



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 downstream (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 in 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 Albin 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.

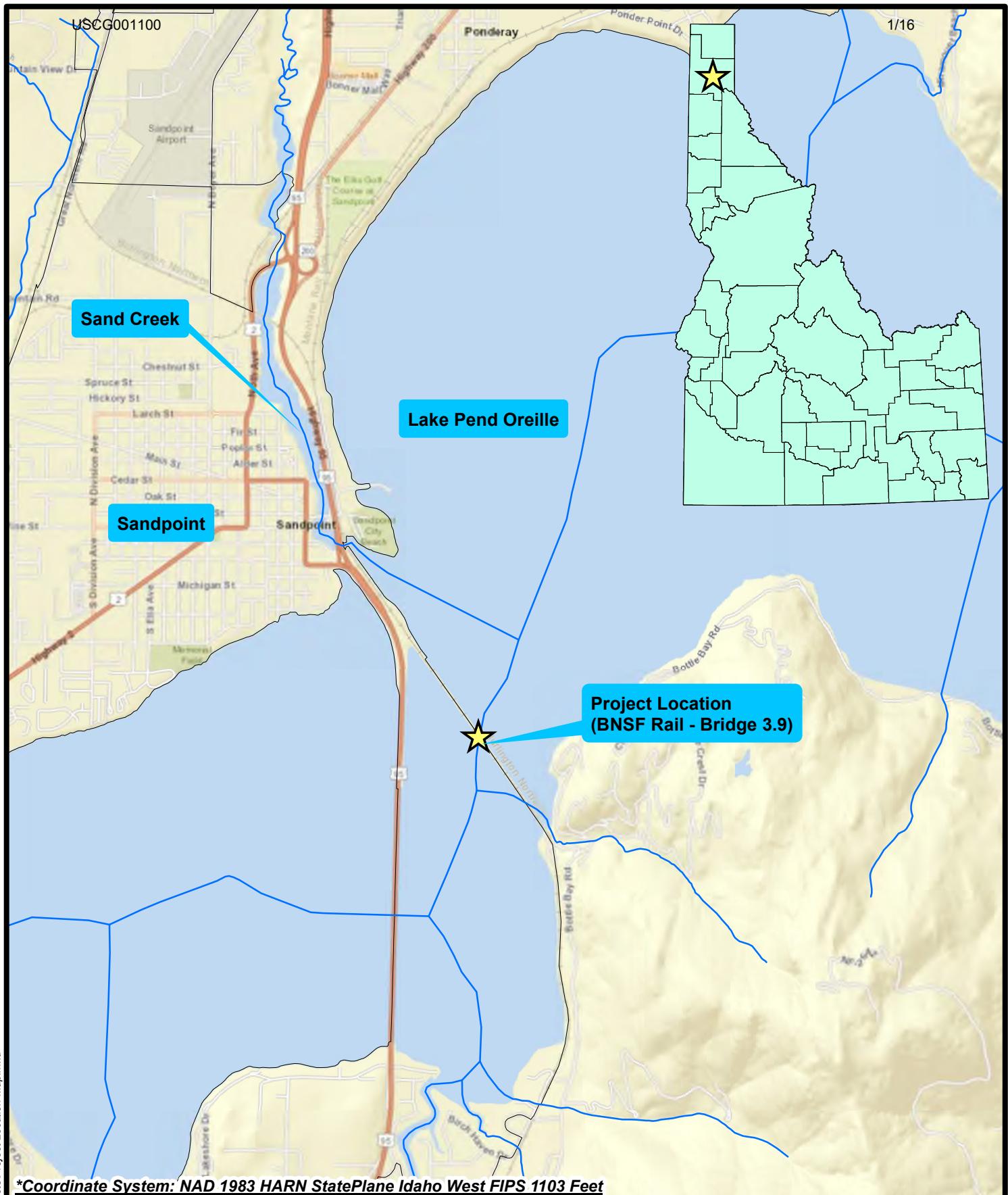
FLOODPLAIN PERMITTING

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



F:\14\jobs\14R0057\CAD\GIS\Projects\Project Location Map.mxd

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

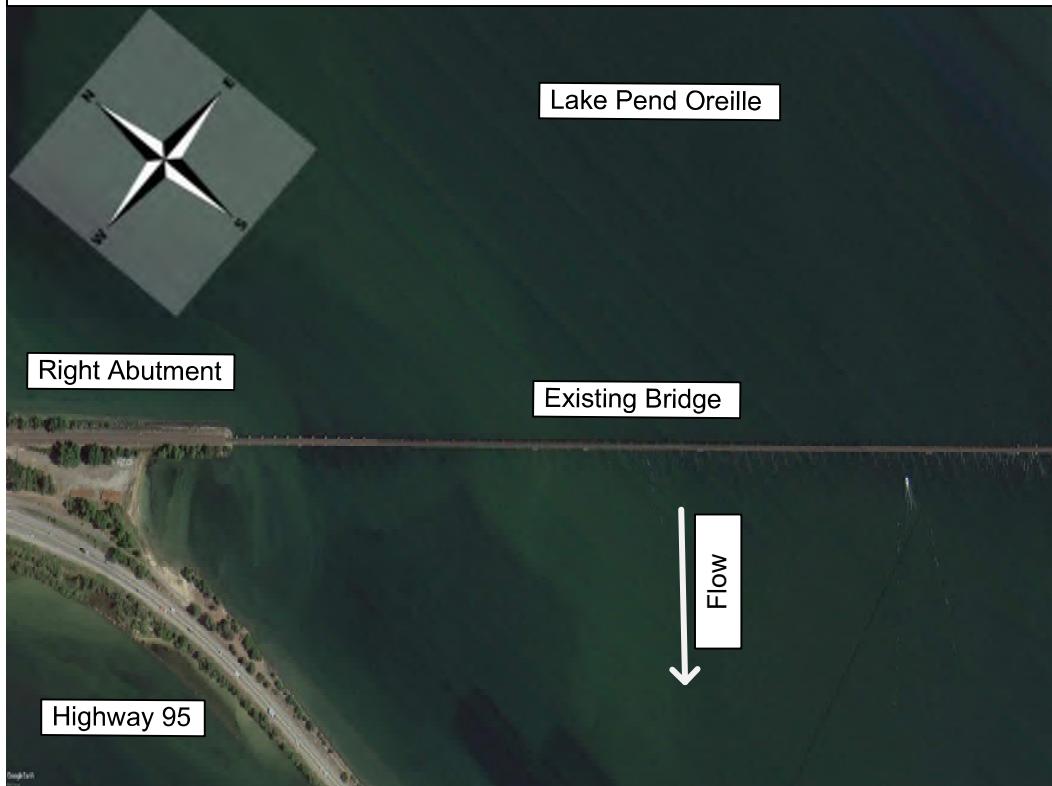
0 1,500 3,000
Feet
1 in = 3,000 ft



| Project Location Map | |
|---|--|
| BNSF Railway Company Bridge 3.9 Over Lake Pend Oreille Sandpoint, Idaho | |
| Job Number: 14R0057 | |

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



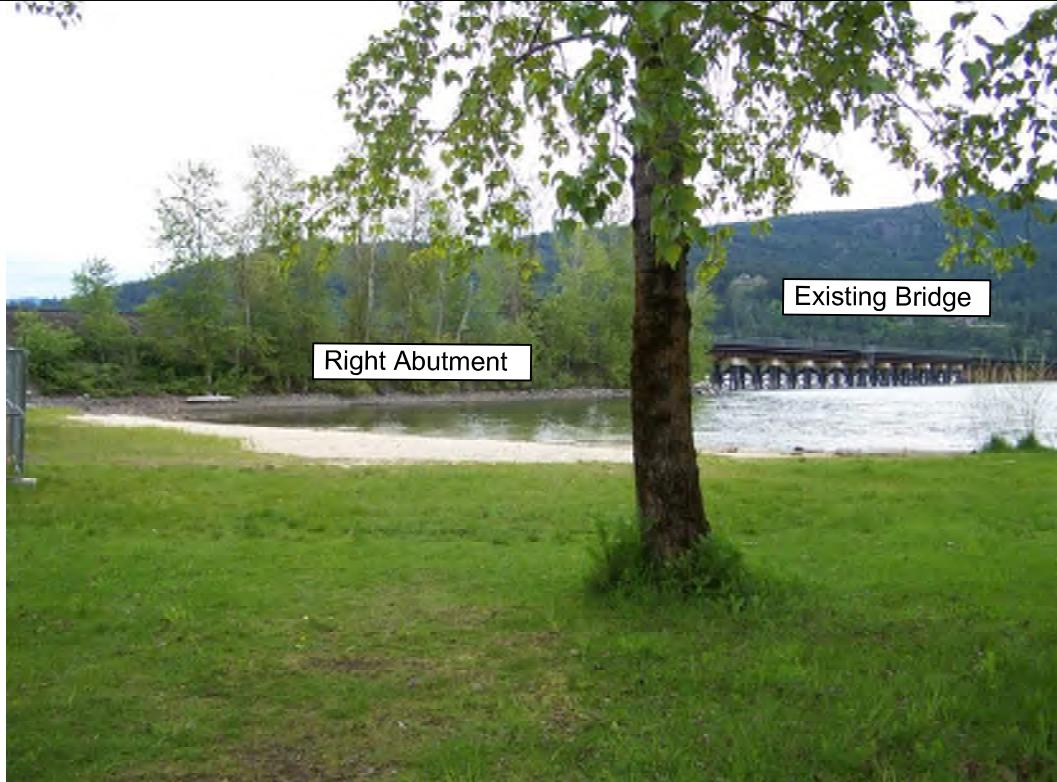
© Copyright Hanson Professional Services Inc. 2018

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)



© Copyright Hanson Professional Services Inc. 2018

Photographs

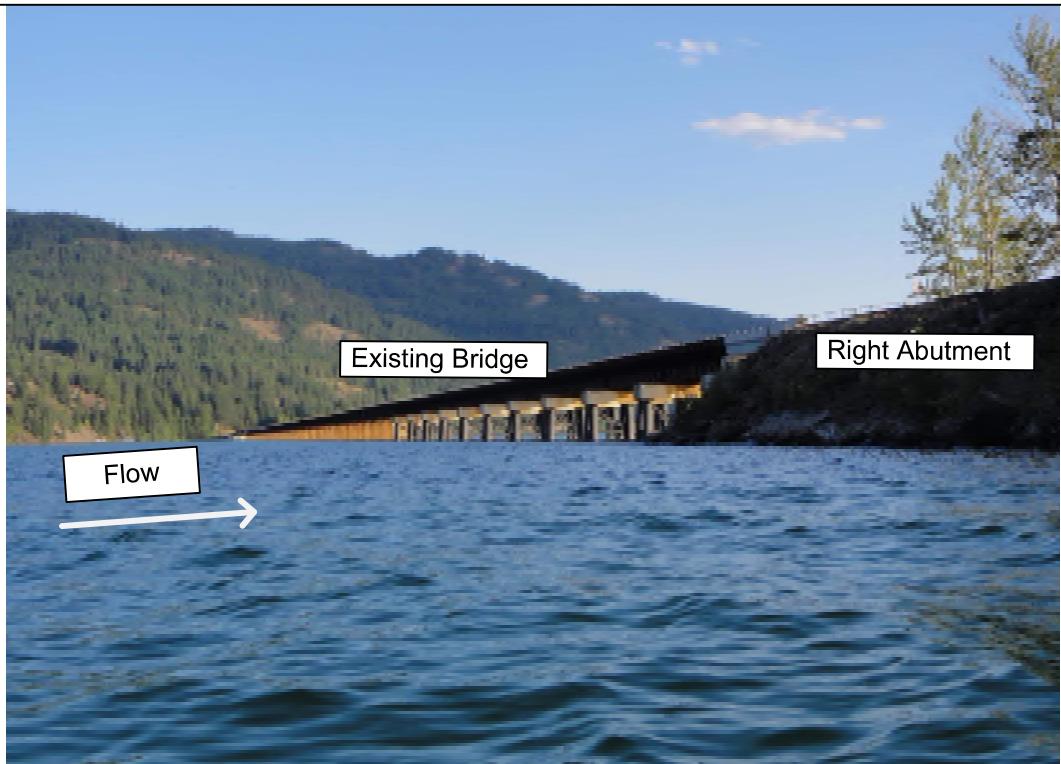


BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

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)

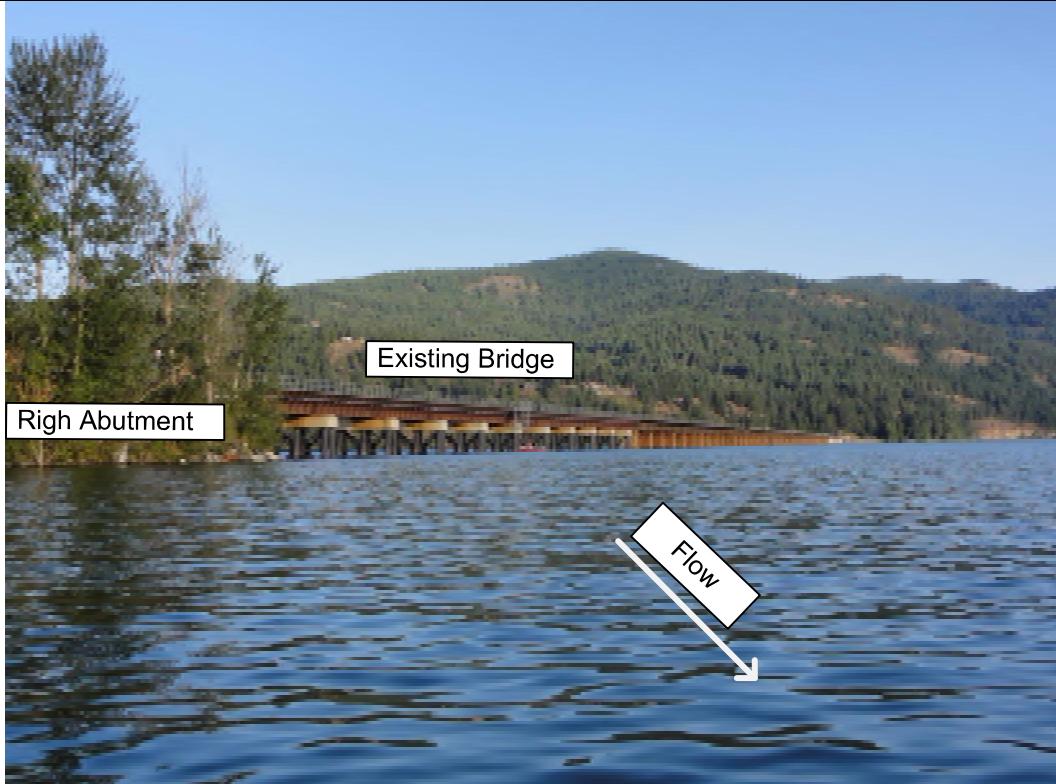


© Copyright Hanson Professional Services Inc. 2018

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)



© Copyright Hanson Professional Services Inc. 2018

Photographs



BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Photograph 9 – Existing Bridge Concrete Piers on Lake Pend Oreille



Existing Bridge

Photograph 10 – Existing Bridge Battered Piers on Lake Pend Oreille



Existing Bridge

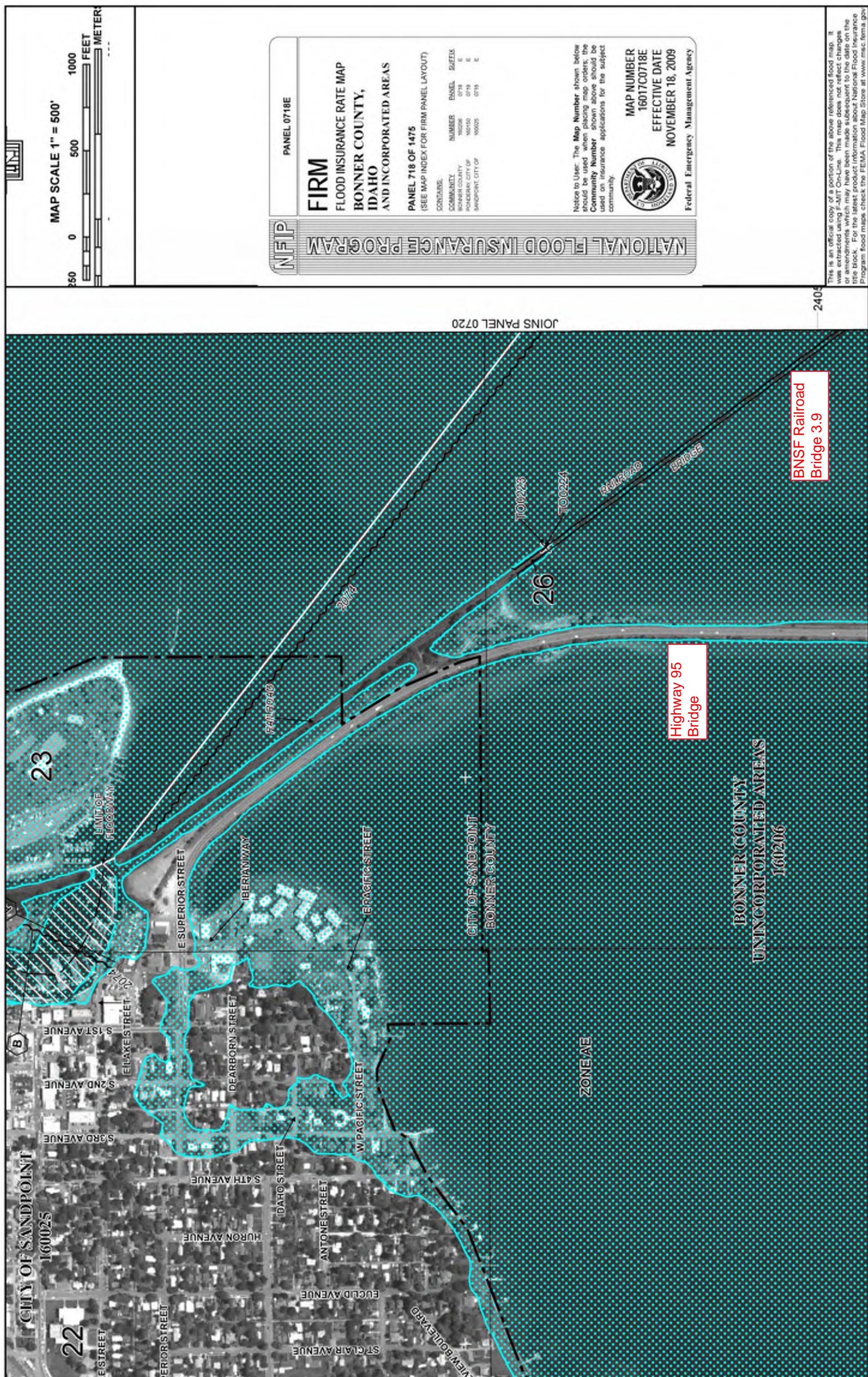
© Copyright Hanson Professional Services Inc. 2018

Photographs



BNSF Railway Company
Bridge 3.9 Over Sand Creek
Sandpoint, Idaho

Attachment C – FEMA FIS and FIRM



FLOOD INSURANCE STUDY

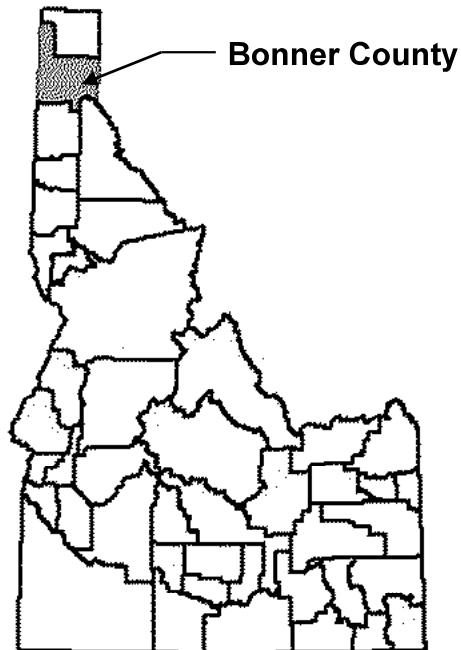


BONNER COUNTY, IDAHO AND INCORPORATED AREAS

| COMMUNITY NAME | |
|-------------------------------------|--|
| BONNER COUNTY, UNINCORPORATED AREAS | |
| CLARK FORK, CITY OF | |
| DOVER, CITY OF | |
| EAST HOPE, CITY OF | |
| HOPE, CITY OF | |
| *KOOTENAI, CITY OF | |
| OLDTOWN, CITY OF | |
| PONDERAY, CITY OF | |
| PRIEST RIVER, CITY OF | |
| SANDBPOINT, CITY OF | |

*No Special Flood Hazard Areas Identified

| COMMUNITY NUMBER | |
|---------------------|--|
| 160206 | |
| 160132 | |
| 160006 | |
| 160237 | |
| 160238 | |
| 160052 | |
| 160073 | |
| 160150 | |
| 160026 | |
| 160025 | |



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 are 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).

City of Clark Fork

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

| <u>Flooding Source and Location</u> | <u>Drainage Area (Square Miles)</u> | <u>10-Percent-Annual-Chance</u> | Peak Elevations (Feet NAVD) | | | |
|-------------------------------------|-------------------------------------|---------------------------------|--------------------------------|---------------------------------|----------------------------------|--|
| | | | <u>2-Percent-Annual-Chance</u> | <u>1- Percent-Annual-Chance</u> | <u>0.2-Percent-Annual-Chance</u> | |
| 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 | |

¹Data Not Available

Table 5. Summary of Discharges

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

| | <u>Channel</u> | <u>Overbank Flood Plain</u> |
|-----------------------|----------------|-----------------------------|
| 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

| <u>Stream Name</u> | Conversion from NGVD 29 to NAVD 88 (feet) | | | |
|-----------------------|---|---------------------------|--|-----------------------|
| | <u>Minimum Conversion</u> | <u>Maximum Conversion</u> | <u>Average Conversion</u> ¹ | <u>Maximum Offset</u> |
| 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 | 2,060.9 | 2,060.1 | 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 |

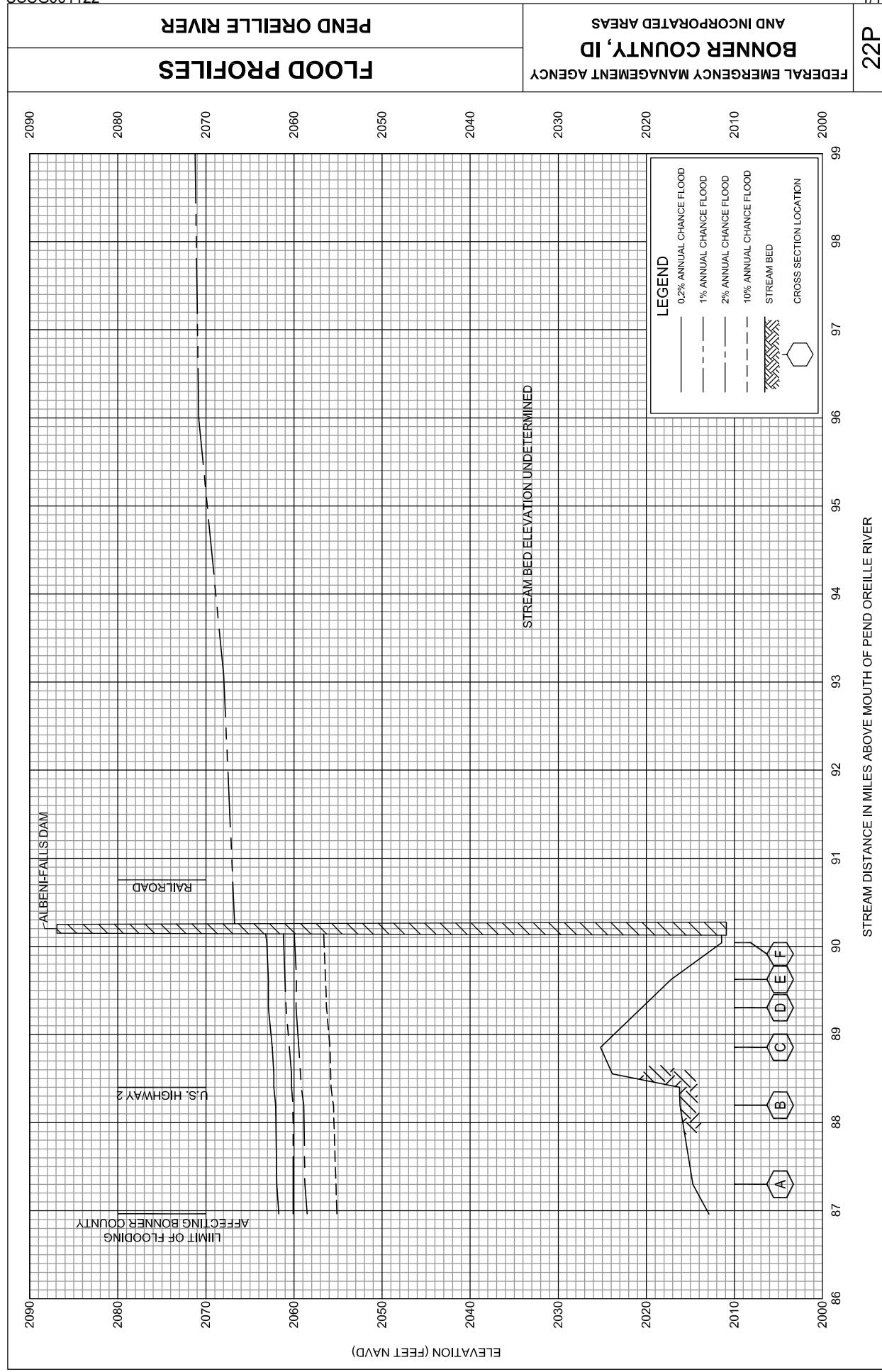
¹Miles above mouth

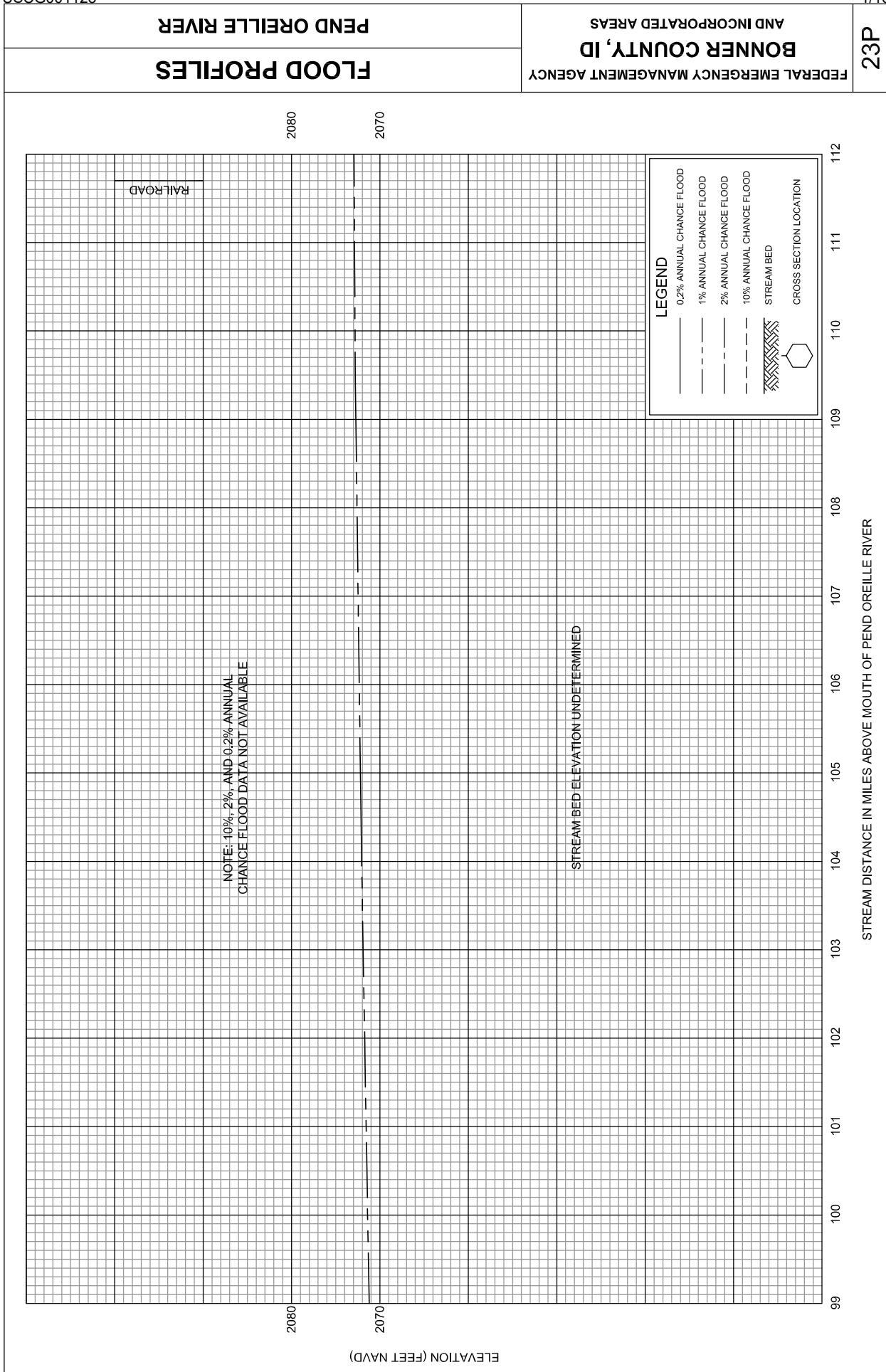
TABLE 8

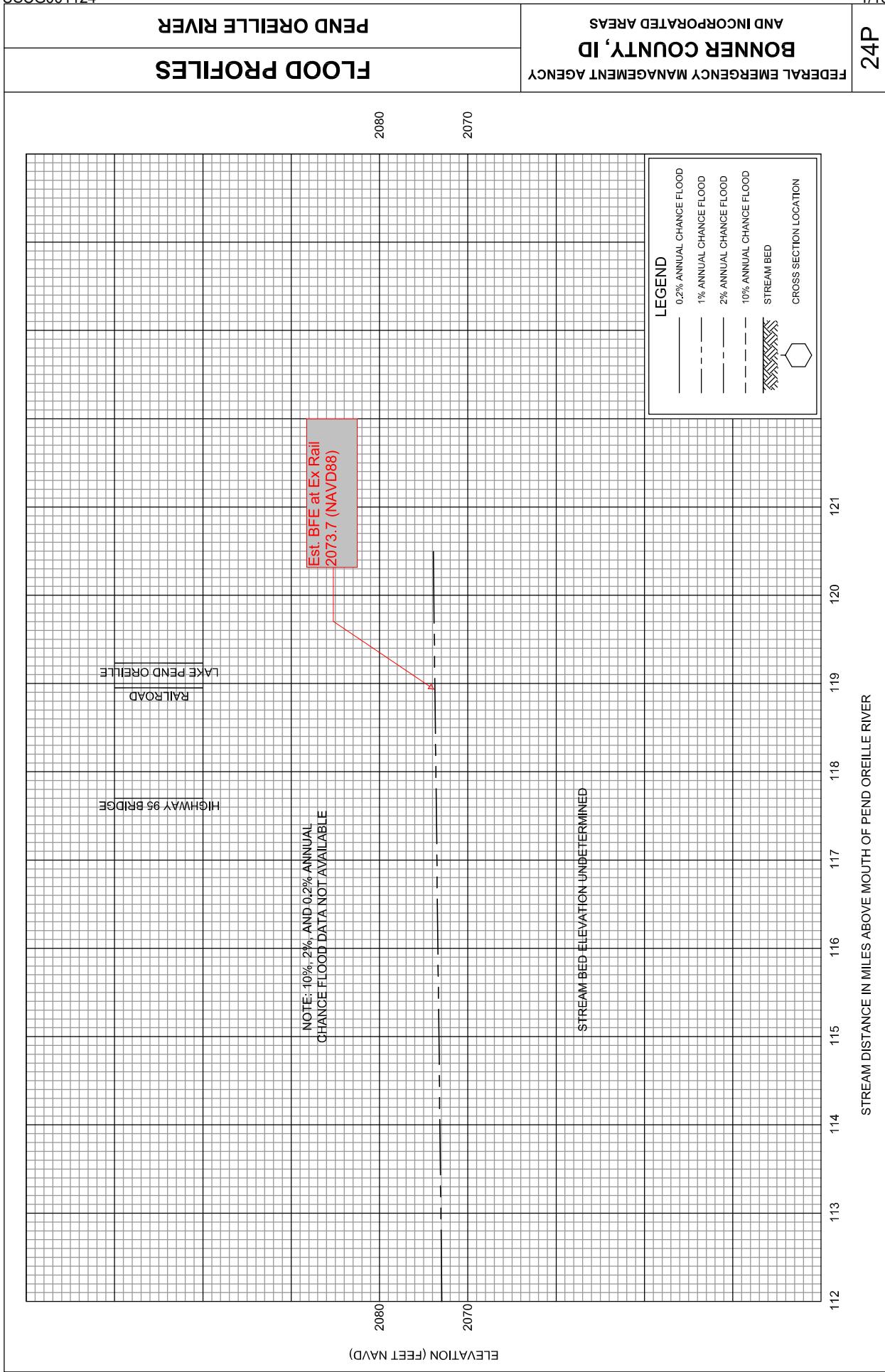
FEDERAL EMERGENCY MANAGEMENT AGENCY
BONNER COUNTY, IDAHO
AND INCORPORATED AREAS

FLOODWAY DATA

PEND OREILLE RIVER







Attachment D: USACE Data & Gage Data



USCG001126

**US Army Corps
of Engineers®**
Seattle District

Frequently Asked¹⁶ 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.

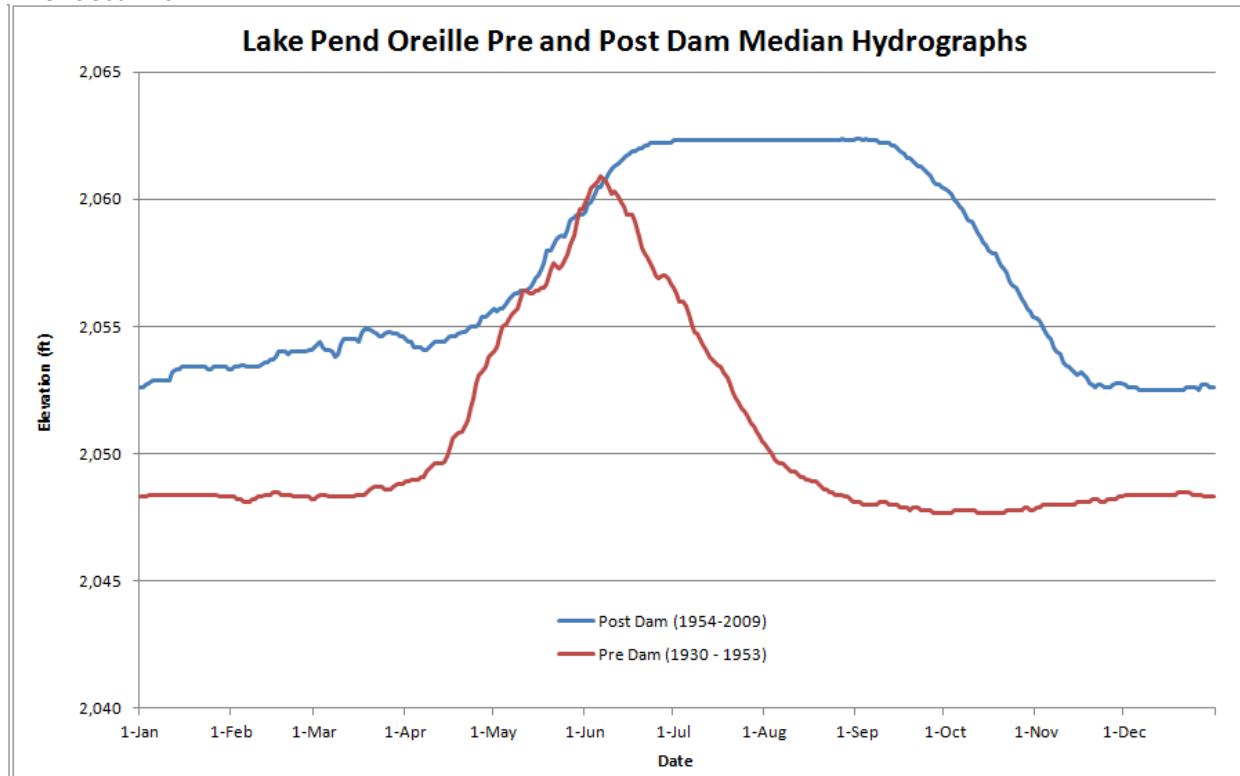
Seasonal operational parameters

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.salmorecovery.gov/Partners/FishAccords.aspx>.

OTHER FREQUENTLY ASKED QUESTIONS

How will the Columbia River Treaty (CRT) negotiations affect lake level?

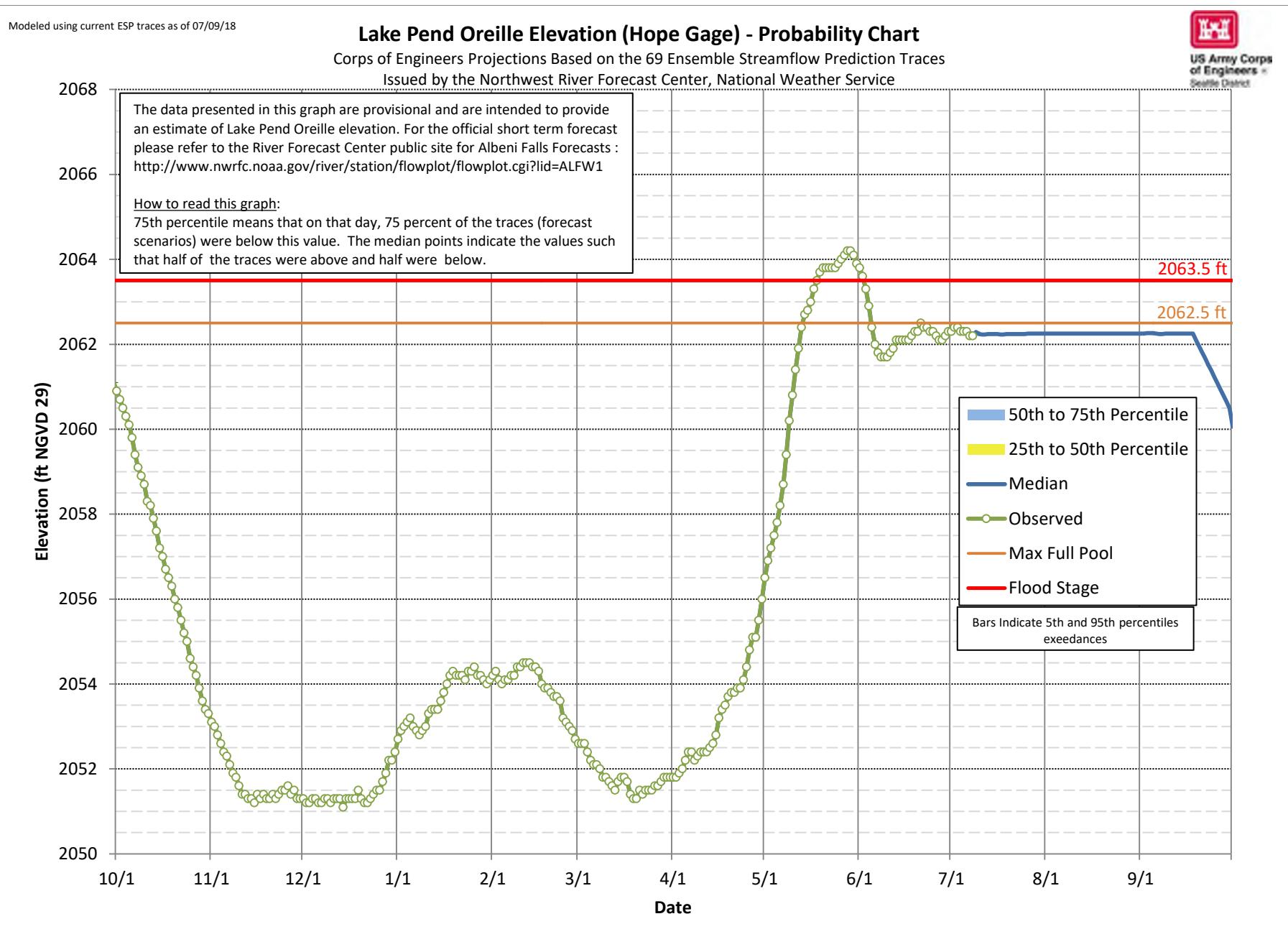
Idaho has been prominently at the table with the region's other states and sovereign tribes from the very beginning. The draft treaty recommendation recently submitted to the U.S. State Department calls for no changes to current management operations at Lake Pend Oreille.

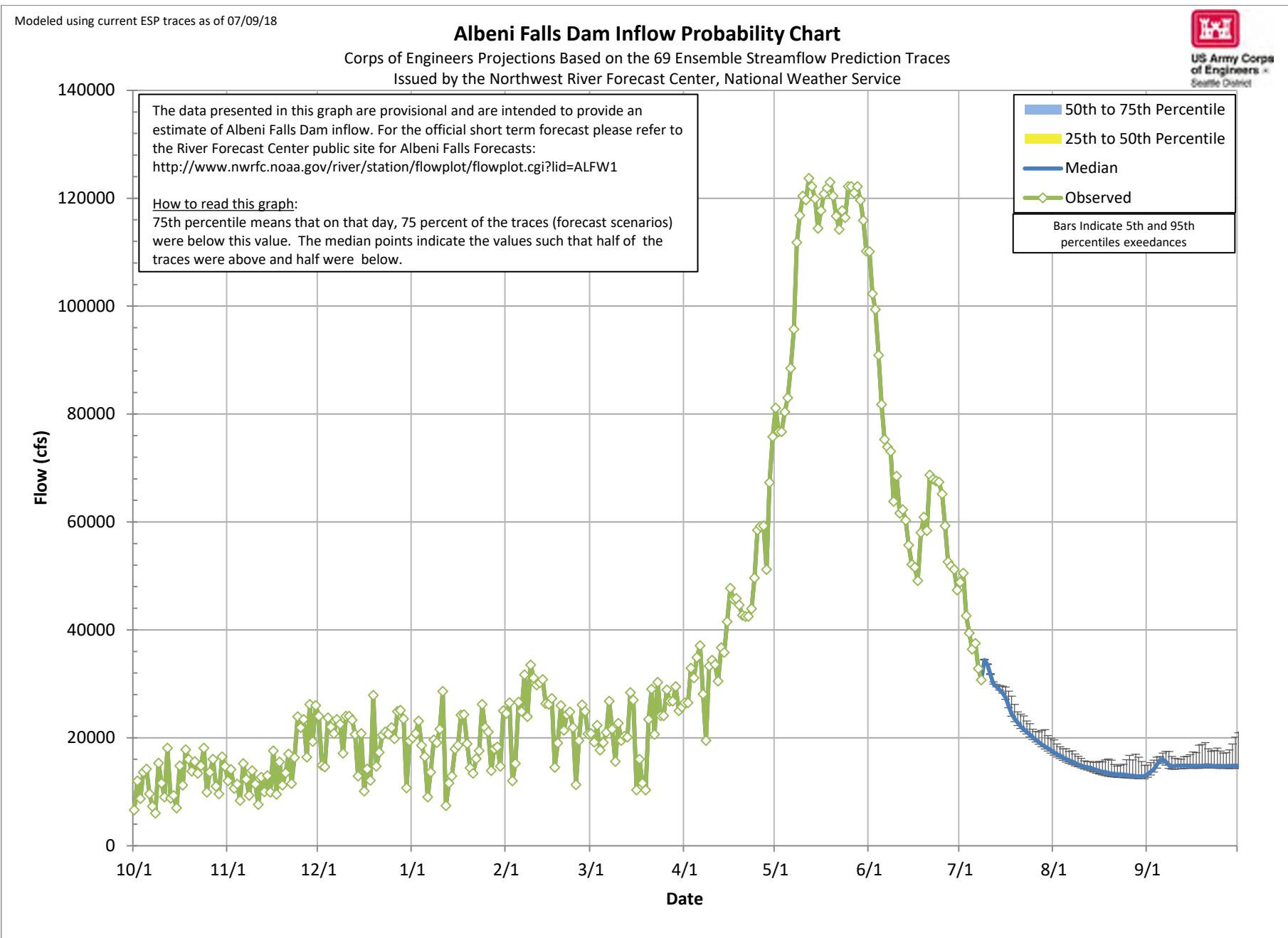
What is the Northwest Power & Conservation Council?

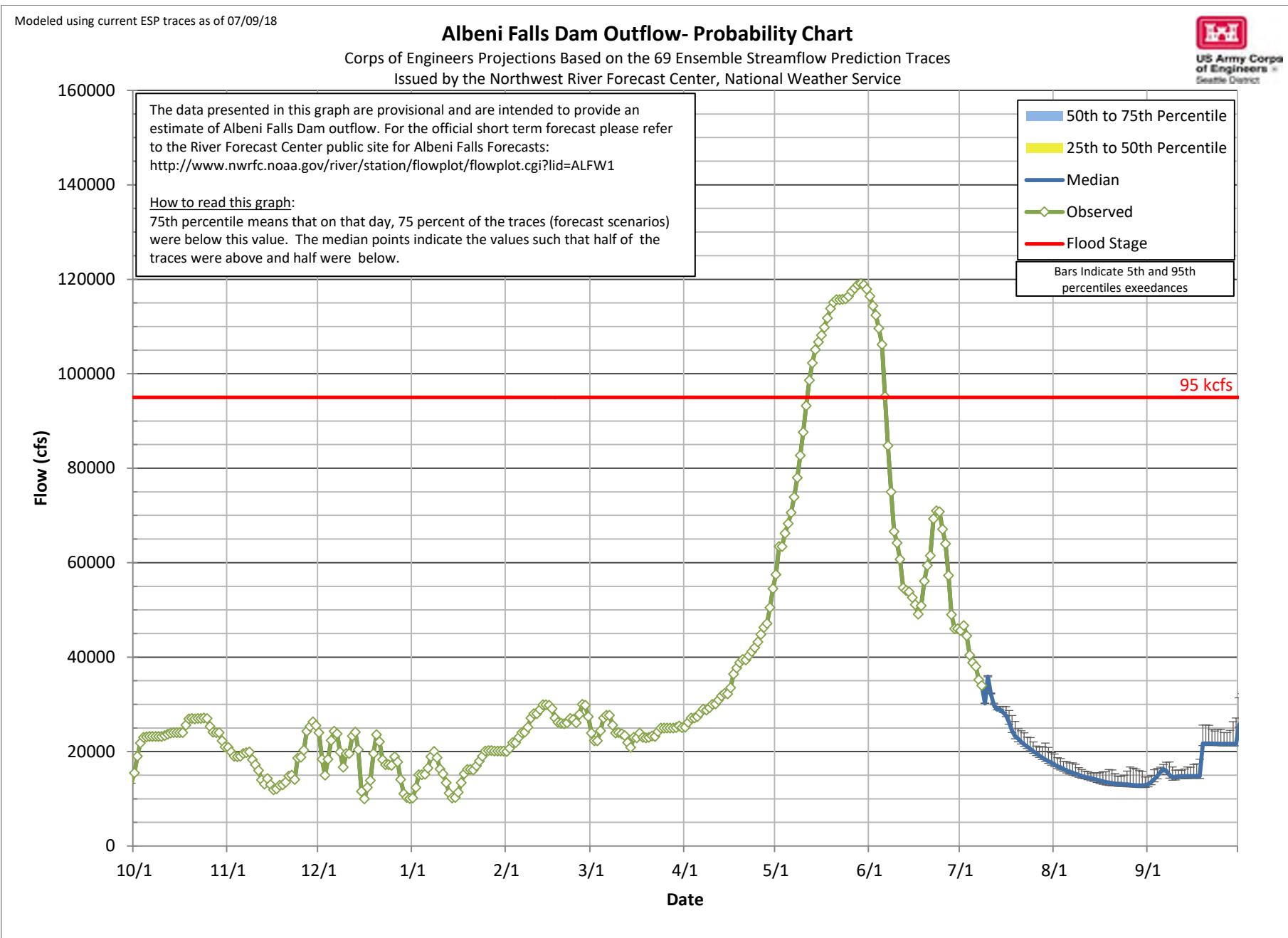
Congress passed the Northwest Power Act in 1980, which called for the establishment of an interstate compact of Idaho, Montana, Washington and Oregon. The compact, known as the Northwest Power and Conservation Council is charged with developing a Power Plan and a Columbia Basin Fish and Wildlife Program 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.









[USGS Home](#)
[Contact USGS](#)
[Search USGS](#)

National Water Information System: Web Interface

[USGS Water Resources](#)

| | |
|----------------|------------------|
| Data Category: | Geographic Area: |
| Surface Water | Idaho |

* 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](#)

Click to hide state-specific text

[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

Click to hidestation-specific text

Station is operated in cooperation with the [U.S. Army Corps of Engineers](#).

USCG001136

1/16

This station managed by the Post Falls Field Office.

| Available Parameters | Period of Record |
|---|-----------------------|
| <input type="checkbox"/> All 2 Available Parameters for this site | |
| <input checked="" type="checkbox"/> 00065 Gage height(Obs.) | 1970-10-01 2018-05-23 |
| <input checked="" type="checkbox"/> 72020 Elevation, NGVD29(Obs.) | 1929-10-01 1970-09-29 |

Output format

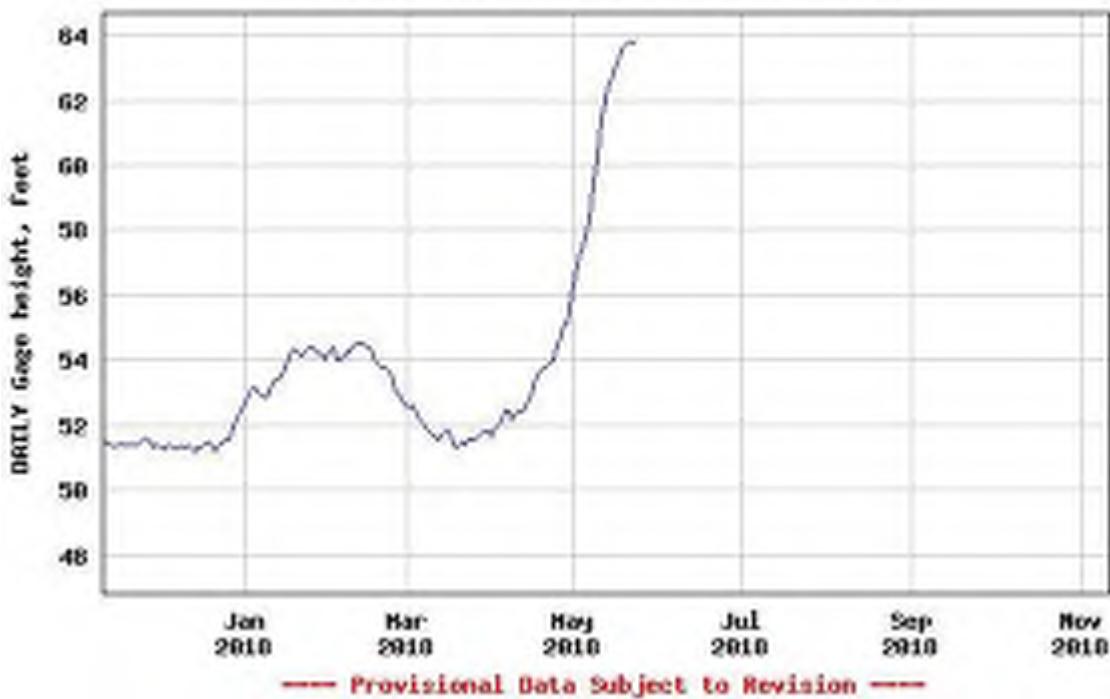
- Graph
- Graph w/ stats
- Graph w/ (up to 3) parms
- Table
- Tab-separated

Days (365) [Summary of all available data for this site](#)[Instantaneous-data availability statement](#)

-- OR --

Begin date **Gage height, feet****End date**

USGS 12392500 LAKE PEND OREILLE NR HOPE, ID



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

[?](#)

Add site numbers

[Note](#)

USCG001137

1/16

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

Create [presentation-quality](#) graph.

[Questions about sites/data?](#)

[Feedback on this web site](#)

[Automated retrievals](#)

[Help](#)

[Data Tips](#)

[Explanation of terms](#)

[Subscribe for system changes](#)

[News](#)

[Accessibility](#)

[Plug-Ins](#)

[FOIA](#)

[Privacy](#)

[Policies and Notices](#)

[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)



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

Home **News** **Organization** Search for: NWS All NOAA [Facebook](#) [Twitter](#) [Email](#)

Local weather forecast by "City, ST"

National Conditions
Rivers
Satellite
Climate
Observed Precip

Local Conditions
Warnings
Weather
Forecast Radar

AHPS Documentation
User Guide
User Brochure

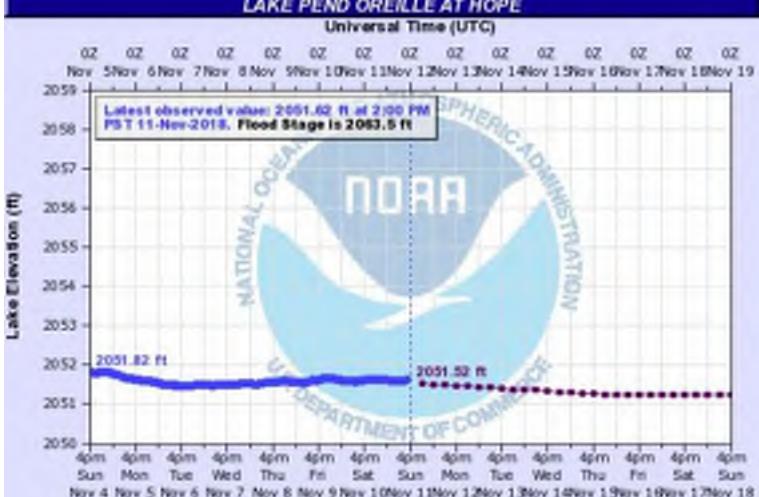
What is AHPS?
Facts
Our Partners

Feedback/Questions
Provide Feedback
Ask Questions




Lake Pend Oreille at Hope
Universal Time (UTC)

Latest observed value: 2051.62 ft at 2:00 PM PST 11-Nov-2018. Flood Stage is 2063.5 ft



Lake Elevation (ft)

Site Time (PST)
Graph Created (4:16PM Nov 11, 2018)

HOP11 (plotting HLR) *Gage 0* Datum: n/a Observations courtesy of US Army Corps of Engineers

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](#).

Flood Categories (in feet)
Major Flood Stage: 2069
Moderate Flood Stage: 2066
Flood Stage: 2063.5
Action Stage: 2062.6



Upstream Gauge  **Downstream Gauge** 

Zoom Level: 14

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

USCG001139

1/16

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



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 Tresle 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 Available | | |
| 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](#)

USCG001140

1/16

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/DocList.cfm?SiteName=PLIB10ACEAIPSPeakflow.htm>

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](#)



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](#).

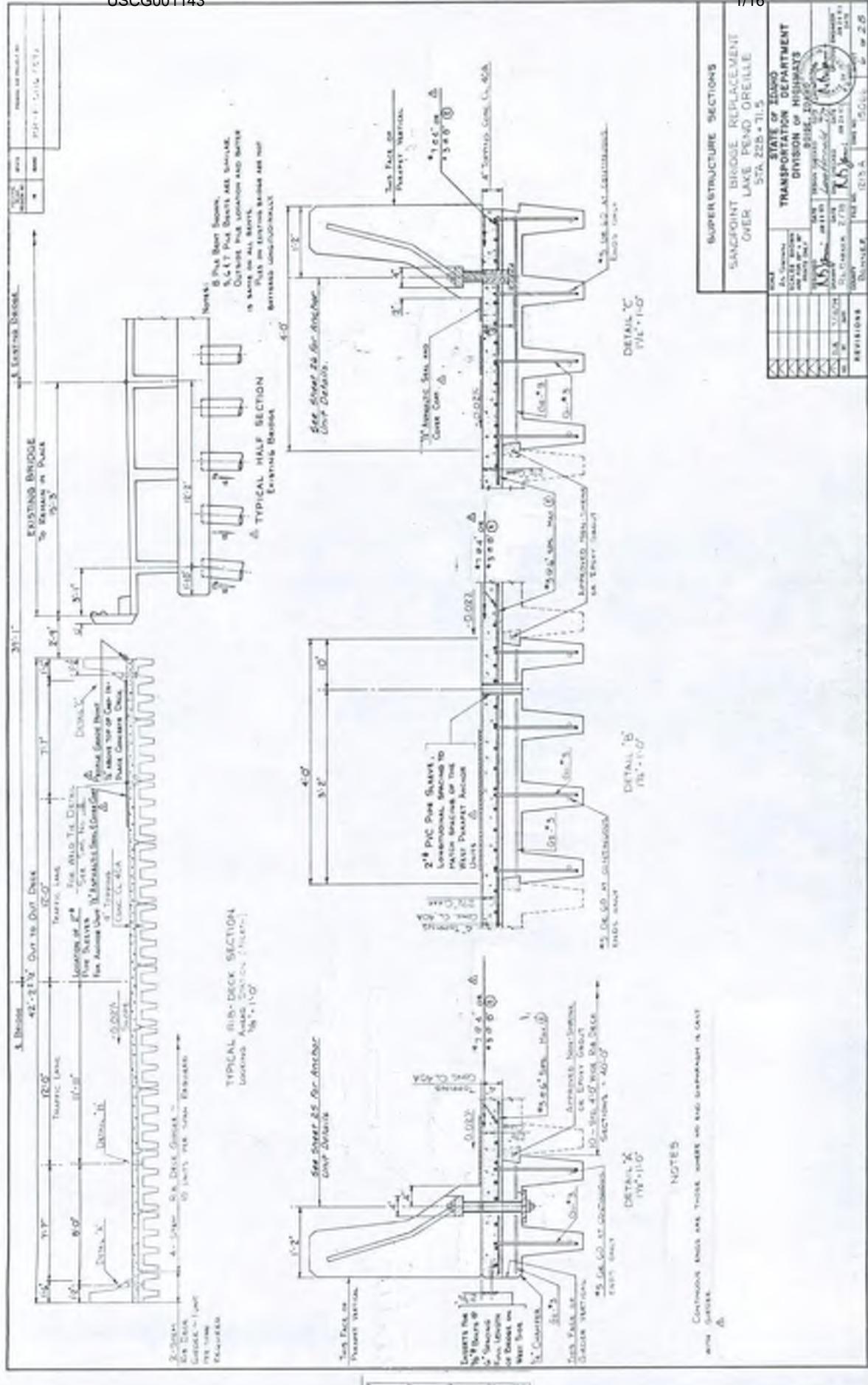
NWS Information

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

[Disclaimer](#) [Credits](#) [Glossary](#) [Privacy Policy](#) [About Us](#) [Career Opportunities](#)

Attachment E: Existing Bridge Plans

Highway 95

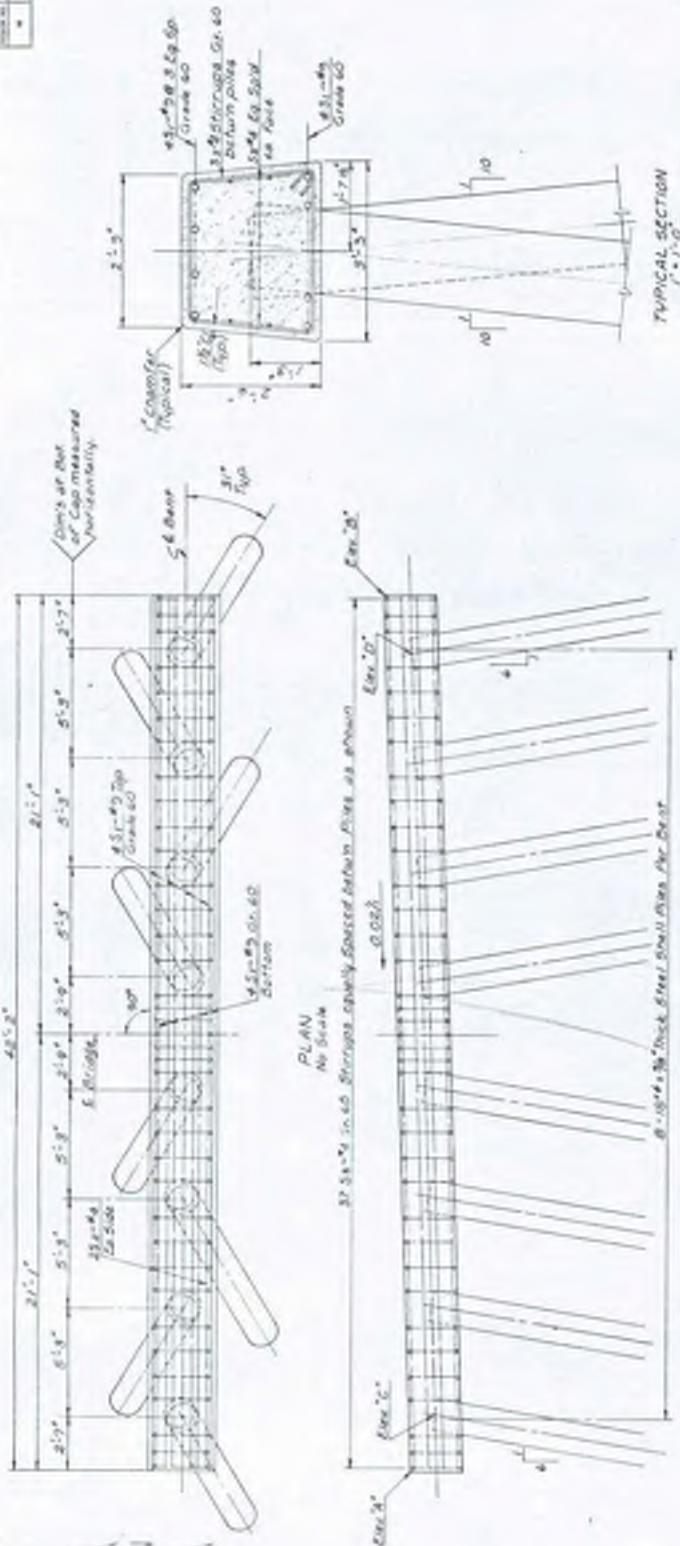


Continuous Aches and Thrills. Workers who work underground in canyons.
No surface.

