**

DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 7 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		



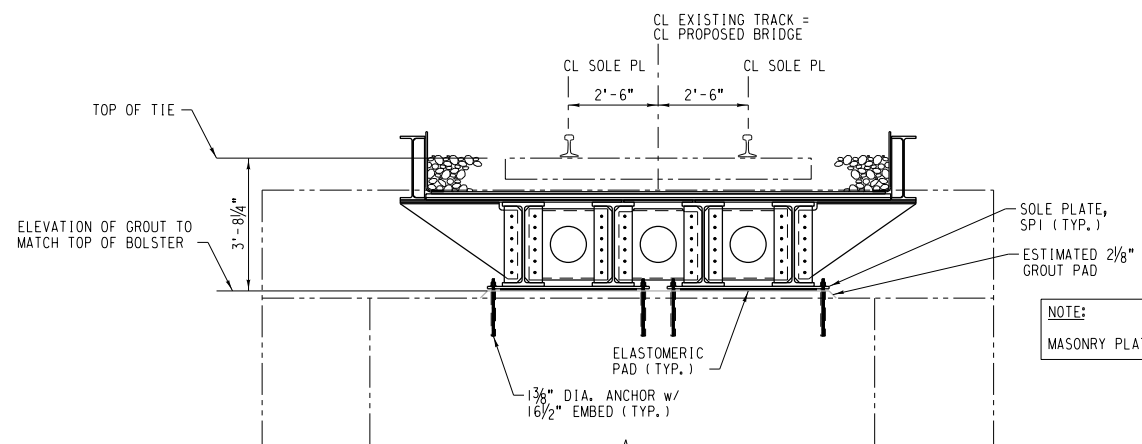
REV.	DATE	BY	REVISION



GIRDER PLACEMENT NOTE:
 PRECISE GIRDER PIER CAP PLACEMENT IS CONTINGENT ON STEEL TEMPERATURE DURING CHANGEOUT. SEE EXPANSION BEARING PAD DETAIL S17, REF 2.

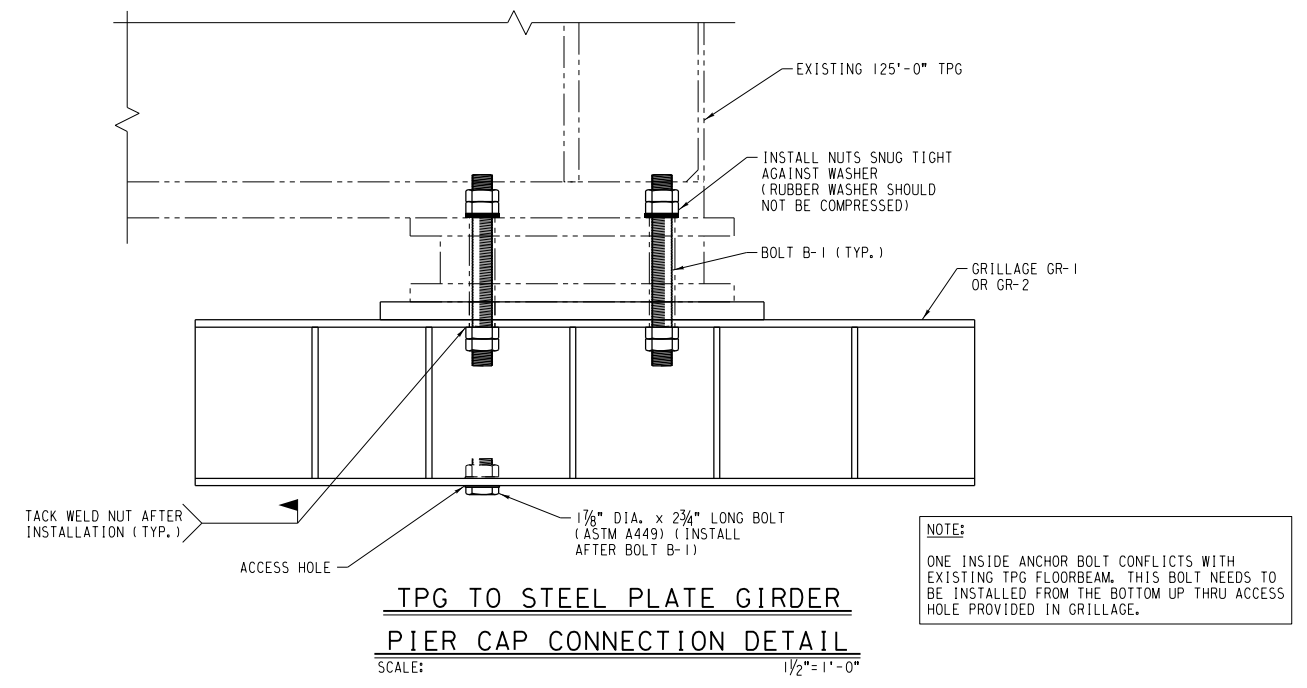
NOTE:
 EXISTING PIER #2 (TO BE REMOVED TO GROUNDLINE) NOT SHOWN FOR CLARITY.

VIEW D
 SCALE: 3/8" = 1'-0"

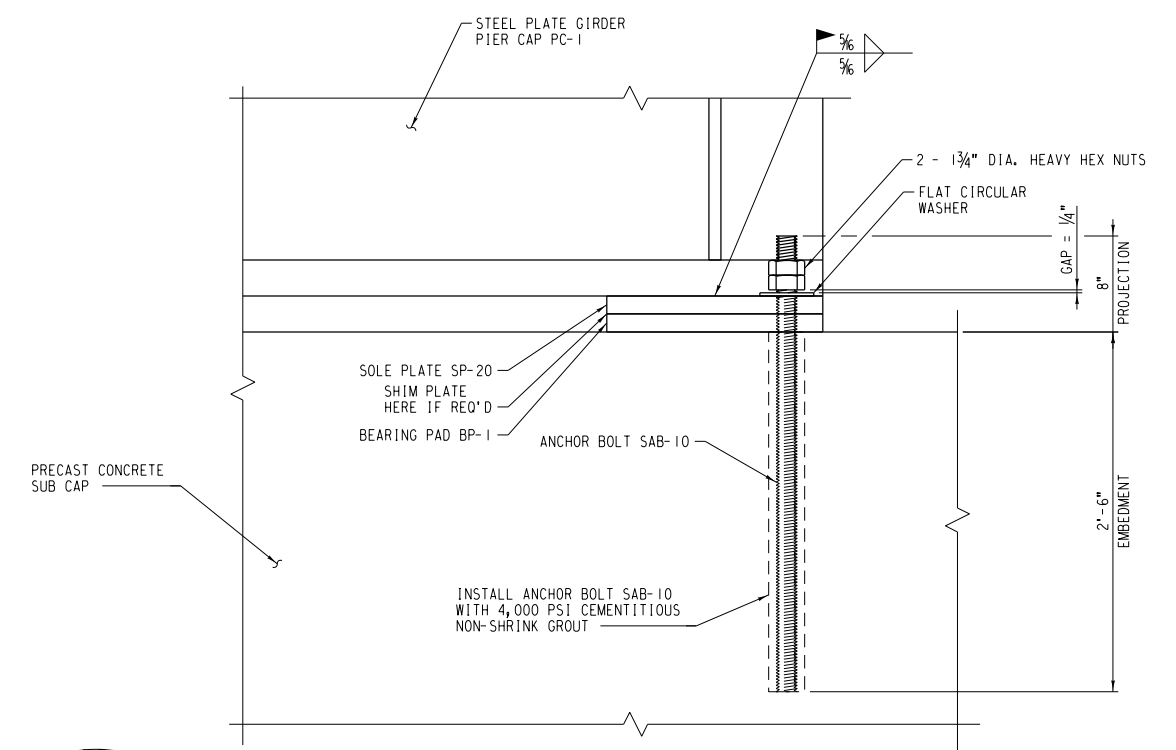


SECTION C
 SCALE: 3/8" = 1'-0"

NOTE:
 MASONRY PLATE WILL NOT BE USED.



NOTE:
 ONE INSIDE ANCHOR BOLT CONFLICTS WITH EXISTING TPG FLOORBEAM. THIS BOLT NEEDS TO BE INSTALLED FROM THE BOTTOM UP THRU ACCESS HOLE PROVIDED IN GRILLAGE.



WILSON & COMPANY

REV.	DATE	BY	REVISION

ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
 ENGINEERING SERVICES
 P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

