Appendix H

Hydraulic Analysis

HANSON

TECHNICAL MEMORANDUM

TO:	BNSF Railway Company
FROM:	Garrett Litteken, P.E., CFM; Tony Comerio, P.E., CFM
DATE:	05/20/2019
SUBJECT:	14R0057 – Bridge 3.1 over Sand Creek H&H Technical Summary

INTRODUCTION

This memorandum summarizes the hydraulic investigation for the proposed Bridge 3.1, which is part of BNSF's Sandpoint Junction Project. BNSF Proposed Bridge No. 3.1 crosses over Sand Creek near its confluence with Lake Pend Oreille in Sandpoint, ID in Bonner County. The proposed bridge will run parallel to the existing 148-foot, 3-span structure. The proposed structure will be constructed upstream of the existing, approximately 26.5-ft on center at its nearest point. FEMA floodplain mapping for Sand Creek indicates that hydraulics are predominantly backwater controlled. Hydrology and downstream boundary conditions were obtained from FEMA data. The FEMA Effective regulatory HEC-2 hydraulics model data along with site survey and LiDAR were utilized to develop a 1-D HEC-RAS model at the bridge.

The existing bridge, Highway 95, and Bridge St. were included in the analysis for floodplain impacts at the railroad bridge. A project location map is provided in Attachment A and site photos are provided in Attachment B.

The proposed bridge structure is within the FEMA regulatory floodway limits and is sufficiently sized to convey Sand Creek with no significant adverse impacts. The proposed bridge opening is less restrictive than the existing bridge. Sand Creek, in the vicinity of the project bridge, is a well maintained recreational area and debris drift is not anticipated to be an issue. The hydraulic analysis utilized HEC-RAS modeling to quantify hydraulic impacts of the proposed design.

DATA COLLECTION

The proposed rail bridge is located near Sand Creek's confluence with Lake Pend Oreille. Hydraulic modeling was extended upstream to include Highway 95 and Bridge St. in order to fully capture potential hydraulic influences of the proposed replacement design. In April 2018, a survey scan of the existing bridge was performed to capture structural details. In addition to the structural scan, hydraulic survey of Sand Creek was performed. Hydraulic survey was limited to the footprint of the existing and proposed rail structures. All survey data, which was used to create the hydraulic models, was collected using the North American Vertical Datum of 1988 (NAVD88).

Upstream channel information was acquired from a combination of LiDAR and FEMA regulatory models covering the project reach. The FEMA Flood Insurance Rate Map (FIRM), effective November 2009, shows the existing bridge is in a Zone AE. This means the floodplain and floodway have been delineated by detailed methods and include Base Flood Elevations (BFE) for the 100-year event. Hanson requested and received the effective HEC-2 model from the FEMA Engineering Library for the area of BNSF expansion. The regulatory FEMA HEC-2 hydraulic model

was used to define the downstream boundary conditions for this analysis. The effective HEC-2 model was developed prior to the completion of Highway 95 Bridge over Sand Creek and does not include model information for the structure. FEMA provided an updated model submitted in support of Conditional Letter of Map Revision (CLOMR) 04-10-0479R for construction of Highway 95. The model incorporated detailed survey of Bridge St., the existing rail bridge, and proposed plans for Highway 95.

In order to accurately depict the study area, the effective HEC-2 model was updated with an existing conditions model which utilized project survey and record bridge drawings. The existing conditions model reflects recent detailed survey, detailed bridge plans, georectified cross-sections, and acquisition of LiDAR. FEMA's CLOMR model was used to provide cross-section data upstream of the project survey, including bridge opening and overtopping information for Highway 95 and Bridge St. The FEMA FIRM and relevant excerpts from the FEMA FIS are provided in Attachment C.

Bonner County LiDAR was used to update the FEMA CLOMR HEC-RAS model floodplain topography above the normal pool water line. 2010 LiDAR data of Bonner County, Idaho was obtained from the USDA/NRCS National Geospatial Center of Excellence. The LiDAR data has a nominal point spacing of 1 meter based on Universal Transverse Mercator Zone 11, related to the North American Datum of 1983, and North American Vertical Datum of 1988 (NAVD88).

HYDROLOGY

The FEMA Effective HEC-2 model and Flood Insurance Study provided discharges for Sand Creek at the project bridge. Sand Creek has an approximate drainage area of 38.5-sq.mi. to its mouth at Lake Pend Oreille. Table 1 shows the resulting discharges from the FEMA FIS at the structure. Relevant excerpts from the FEMA FIS are provided in Attachment C.

Table 1 - Discharge-Frequency Comparison

	Discharge (cfs)
Frequency (Years)	FEMA Effective HEC-2 Model
10	1,455
50	2,280
100	2,820
500	4,015

HYDRAULICS

Hydraulics were developed from a combination of the FEMA model data, detailed bridge plans, LiDAR and project survey data. Three boundary conditions were analyzed to determine impacts under various Lake Pend Oreille backwater conditions. Boundary conditions include a normal depth solution, a summer pool backwater, and the FEMA regulatory backwater. A normal depth boundary slope of 0.0002-ft/ft was acquired from the Effective FEMA HEC-2 model and used to assess normal depth conditions. A known water surface boundary condition was used to establish starting water surface elevations for the backwater models. FEMA flood profiles for Sand Creek are provided in Appendix C, and starting water surface elevations are summarized in Table 2.

Table 2.

Table 2 – HEC-RAS Known Water Surface Boundary

Location	Source	Backwater	Boundary Condition Known W.S. (ft, NAVD88)
Sand Creek	FEMA FIS	Regulatory Pool (100-yr BFE)	2073.7
	Lake Pend Oreille	Summer Pool	2062.5

The US Army Corps of Engineers' HEC-RAS v.5.0.7 program was used to model the creek and Bridge 3.1. The model extends 300-ft downstream of the existing bridge to Sand Creek's confluence with Lake Pend Oreille. Survey of the bridges combined with photos and available construction drawings were used to accurately define the existing and proposed structures. The FEMA HEC-RAS CLOMR model was used to inform upstream bridge and channel geometry. The HEC-RAS model calculates water surface elevations along the Sand Creek floodplain for a 0.4-mile reach near the existing rail crossing. The existing 3-span bridge (48.3'-51.7'-48.3') has an total length of 148.23-feet from abutment to abutment. This establishes baseline conditions for comparison with the proposed replacement design. Existing bridge plans are provided in Attachment E.

A proposed conditions model was developed to analyze potential impacts from the construction of the proposed parallel bridge crossing upstream of the existing rail structure. Per HEC-RAS Hydraulic Reference Manual Version 5.0, the existing and proposed bridge were modeled as a combined bridge deck due to their proximity. The existing bridge was modeled as the downstream face of the hydraulic structure and the proposed bridge was modeled as the upstream face of the deck. The structures were sufficiently far apart that they were assumed not to impact the hydraulic opening of the parallel bridge face. The proposed structure provides a wider hydraulic opening than the existing bridge. The piers are sufficiently spaced that they are not anticipated to experience an aggregated hydraulic influence with the existing piers and abutments. A hydraulic cross-section location map is provided in Attachment D.

The proposed replacement structure utilizes a 11-span design and increased bridge main span length, which improves the hydraulic capacity of the structure. Due to the proximity of the structures, only four of the proposed bridge spans are able to actively convey flow. The proposed structure will provide an effective hydraulic opening of approximately 165.3-ft at its upstream face. Proposed bridge plans are provided in Attachment F.

FLOODPLAIN PERMITTING

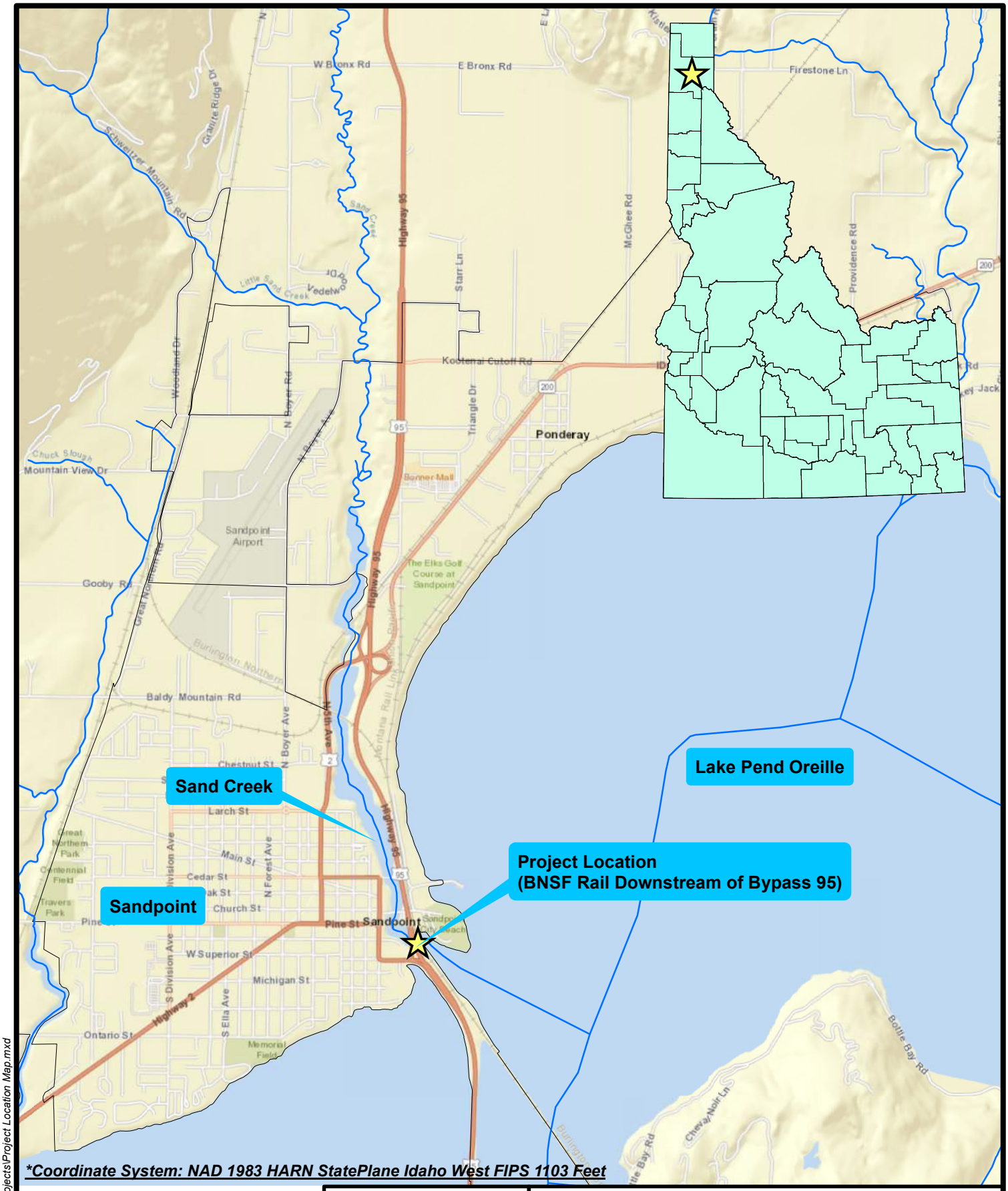
The hydraulic model investigation indicates that the proposed rail bridge creates less than a 0.0-ft impact in the 100-year (1% annual chance flood) water surface elevation under normal depth conditions, less than a 0.0-ft impact under Lake Pend Oreille summer pool backwater conditions, and less than 0.0-ft impact under FEMA regulatory pool backwater conditions. Based on the results of the hydraulic investigation, the proposed structure meets the intent of FEMA "No-Rise" Certification criteria. A summary of HEC-RAS model output comparison between the existing and proposed conditions is provided in Attachment G. Certification that the proposed structure meets the intent of FEMA "no-rise" criteria and certification that the structure is designed in accordance with the General Standards of Bonner County Revised Code Section 14-501 is provided in Attachment H.

structure is designed in accordance with the General Standards of Bonner County Revised Code Section 14-501 is provided in Attachment H.

List of Attachments:

Attachment A - Project Location Map
Attachment B - Site Photos
Attachment C - FEMA FIS and FIRM
Attachment D - Hydraulic Cross-Section Map
Attachment E - Existing Bridge Plans
Attachment F - Proposed Bridge Plans
Attachment G - HEC-RAS Output
Attachment H – No-rise Certification and Design Certification

Attachment A – Project Location Map



HANSON
Hanson Professional Services Inc.

Project Location Map

BNSF Railway Company
Bridge 3.1 Over Sand Creek
Sandpoint, Idaho

Job Number: 14R0057

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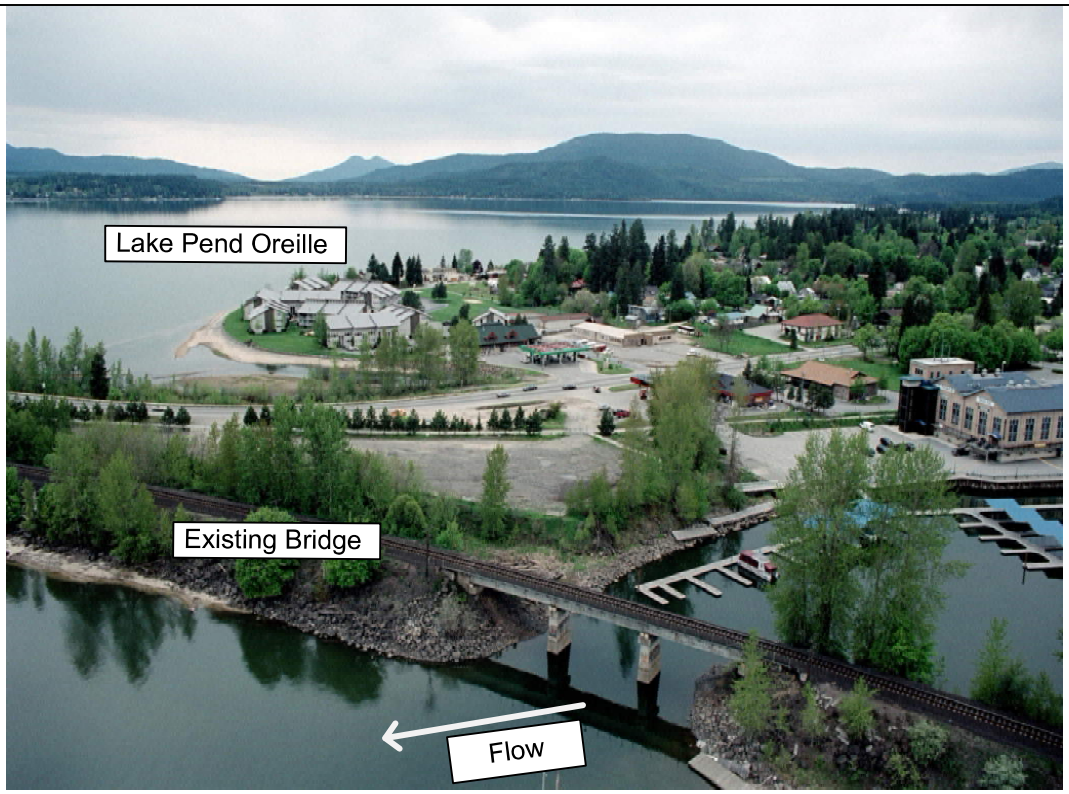
Attachment B – Site Photos

Photograph 1 – Existing Bridge on Sand Creek at confluence with Lake Pend Oreille looking Upstream (west)



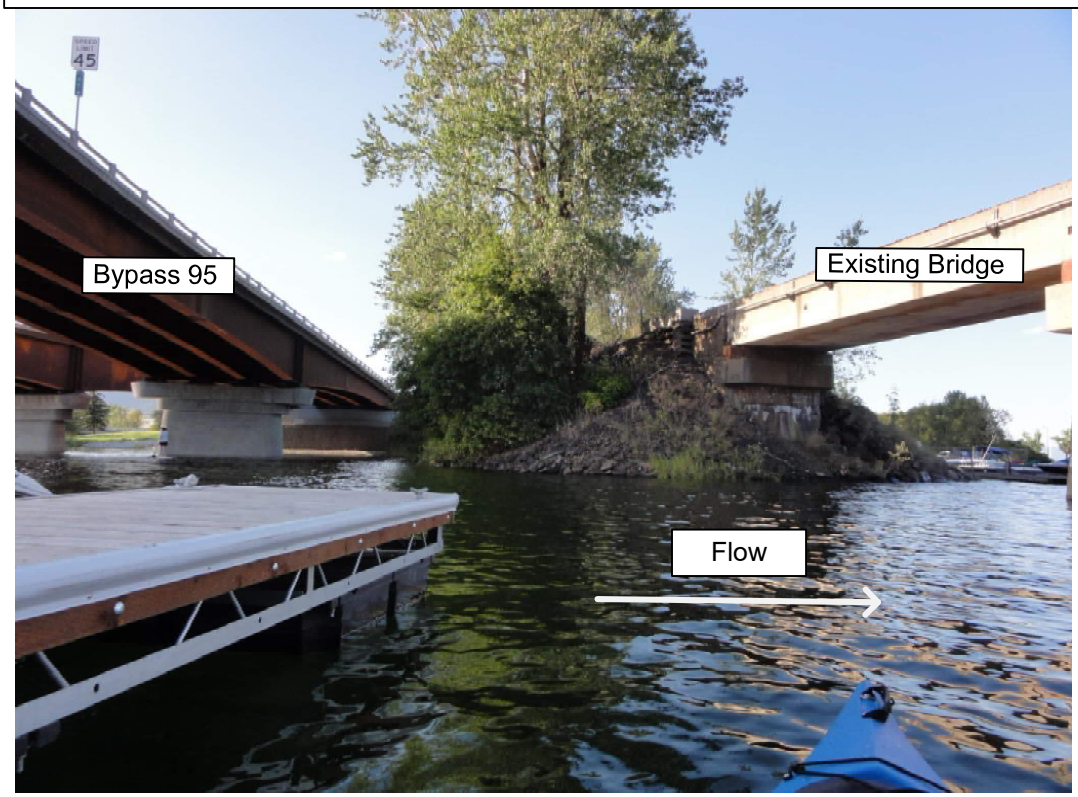
Photograph 2 – Left abutment of Existing Bridge looking Downstream (northeast)

HANSON
HANSON PROFESSIONAL SERVICES INC.

Photographs

BNSF Railway Company
Bridge 3.1 Over Sand Creek
Sandpoint, Idaho

Photograph 3 – Left abutment of Existing Bridge looking north



Photograph 4 – Left abutment of Existing Bridge looking north

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Photographs

BNSF Railway Company
Bridge 3.1 Over Sand Creek
Sandpoint, Idaho

Photograph 5 – Left abutment of Existing Bridge looking north

Photograph 6 – Right abutment of Existing Bridge looking Downstream (southeast)

HANSON
HANSON PROFESSIONAL SERVICES INC.

Photographs

BNSF Railway Company
Bridge 3.1 Over Sand Creek
Sandpoint, Idaho

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Attachment C – FEMA FIS and FIRM

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/13/2018 at 5:34:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FLOOD INSURANCE STUDY

BONNER COUNTY, IDAHO AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BONNER COUNTY, UNINCORPORATED AREAS	160206
CLARK FORK, CITY OF	160132
DOVER, CITY OF	160006
EAST HOPE, CITY OF	160237
HOPE, CITY OF	160238
*KOOTENAI, CITY OF	160052
OLDTOWN, CITY OF	160073
PONDERAY, CITY OF	160150
PRIEST RIVER, CITY OF	160026
SANDPOINT, CITY OF	160025

*No Special Flood Hazard Areas Identified

REVISED
July 7, 2014

Federal Emergency Management Agency

Flood Insurance Study Number
16017CV000B

Table 5. Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Priest River					
At Mouth	907	9,050	10,550	11,100	12,200
Near McAbee Falls	861	8,500	10,000	10,600	11,900
Above Midpoint on Section Line 27/28	795	8,300	9,700	10,300	11,600
Above East River	726	8,000	9,400	10,000	11,200
Rapid Lightning Creek					
At Mouth	48.0	1,750	2,800	3,450	5,000
Above Cross Section BO	34.1	1,300	2,050	2,550	3,550
Above Spring Creek	28.6	1,150	1,750	2,150	3,000
Sand Creek North					
At Mouth	17.0	750	1,100	1,350	1,900
Sand Creek					
At mouth	38.5	1,455	2,280	2,820	4,015
Above Little Sand Creek	23.2	960	1,455	1,780	2,510
Above Schweitzer Creek	16.1	715	1,065	1,295	1,830
Above Cross Section AS	12.1	575	840	1,020	1,445
Above Cross Section AW	8.3	435	625	760	1,075
Above Swede Creek	6.8	375	535	660	915
Above Cross Section BC	4.0	260	395	470	660
Above Jack Creek	2.1	185	295	360	510
Spring Creek					
At Mouth	11.2	550	800	950	1,350
Above Cross Section AA	9.7	500	700	850	1,200

[1]Flows Routed by Burlington Northern Railroad Embankment
[2]Data Not Available

Table 6. Roughness Coefficients - Range of Manning's "n"

	Channel	Overbank Flood Plain
Clark Fork	0.031	0.060 to 0.120
Grouse Creek	0.055	0.070 to 0.140
Lightning Creek	0.048 to 0.070	0.080 to 0.250
Mosquito Creek	0.055 to 0.060	0.060 to 0.150
Pack River	0.048 to 0.055	0.085 to 0.175
Priest River	0.040 to 0.155	0.040 to 0.200
Rapid Lightning Creek	0.040 to 0.070	0.040 to 0.200
Sand Creek North	0.070 to 0.080	0.140 to 0.200
Sand Creek	0.045 to 0.065	0.045 to 0.200
Spring Creek	0.070 to 0.095	0.080 to 0.350

Starting water-surface elevations for all streams were calculated using slope-area methods. Backwater at confluences with larger river systems or lakes are shown at the most downstream reaches of the smaller tributary stream on the flood profiles.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed and do not fail.

Hydraulic analyses of the outlet structures for Cocalalla and Kelso Lakes were conducted in order to provide rating for outflow from the lakes. All structures were measured by field surveys.

It was agreed between the Federal Emergency Management Agency and the study contractor to consider wave height analyses for Lake Pend Oreille only. Significant wave height was calculated using procedures as outlined in ETL-1110-2-221 (References 16 and 17). Input for the calculations included wind direction, duration, and speed along with reservoir shape and size. The calculated wave height was added as a surcharge to the 1-percent-annual-chance stillwater lake elevation. No wave runup analysis was conducted. No analyses of wave height or runup were conducted for any of the additional lakes studied in Bonner County.

Streams and rivers, selected for study by approximate methods, were analyzed by some combination of these five criteria: (1) correlation considering size of drainage area, slope, vegetative cover, and hydraulic conditions with other streams studied by detailed methods within the region; (2) field reconnaissance and historical accounts using information provided by local residents familiar with flooded areas and boundaries during past flooding events; (3) correlation with the U.S. Geological Survey maps of flood-prone areas; (4) correlation with flood boundaries as outlined on the Special Flood Hazard Boundary Map for Bonner County (Reference 20); and (5) engineering judgment.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the completion of the North American Vertical Datum of 1988 (NAVD

88), many FIS reports and FIRMs are now prepared using NAVD 88 as the referenced vertical datum.

To accurately convert flood elevations for the streams and rivers in Bonner County from the current NGVD 29 datum to the newer NAVD 88 datum, the following procedure was implemented. Locations at the upstream and downstream ends of each flooding source, as well as at an intermediate location between these two end points, were evaluated using the COE CORPSCON (Reference 21) vertical datum conversion software. At each of the three points CORPSCON calculated the difference between NGVD 29 and NAVD 88 elevations. These three conversion factors were averaged to develop and average conversion factor for each flooding source. The final NAVD 88 elevations reported herein were computed by adding the calculated average conversion factor to the existing NGVD 29 data. Table 7 shows the conversion factor for each stream studied in detail.

Flood elevations shown in this FIS report and on the FIRMs are referenced to NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD and the NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242
(301) 713-4172 (fax)

Table 7. Vertical Datum Conversion Factors

	Conversion from NGVD 29 to NAVD 88 (feet)			
Stream Name	Minimum Conversion	Maximum Conversion	Average Conversion[1]	Maximum Offset
Clark Fork River	3.86	3.90	3.88	0.02
Grouse Creek	3.86	3.87	3.86	0.01
Lightning Creek	3.88	3.98	3.91	0.07
Mosquito Creek	3.87	3.88	3.88	0.00
Pack River	3.88	3.89	3.89	0.01
Pend Oreille River	3.85	3.87	3.86	0.01
Lake Pend Oreille	3.86	3.87	3.87	0.01
Priest River	3.90	3.95	3.92	0.03
Rapid Lightning Creek	3.90	3.93	3.91	0.02
Sand Creek North	3.86	3.88	3.87	0.01
Sand Creek	3.88	3.90	3.89	0.01
Spring Creek	3.88	3.96	3.92	0.04

[1] Used to convert elevation data from NGVD 29 to NAVD 88.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and the FIRMs for this community. Interested individuals

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Sand Creek								
A	-5,603	365	2,367	1.2	2,073.7	2,064.3[2]	2,064.6[2]	0.3
B	-5,203	273	1,649	1.7	2,073.7	2,064.4[2]	2,064.7[2]	0.3
C	-4,518	234	1,470	1.9	2,073.7	2,064.6[2]	2,064.9[2]	0.3
D	-3,640	359	2,060	1.4	2,073.7	2,064.8[2]	2,065.1[2]	0.3
E	-2,225	399	2,083	1.4	2,073.7	2065.1[2]	2065.4[2]	0.3
F	-1,615	639	3,574	0.8	2,073.7	2065.2[2]	2065.4[2]	0.2
G	-935	188	1,138	2.5	2,073.7	2065.4[2]	2065.6[2]	0.2
H	-315	301	1,811	1.6	2,073.7	2065.7[2]	2066.0[2]	0.3
I	264	416	2,418	1.2	2,073.7	2065.8[2]	2066.1[2]	0.3
J	874	471	2,568	1.1	2,073.7	2066.0[2]	2066.3[2]	0.3
K	1,596	103	535	5.3	2,073.7	2067.8[2]	2067.8[2]	0.0
L	1,951	99	416	6.8	2,073.7	2068.8[2]	2068.8[2]	0.0
M	2,366	285	2,449	1.2	2,073.7	2070.0[2]	2070.3[2]	0.3
N	3,176	330	2,608	1.1	2,073.7	2070.0[2]	2070.3[2]	0.3
O	3,846	288	2,282	1.2	2,073.7	2070.2[2]	2070.5[2]	0.3
P	4,200	265	2,500	1.1	2,073.7	2071.7[2]	2071.9[2]	0.2
Q	5,130	380	3,348	0.8	2,073.7	2071.8[2]	2072.0[2]	0.2
R	5,895	361	2,891	1.0	2,073.7	2071.9[2]	2072.1[2]	0.2
S	6,560	381	2,907	1.0	2,073.7	2071.9[2]	2072.1[2]	0.2
T	8,800	229	1,460	1.9	2,073.7	2072.6[2]	2073.0[2]	0.4
U	9,695	209	1,204	2.3	2,073.7	2073.2[2]	2073.7[2]	0.5
V	10,240	189	736	3.8	2,074.6	2,074.6	2,075.2	0.6
W	10,505	377	2,516	1.1	2,077.2	2,077.2	2,077.5	0.3
X	11,260	248	1,158	2.4	2,077.9	2,077.9	2,078.4	0.5
Y	12,535	141	479	3.7	2,082.0	2,082.0	2,082.6	0.6
Z	13,395	104	481	3.7	2,085.2	2,085.2	2,085.6	0.4
AA	14,160	188	1,133	1.6	2,086.5	2,086.5	2,087.0	0.5
AB	15,560	155	1,232	1.4	2,087.5	2,087.5	2,088.2	0.7

[1]Feet above Burlington Northern Railroad

[2]Elevation computed without consideration of backwater from Lake Pend Oreille

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, IDAHO

AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Sand Creek (Con't)								
AC	16,090	114	975	1.8	2,087.8	2,087.8	2,088.5	0.7
AD	16,505	86	689	2.6	2,088.0	2,088.0	2,088.8	0.8
AE	16,870	101	667	2.7	2,088.4	2088.4	2089.2	0.8
AF	17,865	156	1,336	1.3	2,089.2	2089.2	2090.0	0.8
AG	20,385	150	792	2.2	2,091.7	2091.7	2092.7	1.0
AH	21,072	175	1,213	1.5	2,093.3	2093.3	2094.3	1.0
AI	22,092	416	2,155	0.8	2,093.9	2093.9	2094.9	1.0
AJ	23,437	220	827	2.2	2,095.3	2095.3	2095.9	0.6
AK	24,107	261	1,152	1.5	2,096.5	2096.5	2097.0	0.5
AL	25,252	179	764	2.3	2,098.0	2098.0	2098.5	0.5
AM	26,132	322	1,256	1.4	2,099.2	2099.2	2099.7	0.5
AN	26,697	164	482	2.7	2,100.6	2100.6	2101.0	0.4
AO	27,367	126	648	2.0	2,102.3	2102.3	2102.7	0.4
AP	28,312	320	1,313	1.0	2,103.4	2103.4	2103.9	0.5
AQ	30,392	107	494	2.6	2,106.8	2106.8	2107.4	0.6
AR	31,347	86	545	2.4	2,108.3	2108.3	2109.1	0.8
AS	33,030	236	1,014	1.3	2,110.9	2110.9	2111.7	0.8
AT	35,405	185	753	1.4	2,115.1	2115.1	2115.8	0.7
AU	36,260	106	515	2.0	2,116.8	2116.8	2117.5	0.7
AV	36,614	122	718	1.4	2,118.9	2,118.9	2,119.3	0.4
AW	37,604	59	323	3.2	2,120.8	2,120.8	2,121.7	0.9
AX	38,719	59	291	2.6	2,123.7	2,123.7	2,124.6	0.9
AY	39,549	116	615	1.2	2,124.9	2,124.9	2,125.8	0.9
AZ	39,850	76	426	1.8	2,125.7	2,125.7	2,126.2	0.5
BA	40,775	51	273	2.8	2,127.3	2,127.3	2,128.0	0.7
BB	41,755	61	350	1.9	2,129.4	2,129.4	2,130.3	0.9
BC	42,173	56	355	1.9	2,130.5	2,130.5	2,131.3	0.8

[1]Feet above Burlington Northern Railroad

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, IDAHO

AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Sand Creek (Con't)								
BD	42,743	46	146	3.2	2,131.9	2,131.9	2,132.8	0.9
BE	43,323	82	326	1.4	2,133.5	2133.49	2134.39	0.9
BF	44,298	29	132	3.6	2,136.3	2136.29	2137.09	0.9
BG	45,293	28	114	4.1	2,141.2	2141.19	2142.19	1.0
BH	45,993	48	215	2.2	2,143.3	2143.29	2143.99	0.7
BI	46,350	111	547	0.7	2,145.0	2144.99	2145.49	0.5
BJ	46,970	136	520	0.7	2,145.4	2145.39	2145.89	0.5
BK	47,805	112	268	1.3	2,147.4	2147.39	2147.79	0.4

[1]Feet above Burlington Northern Railroad

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, IDAHO

AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK

FLOOD PROFILES

SAND CREEK

BACKWATER FROM LAKE PEND OREILLE

STATE HIGHWAY 200 U.S. HIGHWAYS 2 AND 95

RAILROAD

RAILROAD

MOUNTIAN VIEW DRIVE

Mapped Lettered A

ELEVATION (FEET NAVD)

2120
2110
2100
2090
2080
2070
2060
2050

-6,000 -5,000 -4,000 -3,000 -2,000 -1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000

STREAM DISTANCE IN FEET ABOVE BURLINGTON NORTHERN RAILROAD

A B C D E F G H I J K L M N O P Q R S

LEGEND

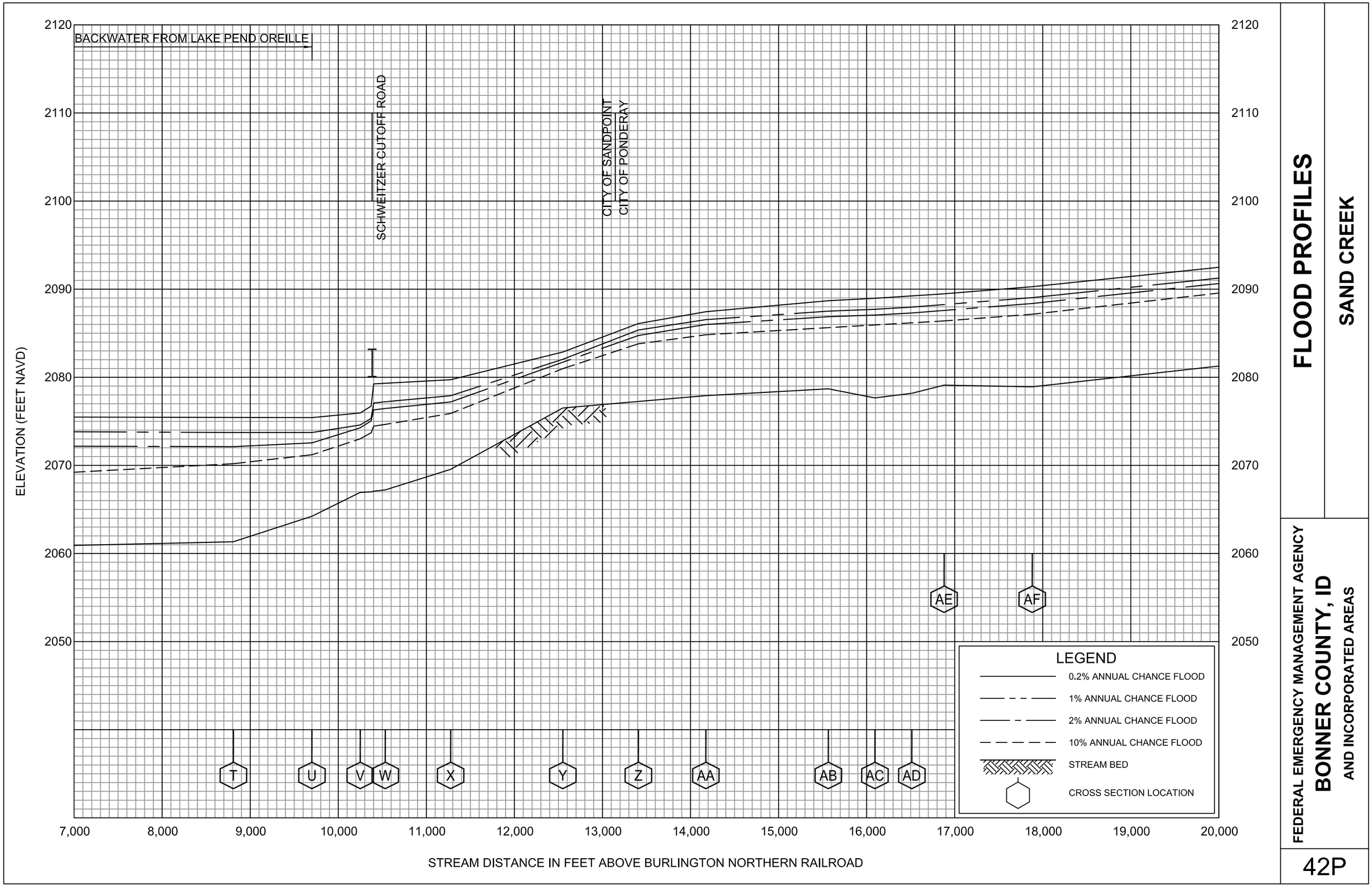
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS

41P



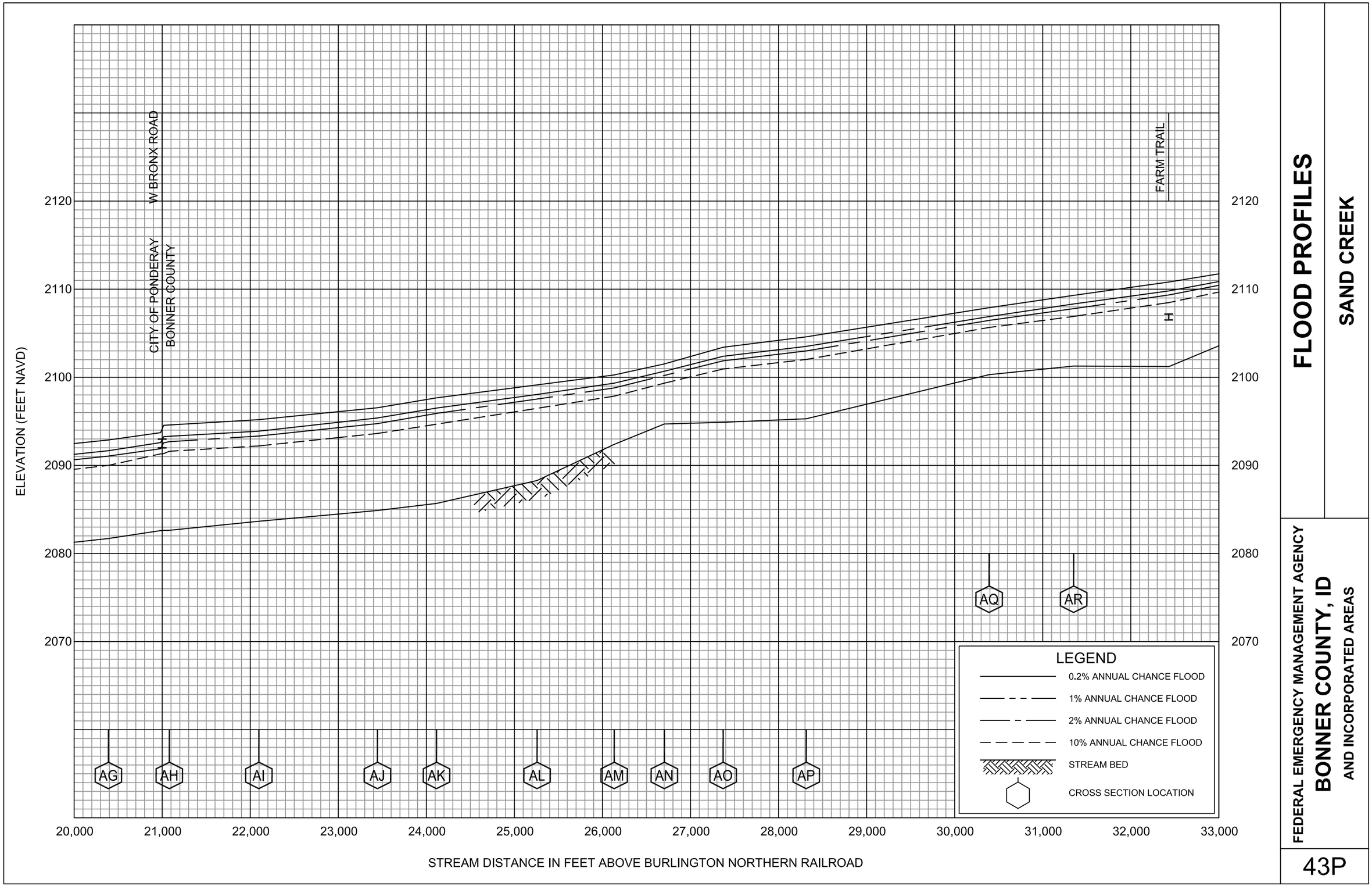
FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS



FLOOD PROFILES

SAND CREEK

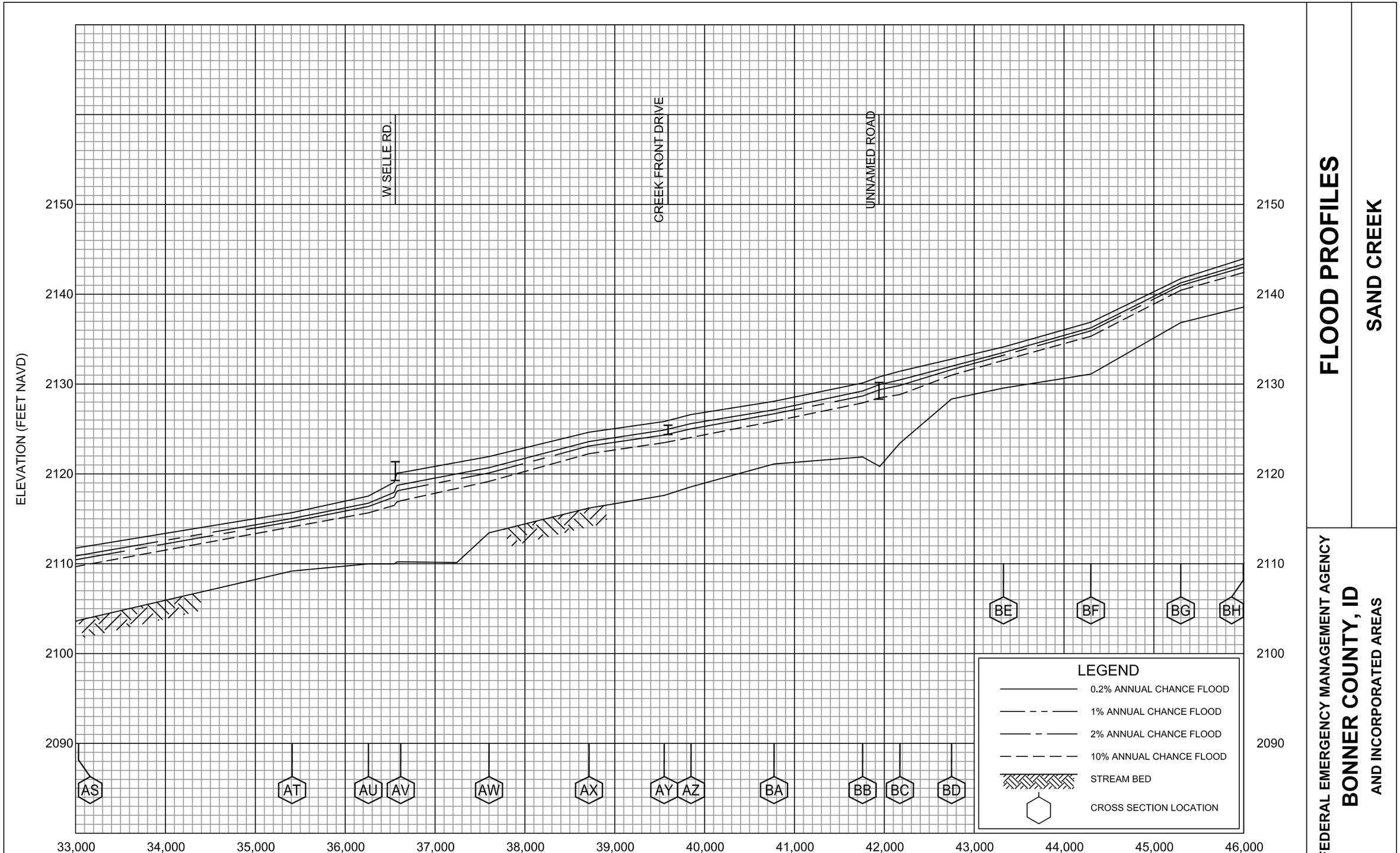
FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS

FLOOD PROFILES

SAND CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS

FLOOD PROFILES

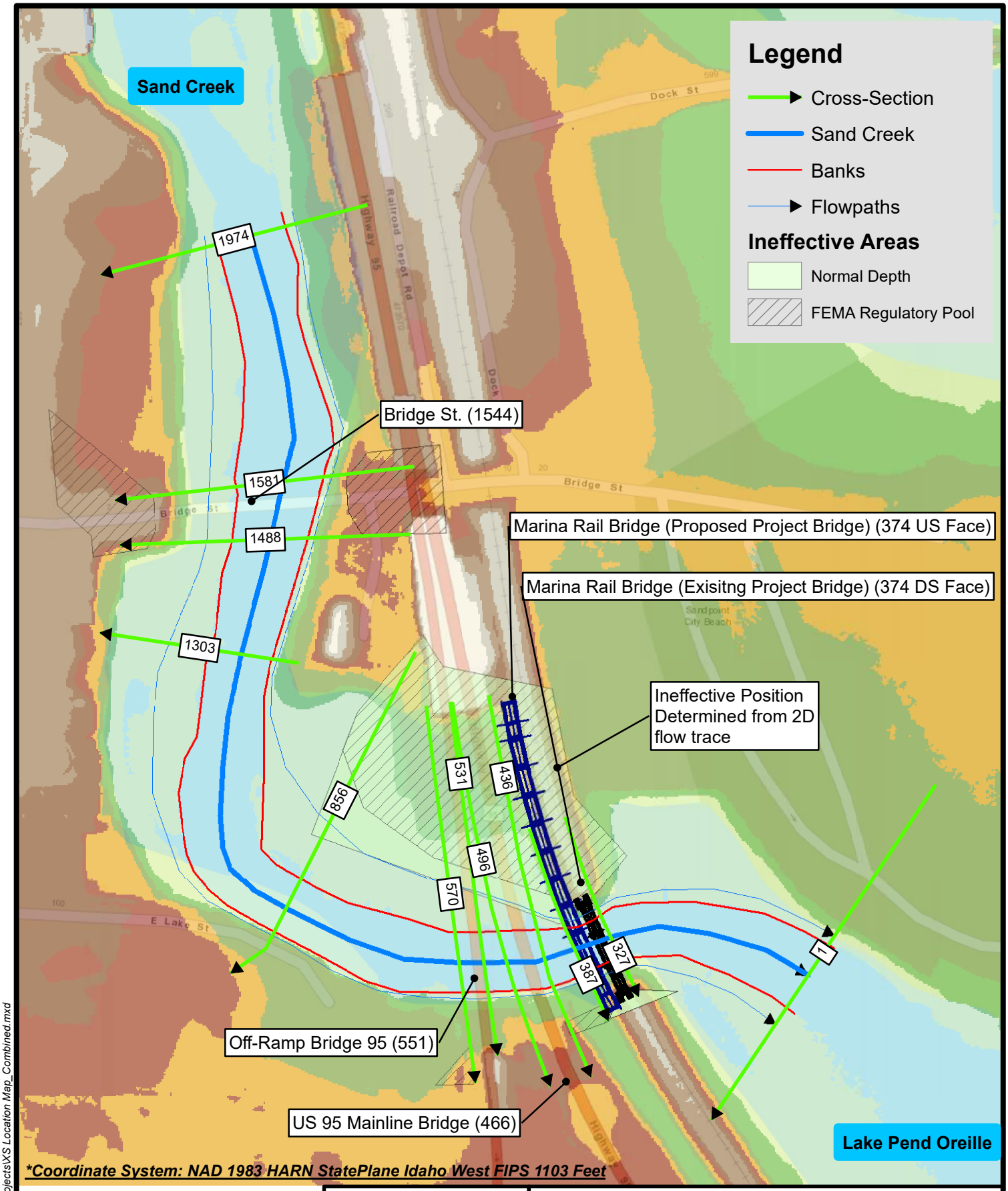
SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS

Attachment D: Hydraulic Cross-Section Map



Coordinate System: NAD 1983 HARN StatePlane Idaho West FIPS 1103 Feet

0 100 200 Feet

1 in = 200 ft

N W E S

HANSON
Hanson Professional Services Inc.

Cross-Section Location Map

BNSF Railway Company
Bridge 3.1 Over Sand Creek
Sandpoint, Idaho

Job Number: 14R0057

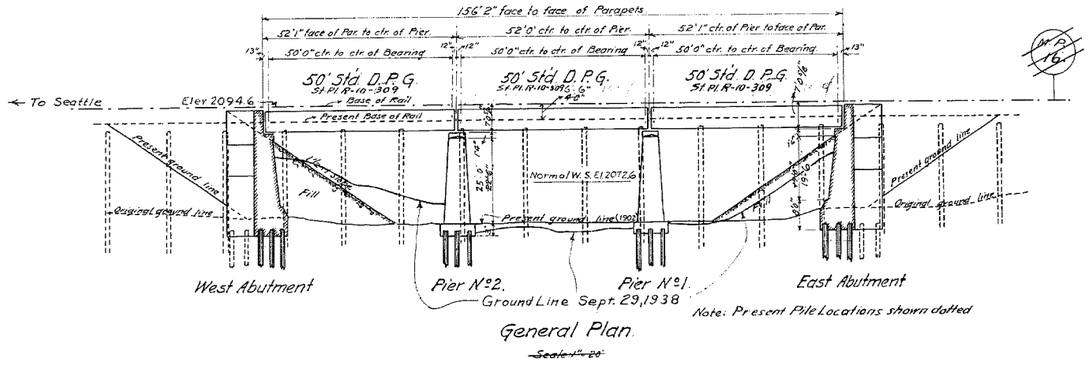
I:\14jobs\14R0057\CAD\GIS\Projects\XS Location Map_Combined.mxd

Attachment E: Existing Bridge Plans

442-57

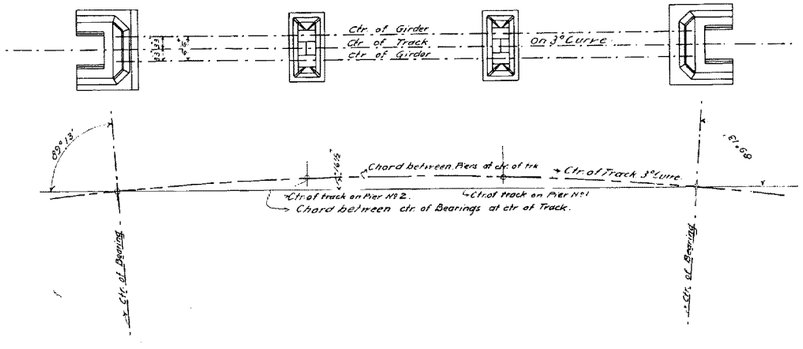
N.P.R.Y.
Idaho Div. Main Line.
3-50' D.P.G. Spans.
Bridge Numbr. ~~3~~ 3.1
Sand Point.
Office of Chief Engr. April 4th 1902.

Approved:-
Chief Engineer



General Plan.

~~Scale 1" = 20'~~

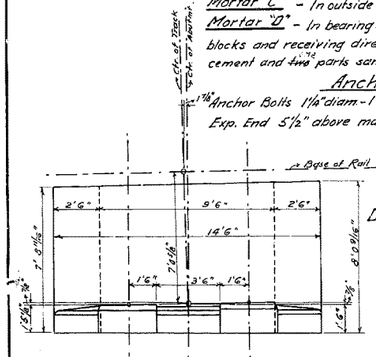


Concrete and Mortar

All Cement to be Best American Portland Cement,
All Sand to be clean, coarse and sharp.
Broken stone or quartz pebbles to be clean and not over 2½" in size
All proportions to be measured by volume.
Mixtures not so wet as to let water flush to top except by tamping.
Concrete "A" - In body of Piers and Abutments. One part cement, three parts sand and five parts broken stones or pebbles
Concrete "B" - In foundations and footing courses. Same mixture as above. Boulders (Nigger Heads) not to exceed one foot in size thrown in promiscuously and thoroughly imbedded by ramming.
Mortar "C" - In outside shell. One part cement and three parts sand.
Mortar "D" - In bearing blocks and parts of coping serving as bearing blocks and receiving direct pressure from superstructure. One part cement and ~~two~~ ½ parts sand.

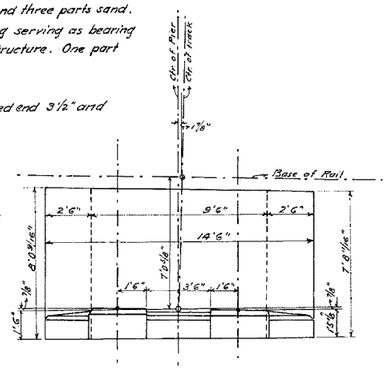
Anchor Bolts.

1⅛" Anchor Bolts 1⅛" diam - 1'4" long. To project Fixed end 3½" and Exp. End 5½" above masonry.



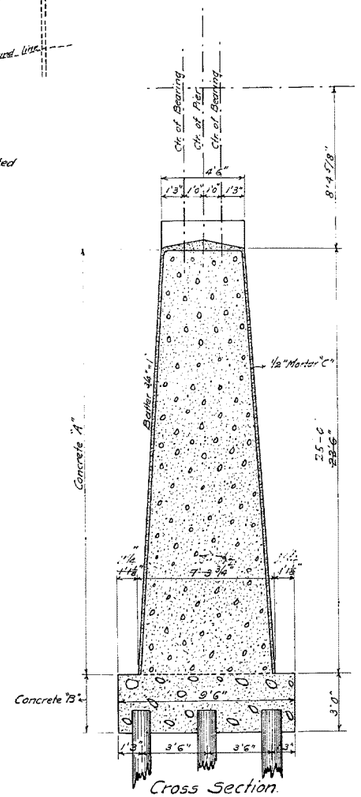
Detail of Upper Part of Abutments.
Scale: 1¼" = 1'

West Abutment.

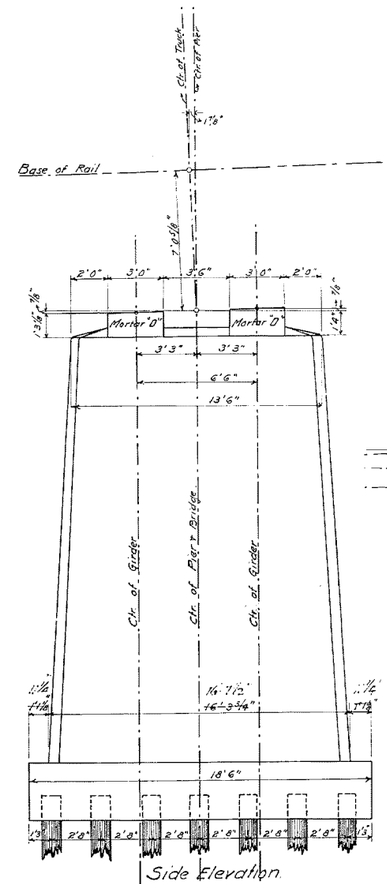


East Abutment

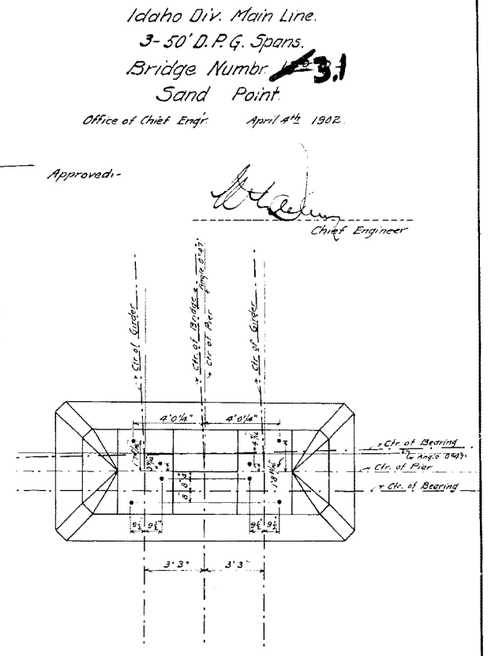
Note: Balance of Abutments same as for Bridge No 13.



Cross Section.



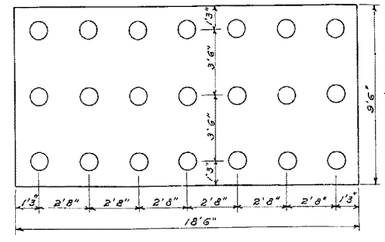
Side Elevation.



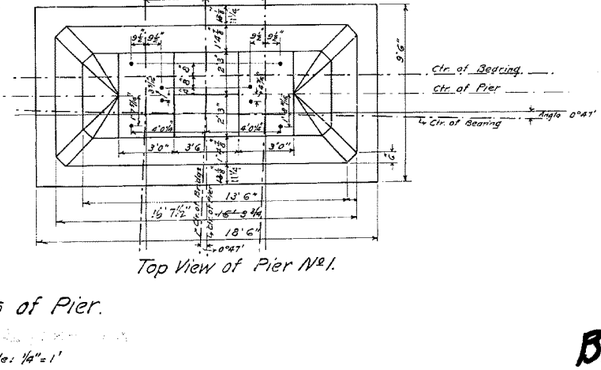
Top View of Pier No 2.

Note. Pier No 2 same as Pier No 1 except as shown.

Note - Dimensions in red show changes made on account of raise in grade of 2'6".



Plan of Pile Foundation.



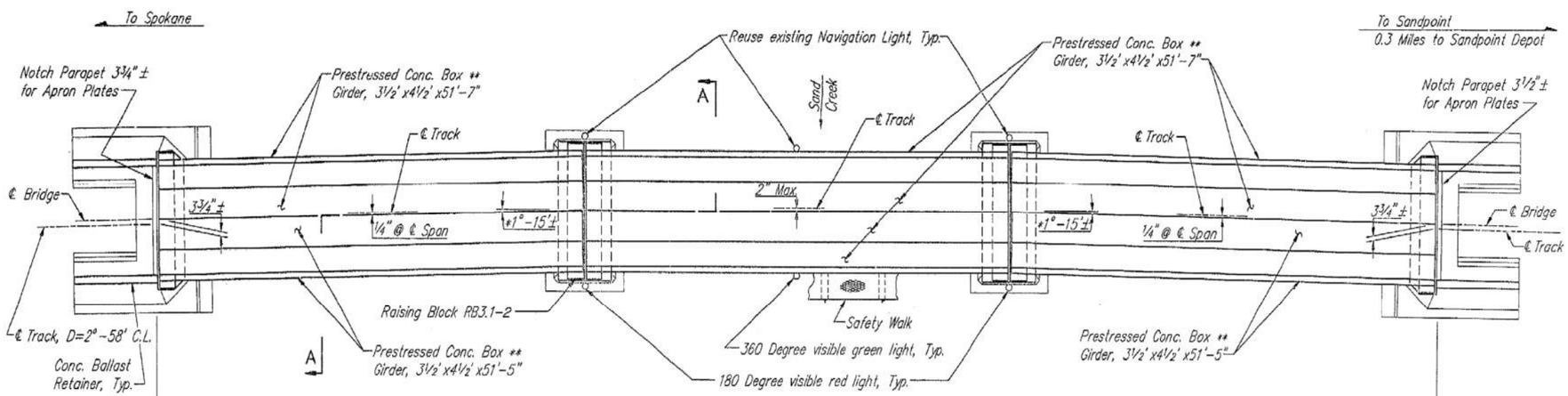
Top View of Pier No 1.

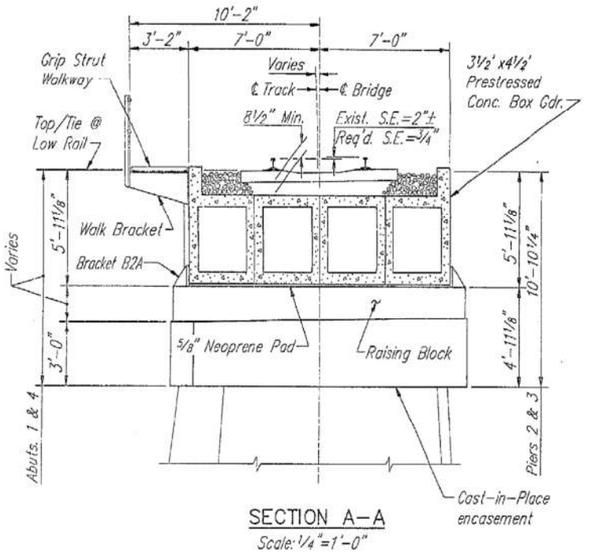
Details of Pier.

Scale: 1/4" = 1'

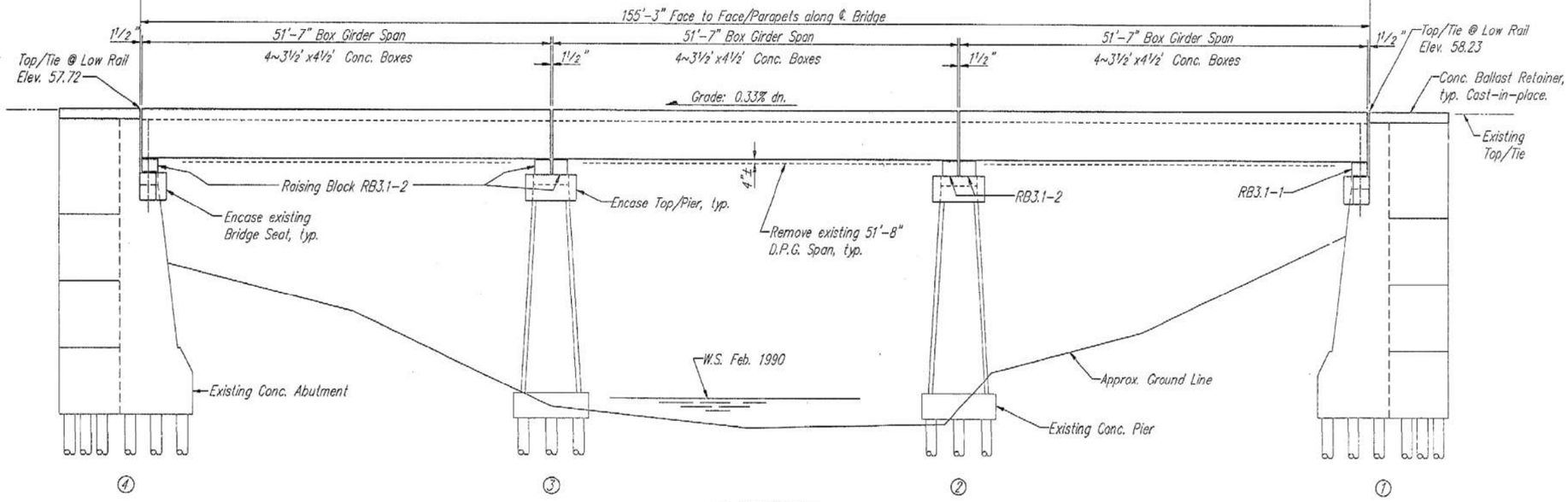
BR. # 3.1

442-57
Bridge No 3.1 Sand Point. Idaho Div. Main line
Complete in two sheets Sheet No 1
O.K. R.T.





SECTION A-A
Scale: ¼"=1'-0"



ELEVATION
Scale: ⅛"=1'-0"

GENERAL NOTES

Design Loading: Coopers E80 (Superstructure)

New construction shown in heavy lines. Existing structure to be retained shown in light solid lines. Portion of structure to be removed shown in light dashed lines.

Bridge stationing and elevations based on Survey Notes dated 11-28-89, Director Engineering Office, St. Paul, MN

Bench Mark: Paint mark near right end of Abutment 1 bridge seat. Assumed Elevation= 50.00

REFERENCES

Correspondence File ~ 110150-0045-3.1

Plan File ~ 0045-3.1

LIST OF DRAWINGS

PLAN NO.	TITLE
0045-3.1-1	General Plan ~ Replace Superstructure
0045-3.1-2	Raising Block Detail
0045-3.1-3	Pier Shaft & Abut. Modifications
0045-3.1-4	Ballast Retainer & Deck Details
0045-3.1-5	Field Erection Details
0045-3.1-6	Deck & Walk Details
0045-3.1-7	51'-7" Long Single P/S Box Girder
0045-3.1-8	51'-5" Long Single P/S Box Girder

R. G. CRABTREE LICENSED 5484 LA./MISS. PROFESSIONAL ENGINEER

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

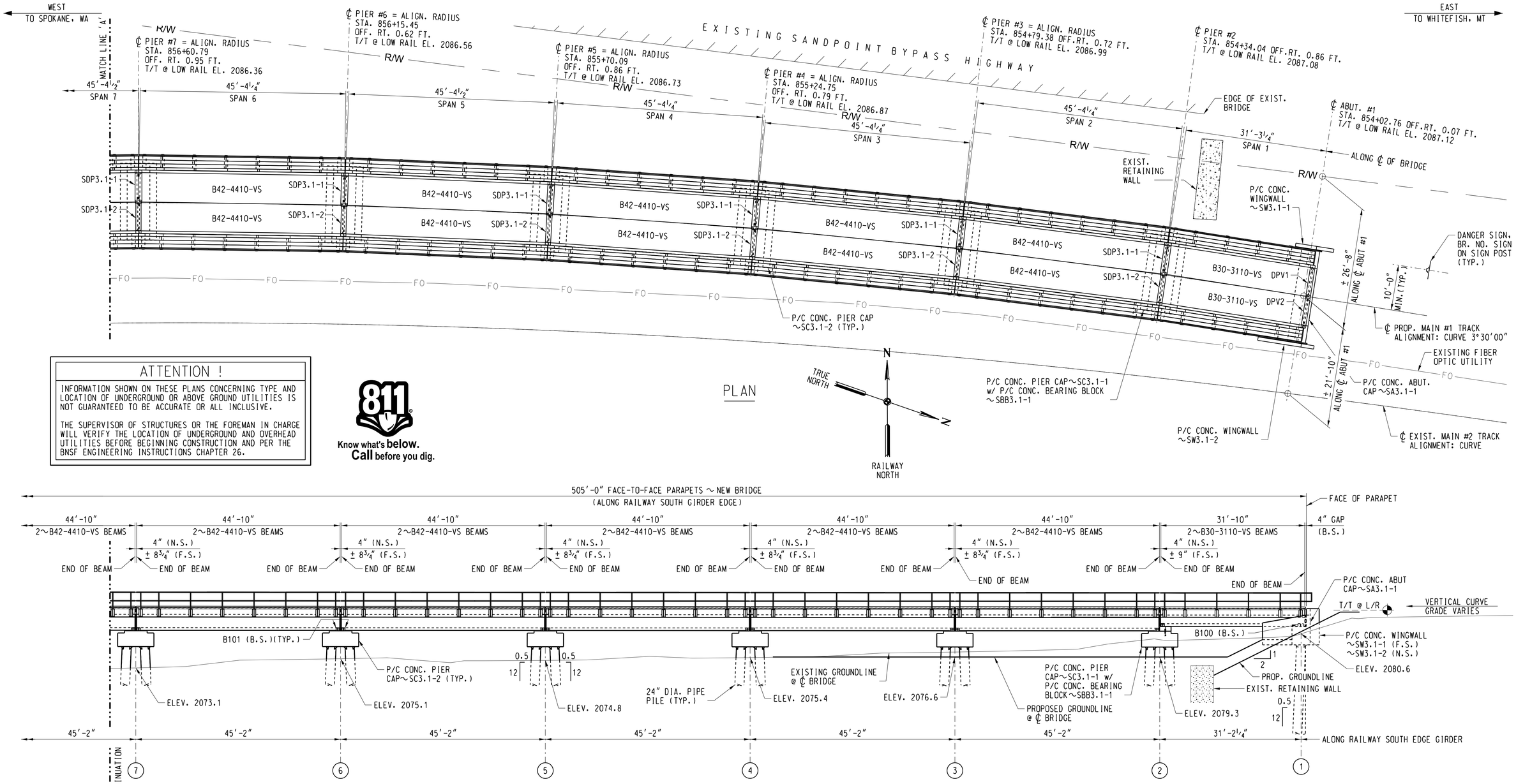
DES. DRW DRW. TLW CHK. BTM℄

LINE SEGMENT	0045
AUTHORITY	
DATE	July, 1990
ACCEPTED:	
DIRECTOR ENGINEERING SERVICES	

BURLINGTON NORTHERN RAILROAD COMPANY
SANDPOINT TO SPOKANE
BRIDGE 3.1 NEAR SANDPOINT, ID
GENERAL PLAN ~ REPLACE SUPERSTRUCTURE

PLAN NO. 0045-3.1-1 SHEET 1 of 8

Attachment F: Proposed Bridge Plans



PLAN

ATTENTION !

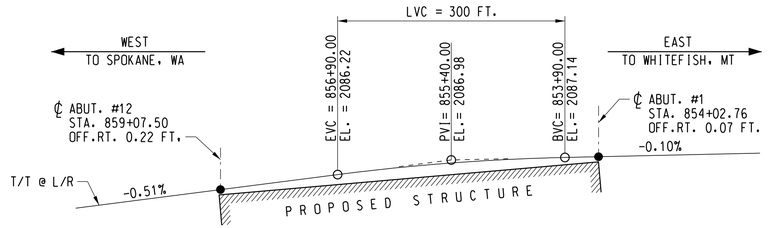
INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.

THE SUPERVISOR OF STRUCTURES OR THE FOREMAN IN CHARGE WILL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION AND PER THE BNSF ENGINEERING INSTRUCTIONS CHAPTER 26.

811 Know what's **below.** **Call** before you dig.

ELEVATION

(LOOKING RY NORTH)



PROPOSED VERTICAL CURVE DIAGRAM

NOTES:

1. EXISTING GROUNDLINE ELEVATIONS ARE APPROXIMATE.
2. ALL TRACTION TREAD PANELS SHALL BE FIELD CUT TO MAINTAIN 2" GAP BETWEEN PANEL ENDS AT ℄ PIER CAP.
3. SEE PLAN NO. 0045-0003.100-034 THRU -039 FOR LOCATIONS AND DETAILS OF HANDRAIL PANELS.
4. PIER PROTECTION WALLS NOT SHOWN FOR CLARITY. SEE PLAN NO. 0045-0003.100-005 THRU -008.
5. SEE PLAN NO. 0045-0003.100-033 FOR TRACTION TREAD PANEL LAYOUT.

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (1 OF 2)

PLAN NO: 0045-0003.100-003 SHEET: 03 OF 39

HANSON Hanson Professional Services Inc.

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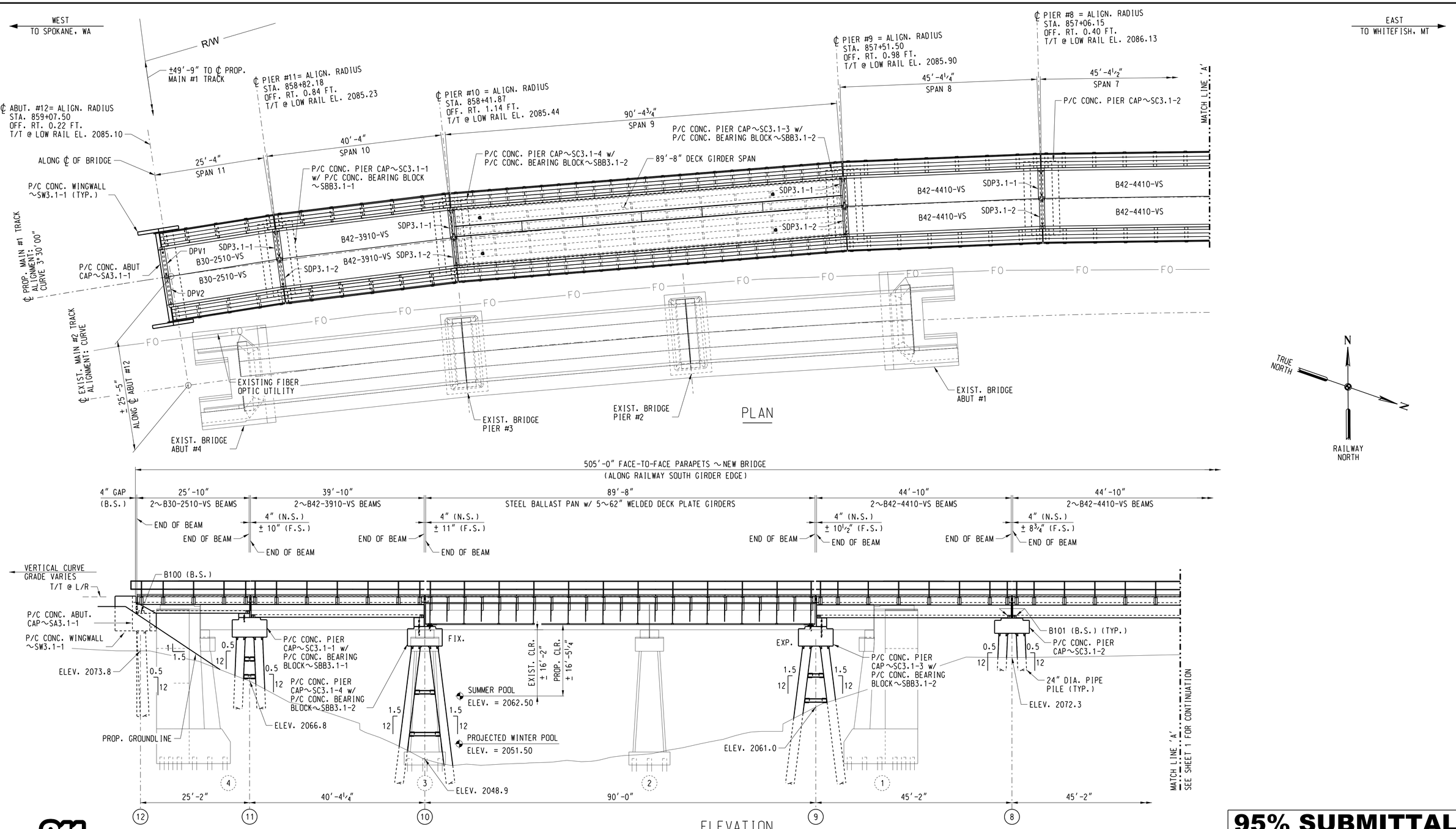

Know what's below. Call before you dig.

ATTENTION !

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HANSON
Hanson Professional Services Inc.

NOTES:

1. EXISTING GROUNDLINE ELEVATIONS ARE APPROXIMATE.
2. ALL TRACTION TREAD PANELS SHALL BE FIELD CUT TO MAINTAIN 2" GAP BETWEEN PANEL ENDS AT ℄ PIER CAP.
3. SEE PLAN NO. 0045-0003.100-034 THRU -039 FOR LOCATIONS AND DETAILS OF HANDRAIL PANELS.
4. PIER PROTECTION WALLS NOT SHOWN FOR CLARITY. SEE PLAN NO. 0045-0003.100-005 THRU -008.
5. SEE PLAN NO. 0045-0003.100-033 FOR TRACTION TREAD PANEL LAYOUT.

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (2 OF 2)

PLAN NO: 0045-0003.100-004 SHEET: 04 OF 39

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WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

EXISTING SANDPOINT BYPASS HIGHWAY

EDGE OF EXIST. BRIDGE

MATCH LINE 'A'

℄ PIER #7 = ALIGN. RADIUS
STA. 856+60.79
OFF. RT. 0.95 FT.

℄ PIER #6 = ALIGN. RADIUS
STA. 856+15.45
OFF. RT. 0.62 FT.

2'-0" (TYP.) 2'-0" (TYP.)

6'-0" (TYP.)

℄ PIER #5 = ALIGN. RADIUS
STA. 855+70.09
OFF. RT. 0.86 FT.

24" DIA. x ½" WALL OPEN ENDED PIPE PILE (TYP.) - SEE PLAN NO. 0045-0003.100-010 FOR PILE TIP LOCATIONS

℄ PIER #4 = ALIGN. RADIUS
STA. 855+24.75
OFF. RT. 0.79 FT.

℄ PIER #3 = ALIGN. RADIUS
STA. 854+79.38
OFF.RT. 0.72 FT.

APPROXIMATE LOCATION OF INDICATOR PILE

℄ PIER #2
STA. 854+34.04
OFF.RT. 0.86 FT.

EXIST. RETAINING WALL

℄ ABUT. #1
STA. 854+02.76
OFF.RT. 0.07 FT.

℄ PROP. MAIN #1 TRACK
ALIGNMENT: CURVE 3°30'00"

℄ EXIST. MAIN #2 TRACK
ALIGNMENT: CURVE

½ :12

90° TYP.

PILE LAYOUT PLAN

N
TRUE NORTH
RAILWAY NORTH

ATTENTION !

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.

THE CONTRACTOR SHALL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION AND PER THE BNSF ENGINEERING INSTRUCTIONS CHAPTER 26.

811 Know what's **below.** **Call** before you dig.

℄ PIER #9
STA. 857+51.50
OFF. RT. 0.98 FT.

℄ PIER #8
STA. 857+06.15
OFF. RT. 0.40 FT.

℄ PIER #10
STA. 858+41.87
OFF. RT. 1.14 FT.

℄ PIER #11
STA. 858+82.18
OFF. RT. 0.84 FT.

℄ PIER #12
STA. 859+07.50
OFF. RT. 0.22 FT.

℄ PROP. MAIN #1 TRACK
ALIGNMENT: CURVE 3°30'00"

℄ EXIST. MAIN #2 TRACK
ALIGNMENT: CURVE

1½ :12

EXIST. BRIDGE

MATCH LINE 'A'

PILE LAYOUT PLAN

N
TRUE NORTH
RAILWAY NORTH

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

WORK PLAN NO. 0045-0003.100-008 AND 0045-0003.100-009 TOGETHER.

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
PILE LAYOUT PLAN

PLAN NO: 0045-0003.100-009 SHEET: 09 OF 39

HANSON
Hanson Professional Services Inc.

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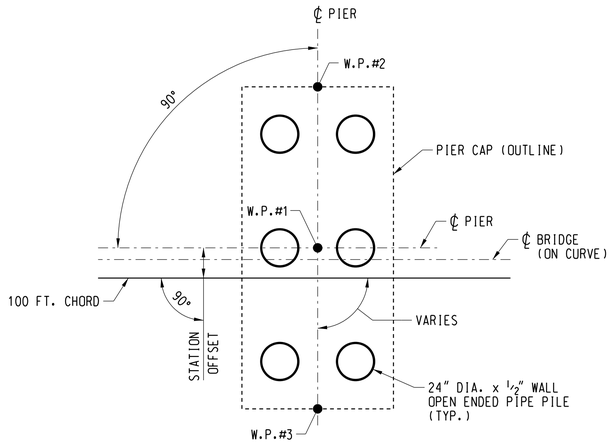

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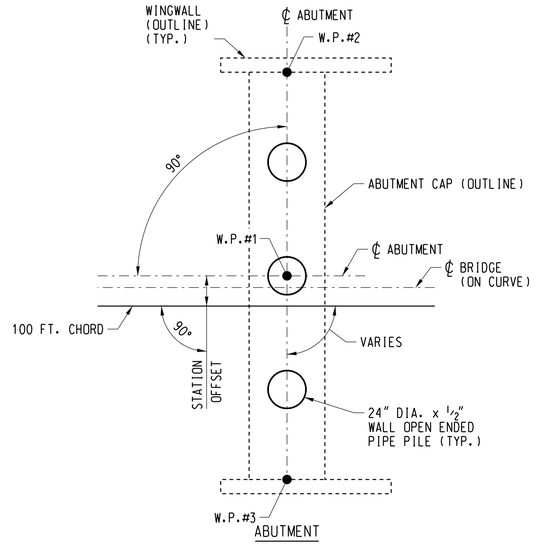


ABUTMENT

TYPICAL PILE LAYOUT DIAGRAMS - PIERS & ABUTMENTS

PILE BATTER NOT SHOWN

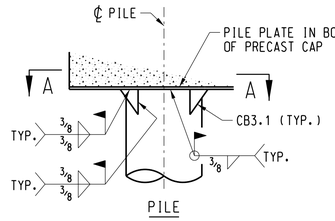
PILE NOTES:

1. CONTRACTOR MAY PROPOSE AN ALTERNATE LOCATION OF THE INDICATOR PILE FOR APPROVAL OF THE ENGINEER.
2. DYNAMIC PILE TESTING SHALL OCCUR AT ABUTMENT 1 AND PIERS 4, 7, 9 & 10. CONTRACTOR SHALL SELECT PILE AT EACH LOCATION FOR APPROVAL.
3. PILE SPACINGS SHOWN ARE AT PILE CUTOFF ELEVATIONS.
4. SYMBOL ←X:12 DENOTES DIRECTION AND AMOUNT OF PILE BATTER.
5. USE TEMPLATE TO ENSURE PILE LOCATION DURING DRIVING IS REQUIRED.
6. PILES SHALL MEET THE MATERIAL REQUIREMENTS OF A.S.T.M. A252, GRADE 3 (MOD) WITH A MINIMUM YIELD STRENGTH OF 50 KSI OR AN APPROVED EQUAL.
7. PILES (AS NOTED IN THE TABLE OF ELEVATIONS) TO BE DRIVEN WITH REINFORCED TIPS (PILE POINTS) - VS700 BY VERSA STEEL INC. OR AN APPROVED EQUAL.
8. NONDESTRUCTIVE TESTING - THE ENTIRE LENGTH OF THE COMPLETE JOINT PENETRATION GROOVE BUTT WELDS OF PILE SPLICES SHALL BE EXAMINED BY ULTRASONIC TESTING. THESE INSPECTIONS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE A.W.S. D1.1.
9. AN EPOXY PROTECTIVE COATING SHALL BE APPLIED TO CONNECTION BARS, BRACING AND THE PILE SURFACE (INTERIOR AND EXTERIOR) FROM PILE CUTOFF TO GROUNDLINE. PROTECTIVE COATING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCESS. THE EPOXY PROTECTIVE COATING SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 04620.

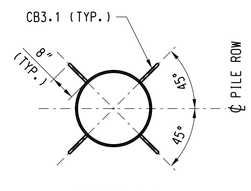
TABLE OF ELEVATION - BRIDGE 3.1

LOCATION	T/T @ LOW RAIL ELEVATION	BRIDGE SEAT ELEVATION	PILE CUTOFF ELEVATION	ESTIMATED TIP ELEVATION	EXTENDED PILE LENGTH (FT)	MIN. ULT. RESISTANCE (TONS)	T/T TO PILE CUTOFF	W.P.#1		W.P.#2		W.P.#3	
								NORTHING	EASTING	NORTHING	EASTING	NORTHING	EASTING
ABUT. 1 *	2087.12	2083.29	2079.29	1959.3	120	235	7'-10"	59557.99	31180.63	59556.12	31170.30	59559.85	31190.97
PIER 2 *	2087.08	2083.23/2082.21	2078.71	1955.7	123	235	8'-4½"	59527.32	31186.79	59525.56	31177.88	59528.85	31194.56
PIER 3 *	2086.99	2082.12	2078.62	1955.6	123	235	8'-4½"	59482.82	31195.58	59480.95	31187.29	59484.70	31203.87
PIER 4 *	2086.87	2081.98	2078.48	1955.4	124	235	8'-4¾"	59438.72	31206.20	59436.61	31197.96	59440.82	31214.43
PIER 5 *	2086.73	2081.84	2078.34	1954.8	124	235	8'-4¼"	59394.93	31218.03	59392.60	31209.85	59397.26	31226.20
PIER 6 *	2086.56	2081.71	2078.21	1955.1	124	235	8'-4¼"	59351.48	31231.07	59348.92	31222.96	59354.03	31239.18
PIER 7 *	2086.36	2081.48	2077.98	1953.1	125	235	8'-4½"	59308.41	31245.31	59305.63	31237.28	59311.19	31253.34
PIER 8 *	2086.13	2081.25	2077.75	1952.3	126	235	8'-4½"	59265.75	31260.74	59262.75	31252.79	59268.75	31268.69
PIER 9	2085.90	2081.03/2078.94	2074.44	1911.0	164	335	11'-5½"	59223.54	31277.34	59220.32	31269.48	59226.76	31285.21
PIER 10	2085.44	2078.49/2080.57	2073.99	1898.9	176	335	11'-5½"	59140.79	31313.72	59137.18	31306.03	59144.40	31321.42
PIER 11 *	2085.23	2080.37/2081.39	2076.87	1946.8	131	235	8'-4¼"	59104.58	31331.49	59100.74	31323.90	59108.42	31339.07
ABUT. 12 *	2085.10	2081.27	2077.27	1917.3	160	310	7'-10"	59082.25	31343.44	59077.29	31334.18	59087.21	31352.70

* PILES REQUIRE A REINFORCED TIP (PILE POINT)



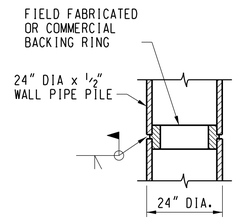
PILE



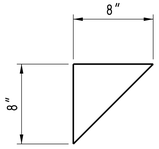
SECTION A-A

PILE-TO-PIER DETAILS

AFTER PRECAST CAP IS SET IN PROPER LOCATION, PLACE AND WELD 4~CB3.1'S PER PILE AS SHOWN. BURNING THE SIDE OF CB3.1 AS REQUIRED TO FIT BATTERED PILES. PAINT CB3.1'S & PILE PLATES AFTER WELDING.



PIPE PILE SPLICE DETAILS



CONNECTION BAR CB3.1

1 BAR 8" x ¾" x 0'-8"
WEIGHT = 6.8 LBS.

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
PILE DETAILS AND TABLE OF ELEVATIONS

PLAN NO: 0045-0003.100-010 | SHEET: 10 OF 39

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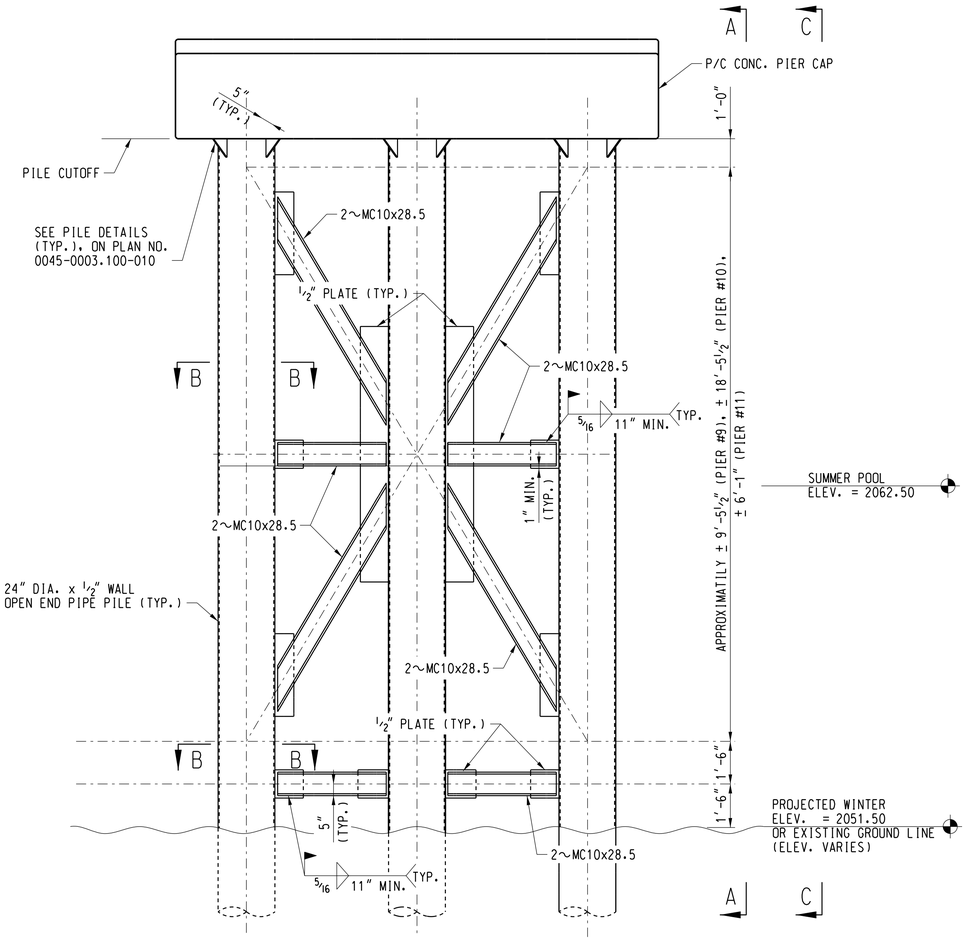
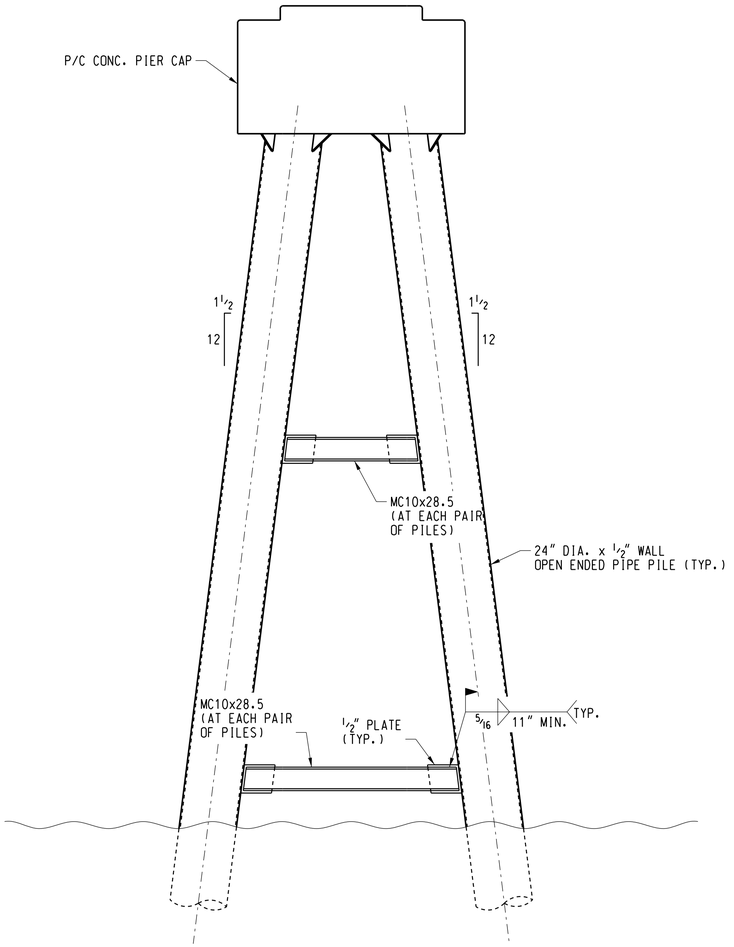
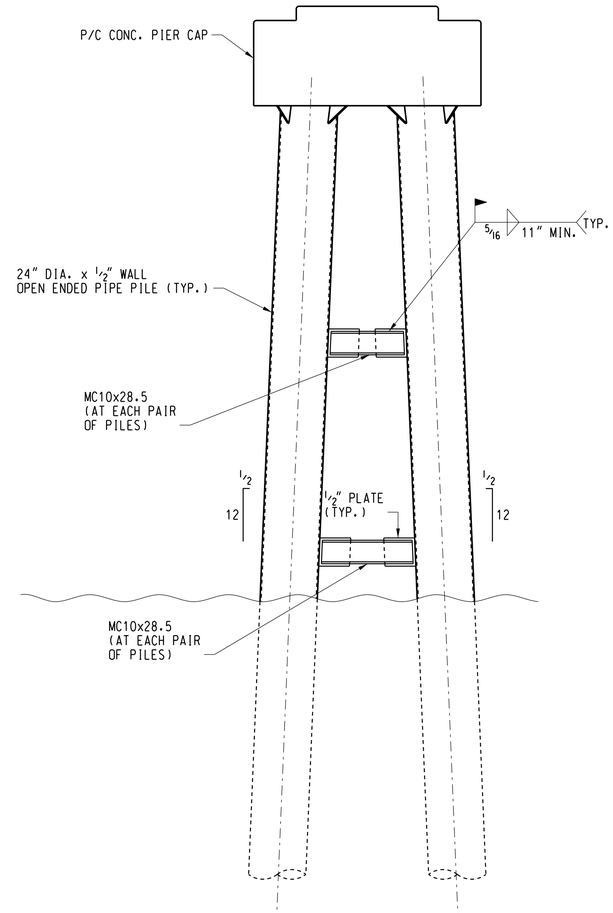


TYPICAL SECTION AT PIERS #9 THRU #11

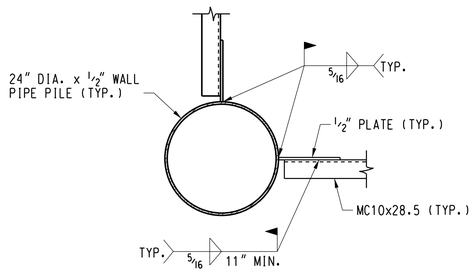
(LOOKING RY WEST)



ELEVATION A-A (PIERS #9 & #10)



ELEVATION C-C (PIER #11)



SECTION B-B

NOTES:

1. SEE PLAN NO. 0045-0003.100-010 FOR ADDITIONAL NOTES ON PILING, CONNECTION BARS AND BRACING.
2. ALL BRACING SHALL BE INSTALLED PRIOR TO SUBSTANTIAL COMPLETION OF THE BRIDGE.

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
PILE BRACING DETAILS - PIERS #9 THRU #11

PLAN NO: 0045-0003.100-011 SHEET: 11 OF 39

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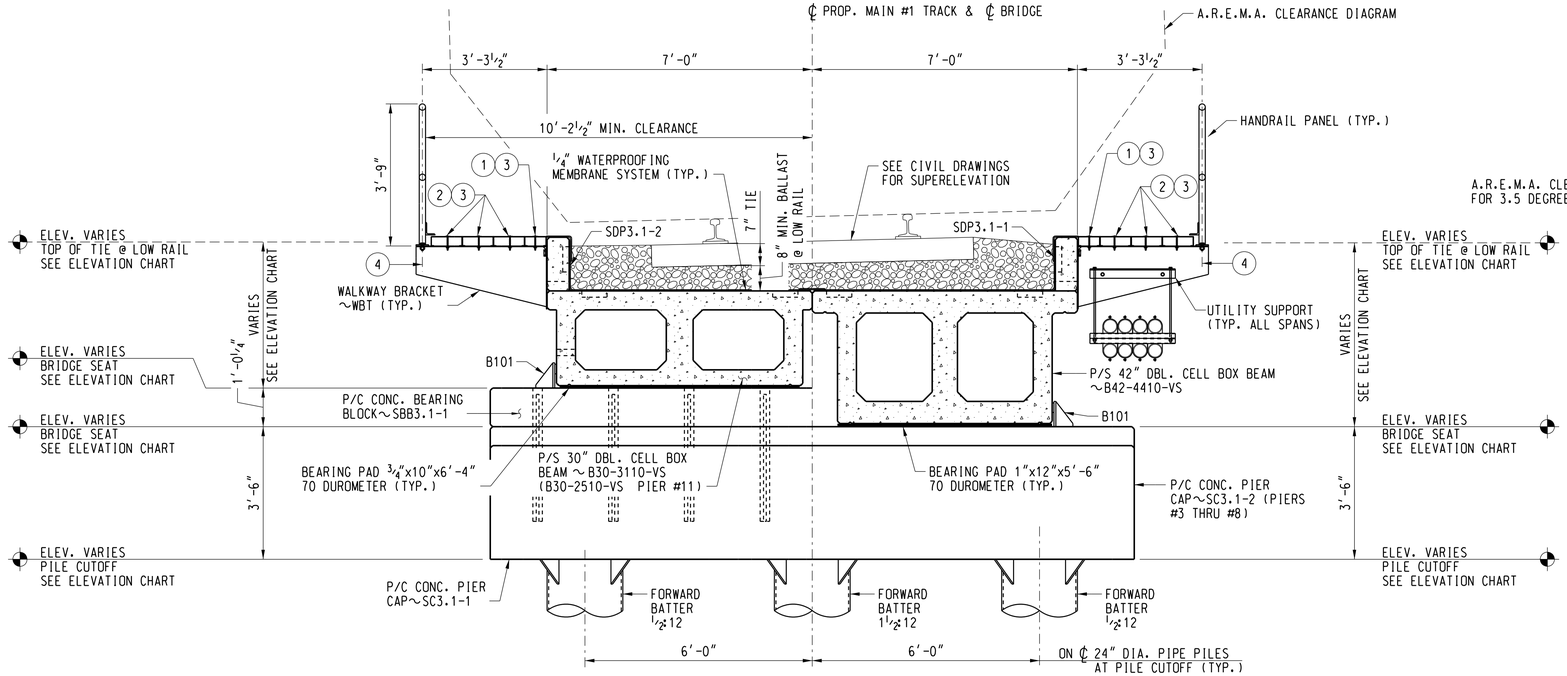
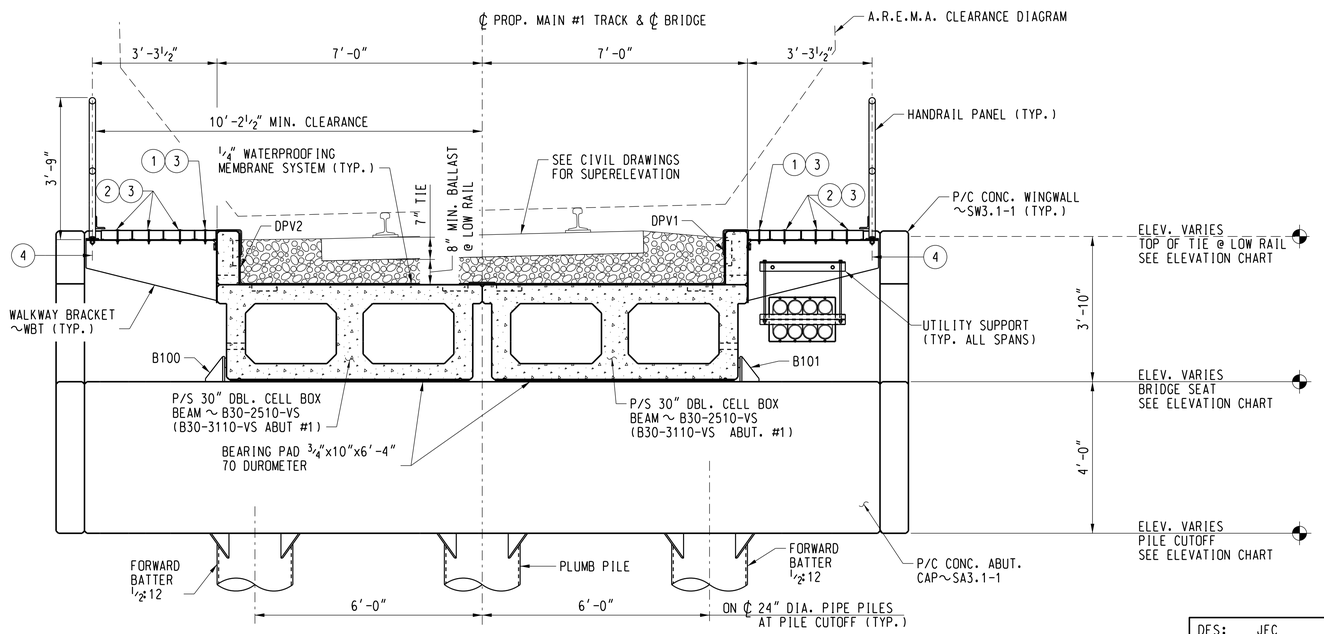


PIER #2 (PIER #11 OPP. HAND)

PIER #3 THRU #8

TYPICAL SECTIONS

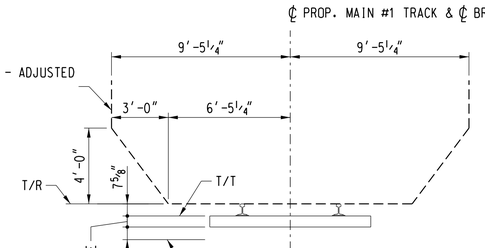
(LOOKING RY WEST)



ABUT. #12 (ABUT. #1 OPP. HAND)

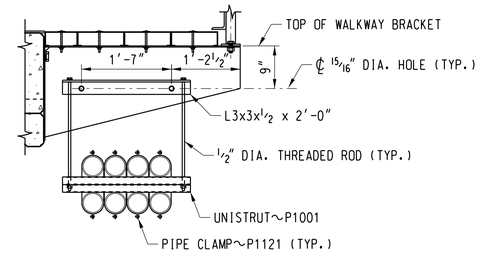
TYPICAL SECTIONS

(LOOKING RY WEST)



A.R.E.M.A. CLEARANCE WINDOW

(ADJUSTED FOR CURVED TRACK)



WALKWAY BRACKET - WBT

UTILITY SUPPORT DETAIL

NOTES:

1. 1~3″x7″x13 GA. TRCTION TREAD SAFETY GRATING
2. 1~3″x10″x13 GA. TRACTION TREAD SAFETY GRATING
3. FASTEN GRATING TO WALKWAY BRACKET WITH:
   1~⅜″ DIA. 4″ CARRIAGE BOLT
   1~WASHER (⅜″ I.D.x⅞″ O.D.)
   1~LOCK NUT, SELF LOCKING NYLON INSERT
4. FASTEN HANDRAIL PANEL TO BRACKET WITH:
   2~¾″ DIA. x 2¼″ BOLTS
   4~WASHERS (13⁄16″ I.D.x1 7⁄16″ O.D.)
   2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

* FOR ELEVATION CHART SEE PLAN NO. 0045-0003.100-010

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MAY 15, 2019

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DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
TYPICAL SECTIONS -
ABUT. #1 & #12, PIER #2 THRU #8 & #11

PLAN NO: 0045-0003.100-012 SHEET: 12 OF 39

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Hanson Professional Services Inc.

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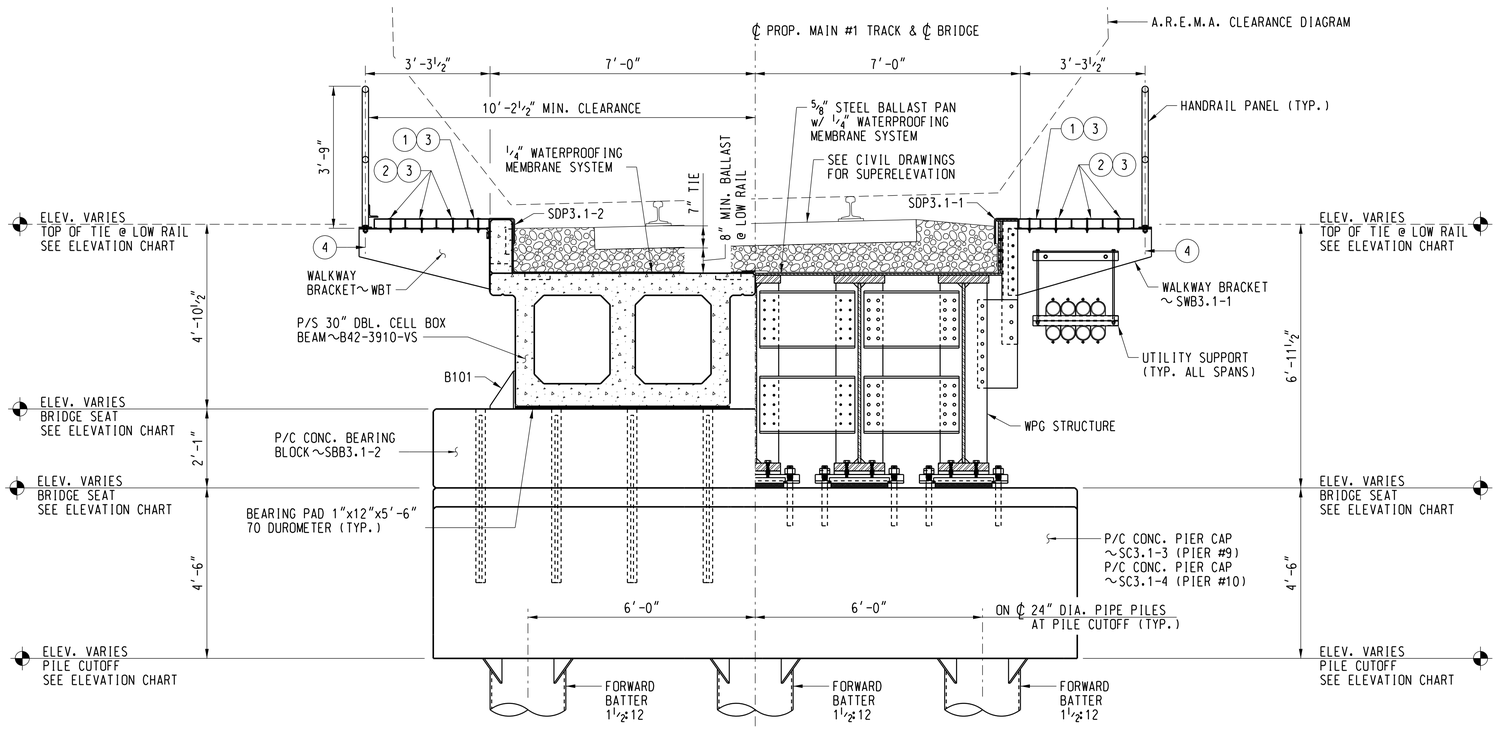
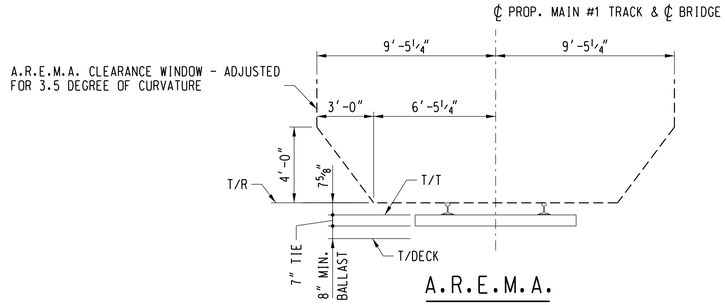


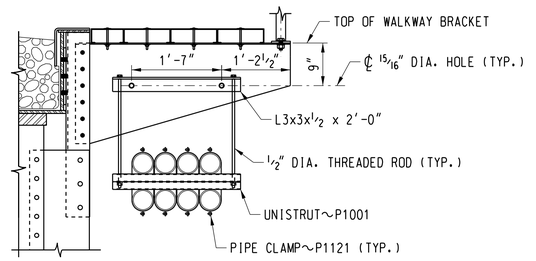
TYPICAL SECTION - PIER #9 & #10

(LOOKING RY WEST)



A.R.E.M.A. CLEARANCE WINDOW

(ADJUSTED FOR CURVED TRACK)



WALKWAY BRACKET - SWB3.1-1

UTILITY SUPPORT DETAILS

NOTES:

1. 1~3″x7″x13 GA. TRACTION TREAD SAFETY GRATING
2. 1~3″x10″x13 GA. TRACTION TREAD SAFETY GRATING
3. FASTEN GRATING TO WALKWAY BRACKET WITH:
   1~3/8″ DIA. 4″ CARRIAGE BOLT
   1~WASHER (3/8″ I.D.x7/8″ O.D.)
   1~LOCK NUT, SELF LOCKING NYLON INSERT
4. FASTEN HANDRAIL PANEL TO BRACKET WITH:
   2~¾″ DIA. x 2¼″ BOLTS
   4~WASHERS (13/16″ I.D.x1 7/16″ O.D.)
   2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

* FOR ELEVATION CHART SEE PLAN NO. 0045-0003.100-010

95% SUBMITTAL
NOT FOR CONSTRUCTION
MAY 15, 2019

DES:	JEC
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAY 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.1
OVER SAND CREEK NEAR SANDPOINT, ID
TYPICAL SECTIONS - PIER #9 & PIER #10
PLAN NO: 0045-0003.100-013 SHEET: 13 OF 39

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Hanson Professional Services Inc.