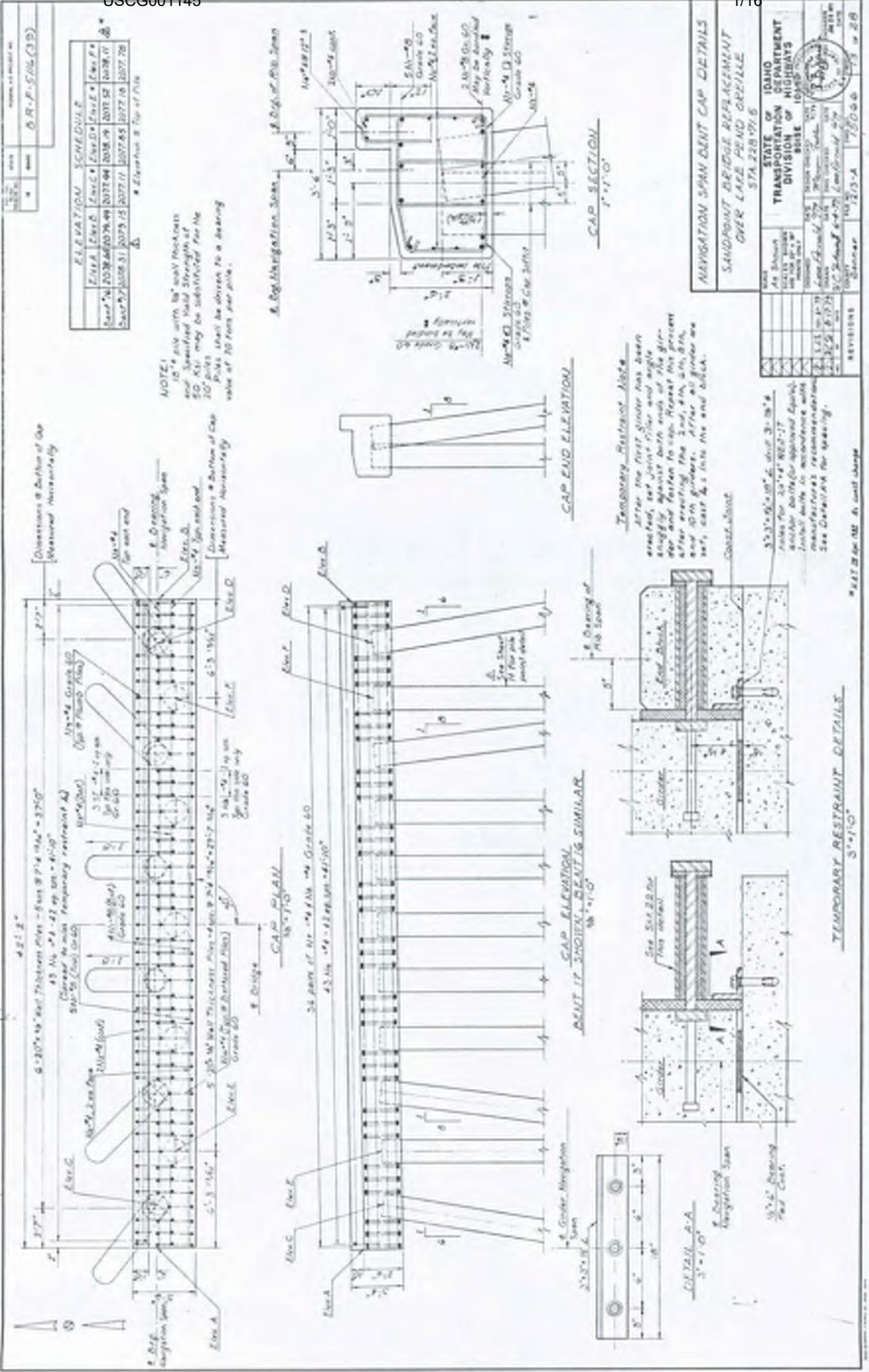
NOTES

| | | | |
|---------------------------|---------|------------|-------|
| SEARCHED | INDEXED | SERIALIZED | FILED |
| SEARCHED | INDEXED | SERIALIZED | FILED |
| APR 20 1998 | | | |
| USCO COAST GUARD | | | |
| DEPT OF HOMELAND SECURITY | | | |

Drawing No. 1
Title Block
B&P-1-516 (39)



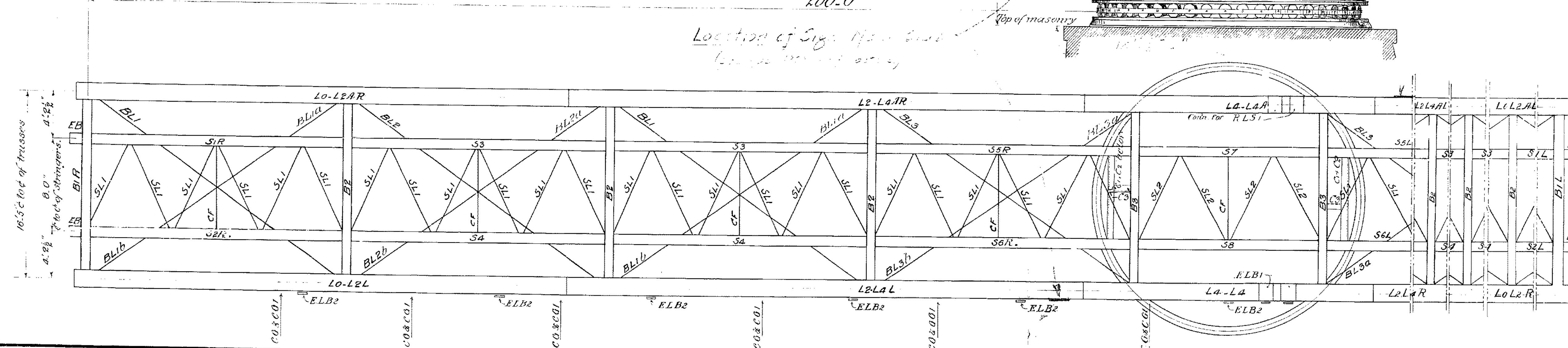
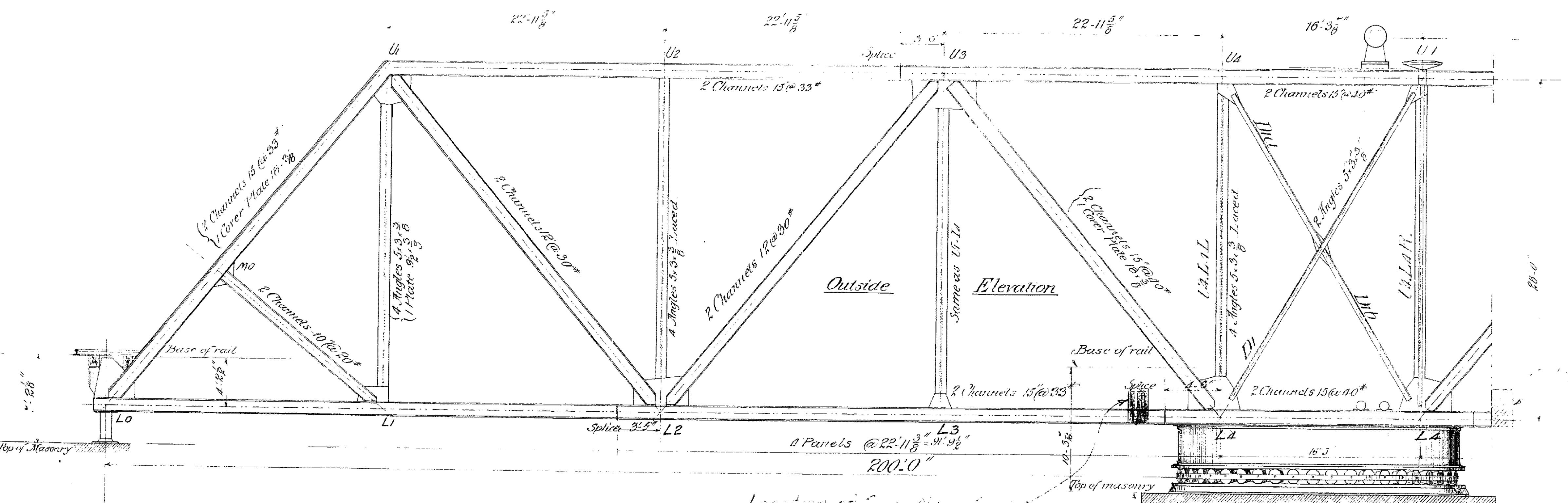
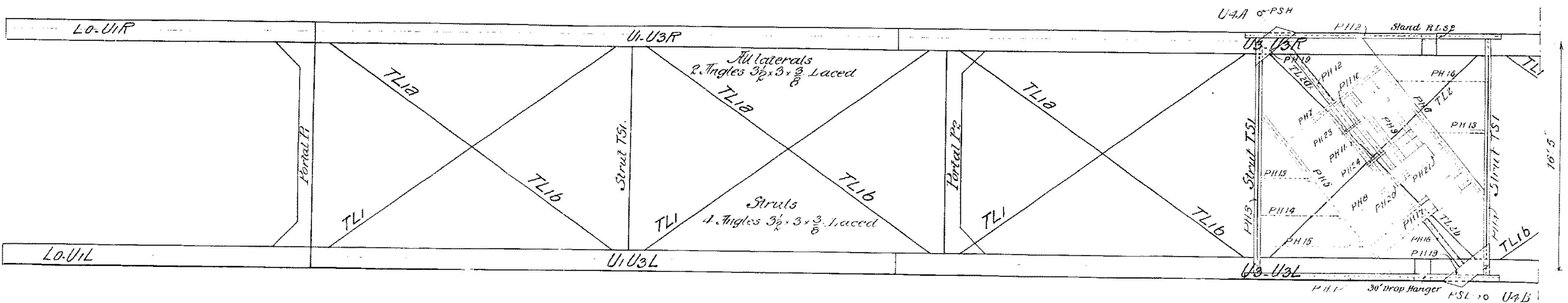
| SCHEDULE OF ELEMENTS | |
|----------------------|----------------|
| <i>(Continued)</i> | |
| Part | Number of Item |
| 1. | 2. |
| 2. | 3. |
| 3. | 4. |
| 4. | 5. |
| 5. | 6. |
| 6. | 7. |
| 7. | 8. |
| 8. | 9. |
| 9. | 10. |
| 10. | 11. |
| 11. | 12. |
| 12. | 13. |
| 13. | 14. |
| 14. | 15. |
| 15. | 16. |
| 16. | 17. |
| 17. | 18. |
| 18. | 19. |
| 19. | 20. |
| 20. | 21. |
| 21. | 22. |
| 22. | 23. |
| 23. | 24. |
| 24. | 25. |
| 25. | 26. |
| 26. | 27. |
| 27. | 28. |
| 28. | 29. |
| 29. | 30. |
| 30. | 31. |
| 31. | 32. |
| 32. | 33. |
| 33. | 34. |
| 34. | 35. |
| 35. | 36. |
| 36. | 37. |
| 37. | 38. |
| 38. | 39. |
| 39. | 40. |
| 40. | 41. |
| 41. | 42. |
| 42. | 43. |
| 43. | 44. |
| 44. | 45. |
| 45. | 46. |
| 46. | 47. |
| 47. | 48. |
| 48. | 49. |
| 49. | 50. |
| 50. | 51. |
| 51. | 52. |
| 52. | 53. |
| 53. | 54. |
| 54. | 55. |
| 55. | 56. |
| 56. | 57. |
| 57. | 58. |
| 58. | 59. |
| 59. | 60. |
| 60. | 61. |
| 61. | 62. |
| 62. | 63. |
| 63. | 64. |
| 64. | 65. |
| 65. | 66. |
| 66. | 67. |
| 67. | 68. |
| 68. | 69. |
| 69. | 70. |
| 70. | 71. |
| 71. | 72. |
| 72. | 73. |
| 73. | 74. |
| 74. | 75. |
| 75. | 76. |
| 76. | 77. |
| 77. | 78. |
| 78. | 79. |
| 79. | 80. |
| 80. | 81. |
| 81. | 82. |
| 82. | 83. |
| 83. | 84. |
| 84. | 85. |
| 85. | 86. |
| 86. | 87. |
| 87. | 88. |
| 88. | 89. |
| 89. | 90. |
| 90. | 91. |
| 91. | 92. |
| 92. | 93. |
| 93. | 94. |
| 94. | 95. |
| 95. | 96. |
| 96. | 97. |
| 97. | 98. |
| 98. | 99. |
| 99. | 100. |
| 100. | 101. |
| 101. | 102. |
| 102. | 103. |
| 103. | 104. |
| 104. | 105. |
| 105. | 106. |
| 106. | 107. |
| 107. | 108. |
| 108. | 109. |
| 109. | 110. |
| 110. | 111. |
| 111. | 112. |
| 112. | 113. |
| 113. | 114. |
| 114. | 115. |
| 115. | 116. |
| 116. | 117. |
| 117. | 118. |
| 118. | 119. |
| 119. | 120. |
| 120. | 121. |
| 121. | 122. |
| 122. | 123. |
| 123. | 124. |
| 124. | 125. |
| 125. | 126. |
| 126. | 127. |
| 127. | 128. |
| 128. | 129. |
| 129. | 130. |
| 130. | 131. |
| 131. | 132. |
| 132. | 133. |
| 133. | 134. |
| 134. | 135. |
| 135. | 136. |
| 136. | 137. |
| 137. | 138. |
| 138. | 139. |
| 139. | 140. |
| 140. | 141. |
| 141. | 142. |
| 142. | 143. |
| 143. | 144. |
| 144. | 145. |
| 145. | 146. |
| 146. | 147. |
| 147. | 148. |
| 148. | 149. |
| 149. | 150. |
| 150. | 151. |
| 151. | 152. |
| 152. | 153. |
| 153. | 154. |
| 154. | 155. |
| 155. | 156. |
| 156. | 157. |
| 157. | 158. |
| 158. | 159. |
| 159. | 160. |
| 160. | 161. |
| 161. | 162. |
| 162. | 163. |
| 163. | 164. |
| 164. | 165. |
| 165. | 166. |
| 166. | 167. |
| 167. | 168. |
| 168. | 169. |
| 169. | 170. |
| 170. | 171. |
| 171. | 172. |
| 172. | 173. |
| 173. | 174. |
| 174. | 175. |
| 175. | 176. |
| 176. | 177. |
| 177. | 178. |
| 178. | 179. |
| 179. | 180. |
| 180. | 181. |
| 181. | 182. |
| 182. | 183. |
| 183. | 184. |
| 184. | 185. |
| 185. | 186. |
| 186. | 187. |
| 187. | 188. |
| 188. | 189. |
| 189. | 190. |
| 190. | 191. |
| 191. | 192. |
| 192. | 193. |
| 193. | 194. |
| 194. | 195. |
| 195. | 196. |
| 196. | 197. |
| 197. | 198. |
| 198. | 199. |
| 199. | 200. |
| 200. | 201. |
| 201. | 202. |
| 202. | 203. |
| 203. | 204. |
| 204. | 205. |
| 205. | 206. |
| 206. | 207. |
| 207. | 208. |
| 208. | 209. |
| 209. | 210. |
| 210. | 211. |
| 211. | 212. |
| 212. | 213. |
| 213. | 214. |
| 214. | 215. |
| 215. | 216. |
| 216. | 217. |
| 217. | 218. |
| 218. | 219. |
| 219. | 220. |
| 220. | 221. |
| 221. | 222. |
| 222. | 223. |
| 223. | 224. |
| 224. | 225. |
| 225. | 226. |
| 226. | 227. |
| 227. | 228. |
| 228. | 229. |
| 229. | 230. |
| 230. | 231. |
| 231. | 232. |
| 232. | 233. |
| 233. | 234. |
| 234. | 235. |
| 235. | 236. |
| 236. | 237. |
| 237. | 238. |
| 238. | 239. |
| 239. | 240. |
| 240. | 241. |
| 241. | 242. |
| 242. | 243. |
| 243. | 244. |
| 244. | 245. |
| 245. | 246. |
| 246. | 247. |
| 247. | 248. |
| 248. | 249. |
| 249. | 250. |
| 250. | 251. |
| 251. | 252. |
| 252. | 253. |
| 253. | 254. |
| 254. | 255. |
| 255. | 256. |
| 256. | 257. |
| 257. | 258. |
| 258. | 259. |
| 259. | 260. |
| 260. | 261. |
| 261. | 262. |
| 262. | 263. |
| 263. | 264. |
| 264. | 265. |
| 265. | 266. |
| 266. | 267. |
| 267. | 268. |
| 268. | 269. |
| 269. | 270. |
| 270. | 271. |
| 271. | 272. |
| 272. | 273. |
| 273. | 274. |
| 274. | 275. |
| 275. | 276. |
| 276. | 277. |
| 277. | 278. |
| 278. | 279. |
| 279. | 280. |
| 280. | 281. |
| 281. | 282. |
| 282. | 283. |
| 283. | 284. |
| 284. | 285. |
| 285. | 286. |
| 286. | 287. |
| 287. | 288. |
| 288. | 289. |
| 289. | 290. |
| 290. | 291. |
| 291. | 292. |
| 292. | 293. |
| 293. | 294. |
| 294. | 295. |
| 295. | 296. |
| 296. | 297. |
| 297. | 298. |
| 298. | 299. |
| 299. | 300. |
| 300. | 301. |
| 301. | 302. |
| 302. | 303. |
| 303. | 304. |
| 304. | 305. |
| 305. | 306. |
| 306. | 307. |
| 307. | 308. |
| 308. | 309. |
| 309. | 310. |
| 310. | 311. |
| 311. | 312. |
| 312. | 313. |
| 313. | 314. |
| 314. | 315. |
| 315. | 316. |
| 316. | 317. |
| 317. | 318. |
| 318. | 319. |
| 319. | 320. |
| 320. | 321. |
| 321. | 322. |
| 322. | 323. |
| 323. | 324. |
| 324. | 325. |
| 325. | 326. |
| 326. | 327. |
| 327. | 328. |
| 328. | 329. |
| 329. | 330. |
| 330. | 331. |
| 331. | 332. |
| 332. | 333. |
| 333. | 334. |
| 334. | 335. |
| 335. | 336. |
| 336. | 337. |
| 337. | 338. |
| 338. | 339. |
| 339. | 340. |
| 340. | 341. |
| 341. | 342. |
| 342. | 343. |
| 343. | 344. |
| 344. | 345. |
| 345. | 346. |
| 346. | 347. |
| 347. | 348. |
| 348. | 349. |
| 349. | 350. |
| 350. | 351. |
| 351. | 352. |
| 352. | 353. |
| 353. | 354. |
| 354. | 355. |
| 355. | 356. |
| 356. | 357. |
| 357. | 358. |
| 358. | 359. |
| 359. | 360. |
| 360. | 361. |
| 361. | 362. |
| 362. | 363. |
| 363. | 364. |
| 364. | 365. |
| 365. | 366. |
| 366. | 367. |
| 367. | 368. |
| 368. | 369. |
| 369. | 370. |
| 370. | 371. |
| 371. | 372. |
| 372. | 373. |
| 373. | 374. |
| 374. | 375. |
| 375. | 376. |
| 376. | 377. |
| 377. | 378. |
| 378. | 379. |
| 379. | 380. |
| 380. | 381. |
| 381. | 382. |
| 382. | 383. |
| 383. | 384. |
| 384. | 385. |
| 385. | 386. |
| 386. | 387. |
| 387. | 388. |
| 388. | 389. |
| 389. | 390. |
| 390. | 391. |
| 391. | 392. |
| 392. | 393. |
| 393. | 394. |
| 394. | 395. |
| 395. | 396. |
| 396. | 397. |
| 397. | 398. |
| 398. | 399. |
| 399. | 400. |
| 400. | 401. |
| 401. | 402. |
| 402. | 403. |
| 403. | 404. |
| 404. | 405. |
| 405. | 406. |
| 406. | 407. |
| 407. | 408. |
| 408. | 409. |
| 409. | 410. |
| 410. | 411. |
| 411. | 412. |
| 412. | 413. |
| 413. | 414. |
| 414. | 415. |
| 415. | 416. |
| 416. | 417. |
| 417. | 418. |
| 418. | 419. |
| 419. | 420. |
| 420. | 421. |
| 421. | 422. |
| 422. | 423. |
| 423. | 424. |
| 424. | 425. |
| 425. | 426. |
| 426. | 427. |
| 427. | 428. |
| 428. | 429. |
| 429. | 430. |
| 430. | 431. |
| 431. | 432. |
| 432. | 433. |
| 433. | 434. |
| 434. | 435. |
| 435. | 436. |
| 436. | 437. |
| 437. | 438. |
| 438. | 439. |
| 439. | 440. |
| 440. | 441. |
| 441. | 442. |
| 442. | 443. |
| 443. | 444. |
| 444. | 445. |
| 445. | 446. |
| 446. | 447. |
| 447. | 448. |
| 448. | 449. |
| 449. | 450. |
| 450. | 451. |
| 451. | 452. |
| 452. | 453. |
| 453. | 454. |
| 454. | 455. |
| 455. | 456. |
| 456. | 457. |
| 457. | 458. |
| 458. | 459. |
| 459. | 460. |
| 460. | 461. |
| 461. | 462. |
| 462. | 463. |
| 463. | 464. |
| 464. | 465. |
| 465. | 466. |
| 466. | 467. |
| 467. | 468. |
| 468. | 469. |
| 469. | 470. |
| 470. | 471. |
| 471. | 472. |
| 472. | 473. |
| 473. | 474. |
| 474. | 475. |
| 475. | 476. |
| 476. | 477. |
| 477. | 478. |
| 478. | 479. |
| 479. | 480. |
| 480. | 481. |
| 481. | 482. |
| 482. | 483. |
| 483. | 484. |
| 484. | 485. |
| 485. | 486. |
| 486. | 487. |
| 487. | 488. |
| 488. | 489. |
| 489. | 490. |
| 490. | 491. |
| 491. | 492. |
| 492. | 493. |
| 493. | 494. |
| 494. | 495. |
| 495. | 496. |
| 496. | 497. |
| 497. | 498. |
| 498. | 499. |
| 499. | 500. |
| 500. | 501. |
| 501. | 502. |
| 502. | 503. |
| 503. | 504. |
| 504. | 505. |
| 505. | 506. |
| 506. | 507. |
| 507. | 508. |
| 508. | 509. |
| 509. | 510. |
| 510. | 511. |
| 511. | 512. |
| 512. | 513. |
| 513. | 514. |
| 514. | 515. |
| 515. | 516. |
| 516. | 517. |
| 517. | 518. |
| 518. | 519. |
| 519. | 520. |
| 520. | 521. |
| 521. | 522. |
| 522. | 523. |
| 523. | 524. |
| 524. | 525. |
| 525. | 526. |
| 526. | 527. |
| 527. | 528. |
| 528. | 529. |
| 529. | 530. |
| 530. | 531. |
| 531. | 532. |
| 532. | 533. |
| 533. | 534. |
| 534. | 535. |
| 535. | 536. |
| 536. | 537. |
| 537. | 538. |
| 538. | 539. |
| 539. | 540. |
| 540. | 541. |
| 541. | 542. |
| 542. | 543. |
| 543. | 544. |
| 544. | 545. |
| 545. | 546. |
| 546. | 547. |
| 547. | 548. |
| 548. | 549. |
| 549. | 550. |
| 550. | 551. |
| 551. | 552. |
| 552. | 553. |
| 553. | 554. |
| 554. | 555. |
| 555. | 556. |
| 556. | 557. |
| 557. | 558. |
| 558. | 559. |
| 559. | 560. |
| 560. | 561. |
| 561. | 562. |
| 562. | 563. |
| 563. | 564. |
| 564. | 565. |
| 565. | 566. |
| 566. | 567. |
| 567. | 568. |
| 568. | 569. |
| 569. | 570. |
| 570. | 571. |
| 571. | 572. |
| 572. | 573. |
| 573. | 574. |
| 574. | 575. |
| 575. | 576. |
| 576. | 577. |
| 577. | 578. |
| 578. | 579. |
| 579. | 580. |
| 580.</ | |



Existing Bridge 3.9

293-7

R.10 720



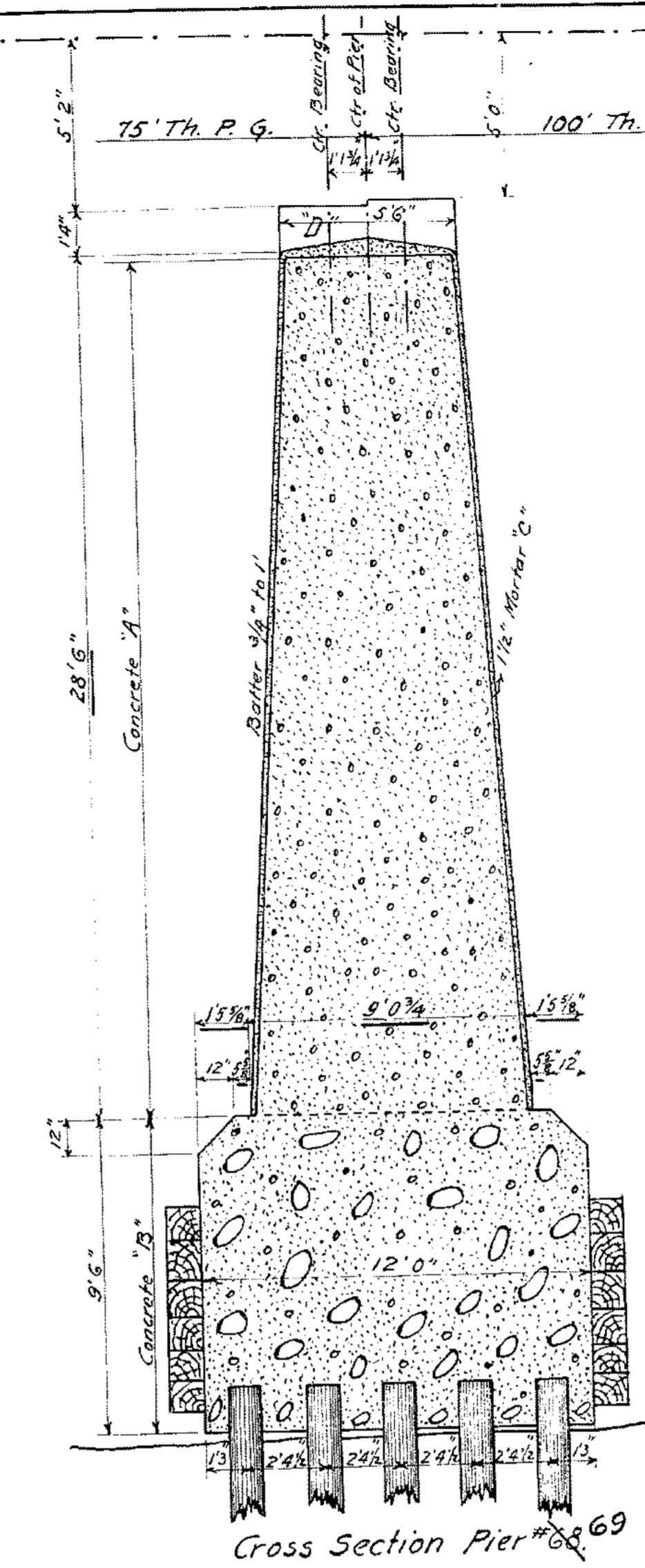
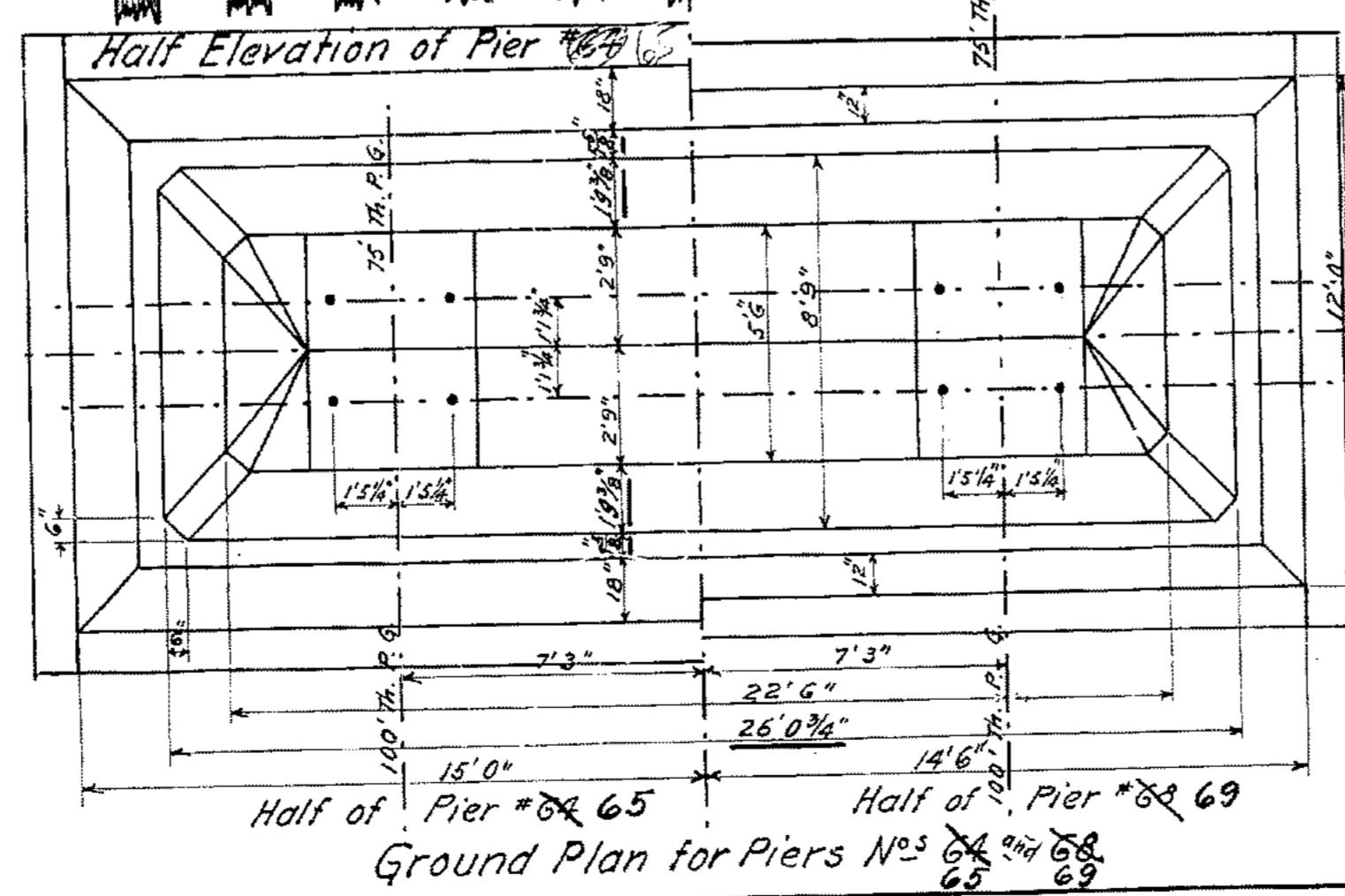
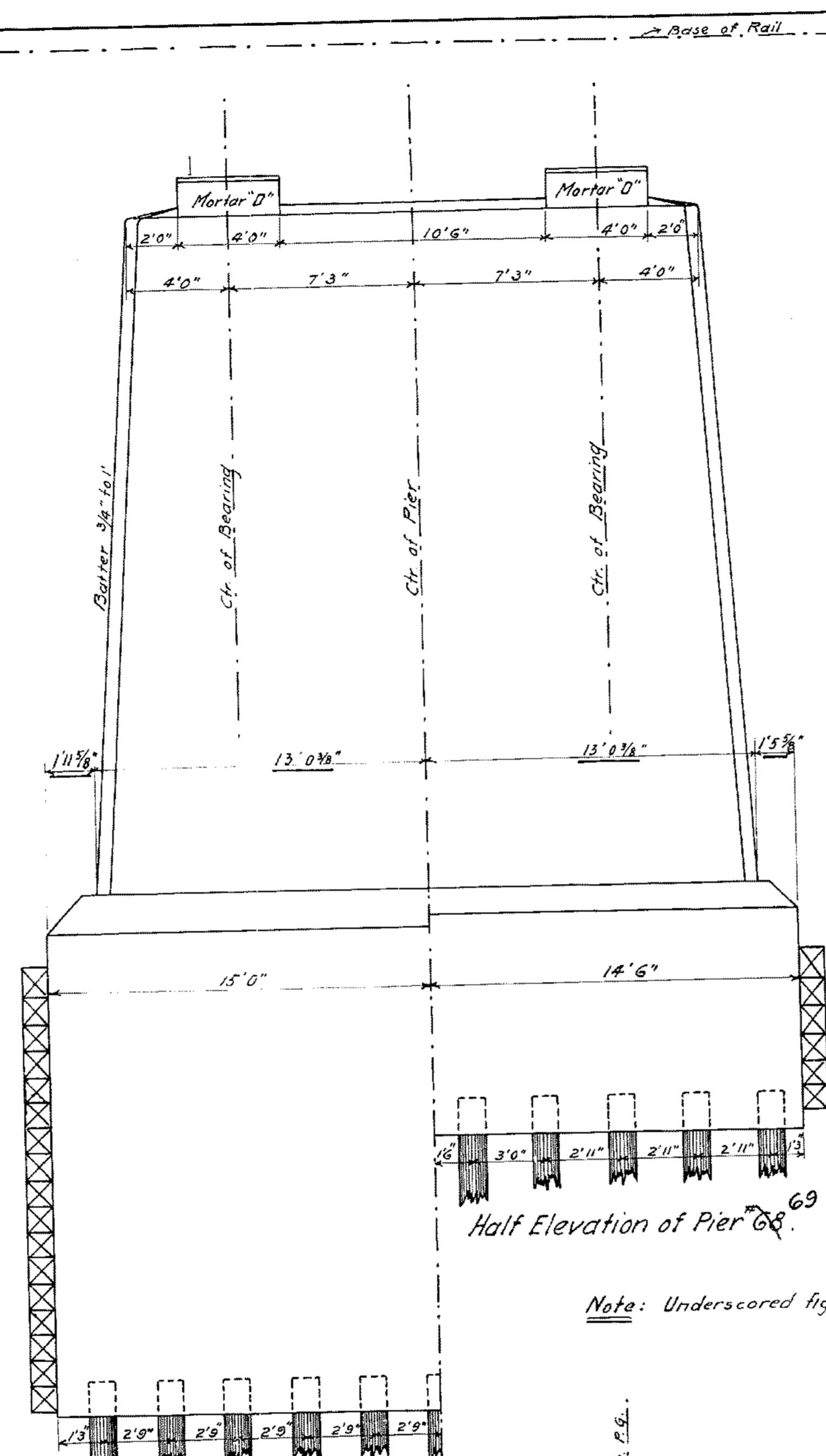
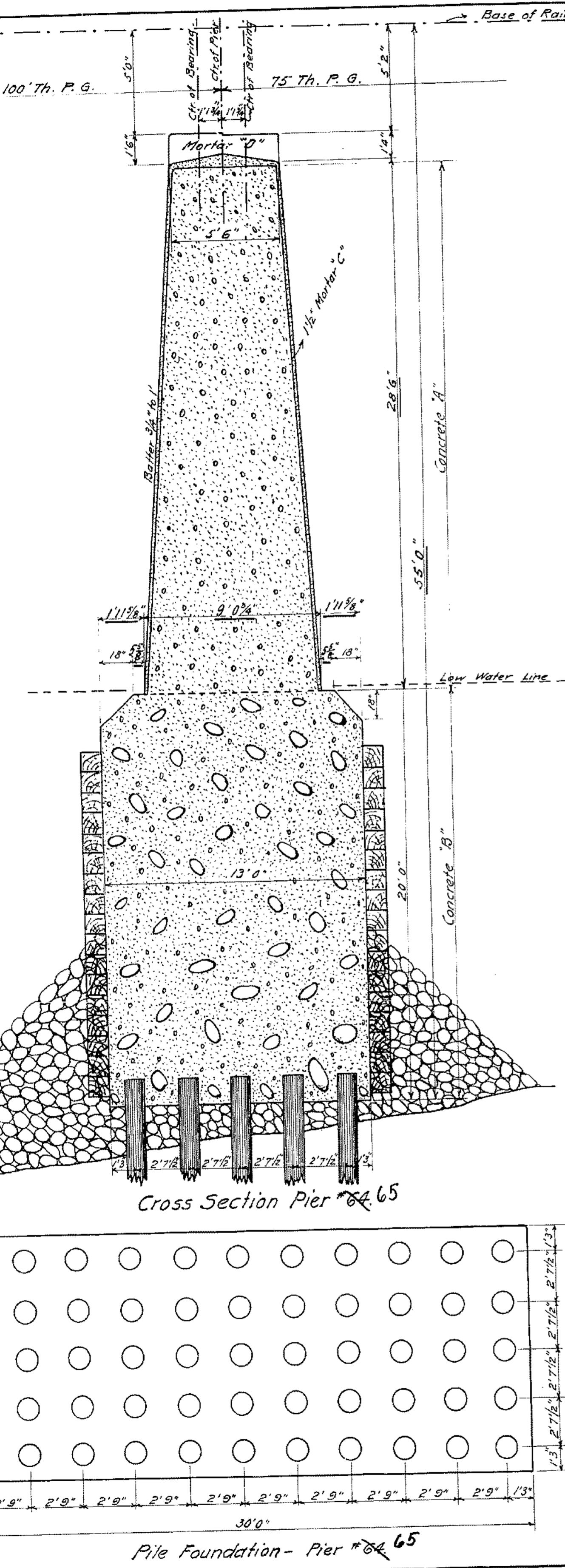
All Machinery above Power floor to be furnished by the
Machinery Contractor; except Shuttles P.S.I., P.S.II.^{and} Stand P.I.II.
Machinery below Power floor to be furnished by the
Minneapolis Machinery ^{and} Steel Co. - also Shuttles ^{and} Stand
noted above.

Note:- Used as shop plans by Mpls. Steel & Machinery Co. order 1494 of 1903, except as detailed on their sheets filed in 442-25 and 1105-3. There may be other variations but no way of finding out as Steel Co. kept no record of sheets. R.R.B. 6/6/19.

N.P.Ry
Lake Pend d'Oreille Bridge
200' 0" Draw Span

Scale $\frac{3}{16} = 1'-0''$
Ralph Modjeski,
CIVIL ENGINEER
Monadnock Bldg
Chicago
March 1903.

442-25



N.P.R.Y.
Idaho Div. Main Line
Bridge No³₂-Sandy Point.
Detail of Piers.
Nos 64.65 68.69
Scale: $\frac{1}{4}$ "=1'

Office of Chief Engineer. April 15th 1902.

Approved:-

H. C. Ellsworth
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 $\frac{1}{4}$ " 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 (Wiggieheads) 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.

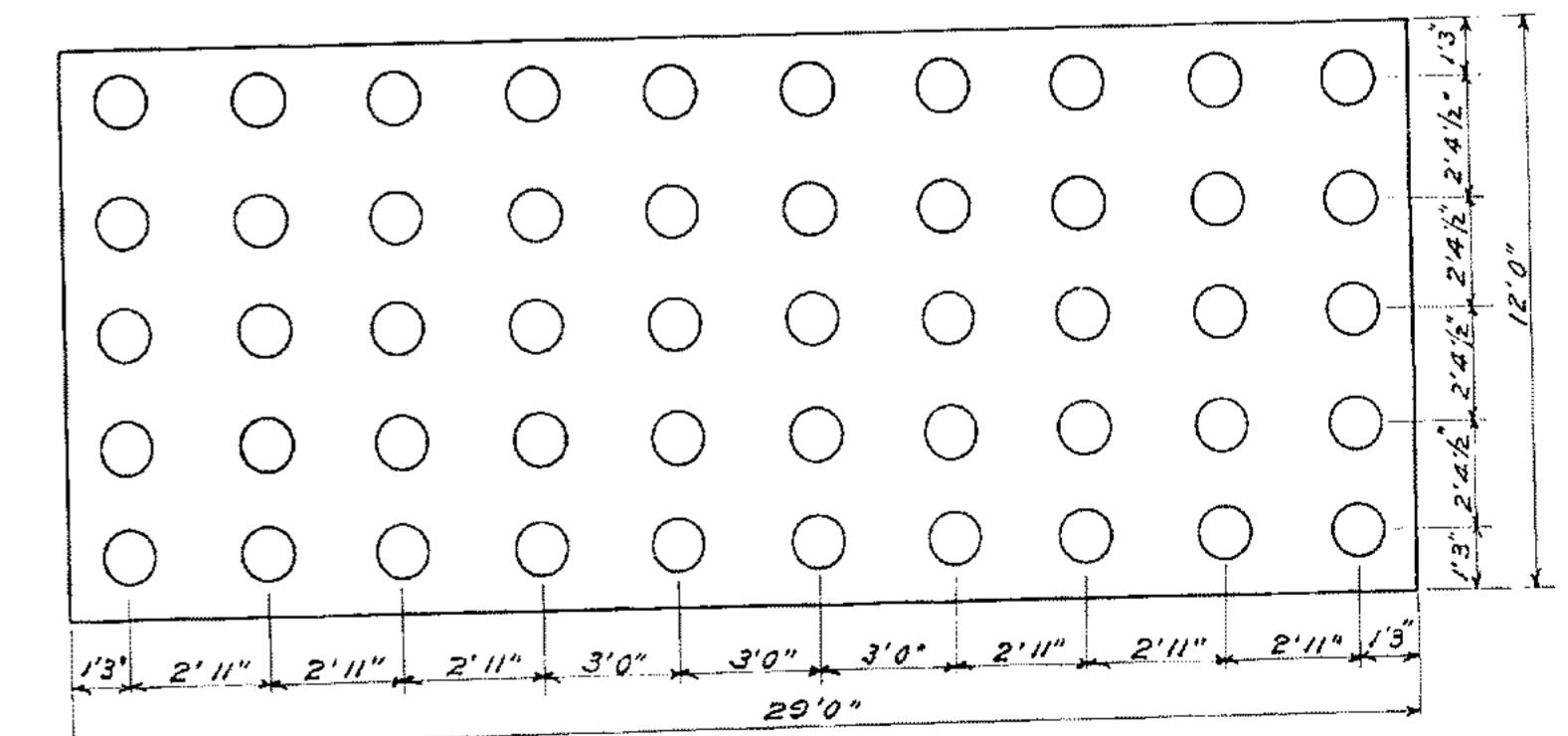
Anchor Bolts.

Anchor Bolts $\frac{1}{2}$ " diam. $\frac{1}{4}$ " long to project $\frac{3}{4}$ " Expansion end and Fixed end $\frac{1}{2}$ " above bearing blocks.

Note: Underscored figures do not scale:

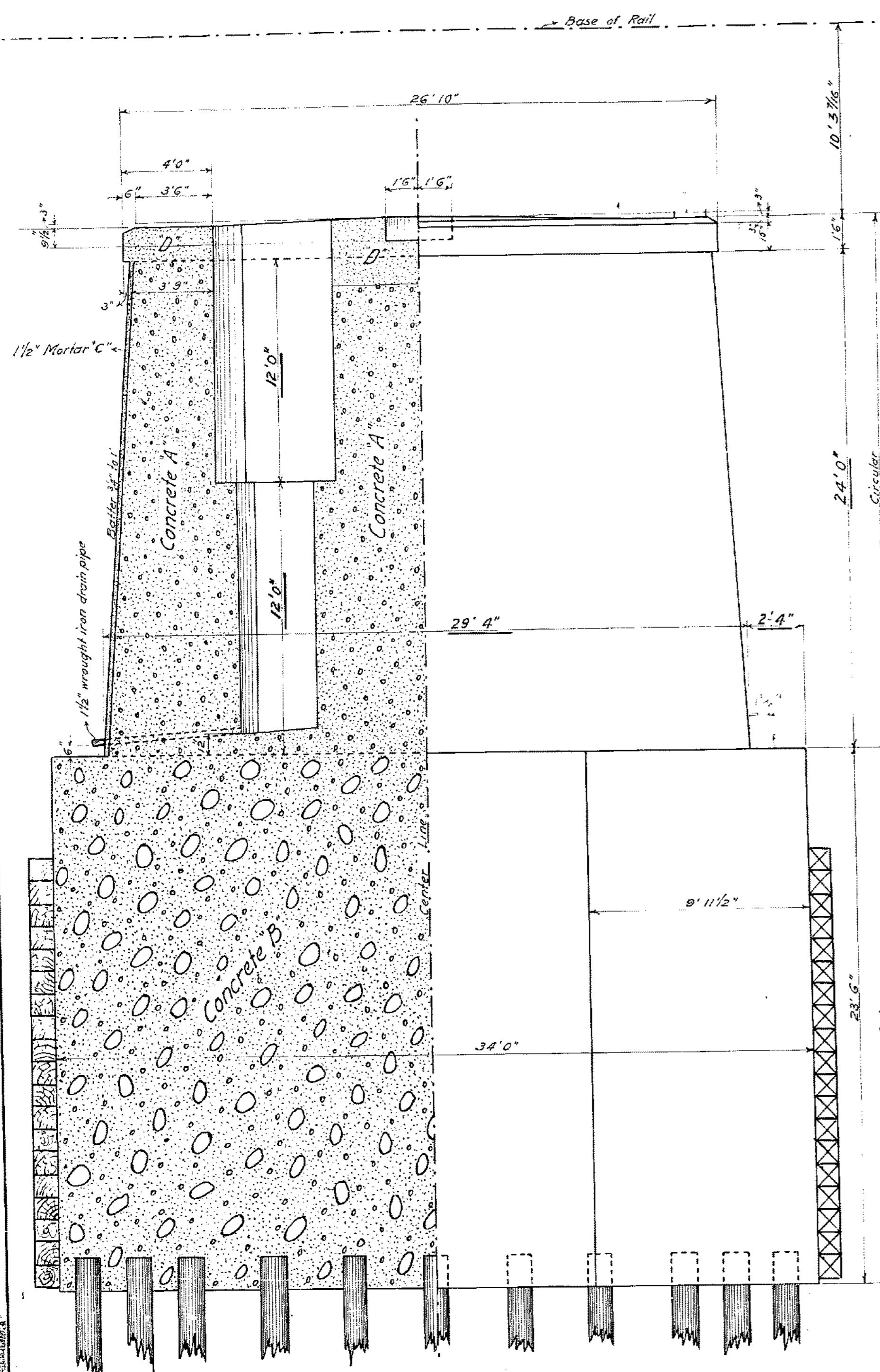
Note:-

Piers protected by Crib as shown in red.



65 69 3²
Detail of Piers Nos 64.65 68.69 Br. No³₂-Sandy Point Idaho Div.
Main Line. CH RTD
Complete in 6 sheets sheet No 3.

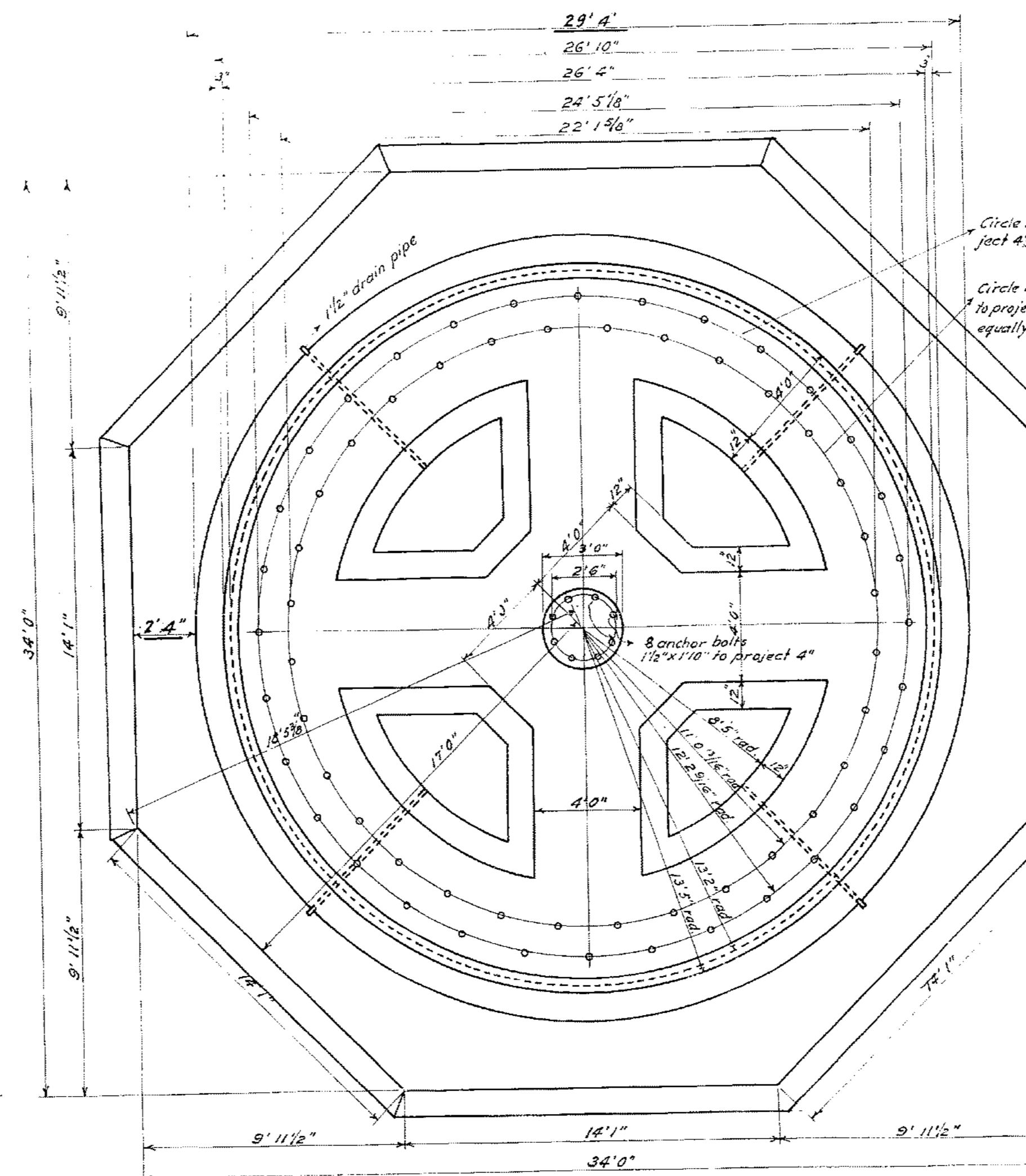
442-25



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

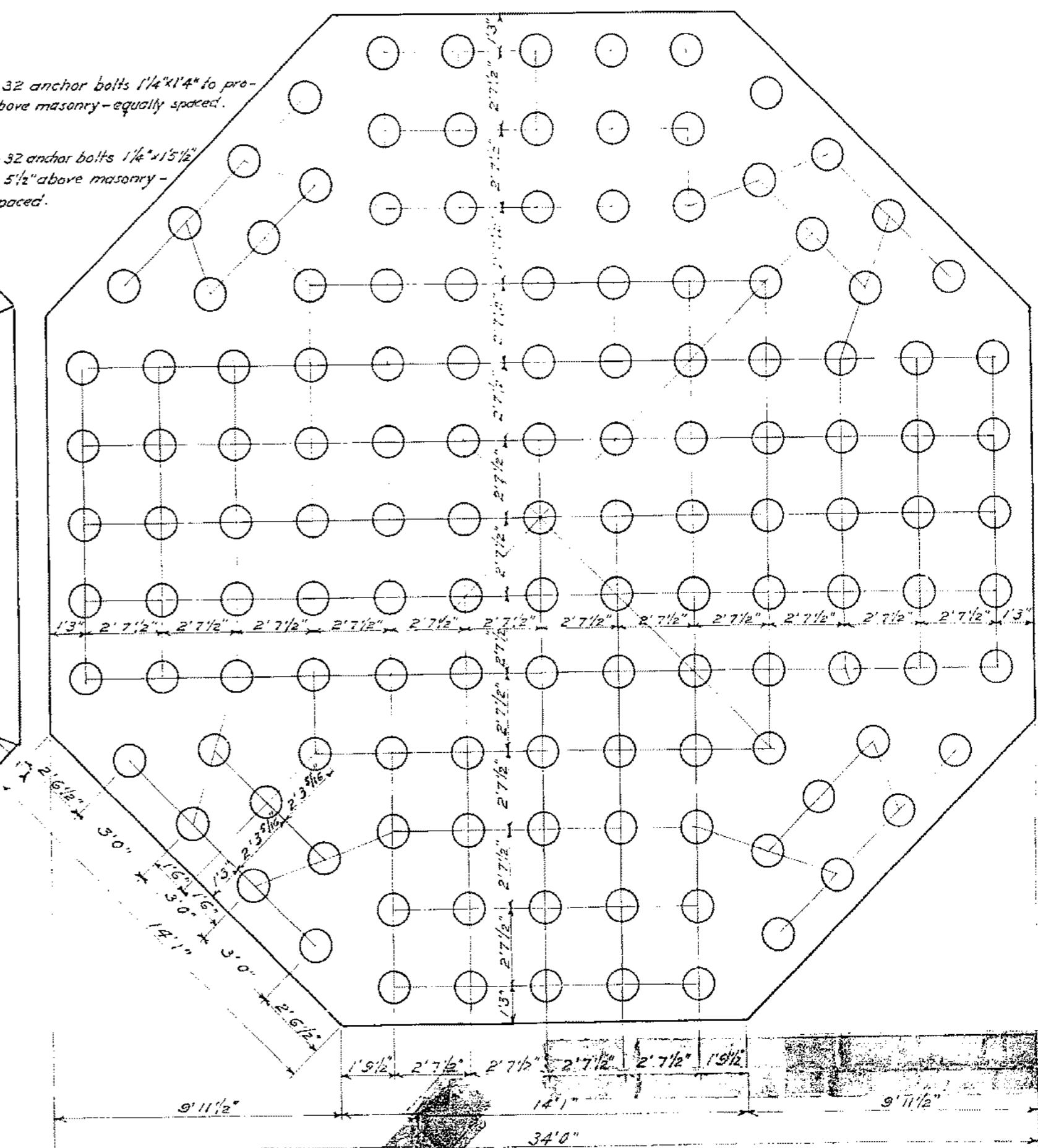
Note
Piers protected by crib
shown in red.

Note: Underscored figures do not sca



Circle A - 32 anchor bolts $1\frac{1}{4}'' \times 1\frac{1}{4}''$ to project $4\frac{1}{2}''$ above masonry - equally spaced.

Circle B - 32 anchor bolts $1\frac{1}{4}'' \times 1\frac{1}{2}''$ to project $5\frac{1}{2}''$ above masonry -

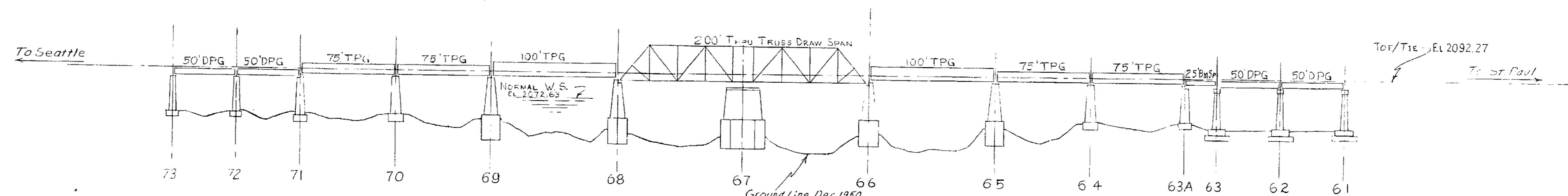
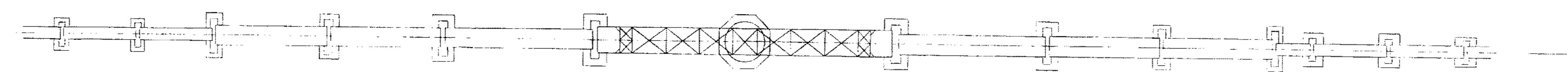
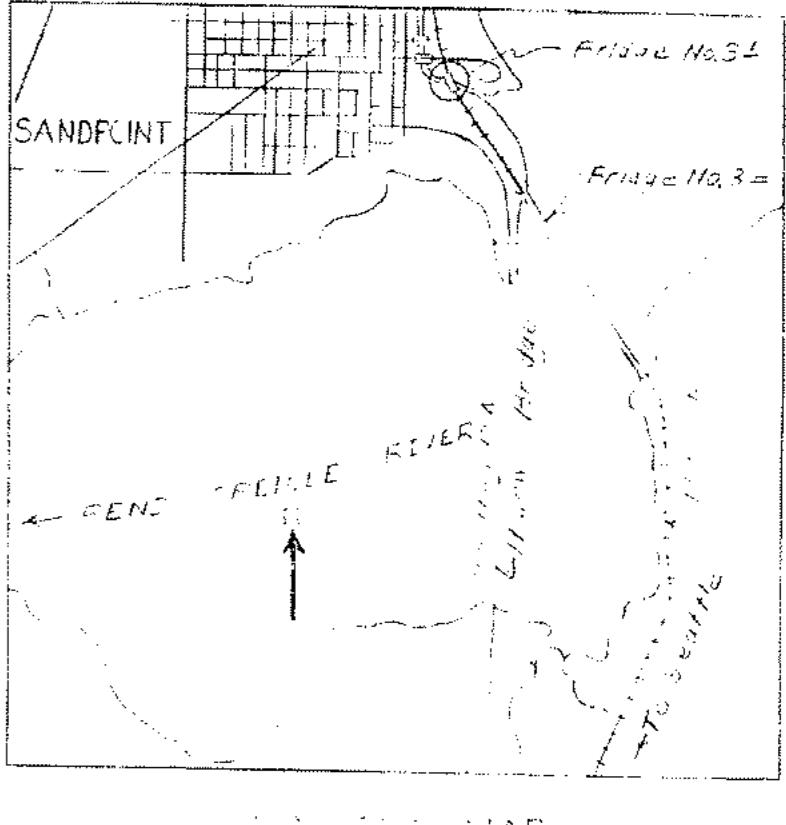
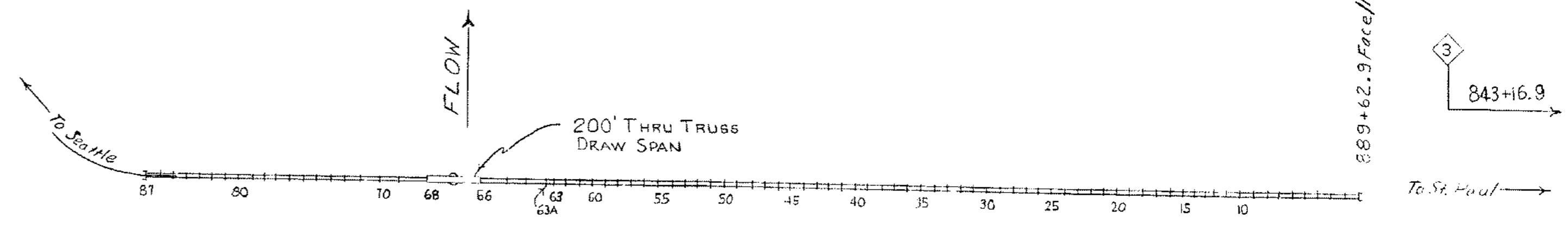


137 piles in foundation.

3 =

Detail of Draw Pier Br. #~~18~~ Sandy Point Bridge- Idaho Div. Main Line.

Complete in 6 sheets. Sheet No 6. Ch. R.T.



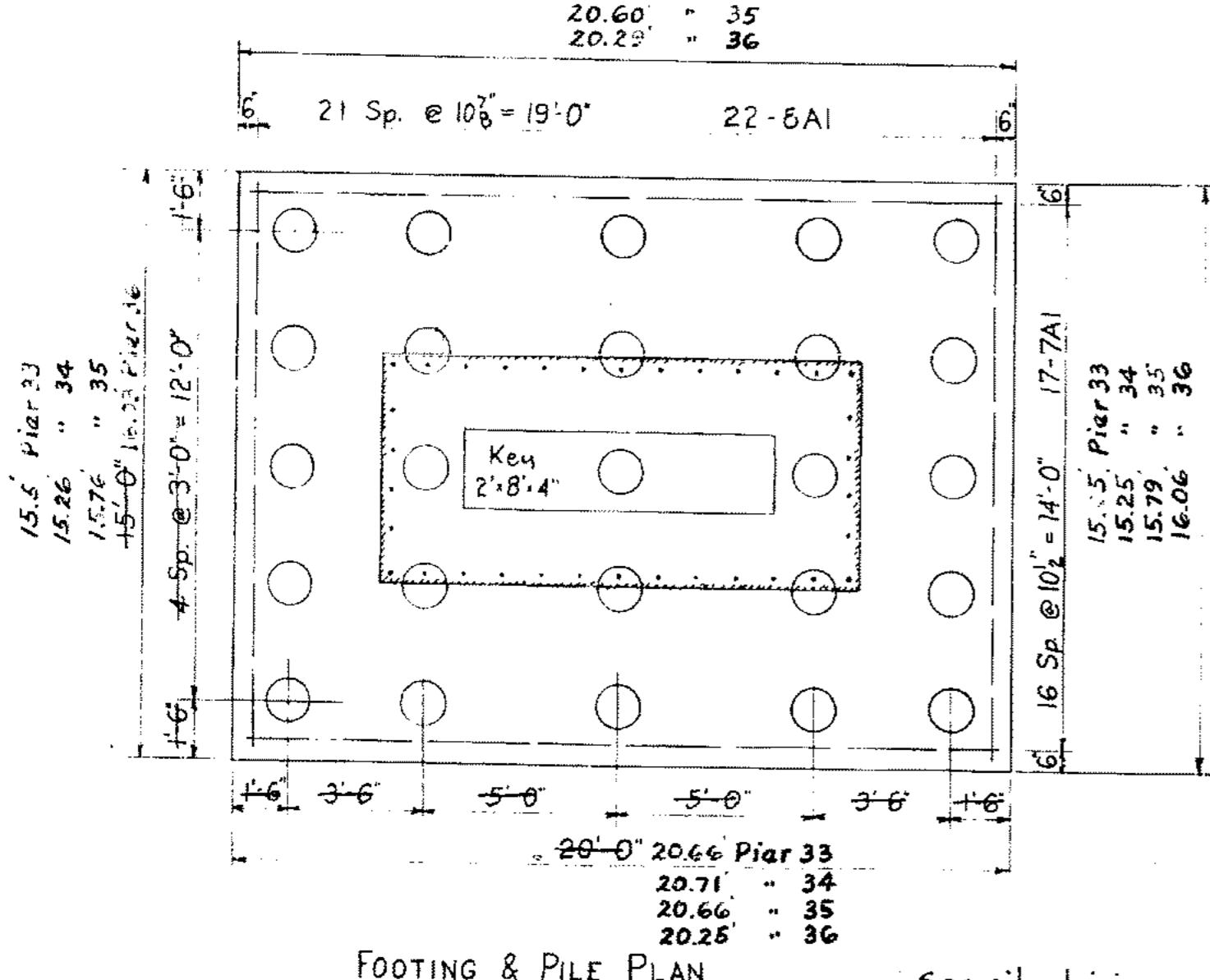
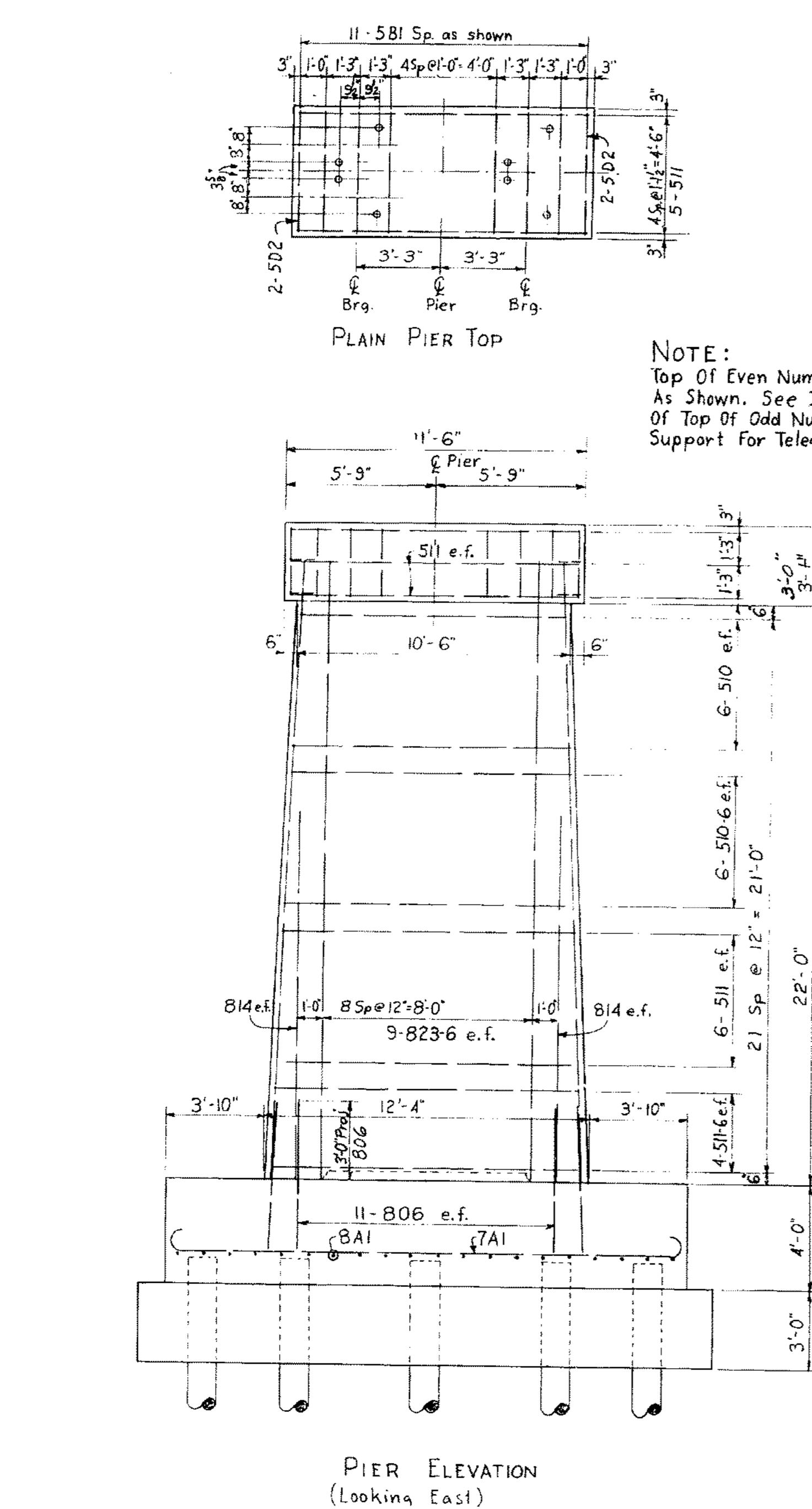
PART ELEVATION PIERS 61 THRU 73

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: | | | | |
| | | | | | | | | | |
| SCALE: ST. PAUL, MINN. DATE: AUG 28, 1964 | | | | | | | | | |
| DR. CH. DR. CH. DR. CH. | | | | | | | | | |
| AFE NO. SHEET OF FILE NO. 91416 | | | | | | | | | |

442-25



| 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. | LF. 2220 | 2225 | 2255 | 2252 |
| Excavation | cy. 77.6 | 69.3 | 56.8 | 49.9 |

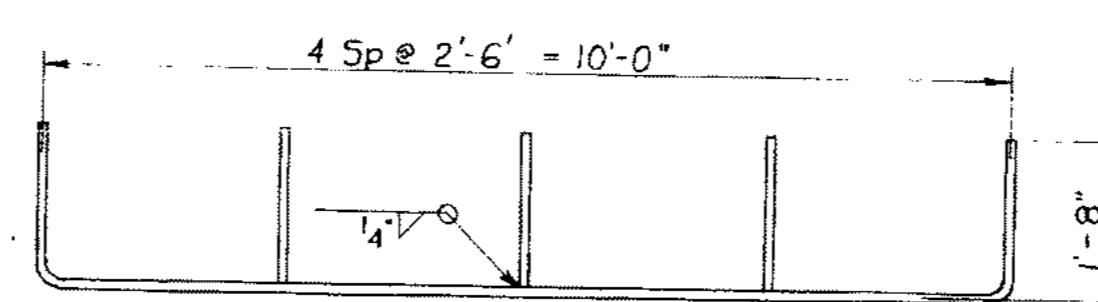
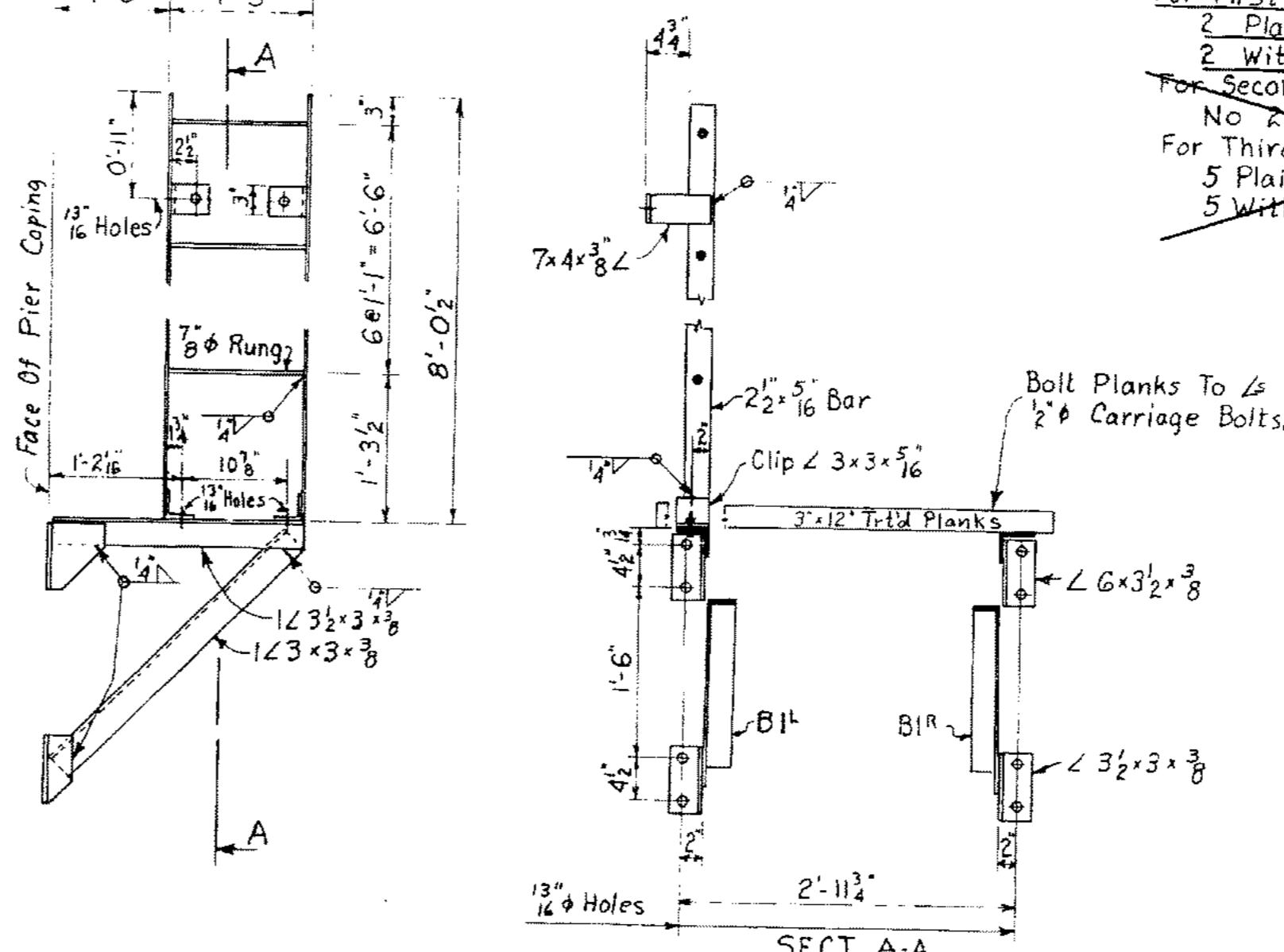
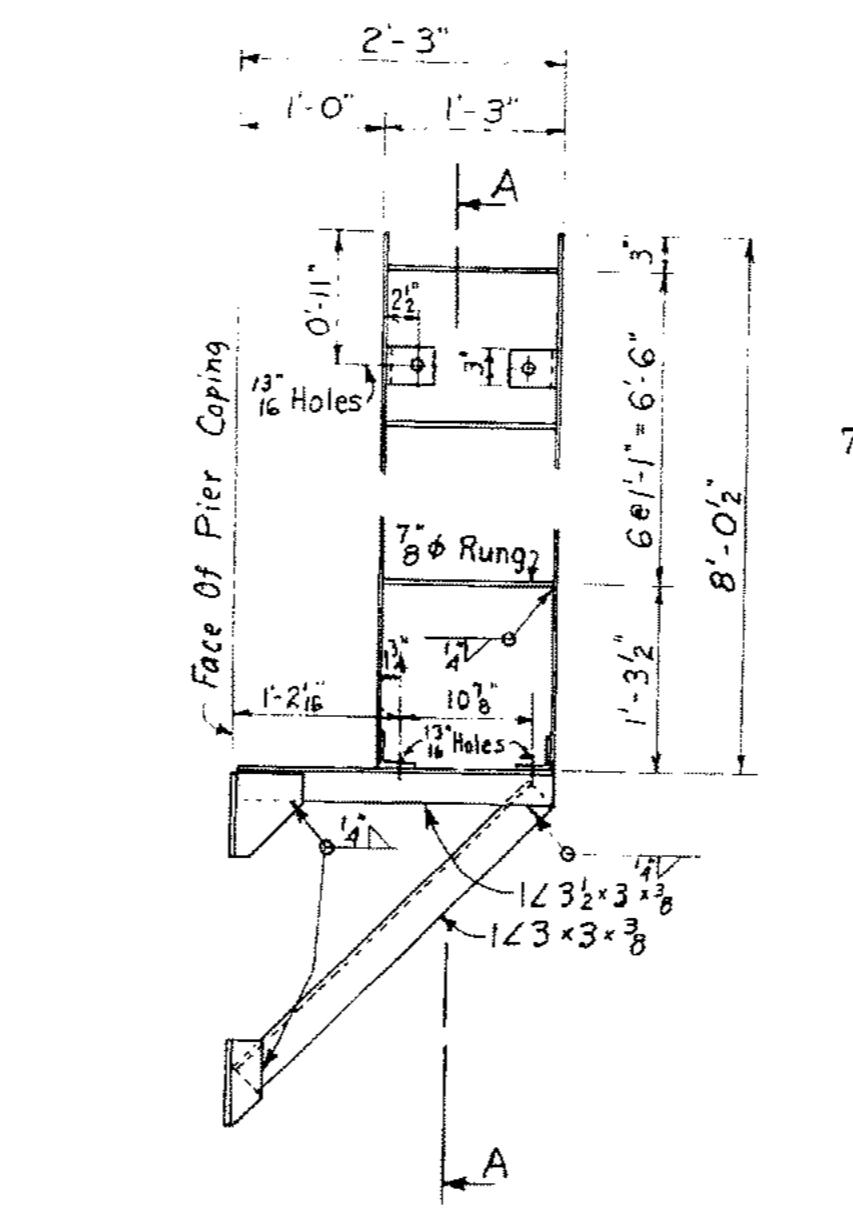
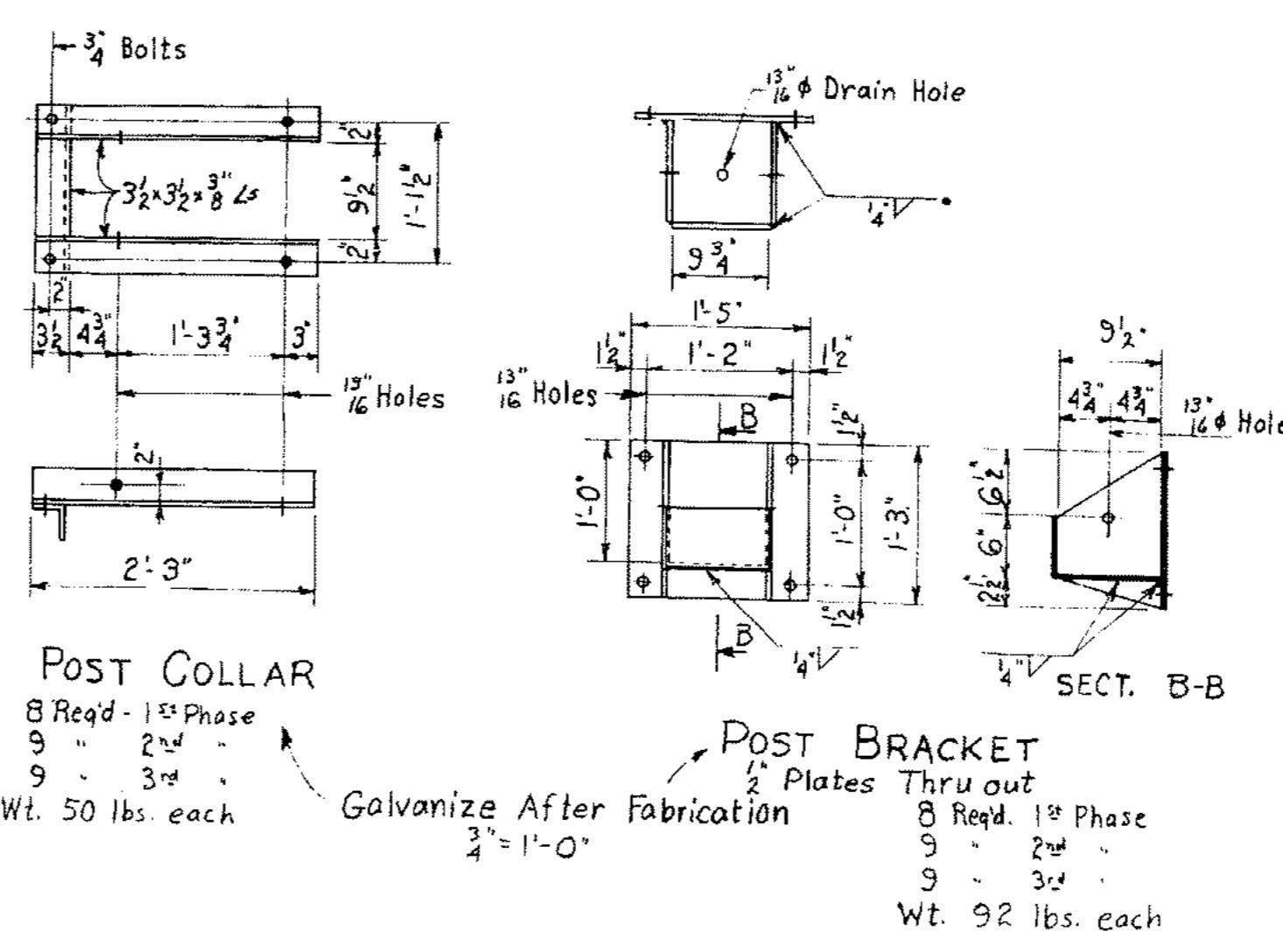
| PILE LOADS | | |
|------------------------|----------------|-----------|
| * D.L. Only | Max. 10.1 tons | Min. 10.1 |
| * D.L.+L.L. | 18.9 | 18.9 |
| * D.L.+L.L.+Wind | 23.9 | 13.9 |
| * D.L.+L.L.+W+Traction | 32.9 | 4.9 |
| ** D.L.+Ice | 17.1 | 3.1 |

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

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

See pile driving record for location of piles.

| | Pier 33 | Pier 34 | Pier 35 | Pier 36 |
|-----------------------|---------|---------|---------|---------|
| 21 Sp. @ 10' = 19' 0" | 22-5A1 | | | |
| 15.5' Pier 33 | | | | |
| 15.26" " 34 | | | | |
| 15.76" " 35 | | | | |
| 15.26" " 36 | | | | |
| 16 Sp. @ 10' = 12' 0" | | | | |
| 15.5' Pier 33 | | | | |
| 15.25" " 34 | | | | |
| 15.79" " 35 | | | | |
| 16.06" " 36 | | | | |
| 16 Sp. @ 10' = 14' 0" | 17-7A1 | | | |
| 15.5' Pier 33 | | | | |
| 15.25" " 34 | | | | |
| 15.79" " 35 | | | | |
| 16.06" " 36 | | | | |
| 20' 0" 2066 Pier 33 | | | | |
| 20.71" " 34 | | | | |
| 20.66" " 35 | | | | |
| 20.28" " 36 | | | | |



ACCESS RUNG
Make From 1 1/2 Dia. Deformed Bars
Galvanize After Fabrication

17 Regd. 1st Phase
17 " 2nd "
17 " 3rd "

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

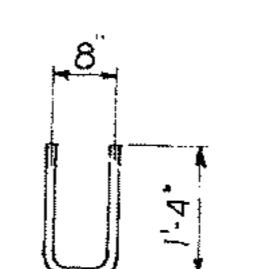
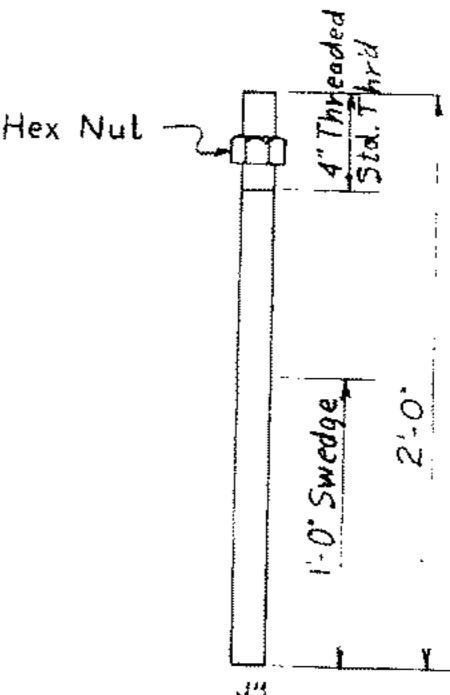
BAR LIST AND BENDING DETAILS

| MARK | NO. REQ'D | PLAIN WITH TEL SUB | BAR SIZE | LENGTH | TYPE | LOCATION | BENDING DETAILS |
|-------|-----------|--------------------|----------|--------|-------------|-----------------|---------------------------|
| BA1 | 22 | 22 | 8 | 16'-6" | A | Footing | 14'-4" O.C. B.A.I. 1'-1" |
| TA1 | 17 | 17 | 7 | 21'-0" | A | " | 19'-4" O.C. T.A.I. 0'-10" |
| SBI | 11 | 12 | 5 | 12'-6" | B | Coping | " |
| SC1 | 24 | 20 | 5 | 4'-0" | C | Shaft Ends Hor. | " |
| SC2 | 24 | 24 | 5 | 4'-3" | C | " | " |
| SC3 | 24 | 24 | 5 | 4'-6" | C | " | " |
| SC4 | 16 | 16 | 5 | 4'-9" | C | " | " |
| SC6 | 0 | 4 | 5 | 5'-0" | C | Tel. Sup. | 4'-6" 5B1 |
| SC7 | 0 | 4 | 5 | 13'-9" | C | " | 1'-6" 5D1 |
| SD1 | 0 | 6 | 5 | 15'-6" | D | " | 5C6 2'-6" |
| SD2 | 4 | 2 | 5 | 7'-6" | D | Coping End | 5C1 2'-9" |
| S06 | 34 | 34 | 8 | 6'-0" | Str. Dowels | " | 5C2 3'-0" |
| S236 | 30 | 30 | 8 | 23'-6" | " | Vert. Shaft | 5C3 3'-3" |
| S14 | 4 | 4 | 8 | 14'-0" | " | " | 5C4 3'-0" |
| S10 | 12 | 8 | 5 | 10'-0" | " | Hor. Shaft | 5C6 11'-3" |
| S10-6 | 12 | 12 | 5 | 10'-6" | " | " | 5C7 12'-3" 5D1 |
| S11 | 21 | 12 | 5 | 11'-0" | " | & Coping | 1'-5" 5D2 |
| S11-6 | 8 | 8 | 5 | 11'-6" | " | " | " |
| S11-9 | 0 | 3 | 5 | 11'-9" | " | Coping | " |
| S03 | 0 | 2 | 5 | 3'-0" | " | " | " |
| S028 | 0 | 4 | 5 | 2'-8" | " | " | " |

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.