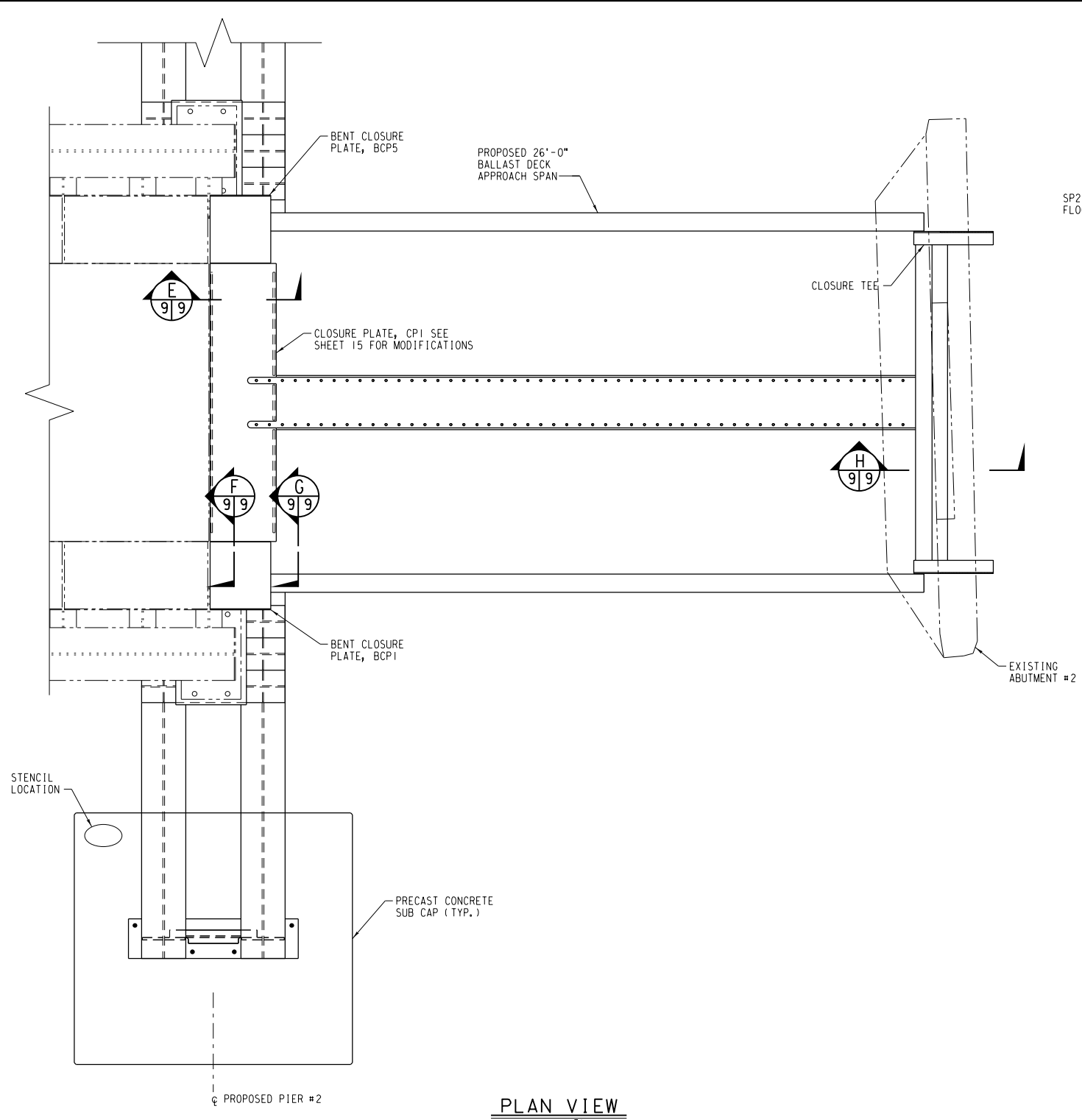
PROJECT: BR. 147.4 PIER #2 REPLACEMENT

TITLE: SECTIONS AND DETAILS (SHEET 2 OF 2)

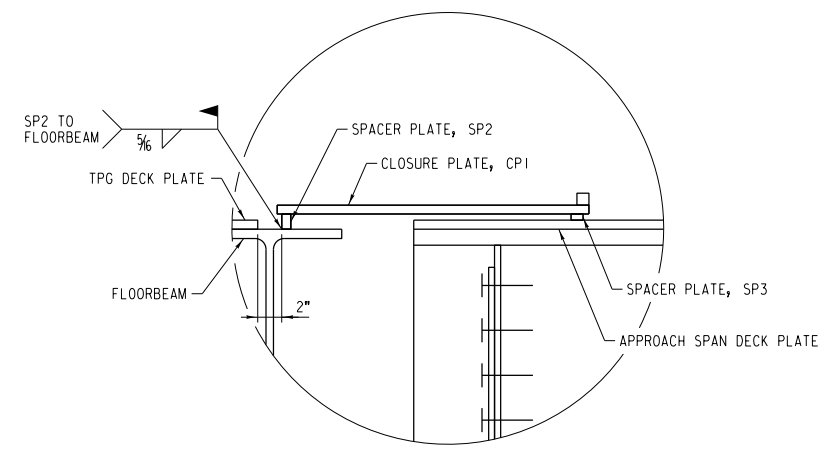
DESIGNED BY: JBH
 DRAWN BY: DTP
 CHECKED BY: BWB/MLB
 APPROVED BY: BWB

SCALE: AS NOTED
 DATE: 11/3/2020

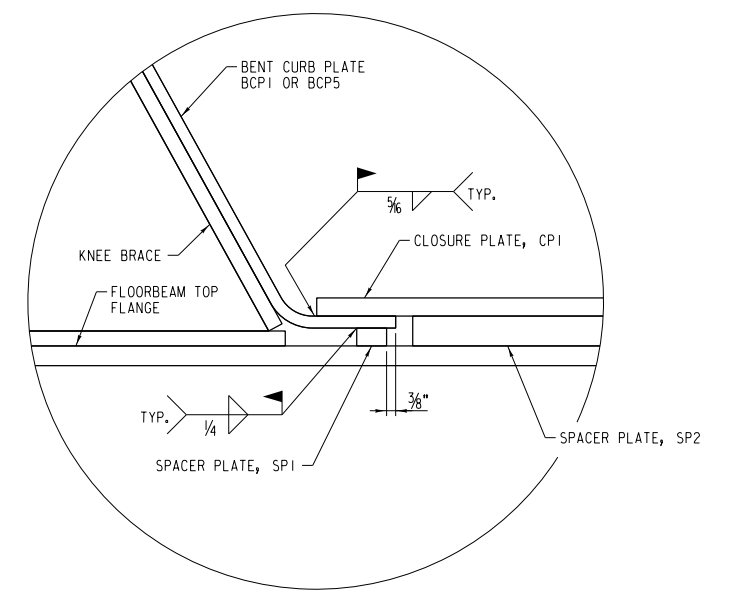
DWG NO. 8 OF 16



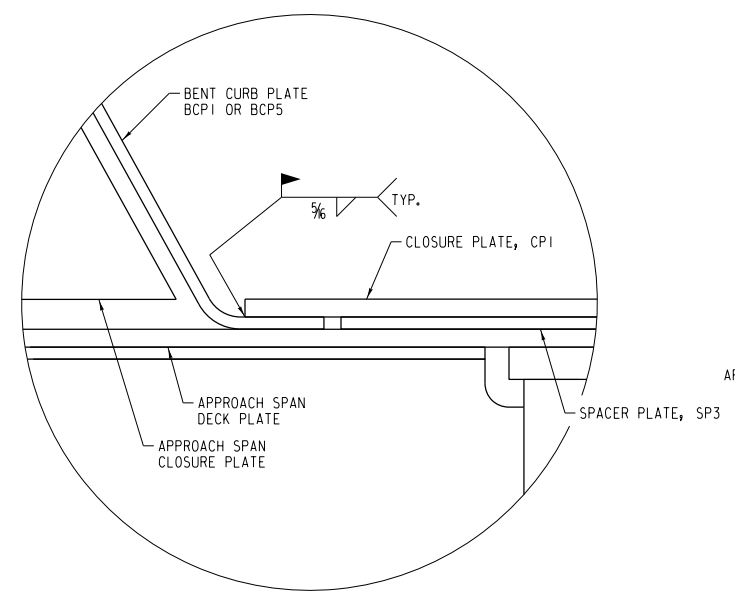
PLAN VIEW
SCALE: 3/8"=1'-0"



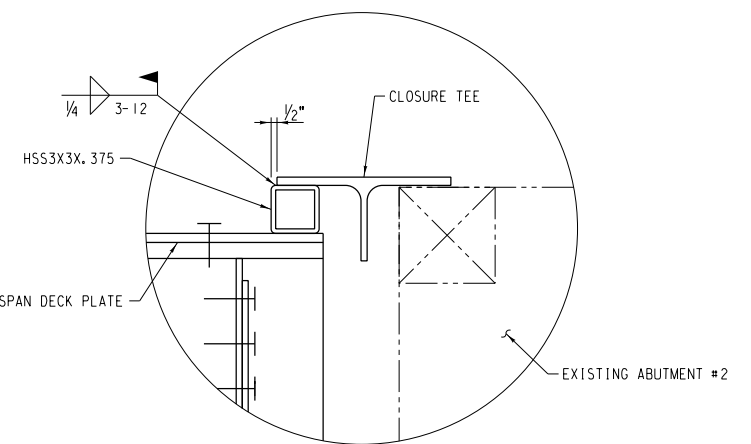
SECTION E
SCALE: 1 1/2"=1'-0" 9/9



SECTION F
SCALE: 3"=1'-0" 9/9



SECTION G
SCALE: 3"=1'-0" 9/9



SECTION H
SCALE: 1 1/2"=1'-0" 9/9



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

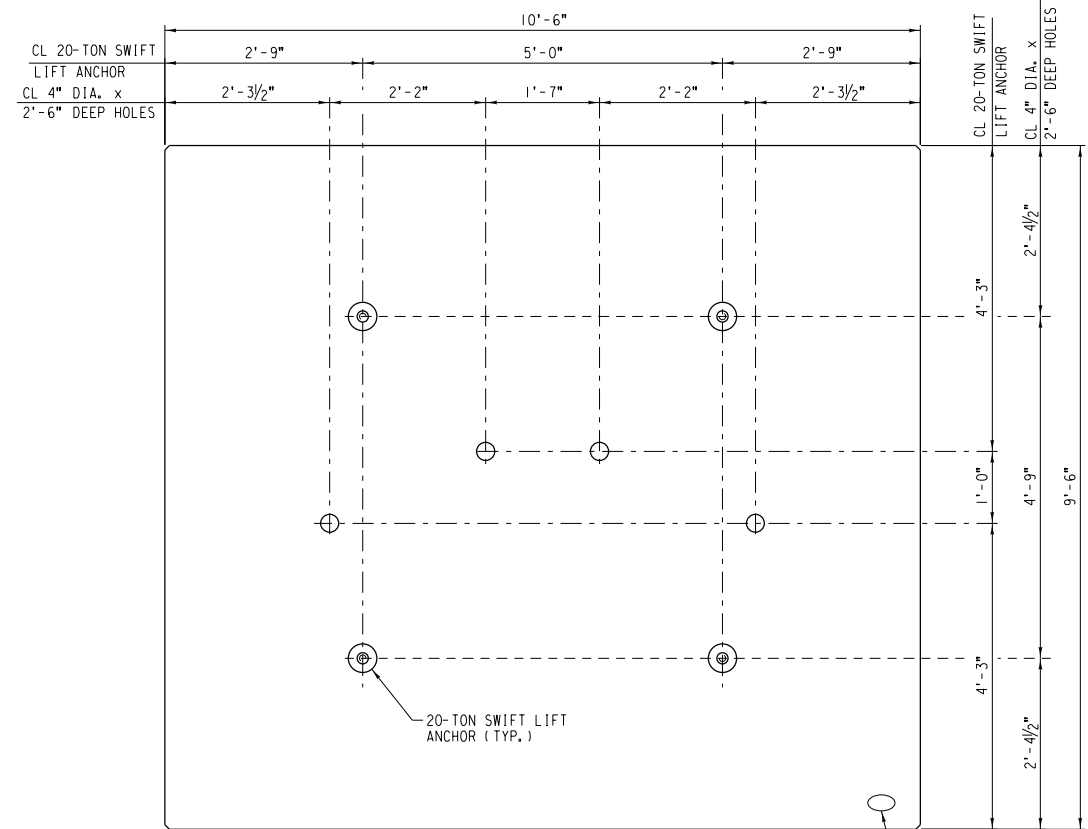
PROJECT: BR. 147.4 PIER #2 REPLACEMENT

TITLE: CLOSURE PLATE LAYOUT

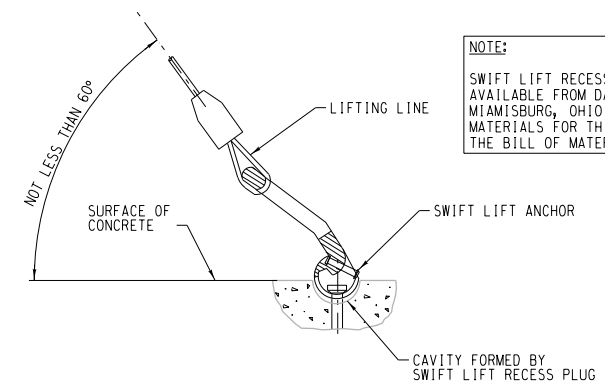
DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 9 OF 16
DRAWN BY: DIP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		