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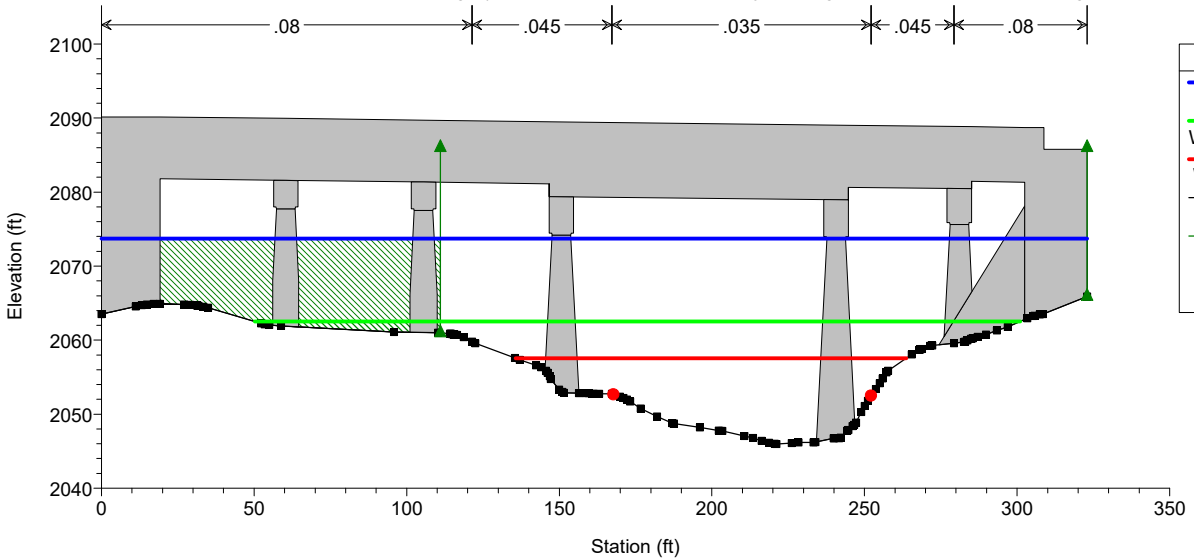
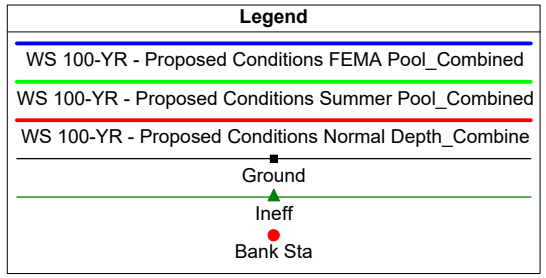
Attachment G: HEC-RAS Output

SandCreek Plan: 1) Proposed Conditions FEMA Pool_Combined 4/8/2019 2) Proposed Conditions Summer Pool_Combined 4/8/2019 3) Proposed Conditions Normal Depth_Combine 4/8/2019

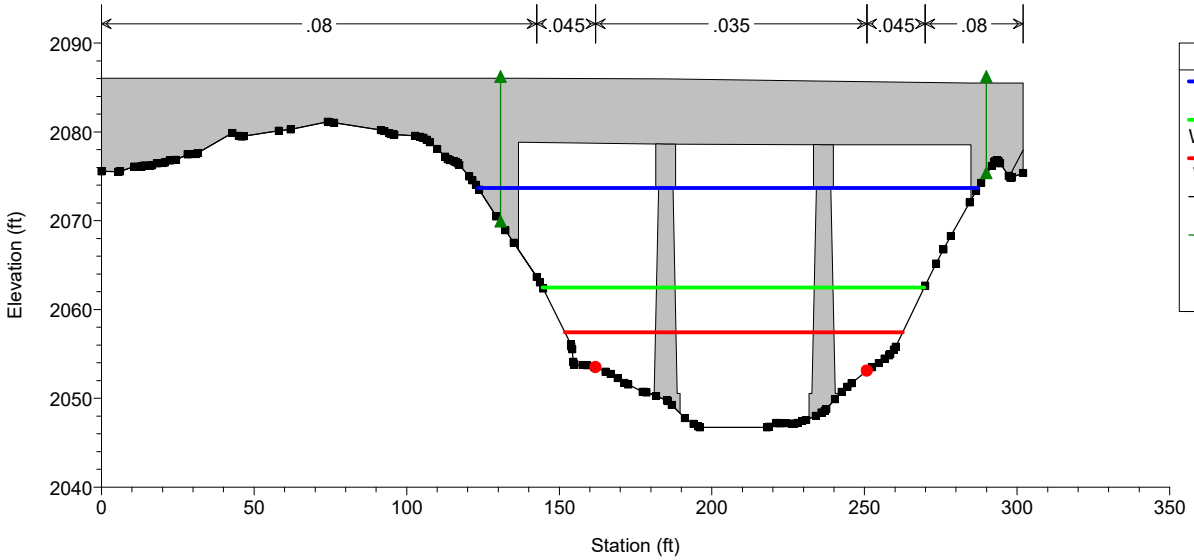
Marina Rail Bridge (Upstream Face - Proposed Project Bridge, Dow Construction of Bridge 3.1 over Sand Creek near Sandpoint

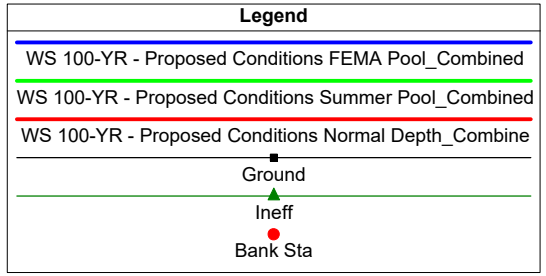




SandCreek Plan: 1) Proposed Conditions FEMA Pool_Combined 4/8/2019 2) Proposed Conditions Summer Pool_Combined 4/8/2019 3) Proposed Conditions Normal Depth_Combine 4/8/2019

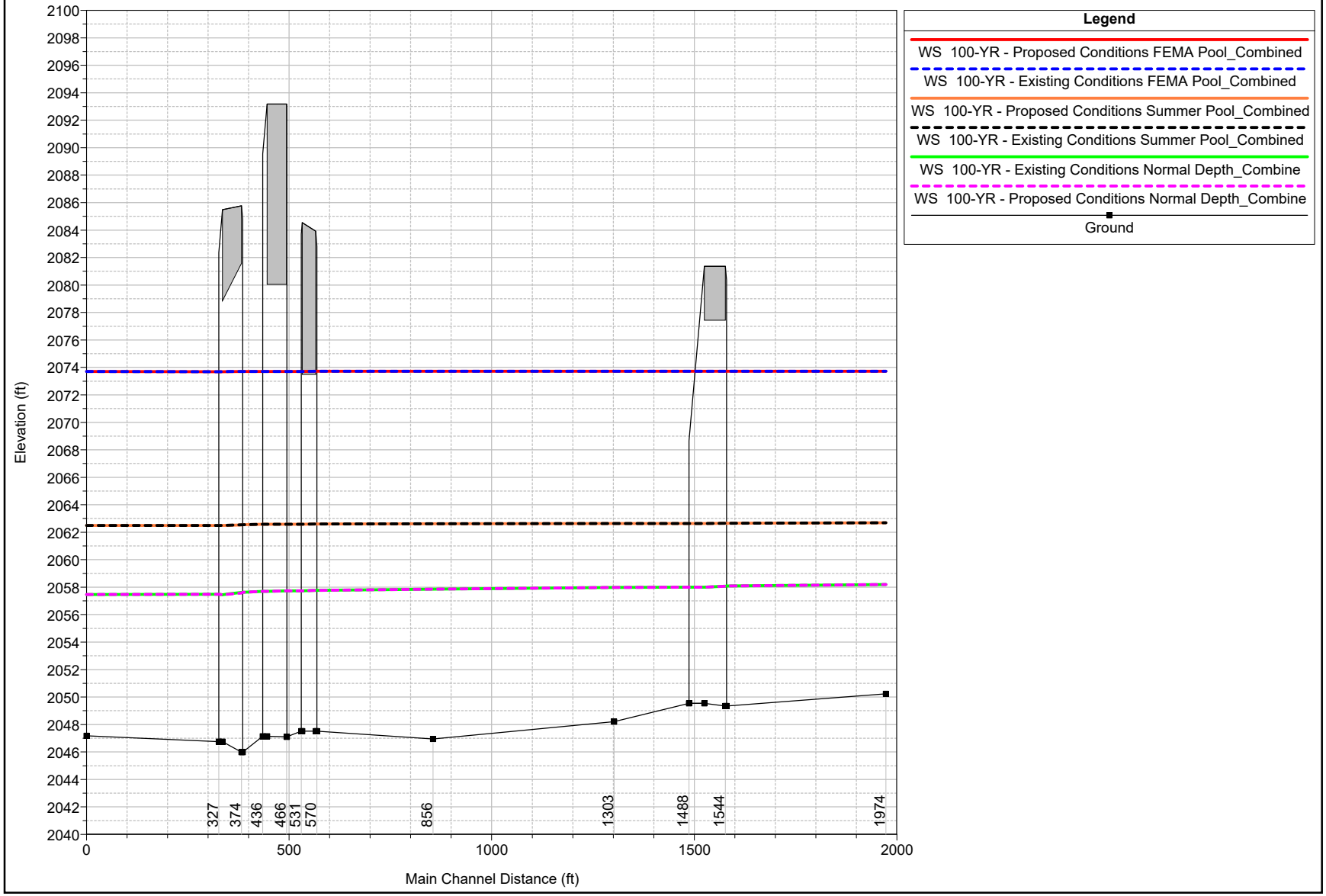
Marina Rail Bridge (Upstream Face - Proposed Project Bridge, Dow Construction of Bridge 3.1 over Sand Creek near Sandpoint





SandCreek Plan: 1) Proposed Conditions FEMA Pool_Combined 10/16/2018 2) Existing Conditions FEMA Pool_Combined 10/16/2018 3) Proposed Conditions Summer Pool_Combined 10/16/2018 4) Existing Conditions Summer Pool_Combined 10/16/2018 5) Existing Conditions Normal Depth_Combine 10/16/2018 6) Proposed Conditions Normal Depth_Combine 10/16/2018

Construction of Bridge 3.1 Over Sand Creek near Sandpoint



Cross section 3 should be located a short distance upstream from the bridge or culvert. This distance should only reflect the length required for the abrupt acceleration and contraction of the flow that occurs in the immediate area of the opening. Cross section 3 represents the natural ground of the channel and overbank area just upstream of the road embankment. This section is normally located near the toe of the upstream road embankment. This cross section should **Not** be placed immediately upstream of the bridge deck or culvert opening (for example some people wrongly place this cross section 1.0 foot upstream of the bridge deck or culvert opening). The bridge and culvert routines used between cross sections 2 and 3 account for the contraction losses that occur just upstream of the structure (entrance losses for the culvert routines). Therefore, this cross section should be place just upstream of the area where the abrupt contraction of flow occurs to get into the bridge opening or culvert. This distance will vary with the size of the bridge opening or culvert.

Parallel Bridges

With the construction of divided highways, a common modeling problem involves parallel bridges (Figure 5-12). For new highways, these bridges are often identical structures. The hydraulic loss through the two structures has been shown to be between one and two times the loss for one bridge [Bradley, 1978]. The model results [Bradley, 1978] indicate the loss for two bridges ranging from 1.3 to 1.55 times the loss for one bridge crossing, over the range of bridge spacing's tested. Presumably if the two bridges were far enough apart, the losses for the two bridges would equal twice the loss for one. If the parallel bridges are very close to each other, and the flow will not be able to expand between the bridges, the bridges can be modeled as a single bridge. If there is enough distance between the bridge, in which the flow has room to expand and contract, the bridges should be modeled as two separate bridges. If both bridges are modeled, care should be exercised in depicting the expansion and contraction of flow between the bridges. Expansion and contraction rates should be based on the same procedures as single bridges.

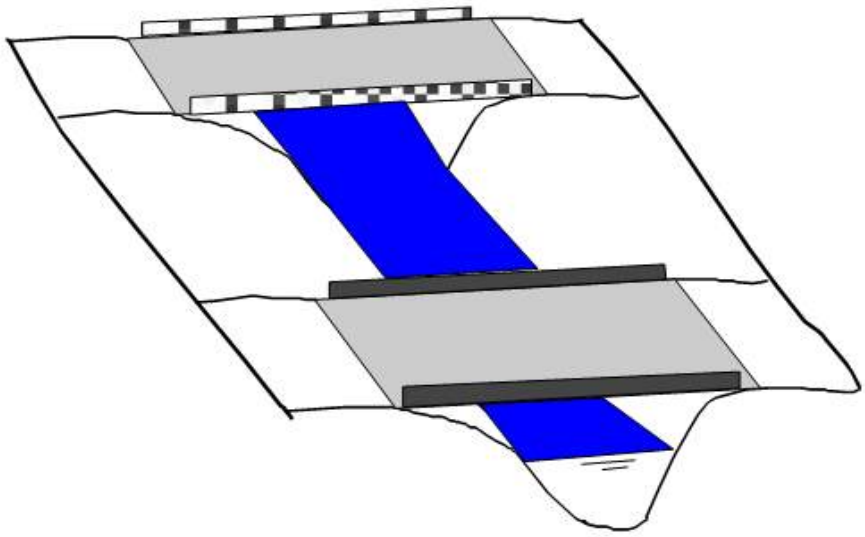


Figure 5-12 Parallel Bridge Example

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Existing Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2055.991	0	2056.07	0.000357	2.25	667.73	169.87	0.18
1581	10-YR	1455	2049.34	2055.877	2052.3	2055.93	0.000301	1.77	832.72	211.4	0.15
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2055.792	2052.53	2055.86	0.000405	2.08	724.33	193.2	0.18
1303	10-YR	1455	2048.2	2055.754	0	2055.79	0.000225	1.62	1035.06	242.33	0.12
856	10-YR	1455	2046.95	2055.655	2050.66	2055.7	0.000158	1.77	870.66	390.43	0.13
570	10-YR	1455	2047.51	2055.574	2051.62	2055.64	0.000275	2.1	744.17	360.65	0.16
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2055.557	2051.62	2055.63	0.000291	2.16	705.47	360.35	0.17
496	10-YR	1455	2047.11	2055.548	2051.19	2055.62	0.000255	2.14	729.11	262.85	0.16
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2055.523	2051.19	2055.59	0.000295	2.19	707.11	262.54	0.16
387	10-YR	1455	2045.98	2055.503	2049.79	2055.58	0.000207	2.27	679.75	110.67	0.15
337	10-YR	Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2055.418	2050.27	2055.52	0.0003	2.51	595.93	105.22	0.17
1	10-YR	1455	2047.18	2055.37	2051.51	2055.41	0.0002	1.53	971.05	250.32	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Existing Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2062.549	0	2062.56	0.000025	0.83	1932.66	214.98	0.04
1581	10-YR	1455	2049.34	2062.543	2052.3	2062.55	0.000016	0.65	2340.18	238.36	0.03
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2062.537	2052.53	2062.54	0.00002	0.73	2100.62	215.54	0.04
1303	10-YR	1455	2048.2	2062.536	0	2062.54	0.000011	0.59	2772.93	269.04	0.03
856	10-YR	1455	2046.95	2062.531	2050.66	2062.54	0.00001	0.58	2974.81	405.69	0.03
570	10-YR	1455	2047.51	2062.525	2051.62	2062.53	0.000015	0.68	2307.22	447.11	0.03
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2062.523	2051.62	2062.53	0.000017	0.72	2171.49	437.75	0.04
496	10-YR	1455	2047.11	2062.523	2051.19	2062.53	0.000016	0.71	2194.31	294.76	0.04
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2062.521	2051.19	2062.53	0.000018	0.73	2161.6	292.76	0.04
387	10-YR	1455	2045.98	2062.512	2049.79	2062.53	0.000026	0.99	1670.91	250.67	0.05
337	10-YR	Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2062.498	2050.27	2062.52	0.000036	1.11	1410.23	125.07	0.05
1	10-YR	1455	2047.18	2062.5	2051.53	2062.5	0.000009	0.52	2996.85	315.99	0.03

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Existing Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2073.706	0	2073.71	0.000002	0.36	4685.98	270.15	0.01
1581	10-YR	1455	2049.34	2073.706	2052.3	2073.71	0.000001	0.3	5164.12	268.61	0.01
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2073.705	2052.53	2073.71	0.000002	0.34	4788.55	290.42	0.01
1303	10-YR	1455	2048.2	2073.705	0	2073.71	0.000001	0.27	6067.52	331.54	0.01
856	10-YR	1455	2046.95	2073.705	2050.66	2073.71	0.000001	0.27	6335.8	527.86	0.01
570	10-YR	1455	2047.51	2073.704	2051.62	2073.71	0.000001	0.31	5170.9	587.94	0.01
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2073.703	2051.62	2073.71	0.000002	0.33	4903.03	521.61	0.01
496	10-YR	1455	2047.11	2073.703	2051.19	2073.71	0.000002	0.34	4679.85	498.63	0.01
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2073.703	2051.19	2073.71	0.000002	0.35	4475.24	501.63	0.01
387	10-YR	1455	2045.98	2073.701	2049.79	2073.7	0.000003	0.46	3520.56	322.96	0.02
337	10-YR	Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2073.699	2050.27	2073.7	0.000004	0.54	3009.86	163.91	0.02
1	10-YR	1455	2047.18	2073.7	2051.53	2073.7	0.000001	0.23	6857.8	609.21	0.01

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Proposed Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2055.993	0	2056.07	0.000356	2.25	668.11	169.89	0.18
1581	10-YR	1455	2049.34	2055.879	2052.3	2055.93	0.0003	1.77	833.23	211.41	0.15
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2055.795	2052.53	2055.86	0.000404	2.08	724.85	193.21	0.18
1303	10-YR	1455	2048.2	2055.757	0	2055.79	0.000224	1.62	1035.71	242.34	0.12
856	10-YR	1455	2046.95	2055.658	2050.66	2055.71	0.000158	1.77	871.1	390.44	0.13
570	10-YR	1455	2047.51	2055.577	2051.62	2055.64	0.000274	2.1	744.66	360.69	0.16
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2055.56	2051.62	2055.63	0.000291	2.15	705.92	360.4	0.17
496	10-YR	1455	2047.11	2055.552	2051.19	2055.62	0.000254	2.14	729.59	262.87	0.16
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2055.526	2051.19	2055.6	0.000294	2.18	707.56	262.56	0.16
387	10-YR	1455	2045.98	2055.506	2049.79	2055.58	0.000206	2.27	680.1	110.68	0.15
374	10-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	10-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2055.418	2050.27	2055.52	0.0003	2.51	595.93	105.22	0.17
1	10-YR	1455	2047.18	2055.37	2051.51	2055.41	0.0002	1.53	971.08	250.35	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Proposed Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2062.549	0	2062.56	0.000025	0.83	1932.71	214.99	0.04
1581	10-YR	1455	2049.34	2062.543	2052.3	2062.55	0.000016	0.65	2340.18	238.36	0.03
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2062.537	2052.53	2062.54	0.00002	0.73	2100.62	215.54	0.04
1303	10-YR	1455	2048.2	2062.536	0	2062.54	0.000011	0.59	2772.93	269.04	0.03
856	10-YR	1455	2046.95	2062.531	2050.66	2062.54	0.00001	0.58	2974.81	405.69	0.03
570	10-YR	1455	2047.51	2062.525	2051.62	2062.53	0.000015	0.68	2307.22	447.11	0.03
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2062.523	2051.62	2062.53	0.000017	0.72	2171.49	437.75	0.04
496	10-YR	1455	2047.11	2062.523	2051.19	2062.53	0.000016	0.71	2194.31	294.76	0.04
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2062.521	2051.19	2062.53	0.000018	0.73	2161.6	292.76	0.04
387	10-YR	1455	2045.98	2062.512	2049.79	2062.53	0.000026	0.99	1670.91	250.67	0.05
374	10-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	10-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2062.498	2050.27	2062.52	0.000036	1.11	1410.23	125.07	0.05
1	10-YR	1455	2047.18	2062.5	2051.53	2062.5	0.000009	0.52	2996.94	315.99	0.03

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison (Proposed Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	10-YR	1455	2050.23	2073.706	0	2073.71	0.000002	0.36	4686.04	270.15	0.01
1581	10-YR	1455	2049.34	2073.706	2052.3	2073.71	0.000001	0.3	5164.12	268.61	0.01
1544	10-YR	Bridge Street									
1488	10-YR	1455	2049.54	2073.705	2052.53	2073.71	0.000002	0.34	4788.55	290.42	0.01
1303	10-YR	1455	2048.2	2073.705	0	2073.71	0.000001	0.27	6067.52	331.54	0.01
856	10-YR	1455	2046.95	2073.705	2050.66	2073.71	0.000001	0.27	6335.8	527.86	0.01
570	10-YR	1455	2047.51	2073.704	2051.62	2073.71	0.000001	0.31	5170.9	587.94	0.01
551	10-YR	Bypass 95 Off-Ramp									
531	10-YR	1455	2047.51	2073.703	2051.62	2073.71	0.000002	0.33	4903.03	521.61	0.01
496	10-YR	1455	2047.11	2073.703	2051.19	2073.71	0.000002	0.34	4679.85	498.63	0.01
466	10-YR	US 95 Mainline Bridge									
436	10-YR	1455	2047.15	2073.703	2051.19	2073.71	0.000002	0.35	4475.24	501.63	0.01
387	10-YR	1455	2045.98	2073.701	2049.79	2073.7	0.000003	0.46	3520.56	322.96	0.02
374	10-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	10-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	10-YR	1455	2046.75	2073.699	2050.27	2073.7	0.000004	0.54	3009.86	163.91	0.02
1	10-YR	1455	2047.18	2073.7	2051.53	2073.7	0.000001	0.23	6857.89	609.21	0.01

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 10% Annual Chance Comparison

	Proposed Conditions (Normal Depth)	**Proposed Conditions (Summer Pool)**	**Proposed Conditions (FEMA Regulatory Pool)**	**Existing Conditions (Normal Depth)**	**Existing Conditions (Summer Pool)**	**Existing Conditions (FEMA Regulatory Pool)**	**Proposed Impacts (Normal Depth)**	**Proposed Impacts (Summer Pool)**	**Project Impacts (FEMA Regulatory Pool)**
River Sta	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)
1974	2056.0	2062.5	2073.7	2056.0	2062.5	2073.7	0.0	0.0	**0.0**
1581	2055.9	2062.5	2073.7	2055.9	2062.5	2073.7	0.0	0.0	**0.0**
1544	Bridge Street								
1488	2055.8	2062.5	2073.7	2055.8	2062.5	2073.7	0.0	0.0	**0.0**
1303	2055.8	2062.5	2073.7	2055.8	2062.5	2073.7	0.0	0.0	**0.0**
856	2055.7	2062.5	2073.7	2055.7	2062.5	2073.7	0.0	0.0	**0.0**
570	2055.6	2062.5	2073.7	2055.6	2062.5	2073.7	0.0	0.0	**0.0**
551	Bypass 95 Off-Ramp								
531	2055.6	2062.5	2073.7	2055.6	2062.5	2073.7	0.0	0.0	**0.0**
496	2055.6	2062.5	2073.7	2055.5	2062.5	2073.7	0.0	0.0	**0.0**
466	US 95 Mainline Bridge								
436	2055.5	2062.5	2073.7	2055.5	2062.5	2073.7	0.0	0.0	**0.0**
387	2055.5	2062.5	2073.7	2055.5	2062.5	2073.7	0.0	0.0	**0.0**
374	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)								
374	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)								
327	2055.4	2062.5	2073.7	2055.4	2062.5	2073.7	0.0	0.0	**0.0**
1	2055.4	2062.5	2073.7	2055.4	2062.5	2073.7	0.0	0.0	**0.0**

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Existing Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2057.415	0	2057.52	0.000347	2.65	916.84	179.92	0.19
1581	50-YR	2280	2049.34	2057.316	2053.08	2057.38	0.00027	2.05	1142.5	219.09	0.15
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2057.227	2053.23	2057.31	0.000357	2.38	1004.88	197.78	0.18
1303	50-YR	2280	2048.2	2057.195	0	2057.24	0.000226	1.88	1388.62	248.34	0.12
856	50-YR	2280	2046.95	2057.072	2051.41	2057.15	0.000187	2.22	1102.35	393.77	0.14
570	50-YR	2280	2047.51	2056.983	2052.39	2057.08	0.000286	2.51	981.75	383.63	0.17
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2056.959	2052.39	2057.06	0.00031	2.61	919.18	382.66	0.18
496	50-YR	2280	2047.11	2056.95	2052.06	2057.05	0.000282	2.61	942.16	270.34	0.17
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2056.915	2052.07	2057.02	0.000333	2.69	908.48	270.06	0.18
387	50-YR	2280	2045.98	2056.871	2050.71	2057	0.000278	2.95	836.74	120.79	0.18
337	50-YR	Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2056.743	2051.29	2056.9	0.000386	3.23	737.6	108.7	0.2
1	50-YR	2280	2047.18	2056.71	2052.53	2056.76	0.0002	1.78	1316.9	265.76	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Existing Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2062.619	0	2062.64	0.00006	1.29	1947.79	215.33	0.07
1581	50-YR	2280	2049.34	2062.605	2053.08	2062.62	0.000039	1.01	2354.96	238.54	0.05
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2062.59	2053.23	2062.61	0.000049	1.14	2112.04	215.78	0.06
1303	50-YR	2280	2048.2	2062.587	0	2062.6	0.000026	0.91	2786.79	269.28	0.05
856	50-YR	2280	2046.95	2062.577	2051.41	2062.59	0.000025	0.9	2987.23	405.78	0.04
570	50-YR	2280	2047.51	2062.562	2052.39	2062.58	0.000037	1.06	2315.4	447.25	0.05
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2062.557	2052.39	2062.58	0.000042	1.12	2178.57	437.85	0.06
496	50-YR	2280	2047.11	2062.556	2052.06	2062.57	0.000039	1.12	2201.06	294.85	0.06
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2062.551	2052.07	2062.57	0.000044	1.14	2167.67	292.84	0.06
387	50-YR	2280	2045.98	2062.53	2050.71	2062.56	0.000065	1.54	1673.9	250.92	0.07
337	50-YR	Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2062.496	2051.29	2062.54	0.000089	1.74	1409.96	125.06	0.08
1	50-YR	2280	2047.18	2062.5	2052.54	2062.51	0.000023	0.81	2996.85	315.99	0.04

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Existing Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2073.715	0	2073.72	0.000005	0.57	4688.49	270.18	0.02
1581	50-YR	2280	2049.34	2073.714	2053.08	2073.72	0.000003	0.47	5166.41	268.63	0.02
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2073.712	2053.23	2073.72	0.000004	0.53	4790.6	290.66	0.02
1303	50-YR	2280	2048.2	2073.712	0	2073.72	0.000002	0.42	6069.95	331.55	0.02
856	50-YR	2280	2046.95	2073.712	2051.41	2073.71	0.000002	0.43	6338.31	528.23	0.02
570	50-YR	2280	2047.51	2073.709	2052.39	2073.71	0.000003	0.49	5172.6	588.09	0.02
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2073.708	2052.39	2073.71	0.000004	0.52	4904.48	521.62	0.02
496	50-YR	2280	2047.11	2073.708	2052.06	2073.71	0.000004	0.53	4681.07	498.73	0.02
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2073.707	2052.07	2073.71	0.000004	0.55	4476.07	501.64	0.02
387	50-YR	2280	2045.98	2073.703	2050.71	2073.71	0.000007	0.73	3520.88	322.96	0.03
337	50-YR	Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2073.697	2051.29	2073.71	0.000009	0.85	3009.55	163.91	0.03
1	50-YR	2280	2047.18	2073.7	2052.54	2073.7	0.000002	0.36	6857.8	609.21	0.01

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Proposed Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2057.416	0	2057.52	0.000347	2.64	917.08	179.94	0.19
1581	50-YR	2280	2049.34	2057.317	2053.08	2057.38	0.00027	2.05	1142.77	219.1	0.15
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2057.228	2053.23	2057.31	0.000357	2.38	1005.12	197.78	0.18
1303	50-YR	2280	2048.2	2057.197	0	2057.24	0.000226	1.88	1388.92	248.34	0.12
856	50-YR	2280	2046.95	2057.073	2051.41	2057.15	0.000187	2.22	1102.55	393.77	0.14
570	50-YR	2280	2047.51	2056.984	2052.39	2057.08	0.000286	2.51	981.95	383.65	0.17
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2056.96	2052.39	2057.06	0.00031	2.61	919.37	382.68	0.18
496	50-YR	2280	2047.11	2056.951	2052.06	2057.05	0.000282	2.61	942.35	270.35	0.17
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2056.917	2052.07	2057.02	0.000333	2.69	908.65	270.06	0.18
387	50-YR	2280	2045.98	2056.872	2050.71	2057	0.000278	2.95	836.92	120.81	0.18
374	50-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	50-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2056.743	2051.29	2056.9	0.000386	3.23	737.6	108.7	0.2
1	50-YR	2280	2047.18	2056.71	2052.53	2056.76	0.0002	1.78	1316.98	265.78	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Proposed Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2062.619	0	2062.64	0.00006	1.29	1947.84	215.33	0.07
1581	50-YR	2280	2049.34	2062.605	2053.08	2062.62	0.000039	1.01	2354.96	238.54	0.05
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2062.59	2053.23	2062.61	0.000049	1.14	2112.04	215.78	0.06
1303	50-YR	2280	2048.2	2062.587	0	2062.6	0.000026	0.91	2786.79	269.28	0.05
856	50-YR	2280	2046.95	2062.577	2051.41	2062.59	0.000025	0.9	2987.23	405.78	0.04
570	50-YR	2280	2047.51	2062.562	2052.39	2062.58	0.000037	1.06	2315.4	447.25	0.05
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2062.557	2052.39	2062.58	0.000042	1.12	2178.57	437.85	0.06
496	50-YR	2280	2047.11	2062.556	2052.06	2062.57	0.000039	1.12	2201.06	294.85	0.06
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2062.551	2052.07	2062.57	0.000044	1.14	2167.67	292.84	0.06
387	50-YR	2280	2045.98	2062.53	2050.71	2062.56	0.000065	1.54	1673.9	250.92	0.07
374	50-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	50-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2062.496	2051.29	2062.54	0.000089	1.74	1409.96	125.06	0.08
1	50-YR	2280	2047.18	2062.5	2052.54	2062.51	0.000023	0.81	2996.94	315.99	0.04

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison (Proposed Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	50-YR	2280	2050.23	2073.715	0	2073.72	0.000005	0.57	4688.55	270.18	0.02
1581	50-YR	2280	2049.34	2073.714	2053.08	2073.72	0.000003	0.47	5166.41	268.63	0.02
1544	50-YR	Bridge Street									
1488	50-YR	2280	2049.54	2073.712	2053.23	2073.72	0.000004	0.53	4790.6	290.66	0.02
1303	50-YR	2280	2048.2	2073.712	0	2073.72	0.000002	0.42	6069.95	331.55	0.02
856	50-YR	2280	2046.95	2073.712	2051.41	2073.71	0.000002	0.43	6338.31	528.23	0.02
570	50-YR	2280	2047.51	2073.709	2052.39	2073.71	0.000003	0.49	5172.6	588.09	0.02
551	50-YR	Bypass 95 Off-Ramp									
531	50-YR	2280	2047.51	2073.708	2052.39	2073.71	0.000004	0.52	4904.48	521.62	0.02
496	50-YR	2280	2047.11	2073.708	2052.06	2073.71	0.000004	0.53	4681.07	498.73	0.02
466	50-YR	US 95 Mainline Bridge									
436	50-YR	2280	2047.15	2073.707	2052.07	2073.71	0.000004	0.55	4476.07	501.64	0.02
387	50-YR	2280	2045.98	2073.703	2050.71	2073.71	0.000007	0.73	3520.88	322.96	0.03
374	50-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	50-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	50-YR	2280	2046.75	2073.697	2051.29	2073.71	0.000009	0.85	3009.55	163.91	0.03
1	50-YR	2280	2047.18	2073.7	2052.54	2073.7	0.000002	0.36	6857.89	609.21	0.01

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 2% Annual Chance Comparison

	Proposed Conditions (Normal Depth)	**Proposed Conditions (Summer Pool)**	**Proposed Conditions (FEMA Regulatory Pool)**	**Existing Conditions (Normal Depth)**	**Existing Conditions (Summer Pool)**	**Existing Conditions (FEMA Regulatory Pool)**	**Proposed Impacts (Normal Depth)**	**Proposed Impacts (Summer Pool)**	**Project Impacts (FEMA Regulatory Pool)**
River Sta	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)
1974	2057.4	2062.6	2073.7	2057.4	2062.6	2073.7	0.0	0.0	**0.0**
1581	2057.3	2062.6	2073.7	2057.3	2062.6	2073.7	0.0	0.0	**0.0**
1544	Bridge Street								
1488	2057.2	2062.6	2073.7	2057.2	2062.6	2073.7	0.0	0.0	**0.0**
1303	2057.2	2062.6	2073.7	2057.2	2062.6	2073.7	0.0	0.0	**0.0**
856	2057.1	2062.6	2073.7	2057.1	2062.6	2073.7	0.0	0.0	**0.0**
570	2057.0	2062.6	2073.7	2057.0	2062.6	2073.7	0.0	0.0	**0.0**
551	Bypass 95 Off-Ramp								
531	2057.0	2062.6	2073.7	2057.0	2062.6	2073.7	0.0	0.0	**0.0**
496	2057.0	2062.6	2073.7	2057.0	2062.6	2073.7	0.0	0.0	**0.0**
466	US 95 Mainline Bridge								
436	2056.9	2062.6	2073.7	2056.9	2062.6	2073.7	0.0	0.0	**0.0**
387	2056.9	2062.5	2073.7	2056.9	2062.5	2073.7	0.0	0.0	**0.0**
374	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)								
374	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)								
327	2056.7	2062.5	2073.7	2056.7	2062.5	2073.7	0.0	0.0	**0.0**
1	2056.7	2062.5	2073.7	2056.7	2062.5	2073.7	0.0	0.0	**0.0**

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Existing Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2058.222	0	2058.34	0.000343	2.85	1064.27	185.62	0.19
1581	100-YR	2820	2049.34	2058.129	2053.41	2058.2	0.000261	2.2	1322.39	223.44	0.15
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2058.035	2053.62	2058.13	0.000343	2.55	1165.77	200.26	0.18
1303	100-YR	2820	2048.2	2058.007	0	2058.06	0.000227	2.01	1591.61	251.94	0.12
856	100-YR	2820	2046.95	2057.869	2051.82	2057.96	0.000201	2.46	1233.51	395.65	0.15
570	100-YR	2820	2047.51	2057.778	2052.8	2057.89	0.000291	2.73	1118.64	398.5	0.18
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2057.748	2052.8	2057.87	0.00032	2.86	1041.61	396.22	0.19
496	100-YR	2820	2047.11	2057.739	2052.54	2057.86	0.000295	2.86	1063.57	274.89	0.18
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2057.698	2052.54	2057.83	0.000352	2.97	1023.19	274.68	0.19
387	100-YR	2820	2045.98	2057.638	2051.22	2057.8	0.000316	3.32	932.57	128.99	0.19
337	100-YR	Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2057.481	2051.85	2057.68	0.000431	3.63	818.55	110.8	0.22
1	100-YR	2820	2047.18	2057.46	2052.82	2057.52	0.0002	1.92	1519.47	274.34	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Existing Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2062.683	0	2062.72	0.000091	1.59	1961.57	215.65	0.08
1581	100-YR	2820	2049.34	2062.662	2053.41	2062.69	0.000058	1.24	2368.48	238.7	0.07
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2062.638	2053.62	2062.67	0.000074	1.4	2122.53	216	0.07
1303	100-YR	2820	2048.2	2062.635	0	2062.65	0.000039	1.13	2799.55	269.49	0.06
856	100-YR	2820	2046.95	2062.619	2051.82	2062.63	0.000037	1.11	2998.7	405.86	0.05
570	100-YR	2820	2047.51	2062.596	2052.8	2062.62	0.000056	1.31	2322.99	447.38	0.07
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2062.589	2052.8	2062.62	0.000063	1.38	2185.18	437.94	0.07
496	100-YR	2820	2047.11	2062.587	2052.54	2062.61	0.000059	1.38	2207.31	294.93	0.07
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2062.58	2052.54	2062.61	0.000066	1.41	2173.36	292.92	0.07
387	100-YR	2820	2045.98	2062.547	2051.22	2062.6	0.000098	1.91	1676.68	251.15	0.09
337	100-YR	Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2062.494	2051.85	2062.56	0.000136	2.15	1409.68	125.06	0.1
1	100-YR	2820	2047.18	2062.5	2052.84	2062.52	0.000036	1	2996.85	315.99	0.05

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Existing Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2073.724	0	2073.73	0.000007	0.7	4690.73	270.2	0.03
1581	100-YR	2820	2049.34	2073.722	2053.41	2073.73	0.000005	0.58	5168.51	268.66	0.02
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2073.719	2053.62	2073.73	0.000006	0.65	4792.66	290.91	0.02
1303	100-YR	2820	2048.2	2073.719	0	2073.72	0.000004	0.52	6072.3	331.57	0.02
856	100-YR	2820	2046.95	2073.718	2051.82	2073.72	0.000004	0.53	6340.56	528.56	0.02
570	100-YR	2820	2047.51	2073.715	2052.8	2073.72	0.000005	0.6	5174.08	588.22	0.02
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2073.713	2052.8	2073.72	0.000006	0.64	4905.73	521.62	0.02
496	100-YR	2820	2047.11	2073.712	2052.54	2073.72	0.000006	0.65	4682.11	498.81	0.02
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2073.71	2052.54	2073.72	0.000007	0.69	4476.84	501.65	0.02
387	100-YR	2820	2045.98	2073.705	2051.22	2073.72	0.00001	0.9	3521.17	322.96	0.03
337	100-YR	Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2073.696	2051.85	2073.71	0.000014	1.05	3009.36	163.9	0.04
1	100-YR	2820	2047.18	2073.7	2052.84	2073.7	0.000003	0.45	6857.8	609.21	0.02

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Proposed Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2058.219	0	2058.34	0.000343	2.86	1063.84	185.61	0.19
1581	100-YR	2820	2049.34	2058.126	2053.41	2058.2	0.000261	2.2	1321.73	223.43	0.15
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2058.032	2053.62	2058.13	0.000343	2.55	1165.23	200.26	0.18
1303	100-YR	2820	2048.2	2058.004	0	2058.06	0.000227	2.01	1590.94	251.93	0.12
856	100-YR	2820	2046.95	2057.866	2051.82	2057.96	0.000201	2.46	1233.06	395.65	0.15
570	100-YR	2820	2047.51	2057.775	2052.8	2057.88	0.000291	2.73	1118.12	398.43	0.18
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2057.745	2052.8	2057.87	0.000321	2.86	1041.12	396.15	0.19
496	100-YR	2820	2047.11	2057.736	2052.54	2057.85	0.000295	2.86	1063.12	274.87	0.18
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2057.695	2052.54	2057.83	0.000352	2.97	1022.76	274.66	0.19
387	100-YR	2820	2045.98	2057.635	2051.22	2057.8	0.000316	3.32	932.16	128.96	0.19
374	100-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	100-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2057.481	2051.85	2057.68	0.000431	3.63	818.52	110.8	0.22
1	100-YR	2820	2047.18	2057.46	2052.81	2057.52	0.0002	1.92	1519.49	274.34	0.13

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Proposed Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2062.683	0	2062.72	0.000091	1.59	1961.52	215.65	0.08
1581	100-YR	2820	2049.34	2062.661	2053.41	2062.68	0.000058	1.24	2368.36	238.7	0.07
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2062.638	2053.62	2062.67	0.000074	1.4	2122.43	216	0.07
1303	100-YR	2820	2048.2	2062.634	0	2062.65	0.000039	1.13	2799.42	269.49	0.06
856	100-YR	2820	2046.95	2062.618	2051.82	2062.63	0.000037	1.11	2998.57	405.86	0.05
570	100-YR	2820	2047.51	2062.595	2052.8	2062.62	0.000056	1.31	2322.88	447.37	0.07
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2062.588	2052.8	2062.62	0.000063	1.38	2185.08	437.94	0.07
496	100-YR	2820	2047.11	2062.586	2052.54	2062.61	0.000059	1.38	2207.21	294.92	0.07
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2062.579	2052.54	2062.61	0.000066	1.41	2173.26	292.92	0.07
387	100-YR	2820	2045.98	2062.547	2051.22	2062.6	0.000098	1.91	1676.6	251.14	0.09
374	100-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	100-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2062.494	2051.85	2062.56	0.000136	2.15	1409.68	125.06	0.1
1	100-YR	2820	2047.18	2062.5	2052.84	2062.52	0.000036	1	2996.94	315.99	0.05

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison (Proposed Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	100-YR	2820	2050.23	2073.724	0	2073.73	0.000007	0.7	4690.86	270.2	0.03
1581	100-YR	2820	2049.34	2073.722	2053.41	2073.73	0.000005	0.58	5168.57	268.66	0.02
1544	100-YR	Bridge Street									
1488	100-YR	2820	2049.54	2073.719	2053.62	2073.73	0.000006	0.65	4792.73	290.92	0.02
1303	100-YR	2820	2048.2	2073.72	0	2073.72	0.000004	0.52	6072.38	331.57	0.02
856	100-YR	2820	2046.95	2073.718	2051.82	2073.72	0.000004	0.53	6340.64	528.57	0.02
570	100-YR	2820	2047.51	2073.715	2052.8	2073.72	0.000005	0.6	5174.16	588.23	0.02
551	100-YR	Bypass 95 Off-Ramp									
531	100-YR	2820	2047.51	2073.713	2052.8	2073.72	0.000006	0.64	4905.8	521.62	0.02
496	100-YR	2820	2047.11	2073.712	2052.54	2073.72	0.000006	0.65	4682.17	498.82	0.02
466	100-YR	US 95 Mainline Bridge									
436	100-YR	2820	2047.15	2073.711	2052.54	2073.72	0.000007	0.69	4476.89	501.65	0.02
387	100-YR	2820	2045.98	2073.705	2051.22	2073.72	0.00001	0.9	3521.21	322.96	0.03
374	100-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	100-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	100-YR	2820	2046.75	2073.696	2051.85	2073.71	0.000014	1.05	3009.36	163.9	0.04
1	100-YR	2820	2047.18	2073.7	2052.84	2073.7	0.000003	0.45	6857.89	609.21	0.02

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 1% Annual Chance Comparison

	Proposed Conditions (Normal Depth)	**Proposed Conditions (Summer Pool)**	**Proposed Conditions (FEMA Regulatory Pool)**	**Existing Conditions (Normal Depth)**	**Existing Conditions (Summer Pool)**	**Existing Conditions (FEMA Regulatory Pool)**	**Proposed Impacts (Normal Depth)**	**Proposed Impacts (Summer Pool)**	**Project Impacts (FEMA Regulatory Pool)**
River Sta	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)
1974	2058.2	2062.7	2073.7	2058.2	2062.7	2073.7	0.0	0.0	**0.0**
1581	2058.1	2062.7	2073.7	2058.1	2062.7	2073.7	0.0	0.0	**0.0**
1544	Bridge Street								
1488	2058.0	2062.6	2073.7	2058.0	2062.6	2073.7	0.0	0.0	**0.0**
1303	2058.0	2062.6	2073.7	2058.0	2062.6	2073.7	0.0	0.0	**0.0**
856	2057.9	2062.6	2073.7	2057.9	2062.6	2073.7	0.0	0.0	**0.0**
570	2057.8	2062.6	2073.7	2057.8	2062.6	2073.7	0.0	0.0	**0.0**
551	Bypass 95 Off-Ramp								
531	2057.7	2062.6	2073.7	2057.7	2062.6	2073.7	0.0	0.0	**0.0**
496	2057.7	2062.6	2073.7	2057.7	2062.6	2073.7	0.0	0.0	**0.0**
466	US 95 Mainline Bridge								
436	2057.7	2062.6	2073.7	2057.7	2062.6	2073.7	0.0	0.0	**0.0**
387	2057.6	2062.5	2073.7	2057.6	2062.5	2073.7	0.0	0.0	**0.0**
374	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)								
374	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)								
327	2057.5	2062.5	2073.7	2057.5	2062.5	2073.7	0.0	0.0	**0.0**
1	2057.5	2062.5	2073.7	2057.5	2062.5	2073.7	0.0	0.0	**0.0**

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Existing Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2059.794	0	2059.95	0.000336	3.24	1364.83	196.71	0.2
1581	500-YR	4015	2049.34	2059.711	2054.06	2059.81	0.000248	2.48	1679.69	227.5	0.15
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2059.606	2054.27	2059.73	0.000325	2.87	1484.23	205.27	0.18
1303	500-YR	4015	2048.2	2059.584	0	2059.65	0.000228	2.27	1994.6	258.56	0.13
856	500-YR	4015	2046.95	2059.417	2052.6	2059.54	0.000225	2.91	1489.97	399.32	0.16
570	500-YR	4015	2047.51	2059.324	2053.64	2059.47	0.000299	3.14	1393.24	413.54	0.18
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2059.283	2053.6	2059.44	0.000334	3.31	1286.97	412.09	0.2
496	500-YR	4015	2047.11	2059.272	2053.42	2059.43	0.000316	3.34	1303.2	281.6	0.19
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2059.219	2053.38	2059.4	0.000383	3.48	1249.65	281.26	0.2
387	500-YR	4015	2045.98	2059.129	2052.23	2059.36	0.000377	4	1136.49	145.51	0.21
337	500-YR	Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2058.907	2052.9	2059.19	0.000509	4.37	979.44	114.85	0.24
1	500-YR	4015	2047.18	2058.916	2053.3	2058.99	0.0002	2.18	1924.47	283.56	0.14

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Existing Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2062.865	0	2062.94	0.000173	2.22	2000.93	216.54	0.11
1581	500-YR	4015	2049.34	2062.824	2054.06	2062.87	0.000112	1.74	2407.21	239.17	0.09
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2062.777	2054.28	2062.83	0.000144	1.97	2152.63	216.63	0.1
1303	500-YR	4015	2048.2	2062.771	0	2062.8	0.000076	1.58	2836.24	270.11	0.08
856	500-YR	4015	2046.95	2062.74	2052.6	2062.77	0.000073	1.56	3031.74	406.09	0.08
570	500-YR	4015	2047.51	2062.694	2053.78	2062.74	0.000111	1.84	2345.01	447.76	0.09
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2062.68	2053.74	2062.73	0.000124	1.95	2204.43	438.2	0.1
496	500-YR	4015	2047.11	2062.677	2053.58	2062.73	0.000117	1.94	2225.59	295.16	0.1
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2062.662	2053.56	2062.72	0.000131	1.99	2189.87	293.15	0.1
387	500-YR	4015	2045.98	2062.596	2052.23	2062.7	0.000197	2.7	1684.84	251.83	0.13
337	500-YR	Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2062.488	2052.9	2062.63	0.000275	3.07	1408.89	125.04	0.15
1	500-YR	4015	2047.18	2062.5	2053.29	2062.53	0.000072	1.42	2996.85	315.99	0.07

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Existing Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2073.748	0	2073.76	0.000014	1	4697.19	270.26	0.04
1581	500-YR	4015	2049.34	2073.745	2054.06	2073.76	0.00001	0.83	5174.54	268.72	0.03
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2073.739	2054.28	2073.75	0.000013	0.92	4798.35	291.52	0.03
1303	500-YR	4015	2048.2	2073.739	0	2073.75	0.000007	0.74	6078.86	331.61	0.03
856	500-YR	4015	2046.95	2073.736	2052.6	2073.74	0.000008	0.76	6347.04	529.5	0.03
570	500-YR	4015	2047.51	2073.73	2053.78	2073.74	0.00001	0.86	5178.54	588.61	0.03
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2073.727	2053.74	2073.74	0.000012	0.91	4909.6	521.65	0.03
496	500-YR	4015	2047.11	2073.725	2053.58	2073.74	0.000012	0.93	4685.4	499.07	0.03
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2073.722	2053.56	2073.74	0.000014	0.98	4479.27	501.67	0.04
387	500-YR	4015	2045.98	2073.711	2052.23	2073.73	0.000021	1.28	3522.13	322.96	0.04
337	500-YR	Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2073.691	2052.9	2073.72	0.000029	1.5	3008.67	163.88	0.05
1	500-YR	4015	2047.18	2073.7	2053.29	2073.71	0.000006	0.64	6857.8	609.21	0.02

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Proposed Conditions - Normal Depth)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2059.782	0	2059.94	0.000338	3.24	1362.52	196.63	0.2
1581	500-YR	4015	2049.34	2059.699	2054.06	2059.79	0.000249	2.49	1676.86	227.45	0.16
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2059.593	2054.27	2059.72	0.000327	2.88	1481.57	205.23	0.18
1303	500-YR	4015	2048.2	2059.572	0	2059.64	0.000229	2.27	1991.25	258.51	0.13
856	500-YR	4015	2046.95	2059.404	2052.6	2059.53	0.000226	2.92	1487.7	399.28	0.16
570	500-YR	4015	2047.51	2059.31	2053.64	2059.45	0.0003	3.14	1390.73	413.43	0.19
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2059.269	2053.6	2059.43	0.000336	3.31	1284.67	411.97	0.2
496	500-YR	4015	2047.11	2059.259	2053.42	2059.42	0.000317	3.34	1301	281.54	0.19
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2059.205	2053.38	2059.38	0.000385	3.49	1247.52	281.2	0.2
387	500-YR	4015	2045.98	2059.115	2052.23	2059.35	0.000378	4.01	1134.4	145.32	0.21
374	500-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	500-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2058.907	2052.9	2059.19	0.000509	4.37	979.41	114.85	0.24
1	500-YR	4015	2047.18	2058.916	2053.3	2058.99	0.0002	2.18	1924.48	283.55	0.14

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Proposed Conditions - Summer Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2062.865	0	2062.94	0.000173	2.22	2000.82	216.54	0.11
1581	500-YR	4015	2049.34	2062.823	2054.06	2062.87	0.000112	1.74	2407.04	239.17	0.09
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2062.777	2054.28	2062.83	0.000144	1.97	2152.48	216.63	0.1
1303	500-YR	4015	2048.2	2062.77	0	2062.8	0.000076	1.58	2836.04	270.11	0.08
856	500-YR	4015	2046.95	2062.739	2052.6	2062.77	0.000073	1.56	3031.54	406.09	0.08
570	500-YR	4015	2047.51	2062.694	2053.78	2062.74	0.000111	1.84	2344.85	447.75	0.09
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2062.679	2053.74	2062.73	0.000124	1.95	2204.28	438.2	0.1
496	500-YR	4015	2047.11	2062.676	2053.58	2062.73	0.000117	1.94	2225.44	295.15	0.1
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2062.661	2053.56	2062.72	0.000131	1.99	2189.72	293.14	0.1
387	500-YR	4015	2045.98	2062.596	2052.23	2062.7	0.000197	2.7	1684.72	251.82	0.13
374	500-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	500-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2062.488	2052.9	2062.63	0.000275	3.07	1408.89	125.04	0.15
1	500-YR	4015	2047.18	2062.5	2053.29	2062.53	0.000072	1.42	2996.94	315.99	0.07

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison (Proposed Conditions - FEMA Pool)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1974	500-YR	4015	2050.23	2073.747	0	2073.76	0.000014	1	4697.12	270.26	0.04
1581	500-YR	4015	2049.34	2073.744	2054.06	2073.75	0.00001	0.83	5174.41	268.72	0.03
1544	500-YR	Bridge Street									
1488	500-YR	4015	2049.54	2073.738	2054.28	2073.75	0.000013	0.92	4798.21	291.51	0.03
1303	500-YR	4015	2048.2	2073.739	0	2073.75	0.000007	0.74	6078.69	331.61	0.03
856	500-YR	4015	2046.95	2073.736	2052.6	2073.74	0.000008	0.76	6346.87	529.48	0.03
570	500-YR	4015	2047.51	2073.729	2053.78	2073.74	0.00001	0.86	5178.4	588.6	0.03
551	500-YR	Bypass 95 Off-Ramp									
531	500-YR	4015	2047.51	2073.726	2053.74	2073.74	0.000012	0.91	4909.46	521.65	0.03
496	500-YR	4015	2047.11	2073.725	2053.58	2073.74	0.000012	0.93	4685.28	499.06	0.03
466	500-YR	US 95 Mainline Bridge									
436	500-YR	4015	2047.15	2073.721	2053.56	2073.74	0.000014	0.98	4479.17	501.67	0.04
387	500-YR	4015	2045.98	2073.71	2052.23	2073.73	0.000021	1.28	3522.05	322.96	0.04
374	500-YR	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)									
374	500-YR	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)									
327	500-YR	4015	2046.75	2073.691	2052.9	2073.72	0.000029	1.5	3008.67	163.88	0.05
1	500-YR	4015	2047.18	2073.7	2053.29	2073.71	0.000006	0.64	6857.89	609.21	0.02

Construction of Bridge 3.1 Over Sand Creek near Sandpoint, ID - 0.2% Annual Chance Comparison

	Proposed Conditions (Normal Depth)	**Proposed Conditions (Summer Pool)**	**Proposed Conditions (FEMA Regulatory Pool)**	**Existing Conditions (Normal Depth)**	**Existing Conditions (Summer Pool)**	**Existing Conditions (FEMA Regulatory Pool)**	**Proposed Impacts (Normal Depth)**	**Proposed Impacts (Summer Pool)**	**Project Impacts (FEMA Regulatory Pool)**
River Sta	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	W.S. Elev (ft, NAVD88)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)	Δ W.S. Elev Prop -Existing (ft)
1974	2059.8	2062.9	2073.7	2059.8	2062.9	2073.7	0.0	0.0	**0.0**
1581	2059.7	2062.8	2073.7	2059.7	2062.8	2073.7	0.0	0.0	**0.0**
1544	Bridge Street								
1488	2059.6	2062.8	2073.7	2059.6	2062.8	2073.7	0.0	0.0	**0.0**
1303	2059.6	2062.8	2073.7	2059.6	2062.8	2073.7	0.0	0.0	**0.0**
856	2059.4	2062.7	2073.7	2059.4	2062.7	2073.7	0.0	0.0	**0.0**
570	2059.3	2062.7	2073.7	2059.3	2062.7	2073.7	0.0	0.0	**0.0**
551	Bypass 95 Off-Ramp								
531	2059.3	2062.7	2073.7	2059.3	2062.7	2073.7	0.0	0.0	**0.0**
496	2059.3	2062.7	2073.7	2059.3	2062.7	2073.7	0.0	0.0	**0.0**
466	US 95 Mainline Bridge								
436	2059.2	2062.7	2073.7	2059.2	2062.7	2073.7	0.0	0.0	**0.0**
387	2059.1	2062.6	2073.7	2059.1	2062.6	2073.7	0.0	0.0	**0.0**
374	Upstream Bridge Face - Project Bridge: Bridge 3.1 (Proposed)								
374	Downstream Bridge Face - Project Bridge: Bridge 3.1 (Existing)								
327	2058.9	2062.5	2073.7	2058.9	2062.5	2073.7	0.0	0.0	**0.0**
1	2058.9	2062.5	2073.7	2058.9	2062.5	2073.7	0.0	0.0	**0.0**

Attachment H: No-rise Certification
Design Certification

"NO-RISE" Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Idaho.

It is further to certify that the attached technical document supports the determination that the proposed construction of BNSF Bridge 3.1 over Sand Creek near its confluence with Lake Pend Oreille near Sandpoint, Idaho will not impact the 100-year flood elevations, floodway elevations, or floodway widths on Sand Creek at published cross-sections in the Flood Insurance Study for Bonner County, Idaho and incorporated areas dated July 7, 2014 and will not impact the 100-year flood elevations, floodway elevations, or floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

- 14R0057 –Bridge 3.1 over Sand Creek H&H Technical Summary Memorandum

(Signature) 5/20/19 (Date)

Name: Anthony K. Comerio, P.E., CFM

Title: Chief Water Resources Engineer

License Number: 18024

P.E Seal

Exp. Date: 7/31/2019

Design Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Idaho.

It is further to certify that the project has been designed in accordance with the General Standards of Bonner County Revised Code Section 14-501.

Attached are the following preliminary documents that further describe the proposed construction.

- BNSF Bridge 3.1 over Sand Creek – 95% Preliminary dated May 15, 2019, sheets 3-4 and 9-13

Mat Fletcher
(Signature)

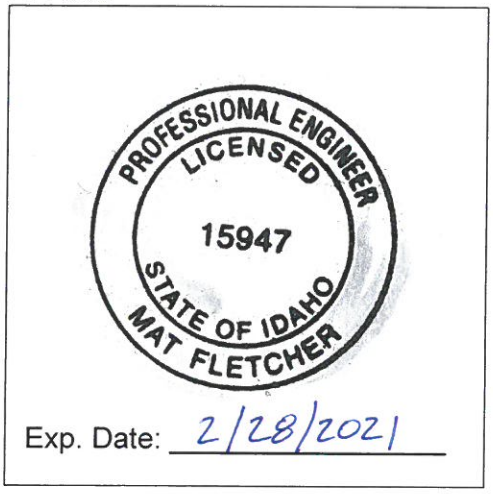
5/20/2019
(Date)

Name: Mathew A. Fletcher, P.E.

Title: Structural Engineer

License Number: 15947

P.E Seal



Exp. Date: 2/28/2021

HANSON

TECHNICAL MEMORANDUM

TO:	BNSF Railway Company
FROM:	Garrett Litteken, P.E., CFM; Tony Comerio, P.E. CFM
DATE:	3/29/2019
SUBJECT:	14R0057 – Bridge 3.9 over Lake Pend Oreille H&H Technical Summary

INTRODUCTION

This memorandum summarizes the hydraulic investigation for the proposed Bridge 3.9, which is part of BNSF's Sandpoint Junction Project. BNSF Proposed Bridge No. 3.9 crosses over Lake Pend Oreille in Sandpoint, ID in Bonner County. The proposed bridge will run parallel to the existing 4,764-ft long, 89 span structure. The proposed structure will be constructed approximately 50-ft west (downstream) of the existing bridge and has a length of 4,874-ft with 48 spans.

Hydraulics modeling of the crossing was developed from a combination of available FEMA data, record construction drawings of the existing bridges, project hydrographic survey data at Bridge 3.9 and hydrographic survey data from the USACE for Lake Pend Oreille and the Pend Oreille River. The existing railroad bridge and the existing Highway 95 roadway bridge were included in a hydraulic analysis to assess floodplain impacts at the railroad bridge. A project location map is provided in Attachment A and site photos are provided in Attachment B.

The proposed bridge structure is within the FEMA regulatory floodplain limits and is sufficiently sized to convey Lake Pend Oreille flow with no significant adverse impacts. The proposed bridge opening is less restrictive and has fewer bridge piers than the existing bridge. The hydraulic analysis utilized 1-D HEC-RAS hydraulic modeling to quantify water surface impacts of the proposed bridge design. Bridge plans are included in Attachment F

DATA COLLECTION

FEMA floodplain mapping and associated Base Flood Elevations (BFE) for Lake Pend Oreille are based on statistical information from USGS gaging station at Hope, ID (No. 12392500) which is operated in cooperation with the U.S. Army Corps of Engineers (USACE). Daily data has been recorded at this site since October 1970 and represents a drainage area of 22,900 square-miles. The lake pool elevation is controlled by Albeni Falls Dam on Pend Oreille River near Newport, Washington. The dam has been operated by the USACE since 1952. The maximum lake pool at the USGS gage at Hope is 2,067.5-ft (NGVD29) or 2,071.37 (NAVD88). This pool represents the limit of the USACE's flowage right-of-way. Normal full pool on the lake is 2,062.5-ft (NGVD29) or 2066.37-ft (NAVD88) and minimum pool is 2,049.7-ft (NGVD29) or 2,053.57 (NAVD88).

The FEMA Flood Insurance Study (FIS) dated July 7, 2014, has a 100-year BFE of 2073.7 (NAVD88) at the existing BNSF railroad crossing. The crossing is estimated to be approximately 119 river miles above the mouth of the Pend Oreille River which is about 29-river miles upstream of the Albeni Falls Dam.

The existing rail bridge is approximately 4,764-ft long and has 89 spans ranging in length from 23-ft to approximately 102-ft which includes a turning span for navigation. The turning span is inoperable. 74 of the spans are 52-ft long. Portions of the existing bridge piers and structure have been rehabilitated over time so the pier shapes and low chords vary from one abutment to the other. Record drawings of the existing bridge are included in Attachment E.

The proposed bridge at milepost 3.9 will carry a new BNSF track over Lake Pend Oreille. The track and bridge will be located 50-ft on center downsteam (west) of the existing bridge. The structure will be 4,874-ft long and consists of 46 precast concrete spans and 2 steel spans. The majority of the spans use 73-inch deep x 104-ft long I-girders with a cast-in-place concrete deck. The foundation will utilize precast concrete pier caps supported on 6 piles that are 36 inch diameter steel pipes which are battered and driven approximately 140-ft below the mudline. The upper section of the piles will be braced with an arrangement of steel channels.

The Highway 95 roadway bridge, located approximately 6,800-ft downstream (west) of the existing Bridge 3.9 structure, was included is the HEC-RAS model for this study utilizing record drawings of portions of the structure provided by the Idaho Transportation Department. The Highway 95 Bridge is approximately 5,896-ft long and has 180 spans, most of which are 35-ft long.

The Bonner County FIS states that a Lake Pend Oreille stage-frequency curve was determined by a graphical frequency analysis of maximum annual lake stages plotted on an arithmetic probability grid with median plotting positions. The results of this analysis are shown in Table 4 of the FEMA Flood Insurance Study (FIS), which reports that the drainage area is 22,900 square miles, the 10-year flood water surface elevation is 2,067.9-ft and the 100-year is 2,073.7-ft, both elevations in NAVD88.

All survey data, which was used to create the hydraulic models, was collected using the North American Vertical Datum of 1988 (NAVD88). The FEMA FIRM and relevant excerpts from the FEMA FIS are provided in Attachment C.

HYDROLOGY

The Bonner County FEMA FIS, dated July 7, 2014, has established effective regulatory discharges at Albeni Falls Dam. The FEMA FIS establishes the regulatory flow rate for the 100-year discharge at the USACE's Albeni Falls Dam as 159,000-cfs. The hydroelectric dam is located over 29 river miles downstream of Bridge 3.9. Discharges have not been established by FEMA further upstream on Pend Oreille River or on Lake Pend Oreille. Table 1 is a summary of the FEMA discharges from the FIS.

Table 1 - Summary of Discharges for Pend Oreille River, Bonner County FEMA Flood Insurance Study, July 7, 2014

	Drainage Area (sq-mi)	10-Percent Annual-Chance (10YR)	2-Percent Annual-Chance (50YR)	1-Percent Annual-Chance (100YR)	0.2-Percent Annual-Chance (500YR)
Albeni Falls Dam	24,200	126,000	151,000	159,000	174,000

According to the USACE, flood stage for Lake Pend Oreille is 2,063.5-ft (NGVD29) as measured at the Hope gage. The Pend Oreille River has a flood flow designated by the National Weather Service as measured by downstream releases of the dam. The flood flow was revised downward in 2014 from 100,000 to 95,000-cfs. The full powerhouse discharge capacity of Albeni Falls Dam depends on lake levels but is estimated to be between 25,000-32,000-cfs. Upstream of the dam, near Dover, there is a natural restriction in the river which controls the amount of flow that can be passed downstream. The following is from a USACE factsheet on the dam which describes dam operations relative to elevations in Lake Pend Oreille (cited elevations are NGVD29):

> *Approximately 9,256 acres of flowage easements were acquired on private lands around the lake for the purpose of accommodating wave action, erosion and ground water effects that might occur as a result of the operation of the project. Easements were acquired at fair market value and allow for permanent flooding up to elevation 2,062.5 feet and intermittent flooding up to elevation 2,067.5 feet. Easement boundaries are loosely tied to the 2067.5 level, but each easement has its own legal description. Additional easements were acquired that restrict habitation below 2,067.5 feet in locations where the original easements were determined to be inadequate. There was a recognition in the mid-90's that easements which contain a no-habitation restriction were too strict for the Pend Oreille River above the dam and below the Long Bridge and consequently the Corps was authorized to release this restriction for dwellings with a first floor elevation above 2,065 feet. Such a release includes language that will release the Corps from liability for flood events that occur where flood waters exceed the 2,065 feet elevation.*

Additional operational data from the USACE on Albeni Falls Dam and the USGS gage at Hope can be found in Attachment D.

HYDRAULICS

The US Army Corps of Engineers' HEC-RAS v.5.0.6 program was used to model the Pend Oreille River, Lake Pend Oreille, the existing Highway 95 roadway bridge and Bridge 3.9. The model extends 43,500-ft downstream and 33,300-ft upstream of the existing Bridge 3.9. Hydrographic survey of the lake at the bridge site combined with photos and available record construction drawings were used to define the existing structure and the lake bed at the existing bridge. A proposed conditions model was developed to analyze potential impacts from the construction of a parallel bridge crossing upstream of the existing . Since discharges at Bridge 3.9 have not been established, a range of discharges from 10,000-cfs to 159,000-cfs (FEMA 100-year discharge at Albini Falls Dam) was used to assess both existing and proposed hydraulic conditions at Bridge 3.9. A normal depth boundary slope of 0.00005-ft/ft used to estimate the downstream boundary condition utilizing an iterative approach. Since the starting water surface is 43,000-ft downstream of Bridge 3.9, the calculated water surfaces at the existing and proposed bridge structure are not sensitive to variability in the downstream boundary condition.

Per HEC-RAS Hydraulic Reference Manual Version 5.0, the existing and proposed bridge were modeled as a combined bridge deck due to their proximity. The existing bridge was modeled as the downstream face of the hydraulic structure and the proposed bridge was modeled as the upstream face of the deck. The structures were sufficiently far apart that they were assumed not to impact the hydraulic opening of the parallel bridge face. The width of the bridge, in the

direction of flow, is the combined length from the upstream face of the existing bridge to the downstream face of the proposed bridge. This distance was estimated to be 65-ft and includes the gap in between the bridges.

The proposed structure provides a wider hydraulic opening than the existing bridge. The proposed bridge piers are generally aligned with the existing piers. However, the proposed piers have generally twice the span length as the existing structure. Therefore, the proposed bridge provides a larger effective hydraulic opening when compared to the existing bridge structure. A hydraulic cross-section location map is provided in Attachment G. Proposed bridge plans are provided in Attachment F.

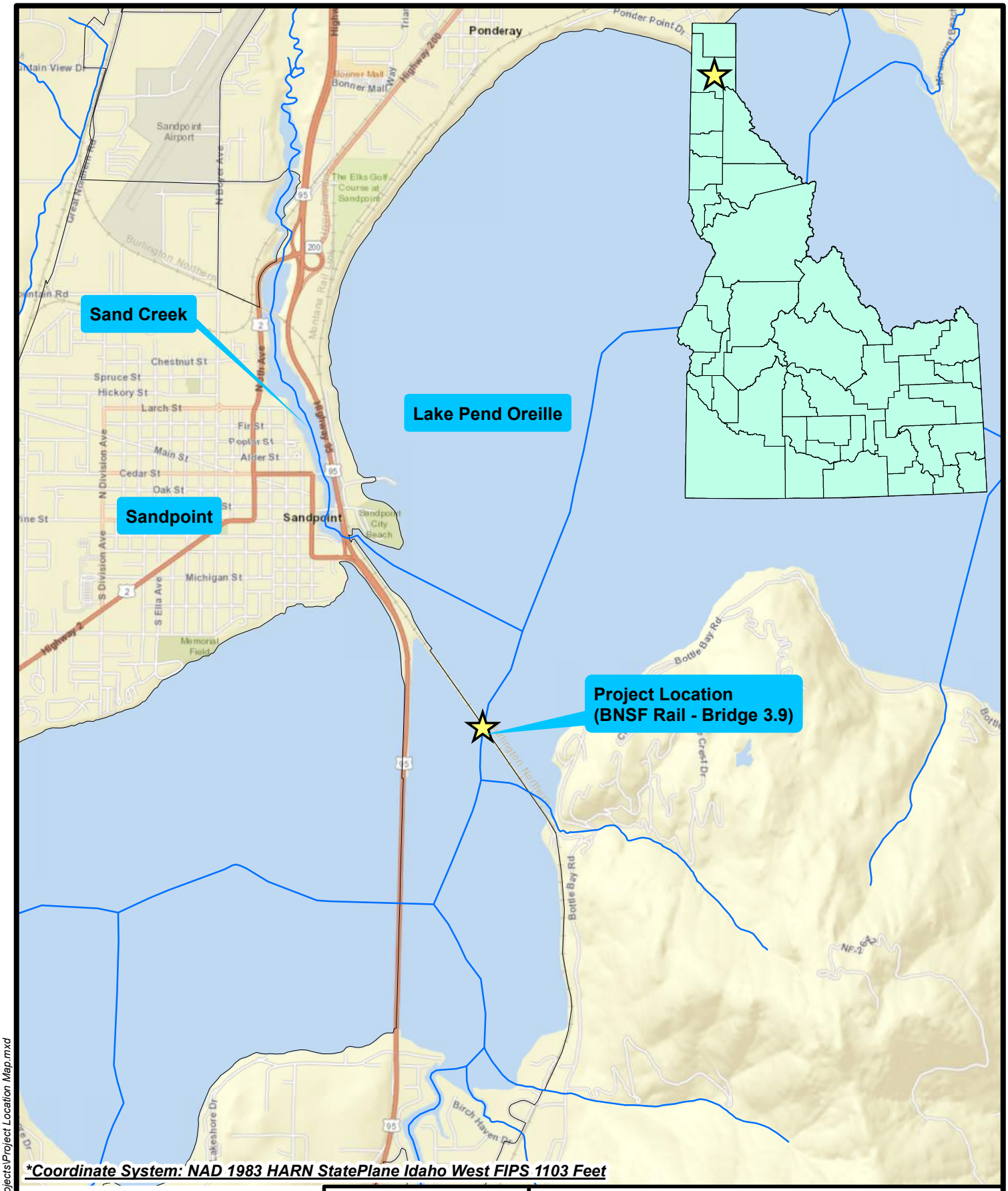
FLOODPLAIN PERMITTING

The hydraulic model investigation indicates that the proposed rail bridge creates less than 0.0-ft increase in water surfaces ranging from 10,000-cfs to 159,000-cfs. Based on the results of the hydraulic investigation, the proposed structure meets the intent of FEMA “No-Rise” Certification criteria. A summary of HEC-RAS model output comparison between the existing and proposed conditions is provided in Attachment H. Certification that the proposed structure meets the intent of FEMA "no-rise" criteria and certification that the structure is designed in accordance with the General Standards of Bonner County Revised Code Section 14-501 is provided in Attachment I.

List of Attachments:

Attachment A – Project Location Map
Attachment B – Site Photos
Attachment C – FEMA FIS and FIRM
Attachment D – USACE Data & Gage Data
Attachment E – Existing Bridge Plans
Attachment F – Proposed Bridge 3.9 Plans
Attachment G – Hydraulic Cross-Section Map
Attachment H – HEC-RAS Output
Attachment I – No-rise Certification and Design Certification

Attachment A – Project Location Map



*Coordinate System: NAD 1983 HARN StatePlane Idaho West FIPS 1103 Feet

0 1,500 3,000 Feet

1 in = 3,000 ft

N W E S

HANSON
Hanson Professional Services Inc.

Project Location Map

BNSF Railway Company
Bridge 3.9 Over Lake Pend Oreille
Sandpoint, Idaho

Job Number: 14R0057

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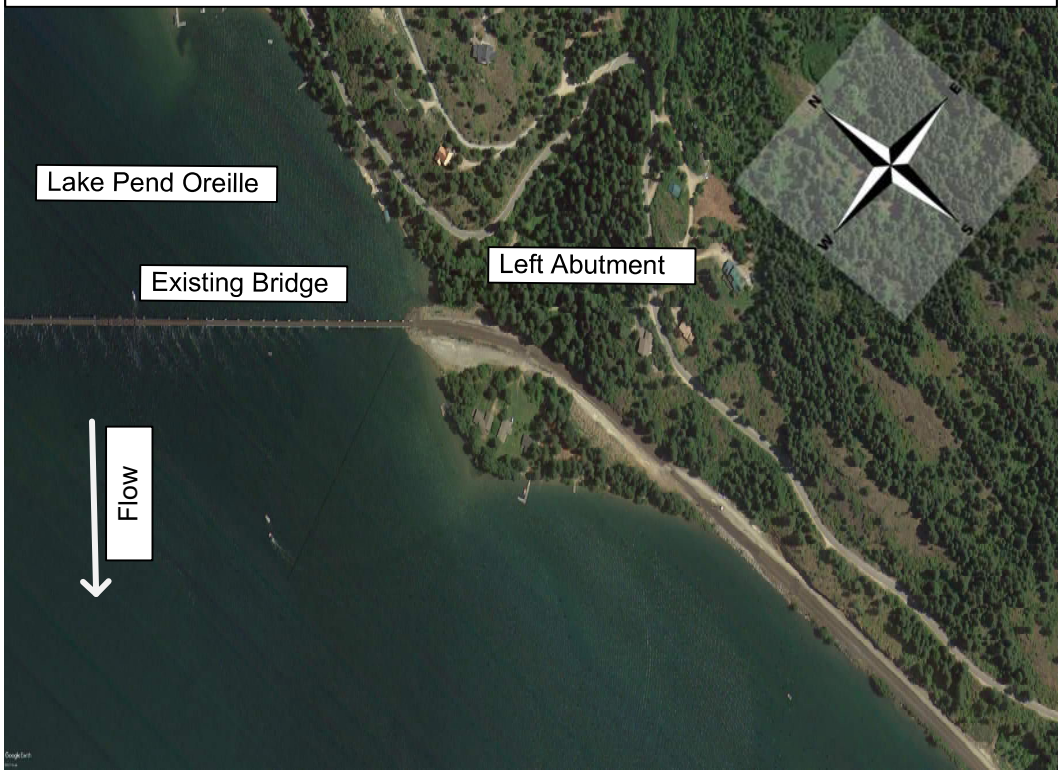
Attachment B – Site Photos

Photograph 1 – Aerial View of Existing Bridge on Lake Pend Oreille

Photograph 2 – Aerial View of Existing Bridge on Lake Pend Oreille

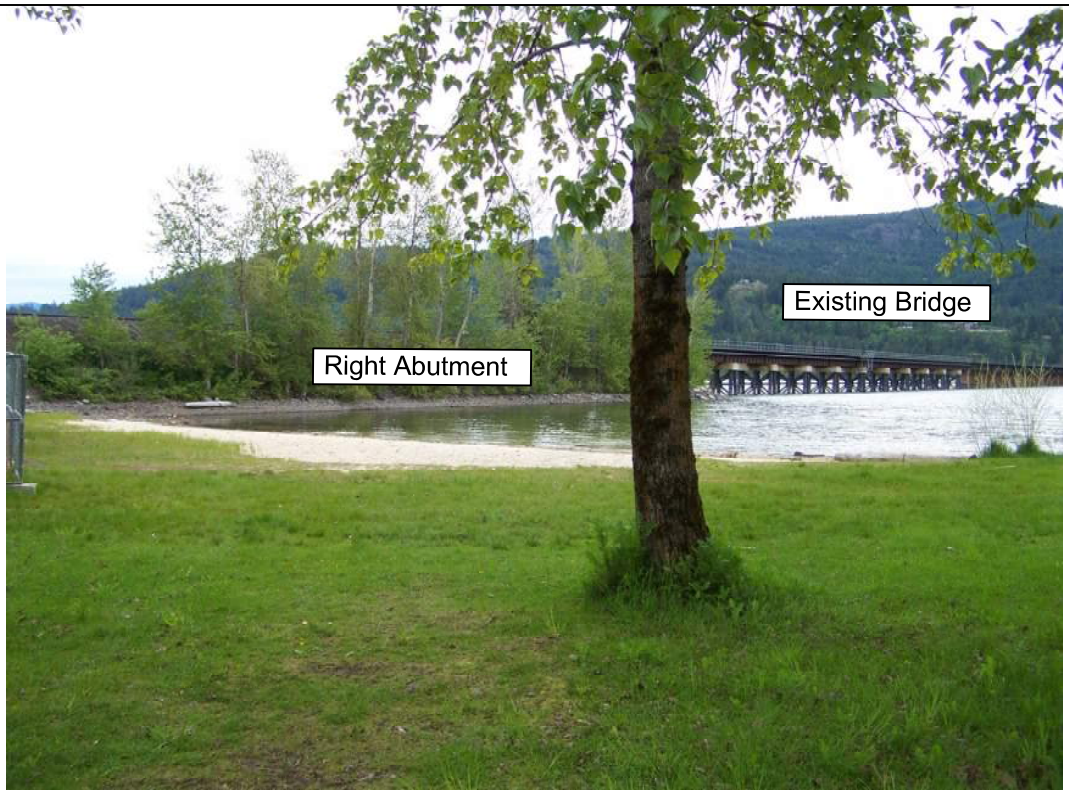


HANSON
HANSON PROFESSIONAL SERVICES INC.

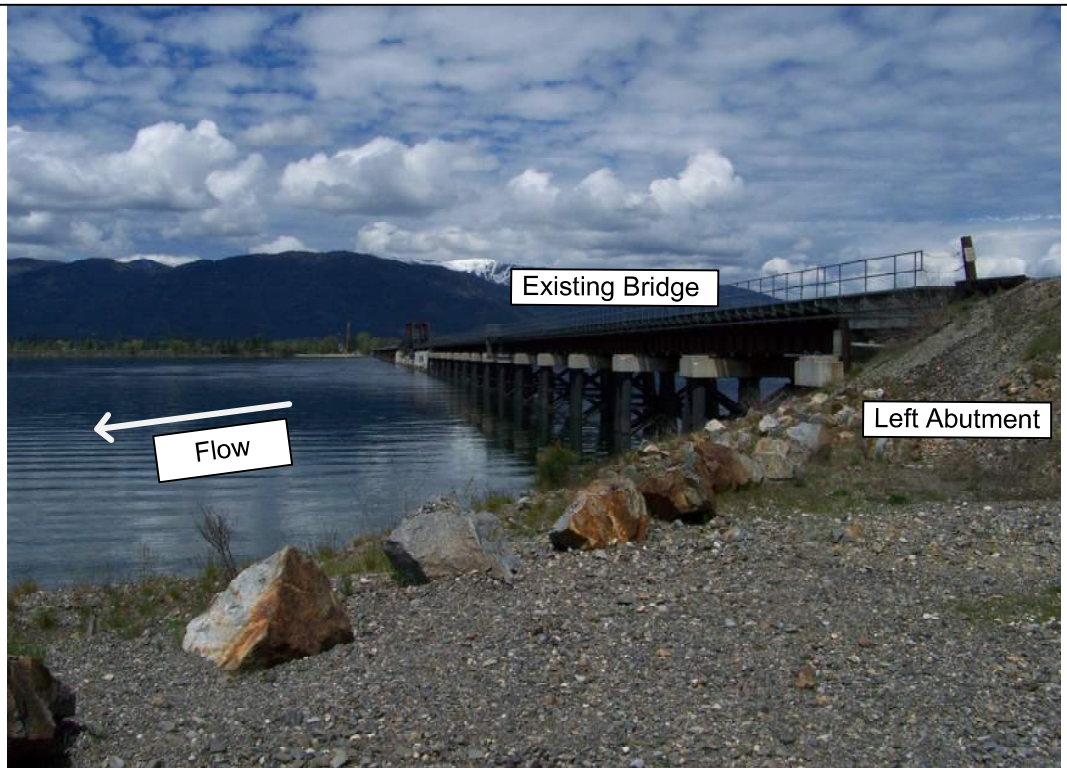
Photographs

BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Photograph 3 – Right Abutment of Existing Bridge on Lake Pend Oreille looking Upstream (east)



Photograph 4 – Left Abutment of Existing Bridge on Lake Pend Oreille looking Upstream (northwest)

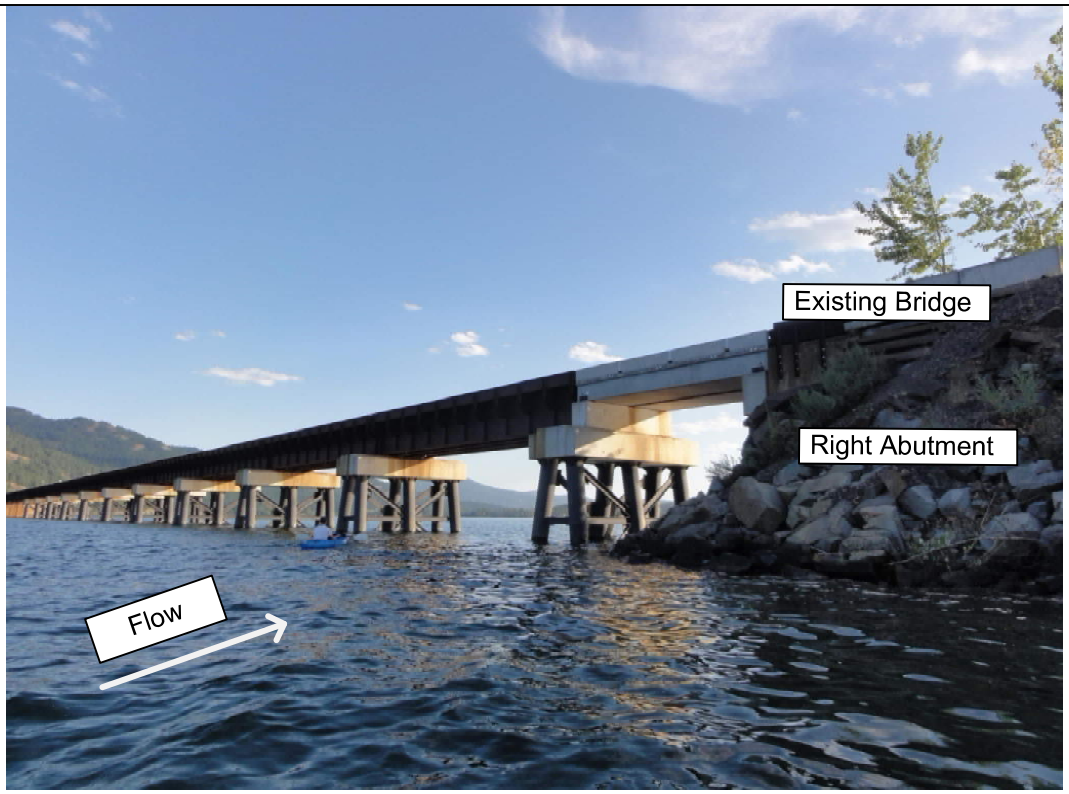


HANSON
HANSON PROFESSIONAL SERVICES INC.

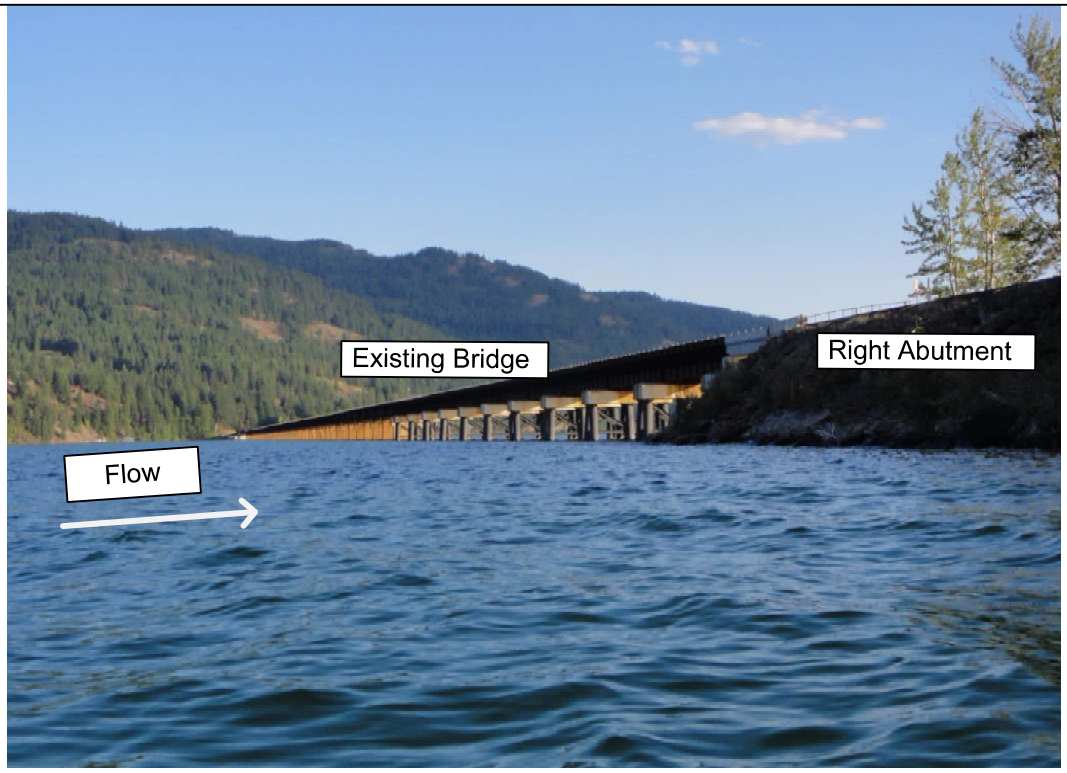
Photographs

BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Photograph 5 – Right Abutment of Existing Bridge on Lake Pend Oreille looking Downstream (south)



Photograph 6 – Right Abutment of Existing Bridge on Lake Pend Oreille looking Downstream (south)

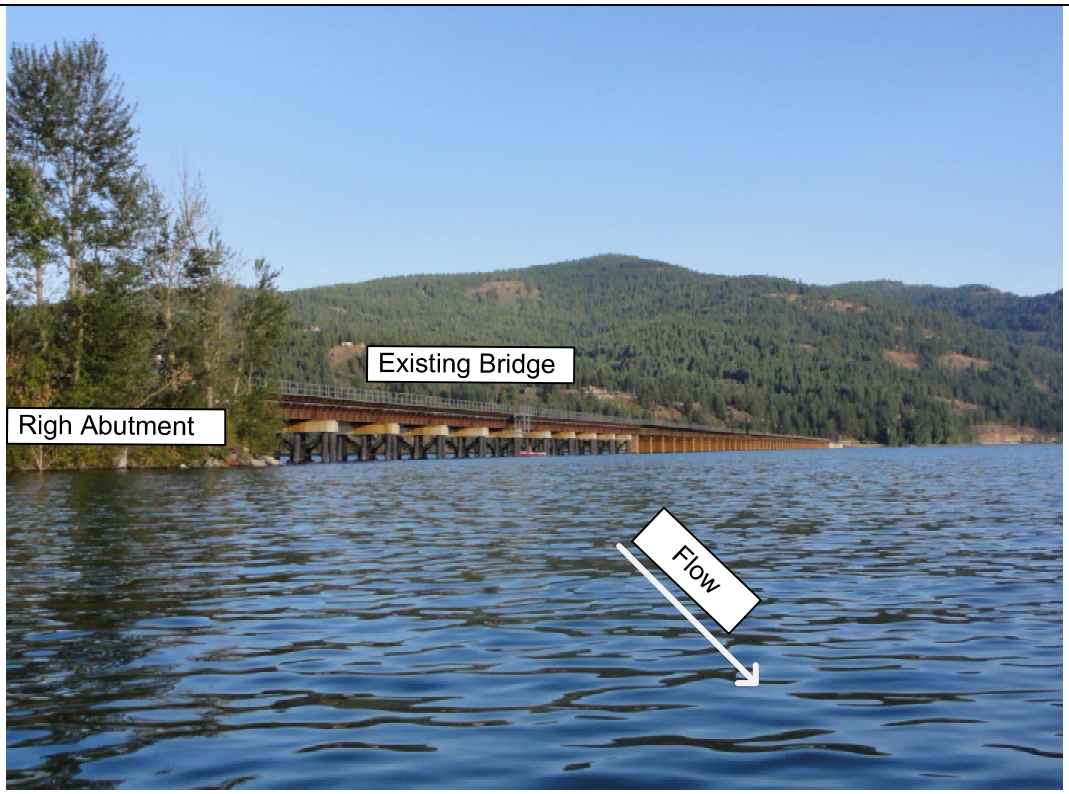


HANSON
HANSON PROFESSIONAL SERVICES INC.

Photographs

BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Photograph 7 – Right Abutment of Existing Bridge on Lake Pend Oreille looking Upstream (east)



Photograph 8 – Existing Bridge Truss on Lake Pend Oreille looking Upstream (east)

HANSON
HANSON PROFESSIONAL SERVICES INC.

Photographs

BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Photograph 9 – Existing Bridge Concrete Piers on Lake Pend Oreille

Photograph 10 – Existing Bridge Battered Piers on Lake Pend Oreille

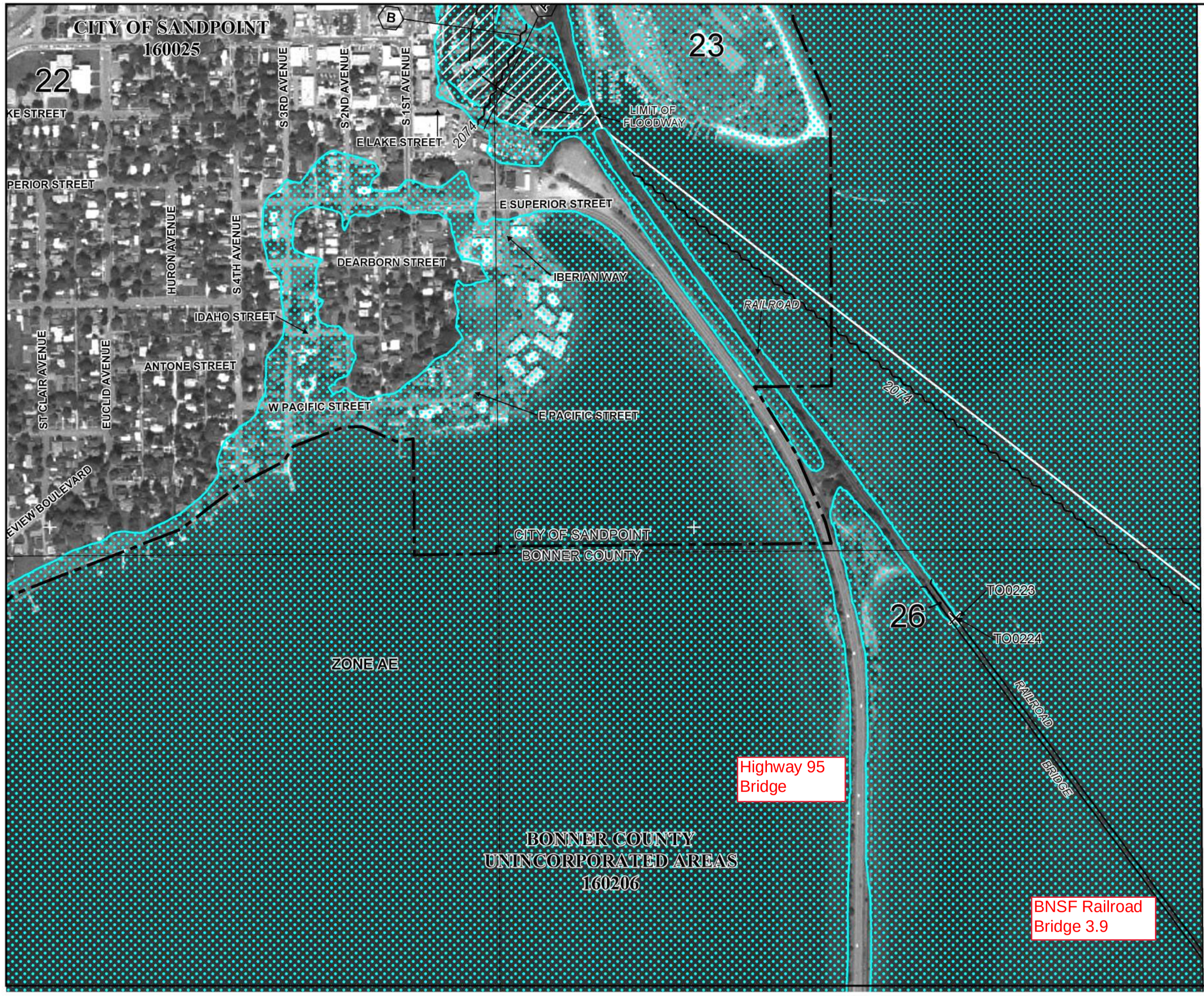
HANSON
HANSON PROFESSIONAL SERVICES INC.

Photographs

BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

I:\14jobs\14R0057\Admin\14-Reports\H&H\Lake Pend Oreille\Attachment B - Site Photos\Photos\Bridge3-9_Photographs.vsd

Attachment C – FEMA FIS and FIRM



MAP SCALE 1" = 500'

250 0 500 1000 FEET METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0718E

FIRM

FLOOD INSURANCE RATE MAP

BONNER COUNTY, IDAHO AND INCORPORATED AREAS

PANEL 718 OF 1475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BONNER COUNTY	160206	0718	E
PONDERAY, CITY OF	160150	0718	E
SANDPOINT, CITY OF	160025	0718	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16017C0718E
EFFECTIVE DATE
NOVEMBER 18, 2009

Federal Emergency Management Agency

FLOOD INSURANCE STUDY

BONNER COUNTY, IDAHO AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BONNER COUNTY, UNINCORPORATED AREAS	160206
CLARK FORK, CITY OF	160132
DOVER, CITY OF	160006
EAST HOPE, CITY OF	160237
HOPE, CITY OF	160238
*KOOTENAI, CITY OF	160052
OLDTOWN, CITY OF	160073
PONDERAY, CITY OF	160150
PRIEST RIVER, CITY OF	160026
SANDPOINT, CITY OF	160025

*No Special Flood Hazard Areas Identified

REVISED
July 7, 2014

Federal Emergency Management Agency

Flood Insurance Study Number
16017CV000B

City of Priest River

The City of Priest River is located at the confluence of Pend Oreille River (Lake Pend Oreille) and Priest River, in western Bonner County. The Idaho-Washington State line is 7 miles to the west, and Spokane, Washington, is 55 miles to the southwest. Priest River is surrounded by unincorporated areas of Bonner County.

Priest River was incorporated in 1949 and has a population of 1,754 (Reference 6). The city encompasses approximately 1.6 square miles. The major industry in the area is logging. The current and proposed development in the flood plain is moderate.

Priest River, which drains the Selkirk Mountains (elevations to 7,300 feet), flows into and out of Priest Lake to eventually join Pend Oreille River at the City of Priest River. Priest River drainage area at the mouth is 907 square miles.

City of Sandpoint

The City of Sandpoint is located on Lake Pend Oreille at the confluence of Lake Pend Oreille and Sand Creek, in central Bonner County. Sandpoint is surrounded by the unincorporated areas of Bonner County.

The Idaho-Washington State line is 29 miles to the west; Spokane, Washington, is 84 miles to the southwest; and the City of Coeur d'Alene, Idaho, is 46 miles to the south.

Sandpoint was incorporated in 1902 and has a population of 6,835 (Reference 6). The city encompasses approximately 4.7 square miles. The major industries in the area are logging and tourism. The current and proposed development in the flood plain is sparse.

Sand Creek originates north of the City of Sandpoint and drains an area of 38.5 square miles.

The City of Sandpoint is situated on relatively flat land, with mountainous terrain to the west and northwest, and Lake Pend Oreille to the east and south.

2.3 Principal Flood Problems

Bonner County is susceptible to periodic flooding along the streams due to overflow, particularly during rapid spring snowmelt. The flood season generally begins in April, peaks in May or June, and subsides in July. Intermittent flooding often occurs after hot weather or heavy rains, but snowmelt runoff is generally slow and steady (Reference 5).

Major river drainages are the Priest and Clark Fork-Pend Oreille River basins. Pack River is a tributary of Clark Fork-Pend Oreille River. Both major basins contain large lakes: Priest Lake and Pend Oreille Lake.

Priest Lake water levels area controlled and operated for hydropower generation; however, there is no flood-control space allocated in the natural lake (Reference 2). Lake Pend Oreille has been controlled by Albeni Falls Dam near Newport since 1952. Major flood damages around the lake in an 18-year frequency flood average $67,000. Damage occurs to 20,350 acres at the Clark Fork Delta, Pack River Delta, Oden Bay, Sandpoint, and Morton (Reference 3).

The lowlands along Clark Fork-Pend Oreille River have flooded in 1894, 1933, 1948, 1956, 1969, and 1974 in Bonner County. The highest flooding occurred in 1894 with damages estimated at $6.8 million, 1967 prices and development; discharges measured at the state line at Newport, Washington, was 200,000 cubic feet per second (cfs). In June 1948, discharge

was 162,000 cfs, and levees were overtopped. Sandpoint received excessive damage in the 1974 flooding. Damage in previous flooding has been largely sustained by grain crops and pastureland, with some low-lying roads and buildings affected around the lakes (Reference 3).

In the Pack River basin, streamflow is measured 10 miles north of Sandpoint. Average recorded discharge is 330 cfs, with a maximum discharge of 4,370 cfs on May 30, 1969. In this flood, the peak flow resulted from heavy rains, which, in turn, caused a sudden surge in the river, already high from snowmelt runoff. A newspaper account reported a cloudburst rain in Bonner County which washed out the Pack River road above Hellroaring Creek. Pack River cut a new channel around the upper bridge during the 1969 flood.

In 1974, area newspapers reported the January flooding occurring near Sandpoint. Of the schools in Bonner County School District, 82 were closed, and the governor proclaimed five northern Idaho counties to be disaster areas, including Bonner County:

> … flooding continued throughout Bonner County today forcing several road closures and evacuation, however, no injuries were reported … Residents in the Pack River flats area of Rapid Lightning Creek were forced to evacuate.
>
> Local authorities had expressed concern yesterday that the city's water reservoir dam would give way … Five men worked for over two hours removing ice from the dam yesterday, (according to Jack Leckner, superintendent of public works) … An eight-inch water main that runs across Sand Creek on Popcycle Road was washed out.
>
> In Sandpoint, water has caused excessive damage to several streets, Leckner stated, all of which will require repair work when the water recedes. (Reference 7)

The next day, the newspaper reported:

> Two feet of water was running over the dam in Strong Creek today, Phillips said…
>
> Other reports received by the Sheriff's Office as of early today are:
>
> - Highway 200 at Laclede closed.
> - Talache Road washed out and closed. Travel to Priest River via Dufort
> - Baldy Road, washouts.
> - Pleasant View Road, washouts.
> - Dufort Road, closed to all truck traffic.
> - Colburn water works is out.
> - Bottle Bay Road washed out.
> - Cocolalla Lake is up to eight inches.
> - The old city pier just east of here is also partially washed away. (Reference 7).

In another newspaper on the same day, high water, icy road conditions, and continuance of school closures were reported:

> The level of Lake Pend Oreille was predicted to rise during the next several

> days to about elevation 2,056 … Inflow was up to 27,000 cubic second feet Monday with the possibility of inflow may reach as high was 50,000 cfs before the end of the week…
>
> The Sheriff's department reported Tuesday that floodwaters on Rapid Lightning Creek has completely destroyed one home and damaged the front porch and garage of a second dwelling…
>
> A portion of the U.S. 95 between Sandpoint and Colburn was covered by more than two feet of water, with almost one-third of the highway washed away. The east end of the Bronx cutoff was completely washed away by a rampaging Sand Creek…
>
> The Pack River Road was reportedly completely washed out above Edna's Tavern … (Reference 8).

The storm continued, and on January 18, 1974, State and Federal action was reported in the area. The Governor sought national disaster status and the U.S. Army Corps of Engineers allowed additional storage in Lake Pend Oreille:

> The Corps of Engineers announced today water will be stored in Pend Oreille Lake above the normal maximum winter level of elevation 2,060 feet above sea level … it will probably go another two feet.
>
> Officials there are making preparations now to spill water if that becomes necessary …. (Reference 7).

By January 22, newspaper reports began estimating damage and telling of flood victims:

> Returning to the most awful mess imaginable …
>
> Estimates released last week indicate that at least $3 million in damage was done to county roads during the flooding. The City of Sandpoint has estimated its damage at nearly $60,000 (Reference 7).

<u>City of Clark Fork</u>

The City of Clark Fork is located on flood-prone land which has its flooding potential from Clark Fork, Lightning Creek, and Mosquito Creek. The major cause of flooding is rainfall on snow with subsequent melting.

Two severe floods from Clark Fork occurred in 1894 and, most recently, in 1948. The flood of June 1948 had a discharge of 153,000 cubic feet per second (cfs). Both floods affected only the southern-most areas of the city.

The most recent flood from Lightning Creek was in December 1921, and affected only the southwestern part of the city.

There are no flood records for Mosquito Creek.
In January 1974, major flows were experienced in all tributaries near the City of Clark Fork. Lightning Creek carried large amounts of silt and debris, but no major flooding of the city resulted.

Fork at Cabinet Gorge Dam. These structures are mainly used for power production purposes. They also enable Albeni Falls Dam to control the annual minimum lake level to an elevation higher than would be experienced under natural conditions and to reduce the maximum lake level for floods with peaks between 80,000 and 220,000 cfs. Lake levels are also affected by regulation of the upstream reservoir on South Fork Flathead River at Hungry Horse and by storage in Flathead Lake, both in Montana.

Dams on upper Clark Fork, particularly Flathead Tributary, decrease the chances of future flooding from Clark Fork. The physical proximity of Clark Fork also protects the city from 1-percent annual chance flood inundation. However, the greater part of the City of Clark Fork is affected by the 0.2-percent annual chance flows from Clark Fork, Lightning Creek, and Mosquito Creek.

For recreation purposes, the elevation of Priest Lake is controlled by a small dam during the summer. Water is later released for downstream power. During high flow conditions, the control for the lake outlet passes from this dam to natural backwater from the river channel leaving the lake.

A levee was constructed in 1959 by the U.S. Army Corps of Engineers on the east bank of Lightning Creek from its mouth to approximately 2 miles upstream. This levee system is currently undergoing accreditation. During the interim, the levees are considered to be provisionally accredited according to the agreement between FEMA and the City of Clark Fork signed August 2, 2007.