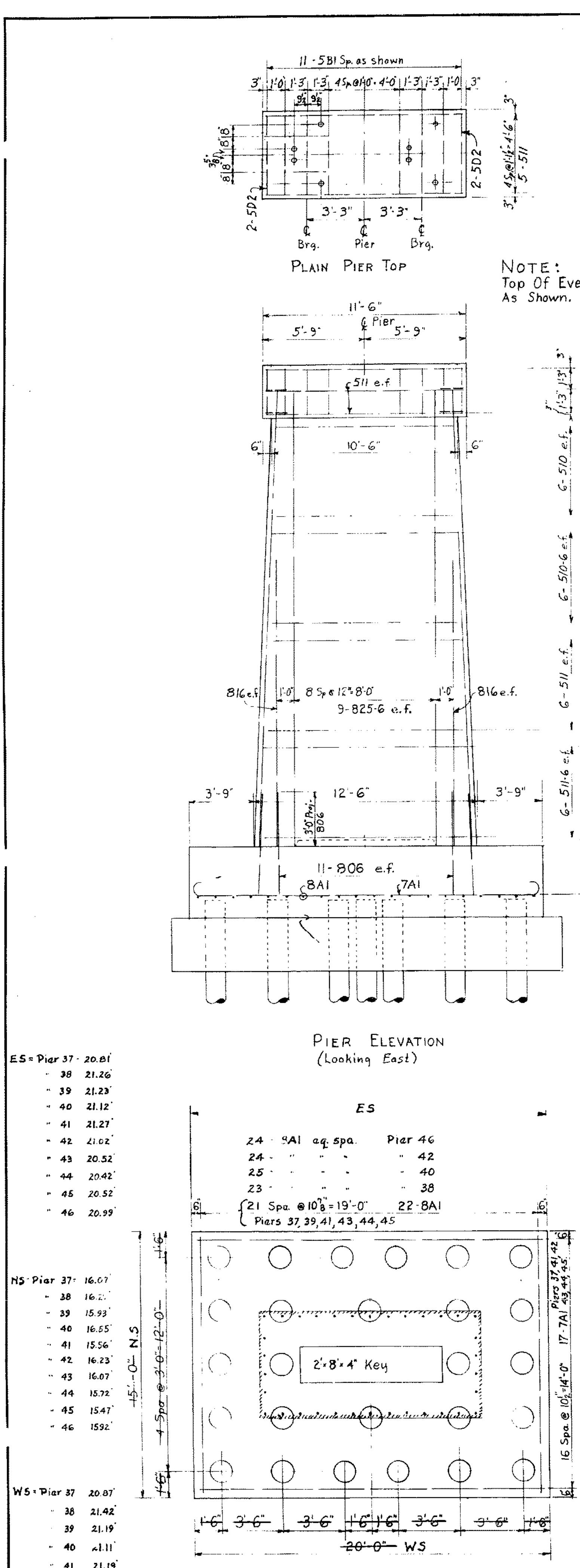
ONE PIER WITH TELEGRAPH SUPPORT
Class 'B' Concrete 98 Cu.Yds.
Seal Concrete 42 Cu.Yds.
Reinforcing Steel 5510 Lbs.
Timber Piling 90 Ft Lengths 2250 Lin.Ft.
Excavation 70 Cu.Yds.

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



LADDER RUNG
8" Deformed Bars
Galvanize After Fabrication
136 Regd. 1st Phase
136 " 2nd "
136 " 3rd "

| | | | | |
|--|--|---------|-----|-------|
| NORTHERN PACIFIC RAILWAY | | | | |
| ENGINEERING DEPARTMENT | | | | |
| IDaho | Division 1 st Sub-Div. M.L. | | | |
| Bridge 3.2 | | | | |
| Sandpoint, Idaho | | | | |
| 29 Foot High Pier For Piers 23 Thru 36 | | | | |
| RECOMMENDED BY: | APPROVED BY: | | | |
| SCALE: 1'-0" = Piers | | | | |
| ST. PAUL, MINN. DATE: May 23, 1960 | | | | |
| OFFICE OF BRIDGE ENGINEER | | | | |
| DATE | REVISIONS | DR. JWD | TR. | CH. |
| 1-18-61 | Rev. T/T & T/Coping | d | JWD | 52360 |
| 11-17-61 | As constructed | e | JWD | 91357 |
| A.F.E. NO. INDEX NO. | | | | |
| SHEET OF FILE NO. | | | | |

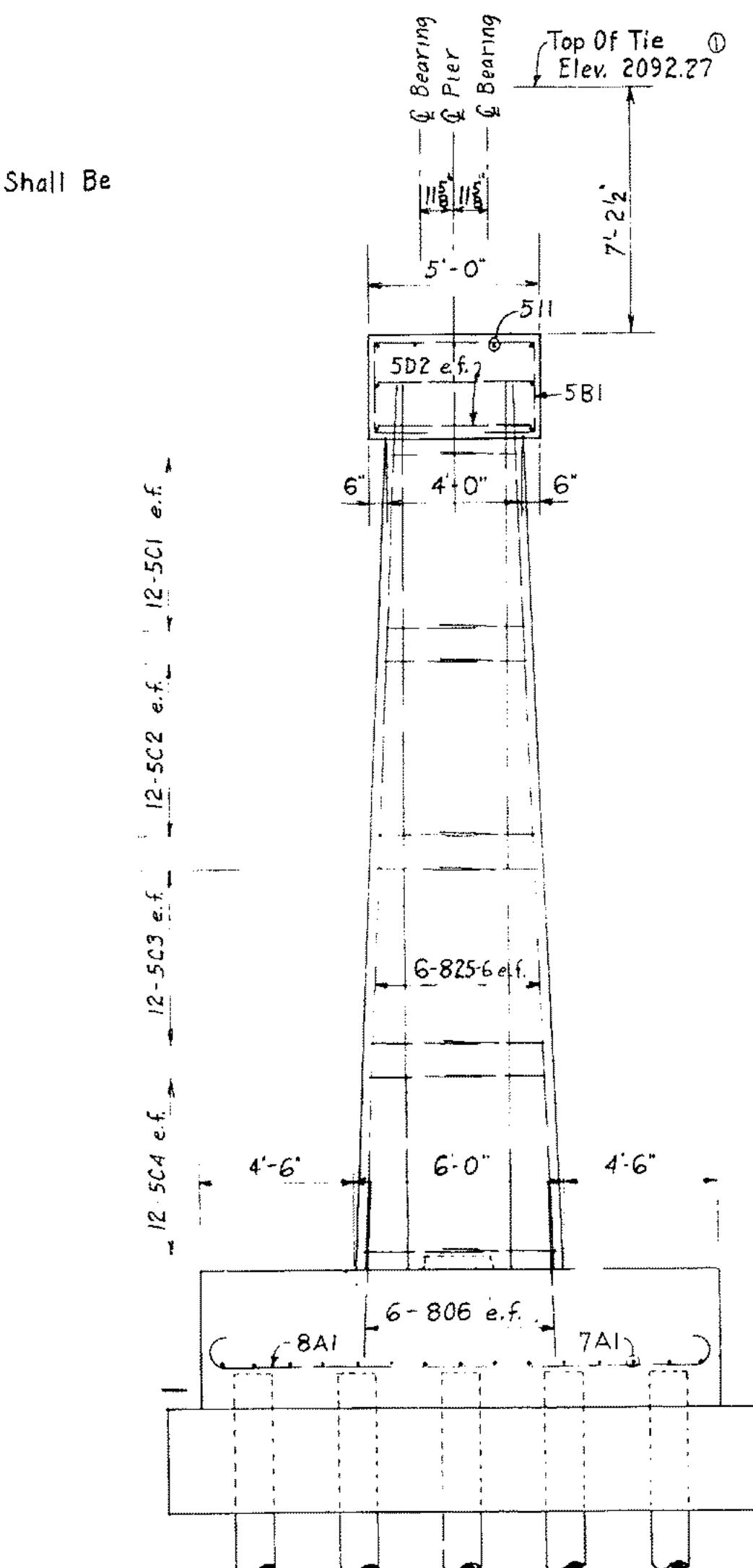


Elevations Are To N.P.Ry. Datum,
For USGS Datum Subtract 10.1 Ft.

FOOTING & PILE PLAN

See pile driving record for location of piles

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

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

| 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. | 5898.2 | 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 |

BAR LIST AND BENDING DETAILS

| MARK | NO. REQ'D* | PLAIN WITH PIER TEL SUP | BAR SIZE | LENGTH | TYPE | LOCATION | BENDING DETAILS | | | |
|-------|------------|-------------------------|----------|--------|------|-----------------|-----------------|--------|--------|--------|
| | | | | | | | 16'-6" | 14'-4" | 12'-0" | 10'-0" |
| 8AI | 22 | 22 | 8 | 16'-6" | A | Footing | | | | |
| 7AI | 17 | 17 | 7 | 21'-0" | A | " | | | | |
| 5BI | 11 | 12 | 5 | 12'-6" | B | Coping | | | | |
| 5CI | 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 | " | | | | |
| 5DI | 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" | " | " | | | | |

1'-1" 14'-4" 8AI
0'-10" 19'-4" 7AI
0'-10" 10'-4" 5BI

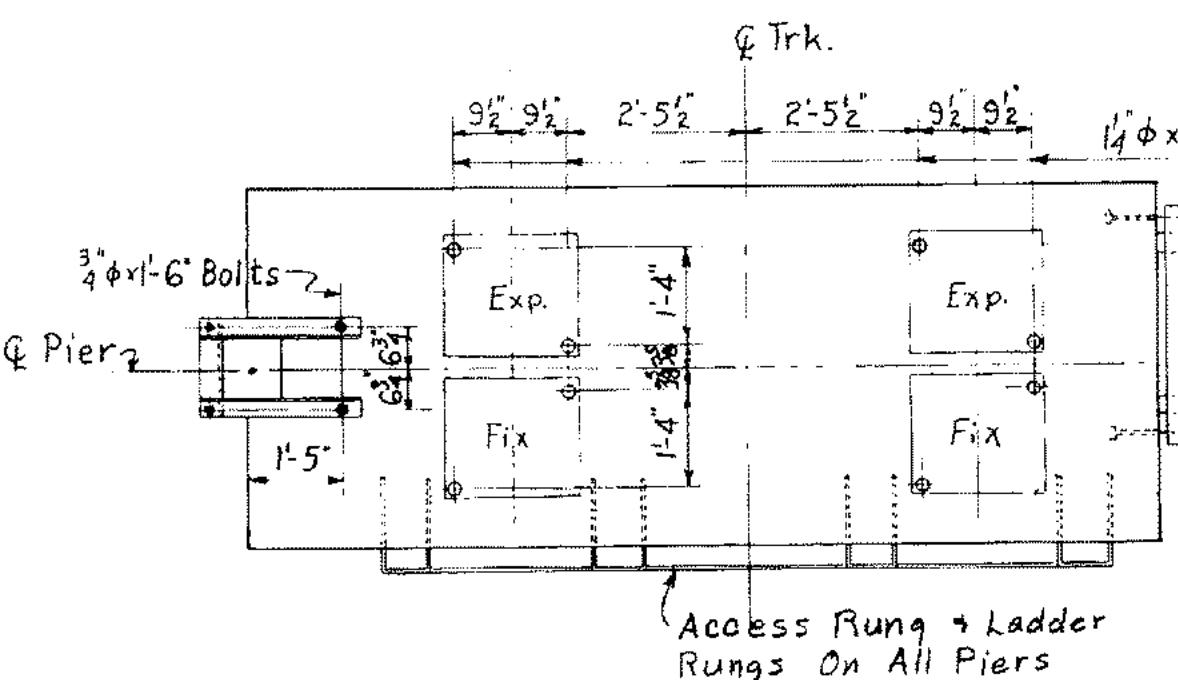
4'-6" 5BL
1'-6" 1'-6"

5C7 2'-6"
5C6 2'-6"

1'-5" 5D2
1'-8" 5DI
1'-7" 5D1

12'-3" 5D1
1'-5" 5D2

NOTE:
Bent Bar Dimensions Are Out To Out.

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

* For First Phase ~ 1960 Work:
5 Plain Piers Reqd. #38, #40, #42, #44, #46
5 With Tel. Support #37, #39, #41, #43, #45

For Second Phase ~ Future Work:
4 Plain Piers Reqd. #48, #50, #52, #54
4 With Tel. Support #47, #49, #51, #53

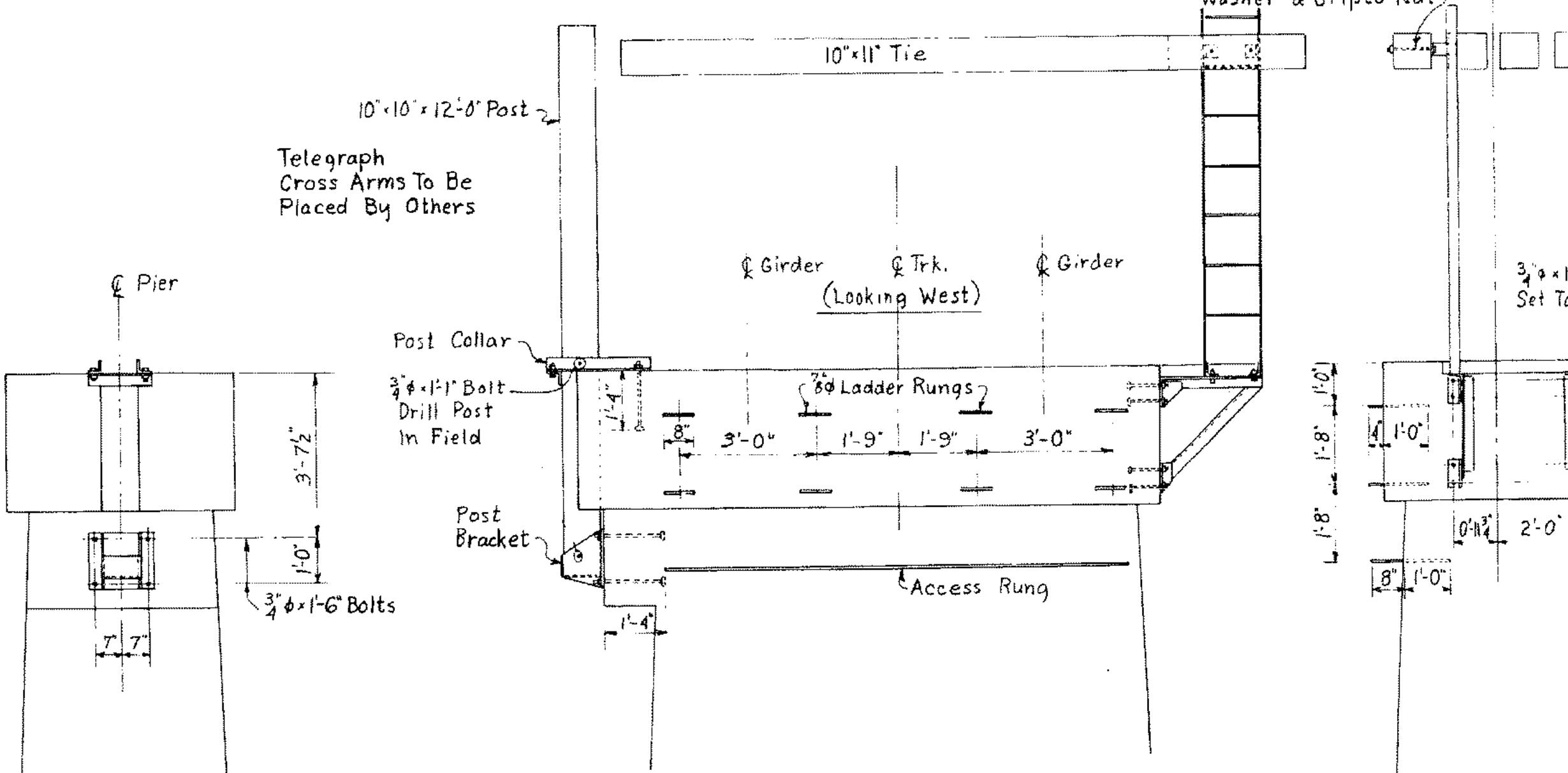
For Third Phase ~ Future Work:
No 31 Ft. Piers Reqd.

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.



| Detail | Material | Required | Item | Size | 1st Phase | 2nd Phase | 3rd Phase |
|----------------------|--------------|----------|----------------------|--------------|-----------|-----------|-----------|
| Post Collar | Complete | 8 | Post Collar | " | 8 | | |
| Bracket | " | 8 | Bracket | 3/8 x 1'-6" | 48 | | |
| Anchor Bolts | 3/8 x 1'-1" | 16 | Anchor Bolts | 3/8 x 1'-1" | 16 | | |
| M. Bolts (Posts) | 3/8 x 1'-1" | 9 | M. Bolts (Posts) | 3/8 x 1'-1" | 9 | | |
| Platform Bracket | BJL | 9 | Platform Bracket | BJL | 9 | | |
| " | " | 9 | " | " | 9 | | |
| Ladders | " | 9 | Ladders | 3/8 x 1'-2" | 72 | | |
| Anchor Bolts | 3/8 x 1'-2" | 72 | Anchor Bolts | 3/8 x 1'-2" | 72 | | |
| M. Bolts (Ladder) | " x 2" | 18 | M. Bolts (Ladder) | " x 2" | 18 | | |
| M. Bolts (Ladder) | " x 1'-0" | 18 | M. Bolts (Ladder) | " x 1'-0" | 18 | | |
| Carriage Bolts | 5/8 x 4" | 72 | Carriage Bolts | 5/8 x 4" | 72 | | |
| Gripco Nuts | 3/8 Bolts | 172 | Gripco Nuts | 3/8 Bolts | 172 | | |
| Spring Lock Washers | 3/8 Bolts | 72 | Spring Lock Washers | 3/8 Bolts | 72 | | |
| Gripco Nuts | 1/2 Bolts | 72 | Gripco Nuts | 1/2 Bolts | 72 | | |
| Spring Lock Washers | " | 72 | Spring Lock Washers | " | 72 | | |
| Total Platform Plank | 3/4 x 12' 3" | 18 | Total Platform Plank | 3/4 x 12' 3" | 18 | | |
| Access Rung | 1'-0" | 17 | Access Rung | 1'-0" | 17 | | |
| Ladder Rung | 1'-4" | 136 | Ladder Rung | 1'-4" | 136 | | |
| Telegraph Posts-Tie | 5/8 x 12' 0" | 8 | Telegraph Posts-Tie | 5/8 x 12' 0" | 8 | | |
| Anchor Bolts (Brass) | 1/2 x 12' 0" | 136 | Anchor Bolts (Brass) | 1/2 x 12' 0" | 136 | | |

NORTHERN PACIFIC RAILWAY
ENGINEERING DEPARTMENT

IDaho DIVISION 1st SUB-DIV. M. L.

BRIDGE 3.2 SANDPOINT, IDAHO

31 FOOT HIGH PIER FOR PIERS 37 THRU 46

RECOMMENDED BY: APPROVED BY:

SCALE: 1" = 1'-0"
OFFICE OF BRIDGE ENGINEER ST. PAUL, MINN. DATE: May 23, 1960
DATE: DR. JWD CH. 5-25-60
1-18-61 Rev. T/T & T/Coping DR. JWD INDEX NO. 91358
11-17-61 As constructed FAL JWD SHEET OF FILE NO.

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.

ERCTION 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 40 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 $\frac{3}{4}$ ".

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 04010 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 MANUFACTURER'S DIRECTIONS. THROUGH 2" DIA. HOLES IN BEARING BLOCK, DRILL 1 $\frac{3}{4}$ " DIA. HOLES INTO THE ABUTMENT SEAT TO A DEPTH OF 5'-6 $\frac{1}{2}$ " BELOW TOP OF BEARING BLOCK. THROUGH 1 $\frac{1}{2}$ " DIA. HOLES IN BEARING BLOCK, DRILL 1 $\frac{1}{4}$ " 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 $\frac{3}{4}$ " DIA. HOLES INTO THE PIER SEAT TO A DEPTH OF 5'-1 $\frac{1}{2}$ " 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:
CNSPEC 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 PIPE 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 $\frac{1}{8}$ 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 HARDEDENED, CONNECTION BARS SHALL BE WELDED TO PIPE 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)

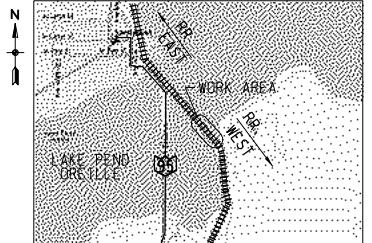
CLASS B EPOXY: AS23-18 A&B GEL TYPE EPOXY (1)
SPEC-BOND 200 EPOXY (2)

(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. |
| SPB3.9-2 = | 17,500 lbs. |
| SPB3.9-3 = | 12,000 lbs. |
| SPB3.9-4 = | 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 40 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.

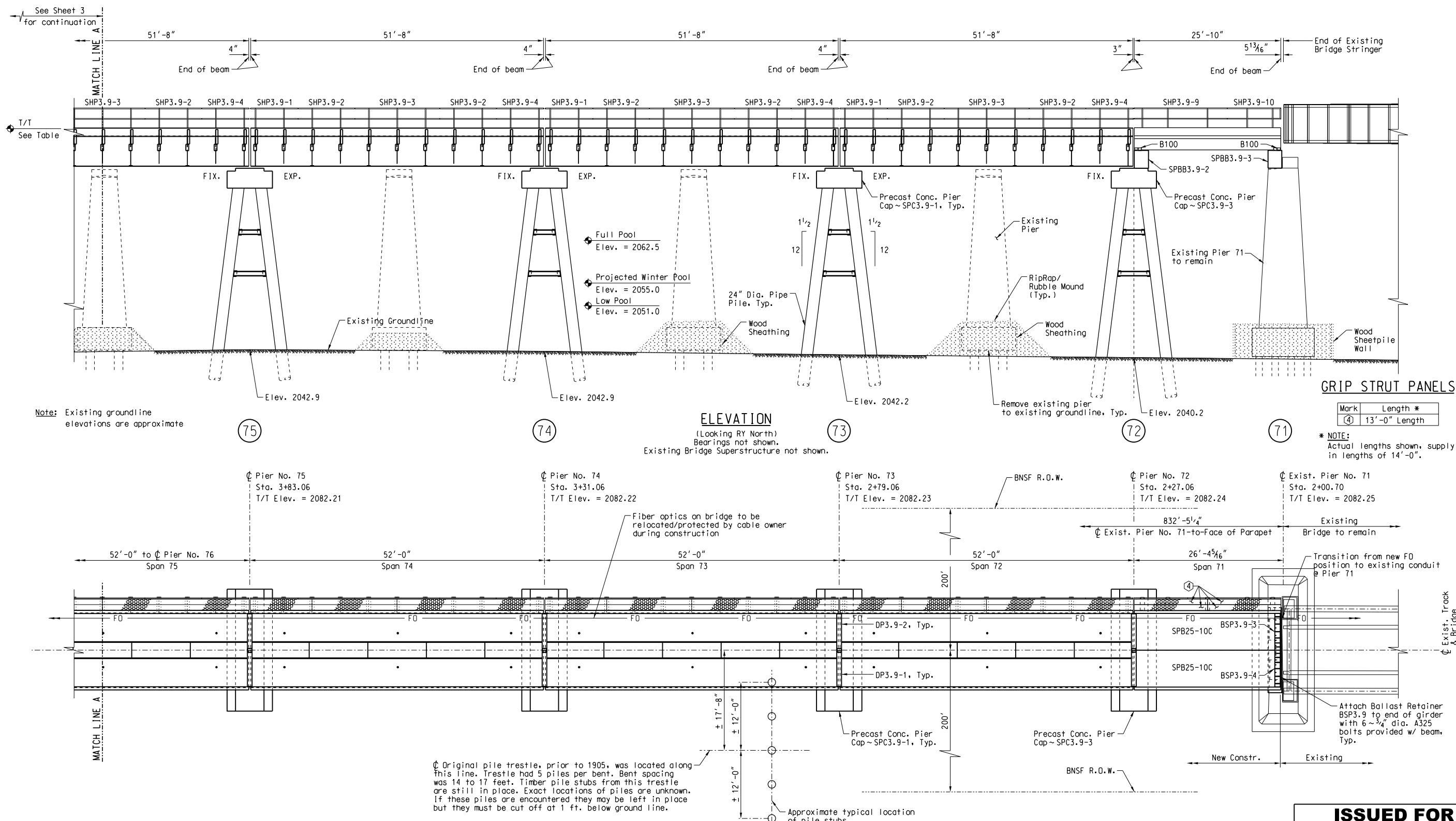
** APPROXIMATE CONCRETE REQUIRED TO FILL PIPE PILES

| | | |
| --- | --- | --- |
| DES: AAN | **RAILWAY** BRIDGE ENGINEERING KANSAS CITY, KS *Ron G Berry* APPROVED: *Ron G Berry* ASST. DIRECTOR STRUCTURES DESIGN | SANDPOINT |

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)

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



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.



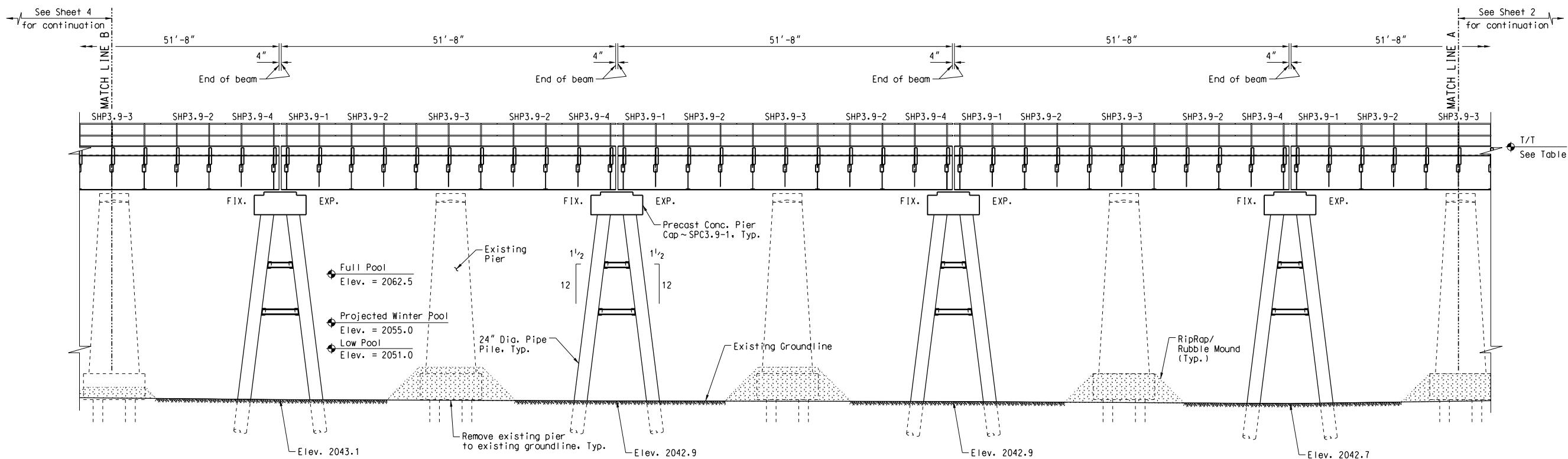
| | | |
|----------------|--|---------------------------------|
| DES: AAN | BNSF RAILWAY BRIDGE ENGINEERING KANSAS CITY, KS APPROVED: <i>Ron G Berry</i> | SANDPOINT JCT. TO LAKESIDE JCT. |
| DRAWN: CDP | | BRIDGE NUMBER 3.9 |
| CHECK: MAF | | OVER LAKE PEND OREILLE |
| DATE: 04/22/09 | | NEAR SANDPOINT, ID |
| AUTH: A090024 | | GENERAL PLAN & ELEVATION |
| LINE SEG: 0045 | | (SPANS 71 THRU 77) |

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

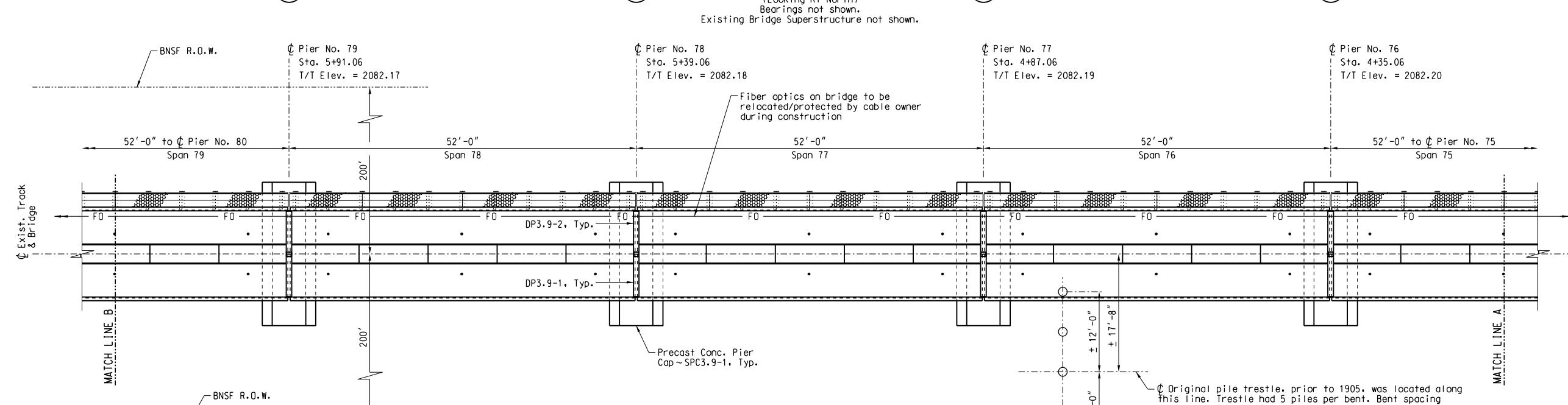
To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)

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.



Note: Existing groundline elevations are approximate



Approximate typical location of pile stubs

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

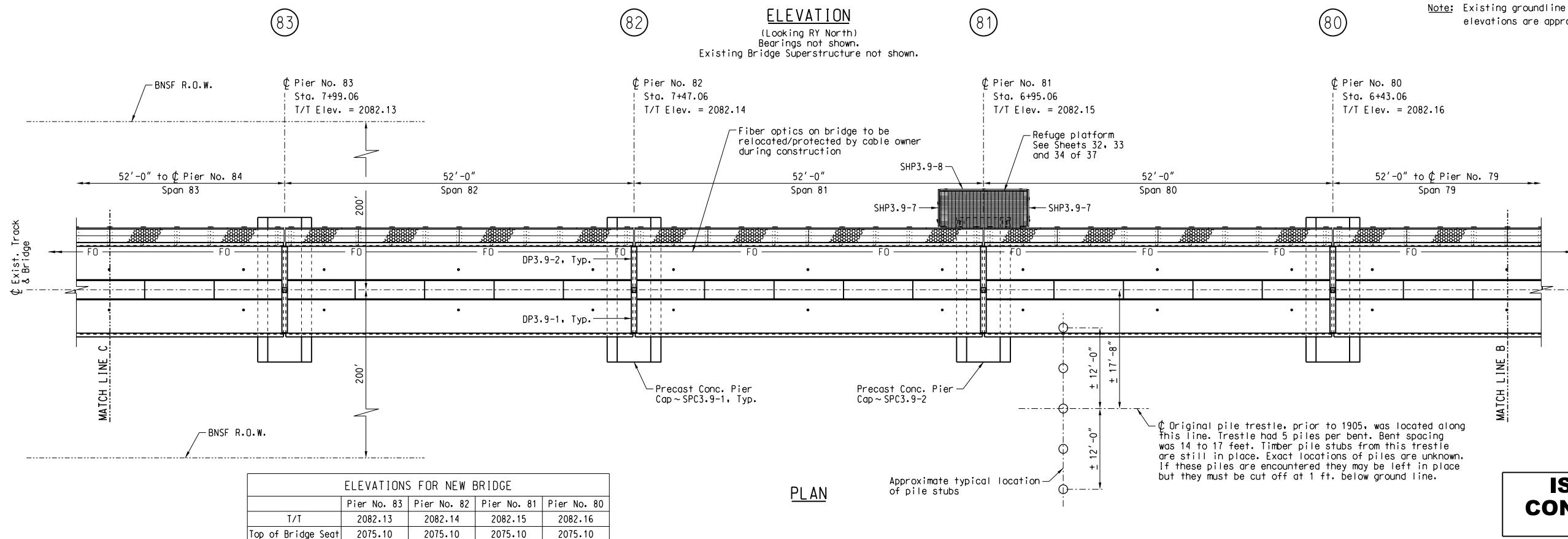
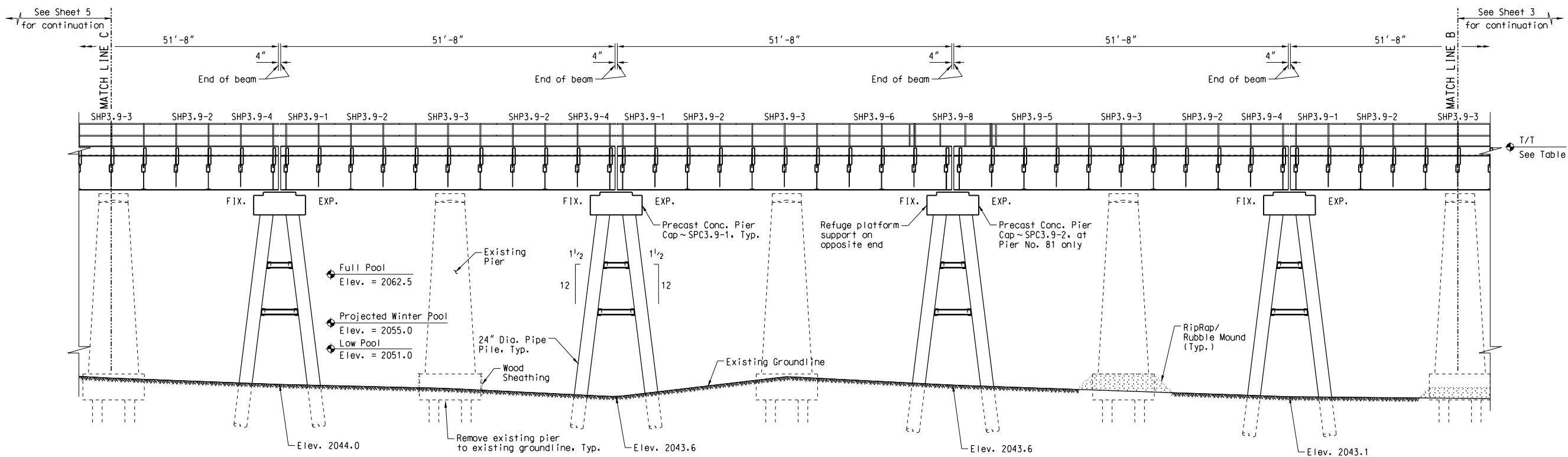
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: *Ron G Berry*
ASST. DIRECTOR STRUCTURES DESIGN

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)

To WHITEFISH, MT
(RY East)

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



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

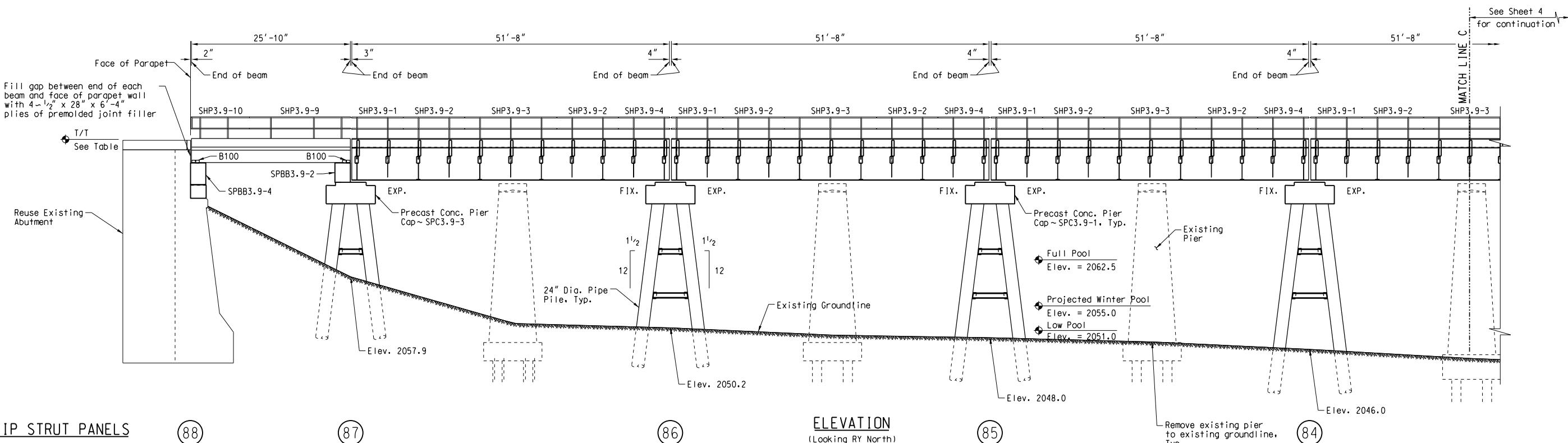
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: *Ron G Berry*
ASST. DIRECTOR STRUCTURES DESIGN

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)

To WHITEFISH, MT
(RY East)

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.



GRIP STRUT PANELS

88

87

86

ELEVATION

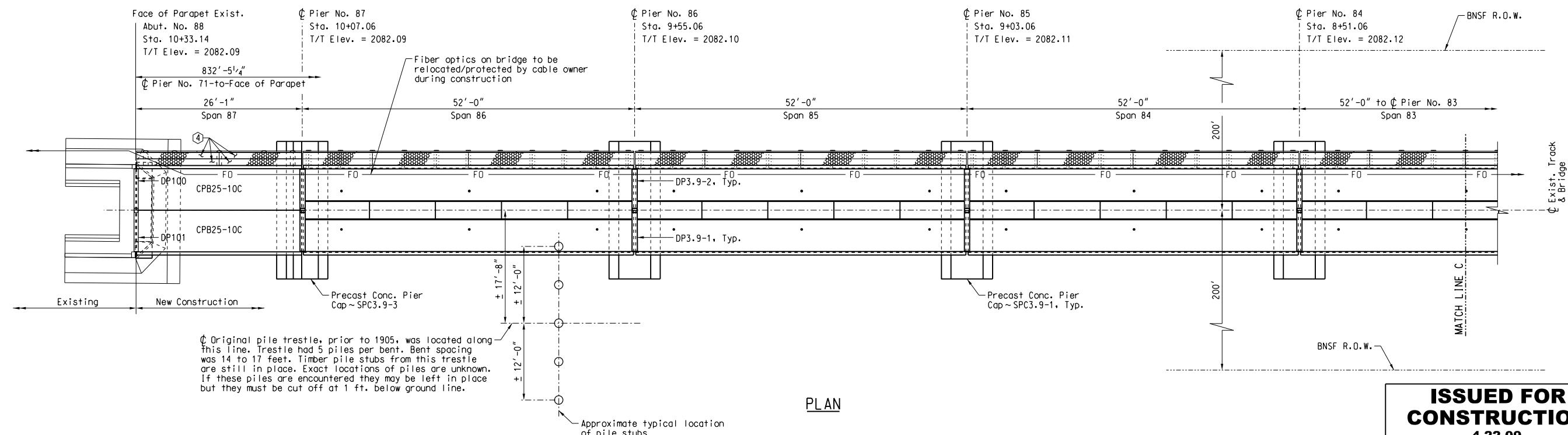
(Looking RY North)
Bearings not shown.
Existing Bridge Superstructure not shown.

85

84

| Mark | Length |
|------|---------------|
| ④ | 13'-0" Length |

Note: Existing groundline elevations are approximate



PLAN

ISSUED FOR
CONSTRUCTION
4-22-09

ELEVATIONS FOR NEW BRIDGE

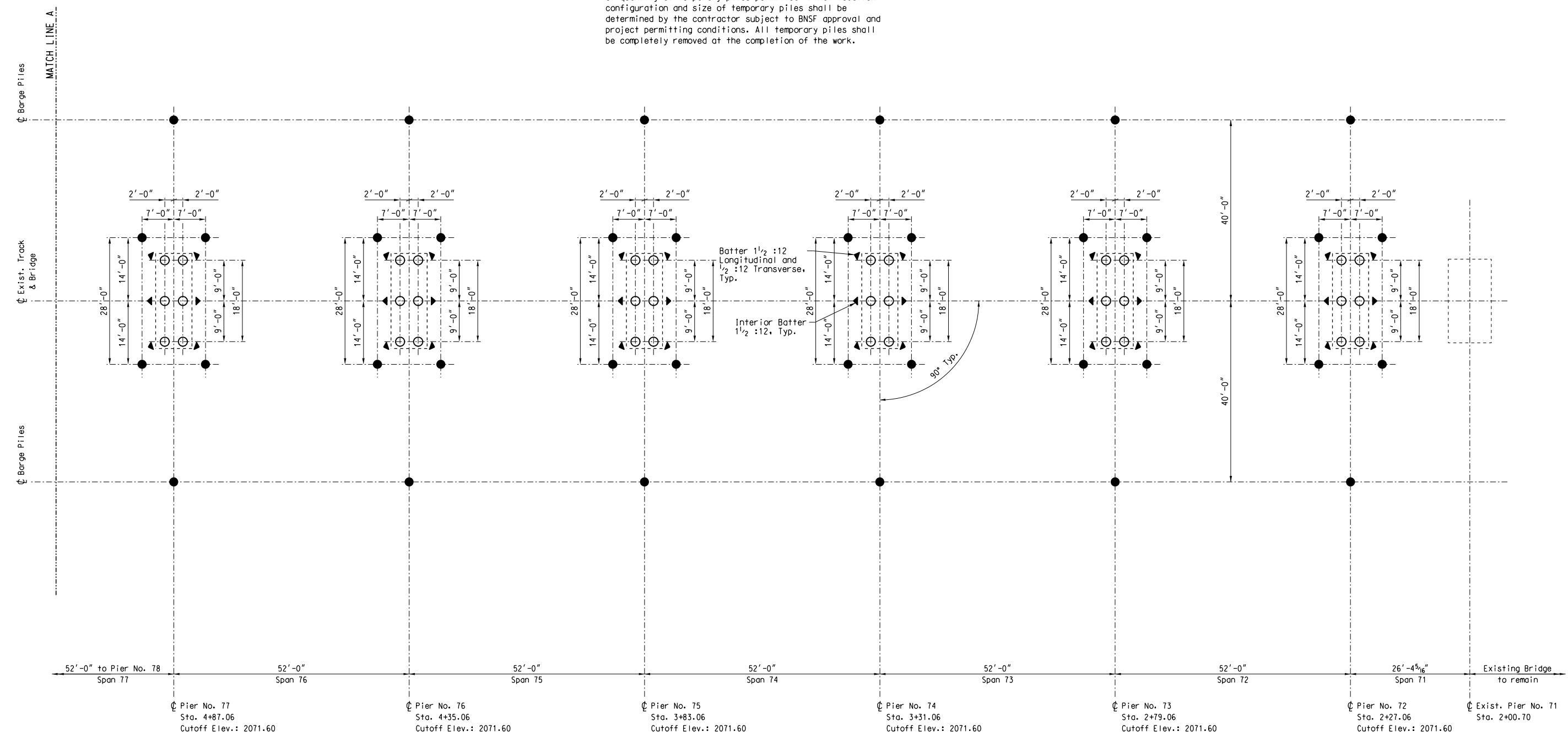
| | Abut. No. 88 | Pier No. 87 | Pier No. 86 | Pier No. 85 | Pier No. 84 |
|--------------------|--------------|-----------------|-------------|-------------|-------------|
| T/T | 2082.09 | 2082.09 | 2082.10 | 2082.11 | 2082.12 |
| Top of Bridge Seat | * 2078.28 | 2078.28/2075.10 | 2075.10 | 2075.10 | 2075.10 |

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

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

**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 $1\frac{1}{2}$ " thk.
2. ● - Temporary template pipe piles 24" dia. x $3\frac{1}{8}$ " thk.
3. ▲ - Temporary trestle pipe piles 24" dia. x $1\frac{1}{2}$ " thk.
4. ▼ - Indicates direction of batter of production piles. The two interior piles shall be battered at $1\frac{1}{2}$:12. The four exterior piles shall be battered at $1\frac{1}{2}$:12 Longitudinal and $\frac{1}{2}$: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.

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.

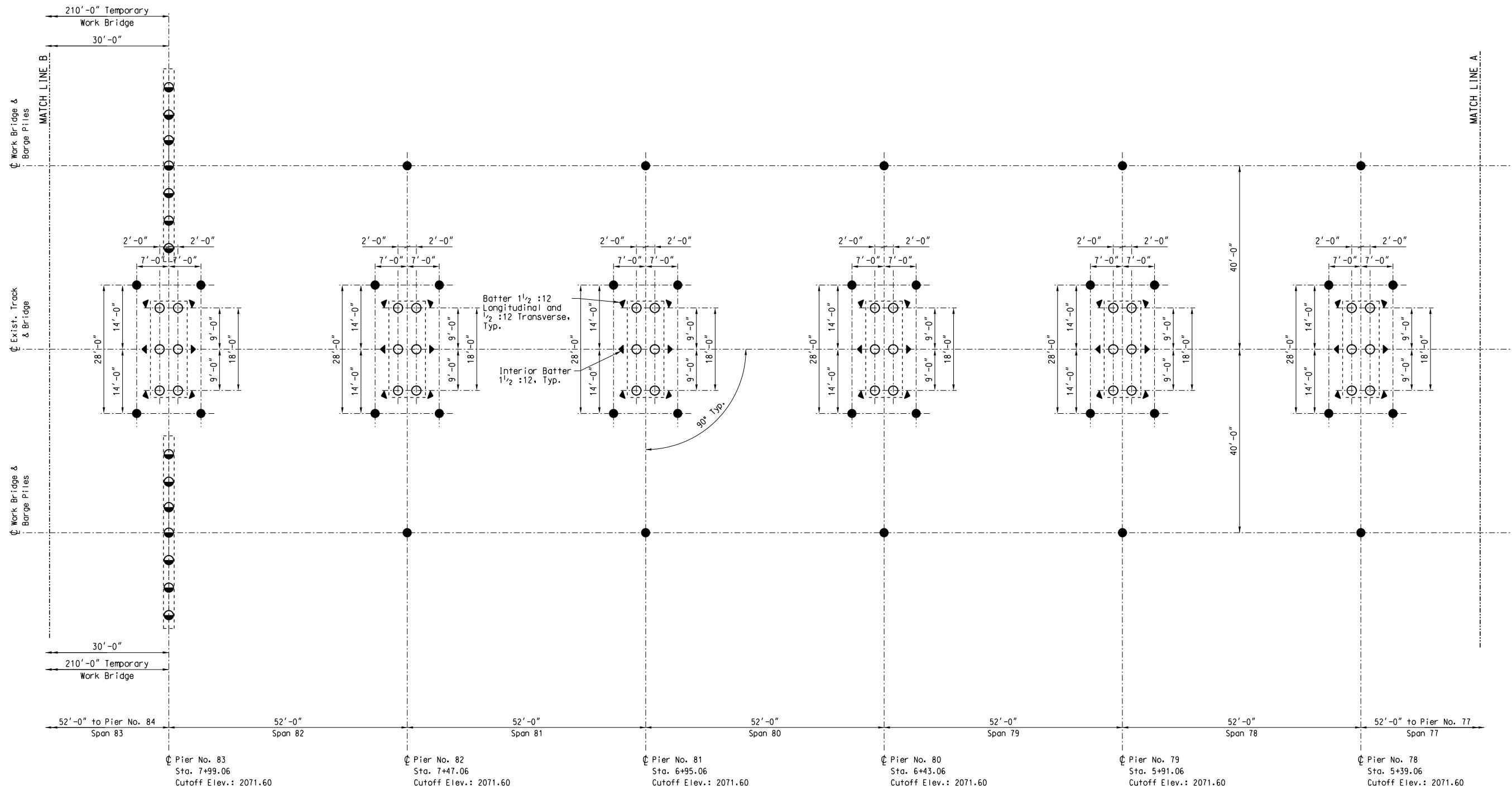
Work with sheets 7 and 8 of 37

| | | |
|----------------|---|---|
| DES: AAN | BNSF RAILWAY BRIDGE ENGINEERING KANSAS CITY, KS <i>Ron G Berry</i> APPROVED: 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 |
| DRAWN: CDP | | |
| CHECK: MAF | | |
| DATE: 04/22/09 | | |
| AUTH: A090024 | | |
| LINE SEG: 0045 | | |

**ISSUED FOR
CONSTRUCTION**
4-22-09

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



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.

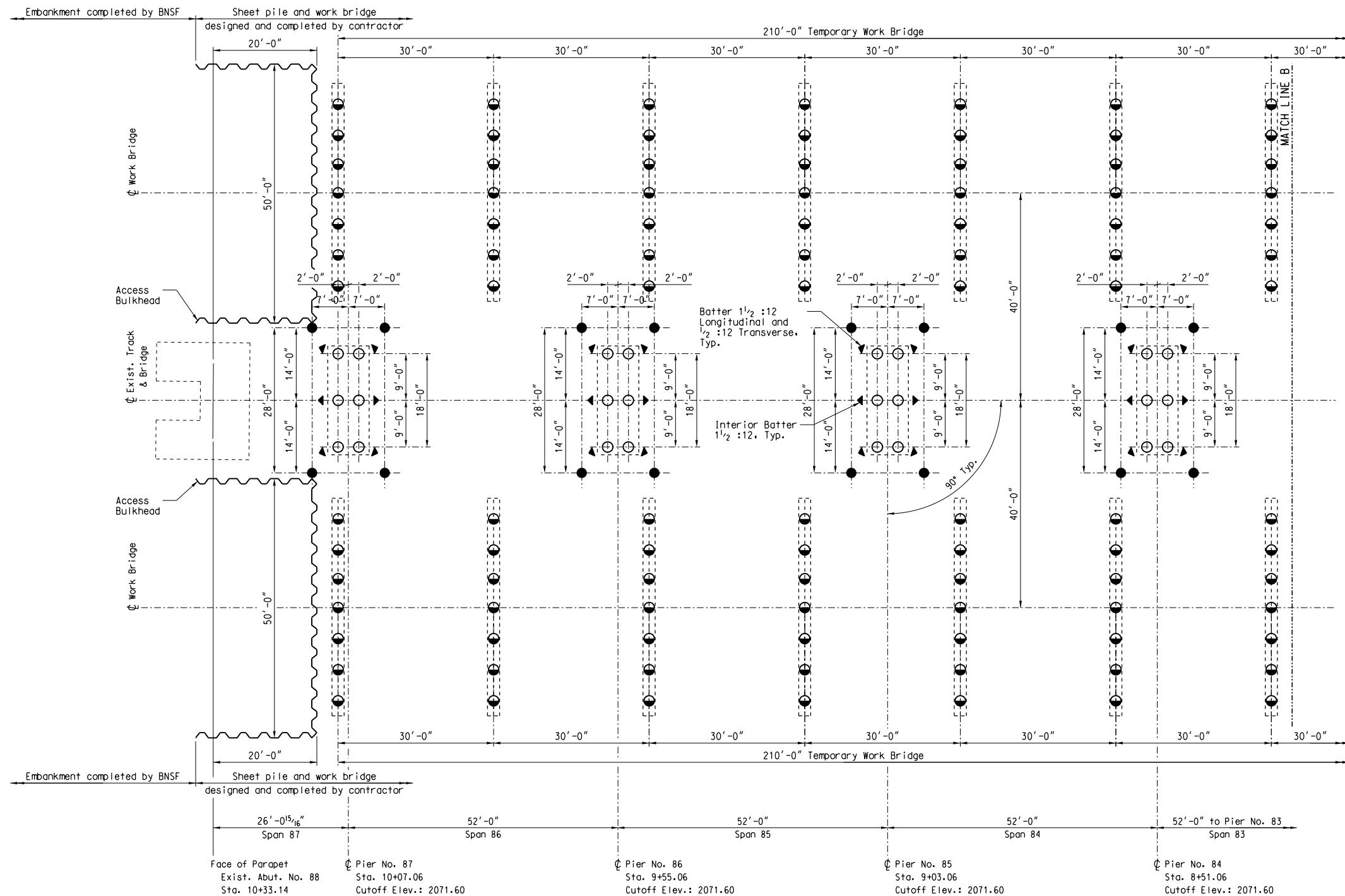
Work with sheets 6 and 8 of 37

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

ISSUED FOR CONSTRUCTION
4-22-09

To SPOKANE, WA
(RY West)To WHITEFISH, MT
(RY East)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.

Work with sheets 6 and 7 of 37

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

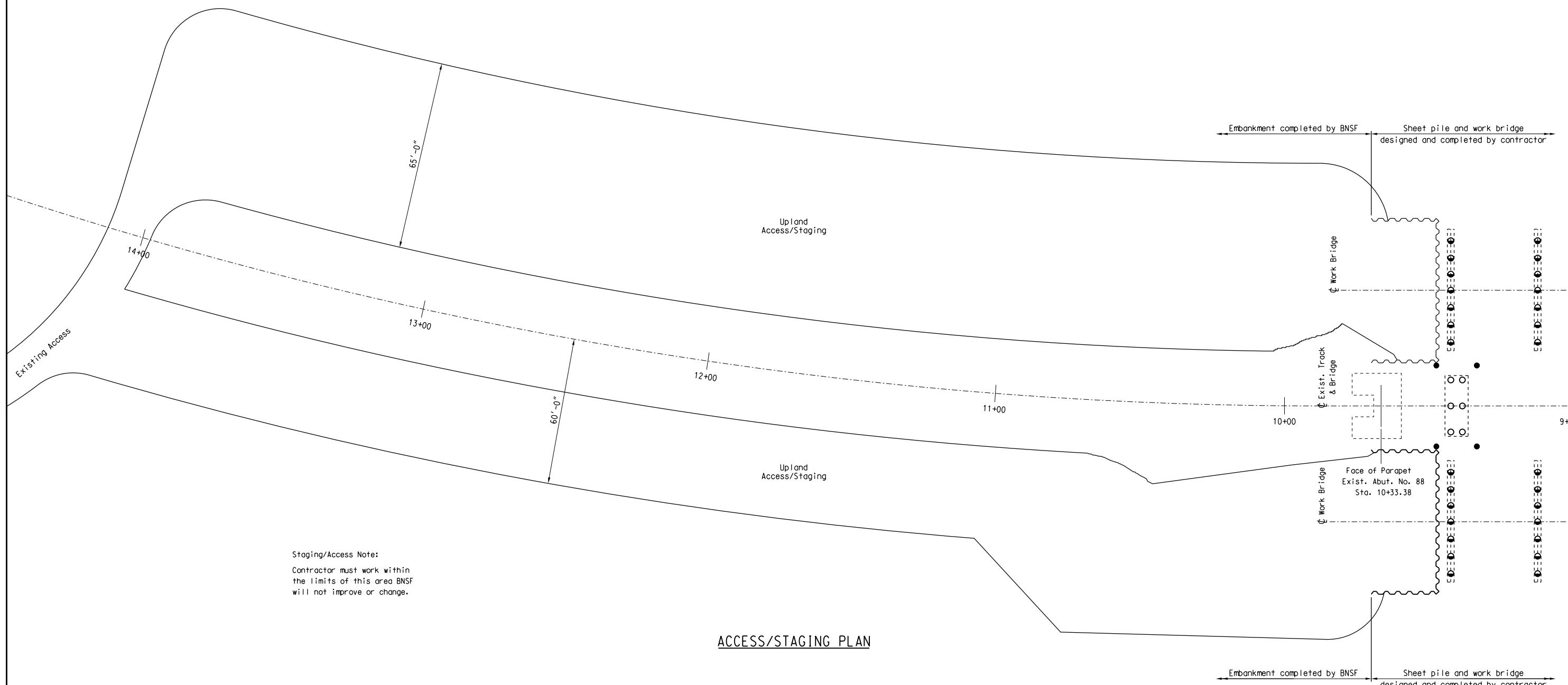
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: *Ron G Berry*
ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID
PILE LAYOUT PLAN
PLAN NO: 0045-3.9-83
SHEET: 8 OF 37

**ISSUED FOR
CONSTRUCTION**
4-22-09

USCG001163 To SPOKANE, WA
(RY West)

To WHITEFISH MT
(RY East)



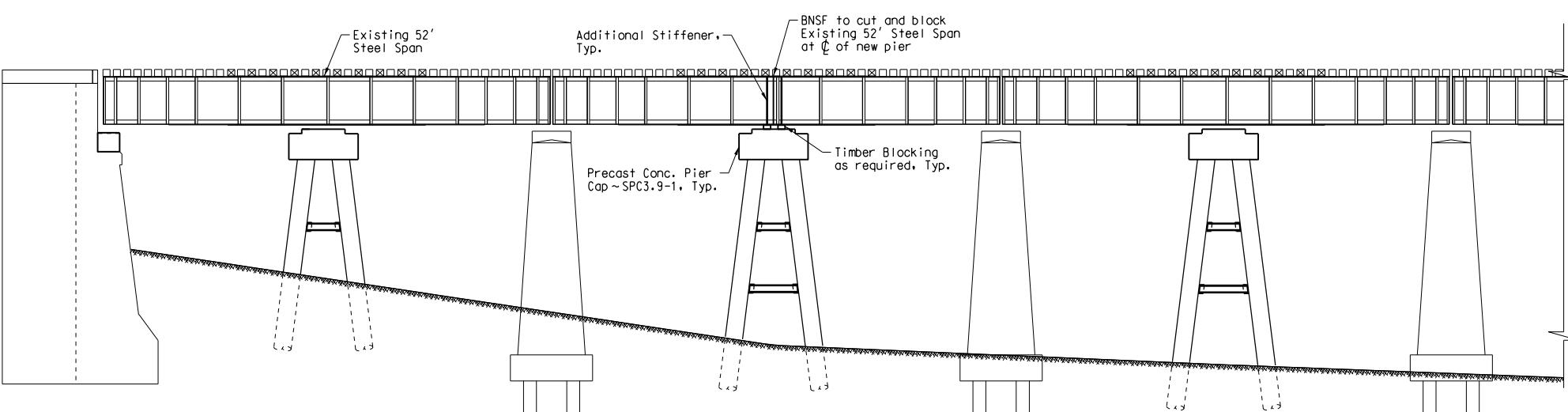
**ISSUED FOR
CONSTRUCTION**
4-22-09



| | | |
|----------------|--|---------------------------------|
| DES: AAN | BNSF RAILWAY BRIDGE ENGINEERING KANSAS CITY, KS APPROVED: <i>Ron G Berry</i> ASST. DIRECTOR STRUCTURES DESIGN | SANDPOINT JCT. TO LAKESIDE JCT. |
| DRAWN: CDP | | BRIDGE NUMBER 3.9 |
| CHECK: MAF | | OVER LAKE PEND OREILLE |
| DATE: 04/22/09 | | NEAR SANDPOINT, ID |
| AUTH: A090024 | | ACCESS/STAGING PLAN |
| LINE SEG: 0045 | | PLAN NO: 0045-3.9-84 |
| | | SHEET: 9 OF 37 |
| | | |
| | | |
| | | |

To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



SUPERSTRUCTURE CONSTRUCTION SEQUENCE:

1. INSTALL PIPE PILES, PIER CAPS, AND PIER BRACING. FIELD VERIFY ELEVATION OF THE TOP OF EXISTING 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 SPLICER 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

(88)

(87)

(86)

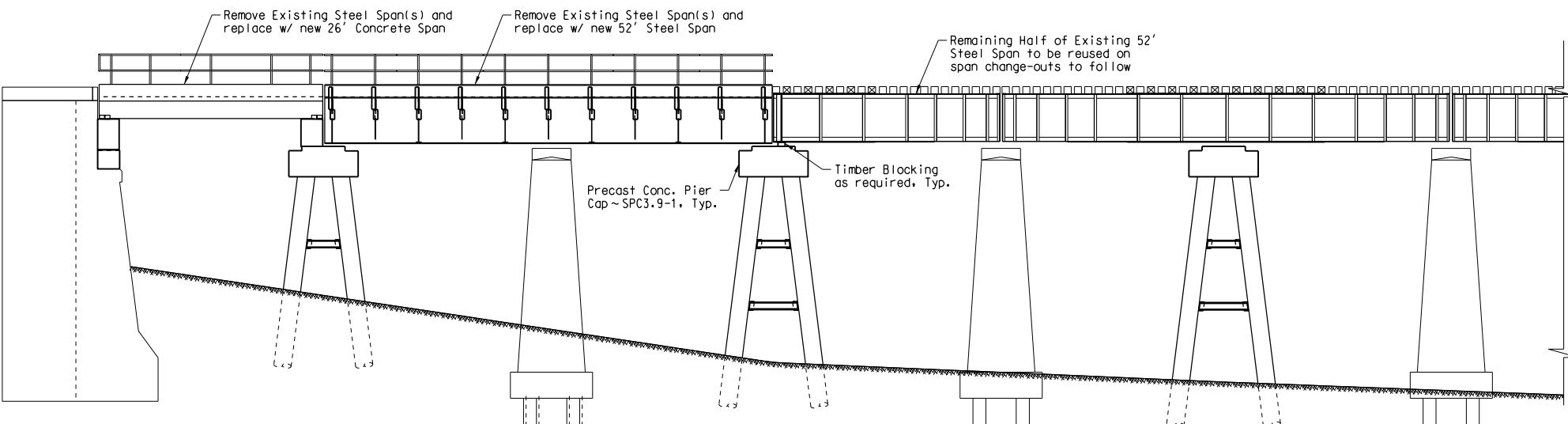
(85)

ELEVATION I(Looking RY North)
Bearings not shown.