REV.	DATE	BY	REVISION



FRAMING - PLAN

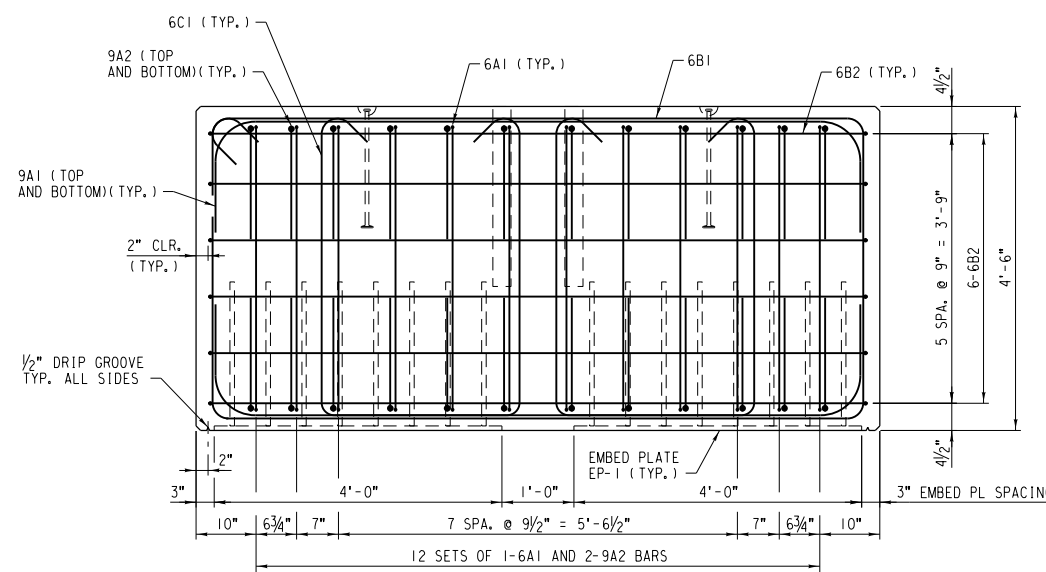
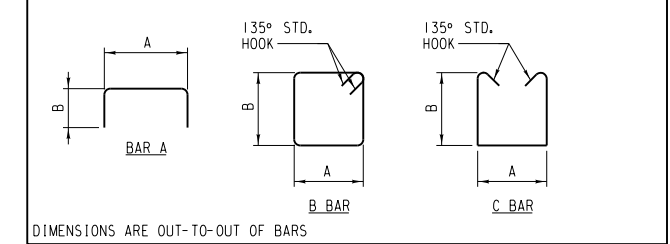


LIFTING DETAIL
SCALE: NONE

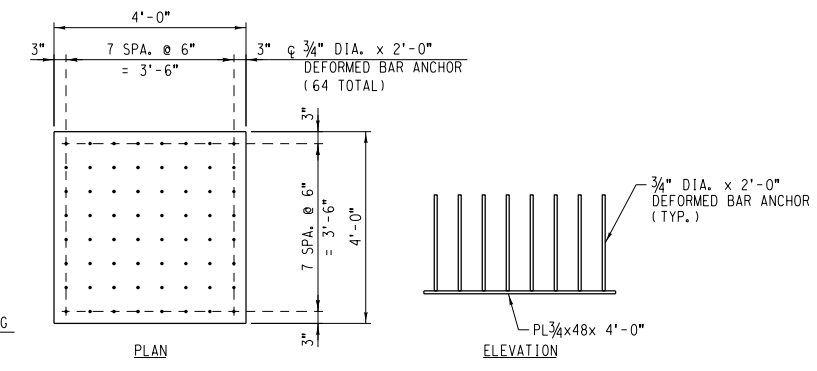
NOTE:
SWIFT LIFT RECESS PLUGS, ANCHORS AND LIFTING EYES ARE AVAILABLE FROM DAYTON SUPERIOR CORP., 1125 BYERS RD., MIAMISBURG, OHIO 45342, TELEPHONE (513) 866-0711. THE MATERIALS FOR THIS LIFTING SYSTEM ARE NOT INCLUDED IN THE BILL OF MATERIAL BUT ARE TO BE ORDERED AS REQUIRED.

SUB CAP MATERIAL SCHEDULE			
TOTAL	PER SUB CAP	UNIT	DESCRIPTION
8	4	EA.	EMBED PLATE EP-1
33.4	16.7	CU. YD.	4000 P.S.I. CONCRETE (PER NOTES, DWG NO. 2)
2	1	LOT	REINFORCING STEEL (PER NOTES, DWG NO. 2)
8	4	LOT	20-TON SWIFT LIFT ANCHOR (PRODUCT CODE 60657)

SUB CAP REINFORCING SCHEDULE							
NAME	SIZE	TYPE	A	B	LENGTH	PER CAP	TOTAL
6A1	#6	A	3'-11"	2'-0"	7'-11"	24	48
9A1	#9	A	9'-0"	1'-7"	12'-2"	24	48
9A2	#9	A	10'-0"	1'-7"	13'-2"	24	48
6B1	#6	B	9'-0"	4'-2"	27'-8"	12	24
6B2	#6	B	10'-2"	9'-2"	40'-0"	6	12
6C1	#6	C	2'-9"	4'-2"	12'-5"	24	48

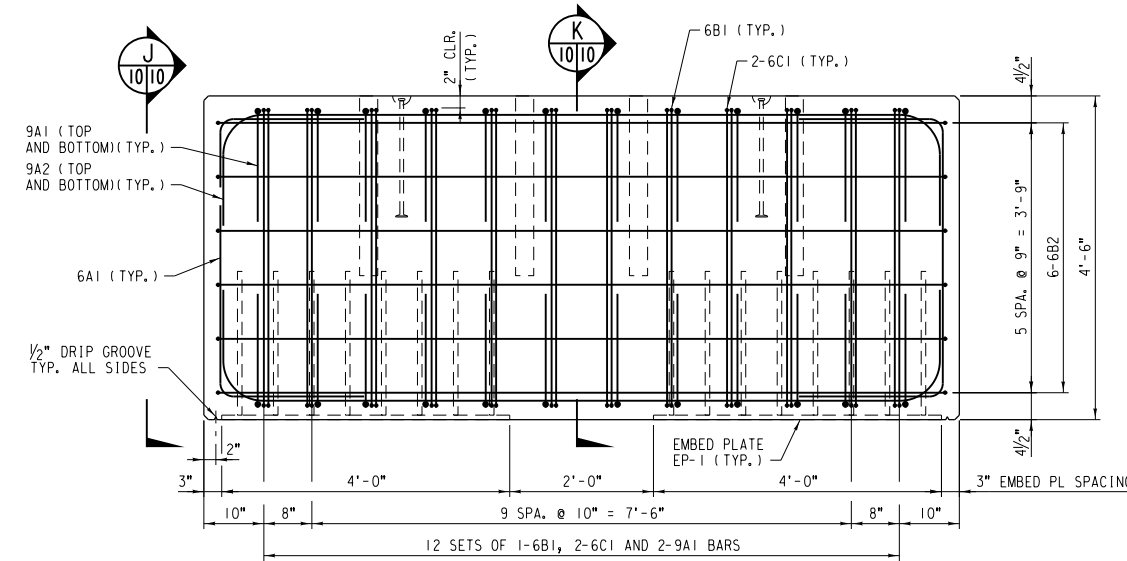


VIEW J
SCALE: 3/4" = 1'-0"

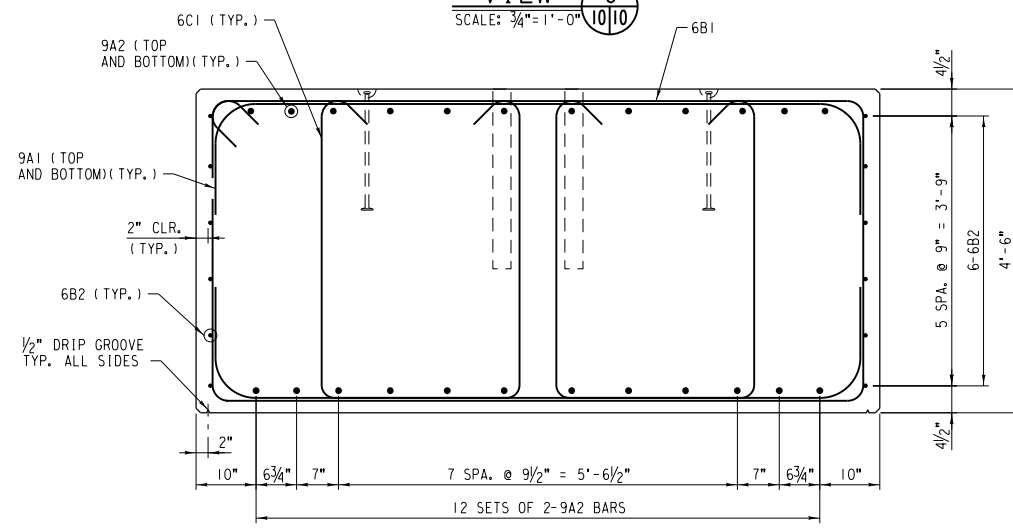


EMBED PLATE EP-1
SCALE: 1/2" = 1'-0"

- NOTES:
- MINIMALLY ADJUST REINFORCING AS REQUIRED TO MISS CAST HOLES AND EMBED PLATES.
 - INSIDE SURFACE OF CAST HOLES SHALL BE EXPOSED UNCOATED CONCRETE. ALTERNATIVELY, CORRUGATED GALVANIZED STEEL DUCT WITH 4" INSIDE DIAMETER MAY BE USED AS A STAY-IN-PLACE FORM.
 - COVER OR FILL CAST HOLES WITH APPROVED MATERIAL TO PREVENT MOISTURE OR DEBRIS FROM ENTERING DURING STORAGE AND TRANSPORT.