Nonstructural measures of flood protection are also being used to aid in the prevention of future flood damage. These are in the form of land-use regulations adopted from the Code of Federal regulations which control building within areas that have a high risk of flooding (Reference 9).

The cities of Priest River and Sand Point use zoning regulations, enforced by Bonner County, which restricted building within the 1-percent annual chance flood zone. These regulations adhere to the standards and requirements set forth by the Federal Emergency Management Agency.

There are no known physical flood protection measures in the cities of Dover, East Hope, Hope, Oldtown, and Ponderay.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60

percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

A regionalized frequency analysis was conducted on annual peak-flow data obtained from 11 stream-gaging stations located throughout northern Idaho. The gages range in drainage area from 1.1 to 1,220 square miles, with length of record ranging from 9 to 55 years (References 4, 10, 11, 12, and 13). A log-Pearson Type III frequency analysis was made on these known discharges using procedures as outlined by the U.S. Water Resources Council (Reference 14). Historical accounts of flooding and the actual computed gage skew coefficient (Reference 14) of -0.30 was too low for application in this region. Computed gage skews were used with additional consideration given to length of gage recorded and drainage basin characteristics.

With values from the above analysis, unit runoff versus drainage area curves were developed. These curves were used for estimating peak flow values for Grouse Creek, Lightning Creek, Mosquito Creek, Pack River, Rapid Lightning Creek, Sand Creek, Sand Creek North, and Spring Creek.

Gaging stations on Clark Fork and Priest River were the primary source of information used for defining peak discharge-frequency relationships for the rivers. The gages have been in continuous operation since 1928 and 1929, respectively (References 10, 11, 12 and 13).

Peak discharges for the required recurrence intervals were obtained from a log-Pearson Type III frequency analysis of annual peak flow data adjusted as described using “Guidelines for Determining Flood Flow Frequency” (Reference 14).

Due to the regulation of Priest River flows by Priest Lake and unique runoff characteristics of Priest River, several methods of analysis were utilized in calculating flows in the two upstream detailed study areas. A log-Pearson Type III frequency analysis was conducted on all known existing flow records for four stream gages located in the Priest River drainage area. The drainage areas vary from 10 to 966 square miles, with length of records from 18 to 50 years. With this data, the timing of peak flows and producing areas for peak flows were analyzed and found to correlate for the drainage area above Coolin (drainage area 624 square miles) and gage for Priest River at Priest River (drainage area 966 square miles). Peak flows for the required specific frequency floods were determined at the study reaches by a unit runoff basis combined with values from the frequency analyses for the gage located on Priest River at Coolin.

For Mosquito Creek downstream of the Burlington Northern Railroad, peak flows were reduced due to hydrograph routing caused by the large railroad embankment and small culvert opening. Inflow hydrographs used for routing calculations for the 10, 2-, 1-, and 0.2-percent-annual-chance floods were obtained from procedures as outlined for lake analyses. The U.S. Army Corps of Engineers HEC-1 computer program was used for all routing calculations (Reference 15). Backwater from the Burlington Northern Railroad is shown on the water-surface profiles. These water-surface elevations were taken from the routing calculations and used in the HEC-2 backwater analyses (Section 3.2).

The Pend Oreille Lake stage-frequency curve was determined by a graphical frequency analysis of maximum annual lake stages plotted on an arithmetic probability grid with median plotting positions. Elevations for floods of the selected recurrence intervals on Lake Pend Oreille are shown in Table 4.
Inflow-outflow routing calculations were used to define peak elevation data for the 10- and 1-percent-annual-chance floods on Cocolalla and Kelso Lakes. Inflow hydrographs for these calculations were taken from recorded high-water events on nearby gaging stations. Several hydrographs from various recorded floods were analyzed for unit volume of runoff, instantaneous peak flow, and shape.

Statistically, during the January 1974 flood, several of the stations analyzed recorded 1-percent-annual-chance peak flows. After the analysis of unit runoff, it was assumed the volume associated with these peaks was also a 1-percent-annual-chance flood event.

The analysis of hydrograph shape revealed the most valid hydrograph to use in routing calculations for the 1-percent-annual-chance flood came from the gage on Coeur d'Alene River located near Prichard. The recorded 1974 hydrograph was linearly adjusted to reflect drainage area differences between each lake studied and Coeur d'Alene River at Prichard drainage area. Instantaneous peak flows for each hydrograph were taken from the regional curve developed for the various drainage areas studied by detailed methods.

The hydrograph for routing calculations to determine the 10-percent-annual-chance event was taken from the March 1950 flood recorded on Hayden Creek. This flood produced statistically a 10-percent-annual-chance peak for the gage located below North Fork Hayden Creek near Hayden Lake. Hydrographs were again adjusted linearly to reflect drainage area differences, and the 10-percent-annual-chance peak flow for each hydrograph was taken from the regional curve.

The HEC-1 computer program Flood Hydrograph Package was used for all calculations of inflow-outflow parameters (Reference 15).

Starting lake elevations used in the HEC-1 routing calculations were based on information obtained during field reconnaissance and interviews with local residents in the area. Computed 1-percent-annual-chance lake elevations were checked for reasonableness with high-water marks obtained during the 1974 flood. Elevations for floods of the selected recurrence intervals on all lakes studied by detailed methods are shown in Table 4.

The analyses reported herein reflect the stillwater elevations due to wind setup effects, but do not include additional surcharge elevation from wave crest height and wave runup. These surcharge elevations were considered only for Lake Pend Oreille and are explained in detail in Section 3.2 of this study.

It was agreed between the Federal Emergency Management Agency and the study contractor to consider wave height analysis for Lake Pend Oreille. Significant wave height was calculated using procedures as outlined in ETL-1110-2-221 (References 16 and 17). Inputs for the calculations include wind direction, duration, and speed along with reservoir shape and size. The calculated wave height was added as a surcharge to the 1-percent-annual-chance stillwater lake elevation. No wave runup analysis was conducted.

Peak discharge-drainage area relationships for each stream studied in detail are shown in Table 5, "Summary of Discharges".

Table 4. Summary of Lake Elevations

Flooding Source and Location	Drainage Area (Square Miles)	Peak Elevations (Feet NAVD) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Cocolalla	58.1	2,212.7	___[1]	2,215.8	___[1]
Kelso	10.7	2,157.6	___[1]	2,158.0	___[1]
Pend Oreille	22,900	2,067.9	___[1]	2,073.7	___[1]
Priest Lake	572	2444.5	2445.3	2445.5	2446.1

[1]Data Not Available

Table 5. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Clark Fork					
Below Rapid Lightning Creek	22,073	142,250	____[2]	148,000	221,650
Grouse Creek					
At mouth	60.0	2,150	3,450	4,250	6,200
At Colburn-Creek	55.6	2,000	3,200	3,950	5,750
Lightning Creek					
At mouth	122	4,100	6,850	8,400	12,500
Above Spring Creek	110	3,700	6,175	7,600	11,275
Above Cascade Creek	103	3,500	5,800	7,100	10,550
Mosquito Creek					
At mouth	7.2[1]	350	425	450	550
Above Burlington Northern RR	7.2	400	550	675	950
Pack River					
At State Route 200	291	9,500	16,000	19,500	29,500
Above Trout Creek	278	9,000	15,250	18,750	28,250
Above Rapid Lightning Creek	228	7,500	12,500	15,500	23,250
Above Gold Creek	214	7,000	11,750	14,500	21,750
Above Grouse Creek	147	4,900	8,200	10,000	15,000
Above Sand Creek	127	4,250	7,100	8,700	13,000
At U.S. Geological Survey Gage Station near Colburn	124	4,200	7,000	8,500	12,750
Above Colburn Creek	103	3,500	5,800	7,150	10,500
Above Carribou Creek	77	2,700	4,400	5,400	8,000
Above Hell Roaring Creek	61	2,200	3,500	4,300	6,300
Pend Oreille River					
At Albeni Falls Dam	24,200	126,000	151,000	159,000	174,000
At Newport, Washington	___[2]	___[2]	___[2]	154,000	___[2]

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Water-surface elevations were computed for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods through use of the U.S. Army Corps of Engineers HEC-2 standard step-backwater computer program (Reference 18) for all detailed study areas.

Cross section data for Pack River below Rapid Lightning Creek Road were obtained from a previous report published by the U.S. Army Corps of Engineers (Reference 5). The sections were field surveyed.

Cross section data for backwater analysis of all other streams studied by detailed methods were digitized using aerial photography dated November 1977 and September 1981 (Reference 19). The below-water sections were field measured. All bridges, culverts, and other hydraulic structures were surveyed in order to obtain elevation data and structural geometry.

Cross sections for all streams studied by detailed methods were located at close intervals above and below bridges, culverts, and other hydraulic structures in order to compute the significant backwater caused by these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). In Clark Fork backwater from Burlington Northern Railroad is shown on the water-surface profiles (Exhibit 1). These water-surface elevations were taken from the routing calculations and used in the HEC-2 backwater analysis (Reference 18).

The computed water-surface elevations for Priest River in the area of the City of Priest River and Sand Creek in the City of Sandpoint are considerably lower than those elevations determined for Lake Pend Oreille. Therefore, the flood profiles (Exhibit 1) for this study show the entire reach for Priest River, within the corporate limits, inundated with backwater from Lake Pend Oreille.

Roughness characteristics (Manning's "n") of the channel and flood plain areas used in the backwater computations were estimated during field reconnaissance. Ranges of values for streams are summarized in Table 6.

Table 6. Roughness Coefficients - Range of Manning's "n"

	Channel	Overbank Flood Plain
Clark Fork	0.031	0.060 to 0.120
Grouse Creek	0.055	0.070 to 0.140
Lightning Creek	0.048 to 0.070	0.080 to 0.250
Mosquito Creek	0.055 to 0.060	0.060 to 0.150
Pack River	0.048 to 0.055	0.085 to 0.175
Priest River	0.040 to 0.155	0.040 to 0.200
Rapid Lightning Creek	0.040 to 0.070	0.040 to 0.200
Sand Creek North	0.070 to 0.080	0.140 to 0.200
Sand Creek	0.045 to 0.065	0.045 to 0.200
Spring Creek	0.070 to 0.095	0.080 to 0.350

Starting water-surface elevations for all streams were calculated using slope-area methods. Backwater at confluences with larger river systems or lakes are shown at the most downstream reaches of the smaller tributary stream on the flood profiles.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed and do not fail.

Hydraulic analyses of the outlet structures for Cocalalla and Kelso Lakes were conducted in order to provide rating for outflow from the lakes. All structures were measured by field surveys.

It was agreed between the Federal Emergency Management Agency and the study contractor to consider wave height analyses for Lake Pend Oreille only. Significant wave height was calculated using procedures as outlined in ETL-1110-2-221 (References 16 and 17). Input for the calculations included wind direction, duration, and speed along with reservoir shape and size. The calculated wave height was added as a surcharge to the 1-percent-annual-chance stillwater lake elevation. No wave runup analysis was conducted. No analyses of wave height or runup were conducted for any of the additional lakes studied in Bonner County.

Streams and rivers, selected for study by approximate methods, were analyzed by some combination of these five criteria: (1) correlation considering size of drainage area, slope, vegetative cover, and hydraulic conditions with other streams studied by detailed methods within the region; (2) field reconnaissance and historical accounts using information provided by local residents familiar with flooded areas and boundaries during past flooding events; (3) correlation with the U.S. Geological Survey maps of flood-prone areas; (4) correlation with flood boundaries as outlined on the Special Flood Hazard Boundary Map for Bonner County (Reference 20); and (5) engineering judgment.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the completion of the North American Vertical Datum of 1988 (NAVD

88), many FIS reports and FIRMs are now prepared using NAVD 88 as the referenced vertical datum.

To accurately convert flood elevations for the streams and rivers in Bonner County from the current NGVD 29 datum to the newer NAVD 88 datum, the following procedure was implemented. Locations at the upstream and downstream ends of each flooding source, as well as at an intermediate location between these two end points, were evaluated using the COE CORPSCON (Reference 21) vertical datum conversion software. At each of the three points CORPSCON calculated the difference between NGVD 29 and NAVD 88 elevations. These three conversion factors were averaged to develop and average conversion factor for each flooding source. The final NAVD 88 elevations reported herein were computed by adding the calculated average conversion factor to the existing NGVD 29 data. Table 7 shows the conversion factor for each stream studied in detail.

Flood elevations shown in this FIS report and on the FIRMs are referenced to NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD and the NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242
(301) 713-4172 (fax)

Table 7. Vertical Datum Conversion Factors

	Conversion from NGVD 29 to NAVD 88 (feet)			
Stream Name	Minimum Conversion	Maximum Conversion	Average Conversion[1]	Maximum Offset
Clark Fork River	3.86	3.90	3.88	0.02
Grouse Creek	3.86	3.87	3.86	0.01
Lightning Creek	3.88	3.98	3.91	0.07
Mosquito Creek	3.87	3.88	3.88	0.00
Pack River	3.88	3.89	3.89	0.01
Pend Oreille River	3.85	3.87	3.86	0.01
Lake Pend Oreille	3.86	3.87	3.87	0.01
Priest River	3.90	3.95	3.92	0.03
Rapid Lightning Creek	3.90	3.93	3.91	0.02
Sand Creek North	3.86	3.88	3.87	0.01
Sand Creek	3.88	3.90	3.89	0.01
Spring Creek	3.88	3.96	3.92	0.04

[1] Used to convert elevation data from NGVD 29 to NAVD 88.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and the FIRMs for this community. Interested individuals

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Pend Oreille River								
A	87	164	52,450	3.0	2,060.1	2,060.1	2,060.9	0.8
B	88	1,118	35,011	4.5	2,060.3	2,060.3	2,061.0	0.7
C	89	1,158	35,326	4.5	2,060.6	2,060.6	2,061.4	0.8
D	89	1,604	49,837	3.2	2,061.0	2,061.0	2,061.7	0.7
E	90	1,314	39,610	4.1	2,061.0	2,061.0	2,061.8	0.8
F	90	1,090	41,085	3.9	2,061.2	2,061.2	2,061.9	0.7

[1]Miles above mouth

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, IDAHO

AND INCORPORATED AREAS

FLOODWAY DATA

PEND OREILLE RIVER

FLOOD PROFILES

PEND OREILLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

AND INCORPORATED AREAS

FLOOD PROFILES

PEND OREILLE RIVER

FLOOD PROFILES

PEND OREILLE RIVER

Attachment D: USACE Data & Gage Data

US Army Corps of Engineers®
Seattle District

Frequently Asked Questions

Albeni Falls Dam

The U.S. Army Corps of Engineers (Corps) was authorized by Congress in Section 204 of the Flood Control Act of 1950, (PL 81-516, 17 May, 1950) to construct, operate, and maintain Albeni Falls Dam for multiple uses. The Corps operates Albeni Falls Dam according to its congressionally delegated authority to meet these multiple purposes which benefit the local community and regional interests, including hydropower generation, flood risk management, navigation, recreation and fish and wildlife conservation. A graphic of the annual operating cycle can be found on line at:
http://www.nws.usace.army.mil/Missions/CivilWorks/LocksandDams/AlbeniFallsDam.aspx by clicking on "Lake Pend Oreille Summary Hydrograph."

The Multiple Purposes of Albeni Falls Dam:

Hydropower
As part of the Federal Columbia River Power System (FCRPS), Albeni Falls Dam provides storage for 15 downstream federal and non-federal hydroelectric projects on the Columbia and Pend Oreille Rivers. The top 11 feet of Lake Pend Oreille is regulated by Albeni Falls Dam, and contributes nearly 1/3 of the water found in the Columbia River. Water stored in Lake Pend Oreille during the spring and summer is later released in the fall and winter to generate hydropower during the winter when users have the highest demand for electricity.

Flood Risk Management
Prior to dam construction in the early 1950s, the natural falls located at the current site of the dam restricted flow of the river. During high spring runoff periods, this narrowed channel was unable to rapidly pass the large flows of water and thereby caused flooding upstream along the river and the lake. Construction of the dam enlarged the size of the channel at this location thereby allowing more water to pass through and reduce upstream flooding. To a lesser extent, flooding downstream on the Pend Oreille and Columbia Rivers can also be eased by the ability of Albeni Falls Dam to temporarily impound spring flows until downstream flooding has subsided – this isn't possible in very high-flow periods. Water released in the fall and winter reduces flood risk above the dam as well as providing hydropower during the period of high electricity demand.

Recreation and Navigation
Before construction, the natural lake level annually peaked at various times and elevations during the spring runoff. This peak occurred for a brief two to three weeks before the natural lake level would then typically drop to an elevation significantly below the current summer elevation of 2062.5 feet in the summertime, still during the prime recreation season. The current regulation of the top 11 feet of the lake aims to hold lake elevation at a constant high elevation throughout the summer providing increased opportunity for safe navigation and water recreation.

The Corps also administers nine recreation areas as part of Albeni Falls Dam, including four developed campgrounds/day-use areas, two day-use only areas, and three primitive access areas. Albeni Cove, Priest River, Riley Creek, and Springy Point have developed campsites (no hookups, except at Riley Creek) with a variety of day-use facilities. The Visitor Center and Trestle Creek are day-use areas only. Morton Slough, Johnson Creek and the Driftyard (managed by the Idaho Department of Fish and Game) offer primitive camping and boat launch facilities. In fiscal year 2013 Albeni Falls Dam recreation facilities hosted 277,898 visitors.

Fish and Wildlife Conservation
Project lands in the delta regions were specifically set aside for fish and wildlife conservation. These lands are currently managed by Idaho Department of Fish & Game under license from the Corps. Albeni Falls Dam is also regulated throughout the year in consideration of fish and wildlife species.

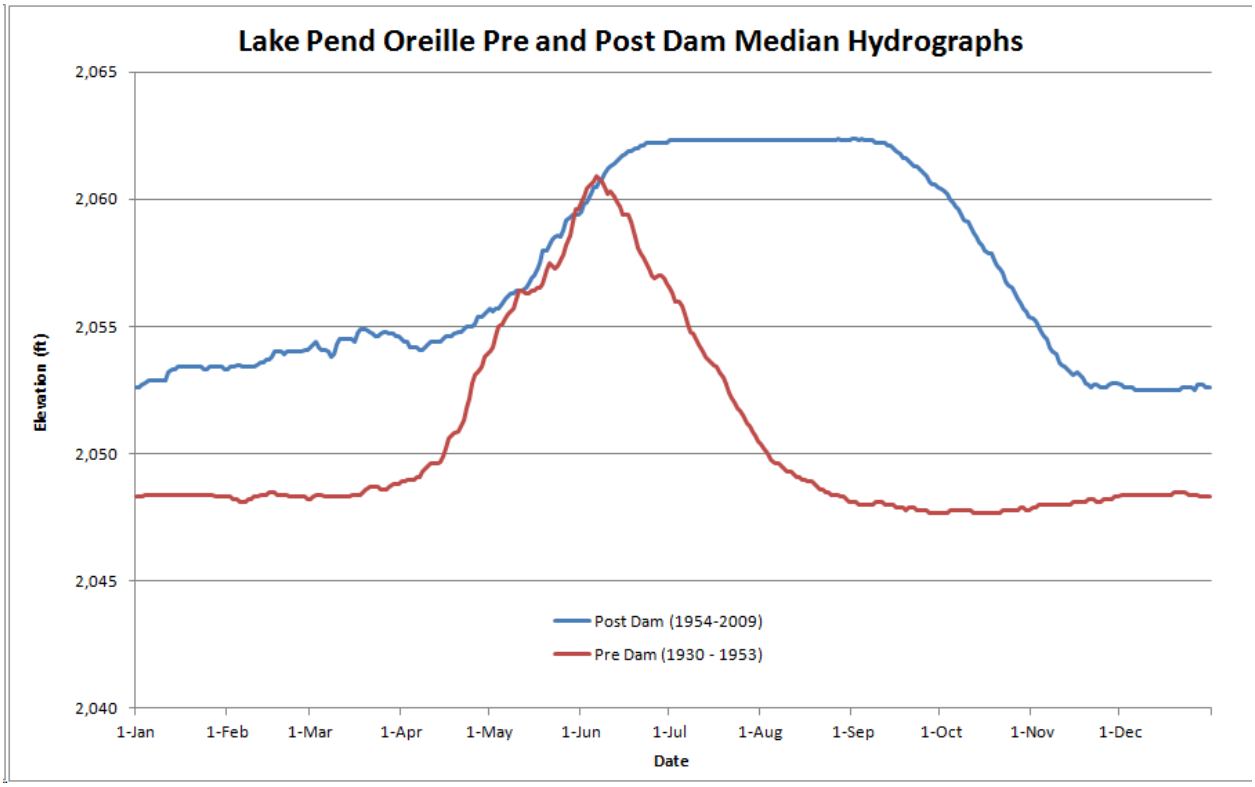
Seasonal operational parameters

Operations of Albeni Falls Dam are in accordance with both the water control plan detailed in the Water Control Manual and the regionally coordinated annual water management plan, and are generally as follows:

- During the winter holding season, (from approximately January to March) the lake level is held to no lower than the minimum control elevation. This minimum elevation is set to avoid dewatering kokanee redds. The minimum control elevation can be set anywhere between 2,051 and 2,055 feet annually, with 2,056 feet as a maximum elevation. If the determined minimum control elevation is not met prior to the start of kokanee spawning, the lake is not lowered below the level at which kokanee are spawning to avoid dewatering kokanee redds.
    - During flood risk management operations in this season, the lake elevation may increase during this period (up to elevation 2,060 feet). Water stored above elevation 2,056 feet must be evacuated by April 1 for flood risk management.
- During the spring flood season (from approximately April through June) the objective is to manage runoff for flood risk management. The project will frequently go on "free flow" to pass as much water as possible through the project which helps minimize flood elevations on Lake Pend Oreille.
    - After the lake is stabilized following the spring runoff and refill, the lake is operated within a 0.5 foot range between 2,062 and 2,062.5 feet, stream flows permitting.
- During the summer, the lake elevation is held between 2,062 and 2,062.5 feet from the end of the spring runoff (sometime in June to early July) until early to mid-September.
- During the fall, the lake is operated between elevations 2,060 to 2,062.5 feet in September and targets a draft to an elevation no lower than the minimum control elevation by mid-November. The November objective is to stabilize the lake within a 0.5 foot range of the minimum control elevation for kokanee spawning, prepare for winter floods and generate coordinated power for the whole FCRPS. In December the lake level is managed to avoid dewatering kokanee redds.
- Albeni Falls Dam operational targets are set to the elevation of Lake Pend Oreille at the Hope gage. However, elevations may vary at different lake locations. Targets are provided in ranges (generally 0.5 to 1.0 foot range) since operating to a specific elevation is difficult given the size of the watershed, the changing operations of upstream dams, local weather conditions and the size of Lake Pend Oreille itself.

The elevation of Lake Pend Oreille without the presence of Albeni Falls Dam

Lake Pend Oreille elevations would only peak for a few weeks each year if Albeni Falls Dam was not constructed. Some years the peak annual elevation would not exceed elevation 2,062 feet, with a range in peak annual elevation from 2,055 to 2,070 feet. Once the spring snowmelt receded, the lake elevation would decrease through the summer to below the current minimum operating level of 2,051 feet by early September, with lake levels during the winter generally around 2,049 to 2,050 feet. The Graph below shows the median elevations for Lake Pend Oreille as measured at the Hope gage before and after the construction of Albeni Falls Dam.



FREQUENTLY ASKED QUESTIONS RELATED TO OPERATIONS:

What is Senate Document No. 9?
Senate Document No. 9 is the transmission of the Interim Report of the Chief of Engineers to the Senate Committee on Public Works discussing the evaluation of the proposed "Albeni Falls Project". This document is referenced in the Flood Control Act of 1950 which authorized the construction of the Albeni Falls Project "substantially in accordance with the recommendation of the Chief of Engineers in Senate Document numbered 9". Pursuant to congressional authority, the proposed operational plan by the Chief of Engineers was refined upon project completion in 1955 and finalized in the 1960 Water Control Manual. Congress itself additionally refined project operations through subsequent statutes such as the Endangered Species Act and the Northwest Power Act. Current operations reflecting such changes are contained in the most recent Water Control Manual.

How do you decide the minimum control elevation each winter? For the last several years, the minimum control elevation was set annually through coordination with Idaho Department of Fish and Game and other entities based on kokanee spawning numbers through the use of a "decision tree". Recent studies completed by the Idaho Department of Fish and Game and the University of Idaho called into question the link between kokanee spawning numbers and use of the "decision tree" to determine the minimum control elevation; the decision tree is no longer in use to set the minimum control elevation. In light of this change, the Corps is currently updating the coordination process for determining the minimum control elevation.

Why is the lake held low in the winter?
The lake is held lower in the winter for many different considerations, including but not limited to: Flood risk management, opportunities to enhance power generation at downstream dams, providing system flexibility in meeting Endangered Species Act requirements and hydropower reliability requirements, meeting fish and wildlife conservation needs (kokanee), and to minimize soil erosion.

What is the reason to provide flexible winter lake levels?
If requested by Bonneville Power Administration, flexible winter lake levels allow the Corps to store water in Lake Pend Oreille in the winter within the project's existing authorized operating limits. The Corps would then release the water days or weeks later for power generation when it is more valuable to the region, such as when a cold snap drives up energy demand or during a power plant outage.

How do you consider Kokanee in your operations?
See the general description of seasonal operations above. During winter operations the lake is not dropped below the level at which kokanee are spawning, once spawning has commenced, to protect kokanee eggs.

What is flood stage for Lake Pend Oreille?
2,063.5 feet as measured at the Hope gage.

What is flood stage for Pend Oreille River?
The Pend Oreille River has a flood flow designated by the National Weather Service as measured by downstream releases of the project. The flood flow was revised downward in 2014 from 100,000 to 95,000 cfs.

What is full powerhouse discharge capacity?
Full powerhouse discharge capacity is between 25,000-32,000 cubic feet per second, depending upon lake elevation.

What is the natural lake constriction and how does it impact operations?
The constriction is the transition from Lake Pend Oreille to the Pend Oreille River near Dover. At times flows downstream of this constriction are limited and upstream lake levels are determined by the bottom of the lake at this constriction point. This constriction can restrict/control the amount of water that can move down the river to the dam. The constriction affects the amount of water that the river can transport and level of the lake when the project is on free flow. In other words, there is a maximum amount of water that can pass over this constriction at any time. When the flows from the lake into the river reach that maximum, for example during a heavy rain or run-off event, the dam no longer is the limiting factor determining the water level. No matter how much water the dam itself passes, flows in the river both upstream and downstream of the dam, as well as in the lake are limited by the "bottle neck" at Dover.

What property easement does the Corps hold around the lake?
Approximately 9,256 acres of flowage easements were acquired on private lands around the lake for the purpose of accommodating wave action, erosion and ground water effects that might occur as a result of the operation of the project. Easements were acquired at fair market value and allow for permanent flooding up to elevation 2,062.5 feet and intermittent flooding up to elevation 2,067.5 feet. Easement boundaries are loosely tied to the 2067.5 level, but each easement has its own legal description. Additional easements were acquired that restrict habitation below 2,067.5 feet in locations where the original easements were determined to be inadequate. There was a recognition in the mid-90's that easements which contain a no-habitation restriction were too strict for the Pend Oreille River above the dam and below the Long Bridge and consequently the Corps was authorized to release this restriction for dwellings with a first floor elevation above 2,065 feet. Such a release includes language that will release the Corps from liability for flood events that occur where flood waters exceed the 2,065 feet elevation.

Will you change operation of the lake without public comment?
If the operation of the lake falls within the current operating limits of the Water Control Manual for Albeni Falls Dam the operation does not require public comment. If the operation is outside of those bounds, the National Environmental Policy Act (NEPA) may require a public comment period prior to undertaking the operation. In general, however, the Corps holds annual public meetings to discuss past and future operations. To receive e-mail notifications about these meetings, please join our stakeholder list by e-mailing the public affairs office at: DLL-NWS-PAOTeam@usace.army.mil

How do I get more information / track operations?
Data for recent operations can be found online here:
http://www.nwd-wc.usace.army.mil/nws/hh/www/index.html

Short term modeling forecasts are provided by the Northwest River Forecast Center. Their projections for Albeni Falls Dam inflow, outflow and the Lake Pend Oreille at the Hope gage can be found here: http://www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?lid=ALFW1

Modeling for the next 3 to 6 months can be found here: http://www.nws.usace.army.mil/About/Offices/Engineering/HydraulicsandHydrology/OperationalProjections.aspx

In addition, individuals can also request to receive flow notification updates whenever Seattle District Water Management makes a change at Albeni Falls Dam. Please contact the public affairs office at DLL-NWS-PAOTeam@usace.army.mil.

FREQUENTLY ASKED QUESTIONS RELATED TO THE KALISPEL MOA

What is the Memorandum of Agreement, referred to in the flier sent out by the "Save Our Pend Oreille Alliance"?
The Corps, Bonneville Power Administration, Bureau of Reclamation and Kalispel Tribe of Indians signed a Memorandum of Agreement (MOA) in July 2012. The Kalispel MOA is modeled after the "Columbia Basin Fish Accords" discussed below. The MOA and comments received during the public review process are on line at: http://efw.bpa.gov/environmental_services/Document_Library/Kalispel_MOA/

Was the MOA process conducted publicly?
Yes. Columbia Basin Fish Accords, including the Kalispel MOA, were each negotiated among the signatories, with subsequent public review of the proposed MOAs prior to signing. Public comments were considered and reflected in the decisions to sign. The Kalispel MOA had a 30-day public comment period which ran from June 30, 2011 – August 1, 2011. Comments were received by Idaho state entities, local power entities, environmental interests, and local citizens. During this time the Lake Pend Oreille, Pend Oreille River, Priest Lake and Priest River Commission (Lakes Commission) was not funded by the State of Idaho and did not have quarterly meetings. The Corps and BPA briefed the Lakes Commission about the MOA and other activities once funding was restored by the State of Idaho.

Comments that were submitted during this process can be viewed at: http://www.bpa.gov/applications/publiccomments/CommentList.aspx?ID=132

What are the Corps' responsibilities when working with Tribal governments?
The United States has a unique legal and political relationship with Indian tribal governments, established through and confirmed by the U.S. Constitution, treaties, statutes, Executive Orders, and judicial decisions. In recognition of that special relationship, the federal government is charged with engaging in regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications. In accordance with the provisions of these treaties, laws, Executive Orders as well as principles lodged in the Constitution of the United States, the U.S. Army Corps of Engineers has a responsibility to meet Tribal trust obligations, protect trust resources, and obtain Tribal views regarding trust and treaty responsibilities or other actions carried out or administered by the Corps.

What are the "Fish Accords"?
The Columbia Basin Fish Accords (Fish Accords) are designed to supplement biological opinions for listed salmon and steelhead and the Northwest Power and Conservation Council's Fish and Wildlife Program. They provide firm commitments to hydro, habitat and hatchery actions; greater clarity about biological benefits and secure funding for 10 years. Under these agreements, the federal agencies, tribes and states work together as partners to provide tangible survival benefits for fish and wildlife, by upgrading passage over federal dams, by restoring river and estuary habitat, and by effective use of hatcheries.
Since 2008, the Accords partners have:

- Opened up more than 1,100 miles of new spawning habitat – a span of stream and tributary, added up, that is almost as long as the Columbia itself.
- Protected or improved more than 175,000 acres of fish and wildlife habitat – roughly the size of Crater Lake National Park.

- Protected more than 35,000 acre feet of water. This is equivalent to the annual residential water consumption of the city of Portland, Oregon.

The Kalispel Memorandum of Agreement was signed in 2012 in the continued spirit of the Columbia Basin Fish Accords. For more information visit: http://www.salmonrecovery.gov/Partners/FishAccords.aspx .

OTHER FREQUENTLY ASKED QUESTIONS

How will the Columbia River Treaty (CRT) negotiations affect lake level?
Idaho has been prominently at the table with the region's other states and sovereign tribes from the very beginning. The draft treaty recommendation recently submitted to the U.S. State Department calls for no changes to current management operations at Lake Pend Oreille.

What is the Northwest Power & Conservation Council?
Congress passed the Northwest Power Act in 1980, which called for the establishment of an interstate compact of Idaho, Montana, Washington and Oregon. The compact, known as the Northwest Power and Conservation Council is charged with developing a Power Plan and a Columbia Basin Fish and Wildlife Program to serve two primary objectives: to provide an adequate, reliable, economic, and efficient power supply while protecting, mitigating, and enhancing fish and wildlife impacted by the hydro-system. For more information about the Northwest Power & Conservation Council please go to http://www.nwcouncil.org/ . The State of Idaho has two representatives on the NWPCC appointed by the Governor, currently, Jim Yost and Bill Booth.

What was the "Columbia River Compact"?
The attempted "Columbia River Compact" was never ratified by Congress and is therefore not in effect and does not have bearing over the operations of Albeni Falls Dam.

Modeled using current ESP traces as of 07/09/18

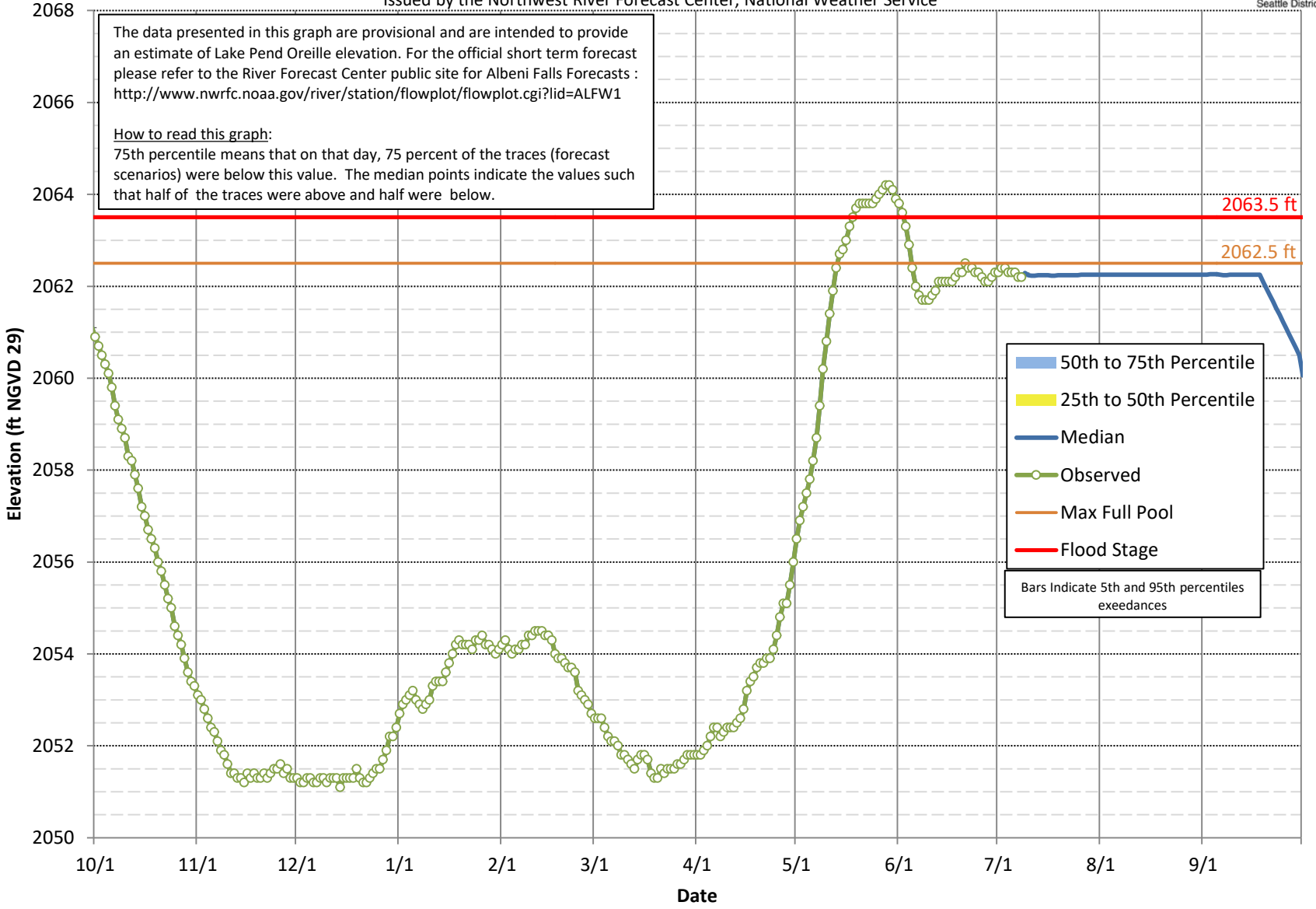
Lake Pend Oreille Elevation (Hope Gage) - Probability Chart

Corps of Engineers Projections Based on the 69 Ensemble Streamflow Prediction Traces
Issued by the Northwest River Forecast Center, National Weather Service

US Army Corps of Engineers
Seattle District

The data presented in this graph are provisional and are intended to provide an estimate of Lake Pend Oreille elevation. For the official short term forecast please refer to the River Forecast Center public site for Albeni Falls Forecasts : http://www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?lid=ALFW1

How to read this graph:
75th percentile means that on that day, 75 percent of the traces (forecast scenarios) were below this value. The median points indicate the values such that half of the traces were above and half were below.

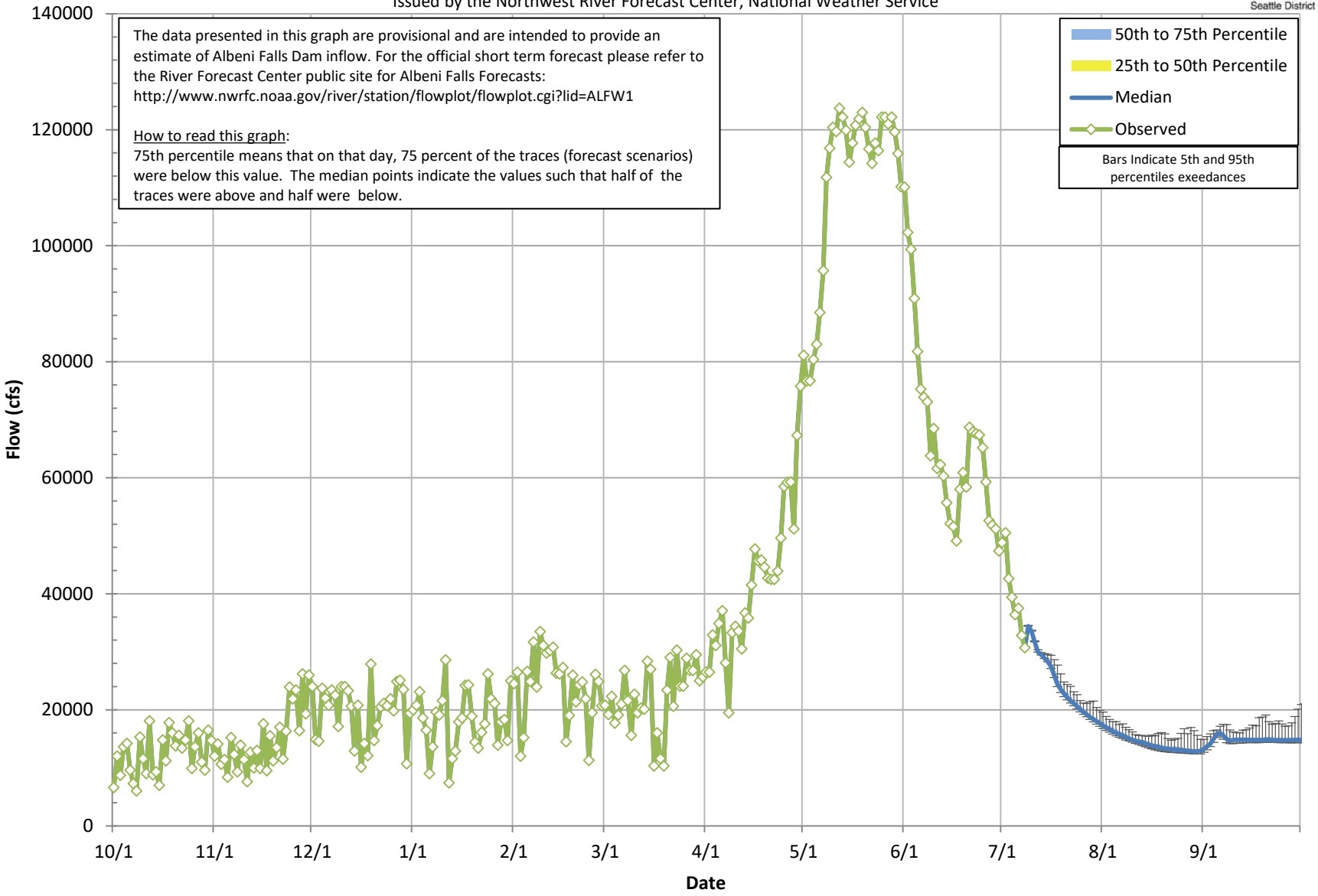


Modeled using current ESP traces as of 07/09/18

Albeni Falls Dam Inflow Probability Chart

Corps of Engineers Projections Based on the 69 Ensemble Streamflow Prediction Traces
Issued by the Northwest River Forecast Center, National Weather Service

US Army Corps of Engineers
Seattle District



Modeled using current ESP traces as of 07/09/18

Albeni Falls Dam Outflow- Probability Chart

Corps of Engineers Projections Based on the 69 Ensemble Streamflow Prediction Traces
Issued by the Northwest River Forecast Center, National Weather Service

US Army Corps of Engineers
Seattle District

The data presented in this graph are provisional and are intended to provide an estimate of Albeni Falls Dam outflow. For the official short term forecast please refer to the River Forecast Center public site for Albeni Falls Forecasts:
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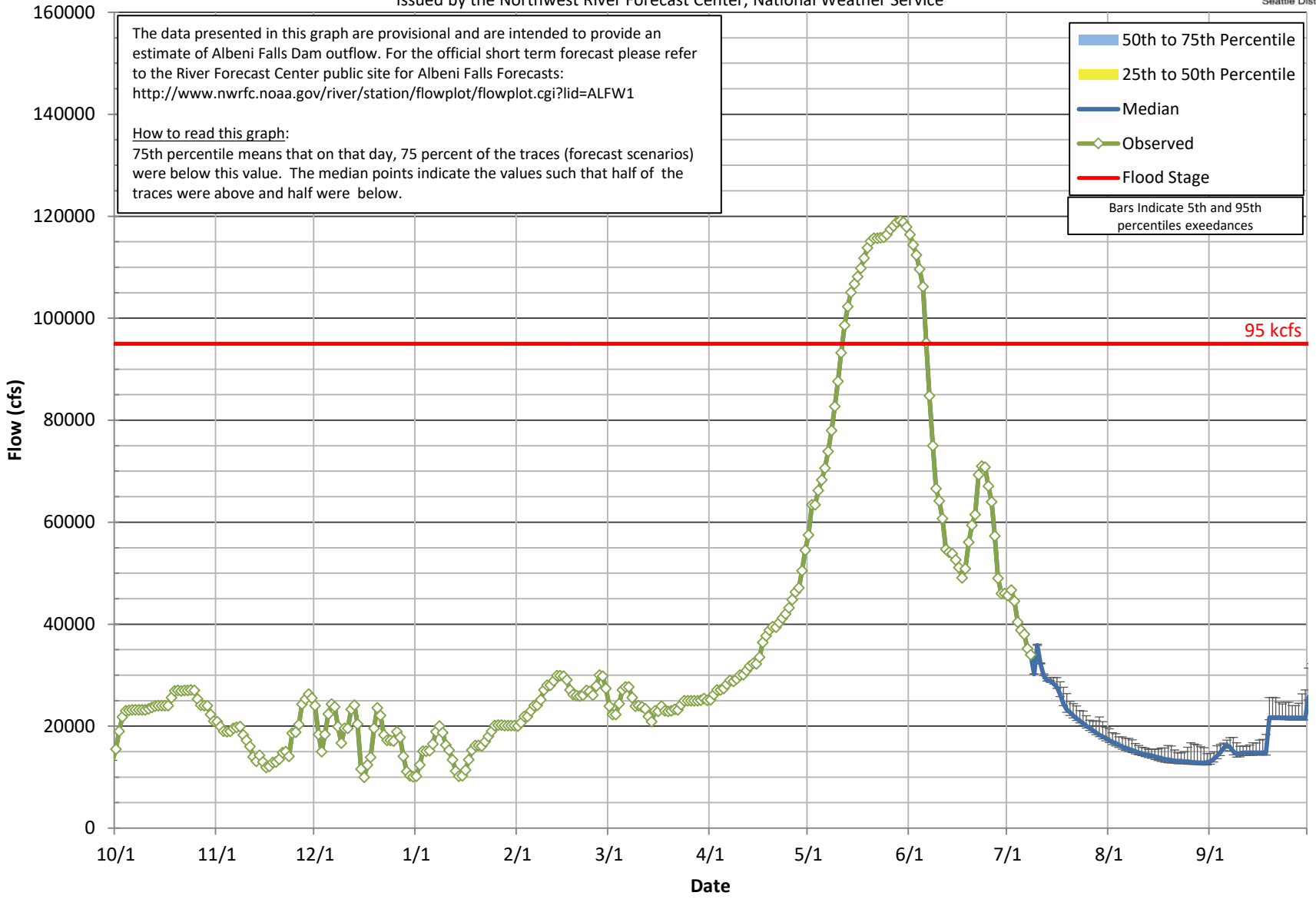

National Water Information System: Web Interface

* We've detected you're using a mobile device. Find our mobile dedicated web site here.

Click to hideNews Bulletins

- Please see news on new formats
- **UPDATE, 11/9: As of November 8, the USGS has successfully restored all of the operational gages that stopped transmitting due to an issue with the satellite telemetry system that records and transmits data. The USGS will now focus on restoring other equipment that experienced the telemetry issues, including about 85 rapid deployment gages that are used periodically for emergency response. Read more**
- Full News

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Idaho Water Science Center | Subscribe to Water Alerts | Threatened and Endangered Stations in Idaho

USGS 12392500 LAKE PEND OREILLE NR HOPE, ID

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site: Time-series: Daily data GO

Click to hidestation-specific text

Station is operated in cooperation with the U.S. Army Corps of Engineers .

This station managed by the Post Falls Field Office.

Available Parameters	Period of Record
☐ All 2 Available Parameters for this site	
☑ 00065 Gage height(Obs.)	1970-10-01 2018-05-23
☑ 72020 Elevation, NGVD29(Obs.)	1929-10-01 1970-09-29

Output format

- ◉ Graph
- ○ Graph w/ stats
- ○ Graph w/ (up to 3) parms
- ○ Table
- ○ Tab-separated

Days (365) [Summary of all available data for this site](#) GO

[Instantaneous-data availability statement](#)

-- or --

Begin date

2017-11-10 **Gage height, feet**

End date

2018-11-10

Add up to 2 more sites and replot for "Gage height, feet"

?

Add site numbers

Note

Enter up to 2 site numbers separated by a comma. A site number consists of 8 to 15 digits

GO

Create presentation-quality graph.

Questions about sites/data?
Feedback on this web site
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News

Title: USGS Surface-Water Daily Data for Idaho
URL: https://waterdata.usgs.gov/id/nwis/dv?

Page Contact Information: Idaho Water Data Support Team
Page Last Modified: 2018-11-11 19:30:00 EST
0.86 0.79 vaww02

weather.gov

National Weather Service
Advanced Hydrologic Prediction Service

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Local weather forecast by "City, ST"
City, ST Go

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WHEN FLOODED TURN AROUND DON'T DROWN

FLOODSMART.GOV

USA.gov

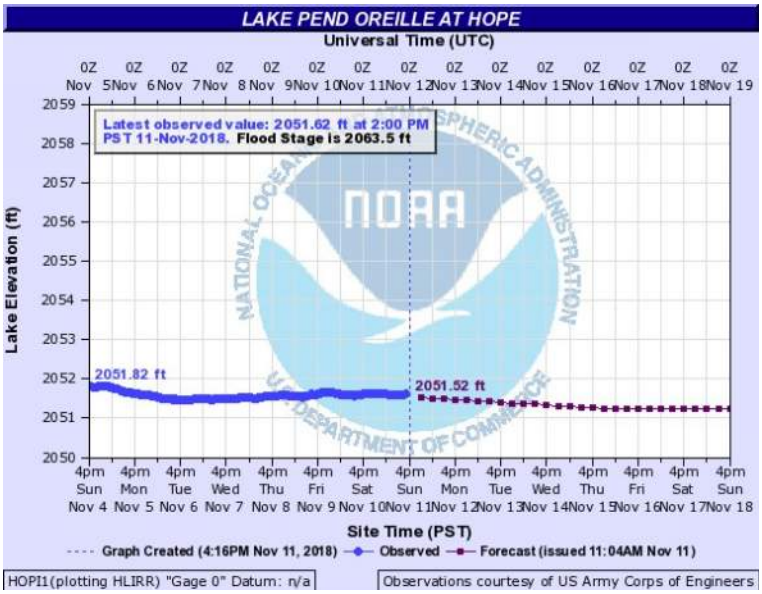
National Observations WFO Observations Hydrograph

ALERT: Update on status of the nationwide data transmission error that prevents stream gauge data collected at affected locations from being displayed on the Advanced Hydrologic Prediction Services (AHPS) webpages. The USGS has restored the transmission from all of their gauges or has placed them in a seasonal outage (some Alaska gauges). There are a few USGS gauges that the NWS is not yet receiving the new transmissions and NWS is working to get that data by alternate means. A map of the status of USGS gauges is here. The status map of gauge outages from other agencies is here. The situation has greatly improved and will continue to improve but at a slower pace. The outage maps will now be updated once per week on Thursday. We apologize for the service interruption and hope to have the data restored as soon as possible.

Weather Forecast Office Spokane, WA Northwest River Forecast Center

Hydrograph River at a Glance Download Probability Information

Auto Refresh: OFF



Printable Image
About this graph
Tabular Data (UTC)
Tabular Data (PST)
XML
RSS
Datum: NGVD29
Metadata

NOTE: Forecasts for the Lake Pend Oreille at Hope are issued routinely year-round.

Observed and forecasted lake levels, as well as the official flood stage, are in reference to the NGVD29 Datum. The Flood Stage of 2063.5 feet is equivalent to an elevation on the new FEMA FIRMS of 2067.37 feet. To learn more about what this means, please click here.

Default Hydrograph

Return to Area Map

Upstream Gauge Downstream Gauge

Flood Categories (in feet)

Major Flood Stage:	2069
Moderate Flood Stage:	2066
Flood Stage:	2063.5
Action Stage:	2062.6

Zoom Level:14

Switch Basemap

Historic Crests
(1) 2,075.88 ft on 06/01/1894
(2) 2,071.62 ft on 06/09/1948
(3) 2,068.76 ft on 06/20/1933
(4) 2,067.11 ft on 06/10/1950
(5) 2,065.74 ft on 06/05/1997
Show More Historic Crests

(P): Preliminary values

subject to further review.

Recent Crests
(1) 2,064.29 ft on 06/17/2011
(2) 2,065.74 ft on 06/05/1997
(3) 2,065.47 ft on 06/23/1974
(4) 2,065.70 ft on 06/12/1972
(5) 2,067.11 ft on 06/10/1950
Show More Recent Crests

(P): Preliminary values
subject to further review.

Low Water Records
(1) 2,046.27 ft on 02/17/1936

FEMA

For more information on your flood risk go to www.floodsmart.gov.

☐ Show FEMA's National Flood Hazard Layers

Bureau of Land Management,...

Gauge Location Disclaimer

Latitude/Longitude Disclaimer: The gauge location shown in the above map is the approximate location based on the latitude/longitude coordinates provided to the NWS by the gauge owner.

Flood Impacts & Photos

Collapse

If you notice any errors in the below information, please contact our Webmaster

2071 Extensive flooding is likely. Some flooding in the Sandpoint business district can also be expected. Lake level of 2071 feet is in reference to the NGVD29 datum.

2071 Extensive flooding is likely. Some flooding in the Sandpoint business district can also be expected. Lake level of 2071 feet is in reference to the NGVD29 datum.

2069 Major flooding of lakeside homes and docks adjacent to the lake is likely. Significant flooding can also be expected along the Pack, Priest, and Clark Fork River valleys near the lake. Lake level of 2069 feet is in reference to the NGVD29 datum.

2065.75 Portions of Lakeview Avenue in Bayview will be flooded. Extensive damage to docks in Bayview. In 1997 water approached the sewer lift station in Bayview, and the lake level threatened to raise boat houses above their mooring piers.

2065.5 Flooding of some lakeside homes and docks is likely. In 1997 several homes and docks were damaged near Bayview. Lake level of 2065.5 feet is in reference to the NGVD29 datum.

2064 Minor flooding of driveways and low lands in the Pack and Clark Fork River Valleys near the lake. Scenic Bay RV sites and part of parking lot at Scenic Bay Marina in Bayview will be flooded. Most dock ramps around the lake will be underwater. Part of the parking lot behind the Power House in Sandpoint will be flooded. Water will begin to cover part of the sidewalk behind the Edgewater Resort in Sandpoint. Flooding of parking lot and picnic area at Trestle Creek Rec Area. 2064 feet is referenced to NGVD29.

2063.5 Minor flooding of dock ramps, yards, and recreational sites around the lake can be expected. Some erosional damage from wave action is possible along the windward shores. Lake level of 2063.5 feet is in reference to the NGVD29 datum.

About This Location

Collapse

Latitude: 48.276389° N, Longitude: 116.346389° W, Horizontal Datum: NAD83/WGS84

River Stage Reference Frame	Gauge Height	Flood Stage	Uses
NWS stage	0 ft	2063.5 ft	Interpreting hydrographs and NWS watch, warnings, and forecasts, and inundation maps
Vertical Datum	**Elevation (gauge height = 0)**	**Elevation (gauge height = flood stage)**	**Elevation information source**
NAVD88	Not Available	2067.37	Survey grade GPS equipment, FEMA flood plain maps,
NGVD 29	Not Ava		
MSL	Not Available	Not Available	Older USGS topographic maps, MSL benchmarks
Other	Not Available	Not Available	

Current/Historical Observations:

- Corps of Engineers (COE) Info for Hope
- U.S. Geological Survey (USGS) Data and Site Info for Hope

Additional Information Collapse

USACE Spring Peak Flow charts available on the web. Copy/paste the following link in your browser.
http://www.nws.usace.army.mil/PublicMenu/Doc_List.cfm?sitename=PUBLICAFFAIRS&pagename=Lake_Pend_Oreille

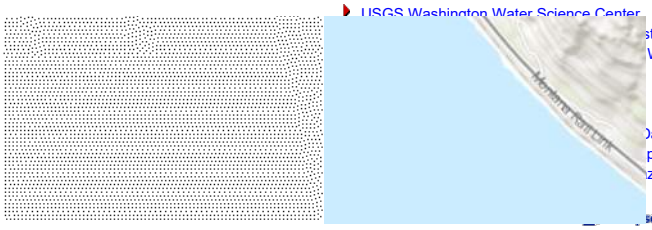
Resources

Hydrologic Resources

- Text Products
- Past Precipitation
- Forecast Precipitation
- River Forecast Centers
- River Stage Summary
- Inundation Mapping Locations
- Pacific Northwest Water Supply Forecasts
- U.S. Bureau of Reclamation Hydromet Program - Pacific Northwest
- Washington State Dept of Ecology River & Streamflow Monitoring Network

1903 - 2014

- Weather Forecast Office Spokane, Washington
- Northwest U.S. River Flood Outlook
- Snow Information
- National Flood Insurance Program
- USGS Idaho Water Science Center
- USGS Washington Water Science Center



strict
Water & Climate Center

Daily
p - Dept of Ecology
zard Maps

Collaborative Agencies

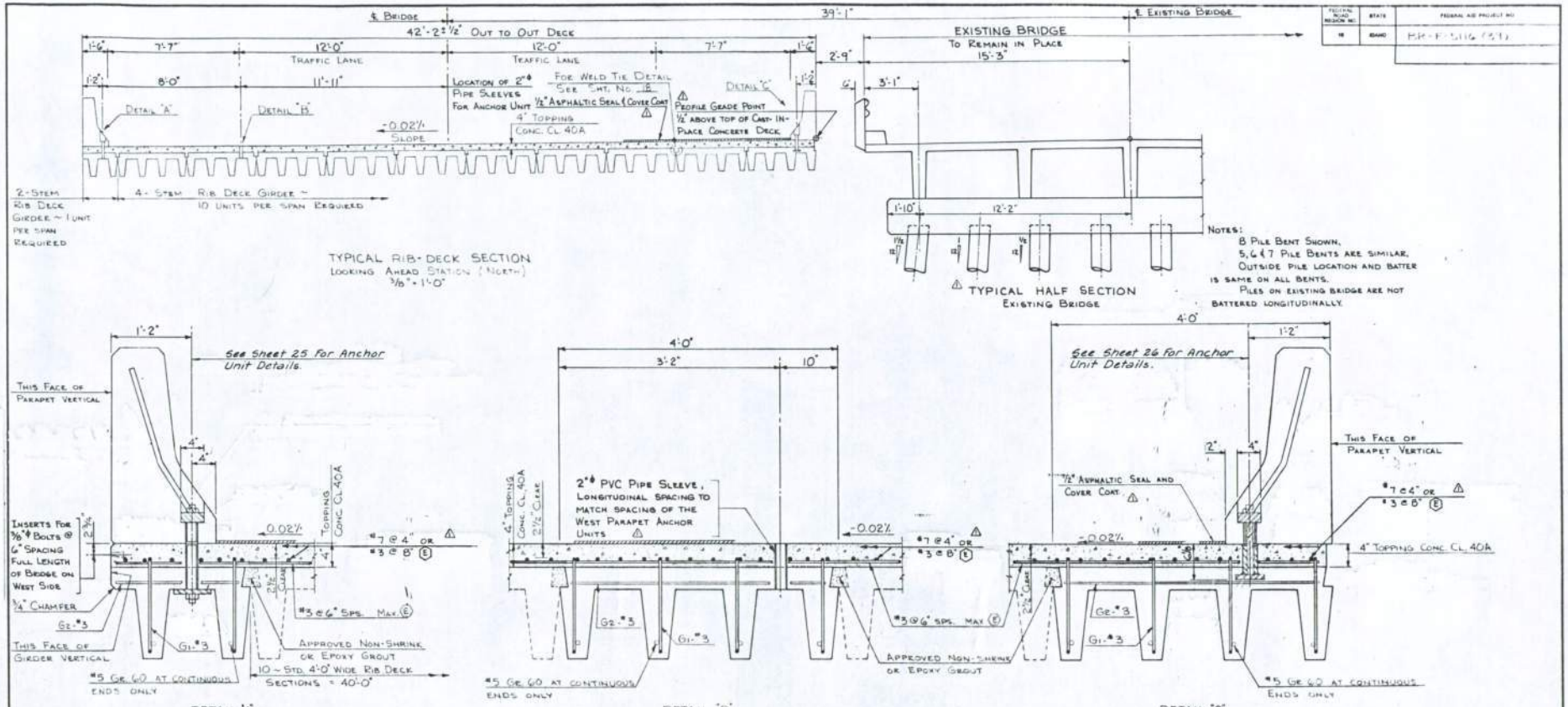
The National Weather Service prepares its forecasts and other services in collaboration with agencies like the US Geological Survey, US Bureau of Reclamation, US Army Corps of Engineers, Natural Resource Conservation Service, National Park Service, ALERT Users Group, Bureau of Indian Affairs, and many state and local emergency managers across the country. For details, please click here.

NWS Information

National Weather Service
Spokane Weather Forecast Office
2601 N. Rambo Rd.
Spokane, WA 99224
(509) 244-0110
Ask Questions/Webmaster
Page last modified: 21-Dec-2016 10:35 PM

Attachment E: Existing Bridge Plans

Highway 95



MICROFILM RECORD
DATE FILMED | ROLL NO. | SEE INDEX
NOTES

Notes

Continuous ends are those where no end diaphragm is cast with girder. ⚠

Federal Aid Project No.	State	Federal Aid Project No.
18	Idaho	BR-F-5116(5)

Superstructure Sections

Sandpoint Bridge Replacement
Over Lake Pend Oreille
Sta. 228+71.5

Revisions			
No.	By	Date	
2.8		7/12/79	

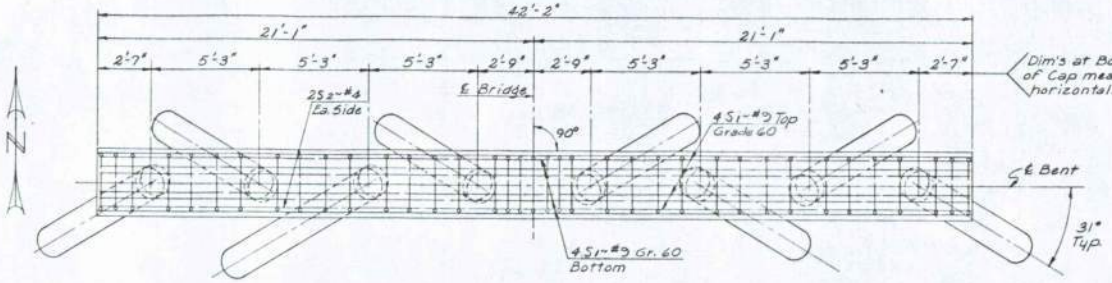
Scale: As Shown
Scales shown are for 22" x 36" prints only

State of Idaho
Transportation Department
Division of Highways
Boise, Idaho

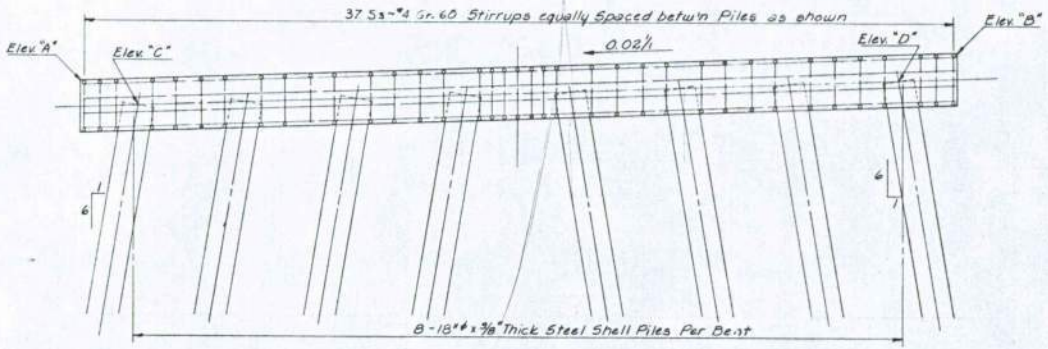
Designed: R.B. Jones, Jun 29 '79
Drawn: R.L. Tolarker, 2/78
Design Checked: Lee Arnold 6/79
Dwg. Checked: R.B. Jones, Jun 29 '79
Approved: Jun 29 '79 — Bridge Engineer — Date

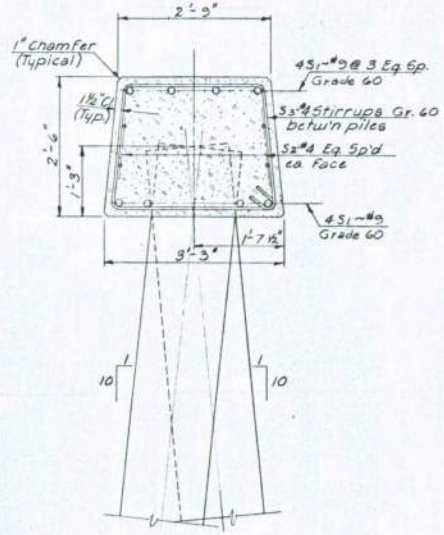
County: Bonner
File No.: 1213A
Dwg. No.: 15066
Sheet 20 of 28

FEDERAL ROAD REGION NO.	STATE	FEDERAL AID PROJECT NO.
10	IDAHO	BR-F-5116(39)



PLAN
No Scale





TYPICAL SECTION
1" = 1'-0"

SCHEDULE OF ELEVATIONS						
Bent No.	Station of ℄ of Bent	Unit No.	ELEVATION A	B	C	D
1	199+58.00	1	2081.43	2082.27	2080.23	2080.57
2	199+93.00	1	81.23	82.13	80.09	80.83
3	200+28.00	1&2	81.15	81.99	79.95	80.63
4	200+63.00	2	81.01	81.86	79.81	80.55
5	200+98.00	2	80.87	81.71	79.67	80.41
8	201+85.00	2	80.52	81.36	79.32	80.06
9	202+20.00	2	80.36	81.22	79.18	79.52
10	202+55.00	2	80.24	81.08	79.04	79.38
11	202+90.00	2&3	80.10	80.94	78.90	79.44
⚠12	203+25.00	3	79.96	80.80	78.76	79.50
15	204+12.00	3	79.61	80.45	78.41	79.15
16	204+46.58	3&4	~~79.47~~	~~80.32~~	~~78.27~~	~~79.02~~
17	205+23.42	4	~~79.14~~	~~79.99~~	~~77.94~~	~~78.69~~
18	205+64.00	4&5	79.01	79.85	77.80	78.55
21	206+51.00	5	78.66	79.50	77.46	78.20
22	206+86.00	5	78.52	79.36	77.32	78.06
23	207+21.00	5&6	78.38	79.22	77.18	77.92
24	207+56.00	6	78.24	79.08	77.04	77.78
25	207+91.00	6	78.10	78.94	76.90	77.64
28	208+78.00	6	77.75	78.59	76.55	77.29
29	209+13.00	6	77.61	78.45	76.41	77.15
30	209+48.00	6	77.47	78.31	76.27	77.01
31	209+83.00	7	77.33	78.17	76.13	76.87
32	210+18.00	7	77.19	78.03	75.99	76.73
35	211+05.00	7	76.84	77.68	75.64	76.38
36	211+40.00	7	76.70	77.54	75.50	76.24

See sht #13

SCHEDULE OF ELEVATIONS						
Bent No.	Station of ℄ of Bent	Unit No.	ELEVATION A	B	C	D
37	211+75.00	8	74.56	77.40	75.36	76.10
38	212+10.00	8	76.42	77.26	75.22	75.96
39	212+45.00	8	76.28	77.12	75.08	75.82
42	213+32.00	8	75.93	76.77	74.73	76.47
43	213+67.00	8	75.79	76.63	74.59	75.33
44	214+02.00	8	75.65	76.49	74.45	75.19
45	214+37.00	9	75.51	76.35	74.31	75.05
46	214+72.00	9	75.37	76.21	74.17	74.91
49	215+53.00	9	75.02	75.87	73.82	74.57
50	215+94.00	9	74.88	75.73	73.68	74.43
51	216+29.00	10	74.74	75.59	73.54	74.29
52	216+64.00	10	74.61	75.45	73.40	74.15
53	216+99.00	10	74.46	75.31	73.26	74.01
⚠56*	217+86.00	10	74.32	75.17	73.12	73.87
			THRU	THRU	THRU	THRU
173	257+85.00	28	74.32	75.17	73.12	73.87

NOTES

1. The Schedule of Elevations does not include the Tower and Navigation Bents. Piles shall be driven to a bearing value of 60 ton per pile. For anchor units see sheets 15 & 16.

*HAT 28 April At const changes

S or E BENTS - BEARING PILES

SANDPOINT BRIDGE REPLACEMENT
OVER LAKE PEND OREILLE
STA. 228+71.5

NO.	BY	DATE	REVISIONS
3	SJS	10-31-79	
2	JCS	8-17-79	
1	HEH	7-13-79	

SCALE: As Shown
SCALES SHOWN ARE FOR 22" x 36" PRINTS ONLY

STATE OF IDAHO
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BOISE IDAHO

DESIGNED: R [illegible] 6/79 — DESIGN CHECKED: Marvin Fadel 6/79
DRAWN: MKP 7/79 — DWG CHECKED: R.P. Newell 8/79
COUNTY: BONNER — FILE NO.: 1213A — DWG NO.: 15066

RECOMMENDED FOR APPROVAL — STATE BRIDGE ENGINEER — DATE JAN 28 1980

9 of 28

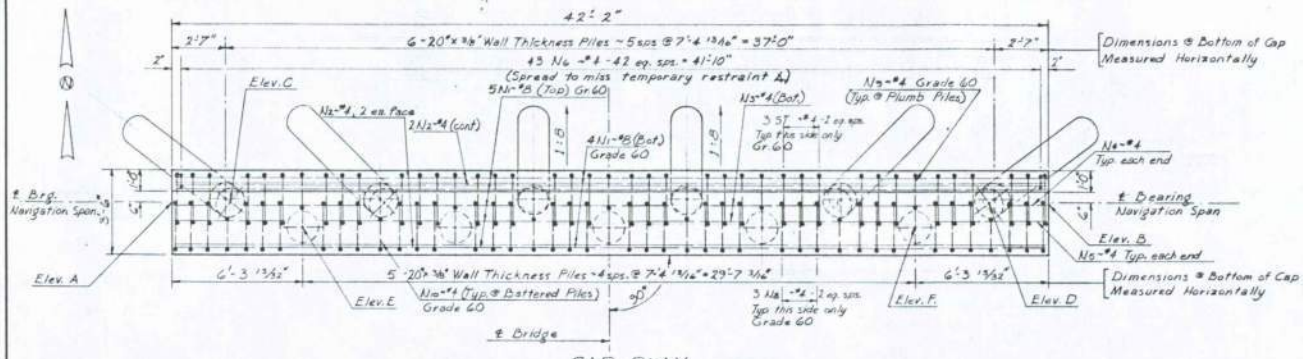
MICROFILM RECORD
DATE FILMED: ROLL NO.: SEE INDEX

FED. ROAD REGION NO.	STATE	FEDERAL AID PROJECT NO.
10	IDAHO	BR-F-5116(39)

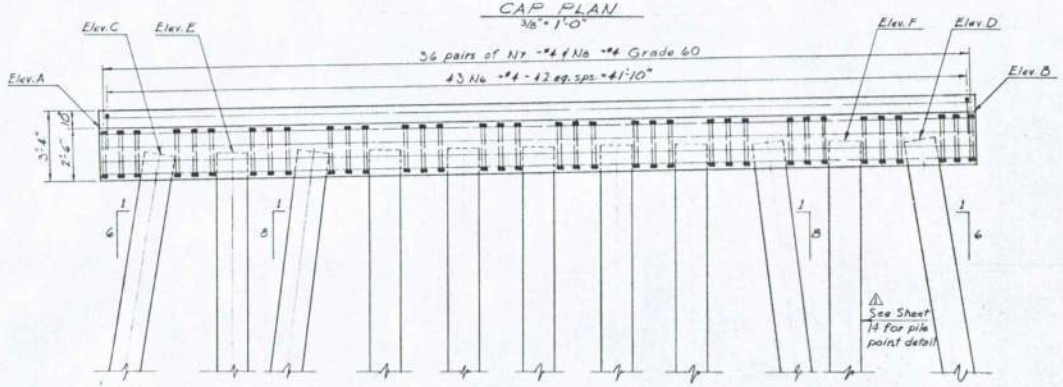
ELEVATION SCHEDULE						
	Elev. A	Elev. B	Elev. C *	Elev. D *	Elev. E *	Elev. F *
Bent #16	2078.64	2079.49	2077.94	2078.19	2077.52	2078.11
Bent #17	2078.31	2079.15	2077.11	2077.85	2077.18	2077.78

* Elevation @ Top of Pile

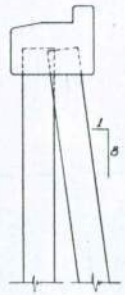
NOTE:
18"ϕ pile with 3/8" wall thickness and Specified Yield Strength of 50 Ksi may be substituted for the 20" piles.
Piles shall be driven to a bearing value of 70 tons per pile.



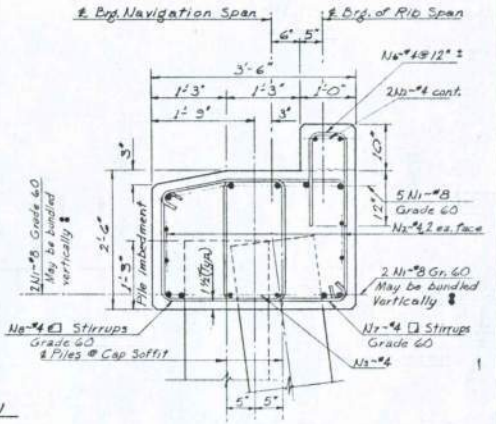
CAP PLAN
3/8" = 1'-0"



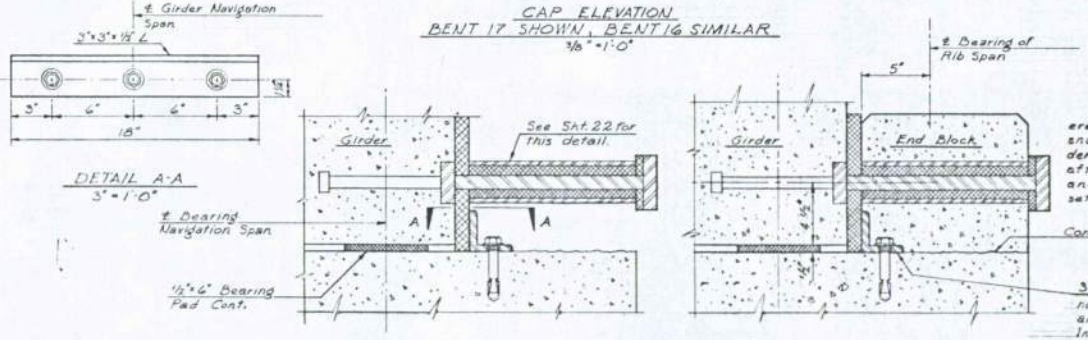
CAP ELEVATION
BENT 17 SHOWN, BENT 16 SIMILAR
3/8" = 1'-0"



CAP END ELEVATION



CAP SECTION
1" = 1'-0"



TEMPORARY RESTRAINT DETAILS
3" = 1'-0"

Temporary Restraint Note

After the first girder has been erected, set joint filler and angle snuggly against both ends of the girder and fasten to cap. Repeat this process after erecting the 2nd, 4th, 6th, 8th, and 10th girders. After all girder are set, cast 4 s into the end block.

*H.A.T. 28 Apr. 1982 As const. change

NAVIGATION SPAN BENT CAP DETAILS

SANDPOINT BRIDGE REPLACEMENT
OVER LAKE PEND OREILLE
STA. 228+71.5

NO.	BY	DATE	REVISIONS
1	SLS	10-27-79	
2	JCG	8-17-79	

SCALE: As Shown
SCALES SHOWN ARE FOR 22" x 36" PRINTS ONLY

STATE OF IDAHO DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
BOISE IDAHO

DESIGNED	DATE	DESIGN CHECKED	DATE
Lee Arnold	4/79	Marvin Fallen	4/79
DRAWN	DATE	DWG CHECKED	DATE
W.C. Hamm	6-4-79	Lee Arnold	4/79

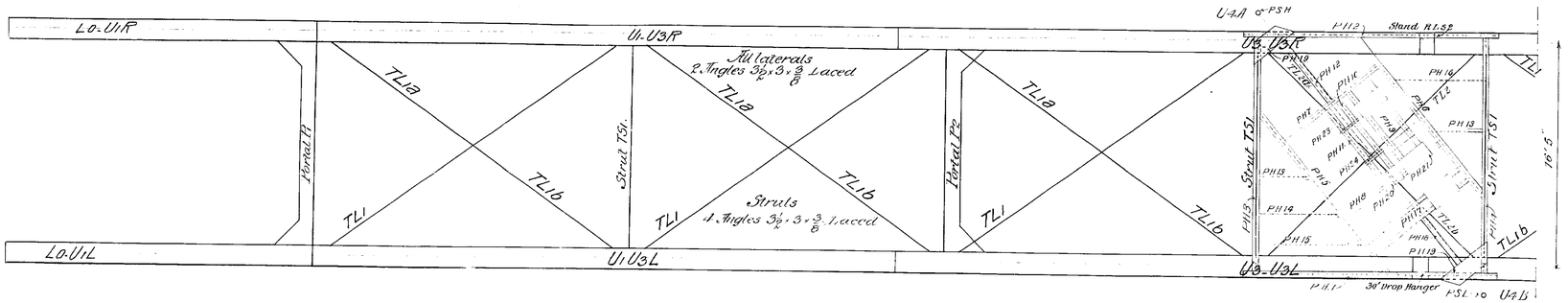
COUNTY: Banner | FILE NO.: 1213-A | DWG NO.: 15066 | 13 of 28

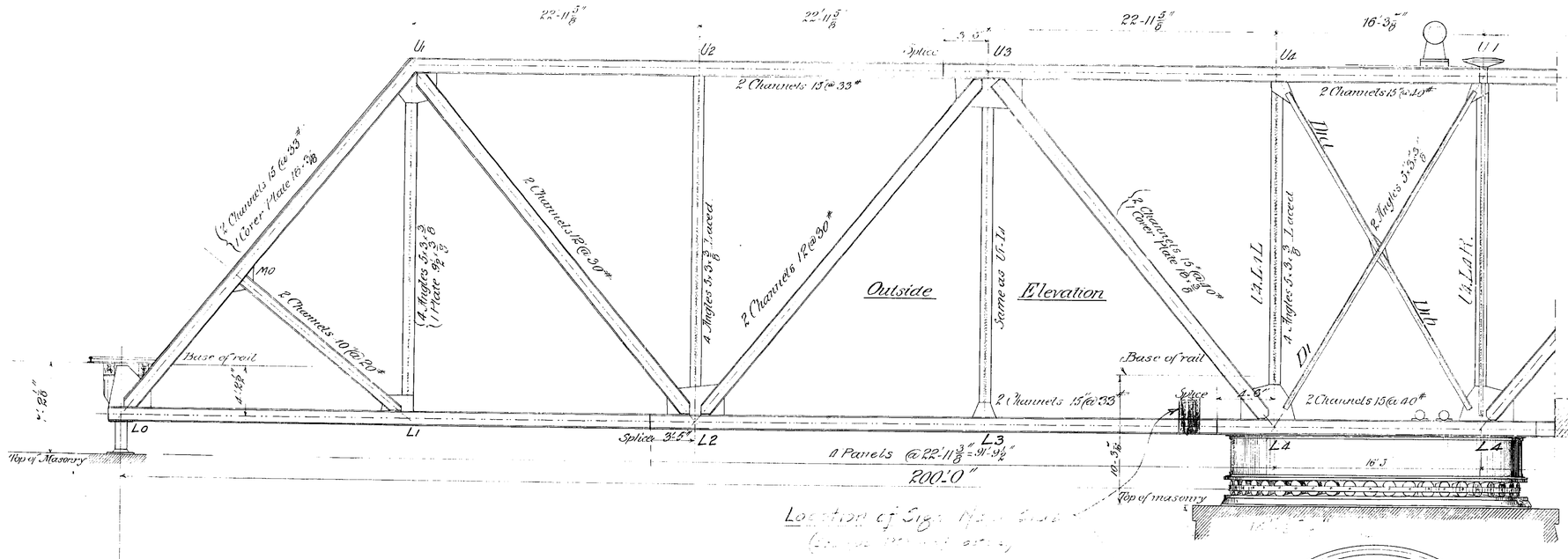
RECEIVED JUN 21 1982

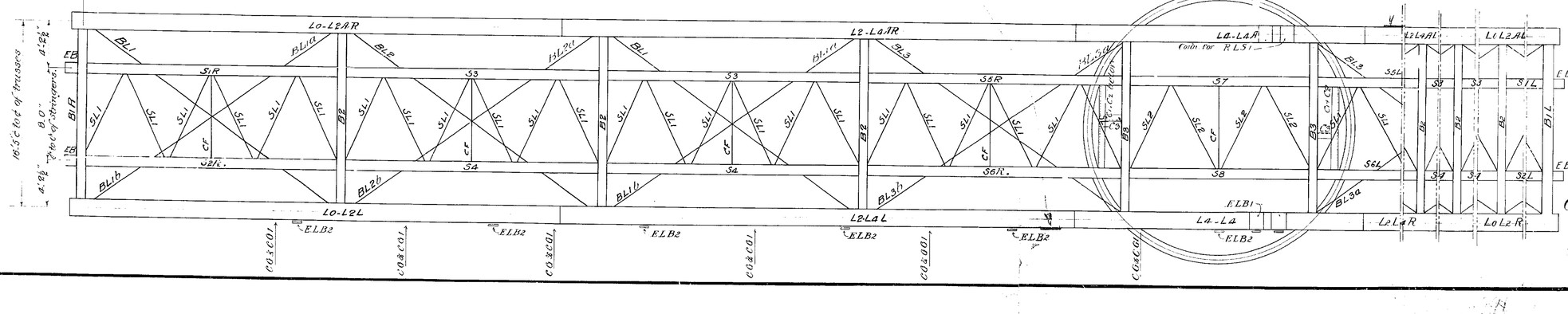
MICROFILM RECORD
DATE FILMED
ROLL NO.
SEE INDEX

Existing Bridge 3.9

R. 10 720


L0-U1R
U1-U3R
U3-U3R
L0-U1L
U1-U3L
U3-U3L
Portal P1
Portal P2
Strut TS1
Strut TS1
All laterals
2 Angles 3½ x 3 x 3/8 Laced
Struts
4 Angles 3½ x 3 x 3/8 Laced
TL1
TL1a
TL1b
TL2
PH1
PH2
PH3
PH4
PH5
PH6
PH7
PH8
PH9
PH10
PH11
PH12
PH13
PH14
PH15
PH16
PH17
PH18
PH19
PH20
PH21
PH22
PH23
PH24
Stand. R.L.S2
16'-5"
30" Drop Hanger
U4-A & PSH
U4-B


U1
U2
U3
U4
22'-11⅝"
22'-11⅝"
22'-11⅜"
16'-3⅞"
Splice
3'-5"
2 Channels 15"@ 33#
2 Channels 15"@ 40#
2 Cover Plates 15"x ⅜" @ 40#
2 Channels 12"@ 20#
2 Channels 10"@ 20#
4 Angles 5"x3½"x⅜" Laced
4 Angles 5"x3½"x⅜" Laced
1 Cover Plate 16"x⅜"
Same as U1-L1
Outside Elevation
Base of rail
Top of Masonry
L0
L1
L2
L3
L4
8 Panels @ 22'-11⅜" = 91'-9½"
200'-0"
16'-3"
Top of masonry
Location of Sight Mark
(Center Pin of Span)
22'-0" Clearance
End View
Int. Section


L0-L2AR
L2-L4AR
L4-L4AR
L2L4AL
L0L2AL
L0-L2L
L2-L4L
L4-L4
L4L2R
L0L2R
U1
U2
U3
U4
L0
L1
L2
L3
L4
BL1
BL1a
BL2
BL2a
BL3
BL3a
BL3b
BL4
BL4a
BL4b
SL1
SL2
SL3
SL4
SL5
SL6
SL7
SL8
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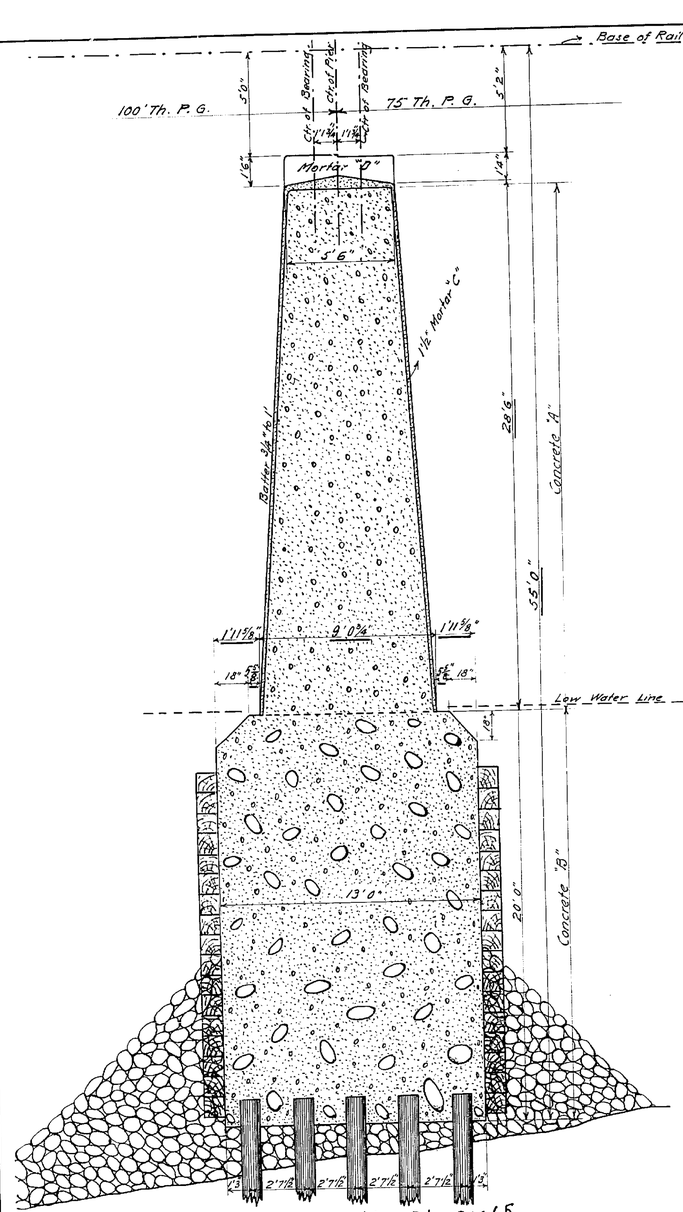
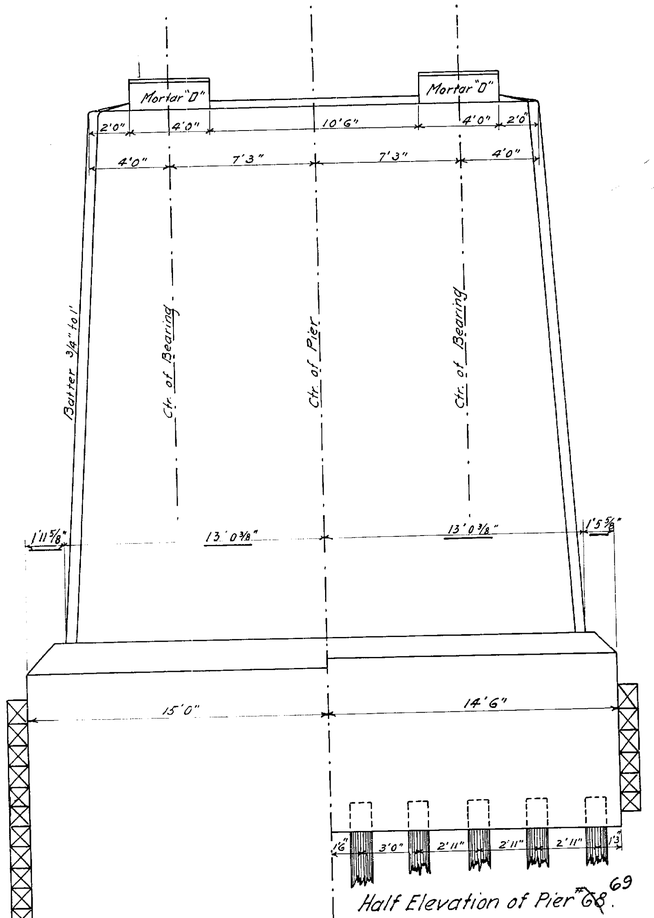
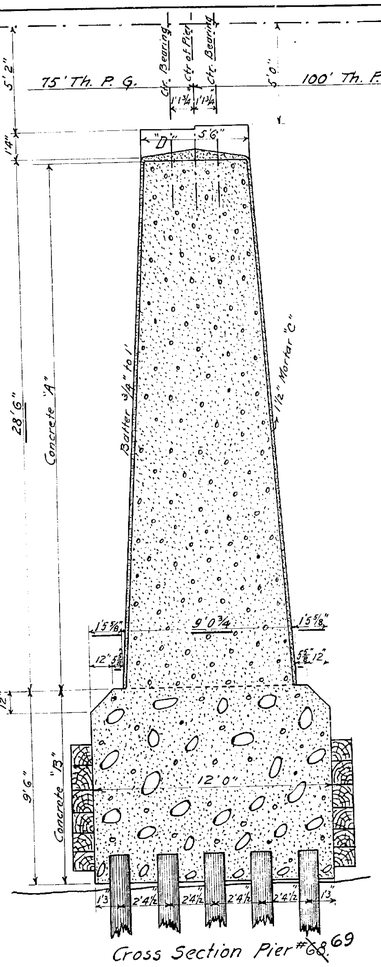
442-25



Cross Section Pier #64 65



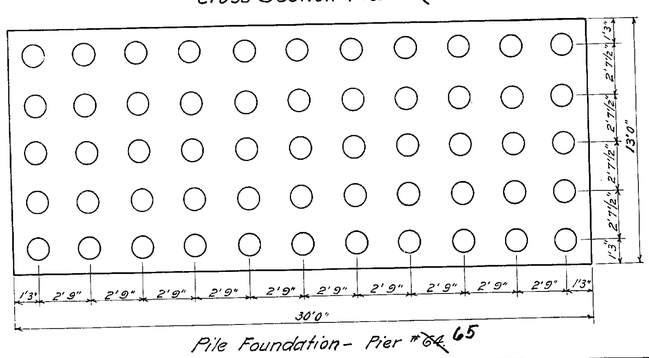
Half Elevation of Pier #68 69



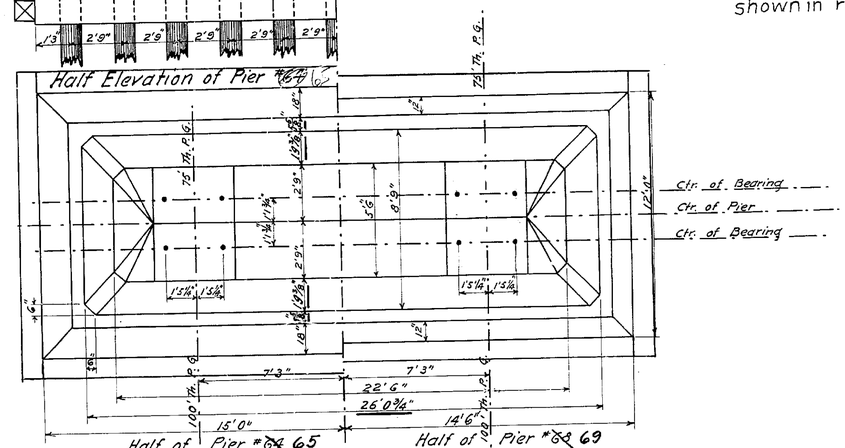
Cross Section Pier #68 69

Note: Underscored figures do not scale:

Note:—
Piers protected by Crib as shown in red.

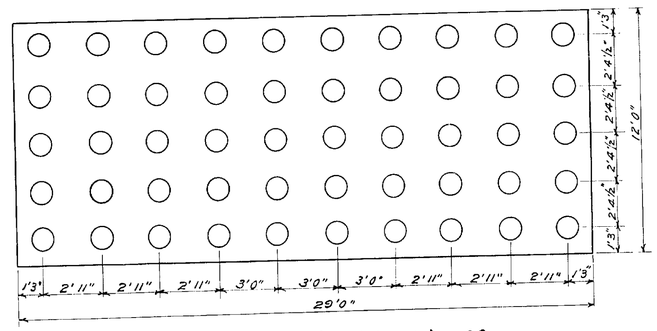


Pile Foundation - Pier #64 65



Half of Pier #64 65 — Half of Pier #68 69

Ground Plan for Piers Nos 64 65 and 68 69



Pile Foundation - Pier Nos 68 69

N.P.R.Y.
Idaho Div. Main Line
Bridge No 3½ - Sandy Point.
Detail of Piers
Nos 64 65 and 68 69

Scale: 1/4"=1'

Office of Chief Engineer. April 15th 1902.

Approved:—

Chief Engineer.

Concrete and Mortar.

All cement to be the best American Portland Cement.
All sand to be clean, coarse and sharp.
Broken stone or quartz pebbles to be clean and not over 2¼" in size.
All proportions are measured by volume.
Mixture not so wet as to let water flush to surface except by tamping.

Concrete "A":— In body of Piers. Ingredients of mixture: One part cement, three parts sand and five parts broken stone or pebbles.

Concrete "B":— In foundations and footing courses. Same mixture as concrete "A". Boulders (Niggerheads) not to exceed one foot in size, thrown in promiscuously and thoroughly imbedded by ramming.

Mortar "C":— In outside shell and coping. One part cement and three parts sand.

Mortar "D":— In bearing blocks and parts of coping serving as bearing blocks and receiving direct pressure from superstructure. One part cement and two parts sand.

Anchor Bolts.

Anchor Bolts 1½" diam. 1'4" long to project 3½" Expansion end and Fixed end 4½" above bearing blocks.

442-25

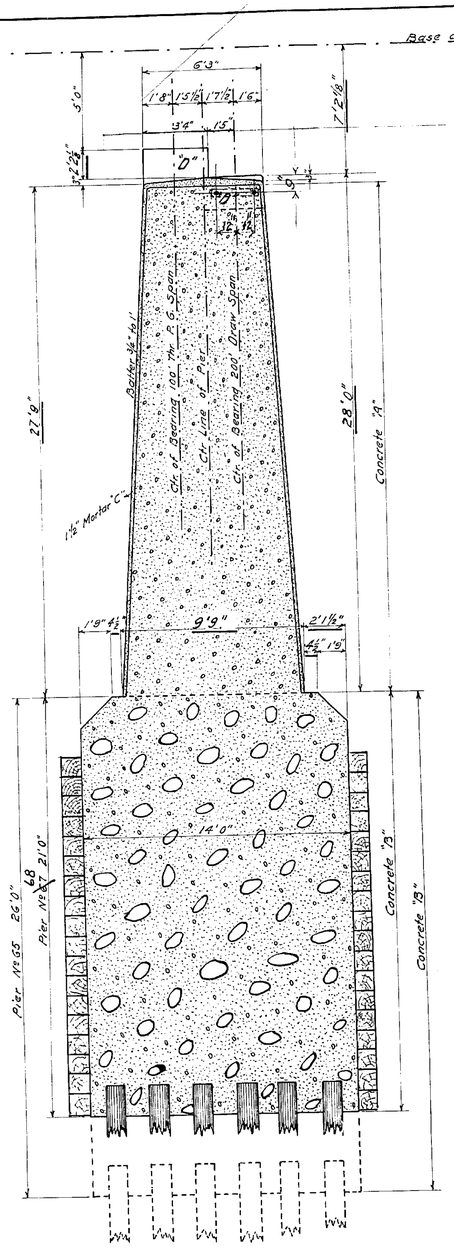
Detail of Piers Nos 64 65 and 68 69 Br. # 3½ - Sandy Point Idaho Div. Main Line. Ch. N.P.

Complete in 6 sheets sheet No 3.

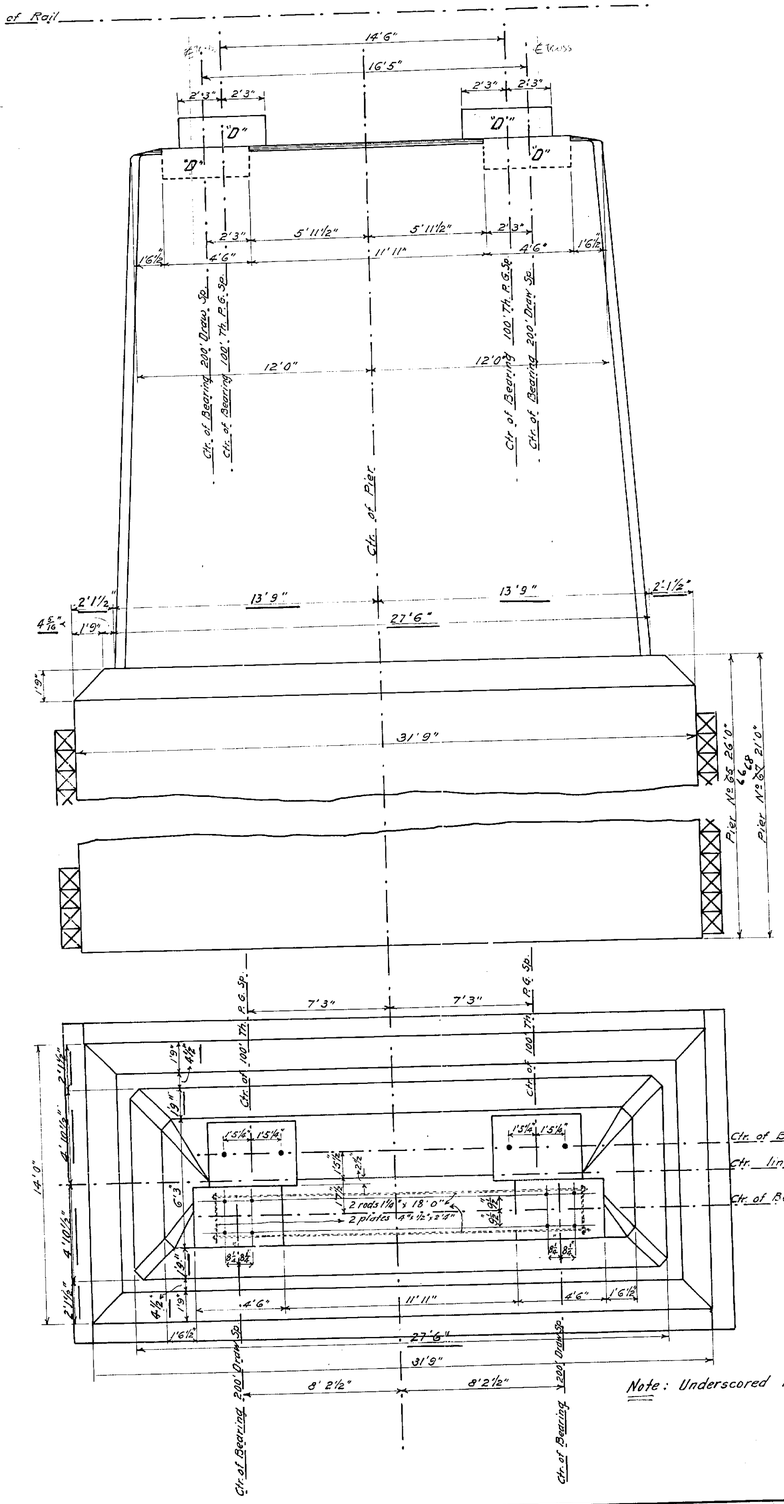
442-25

N.P.R.Y
Idaho Division, Main Line.
Bridge Nº 13, 3 2
Sandy Point Bridge
Details of Piers Nºs ~~65~~ 66 & ~~67~~ 68
Scale: 1/4"=1'
Office of Chief Engr. May 14th 1902

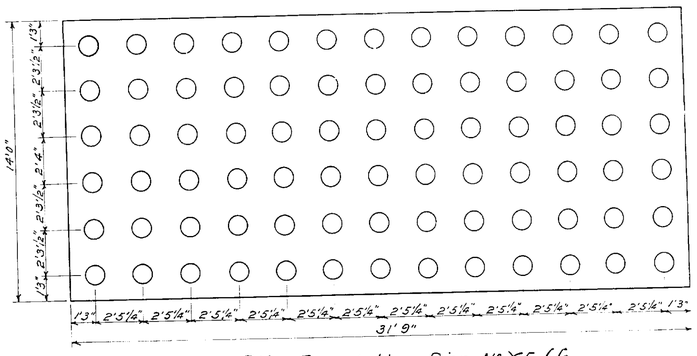
Approved:-
Chief Engineer.



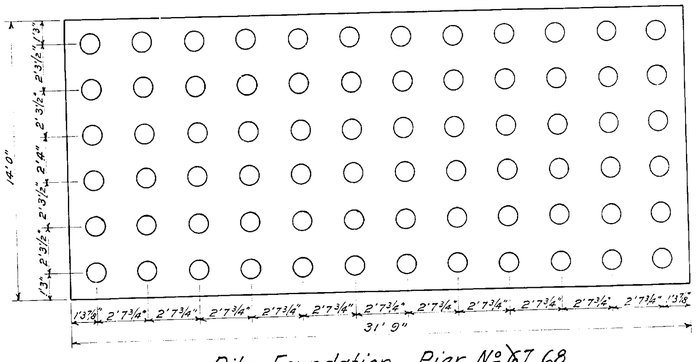
Note:-
Piers protected by crib as shown in red



Note: Underscored figures do not scale.



Pile Foundation- Pier Nº ~~65~~ 66



Pile Foundation- Pier Nº ~~67~~ 68

Concrete & Mortar

All cement to be the best American Portland Cement.
All sand to be clean, coarse and sharp.
Broken stone or quartz pebbles to be clean and not over 2½" in size.
All proportions are measured by volume.
Mixture not so wet as to let water flush to surface except by tamping.
Mixture not so wet as to let water flush to surface except by tamping.
Concrete "A"- In body of Piers. Ingredients of mixture: One part cement, three parts sand and five parts broken stones or pebbles.
Concrete "B"- In foundations and footing courses. Same mixture as Concr."A" Boulders (Maggerheads) not to exceed one foot in size, thrown in promiscuously and thoroughly imbedded by ramming.
Mortar "C"- In outside shell and coping. One part cement and three parts sand.
Mortar "D"- In bearing blocks and parts of coping serving as bearing blocks and receiving direct pressure from superstructure. One part cement and two parts sand.

Anchor Bolts.

Anchor bolts 1½" diam 1'4" long to project 4½" above bearing blocks for 100' Th. P. G. Span
" " 1½ " 1'10" " " " 4½" " " " " 200' Draw Span.

442-25

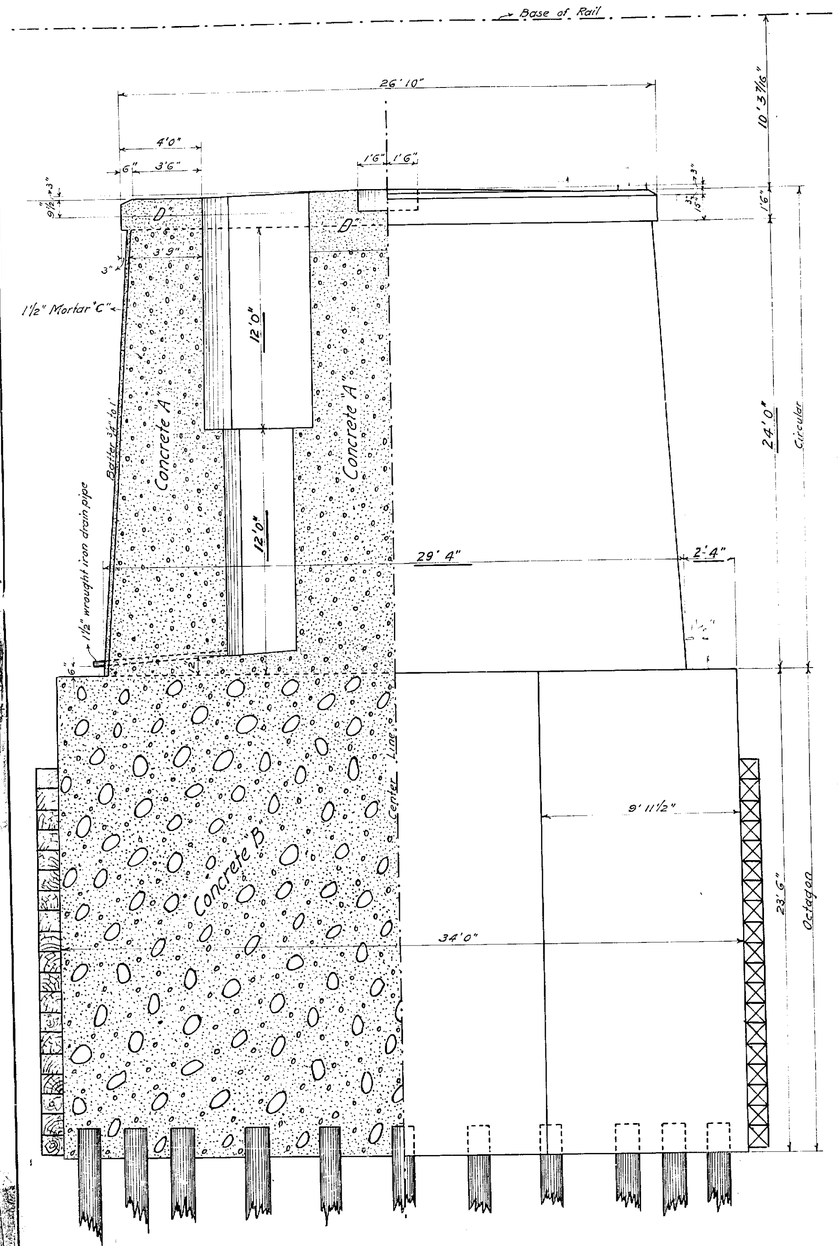
Details of Pier Nºs ~~65~~ 66 & ~~67~~ 68 - Bridge Nº 13, 3 2 Sandy Point - Idaho
Complete in 6 Sheets. Sheet Nº 4. C.H.