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

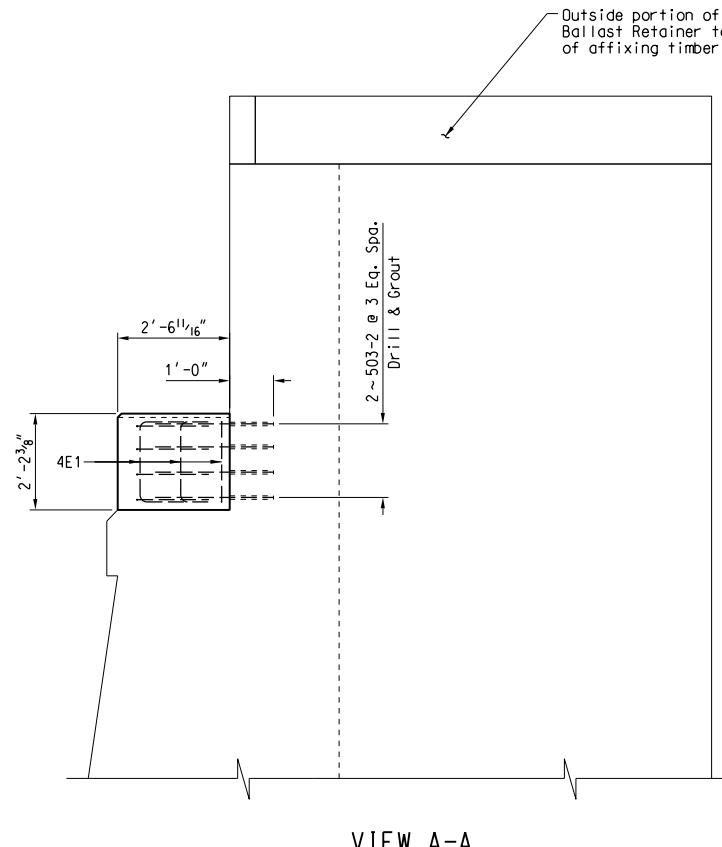
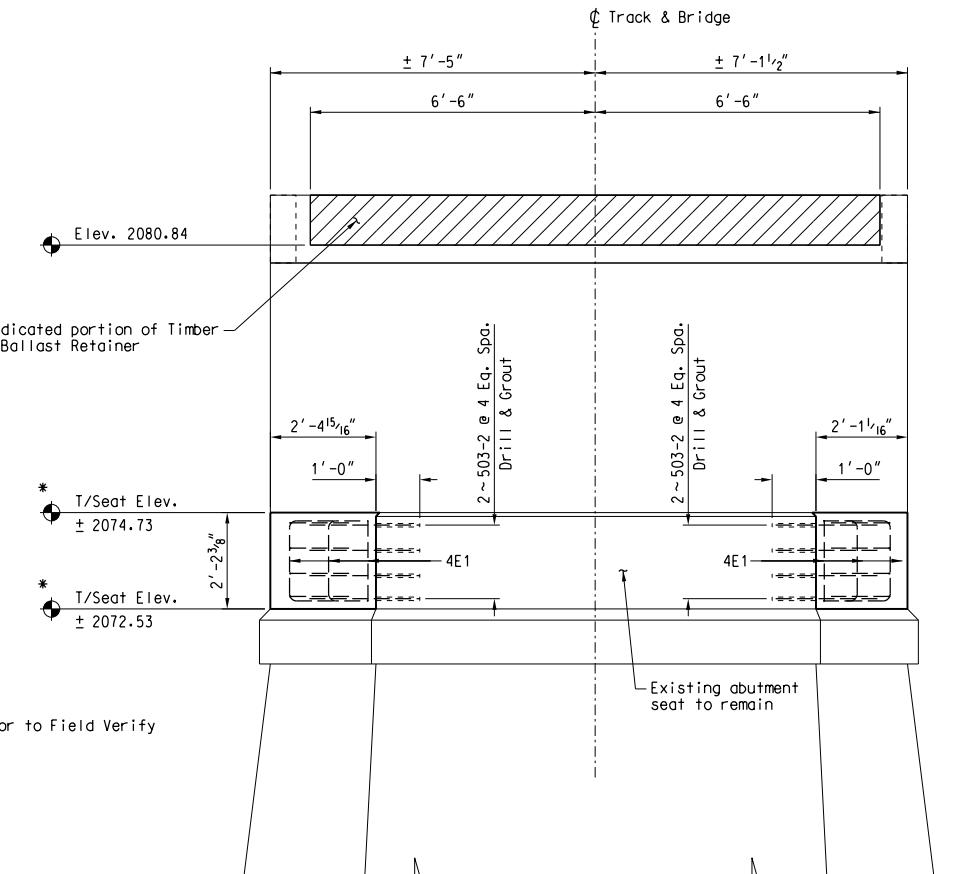
To SPOKANE, WA
(RY West)

To WHITEFISH, MT
(RY East)



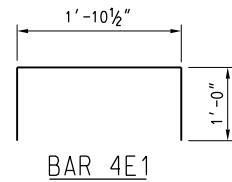
Note: Contractor to perform construction activities unless stated otherwise.

**ISSUED FOR
CONSTRUCTION**
4-22-09



| LIST OF REINFORCING BARS REQUIRED | | | | |
|-----------------------------------|-------|------|------|------------|
| NO. | MARK | SIZE | TYPE | LENGTH |
| 16 | 503-2 | #5 | STR. | 3'-2" |
| 6 | 4E1 | #4 | E | 3'-10 1/2" |

Note: Field bend 503-2 bars to fit.



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 $\frac{3}{4}$ ".

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:

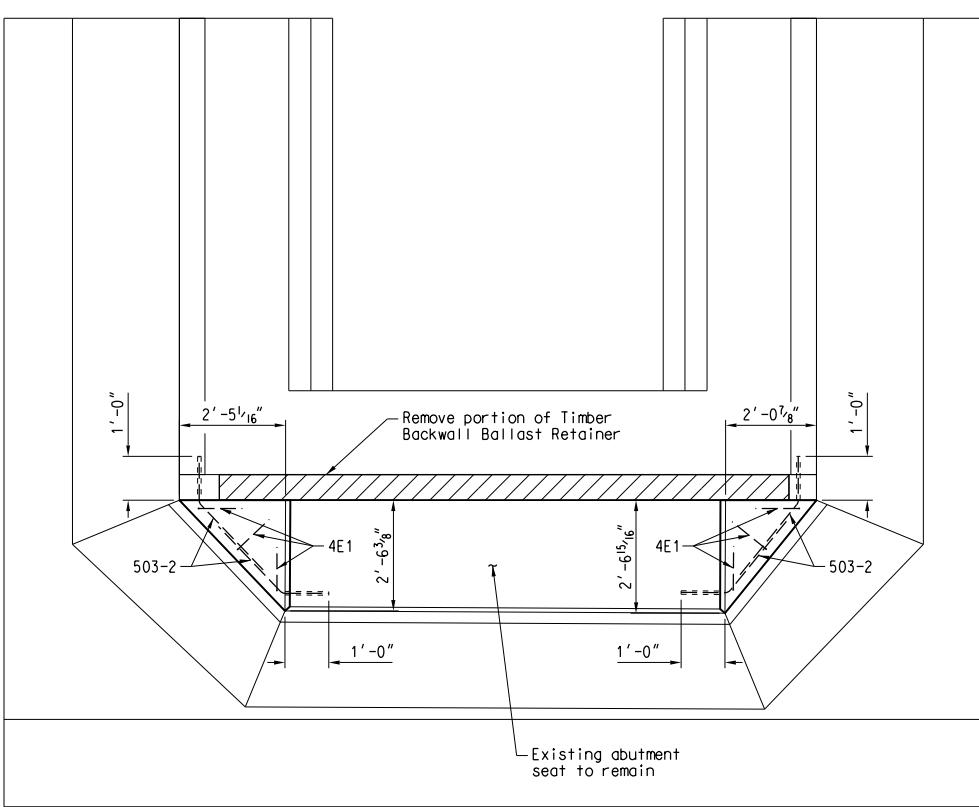
- AS23-18 A&B manufactured by Delta Plastics Co., phone (559)535-1332.
- Spec-Bond 200 manufactured by Conspec Marketing & Manufacturing Co., Inc., phone (877)266-7732.
- Epoxy-Tie epoxy, manufactured by Simpson Strong-Tie Co., Inc., phone (800)999-5099

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 $\frac{1}{8}$ inch larger than reinforcement bar diameter.

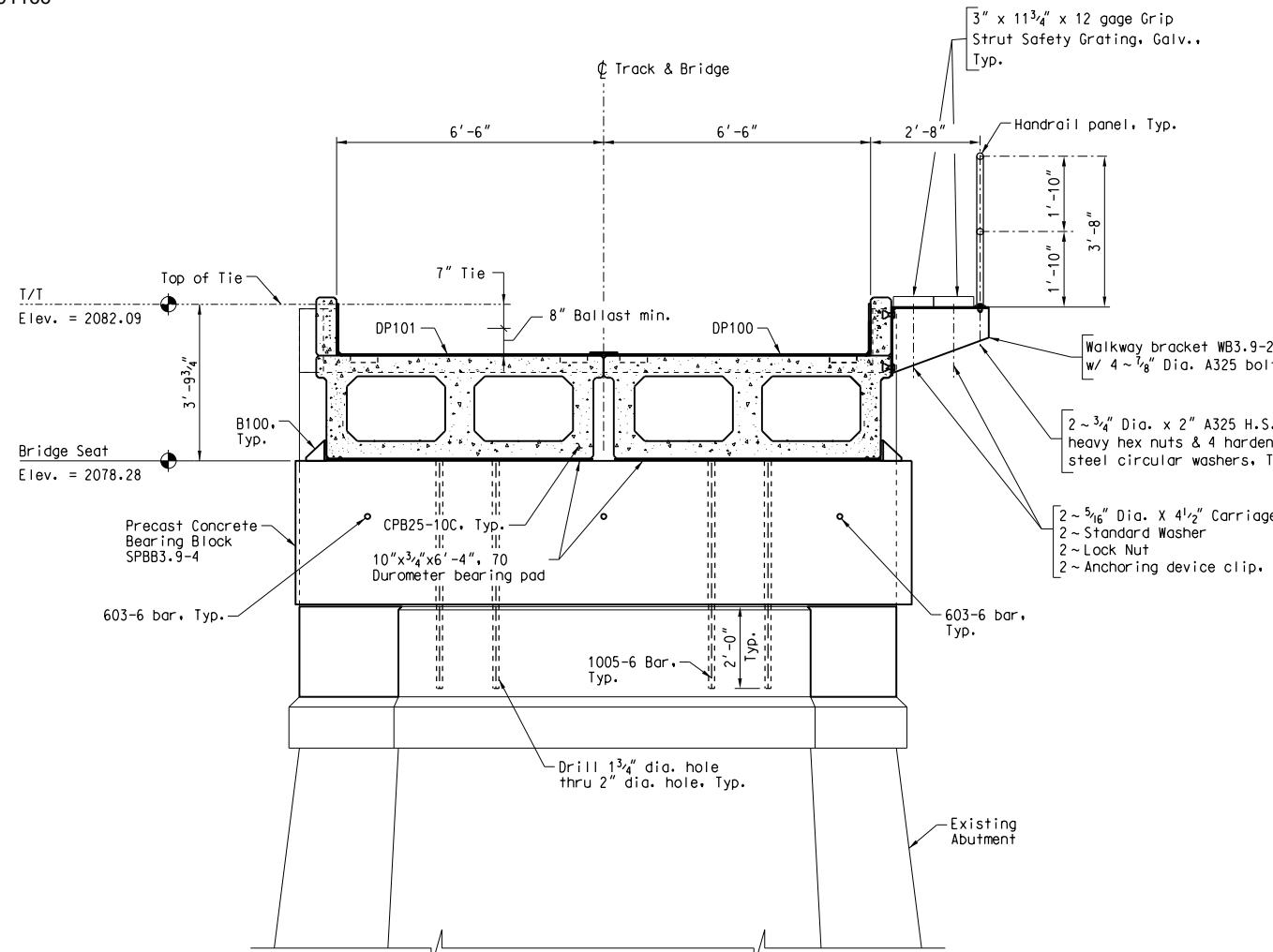
REMOVAL NOTES: Hatched portions of Existing Abutment No. 88 shall be removed. All other components of Existing Abutment to remain.

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

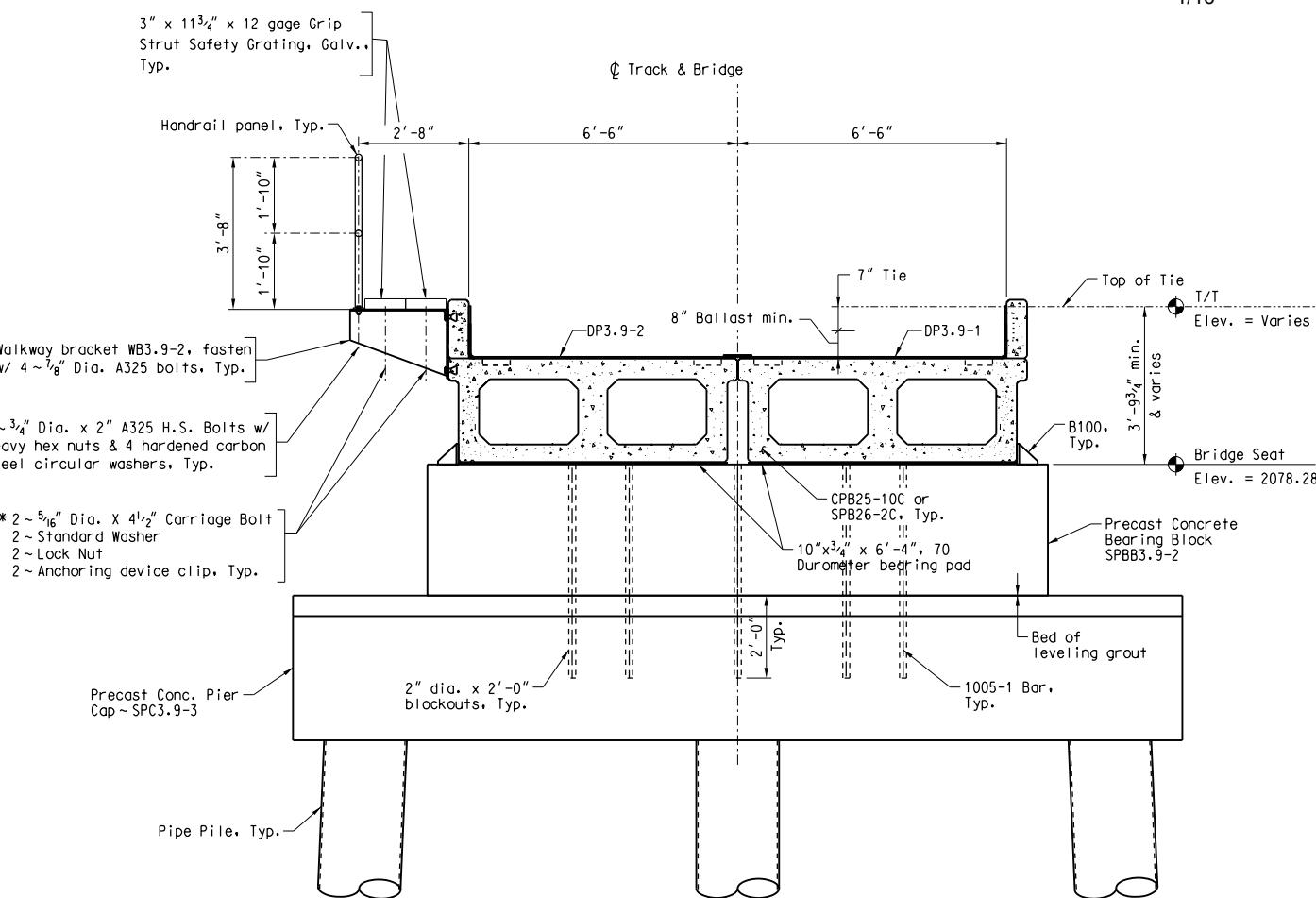
Abutment seats shall be made level at the indicated elevation prior to the placing, precast concrete bearing block SPBB3.9-4.



| | | |
|----------------|--|---------------------------------|
| DES: AAN | BNSF RAILWAY BRIDGE ENGINEERING KANSAS CITY, KS APPROVED: <i>Ron G Berry</i> ASST. DIRECTOR STRUCTURES DESIGN | SANDPOINT JCT. TO LAKESIDE JCT. |
| DRAWN: CDP | | BRIDGE NUMBER 3.9 |
| CHECK: MAF | | OVER LAKE PEND OREILLE |
| DATE: 04/22/09 | | NEAR SANDPOINT, ID |
| AUTH: A090024 | | EXISTING ABUT. NO. 88 |
| LINE SEG: 0045 | | MODIFICATION DETAILS |

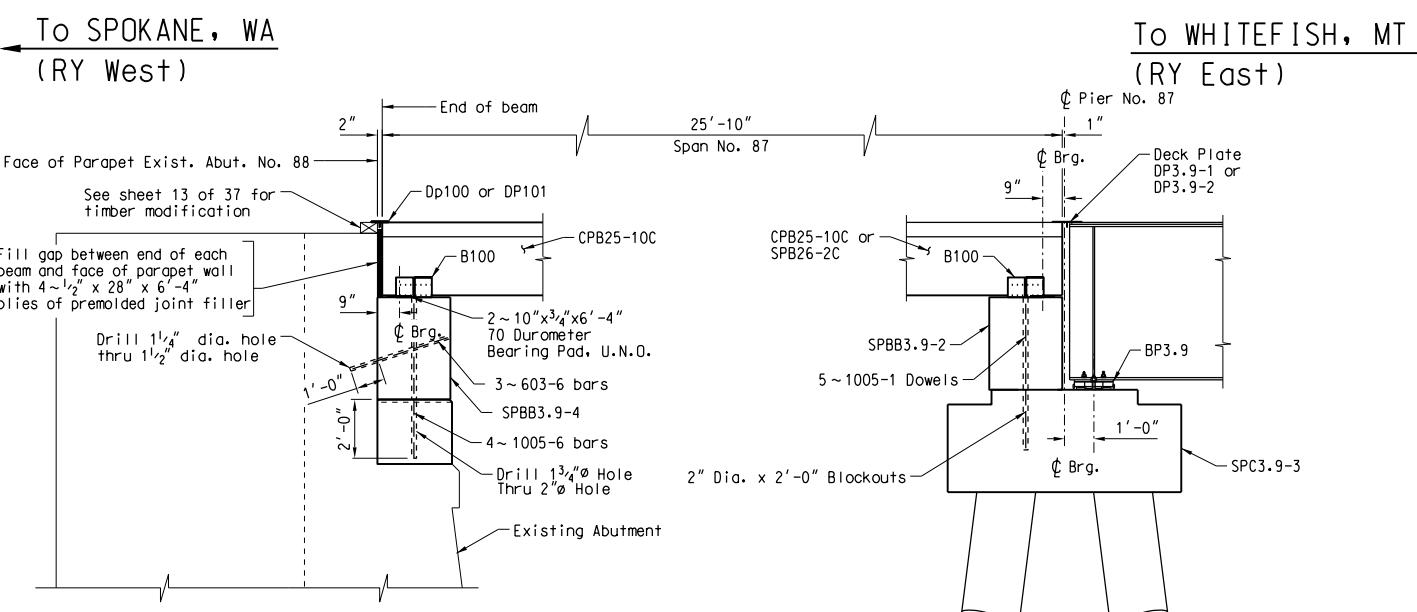
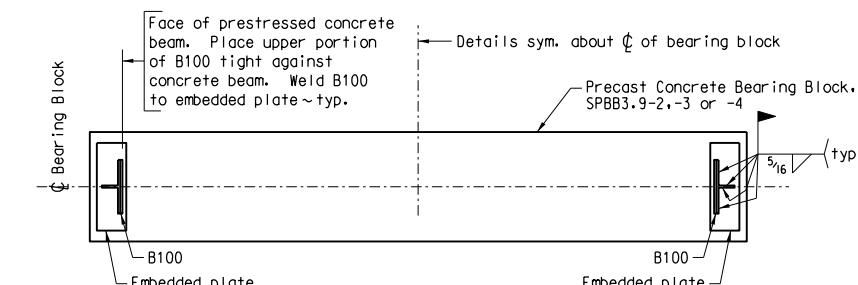
TYPICAL SECTION AT ABUT. NO. 88

Looking Railway West

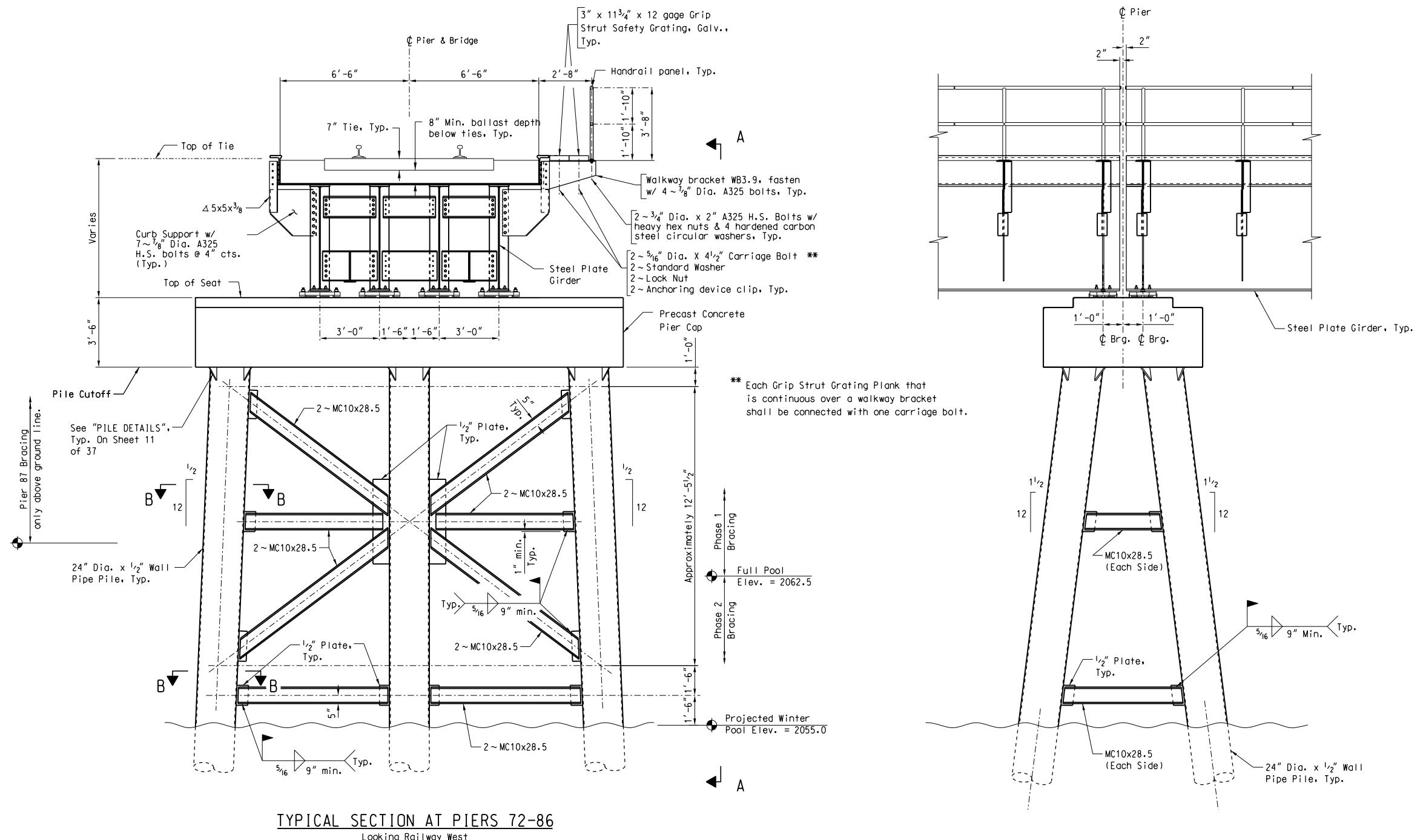
TYPICAL SECTION AT PIER NO. 87 & 72

Looking Railway East
Pier 87 shown Pier 72 similar and opposite hand
(CB3.9's & Bracing omitted from view)

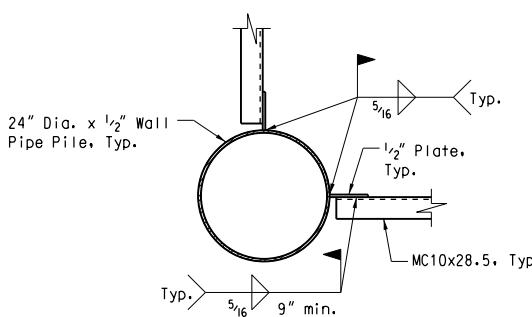
* Each Grip Strut Grating Plank that is continuous over a walkway bracket shall be connected with one carriage bolt.

ABUT. NO. 88PIER NO. 87 & 72
Pier 87 shown Pier 72 similar and opposite handBEARING BLOCK ELEVATIONTYPICAL B100 ATTACHMENT DETAILS

ISSUED FOR CONSTRUCTION
4-22-09



TYPICAL SECTION AT PIERS 72-86
Looking Railway West



SECTION B-B

ELEVATION A-A

- Notes:

 1. Pier 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. 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.



HANSON
Hanson Professional Services Inc.

Hanson Professional Services Inc.

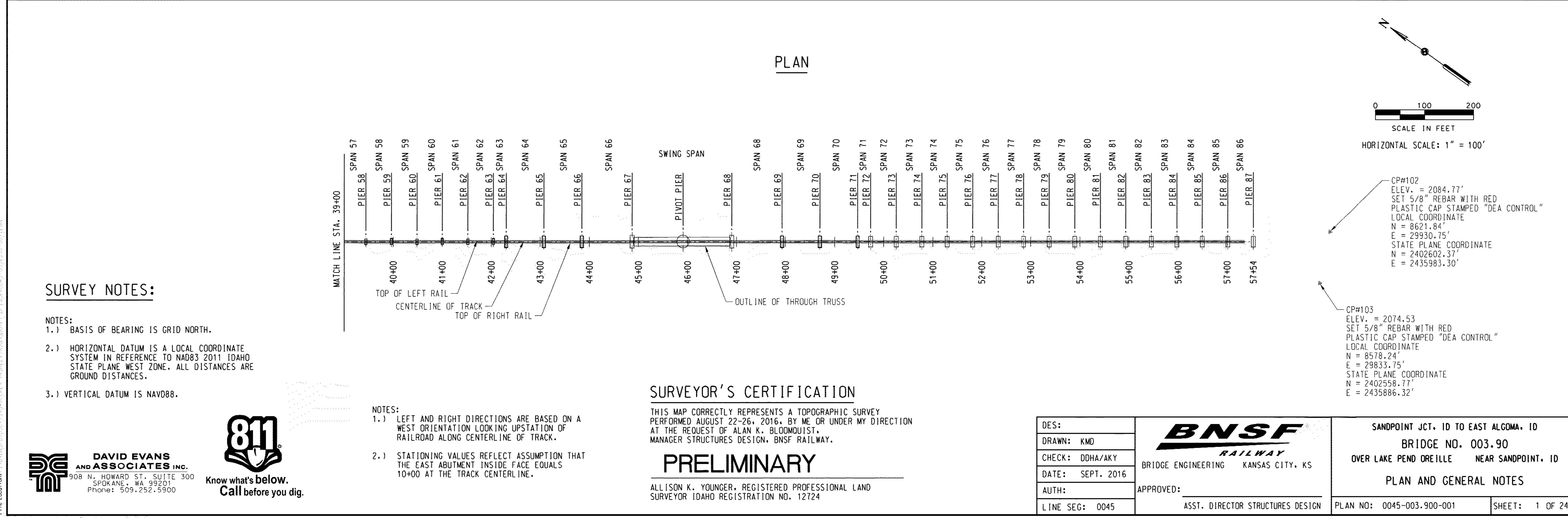
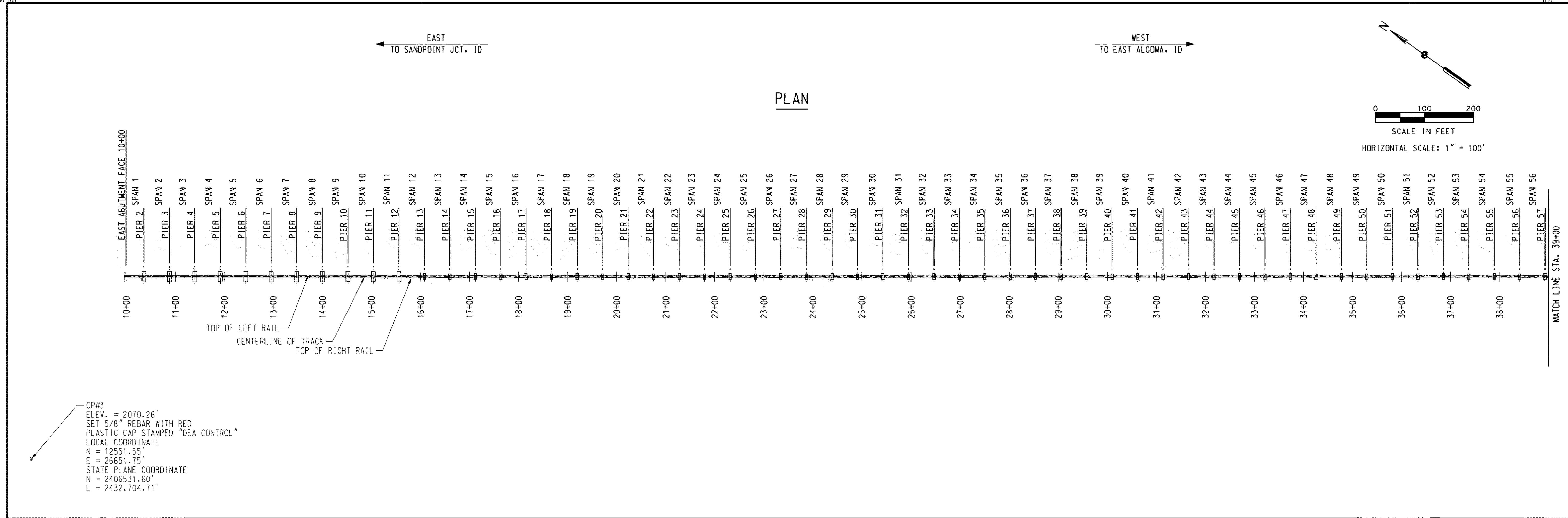
**ISSUED FOR
CONSTRUCTION**



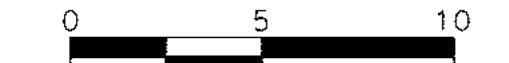
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: Ron G Berry
ASST. DIRECTOR STRUCTURES DESIGN

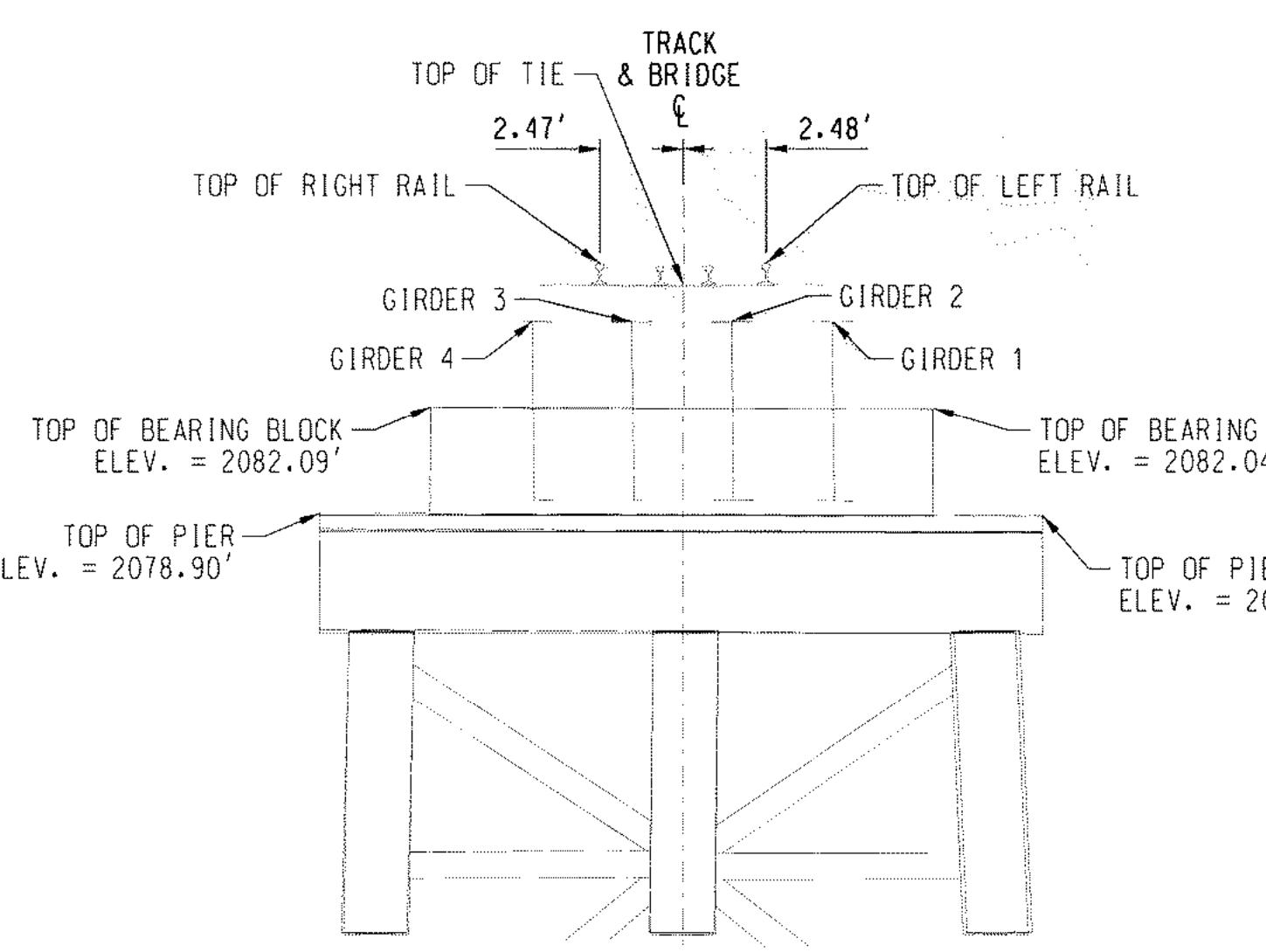
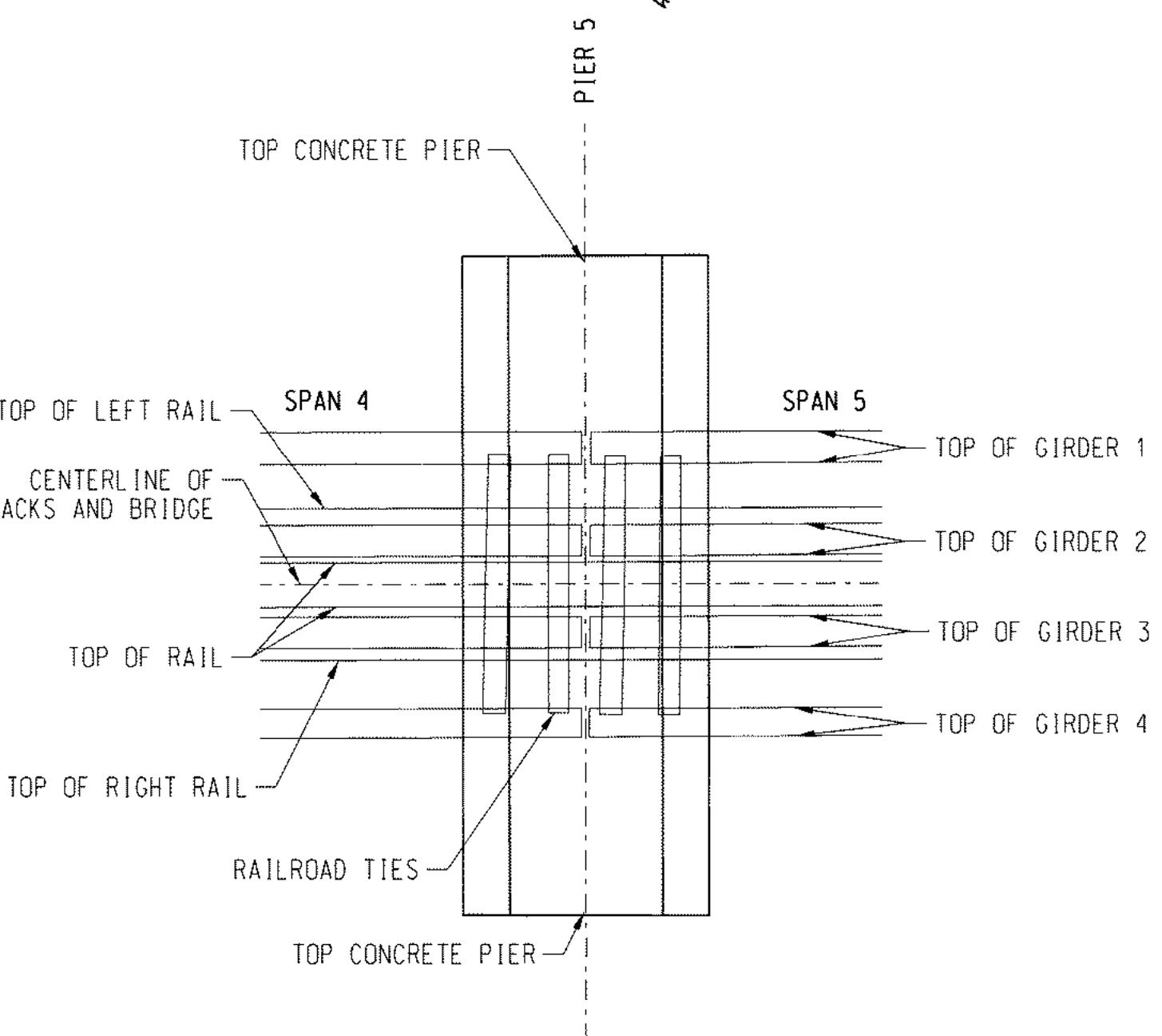
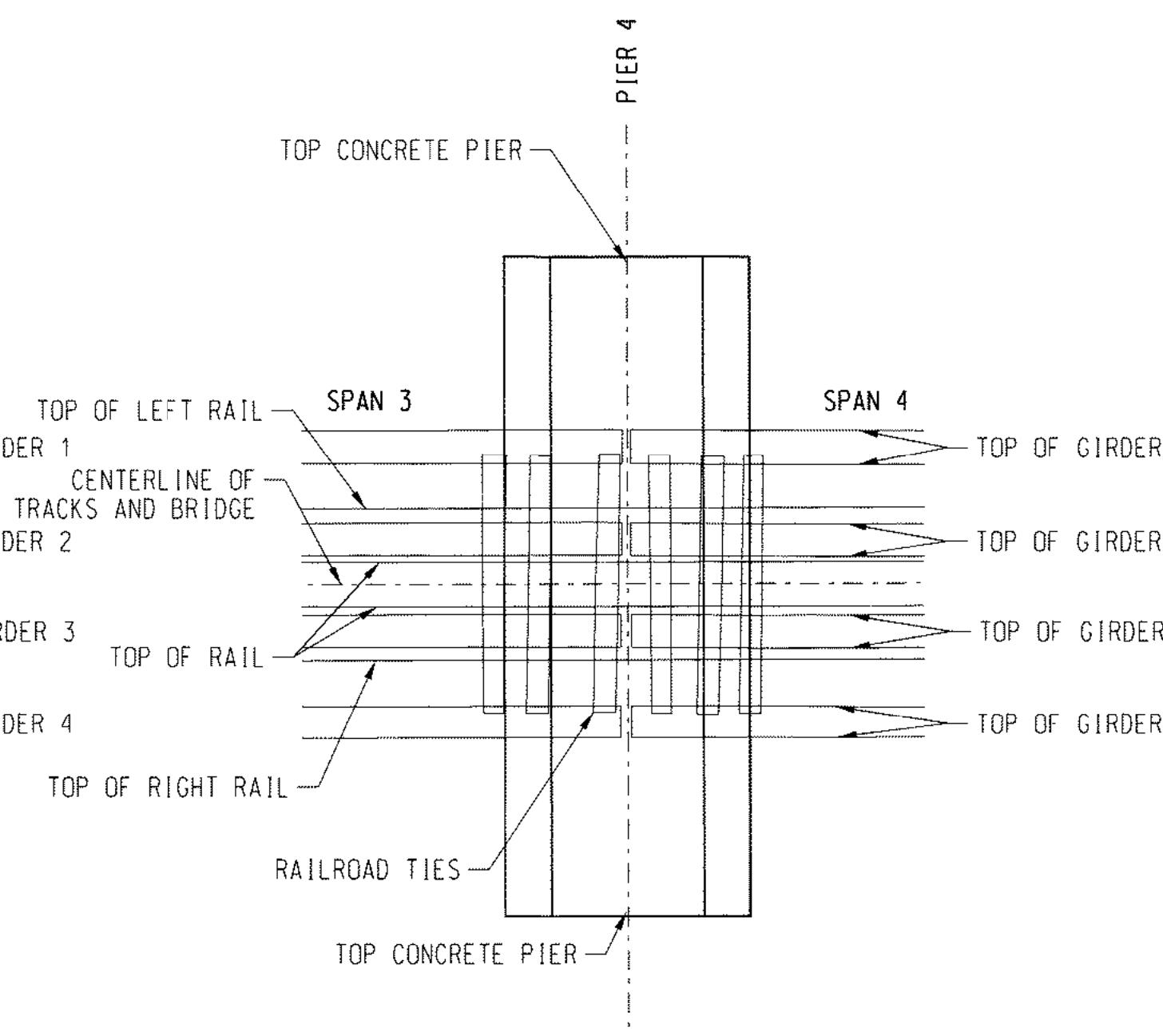
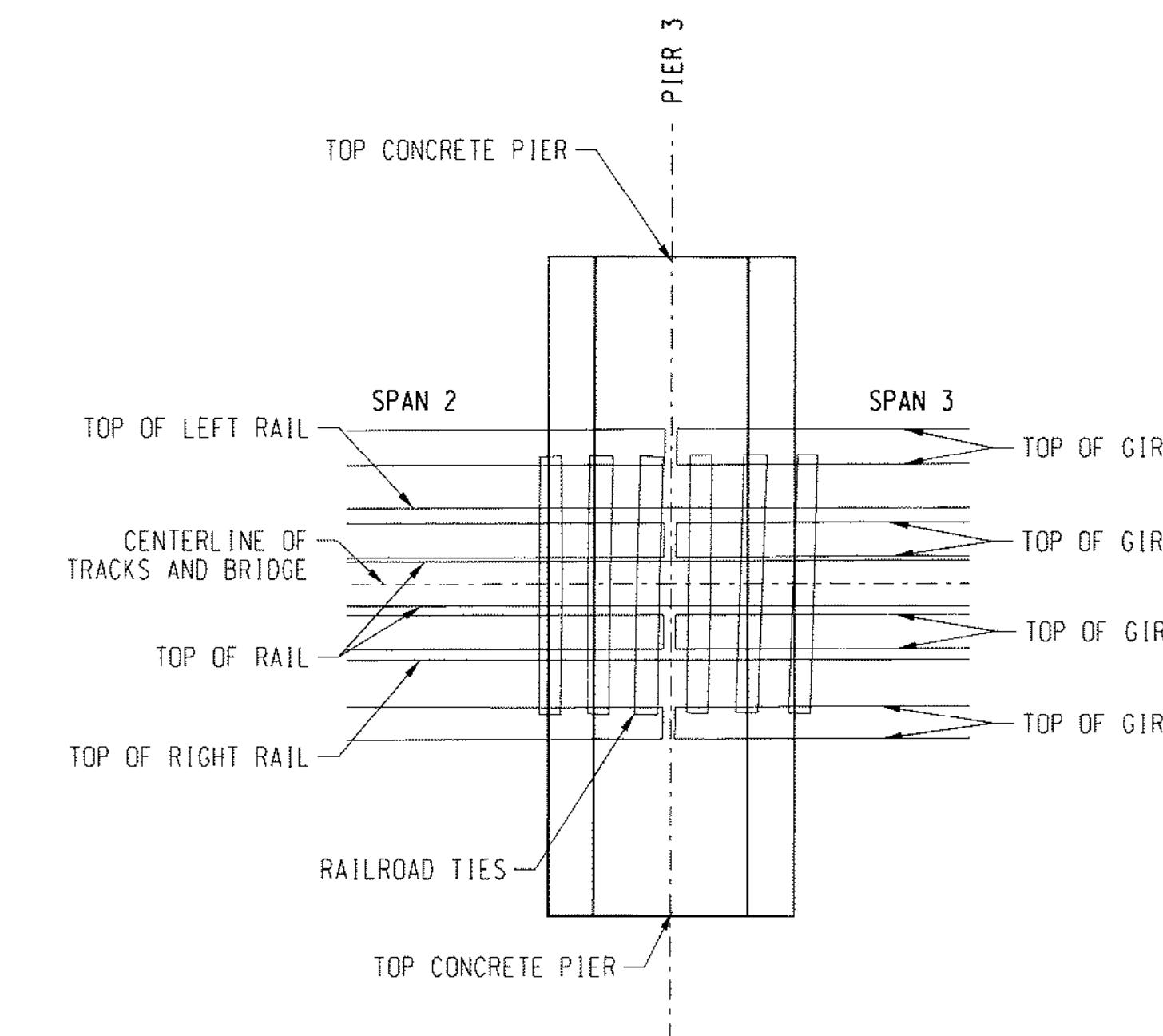
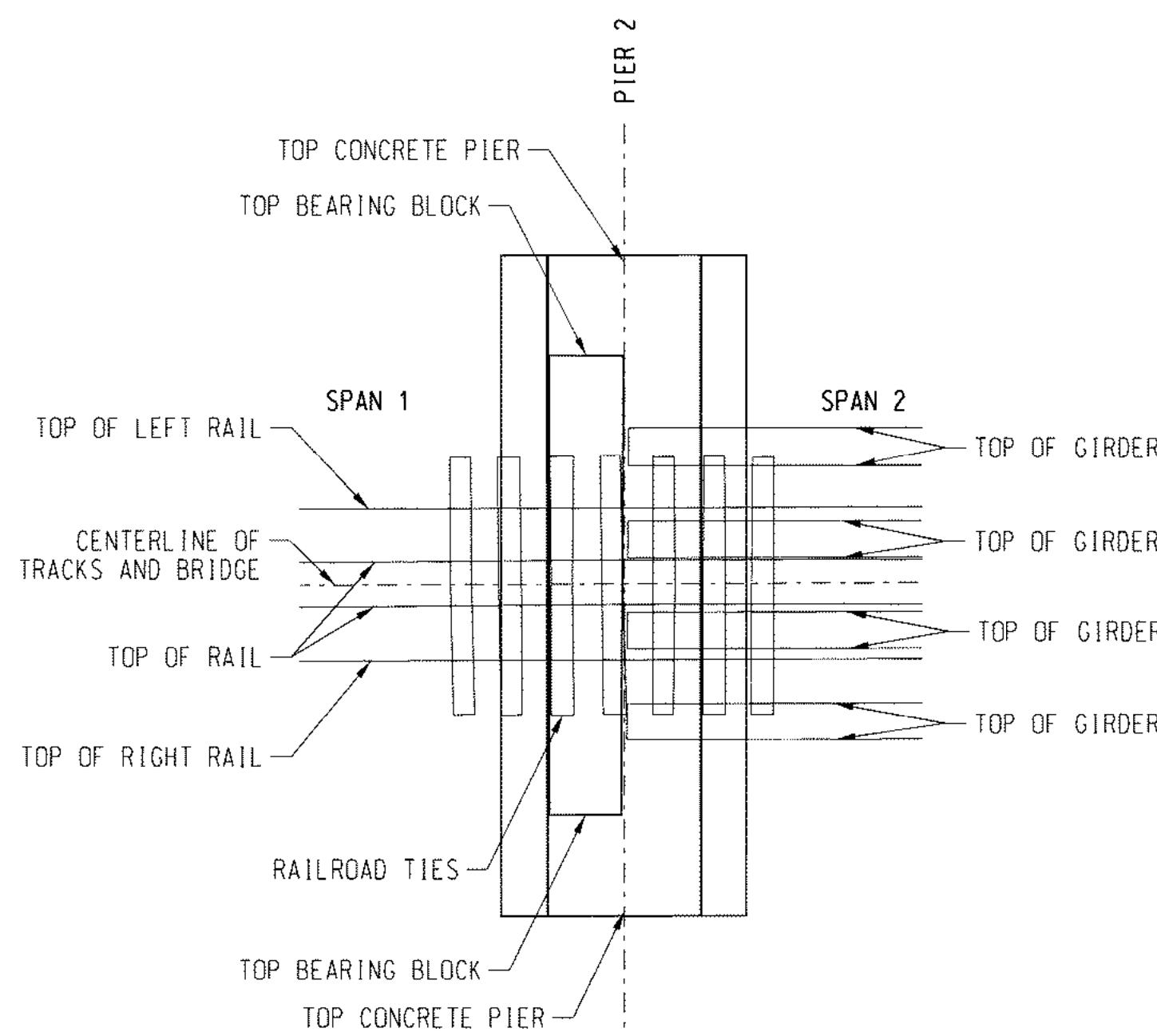
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE
NEAR SANDPOINT, ID

TYPICAL SECTIONS ~ PIERS 72-86

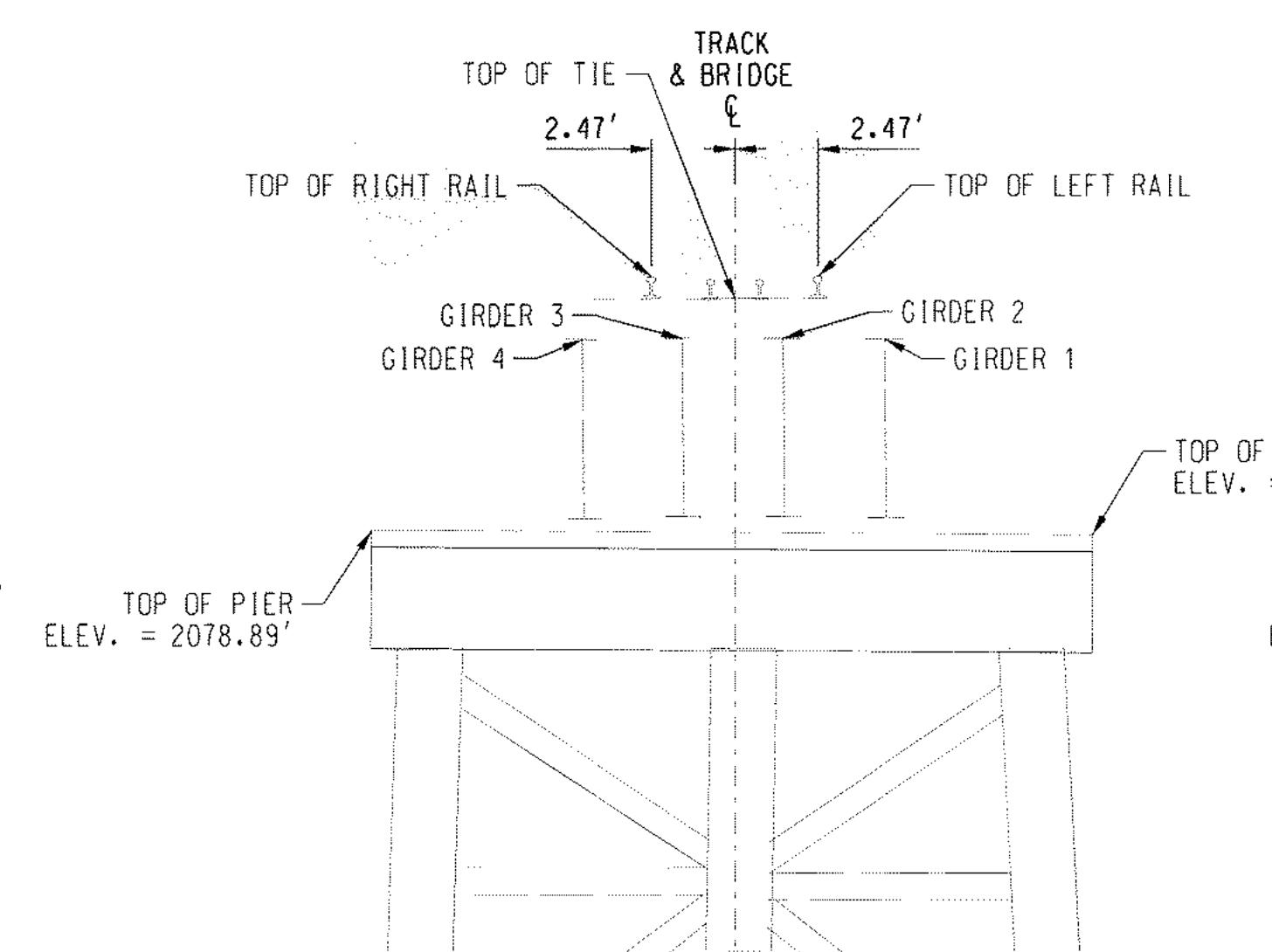


PIER PLAN & PROFILES

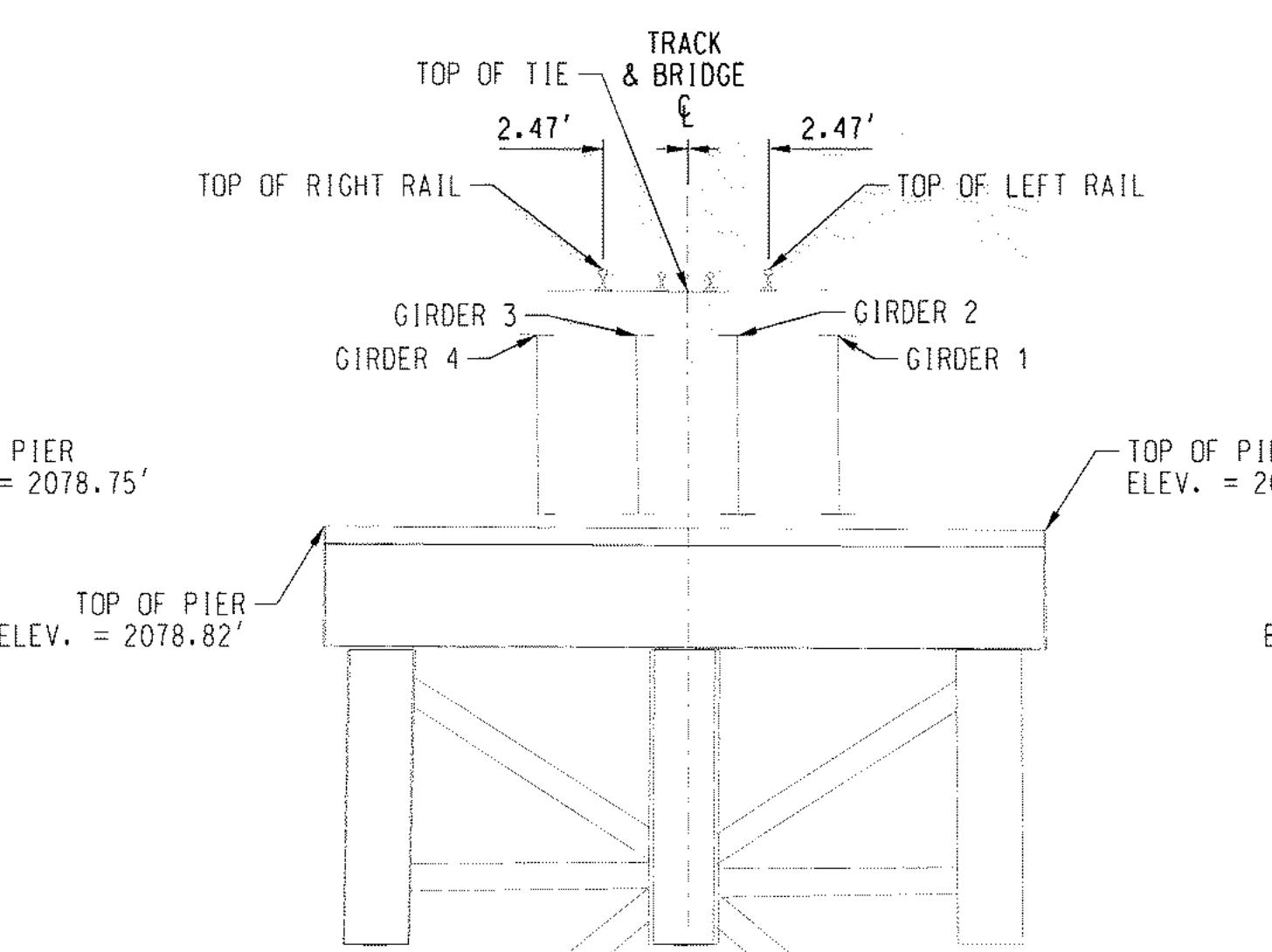
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 2
LOOKING RAILROAD EAST

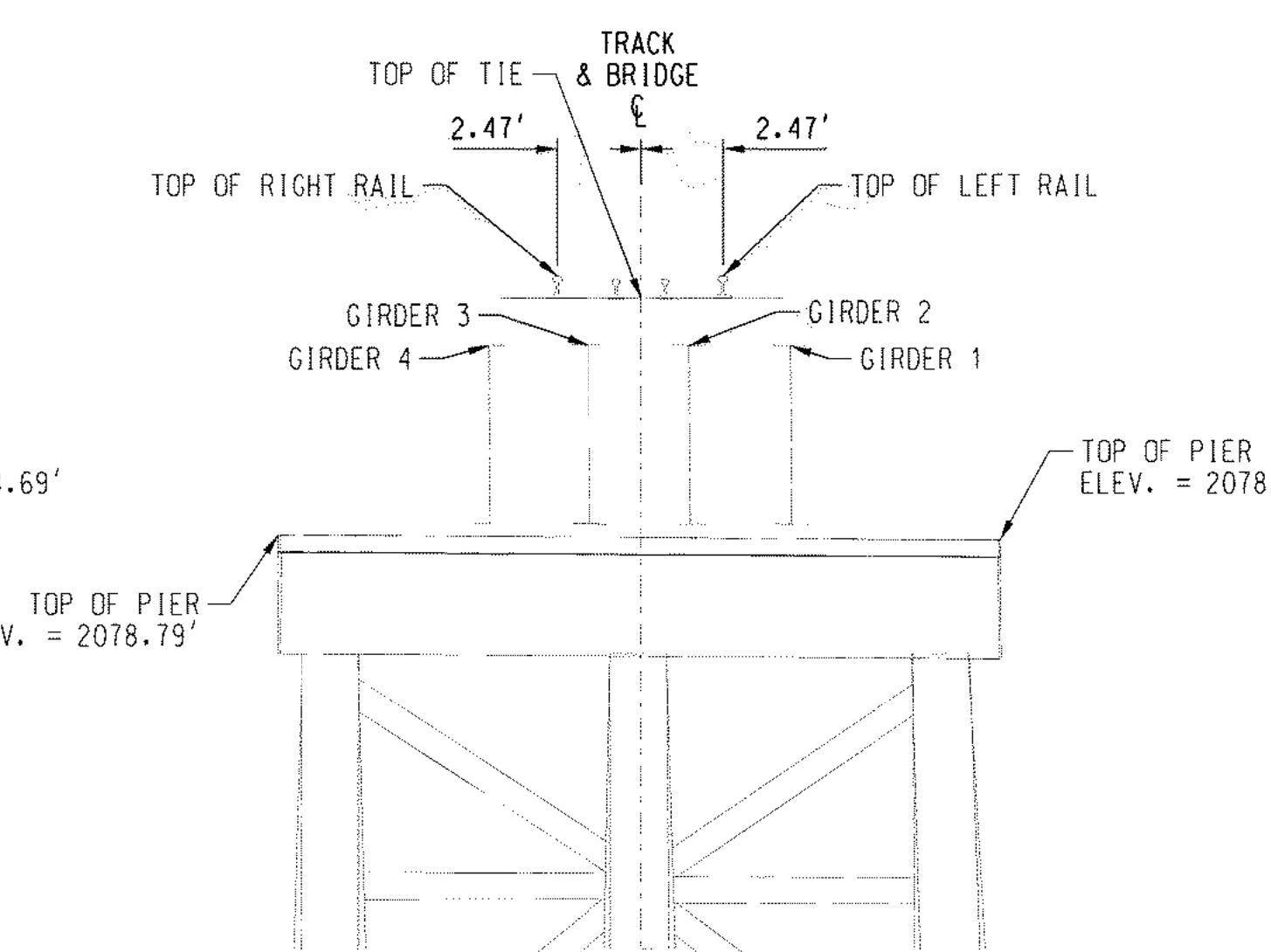
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.39' | 2085.76' | 2086.39' |

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' |

- 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

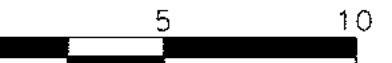
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-002 SHEET: 2 OF 24