REINFORCING - ELEVATION
PRECAST CONCRETE SUB CAP
SCALE: 3/4" = 1'-0"
EST. WT. = 72,000 LB. EA.



SECTION K
SCALE: 3/4" = 1'-0"

ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

BR. 147.4 PIER #2 REPLACEMENT

PRECAST CONCRETE SUB CAP

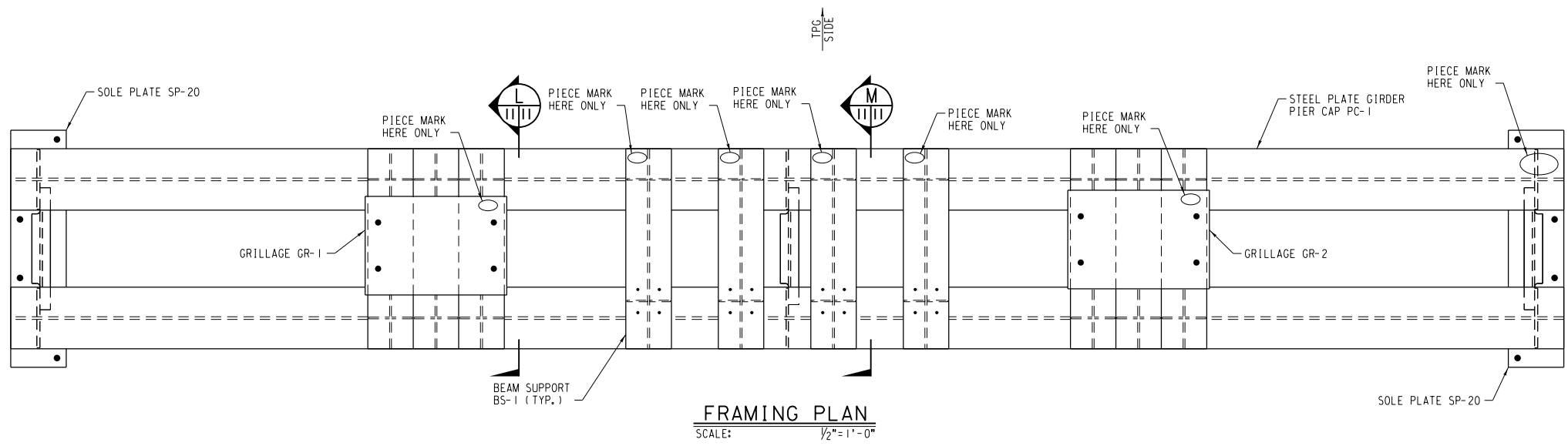
DESIGNED BY: JBH
DRAWN BY: DTP
CHECKED BY: BWB/MLB
APPROVED BY: BWB

SCALE: AS NOTED
DATE: 11/3/2020

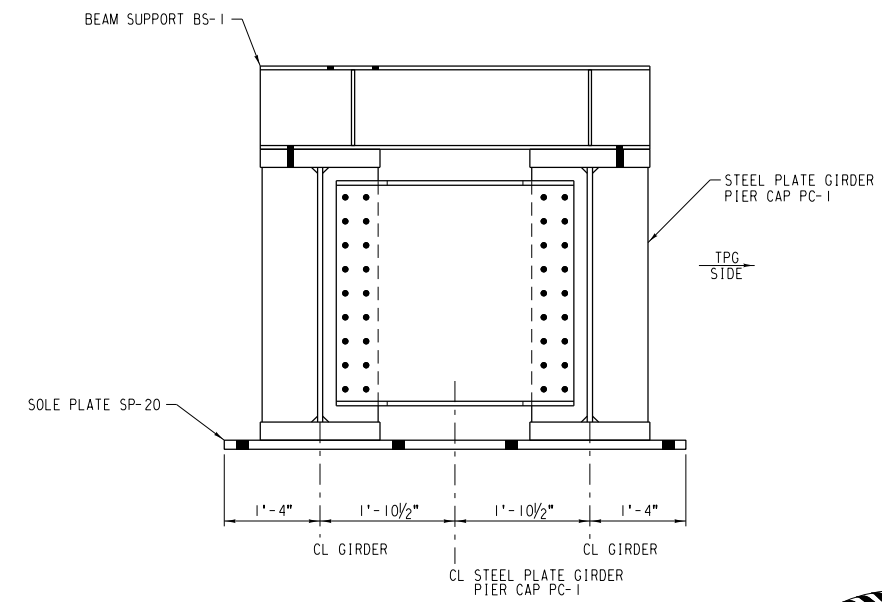
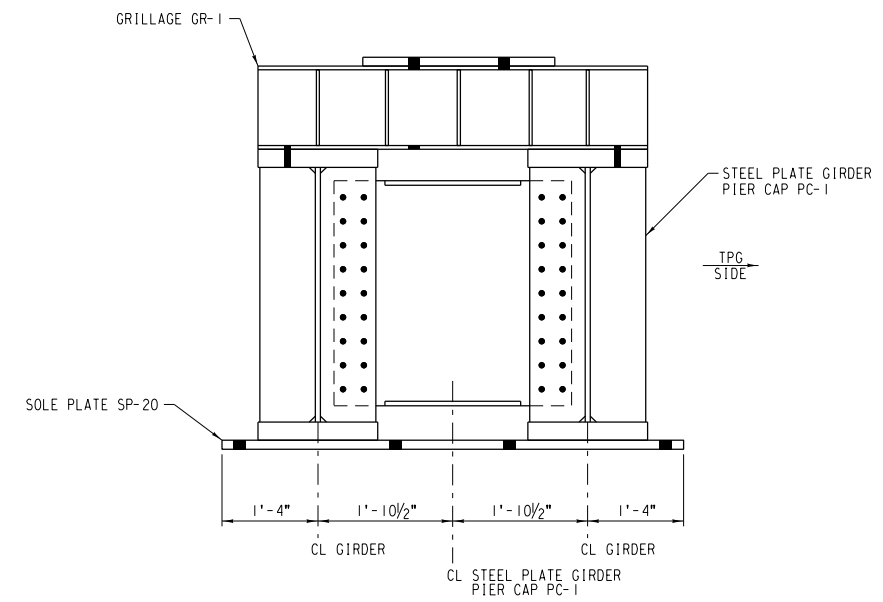
DWG NO.
10 OF 16



REV.	DATE	BY	REVISION



STRUCTURAL STEEL SCHEDULE			
DESCRIPTION	ESTIMATING UNIT	QUANTITY	SHIPPING NOTES
STRUCTURAL STEEL (STEEL PLATE GIRDER PIER CAP PC-1)	EA.	1	SHIP WITH SHOP FASTENED DIAPHRAGMS
STRUCTURAL STEEL (GRILLAGE GR-1)	EA.	1	SHIP LOOSE
STRUCTURAL STEEL (GRILLAGE GR-2)	EA.	1	SHIP LOOSE
STRUCTURAL STEEL (BEAM SUPPORT BS-1)	EA.	4	SHIP LOOSE
STRUCTURAL STEEL (BOLSTER BEAM BB-1)	EA.	1	SHIP LOOSE
STRUCTURAL STEEL (SOLE PLATE SP-20)	EA.	2	SHIP LOOSE
BEARING PAD BP-1	EA.	2	SHIP LOOSE
STRUCTURAL STEEL (BOLT B-1)	EA.	8	SHIP LOOSE, BOXED
STRUCTURAL STEEL (ANCHOR BOLT SAB-10)	EA.	8	SHIP LOOSE, BOXED
1/8" DIA. x 4 1/2" LONG BOLT (A325)	EA.	20	SHIP LOOSE, BOXED (4 EXTRA INCLUDED)
1/8" DIA. x 5 1/2" LONG BOLT (A325)	EA.	45	SHIP LOOSE, BOXED (5 EXTRA INCLUDED)
1/4" DIA. x 5 1/2" LONG FULLY THREADED BOLT (ASTM A449)	EA.	6	SHIP LOOSE, BOXED (2 EXTRA INCLUDED)
1/8" DIA. x 2 3/4" LONG BOLT (ASTM A449)	EA.	4	SHIP LOOSE, BOXED (2 EXTRA INCLUDED)



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT: **BR. 147.4 PIER #2 REPLACEMENT**

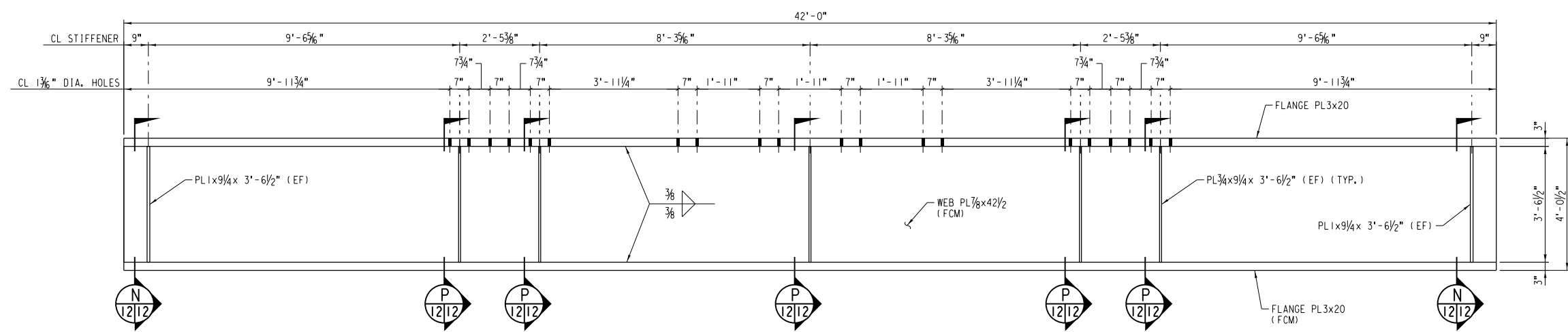
TITLE: **STRUCTURAL STEEL DETAILS (SHEET 1 OF 4)**

DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 11 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		