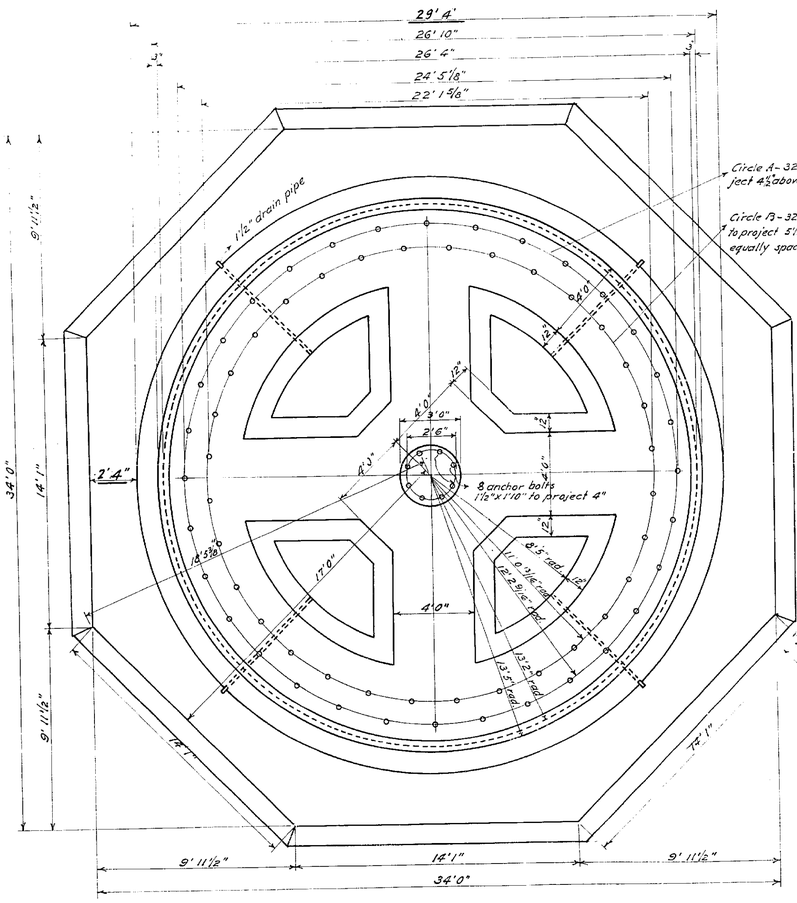
442-25

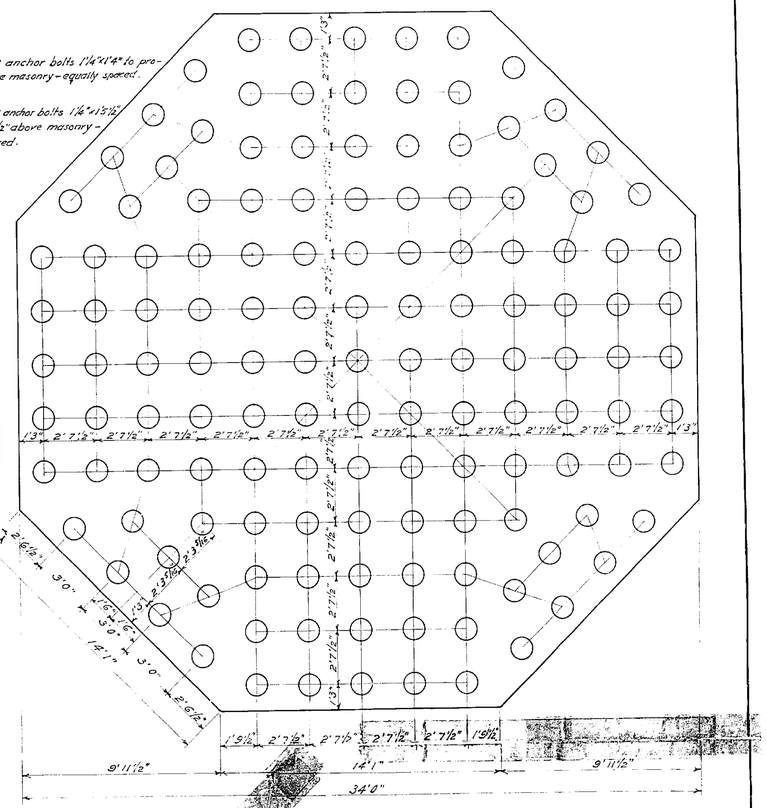
N.P.R.R.
Idaho Division, Main Line.
Bridge No 73. 3 2
Sandy Point Bridge.
Detail of Draw Pier No 67
Scale: 1/4"=1'
Office of Chief Engr. May 9th 1902.
Approved:-
Chief Engineer.

Concrete & Mortar.

All cement to be the best American Portland Cement.
All sand to be clean, coarse and sharp.
Broken stone or quartz pebbles to be clean and not over 2¼" in size.
All proportions are measured by volume.
Mixture not so wet as to let water flush to surface except by tamping.
Concrete 'A'- In body of Pier. Ingredients of mixture: One part cement, three parts sand and five parts broken stone or pebbles.
Concrete 'B'- In foundation and footing course. Same mixture as Concrete 'A'. Boulders (Niggerheads) not to exceed one foot in size, thrown in promiscuously and thoroughly imbedded by ramming.
Mortar 'C'- In outside shell and coping. One part cement and three parts sand.
Mortar 'D'- In bearing block and coping serving as bearing and receiving direct pressure from superstructure. One part cement and two parts sand.







Concrete Bill for Pier.		
Concrete "A"	414	cu. yds.
" "B"	873	" "
Mortar "C"	10	" "
" "D"	27	" "
Total cu. yds.	1324	" "

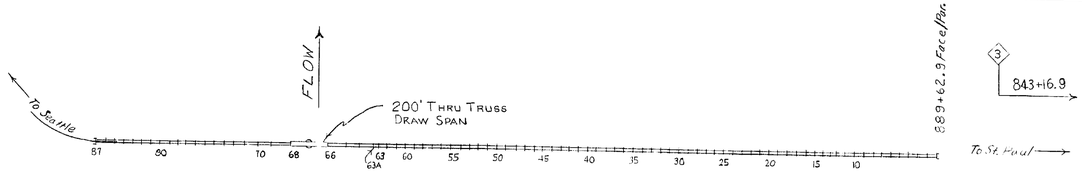
Note
Piers protected by crib as shown in red.

Note: Underscored figures do not scale.

37 piles in Foundation.

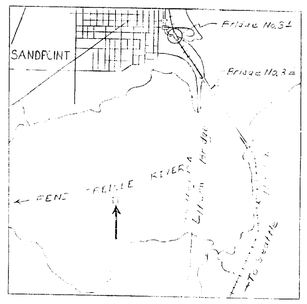
442-25

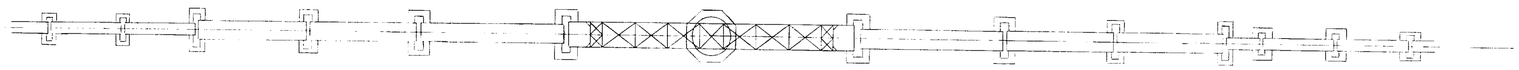
Detail of Draw Pier Br. No 73 2 Sandy Point Bridge - Idaho Div. Main Line.
Complete in 6 sheets. Sheet No 6. Ch. R.T.

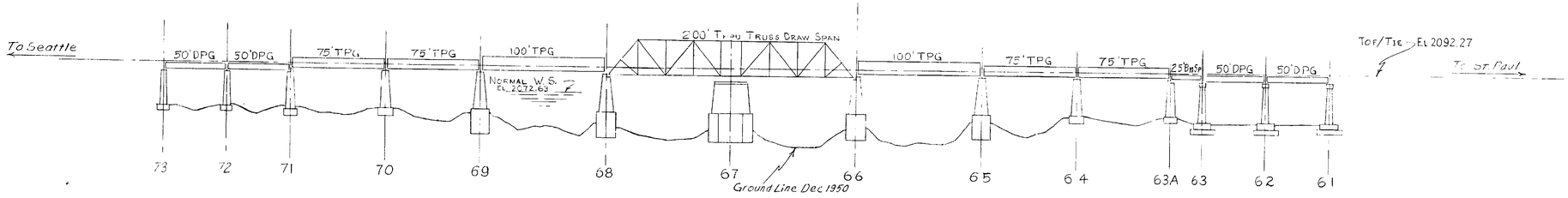


LAKE PEND OREILLE

LAYOUT SKETCH







PART ELEVATION PIERS 61 THRU 73

Scale 1"=50'

REFERENCES:
V. F. 442-25
BR. ENGR. FILE 315

NORTHERN PACIFIC RAILWAY
ENGINEERING DEPARTMENT
IDAHO DIVISION 1ST SUB-DIV. M. L.

BR 32
LAKE PEND OREILLE SANDPOINT, IDAHO
PIERS IN VICINITY OF DRAW SPAN

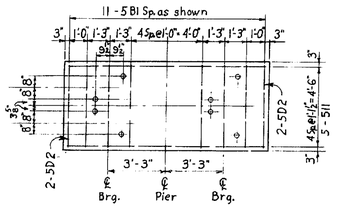
RECOMMENDED BY: APPROVED BY:

OFFICE OF SCALE: ST. PAUL, MINN. DATE: AUG 28 1964

DATE	REVISIONS	DR.	CH.

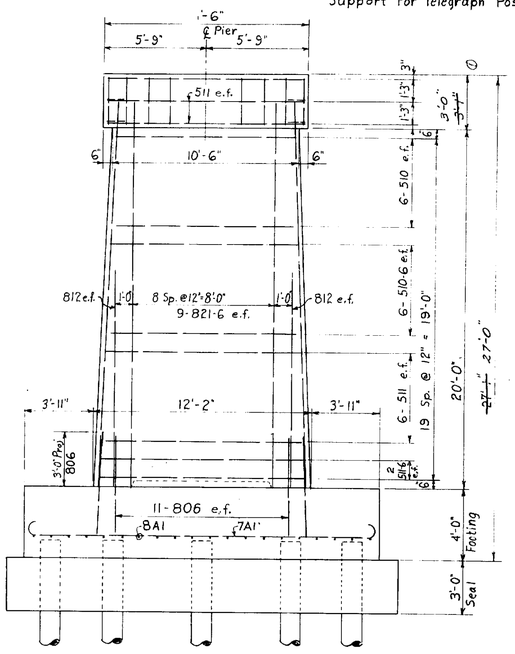
DR.	TR.	CH.
AFE NO.		
SHEET 1 OF	FILE NO. 91416	

442-25

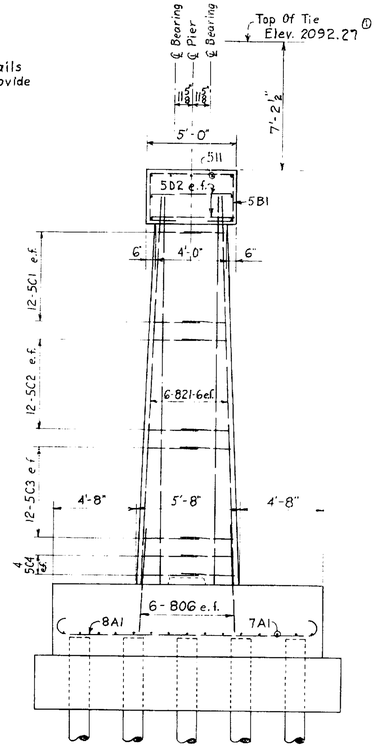


PLAIN PIER TOP

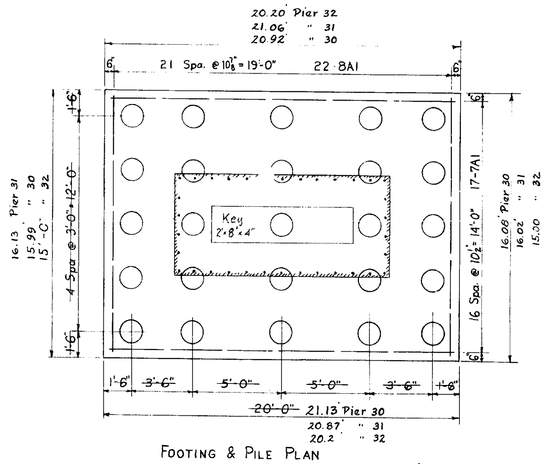
NOTE:
Top Of Even Numbered Piers Shall Be As Shown. See Index 9135B For Details Of Top Of Odd Numbered Piers To Provide Support For Telegraph Posts.



PIER ELEVATION
Looking East



END VIEW



FOOTING & PILE PLAN

See pile driving record for location of piles

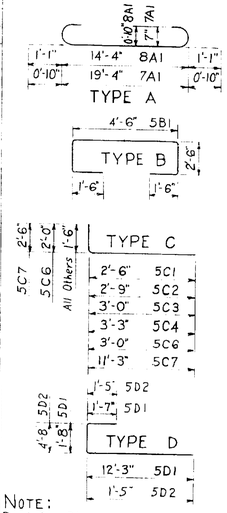
PILE LOADS	Max.	Min.
*D.L. Only	9.9 tons	9.9
*D.L.+L.L.	18.6 "	18.6
*D.L.+L.L.+Wind	23.5 "	13.7
*D.L.+L.L.+W.+Traction	31.7 "	5.5
**D.L.+Ice	14.7 "	2.3

*Buoyancy Assumed To El. 2060.5
** " " " El. 2072.5

Elevations Are To N.P.Ry. Datum.
For USGS Datum Subtract 10.1 Ft.

BAR LIST AND BENDING DETAILS

MARK	No. Req'd* PLAIN PIER	No. Req'd* WITH TEL. SUP.	BAR SIZE	LENGTH	TYPE	LOCATION
8A1	22	22	8	16'-6"	A	Footing
7A1	17	17	7	21'-0"	A	"
5B1	11	12	5	12'-6"	B	Coping
5C1	24	20	5	4'-0"	C	Shaft Ends Hor.
5C2	24	24	5	4'-3"	C	" " "
5C3	24	24	5	4'-6"	C	" " "
5C4	8	8	5	4'-9"	C	" " "
5C6	0	4	5	5'-0"	C	Tel. Sup.
5C7	0	4	5	13'-9"	C	" "
5D1	0	6	5	15'-6"	D	" "
5D2	4	2	5	7'-6"	D	Coping End
806	34	34	8	6'-0"	Str.	Dowels
821-6	30	30	8	21'-6"	"	Vert. Shaft
812	4	4	8	12'-0"	"	" "
510	12	8	5	10'-0"	"	Hor. Shaft
510-6	12	12	5	10'-6"	"	" "
511	21	12	5	11'-0"	"	" " & Coping
511-6	4	4	5	11'-6"	"	" "
511-9	0	3	5	11'-9"	"	Coping
503	0	2	5	3'-0"	"	"
502-8	0	4	5	2'-8"	"	"



NOTE:
Bent Bar Dimensions Are Out To Out.

*For First Phase ~ 1960 Work:
2 Plain Piers Req'd *30, *32
1 With Tel. Support *31
~~For Second Phase ~ Future Work~~
~~No 27 Ft. Piers Req'd.~~
For Third Phase ~ Future Work
~~3 Plain Piers Req'd *24, *26, *28~~
~~4 With Tel. Support *23, *25, *27, *29~~

ESTIMATED QUANTITIES 27 FT. PIER

ONE PIER WITH PLAIN TOP

Class 'B' Concrete	92 Cu. Yds.
Seal Concrete	42 Cu. Yds.
Reinforcing Steel	5180 Lbs.
Timber Piles - 90 Ft. Lengths	2250 Lin. Ft.
Excavation	70 Cu. Yds.

ONE PIER WITH TELEGRAPH SUPPORT

Class 'B' Concrete	93 Cu. Yds.
Seal Concrete	42 Cu. Yds.
Reinforcing Steel	5250 Lbs.
Timber Piles - 90 Ft. Lengths	2250 Lin. Ft.
Excavation	70 Cu. Yds.

CONCRETE NOTES:

N. P. Ry. Co. Specification E-114, Section 13 Shall Govern. Concrete For Pier Shafts And Footings Shall Be Type 'B' Air Entrained Concrete Using Type II Low Alkali Cement.

REINFORCEMENT NOTES:

Material Shall Conform To A.S.T.M. Designation A-15 For Intermediate Grade Billet Steel Manufactured By Open Hearth Or Electric Furnace Process, Or Bars May Be Manufactured From Axle Steel At South Tacoma.
Reinforcing Bars Shall Be Formed In Accordance With Current A.S.T.M. Designation A-305.
All Reinforcement Shall Have Minimum Concrete Cover Of 2" Unless Otherwise Noted.

PILING NOTES:

Timber Piles Shall Be Untreated And Shall Conform To N.P.Ry. Specification E-117 Except Tip Dia. To Be 8". Pile Length In Place Shall Be 90 Ft. Below Cutoff. No Splicing Of Piles Will Be Permitted. Followers Will Not Be Permitted Without The Permission Of The Engineer. If Followers Are To Be Used, Plan Must Be Submitted To Bridge Engineer For Approval.

ANCHOR BOLTS:

3" Dia. Holes For Setting Anchor Bolts May Be Located And Drilled In Concrete Before Shifting 50 Ft. Spans, Or 1⅜" Dia. Holes May Be Drilled With Spans In Relocated Positions. Anchor Bolts Will Be Set And Grouted In With Spans In Final Position.

QUANTITIES AS BUILT

		Pier 30	Pier 31	Pier 32
Class B Concrete	c.y.	97.07	98.08	92.01
Seal Concrete	c.y.	47.15	47.15	47.15
Reinforcing Steel	lbs.	5289.70	5354.80	5289.70
Timber Piling below C.O	L.Ft.	2215	2210	2225
Excavation	c.y.	60.9	55.4	51.3

NORTHERN PACIFIC RAILWAY
ENGINEERING DEPARTMENT

IDAHO DIVISION 1ST SUB-DIV. M. L.

BRIDGE 3.2
SANDPOINT, IDAHO 30
27 FOOT HIGH PIER FOR PIERS ~~23~~ THRU 32

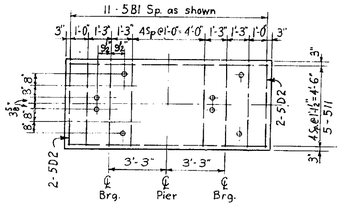
RECOMMENDED BY: APPROVED BY:

SCALE: ¼" = 1'-0"
OFFICE OF BRIDGE ENGINEER ST. PAUL, MINN. DATE: May 23, '60

DATE	REVISIONS	DR.	CH.
① 1-18-61	Changed T/T & T/Coping	d	EAL
11-17-61	As constructed		J.W.D

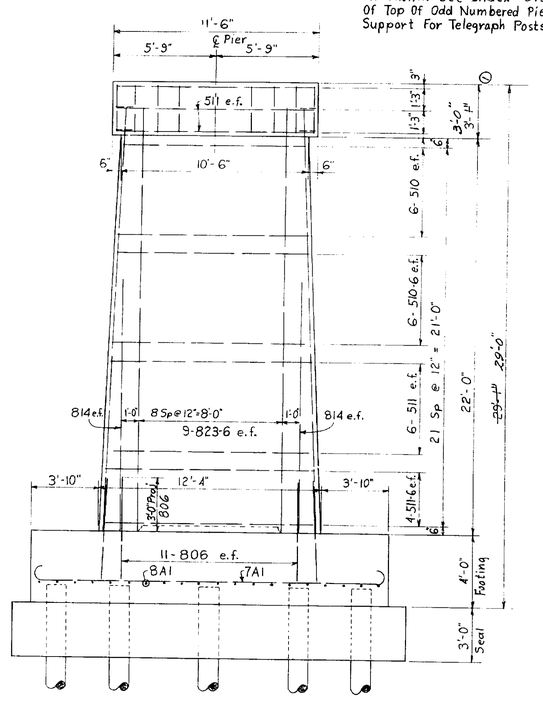
DR. JWD TR. CH. EAL 5-23-60
AFE NO. 432-60
INDEX NO. 91356
SHEET OF
FILE NO.

442-25A

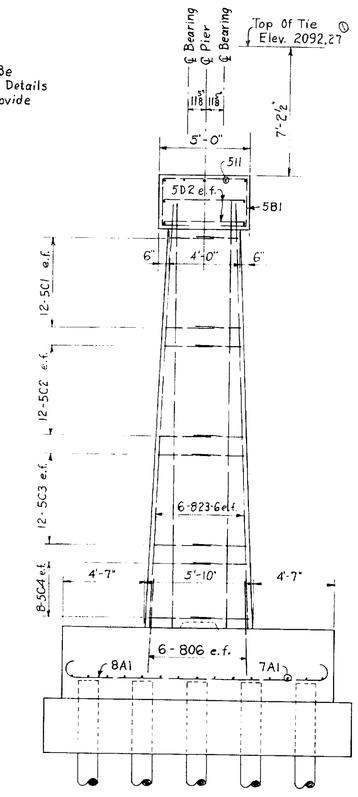


PLAIN PIER TOP

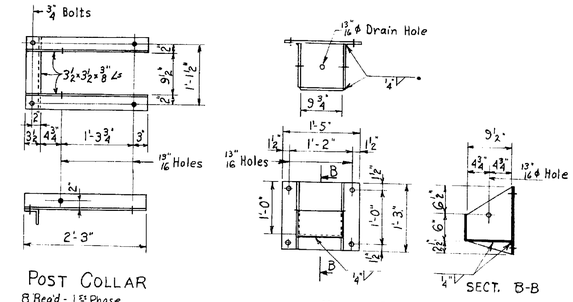
NOTE:
Top Of Even Numbered Piers Shall Be As Shown. See Index 91358 For Details Of Top Of Odd Numbered Piers To Provide Support For Telegraph Posts.



PIER ELEVATION
(Looking East)



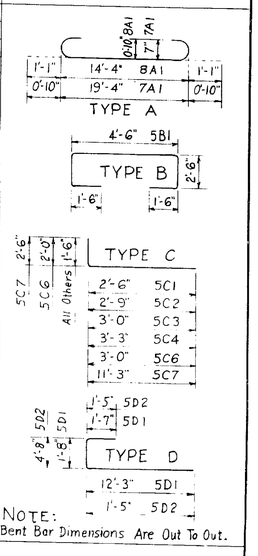
END VIEW



Galvanize After Fabrication
¾" = 1'-0"

BAR LIST AND BENDING DETAILS

MARK	No. Req'd* Plain Pier	With Tel. Sup.	Bar Size	Length	Type	Location
8A1	22	22	8	16'-6"	A	Footing
7A1	17	17	7	21'-0"	A	"
5B1	11	12	5	12'-6"	B	Coping
5C1	24	20	5	4'-0"	C	Shaft Ends Hor.
5C2	24	24	5	4'-3"	C	" " "
5C3	24	24	5	4'-6"	C	" " "
5C4	16	16	5	4'-9"	C	" " "
5C6	0	4	5	5'-0"	C	Tel. Sup.
5C7	0	4	5	13'-9"	C	" "
5D1	0	6	5	15'-6"	D	" "
5D2	4	2	5	7'-6"	D	Coping End
806	34	34	8	6'-0"	Str.	Dowels
823-6	30	30	8	23'-6"	"	Vert. Shaft
814	4	4	8	14'-0"	"	" "
510	12	8	5	10'-0"	"	Hor. Shaft
510-6	12	12	5	10'-6"	"	" "
511	21	12	5	11'-0"	"	" " & Coping
511-6	8	8	5	11'-6"	"	" "
511-9	0	3	5	11'-9"	"	Coping
503	0	2	5	3'-0"	"	"
502-8	0	4	5	2'-8"	"	"



NOTE:
Bent Bar Dimensions Are Out To Out.

*For First Phase ~ 1960 Work
2 Plain Piers Req'd. #34 #36
2 With Tel. Support #33, #35
~~For Second Phase ~ Future Work~~
No 29 Ft Piers
For Third Phase ~ Future Work
5 Plain Piers Req'd. #13, #15, #17, #19, #21
5 With Tel. Support #14, #16, #18, #20, #22

ESTIMATED QUANTITIES 29 FT. PIER

ONE PIER WITH PLAIN TOP

Class 'B' Concrete	97 Cu. Yds.
Seal Concrete	42 Cu. Yds.
Reinforcing Steel	5450 Lbs.
Timber Piles 90 Ft. Lengths	2250 Lin. Ft.
Excavation	70 Cu. Yds.

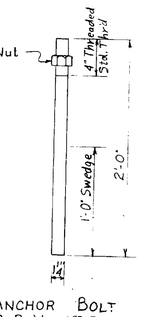
ONE PIER WITH TELEGRAPH SUPPORT

Class 'B' Concrete	98 Cu.Yds.
Seal Concrete	42 Cu.Yds.
Reinforcing Steel	5510 Lbs.
Timber Piling 90 Ft Lengths	2250 Lin. Ft.
Excavation	70 Cu.Yds.

For General Concrete, Reinforcing And Pile Notes See Index 91356.

LADDER AND PLATFORM
Galvanize After Fabrication
9 Req'd. 1st Phase
8 " 2nd "
8 " 3rd "
¾" = 1'-0"

Est. Wt. One Ladder And Platform 175 lbs.



ANCHOR BOLT
128 Req'd. 1st Phase
136 " 2nd "
136 " 3rd "
Wt. 9 lbs. each

QUANTITIES AS BUILT		Pier 33	Pier 34	Pier 35	Pier 36
Class B Concrete	cy.	100.95	99.28	101.62	100.55
Seal Concrete	cy.	47.15	47.15	47.15	47.15
Reinforcing Steel	Lb	5624.0	5558.9	5624.0	5558.9
Timber Piling below C.O	L.F.	2220	2225	2255	2252
Excavation	c.y.	77.6	69.3	56.8	49.9

FOOTING & PILE PLAN

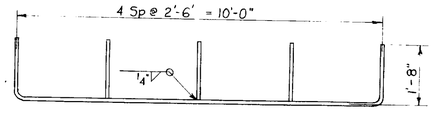
See pile driving record for location of piles.

PILE LOADS

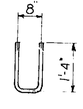
	Max.	Min.
*D.L. Only	10.1 tons	10.1
*D.L.+L.L.	18.9 "	18.9
*D.L.+L.L.+Wind	23.9 "	13.9
*D.L.+L.L.+W.+Traction	32.9 "	4.9
**D.L.+Ice	17.1 "	3.1

*Buoyancy Assumed To El. 2060.5
** " " " El. 2072.5

Elevations Are To N.P.Ry. Datum.
For USGS Datum Subtract 10.1 Ft.



ACCESS RUNG
Make From 1⅛" Dia. ~~Deformed~~ Bars
Galvanize After Fabrication
17 Req'd 1st Phase
17 " 2nd "
17 " 3rd "



LADDER RUNG
⅝" ϕ Deformed Bars
Galvanize After Fabrication.
136 Req'd. 1st Phase
136 " 2nd "
136 " 3rd "

NOTE:
Galvanizing Shall Conform To A.S.T.M. Designation A153-59 Class B-1.

NORTHERN PACIFIC RAILWAY
ENGINEERING DEPARTMENT
IDAHO DIVISION 1ST SUB-DIV. M. L.
BRIDGE 3.2
SANDPOINT, IDAHO
29 FOOT HIGH PIER FOR PIERS ~~13 THRU 22~~ & 33 THRU 36

RECOMMENDED BY: APPROVED BY:

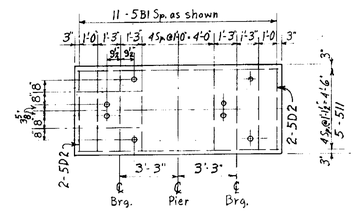
SCALE: ¼"=1'-0" ~ Piers
OFFICE OF BRIDGE ENGINEER ST. PAUL, MINN. DATE: MAY 23, 1960

DATE	REVISIONS	DR.	CH.
1-18-61	Rev. T/T & T/Coping	d	
11-17-61	As constructed	BAL	JWD

DR. JWD TR. CH. JWD 5-23-60
AFE NO. 432-60
INDEX NO. 91357
SHEET OF FILE NO.

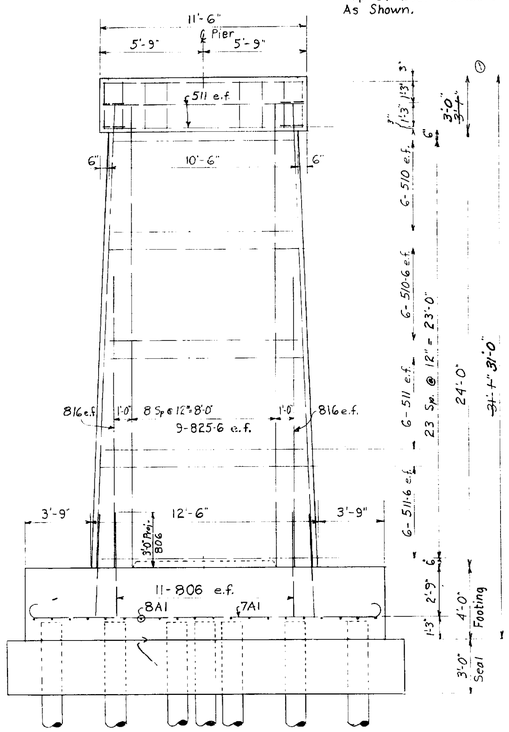
① 11-17-61

442-25A

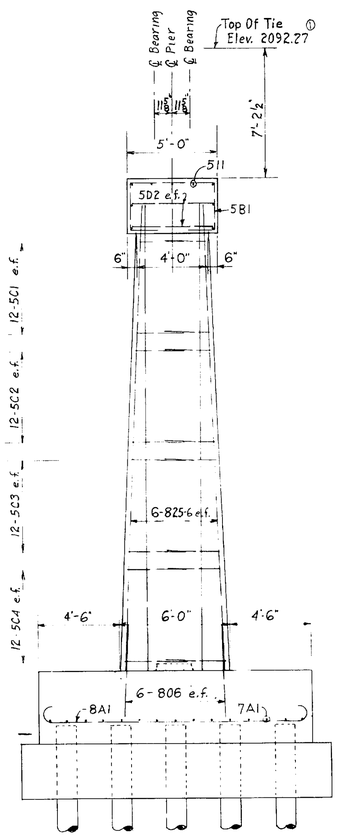


PLAIN PIER TOP

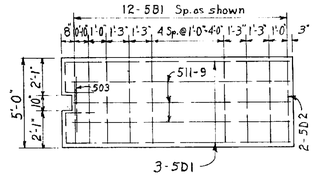
NOTE:
Top Of Even Numbered Piers Shall Be As Shown.

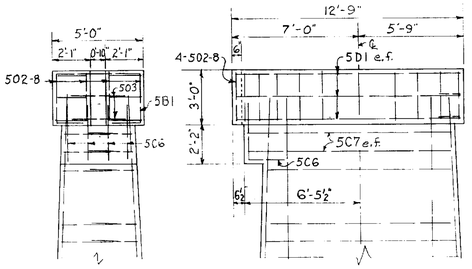


PIER ELEVATION
(Looking East)



END VIEW





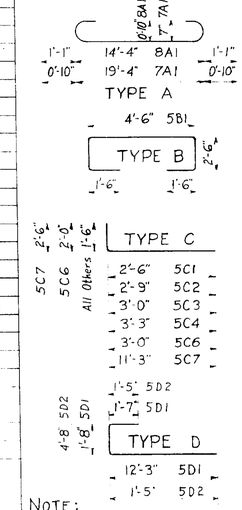
PIER TOP DETAIL WITH TELEGRAPH SUPPORT
To Be Used For Odd Numbered Piers

BAR LIST AND BENDING DETAILS

MARK	No. REQ'D* PLAIN PIER	No. REQ'D* WITH TEL. SUP.	BAR SIZE	LENGTH	TYPE	LOCATION
8A1	22	22	8	16'-6"	A	Footing
7A1	17	17	7	21'-0"	A	"
5B1	11	12	5	12'-6"	B	Coping
5C1	24	20	5	4'-0"	C	Shaft Ends Hor.
5C2	24	24	5	4'-3"	C	" " "
5C3	24	24	5	4'-6"	C	" " "
5C4	24	24	5	4'-9"	C	" " "
						" " "
5C6	0	4	5	5'-0"	C	Tel. Sup.
5C7	0	4	5	13'-9"	C	
5D1	0	6	5	15'-6"	D	
5D2	4	2	5	7'-6"	D	Coping End
806	34	34	8	6'-0"	Str.	Dowels
825-6	30	30	8	25'-6"	"	Vert. Shaft
816	4	4	8	16'-0"	"	" "
510	12	8	5	10'-0"	"	Hor. Shaft
510-6	12	12	5	10'-6"	"	" "
511	21	12	5	11'-0"	"	" " & Coping
511-6	12	12	5	11'-6"	"	" "
511-9	0	3	5	11'-9"	"	Coping
503	0	2	5	3'-0"	"	"
502-8	0	4	5	2'-8"	"	"

* For First Phase ~ 1960 Work:
5 Plain Piers Req'd. #38, #40, #42, #44, #46
5 With Tel. Support #37, #39, #41, #43, #45
For ~~Second Phase ~ Future Work~~
4 Plain Piers Req'd. #48, #50, #52, #54
4 With Tel. Support #47, #49, #51, #53
For Third Phase ~ Future Work
No. ~~31 Ft.~~ Piers Req'd.

BENDING DETAILS



NOTE:
Bent Bar Dimensions Are Out To Out.

ESTIMATED QUANTITIES 31 FT. PIER

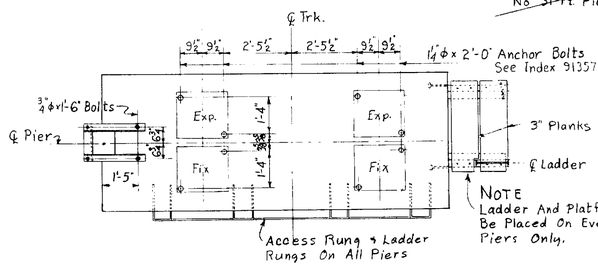
ONE PIER WITH PLAIN TOP

Class 'B' Concrete	103 Cu. Yds.
Seal Concrete	42 Cu. Yds.
Reinforcing Steel	5710 Lbs.
Timber Piles - 90 Ft. Lengths	2340 Lin. Ft.
Excavation	70 Cu. Yds.

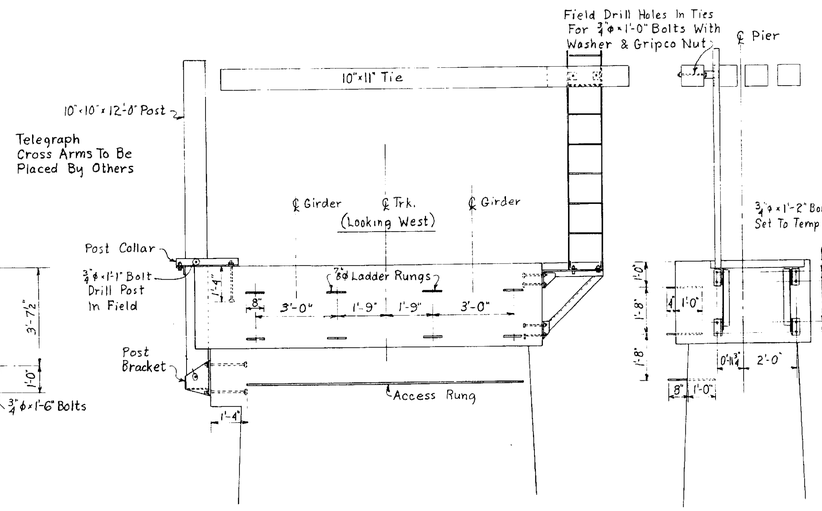
ONE PIER WITH TELEGRAPH SUPPORT

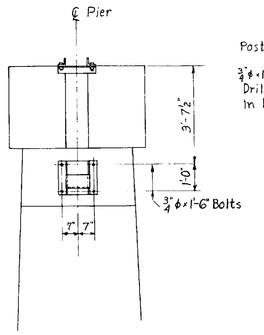
Class 'B' Concrete	104 Cu. Yds.
Seal Concrete	42 Cu. Yds.
Reinforcing Steel	5780 Lbs.
Timber Piles - 90 Ft. Lengths	2340 Lin. Ft.
Excavation	70 Cu. Yds.

For General Concrete, Reinforcing And Pile Notes See Index 91356.

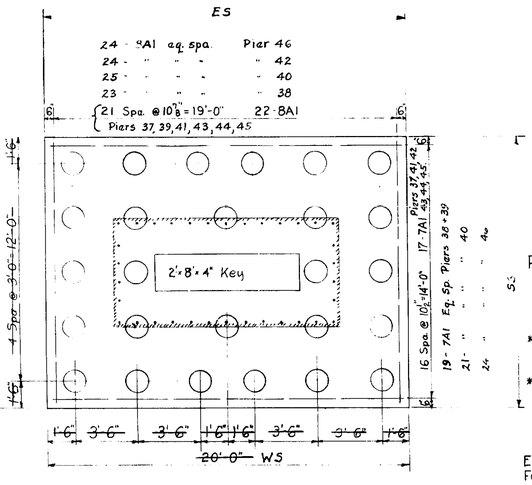


Item	Detail Size	Material Required 1st Phase	2nd Phase	3rd Phase
Post Collar	Complete	8		
" Bracket	"	8		
Anchor Bolts	¾"Φ x 1'-6"	48		
M. Bolts (Posts)	¾"Φ x 1'-1"	16		
Platform Bracket	BL	9		
" "	BR	9		
Ladders		9		
Anchor Bolts	¾"Φ x 1'-2"	72		
M. Bolts (Ladder)	" x 2½"	18		
M. Bolts (Ladder)	" x 1'-0"	18		
Carriage Bolts	½"Φ x 4½"	72		
Gripco Nuts	¾" Bolts	172		
Spring Lock Washers	"	172		
Gripco Nuts	½" Bolts	72		
Spring Lock Washers	"	72		
Trtd Platform Plank	3"x12"x3'-6"	18		
Access Rung	⅝"Φ	17		
Ladder Rung	⅝"Φ	136		
Telegraph Posts-Trtd.	10"x10"x12'-0" S4S to 9½"	8		
Anchor Bolts (Brass)	¼"Φ x 2"-0"	136		





LOCATION OF HARDWARE ON PIER TOPS
See Index 91357 For Details Of Hardware.



ES = Pier 37 - 20.81'
" 38 21.26'
" 39 21.23'
" 40 21.12'
" 41 21.27'
" 42 21.02'
" 43 20.52'
" 44 20.42'
" 45 20.52'
" 46 20.99'

NS - Pier 37 - 16.07'
" 38 16.2[illegible]'
" 39 15.93'
" 40 16.55'
" 41 15.56'
" 42 16.23'
" 43 16.07'
" 44 15.72'
" 45 15.47'
" 46 1592'

WS - Pier 37 20.87'
" 38 21.42'
" 39 21.19'
" 40 21.11'
" 41 21.19'
" 42 21.02'
" 43 20.62'
" 44 20.45'
" 45 20.57'
" 46 20.65'

SS - Pier 37 - 16.07'
" 38 16.36'
" 39 15.86'
" 40 16.31'
" 41 15.49'
" 42 16.15'
" 43 16.02'
" 44 15.70'
" 45 15.42'
" 46 15.94'

PILE LOADS	Max.	Min.
*D.L. Only	9.6 tons	9.6
*D.L.+L.L.	18.3 "	18.3
*D.L.+L.L.+Wind	24.2 "	12.2
*D.L.+L.L.+W.+Traction	33.7 "	2.9
**D.L.+Ice	17.2 "	2.0

*Buoyancy Assumed To El. 2060.5
** " " " El. 2072.5

Elevations Are To N.P.Ry. Datum.
For USGS Datum Subtract 10.1 Ft.

FOOTING & PILE PLAN

See pile driving record for location of piles

QUANTITIES AS BUILT

		Pier 37	Pier 38	Pier 39	Pier 40	Pier 41	Pier 42	Pier 43	Pier 44	Pier 45	Pier 46
Class B Concrete	c.y	108.03	108.50	108.37	108.91	107.25	107.85	107.32	105.95	105.41	106.10
Seal Concrete	c.y	47.15	47.15	47.15	47.15	47.15	47.15	47.15	47.15	47.15	47.15
Reinforcing Steel	Lbs	5893.2	5958.0	5979.0	6131.9	5893.2	5916.2	5893.2	5828.1	5893.2	6216.7
Timber piling below C.O	L.Ft	2329	2314	2352	2352	2344	2353	2356	2369	2359	2343
Excavation	c.y	56.8	49.9	45.7	62.3	55.4	49.9	48.5	48.5	45.7	42.9

NORTHERN PACIFIC RAILWAY
ENGINEERING DEPARTMENT
IDAHO DIVISION 1ST SUB-DIV. M. L.
BRIDGE 3.2
SANDPOINT, IDAHO 46
31 FOOT HIGH PIER FOR PIERS 37 THRU ~~54~~

RECOMMENDED BY: APPROVED BY:

SCALE: ¼"=1'-0"
OFFICE OF BRIDGE ENGINEER ST. PAUL, MINN. DATE: May 23, 1960

DATE	REVISIONS	DR.	CH.
1-18-61	Rev. T/t & T/coping	d	
11-17-61	As constructed	EAL	JWD

DR. JWD TR. CK. 5-25-60
AFE NO. INDEX NO. 91358
SHEET OF FILE NO.

① 1-18-61 11-17-61

442-25A

442-25A

GENERAL NOTES:

GENERAL: ALL MATERIAL AND WORKMANSHIP SHALL BE AS PER THE CURRENT A.R.E.M.A. MANUALS FOR RAILWAY ENGINEERING: CHAPTER 8 - CONCRETE STRUCTURES AND FOUNDATIONS, CHAPTER 15-STEEL STRUCTURES.

THE BNSF STANDARD CONSTRUCTION SPECIFICATIONS SUPPLEMENT THE ABOVE A.R.E.M.A. MANUALS AND SHALL GOVERN.

CONSTRUCTION EQUIPMENT: CONTRACTOR IS REQUIRED TO ALLOCATE A MINIMUM OF THREE CRANES TO THE PROJECT THAT ARE CAPABLE OF DRIVING PILES AND SETTING NEW STEEL SPANS. ALL CRANES SHALL BE SIZED TO ALLOW FOR THE HANDLING OF 120-FEET LENGTH OF PIPE PILE UNDER THE BOOM.

PILING: PILES SHALL MEET THE MATERIAL REQUIREMENTS OF ASTM A500, GR. B OR APPROVED EQUIVALENT, AND SHALL BE DRIVEN IN ACCORDANCE WITH THE BNSF STANDARD SPECIFICATIONS. ALL PILES SHALL HAVE A STEEL CONICAL TIP WITH DULL POINT WELDED TO THE PILE ON THE TIP END. PIPE PILES SHALL BE DRIVEN WITH A PILE TEMPLATE AND AS NOTED IN THE PROJECT TECHNICAL SPECIFICATION SECTION 4210 AND AS DETERMINED BY THE ENGINEER.

AFTER PIER PILES ARE DRIVEN, THEY SHALL BE PULLED, IF NECESSARY, AND HELD IN THE PROPER LOCATION AND CUT OFF AT THE PROPER ELEVATION. THE DESIGNATED REINFORCING CAGE SHALL BE CENTERED IN EACH PILE WITH THE TIP OF CAGE FLUSH WITH THE TOP OF PILE. EACH PILE SHALL THEN BE FILLED WITH CONCRETE HAVING AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 p.s.i. IN 28 DAYS, AND MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE ONE INCH. THE PIER PILES SHALL CONTINUE BEING HELD UNTIL THE PRECAST CAPS HAVE BEEN SET AND CONNECTION BARS WELDED TO PILE PLATES AND PILES.

CHANNEL BRACING SHOWN ON SHEET 15 OF 37 SHALL BE INSTALLED AND CONCRETE TEST VERIFYING 4000 PSI CONCRETE STRENGTH SHALL BE CONDUCTED PRIOR TO PIER PILES RECEIVING LIVE LOAD.

DECK PLATES: THE DECK PLATES SHALL BE ADJUSTED AS NECESSARY TO INSURE THE PLATES FIT TIGHT AGAINST THE BEAMS AND CURBS.

REINFORCEMENT: UNLESS NOTED OTHERWISE, STEEL BARS FOR REINFORCEMENT SHALL BE DEFORMED BILLET -STEEL BARS CONFORMING TO THE REQUIREMENTS OF THE CURRENT ASTM DESIGNATION: A615 OR A706, GRADE 60.

FABRICATION OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH CHAPTER 7 OF THE CURRENT C.R.S.I. MANUAL OF STANDARD PRACTICE.

REINFORCEMENT WIRE BAR SUPPORTS THAT ARE IN CONTACT WITH FORMS SHALL BE CLASS 1, PLASTIC PROTECTED, IN ACCORDANCE WITH CHAPTER 3 OF THE CURRENT C.R.S.I. MANUAL OF STANDARD PRACTICE.

REPAIR OF DAMAGED GALVANIZED SURFACES: DAMAGED GALVANIZED SURFACES SHALL BE THOROUGHLY CLEANED TO REMOVE ALL CONTAMINANTS INCLUDING WELD-SLAG, WELD SPATTER AND RUST AND SHALL THEN BE PAINTED WITH TWO COATS OF ZINC DUST - ZINC OXIDE, TYPE 1, LINSEED OIL PAINT MEETING FEDERAL SPECIFICATION TT-P-641.

ELASTOMERIC BEARING PADS: ELASTOMERIC BEARING PADS SHALL BE IN ACCORDANCE WITH SECTION 04900 OF THE BNSF STANDARD CONSTRUCTION SPECIFICATIONS.

HANDRAIL: HANDRAIL PANELS ON WALKWAYS SHALL BE ERECTED PLUMB AND IN LINE.

ERECTION OF DOUBLE VOIDED BOX BEAMS: BOX BEAMS SHALL BE SET IN THE PROPER LOCATION USING CARE NOT TO DAMAGE CONCRETE MEMBERS. AFTER BEAMS ARE SET, LIFTING LOOPS SHALL BE REMOVED IN FIELD FLUSH WITH ABOVE CONCRETE SURFACE. REMAINING PORTION OF LIFTING LOOPS ARE TO BE COATED WITH PAINT. PATCH RECESSES, IF NECESSARY, AROUND LIFTING LOOPS WITH EPOXY MORTAR AS USED FOR SETTING BEAMS.

MORTAR FOR SETTING DOUBLE VOIDED BOX BEAMS: BOX BEAMS SHALL HAVE FULL AND EVEN BEARING UPON THE BRIDGE SEAT AREAS. IF NEEDED, MORTAR CONSISTING OF EQUAL PARTS BY VOLUME OF CLASS B EPOXY AND DRY SILICA SAND, MIXED IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS, SHALL BE SPREAD ON TOP OF BEARING PADS TO OBTAIN UNIFORM BEARING. SCRAPE EXCESS MORTAR FROM AROUND BEARING PADS AFTER BEAMS ARE SET.

CAST-IN-PLACE CONCRETE: ALL CONCRETE, CONCRETE WORK AND PLACEMENT OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH SECTION 04400 OF THE BNSF STANDARD CONSTRUCTION SPECIFICATIONS.

THE PORTLAND CEMENT USED IN ALL CONCRETE SHALL BE TYPE II OR TYPE IIA. ALL CONCRETE SHALL BE AIR-ENTRAINED CONTAINING NOT LESS THAN 5 PERCENT NOR MORE THAN 7 PERCENT AIR BY VOLUME.

CONCRETE SHALL BE CLASS 4Q WITH AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI IN 28 DAYS. MAXIMUM SIZE OF COURSE AGGREGATE SHALL BE ONE INCH. THE MINIMUM CONCRETE COVER ON REINFORCEMENT SHALL BE TWO INCHES UNLESS INDICATED OTHERWISE. EXPOSED CONCRETE EDGES SHALL BE BEVELED $^{3}/_{4}$".

EXISTING SUPERSTRUCTURE AND PIER REMOVAL: AFTER THE NEW PIPE PILES AND PIER CAPS ARE IN PLACE, THE CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING SUPERSTRUCTURE SPANS 71 THRU 86. SEE EXISTING DRAWINGS "DETAILS OF 50'-0" DECK PLATE GIRDER" (DATED OCTOBER 27, 1903) AND "24 FT. BEAM SPAN AND BEARINGS FOR 50 FT. SPANS" (DATED NOVEMBER 17, 1961) FOR DETAILS OF EXISTING SUPERSTRUCTURE SPANS 71 THRU 86.

AFTER THE NEW BRIDGE IS CONSTRUCTED, THE CONTRACTOR SHALL REMOVE ALL PORTIONS OF EXISTING PIERS 72 THRU 86 TO THE EXISTING GROUNDLINE. SEE EXISTING DRAWING "DETAIL OF PIERS NO. 2 THRU 12 INCL., 84 TO 86 INCL." (DATED APRIL 11, 1902) AND "DETAILS OF ABUTMENTS AND PIERS NO. 72 TO 83 INCL." FOR DETAILS OF EXISTING PIERS 72 THRU 86.

UPON REMOVAL OF THE EXISTING SUPERSTRUCTURE AND PIERS, ALL REMOVAL MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSING OF ALL REMOVAL MATERIAL IN ACCORDANCE WITH ALL LOCAL, COUNTY, STATE, AND OTHER REQUIREMENTS AND LAWS AS APPLICABLE. ALL REMOVAL WORK SHALL BE DONE IN ACCORDANCE WITH SPECIAL PROVISION Q4010 IN IN THE PROJECT MANUAL.

PLACING PRECAST CONCRETE BEARING BLOCK ON EXISTING ABUTMENT: PRIOR TO PLACING BEARING BLOCK AT THE EXISTING ABUTMENT, THE CONTRACTOR SHALL FIELD VERIFY THE ELEVATION OF THE TOP OF THE EXISTING BEARING SEAT AFTER REMOVAL OF GROUT PADS AND ADDITION OF INFILL CONCRETE, AND SHALL VERIFY THAT THE EXISTING BEARING SEAT IS LEVEL. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY VARIANCES.

TOP OF EXISTING BEARING SEAT SHALL BE THOROUGHLY CLEANED TO REMOVE ALL LOOSE PARTICLES AND DUST. PRECAST CONCRETE BEARING BLOCK SHALL THEN BE SET ON TOP OF THE EXISTING ABUTMENT BEARING SEAT, WITH THE TOP OF BEARING BLOCK LEVEL AT THE CORRECT ELEVATION, USING EPOXY MORTAR AS NECESSARY TO COMPLETELY FILL ANY VOID BETWEEN THE BOTTOM OF BEARING BLOCK AND EXISTING BEARING SEAT. EPOXY MORTAR SHALL CONSIST OF EQUAL PARTS OF CLASS B GEL TYPE EPOXY AND DRY SILICA SAND MIXED IN ACCORDANCE WITH THE MANUFACTURERS DIRECTIONS. THROUGH 2" DIA. HOLES IN BEARING BLOCK, DRILL $1^{3}/_{4}$" DIA. HOLES INTO THE ABUTMENT SEAT TO A DEPTH OF 5'-$6^{1}/_{2}$" BELOW TOP OF BEARING BLOCK. THROUGH $1^{1}/_{2}$" DIA. HOLES IN BEARING BLOCK, DRILL $1^{1}/_{4}$" DIA. HOLES INTO THE ABUTMENT BACKWALL TO A DEPTH OF 3'-6" FROM THE FRONT FACE OF THE BEARING BLOCK. HOLES SHALL BE THOROUGHLY CLEANED USING A WIRE BRUSH AND COMPRESSED AIR OR VACUUMING TO REMOVE ALL LOOSE PARTICLES AND DUST. THEN #10 X 5'-6" DOWELS AND #6 X 3'-6" SHALL BE SET IN THEIR RESPECTIVE HOLES THROUGH THE BEARING BLOCK USING EPOXY GROUT, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, TO COMPLETELY FILL THE VOIDS.

PLACING PRECAST CONCRETE BEARING BLOCK ON PRECAST CAP AT PIERS 72 AND 87: TOP OF PIER 72 AND 87 PRECAST CONCRETE CAP SHALL BE THOROUGHLY CLEANED TO REMOVE ALL LOOSE PARTICLES AND DUST. THE PRECAST BEARING BLOCK SHALL THEN BE SET ON TOP OF PRECAST CONCRETE CAP AT PIER 72 AND 87, WITH THE TOP OF BEARING BLOCK LEVEL AT THE CORRECT ELEVATION. LINE UP 2" DIA. HOLES IN BEARING BLOCK WITH 2" DIA. BLOCKOUTS IN PRECAST CAP. HOLES SHALL BE THOROUGHLY CLEANED USING A WIRE BRUSH AND COMPRESSED AIR OR VACUUMING TO REMOVE ALL LOOSE PARTICLES AND DUST. THEN #10 X 5'-1" DOWELS SHALL BE SET IN HOLES THROUGH BEARING BLOCK USING EPOXY GROUT, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, TO COMPLETELY FILL THE VOIDS.

PLACING PRECAST CONCRETE BEARING BLOCK ON EXISTING PIER 71: PRIOR TO PLACING THE BEARING BLOCK AT EXISTING PIER 71, THE CONTRACTOR SHALL FIELD VERIFY THE ELEVATIONS OF THE TOP OF THE EXISTING PIER AND THE HORIZONTAL DIMENSION OF THE LOWER SEAT. THE CONTRACTOR SHALL INSTALL THE CAST-IN-PLACE BEARING BLOCKS ON THE FIELD EDGES OF THE PIER, PRIOR TO REMOVAL OF THE SPAN, AS DETAILED ON SHEET 16 OF 37. ONCE THE SPAN IS REMOVED, THEN FILL AND LEVEL THE EXISTING BEARING SEAT TO PROVIDE THE TOP OF BLOCK THE ELEVATION INDICATED ON SHEET 16 OF 37. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY VARIANCES IN ELEVATION PRIOR TO PLACING THE BEARING BLOCK.

TOP OF EXISTING BEARING SEAT SHALL BE THOROUGHLY CLEANED TO REMOVE ALL LOOSE PARTICLES AND DUST. PRECAST CONCRETE BEARING BLOCK SHALL THEN BE SET ON TOP OF THE EXISTING PIER SEAT, WITH THE TOP OF BEARING BLOCK LEVEL AT THE CORRECT ELEVATION, USING EPOXY MORTAR AS NECESSARY TO COMPLETELY FILL ANY VOID BETWEEN THE BOTTOM OF BEARING BLOCK AND EXISTING PIER SEAT AND BETWEEN THE EDGE OF THE PRECAST BEARING BLOCK AND THE ADJACENT CAST-IN-PLACE BLOCKS. EPOXY MORTAR SHALL CONSIST OF EQUAL PARTS OF CLASS B GEL TYPE EPOXY AND DRY SILICA SAND MIXED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS. THROUGH 2" DIA. HOLES IN BEARING BLOCK, DRILL $1^{3}/_{4}$" DIA. HOLES INTO THE PIER SEAT TO A DEPTH OF 5'-$1^{1}/_{2}$" BELOW TOP OF BEARING BLOCK. HOLES SHALL BE THOROUGHLY CLEANED USING A WIRE BRUSH AND COMPRESSED AIR OR VACUUMING TO REMOVE ALL LOOSE PARTICLES AND DUST. THEN #10 X 5'-1" DOWELS SHALL BE SET IN HOLES THROUGH BEARING BLOCK USING EPOXY GROUT, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, TO COMPLETELY FILL THE VOIDS.

RECESSES AT LIFT ANCHORS: AFTER BEARING BLOCKS ARE SET, FILL RECESSES WITH CEMENT GROUT TO TOP OF SURROUNDING CONCRETE.

PATCHING AT PRECAST MEMBERS: PATCHING OR REPAIR OF SPALLED OR CHIPPED PRECAST CONCRETE MEMBERS SHALL BE DONE USING CONPATCH V/O MORTAR, MIXED AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

CONPATCH V/O MORTAR CAN BE ORDERED FROM:
CONSPEC MARKETING & MANUFACTURING CO., INC.
636 SOUTH 66TH TERRACE
KANSAS CITY, KS 66111
PHONE (913) 287 - 1700
FAX (913) 287 - 2716
TOLL FREE (800) 348 - 7351

PLACING PRECAST CAPS ON PIPE PILES: ABRASIVE BLAST CLEAN TOP OF PILES, TO EXPOSE CLEAN AGGREGATE, AND PILE PLATES ON PRECAST CAPS TO REMOVE ALL OIL, GREASE, RUST AND MILL SCALE. MORTAR SHALL CONSIST OF EQUAL PARTS BY VOLUME OF CLASS B EPOXY AND DRY SILICA SAND, MIXED IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS. MORTAR SHALL BE SPREAD ON TOP OF EACH PILE IN A BENT TO A THICKNESS OF APPROXIMATELY $^{1}/_{8}$ INCH IN ORDER TO OBTAIN UNIFORM BEARING. A PRECAST CAP SHALL THEN BE PLACED IN THE PROPER LOCATION ON TOP OF THE PILES. AFTER EPOXY MORTAR HAS HARDENED, CONNECTION BARS SHALL BE WELDED TO PILE PLATES AND PIPE PILING, AS SHOWN ON SHEET 11 OF 37.

AFTER PIER CAP HAS BEEN WELDED TO PILES, BURN OFF LIFTING LOOPS TWO (2) INCHES ABOVE CONCRETE SURFACE. REMAINING PORTION OF LIFTING LOOPS ARE TO BE COATED WITH PAINT. PATCH RECESSES, IF NECESSARY, AROUND LIFTING LOOPS WITH EPOXY MORTAR AS USED FOR SETTING DECK SLAB BEAMS.

STRUCTURAL STEEL: SEE SHEET 25 OF 37 FOR STRUCTURAL STEEL NOTES.

EPOXY: THE FOLLOWING EPOXY MATERIALS ARE APPROVED FOR USE.

CLASS A EPOXY: AS15-18 A&B LIQUID TYPE EPOXY (1)

SPEC-BOND 100 EPOXY (2)

CLASS B EPOXY: AS23-18 A&B GEL TYPE EPOXY (1)

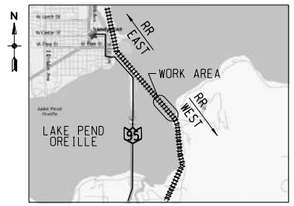
SPEC-BOND 200 EPOXY (2)

(1) AS15-18 AND AS23-18 EPOXIES ARE AVAILABLE FROM:

DELTA PLASTICS CO.	OR PERMALITE
10513 ROAD 236	1537 MONROVIA AVE.
TERRA BELLA, CA 93270	NEWPORT BEACH, CA 92663
PHONE (559) 535 - 1332	PHONE (714) 548 - 1137
FAX (559) 535 - 3723	FAX (714) 548 - 1130

(2) SPEC-BOND EPOXIES ARE AVAILABLE FROM:

CONSPEC MARKETING & MANUFACTURING CO., INC.
636 SOUTH 66TH TERRACE
KANSAS CITY, KS 66111
PHONE (913) 287 - 1700
FAX (913) 287 - 2716
TOLL FREE (800) 348 - 7351



LOCATION PLAN

LEGEND

T/T	= Top of Tie
RY	= Railway
F.S.	= Far Side
N.S.	= Near Side
B.S.	= Both Sides
U.N.O.	= Unless Noted Otherwise
cts.	= Centers
E.F.	= Each Face
F.F.	= Front Face
B.F.	= Back Face
T.	= Top
B.	= Bottom
EXP.	= Expansion Bearing
FIX.	= Fixed Bearing
FO	= Fiber Optic Line

LIFTING WEIGHTS: (APPROXIMATE)
SPC3.9-1 = 85,500 lbs.
SPC3.9-2 = 85,500 lbs.
SPC3.9-3 = 85,500 lbs.
SPBB3.9-2 = 17,500 lbs.
SPBB3.9-3 = 12,000 lbs.
SPBB3.9-4 = 20,000 lbs.
CPB25-10C = 41,600 lbs.
NEW 52'-0" 4-BEAM SET
w/ TRACK PANELS = 100,000 lbs.
EXISTING 52'-0" SPAN w/ TRACK = 72,000 LBS.

ATTENTION !! - UTILITY NOTE

THE IMPLIED PRESENCE OR ABSENCE OF UTILITIES IS NOT TO BE CONSTRUED BY OWNER, ENGINEER, CONTRACTOR, OR SUBCONTRACTORS TO BE AN ACCURATE AND COMPLETE REPRESENTATION OF UTILITIES THAT MAY OR MAY NOT EXIST ON THE CONSTRUCTION SITE. BURIED AND ABOVEGROUND UTILITY LOCATION, IDENTIFICATION, AND MARKING ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. REROUTING, DISCONNECTION, PROTECTION, ETC. OF ANY UTILITIES MUST BE COORDINATED AMONG THE CONTRACTOR, UTILITY COMPANY, AND OWNER. SITE SAFETY, INCLUDING THE AVOIDANCE OF HAZARDS, ASSOCIATED WITH BURIED AND ABOVEGROUND UTILITIES REMAINS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

SUMMARY OF ESTIMATED QUANTITIES *

ITEM	DESCRIPTION	UNIT	QUANTITY
1	MOBILIZATION	L. SUM	1
2	DRIVING 24" DIA. PIPE PILE	L.F.	12,300
3	CLASS 4Q CONCRETE**	C.Y.	1,313
4	REINFORCEMENT STEEL	LBS.	165,700
5	INSTALL PIER CAP & CHANNEL BRACING	EACH	16
6	INSTALL 52 FT. STEEL GIRDER SPAN	EACH	15
7	INSTALL 26 FT. PPC GIRDER SPANS, INSTALL BRG. BLOCKS AND MODIFY ABUT./PIER	EACH	2
8	INSTALL REFUGE PLATFORM	EACH	1
9	PIER DEMOLITION	EACH	15
10	SUPERSTRUCTURE DEMOLITION & DISPOSAL	EACH	16

ESTIMATED WEIGHT OF STRUCTURAL STEEL SPANS 72 THRU 86 = 637 TONS

* THESE ITEMS ARE FOR REFERENCE ONLY. SEE PROJECT SPECIFICATIONS FOR ACTUAL PAY ITEMS.

** APPROXIMATE CONCRETE REQUIRED TO FILL PIPE PILES

LIST OF SHEETS

REFERENCES:

BNSF Standards:
PLAN NO. 0000-17902-70A
PLAN NO. 500000-BG1 & BG2

Existing Drawings:
General Plan - Index No. 91370
Detail of Abutments and Piers No. 72 to 83 incl.
Detail of Piers No. 2 to 12 incl. and No. 84 to 86 incl.
Detail of Pier Nos. 63, 64, 70 and 71
Shop Plan of Existing Bearings for 50' T.P.G. Spans
4-75 ft. Through Plate Girder Span
Elevation & Location Plan
Details of 50'-0" Deck Plate Girder
Soil Borings and Test Piles

Survey Drawings:
Sheets 1 thru 16 dated 10-21-08

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

SURVEY DATA
Bridge Survey completed by Parsons Dec. 2008. Elevations based on NGVD 1929 datum.

DESIGN DATA
2008 A.R.E.M.A. Design Specifications
Loading: Cooper E 80 w/ Diesel Impact and A.R.E.M.A. Chapter 15 Alternative Live Load

DES:	AAN
DRAWN:	CDP
CHECK:	MAF
DATE:	04/22/09
AUTH:	A090024
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING / KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

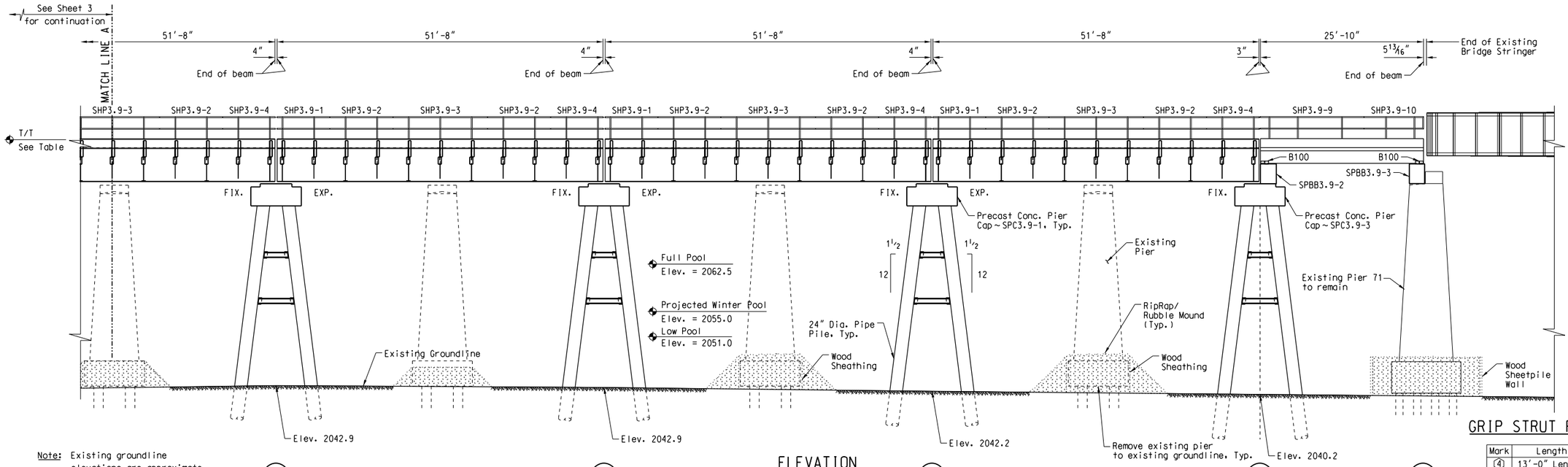
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
RECONSTRUCT WEST 832' OF BRIDGE
GENERAL NOTES & LIST OF SHEETS

PLAN NO: 0045-3.9-76 | SHEET: 1 OF 37

To SPOKANE, WA
(RY West)

NOTE: Details of existing pier footing protection are schematic in nature and are shown for information only. Details are based on underwater inspection performed Sept. 2007

To WHITEFISH, MT
(RY East)



Note: Existing groundline elevations are approximate

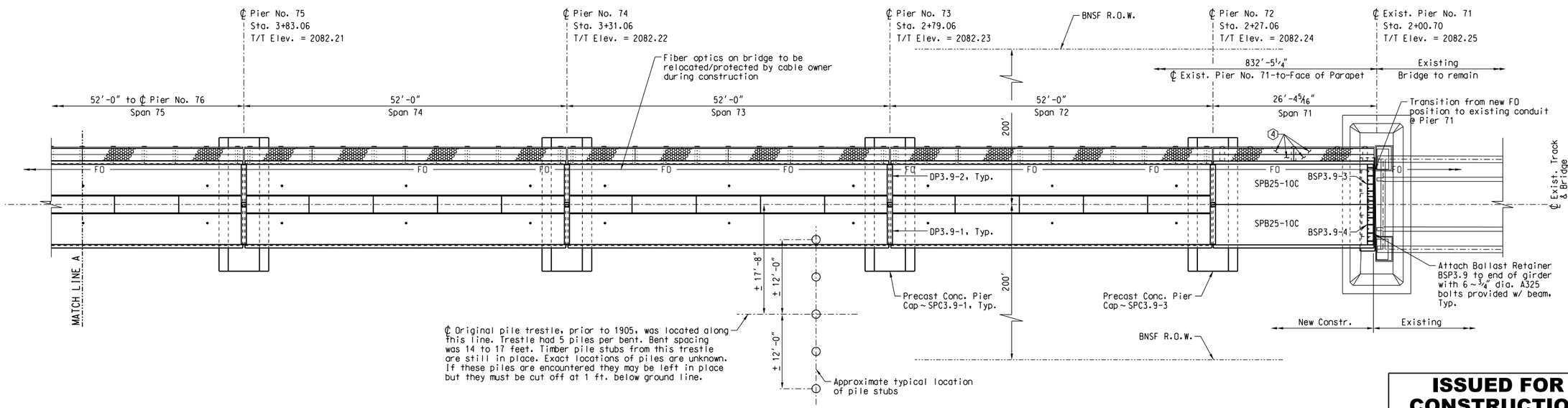
ELEVATION

(Looking RY North)
Bearings not shown.
Existing Bridge Superstructure not shown.

GRIP STRUT PANELS

Mark	Length *
4	13'-0" Length

* NOTE:
Actual lengths shown, supply in lengths of 14'-0".



PLAN

ELEVATIONS FOR NEW BRIDGE					
	Pier No. 75	Pier No. 74	Pier No. 73	Pier No. 72	Pier No. 71
T/T	2082.21	2082.22	2082.23	2082.24	2082.25
Top of Bridge Seat	2075.10	2075.10	2075.10	2075.10/2078.28	* 2078.28

* Contractor to field verify elevation of existing pier 71 prior to existing span removal.

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

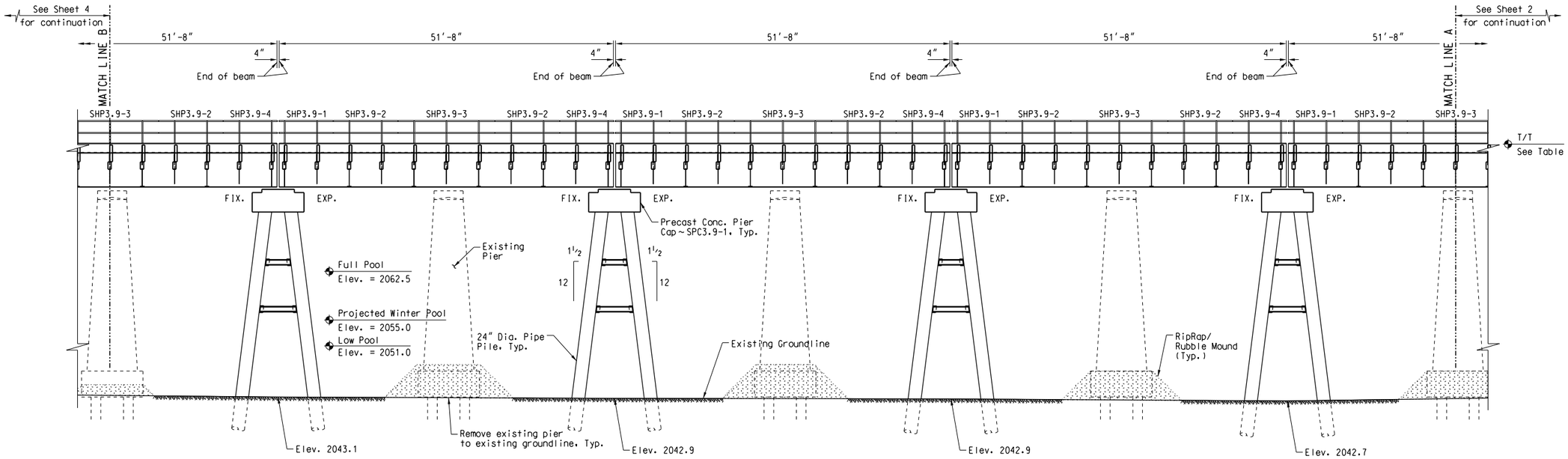
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION
(SPANS 71 THRU 74)

PLAN NO: 0045-3.9-77 | SHEET: 2 OF 37

To SPOKANE, WA
(RY West)

NOTE: Details of existing pier footing protection are schematic in nature and are shown for information only. Details are based on underwater inspection performed Sept. 2007

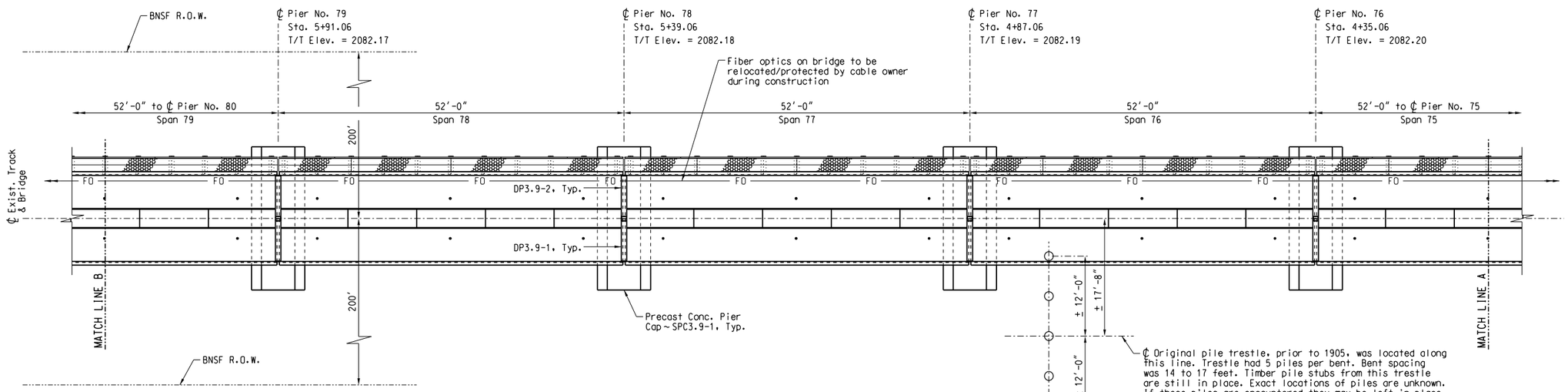
To WHITEFISH, MT
(RY East)



Note: Existing groundline elevations are approximate

ELEVATION

(Looking RY North)
Bearings not shown.
Existing Bridge Superstructure not shown.



PLAN

ELEVATIONS FOR NEW BRIDGE				
	Pier No. 79	Pier No. 78	Pier No. 77	Pier No. 76
T/T	2082.17	2082.18	2082.19	2082.20
Top of Bridge Seat	2075.10	2075.10	2075.10	2075.10

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

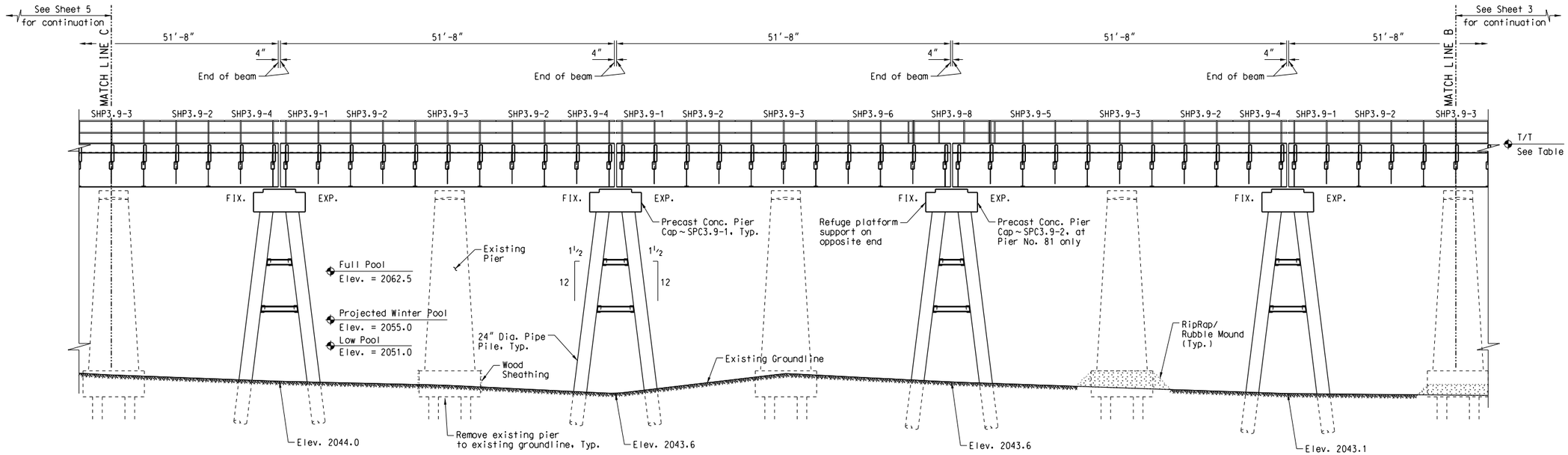
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION
(SPANS 75 THRU 78)

PLAN NO: 0045-3.9-78 | SHEET: 3 OF 37

To SPOKANE, WA
(RY West)

NOTE: Details of existing pier footing protection are schematic in nature and are shown for information only. Details are based on underwater inspection performed Sept. 2007

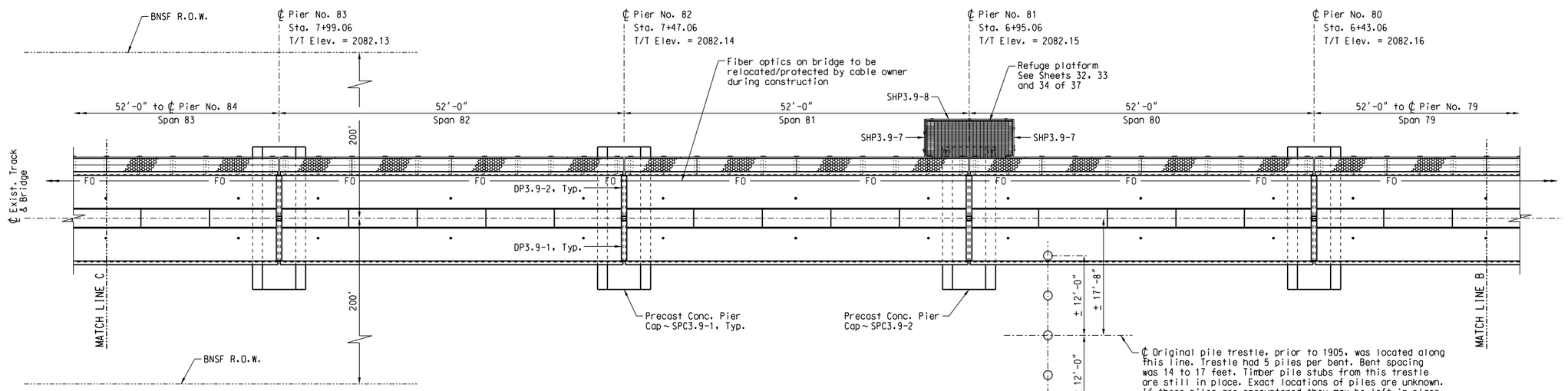
To WHITEFISH, MT
(RY East)



Note: Existing groundline elevations are approximate

ELEVATION

(Looking RY North)
Bearings not shown.
Existing Bridge Superstructure not shown.



PLAN

ELEVATIONS FOR NEW BRIDGE				
	Pier No. 83	Pier No. 82	Pier No. 81	Pier No. 80
T/T	2082.13	2082.14	2082.15	2082.16
Top of Bridge Seat	2075.10	2075.10	2075.10	2075.10

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

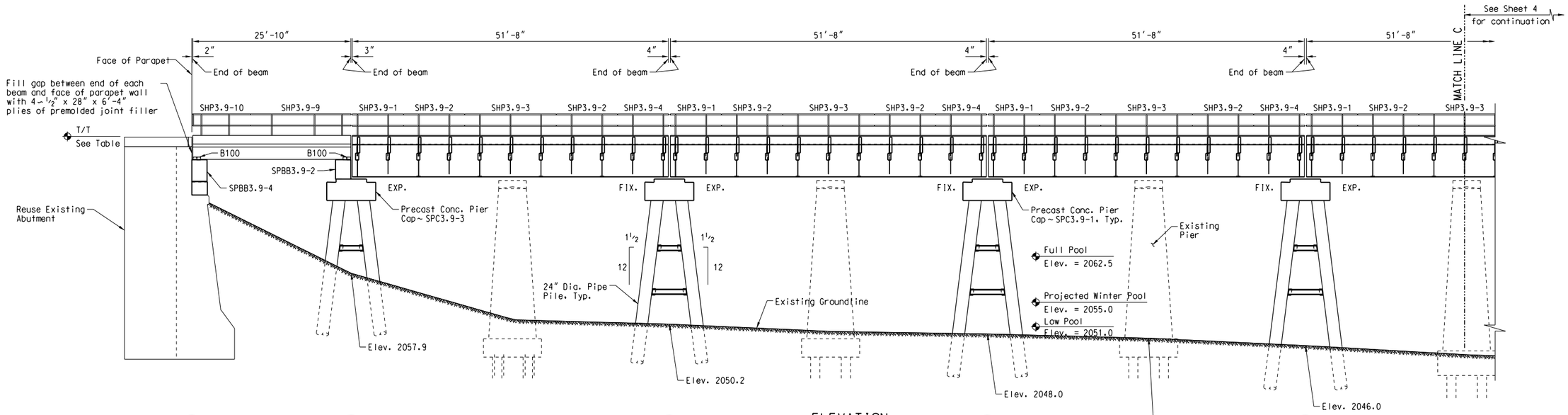
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION
(SPANS 79 THRU 82)

PLAN NO: 0045-3.9-79 | SHEET: 4 OF 37

To SPOKANE, WA
(RY West)

NOTE: Details of existing pier footing protection are schematic in nature and are shown for information only. Details are based on underwater inspection performed Sept. 2007

To WHITEFISH, MT
(RY East)



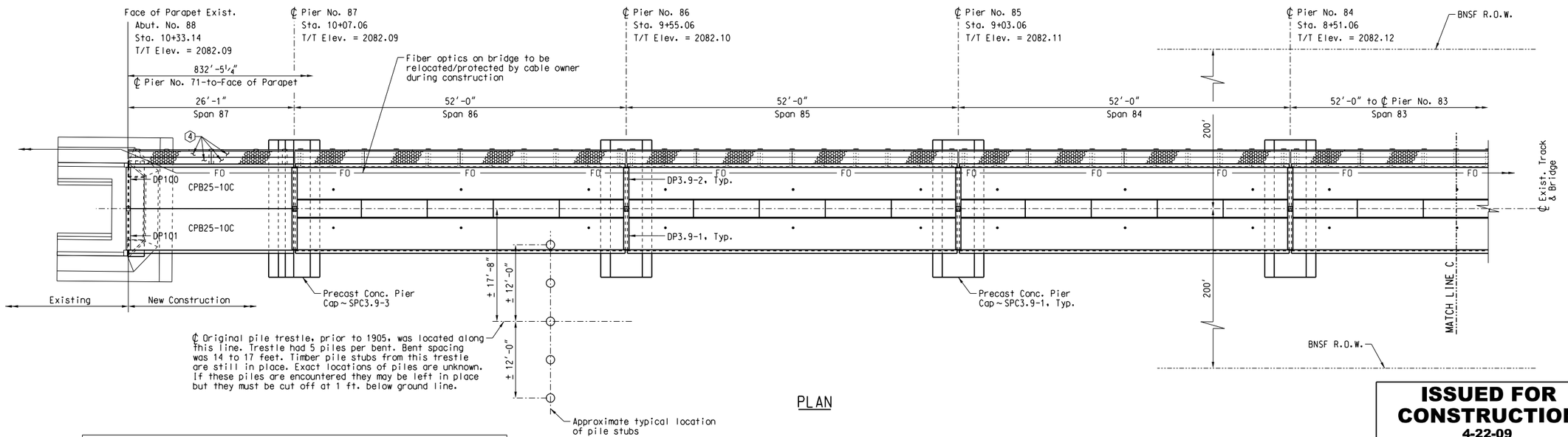
ELEVATION

(Looking RY North)
Bearings not shown.
Existing Bridge Superstructure not shown.

GRIP STRUT PANELS

Mark	Length
④	13'-0" Length

Note: Existing groundline elevations are approximate



PLAN

ELEVATIONS FOR NEW BRIDGE					
	Abut. No. 88	Pier No. 87	Pier No. 86	Pier No. 85	Pier No. 84
T/T	2082.09	2082.09	2082.10	2082.11	2082.12
Top of Bridge Seat	* 2078.28	2078.28/2075.10	2075.10	2075.10	2075.10

* Contractor to field verify elevation of existing abutment seat prior to existing span removal.

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES:	AAN
DRAWN:	CDP
CHECK:	MAF
DATE:	04/22/09
AUTH:	A090024
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING — KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION
(SPANS 83 THRU 87)

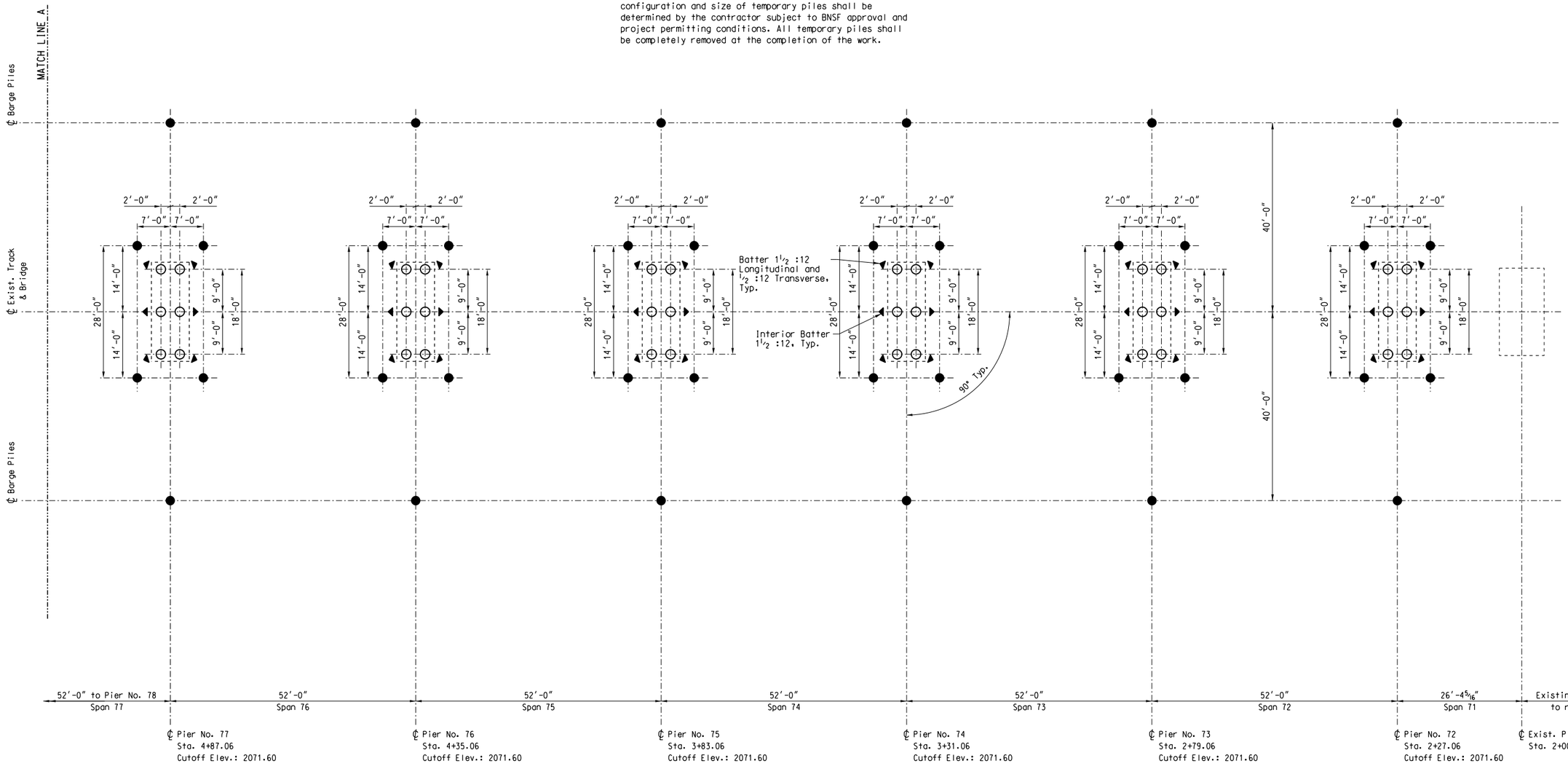
PLAN NO: 0045-3.9-80 | SHEET: 5 OF 37

← To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East) →

NOTE:

Temporary piles are shown only as representative indication of quantity of temporary piles permitted. Final location, configuration and size of temporary piles shall be determined by the contractor subject to BNSF approval and project permitting conditions. All temporary piles shall be completely removed at the completion of the work.



PILE LAYOUT PLAN

ELEVATIONS FOR NEW BRIDGE						
	Pier No. 77	Pier No. 76	Pier No. 75	Pier No. 74	Pier No. 73	Pier No. 72
Top of Pile (cutoff)	2071.60	2071.60	2071.60	2071.60	2071.60	2071.60
Estimated tip elev.	1940.9	1958.7	1958.9	1958.9	1958.2	1956.2

Note: Estimated tip elevations are based on Geotech Report.

ATTENTION !! - UTILITY NOTE

THE LOCATIONS OF THOSE BURIED AND ABOVEGROUND UTILITIES SHOWN ARE APPROXIMATE, ARE SHOWN FOR CONTRACTOR INFORMATIONAL USE ONLY, AND ARE NOT TO BE REFERENCED FOR CONSTRUCTION PURPOSES. THE IMPLIED PRESENCE OR ABSENCE OF UTILITIES IS NOT TO BE CONSTRUED BY OWNER, ENGINEER, CONTRACTOR, OR SUBCONTRACTORS TO BE AN ACCURATE AND COMPLETE REPRESENTATION OF UTILITIES THAT MAY OR MAY NOT EXIST ON THE CONSTRUCTION SITE. BURIED AND ABOVEGROUND UTILITY LOCATION, IDENTIFICATION, AND MARKING ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. REROUTING, DISCONNECTION, PROTECTION, ETC. OF ANY UTILITIES MUST BE COORDINATED AMONG THE CONTRACTOR, UTILITY COMPANY, AND OWNER, SITE SAFETY, INCLUDING THE AVOIDANCE OF HAZARDS, ASSOCIATED WITH BURIED AND ABOVEGROUND UTILITIES REMAINS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

Notes:

1. ○ - Production pipe piles 24" dia. x ½" thk.
2. ● - Temporary template pipe piles 24" dia. x ⅜" thk.
3. ◒ - Temporary trestle pipe piles 24" dia. x ½" thk.
4. ▼ - Indicates direction of batter of production piles. The two interior piles shall be battered at 1½ :12. The four exterior piles shall be battered at 1½ :12 Longitudinal and ½ :12 Transverse.
5. All dimensions are given at cutoff elevation of production piles.
6. Production Piles to be driven as noted in the Project Technical Specification Section 4210 and as determined by the Engineer.
7. See General Plan & Elevation sheets for approximate location of original pile trestle.
8. Use of a template to ensure pile locations during driving is required.
9. Steel conical pile points with dull tip shall be welded onto each pile.

ISSUED FOR CONSTRUCTION
4-22-09

Work with sheets 7 and 8 of 37

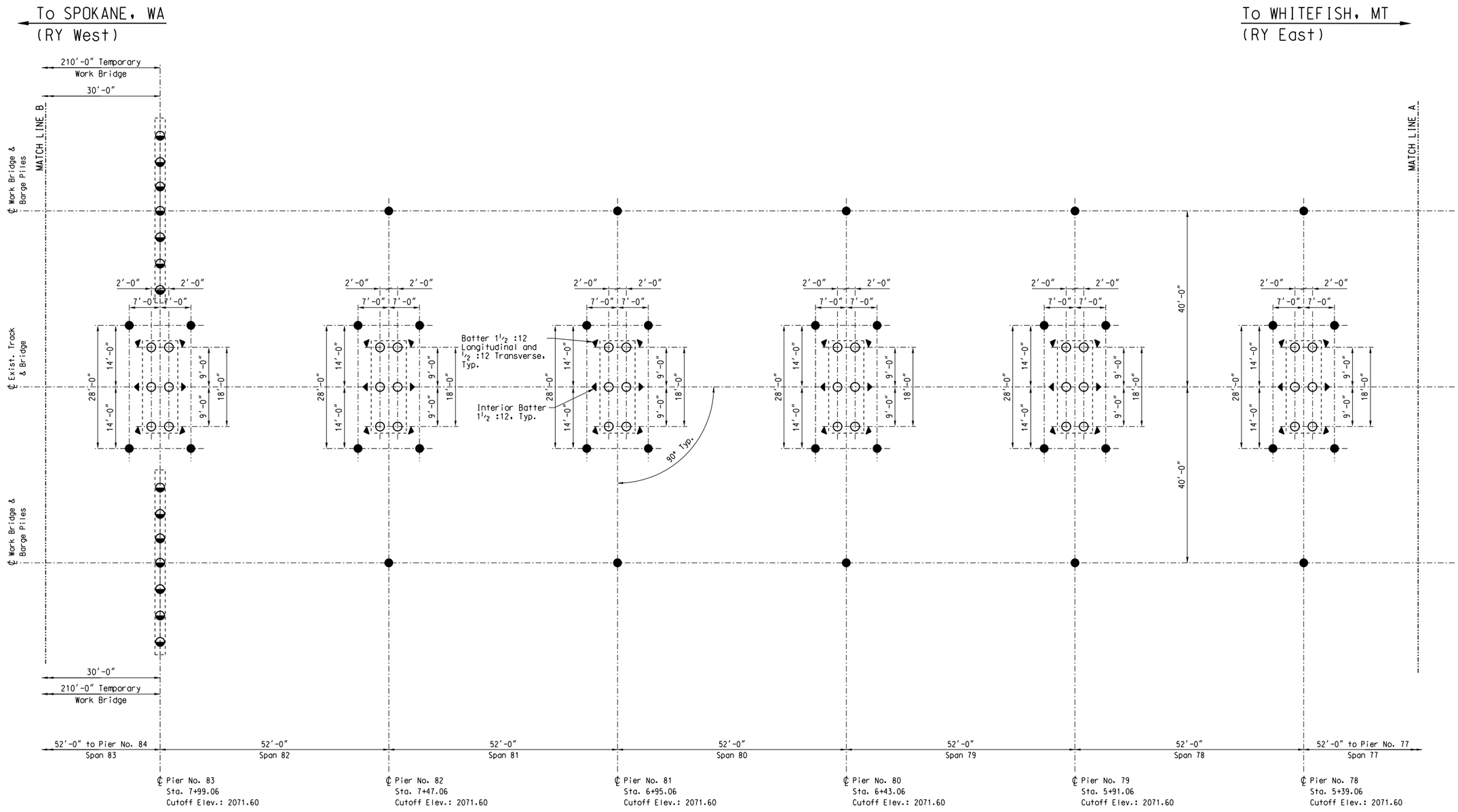
HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING / KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
PILE LAYOUT PLAN

PLAN NO: 0045-3.9-81 | SHEET: 6 OF 37



PILE LAYOUT PLAN

ELEVATIONS FOR NEW BRIDGE						
	Pier No. 83	Pier No. 82	Pier No. 81	Pier No. 80	Pier No. 79	Pier No. 78
Top of Pile (cutoff)	2071.60	2071.60	2071.60	2071.60	2071.60	2071.60
Estimated tip elev.	1934.0	1933.6	1941.6	1941.1	1941.1	1940.9

Note: Estimated tip elevations are based on Geotech Report.

ISSUED FOR CONSTRUCTION
4-22-09

Work with sheets 6 and 8 of 37

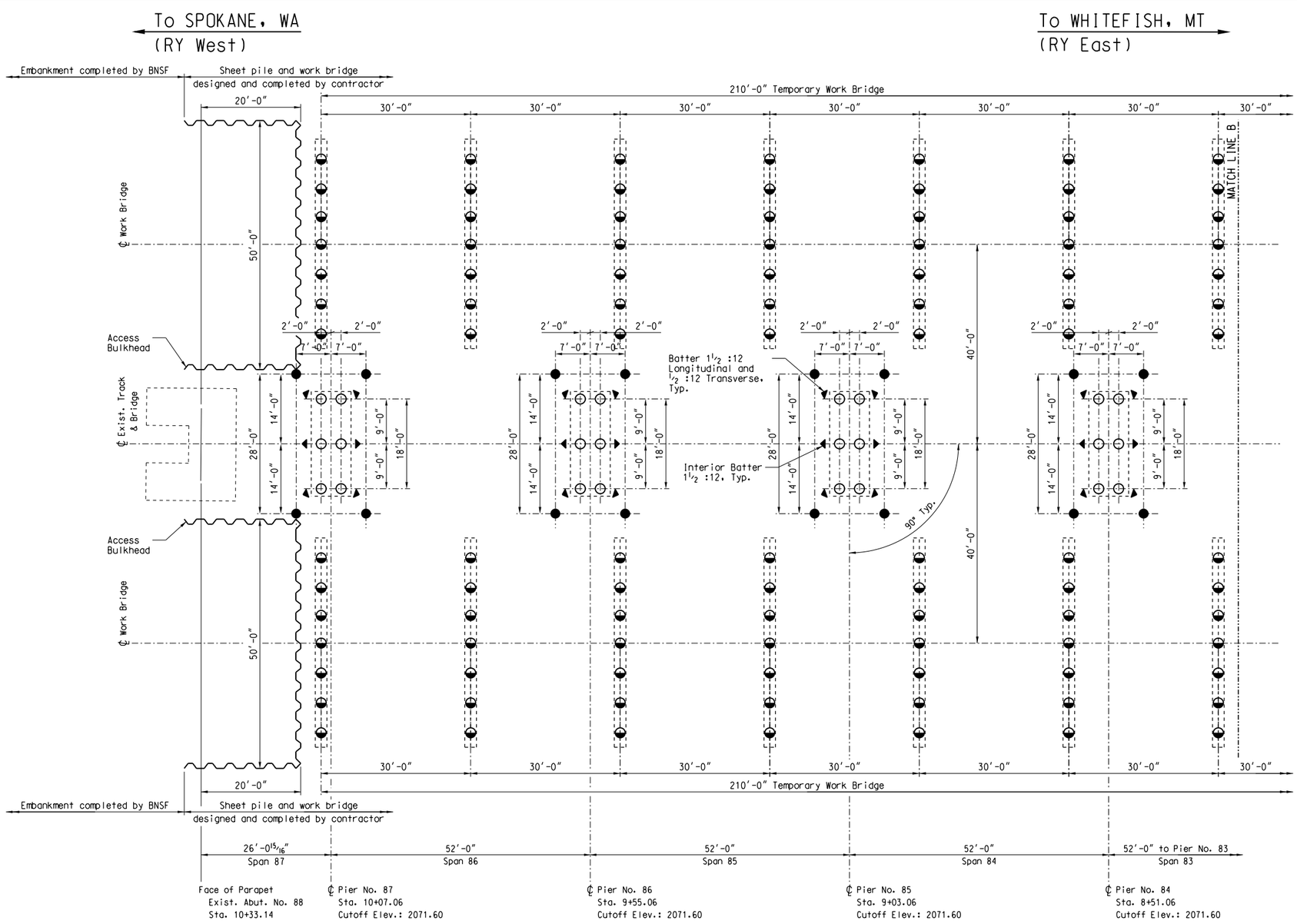
DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
PILE LAYOUT PLAN

PLAN NO: 0045-3.9-82 | SHEET: 7 OF 37

HANSON
Hanson Professional Services Inc.



See sheet 9 of 37 for access/staging area.

PILE LAYOUT PLAN

ELEVATIONS FOR NEW BRIDGE				
	Pier No. 87	Pier No. 86	Pier No. 85	Pier No. 84
Top of Pile (cutoff)	2071.60	2071.60	2071.60	2071.60
Estimated tip elev.	1940.1	1940.2	1938.0	1936.0

Note: Estimated tip elevations are based on Geotech Report.

ISSUED FOR CONSTRUCTION
4-22-09

Work with sheets 6 and 7 of 37

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

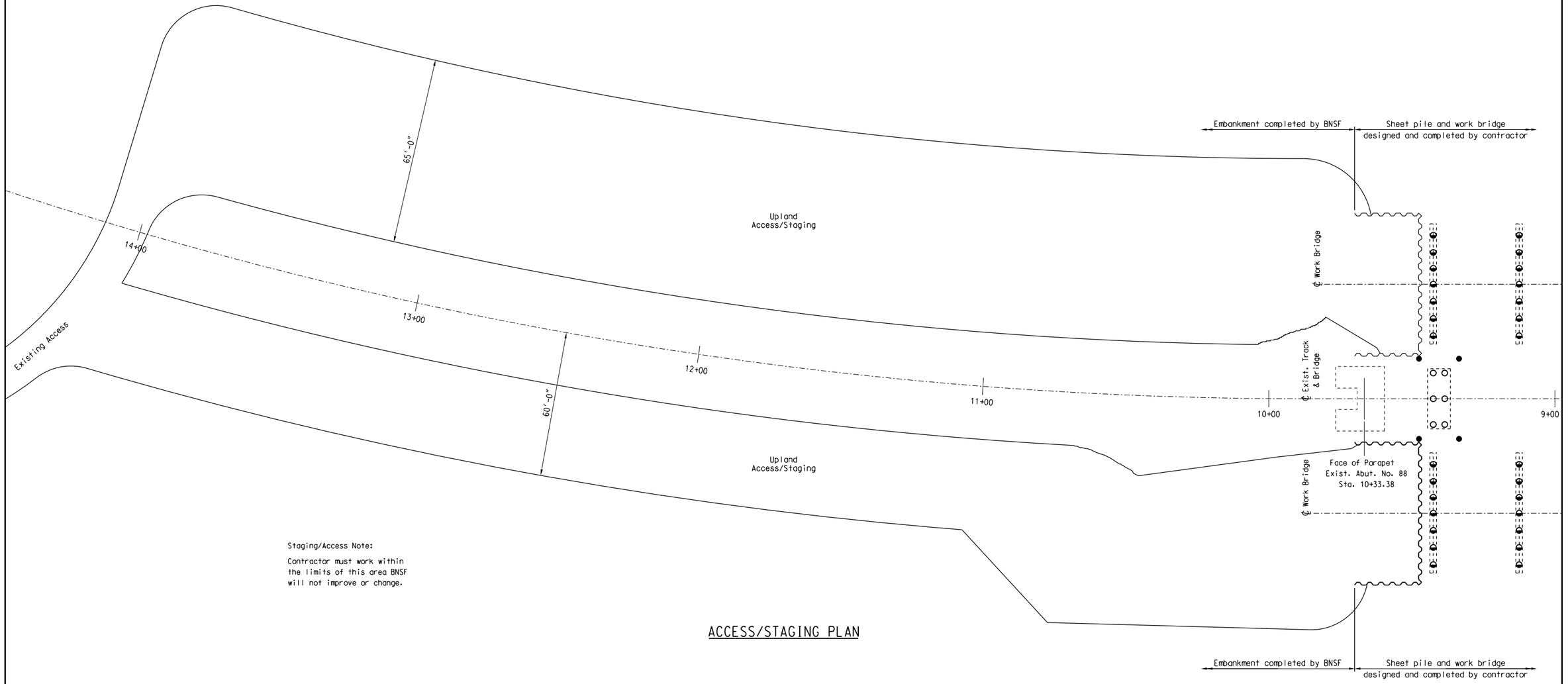
BNSF RAILWAY
BRIDGE ENGINEERING / KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
PILE LAYOUT PLAN

PLAN NO: 0045-3.9-83 | SHEET: 8 OF 37

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



Staging/Access Note:

Contractor must work within the limits of this area BNSF will not improve or change.

ACCESS/STAGING PLAN

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

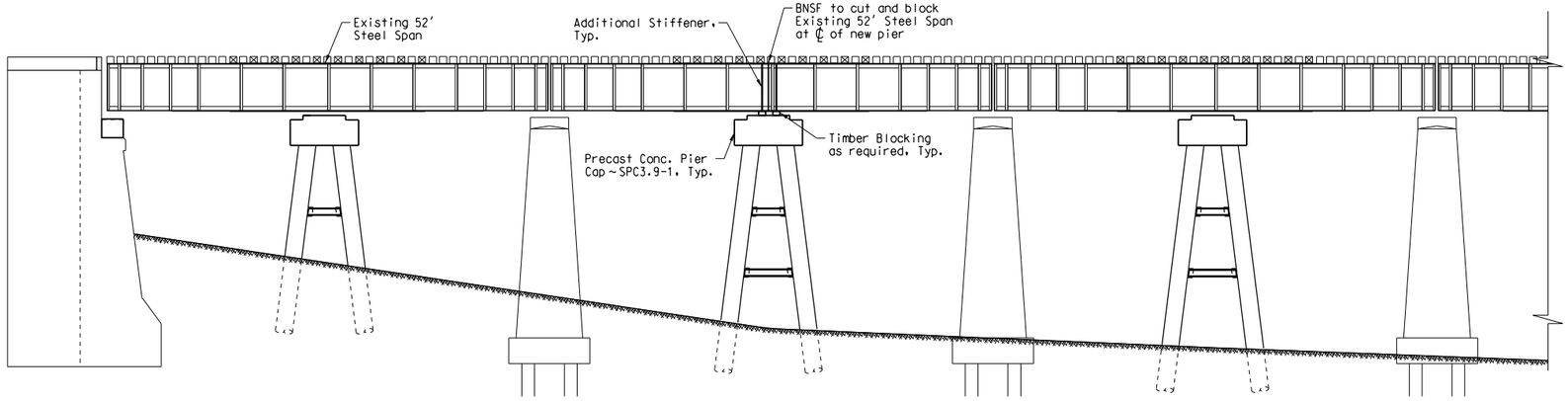
BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
ACCESS/STAGING PLAN

PLAN NO: 0045-3.9-84 | SHEET: 9 OF 37

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



ELEVATION I
(Looking RY North)
Bearings not shown.