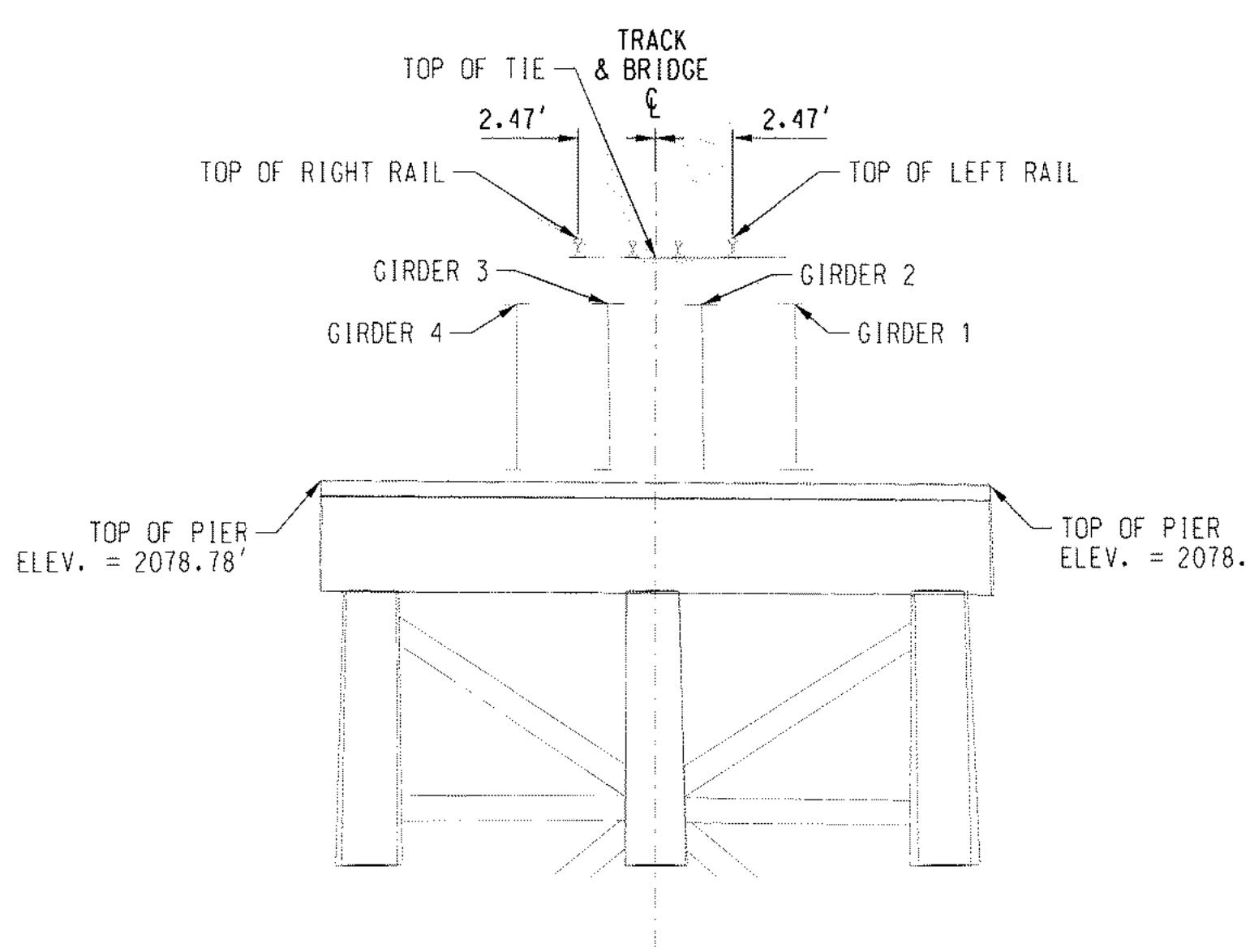
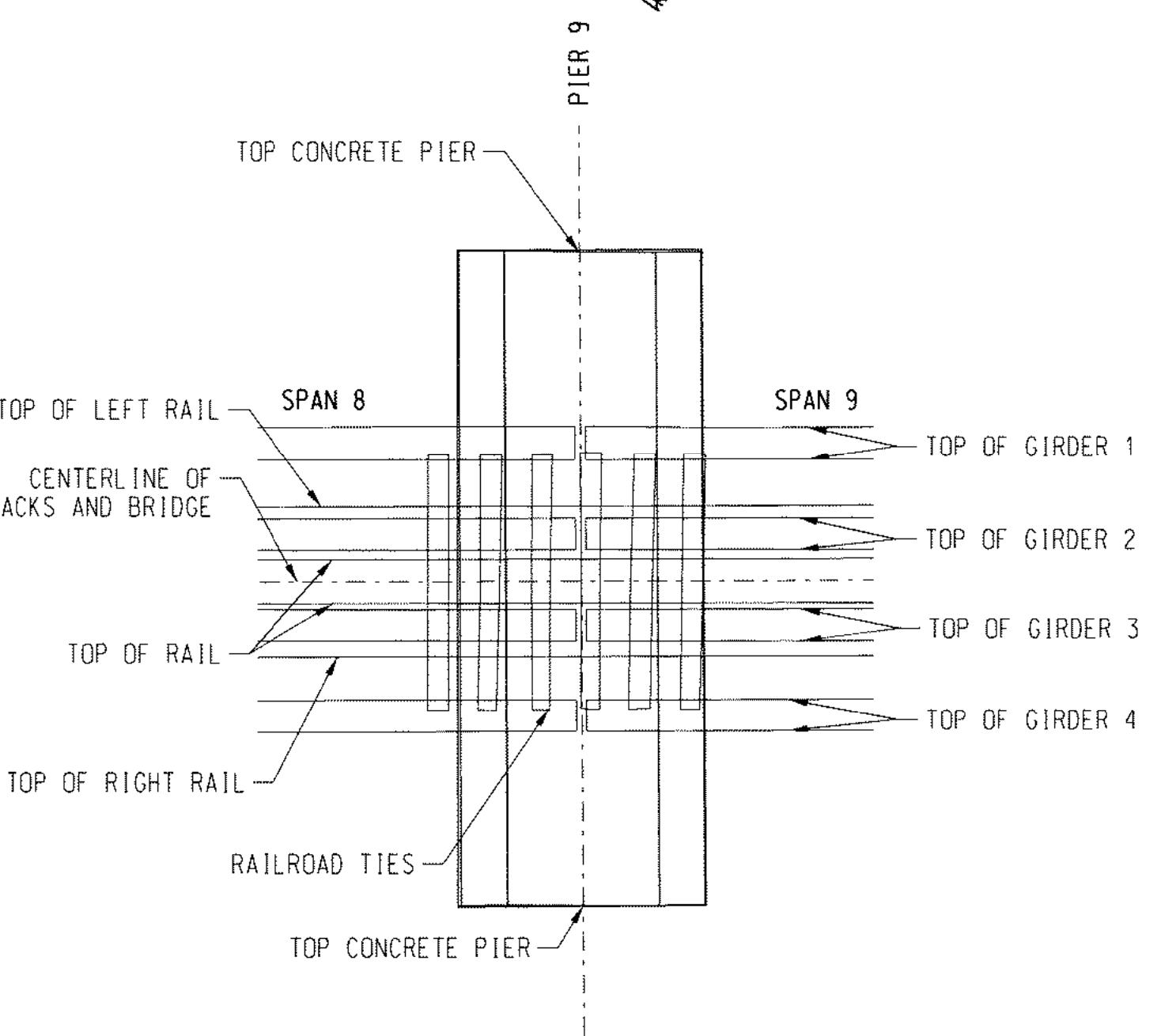
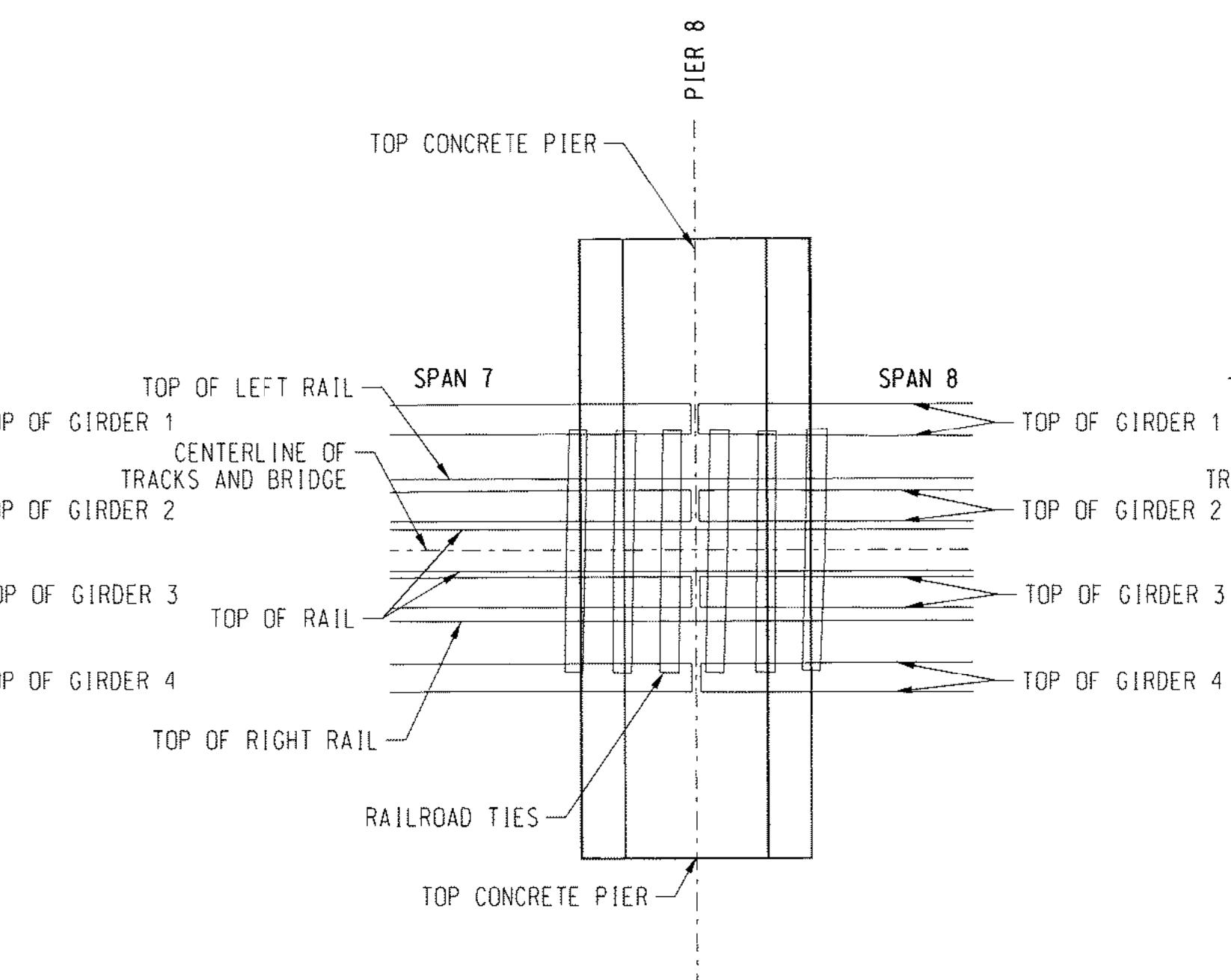
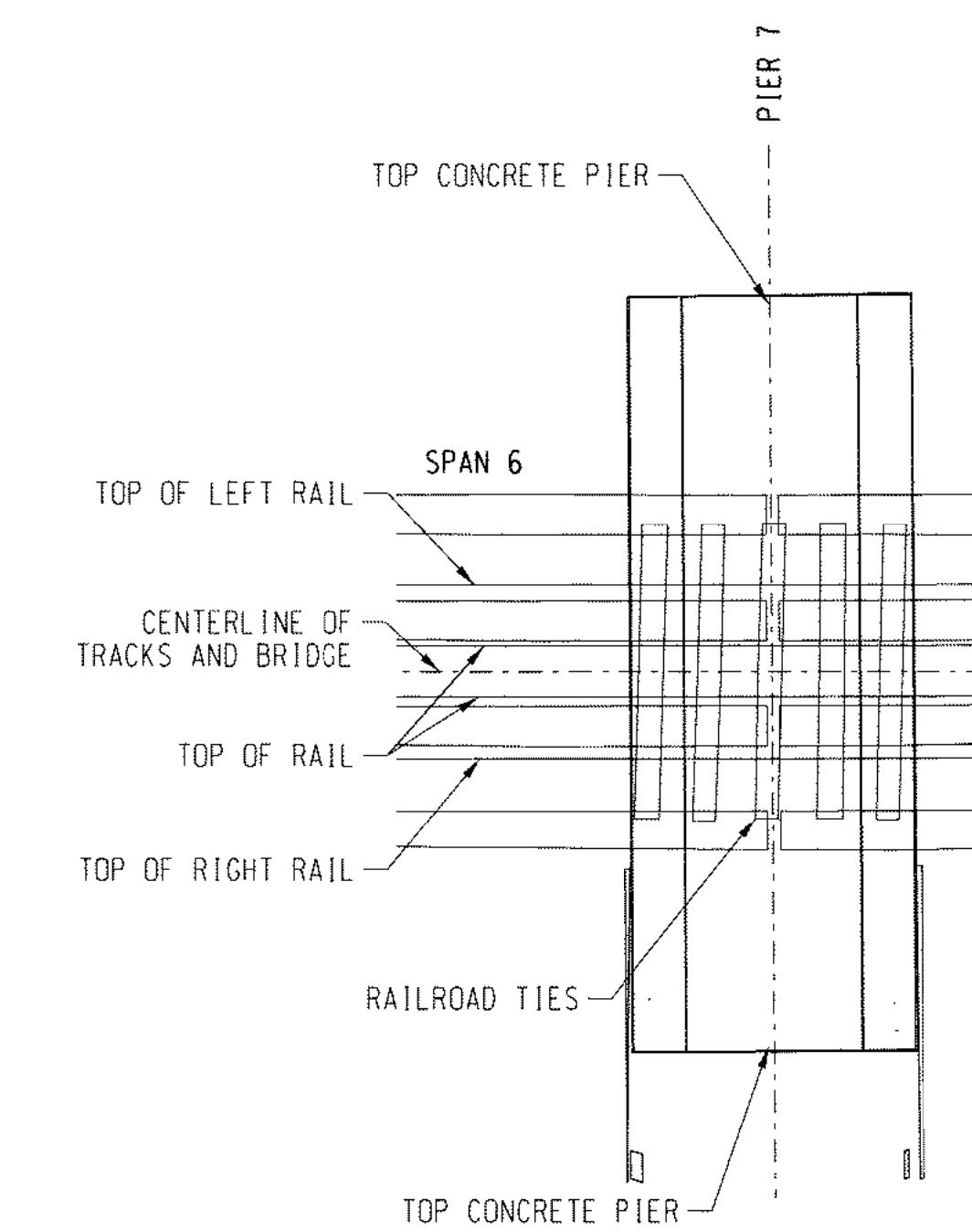
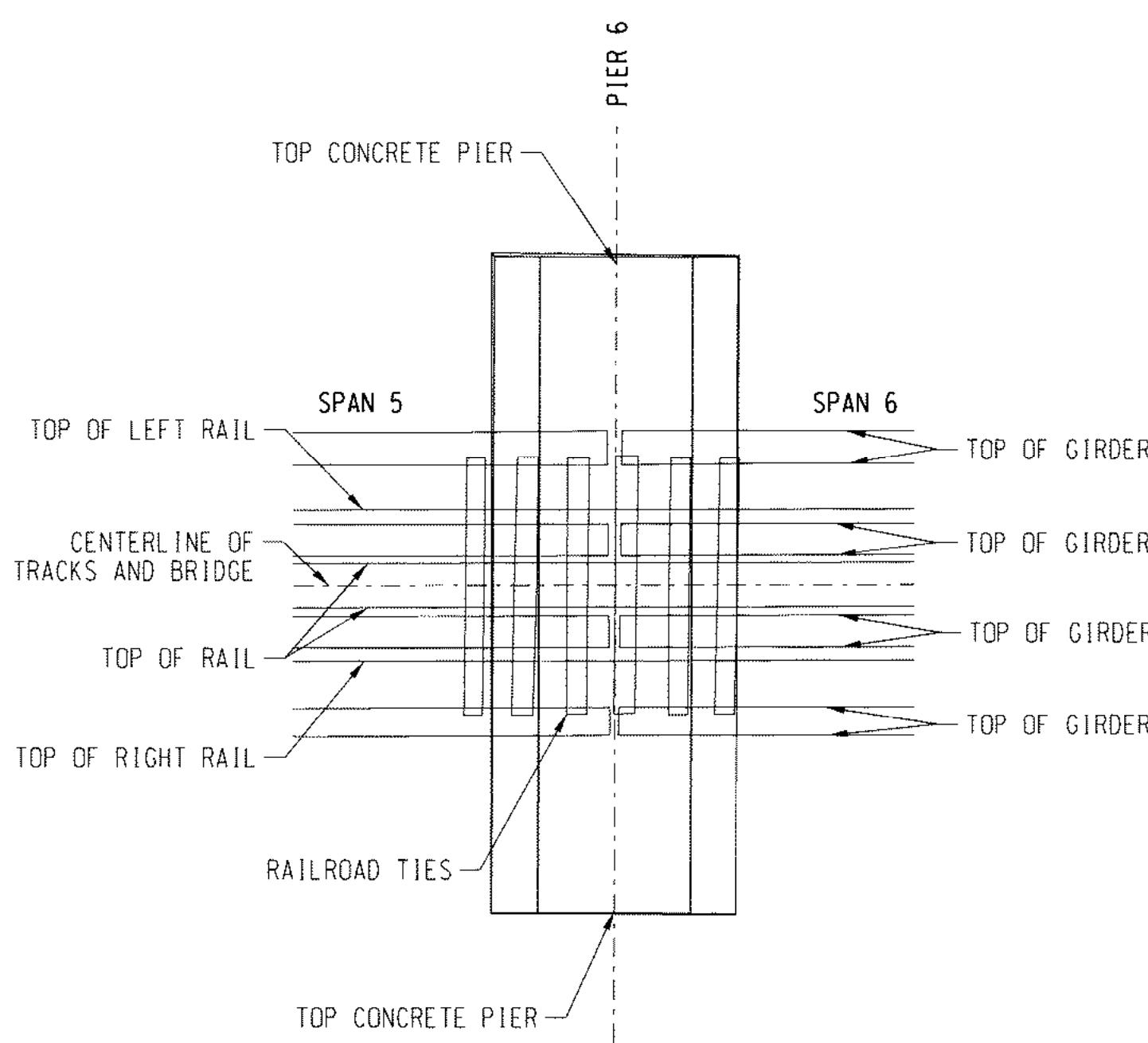


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

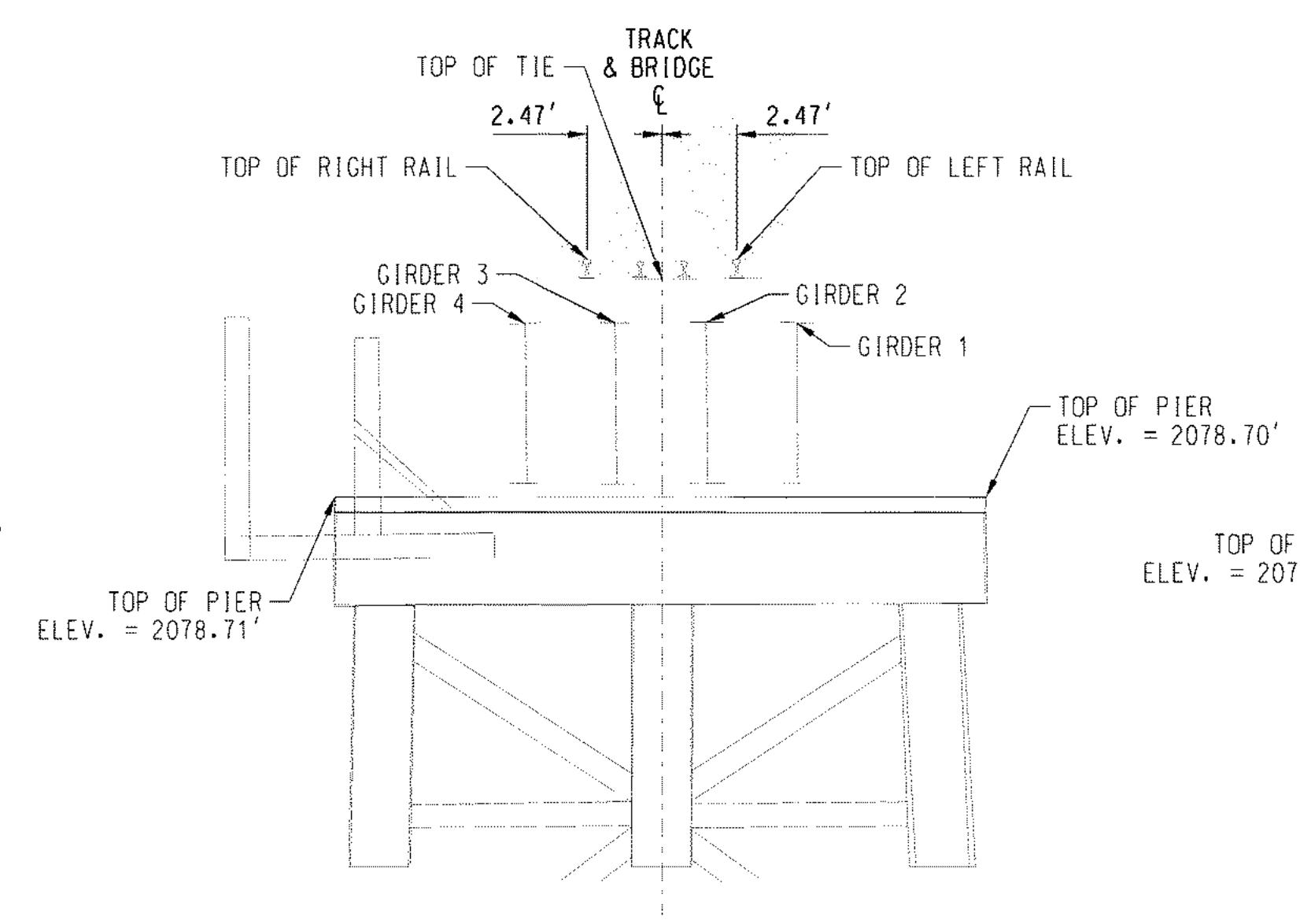
811
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

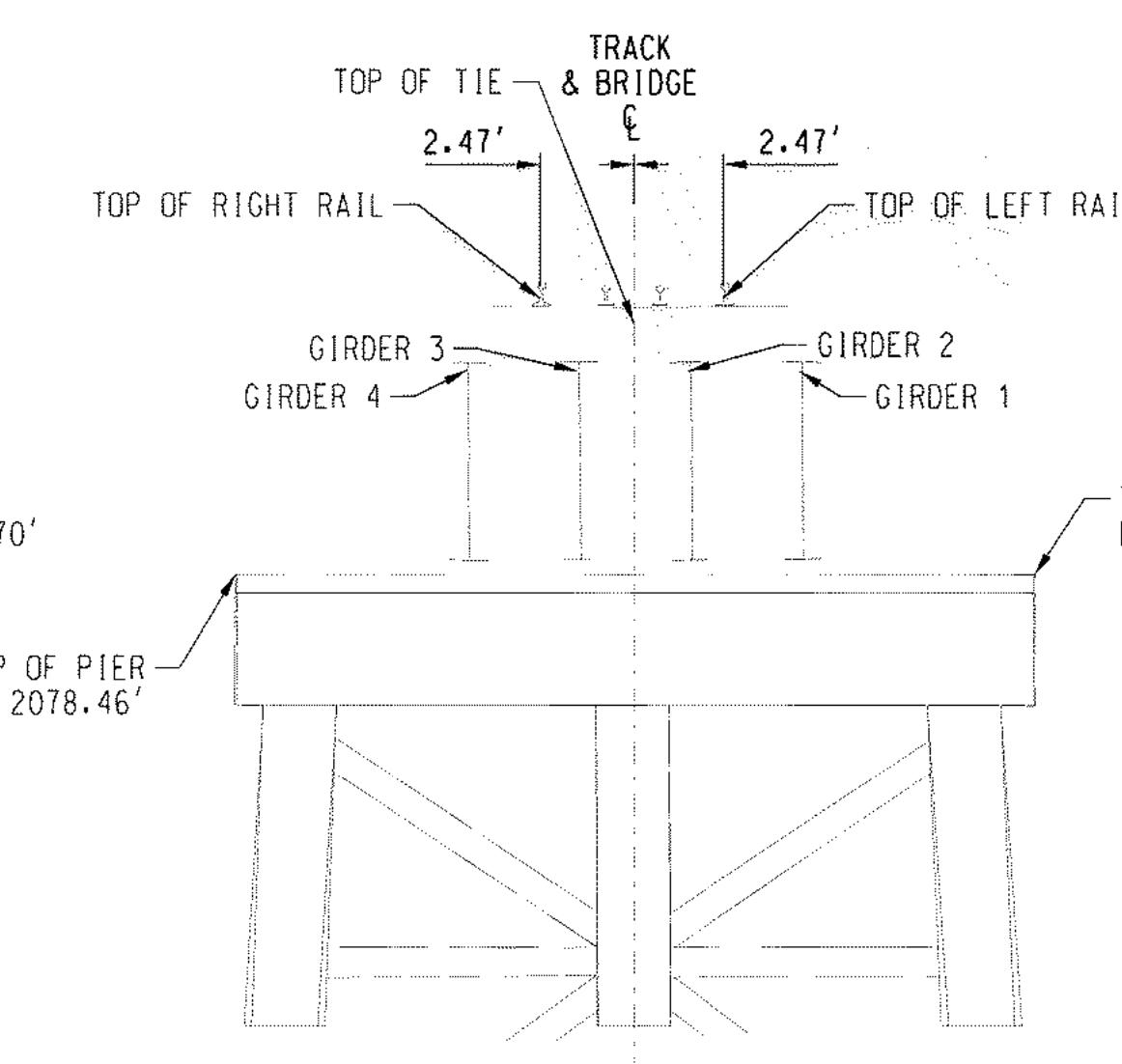
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 6
LOOKING RAILROAD EAST

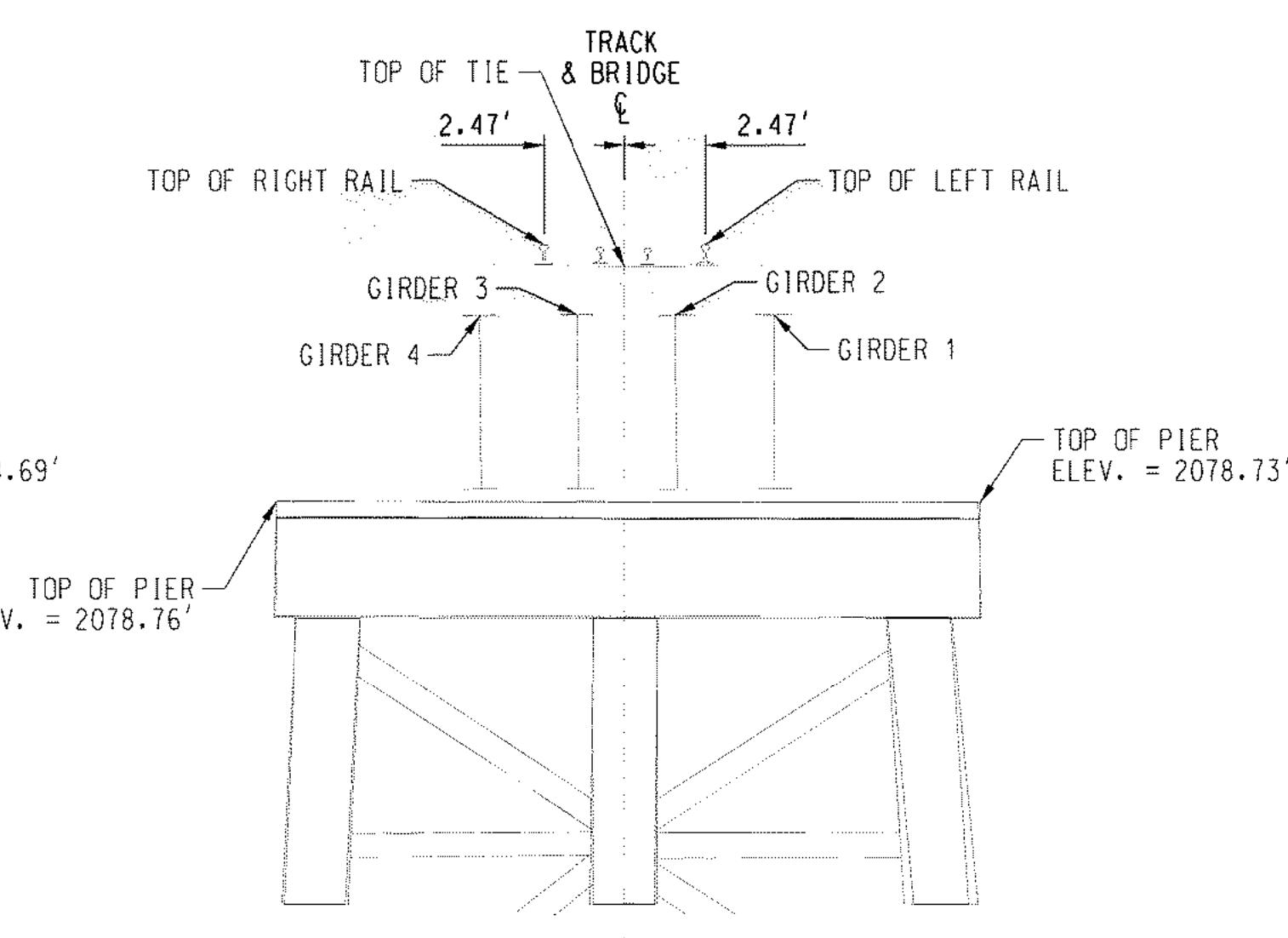
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.60' | 2085.95' | 2086.60' |

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' |

- 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

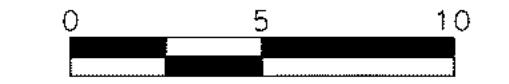
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-003 SHEET: 3 OF 24

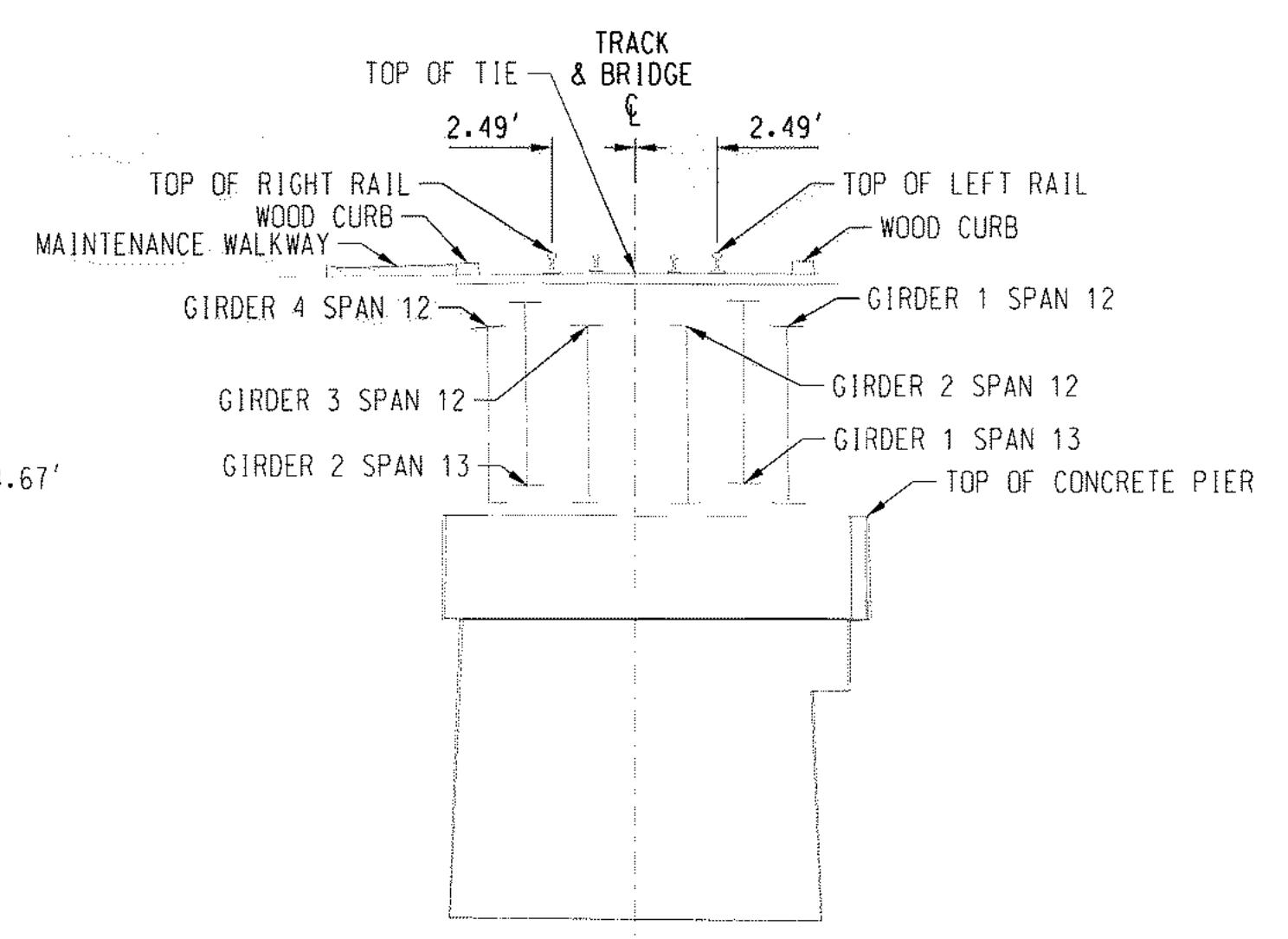
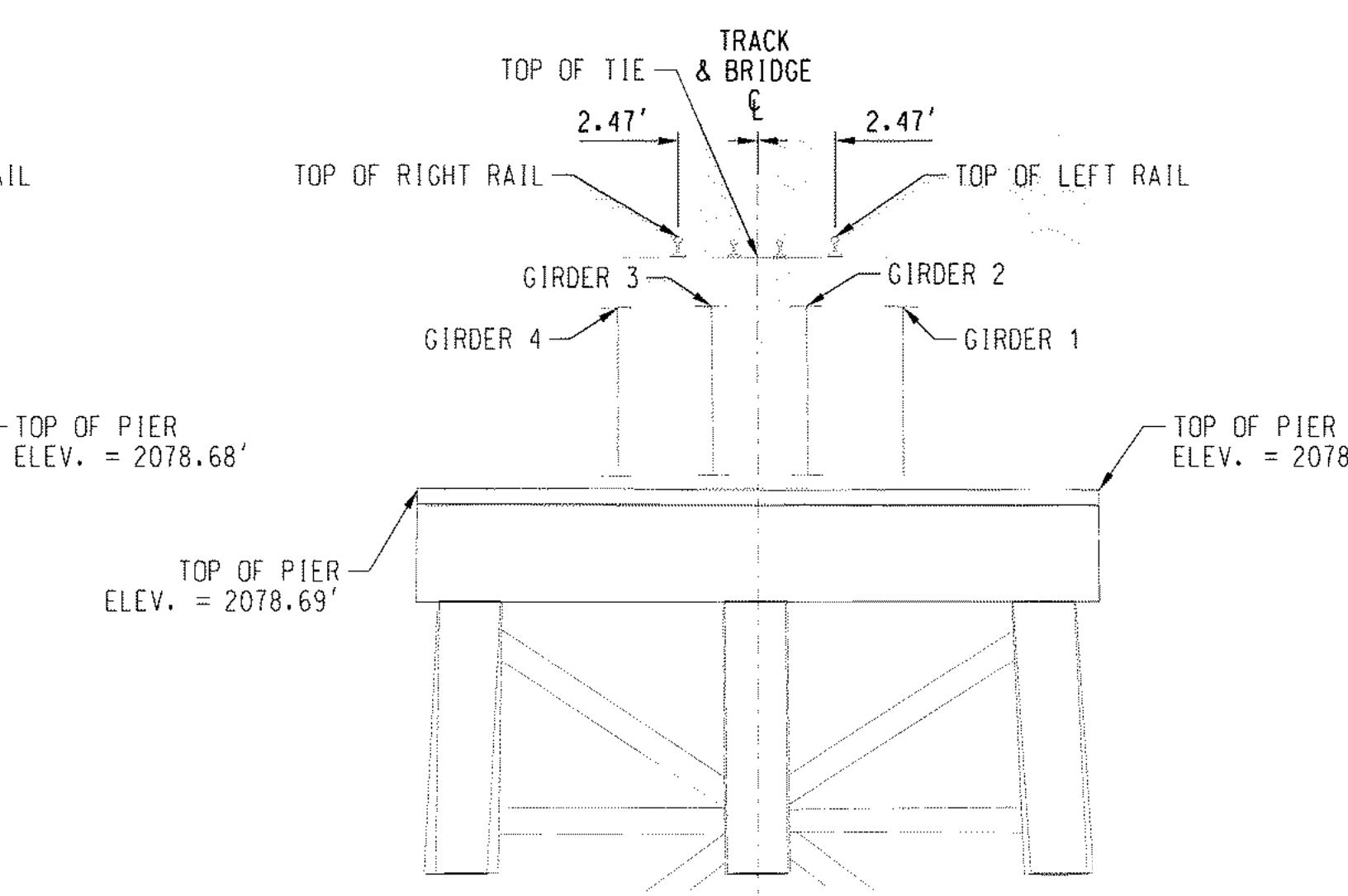
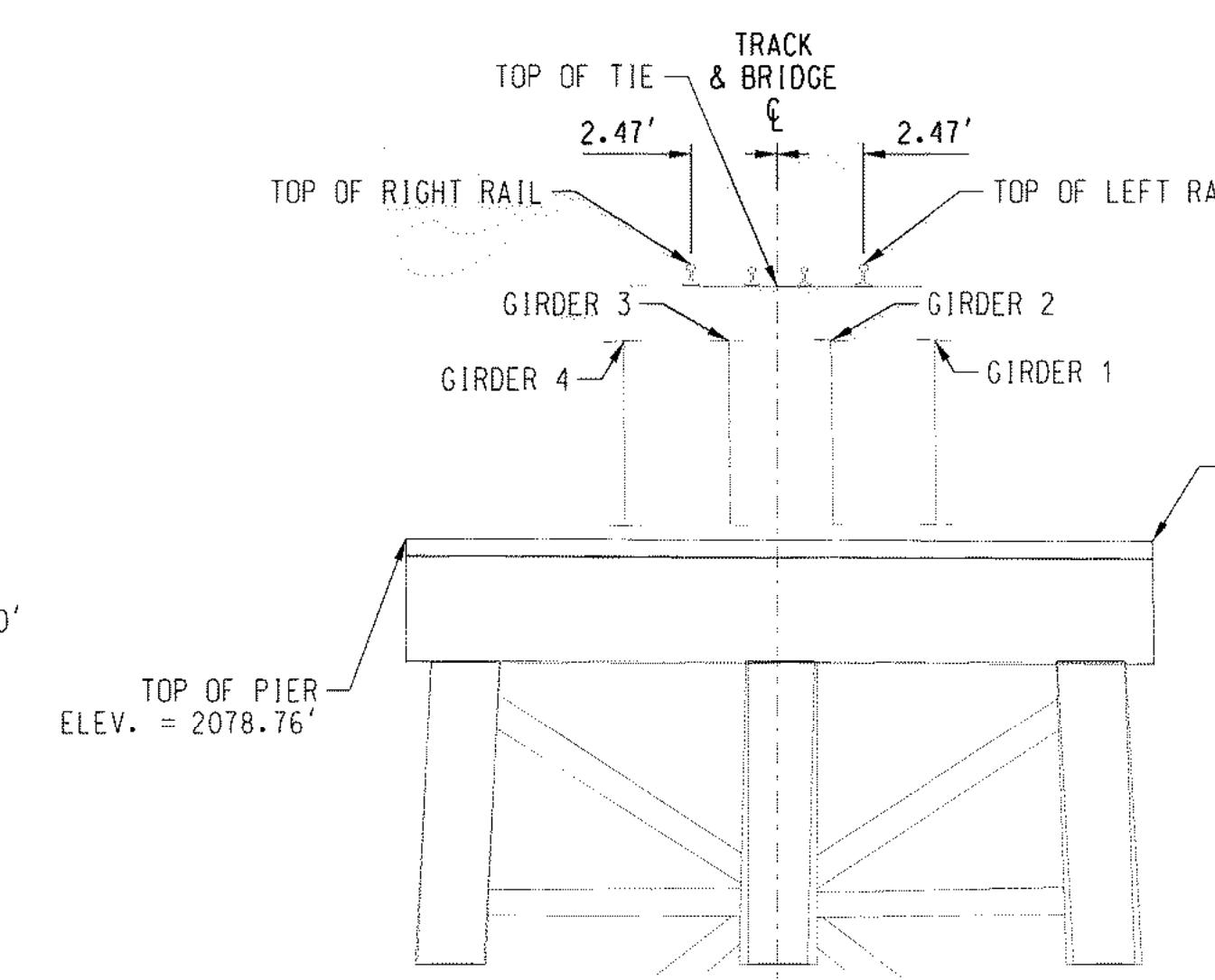
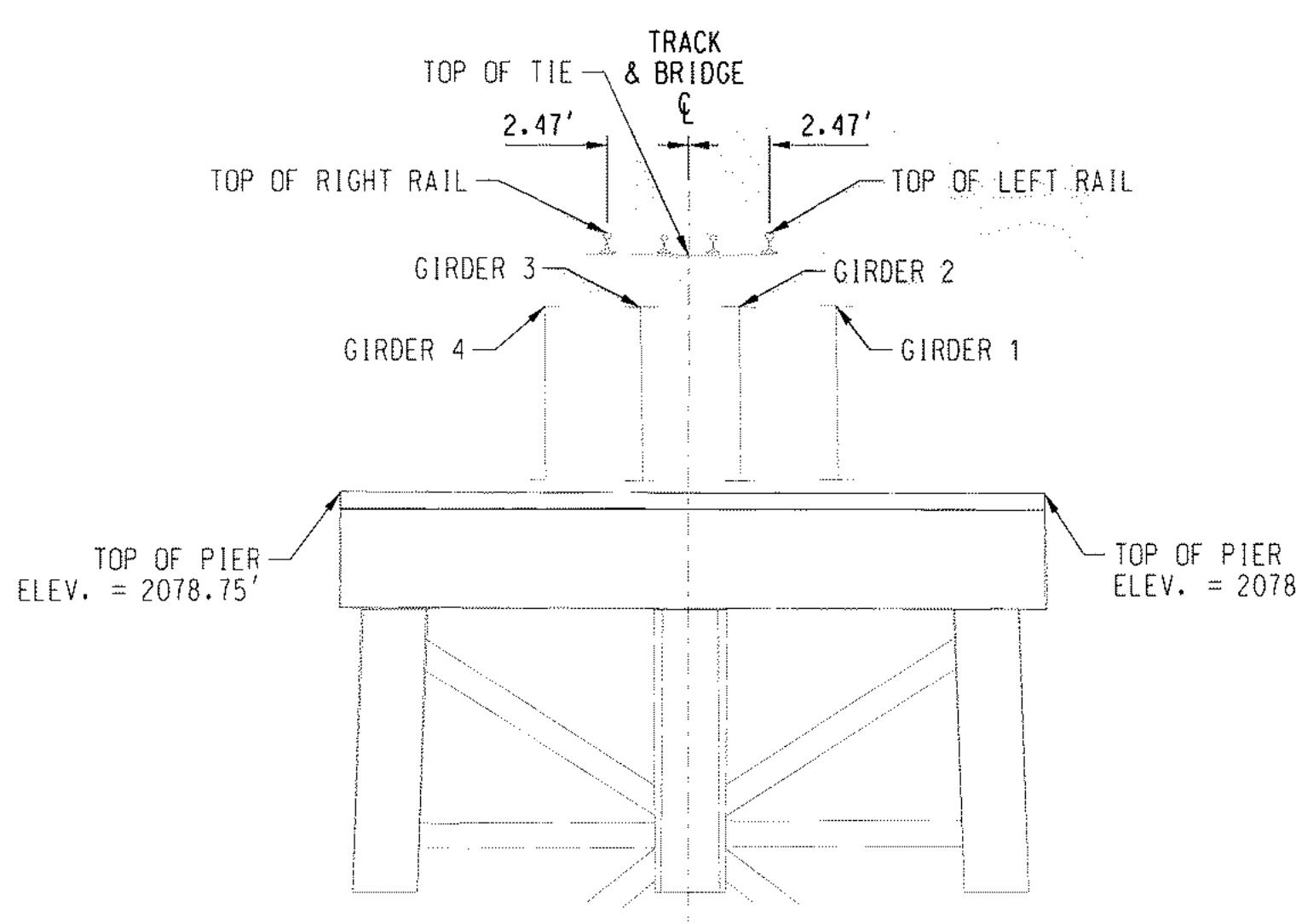
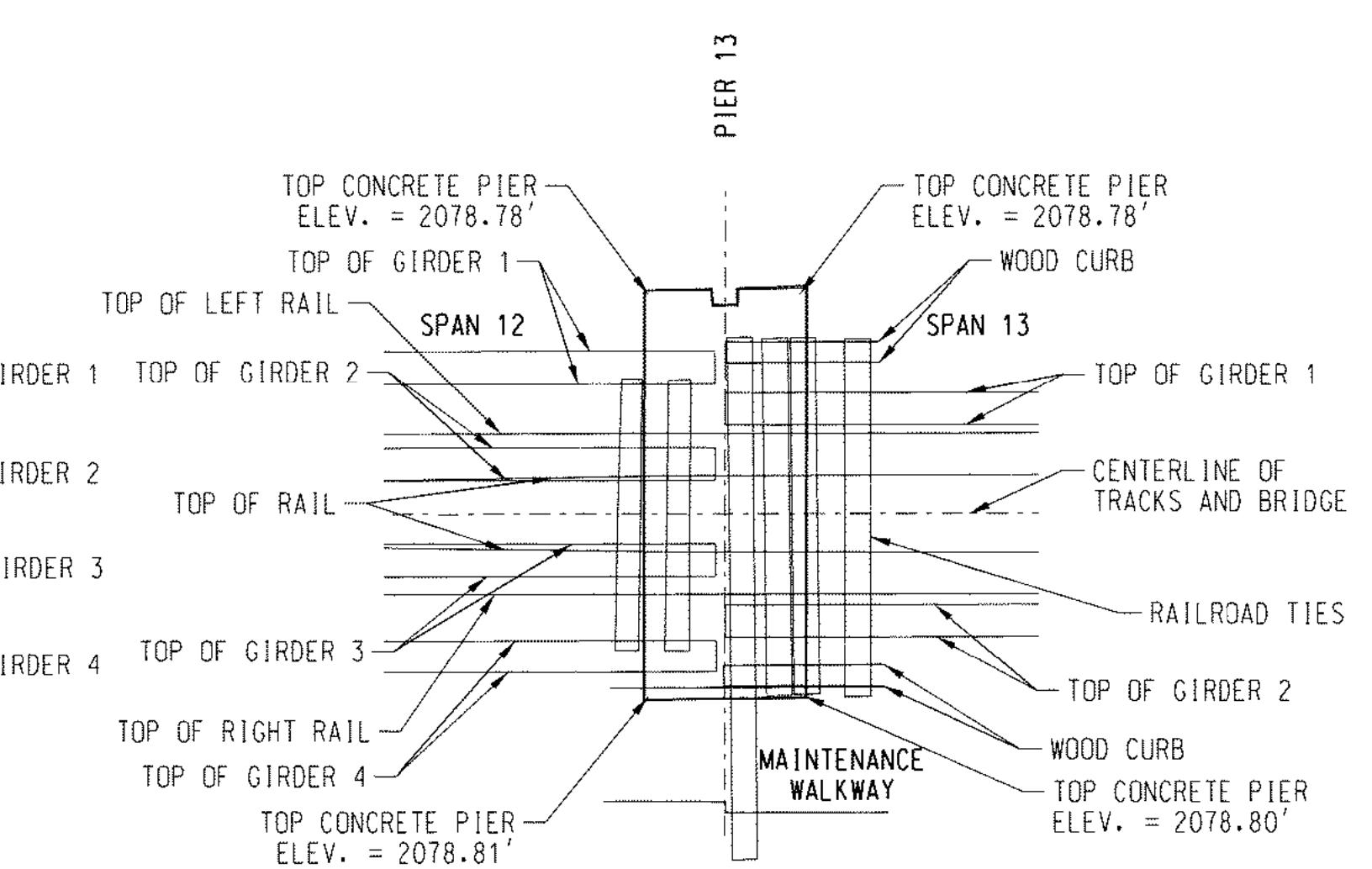
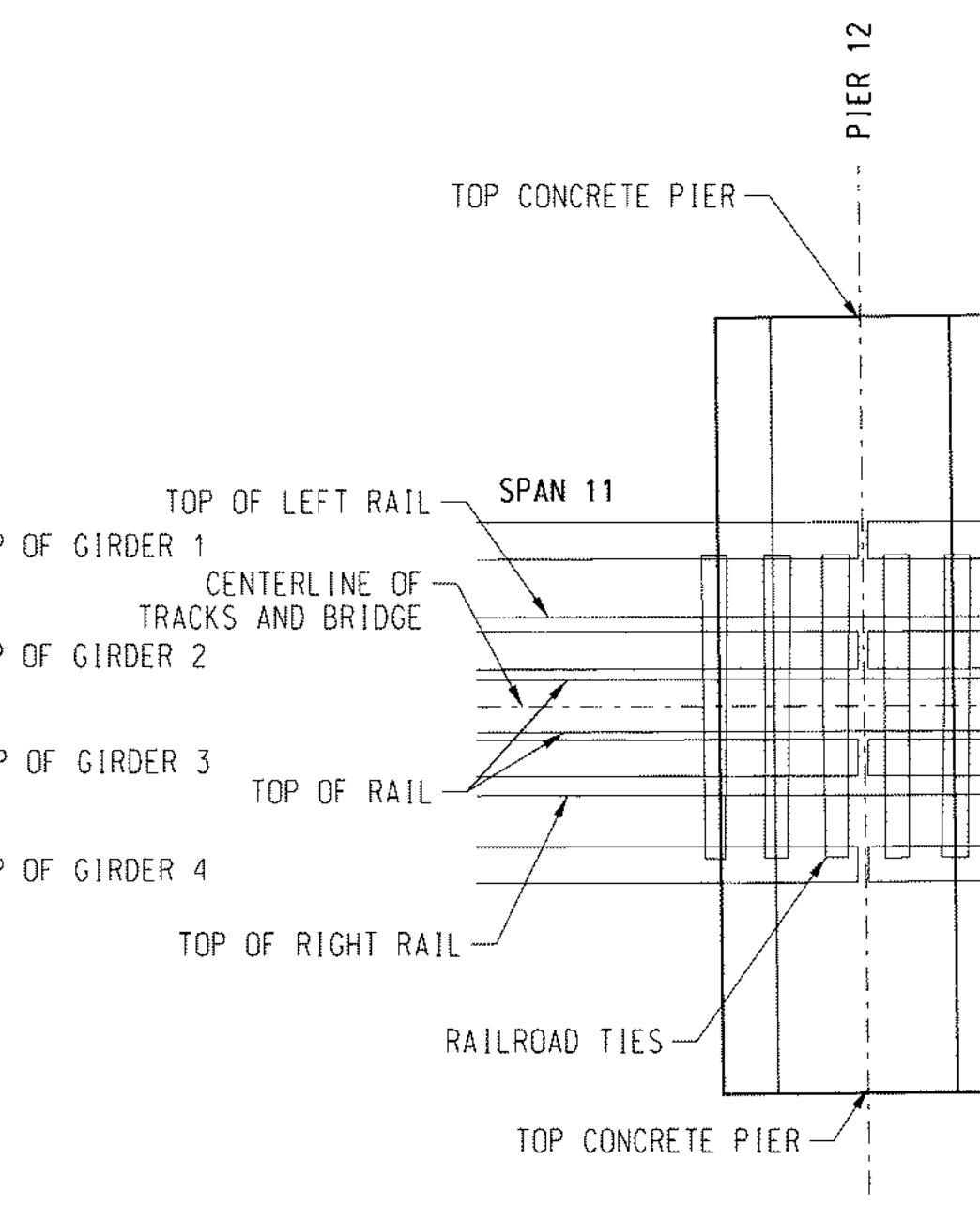
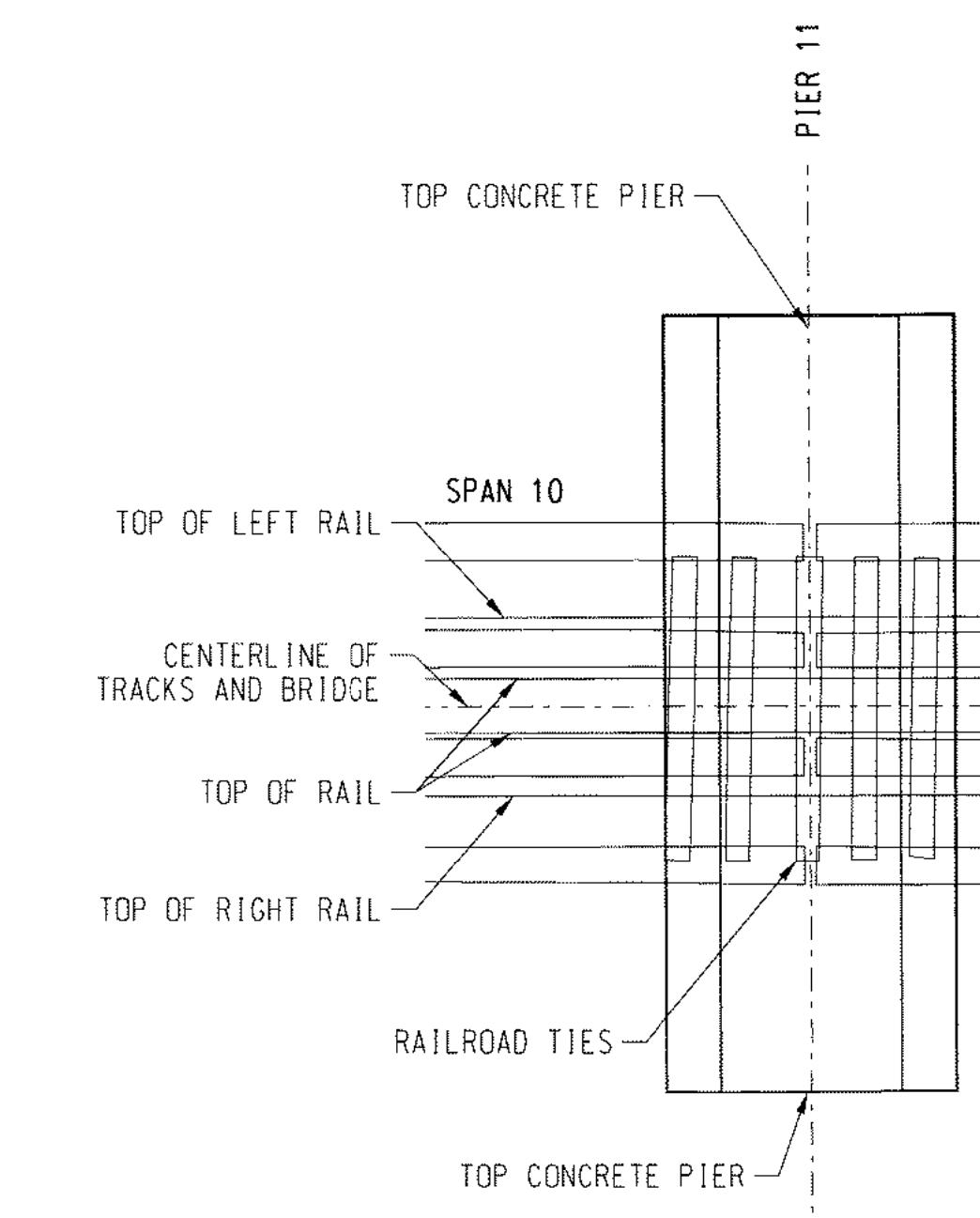
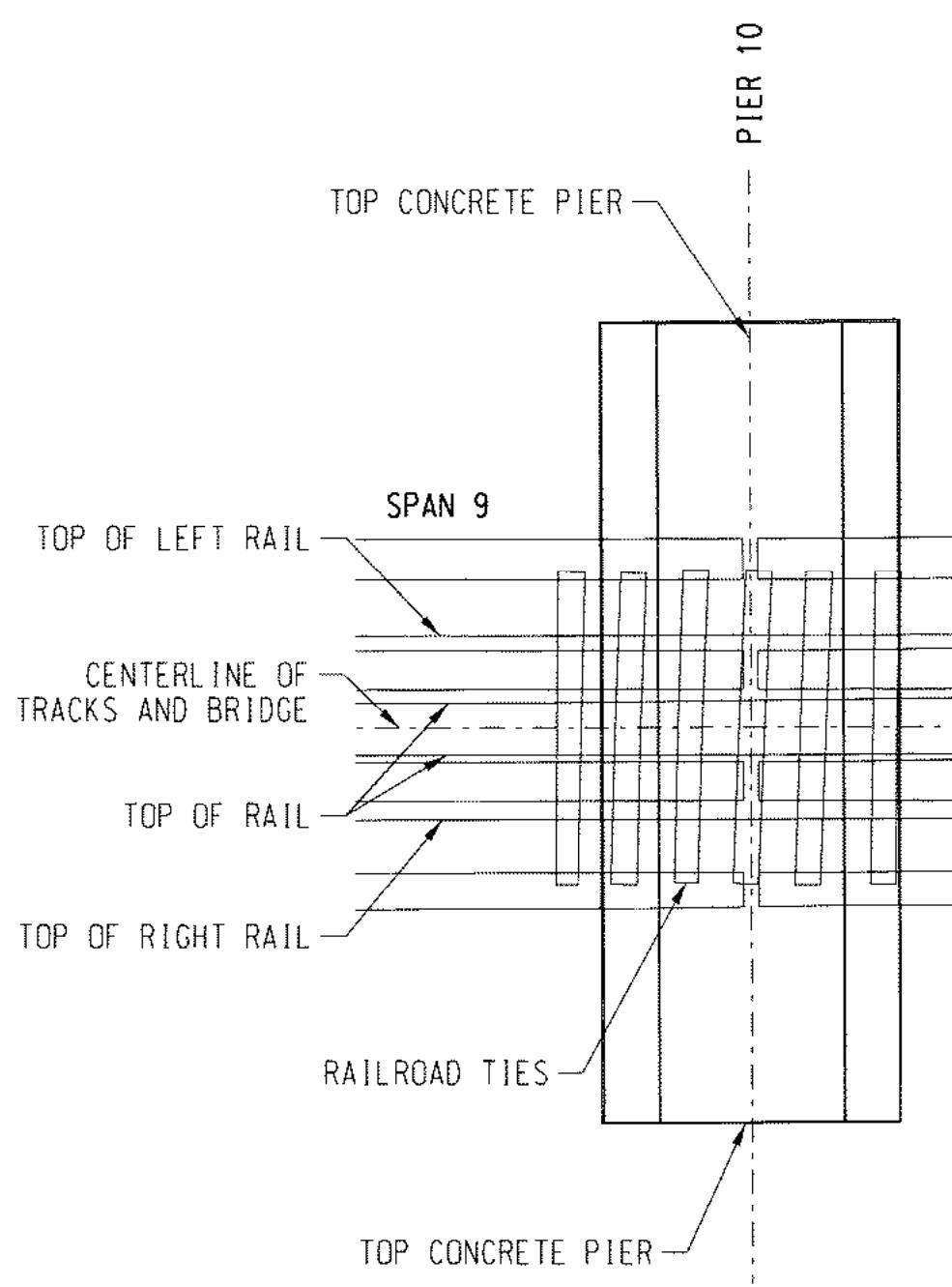


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

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

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


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' |

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.

- 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.

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



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

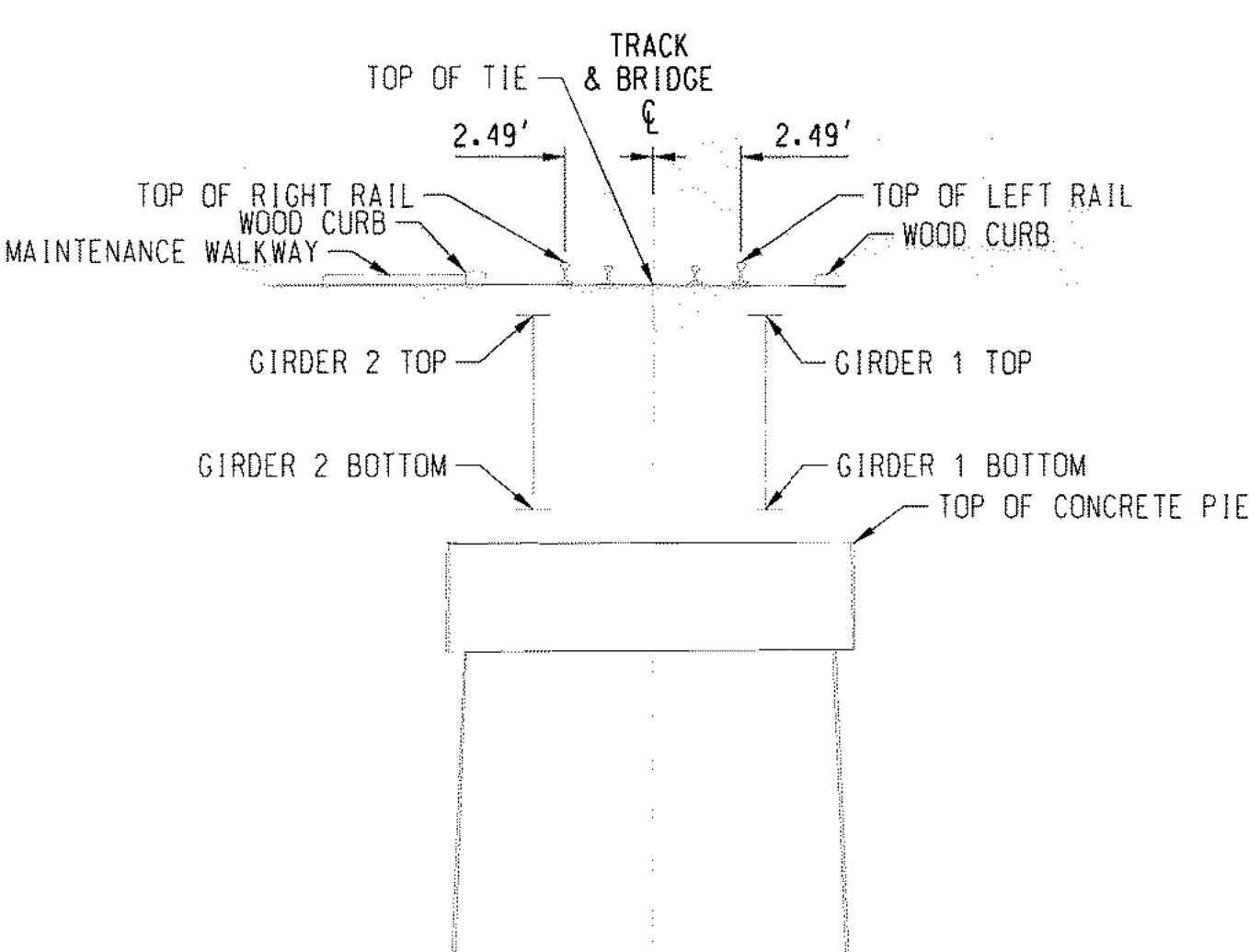
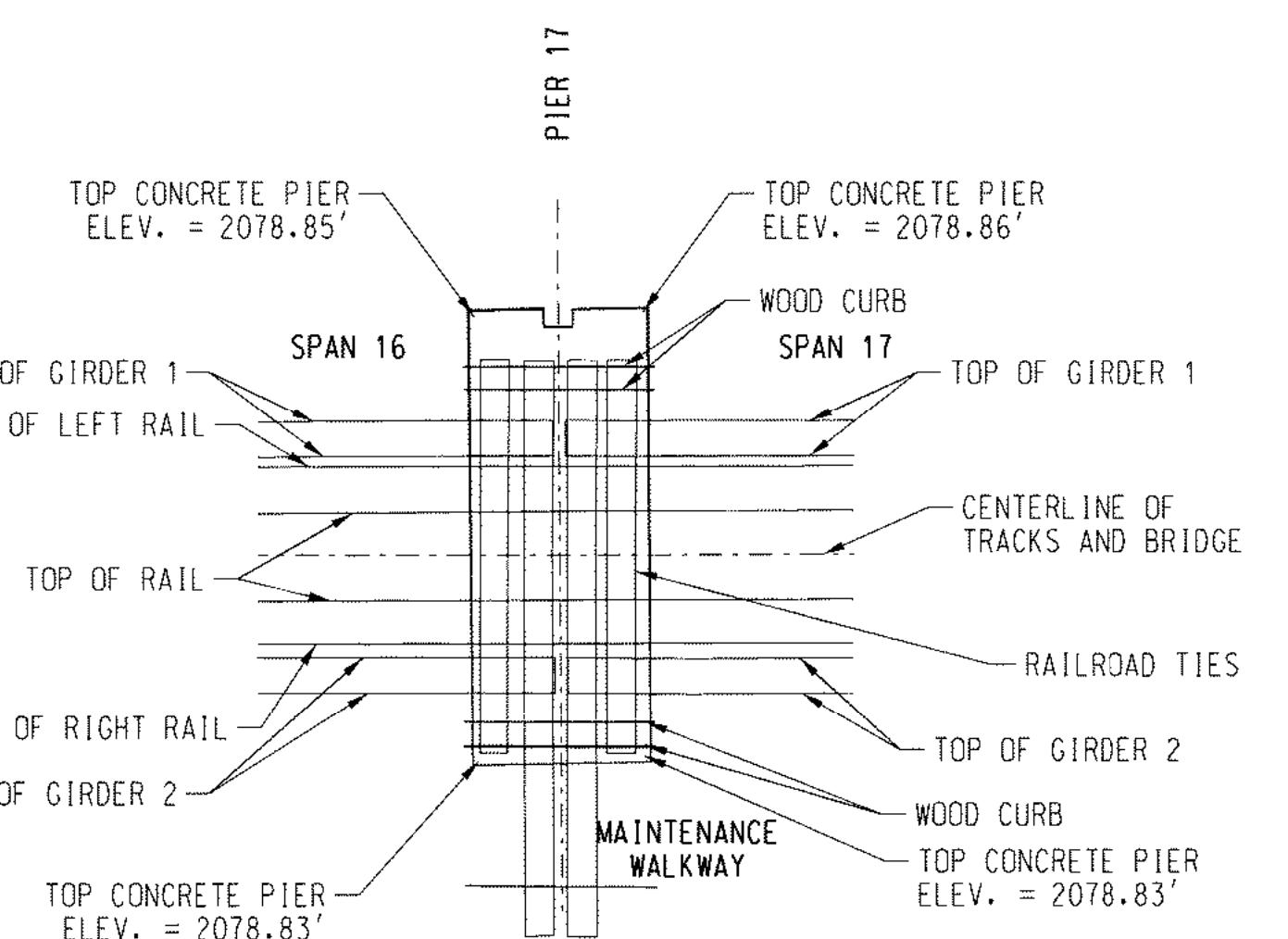
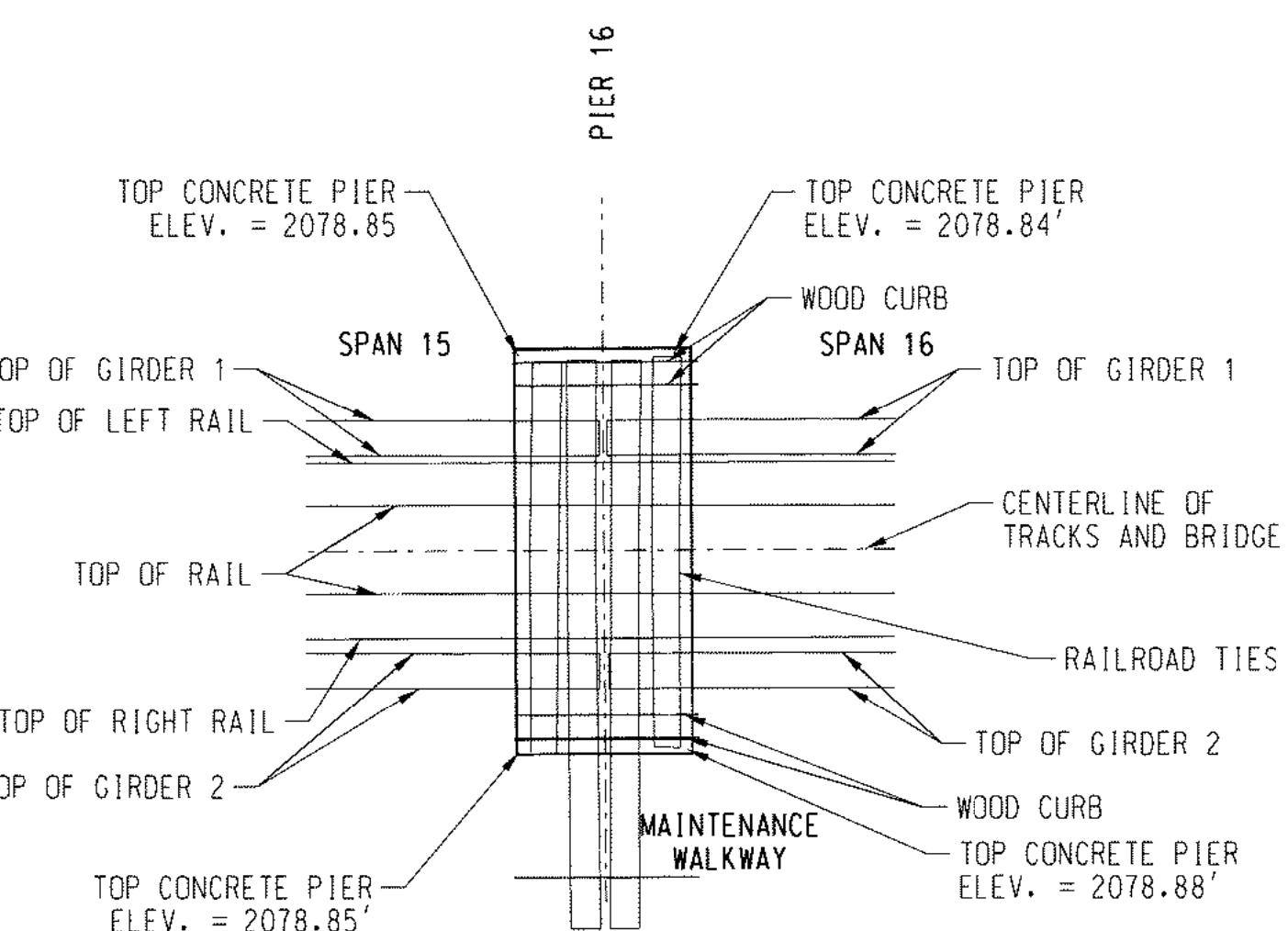
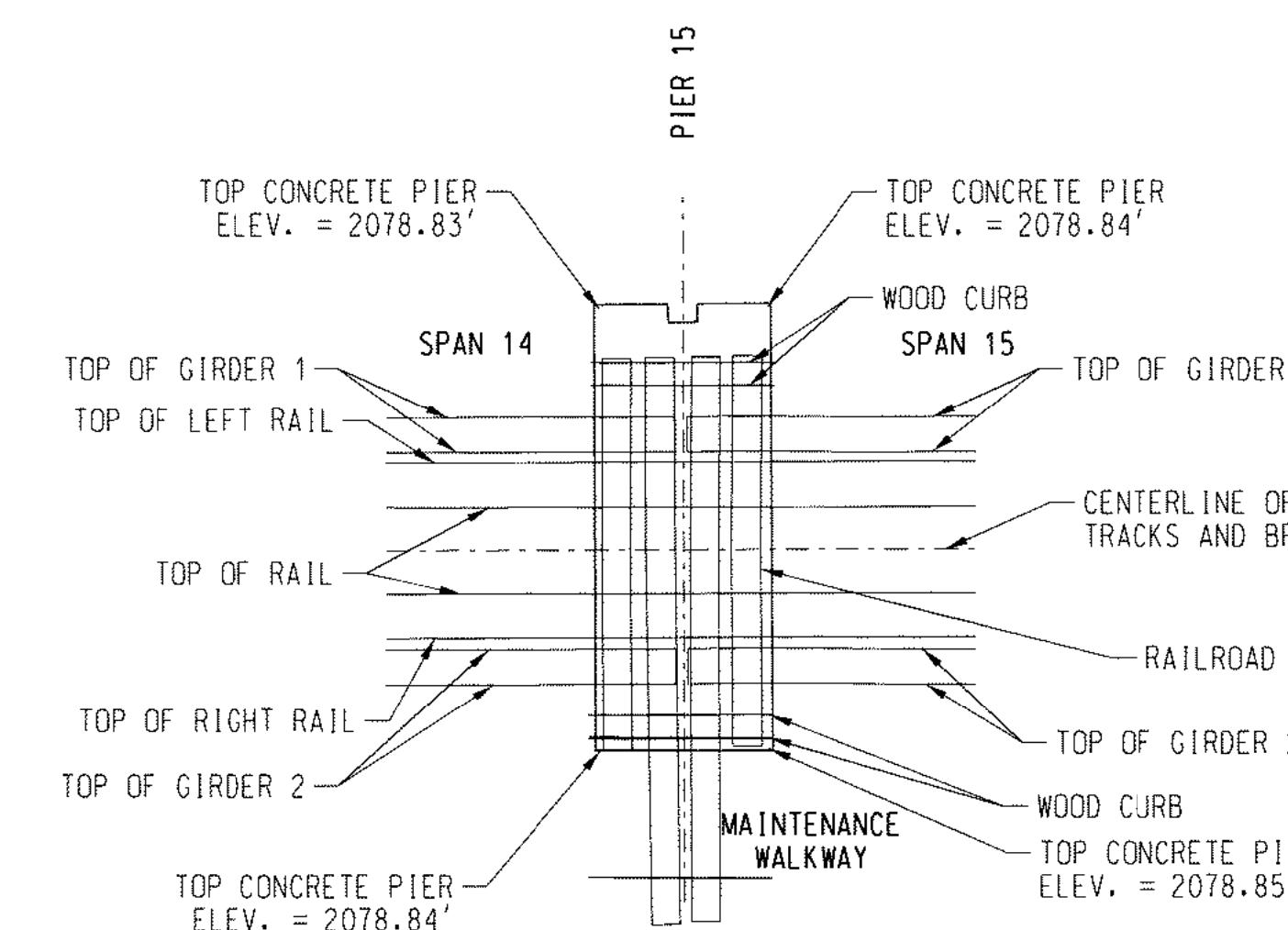
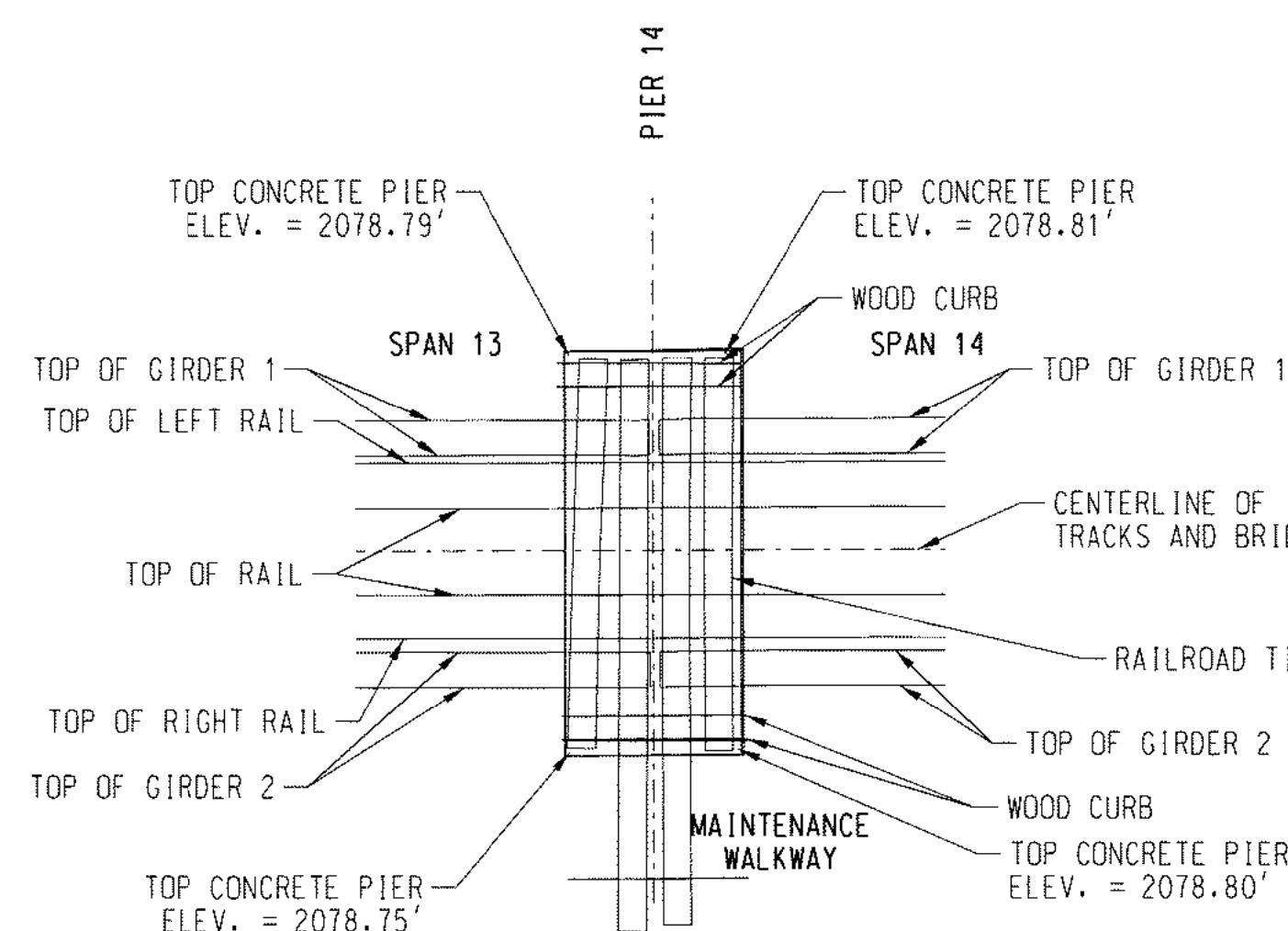
811
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