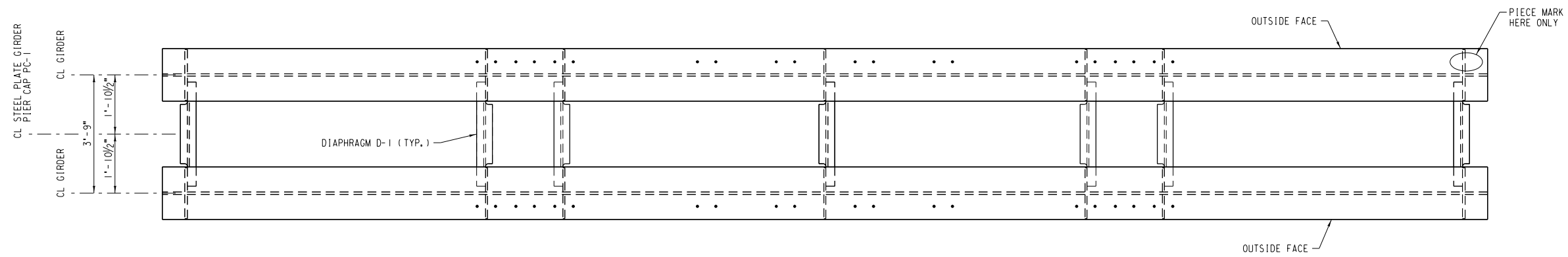


REV.	DATE	BY	REVISION

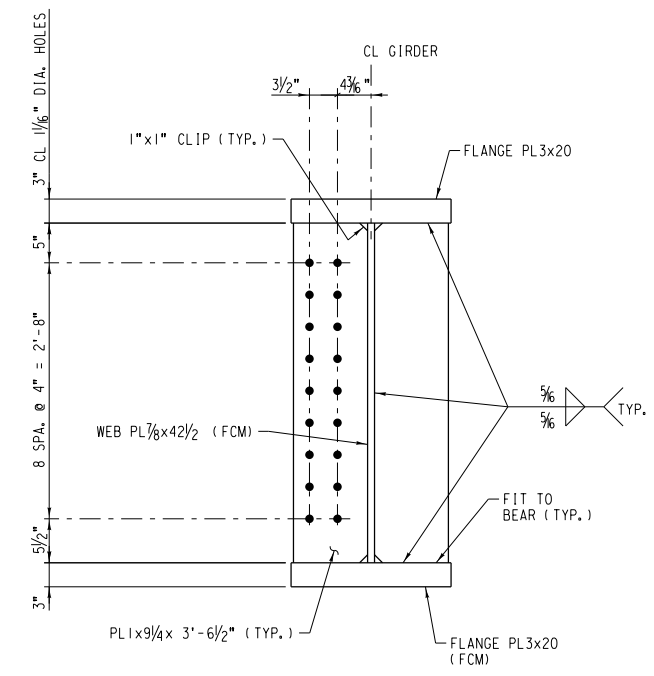
TABLE OF MEMBERS AND LOADING			
MEMBER	MOMENT (KIPS-FT)	SHEAR (KIPS)	SECTION
GIRDER	DEAD LOAD = 1,732	DEAD LOAD = 152 LIVE LOAD = 233 IMPACT = 72 TOTAL = 457	SEE GIRDER ELEVATION
	LIVE LOAD = 2,561		
	IMPACT = 756		
	TOTAL = 5,049		



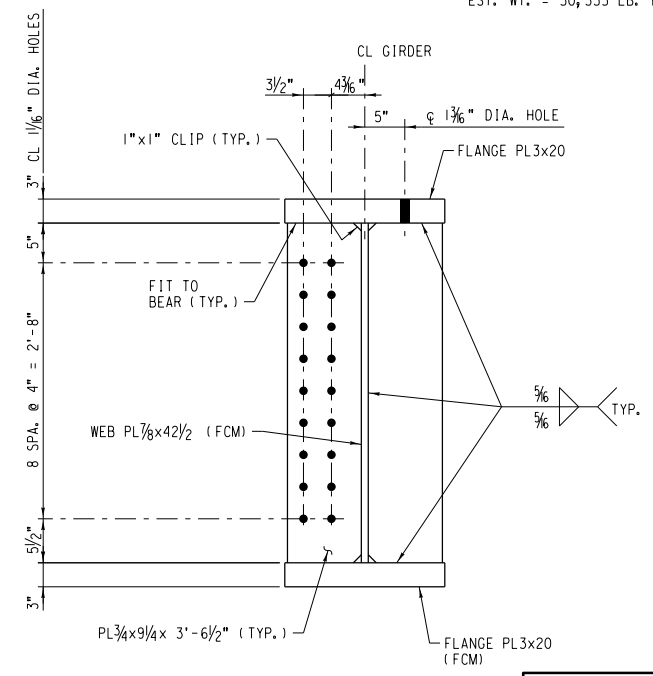
STEEL PLATE GIRDER DETAIL
SCALE: 1/2" = 1'-0"
(OUTSIDE FACE SHOWN)
EST. WT. = 23,750 LB. EA.



STEEL PLATE GIRDER PIER CAP PC-1
SCALE: 1/2" = 1'-0"
EST. WT. = 50,335 LB. EA.



SECTION N
SCALE: 1" = 1'-0"
12|12



SECTION P
SCALE: 1" = 1'-0"
12|12

NOTE:
ORIENTATE DIAPHRAGMS AS SHOWN

NOTE:
EF = EACH FACE



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

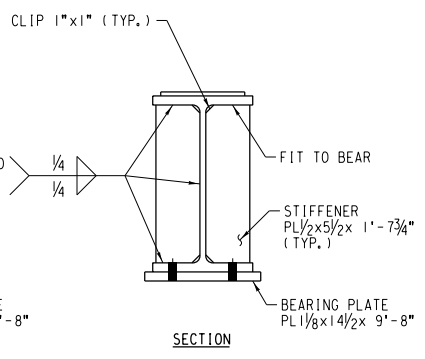
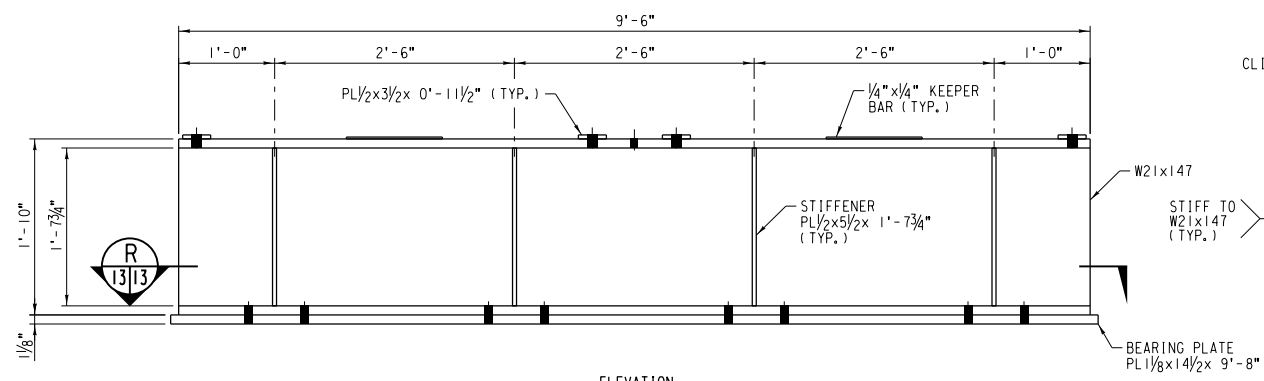
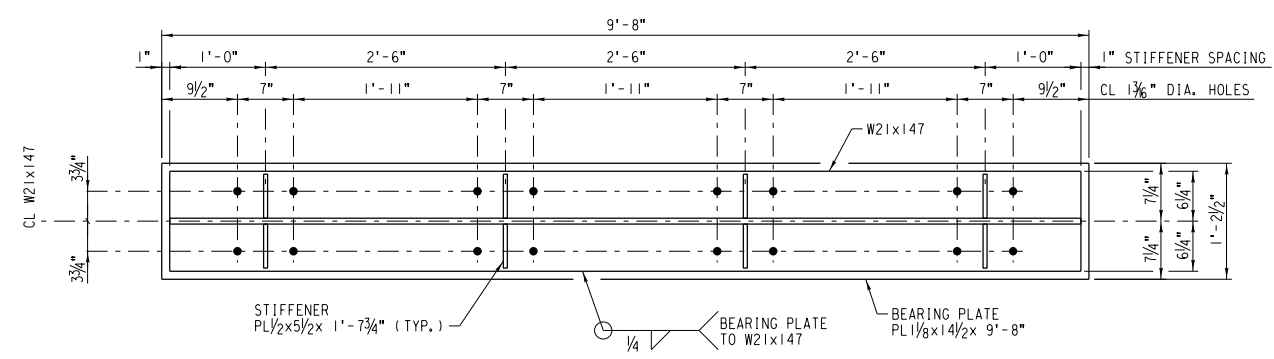
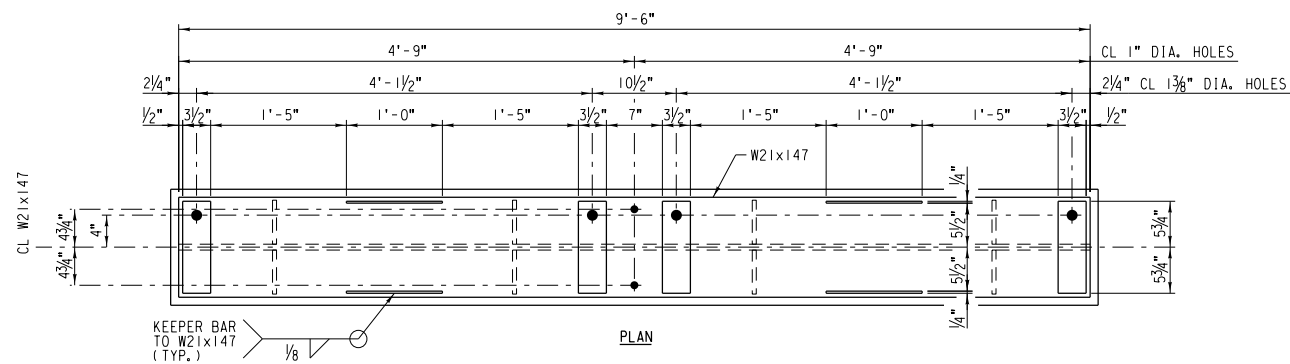
BR. 147.4 PIER #2 REPLACEMENT