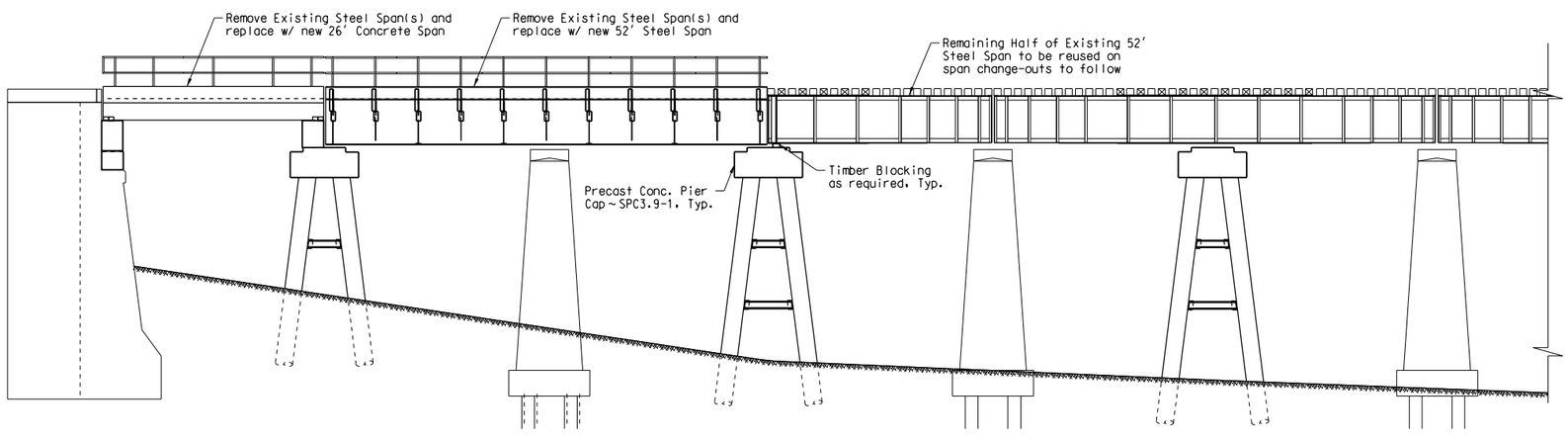
SUPERSTRUCTURE CONSTRUCTION SEQUENCE:

1. INSTALL PIPE PILES, PIER CAPS, AND PIER BRACING. FIELD VERIFY ELEVATION OF THE TOP OF EXISITNG PIER TO CONFIRM CLEARANCE FOR INSTALLATION OF 52 FT. STEEL SPAN.
2. BNSF TO INSTALL STIFFENERS AND DIAPHRAGMS AS REQUIRED.
3. BNSF TO SUPPORT EXISTING 52 FT. STEEL SPANS ON TIMBER BLOCKING AS REQUIRED AT NEW PIER SUPPORT LOCATIONS.
4. BNSF TO CUT EXISTING 52 FT. STEEL SPANS AT NEW PIER SUPPORT LOCATIONS.
5. SUBMIT SUPERSTRUCTURE CONSTRUCTION PLAN TO BNSF FOR APPROVAL. APPROVAL OF SUPERSTRUCTURE CONSTRUCTION PLAN IS REQUIRED PRIOR TO BEGINNING WORK.
6. COORDINATE REQUIRED SUPERSTRUCTURE REPLACEMENT WORK WINDOWS WITH BNSF.
7. BRIDGE CLOSED TO TRAIN TRAFFIC AT START OF WORK WINDOW.
8. BNSF TO CUT RAIL AS REQUIRED.
9. REMOVE AND DISPOSE OF EXISTING STEEL SPAN(S) TO BE REPLACED DURING WORK WINDOW. PART OF MODIFIED EXISTING 52 FT. STEEL SPAN TO REMAIN AND BE REUSED AS REQUIRED.
10. ERECT NEW 52 FT. STEEL SPAN.
11. BNSF TO SPLICE RAIL AND COMPLETE TRACK WORK AS REQUIRED IN WORK AREA.
12. BRIDGE REOPENED TO TRAIN TRAFFIC AT COMPLETION OF WORK AND END OF WORK WINDOW.
13. STEPS 7 THRU 12 REPEATED DURING COORDINATED WORK WINDOWS UNTIL SPANS 71 THRU 87 HAVE BEEN REMOVED AND REPLACED.
14. BNSF TO INSTALL BALLAST AND SURFACE TRACK SPANS 71 THRU 87

Note:
New spans shall be set with the grating and walkway installed.

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



ELEVATION II
(Looking RY North)
Bearings not shown.

Note: Contractor to perform construction activities unless stated otherwise.

ISSUED FOR CONSTRUCTION
4-22-09

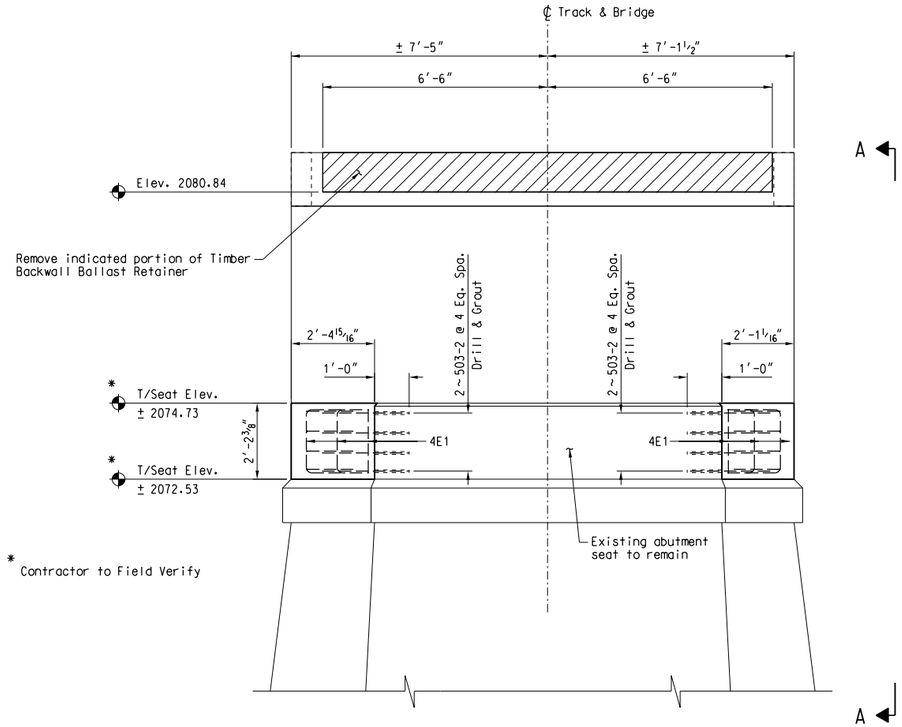
HANSON
Hanson Professional Services Inc.

DES:	AAN
DRAWN:	CDP
CHECK:	MAF
DATE:	04/22/09
AUTH:	A090024
LINE SEG:	0045

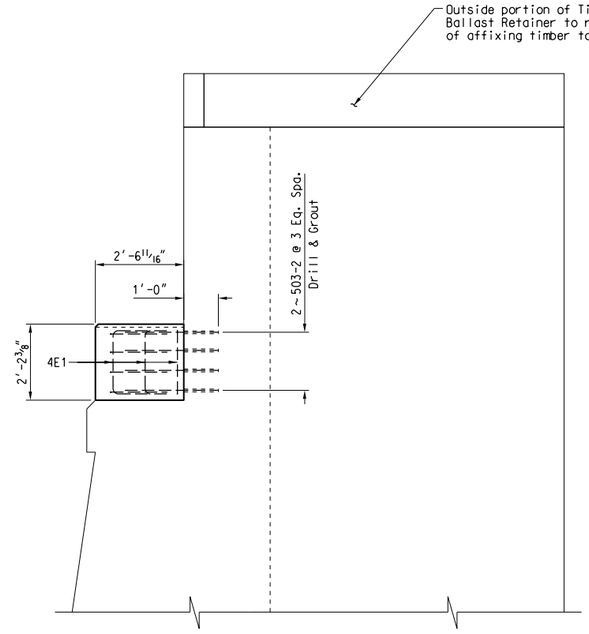
BNSF RAILWAY
BRIDGE ENGINEERING — KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
SUPERSTRUCTURE CONSTRUCTION SEQUENCE

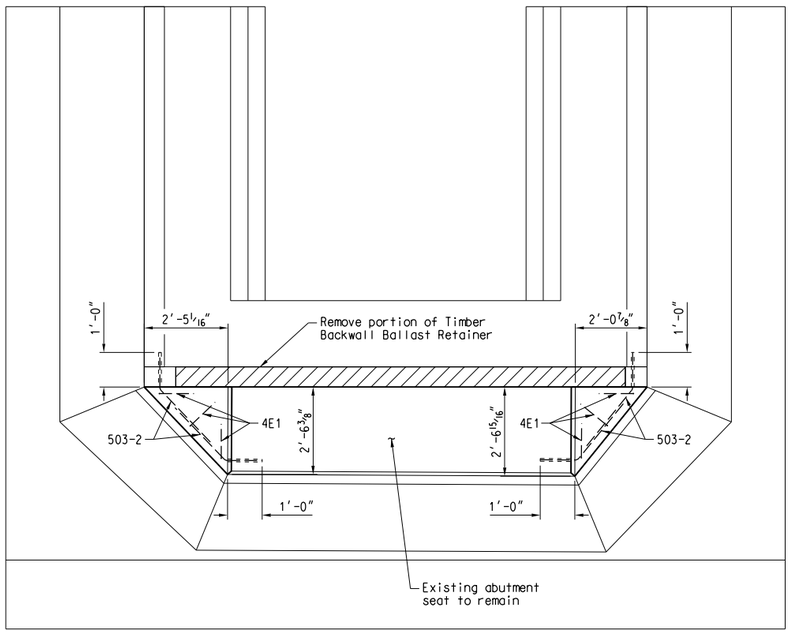
PLAN NO: 0045-3.9-87 | SHEET: 12 OF 37



ELEVATION ~ EXISTING ABUTMENT NO. 88



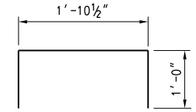
VIEW A-A



PLAN ~ EXISTING ABUTMENT NO. 88

LIST OF REINFORCING BARS REQUIRED				
NO.	MARK	SIZE	TYPE	LENGTH
16	503-2	#5	STR.	3′-2″
6	4E1	#4	E	3′-10½″

Note: Field bend 503-2 bars to fit.



BAR 4E1

REINFORCING STEEL DETAILS

All dimensions shown are out-to-out of bars

ESTIMATED QUANTITIES		
DESCRIPTION	UNIT	QUANTITY
C.I.P. CONCRETE, CLASS 40	CU.YDS.	0.5
REINFORCEMENT	LBS.	68

NOTES:

CAST-IN-PLACE CONCRETE: All concrete, concrete work and placement of reinforcement shall be in accordance with Section 04400 of the B.N.S.F. Standard Construction Specifications.

The portland cement used in all concrete shall be Type II or Type IIA.

All concrete shall be air-entrained containing not less than 5 percent nor more than 7 percent air by volume.

Concrete shall be Class 40 with an ultimate compressive strength of not less than 4000 psi in 28 days. Maximum size of coarse aggregate shall be one inch. The minimum concrete cover on reinforcement shall be two inches unless indicated otherwise. Exposed concrete edges shall be beveled ¾″.

Existing concrete surfaces, against which new concrete is to be placed, shall be abrasive blast cleaned to expose clean aggregate. Dirt and other foreign material must be thoroughly cleaned off, and surfaces dampened before additional concrete is placed.

Reinforcing bars to be drilled into existing concrete shall be epoxy grouted with an approved epoxy. The following epoxy materials are approved for use:

1. AS23-18 A&B manufactured by Delta Plastics Co., phone (559)535-1332.
2. Spec-Bond 200 manufactured by Conspec Marketing & Manufacturing Co., Inc., phone (877)266-7732.
3. Epoxy-Tie epoxy, manufactured by Simpson Strong-Tie Co. Inc., phone (800)999-5099

An equivalent epoxy grout adhesive system could be used with written approval from the Engineer. Grouting shall be in accordance with manufacturer's recommendations. Drilled hole size diameter shall be ⅛ inch larger than reinforcement bar diameter.

REMOVAL NOTES: Hatched portions of Existing Abutment No. 88 shall be removed. All other components of Existing Abutment to remain.

Removal procedures shall not damage portion of Existing Abutment to remain.

Abutment seats shall be made level at the indicated elevation prior to the placing, precast concrete bearing block SPBB3.9-4.

ISSUED FOR CONSTRUCTION
4-22-09

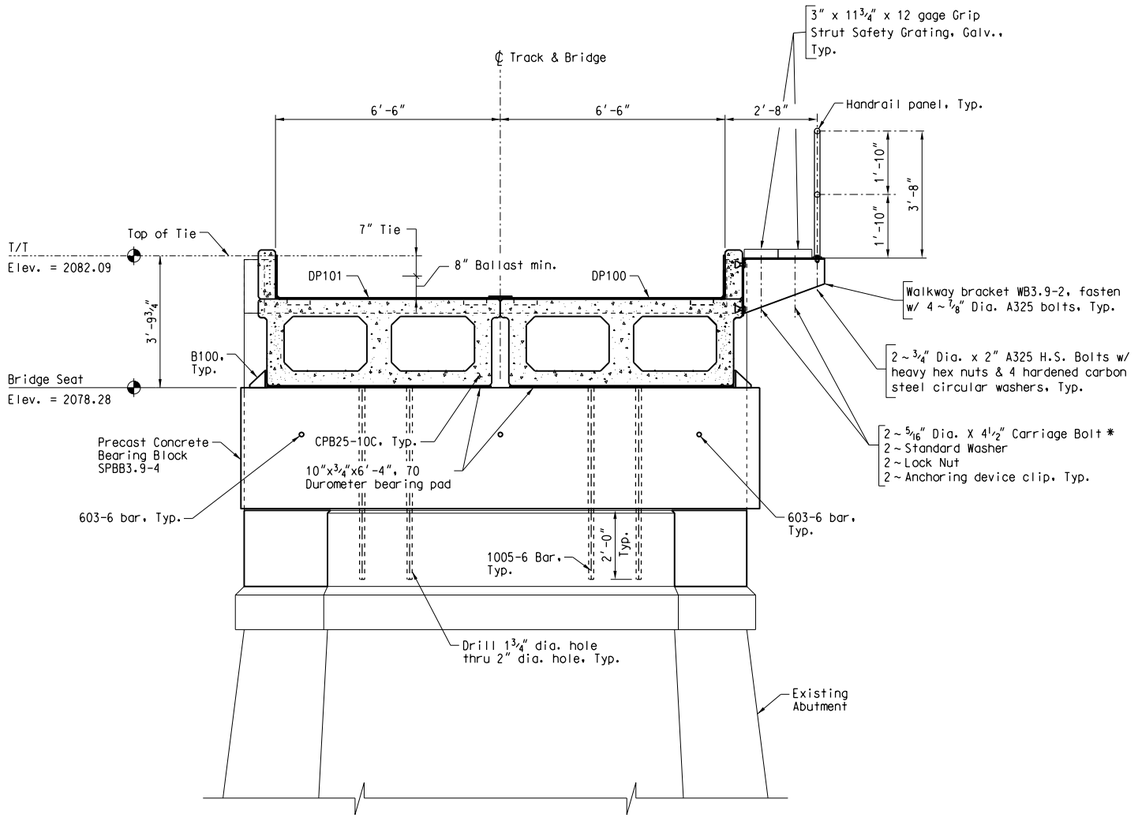
HANSON
Hanson Professional Services Inc.

DES:	AAN
DRAWN:	CDP
CHECK:	MAF
DATE:	04/22/09
AUTH:	A090024
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING — KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

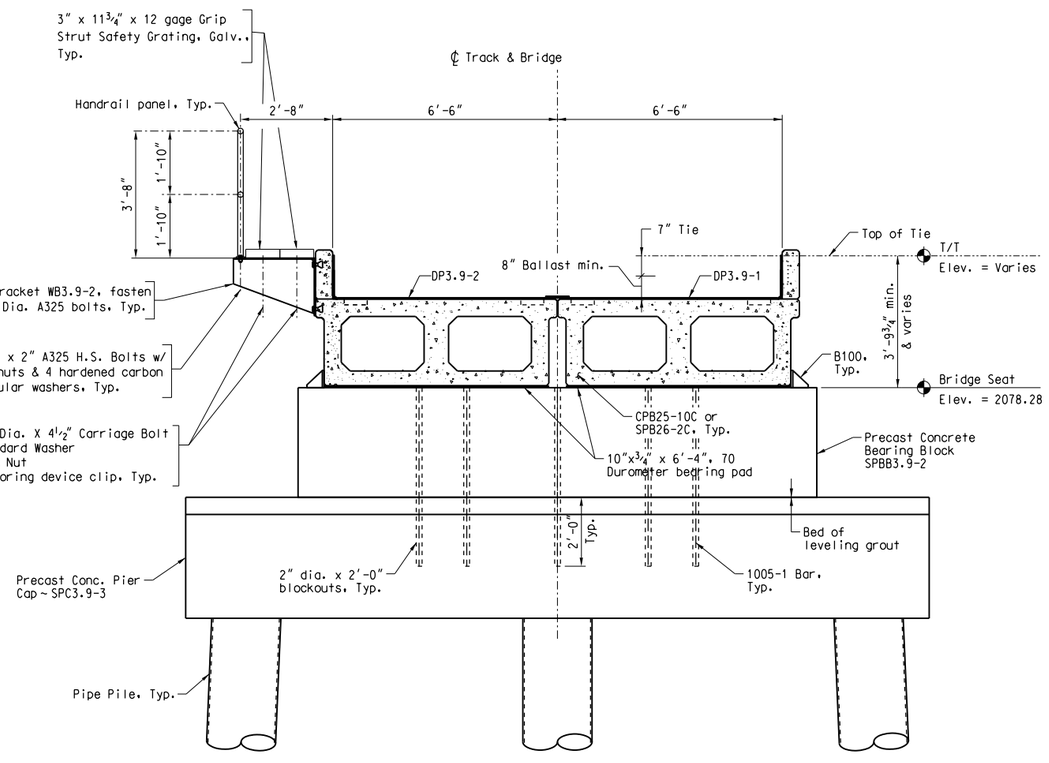
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
EXISTING ABUT. NO. 88
MODIFICATION DETAILS

PLAN NO: 0045-3.9-88 | SHEET: 13 OF 37



TYPICAL SECTION AT ABUT. NO. 88

Looking Railway West



* Each Grip Strut Grating Plank that is continuous over a walkway bracket shall be connected with one carriage bolt.

TYPICAL SECTION AT PIER NO. 87 & 72

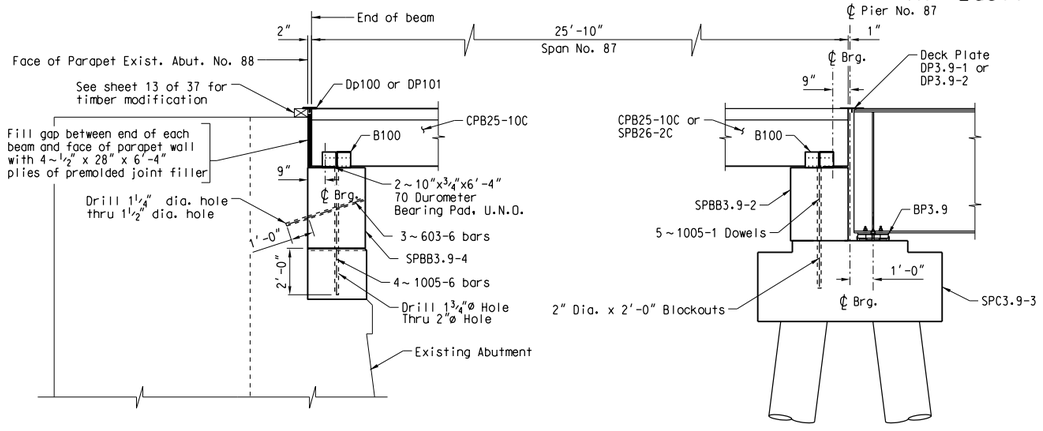
Looking Railway East

Pier 87 shown Pier 72 similar and opposite hand

(CB3.9's & Bracing omitted from view)

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)

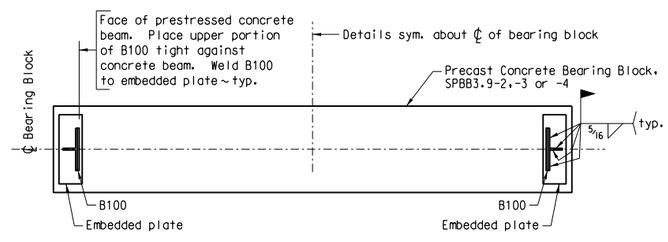


ABUT. NO. 88

PIER NO. 87 & 72

Pier 87 shown Pier 72 similar and opposite hand

BEARING BLOCK ELEVATION



TYPICAL B100 ATTACHMENT DETAILS

ISSUED FOR CONSTRUCTION
4-22-09

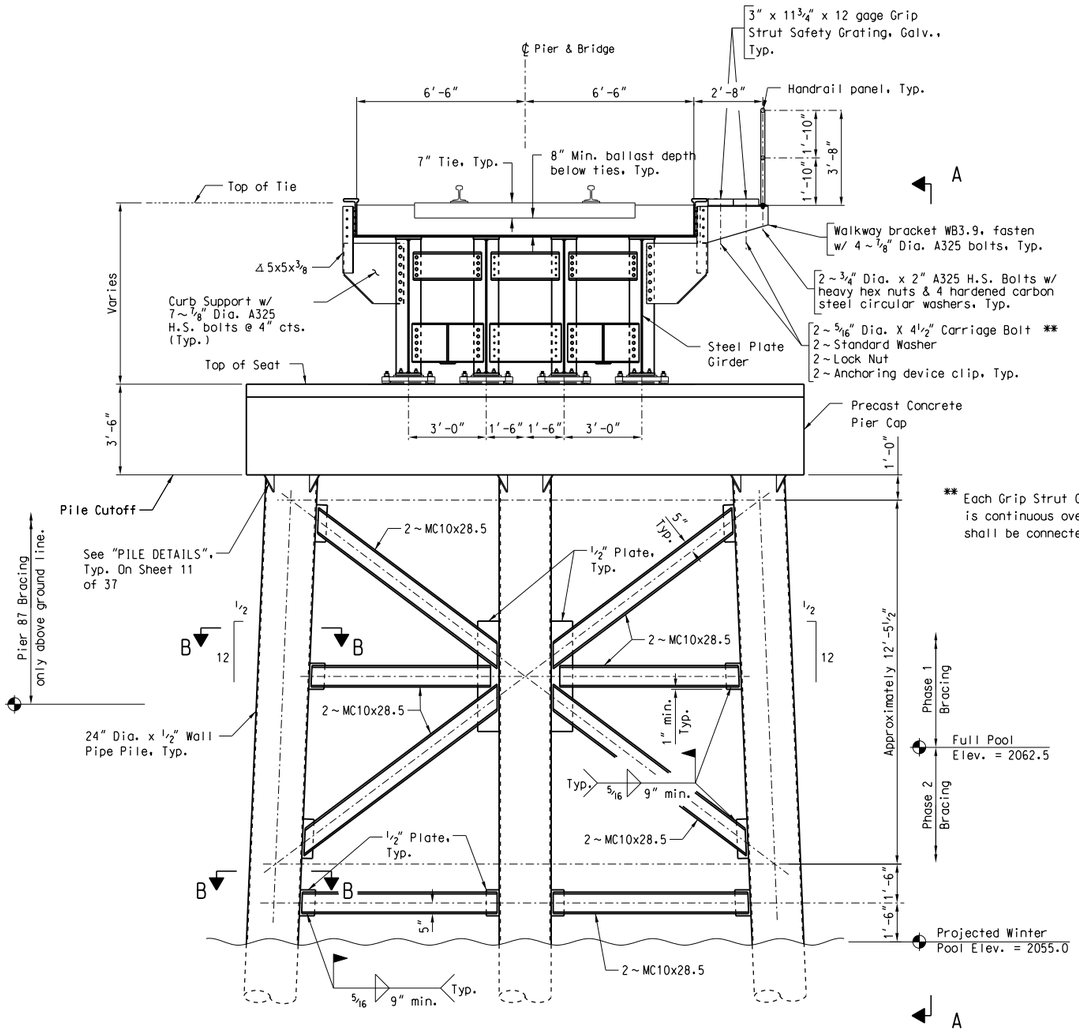
HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING / KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
TYPICAL SECTIONS

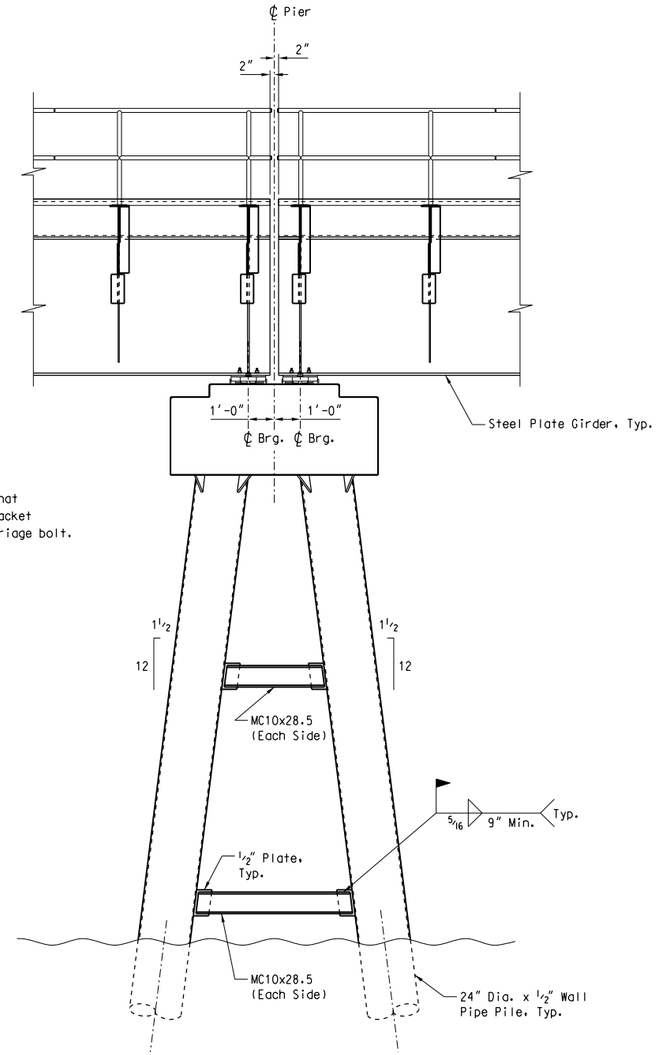
PLAN NO: 0045-3.9-89 | SHEET: 14 OF 37



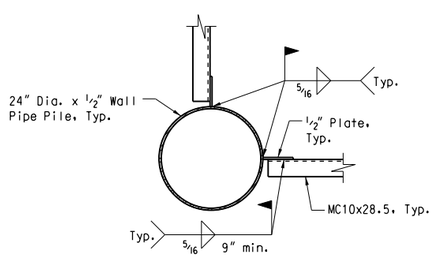
** Each Grip Strut Grating Plank that is continuous over a walkway bracket shall be connected with one carriage bolt.

TYPICAL SECTION AT PIERS 72-86

Looking Railway West



ELEVATION A-A



SECTION B-B

Notes:

1. Pile bracing shall be painted in accordance with Project Technical Specification Section 04710.
2. Coating on piling that is damaged during construction shall be repaired with simalar coating and application procedures.
3. Phase 1 bracing shall be installed prior to installing the new span.
   Phase 2 bracing shall be installed prior to substantial completion of the project.
4. Pier 87 to include bracing above existing ground only.

ISSUED FOR CONSTRUCTION
4-22-09

HANSON
Hanson Professional Services Inc.

DES: AAN	
DRAWN: CDP	
CHECK: MAF	
DATE: 04/22/09	
AUTH: A090024	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

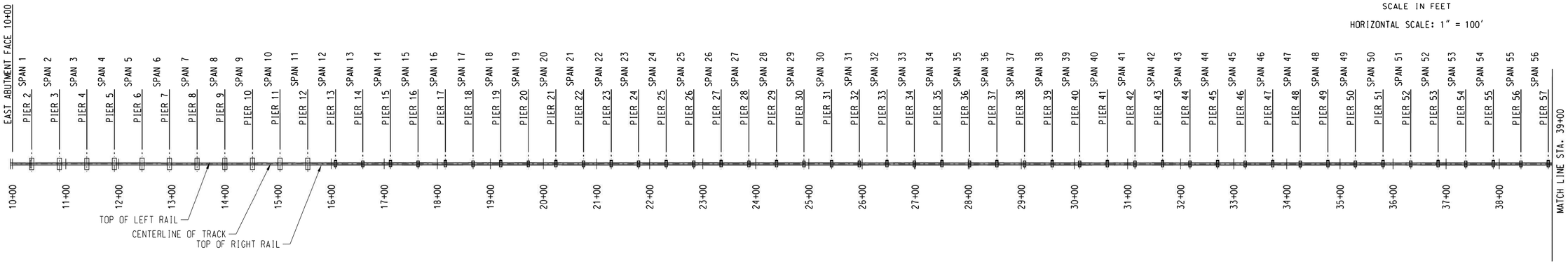
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
TYPICAL SECTIONS ~ PIERS 72-86

PLAN NO: 0045-3.9-90 | SHEET: 15 OF 37

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

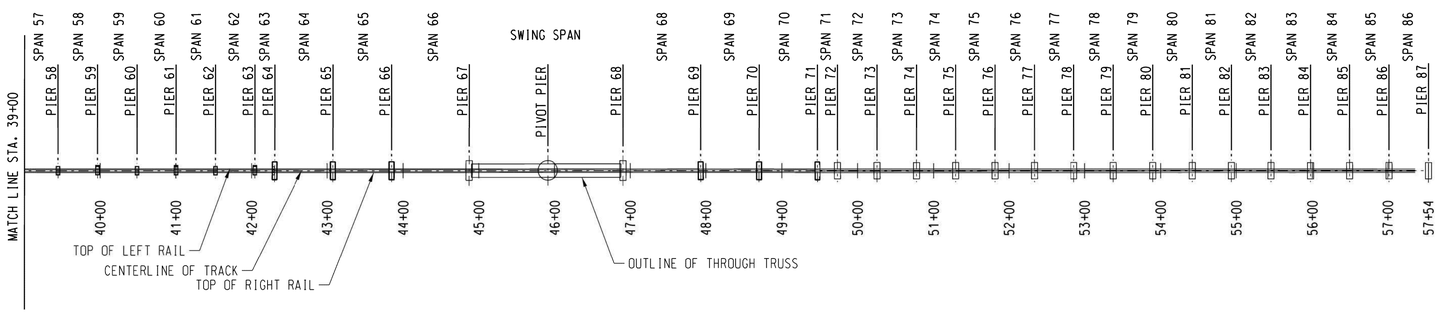
PLAN

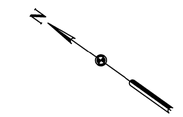


HORIZONTAL SCALE: 1" = 100'

CP#3
ELEV. = 2070.26'
SET 5/8" REBAR WITH RED
PLASTIC CAP STAMPED "DEA CONTROL"
LOCAL COORDINATE
N = 12551.55'
E = 26651.75'
STATE PLANE COORDINATE
N = 2406531.60'
E = 2432.704.71'

PLAN





HORIZONTAL SCALE: 1" = 100'

CP#102
ELEV. = 2084.77'
SET 5/8" REBAR WITH RED
PLASTIC CAP STAMPED "DEA CONTROL"
LOCAL COORDINATE
N = 8621.84'
E = 29930.75'
STATE PLANE COORDINATE
N = 2402602.37'
E = 2435983.30'

CP#103
ELEV. = 2074.53
SET 5/8" REBAR WITH RED
PLASTIC CAP STAMPED "DEA CONTROL"
LOCAL COORDINATE
N = 8578.24'
E = 29833.75'
STATE PLANE COORDINATE
N = 2402558.77'
E = 2435886.32'

SURVEY NOTES:

NOTES:
1.) BASIS OF BEARING IS GRID NORTH.

2.) HORIZONTAL DATUM IS A LOCAL COORDINATE SYSTEM IN REFERENCE TO NAD83 2011 IDAHO STATE PLANE WEST ZONE. ALL DISTANCES ARE GROUND DISTANCES.

3.) VERTICAL DATUM IS NAVD88.

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

DES:	
DRAWN:	KMD
CHECK:	DDHA/AKY
DATE:	SEPT. 2016
AUTH:	
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PLAN AND GENERAL NOTES

PLAN NO: 0045-003.900-001 SHEET: 1 OF 24

File Location: H:\HEINBSF00000119\#ADDADMS\#SHEETS\#Sandpoint Bridge\0045-003.900-001.DGN

Date Printed: 9/30/2016 Time Printed: 4:51:59 PM

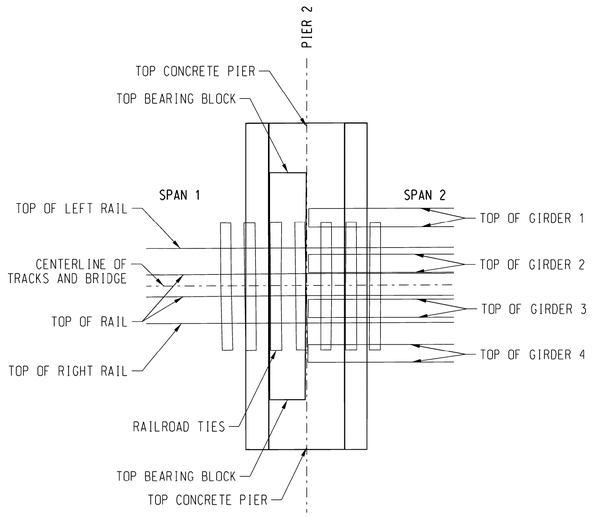
PIER PLAN & PROFILES

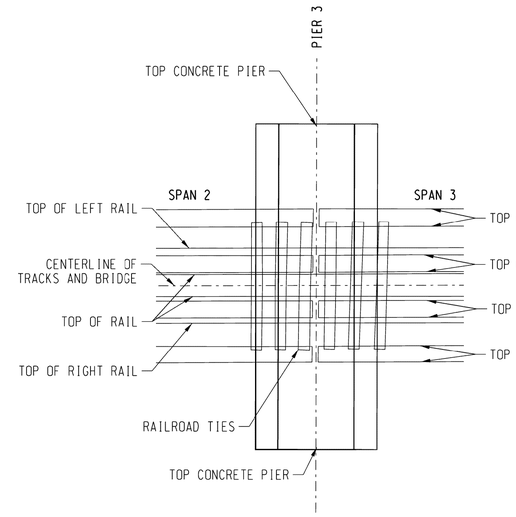
EAST
TO SANDPOINT JCT. ID

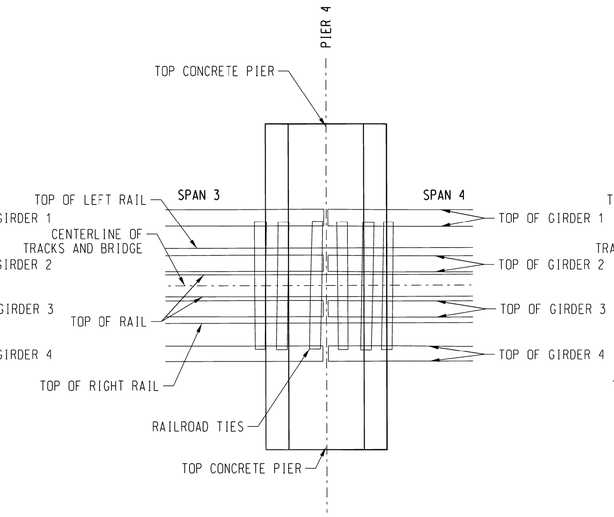
WEST
TO EAST ALGOMA. ID

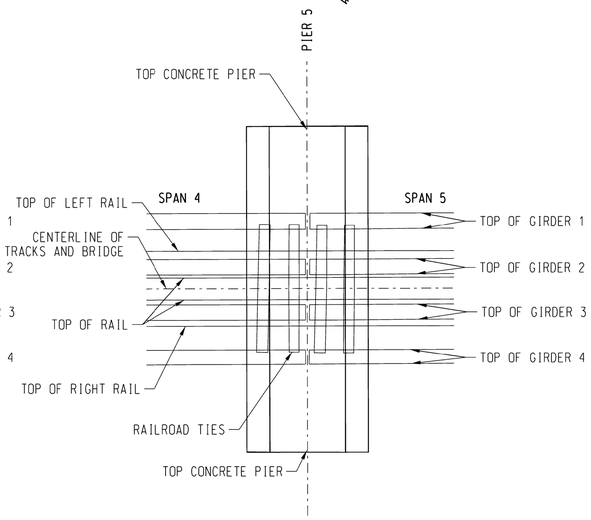
N

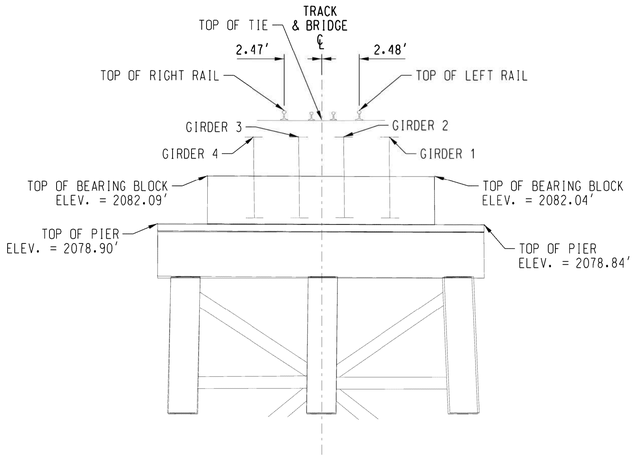
0 5 10
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'





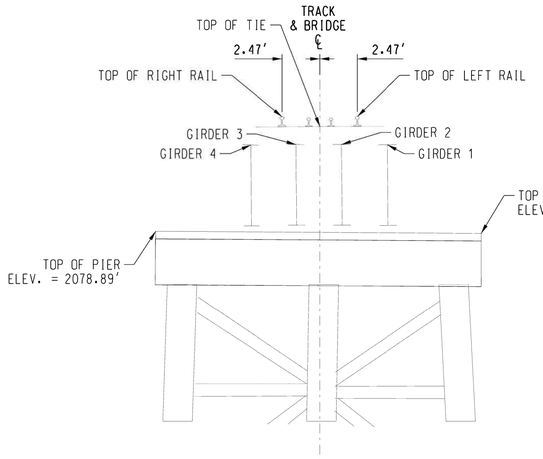






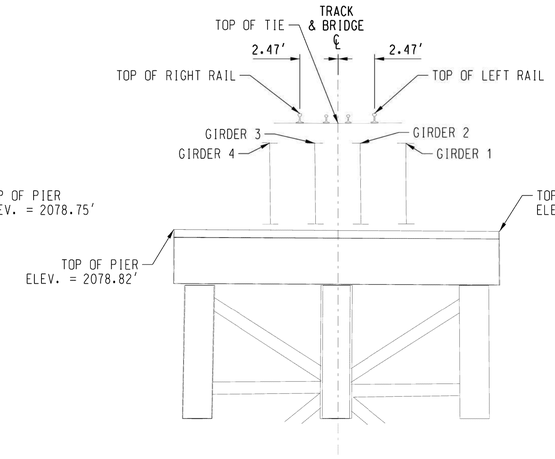
PIER 2
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.39'	2085.76'	2086.39'



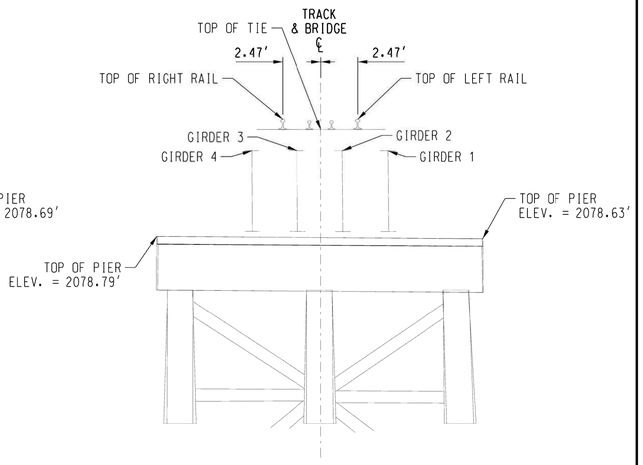
PIER 3
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.47'	2085.80'	2086.46'



PIER 4
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.51'	2085.82'	2086.50'



PIER 5
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.53'	2085.85'	2086.52'

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-002 SHEET: 2 OF 24

File Location: H:\HENSF\000011\#400\ADMIN\#SHEETS\#Sandpoint Bridge#0045-003.900-002.DGN

Date Printed: 9/30/2016 Time Printed: 4:52:27 PM

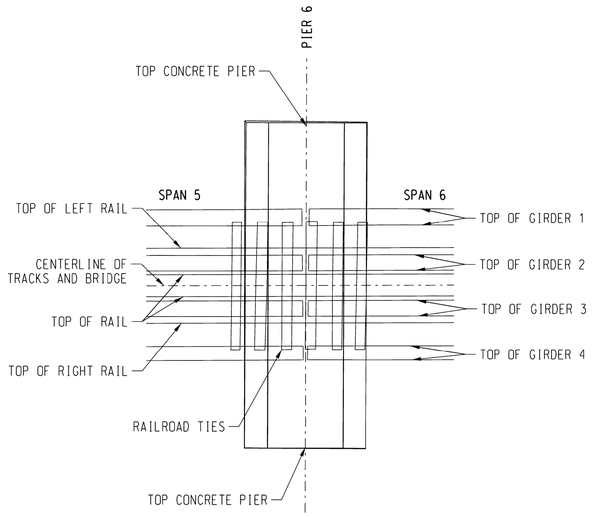
PIER PLAN & PROFILES

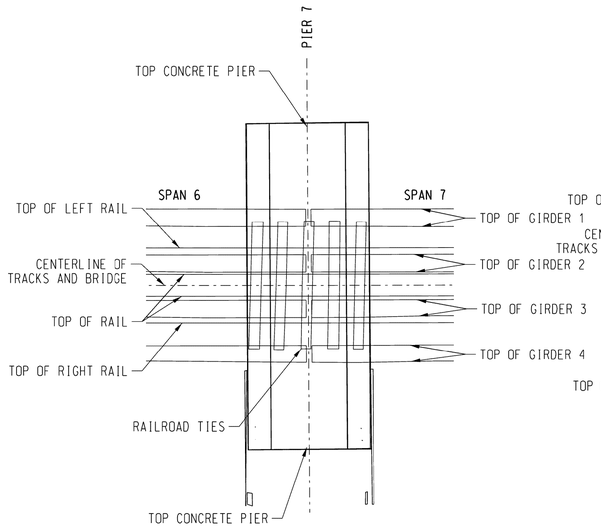
EAST
TO SANDPOINT JCT. ID

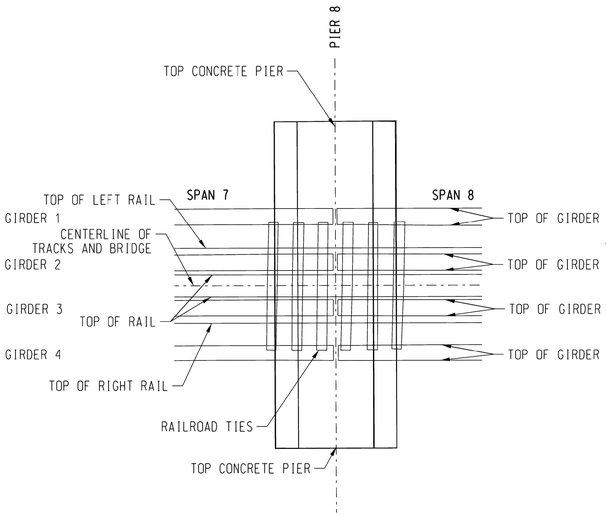
WEST
TO EAST ALGOMA. ID

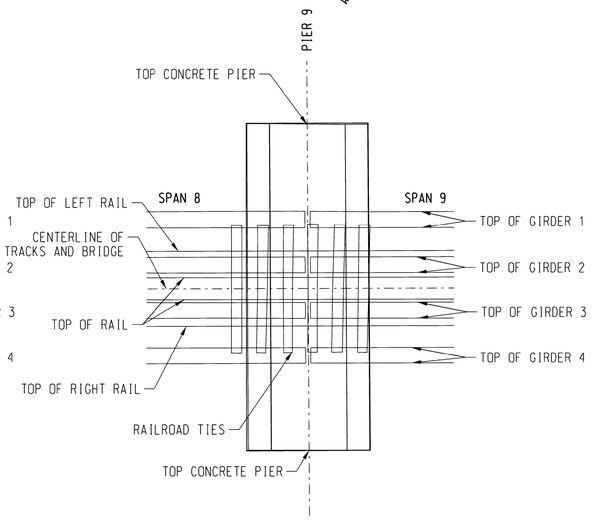
N

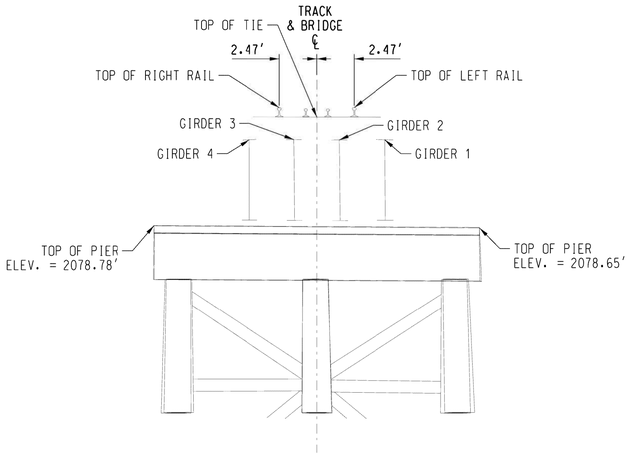
0 5 10
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'





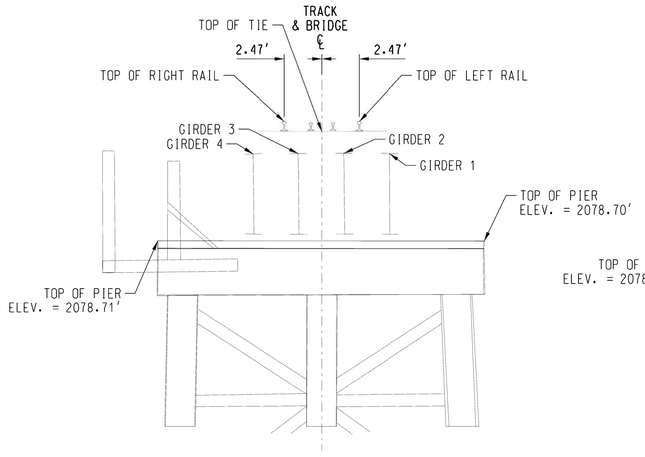






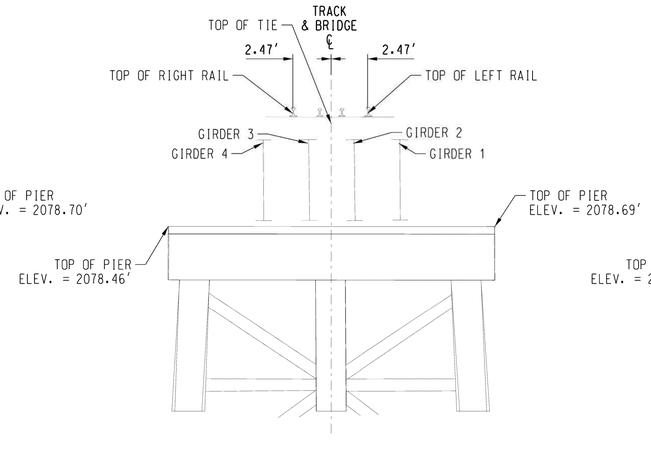
PIER 6
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.60'	2085.95'	2086.60'



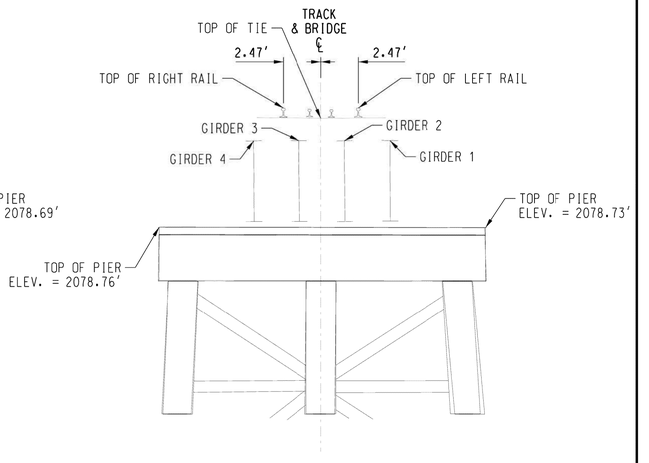
PIER 7
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.59'	2085.93'	2086.58'



PIER 8
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.59'	2085.93'	2086.59'



PIER 9
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.63'	2085.96'	2086.63'

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908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-003 SHEET: 3 OF 24

File Location: H:\HENSF\000\119\w\000\AD\#\W\SHEETS\#sandpoint Bridge\0045-003.900-003.DGN

Date Printed: 9/30/2016 Time Printed: 4:52:55 PM

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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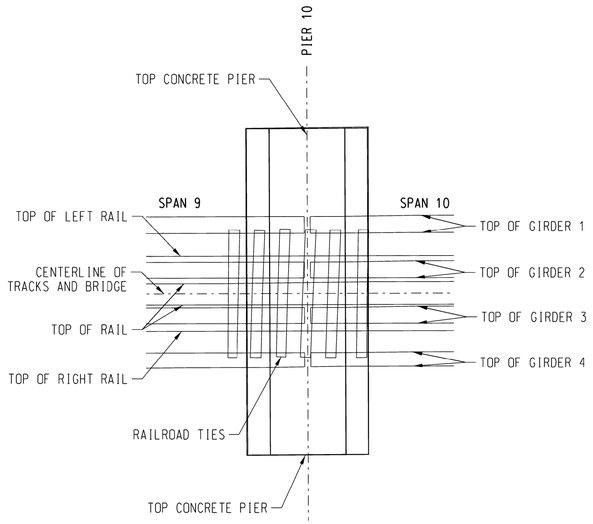
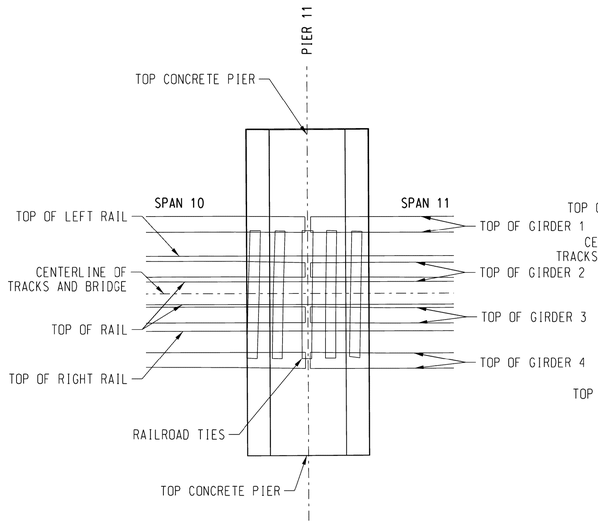
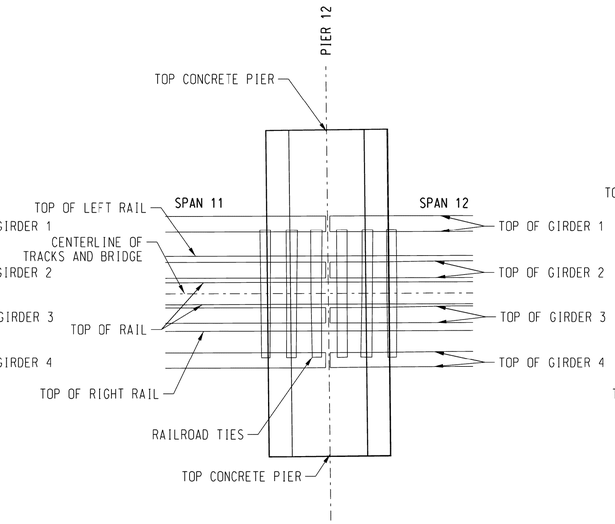
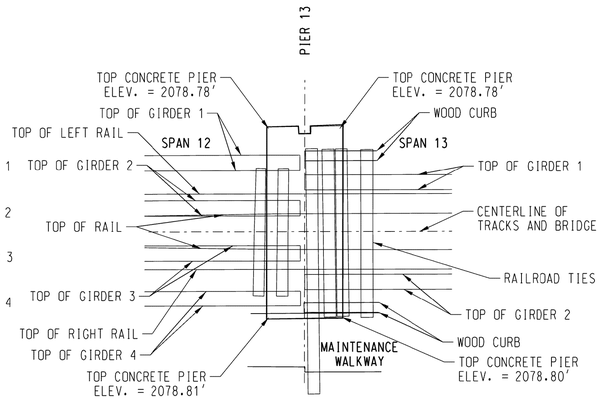
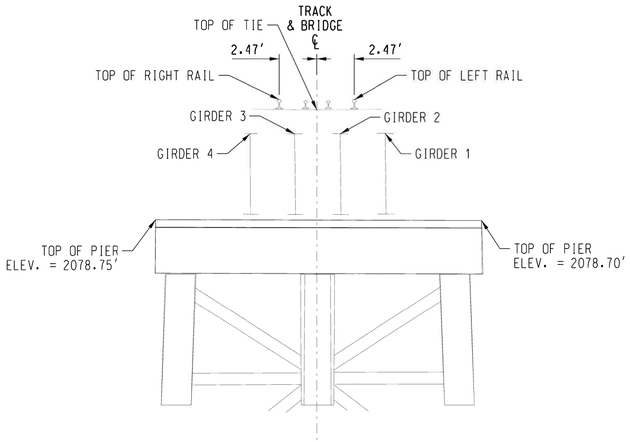
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'





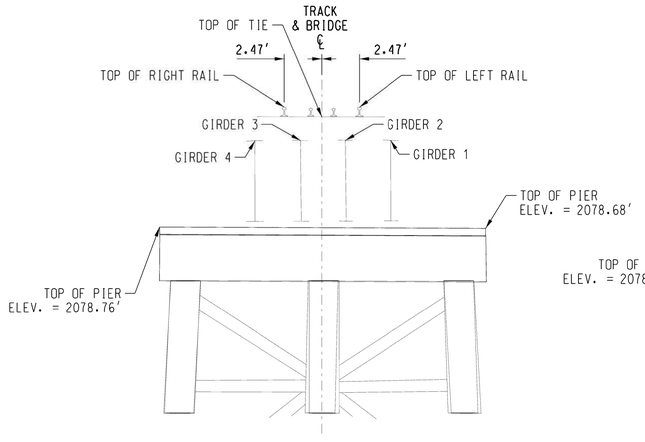






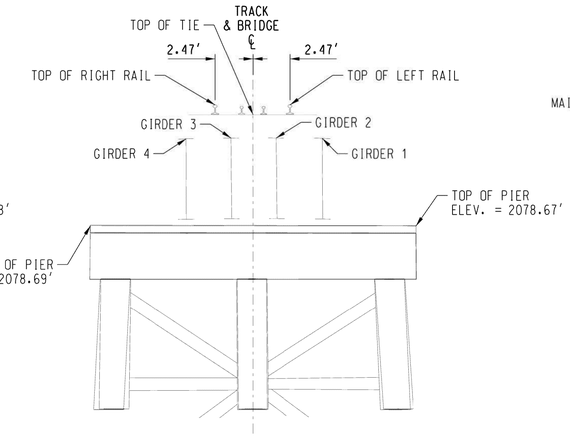
PIER 10
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.69'	2086.02'	2086.69'



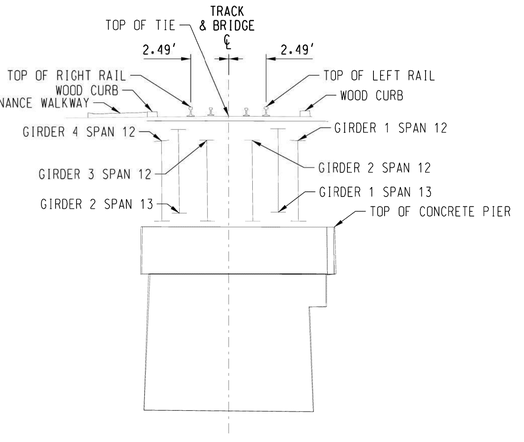
PIER 11
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.70'	2086.04'	2086.71'



PIER 12
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.66'	2086.01'	2086.67'



PIER 13
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.11'	2086.73'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 12	2084.50'	2079.18'
GIRDER 2 SPAN 12	2084.52'	2079.18'
GIRDER 3 SPAN 12	2084.53'	2079.18'
GIRDER 4 SPAN 12	2084.49'	2079.18'
GIRDER 1 SPAN 13	2085.28'	2079.77'
GIRDER 2 SPAN 13	2085.24'	2079.70'

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Phone: 509.252.5900

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NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-004 SHEET: 4 OF 24

File Location: I:\HE\NST\000011\400\CAD\SHEETS\Sandpoint Bridge\0045-003.900-004.DGN

Date Printed: 9/30/2016 Time Printed: 4:53:26 PM

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

N

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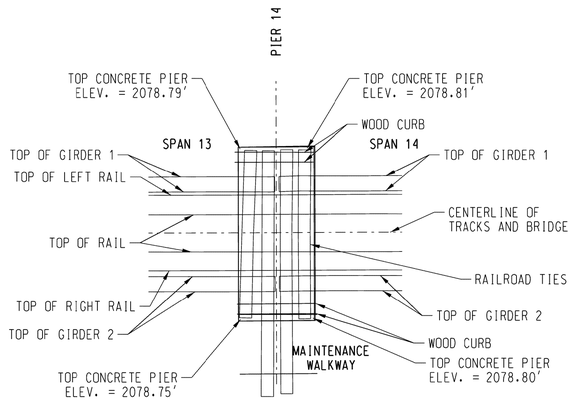
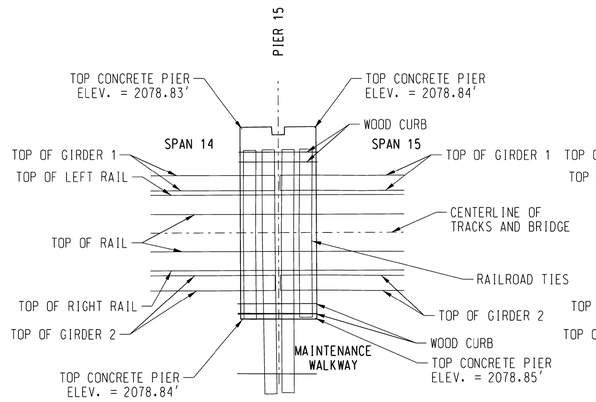
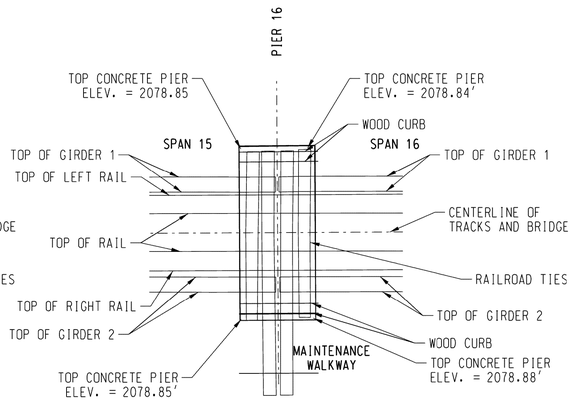
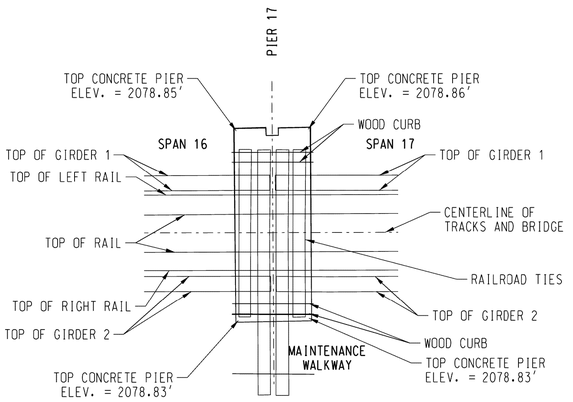
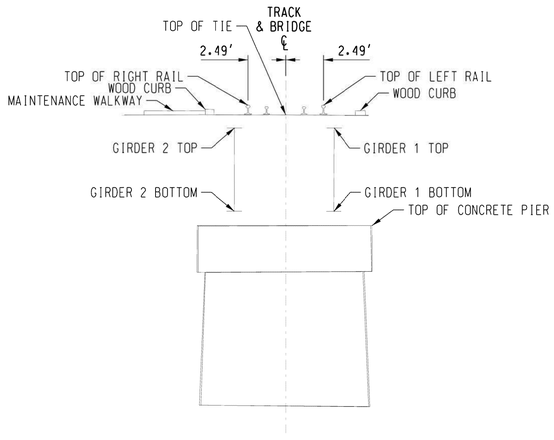
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







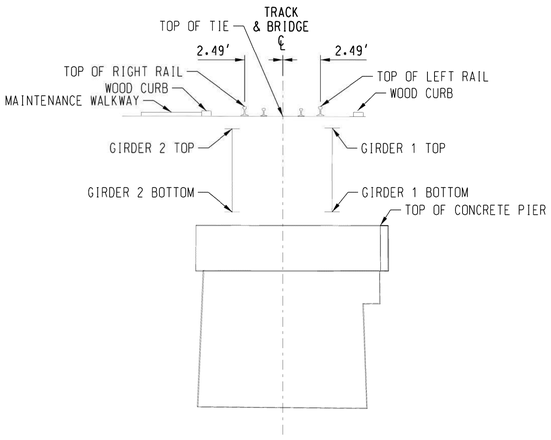




PIER 14
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.09'	2086.75'

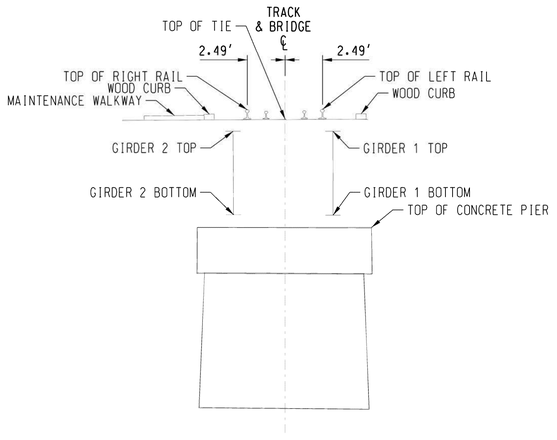
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 13	2085.25'	2079.73'
GIRDER 2 SPAN 13	2085.25'	2079.74'
GIRDER 1 SPAN 14	2085.26'	2079.73'
GIRDER 2 SPAN 14	2085.25'	2079.74'



PIER 15
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.70'	2086.06'	2086.70'

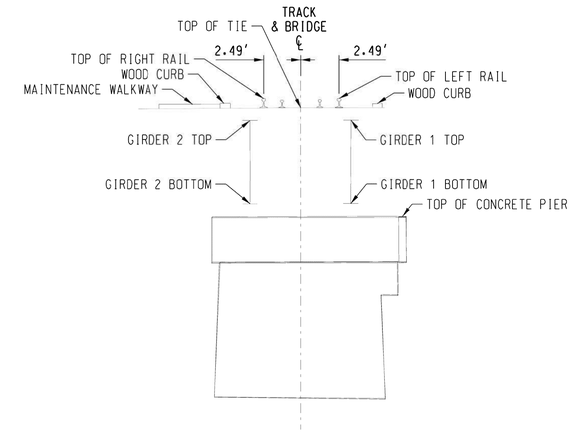
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 14	2085.29'	2079.75'
GIRDER 2 SPAN 14	2085.24'	2079.72'
GIRDER 1 SPAN 15	2085.28'	2079.74'
GIRDER 2 SPAN 15	2085.24'	2079.73'



PIER 16
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.66'	2085.98'	2086.63'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 15	2085.22'	2079.67'
GIRDER 2 SPAN 15	2085.22'	2079.69'
GIRDER 1 SPAN 16	2085.22'	2079.67'
GIRDER 2 SPAN 16	2085.22'	2079.69'



PIER 17
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.70'	2086.06'	2086.69'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 16	2085.25'	2079.73'
GIRDER 2 SPAN 16	2085.23'	2079.72'
GIRDER 1 SPAN 17	2085.25'	2079.73'
GIRDER 2 SPAN 17	2085.22'	2079.71'

NOTES:
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SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-005 SHEET: 5 OF 24

File Location: I:\ENGINEERING\11\400\CAD\SHEETS\Sandpoint Bridge\0045-003.900-005.DGN

Date Printed: 9/30/2016 Time Printed: 4:53:57 PM

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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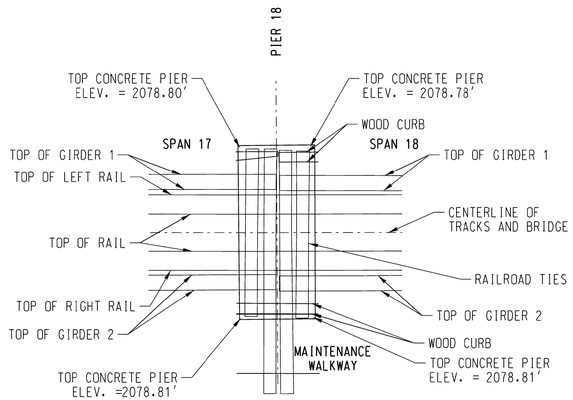
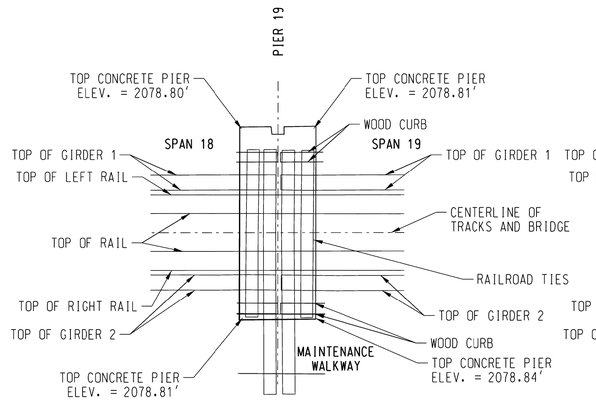
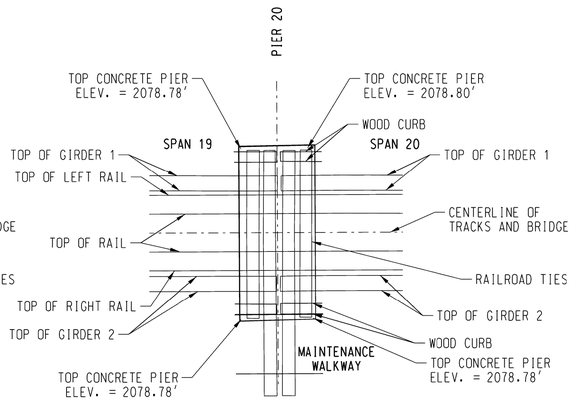
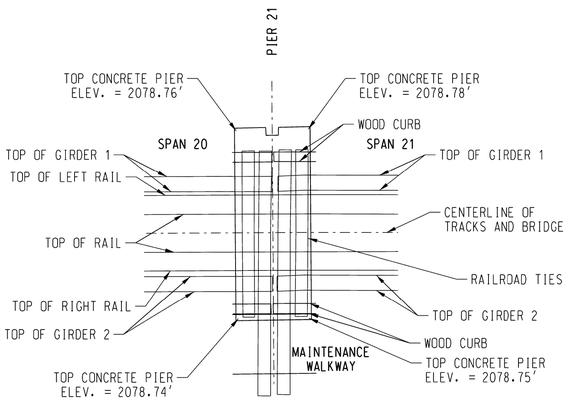
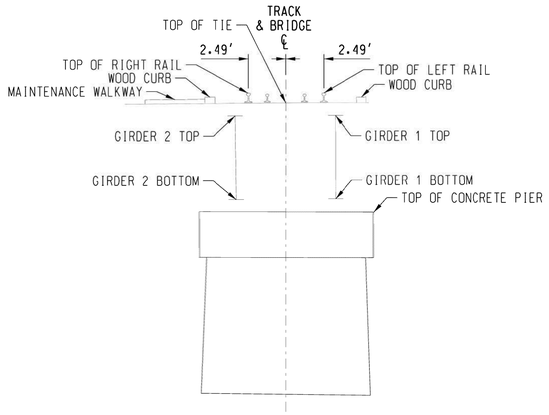
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







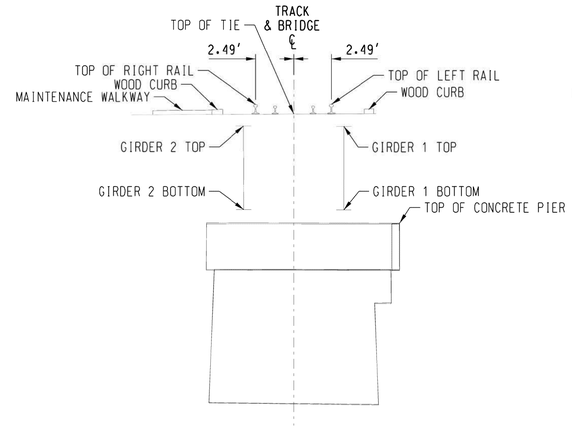




PIER 18
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.66'	2086.00'	2086.65'

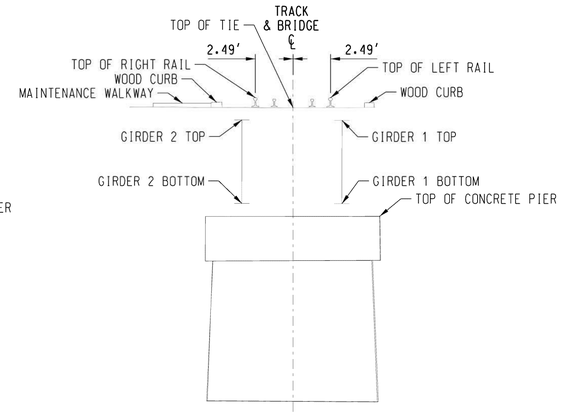
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 17	2085.16'	2079.63'
GIRDER 2 SPAN 17	2085.19'	2079.67'
GIRDER 1 SPAN 18	2085.18'	2079.66'
GIRDER 2 SPAN 18	2085.15'	2079.61'



PIER 19
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.69'	2086.03'	2086.67'

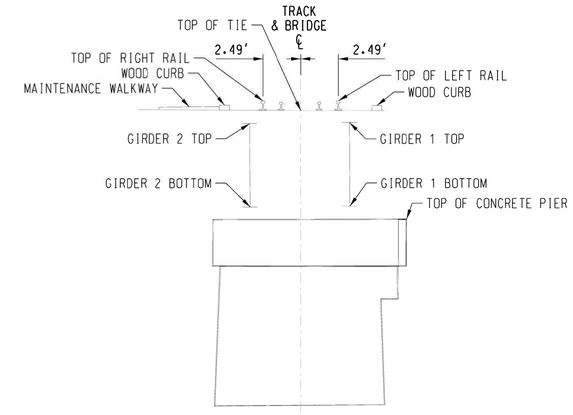
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 18	2085.23'	2079.70'
GIRDER 2 SPAN 18	2085.26'	2079.73'
GIRDER 1 SPAN 19	2085.24'	2079.70'
GIRDER 2 SPAN 19	2085.25'	2079.72'



PIER 20
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.62'	2085.97'	2086.63'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 19	2085.14'	2079.62'
GIRDER 2 SPAN 19	2085.17'	2079.64'
GIRDER 1 SPAN 20	2085.14'	2079.62'
GIRDER 2 SPAN 20	2085.17'	2079.64'



PIER 21
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.62'	2085.97'	2086.61'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 20	2085.17'	2079.64'
GIRDER 2 SPAN 20	2085.10'	2079.57'
GIRDER 1 SPAN 21	2085.16'	2079.63'
GIRDER 2 SPAN 21	2085.10'	2079.57'

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2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-006 SHEET: 6 OF 24

File Location: I:\HE\NST\000011\wd\400\dwg\SHEETS\Sandpoint Bridge\0045-003.900-006.DGN

Date Printed: 9/30/2016 Time Printed: 4:54:30 PM

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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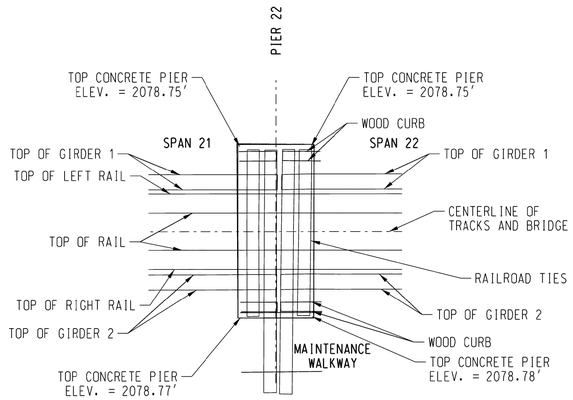
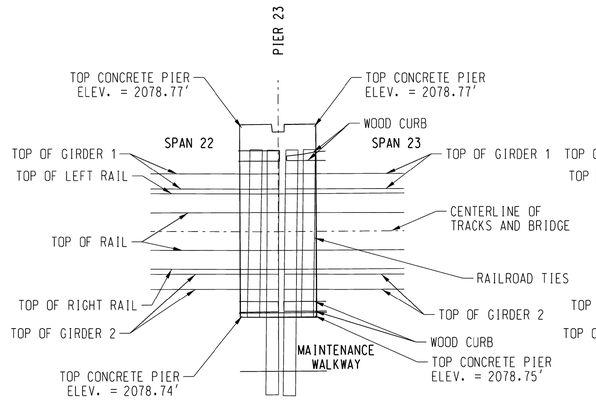
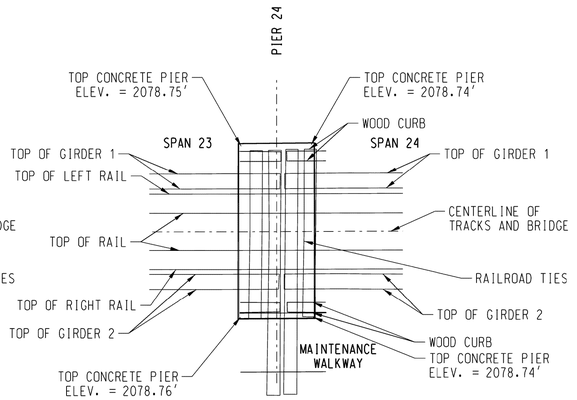
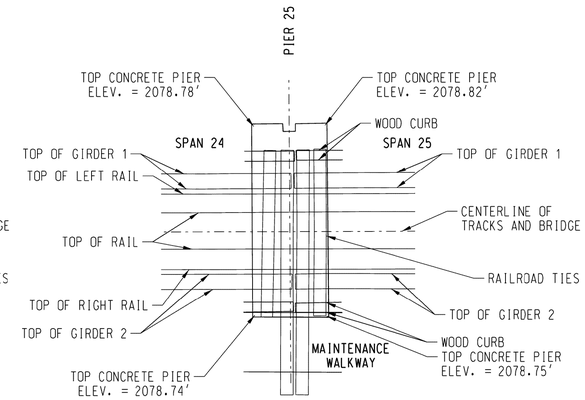
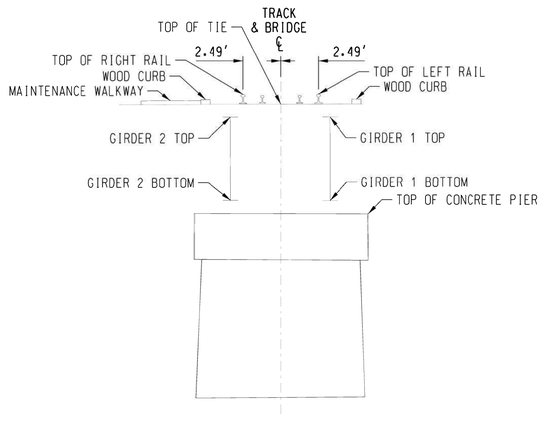
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







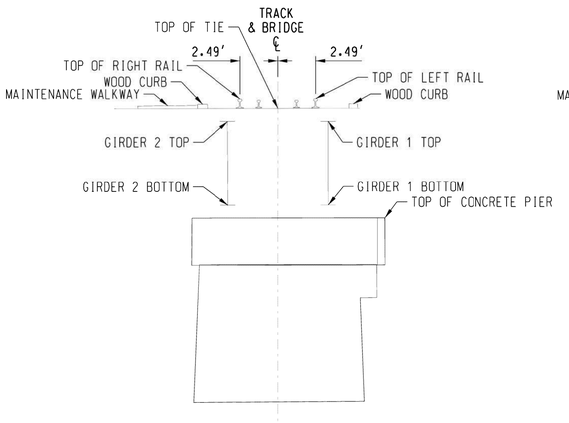




PIER 22
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.66'	2086.01'	2086.65'

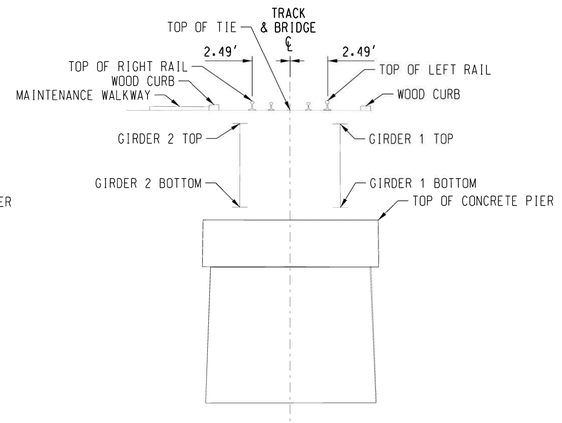
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 21	2085.16'	2079.63'
GIRDER 2 SPAN 21	2085.15'	2079.65'
GIRDER 1 SPAN 22	2085.15'	2079.63'
GIRDER 2 SPAN 22	2085.15'	2079.64'



PIER 23
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.65'	2085.99'	2086.62'

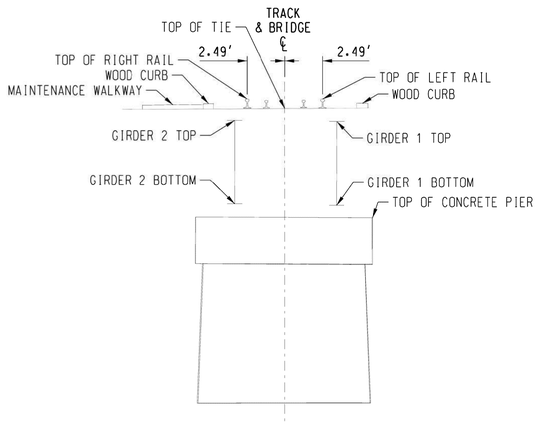
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 22	2085.16'	2079.63'
GIRDER 2 SPAN 22	2085.15'	2079.61'
GIRDER 1 SPAN 23	2085.16'	2079.62'
GIRDER 2 SPAN 23	2085.14'	2079.60'



PIER 24
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.64'	2085.99'	2086.63'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 23	2085.10'	2079.57'
GIRDER 2 SPAN 23	2085.13'	2079.59'
GIRDER 1 SPAN 24	2085.10'	2079.57'
GIRDER 2 SPAN 24	2085.13'	2079.59'



PIER 25
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.63'	2085.97'	2086.60'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 24	2085.19'	2079.64'
GIRDER 2 SPAN 24	2085.09'	2079.57'
GIRDER 1 SPAN 25	2085.20'	2079.64'
GIRDER 2 SPAN 25	2085.09'	2079.57'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-007 SHEET: 7 OF 24

File Location: :\ENGINEERING\0001\ENGDOC\CAD\SHEETS\Sandpoint Bridge\0045-003.900-007.DGN

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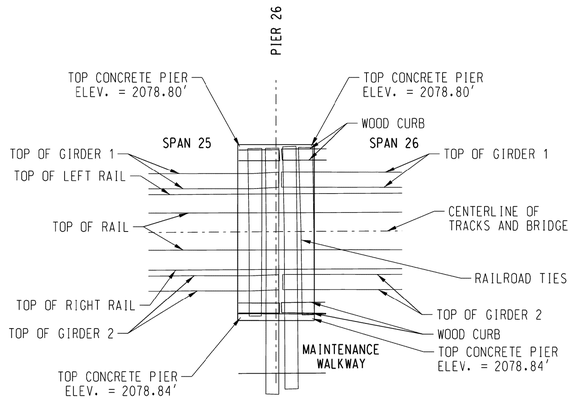
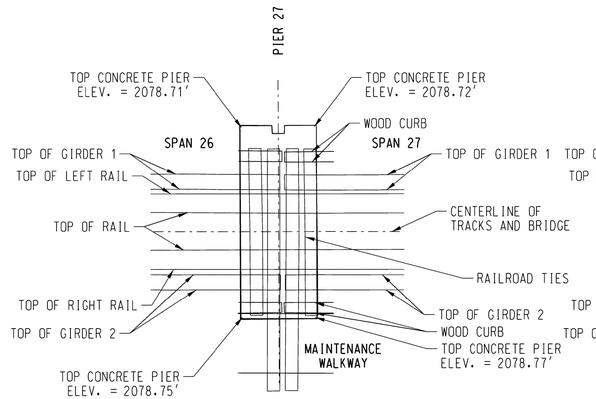
PIER PLAN & PROFILES

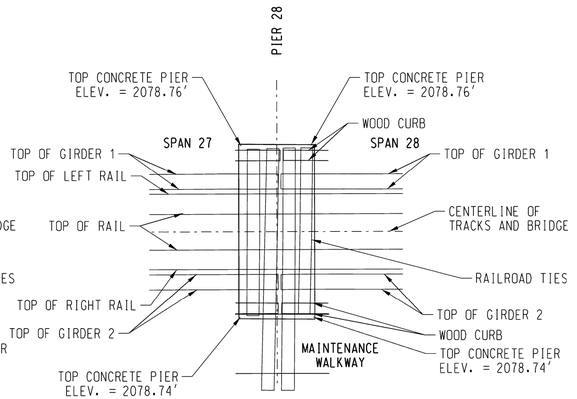
EAST
TO SANDPOINT JCT. ID

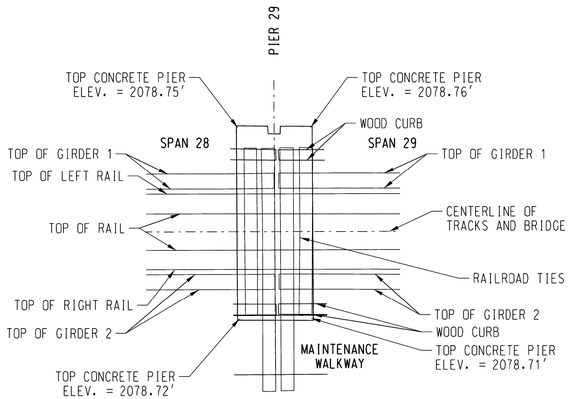
WEST
TO EAST ALGOMA. ID

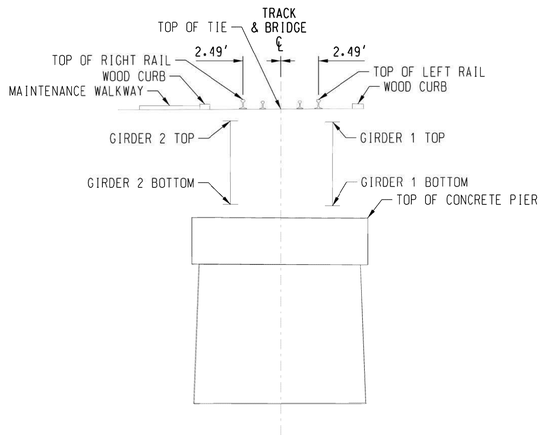
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







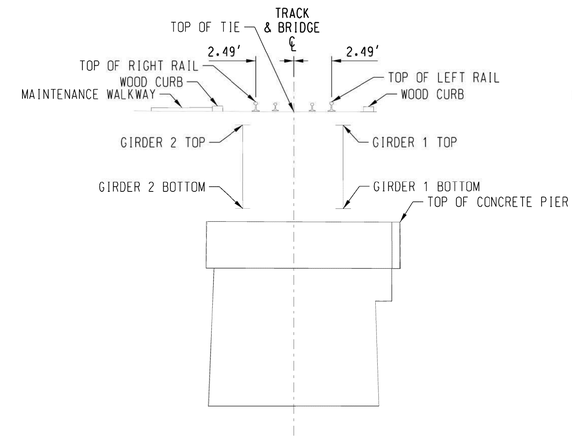




PIER 26
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.65'	2086.00'	2086.65'

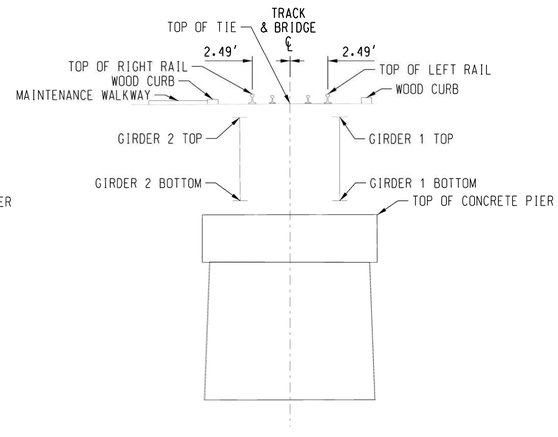
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 25	2085.16'	2079.63'
GIRDER 2 SPAN 25	2085.24'	2079.71'
GIRDER 1 SPAN 26	2085.16'	2079.61'
GIRDER 2 SPAN 26	2085.24'	2079.71'



PIER 27
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.67'	2086.01'	2086.66'

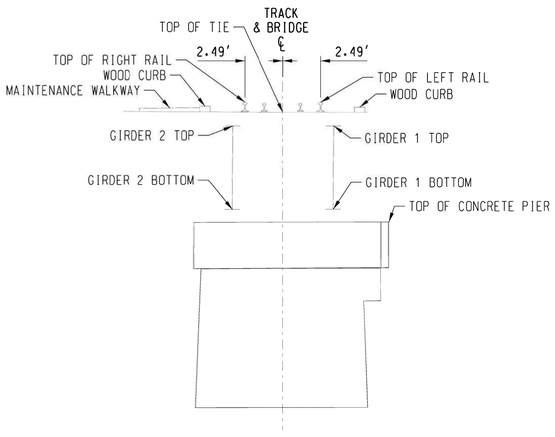
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 26	2085.13'	2079.60'
GIRDER 2 SPAN 26	2085.14'	2079.62'
GIRDER 1 SPAN 27	2085.13'	2079.61'
GIRDER 2 SPAN 27	2085.14'	2079.62'



PIER 28
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.74'	2086.11'	2086.72'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 27	2085.21'	2079.67'
GIRDER 2 SPAN 27	2085.18'	2079.67'
GIRDER 1 SPAN 28	2085.21'	2079.67'
GIRDER 2 SPAN 28	2085.18'	2079.67'



PIER 29
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.65'	2086.02'	2086.66'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 28	2085.10'	2079.58'
GIRDER 2 SPAN 28	2085.09'	2079.57'
GIRDER 1 SPAN 29	2085.10'	2079.58'
GIRDER 2 SPAN 29	2085.09'	2079.57'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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DAVID EVANS AND ASSOCIATES INC.
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SPOKANE, WA 99201
Phone: 509.252.5900

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CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-008 SHEET: 8 OF 24

File Location: I:\ENGINEERING\DOCUMENTS\4000-4099\4048\SHEETS\Sandpoint Bridge\4048-003-900-008.DGN

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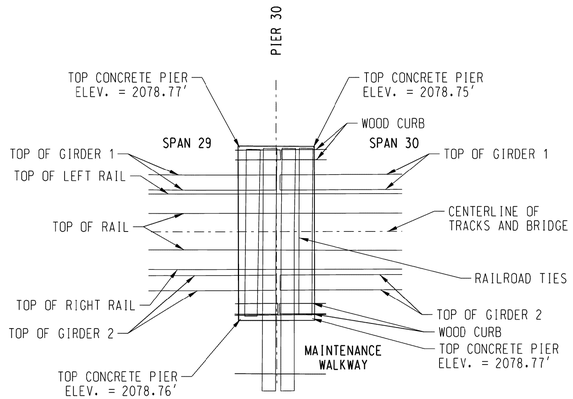
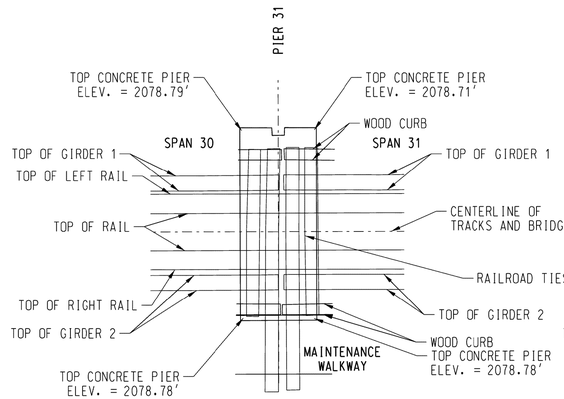
PIER PLAN & PROFILES

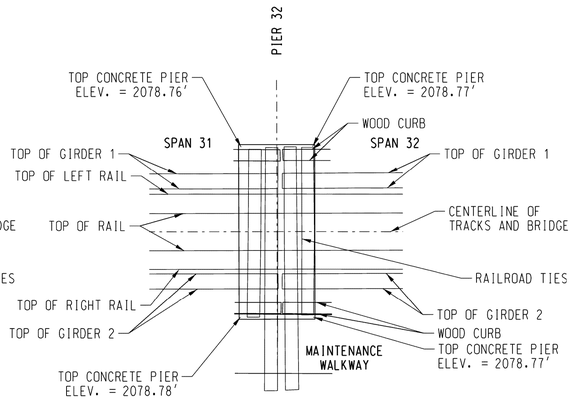
EAST
TO SANDPOINT JCT. ID

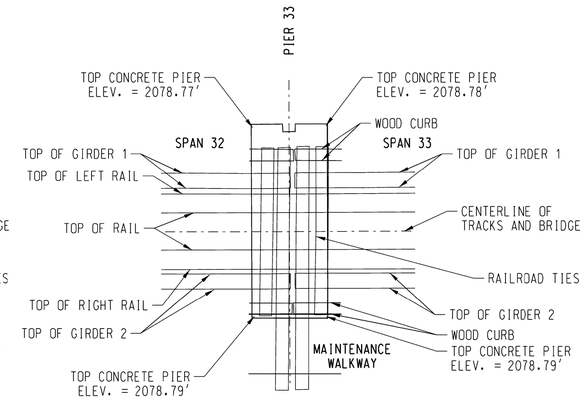
WEST
TO EAST ALGOMA. ID

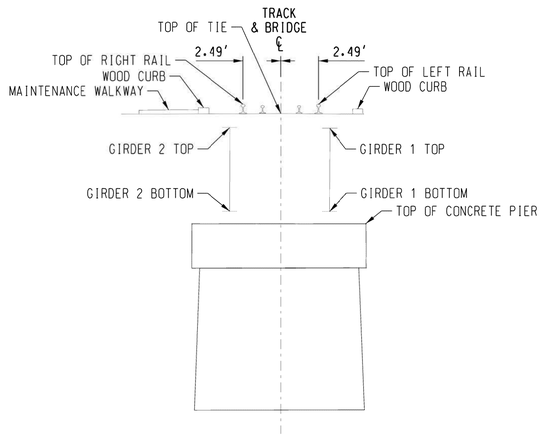
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







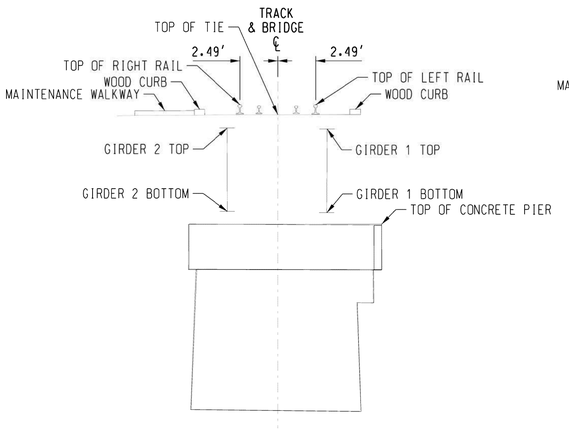




PIER 30
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.67'	2086.05'	2086.67'

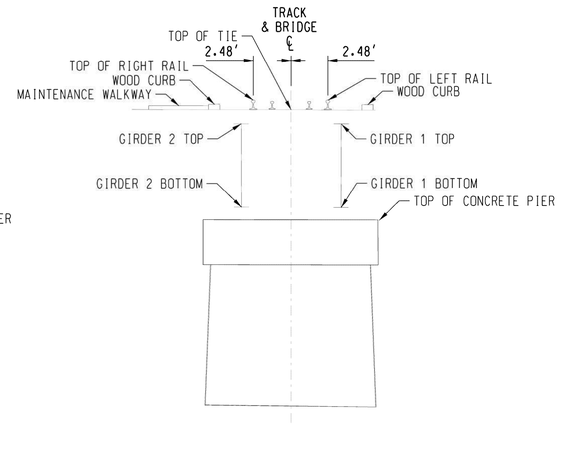
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 29	2085.08'	2079.57'
GIRDER 2 SPAN 29	2085.11'	2079.59'
GIRDER 1 SPAN 30	2085.08'	2079.57'
GIRDER 2 SPAN 30	2085.12'	2079.59'



PIER 31
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.67'	2086.03'	2086.68'

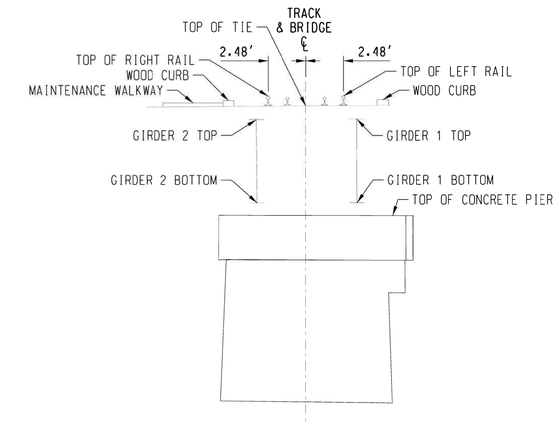
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 30	2085.07'	2079.54'
GIRDER 2 SPAN 30	2085.13'	2079.63'
GIRDER 1 SPAN 31	2085.08'	2079.54'
GIRDER 2 SPAN 31	2085.14'	2079.63'



PIER 32
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.68'	2086.04'	2086.68'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 31	2085.10'	2079.58'
GIRDER 2 SPAN 31	2085.13'	2079.60'
GIRDER 1 SPAN 32	2085.11'	2079.58'
GIRDER 2 SPAN 32	2085.13'	2079.60'



PIER 33
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.69'	2086.03'	2086.66'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 32	2085.16'	2079.62'
GIRDER 2 SPAN 32	2085.12'	2079.61'
GIRDER 1 SPAN 33	2085.16'	2079.62'
GIRDER 2 SPAN 33	2085.12'	2079.61'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

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DAVID EVANS AND ASSOCIATES INC.
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SPOKANE, WA 99201
Phone: 509.252.5900

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AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-009 SHEET: 9 OF 24

File Location: P:\BNSF\000018\#04DCAD\#SHEETS\Sandpoint Bridge#0045-003.900-009.DGN

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PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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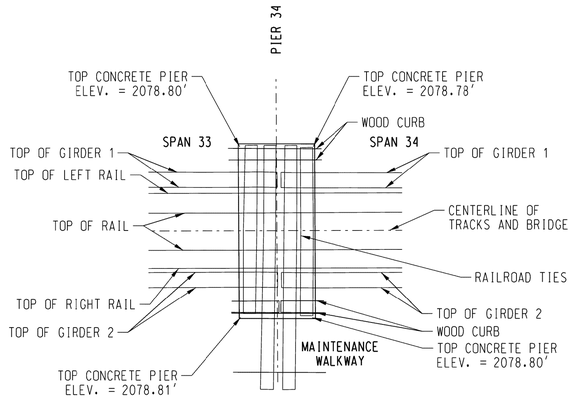
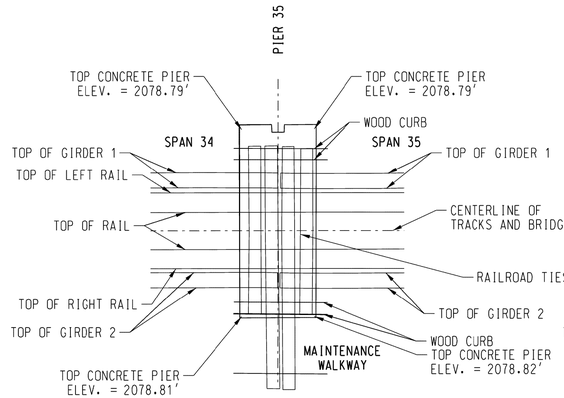
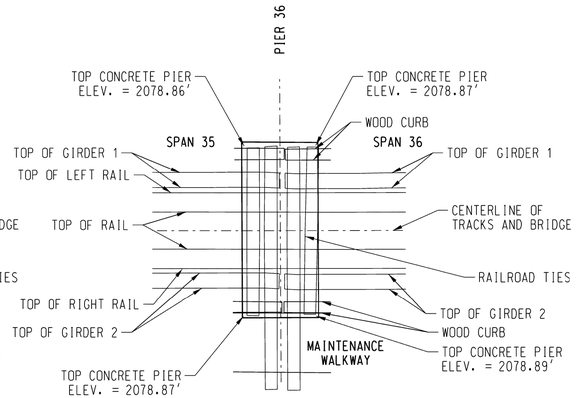
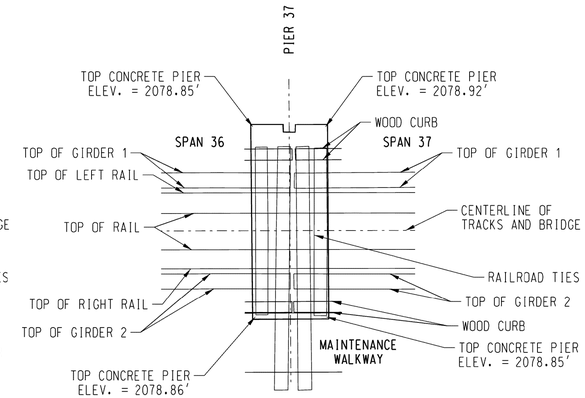
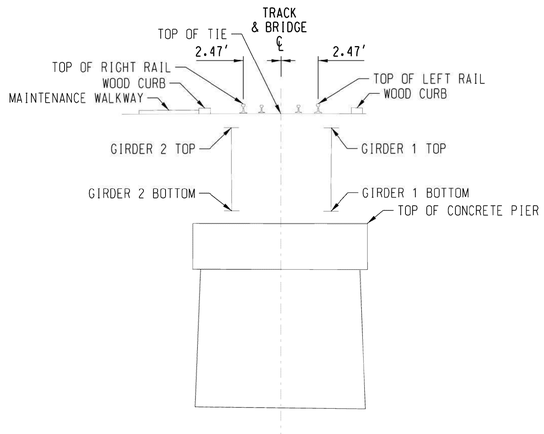
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







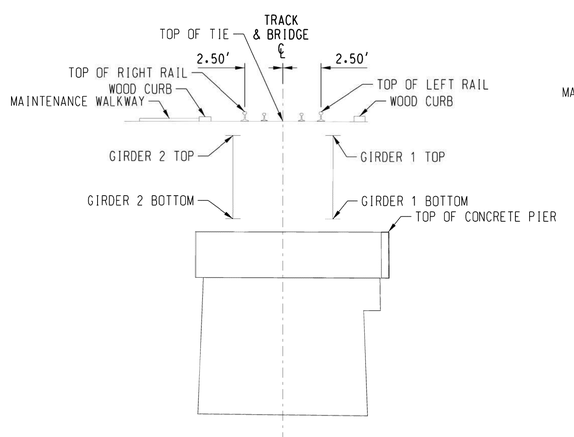




PIER 34
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.71'	2086.06'	2086.71'

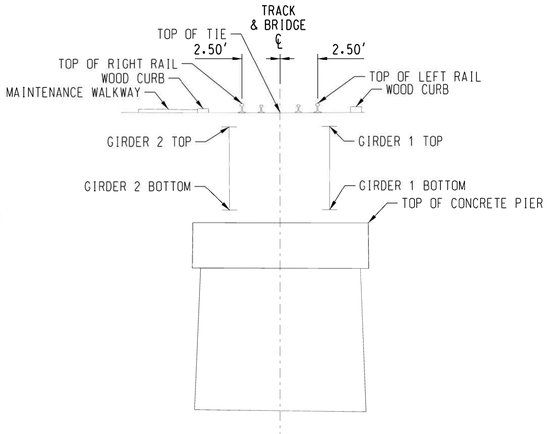
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 33	2085.13'	2079.60'
GIRDER 2 SPAN 33	2085.15'	2079.63'
GIRDER 1 SPAN 34	2085.13'	2079.61'
GIRDER 2 SPAN 34	2085.14'	2079.63'



PIER 35
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.11'	2086.74'

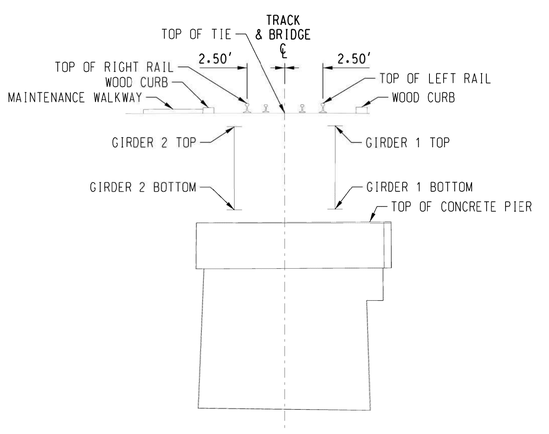
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 34	2085.18'	2079.65'
GIRDER 2 SPAN 34	2085.18'	2079.68'
GIRDER 1 SPAN 35	2085.18'	2079.65'
GIRDER 2 SPAN 35	2085.18'	2079.67'



PIER 36
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.78'	2086.15'	2086.75'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 35	2085.26'	2079.74'
GIRDER 2 SPAN 35	2085.23'	2079.72'
GIRDER 1 SPAN 36	2085.26'	2079.74'
GIRDER 2 SPAN 36	2085.22'	2079.71'



PIER 37
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.76'	2086.11'	2086.76'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 36	2085.27'	2079.75'
GIRDER 2 SPAN 36	2085.22'	2079.71'
GIRDER 1 SPAN 37	2085.28'	2079.76'
GIRDER 2 SPAN 37	2085.22'	2079.71'

NOTES:
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Phone: 509.252.5900

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DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-010 SHEET: 10 OF 24