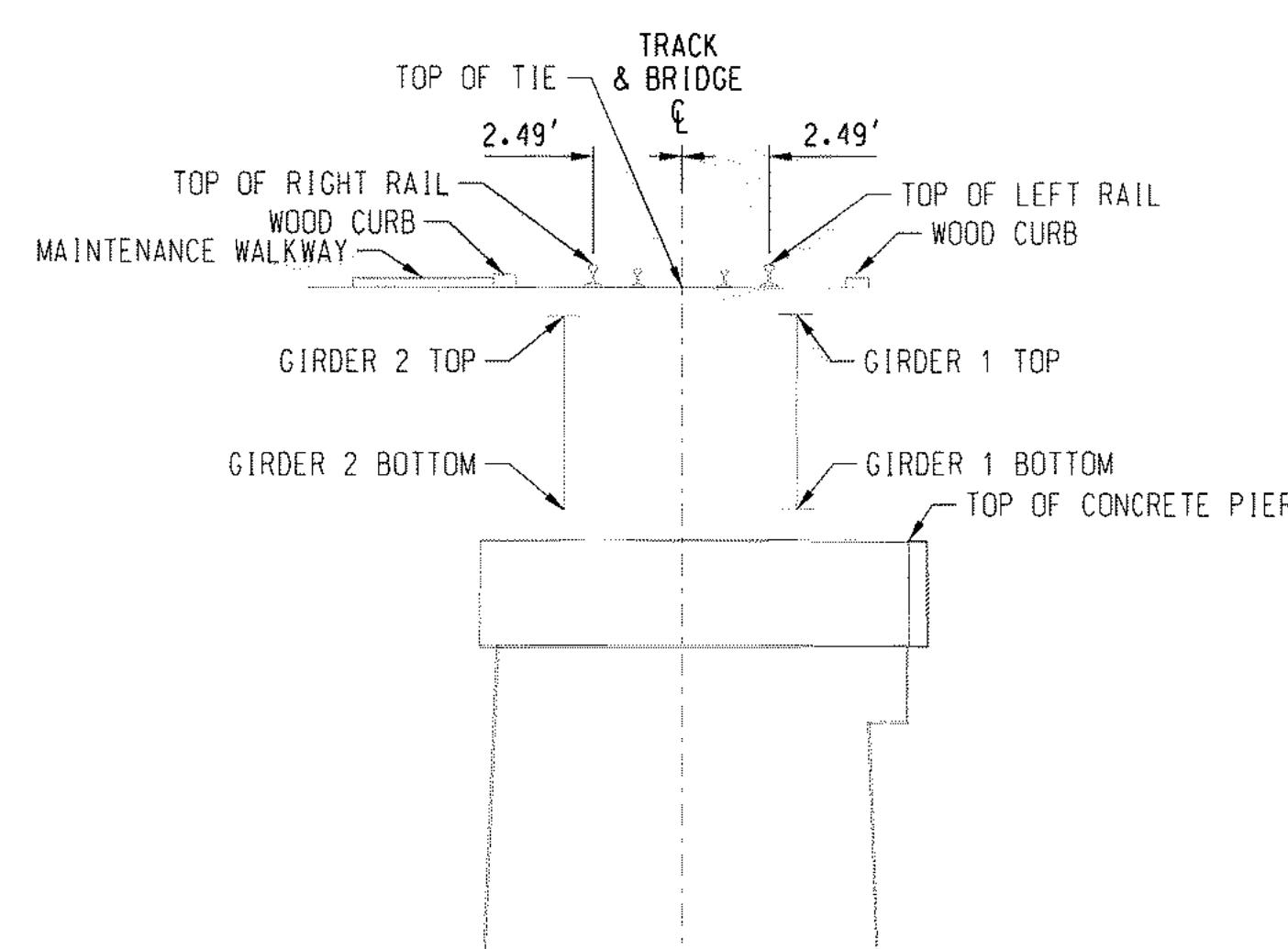
WEST
TO EAST ALGOMA, ID

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



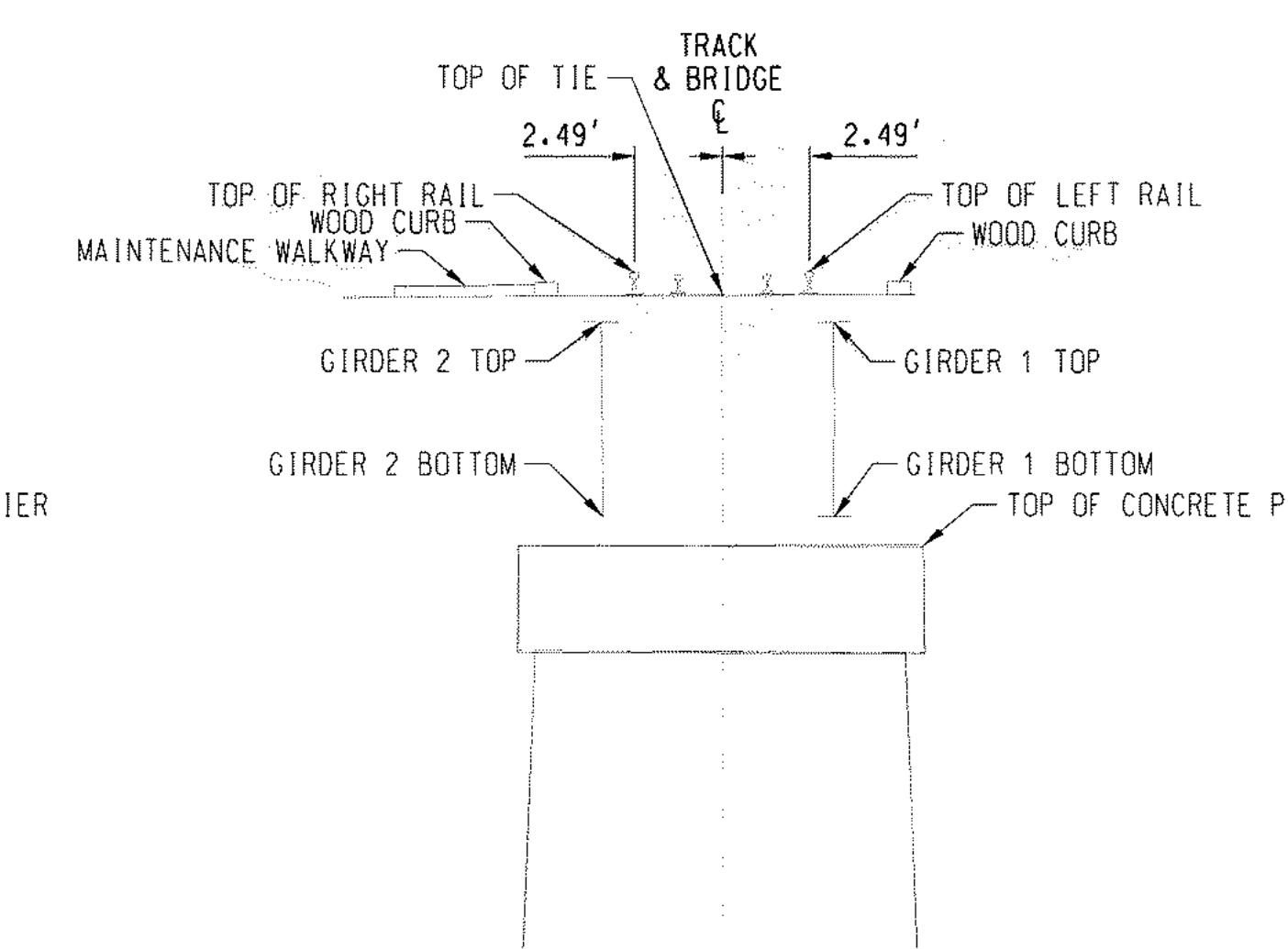
PIER 14
LOOKING RAILROAD EAST

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



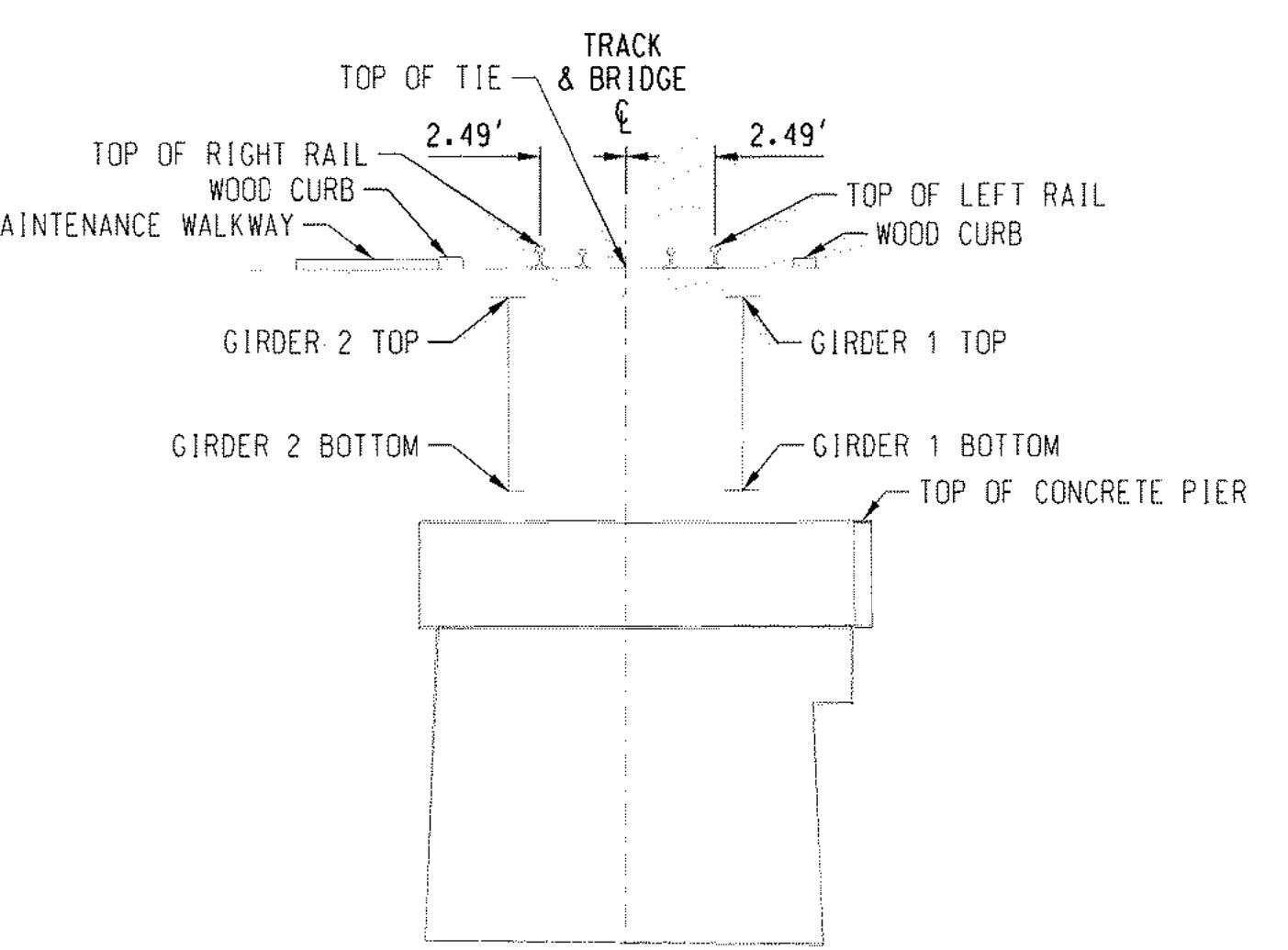
PIER 15
LOOKING RAILROAD EAST

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



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' |



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 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' |

| 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' |

| 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' |

| 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:
- 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: 0045-003.900-005 SHEET: 5 OF 24

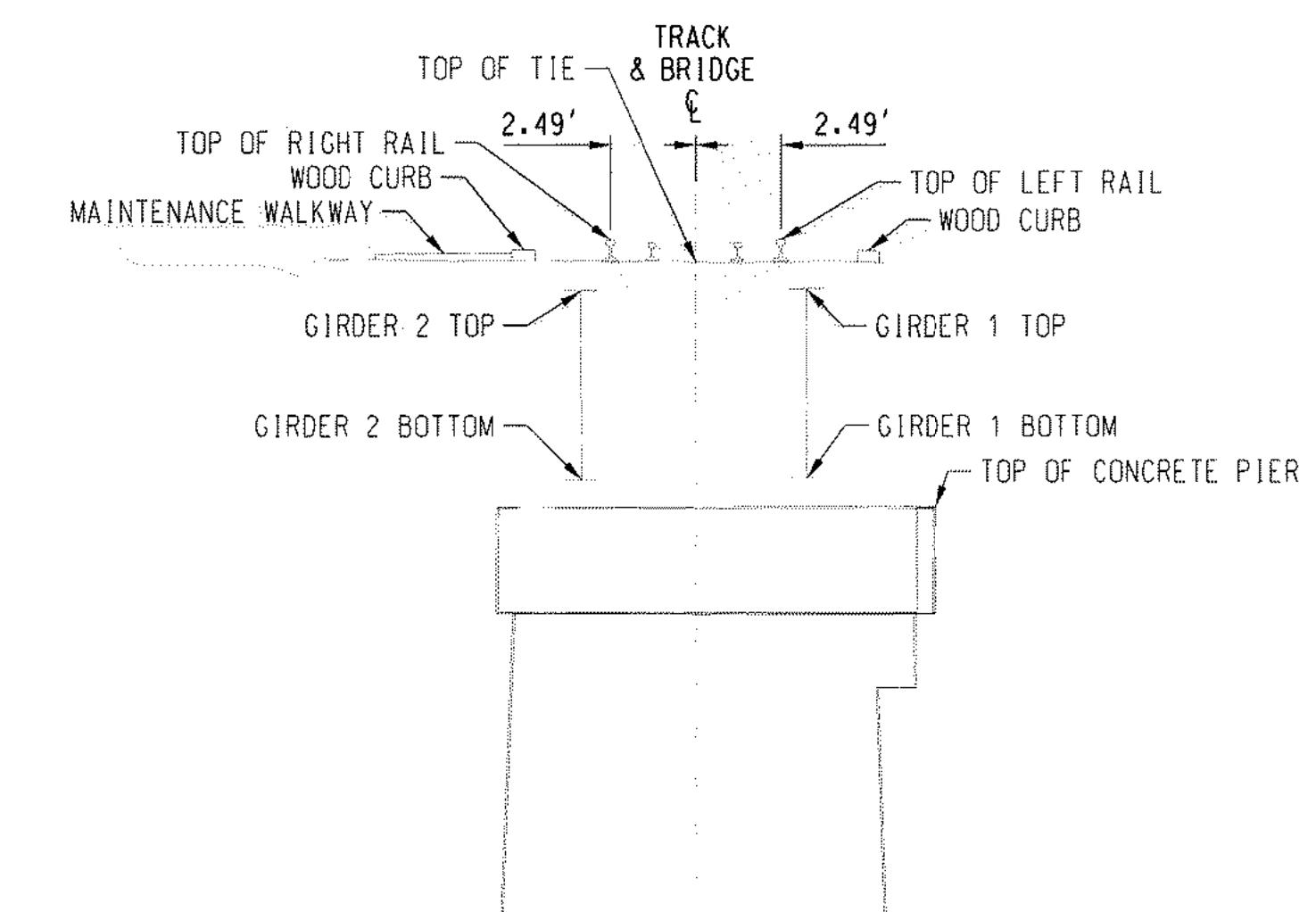
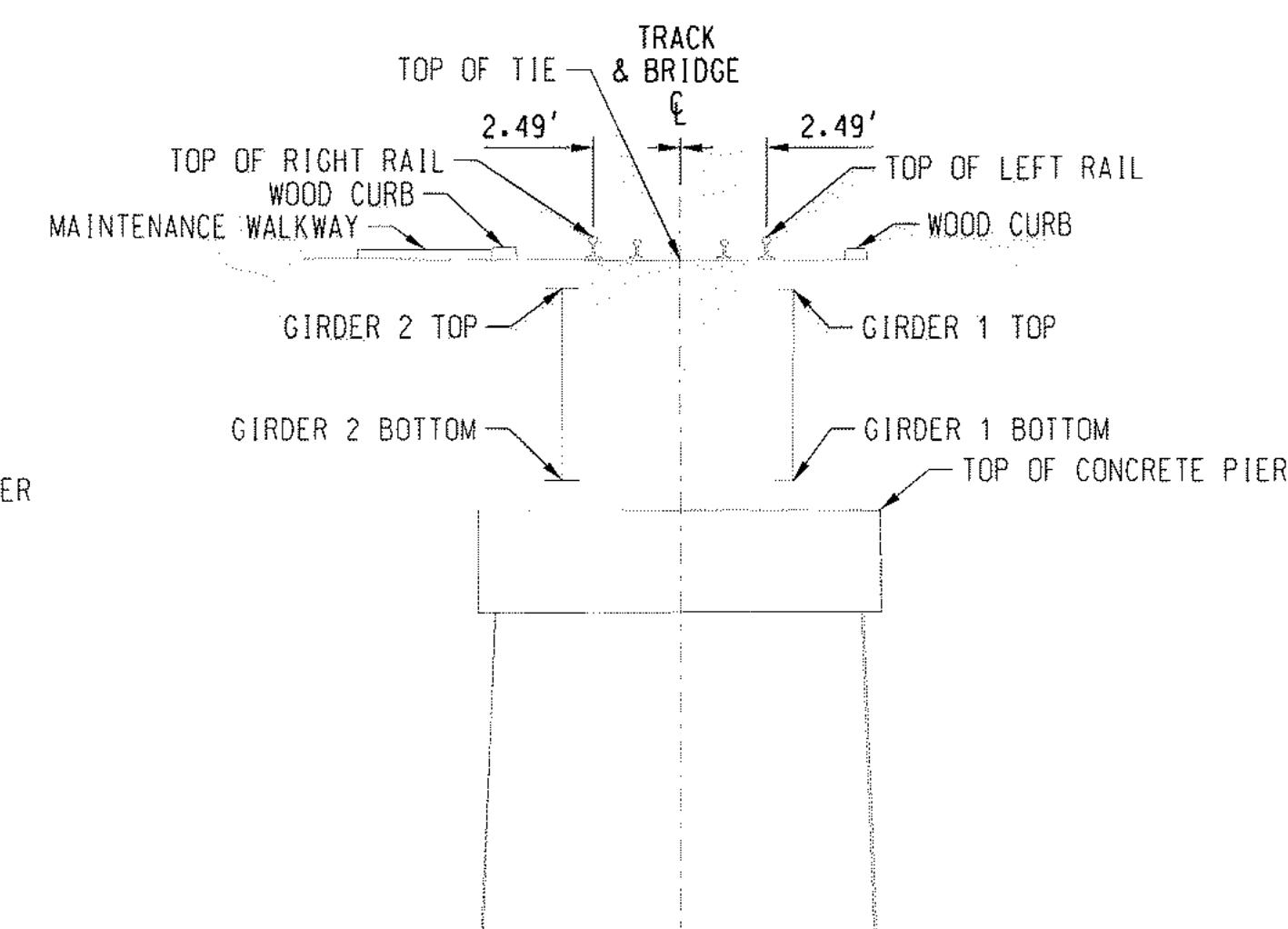
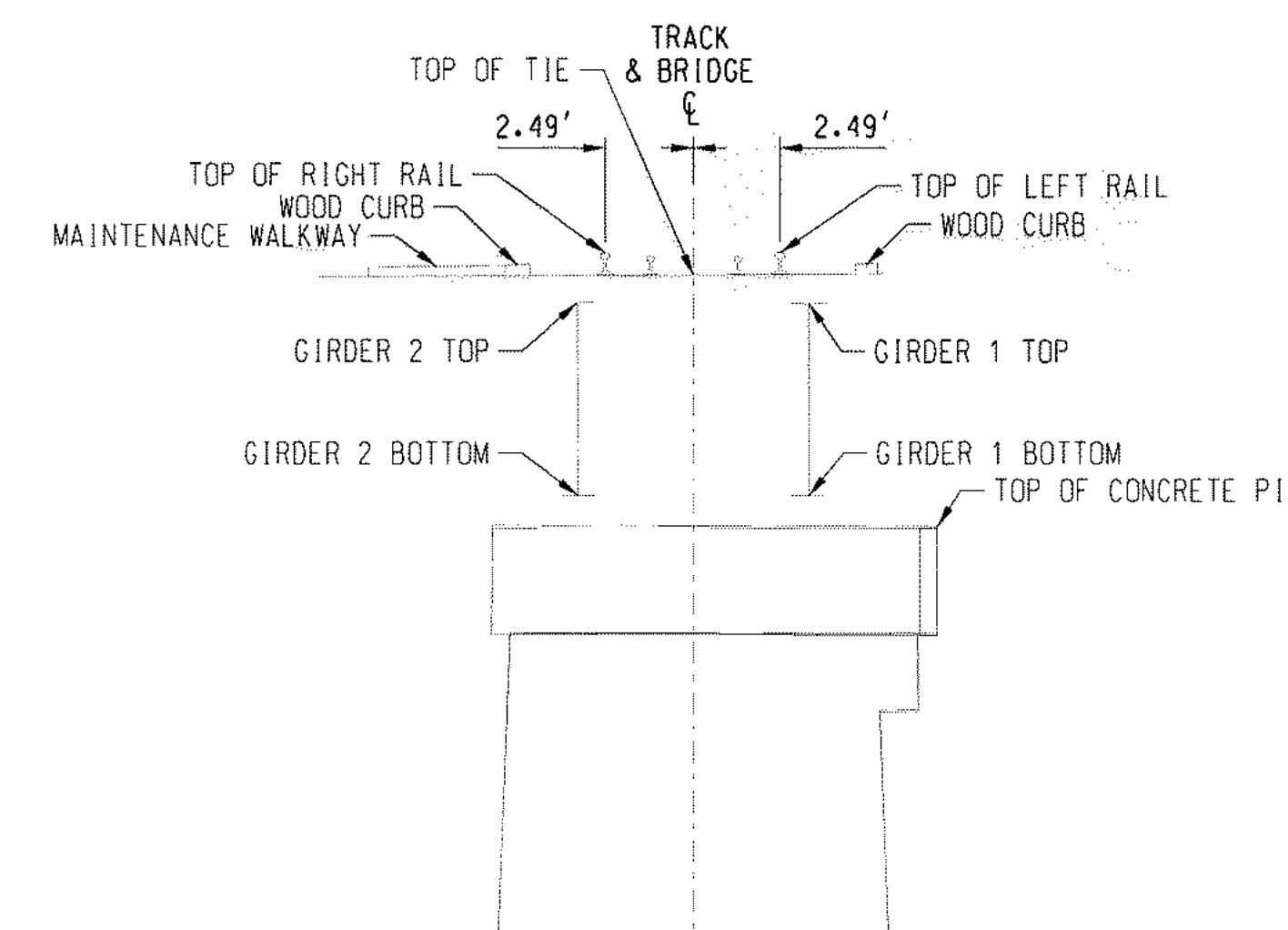
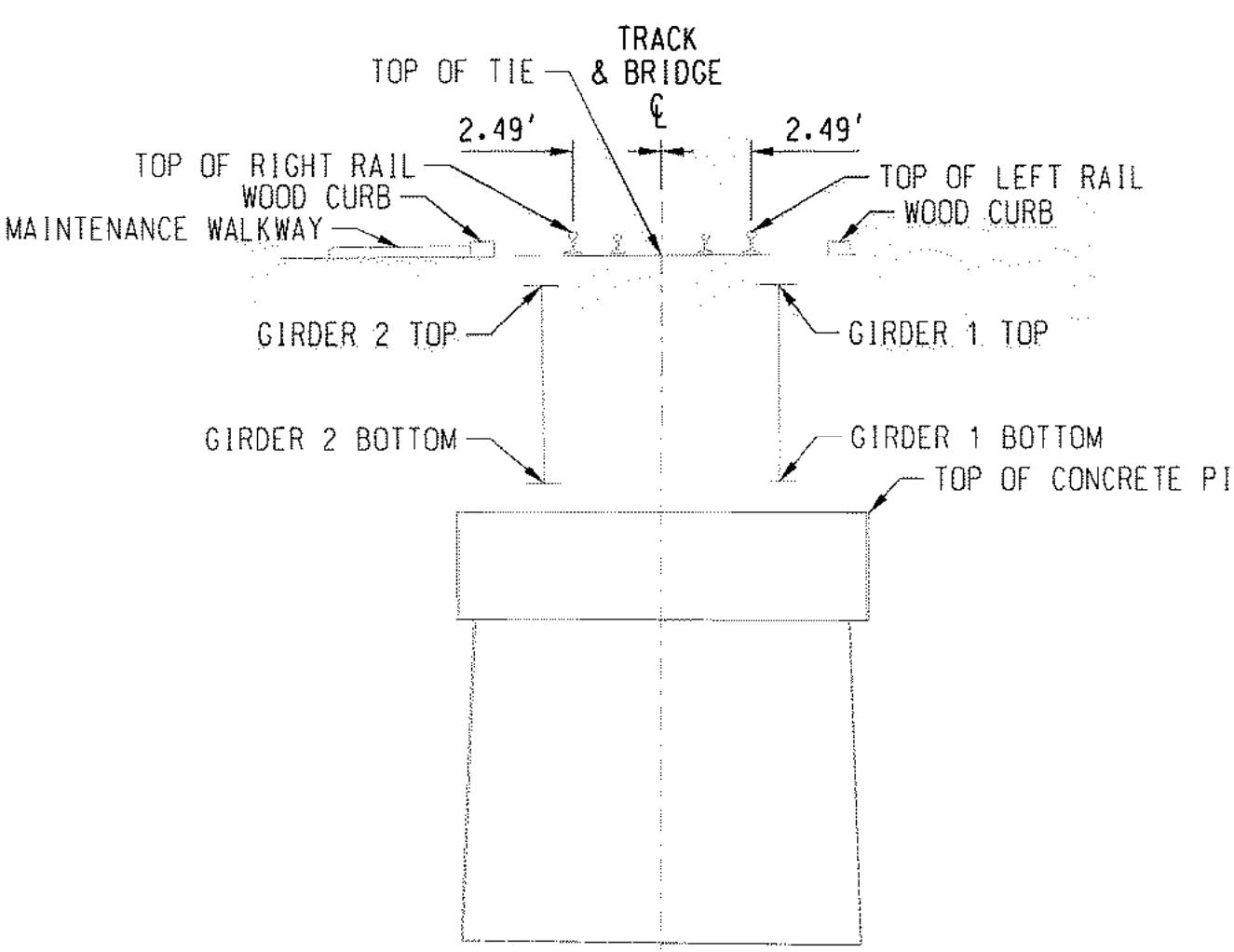
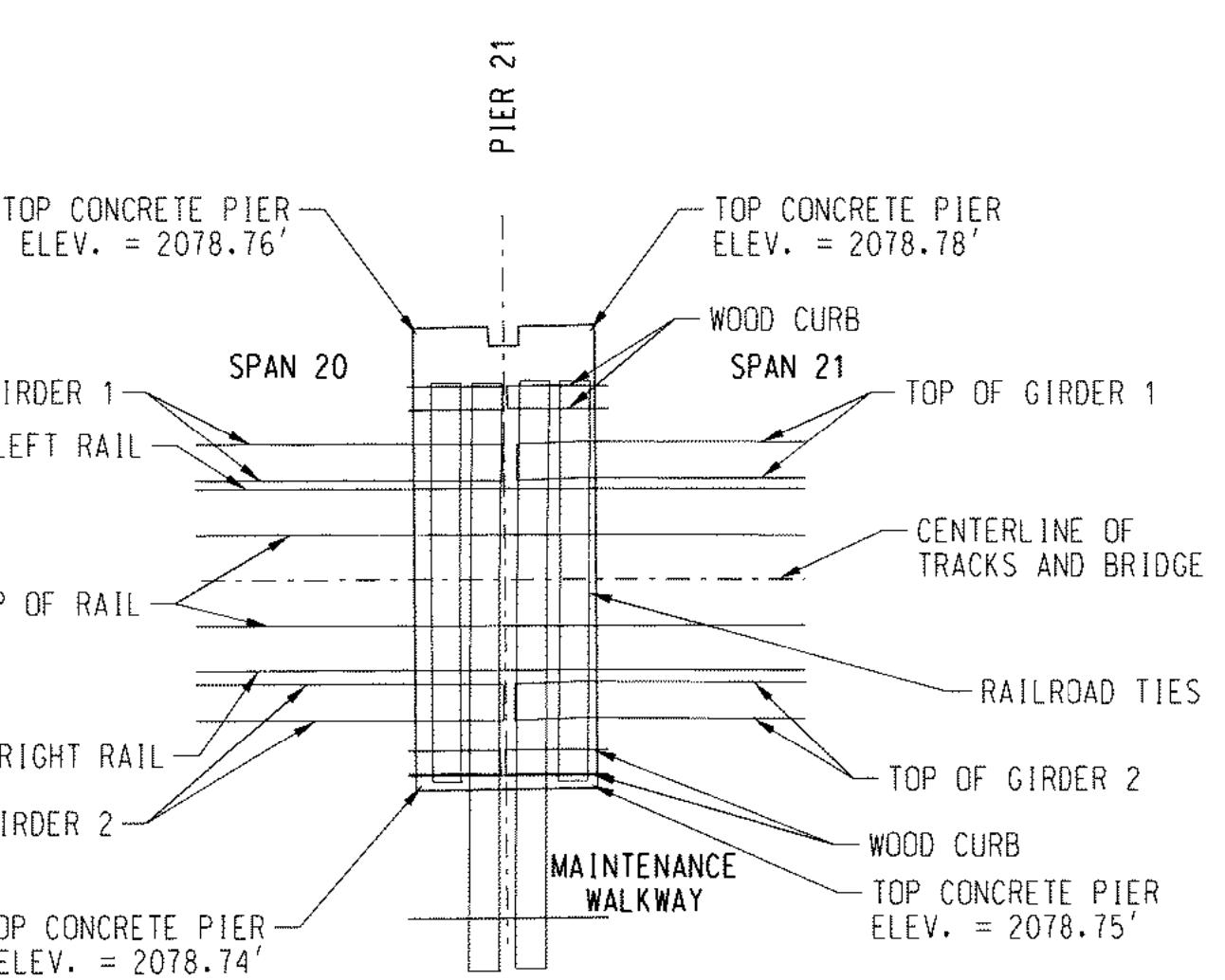
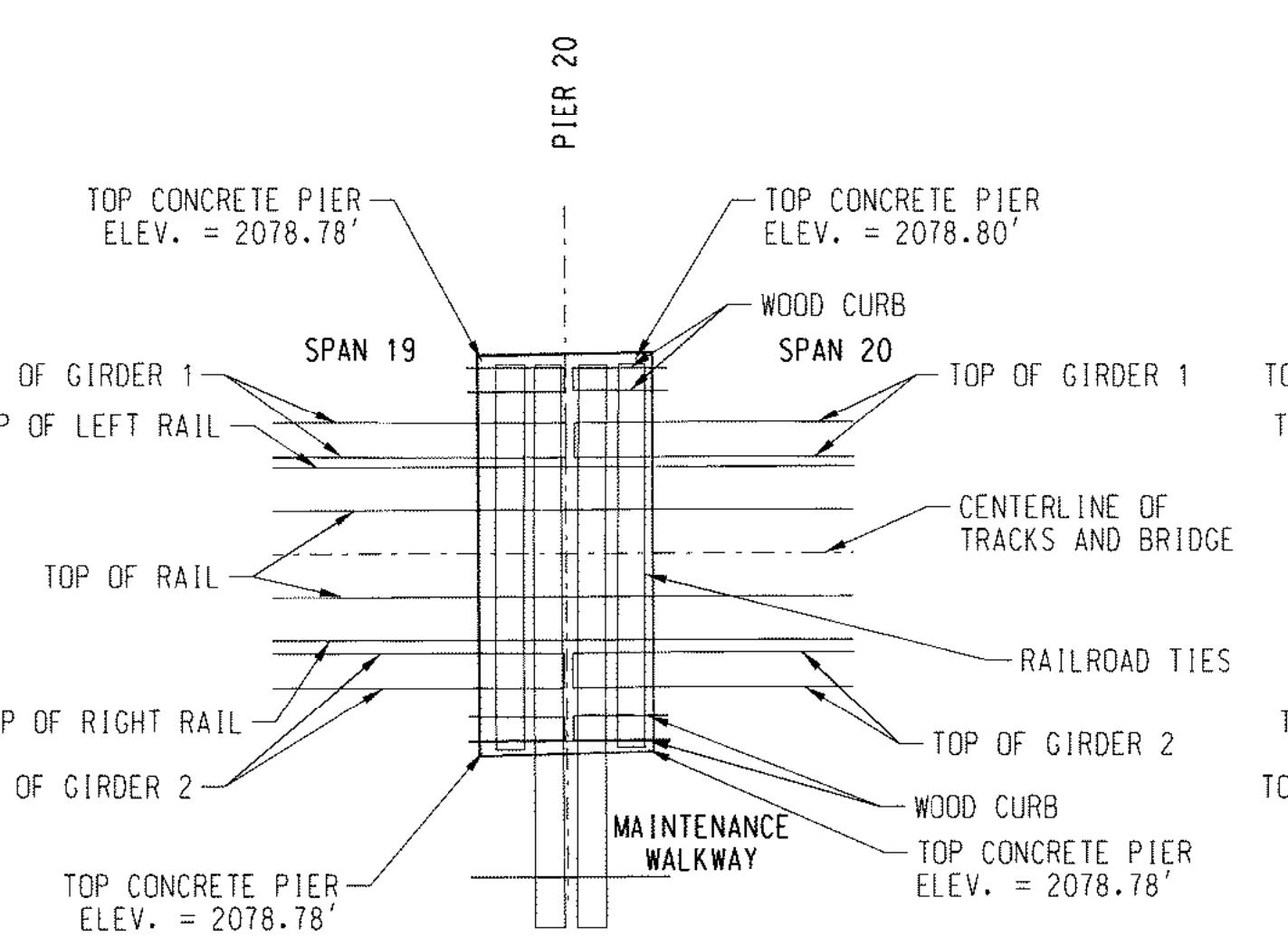
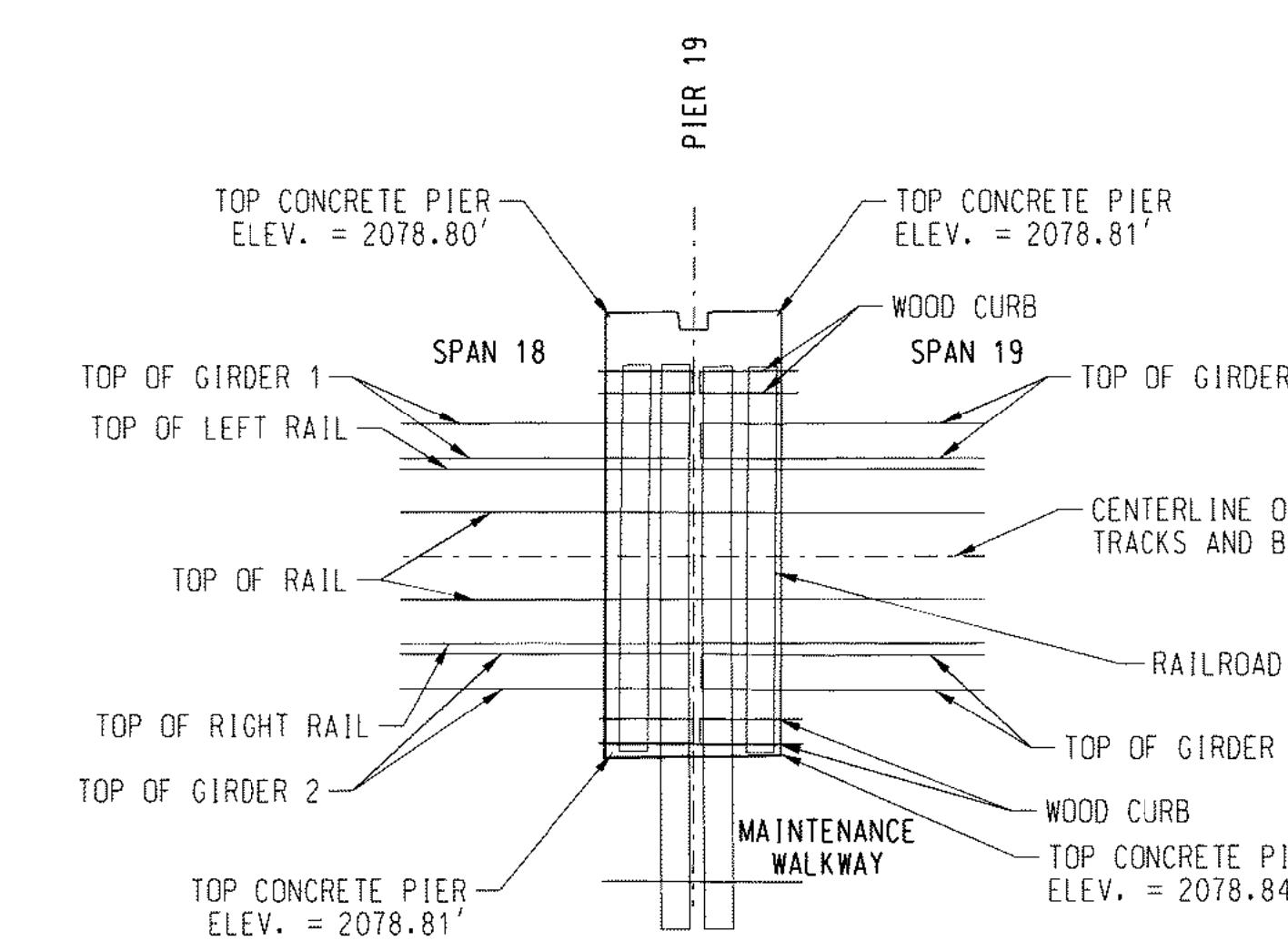
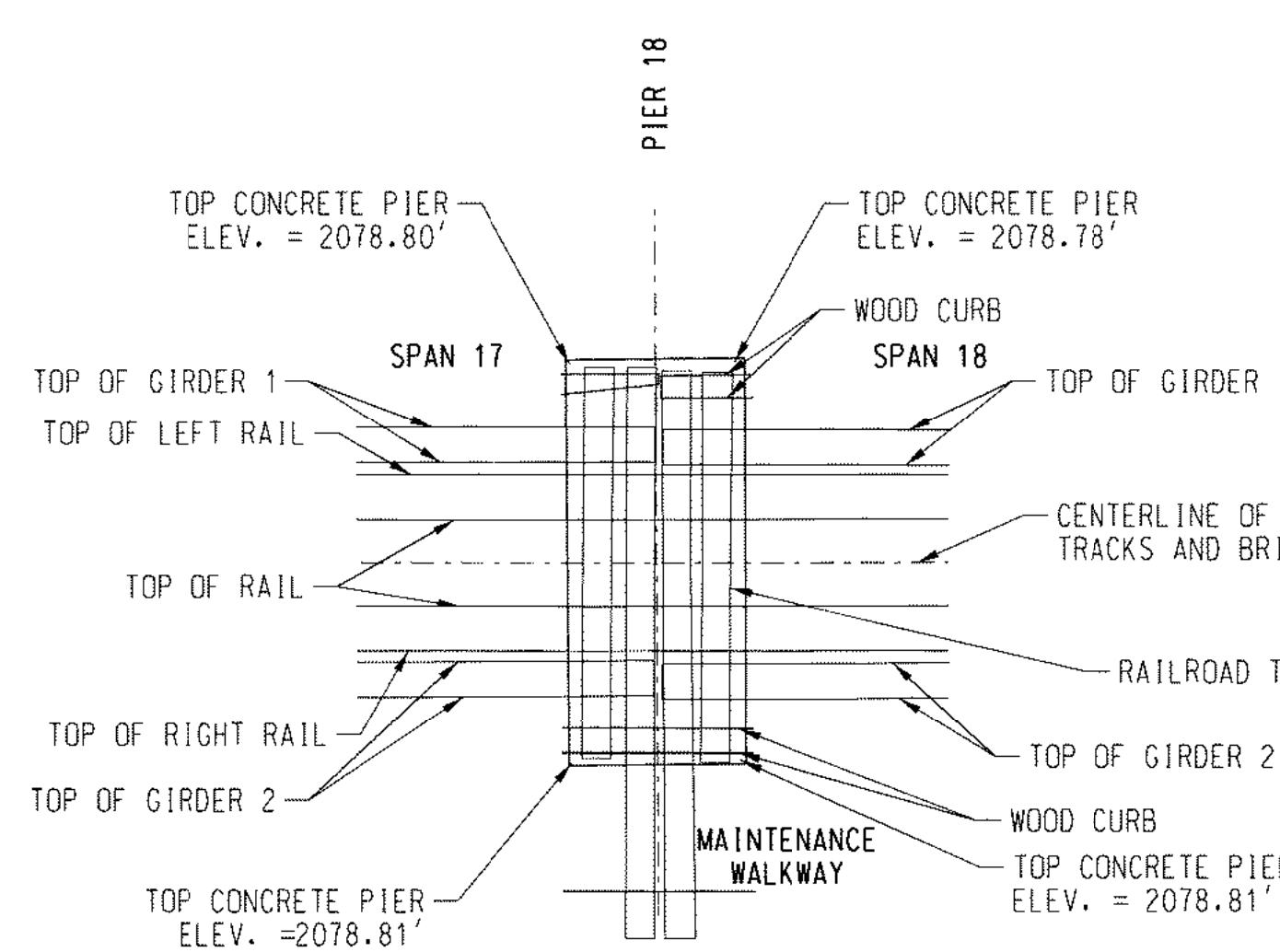


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID

SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'


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

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

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

| 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 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' |

| 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' |

| 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' |

| 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' |

- 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: 0045-003.900-006 SHEET: 6 OF 24

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

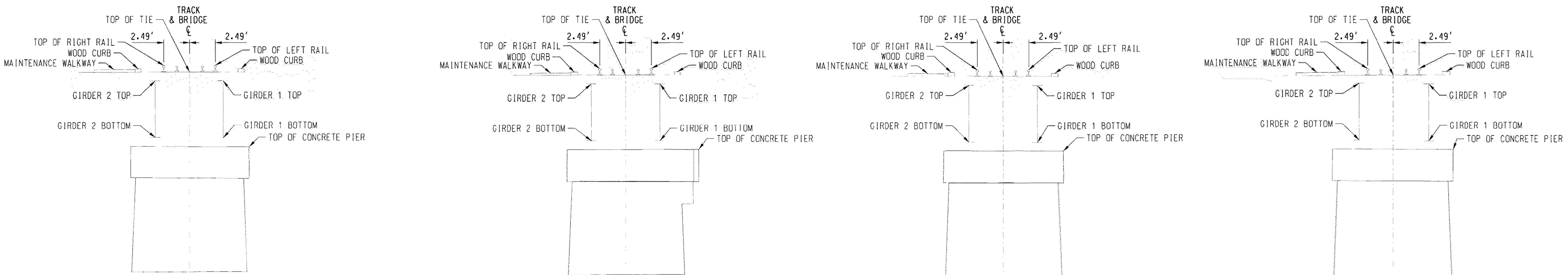
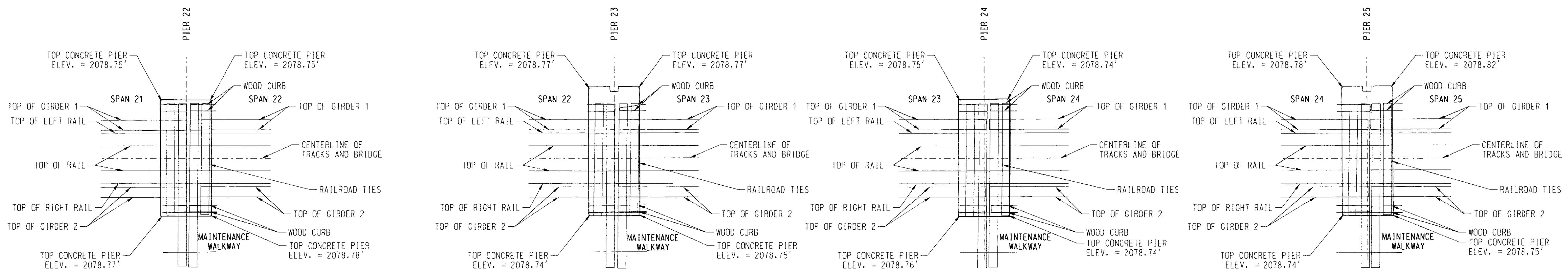
81
 Know what's below.
 Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA, ID

0 5 10
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' |

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' |

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' |

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 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' |

| 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' |

| 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' |

| 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

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

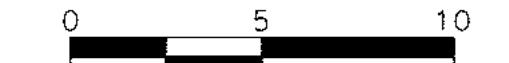
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-007 SHEET: 7 OF 24

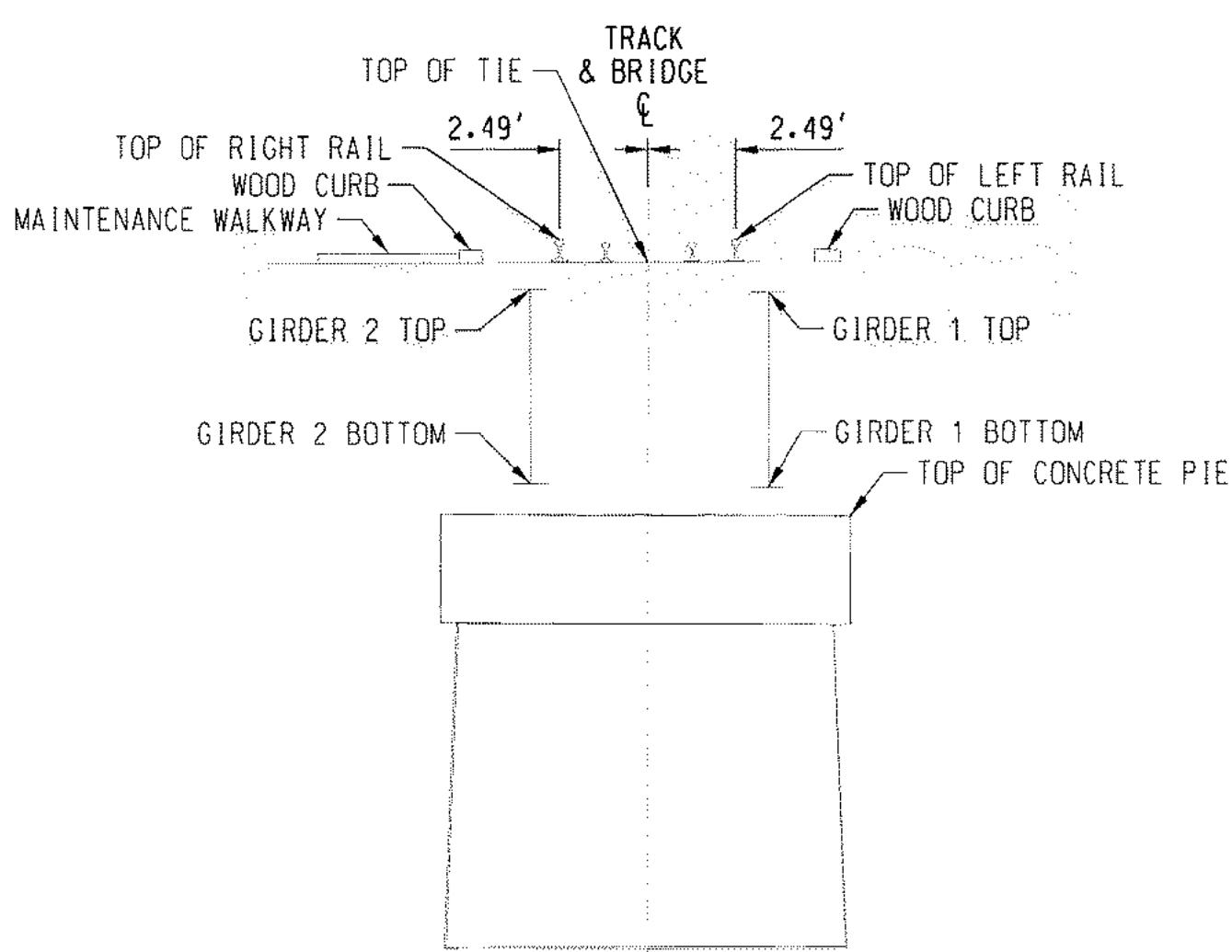
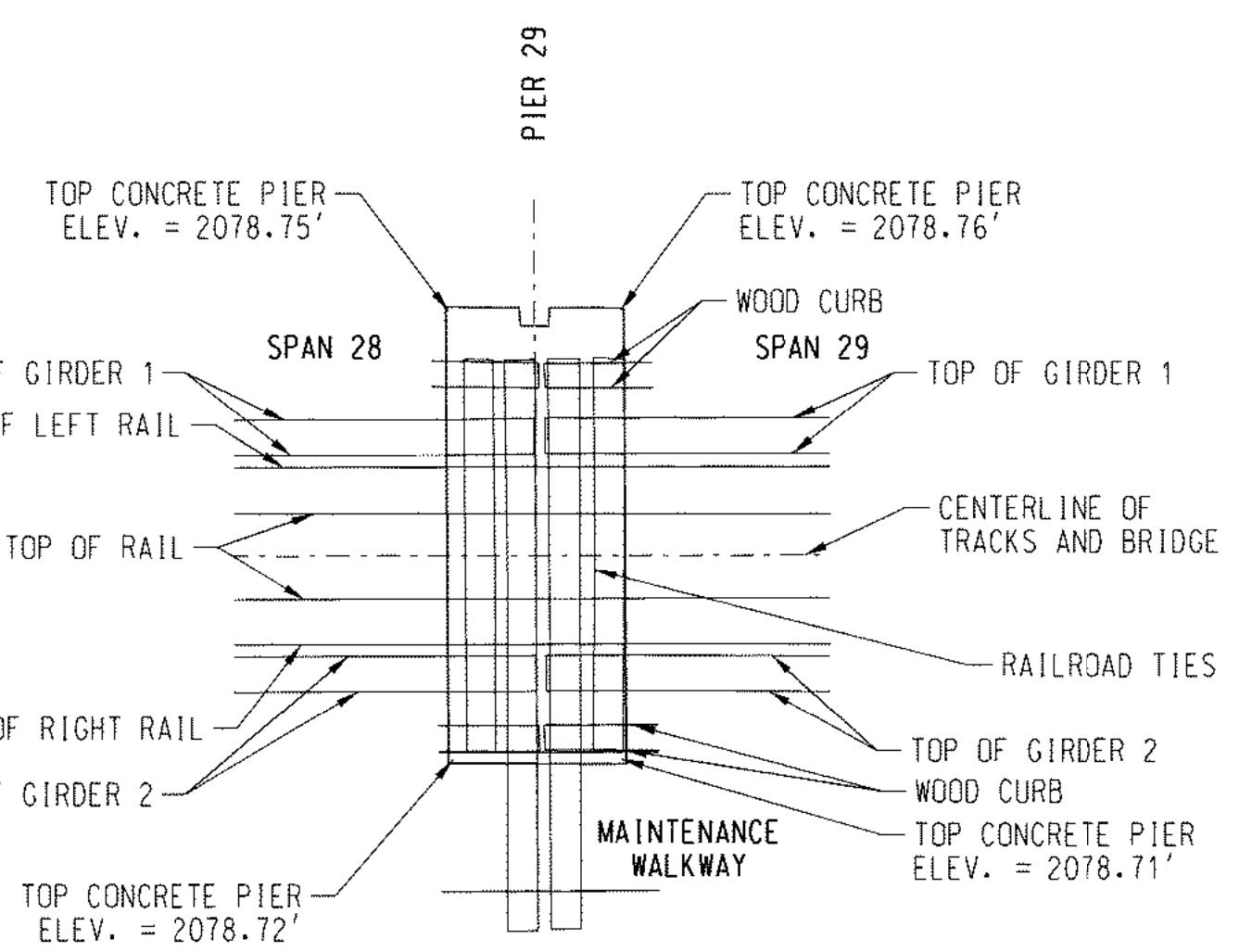
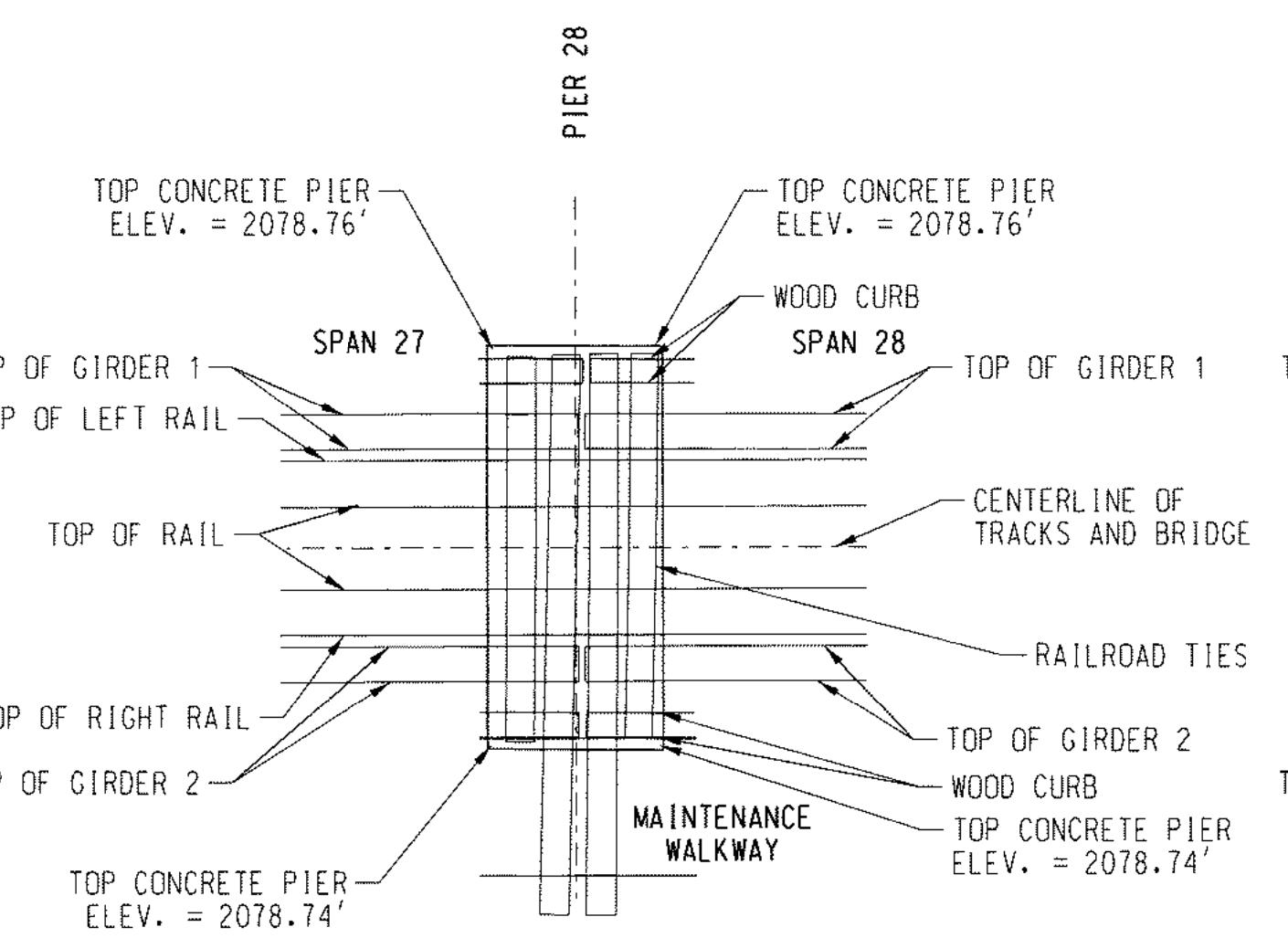
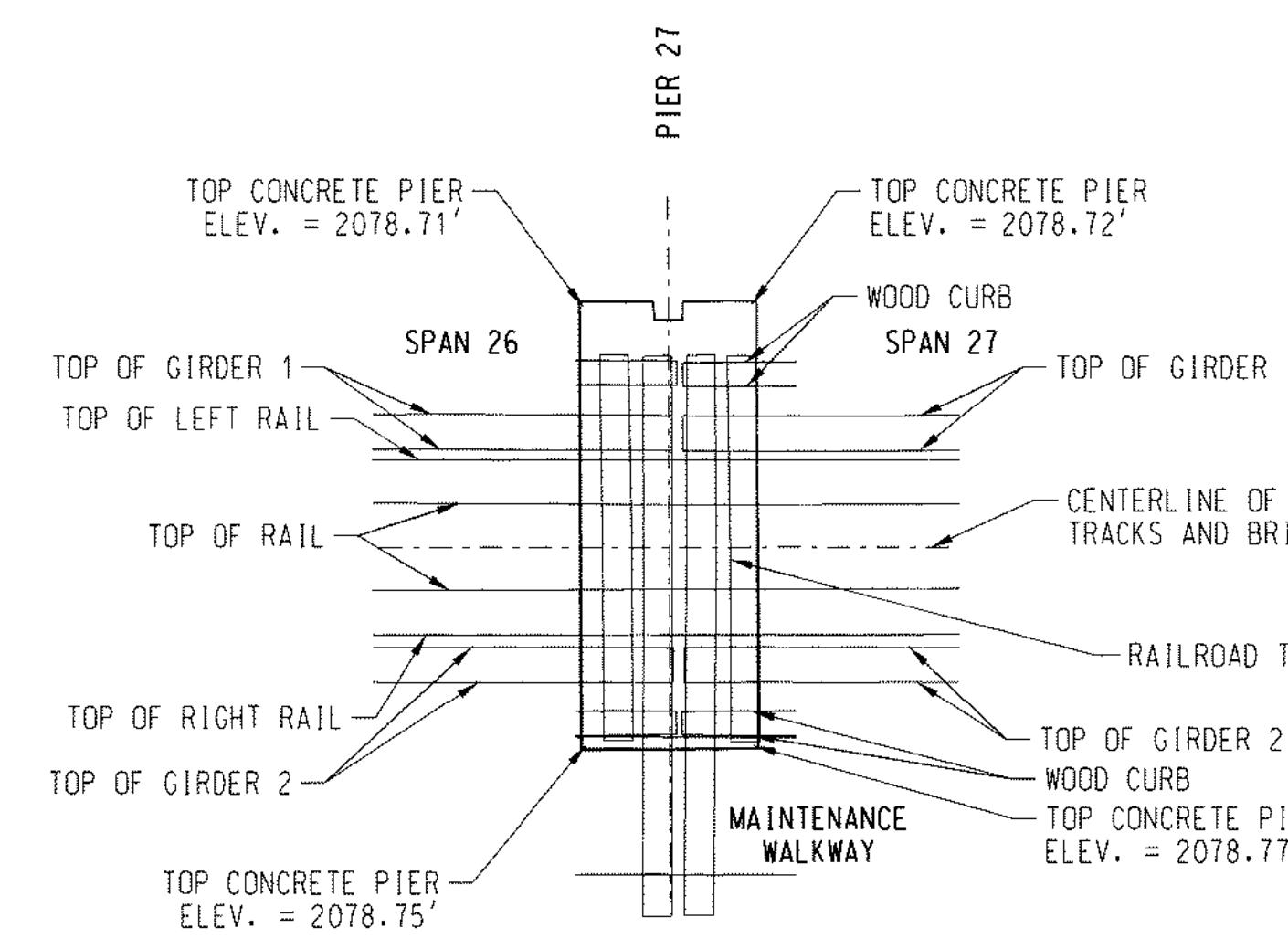
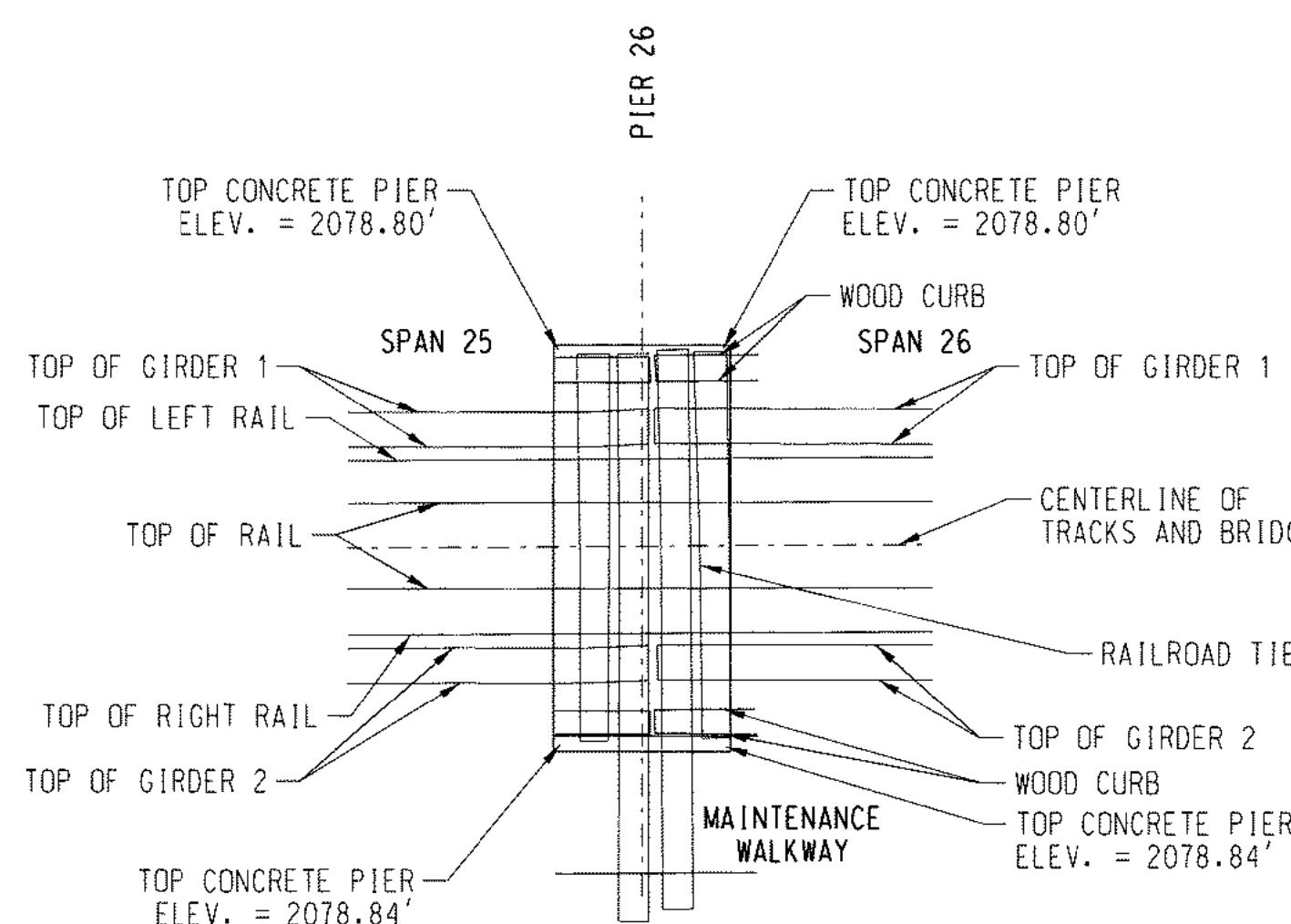