STRUCTURAL STEEL DETAILS
(SHEET 2 OF 4)

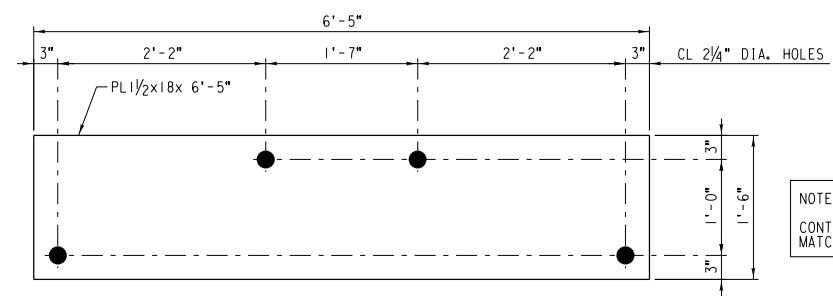
DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO. 12 OF 16
DRAWN BY: DTP	DATE: 11/3/2020	
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		



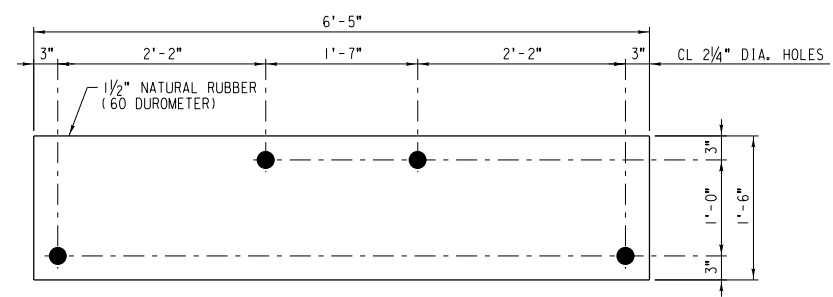
REV.	DATE	BY	REVISION



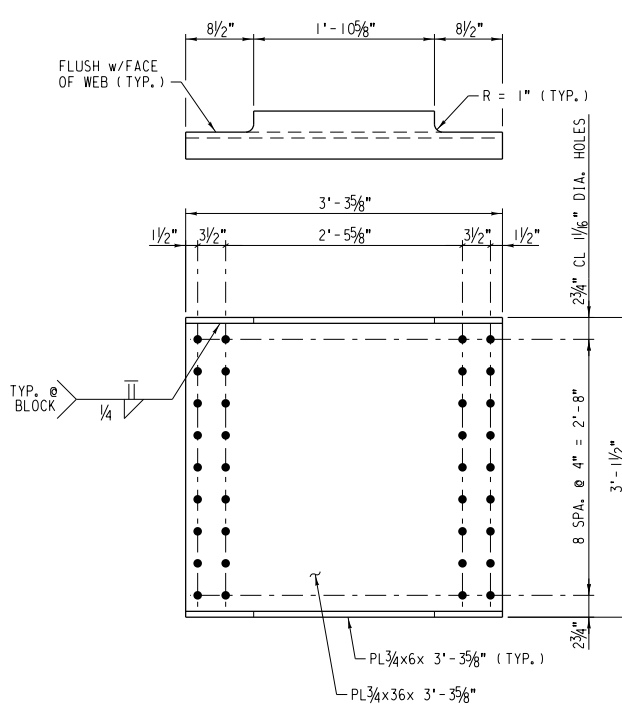
BOLSTER BEAM BB-1
 SCALE: 1" = 1'-0"
 EST. WT. = 2,057 LB. EA.



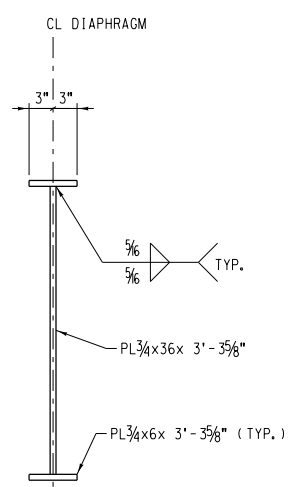
SOLE PLATE SP-20
 SCALE: 1" = 1'-0"
 ESTW. WT. = 590 LB. EA.



BEARING PAD BP-1
 SCALE: 1" = 1'-0"



DIAPHRAGM D-1
 SCALE: 1" = 1'-0"
 EST. WT. = 405 LB. EA.