File Location: I:\ENS\FOOOOTT\#ADDCAD\#SHEETS\Sandpoint Bridge\#0045-003.900-010.DGN

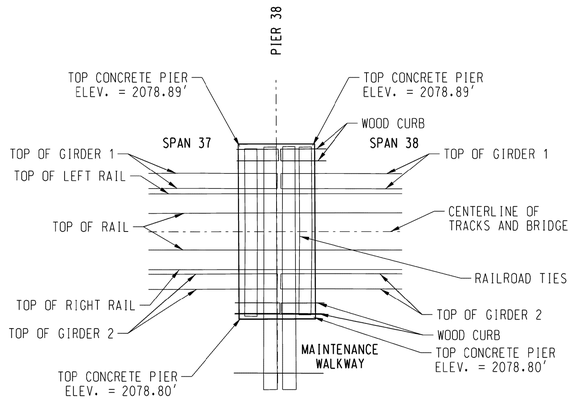
Date Printed: 9/30/2016 Time Printed: 4:56:37 PM

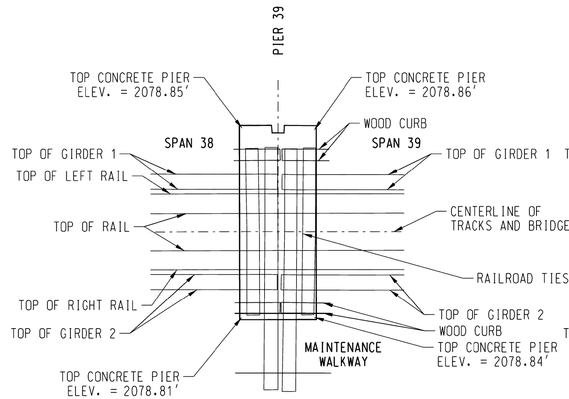
PIER PLAN & PROFILES

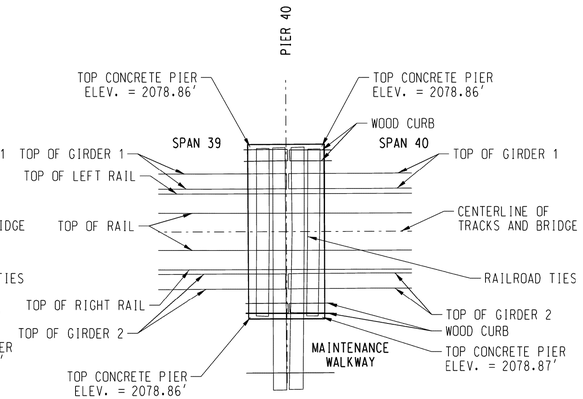
EAST
TO SANDPOINT JCT. ID

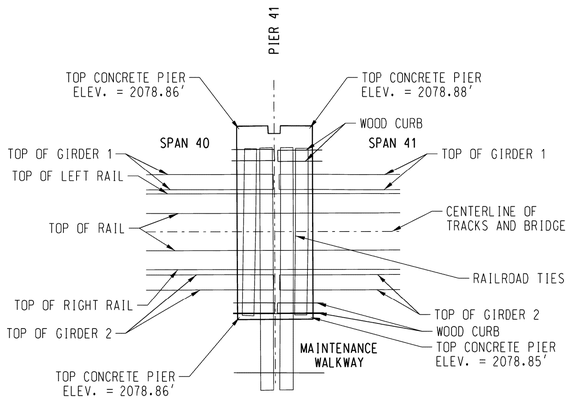
WEST
TO EAST ALGOMA. ID

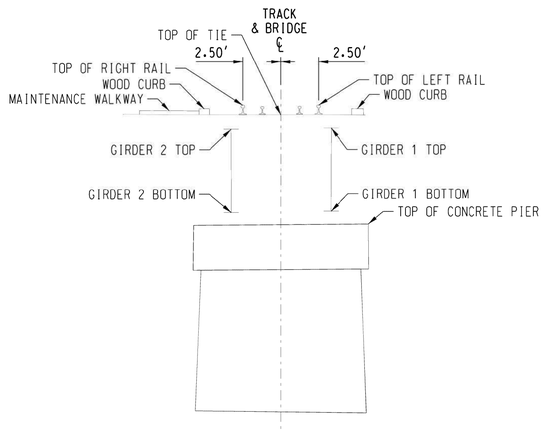
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







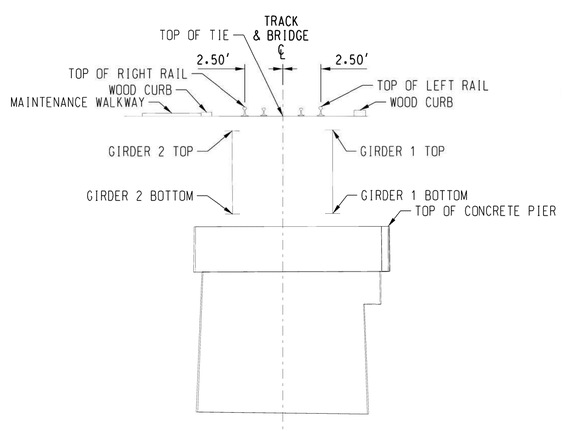




PIER 38
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.76'	2086.11'	2086.75'

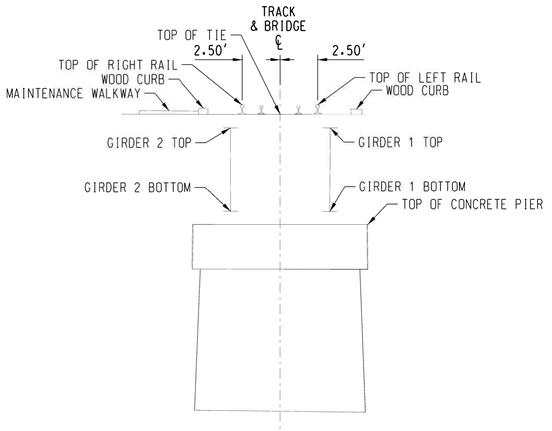
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 37	2085.25'	2079.73'
GIRDER 2 SPAN 37	2085.17'	2079.65'
GIRDER 1 SPAN 38	2085.25'	2079.74'
GIRDER 2 SPAN 38	2085.16'	2079.65'



PIER 39
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.76'	2086.14'	2086.74'

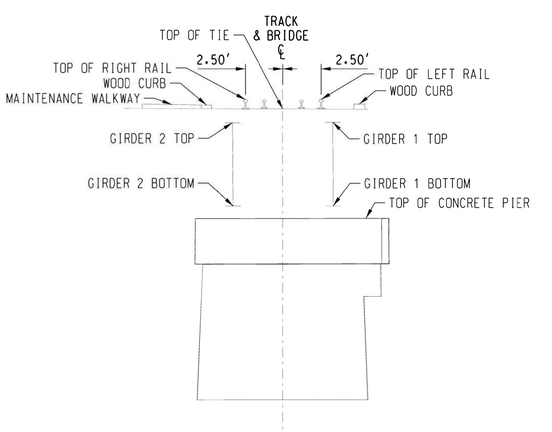
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 38	2085.23'	2079.70'
GIRDER 2 SPAN 38	2085.18'	2079.67'
GIRDER 1 SPAN 39	2085.24'	2079.70'
GIRDER 2 SPAN 39	2085.17'	2079.66'



PIER 40
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.78'	2085.15'	2086.76'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 39	2085.25'	2079.71'
GIRDER 2 SPAN 39	2085.25'	2079.74'
GIRDER 1 SPAN 40	2085.25'	2079.72'
GIRDER 2 SPAN 40	2085.25'	2079.73'



PIER 41
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.11'	2086.72'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 40	2085.22'	2079.71'
GIRDER 2 SPAN 40	2085.22'	2079.71'
GIRDER 1 SPAN 41	2085.23'	2079.68'
GIRDER 2 SPAN 41	2085.20'	2079.68'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-011 SHEET: 11 OF 24

File Location: I:\ENGINEERING\0011\400\CAD\SHEETS\Sandpoint Bridge\0045-003.900-011.DGN

Date Printed: 9/30/2016 Time Printed: 4:57:08 PM

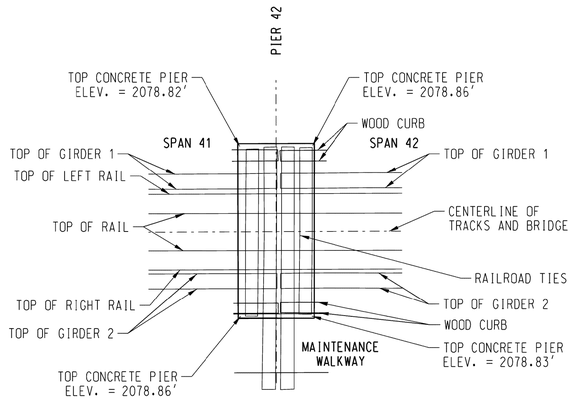
PIER PLAN & PROFILES

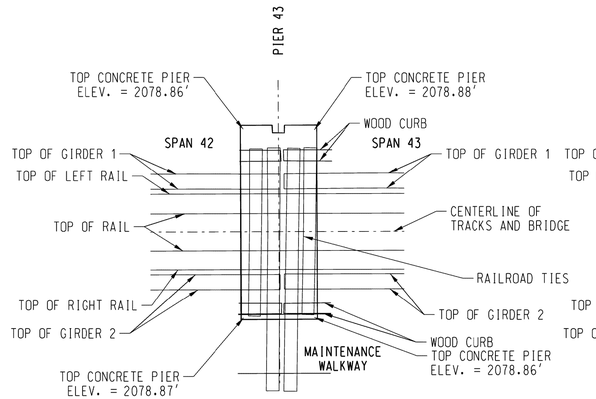
EAST
TO SANDPOINT JCT. ID

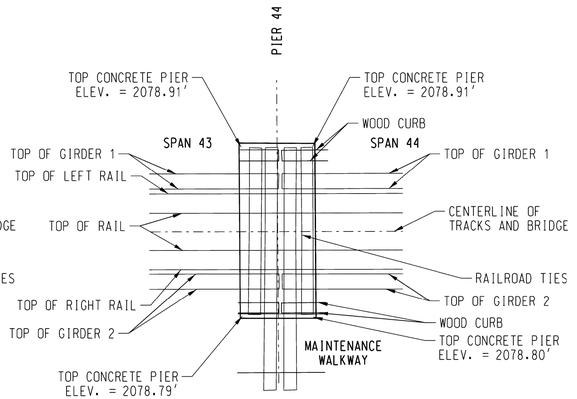
WEST
TO EAST ALGOMA. ID

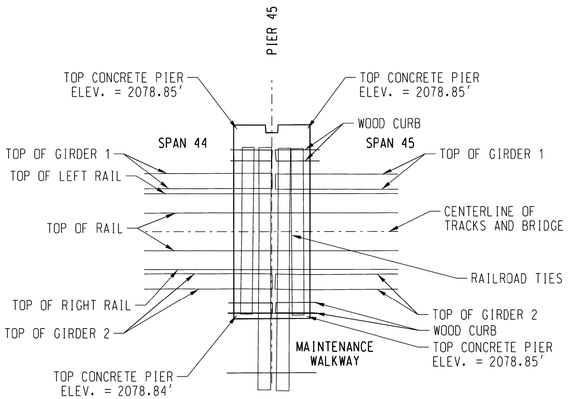
N

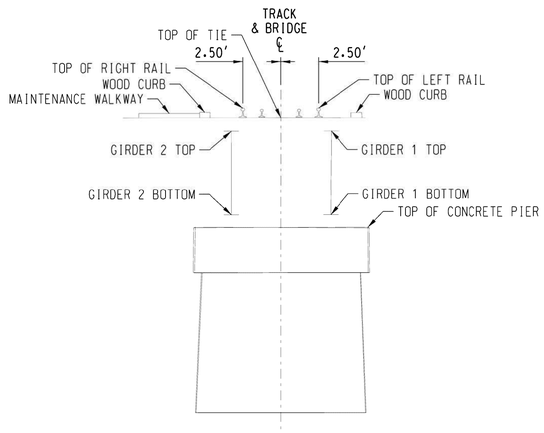
0 5 10
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







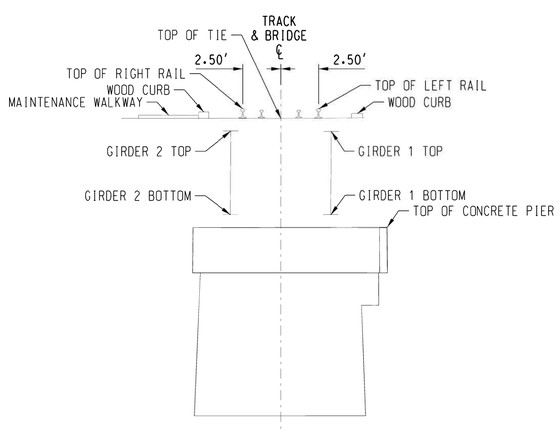




PIER 42
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.74'	2086.10'	2086.73'

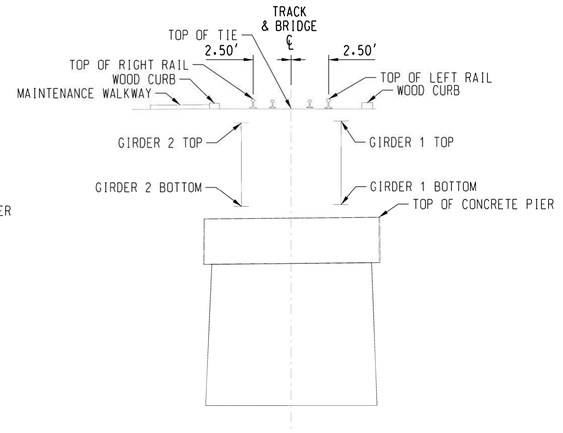
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 41	2085.23'	2079.69'
GIRDER 2 SPAN 41	2085.21'	2079.68'
GIRDER 1 SPAN 42	2085.23'	2079.69'
GIRDER 2 SPAN 42	2085.21'	2079.68'



PIER 43
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.72'	2086.08'	2086.72'

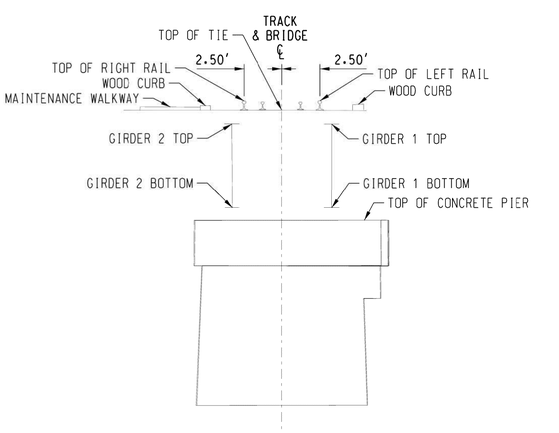
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 42	2085.25'	2079.72'
GIRDER 2 SPAN 42	2085.21'	2079.68'
GIRDER 1 SPAN 43	2085.23'	2079.71'
GIRDER 2 SPAN 43	2085.25'	2079.71'



PIER 44
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.10'	2086.73'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 43	2085.27'	2079.74'
GIRDER 2 SPAN 43	2085.15'	2079.63'
GIRDER 1 SPAN 44	2085.27'	2079.74'
GIRDER 2 SPAN 44	2085.15'	2079.63'



PIER 45
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.14'	2086.73'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 44	2085.21'	2079.70'
GIRDER 2 SPAN 44	2085.23'	2079.69'
GIRDER 1 SPAN 45	2085.21'	2079.68'
GIRDER 2 SPAN 45	2085.22'	2079.68'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-012 SHEET: 12 OF 24

File Location: I:\HWEST\000011\wd\ADD\ACAD\WS\WSHEETS\Sandpoint Bridge\0045-003.900-012.DGN

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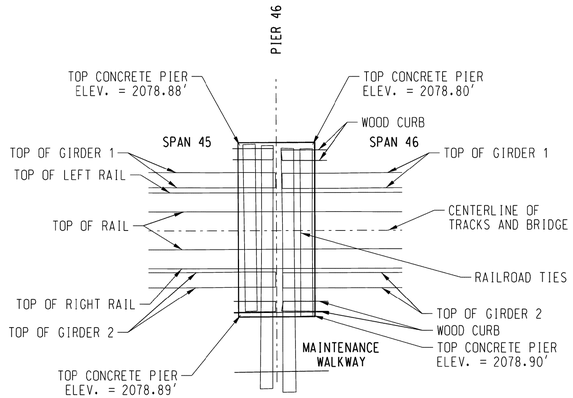
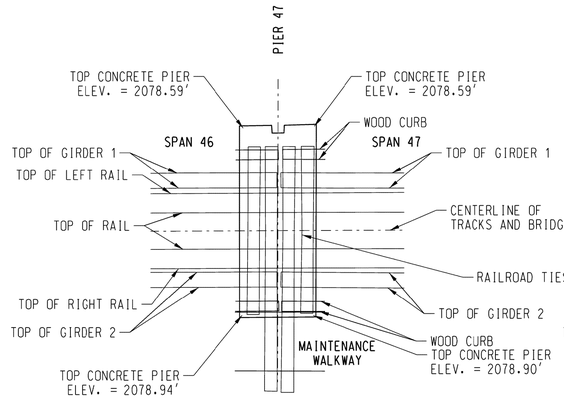
PIER PLAN & PROFILES

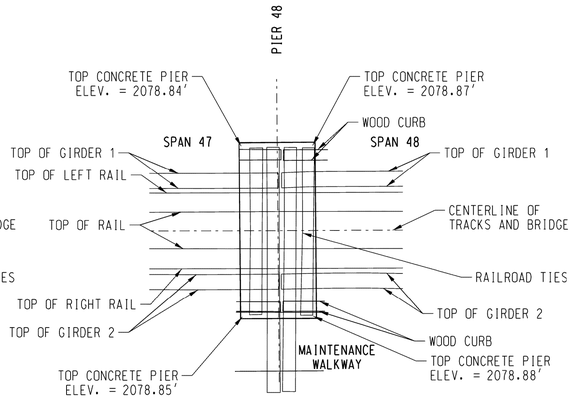
EAST
TO SANDPOINT JCT. ID

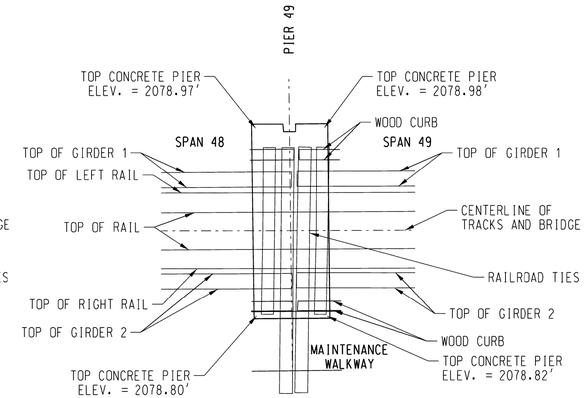
WEST
TO EAST ALGOMA. ID

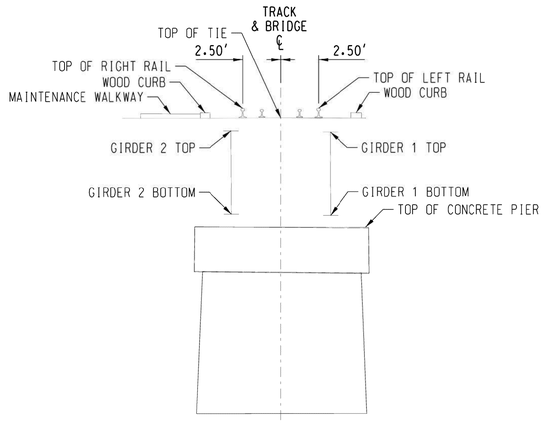
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







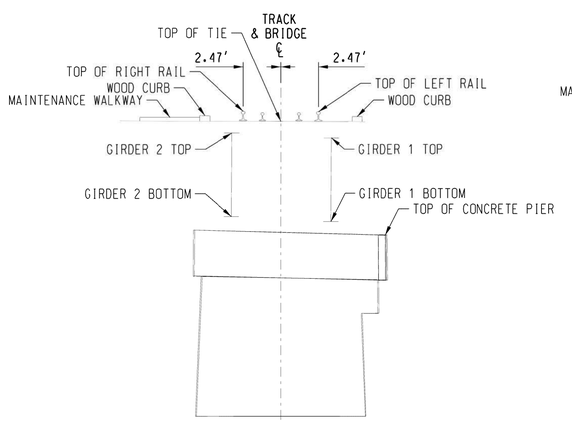




PIER 46
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.09'	2086.73'

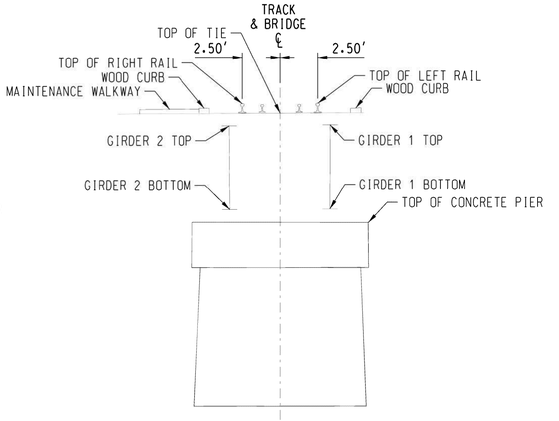
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 45	2085.15'	2079.63'
GIRDER 2 SPAN 45	2085.24'	2079.73'
GIRDER 1 SPAN 46	2085.16'	2079.64'
GIRDER 2 SPAN 46	2085.25'	2079.72'



PIER 47
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.74'	2086.10'	2086.77'

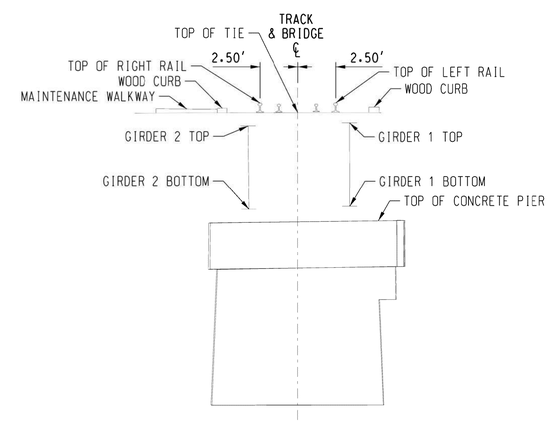
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 46	2085.02'	2079.48'
GIRDER 2 SPAN 46	2085.33'	2079.80'
GIRDER 1 SPAN 47	2085.02'	2079.48'
GIRDER 2 SPAN 47	2085.34'	2079.81'



PIER 48
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2085.08'	2086.71'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 47	2085.31'	2079.75'
GIRDER 2 SPAN 47	2085.23'	2079.71'
GIRDER 1 SPAN 48	2085.31'	2079.75'
GIRDER 2 SPAN 48	2085.24'	2079.71'



PIER 49
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.10'	2086.74'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 48	2085.43'	2079.90'
GIRDER 2 SPAN 48	2085.27'	2079.76'
GIRDER 1 SPAN 49	2085.43'	2079.92'
GIRDER 2 SPAN 49	2085.22'	2079.72'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
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SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-013 SHEET: 13 OF 24

File Location: F:\BNSF00001\dgn\400CAD\sheet\Sandpoint Bridge#0045-003.900-013.DGN

Date Printed: 9/30/2016 Time Printed: 4:58:11 PM

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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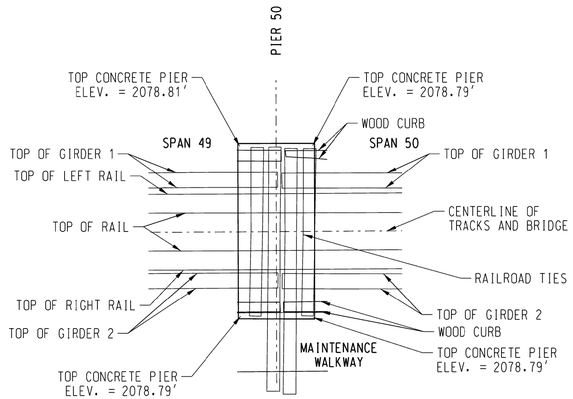
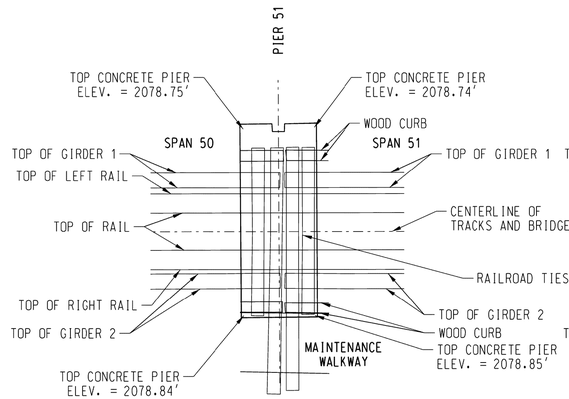
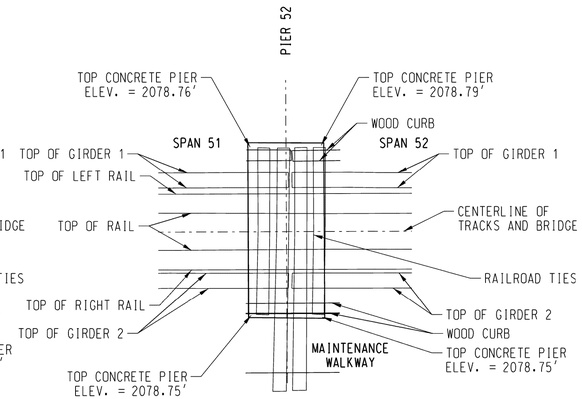
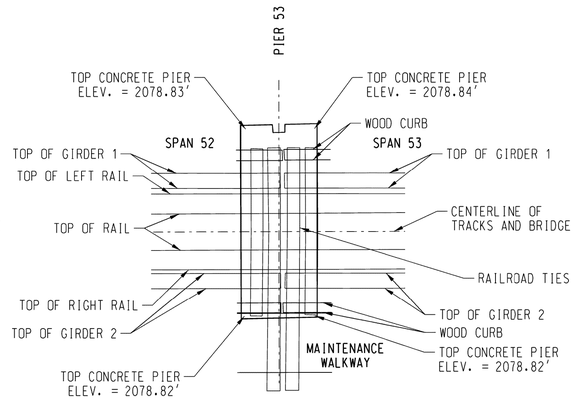
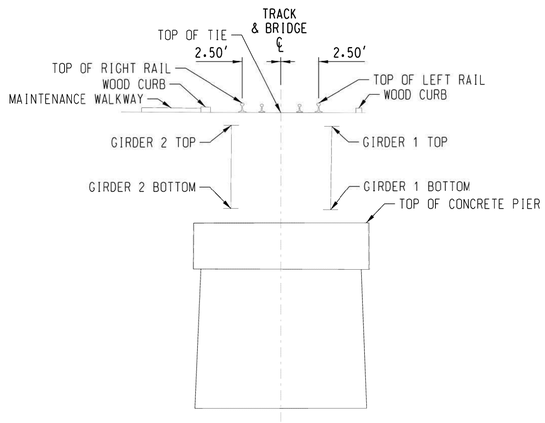
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







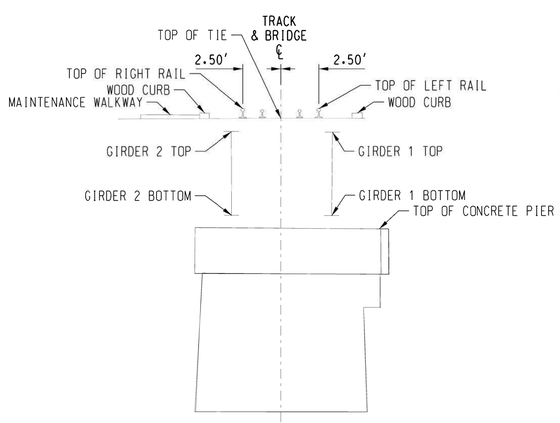




PIER 50
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.08'	2086.73'

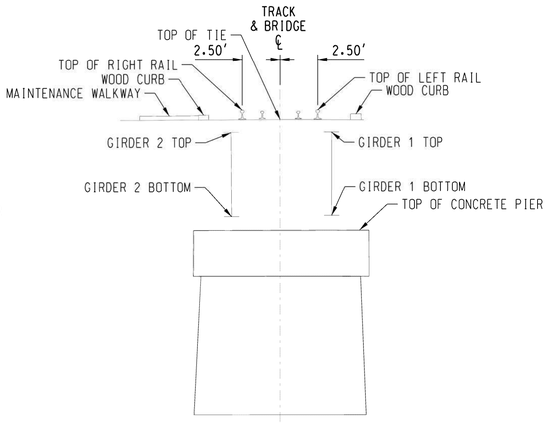
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 49	2085.22'	2079.69'
GIRDER 2 SPAN 49	2085.26'	2079.73'
GIRDER 1 SPAN 50	2085.18'	2079.67'
GIRDER 2 SPAN 50	2085.26'	2079.67'



PIER 51
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.70'	2086.06'	2086.70'

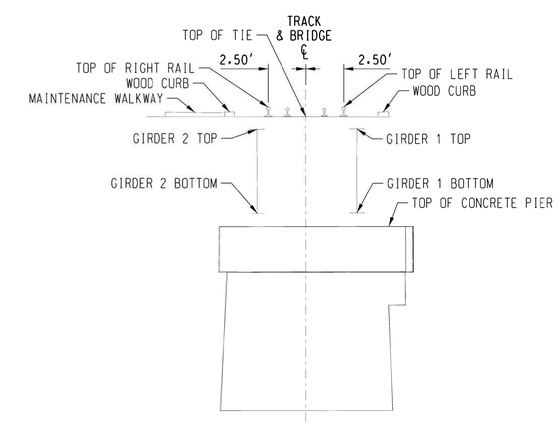
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 50	2085.16'	2079.63'
GIRDER 2 SPAN 50	2085.19'	2079.65'
GIRDER 1 SPAN 51	2085.15'	2079.63'
GIRDER 2 SPAN 51	2085.19'	2079.65'



PIER 52
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.09'	2086.70'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 51	2085.26'	2079.75'
GIRDER 2 SPAN 51	2085.23'	2079.66'
GIRDER 1 SPAN 52	2085.27'	2079.75'
GIRDER 2 SPAN 52	2085.22'	2079.66'



PIER 53
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.73'	2086.10'	2086.72'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 52	2085.28'	2079.73'
GIRDER 2 SPAN 52	2085.26'	2079.70'
GIRDER 1 SPAN 53	2085.28'	2079.73'
GIRDER 2 SPAN 53	2085.26'	2079.70'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-014 SHEET: 14 OF 24

File Location: I:\ENGINEERING\PROJECTS\400-499\449-Sandpoint Bridge\PLANS-003-900-014.DGN

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PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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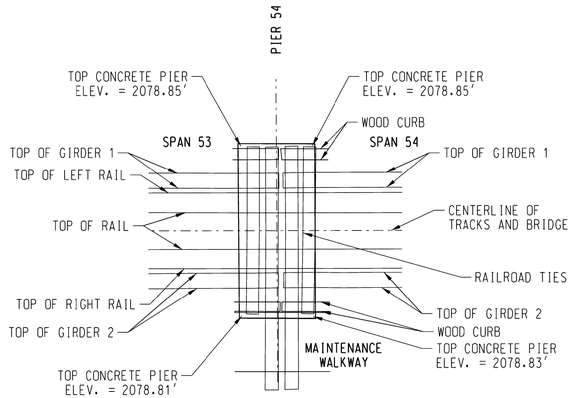
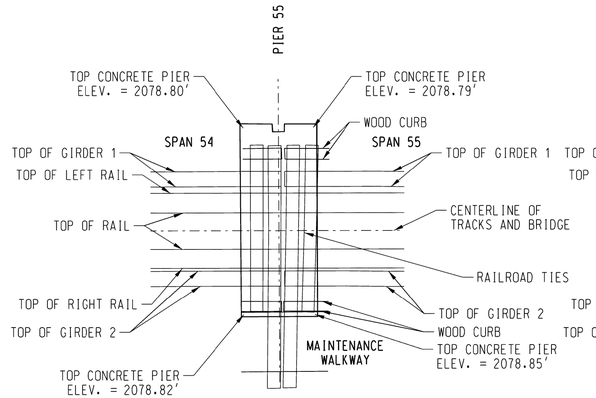
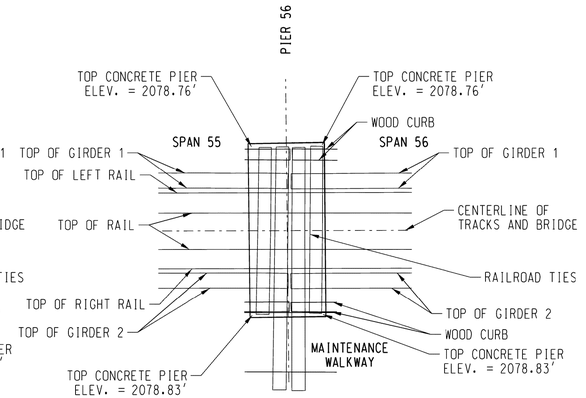
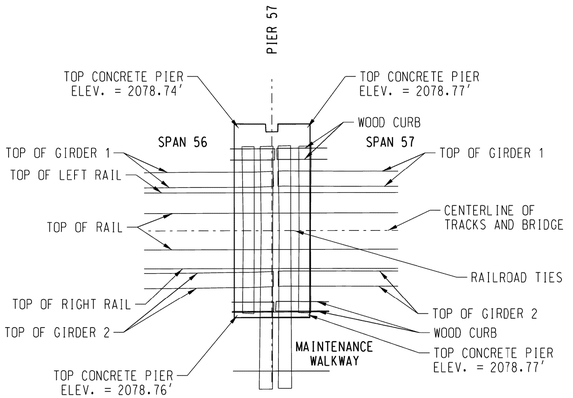
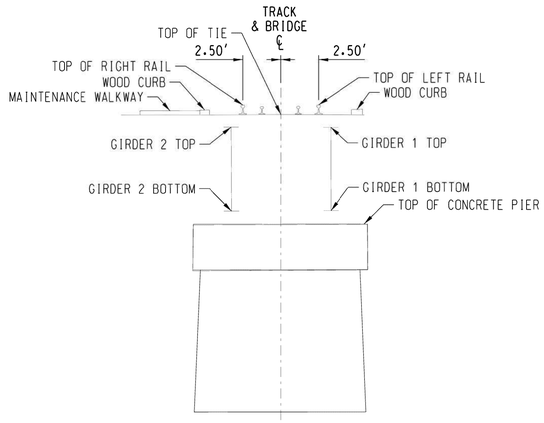
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'







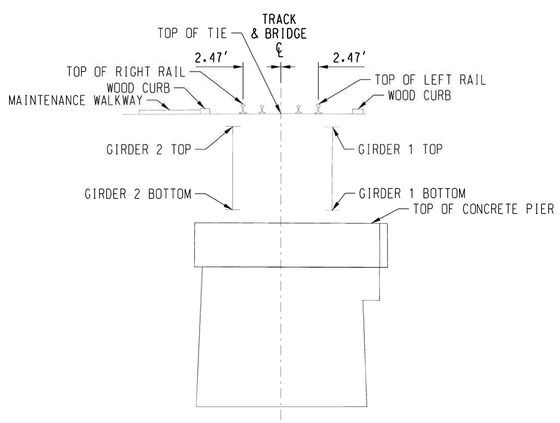




PIER 54
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.72'	2086.10'	2086.71'

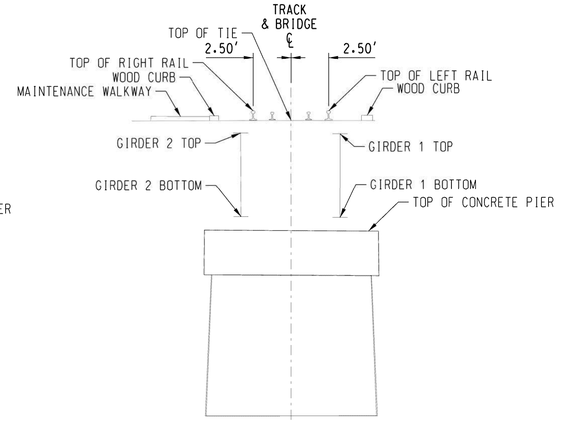
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 53	2085.25'	2079.72'
GIRDER 2 SPAN 53	2085.26'	2079.70'
GIRDER 1 SPAN 54	2085.25'	2079.73'
GIRDER 2 SPAN 54	2085.26'	2079.70'



PIER 55
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.68'	2086.05'	2086.68'

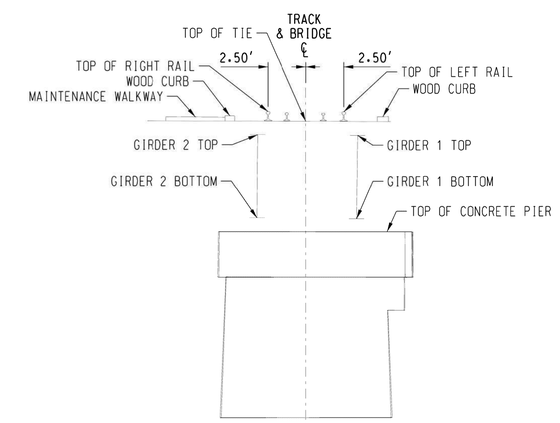
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 54	2085.17'	2079.64'
GIRDER 2 SPAN 54	2085.19'	2079.68'
GIRDER 1 SPAN 55	2085.17'	2079.64'
GIRDER 2 SPAN 55	2085.19'	2079.69'



PIER 56
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.72'	2086.08'	2086.71'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 55	2085.20'	2079.66'
GIRDER 2 SPAN 55	2085.25'	2079.72'
GIRDER 1 SPAN 56	2085.20'	2079.67'
GIRDER 2 SPAN 56	2085.25'	2079.72'



PIER 57
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.68'	2086.06'	2086.70'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 56	2085.13'	2079.61'
GIRDER 2 SPAN 56	2085.18'	2079.67'
GIRDER 1 SPAN 57	2085.13'	2079.61'
GIRDER 2 SPAN 57	2085.18'	2079.68'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-015 SHEET: 15 OF 24

File Location: I:\BNSF0000011\400CAD\SHEETS\Sandpoint Bridge#003-900-015.DGN

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PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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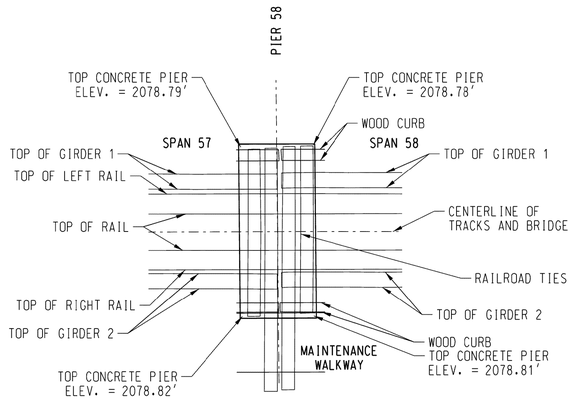
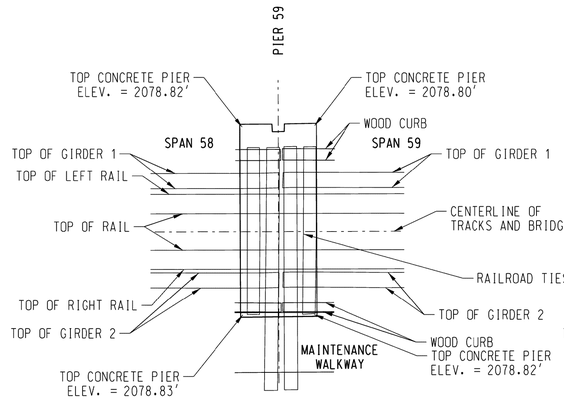
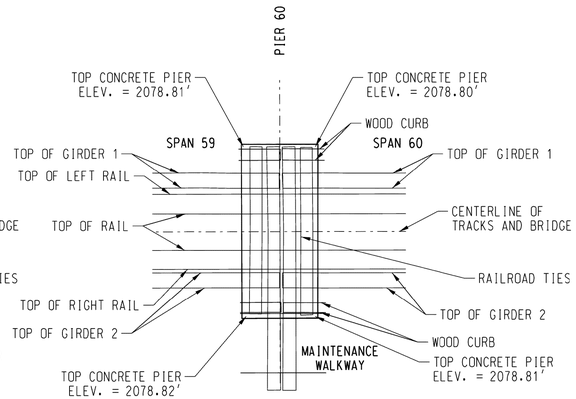
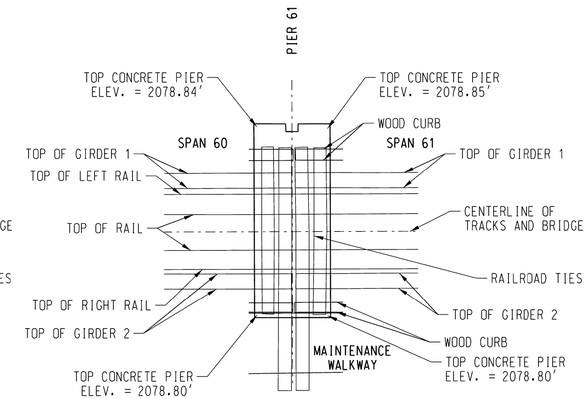
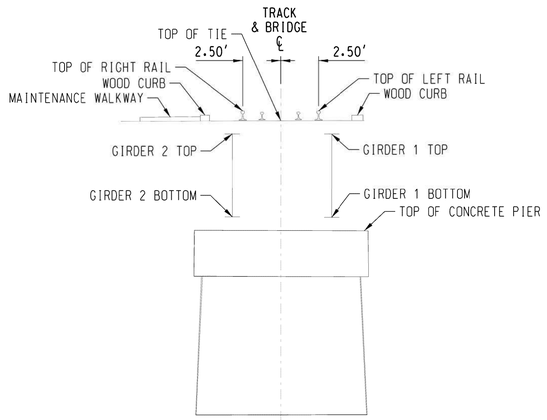
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'



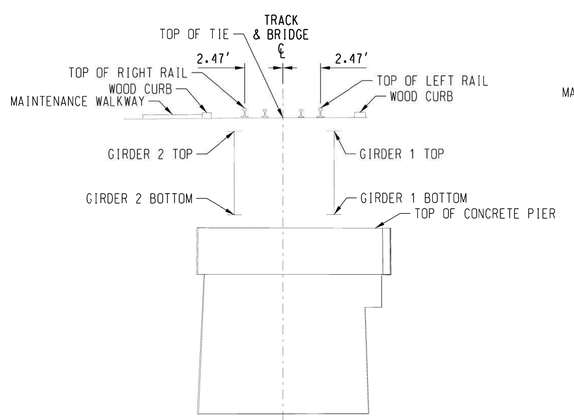




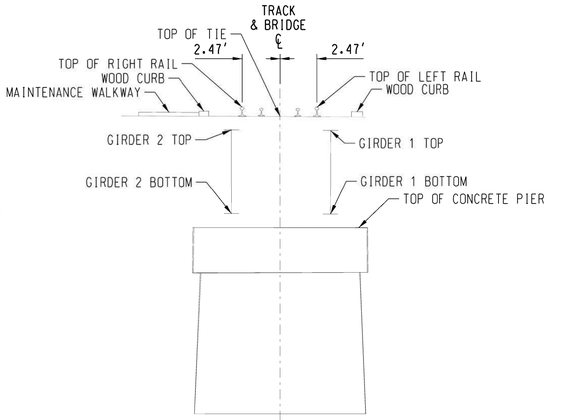




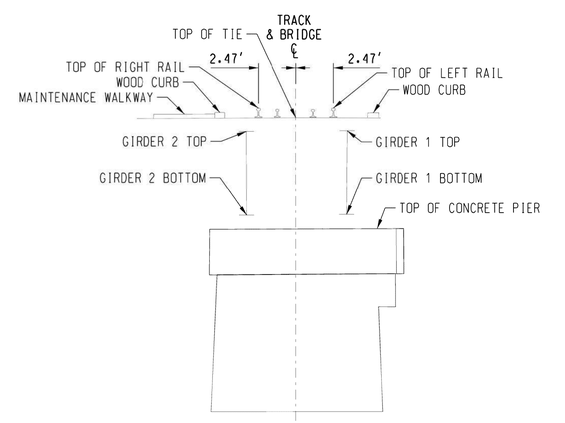
PIER 58
LOOKING RAILROAD EAST



PIER 59
LOOKING RAILROAD EAST



PIER 60
LOOKING RAILROAD EAST



PIER 61
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.71'	2086.06'	2086.71'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 57	2085.17'	2079.64'
GIRDER 2 SPAN 57	2085.19'	2079.69'
GIRDER 1 SPAN 58	2085.18'	2079.67'
GIRDER 2 SPAN 58	2085.20'	2079.70'

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.75'	2086.11'	2086.74'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 58	2085.23'	2079.70'
GIRDER 2 SPAN 58	2085.21'	2079.69'
GIRDER 1 SPAN 59	2085.23'	2079.70'
GIRDER 2 SPAN 59	2085.21'	2079.69'

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.78'	2086.16'	2086.79'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 59	2085.23'	2079.70'
GIRDER 2 SPAN 59	2085.28'	2079.74'
GIRDER 1 SPAN 60	2085.23'	2079.70'
GIRDER 2 SPAN 60	2085.28'	2079.74'

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.81'	2086.18'	2086.82'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 60	2085.32'	2079.78'
GIRDER 2 SPAN 60	2085.27'	2079.73'
GIRDER 1 SPAN 61	2085.32'	2079.78'
GIRDER 2 SPAN 61	2085.27'	2079.74'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-016 SHEET: 16 OF 24

File Location: :#ewENSTD00011#:400UC4C:#:SHEET:#:Sandpoint Bridge#0045-003.900-016.DGN

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PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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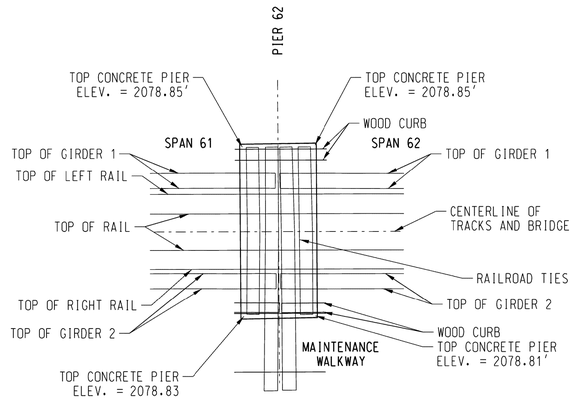
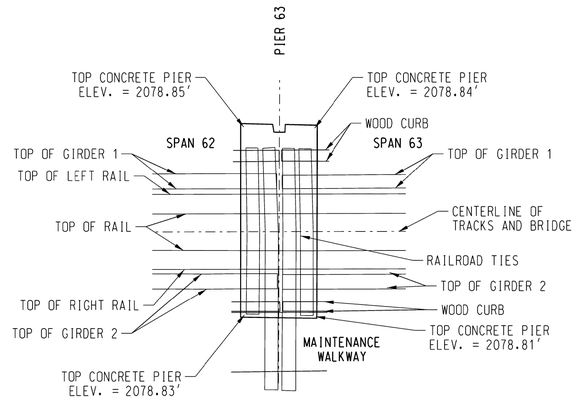
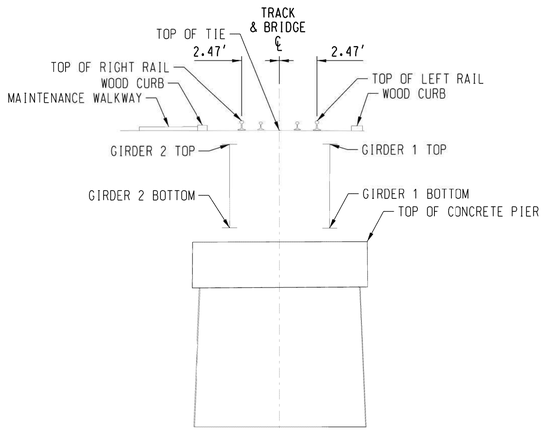
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'



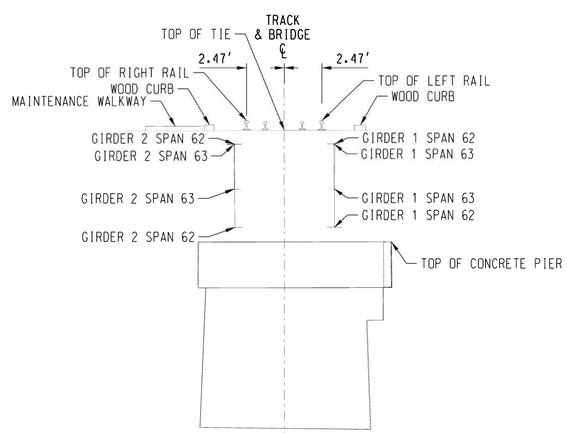




PIER 62
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.83'	2086.19'	2086.84'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 61	2085.29'	2079.74'
GIRDER 2 SPAN 61	2085.28'	2079.76'
GIRDER 1 SPAN 62	2085.30'	2079.75'
GIRDER 2 SPAN 62	2085.28'	2079.76'



PIER 63
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.85'	2086.21'	2086.85'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 62	2085.32'	2079.80'
GIRDER 2 SPAN 62	2085.29'	2079.78'
GIRDER 1 SPAN 63	2085.32'	2082.33'
GIRDER 2 SPAN 63	2085.28'	2082.31'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

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DAVID EVANS AND ASSOCIATES INC.
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SPOKANE, WA 99201
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BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-017 | SHEET: 17 OF 24

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PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID

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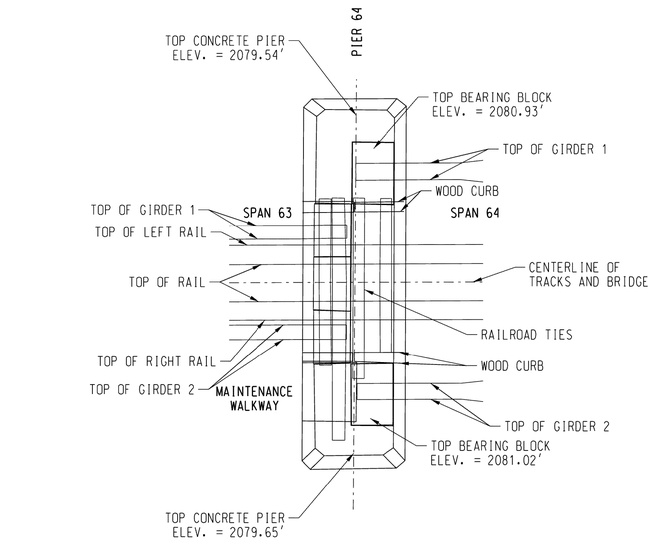
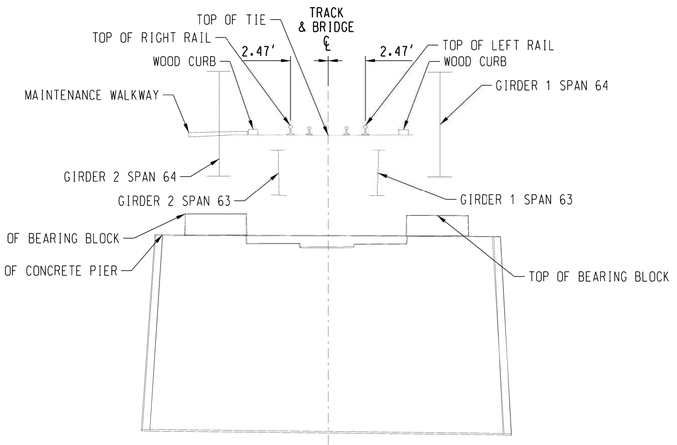
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'

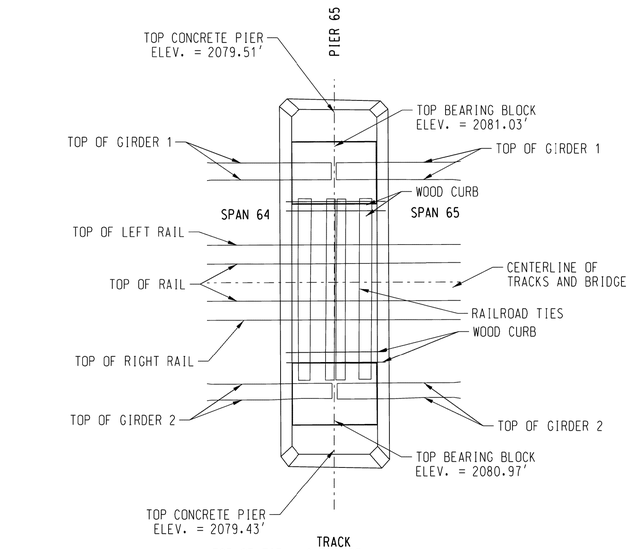


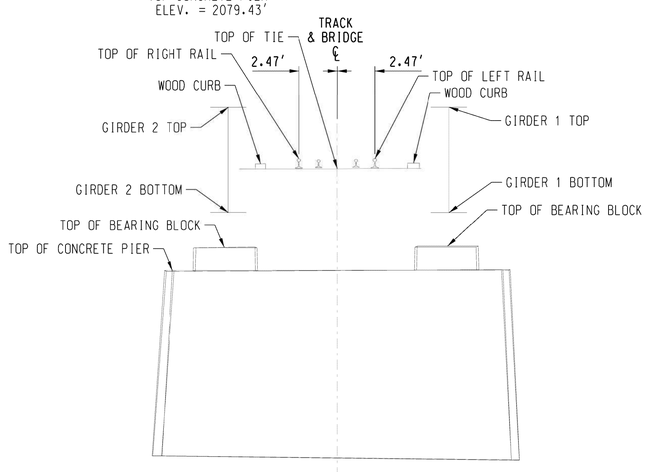


PIER 64
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.89'	2086.25'	2086.90'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 63	2085.30'	2082.26'
GIRDER 2 SPAN 63	2085.27'	2082.92'
GIRDER 1 SPAN 64	2090.19'	2083.34'
GIRDER 2 SPAN 64	2090.25'	2083.37'

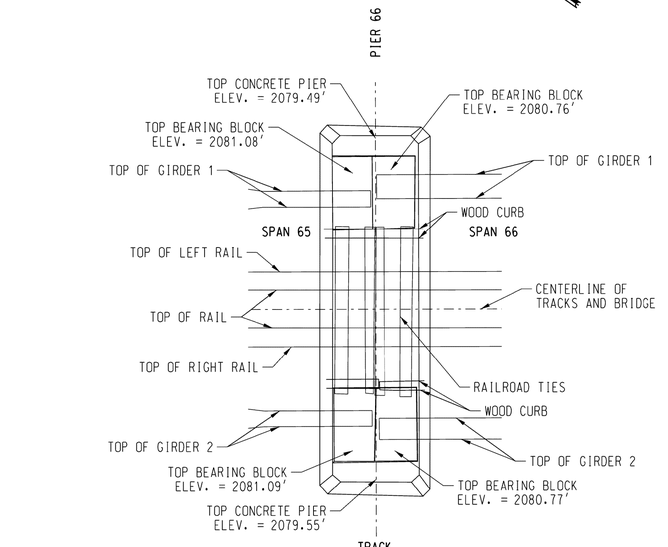


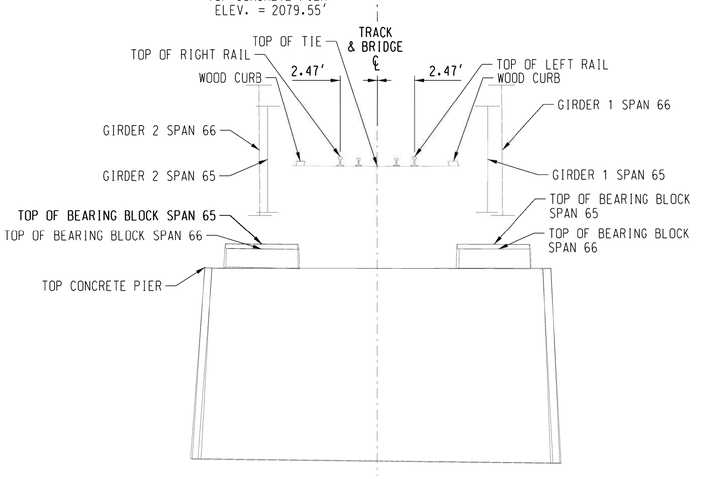


PIER 65
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.85'	2086.19'	2086.84'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 64	2090.17'	2082.32'
GIRDER 2 SPAN 64	2090.13'	2083.32'
GIRDER 1 SPAN 65	2090.17'	2083.30'
GIRDER 2 SPAN 65	2090.14'	2083.32'





PIER 66
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.87'	2086.22'	2086.87'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 65	2090.18'	2083.28'
GIRDER 2 SPAN 65	2090.19'	2083.30'
GIRDER 1 SPAN 66	2091.58'	2082.99'
GIRDER 2 SPAN 66	2091.59'	2082.97'

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

DES:	
DRAWN: KMD	
CHECK: ODHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-018 SHEET: 18 OF 24

File Locations: J:\BNSF\000011\#04\CAD\#sheets\Sandpoint Bridge\0045-003.900-018.DGN

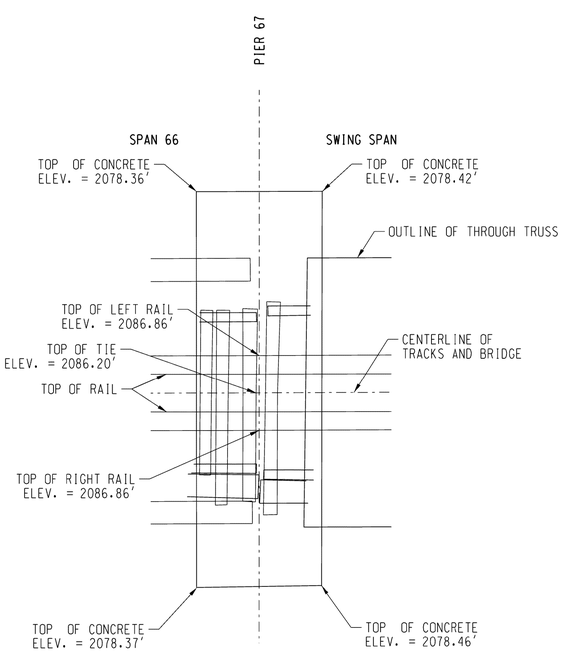
Date Printed: 9/30/2016 Time Printed: 5:00:40 PM

PIER PLAN & PROFILES

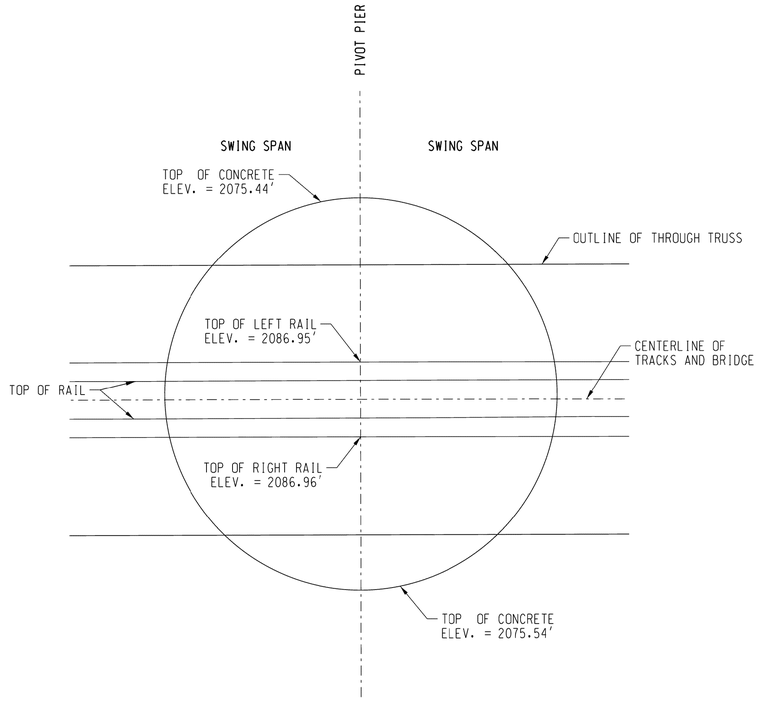
0 5 10
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'

EAST
TO SANDPOINT JCT. ID

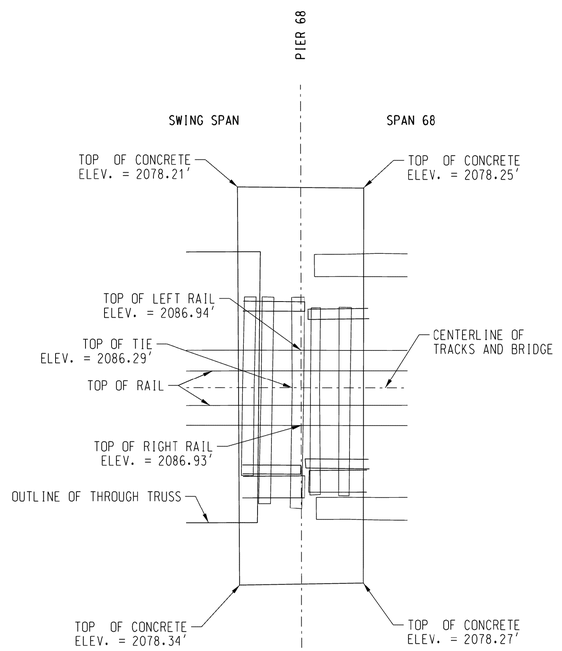
WEST
TO EAST ALGOMA. ID



PIER 67



PIVOT PIER



PIER 68

DAVID EVANS AND ASSOCIATES INC.
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SPOKANE. WA 99201
Phone: 509.252.5900

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NOTES:
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2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

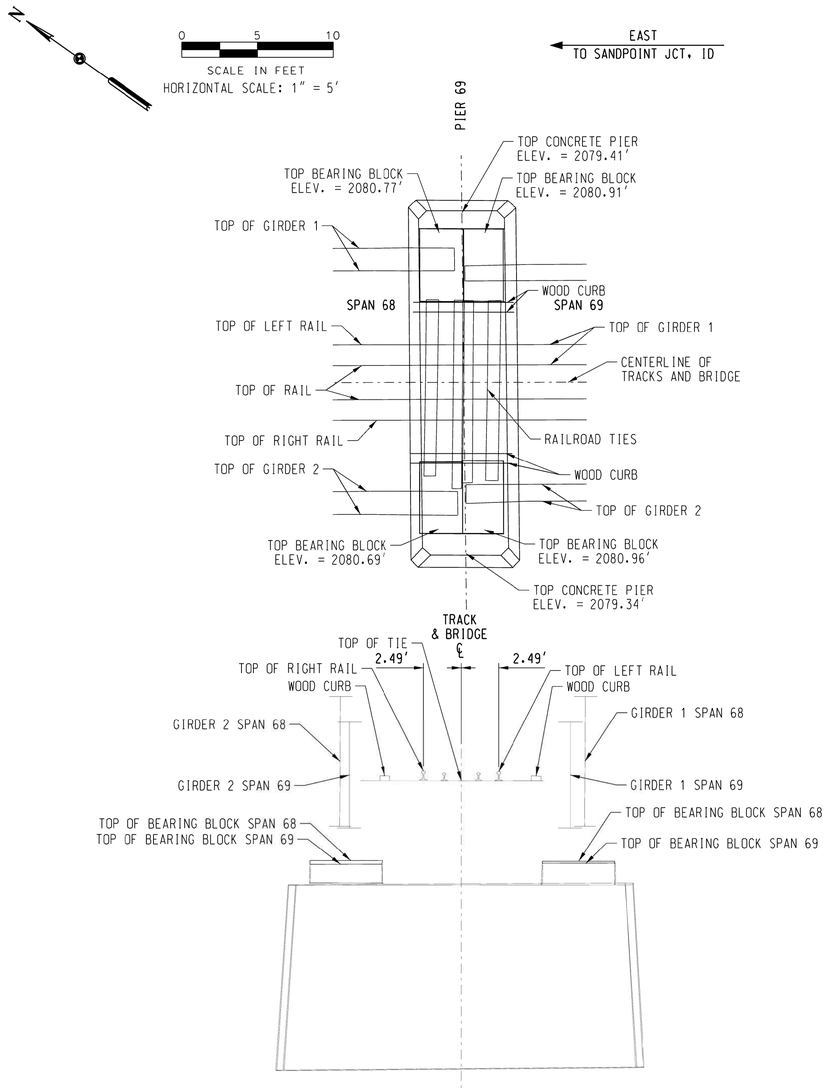
SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-019 SHEET: 19 OF 24

File Location: H:\HENSF\000\019\wk\000\ADs\WSHEETS\Sandpoint Bridge#0045-003.900-019.DGN

Date Printed: 9/30/2016 Time Printed: 5:05:33 PM

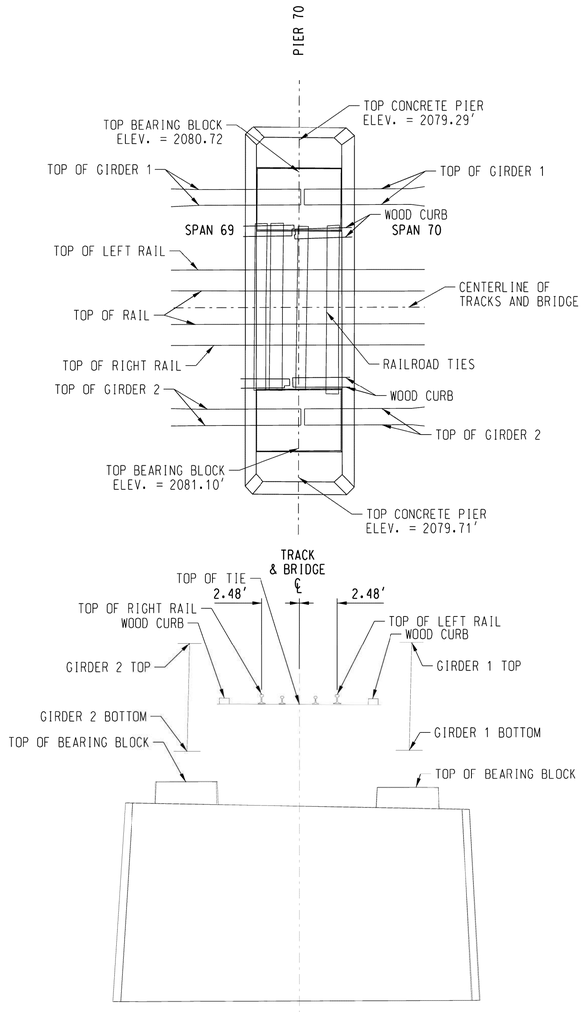
PIER PLAN & PROFILES



PIER 69
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.87'	2086.24'	2086.87'

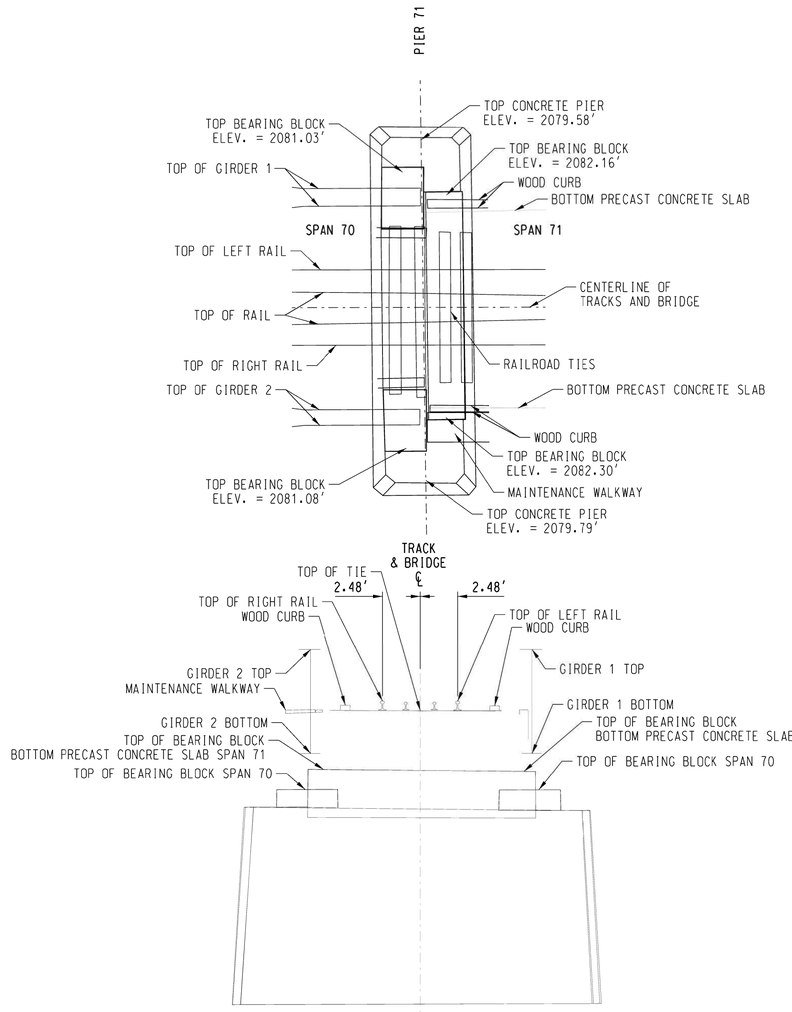
TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 68	2090.14'	2083.06'
GIRDER 2 SPAN 68	2090.07'	2083.07'
GIRDER 1 SPAN 69	2090.18'	2083.33'
GIRDER 2 SPAN 69	2090.20'	2083.38'



PIER 70
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.87'	2086.23'	2086.88'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 69	2090.21'	2083.37'
GIRDER 2 SPAN 69	2090.22'	2083.38'
GIRDER 1 SPAN 70	2090.21'	2083.37'
GIRDER 2 SPAN 70	2090.22'	2083.38'



PIER 71
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.81'	2086.17'	2086.82'

TABLE OF GIRDER ELEVATIONS		
LOCATION	TOP OF GIRDER	BOTTOM OF GIRDER
GIRDER 1 SPAN 70	2090.28'	2083.39'
GIRDER 2 SPAN 70	2090.28'	2083.39'

NOTES:
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2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

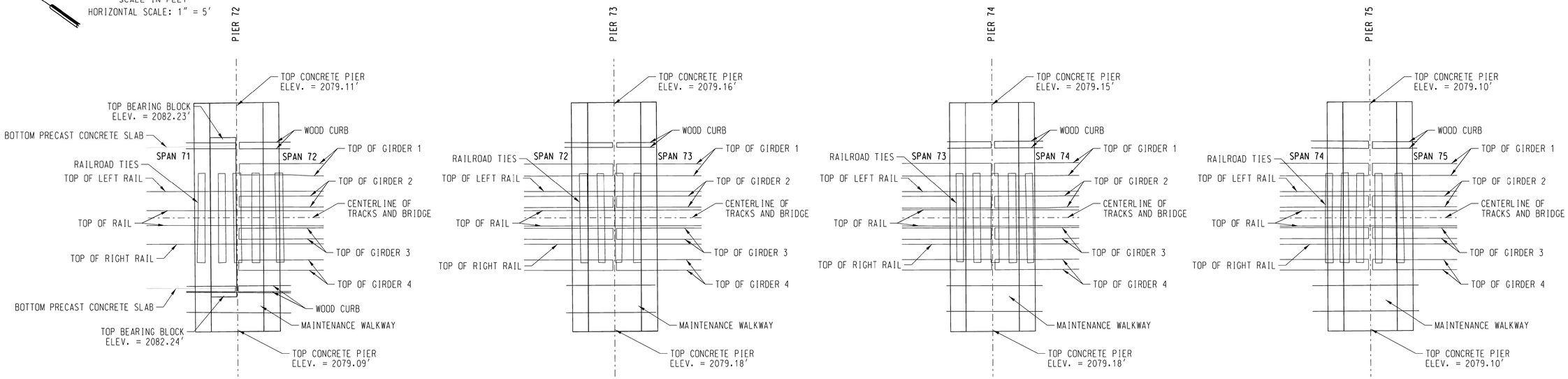
DES:	BNSF RAILWAY	SANDPOINT JCT. ID TO EAST ALGOMA. ID
DRAWN: KMD	BRIDGE ENGINEERING KANSAS CITY, KS	BRIDGE NO. 003.90
CHECK: DDHA/AKY		OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
DATE: SEPT. 2016		PIER PLAN & PROFILES
AUTH:	APPROVED:	
LINE SEG: 0045	ASST. DIRECTOR STRUCTURES DESIGN	PLAN NO: 0045-003.900-020 SHEET: 20 OF 24

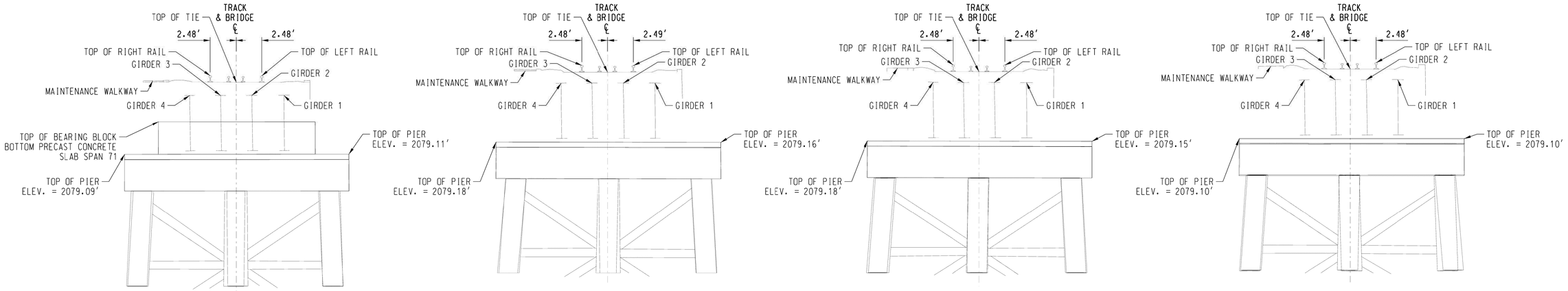
PIER PLAN & PROFILES

SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID





PIER 72
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.68'	2085.72'	2086.69'

PIER 73
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.55'	2085.92'	2086.57'

PIER 74
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.49'	2085.85'	2086.50'

PIER 75
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.45'	2085.82'	2086.47'

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Phone: 509.252.5900

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NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

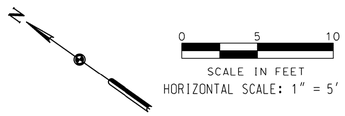
ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	BNSF RAILWAY	SANDPOINT JCT. ID TO EAST ALGOMA. ID
DRAWN: KMD	BRIDGE ENGINEERING KANSAS CITY, KS	BRIDGE NO. 003.90
CHECK: DDHA/AKY		OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
DATE: SEPT. 2016	APPROVED:	PIER PLAN & PROFILES
AUTH:	ASST. DIRECTOR STRUCTURES DESIGN	PLAN NO: 0045-003.900-021 SHEET: 21 OF 24
LINE SEG: 0045		

File Location: \\eHNSF\000011\#4\400\04\#SHEETS\Sandpoint Bridge\0045-003.900-021.DGN

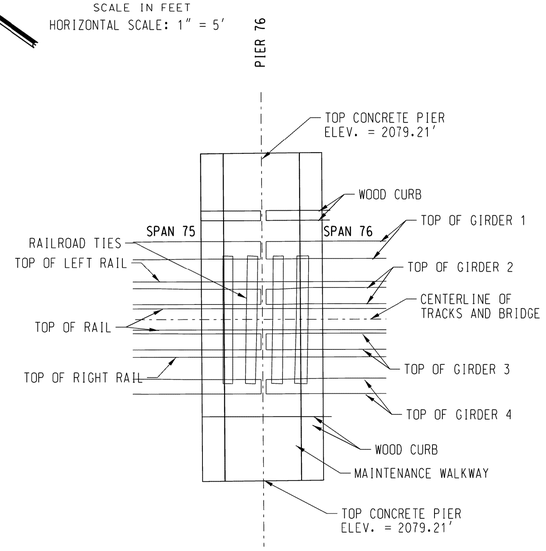
Date Printed: 9/30/2016 Time Printed: 5:06:32 PM

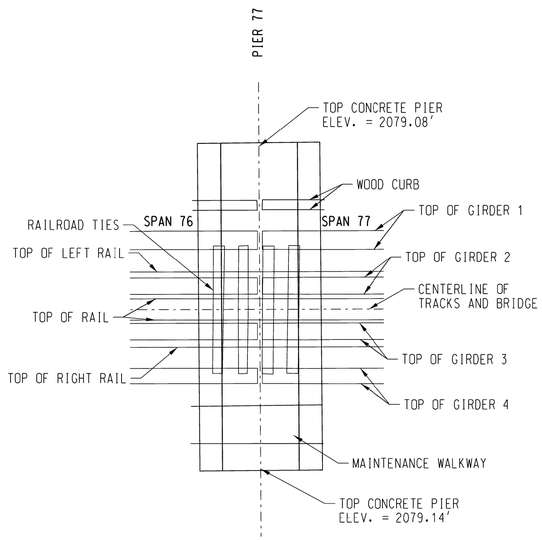
PIER PLAN & PROFILES

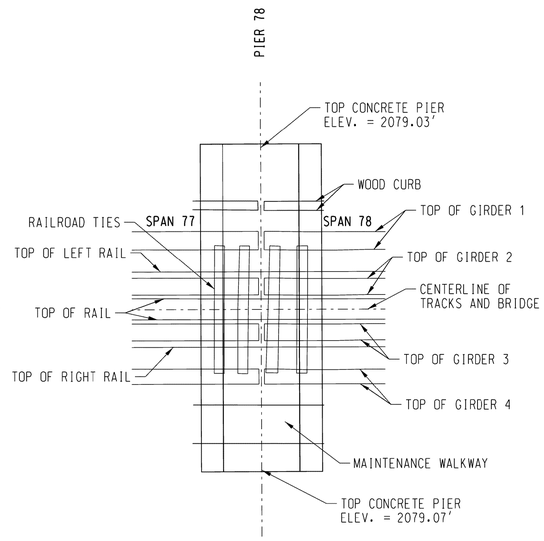


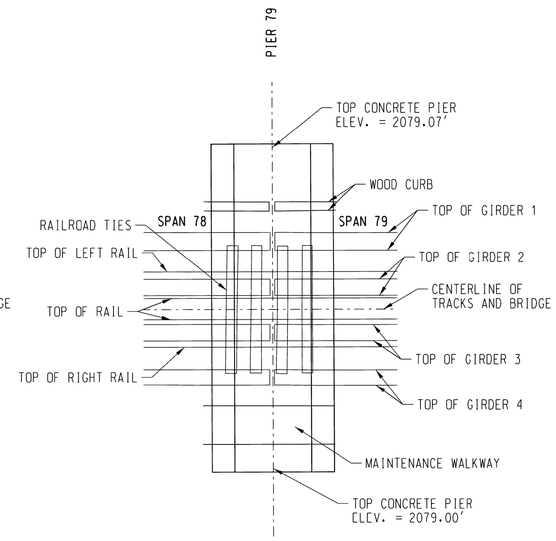
EAST
TO SANDPOINT JCT. ID

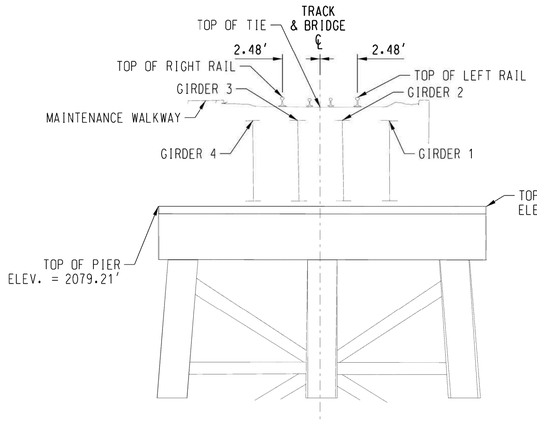
WEST
TO EAST ALGOMA. ID





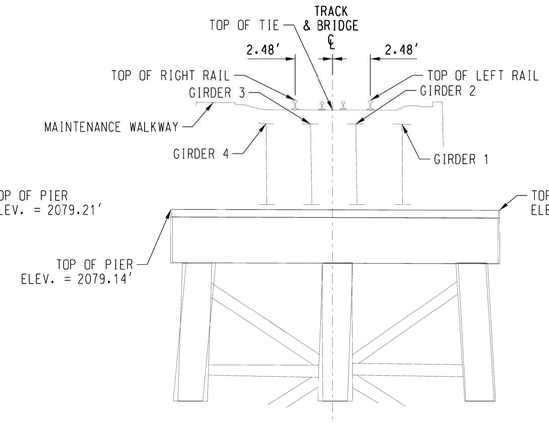






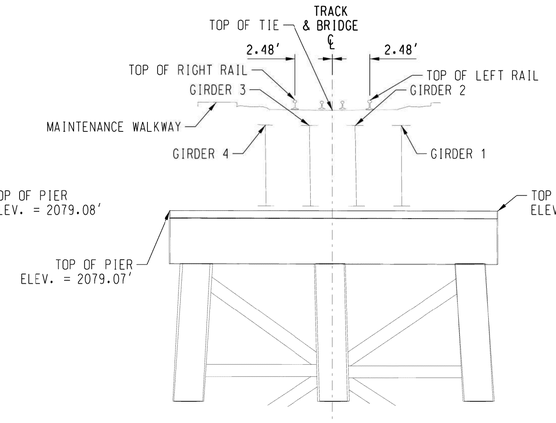
PIER 76
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.41'	2085.77'	2086.44'



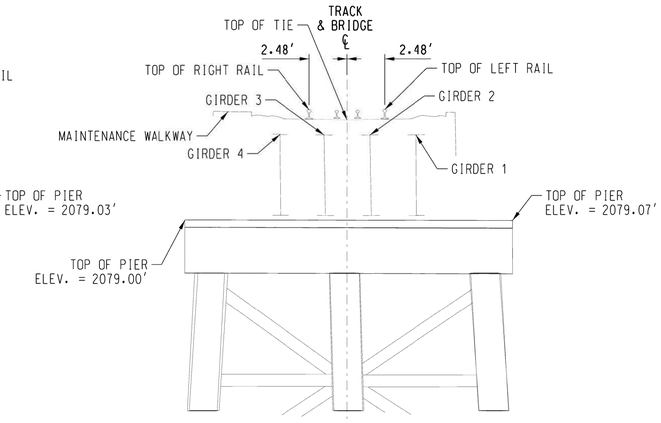
PIER 77
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.36'	2085.69'	2086.36'



PIER 78
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.39'	2085.69'	2086.37'



PIER 79
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.33'	2085.68'	2086.35'

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SPOKANE. WA 99201
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NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-022 | SHEET: 22 OF 24

File Location: H:\HENSF\000\019\w\400\AD\w\SHEETS\Sandpoint Bridge\0045-003.900-022.DGN

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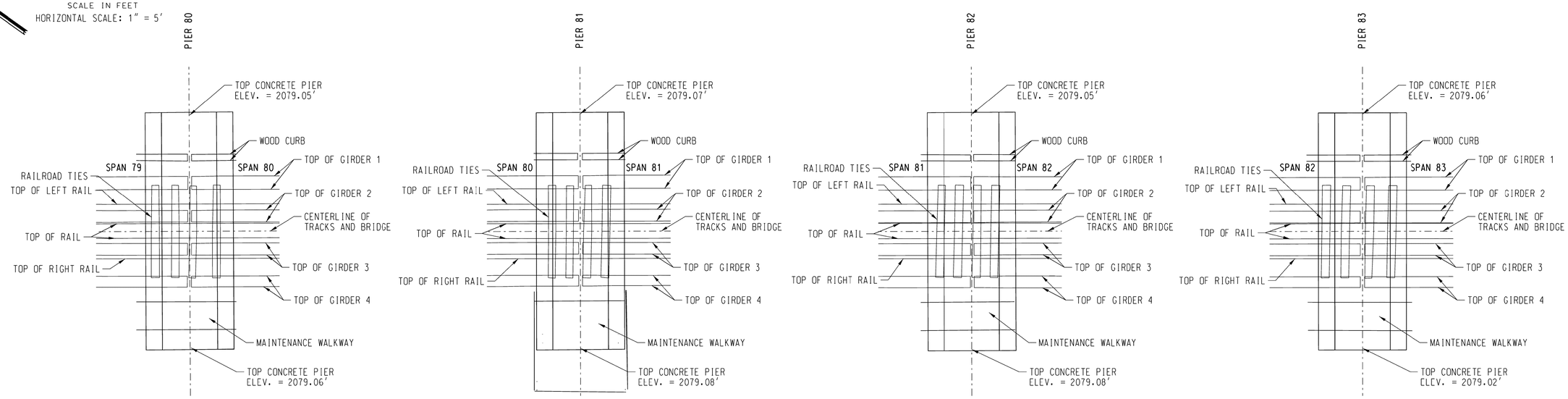
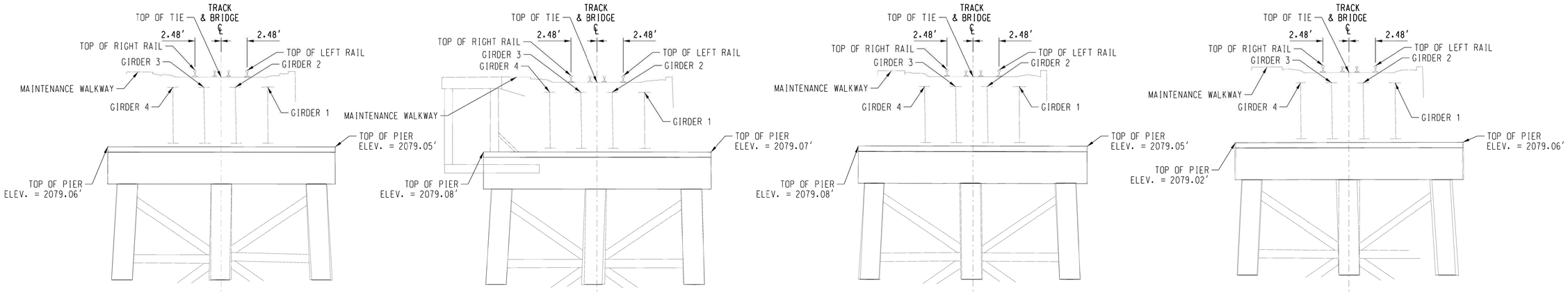
PIER PLAN & PROFILES

0 5 10
SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA. ID





PIER 80
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.32'	2085.67'	2086.34'

PIER 81
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.31'	2085.67'	2086.33'

PIER 82
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.31'	2085.66'	2086.32'

PIER 83
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.33'	2085.68'	2086.35'

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SPOKANE, WA 99201
Phone: 509.252.5900

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NOTES:
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2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

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PRELIMINARY

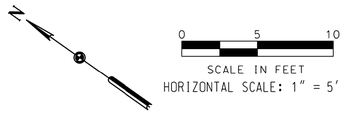
ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	BNSF RAILWAY	SANDPOINT JCT. ID TO EAST ALGOMA. ID
DRAWN: KMD	BRIDGE ENGINEERING KANSAS CITY, KS	BRIDGE NO. 003.90
CHECK: DDHA/AKY	APPROVED:	OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
DATE: SEPT. 2016	ASST. DIRECTOR STRUCTURES DESIGN	PIER PLAN & PROFILES
AUTH:		PLAN NO: 0045-003.900-023 SHEET: 23 OF 24
LINE SEG: 0045		

File Location: H:\e#ENGF\000011\e#140D-AD\e#SHEETS-Sandpoint Bridge\0045-003.900-023.DGN

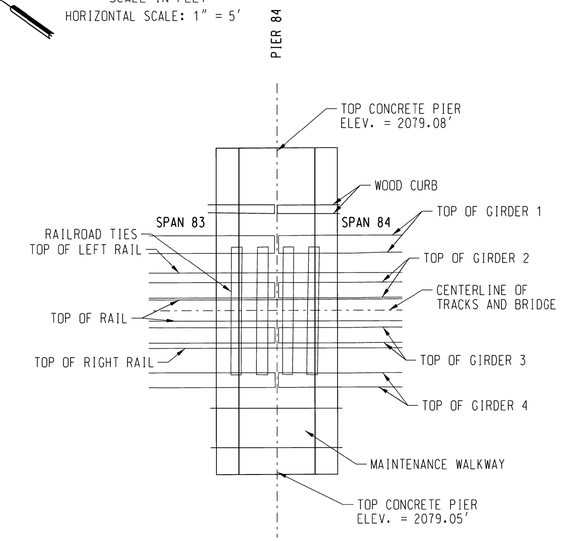
Date Printed: 9/30/2016 Time Printed: 5:07:32 PM

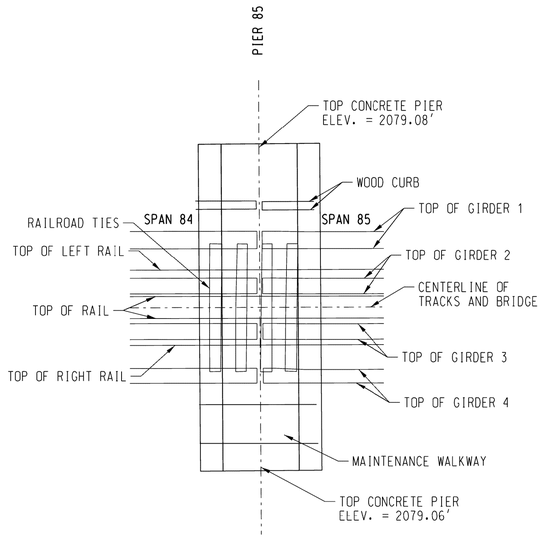
PIER PLAN & PROFILES

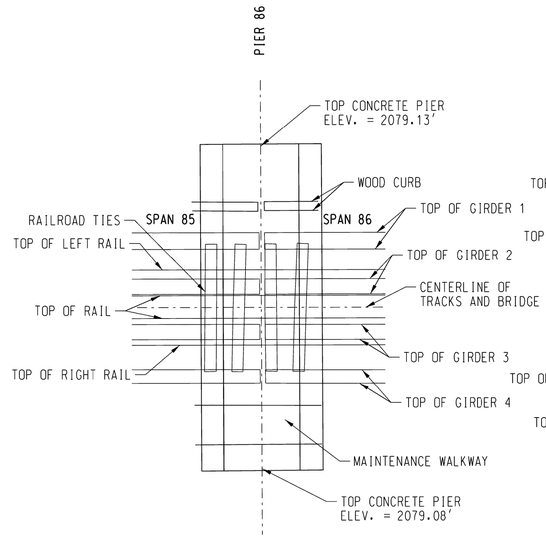


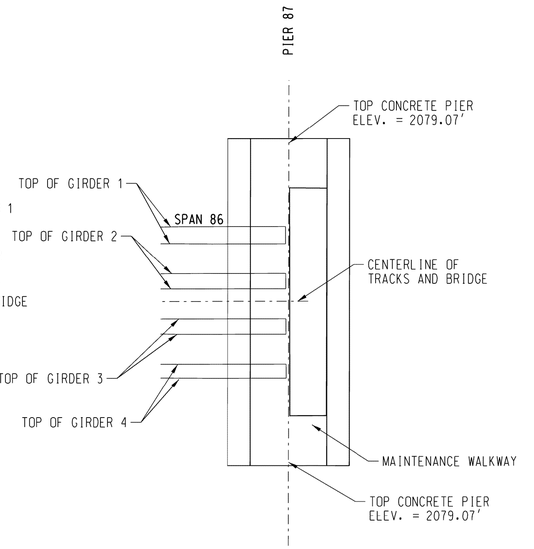
EAST
TO SANDPOINT JCT. ID

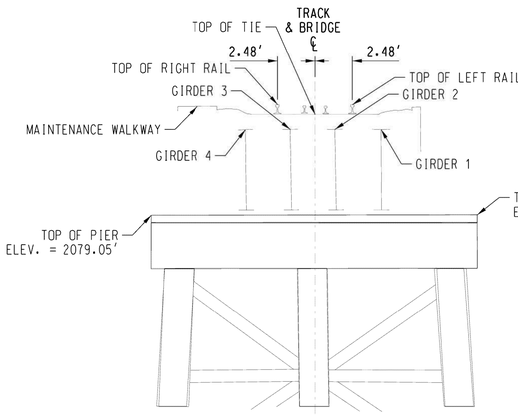
WEST
TO EAST ALGOMA. ID





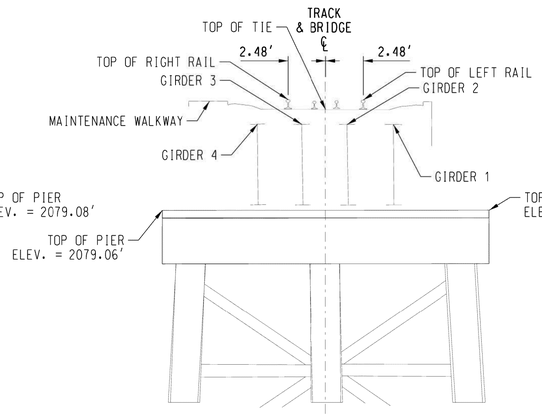






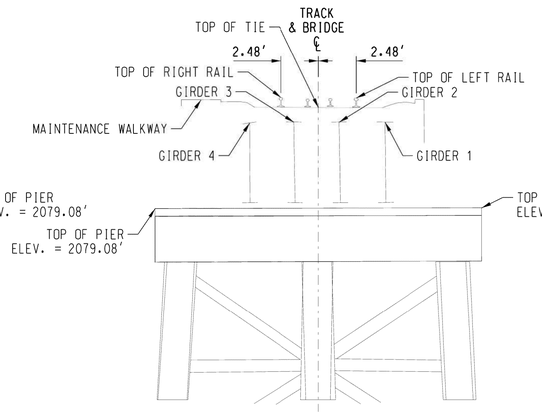
PIER 84
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.36'	2085.72'	2086.38'



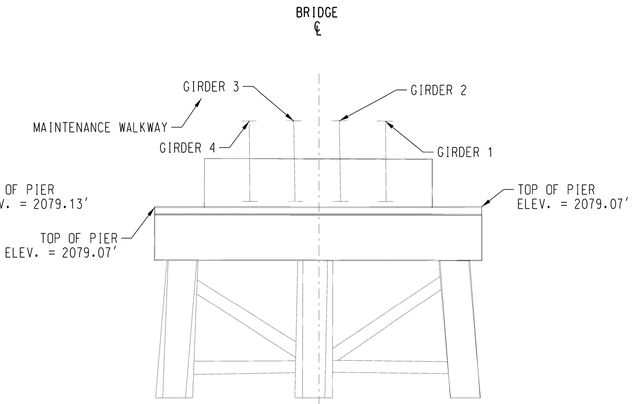
PIER 85
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.36'	2085.73'	2086.39'



PIER 86
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS			
LOCATION	TOP LEFT RAIL	TOP OF TIE	TOP RIGHT RAIL
ELEVATION	2086.40'	2085.77'	2086.42'



PIER 87
LOOKING RAILROAD EAST

DAVID EVANS AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

811 Know what's below. Call before you dig.

NOTES:
1.) LEFT AND RIGHT DIRECTIONS ARE BASED ON A WEST ORIENTATION LOOKING UPSTATION OF RAILROAD ALONG CENTERLINE OF TRACK.

2.) STATIONING VALUES REFLECT ASSUMPTION THAT THE EAST ABUTMENT INSIDE FACE EQUALS 10+00 AT THE TRACK CENTERLINE.

SURVEYOR'S CERTIFICATION

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED AUGUST 22-26, 2016, BY ME OR UNDER MY DIRECTION AT THE REQUEST OF ALAN K. BLOOMQUIST, MANAGER STRUCTURES DESIGN, BNSF RAILWAY.

PRELIMINARY

ALLISON K. YOUNGER, REGISTERED PROFESSIONAL LAND SURVEYOR IDAHO REGISTRATION NO. 12724

DES:	
DRAWN: KMD	
CHECK: DDHA/AKY	
DATE: SEPT. 2016	
AUTH:	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

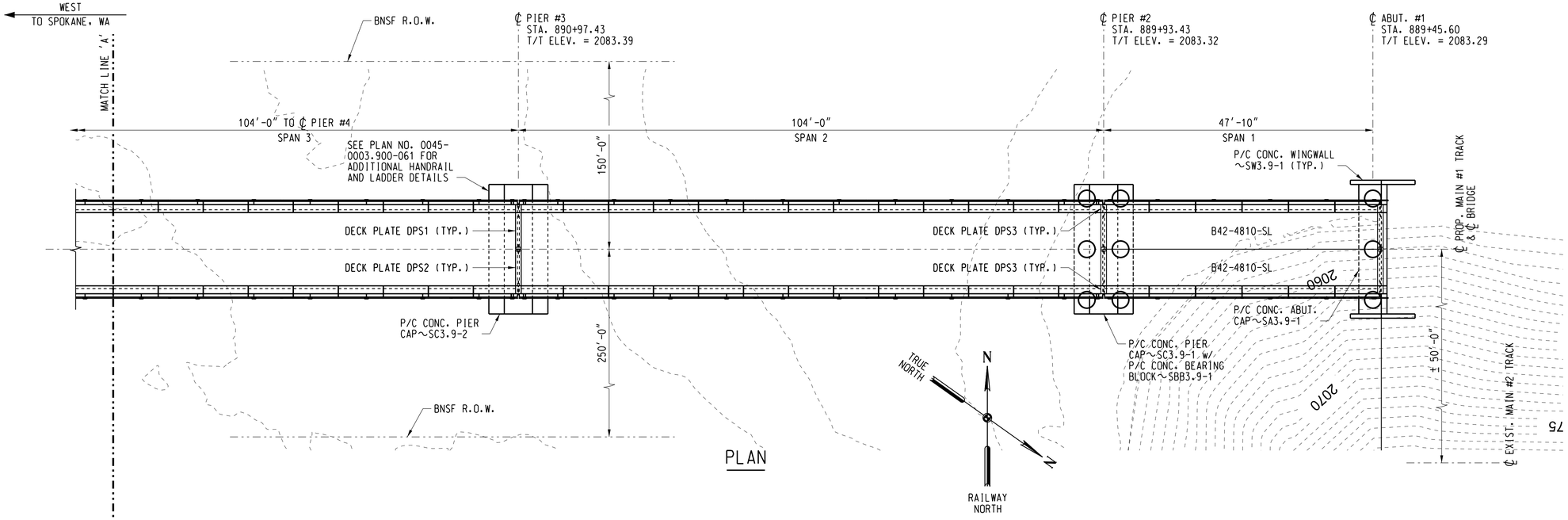
SANDPOINT JCT. ID TO EAST ALGOMA. ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT. ID
PIER PLAN & PROFILES

PLAN NO: 0045-003.900-024 SHEET: 24 OF 24

File Location: I:\ENGINEERING\11\400\400\SHEETS\Sandpoint Bridge\0045-003.900-024.DGN

Date Printed: 9/30/2016 Time Printed: 5:08:01 PM

Attachment F: Proposed Bridge Plans



NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

BRIDGE NUMBER 3.9

OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

GENERAL PLAN & ELEVATION (1 OF 18)

PLAN NO: 0045-0003.900-003 SHEET: 03 OF

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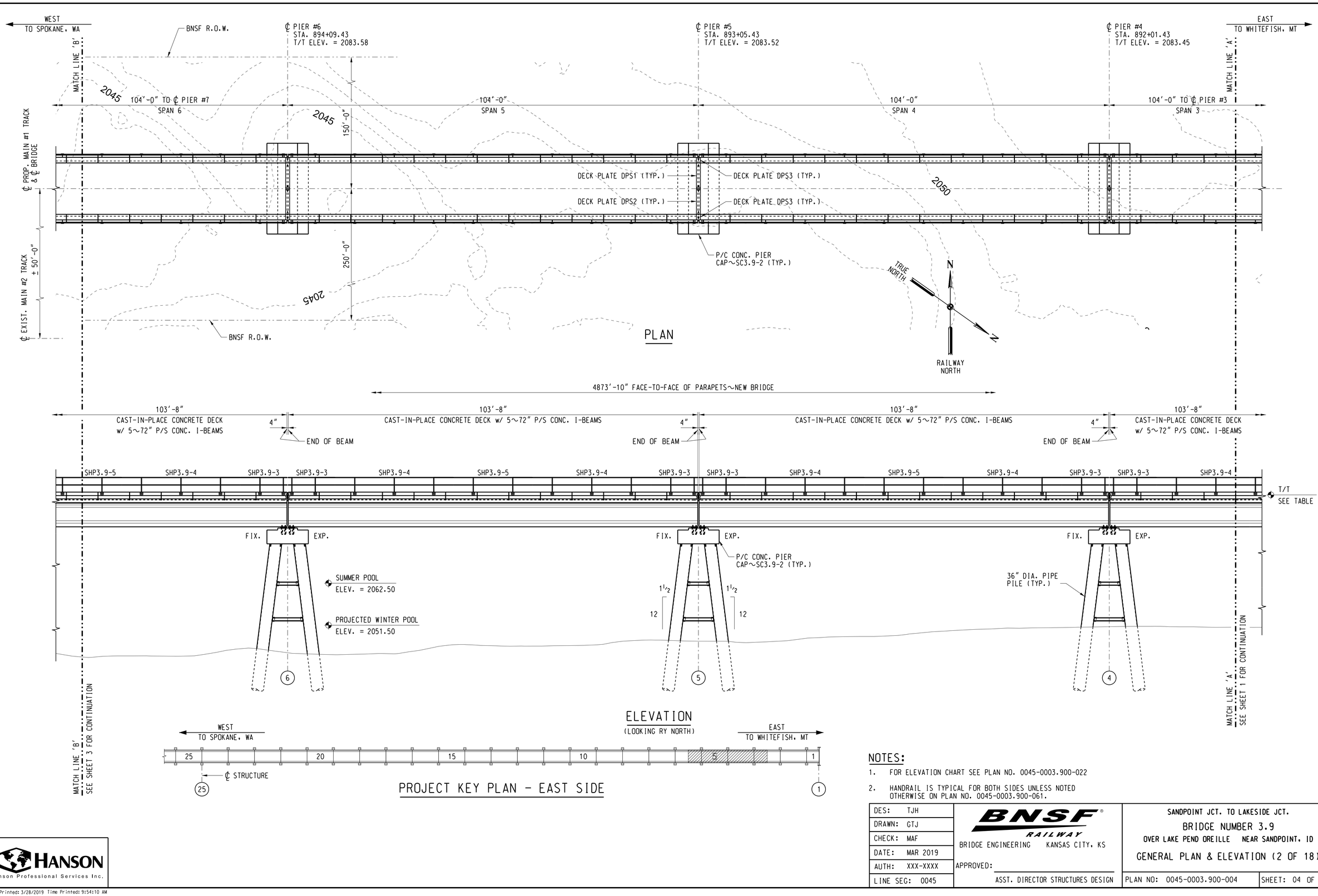

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (2 OF 18)

PLAN NO: 0045-0003.900-004 SHEET: 04 OF

HANSON
Hanson Professional Services Inc.