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

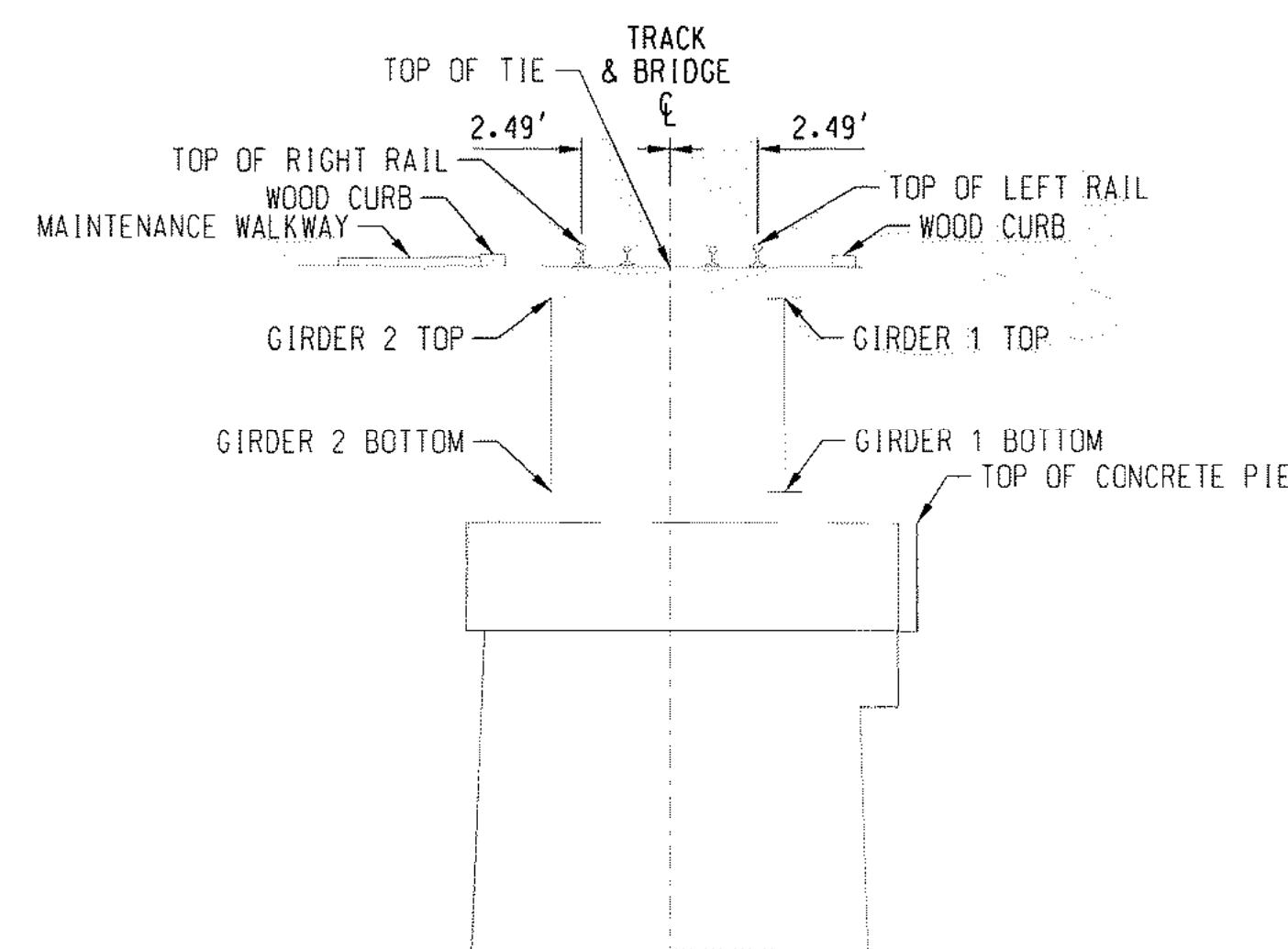
81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

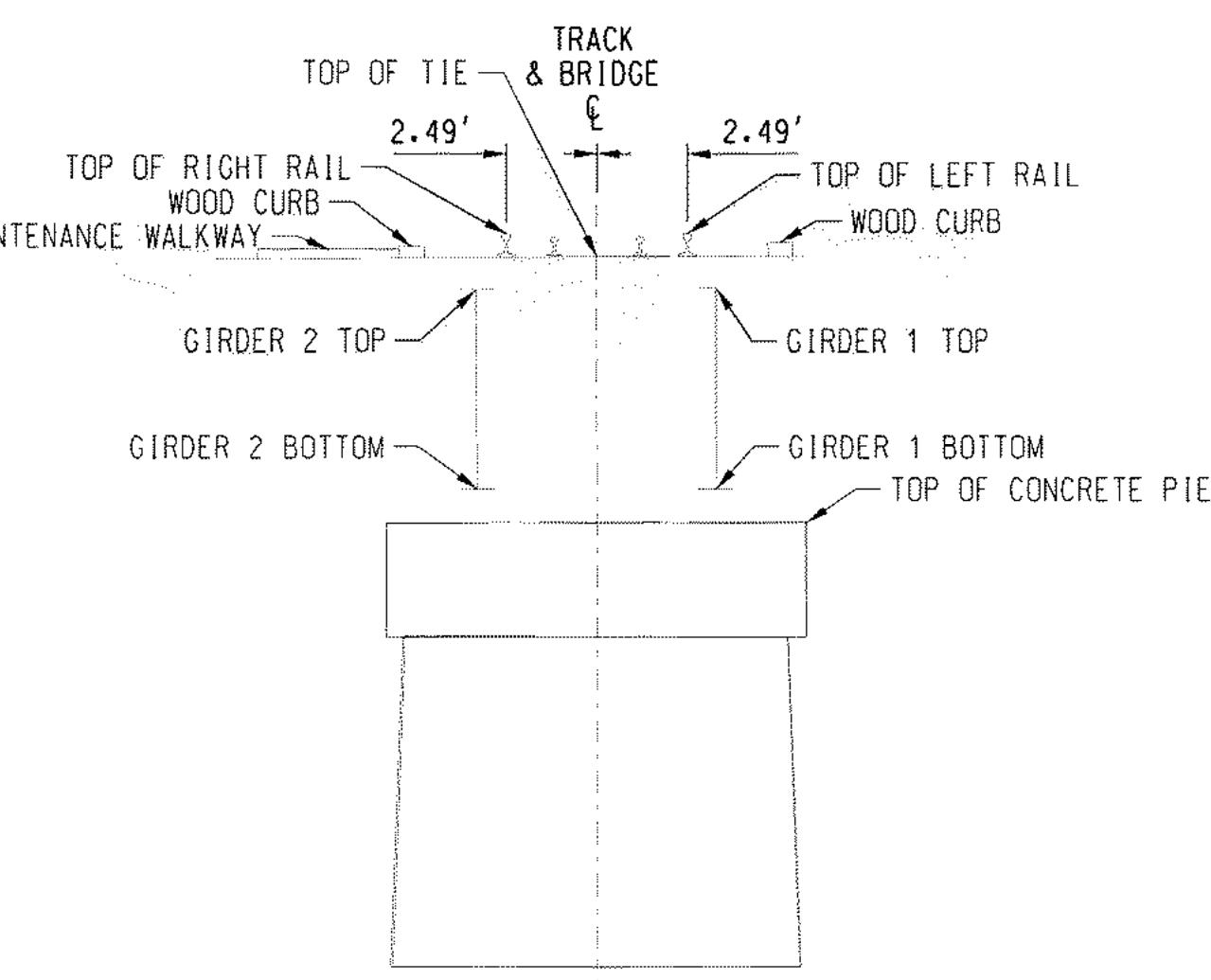
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 26
LOOKING RAILROAD EAST

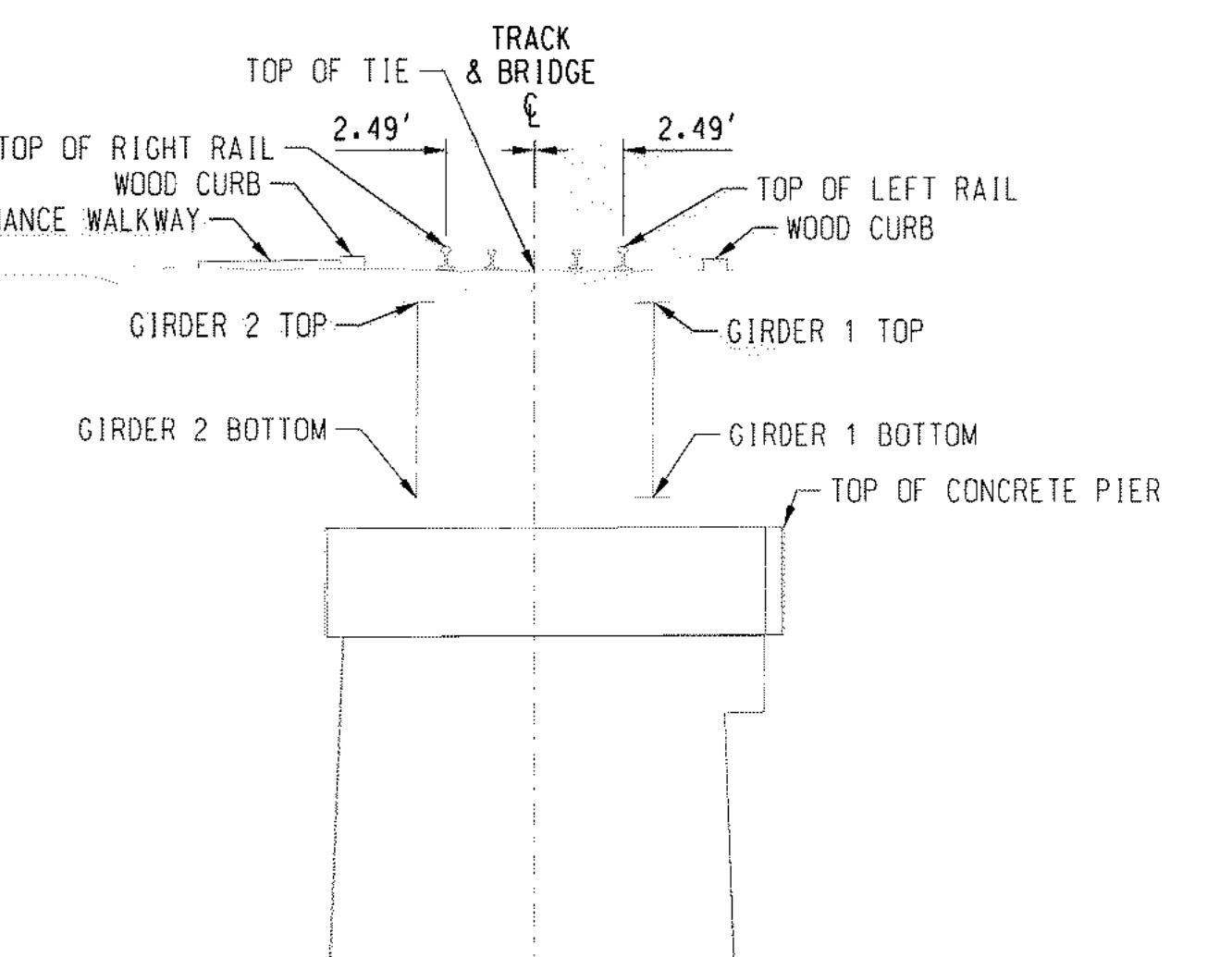
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.65' | 2086.00' | 2086.65' |

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' |

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' |

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 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' |

| 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' |

| 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' |

| 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

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: 0045-003.900-008 SHEET: 8 OF 24



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

81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA, ID

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

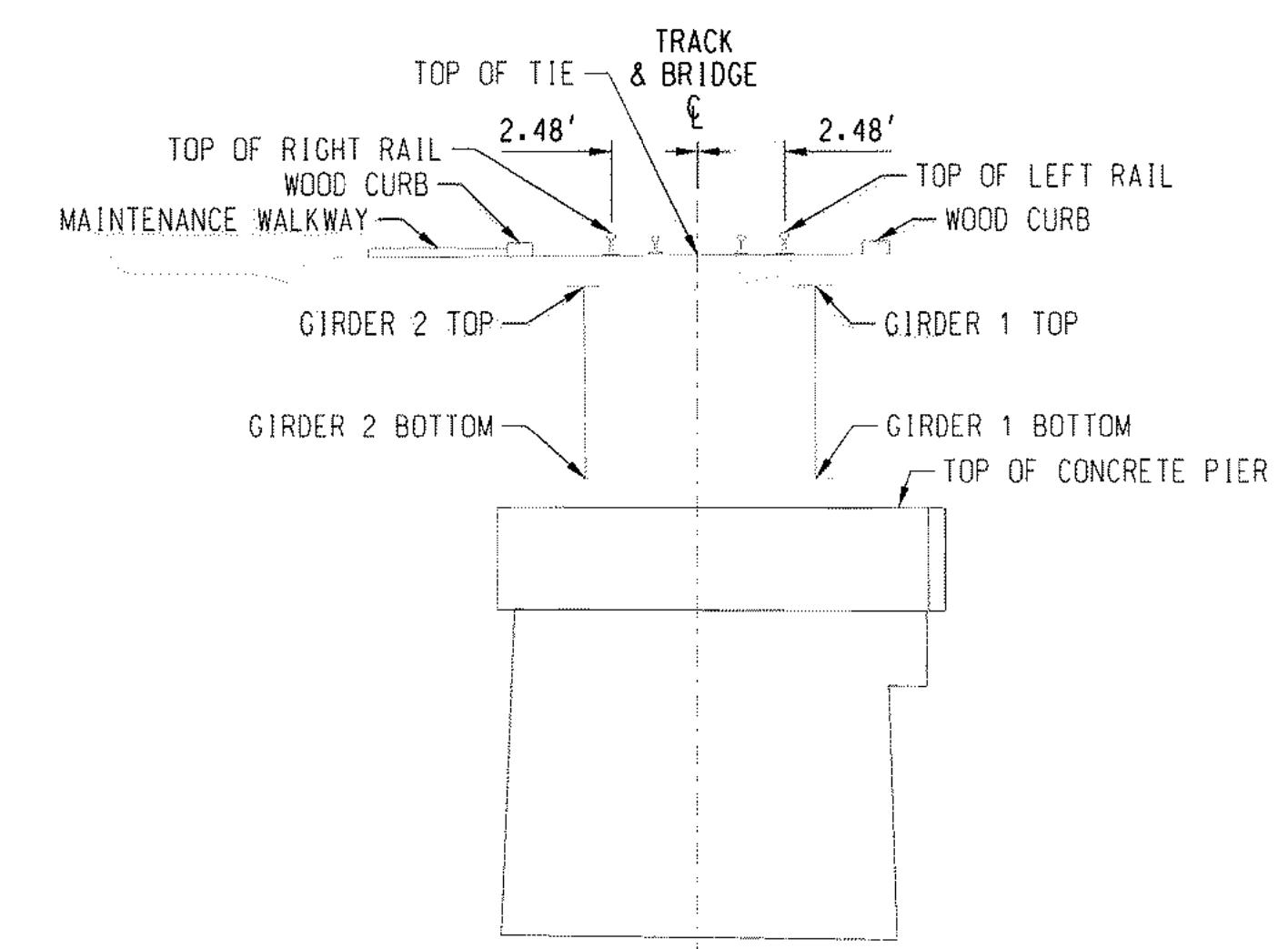
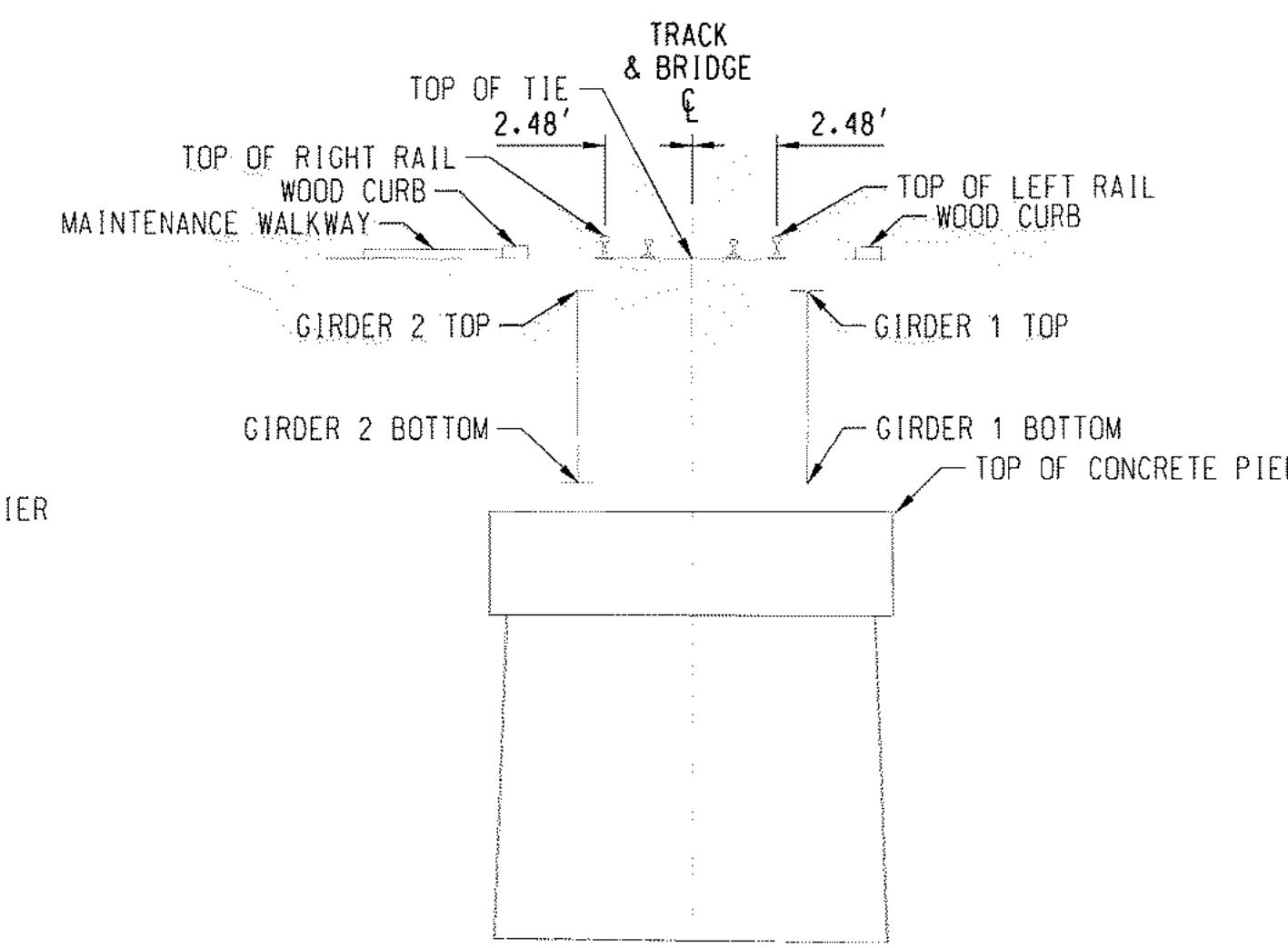
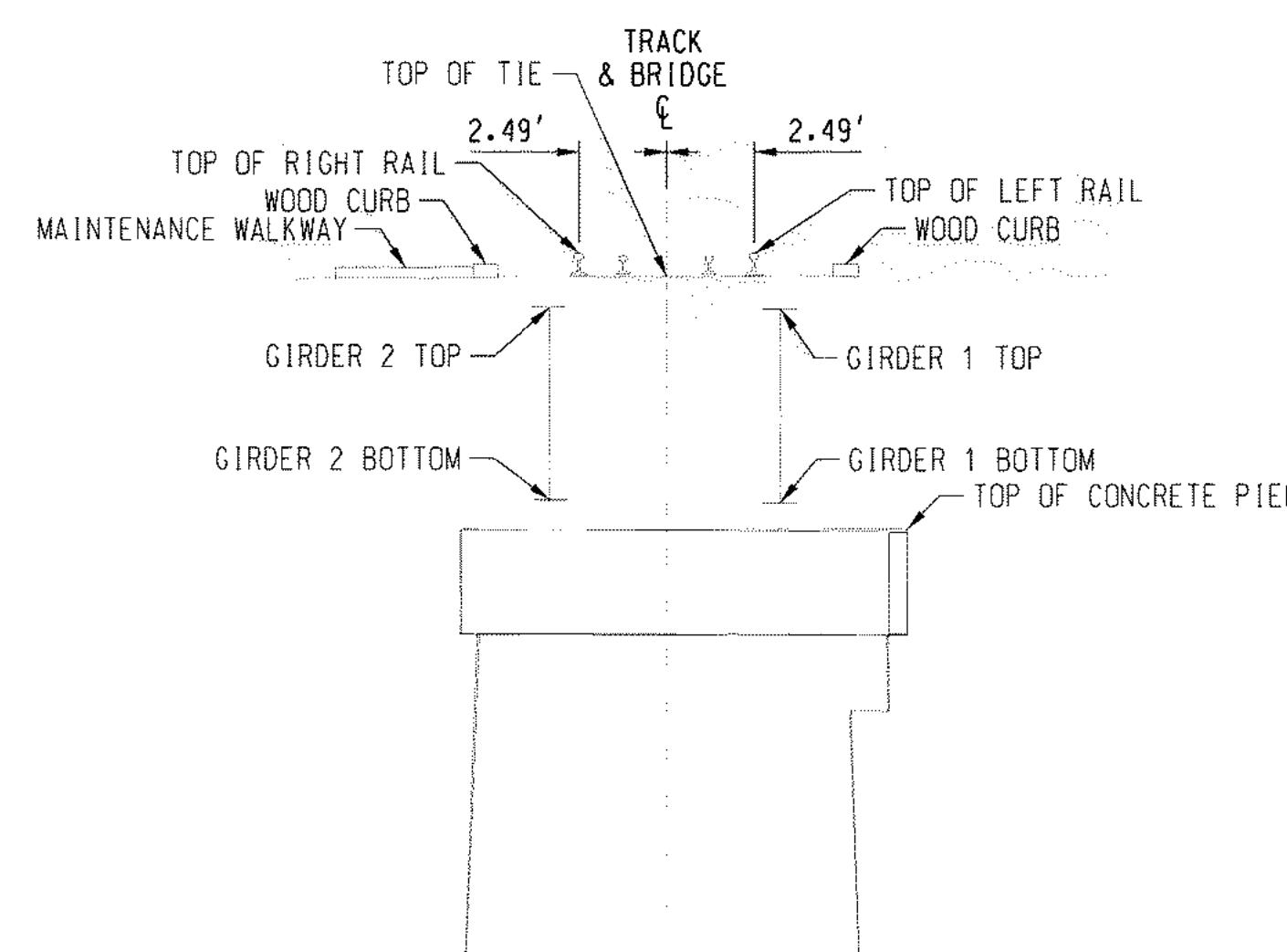
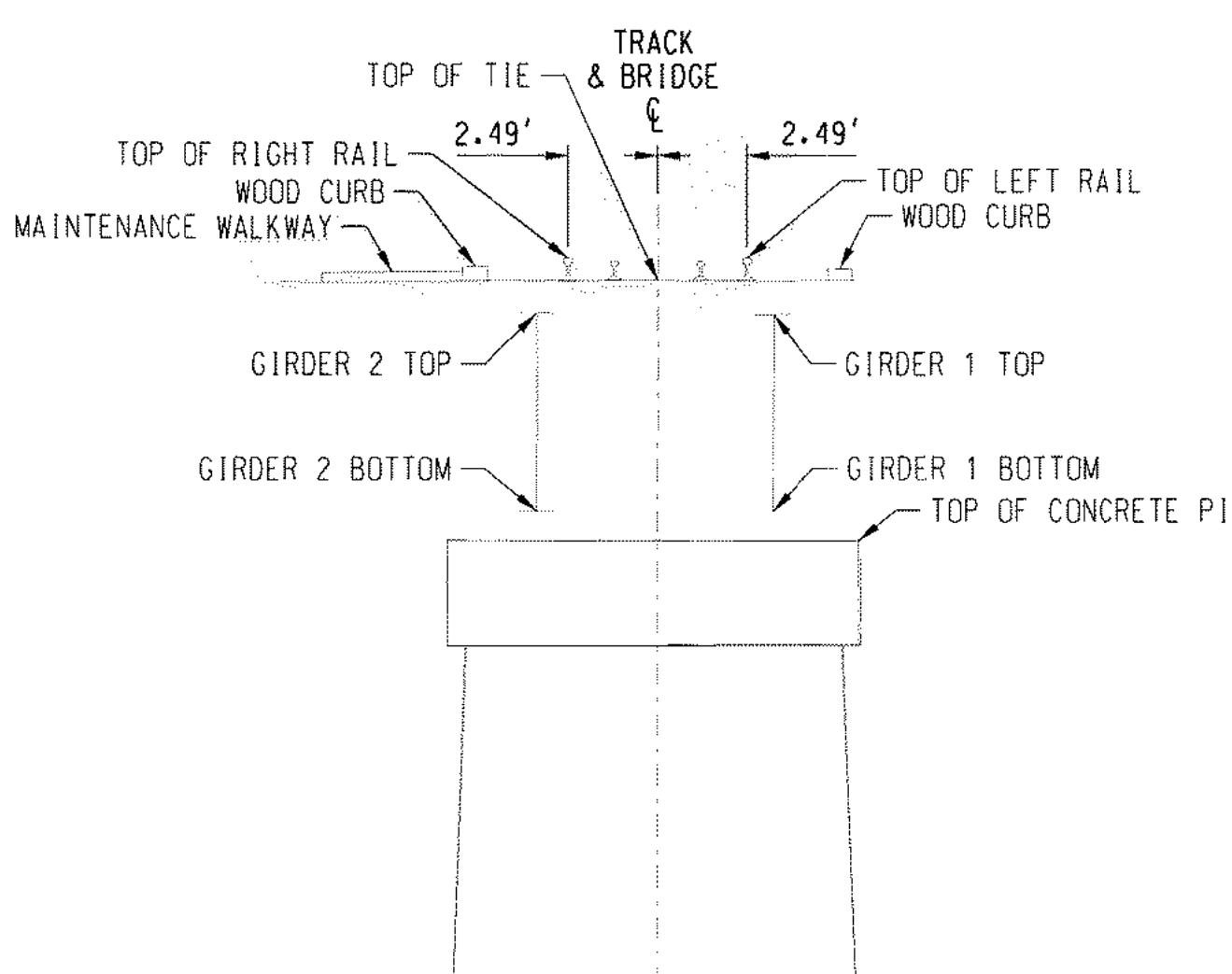
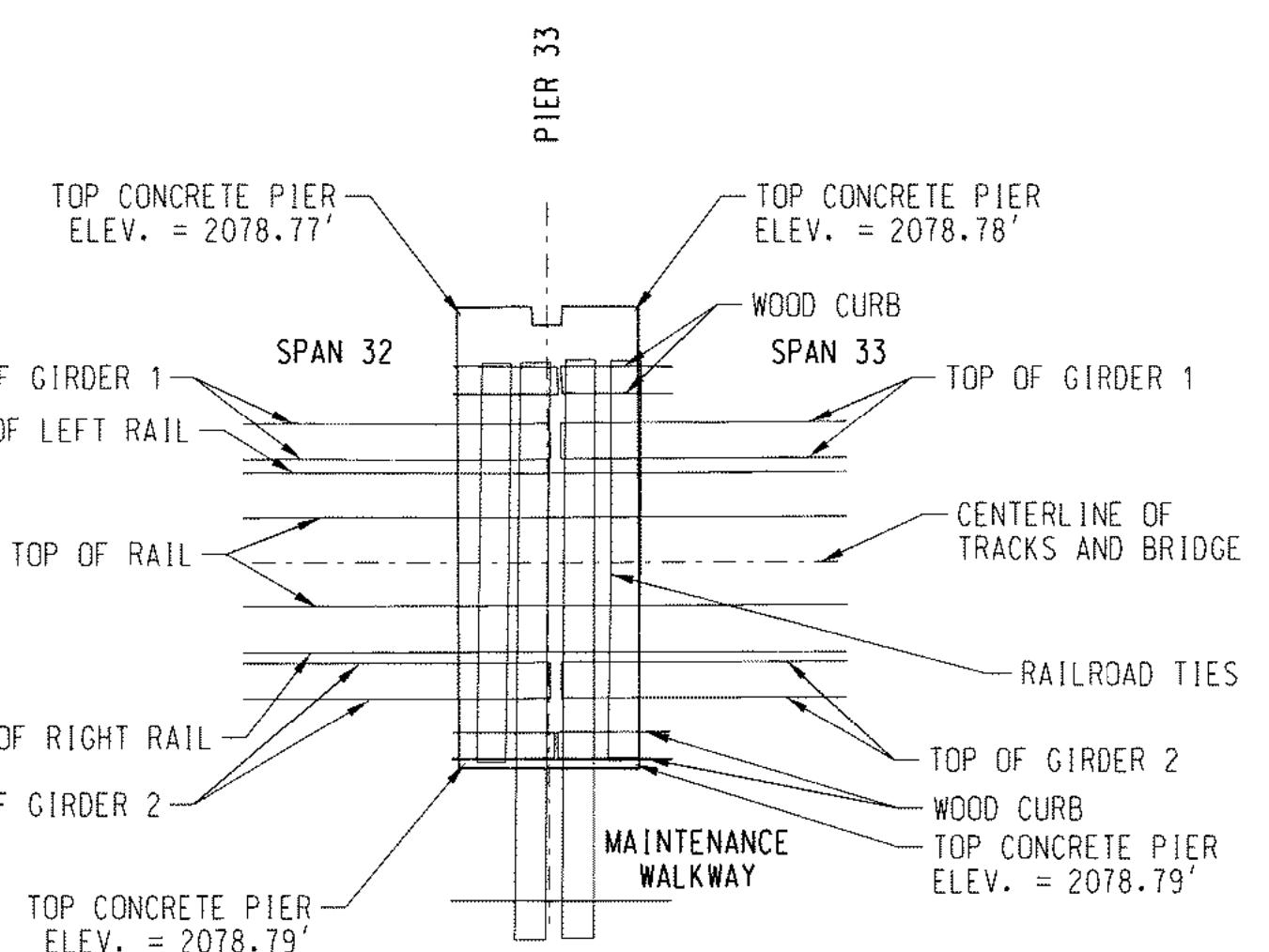
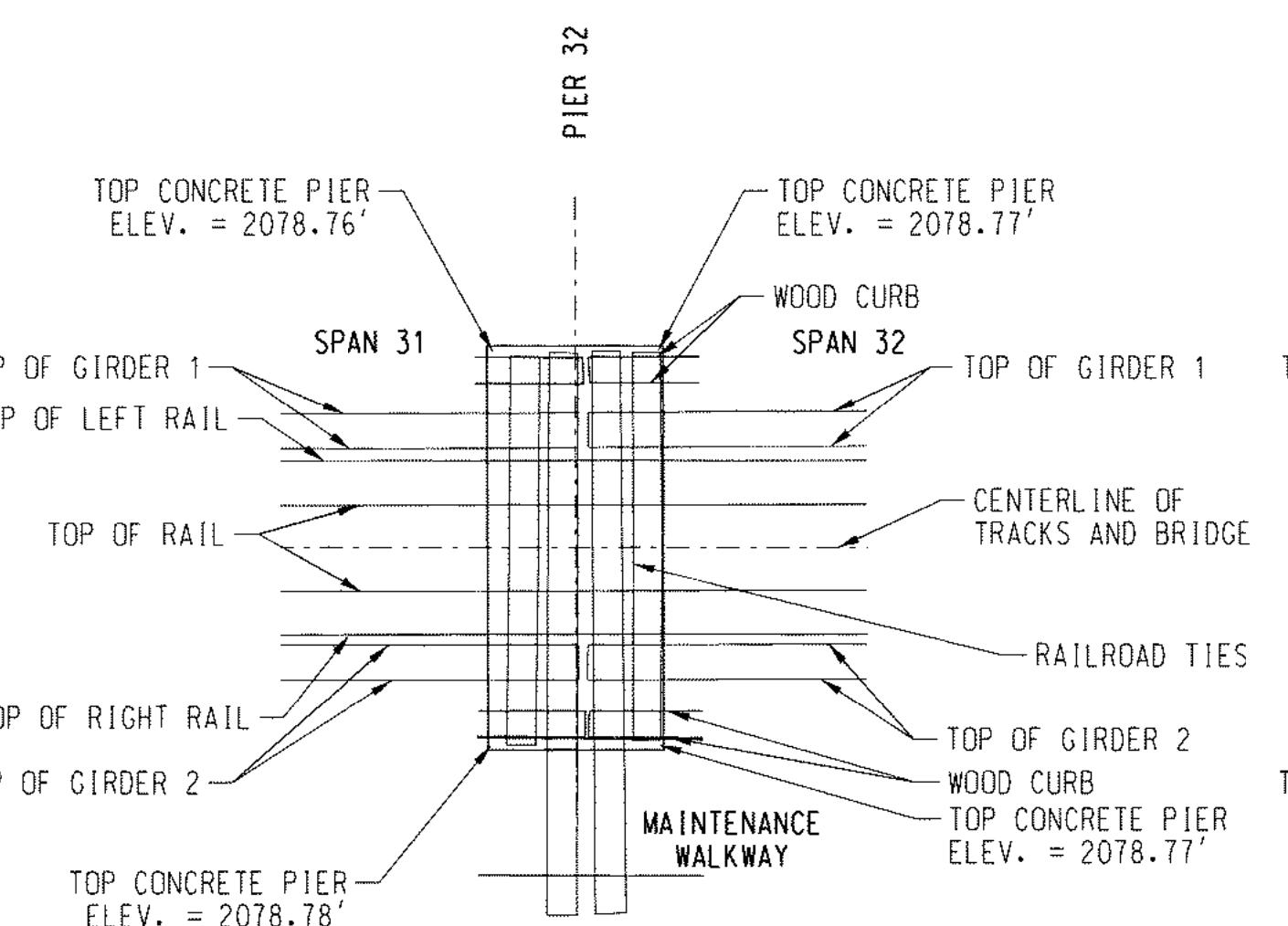
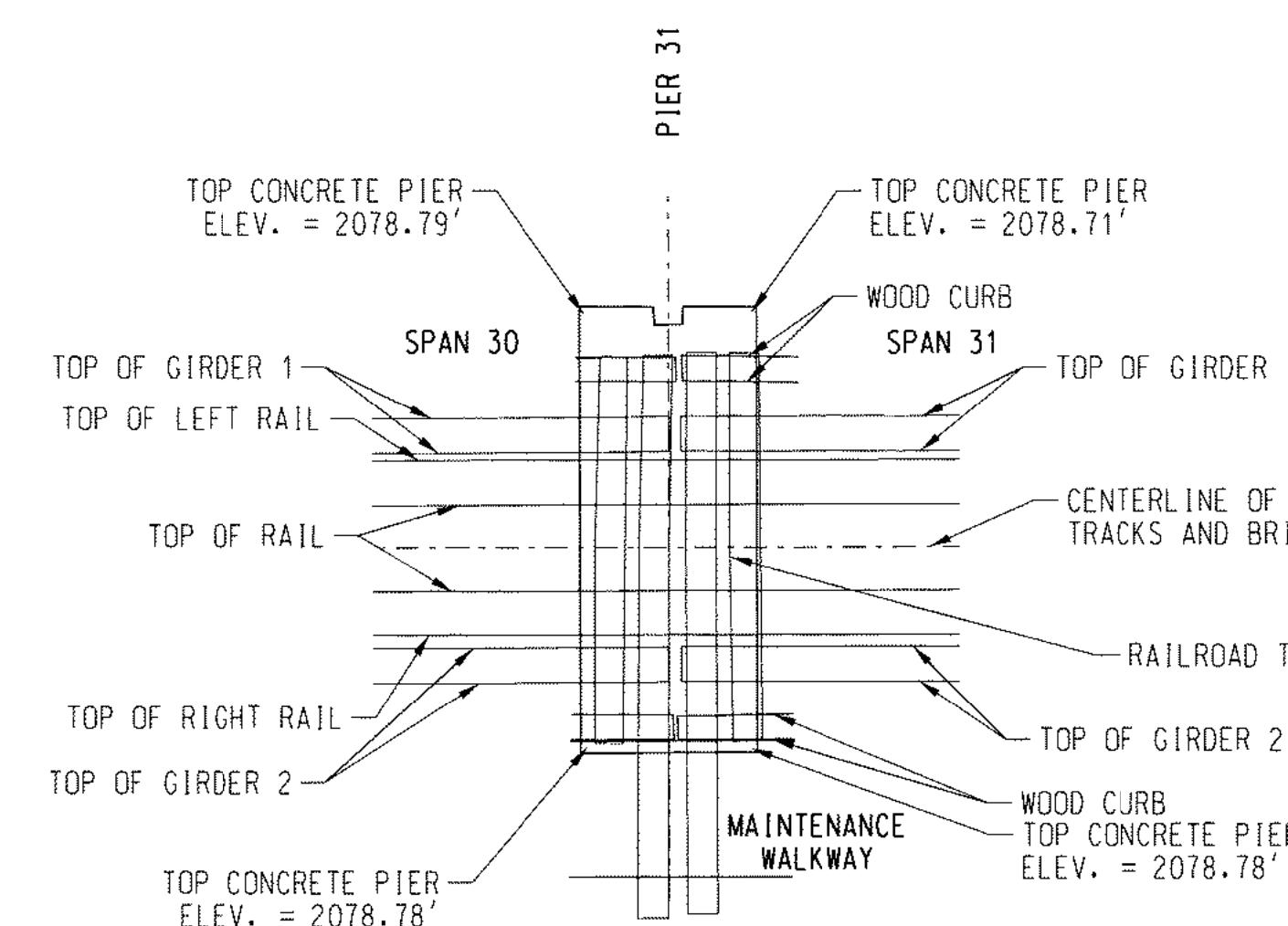
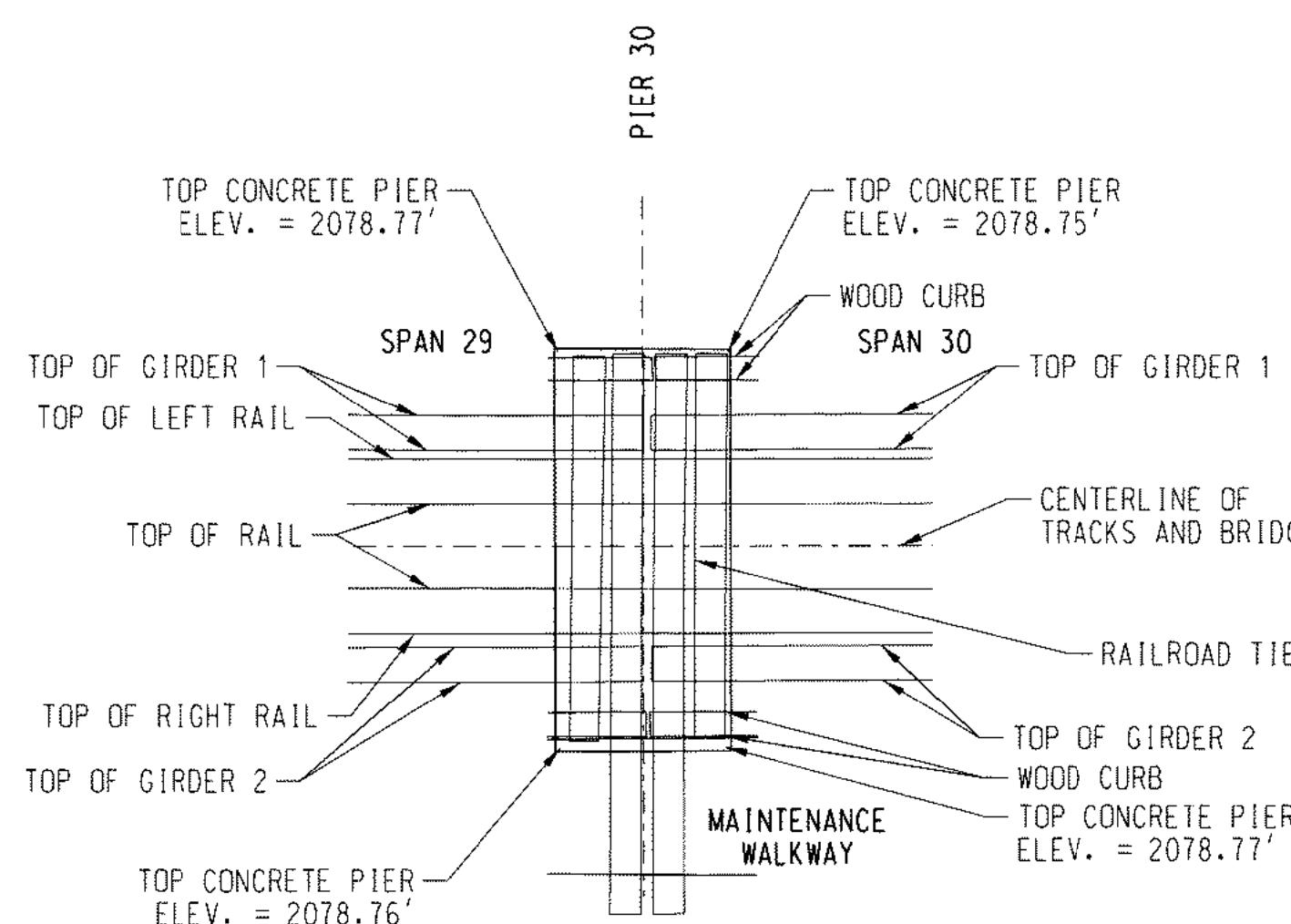


TABLE OF ELEVATIONS

| 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' |

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' |

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' |

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.

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

ASST. DIRECTOR STRUCTURES DESIGN

BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

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

PIER PLAN & PROFILES

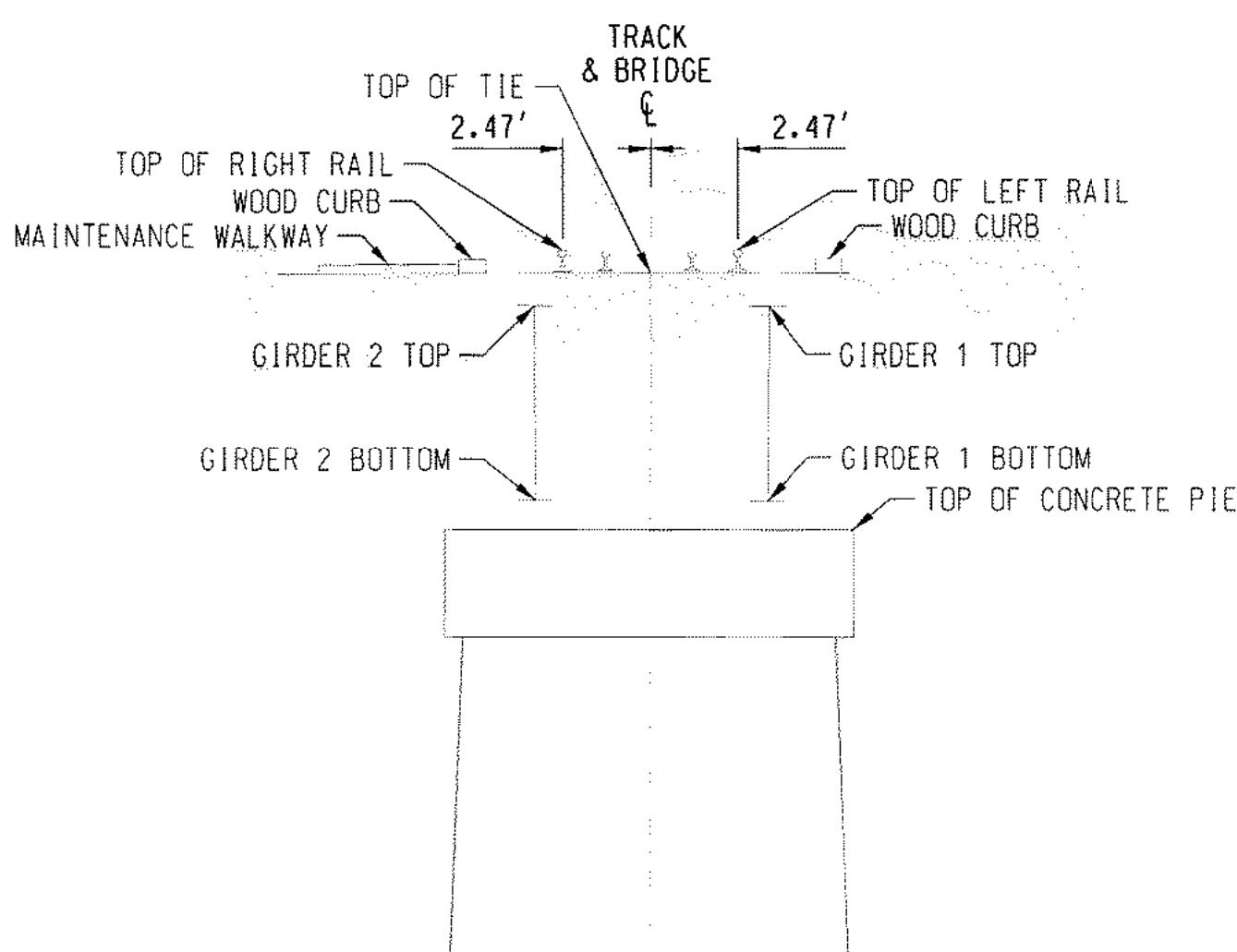
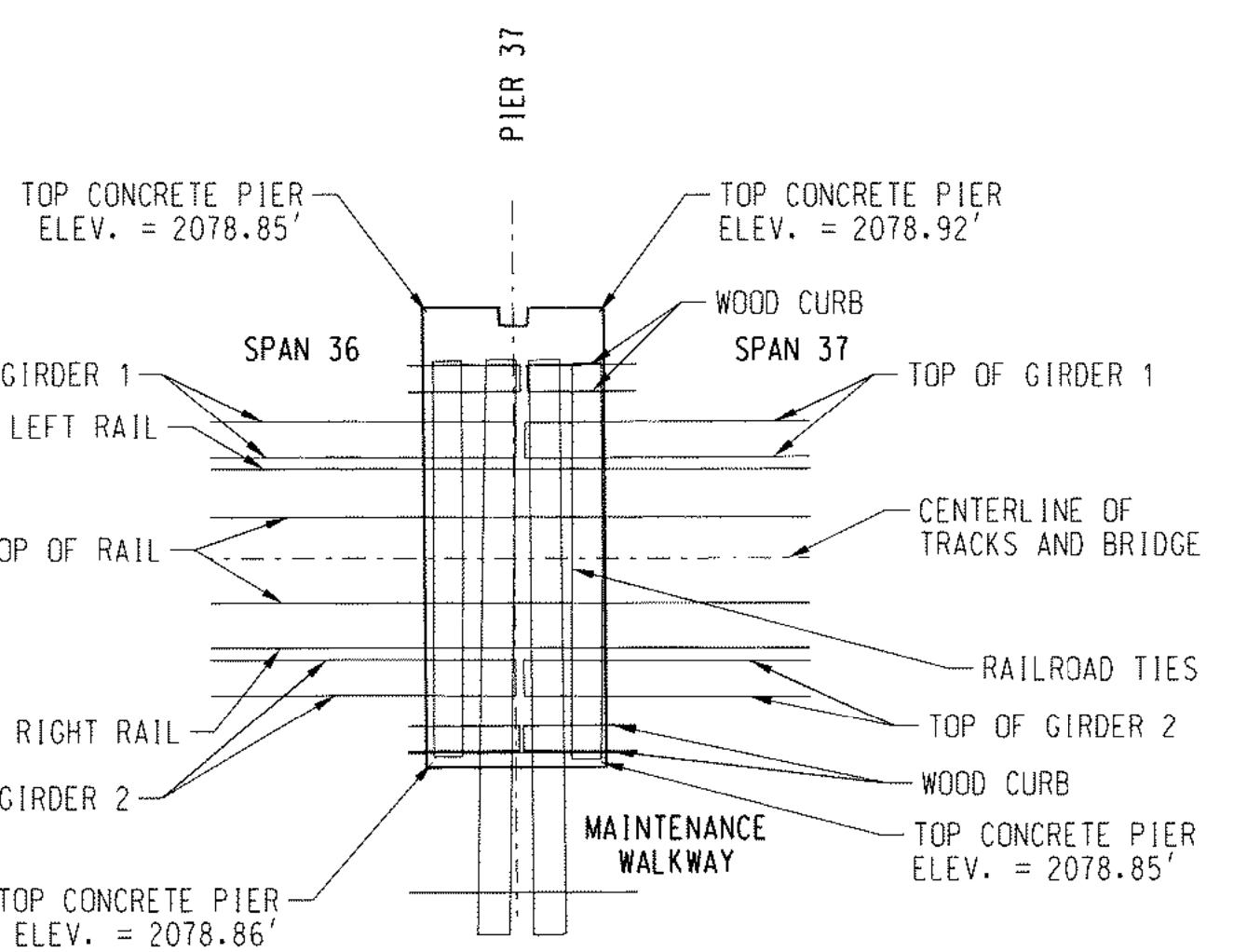
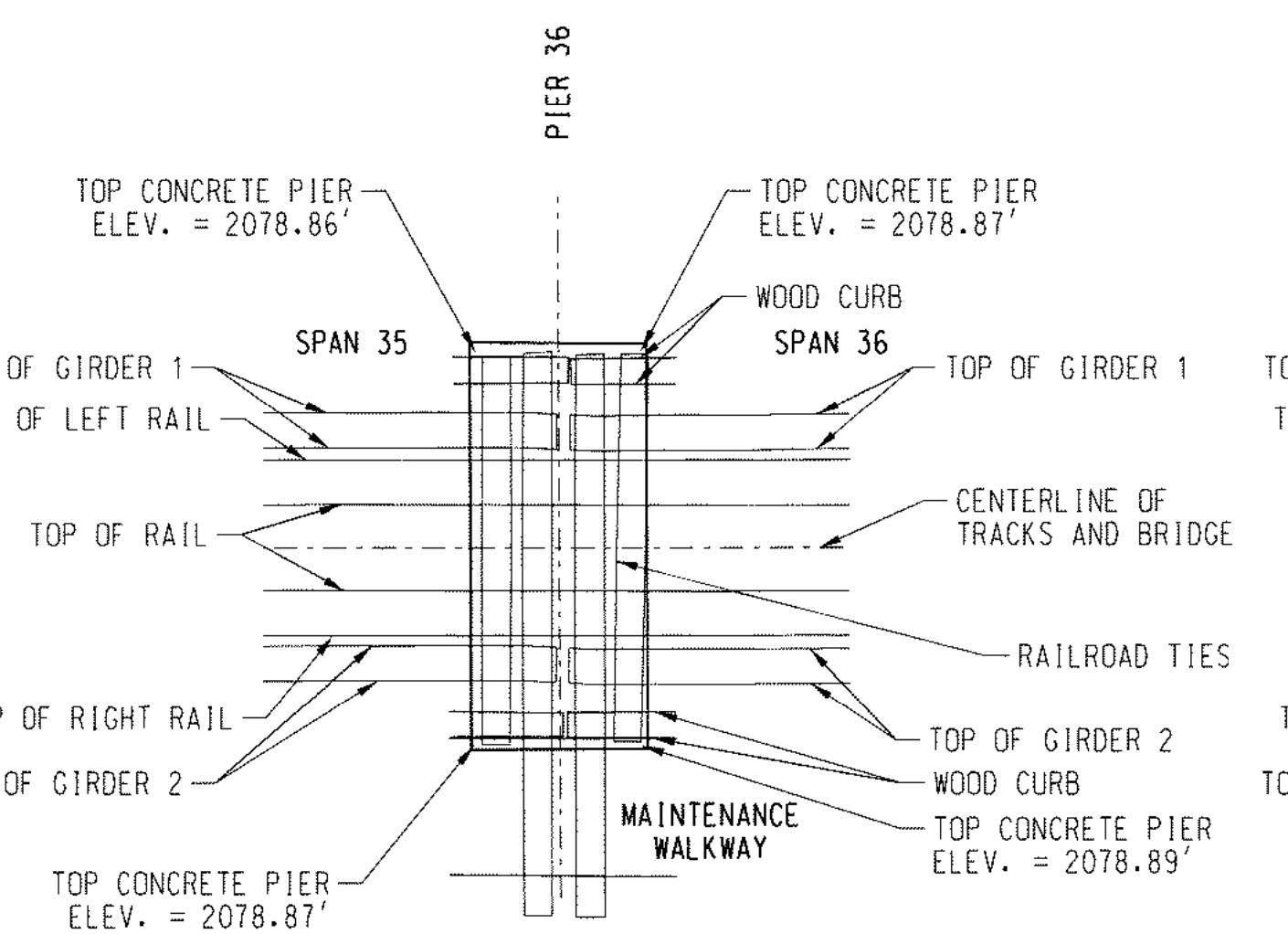
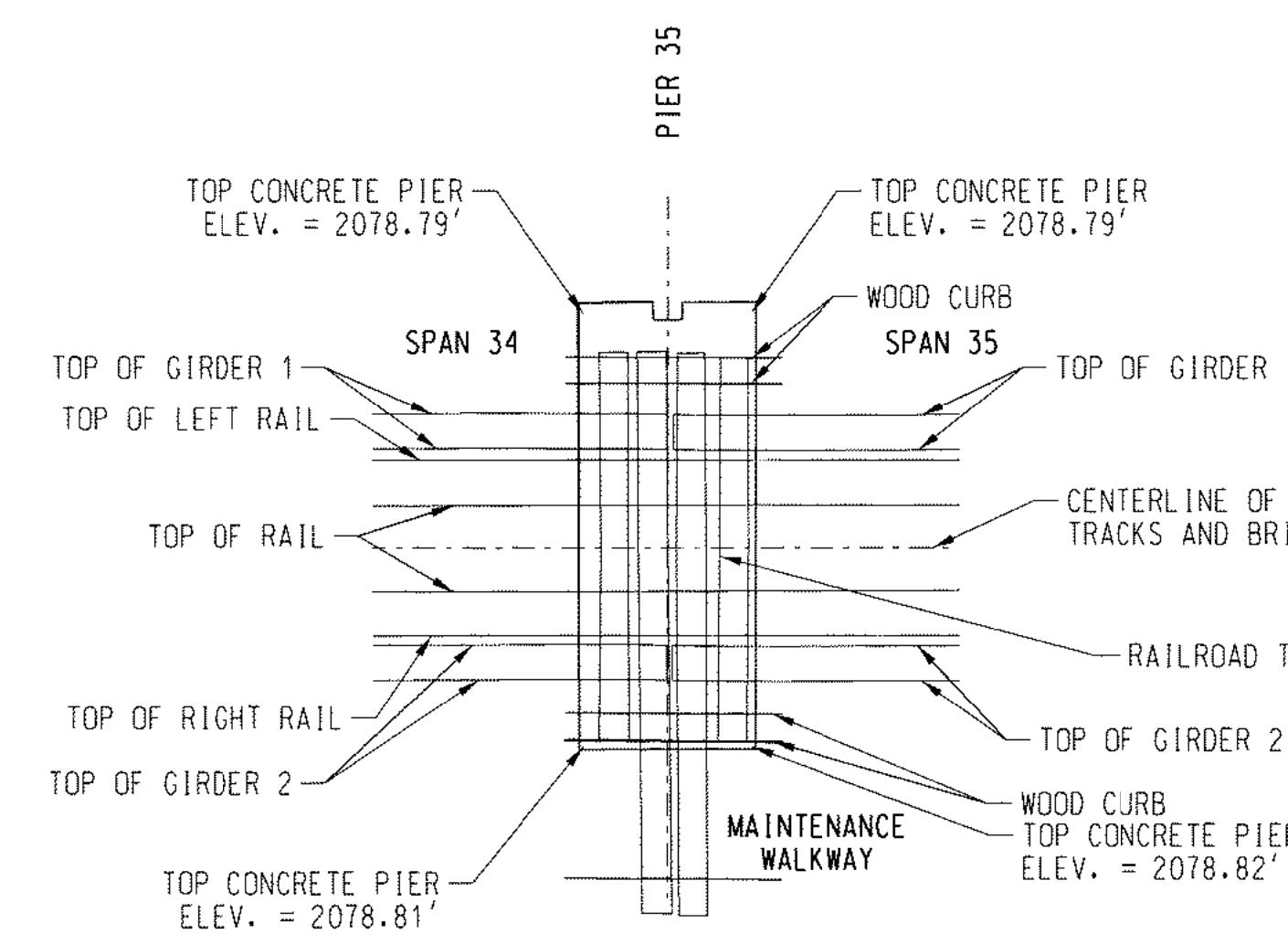
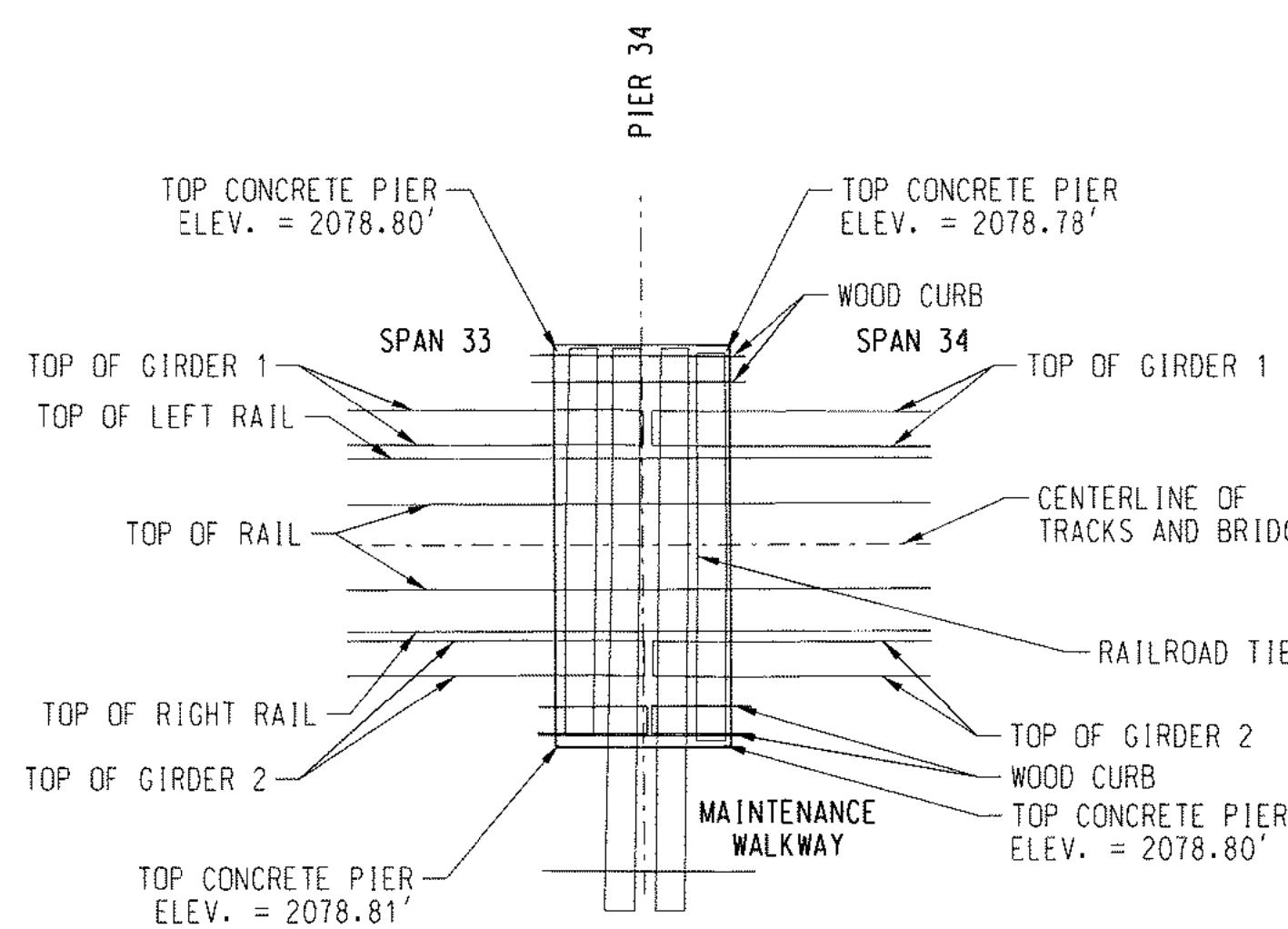
PLAN NO: 0045-003.900-009 SHEET: 9 OF 24

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

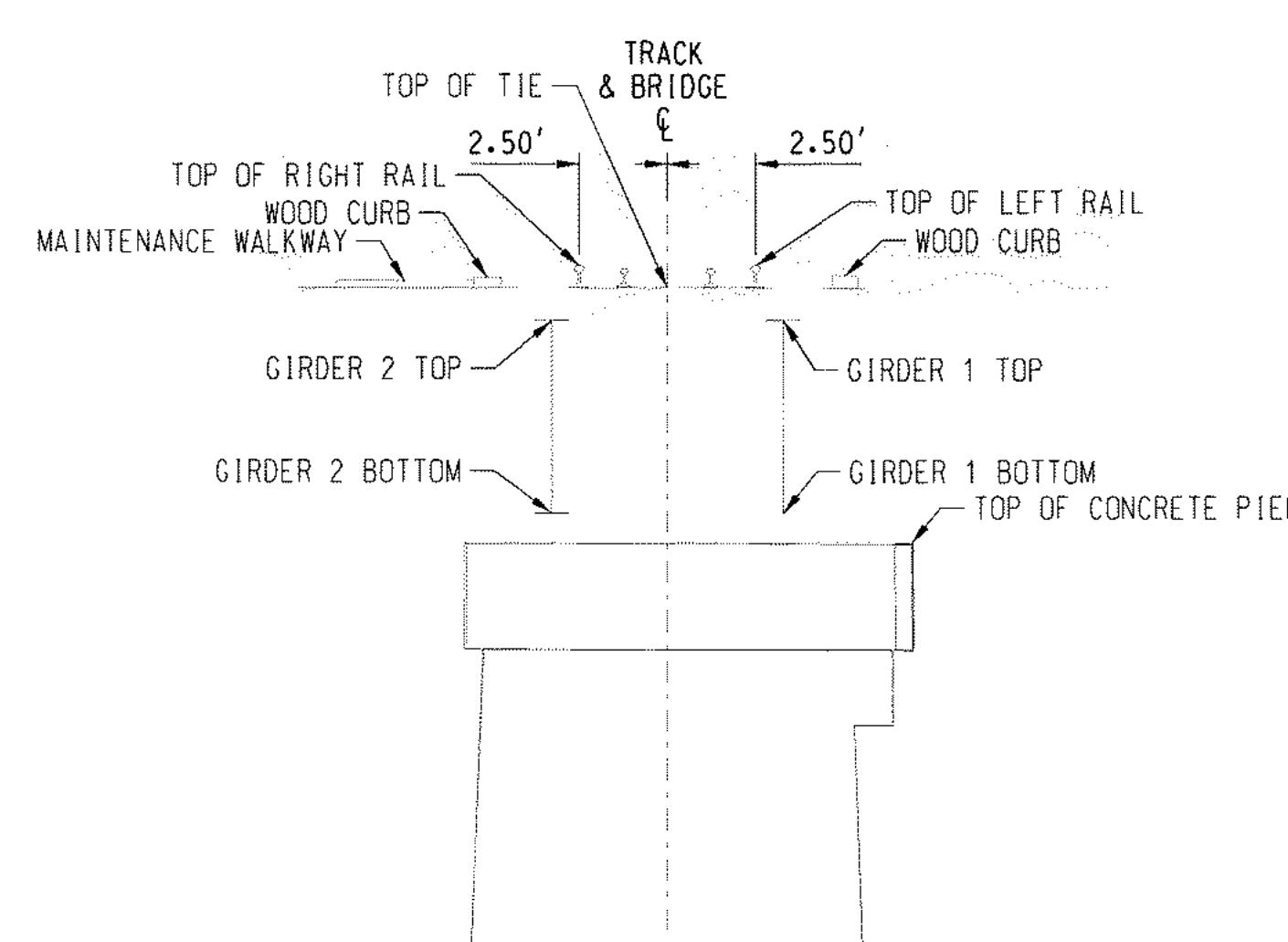
WEST
TO EAST ALGOMA, ID

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



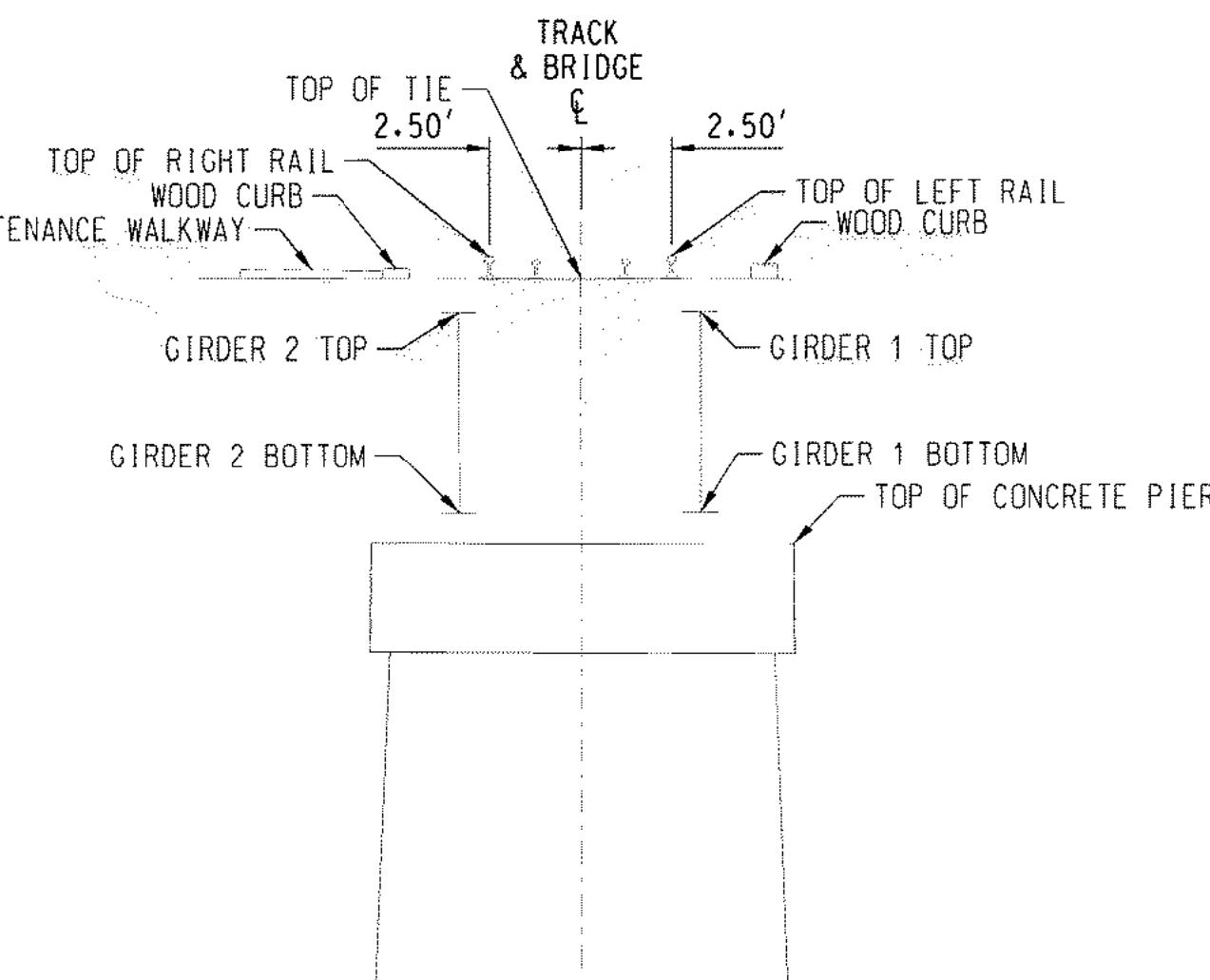
PIER 34
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.71' | 2086.06' | 2086.71' |