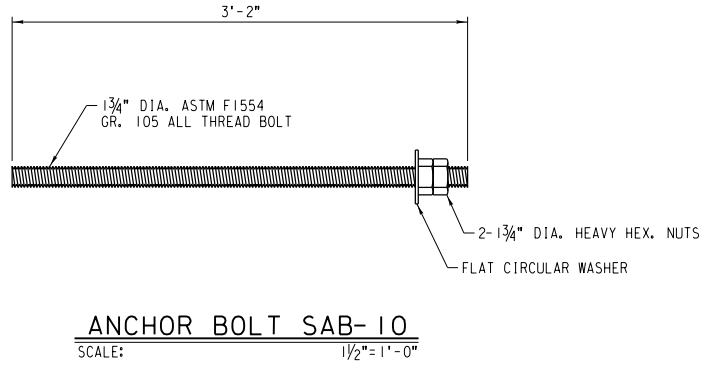
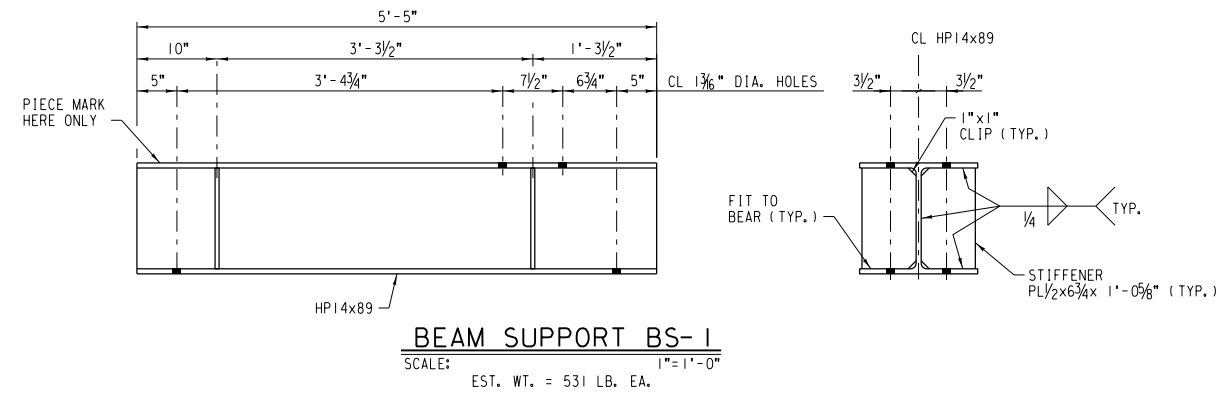
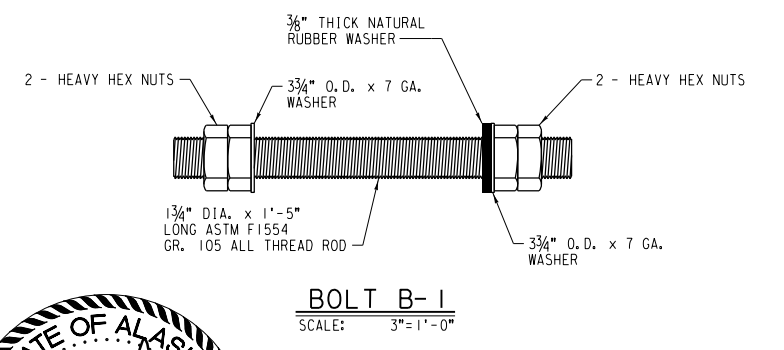
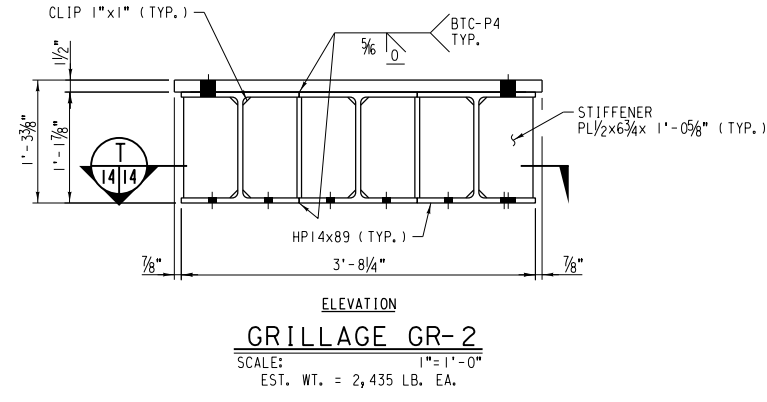
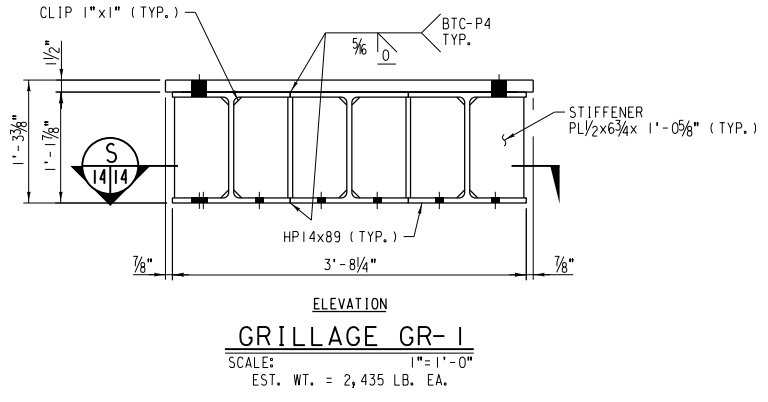
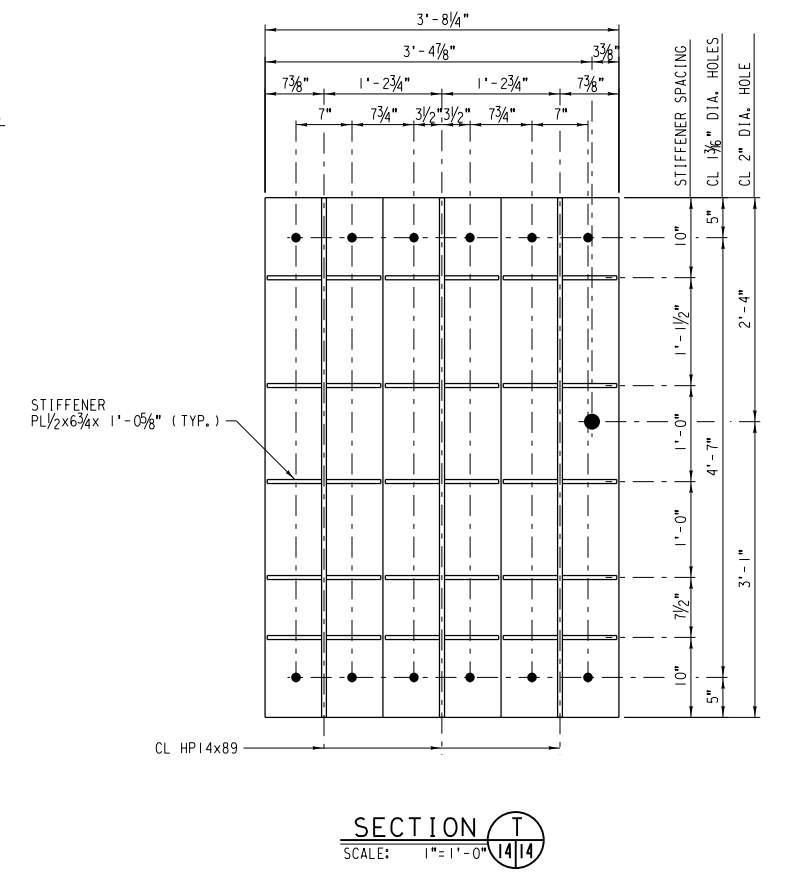
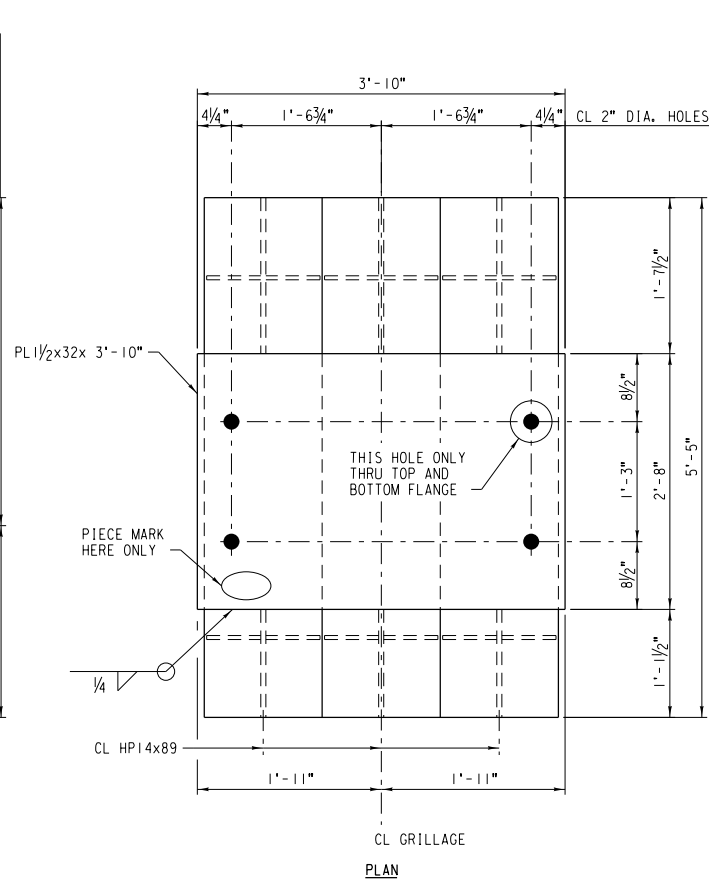
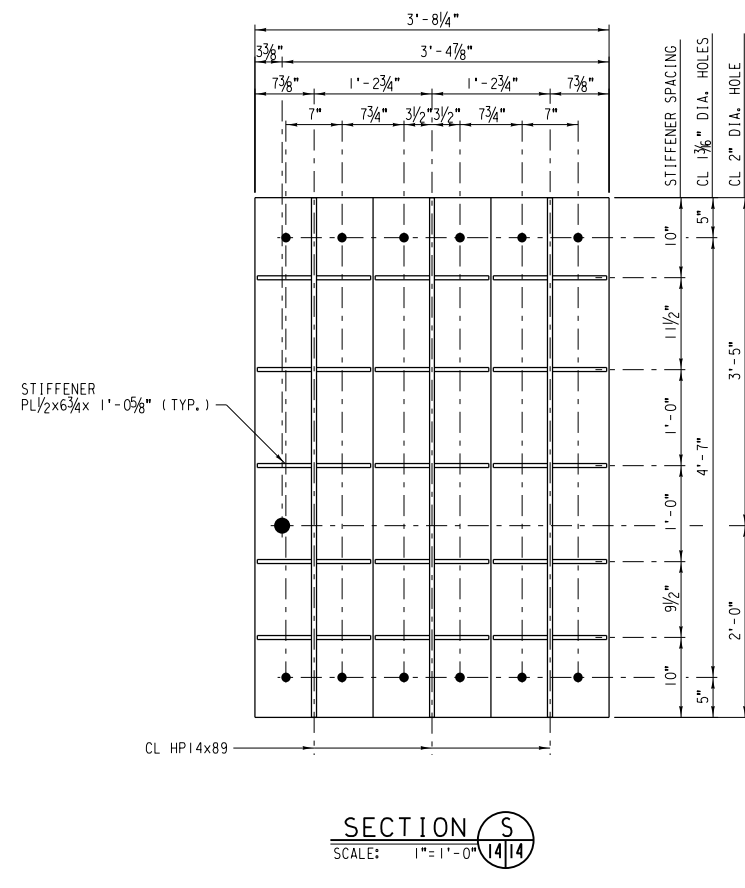
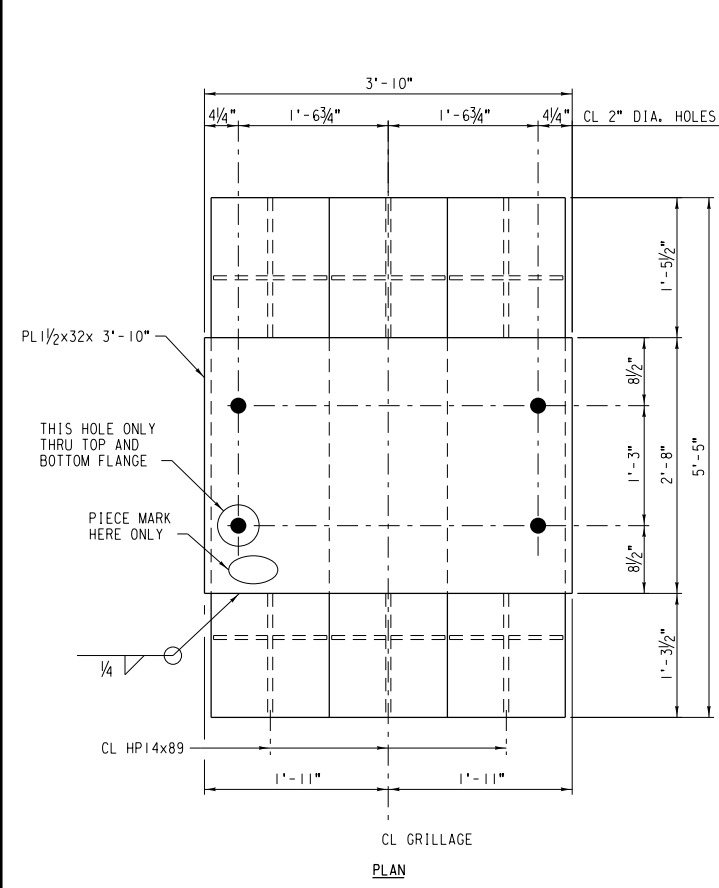


ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION ENGINEERING SERVICES P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500	
PROJECT: BR. 147.4 PIER #2 REPLACEMENT	
TITLE: STRUCTURAL STEEL DETAILS (SHEET 3 OF 4)	
DESIGNED BY: JBH DRAWN BY: DTP CHECKED BY: BWB/MLB APPROVED BY: BWB	SCALE: AS NOTED DATE: 11/3/2020
DWG NO. 13 OF 16	REVISION



REV.	DATE	BY	REVISION



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT: BR. 147.4 PIER #2 REPLACEMENT

TITLE: STRUCTURAL STEEL DETAILS (SHEET 4 OF 4)