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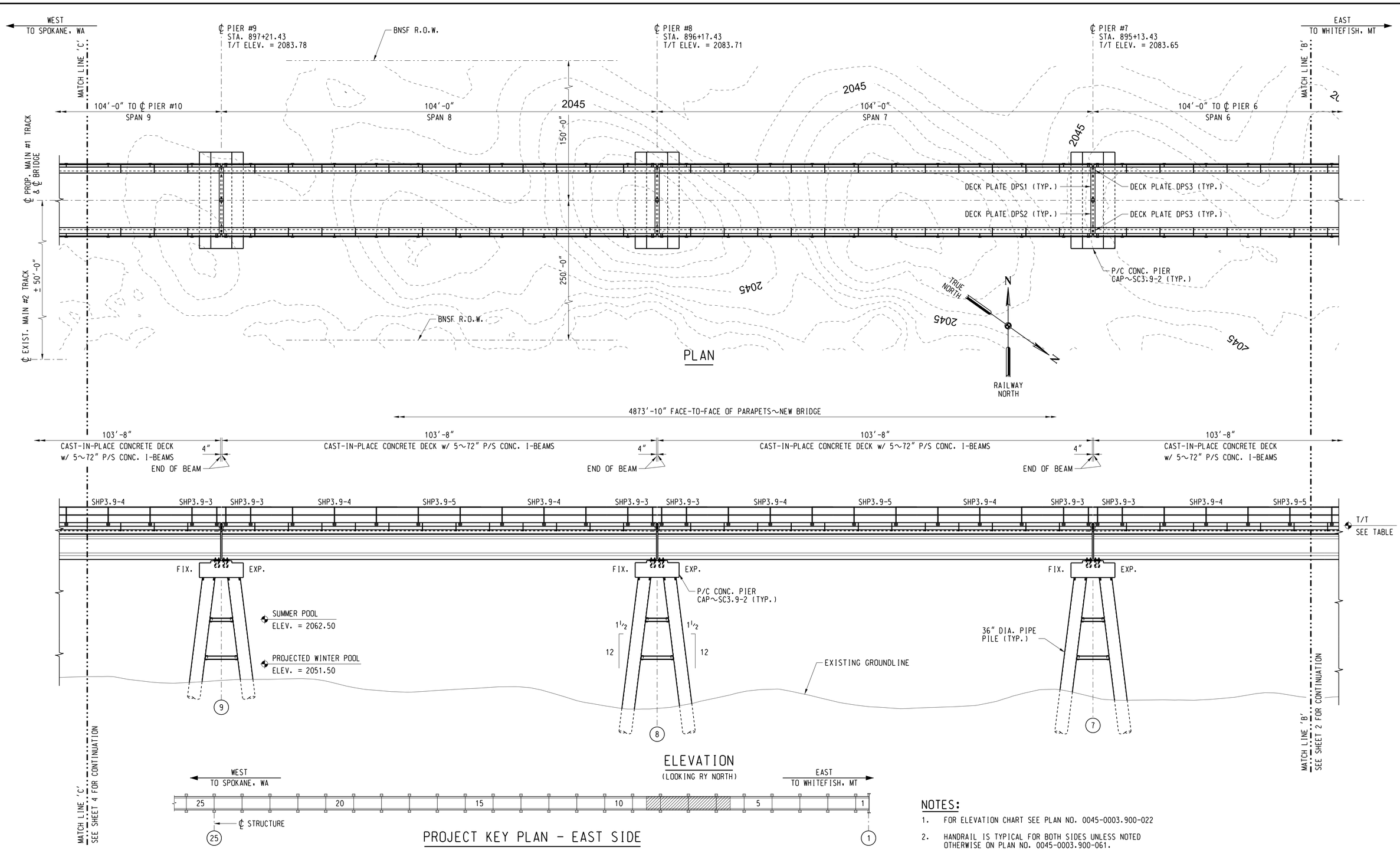

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (3 OF 18)

PLAN NO: 0045-0003.900-005 | SHEET: 05 OF

HANSON
Hanson Professional Services Inc.

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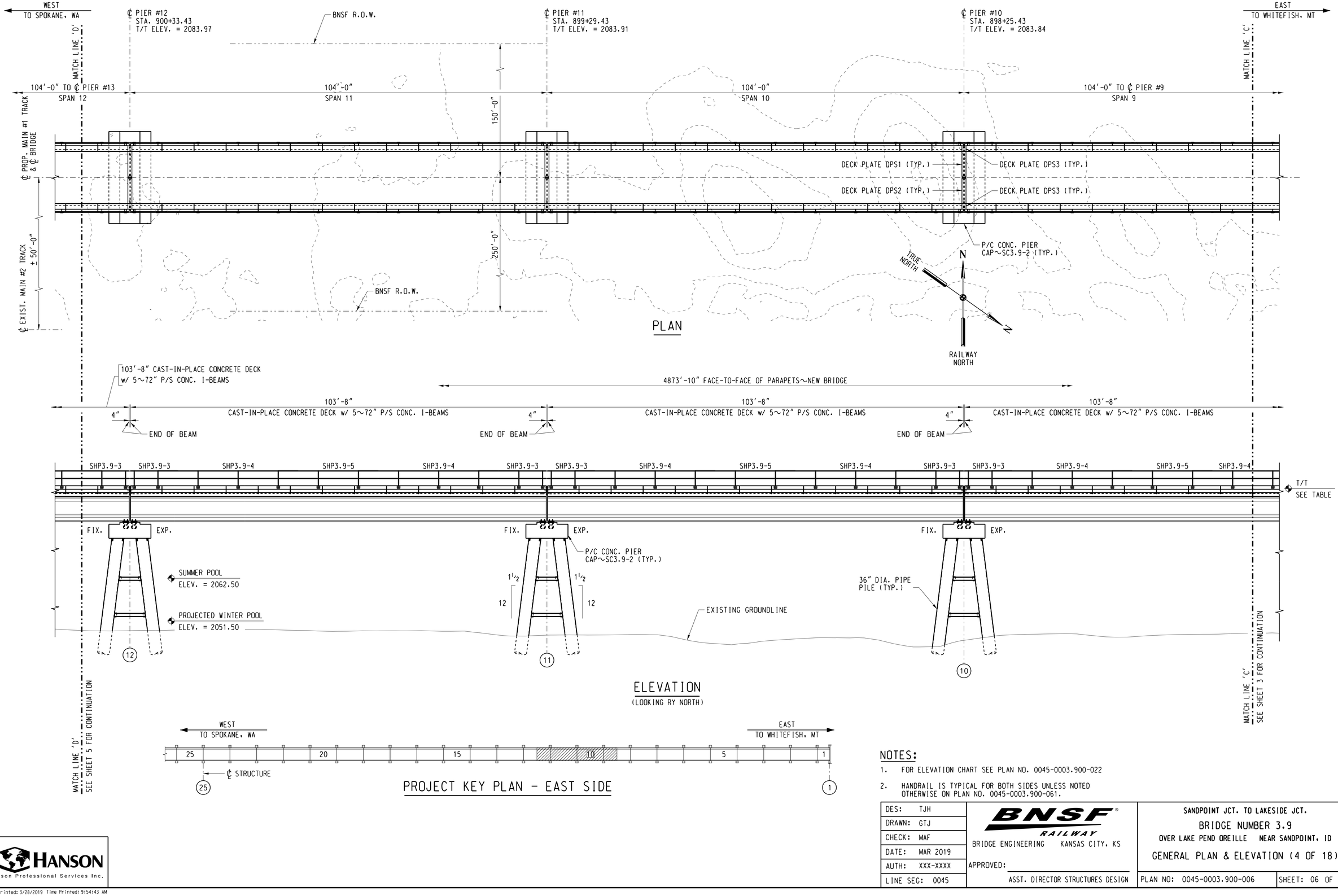

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (4 OF 18)

PLAN NO: 0045-0003.900-006 SHEET: 06 OF

HANSON
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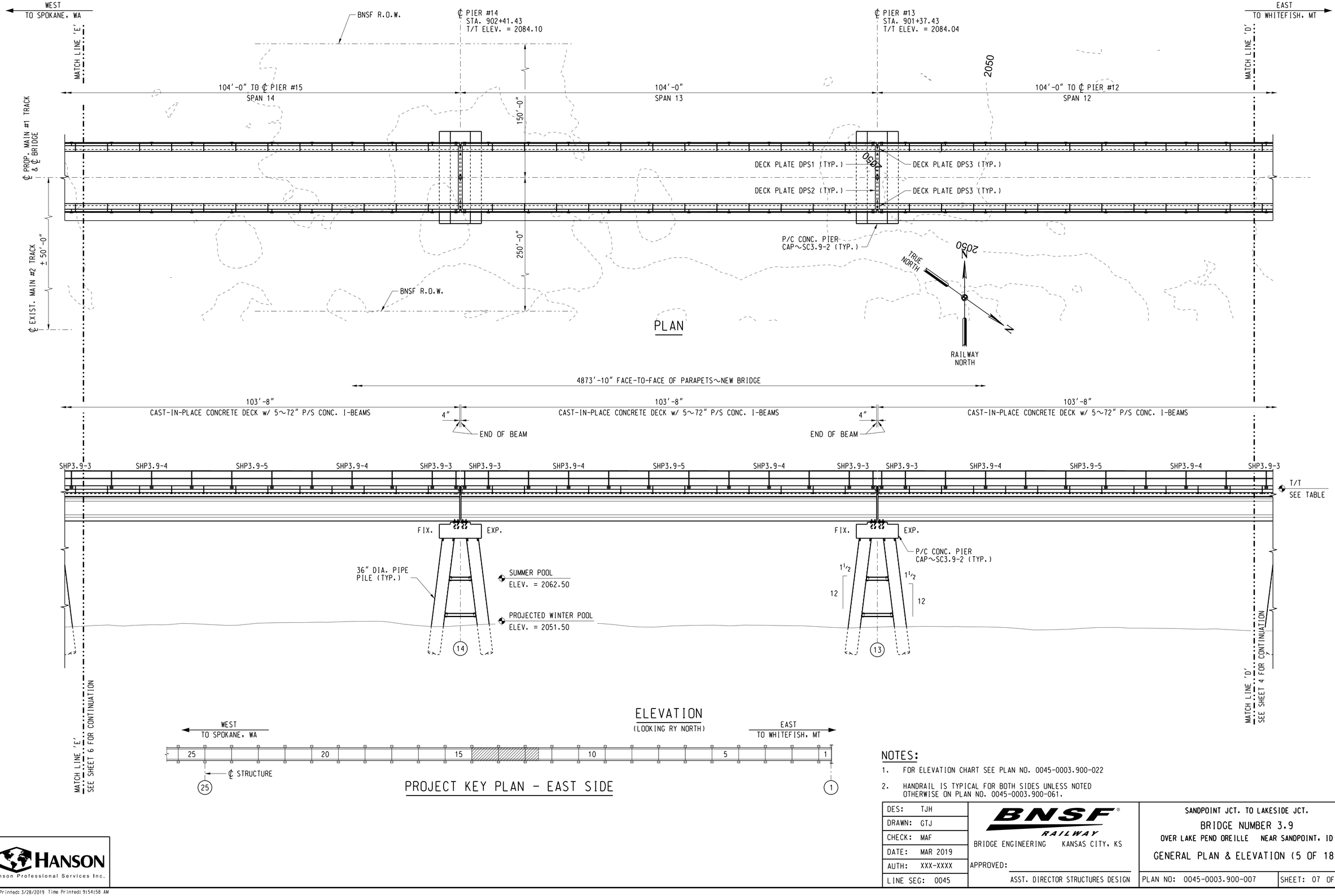

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (5 OF 18)

PLAN NO: 0045-0003.900-007 SHEET: 07 OF

HANSON
Hanson Professional Services Inc.

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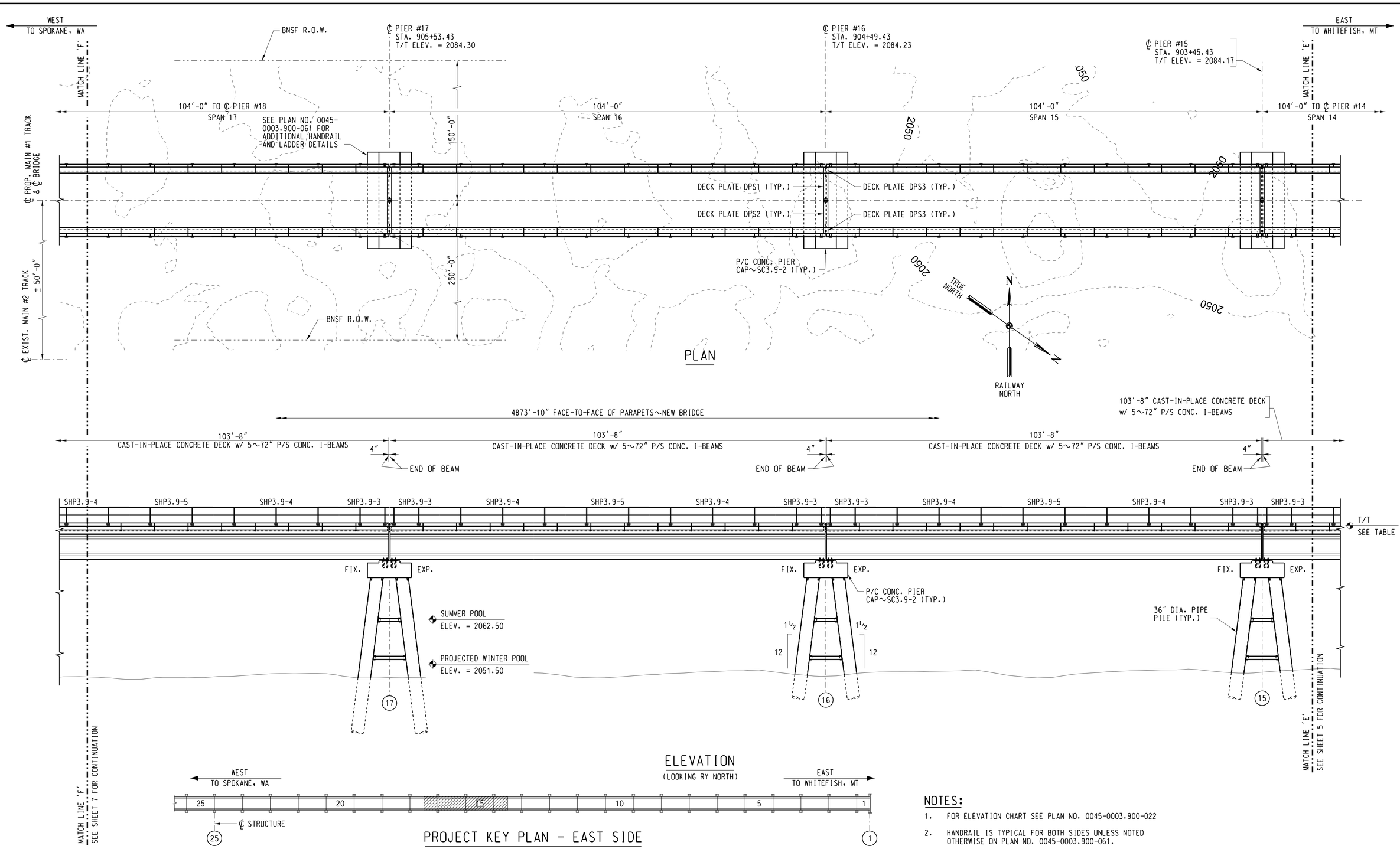

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (6 OF 18)

PLAN NO: 0045-0003.900-008 SHEET: 08 OF

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Hanson Professional Services Inc.

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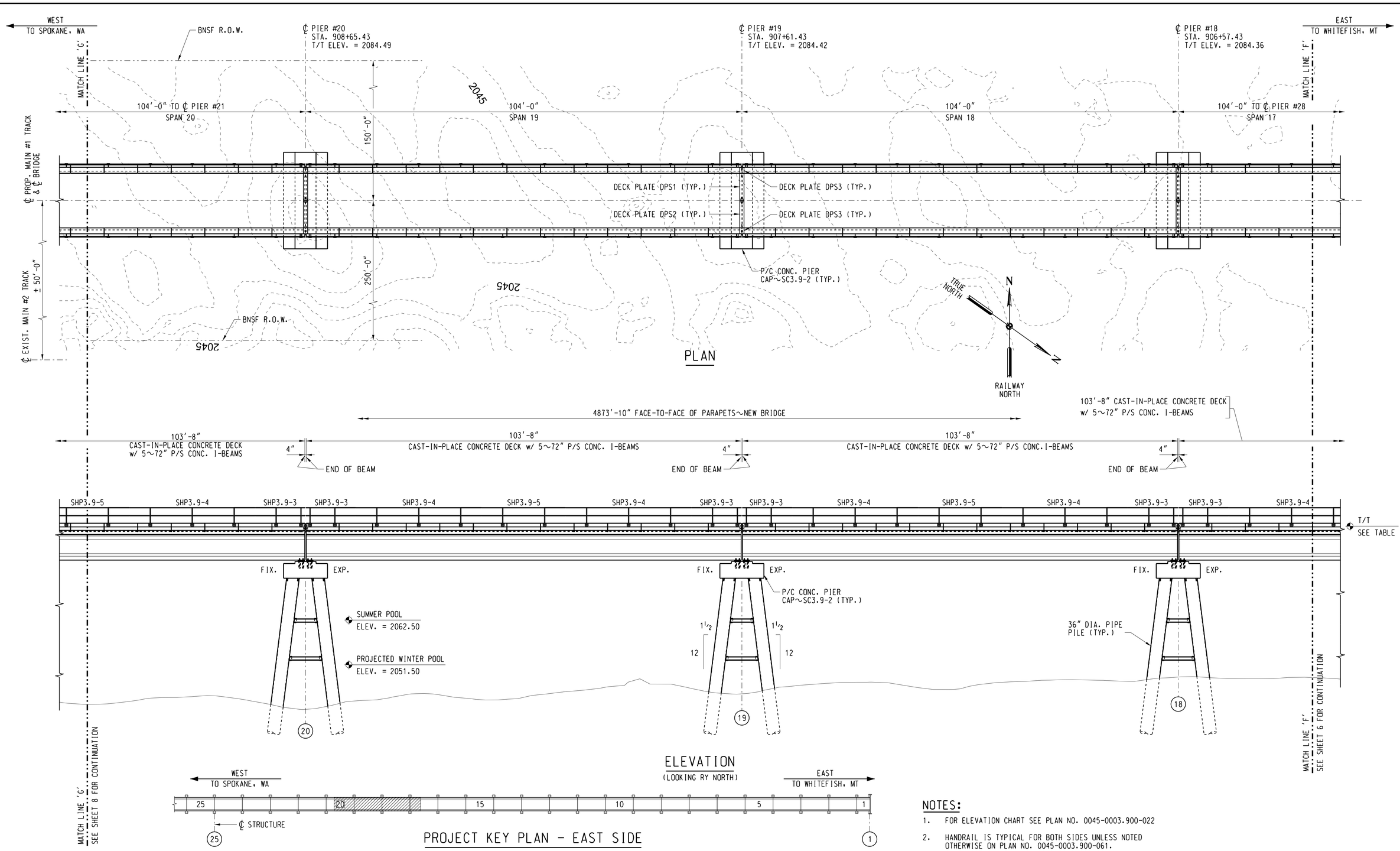

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (7 OF 18)

PLAN NO: 0045-0003.900-009 SHEET: 09 OF

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Hanson Professional Services Inc.

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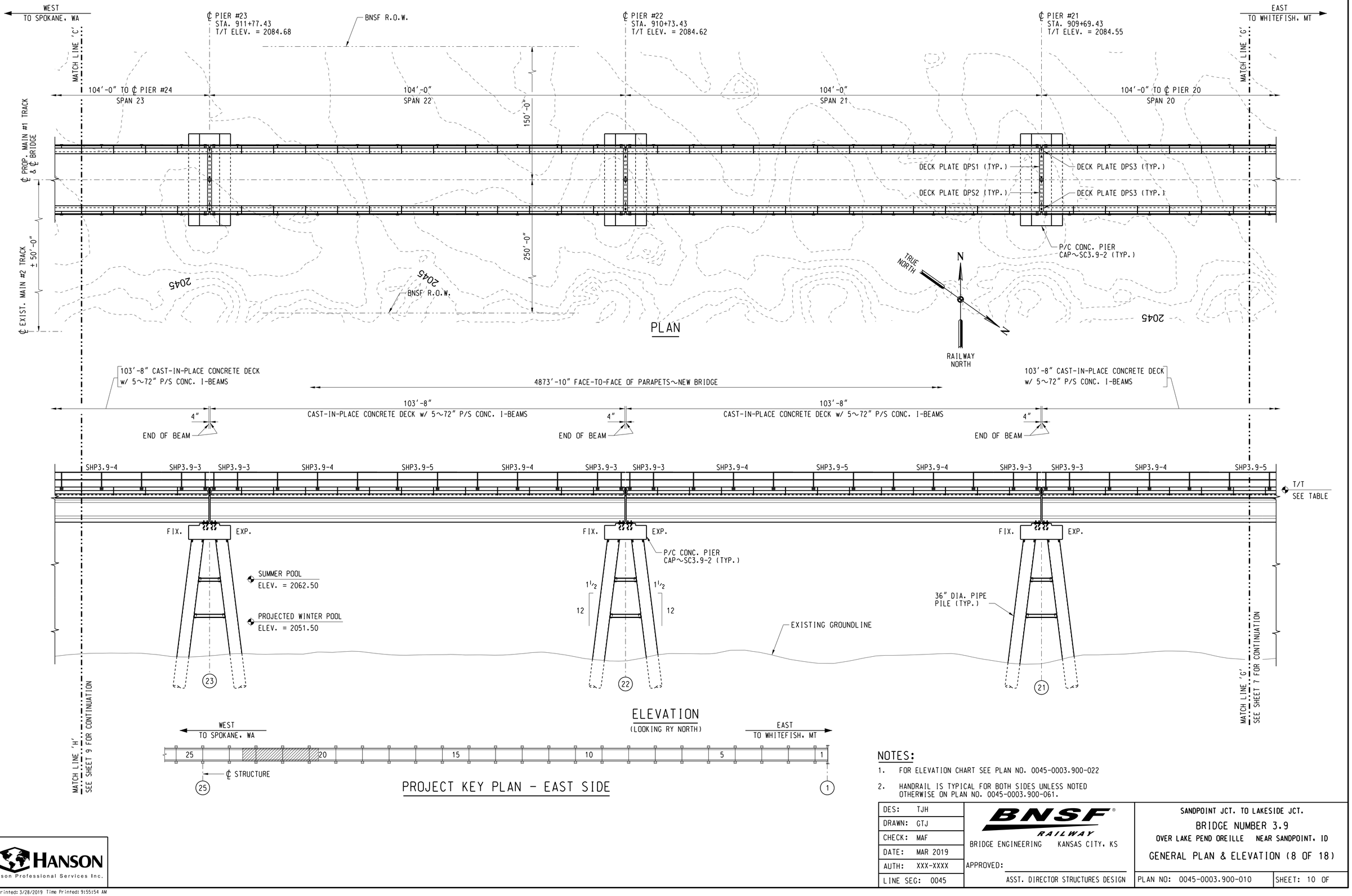

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (8 OF 18)

PLAN NO: 0045-0003.900-010 SHEET: 10 OF

HANSON
Hanson Professional Services Inc.

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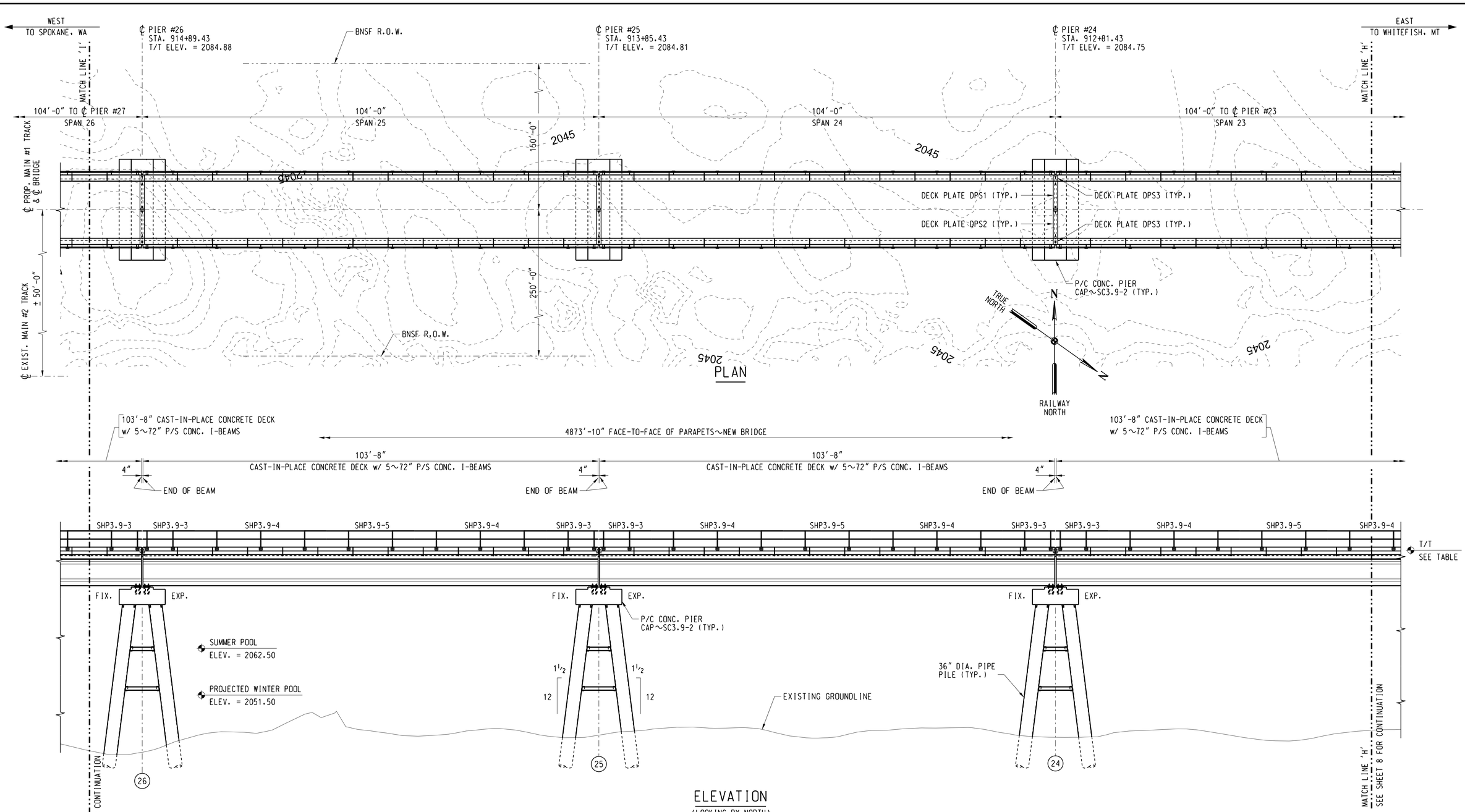

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (9 OF 18)

PLAN NO: 0045-0003.900-011 SHEET: 11 OF

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Hanson Professional Services Inc.

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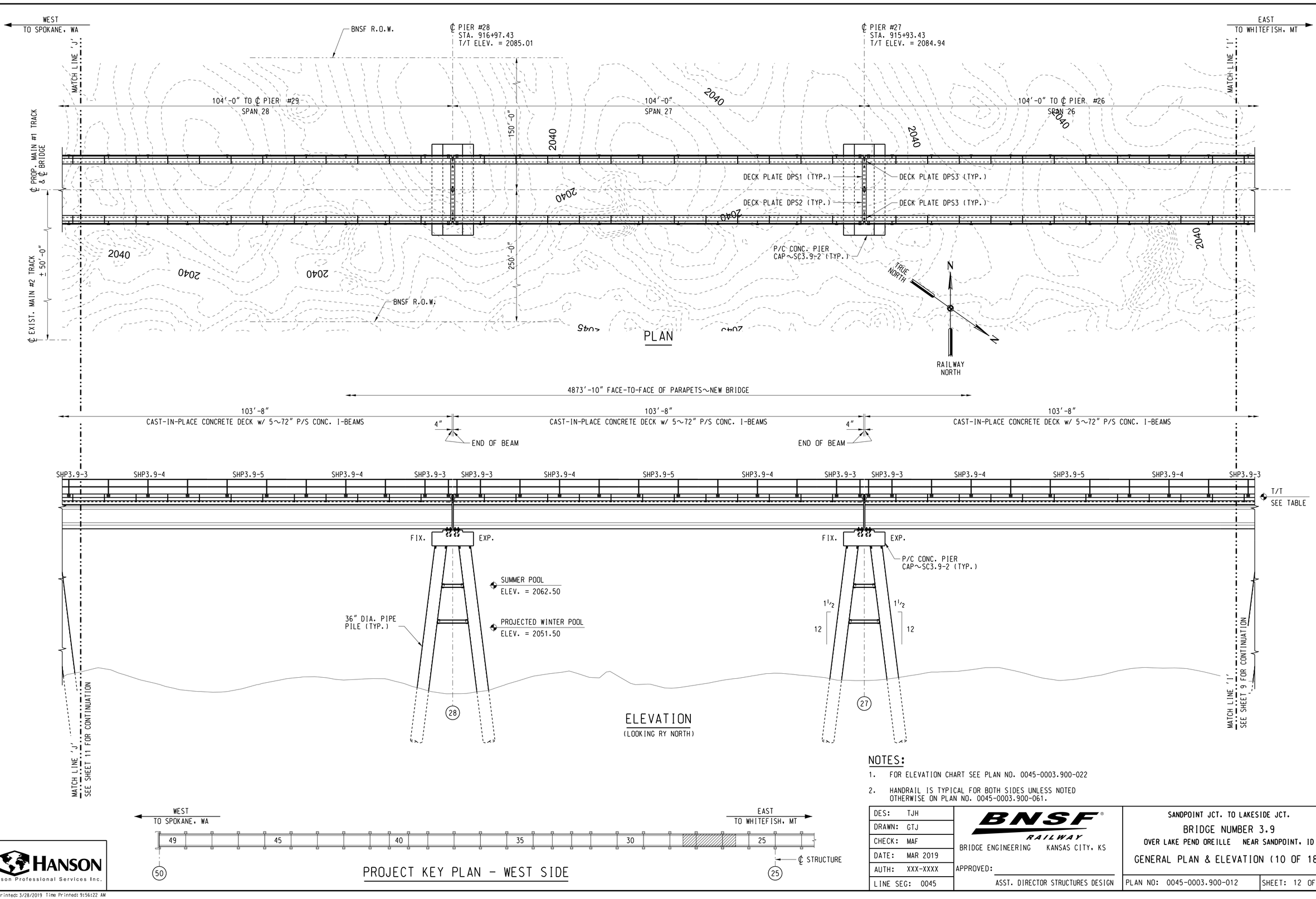

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (10 OF 18)

PLAN NO: 0045-0003.900-012 | SHEET: 12 OF

HANSON
Hanson Professional Services Inc.

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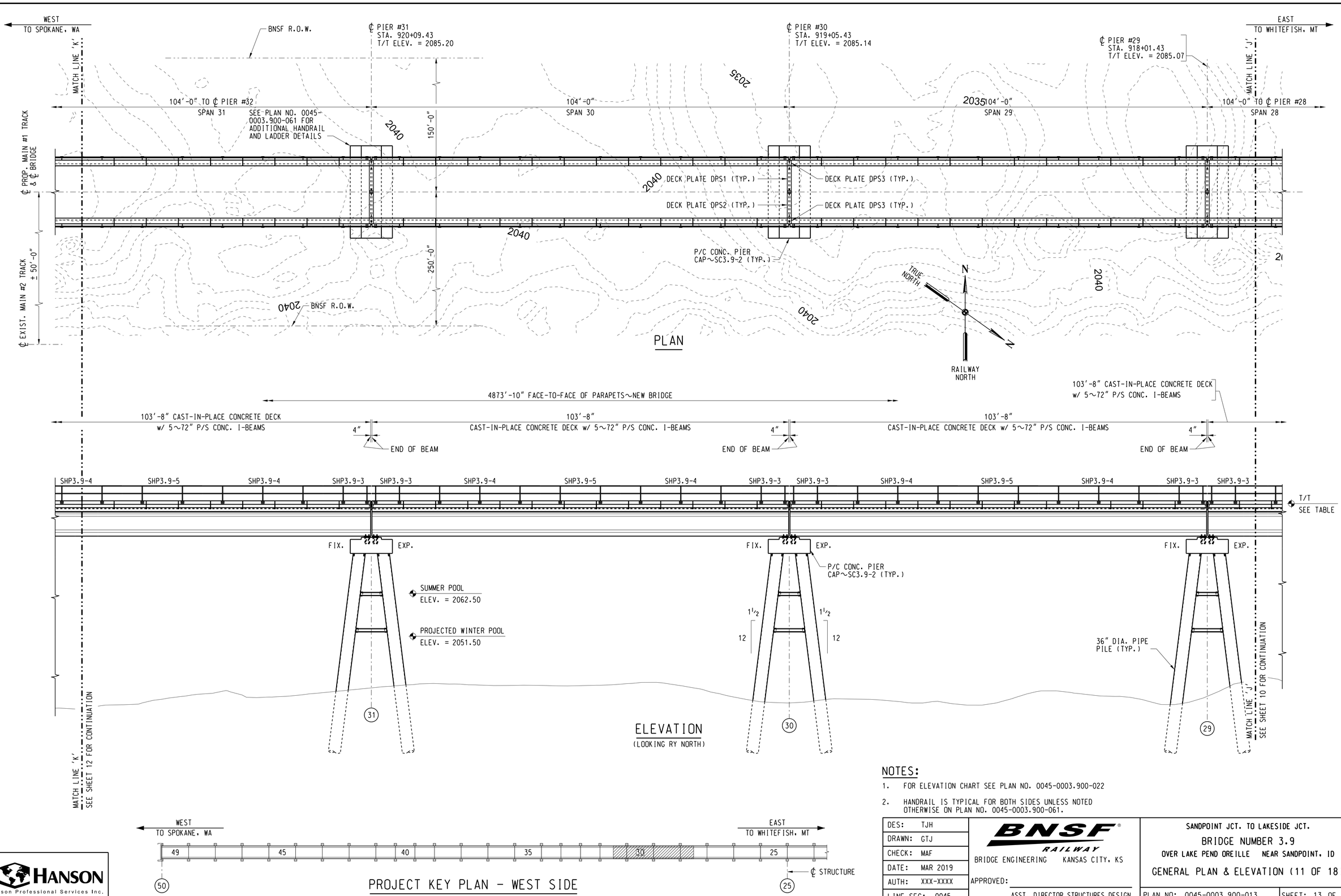

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (11 OF 18)

PLAN NO: 0045-0003.900-013 SHEET: 13 OF

HANSON
Hanson Professional Services Inc.

File Location: E:\Projects\400057\CAD\Struct\Sheet\0039001.dgn
Date Printed: 3/28/2019 Time Printed: 9:56:39 AM

WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

MATCH LINE 'L'

MATCH LINE 'K'

℄ PIER #35
STA. 923+41.18
T/T ELEV. = 2085.41

℄ PIER #34
STA. 922+65.26
T/T ELEV. = 2085.36

℄ PIER #33
STA. 921+89.35
T/T ELEV. = 2085.31

℄ PIER #32
STA. 921+13.43
T/T ELEV. = 2085.27

BNSF R.O.W.

104'-0" TO ℄ PIER #36
SPAN 35

75'-11"
SPAN 34

75'-11"
SPAN 33

75'-11"
SPAN 32

104'-0" TO ℄ PIER #31
SPAN 31

℄ PROP. MAIN #1 TRACK & ℄ BRIDGE

℄ EXIST. MAIN #2 TRACK ± 50'-0"

150'-0"

250'-0"

DECK PLATE DPS1 (TYP.)

DECK PLATE DPS2 (TYP.)

DECK PLATE DPS3 (TYP.)

DECK PLATE DPS3 (TYP.)

P/C CONC. PIER CAP~SC3.9-5 w/ BEARING BLOCK ~SBB3.9-3

P/C CONC. PIER CAP~SC3.9-4 (TYP.)

P/C CONC. PIER CAP~SC3.9-3 w/ BEARING BLOCK ~SBB3.9-2

2025
2030
2035
2040
2045

TRUE NORTH

N

RAILWAY NORTH

PLAN

103'-8" CAST-IN-PLACE CONCRETE DECK w/ 4~53" WELDED PLATE GIRDERS

4873'-10" FACE-TO-FACE OF PARAPETS~NEW BRIDGE

103'-8" CAST-IN-PLACE CONCRETE DECK w/ 5~72" P/S CONC. I-BEAMS

75'-7" CAST-IN-PLACE CONCRETE DECK w/ 4~63" P/S CONC. I-BEAMS

75'-7" CAST-IN-PLACE CONCRETE DECK w/ 4~63" P/S CONC. I-BEAMS

75'-7" CAST-IN-PLACE CONCRETE DECK w/ 4~63" P/S CONC. I-BEAMS

4"

END OF BEAM

SHP3.9-4 SHP3.9-3 SHP3.9-6 SHP3.9-4 SHP3.9-6 SHP3.9-6 SHP3.9-4 SHP3.9-6 SHP3.9-6 SHP3.9-4 SHP3.9-6 SHP3.9-3 SHP3.9-4

T/T SEE TABLE

P/C CONC. BEARING BLOCK~SBB3.9-3

P/C CONC. PIER CAP~SC3.9-5

FIX.

EXP.

EXIST. CLR. ± 16'-4¾"

PROP. CLR. ±15'-4"

EXIST. CLR. ± 16'-4¾"

PROP. CLR. ±15'-3½"

PROP. CLR. ±15'-3"

P/C CONC. BEARING BLOCK~SBB3.9-2

P/C CONC. PIER CAP~SC3.9-3

SUMMER POOL
ELEV. = 2062.50

PROJECTED WINTER POOL
ELEV. = 2051.50

1½

12

36" DIA. PIPE PILE (TYP.)

EXISTING GROUNDLINE

ELEVATION
(LOOKING RY NORTH)

MATCH LINE 'L'
SEE SHEET 13 FOR CONTINUATION

MATCH LINE 'K'
SEE SHEET 11 FOR CONTINUATION

35 34 33 32

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

49 45 40 35 30 25

℄ STRUCTURE

50 25

PROJECT KEY PLAN - WEST SIDE

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

BRIDGE NUMBER 3.9

OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

GENERAL PLAN & ELEVATION (12 OF 18)

PLAN NO: 0045-0003.900-014 SHEET: 14 OF

HANSON
Hanson Professional Services Inc.

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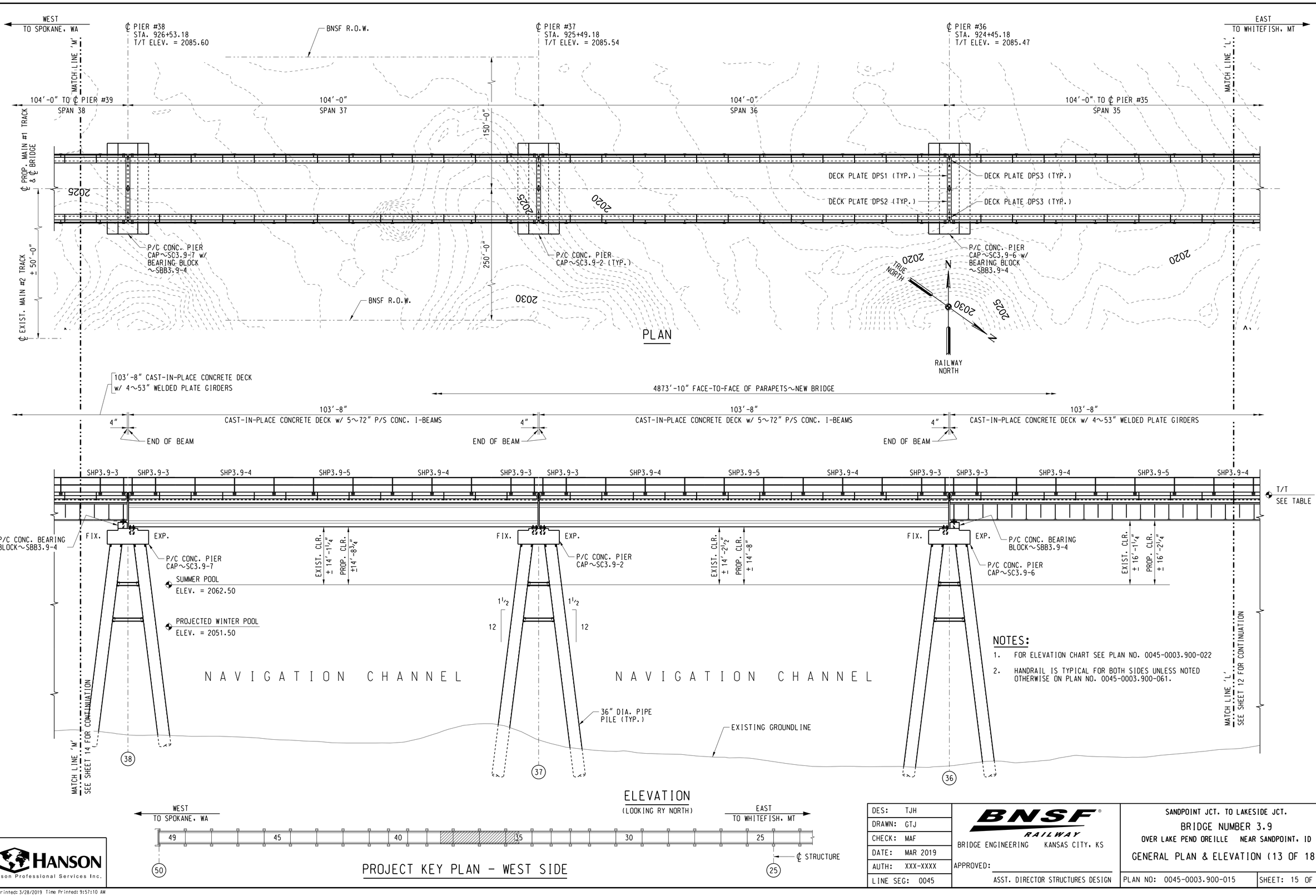

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (13 OF 18)

PLAN NO: 0045-0003.900-015 SHEET: 15 OF

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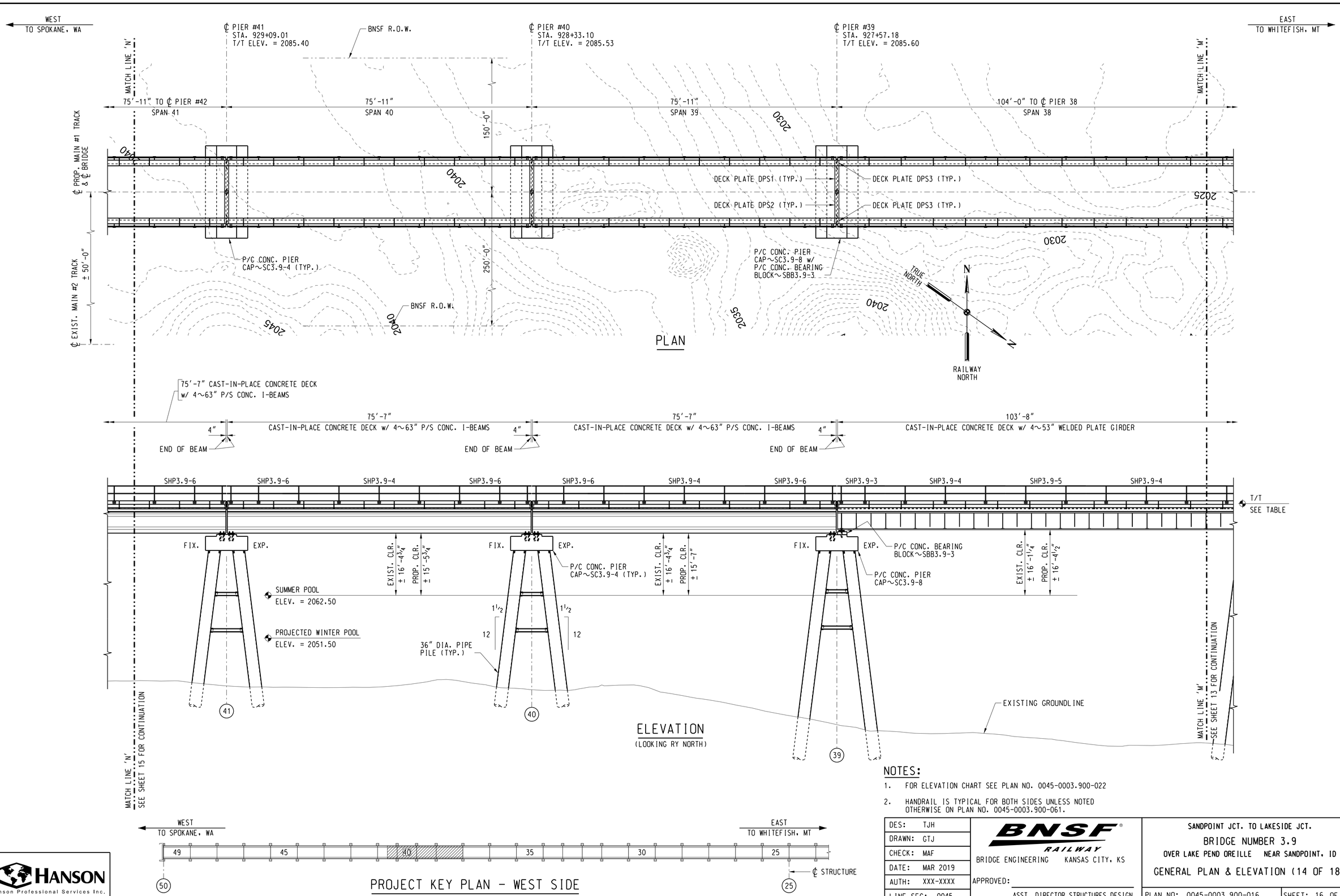

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (14 OF 18)

PLAN NO: 0045-0003.900-016 SHEET: 16 OF

HANSON
Hanson Professional Services Inc.

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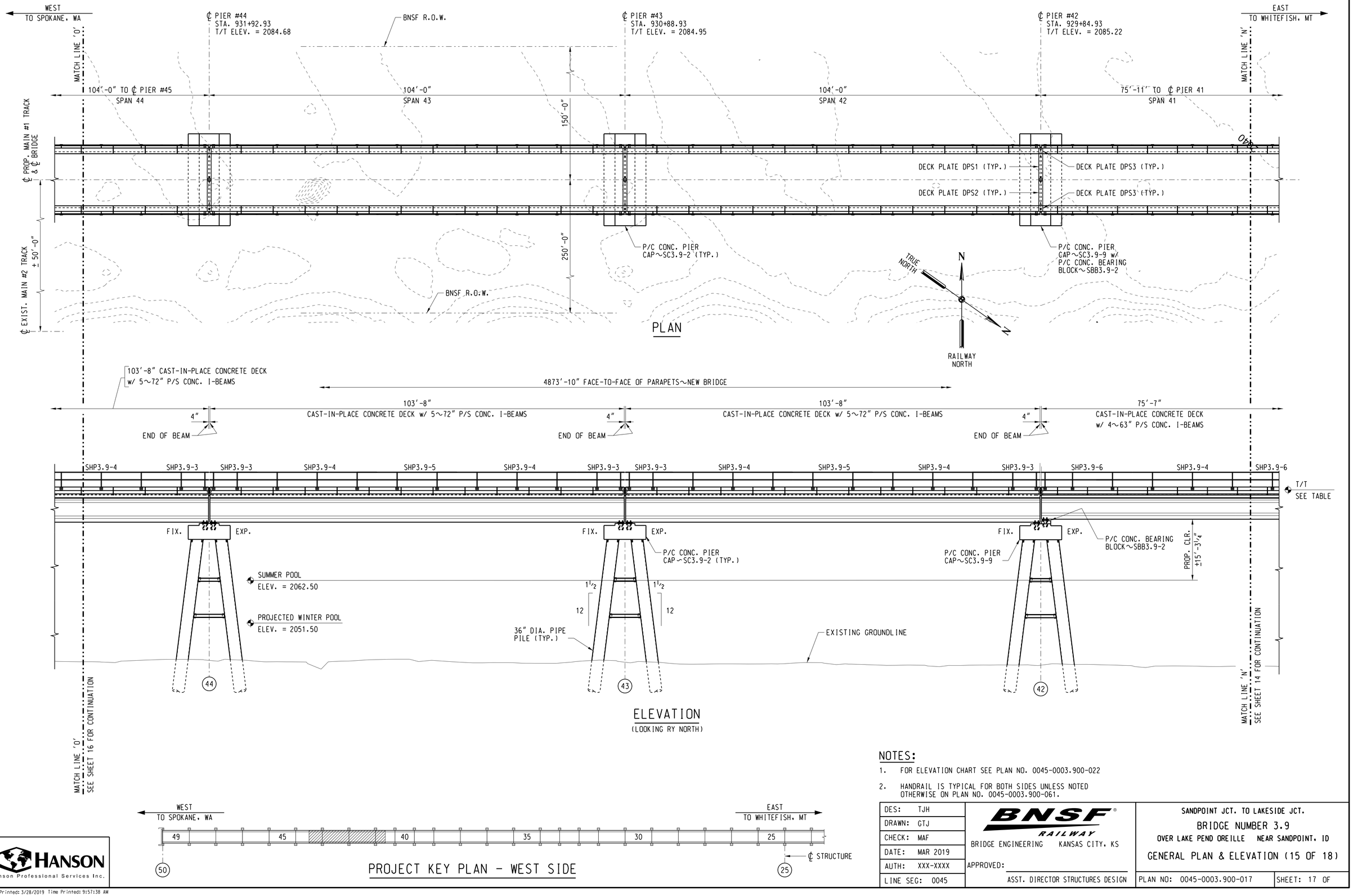

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

BRIDGE NUMBER 3.9

OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

GENERAL PLAN & ELEVATION (15 OF 18)

PLAN NO: 0045-0003.900-017 SHEET: 17 OF

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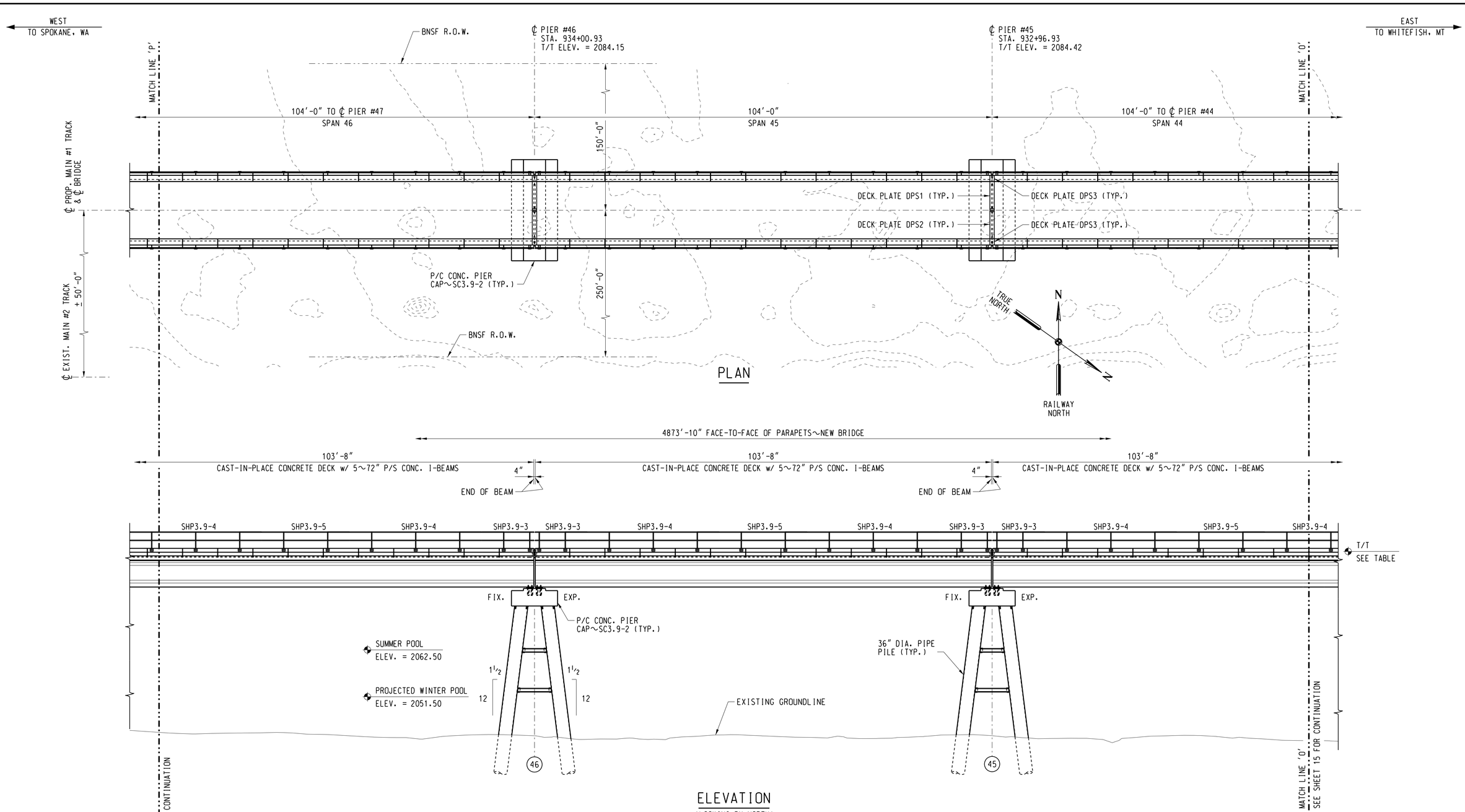
Date Printed: 3/28/2019 Time Printed: 9:57:38 AM



NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (16 OF 18)

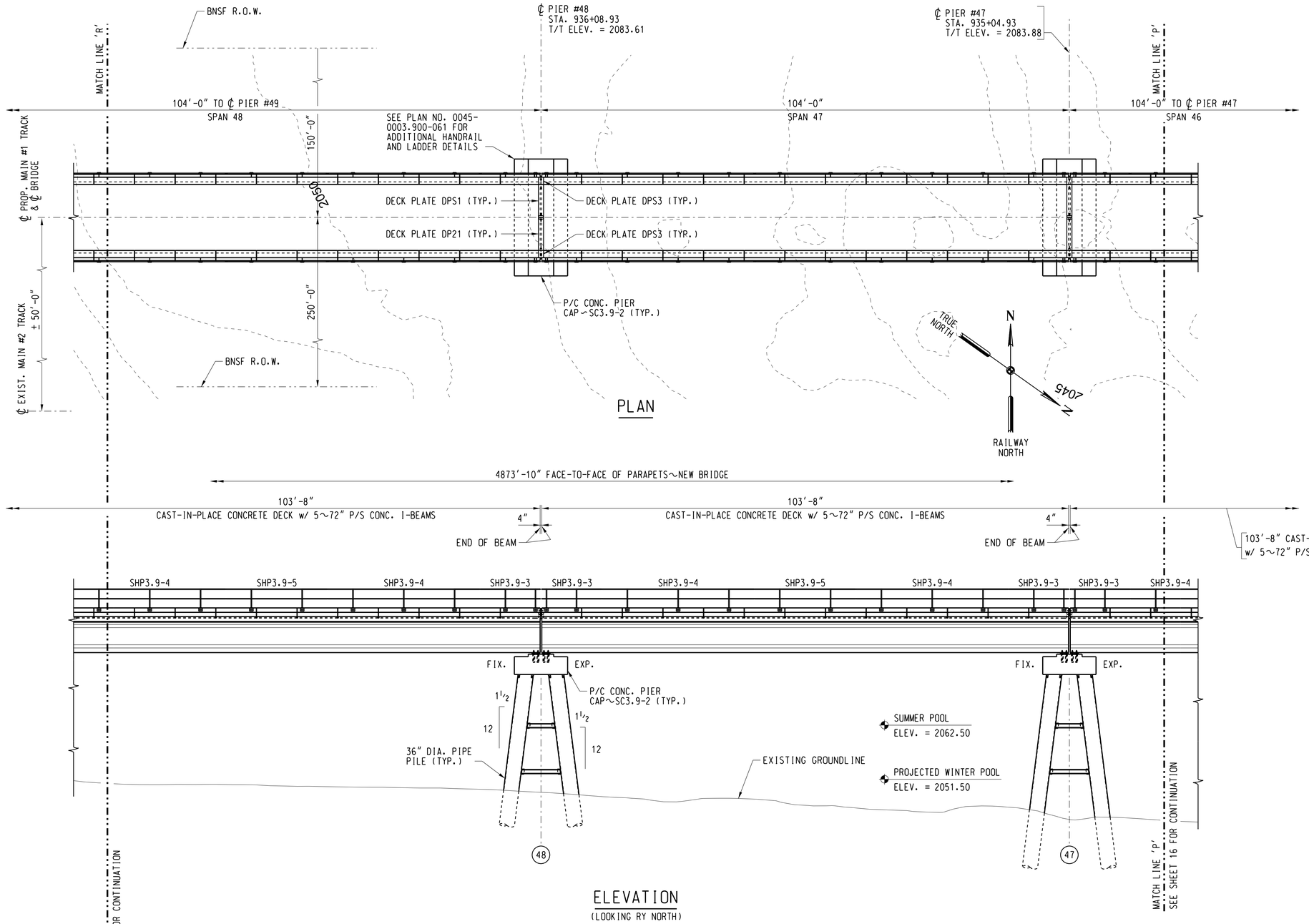
PLAN NO: 0045-0003.900-018 SHEET: 18 OF

HANSON
Hanson Professional Services Inc.

File Location: N:\Projects\450057\CAD\Struct\Sheet\0039018.dgn
Date Printed: 3/28/2019 Time Printed: 9:57:50 AM

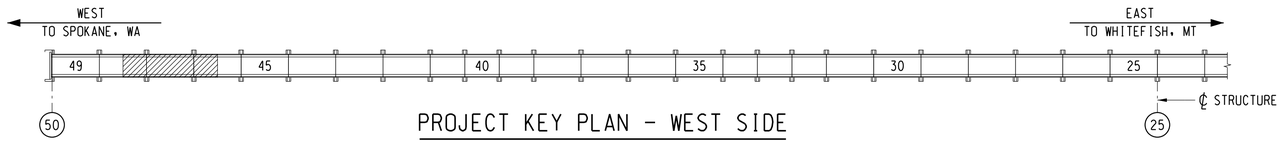
WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT



NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.



PROJECT KEY PLAN - WEST SIDE

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (17 OF 18)

PLAN NO: 0045-0003.900-019 | SHEET: 19 OF

File Location: E:\Projects\4800577\CAD\Struct\Sheet\0045000019.dgn

Date Printed: 3/28/2019 Time Printed: 9:58:01 AM

WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

℄ ABUT. #50
STA. 938+16.93
T/T ELEV. = 2083.08

BNSF R.O.W.

℄ PIER #49
STA. 937+12.93
T/T ELEV. = 2083.35

MATCH LINE 'R'

104'-0"
SPAN 49

104'-0" TO ℄ PIER #48
SPAN 48

150'-0"

℄ PROP. MAIN #1 TRACK
& ℄ BRIDGE

SHP3.9-9

SHP3.9-9

DECK PLATE DPS1 (TYP.)

DECK PLATE DPS2 (TYP.)

DECK PLATE DPS3 (TYP.)

DECK PLATE DPS3 (TYP.)

C.I.P. CONC. ABUT.

P/C CONC. PIER
CAP~SC3.9-2

℄ EXIST. MAIN #2 TRACK
± 50'-0"

250'-0"

2070

2075

BNSF R.O.W.

2070

2065

2060

2055

PLAN

TRUE NORTH

N

RAILWAY NORTH

4873'-10" FACE-TO-FACE OF PARAPETS~NEW BRIDGE

4"

103'-8"
CAST-IN-PLACE CONCRETE DECK WITH 5~72" P/S CONC. I-BEAMS

4"

103'-8"
CAST-IN-PLACE CONCRETE DECK WITH
5~72" P/S CONC. I-BEAMS

FACE OF PARAPET

END OF BEAM

END OF BEAM

SHP3.9-8 SHP3.9-7 SHP3.9-4 SHP3.9-5 SHP3.9-4 SHP3.9-3 SHP3.9-3 SHP3.9-4

T/T
SEE TABLE

EXP.

C.I.P. CONC.
ABUT.

FIX.

EXP.

P/C CONC. PIER
CAP~SC3.9-2

HP14x117 x 50'-0" w/
REINFORCED PILE TIPS (TYP.)

2
1

1½

12

ON PROP.
GROUNDLINE

36" DIA. PIPE
PILE (TYP.)

EXISTING GROUNDLINE

36" DIA. PIPE
PILE (TYP.)

SUMMER POOL
ELEV. = 2062.50

PROJECTED WINTER POOL
ELEV. = 2051.50

MATCH LINE 'R'
SEE SHEET 17 FOR CONTINUATION

50

49

ELEVATION
(LOOKING RY NORTH)

NOTES:

1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

49 45 40 35 30 25

℄ STRUCTURE

50

25

PROJECT KEY PLAN - WEST SIDE

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (18 OF 18)

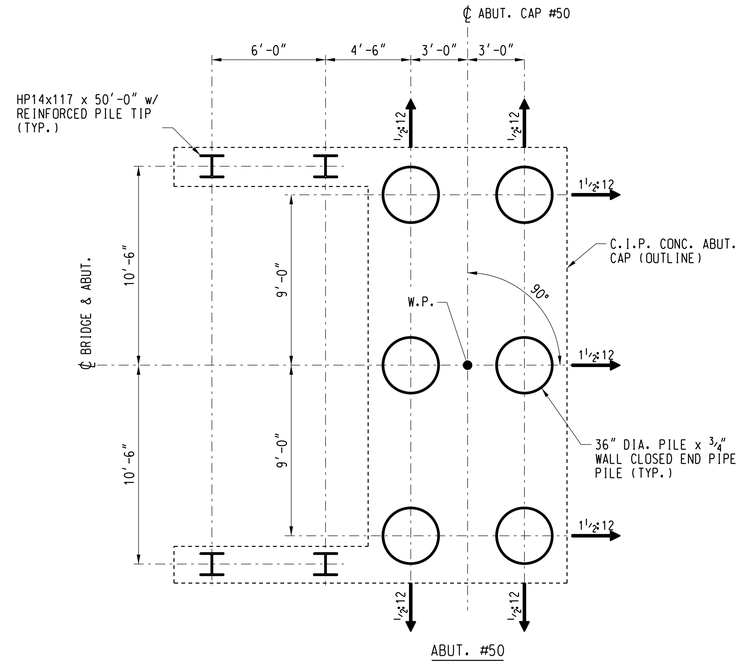
PLAN NO: 0045-0003.900-020 SHEET: 20 OF

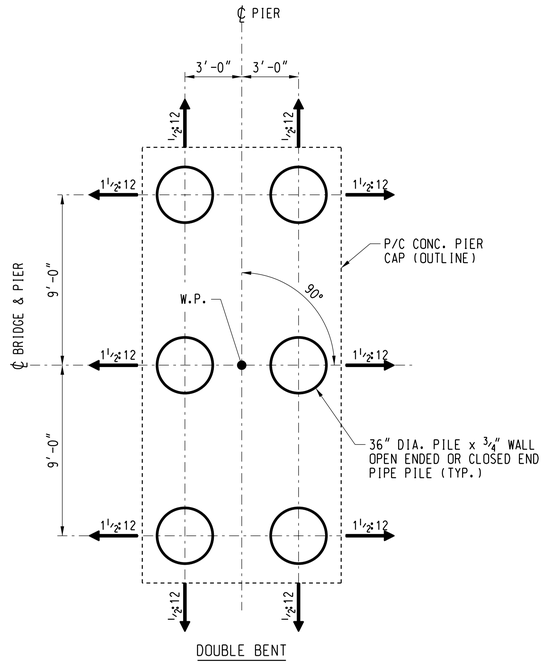
File Locations: E:\Hpw\HR0057\CAD\Struct\Sheet\0020020.dgn

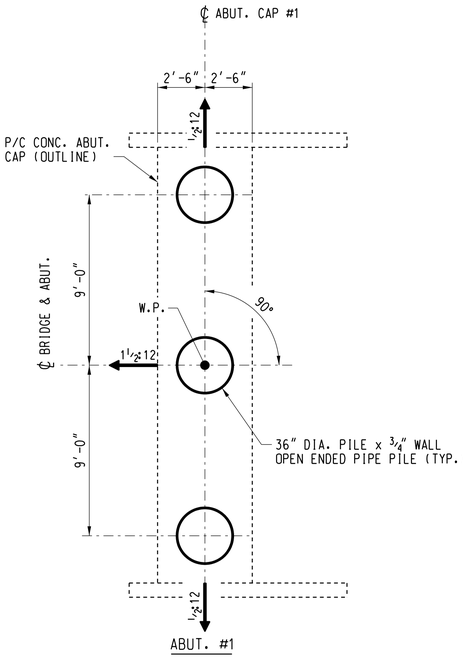
Date Printed: 3/28/2019 Time Printed: 9:58:15 AM

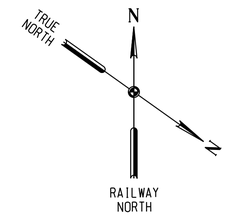
WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT

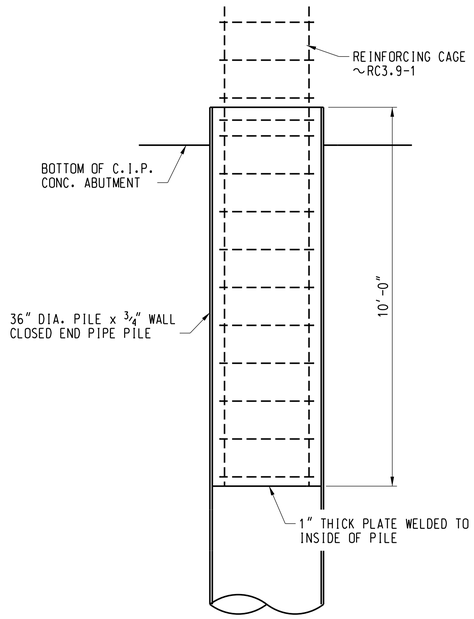




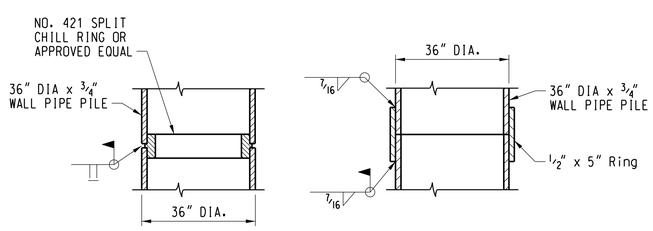




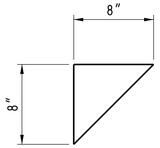
TYPICAL PILE LAYOUT DIAGRAMS - PIERS & ABUTMENTS



TYPICAL ABUT. #50 PILES

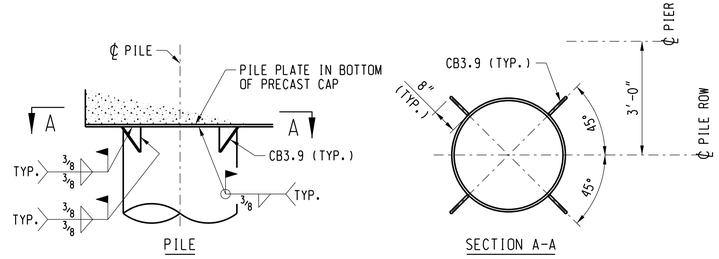


ALTERNATE PIPE PILE SPLICE DETAILS



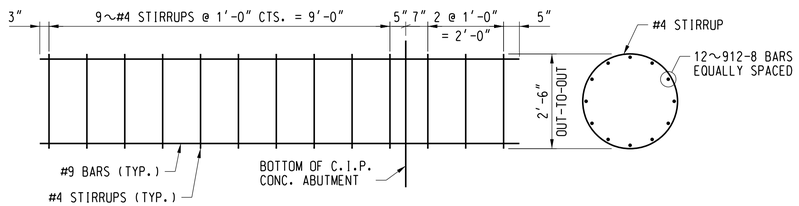
CONNECTION BAR CB3.9

1~BAR 8" x ¾" x 0'-8"
WEIGHT = 6.8 LBS.



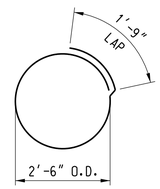
PILE-TO-PIER DETAILS

AFTER PRECAST CAP IS SET IN PROPER LOCATION AND EPOXY MORTAR BETWEEN PILE AND CAP HAS HARDENED, PLACE AND WELD 4~CB3.9'S PER PILE AS SHOWN. BURNING THE SIDE OF CB3.9 AS REQUIRED TO FIT BATTERED PILES. PAINT CB3.9'S & PILE PLATES AFTER WELDING.



REINFORCING CAGE - RC3.9-1

12~#9 BARS x 12'-8"
13~#4 STIRRUPS
WEIGHT (EACH CAGE) = 601 LBS.



#4 STIRRUP

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PILE LAYOUT PLAN & DETAILS

PLAN NO: 0045-0003.900-021 SHEET: 21 OF

File Locations: E:\4pdoc\1450037\CAD\Struct\Sheet\00390021.dgn

Date Printed: 3/28/2019 Time Printed: 9:58:32 AM

TABLE OF ELEVATIONS - BRIDGE 3.9

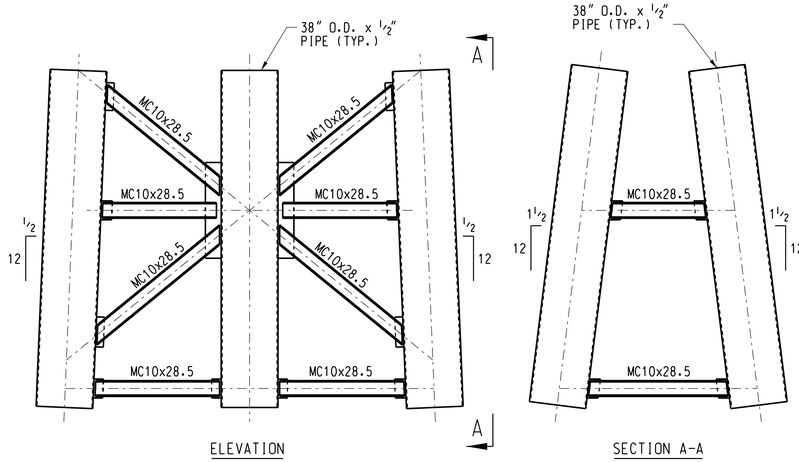
LOCATION	TOP/TIE	BRIDGE SEAT ELEVATION	PILE CUTOFF ELEVATION	ESTIMATED TIP ELEVATION	ESTIMATED PILE LENGTH (FT)	MIN. ULT RESISTANCE (TONS)	T/T TO PILE CUTOFF	BRACING HEIGHT	BRACE 'A' DIMENSION	BRACE 'B' DIMENSION	W.P.	
											NORTHING	EASTING
ABUT. 1	2083.29	2078.40	2074.40	1950.4	124	400	8′-10¾″	-	-	-	56571.02	33071.74
PIER 2	2083.32	2078.43 / 2074.82	2070.82	1918.8	152	415	12′-6″	15′-3¾″	8′-2″	10′-1″	56532.05	33099.48
PIER 3	2083.39	2074.88	2070.88	1898.9	172	570	12′-6″	15′-4½″	8′-2″	10′-1¼″	56447.33	33159.79
PIER 4	2083.45	2074.95	2070.95	1899.0	172	570	12′-6″	15′-5½″	8′-2¼″	10′-1¼″	56362.60	33220.10
PIER 5	2083.52	2075.01	2071.01	1899.0	172	570	12′-6″	15′-6″	8′-2¼″	10′-1½″	56277.88	33280.42
PIER 6	2083.58	2075.07	2071.07	1899.1	172	570	12′-6″	15′-6¾″	8′-2½″	10′-1¾″	56193.15	33340.73
PIER 7	2083.65	2075.13	2071.13	1899.1	172	570	12′-6¼″	15′-7½″	8′-2½″	10′-2″	56108.43	33401.04
PIER 8	2083.71	2075.20	2071.20	1895.2	176	570	12′-6″	15′-8½″	8′-2½″	10′-2″	56023.70	33461.36
PIER 9	2083.78	2075.26	2071.26	1895.3	176	570	12′-6¼″	15′-9″	8′-2¾″	10′-2¼″	55938.98	33521.67
PIER 10	2083.84	2075.32	2071.32	1895.3	176	570	12′-6¼″	15′-9¾″	8′-2¾″	10′-2½″	55854.25	33581.99
PIER 11	2083.91	2075.38	2071.38	1895.4	176	570	12′-6¼″	15′-10½″	8′-3″	10′-2¾″	55769.53	33642.30
PIER 12	2083.97	2075.45	2071.45	1895.5	176	570	12′-6¼″	15′-11½″	8′-3″	10′-3″	55684.80	33702.61
PIER 13	2084.04	2075.51	2071.51	1895.5	176	570	12′-6¼″	16′-0″	8′-3″	10′-3″	55600.08	33762.93
PIER 14	2084.10	2075.57	2071.57	1895.6	176	570	12′-6¼″	16′-0¾″	8′-3″	10′-3¼″	55515.36	33823.24
PIER 15	2084.17	2075.63	2071.63	1895.6	176	570	12′-6½″	16′-1½″	8′-3¼″	10′-3¼″	55430.63	33883.55
PIER 16	2084.23	2075.70	2071.70	1895.7	176	570	12′-6¼″	16′-2½″	8′-3¼″	10′-3½″	55345.91	33943.87
PIER 17	2084.30	2075.76	2071.76	1895.8	176	570	12′-6½″	16′-3″	8′-3¼″	10′-3¾″	55261.18	34004.18
PIER 18	2084.36	2075.82	2071.82	1895.8	176	570	12′-6½″	16′-3¾″	8′-3½″	10′-4″	55176.46	34064.49
PIER 19	2084.42	2075.88	2071.88	1895.9	176	570	12′-6½″	16′-4½″	8′-3½″	10′-4¼″	55091.73	34124.81
PIER 20	2084.49	2075.95	2071.95	1896.0	176	570	12′-6½″	16′-5½″	8′-3¾″	10′-4¼″	55007.01	34185.12
PIER 21	2084.55	2076.01	2072.01	1896.0	176	570	12′-6½″	16′-6″	8′-3¾″	10′-4½″	54922.28	34245.43
PIER 22	2084.62	2076.07	2072.07	1895.1	177	570	12′-6½″	16′-6¾″	8′-3¾″	10′-4¾″	54837.56	34305.75
PIER 23	2084.68	2076.13	2072.13	1895.1	177	570	12′-6½″	16′-7½″	8′-4″	10′-5″	54752.83	34366.06
PIER 24	2084.75	2076.19	2072.19	1895.2	177	570	12′-6¾″	16′-8¼″	8′-4″	10′-5″	54668.11	34426.38
PIER 25	2084.81	2076.26	2072.26	1895.3	177	570	12′-6½″	16′-9″	8′-4″	10′-5¼″	54583.38	34486.69
PIER 26	2084.88	2076.32	2072.32	1895.3	177	570	12′-6¾″	16′-9¾″	8′-4¼″	10′-5½″	54498.66	34547.00
PIER 27	2084.94	2076.38	2072.38	1895.4	177	570	12′-6¾″	16′-10½″	8′-4¼″	10′-5¾″	54413.93	34607.32
PIER 28	2085.01	2076.44	2072.44	1895.4	177	570	12′-6¾″	16′-11¼″	8′-4½″	10′-6″	54329.21	34667.63
PIER 29	2085.07	2076.51	2072.51	1895.5	177	570	12′-6¾″	17′-0″	8′-4½″	10′-6″	54244.49	34727.94
PIER 30	2085.14	2076.57	2072.57	1895.6	177	570	12′-6¾″	17′-0¾″	8′-4½″	10′-6¼″	54159.76	34788.26
PIER 31	2085.20	2076.63	2072.63	1895.6	177	570	12′-6¾″	17′-1½″	8′-4¾″	10′-6¼″	54075.04	34848.57
PIER 32	2085.27	2077.44 / 2076.69	2072.69	1903.7	169	505	12′-7″	17′-2¼″	8′-4¾″	10′-6½″	53990.31	34908.88
PIER 33	2085.31	2077.49	2073.49	1901.5	172	430	11′-9¾″	18′-0″	8′-6″	10′-9″	53928.46	34952.91
PIER 34	2085.36	2077.54	2073.54	1901.5	172	430	11′-9¾″	18′-0½″	8′-6″	10′-9″	53866.62	34996.94
PIER 35	2085.41	2078.33 / 2077.58	2073.58	1888.6	185	505	11′-10″	18′-1″	8′-6″	10′-9¼″	53804.77	35040.96
PIER 36	2085.47	2078.39 / 2076.89	2072.89	1887.9	185	570	12′-7″	17′-4¾″	8′-5″	10′-7¼″	53720.05	35101.28
PIER 37	2085.54	2076.96	2072.96	1888.0	185	570	12′-7″	17′-5½″	8′-5¼″	10′-7¼″	53635.32	35161.59
PIER 38	2085.60	2078.52 / 2077.02	2073.02	1888.0	185	570	12′-7″	17′-6¼″	8′-5¼″	10′-7½″	53550.60	35221.91
PIER 39	2085.60	2078.58 / 2077.83	2073.83	1928.8	145	505	11′-9¼″	18′-4″	8′-6½″	10′-10″	53465.87	35282.22
PIER 40	2085.53	2077.78	2073.78	1938.8	135	430	11′-9″	18′-3¼″	8′-6½″	10′-9¾″	53404.03	35326.25
PIER 41	2085.40	2077.59	2073.59	1938.6	135	430	11′-9¾″	18′-1″	8′-6″	10′-9¼″	53342.18	35370.27
PIER 42	2085.22	2077.40 / 2076.65	2072.65	1972.7	100	505	12′-6¾″	17′-1¾″	8′-4¾″	10′-6½″	53280.33	35414.30
PIER 43	2084.95	2076.39	2072.39	1967.4	105	570	12′-6¾″	16′-10¾″	8′-4¼″	10′-5¾″	53195.61	35474.61
PIER 44	2084.68	2076.13	2072.13	1962.1	110	570	12′-6½″	16′-7½″	8′-4″	10′-5″	53110.89	35534.93
PIER 45	2084.42	2075.87	2071.87	1961.9	110	570	12′-6½″	16′-4½″	8′-3½″	10′-4″	53026.16	35595.24
PIER 46	2084.15	2075.61	2071.61	1961.6	110	570	12′-6½″	16′-1¼″	8′-3″	10′-3¼″	52941.44	35655.55
PIER 47	2083.88	2075.35	2071.35	1936.4	135	570	12′-6¼″	15′-10¼″	8′-2¾″	10′-2½″	52856.71	35715.87
PIER 48	2083.61	2075.09	2071.09	1936.1	135	570	12′-6¼″	15′-7″	8′-2½″	10′-1¾″	52771.99	35776.18
PIER 49	2083.35	2074.83	2070.83	1935.8	135	570	12′-6¼″	15′-4″	8′-2″	10′-1″	52687.26	35836.50
ABUT. 50	2083.08	2074.57	2070.57	1960.6	110	445	12′-6″	-	-	-	52602.40	35896.91

36″ DIA. PILE x ¾″ WALL, OPEN ENDED

36″ DIA. PILE x ¾″ WALL, CLOSED END

PILE NOTES:

1. PILES SHALL MEET THE MATERIAL REQUIREMENTS OF A.S.T.M. A252, GRADE 3 (MOD) WITH A MINIMUM YIELD STRENGTH OF 50 KSI OR APPROVED EQUIVALENT AND SHALL BE DRIVEN IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND THESE NOTES.
2. ESTIMATED PILE LENGTH BELOW CUTOFF = VARIES. TO BE VERIFIED ACCORDINGLY BY ONSITE GEOTECHNICAL ENGINEER AND PILE DRIVING EQUIPMENT APPROVED BY THE ENGINEER.
3. PILE SPACINGS SHOWN ARE AT PILE CUTOFF ELEVATIONS.
4. SYMBOL X:12 DENOTES DIRECTION AND AMOUNT OF PILE BATTER.
5. USE OF TEMPLATE TO ENSURE PILE LOCATION DURING DRIVING IS REQUIRED.
6. BEFORE DRIVING, CONDUCT A WEAP ANALYSIS TO EVALUATE THE DRIVING STRESSES IN A PILE FOR THE ESTIMATED PILE RESISTANCE AND DEPTH. ENSURE THAT DRIVING STRESSES WILL NOT RESULT IN DAMAGE TO THE PILE.
7. CONDUCT A DYNAMIC LOAD TEST ON THE FIRST 36-INCH PILE AT EACH ABUTMENT AND PIER USING A PILE DRIVING ANALYZER (PDA) AND CAPWAP ANALYSES TO ESTIMATE DRIVING STRESSES, TIP CAPACITY AND SKIN FRICTION. THE CONTRACTOR SHALL PLAN TO RESTRIKE THE TEST PILES PER THE SCHEDULE ESTABLISHED IN THE PROJECT SPECIFICATIONS.
8. AN EPOXY PROTECTIVE COATING SHALL BE APPLIED TO CONNECTION BARS, BRACING AND THE PILE SURFACE (INTERIOR AND EXTERIOR) FROM PILE CUTOFF TO GROUNDLINE TO REDUCE CORROSION. PROTECTIVE COATING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH A SIMILAR COATING AND APPLICATION PROCESS. THE EPOXY PROTECTIVE COATING SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 04620.
9. SEE PLAN NO. 0045-0003.900-024 THROUGH 0045-0003.900-027 FOR LOCATION OF BRACING HEIGHT.
10. CLOSED END PIPES WILL BE SUBJECT TO BUOYANCY FORCES DURING DRIVING PRIOR TO EMBEDMENT IN SAND. COST TO SECURE PILE WILL BE INCIDENTAL TO STEEL PIPE PILE (CLOSED END).



ALTERNATE BRACING DETAIL - PILE DRIVING TEMPLATE

CONNECT CHANNELS TO SLEEVE AS SHOWN ON TYPICAL SECTIONS

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TABLE OF ELEVATIONS & PILE NOTES

PLAN NO: 0045-0003.900-022 SHEET: 22 OF

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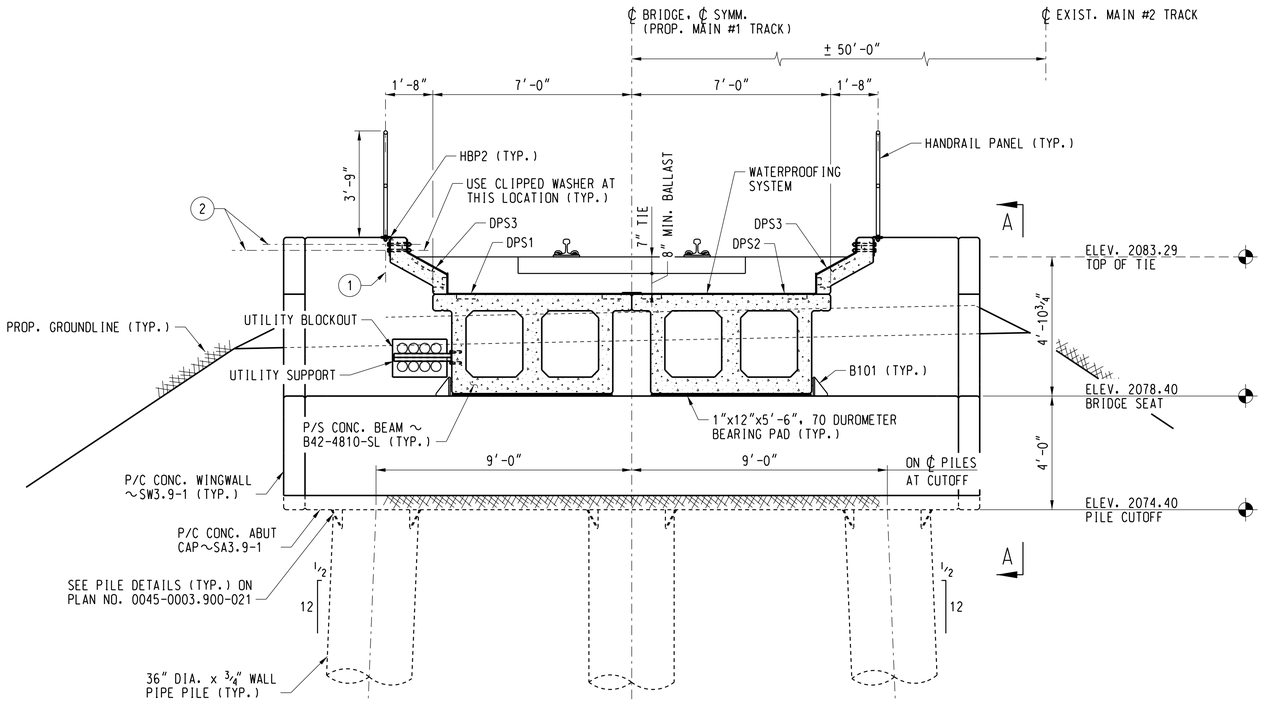
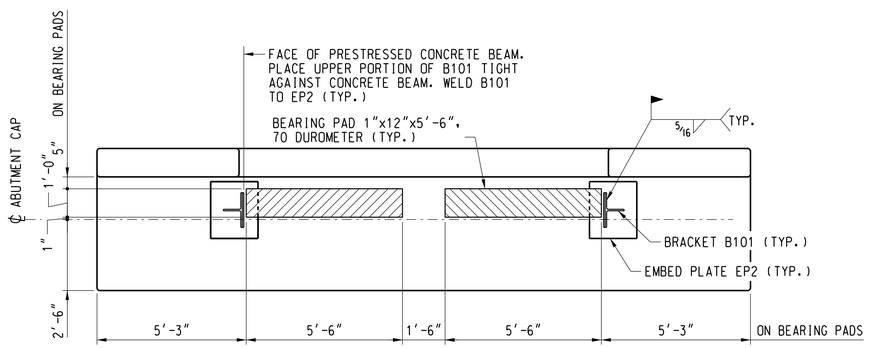
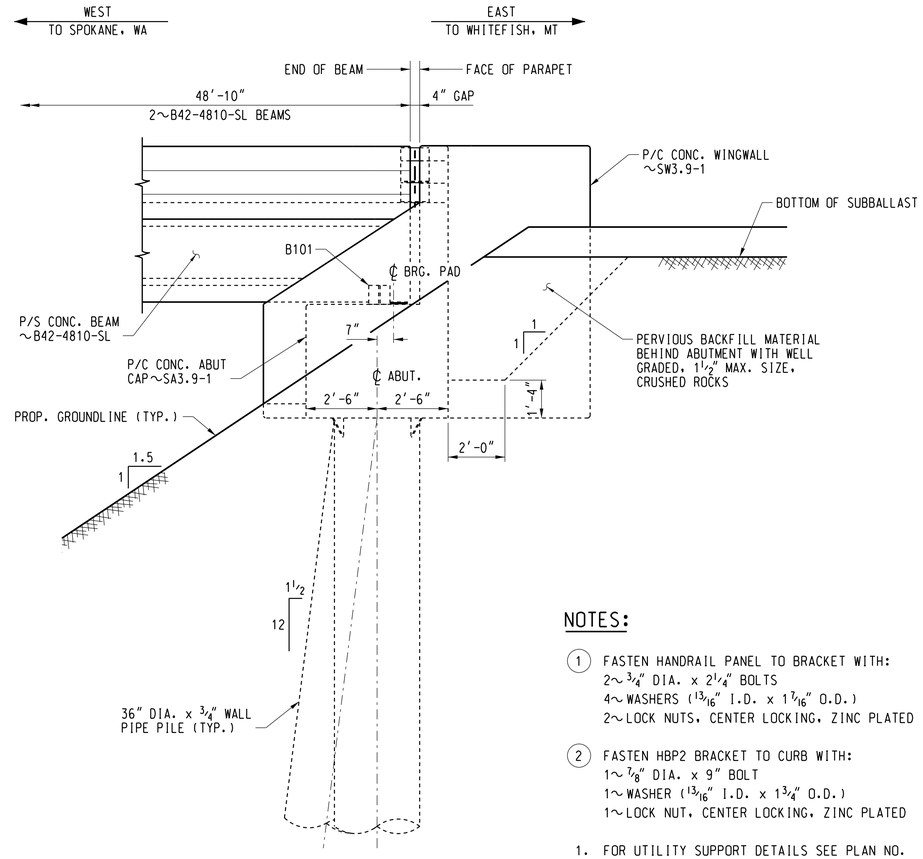


TYPICAL SECTION - ABUT. #1

(LOOKING RY EAST)



TYPICAL B101 ATTACHMENT DETAILS - ABUT. 1



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~¾″ DIA. x 2¼″ BOLTS
4~WASHERS (13/16″ I.D. x 1 7/16″ O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~⅞″ DIA. x 9″ BOLT
1~WASHER (13/16″ I.D. x 1¾″ O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

1. FOR UTILITY SUPPORT DETAILS SEE PLAN NO. 0045-0003.900-054.

DES: TJH	BNSF RAILWAY	SANDPOINT JCT. TO LAKESIDE JCT.	
DRAWN: GTJ	BRIDGE ENGINEERING KANSAS CITY, KS	BRIDGE NUMBER 3.9	
CHECK: MAF		OVER LAKE PEND OREILLE NEAR SANDPOINT, ID	
DATE: MAR 2019	APPROVED:	TYPICAL SECTION - ABUT. #1	
AUTH: XXX-XXXX	ASST. DIRECTOR STRUCTURES DESIGN	PLAN NO: 0045-0003.900-023	SHEET: 23 OF
LINE SEG: 0045			

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Hanson Professional Services Inc.

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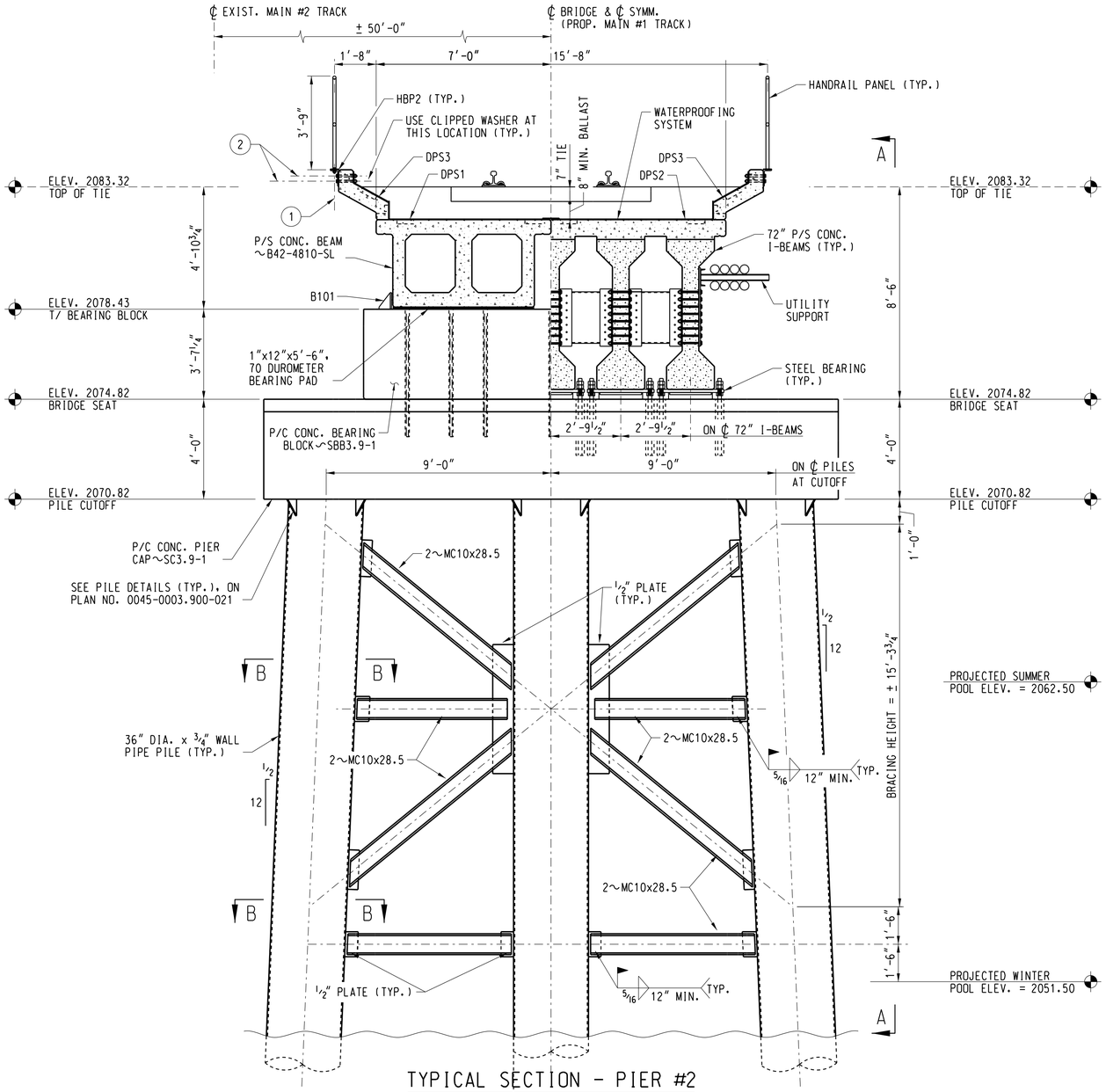
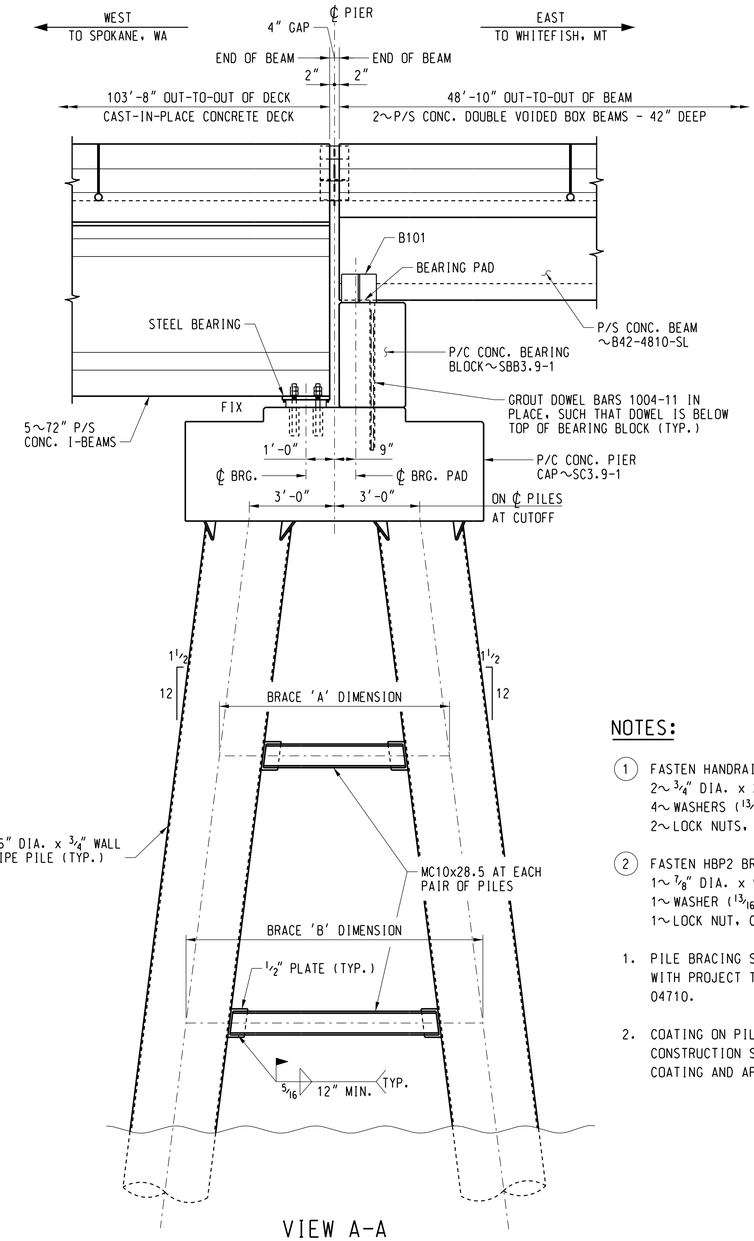


TYPICAL SECTION - PIER #2

(LOOKING RY WEST)



VIEW A-A

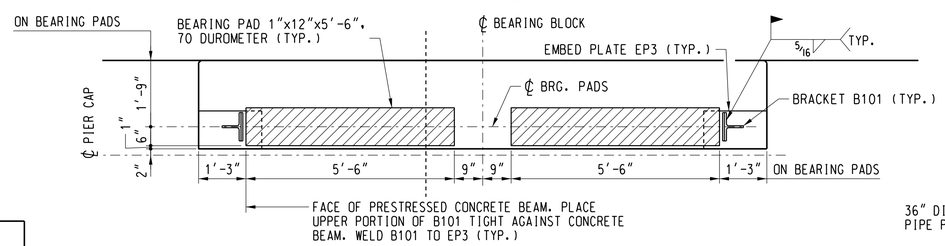
HANDRAIL PANELS NOT SHOWN FOR CLARITY.

NOTES:

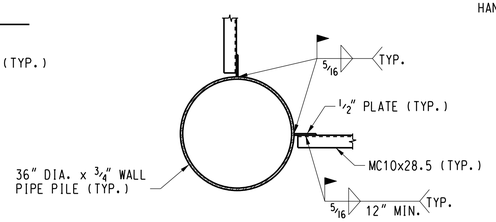
(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~¾" DIA. x 2¼" BOLTS
4~WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~⅞" DIA. x 9" BOLT
1~WASHER (13/16" I.D. x 1¾" O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.



TYPICAL B101 ATTACHMENT DETAILS - BEARING BLOCK SBB3.9-1



SECTION B-B

DES: TJH	
DRAWN: GTJ	
CHECK: MAF	
DATE: MAR 2019	
AUTH: XXX-XXXX	
LINE SEG: 0045	

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION - PIER #2

PLAN NO: 0045-0003.900-024 SHEET: 24 OF

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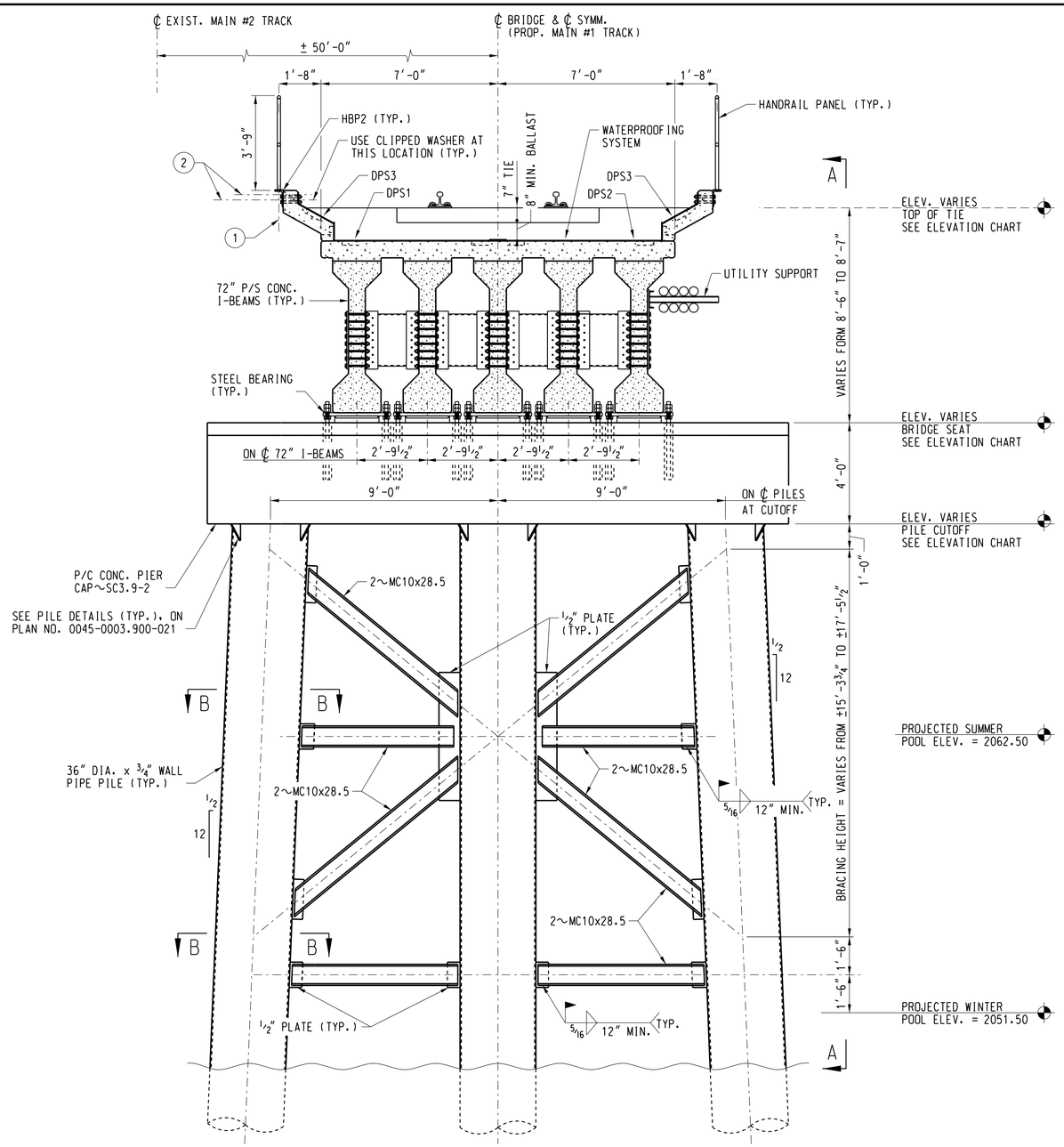
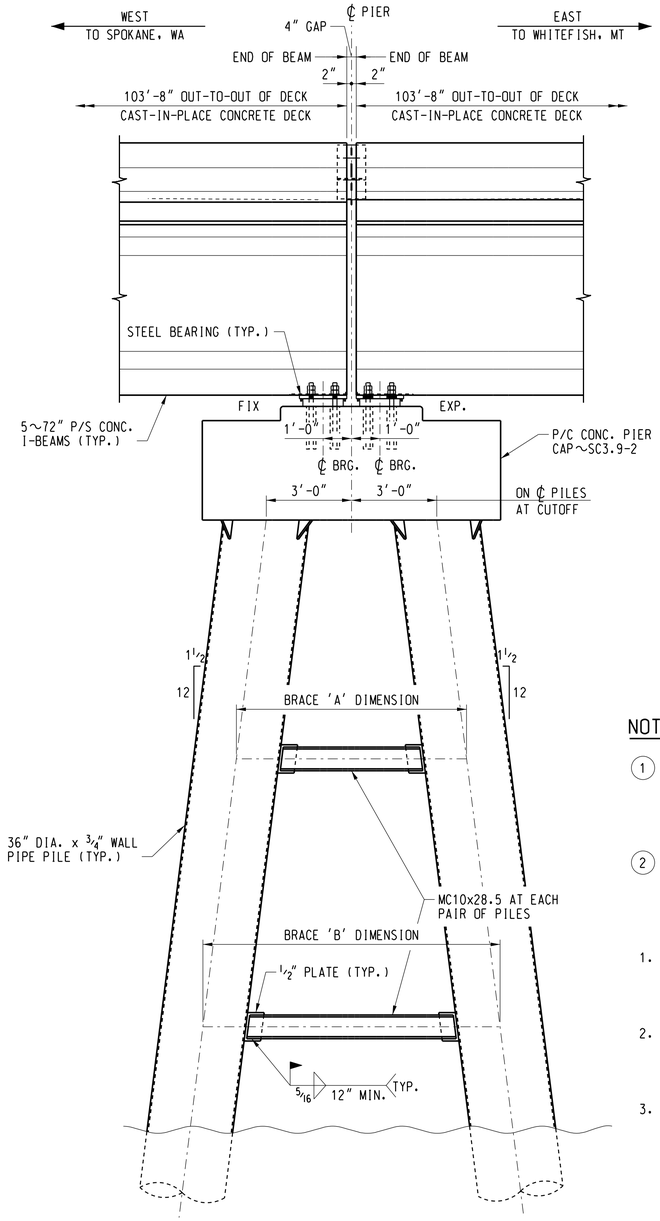


TYPICAL SECTION

PIER #3 THRU #31, #37 & #43 THRU #49

(LOOKING RY WEST)



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~¾" DIA. x 2¼" BOLTS
4~WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~⅞" DIA. x 9" BOLT
1~WASHER (13/16" I.D. x 1¾" O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.
3. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022.

NOTE:

FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY

BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

BRIDGE NUMBER 3.9

OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

TYPICAL SECTION - PIERS #3 THRU #31, #37 & #43 THRU #49

PLAN NO: 0045-0003.900-025 SHEET: 25 OF

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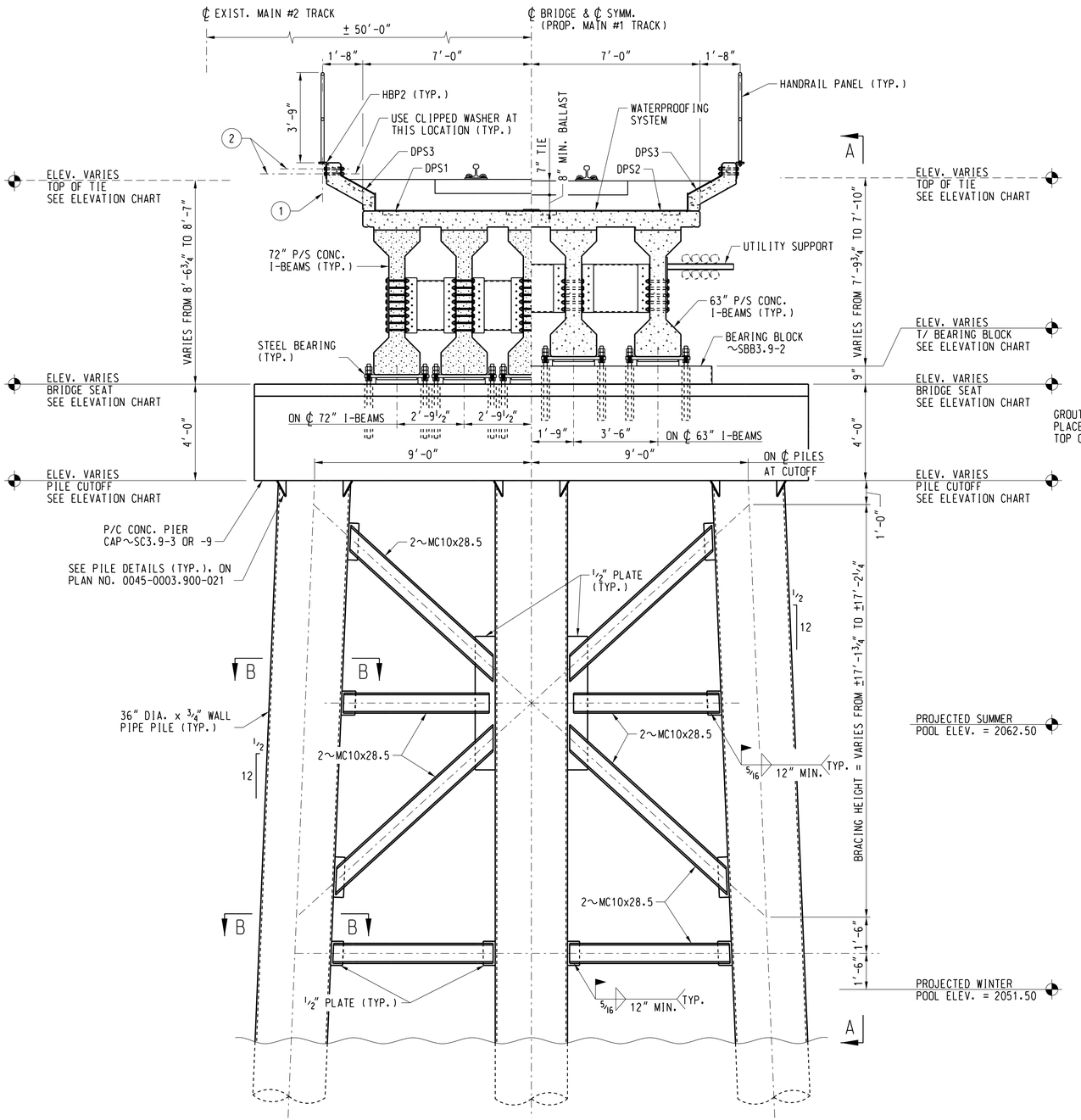
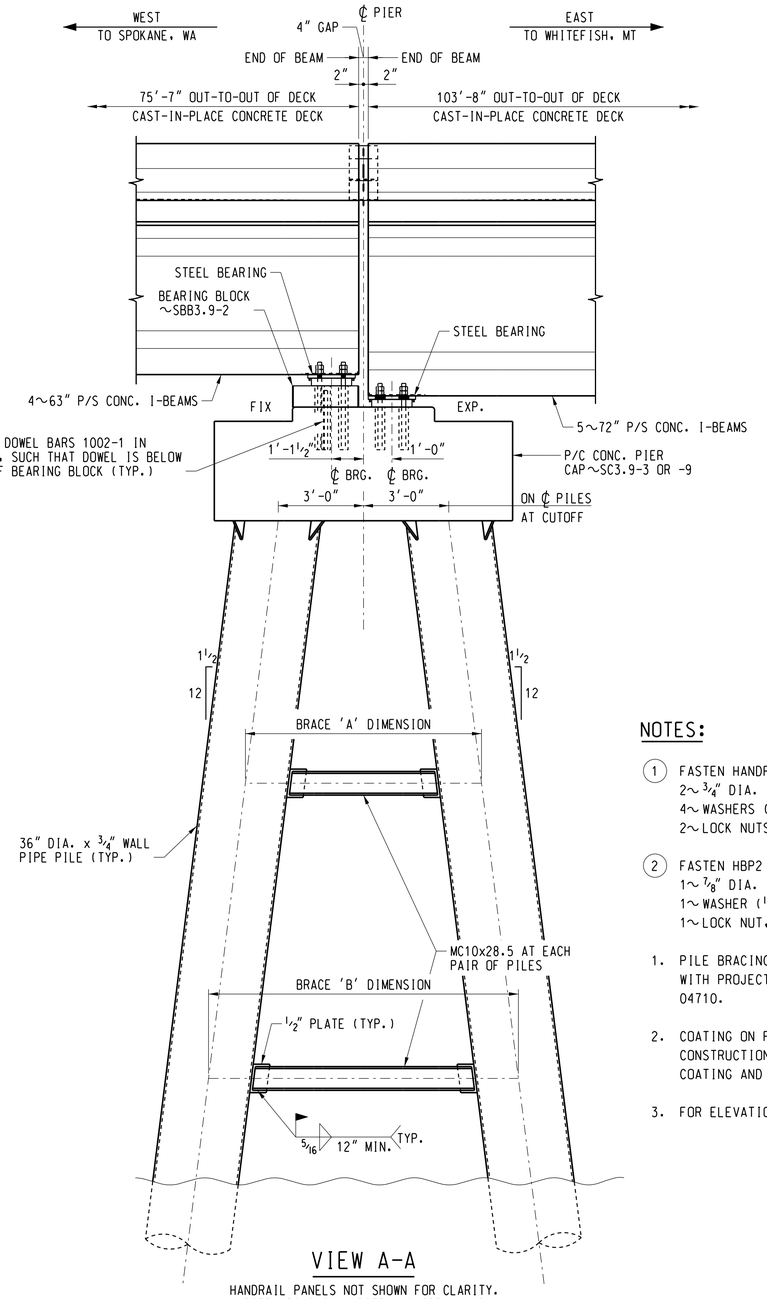
Hanson Professional Services Inc.



TYPICAL SECTION - PIERS #32 & #42

(LOOKING RY WEST)



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.
PIER #32 SHOWN, PIER #42 OPP. HAND

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~¾″ DIA. x 2¼″ BOLTS
4~WASHERS (13/16″ I.D. x 1 7/16″ O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~⅞″ DIA. x 9″ BOLT
1~WASHER (13/16″ I.D. x 1¾″ O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.
3. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022.

NOTE:

FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION
PIERS #32 & #42

PLAN NO: 0045-0003.900-026 SHEET: 26 OF

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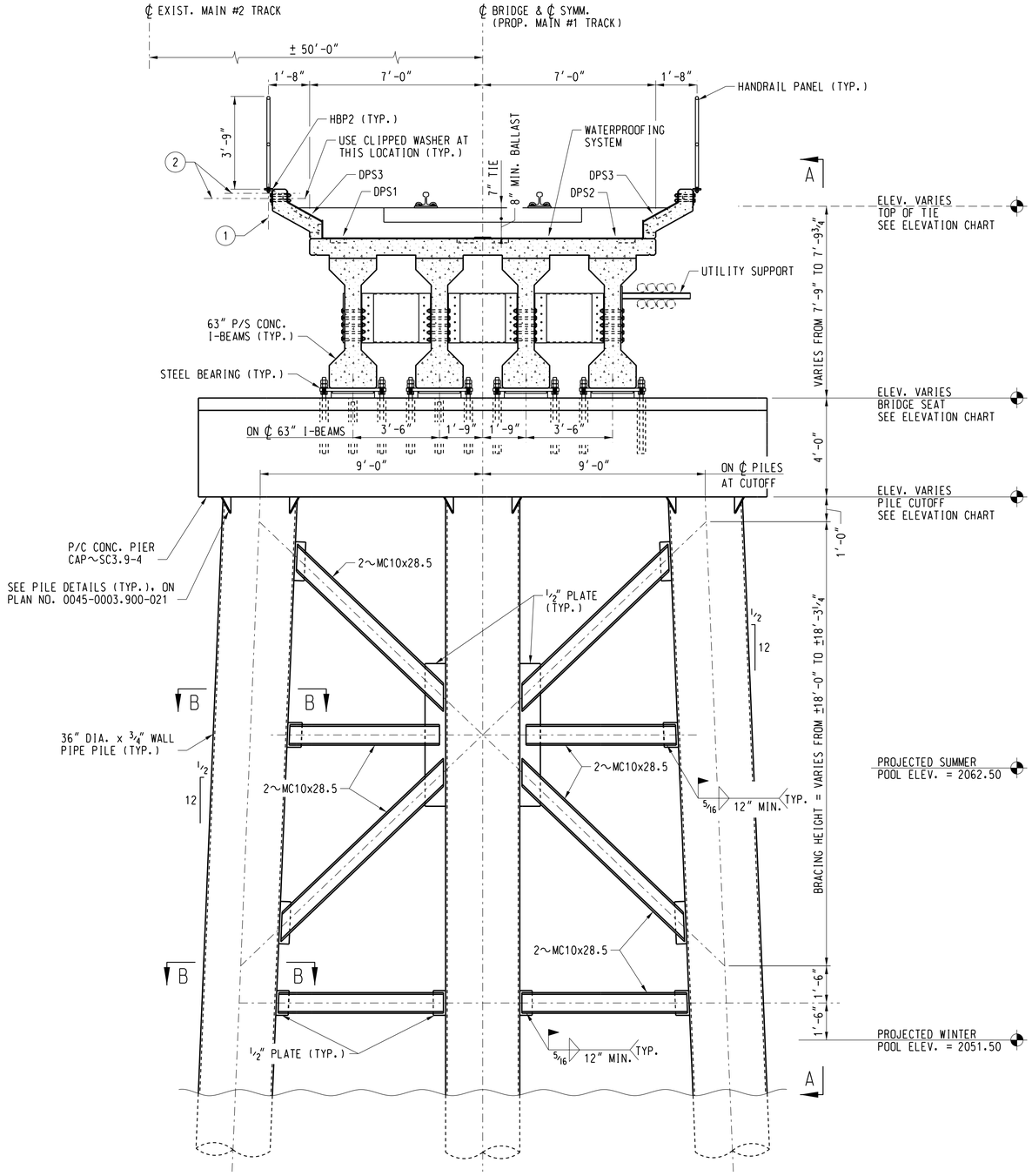
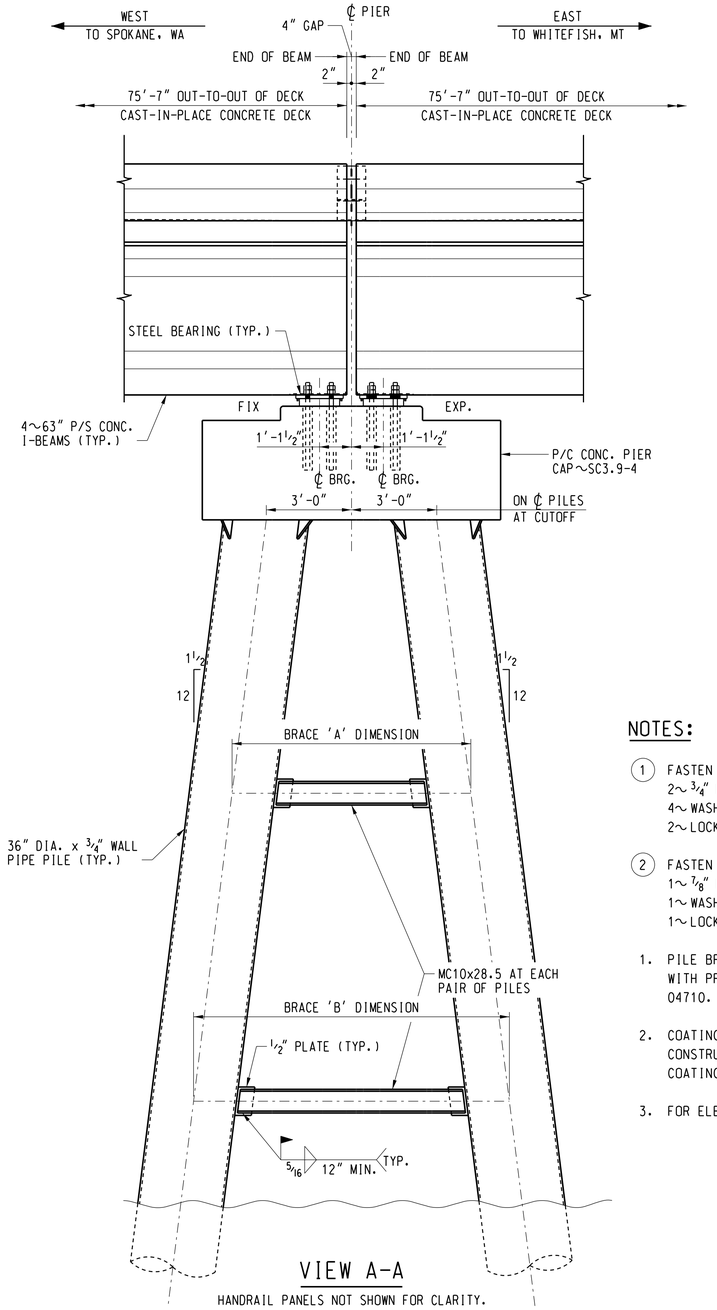


TYPICAL SECTION - PIERS #33, #34, #40 & #41

(LOOKING RY WEST)



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2∼¾″ DIA. x 2¼″ BOLTS
4∼WASHERS (13/16″ I.D. x 1 7/16″ O.D.)
2∼LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1∼⅞″ DIA. x 9″ BOLT
1∼WASHER (13/16″ I.D. x 1¾″ O.D.)
1∼LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.
3. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022.

NOTE:

FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY

BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

BRIDGE NUMBER 3.9

OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

TYPICAL SECTION - PIERS #33, #34, #40 & #41

PLAN NO: 0045-0003.900-027 SHEET: 27 OF

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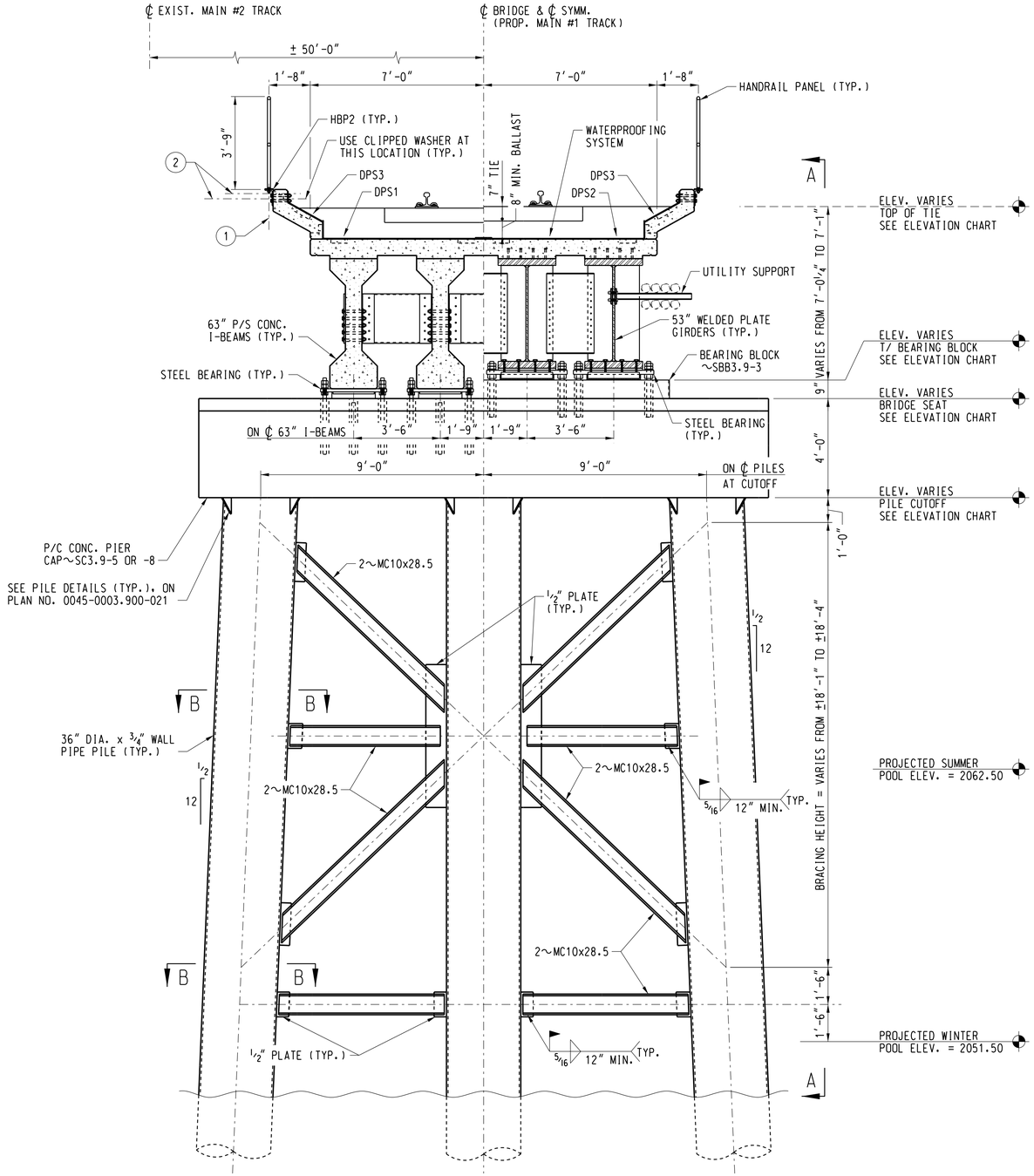
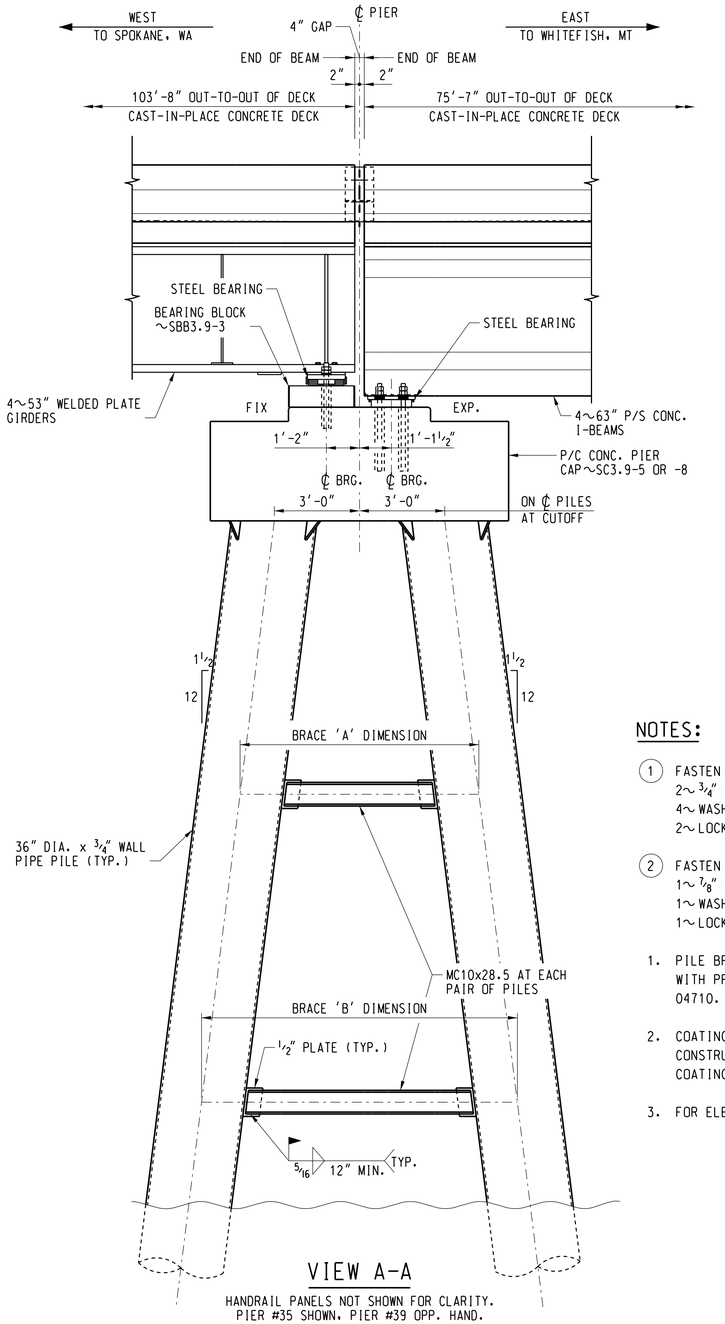


TYPICAL SECTION - PIERS #35 & #39

(LOOKING RY WEST)



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.
PIER #35 SHOWN, PIER #39 OPP. HAND.

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~ ¾″ DIA. x 2¼″ BOLTS
4~ WASHERS (13/16″ I.D. x 1 7/16″ O.D.)
2~ LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~ 7/8″ DIA. x 9″ BOLT
1~ WASHER (13/16″ I.D. x 1¾″ O.D.)
1~ LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.
3. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022.

NOTE:

FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION - PIERS #35 & #39

PLAN NO: 0045-0003.900-028 SHEET: 28 OF

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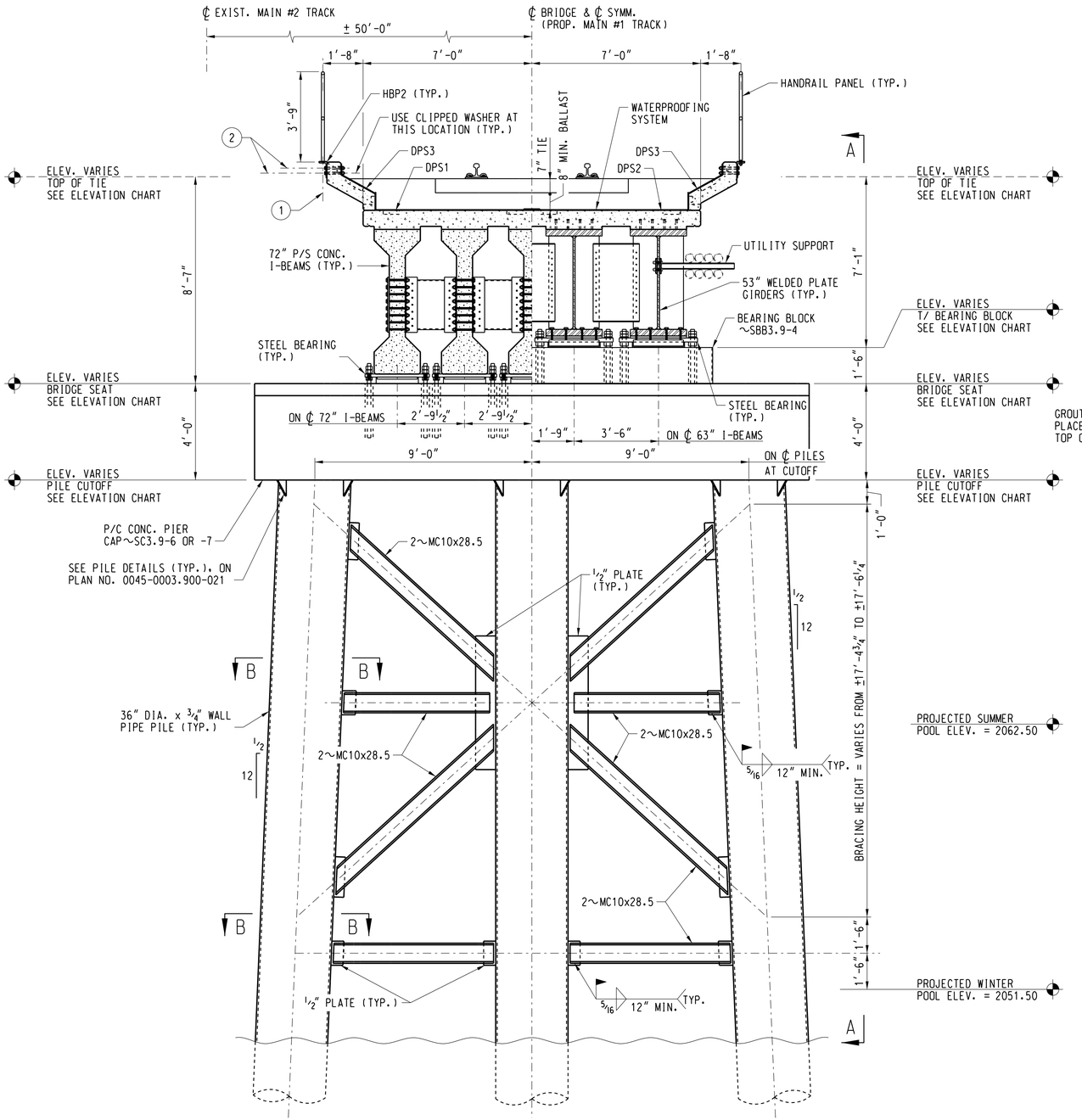
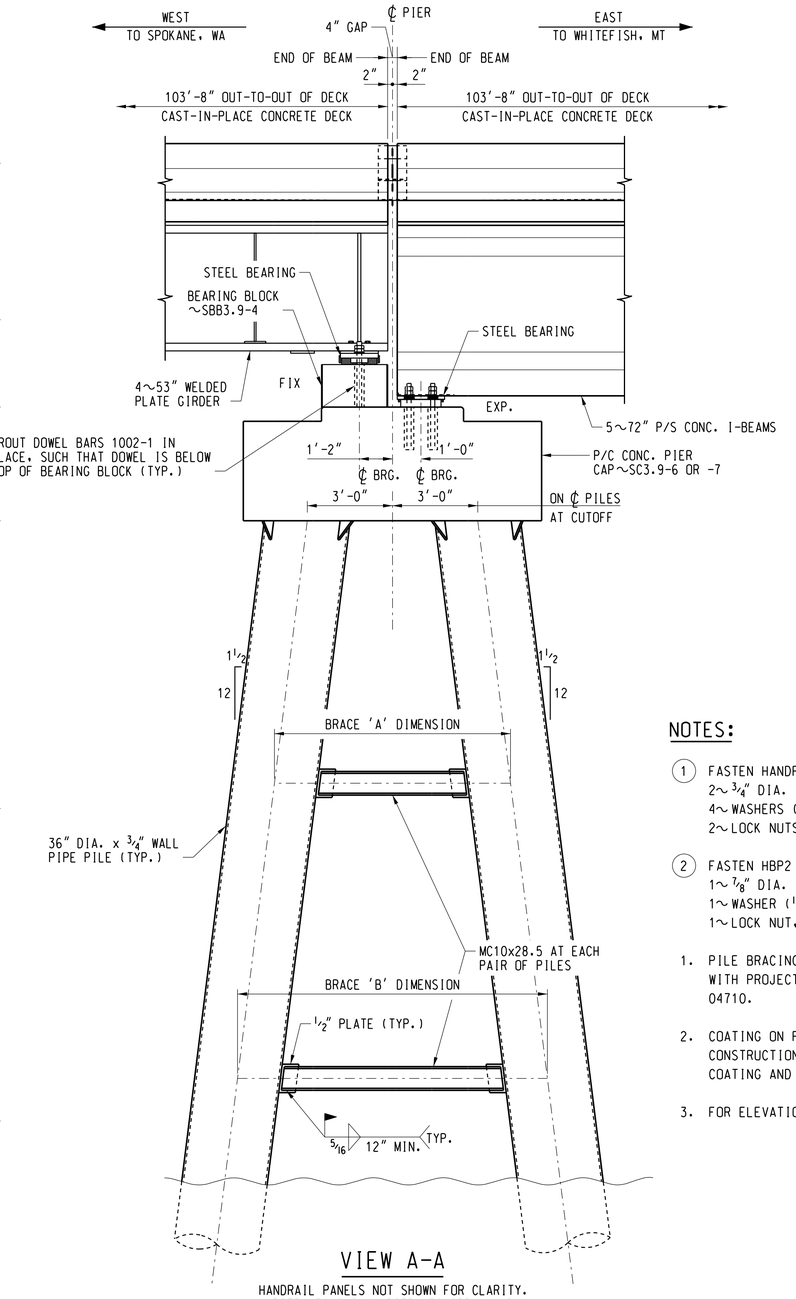


TYPICAL SECTION - PIERS #36 & #38

(LOOKING RY WEST)



VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.
PIER #38 SHOWN, PIER #36 OPP. HAND

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~¾" DIA. x 2¼" BOLTS
4~WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~⅞" DIA. x 9" BOLT
1~WASHER (13/16" I.D. x 1¾" O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

1. PILE BRACING SHALL BE PAINTED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATION SECTION 04710.
2. COATING ON PILING THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH SIMILAR COATING AND APPLICATION PROCEDURES.
3. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022.

NOTE:

FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION - PIERS #36 & #38

PLAN NO: 0045-0003.900-029 SHEET: 29 OF

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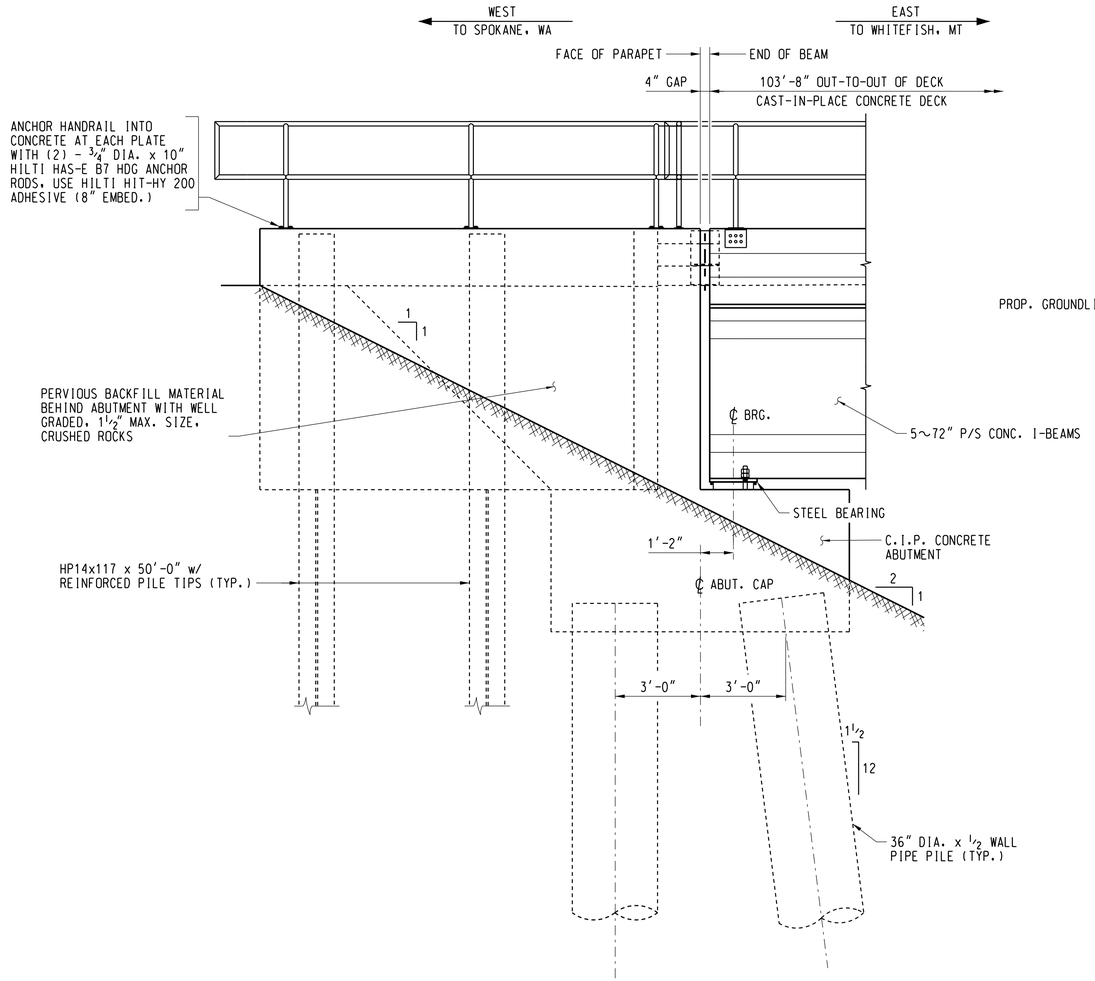
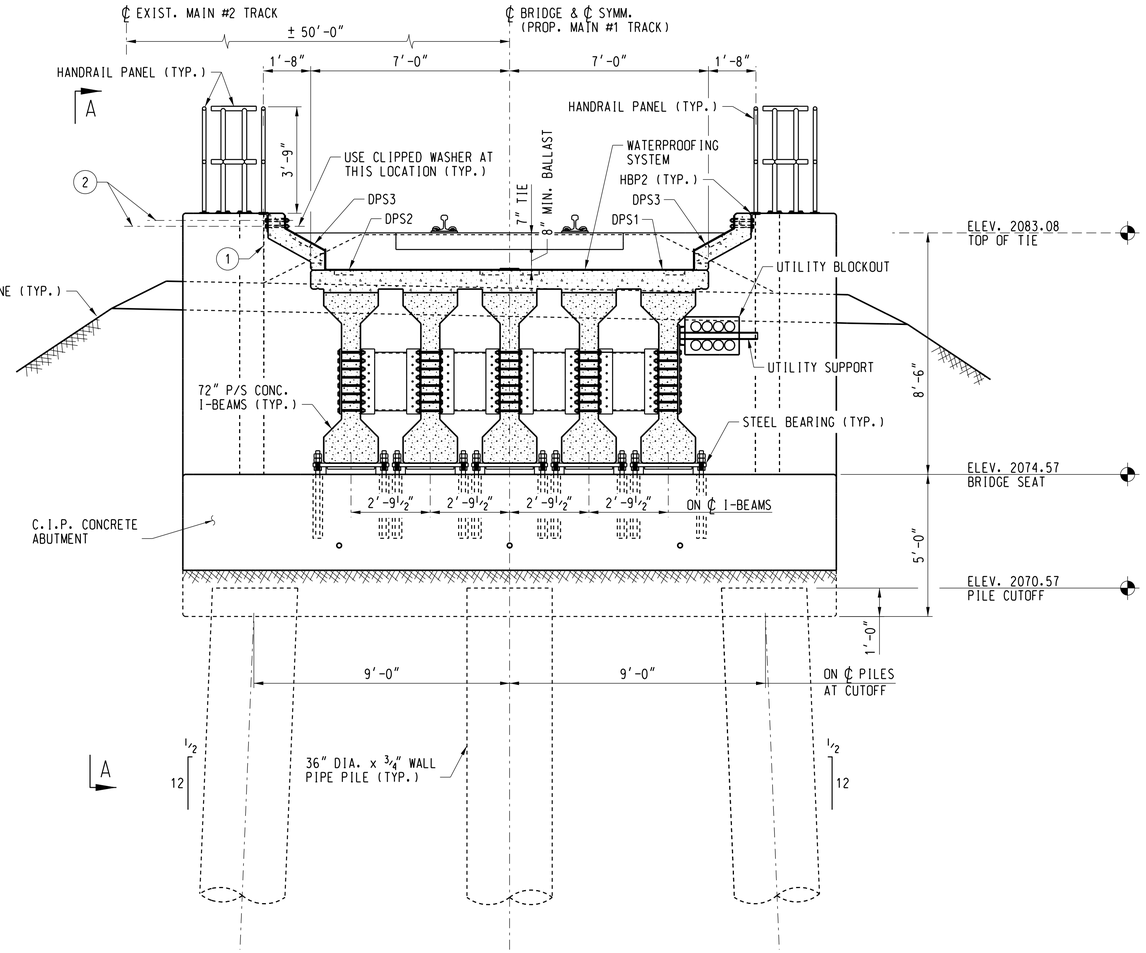


VIEW A-A



TYPICAL SECTION - ABUT. #50

(LOOKING RY WEST)

NOTES:

(1) FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~ 3/4" DIA. x 2 1/4" BOLTS
4~ WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~ LOCK NUTS, CENTER LOCKING, ZINC PLATED

(2) FASTEN HBP2 BRACKET TO CURB WITH:
1~ 7/8" DIA. x 9" BOLT
1~ WASHER (13/16" I.D. x 1 3/4" O.D.)
1~ LOCK NUT, CENTER LOCKING, ZINC PLATED

HANSON
Hanson Professional Services Inc.

DES:	TJH
DRAWN:	GTJ
CHECK:	MAF
DATE:	MAR 2019
AUTH:	XXX-XXXX
LINE SEG:	0045

BNSF RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION - ABUT. #50

PLAN NO: 0045-0003.900-030 | SHEET: 30 OF

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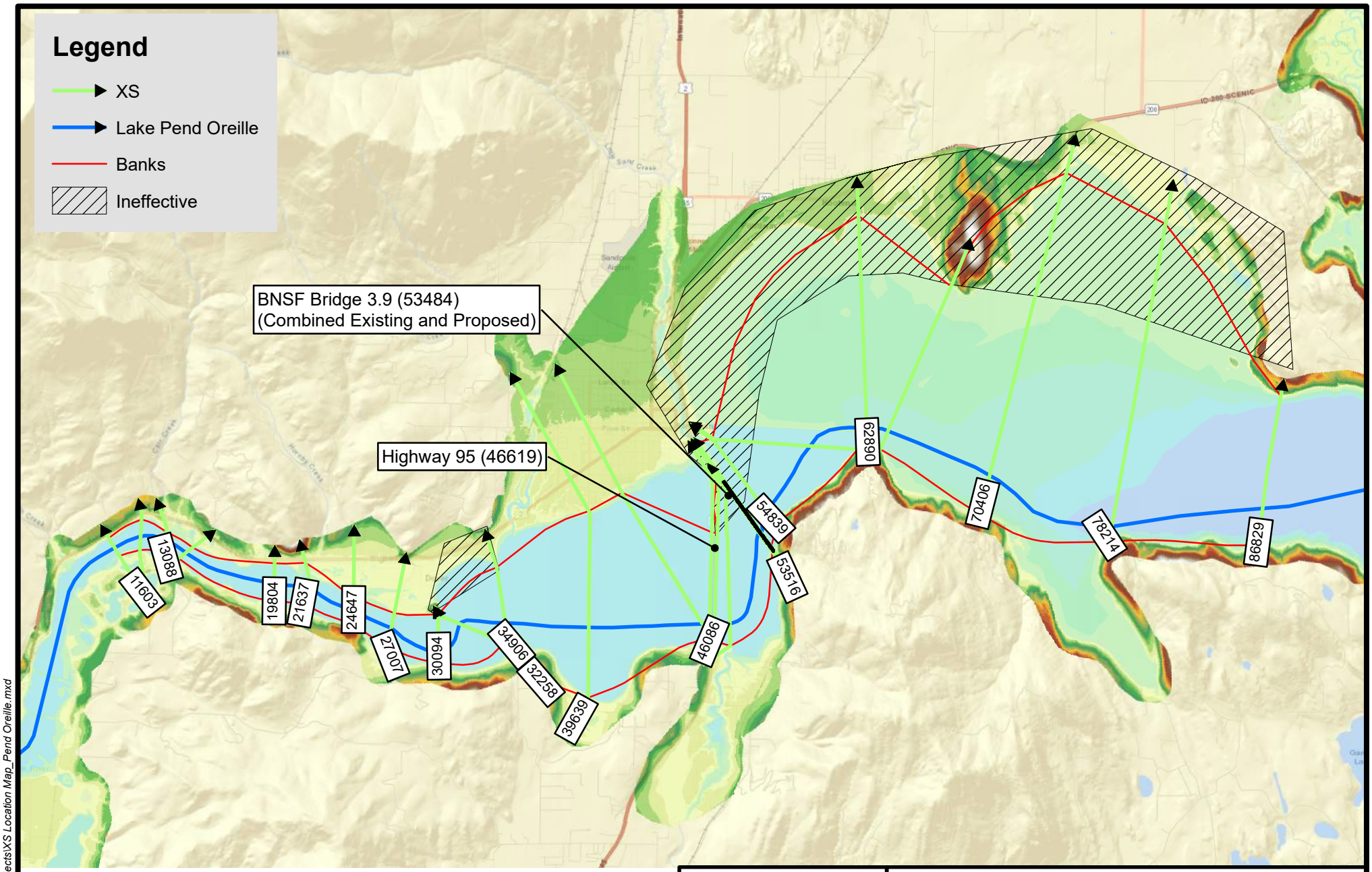
Date Printed: 3/28/2019 Time Printed: 10:01:06 AM

Attachment G: Hydraulic Cross-Section Map



1 in = 7,350 ft

0 3,675 7,350 11,025 Feet

N W E S

Coordinate System: NAD 1983 HARN StatePlane Idaho West FIPS 1103 Feet

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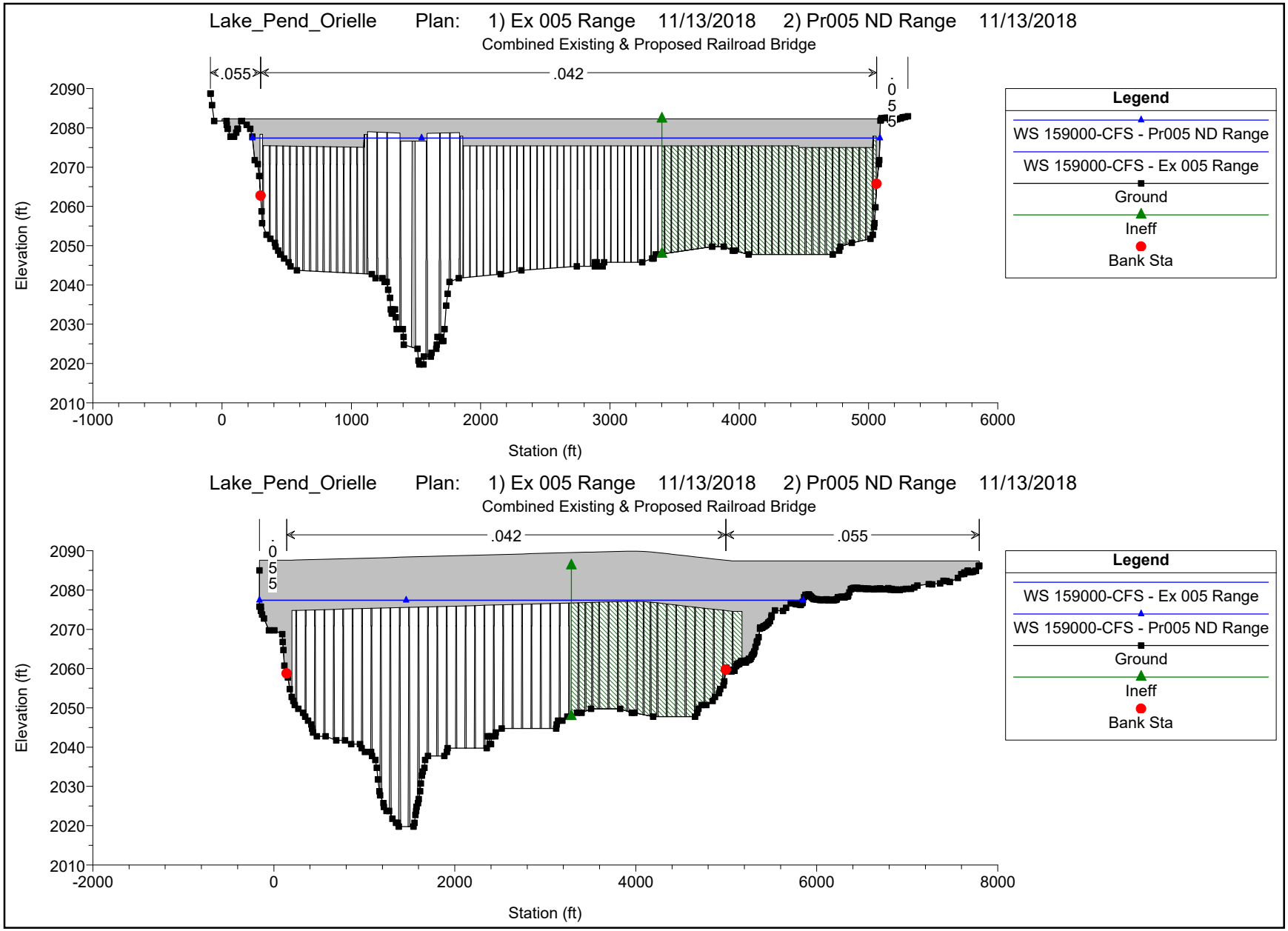
Cross-Section Location Map

BNSF Railway Company
Bridge 3.9 Over Lake Pend Oreille
Sandpoint, Idaho

Job Number: 14R0057

I:\14jobs\14R0057\CAD\GIS\Projects\XS Location Map_Pend Oreille.mxd

Attachment H: HEC-RAS Output


Lake_Pend_Orielle Plan: 1) Ex 005 Range 11/13/2018 2) Pr005 ND Range 11/13/2018
Combined Existing & Proposed Railroad Bridge
.055
.042
.055
Elevation (ft)
2090
2080
2070
2060
2050
2040
2030
2020
2010
-1000
0
1000
2000
3000
4000
5000
6000
Station (ft)
Legend
WS 159000-CFS - Pr005 ND Range
WS 159000-CFS - Ex 005 Range
Ground
Ineff
Bank Sta
Lake_Pend_Orielle Plan: 1) Ex 005 Range 11/13/2018 2) Pr005 ND Range 11/13/2018
Combined Existing & Proposed Railroad Bridge
.055
.042
.055
Elevation (ft)
2090
2080
2070
2060
2050
2040
2030
2020
2010
-2000
0
2000
4000
6000
8000
Station (ft)
Legend
WS 159000-CFS - Ex 005 Range
WS 159000-CFS - Pr005 ND Range
Ground
Ineff
Bank Sta

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	86829	10000-CFS	10000	2050.6	0.01	10000	2050.6	0.01	0.0	0
Main Reach	86829	20000-CFS	20000	2052.2	0.03	20000	2052.2	0.03	0.0	0
Main Reach	86829	30000-CFS	30000	2053.1	0.04	30000	2053.1	0.04	0.0	0
Main Reach	86829	40000-CFS	40000	2054.7	0.05	40000	2054.7	0.05	0.0	0
Main Reach	86829	50000-CFS	50000	2057.2	0.06	50000	2057.2	0.06	0.0	0
Main Reach	86829	60000-CFS	60000	2059.9	0.07	60000	2059.9	0.07	0.0	0
Main Reach	86829	70000-CFS	70000	2062.5	0.08	70000	2062.5	0.08	0.0	0
Main Reach	86829	80000-CFS	80000	2064.8	0.09	80000	2064.8	0.09	0.0	0
Main Reach	86829	90000-CFS	90000	2066.9	0.1	90000	2066.9	0.1	0.0	0
Main Reach	86829	100000-CFS	100000	2068.8	0.11	100000	2068.8	0.11	0.0	0
Main Reach	86829	110000-CFS	110000	2070.6	0.12	110000	2070.6	0.12	0.0	0
Main Reach	86829	115000-CFS	115000	2071.4	0.13	115000	2071.4	0.13	0.0	0
Main Reach	86829	120000-CFS	120000	2072.1	0.13	120000	2072.1	0.13	0.0	0
Main Reach	86829	130000-CFS	130000	2073.6	0.14	130000	2073.6	0.14	0.0	0
Main Reach	86829	140000-CFS	140000	2075.0	0.15	140000	2075.0	0.15	0.0	0
Main Reach	86829	150000-CFS	150000	2076.3	0.16	150000	2076.3	0.16	0.0	0
Main Reach	86829	159000-CFS	159000	2077.5	0.16	159000	2077.5	0.16	0.0	0
Main Reach	78214	10000-CFS	10000	2050.6	0.02	10000	2050.6	0.02	0.0	0
Main Reach	78214	20000-CFS	20000	2052.2	0.04	20000	2052.2	0.04	0.0	0
Main Reach	78214	30000-CFS	30000	2053.1	0.06	30000	2053.1	0.06	0.0	0
Main Reach	78214	40000-CFS	40000	2054.7	0.08	40000	2054.7	0.08	0.0	0
Main Reach	78214	50000-CFS	50000	2057.2	0.1	50000	2057.2	0.1	0.0	0
Main Reach	78214	60000-CFS	60000	2059.9	0.11	60000	2059.9	0.11	0.0	0
Main Reach	78214	70000-CFS	70000	2062.5	0.12	70000	2062.5	0.12	0.0	0
Main Reach	78214	80000-CFS	80000	2064.8	0.13	80000	2064.8	0.13	0.0	0
Main Reach	78214	90000-CFS	90000	2066.9	0.14	90000	2066.9	0.14	0.0	0
Main Reach	78214	100000-CFS	100000	2068.8	0.15	100000	2068.8	0.15	0.0	0
Main Reach	78214	110000-CFS	110000	2070.6	0.16	110000	2070.6	0.16	0.0	0
Main Reach	78214	115000-CFS	115000	2071.4	0.16	115000	2071.4	0.16	0.0	0
Main Reach	78214	120000-CFS	120000	2072.1	0.17	120000	2072.1	0.17	0.0	0
Main Reach	78214	130000-CFS	130000	2073.6	0.18	130000	2073.6	0.18	0.0	0
Main Reach	78214	140000-CFS	140000	2075.0	0.19	140000	2075.0	0.19	0.0	0
Main Reach	78214	150000-CFS	150000	2076.3	0.2	150000	2076.3	0.2	0.0	0
Main Reach	78214	159000-CFS	159000	2077.5	0.2	159000	2077.5	0.2	0.0	0
Main Reach	70406	10000-CFS	10000	2050.6	0.04	10000	2050.6	0.04	0.0	0
Main Reach	70406	20000-CFS	20000	2052.2	0.08	20000	2052.2	0.08	0.0	0
Main Reach	70406	30000-CFS	30000	2053.1	0.11	30000	2053.1	0.11	0.0	0
Main Reach	70406	40000-CFS	40000	2054.7	0.14	40000	2054.7	0.14	0.0	0
Main Reach	70406	50000-CFS	50000	2057.2	0.15	50000	2057.2	0.15	0.0	0
Main Reach	70406	60000-CFS	60000	2059.9	0.17	60000	2059.9	0.17	0.0	0
Main Reach	70406	70000-CFS	70000	2062.5	0.18	70000	2062.5	0.18	0.0	0
Main Reach	70406	80000-CFS	80000	2064.8	0.19	80000	2064.8	0.19	0.0	0
Main Reach	70406	90000-CFS	90000	2066.9	0.2	90000	2066.9	0.2	0.0	0
Main Reach	70406	100000-CFS	100000	2068.8	0.21	100000	2068.8	0.21	0.0	0
Main Reach	70406	110000-CFS	110000	2070.6	0.22	110000	2070.6	0.22	0.0	0
Main Reach	70406	115000-CFS	115000	2071.4	0.23	115000	2071.4	0.23	0.0	0
Main Reach	70406	120000-CFS	120000	2072.1	0.23	120000	2072.1	0.23	0.0	0
Main Reach	70406	130000-CFS	130000	2073.6	0.24	130000	2073.6	0.24	0.0	0
Main Reach	70406	140000-CFS	140000	2075.0	0.25	140000	2075.0	0.25	0.0	0
Main Reach	70406	150000-CFS	150000	2076.3	0.26	150000	2076.3	0.26	0.0	0
Main Reach	70406	159000-CFS	159000	2077.5	0.27	159000	2077.5	0.27	0.0	0
Main Reach	64114	10000-CFS	10000	2050.6	0.09	10000	2050.6	0.09	0.0	0
Main Reach	64114	20000-CFS	20000	2052.2	0.16	20000	2052.2	0.16	0.0	0
Main Reach	64114	30000-CFS	30000	2053.1	0.22	30000	2053.1	0.22	0.0	0
Main Reach	64114	40000-CFS	40000	2054.7	0.26	40000	2054.7	0.26	0.0	0
Main Reach	64114	50000-CFS	50000	2057.2	0.28	50000	2057.2	0.28	0.0	0
Main Reach	64114	60000-CFS	60000	2059.9	0.29	60000	2059.9	0.29	0.0	0
Main Reach	64114	70000-CFS	70000	2062.5	0.31	70000	2062.5	0.31	0.0	0
Main Reach	64114	80000-CFS	80000	2064.8	0.32	80000	2064.8	0.32	0.0	0
Main Reach	64114	90000-CFS	90000	2066.9	0.33	90000	2066.9	0.33	0.0	0
Main Reach	64114	100000-CFS	100000	2068.8	0.34	100000	2068.8	0.34	0.0	0
Main Reach	64114	110000-CFS	110000	2070.5	0.35	110000	2070.5	0.35	0.0	0
Main Reach	64114	115000-CFS	115000	2071.4	0.36	115000	2071.4	0.36	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	64114	120000-CFS	120000	2072.1	0.37	120000	2072.1	0.37	0.0	0
Main Reach	64114	130000-CFS	130000	2073.6	0.38	130000	2073.6	0.38	0.0	0
Main Reach	64114	140000-CFS	140000	2075.0	0.39	140000	2075.0	0.39	0.0	0
Main Reach	64114	150000-CFS	150000	2076.3	0.41	150000	2076.3	0.41	0.0	0
Main Reach	64114	159000-CFS	159000	2077.5	0.42	159000	2077.5	0.42	0.0	0
Main Reach	62890	10000-CFS	10000	2050.6	0.09	10000	2050.6	0.09	0.0	0
Main Reach	62890	20000-CFS	20000	2052.2	0.16	20000	2052.2	0.16	0.0	0
Main Reach	62890	30000-CFS	30000	2053.1	0.23	30000	2053.1	0.23	0.0	0
Main Reach	62890	40000-CFS	40000	2054.7	0.28	40000	2054.7	0.28	0.0	0
Main Reach	62890	50000-CFS	50000	2057.1	0.3	50000	2057.1	0.3	0.0	0
Main Reach	62890	60000-CFS	60000	2059.9	0.31	60000	2059.9	0.31	0.0	0
Main Reach	62890	70000-CFS	70000	2062.5	0.32	70000	2062.5	0.32	0.0	0
Main Reach	62890	80000-CFS	80000	2064.8	0.33	80000	2064.8	0.33	0.0	0
Main Reach	62890	90000-CFS	90000	2066.9	0.34	90000	2066.9	0.34	0.0	0
Main Reach	62890	100000-CFS	100000	2068.8	0.35	100000	2068.8	0.35	0.0	0
Main Reach	62890	110000-CFS	110000	2070.5	0.37	110000	2070.5	0.37	0.0	0
Main Reach	62890	115000-CFS	115000	2071.3	0.37	115000	2071.4	0.37	0.0	0
Main Reach	62890	120000-CFS	120000	2072.1	0.38	120000	2072.1	0.38	0.0	0
Main Reach	62890	130000-CFS	130000	2073.6	0.39	130000	2073.6	0.39	0.0	0
Main Reach	62890	140000-CFS	140000	2075.0	0.41	140000	2075.0	0.41	0.0	0
Main Reach	62890	150000-CFS	150000	2076.3	0.42	150000	2076.3	0.42	0.0	0
Main Reach	62890	159000-CFS	159000	2077.5	0.43	159000	2077.5	0.43	0.0	0
Main Reach	59294	10000-CFS	10000	2050.6	0.11	10000	2050.6	0.11	0.0	0
Main Reach	59294	20000-CFS	20000	2052.2	0.2	20000	2052.2	0.2	0.0	0
Main Reach	59294	30000-CFS	30000	2053.1	0.28	30000	2053.1	0.28	0.0	0
Main Reach	59294	40000-CFS	40000	2054.7	0.35	40000	2054.7	0.35	0.0	0
Main Reach	59294	50000-CFS	50000	2057.1	0.39	50000	2057.1	0.39	0.0	0
Main Reach	59294	60000-CFS	60000	2059.9	0.41	60000	2059.9	0.41	0.0	0
Main Reach	59294	70000-CFS	70000	2062.5	0.44	70000	2062.5	0.44	0.0	0
Main Reach	59294	80000-CFS	80000	2064.8	0.46	80000	2064.8	0.46	0.0	0
Main Reach	59294	90000-CFS	90000	2066.9	0.48	90000	2066.9	0.48	0.0	0
Main Reach	59294	100000-CFS	100000	2068.8	0.5	100000	2068.8	0.5	0.0	0
Main Reach	59294	110000-CFS	110000	2070.5	0.53	110000	2070.5	0.53	0.0	0
Main Reach	59294	115000-CFS	115000	2071.3	0.54	115000	2071.3	0.54	0.0	0
Main Reach	59294	120000-CFS	120000	2072.1	0.55	120000	2072.1	0.55	0.0	0
Main Reach	59294	130000-CFS	130000	2073.6	0.57	130000	2073.6	0.57	0.0	0
Main Reach	59294	140000-CFS	140000	2075.0	0.6	140000	2075.0	0.6	0.0	0
Main Reach	59294	150000-CFS	150000	2076.3	0.62	150000	2076.3	0.62	0.0	0
Main Reach	59294	159000-CFS	159000	2077.5	0.64	159000	2077.5	0.64	0.0	0
Main Reach	54839	10000-CFS	10000	2050.6	0.32	10000	2050.6	0.32	0.0	0
Main Reach	54839	20000-CFS	20000	2052.2	0.57	20000	2052.2	0.57	0.0	0
Main Reach	54839	30000-CFS	30000	2053.1	0.8	30000	2053.1	0.8	0.0	0
Main Reach	54839	40000-CFS	40000	2054.6	0.96	40000	2054.6	0.96	0.0	0
Main Reach	54839	50000-CFS	50000	2057.1	1.04	50000	2057.1	1.04	0.0	0
Main Reach	54839	60000-CFS	60000	2059.9	1.08	60000	2059.9	1.08	0.0	0
Main Reach	54839	70000-CFS	70000	2062.4	1.12	70000	2062.4	1.12	0.0	0
Main Reach	54839	80000-CFS	80000	2064.7	1.16	80000	2064.7	1.16	0.0	0
Main Reach	54839	90000-CFS	90000	2066.8	1.21	90000	2066.8	1.21	0.0	0
Main Reach	54839	100000-CFS	100000	2068.8	1.25	100000	2068.8	1.25	0.0	0
Main Reach	54839	110000-CFS	110000	2070.5	1.3	110000	2070.5	1.3	0.0	0
Main Reach	54839	115000-CFS	115000	2071.3	1.32	115000	2071.3	1.32	0.0	0
Main Reach	54839	120000-CFS	120000	2072.1	1.35	120000	2072.1	1.35	0.0	0
Main Reach	54839	130000-CFS	130000	2073.5	1.4	130000	2073.5	1.4	0.0	0
Main Reach	54839	140000-CFS	140000	2074.9	1.44	140000	2074.9	1.44	0.0	0
Main Reach	54839	150000-CFS	150000	2076.3	1.49	150000	2076.3	1.49	0.0	0
Main Reach	54839	159000-CFS	159000	2077.4	1.53	159000	2077.4	1.53	0.0	0
Main Reach	53516	10000-CFS	10000	2050.6	0.36	10000	2050.6	0.36	0.0	0
Main Reach	53516	20000-CFS	20000	2052.2	0.61	20000	2052.2	0.61	0.0	0
Main Reach	53516	30000-CFS	30000	2053.1	0.85	30000	2053.1	0.84	0.0	-0.01
Main Reach	53516	40000-CFS	40000	2054.6	0.99	40000	2054.6	0.99	0.0	0
Main Reach	53516	50000-CFS	50000	2057.1	1.04	50000	2057.1	1.04	0.0	0
Main Reach	53516	60000-CFS	60000	2059.9	1.06	60000	2059.9	1.06	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	53516	70000-CFS	70000	2062.4	1.09	70000	2062.4	1.09	0.0	0
Main Reach	53516	80000-CFS	80000	2064.7	1.12	80000	2064.7	1.12	0.0	0
Main Reach	53516	90000-CFS	90000	2066.8	1.15	90000	2066.8	1.15	0.0	0
Main Reach	53516	100000-CFS	100000	2068.7	1.19	100000	2068.7	1.19	0.0	0
Main Reach	53516	110000-CFS	110000	2070.5	1.23	110000	2070.5	1.23	0.0	0
Main Reach	53516	115000-CFS	115000	2071.3	1.25	115000	2071.3	1.25	0.0	0
Main Reach	53516	120000-CFS	120000	2072.0	1.27	120000	2072.0	1.27	0.0	0
Main Reach	53516	130000-CFS	130000	2073.5	1.31	130000	2073.5	1.31	0.0	0
Main Reach	53516	140000-CFS	140000	2074.9	1.36	140000	2074.9	1.36	0.0	0
Main Reach	53516	150000-CFS	150000	2076.2	1.4	150000	2076.2	1.4	0.0	0
Main Reach	53516	159000-CFS	159000	2077.4	1.43	159000	2077.4	1.43	0.0	0
Main Reach	ExistBNSF Bridg	10000-CFS	10000	2050.6	0.42	10000	2050.6	0.42	0.0	0
Main Reach	ExistBNSF Bridg	20000-CFS	20000	2052.2	0.72	20000	2052.2	0.72	0.0	0
Main Reach	ExistBNSF Bridg	30000-CFS	30000	2053.1	0.99	30000	2053.1	0.99	0.0	0
Main Reach	ExistBNSF Bridg	40000-CFS	40000	2054.6	1.16	40000	2054.6	1.16	0.0	0
Main Reach	ExistBNSF Bridg	50000-CFS	50000	2057.1	1.22	50000	2057.1	1.22	0.0	0
Main Reach	ExistBNSF Bridg	60000-CFS	60000	2059.9	1.23	60000	2059.9	1.23	0.0	0
Main Reach	ExistBNSF Bridg	70000-CFS	70000	2062.4	1.26	70000	2062.4	1.26	0.0	0
Main Reach	ExistBNSF Bridg	80000-CFS	80000	2064.7	1.29	80000	2064.7	1.29	0.0	0
Main Reach	ExistBNSF Bridg	90000-CFS	90000	2066.8	1.33	90000	2066.8	1.33	0.0	0
Main Reach	ExistBNSF Bridg	100000-CFS	100000	2068.7	1.37	100000	2068.7	1.37	0.0	0
Main Reach	ExistBNSF Bridg	110000-CFS	110000	2070.5	1.41	110000	2070.5	1.41	0.0	0
Main Reach	ExistBNSF Bridg	115000-CFS	115000	2071.3	1.43	115000	2071.3	1.43	0.0	0
Main Reach	ExistBNSF Bridg	120000-CFS	120000	2072.0	1.46	120000	2072.0	1.46	0.0	0
Main Reach	ExistBNSF Bridg	130000-CFS	130000	2073.5	1.5	130000	2073.5	1.5	0.0	0
Main Reach	ExistBNSF Bridg	140000-CFS	140000	2074.9	1.55	140000	2074.9	1.55	0.0	0
Main Reach	ExistBNSF Bridg	150000-CFS	150000	2076.2	1.63	150000	2076.2	1.63	0.0	0
Main Reach	ExistBNSF Bridg	159000-CFS	159000	2077.4	1.71	159000	2077.4	1.71	0.0	0
Main Reach	ExistBNSF Bridg	10000-CFS	10000	2050.6	0.34	10000	2050.6	0.34	0.0	0
Main Reach	ExistBNSF Bridg	20000-CFS	20000	2052.2	0.6	20000	2052.2	0.6	0.0	0
Main Reach	ExistBNSF Bridg	30000-CFS	30000	2053.1	0.84	30000	2053.1	0.84	0.0	0
Main Reach	ExistBNSF Bridg	40000-CFS	40000	2054.6	1	40000	2054.6	1	0.0	0
Main Reach	ExistBNSF Bridg	50000-CFS	50000	2057.1	1.07	50000	2057.1	1.07	0.0	0
Main Reach	ExistBNSF Bridg	60000-CFS	60000	2059.9	1.11	60000	2059.9	1.11	0.0	0
Main Reach	ExistBNSF Bridg	70000-CFS	70000	2062.4	1.14	70000	2062.4	1.14	0.0	0
Main Reach	ExistBNSF Bridg	80000-CFS	80000	2064.7	1.19	80000	2064.7	1.18	0.0	-0.01
Main Reach	ExistBNSF Bridg	90000-CFS	90000	2066.8	1.23	90000	2066.8	1.23	0.0	0
Main Reach	ExistBNSF Bridg	100000-CFS	100000	2068.7	1.27	100000	2068.7	1.27	0.0	0
Main Reach	ExistBNSF Bridg	110000-CFS	110000	2070.5	1.32	110000	2070.5	1.31	0.0	-0.01
Main Reach	ExistBNSF Bridg	115000-CFS	115000	2071.3	1.34	115000	2071.3	1.34	0.0	0
Main Reach	ExistBNSF Bridg	120000-CFS	120000	2072.0	1.37	120000	2072.0	1.36	0.0	-0.01
Main Reach	ExistBNSF Bridg	130000-CFS	130000	2073.5	1.42	130000	2073.5	1.41	0.0	-0.01
Main Reach	ExistBNSF Bridg	140000-CFS	140000	2074.9	1.47	140000	2074.9	1.46	0.0	-0.01
Main Reach	ExistBNSF Bridg	150000-CFS	150000	2076.2	1.54	150000	2076.2	1.53	0.0	-0.01
Main Reach	ExistBNSF Bridg	159000-CFS	159000	2077.4	1.62	159000	2077.4	1.62	0.0	0
Main Reach	53413	10000-CFS	10000	2050.6	0.29	10000	2050.6	0.29	0.0	0
Main Reach	53413	20000-CFS	20000	2052.2	0.5	20000	2052.2	0.5	0.0	0
Main Reach	53413	30000-CFS	30000	2053.1	0.71	30000	2053.1	0.71	0.0	0
Main Reach	53413	40000-CFS	40000	2054.6	0.85	40000	2054.6	0.85	0.0	0
Main Reach	53413	50000-CFS	50000	2057.1	0.91	50000	2057.1	0.91	0.0	0
Main Reach	53413	60000-CFS	60000	2059.9	0.94	60000	2059.9	0.94	0.0	0
Main Reach	53413	70000-CFS	70000	2062.4	0.98	70000	2062.4	0.98	0.0	0
Main Reach	53413	80000-CFS	80000	2064.7	1.01	80000	2064.7	1.01	0.0	0
Main Reach	53413	90000-CFS	90000	2066.8	1.05	90000	2066.8	1.05	0.0	0
Main Reach	53413	100000-CFS	100000	2068.7	1.09	100000	2068.7	1.09	0.0	0
Main Reach	53413	110000-CFS	110000	2070.5	1.13	110000	2070.5	1.13	0.0	0
Main Reach	53413	115000-CFS	115000	2071.3	1.15	115000	2071.3	1.15	0.0	0
Main Reach	53413	120000-CFS	120000	2072.0	1.18	120000	2072.0	1.18	0.0	0
Main Reach	53413	130000-CFS	130000	2073.5	1.22	130000	2073.5	1.22	0.0	0
Main Reach	53413	140000-CFS	140000	2074.9	1.26	140000	2074.9	1.26	0.0	0
Main Reach	53413	150000-CFS	150000	2076.2	1.3	150000	2076.2	1.3	0.0	0
Main Reach	53413	159000-CFS	159000	2077.4	1.33	159000	2077.4	1.33	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	47648	10000-CFS	10000	2050.5	0.39	10000	2050.5	0.39	0.0	0
Main Reach	47648	20000-CFS	20000	2052.1	0.56	20000	2052.1	0.56	0.0	0
Main Reach	47648	30000-CFS	30000	2053.0	0.72	30000	2053.0	0.72	0.0	0
Main Reach	47648	40000-CFS	40000	2054.5	0.77	40000	2054.5	0.77	0.0	0
Main Reach	47648	50000-CFS	50000	2057.0	0.73	50000	2057.0	0.73	0.0	0
Main Reach	47648	60000-CFS	60000	2059.8	0.69	60000	2059.8	0.69	0.0	0
Main Reach	47648	70000-CFS	70000	2062.4	0.67	70000	2062.4	0.67	0.0	0
Main Reach	47648	80000-CFS	80000	2064.6	0.66	80000	2064.6	0.66	0.0	0
Main Reach	47648	90000-CFS	90000	2066.8	0.67	90000	2066.8	0.67	0.0	0
Main Reach	47648	100000-CFS	100000	2068.7	0.68	100000	2068.7	0.68	0.0	0
Main Reach	47648	110000-CFS	110000	2070.4	0.69	110000	2070.4	0.69	0.0	0
Main Reach	47648	115000-CFS	115000	2071.2	0.7	115000	2071.2	0.7	0.0	0
Main Reach	47648	120000-CFS	120000	2072.0	0.7	120000	2072.0	0.7	0.0	0
Main Reach	47648	130000-CFS	130000	2073.5	0.72	130000	2073.5	0.72	0.0	0
Main Reach	47648	140000-CFS	140000	2074.9	0.74	140000	2074.9	0.74	0.0	0
Main Reach	47648	150000-CFS	150000	2076.2	0.75	150000	2076.2	0.75	0.0	0
Main Reach	47648	159000-CFS	159000	2077.4	0.77	159000	2077.4	0.77	0.0	0
Main Reach	46775	10000-CFS	10000	2050.5	0.69	10000	2050.5	0.69	0.0	0
Main Reach	46775	20000-CFS	20000	2052.1	0.86	20000	2052.1	0.86	0.0	0
Main Reach	46775	30000-CFS	30000	2052.9	1.06	30000	2052.9	1.06	0.0	0
Main Reach	46775	40000-CFS	40000	2054.4	1.08	40000	2054.4	1.08	0.0	0
Main Reach	46775	50000-CFS	50000	2056.9	0.96	50000	2056.9	0.96	0.0	0
Main Reach	46775	60000-CFS	60000	2059.8	0.87	60000	2059.8	0.87	0.0	0
Main Reach	46775	70000-CFS	70000	2062.3	0.83	70000	2062.3	0.83	0.0	0
Main Reach	46775	80000-CFS	80000	2064.6	0.81	80000	2064.6	0.81	0.0	0
Main Reach	46775	90000-CFS	90000	2066.7	0.81	90000	2066.7	0.81	0.0	0
Main Reach	46775	100000-CFS	100000	2068.7	0.82	100000	2068.7	0.82	0.0	0
Main Reach	46775	110000-CFS	110000	2070.4	0.83	110000	2070.4	0.83	0.0	0
Main Reach	46775	115000-CFS	115000	2071.2	0.83	115000	2071.2	0.83	0.0	0
Main Reach	46775	120000-CFS	120000	2072.0	0.84	120000	2072.0	0.84	0.0	0
Main Reach	46775	130000-CFS	130000	2073.5	0.86	130000	2073.5	0.86	0.0	0
Main Reach	46775	140000-CFS	140000	2074.9	0.87	140000	2074.9	0.87	0.0	0
Main Reach	46775	150000-CFS	150000	2076.2	0.89	150000	2076.2	0.89	0.0	0
Main Reach	46775	159000-CFS	159000	2077.4	0.91	159000	2077.4	0.91	0.0	0
Main Reach	46619 BR U	10000-CFS	10000	2050.5	0.92	10000	2050.5	0.92	0.0	0
Main Reach	46619 BR U	20000-CFS	20000	2052.0	1.13	20000	2052.0	1.13	0.0	0
Main Reach	46619 BR U	30000-CFS	30000	2052.8	1.39	30000	2052.8	1.39	0.0	0
Main Reach	46619 BR U	40000-CFS	40000	2054.4	1.4	40000	2054.4	1.4	0.0	0
Main Reach	46619 BR U	50000-CFS	50000	2056.9	1.24	50000	2056.9	1.24	0.0	0
Main Reach	46619 BR U	60000-CFS	60000	2059.7	1.11	60000	2059.7	1.11	0.0	0
Main Reach	46619 BR U	70000-CFS	70000	2062.3	1.05	70000	2062.3	1.05	0.0	0
Main Reach	46619 BR U	80000-CFS	80000	2064.6	1.03	80000	2064.6	1.03	0.0	0
Main Reach	46619 BR U	90000-CFS	90000	2066.7	1.02	90000	2066.7	1.02	0.0	0
Main Reach	46619 BR U	100000-CFS	100000	2068.7	1.02	100000	2068.7	1.02	0.0	0
Main Reach	46619 BR U	110000-CFS	110000	2070.4	1.03	110000	2070.4	1.03	0.0	0
Main Reach	46619 BR U	115000-CFS	115000	2071.2	1.03	115000	2071.2	1.03	0.0	0
Main Reach	46619 BR U	120000-CFS	120000	2072.0	1.04	120000	2072.0	1.04	0.0	0
Main Reach	46619 BR U	130000-CFS	130000	2073.5	1.06	130000	2073.5	1.06	0.0	0
Main Reach	46619 BR U	140000-CFS	140000	2074.8	1.08	140000	2074.8	1.08	0.0	0
Main Reach	46619 BR U	150000-CFS	150000	2076.2	1.09	150000	2076.2	1.09	0.0	0
Main Reach	46619 BR U	159000-CFS	159000	2077.3	1.11	159000	2077.3	1.11	0.0	0
Main Reach	46619 BR D	10000-CFS	10000	2050.5	0.92	10000	2050.5	0.92	0.0	0
Main Reach	46619 BR D	20000-CFS	20000	2052.0	1.15	20000	2052.0	1.15	0.0	0
Main Reach	46619 BR D	30000-CFS	30000	2052.8	1.42	30000	2052.8	1.42	0.0	0
Main Reach	46619 BR D	40000-CFS	40000	2054.4	1.43	40000	2054.4	1.43	0.0	0
Main Reach	46619 BR D	50000-CFS	50000	2056.9	1.27	50000	2056.9	1.27	0.0	0
Main Reach	46619 BR D	60000-CFS	60000	2059.7	1.14	60000	2059.7	1.14	0.0	0
Main Reach	46619 BR D	70000-CFS	70000	2062.3	1.08	70000	2062.3	1.08	0.0	0
Main Reach	46619 BR D	80000-CFS	80000	2064.6	1.05	80000	2064.6	1.05	0.0	0
Main Reach	46619 BR D	90000-CFS	90000	2066.7	1.05	90000	2066.7	1.05	0.0	0
Main Reach	46619 BR D	100000-CFS	100000	2068.7	1.05	100000	2068.7	1.05	0.0	0
Main Reach	46619 BR D	110000-CFS	110000	2070.4	1.06	110000	2070.4	1.06	0.0	0
Main Reach	46619 BR D	115000-CFS	115000	2071.2	1.06	115000	2071.2	1.06	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	46619 BR D	120000-CFS	120000	2072.0	1.07	120000	2072.0	1.07	0.0	0
Main Reach	46619 BR D	130000-CFS	130000	2073.4	1.09	130000	2073.4	1.09	0.0	0
Main Reach	46619 BR D	140000-CFS	140000	2074.8	1.11	140000	2074.8	1.11	0.0	0
Main Reach	46619 BR D	150000-CFS	150000	2076.2	1.12	150000	2076.2	1.12	0.0	0
Main Reach	46619 BR D	159000-CFS	159000	2077.3	1.14	159000	2077.3	1.14	0.0	0
Main Reach	46481	10000-CFS	10000	2050.5	0.71	10000	2050.5	0.71	0.0	0
Main Reach	46481	20000-CFS	20000	2052.0	0.88	20000	2052.0	0.88	0.0	0
Main Reach	46481	30000-CFS	30000	2052.8	1.09	30000	2052.8	1.09	0.0	0
Main Reach	46481	40000-CFS	40000	2054.4	1.1	40000	2054.4	1.1	0.0	0
Main Reach	46481	50000-CFS	50000	2056.9	0.98	50000	2056.9	0.98	0.0	0
Main Reach	46481	60000-CFS	60000	2059.7	0.89	60000	2059.7	0.89	0.0	0
Main Reach	46481	70000-CFS	70000	2062.3	0.85	70000	2062.3	0.85	0.0	0
Main Reach	46481	80000-CFS	80000	2064.6	0.83	80000	2064.6	0.83	0.0	0
Main Reach	46481	90000-CFS	90000	2066.7	0.83	90000	2066.7	0.83	0.0	0
Main Reach	46481	100000-CFS	100000	2068.7	0.84	100000	2068.7	0.84	0.0	0
Main Reach	46481	110000-CFS	110000	2070.4	0.85	110000	2070.4	0.85	0.0	0
Main Reach	46481	115000-CFS	115000	2071.2	0.85	115000	2071.2	0.85	0.0	0
Main Reach	46481	120000-CFS	120000	2072.0	0.86	120000	2072.0	0.86	0.0	0
Main Reach	46481	130000-CFS	130000	2073.4	0.88	130000	2073.4	0.88	0.0	0
Main Reach	46481	140000-CFS	140000	2074.8	0.9	140000	2074.8	0.9	0.0	0
Main Reach	46481	150000-CFS	150000	2076.2	0.92	150000	2076.2	0.92	0.0	0
Main Reach	46481	159000-CFS	159000	2077.3	0.93	159000	2077.3	0.93	0.0	0
Main Reach	46086	10000-CFS	10000	2050.4	0.71	10000	2050.4	0.71	0.0	0
Main Reach	46086	20000-CFS	20000	2052.0	0.81	20000	2052.0	0.81	0.0	0
Main Reach	46086	30000-CFS	30000	2052.8	0.95	30000	2052.8	0.95	0.0	0
Main Reach	46086	40000-CFS	40000	2054.3	0.88	40000	2054.3	0.88	0.0	0
Main Reach	46086	50000-CFS	50000	2056.9	0.72	50000	2056.9	0.72	0.0	0
Main Reach	46086	60000-CFS	60000	2059.7	0.62	60000	2059.7	0.62	0.0	0
Main Reach	46086	70000-CFS	70000	2062.3	0.58	70000	2062.3	0.58	0.0	0
Main Reach	46086	80000-CFS	80000	2064.6	0.56	80000	2064.6	0.56	0.0	0
Main Reach	46086	90000-CFS	90000	2066.7	0.55	90000	2066.7	0.55	0.0	0
Main Reach	46086	100000-CFS	100000	2068.7	0.55	100000	2068.7	0.55	0.0	0
Main Reach	46086	110000-CFS	110000	2070.4	0.55	110000	2070.4	0.55	0.0	0
Main Reach	46086	115000-CFS	115000	2071.2	0.55	115000	2071.2	0.55	0.0	0
Main Reach	46086	120000-CFS	120000	2072.0	0.56	120000	2072.0	0.56	0.0	0
Main Reach	46086	130000-CFS	130000	2073.5	0.57	130000	2073.5	0.57	0.0	0
Main Reach	46086	140000-CFS	140000	2074.8	0.58	140000	2074.8	0.58	0.0	0
Main Reach	46086	150000-CFS	150000	2076.2	0.59	150000	2076.2	0.59	0.0	0
Main Reach	46086	159000-CFS	159000	2077.3	0.6	159000	2077.3	0.6	0.0	0
Main Reach	39639	10000-CFS	10000	2047.6	5.83	10000	2047.6	5.83	0.0	0
Main Reach	39639	20000-CFS	20000	2048.3	6.69	20000	2048.3	6.69	0.0	0
Main Reach	39639	30000-CFS	30000	2050.4	3.28	30000	2050.4	3.28	0.0	0
Main Reach	39639	40000-CFS	40000	2053.5	1.31	40000	2053.5	1.31	0.0	0
Main Reach	39639	50000-CFS	50000	2056.7	0.81	50000	2056.7	0.81	0.0	0
Main Reach	39639	60000-CFS	60000	2059.6	0.64	60000	2059.6	0.64	0.0	0
Main Reach	39639	70000-CFS	70000	2062.3	0.58	70000	2062.3	0.58	0.0	0
Main Reach	39639	80000-CFS	80000	2064.6	0.55	80000	2064.6	0.55	0.0	0
Main Reach	39639	90000-CFS	90000	2066.7	0.53	90000	2066.7	0.53	0.0	0
Main Reach	39639	100000-CFS	100000	2068.6	0.53	100000	2068.6	0.53	0.0	0
Main Reach	39639	110000-CFS	110000	2070.4	0.53	110000	2070.4	0.53	0.0	0
Main Reach	39639	115000-CFS	115000	2071.2	0.53	115000	2071.2	0.53	0.0	0
Main Reach	39639	120000-CFS	120000	2072.0	0.53	120000	2072.0	0.53	0.0	0
Main Reach	39639	130000-CFS	130000	2073.4	0.54	130000	2073.4	0.54	0.0	0
Main Reach	39639	140000-CFS	140000	2074.8	0.55	140000	2074.8	0.55	0.0	0
Main Reach	39639	150000-CFS	150000	2076.2	0.56	150000	2076.2	0.56	0.0	0
Main Reach	39639	159000-CFS	159000	2077.3	0.56	159000	2077.3	0.56	0.0	0
Main Reach	34906	10000-CFS	10000	2040.0	1.57	10000	2040.0	1.57	0.0	0
Main Reach	34906	20000-CFS	20000	2044.2	1.97	20000	2044.2	1.97	0.0	0
Main Reach	34906	30000-CFS	30000	2049.1	1.3	30000	2049.1	1.3	0.0	0
Main Reach	34906	40000-CFS	40000	2053.1	1.07	40000	2053.1	1.07	0.0	0
Main Reach	34906	50000-CFS	50000	2056.5	0.99	50000	2056.5	0.99	0.0	0
Main Reach	34906	60000-CFS	60000	2059.5	0.96	60000	2059.5	0.96	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	34906	70000-CFS	70000	2062.2	0.96	70000	2062.2	0.96	0.0	0
Main Reach	34906	80000-CFS	80000	2064.5	0.97	80000	2064.5	0.97	0.0	0
Main Reach	34906	90000-CFS	90000	2066.6	0.99	90000	2066.6	0.99	0.0	0
Main Reach	34906	100000-CFS	100000	2068.6	1.01	100000	2068.6	1.01	0.0	0
Main Reach	34906	110000-CFS	110000	2070.3	1.03	110000	2070.3	1.03	0.0	0
Main Reach	34906	115000-CFS	115000	2071.1	1.04	115000	2071.1	1.04	0.0	0
Main Reach	34906	120000-CFS	120000	2071.9	1.06	120000	2071.9	1.06	0.0	0
Main Reach	34906	130000-CFS	130000	2073.4	1.08	130000	2073.4	1.08	0.0	0
Main Reach	34906	140000-CFS	140000	2074.8	1.11	140000	2074.8	1.11	0.0	0
Main Reach	34906	150000-CFS	150000	2076.1	1.14	150000	2076.1	1.14	0.0	0
Main Reach	34906	159000-CFS	159000	2077.3	1.16	159000	2077.3	1.16	0.0	0
Main Reach	32258	10000-CFS	10000	2040.0	0.28	10000	2040.0	0.28	0.0	0
Main Reach	32258	20000-CFS	20000	2044.2	0.47	20000	2044.2	0.47	0.0	0
Main Reach	32258	30000-CFS	30000	2049.1	0.53	30000	2049.1	0.53	0.0	0
Main Reach	32258	40000-CFS	40000	2053.1	0.56	40000	2053.1	0.56	0.0	0
Main Reach	32258	50000-CFS	50000	2056.5	0.59	50000	2056.5	0.59	0.0	0
Main Reach	32258	60000-CFS	60000	2059.5	0.62	60000	2059.5	0.62	0.0	0
Main Reach	32258	70000-CFS	70000	2062.2	0.65	70000	2062.2	0.65	0.0	0
Main Reach	32258	80000-CFS	80000	2064.5	0.68	80000	2064.5	0.68	0.0	0
Main Reach	32258	90000-CFS	90000	2066.6	0.71	90000	2066.6	0.71	0.0	0
Main Reach	32258	100000-CFS	100000	2068.6	0.74	100000	2068.6	0.74	0.0	0
Main Reach	32258	110000-CFS	110000	2070.3	0.77	110000	2070.3	0.77	0.0	0
Main Reach	32258	115000-CFS	115000	2071.1	0.78	115000	2071.1	0.78	0.0	0
Main Reach	32258	120000-CFS	120000	2071.9	0.8	120000	2071.9	0.8	0.0	0
Main Reach	32258	130000-CFS	130000	2073.4	0.83	130000	2073.4	0.83	0.0	0
Main Reach	32258	140000-CFS	140000	2074.8	0.86	140000	2074.8	0.86	0.0	0
Main Reach	32258	150000-CFS	150000	2076.1	0.89	150000	2076.1	0.89	0.0	0
Main Reach	32258	159000-CFS	159000	2077.3	0.91	159000	2077.3	0.91	0.0	0
Main Reach	30094	10000-CFS	10000	2040.0	0.45	10000	2040.0	0.45	0.0	0
Main Reach	30094	20000-CFS	20000	2044.2	0.68	20000	2044.2	0.68	0.0	0
Main Reach	30094	30000-CFS	30000	2049.1	0.76	30000	2049.1	0.76	0.0	0
Main Reach	30094	40000-CFS	40000	2053.1	0.81	40000	2053.1	0.81	0.0	0
Main Reach	30094	50000-CFS	50000	2056.5	0.86	50000	2056.5	0.86	0.0	0
Main Reach	30094	60000-CFS	60000	2059.5	0.9	60000	2059.5	0.9	0.0	0
Main Reach	30094	70000-CFS	70000	2062.2	0.94	70000	2062.2	0.94	0.0	0
Main Reach	30094	80000-CFS	80000	2064.5	0.99	80000	2064.5	0.99	0.0	0
Main Reach	30094	90000-CFS	90000	2066.6	1.04	90000	2066.6	1.04	0.0	0
Main Reach	30094	100000-CFS	100000	2068.6	1.09	100000	2068.6	1.09	0.0	0
Main Reach	30094	110000-CFS	110000	2070.3	1.13	110000	2070.3	1.13	0.0	0
Main Reach	30094	115000-CFS	115000	2071.1	1.16	115000	2071.1	1.16	0.0	0
Main Reach	30094	120000-CFS	120000	2071.9	1.18	120000	2071.9	1.18	0.0	0
Main Reach	30094	130000-CFS	130000	2073.3	1.23	130000	2073.3	1.23	0.0	0
Main Reach	30094	140000-CFS	140000	2074.7	1.28	140000	2074.7	1.28	0.0	0
Main Reach	30094	150000-CFS	150000	2076.1	1.32	150000	2076.1	1.32	0.0	0
Main Reach	30094	159000-CFS	159000	2077.2	1.36	159000	2077.2	1.36	0.0	0
Main Reach	27007	10000-CFS	10000	2040.0	0.43	10000	2040.0	0.43	0.0	0
Main Reach	27007	20000-CFS	20000	2044.1	0.71	20000	2044.1	0.71	0.0	0
Main Reach	27007	30000-CFS	30000	2049.1	0.89	30000	2049.1	0.89	0.0	0
Main Reach	27007	40000-CFS	40000	2053.0	1.03	40000	2053.0	1.03	0.0	0
Main Reach	27007	50000-CFS	50000	2056.4	1.13	50000	2056.4	1.13	0.0	0
Main Reach	27007	60000-CFS	60000	2059.5	1.2	60000	2059.5	1.2	0.0	0
Main Reach	27007	70000-CFS	70000	2062.1	1.27	70000	2062.1	1.27	0.0	0
Main Reach	27007	80000-CFS	80000	2064.4	1.34	80000	2064.4	1.34	0.0	0
Main Reach	27007	90000-CFS	90000	2066.6	1.41	90000	2066.6	1.41	0.0	0
Main Reach	27007	100000-CFS	100000	2068.5	1.48	100000	2068.5	1.48	0.0	0
Main Reach	27007	110000-CFS	110000	2070.2	1.54	110000	2070.2	1.54	0.0	0
Main Reach	27007	115000-CFS	115000	2071.1	1.58	115000	2071.1	1.58	0.0	0
Main Reach	27007	120000-CFS	120000	2071.8	1.61	120000	2071.8	1.61	0.0	0
Main Reach	27007	130000-CFS	130000	2073.3	1.67	130000	2073.3	1.67	0.0	0
Main Reach	27007	140000-CFS	140000	2074.7	1.74	140000	2074.7	1.74	0.0	0
Main Reach	27007	150000-CFS	150000	2076.0	1.8	150000	2076.0	1.8	0.0	0
Main Reach	27007	159000-CFS	159000	2077.2	1.85	159000	2077.2	1.85	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	24647	10000-CFS	10000	2040.0	0.41	10000	2040.0	0.41	0.0	0
Main Reach	24647	20000-CFS	20000	2044.1	0.69	20000	2044.1	0.69	0.0	0
Main Reach	24647	30000-CFS	30000	2049.0	0.86	30000	2049.0	0.86	0.0	0
Main Reach	24647	40000-CFS	40000	2053.0	1	40000	2053.0	1	0.0	0
Main Reach	24647	50000-CFS	50000	2056.4	1.12	50000	2056.4	1.12	0.0	0
Main Reach	24647	60000-CFS	60000	2059.4	1.21	60000	2059.4	1.21	0.0	0
Main Reach	24647	70000-CFS	70000	2062.1	1.3	70000	2062.1	1.3	0.0	0
Main Reach	24647	80000-CFS	80000	2064.4	1.39	80000	2064.4	1.39	0.0	0
Main Reach	24647	90000-CFS	90000	2066.5	1.48	90000	2066.5	1.48	0.0	0
Main Reach	24647	100000-CFS	100000	2068.5	1.56	100000	2068.5	1.56	0.0	0
Main Reach	24647	110000-CFS	110000	2070.2	1.64	110000	2070.2	1.64	0.0	0
Main Reach	24647	115000-CFS	115000	2071.0	1.68	115000	2071.0	1.68	0.0	0
Main Reach	24647	120000-CFS	120000	2071.8	1.72	120000	2071.8	1.72	0.0	0
Main Reach	24647	130000-CFS	130000	2073.2	1.79	130000	2073.2	1.79	0.0	0
Main Reach	24647	140000-CFS	140000	2074.6	1.86	140000	2074.6	1.86	0.0	0
Main Reach	24647	150000-CFS	150000	2076.0	1.93	150000	2076.0	1.93	0.0	0
Main Reach	24647	159000-CFS	159000	2077.1	1.99	159000	2077.1	1.99	0.0	0
Main Reach	21637	10000-CFS	10000	2040.0	0.38	10000	2040.0	0.38	0.0	0
Main Reach	21637	20000-CFS	20000	2044.1	0.66	20000	2044.1	0.66	0.0	0
Main Reach	21637	30000-CFS	30000	2049.0	0.85	30000	2049.0	0.85	0.0	0
Main Reach	21637	40000-CFS	40000	2053.0	1.01	40000	2053.0	1.01	0.0	0
Main Reach	21637	50000-CFS	50000	2056.3	1.15	50000	2056.3	1.15	0.0	0
Main Reach	21637	60000-CFS	60000	2059.4	1.24	60000	2059.4	1.24	0.0	0
Main Reach	21637	70000-CFS	70000	2062.0	1.31	70000	2062.0	1.31	0.0	0
Main Reach	21637	80000-CFS	80000	2064.4	1.37	80000	2064.4	1.37	0.0	0
Main Reach	21637	90000-CFS	90000	2066.5	1.43	90000	2066.5	1.43	0.0	0
Main Reach	21637	100000-CFS	100000	2068.4	1.48	100000	2068.4	1.48	0.0	0
Main Reach	21637	110000-CFS	110000	2070.2	1.53	110000	2070.2	1.53	0.0	0
Main Reach	21637	115000-CFS	115000	2071.0	1.56	115000	2071.0	1.56	0.0	0
Main Reach	21637	120000-CFS	120000	2071.7	1.58	120000	2071.7	1.58	0.0	0
Main Reach	21637	130000-CFS	130000	2073.2	1.64	130000	2073.2	1.64	0.0	0
Main Reach	21637	140000-CFS	140000	2074.6	1.69	140000	2074.6	1.69	0.0	0
Main Reach	21637	150000-CFS	150000	2075.9	1.74	150000	2075.9	1.74	0.0	0
Main Reach	21637	159000-CFS	159000	2077.1	1.78	159000	2077.1	1.78	0.0	0
Main Reach	19804	10000-CFS	10000	2039.9	0.46	10000	2039.9	0.46	0.0	0
Main Reach	19804	20000-CFS	20000	2044.1	0.73	20000	2044.1	0.73	0.0	0
Main Reach	19804	30000-CFS	30000	2049.0	0.88	30000	2049.0	0.88	0.0	0
Main Reach	19804	40000-CFS	40000	2052.9	0.99	40000	2052.9	0.99	0.0	0
Main Reach	19804	50000-CFS	50000	2056.3	1.06	50000	2056.3	1.06	0.0	0
Main Reach	19804	60000-CFS	60000	2059.4	1.12	60000	2059.4	1.12	0.0	0
Main Reach	19804	70000-CFS	70000	2062.0	1.18	70000	2062.0	1.18	0.0	0
Main Reach	19804	80000-CFS	80000	2064.3	1.25	80000	2064.3	1.25	0.0	0
Main Reach	19804	90000-CFS	90000	2066.4	1.31	90000	2066.4	1.31	0.0	0
Main Reach	19804	100000-CFS	100000	2068.4	1.37	100000	2068.4	1.37	0.0	0
Main Reach	19804	110000-CFS	110000	2070.1	1.44	110000	2070.1	1.44	0.0	0
Main Reach	19804	115000-CFS	115000	2070.9	1.47	115000	2070.9	1.47	0.0	0
Main Reach	19804	120000-CFS	120000	2071.7	1.5	120000	2071.7	1.5	0.0	0
Main Reach	19804	130000-CFS	130000	2073.2	1.56	130000	2073.2	1.56	0.0	0
Main Reach	19804	140000-CFS	140000	2074.6	1.62	140000	2074.6	1.62	0.0	0
Main Reach	19804	150000-CFS	150000	2075.9	1.68	150000	2075.9	1.68	0.0	0
Main Reach	19804	159000-CFS	159000	2077.0	1.73	159000	2077.0	1.73	0.0	0
Main Reach	14428	10000-CFS	10000	2039.6	4.09	10000	2039.6	4.09	0.0	0
Main Reach	14428	20000-CFS	20000	2043.6	4.77	20000	2043.6	4.77	0.0	0
Main Reach	14428	30000-CFS	30000	2048.6	4.1	30000	2048.6	4.1	0.0	0
Main Reach	14428	40000-CFS	40000	2052.5	3.79	40000	2052.5	3.79	0.0	0
Main Reach	14428	50000-CFS	50000	2055.9	3.63	50000	2055.9	3.63	0.0	0
Main Reach	14428	60000-CFS	60000	2059.0	3.56	60000	2059.0	3.56	0.0	0
Main Reach	14428	70000-CFS	70000	2061.6	3.59	70000	2061.6	3.59	0.0	0
Main Reach	14428	80000-CFS	80000	2063.9	3.66	80000	2063.9	3.66	0.0	0
Main Reach	14428	90000-CFS	90000	2066.1	3.74	90000	2066.1	3.74	0.0	0
Main Reach	14428	100000-CFS	100000	2068.0	3.84	100000	2068.0	3.84	0.0	0
Main Reach	14428	110000-CFS	110000	2069.7	3.96	110000	2069.7	3.96	0.0	0
Main Reach	14428	115000-CFS	115000	2070.5	4.02	115000	2070.5	4.02	0.0	0

			Existing Conditions			Proposed Conditions			Change	
Reach	River Sta	Profile	Q Total	W.S. Elev	Vel Chnl	Q Total	W.S. Elev	Vel Chnl	W.S. Elev	Vel Chnl
			(cfs)	(ft)	(ft/s)	(cfs)	(ft)	(ft/s)	(ft)	(ft/s)
Main Reach	14428	120000-CFS	120000	2071.3	4.08	120000	2071.3	4.08	0.0	0
Main Reach	14428	130000-CFS	130000	2072.7	4.21	130000	2072.7	4.21	0.0	0
Main Reach	14428	140000-CFS	140000	2074.1	4.34	140000	2074.1	4.34	0.0	0
Main Reach	14428	150000-CFS	150000	2075.4	4.45	150000	2075.4	4.45	0.0	0
Main Reach	14428	159000-CFS	159000	2076.5	4.55	159000	2076.5	4.55	0.0	0
Main Reach	13088	10000-CFS	10000	2033.9	10.99	10000	2033.9	10.99	0.0	0
Main Reach	13088	20000-CFS	20000	2041.5	6.1	20000	2041.5	6.1	0.0	0
Main Reach	13088	30000-CFS	30000	2047.4	5.07	30000	2047.4	5.07	0.0	0
Main Reach	13088	40000-CFS	40000	2051.7	4.28	40000	2051.7	4.28	0.0	0
Main Reach	13088	50000-CFS	50000	2055.4	3.7	50000	2055.4	3.7	0.0	0
Main Reach	13088	60000-CFS	60000	2058.6	3.4	60000	2058.6	3.4	0.0	0
Main Reach	13088	70000-CFS	70000	2061.4	3.3	70000	2061.4	3.3	0.0	0
Main Reach	13088	80000-CFS	80000	2063.7	3.29	80000	2063.7	3.29	0.0	0
Main Reach	13088	90000-CFS	90000	2065.9	3.31	90000	2065.9	3.31	0.0	0
Main Reach	13088	100000-CFS	100000	2067.8	3.36	100000	2067.8	3.36	0.0	0
Main Reach	13088	110000-CFS	110000	2069.6	3.43	110000	2069.6	3.43	0.0	0
Main Reach	13088	115000-CFS	115000	2070.4	3.47	115000	2070.4	3.47	0.0	0
Main Reach	13088	120000-CFS	120000	2071.1	3.51	120000	2071.1	3.51	0.0	0
Main Reach	13088	130000-CFS	130000	2072.6	3.6	130000	2072.6	3.6	0.0	0
Main Reach	13088	140000-CFS	140000	2074.0	3.68	140000	2074.0	3.68	0.0	0
Main Reach	13088	150000-CFS	150000	2075.3	3.77	150000	2075.3	3.77	0.0	0
Main Reach	13088	159000-CFS	159000	2076.4	3.84	159000	2076.4	3.84	0.0	0
Main Reach	11603	10000-CFS	10000	2033.0	0.39	10000	2033.0	0.39	0.0	0
Main Reach	11603	20000-CFS	20000	2041.9	0.6	20000	2041.9	0.6	0.0	0
Main Reach	11603	30000-CFS	30000	2047.6	0.77	30000	2047.6	0.77	0.0	0
Main Reach	11603	40000-CFS	40000	2051.9	0.92	40000	2051.9	0.92	0.0	0
Main Reach	11603	50000-CFS	50000	2055.5	1.04	50000	2055.5	1.04	0.0	0
Main Reach	11603	60000-CFS	60000	2058.7	1.12	60000	2058.7	1.12	0.0	0
Main Reach	11603	70000-CFS	70000	2061.4	1.2	70000	2061.4	1.2	0.0	0
Main Reach	11603	80000-CFS	80000	2063.8	1.28	80000	2063.8	1.28	0.0	0
Main Reach	11603	90000-CFS	90000	2065.9	1.36	90000	2065.9	1.36	0.0	0
Main Reach	11603	100000-CFS	100000	2067.9	1.43	100000	2067.9	1.43	0.0	0
Main Reach	11603	110000-CFS	110000	2069.6	1.51	110000	2069.6	1.51	0.0	0
Main Reach	11603	115000-CFS	115000	2070.4	1.55	115000	2070.4	1.55	0.0	0
Main Reach	11603	120000-CFS	120000	2071.2	1.58	120000	2071.2	1.58	0.0	0
Main Reach	11603	130000-CFS	130000	2072.6	1.66	130000	2072.6	1.66	0.0	0
Main Reach	11603	140000-CFS	140000	2074.0	1.72	140000	2074.0	1.72	0.0	0
Main Reach	11603	150000-CFS	150000	2075.3	1.79	150000	2075.3	1.79	0.0	0
Main Reach	11603	159000-CFS	159000	2076.5	1.85	159000	2076.5	1.85	0.0	0
Main Reach	10000	10000-CFS	10000	2033.0	1.45	10000	2033.0	1.45	0.0	0
Main Reach	10000	20000-CFS	20000	2041.8	1.64	20000	2041.8	1.64	0.0	0
Main Reach	10000	30000-CFS	30000	2047.6	1.78	30000	2047.6	1.78	0.0	0
Main Reach	10000	40000-CFS	40000	2051.8	1.93	40000	2051.8	1.93	0.0	0
Main Reach	10000	50000-CFS	50000	2055.4	2.05	50000	2055.4	2.05	0.0	0
Main Reach	10000	60000-CFS	60000	2058.6	2.16	60000	2058.6	2.16	0.0	0
Main Reach	10000	70000-CFS	70000	2061.3	2.26	70000	2061.3	2.26	0.0	0
Main Reach	10000	80000-CFS	80000	2063.7	2.35	80000	2063.7	2.35	0.0	0
Main Reach	10000	90000-CFS	90000	2065.8	2.44	90000	2065.8	2.44	0.0	0
Main Reach	10000	100000-CFS	100000	2067.8	2.52	100000	2067.8	2.52	0.0	0
Main Reach	10000	110000-CFS	110000	2069.5	2.61	110000	2069.5	2.61	0.0	0
Main Reach	10000	115000-CFS	115000	2070.3	2.65	115000	2070.3	2.65	0.0	0
Main Reach	10000	120000-CFS	120000	2071.1	2.69	120000	2071.1	2.69	0.0	0
Main Reach	10000	130000-CFS	130000	2072.5	2.77	130000	2072.5	2.77	0.0	0
Main Reach	10000	140000-CFS	140000	2073.9	2.83	140000	2073.9	2.83	0.0	0
Main Reach	10000	150000-CFS	150000	2075.2	2.9	150000	2075.2	2.9	0.0	0
Main Reach	10000	159000-CFS	159000	2076.4	2.95	159000	2076.4	2.95	0.0	0

Attachment I: No-rise Certification
Design Certification

"NO-RISE" Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Idaho.

It is further to certify that the attached technical document supports the determination that the proposed construction of BNSF Bridge 3.9 over Lake Pend Oreille near Sandpoint, Idaho will not impact the 100-year flood elevations on Lake Pend Oreille for Bonner County, Idaho and incorporated areas dated July 7, 2014 and will not impact the 100-year flood elevations, floodway elevations, or floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

- 14R0057 –Bridge 3.9 over Lake Pend Oreille H&H Technical Summary Memorandum

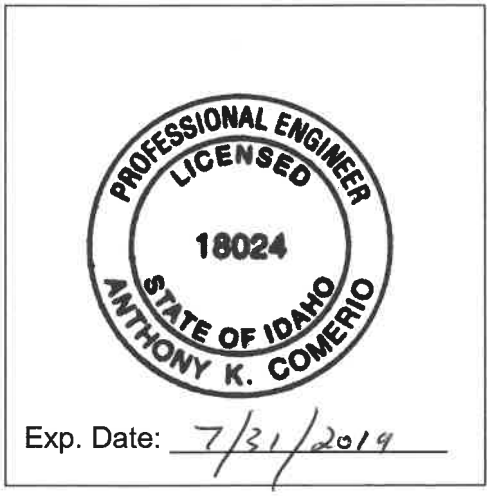
(Signature) 3/29/2019 (Date)

Name: Anthony K. Comerio, P.E., CFM

Title: Chief Water Resources Engineer

License Number: 18024

P.E Seal



Exp. Date: 7/31/2019

Design Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Idaho.

It is further to certify that the project has been designed in accordance with the General Standards of Bonner County Revised Code Section 14-501.

Attached are the following preliminary documents that further describe the proposed construction.

- BNSF Bridge 3.9 over Lake Pend Oreille –dated March 2019, 28 sheets

Mat Fletcher — (Signature)

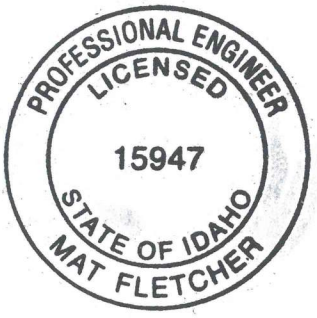
3/29/2019 — (Date)

Name: Mathew A. Fletcher, P.E.

Title: Structural Engineer

License Number: 15947

P.E Seal



Exp. Date: 2-28-2021