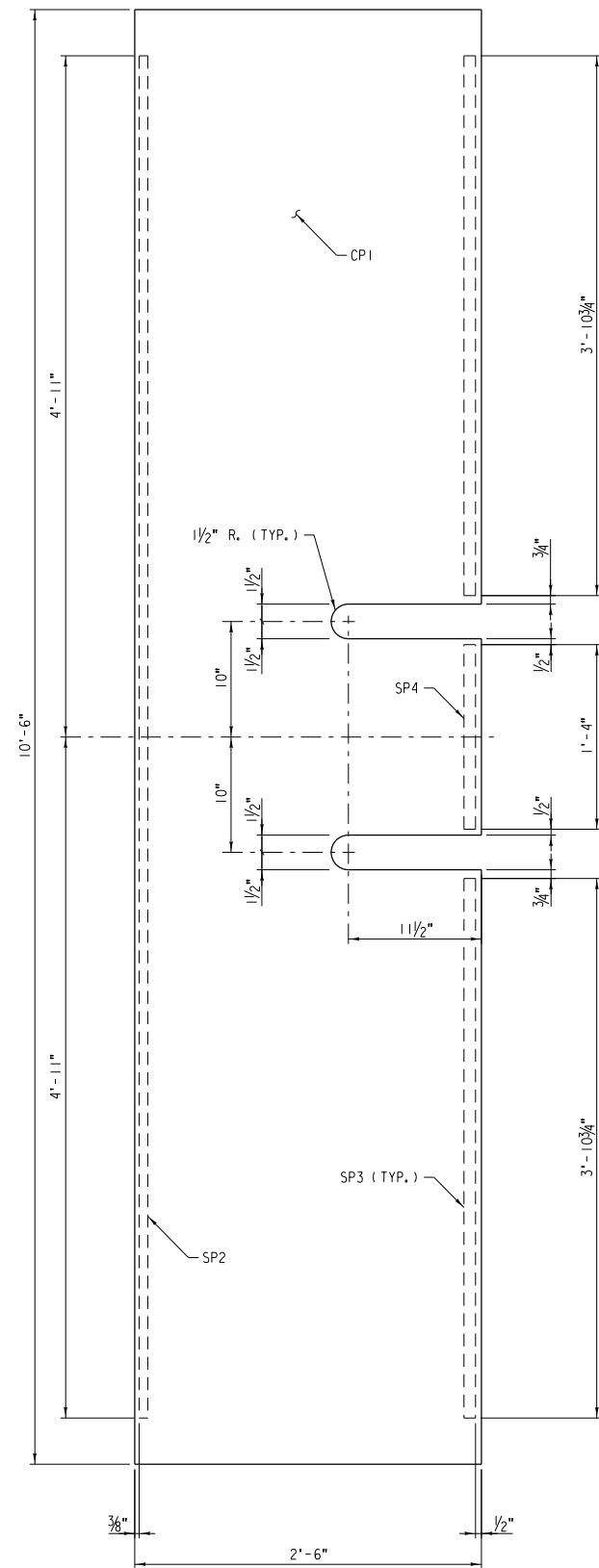
DESIGNED BY: JBH
DRAWN BY: DTP
CHECKED BY: BWB/MLB
APPROVED BY: BWB

SCALE: AS NOTED
DATE: 11/3/2020

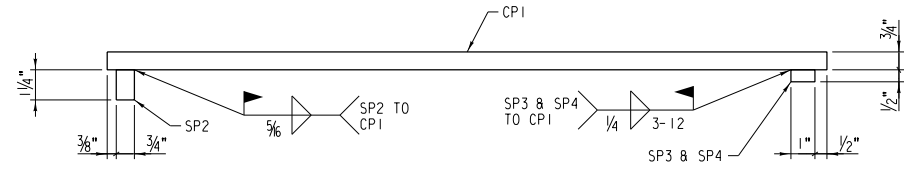
DWG NO. 14 OF 16



REV.	DATE	BY	REVISION



CLOSURE PLATE CPI MODIFICATIONS
SCALE: 1/2" = 1' - 0"



CPI SECTION VIEW
SCALE: 3" = 1' - 0"

- NOTES:**
1. ALL PLATE SHALL BE GRADE 50.
 2. ALL HSS SHALL BE GRADE 46 OR BETTER.
 3. ALL STEEL SHALL BE UNCOATED.
 4. ALL WELD ELECTRODES SHALL BE LOW HYDROGEN, 70,000 PSI.

CLOSURE PLATE MATERIAL SCHEDULE			
ITEM	SIZE	LENGTH	QTY
CP1	3/4" x 30"	10' - 6"	1
SP1	3/4" x 1 1/4"	0' - 5"	2
SP2	3/4" x 1 1/4"	9' - 10"	1
SP3	1/2" x 1"	3' - 10 3/4"	2
SP4	1/2" x 1"	1' - 4"	1
ABUT 2	HSS 3x3x.375	12' - 7 1/2"	1



ISSUED FOR CONSTRUCTION

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT:
BR. 147.4 PIER #2 REPLACEMENT

TITLE:
MISCELLANEOUS STEEL DETAILS

DESIGNED BY: JBH	SCALE: AS NOTED	DWG NO.
DRAWN BY: DTP	DATE: 11/3/2020	15 OF 16
CHECKED BY: BWB/MLB		
APPROVED BY: BWB		



REV.	DATE	BY	REVISION



Northern Geotechnical Engineering, Inc.
and Terra Firma Testing
11301 Olive Lane
Anchorage, AK 99515
Telephone: 907-344-5934

EXPLORATION B1

PAGE 1 OF 3

NGE-TFT PROJECT NAME: ARRC Bridge 147.4
PROJECT LOCATION: Matanuska River, AK
EXPLORATION EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MPTw/340lb autohammer
DATE/TIME STARTED: 6/10/2020 @ 12:35:00PM
EXPLORATION LOCATION: Seereport Figure 2
GROUNDWATER (ATD): Approx. 11.0ft bgs

NGE-TFT PROJECT NUMBER: 5747-20
EXPLORATION CONTRACTOR: Discovery Drilling, Inc.
EXPLORATION METHOD: Hollow Stem Auger
LOGGED BY: C. Banzhaf
DATE/TIME COMPLETED: 6/11/2020 @ 3:50:00PM
GROUND ELEVATION: Not Known
GROUNDWATER (I): N/A

EXPLORATION COMPLETION: Backfilled with cuttings
WEATHER CONDITIONS:

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	FIELD SAMPLE ID	RECOVERY (in)	FIELD BLOWS	(N) ₆₀	SAMPLE INT. COLLECT	LAB SAMPLE ID	LAB RESULTS	REMARKS/NOTES
0		SAND WITH SILT (SP-SM), loose to medium dense, gray, moist to wet, fine grained									
10		SAND WITH GRAVEL (SP), medium dense, gray	S1	12	2 5 8	14		S1	S1 MC = 29.3%		
20		SAND (SP), medium dense, gray, medium to coarse grained	S2	14	4 6 8	15		S2	S2 MC = 18.5%		
30		GRAVEL WITH SAND (GP), medium dense, gray	S3	12	8 11 12	22		S3	S3 MC = 9.3% 52.7% gravel, 40.4% sand, 6.9% silt		

Always refer to our complete geotechnical report for this project for a more detailed explanation of the subsurface conditions at the project site and how they may affect any existing and/or prospective project site development. (Continued Next Page)



Northern Geotechnical Engineering, Inc.
and Terra Firma Testing
11301 Olive Lane
Anchorage, AK 99515
Telephone: 907-344-5934

EXPLORATION B1

PAGE 2 OF 3

NGE-TFT PROJECT NAME: ARRC Bridge 147.4
PROJECT LOCATION: Matanuska River, AK
EXPLORATION EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MPTw/340lb autohammer
DATE/TIME STARTED: 6/10/2020 @ 12:35:00PM
EXPLORATION LOCATION: Seereport Figure 2
GROUNDWATER (ATD): Approx. 11.0ft bgs

NGE-TFT PROJECT NUMBER: 5747-20
EXPLORATION CONTRACTOR: Discovery Drilling, Inc.
EXPLORATION METHOD: Hollow Stem Auger
LOGGED BY: C. Banzhaf
DATE/TIME COMPLETED: 6/11/2020 @ 3:50:00PM
GROUND ELEVATION: Not Known
GROUNDWATER (I): N/A

EXPLORATION COMPLETION: Backfilled with cuttings
WEATHER CONDITIONS:

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	FIELD SAMPLE ID	RECOVERY (in)	FIELD BLOWS	(N) ₆₀	SAMPLE INT. COLLECT	LAB SAMPLE ID	LAB RESULTS	REMARKS/NOTES
40		GRAVEL WITH SAND (GP), medium dense, gray (continued)	S4	8	8 8 10	11		S4	S4 MC = 9.1%		
50		SAND (SP), loose to medium dense, gray, wet, medium to coarse grained, interbedded with thin layers of medium stiff gray silt	S5	16	6 7 8 10	12		S5	S5 MC = 18.9% P200 = 7.5%		
60			S6	17	6 8 10 13	14		S6	S6 MC = 23.7% 0.2% gravel, 94.4% sand, 5.4% silt		
70		SILT (ML), medium stiff to stiff, gray, wet, interbedded with layers of sand	S7	19	6 9 12 15	14		S7	S7 MC = 26.1%		

Always refer to our complete geotechnical report for this project for a more detailed explanation of the subsurface conditions at the project site and how they may affect any existing and/or prospective project site development. (Continued Next Page)



Northern Geotechnical Engineering, Inc.
and Terra Firma Testing
11301 Olive Lane
Anchorage, AK 99515
Telephone: 907-344-5934

EXPLORATION B1

PAGE 3 OF 3

NGE-TFT PROJECT NAME: ARRC Bridge 147.4
PROJECT LOCATION: Matanuska River, AK
EXPLORATION EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MPT w/ 340lb autohammer
DATE/TIME STARTED: 6/10/2020 @ 12:35:00 PM
EXPLORATION LOCATION: See report Figure 2

NGE-TFT PROJECT NUMBER: 5747-20
EXPLORATION CONTRACTOR: Discovery Drilling, Inc.
EXPLORATION METHOD: Hollow Stem Auger
LOGGED BY: C. Banzhaf
DATE/TIME COMPLETED: 6/11/2020 @ 3:50:00PM
GROUND ELEVATION: Not Known
GROUNDWATER (I): N/A

EXPLORATION COMPLETION: Backfilled with cuttings
WEATHER CONDITIONS:

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	FIELD SAMPLE ID	RECOVERY (in)	FIELD BLOWS	(N) ₆₀	SAMPLE INT. COLLECT	LAB SAMPLE ID	LAB RESULTS	REMARKS/NOTES
0		Approx. 11.0 ft bgs									
0		(;3/25;7,21 & 203/(7,21; Backfilled with cuttings									
80		SILT (ML), medium stiff to stiff, gray, wet, interbedded with layers of sand (continued)	S8	17	4 4 8 10	8		S8	S8 MC = 26.0% P200 = 76.5% PL = 22		
90		SAND (SP), loose to medium dense, gray, wet, medium to coarse grained, interbedded with thin layers of medium stiff gray silt	S9	18	8 9 12 11	14		S9	S9 MC = 25.1% P200 = 7.2%		
100		SILT (ML), medium stiff to stiff, gray, moist, interbedded with layers of fine to medium grain wet sand	S10	18	2 2 3 5	6		S10	S10 MC = 31.6% P200 = 93.3% PL = 23	Pocket Penetrometer: 0.75, 0.75, 1.0, 1.0, 1.25 tsf.	
110		Bottom of borehole at 112.0 ft bgs.	S11	24	3 3 4 4	8		S11	S11 MC = 28.8% P200 = 93.9%	Pocket Penetrometer: 4 @ 0.75 tsf.	

ISSUED FOR
CONSTRUCTION



ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

BR. 147.4 PIER #2 REPLACEMENT

BORING LOG

DESIGNED BY: JBH
DRAWN BY: DTP
CHECKED BY: BWB/MLB
APPROVED BY: BWB

SCALE: AS NOTED
DATE: 11/3/2020

DWG NO.
16 OF 16

WILSON
& COMPANY

REV. DATE BY REVISION