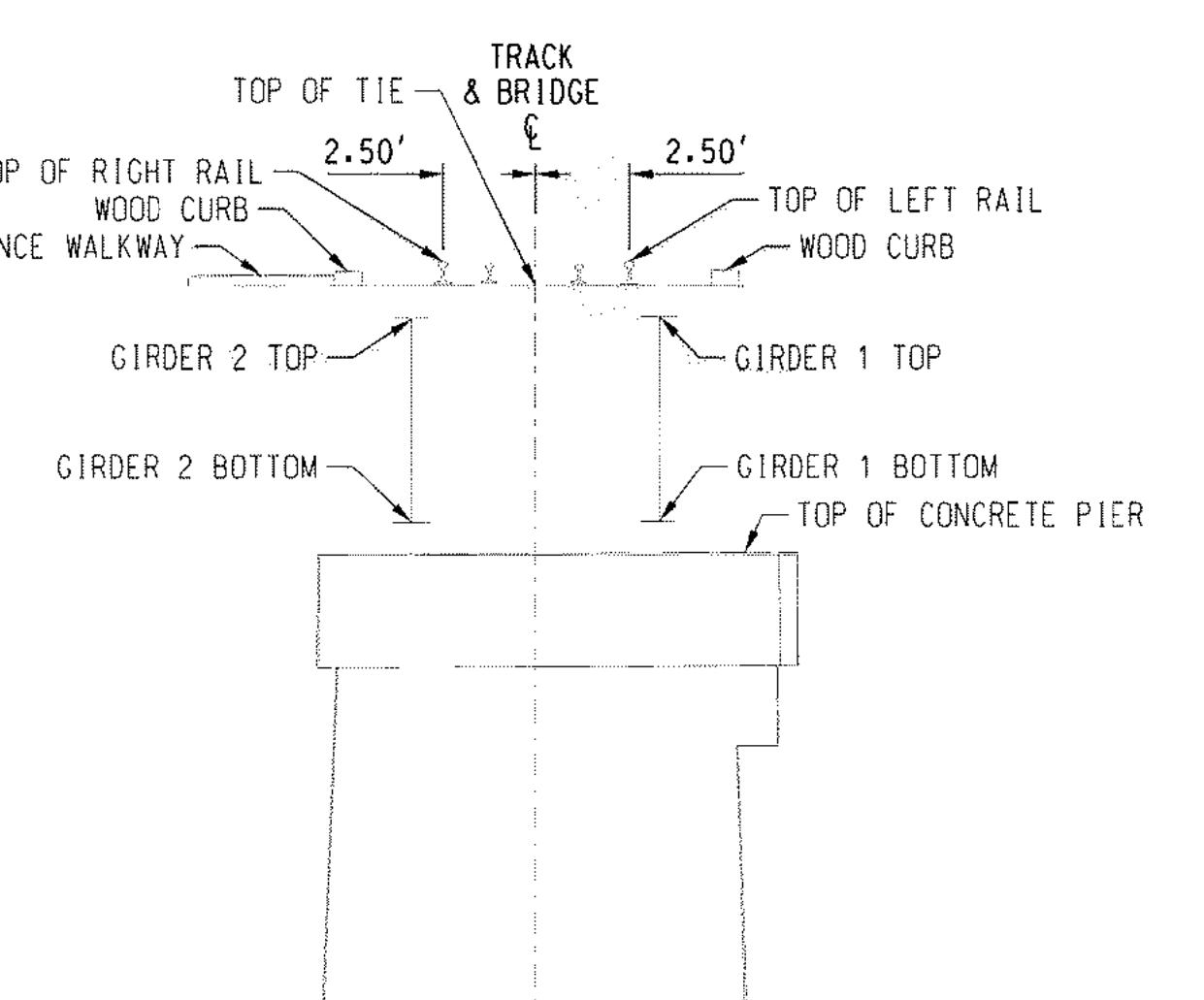
PIER 35
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.75' | 2086.11' | 2086.74' |



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' |



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 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' |

| 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' |

| 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' |

| 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:
- 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: 0045-003.900-010
SHEET: 10 OF 24



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

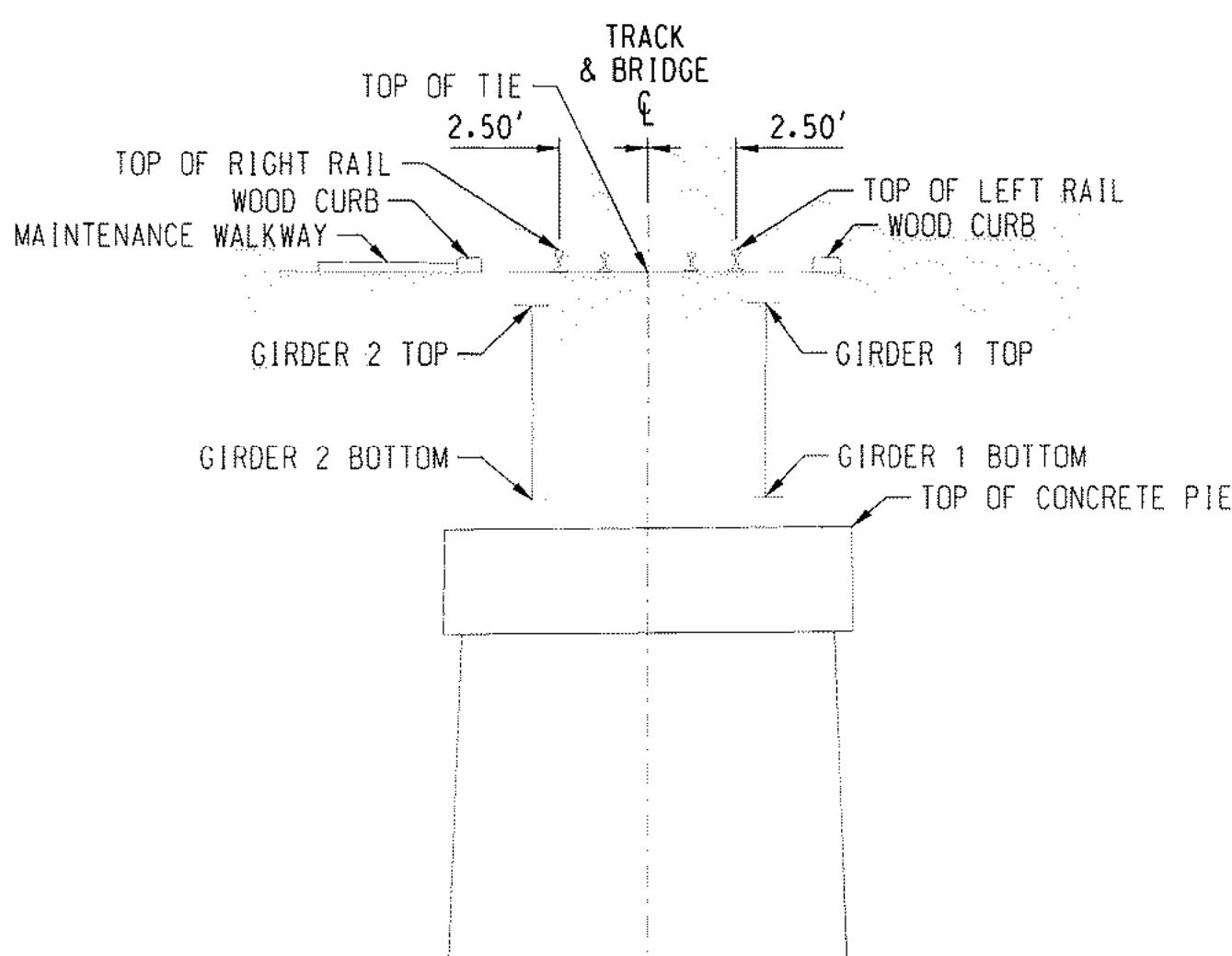
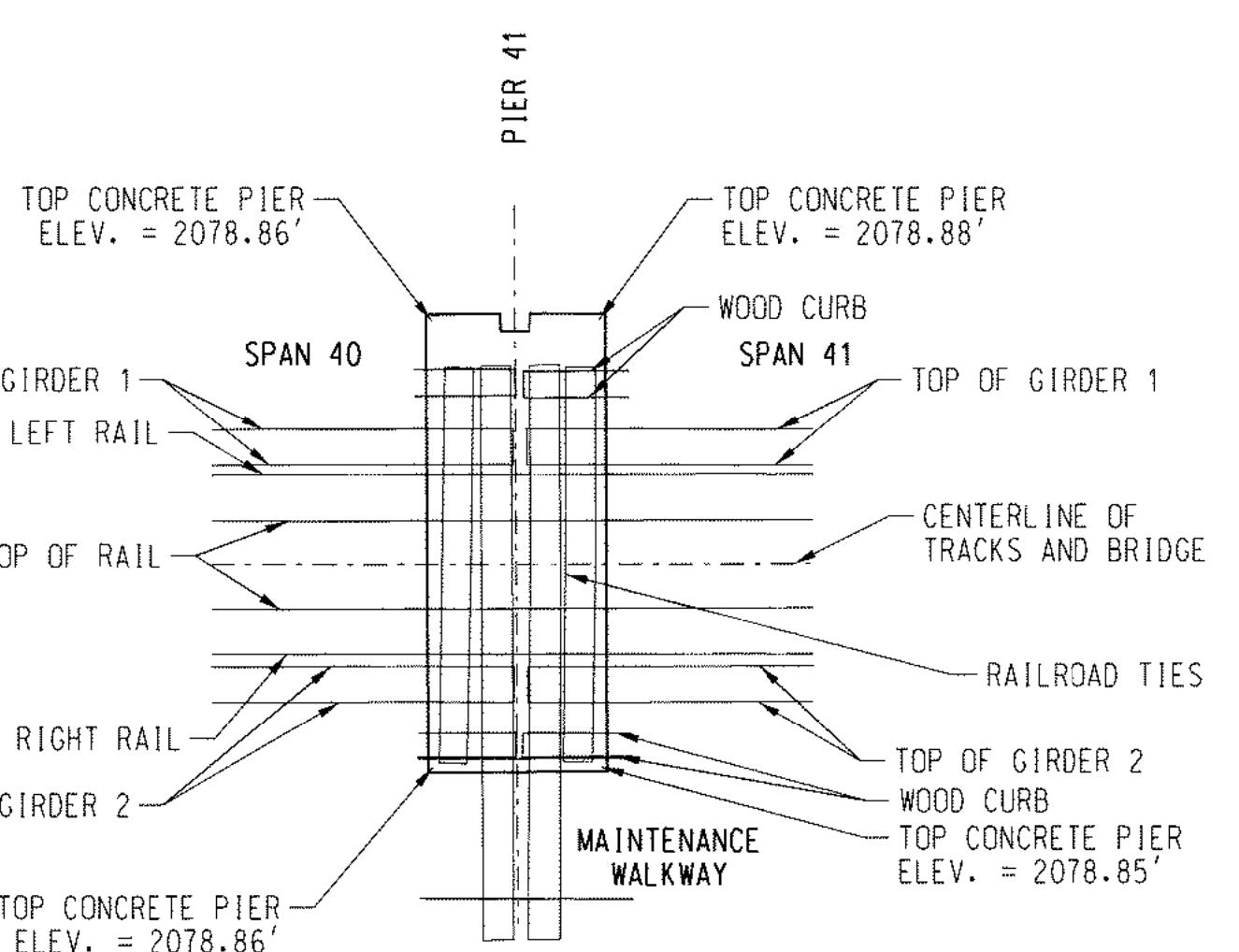
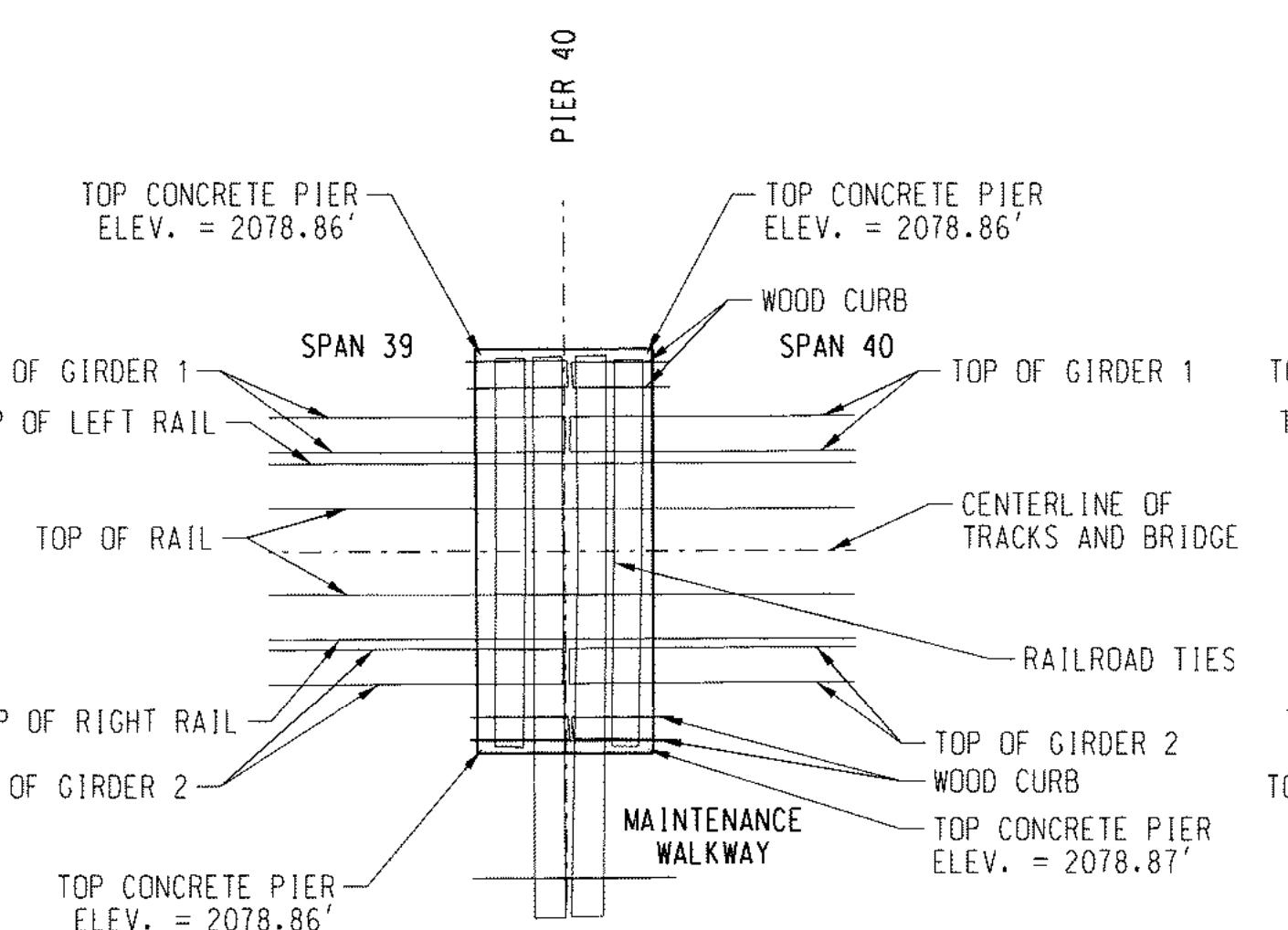
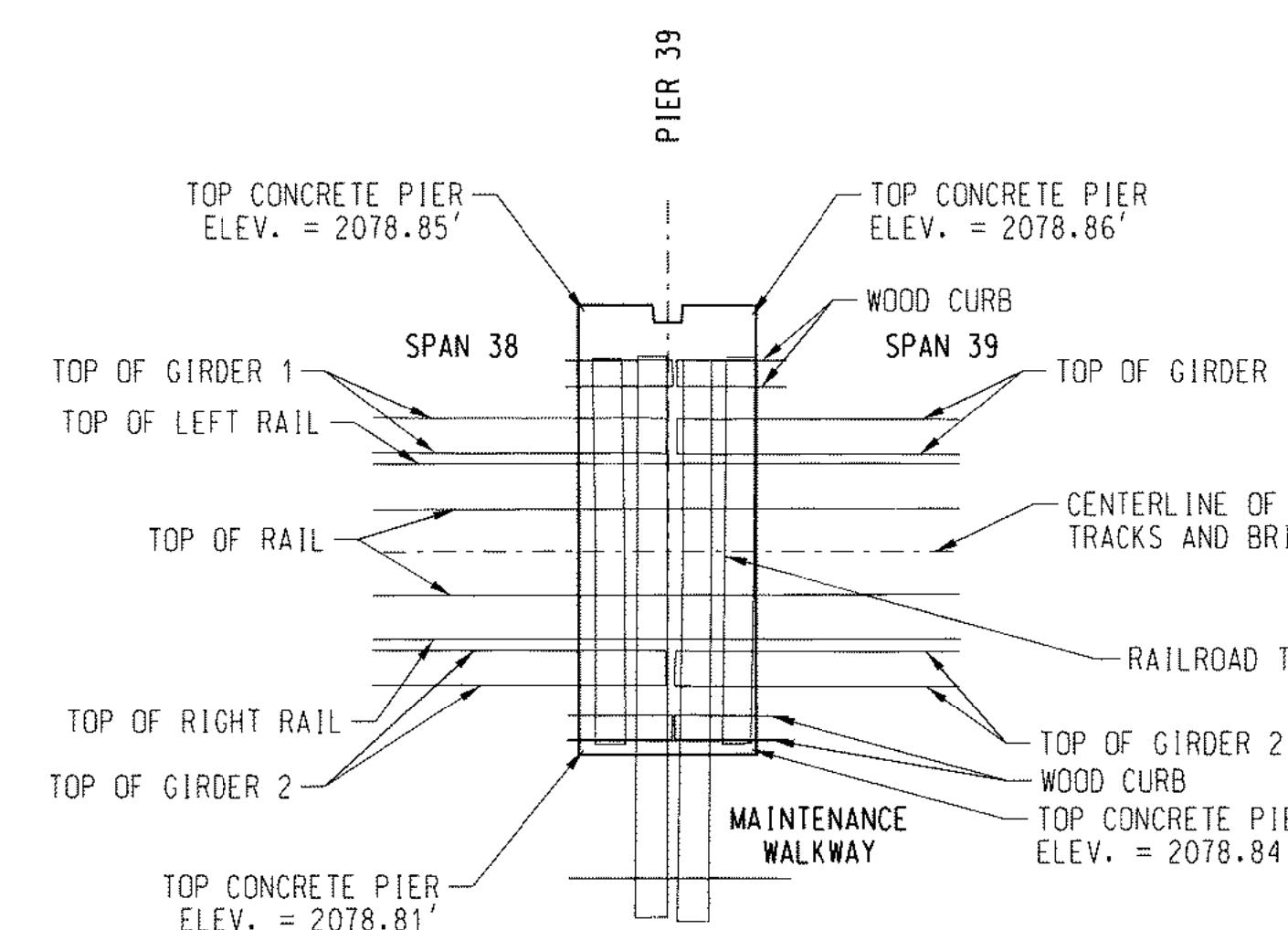
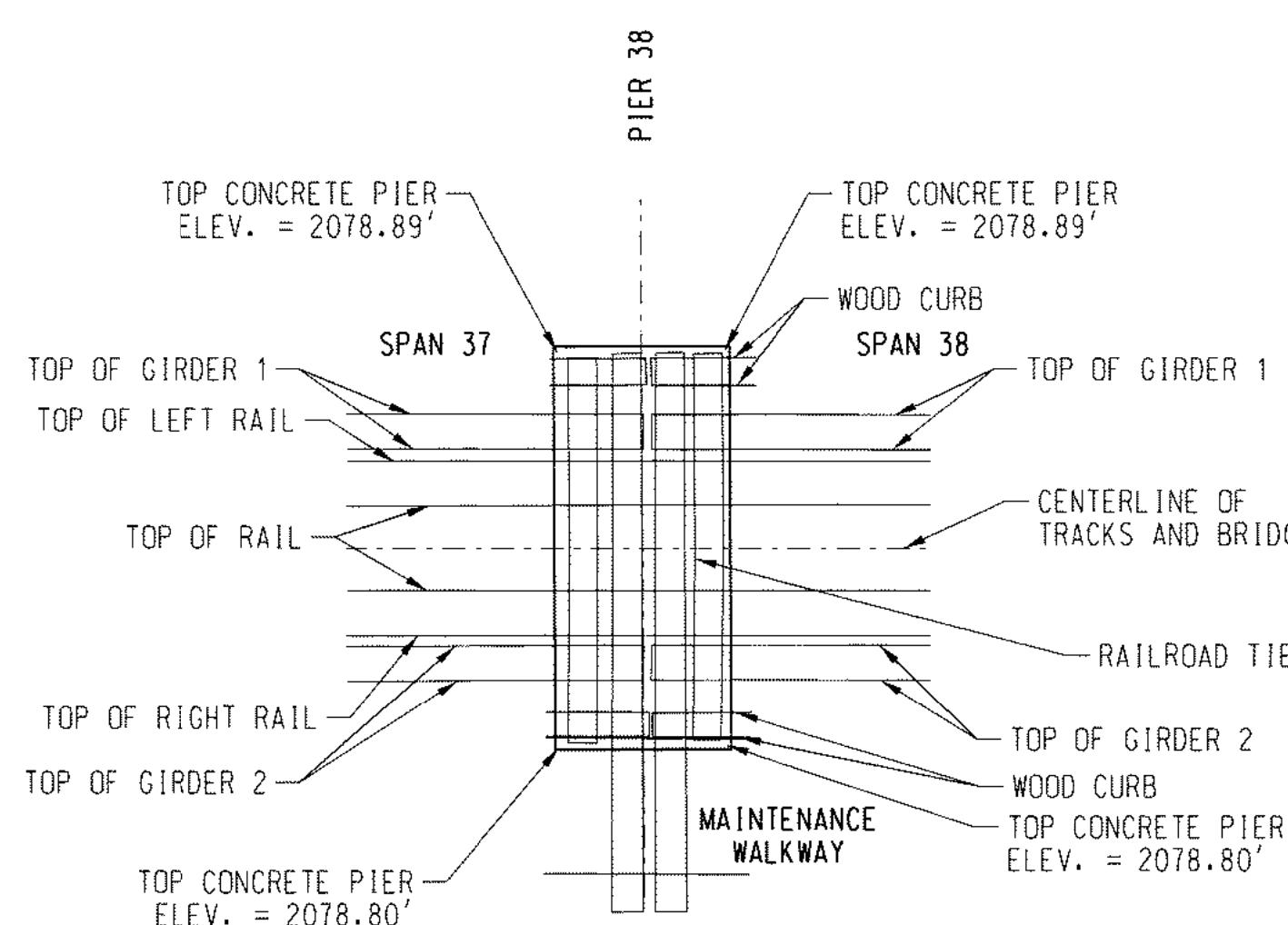
81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

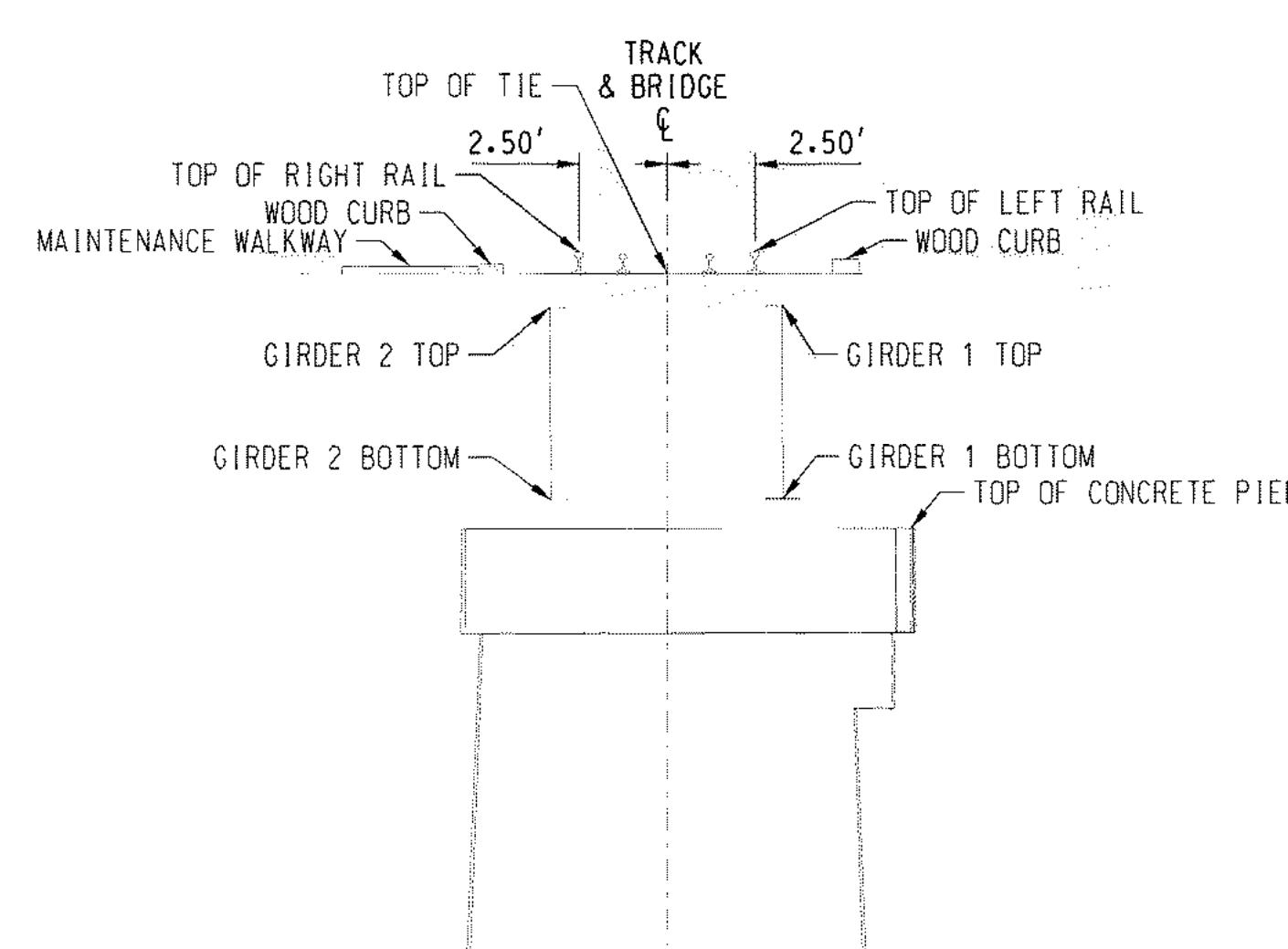
WEST
TO EAST ALGOMA, ID

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



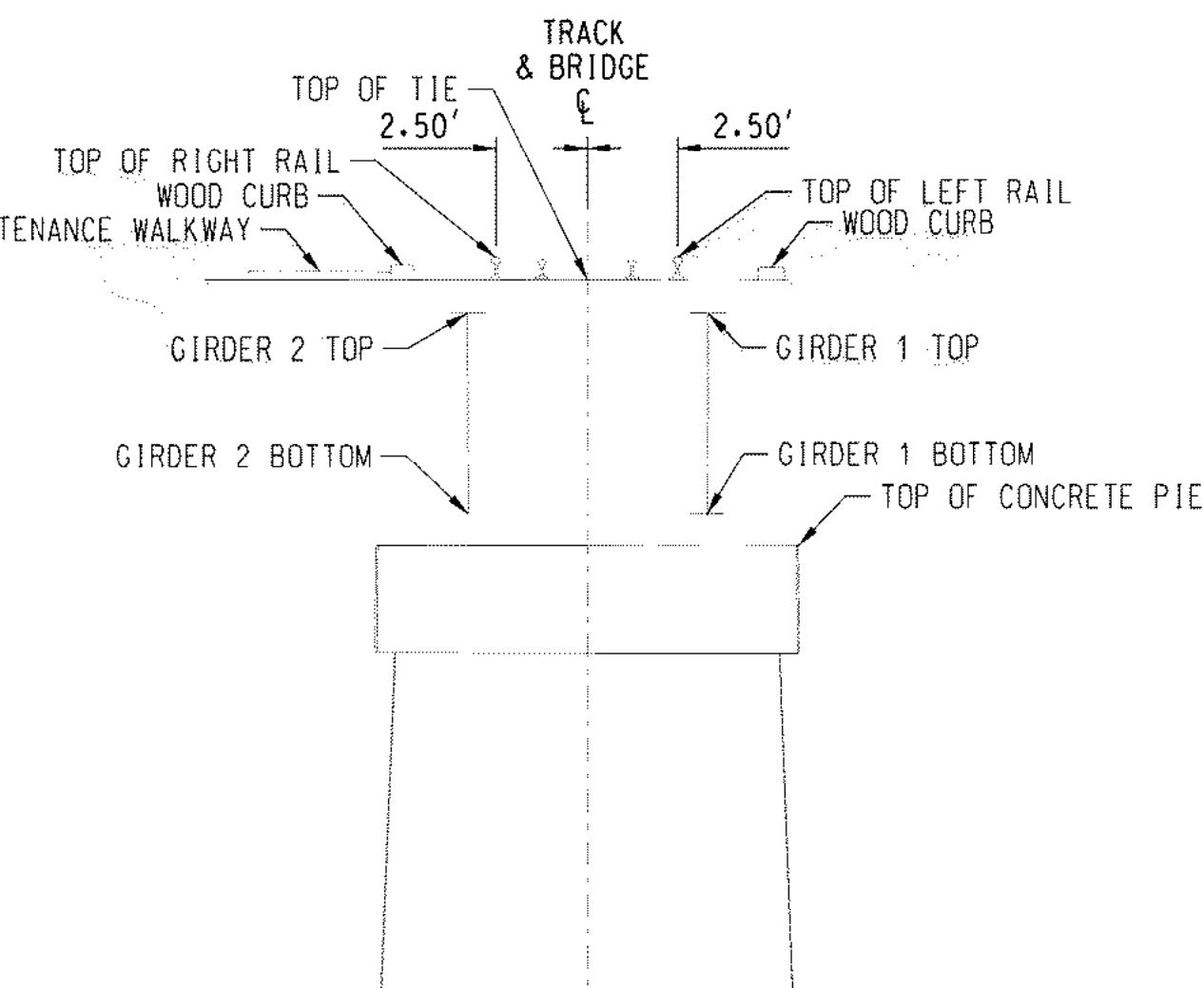
PIER 38
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.76' | 2086.11' | 2086.75' |



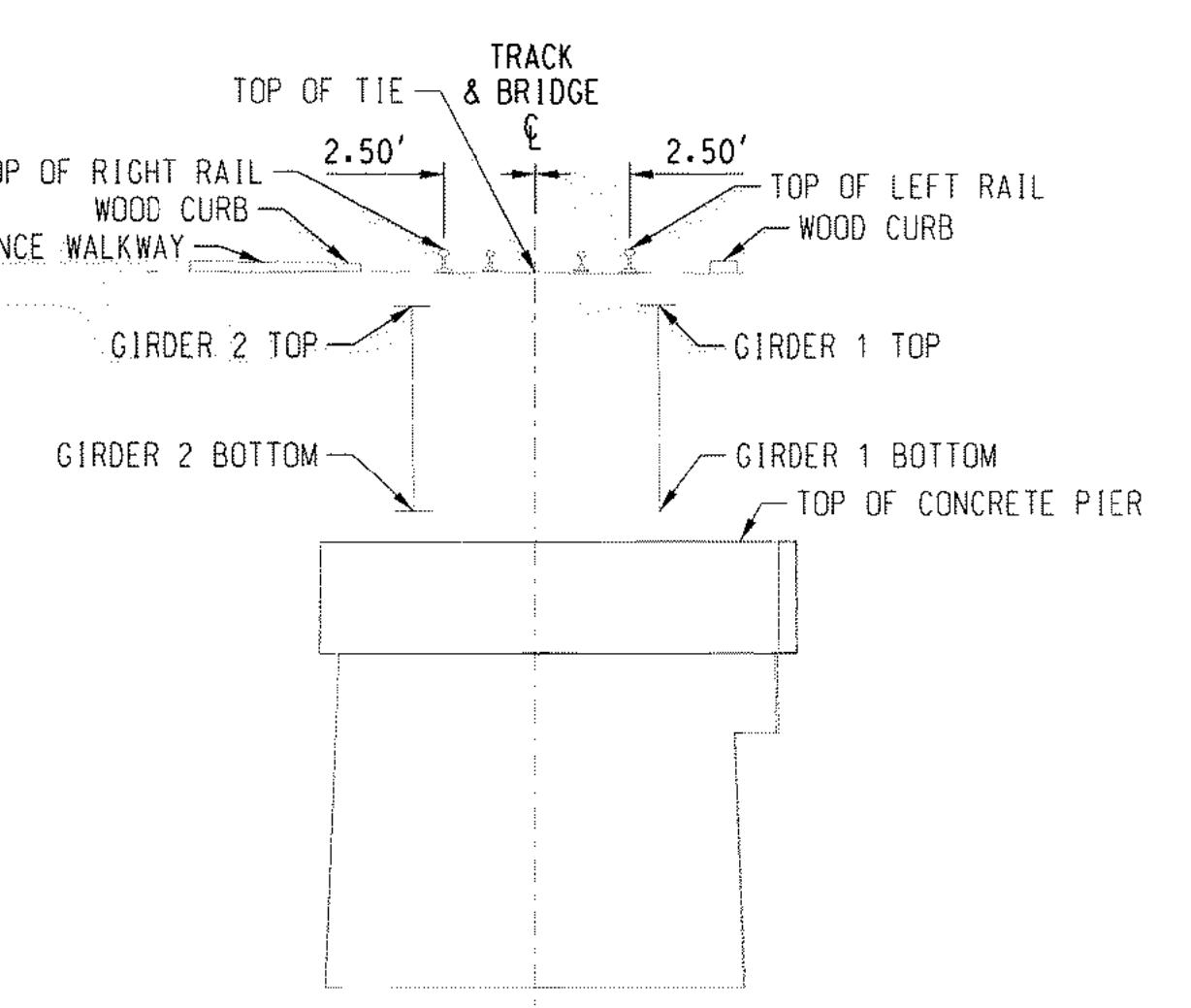
PIER 39
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.76' | 2086.14' | 2086.74' |



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' |



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 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' |

| 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' |

| 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' |

| 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

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



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

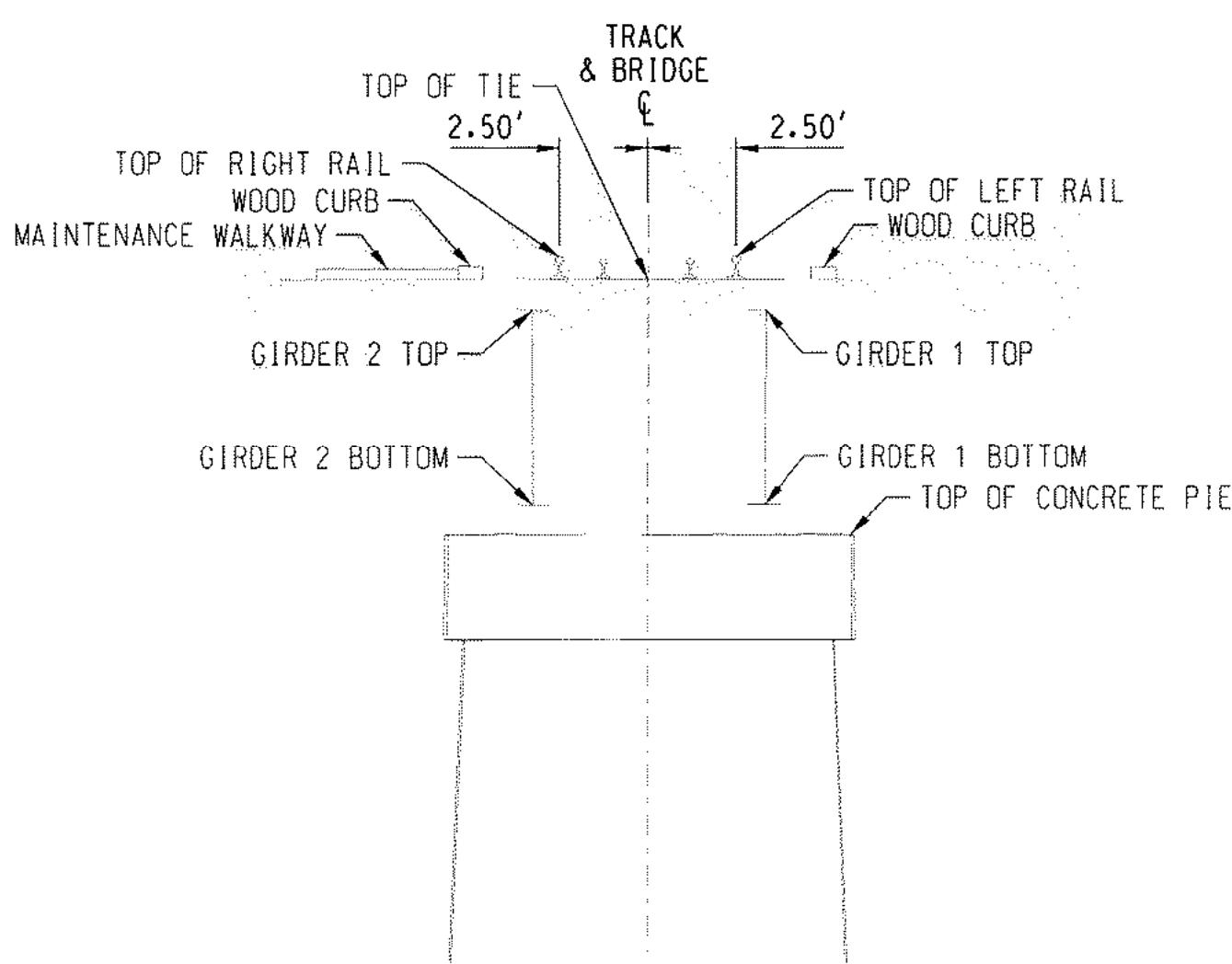
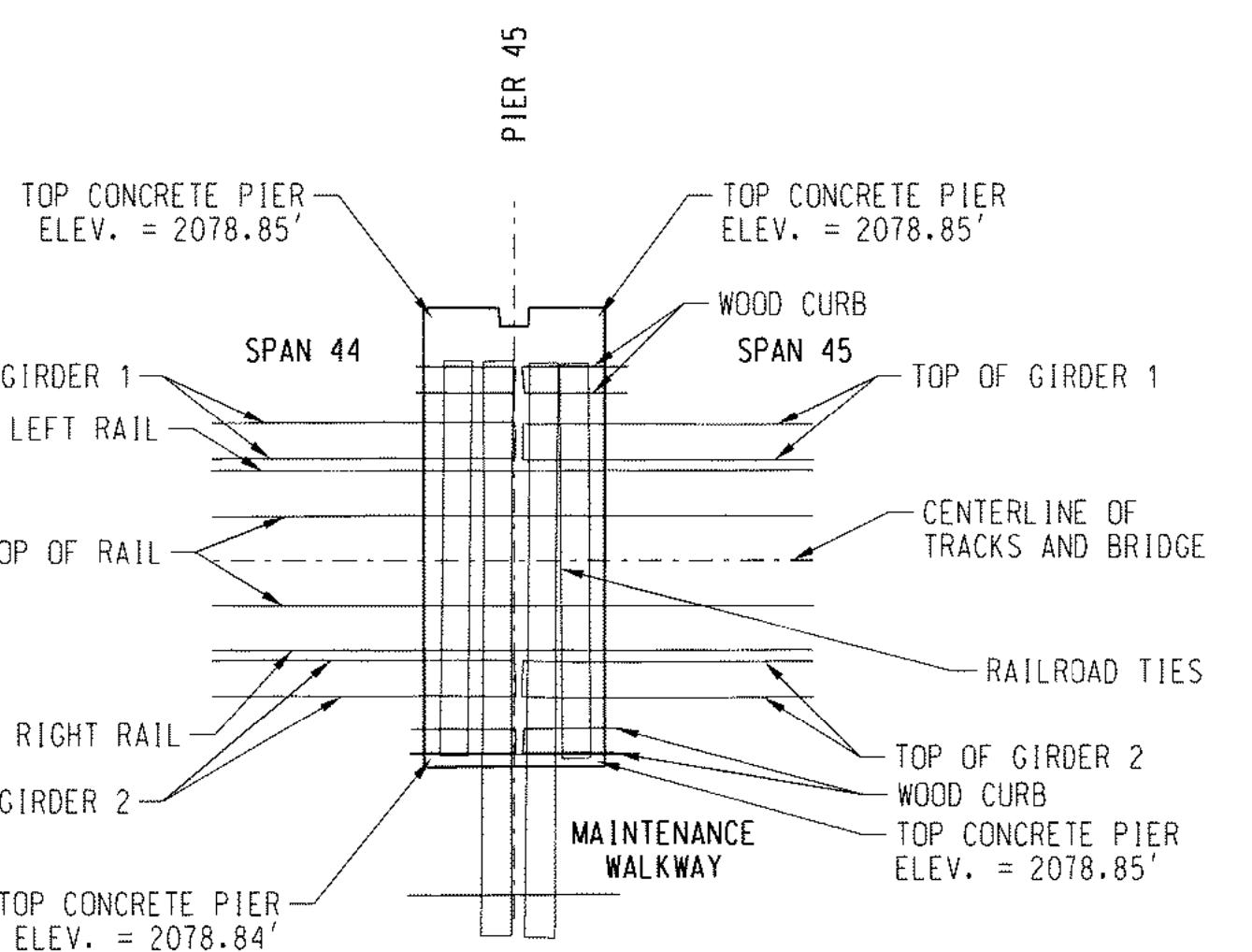
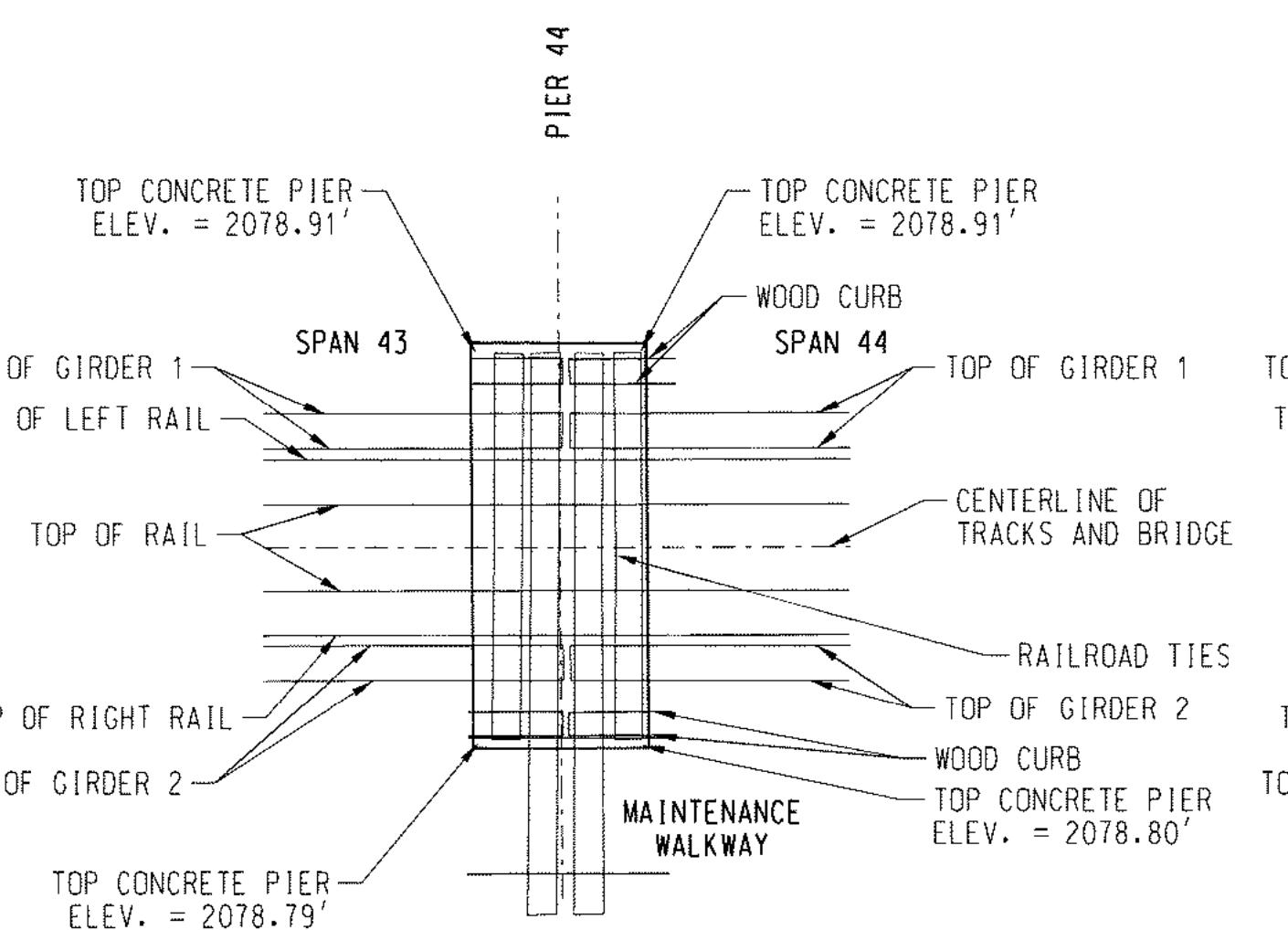
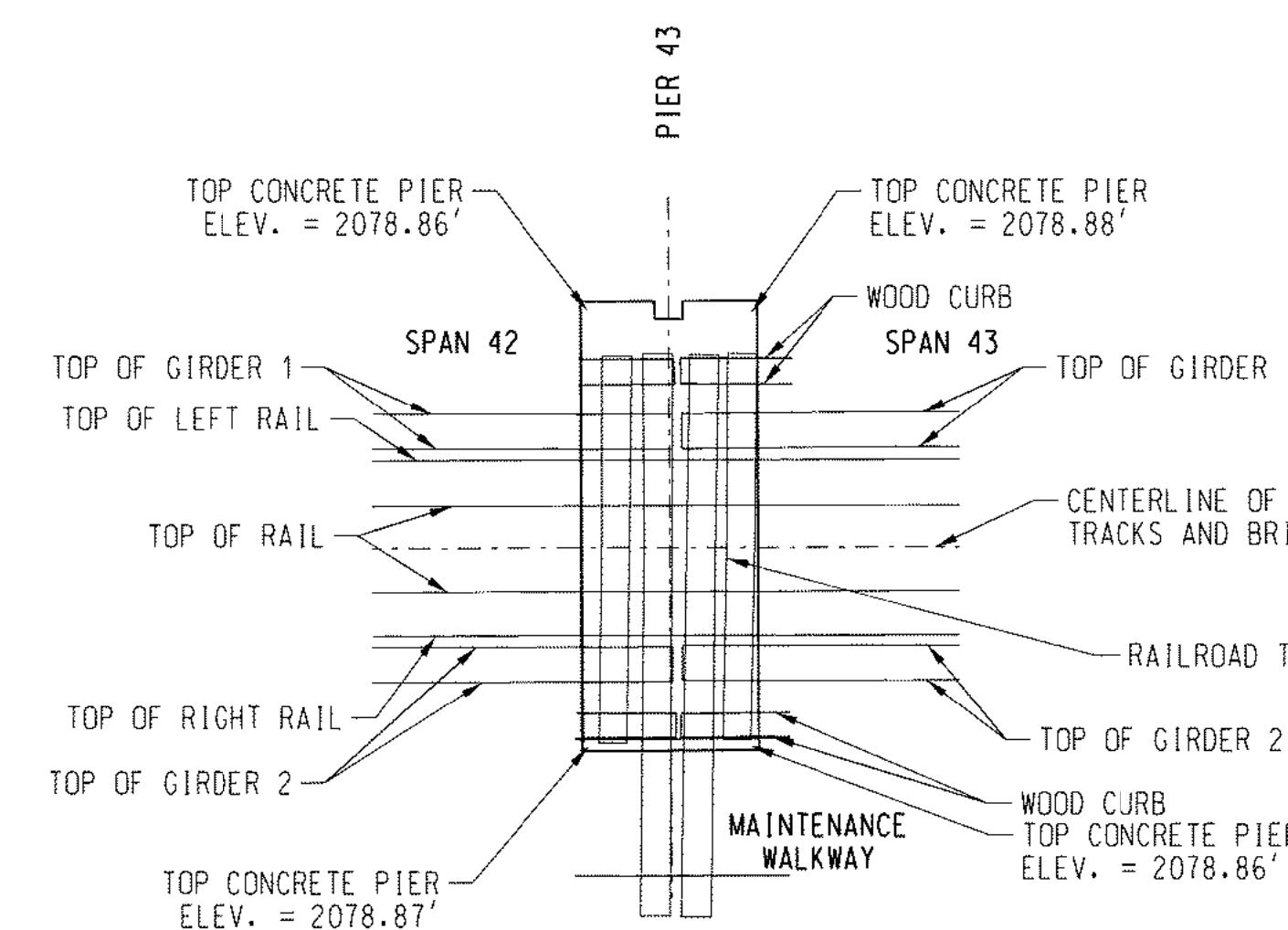
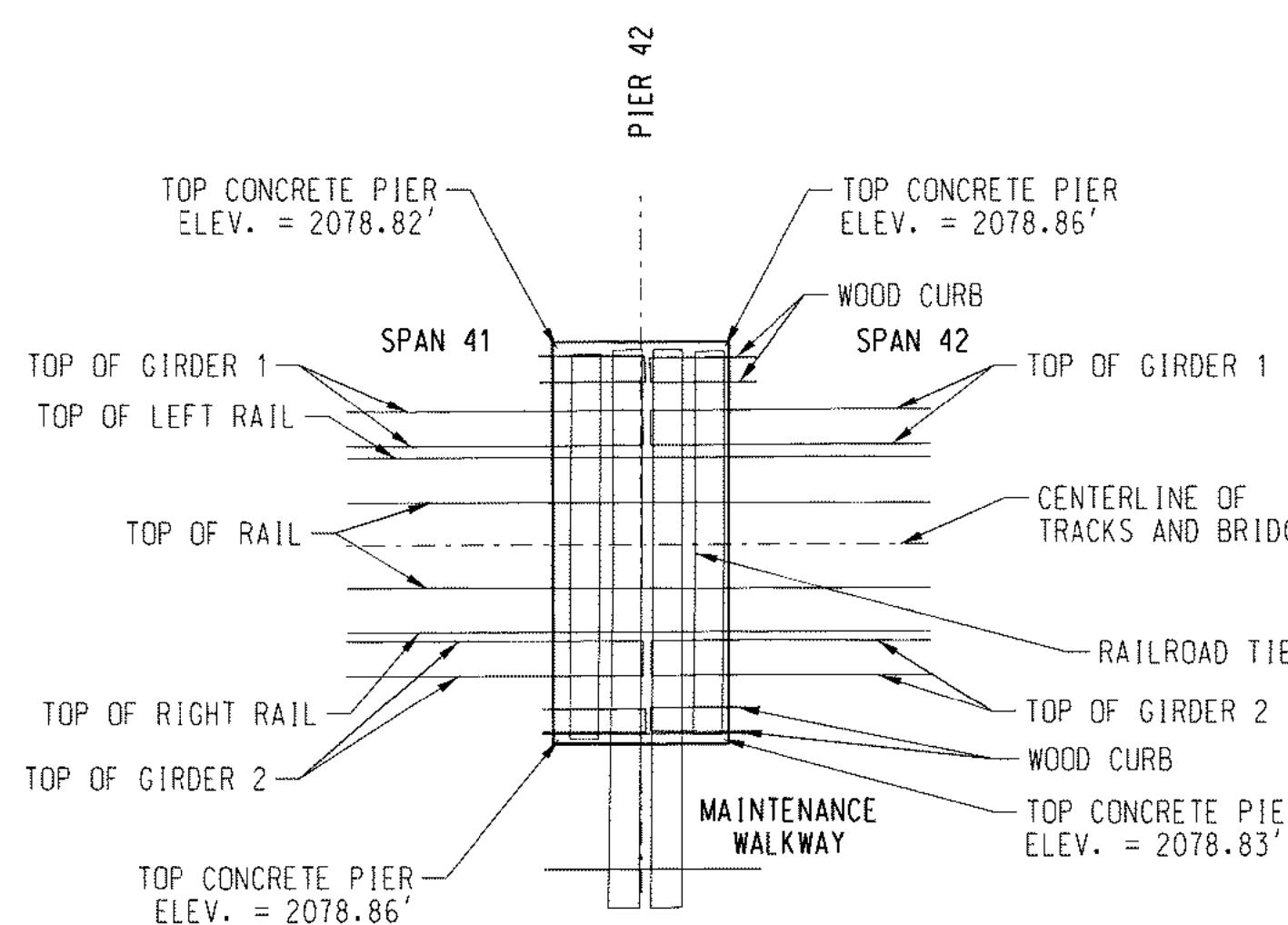
81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

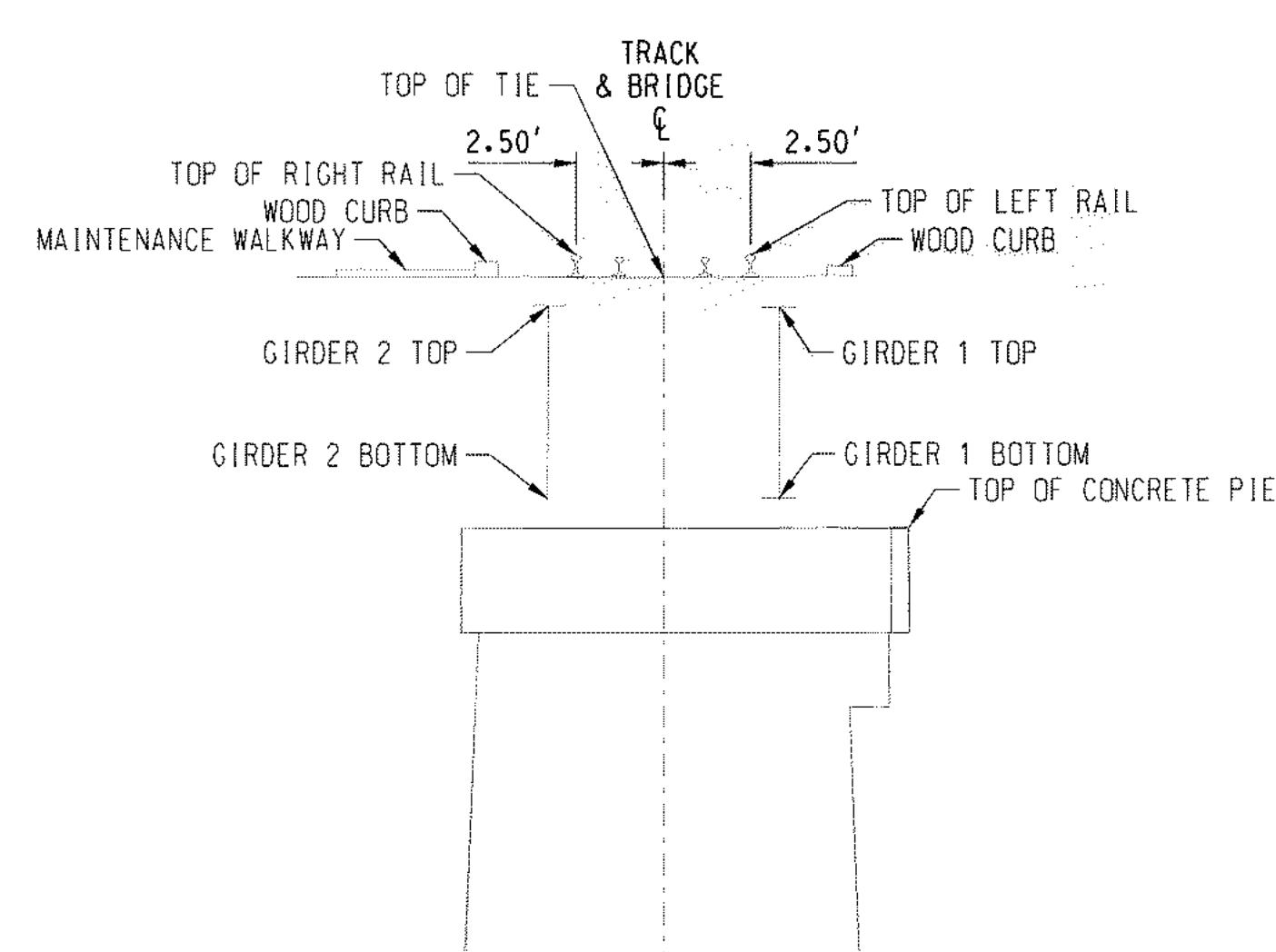
WEST
TO EAST ALGOMA, ID

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



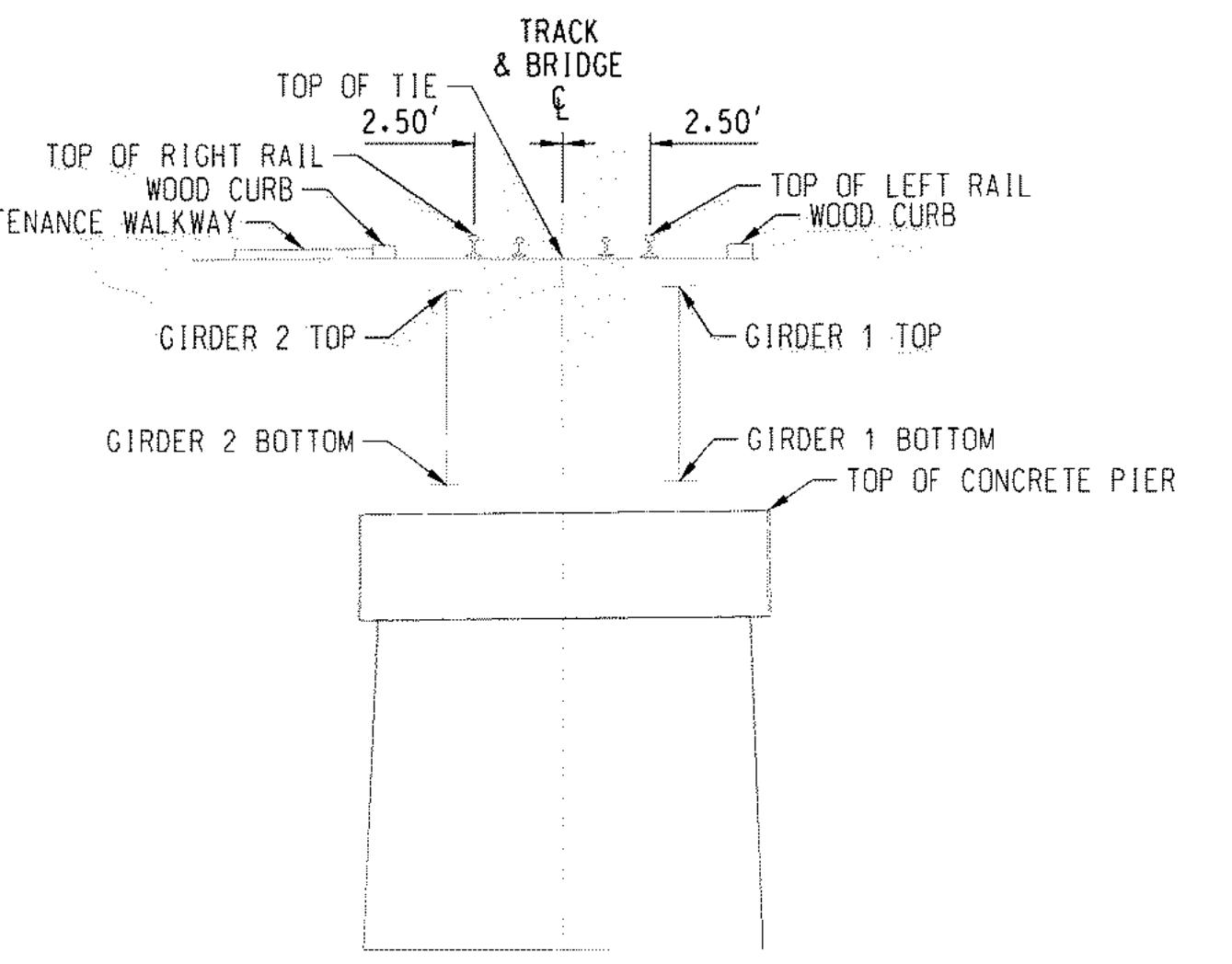
PIER 42
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.74' | 2086.10' | 2086.73' |



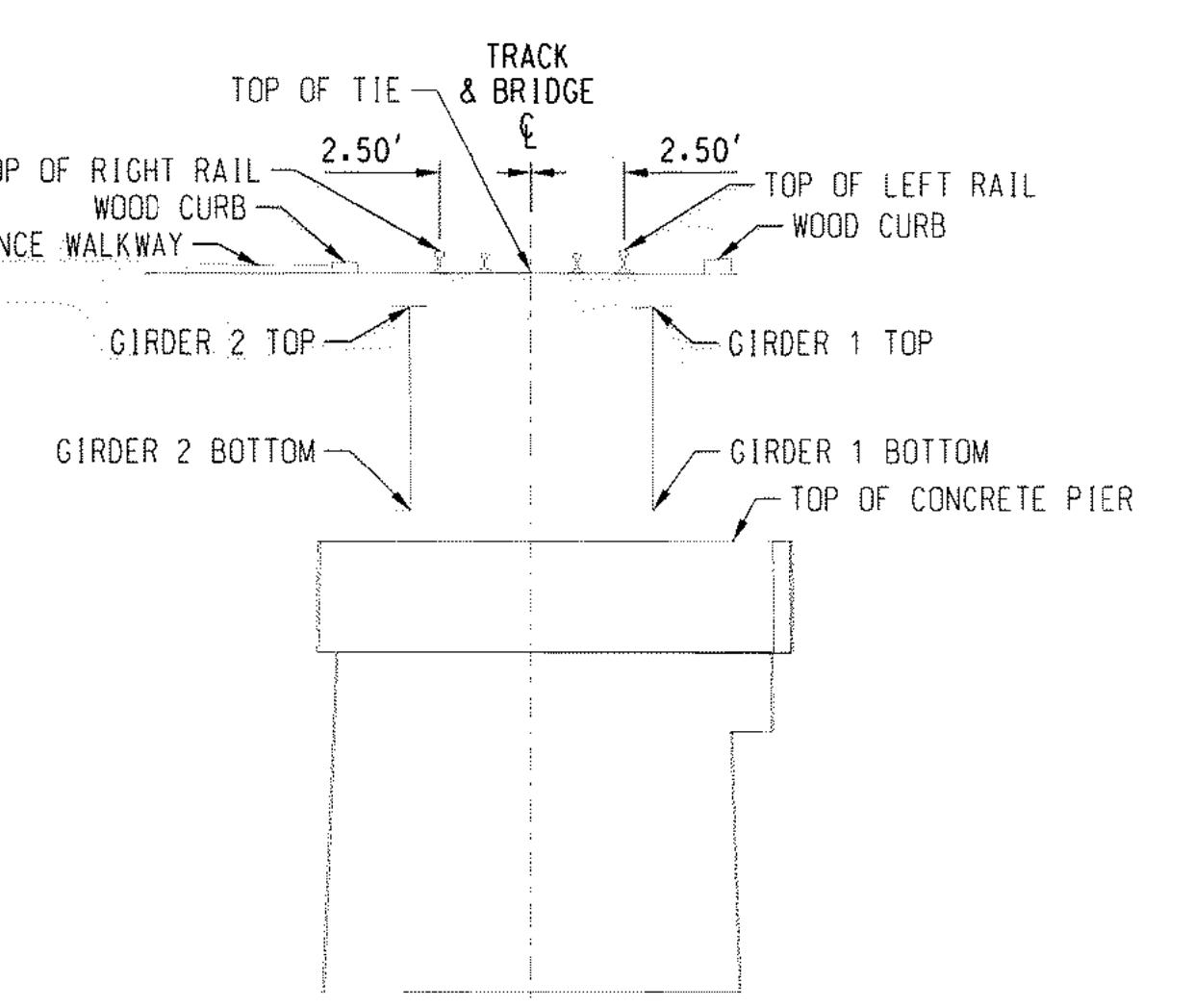
PIER 43
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.72' | 2086.08' | 2086.72' |



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' |



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 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' |

| 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' |

| 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' |

| 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

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: 0045-003.900-012 SHEET: 12 OF 24



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

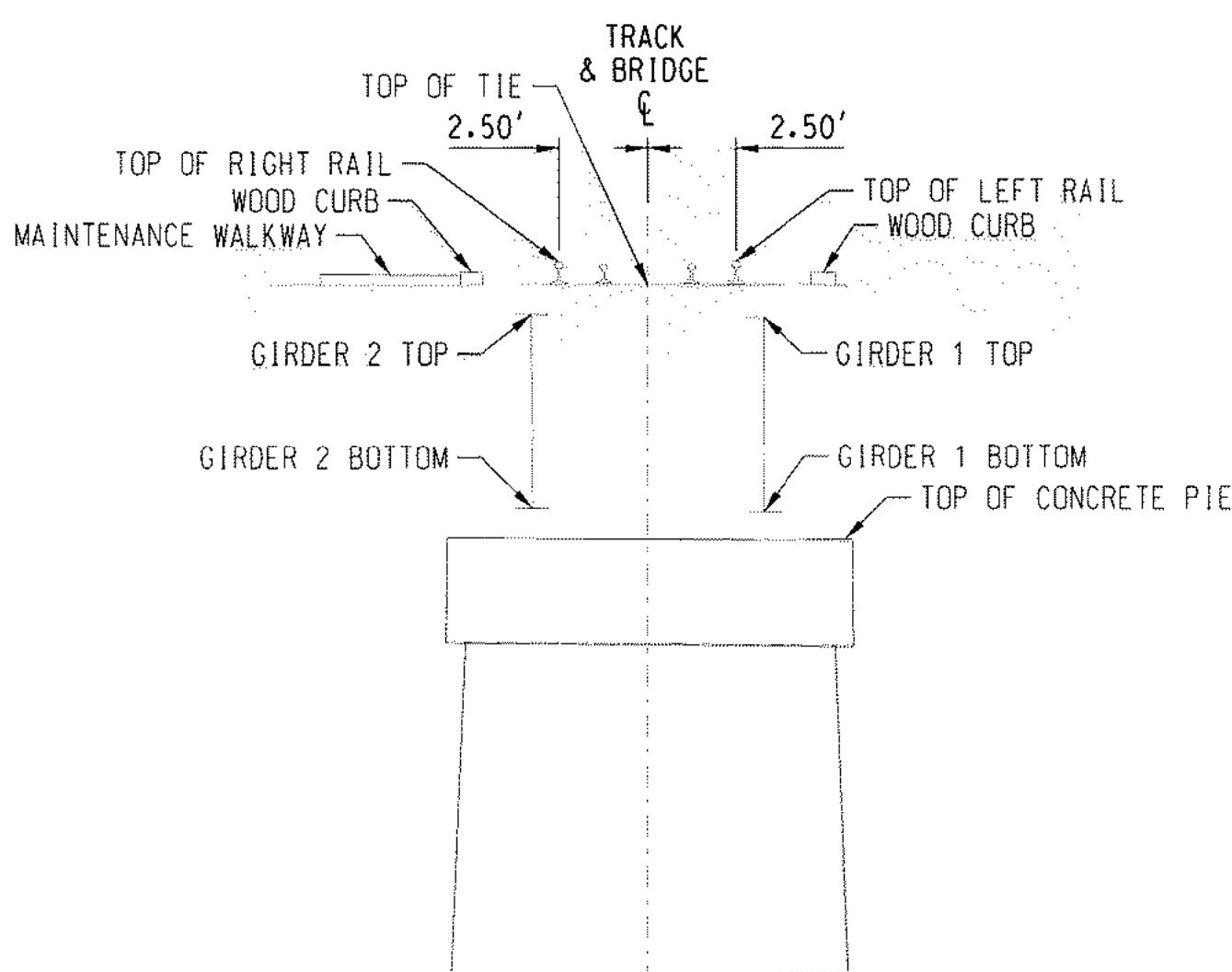
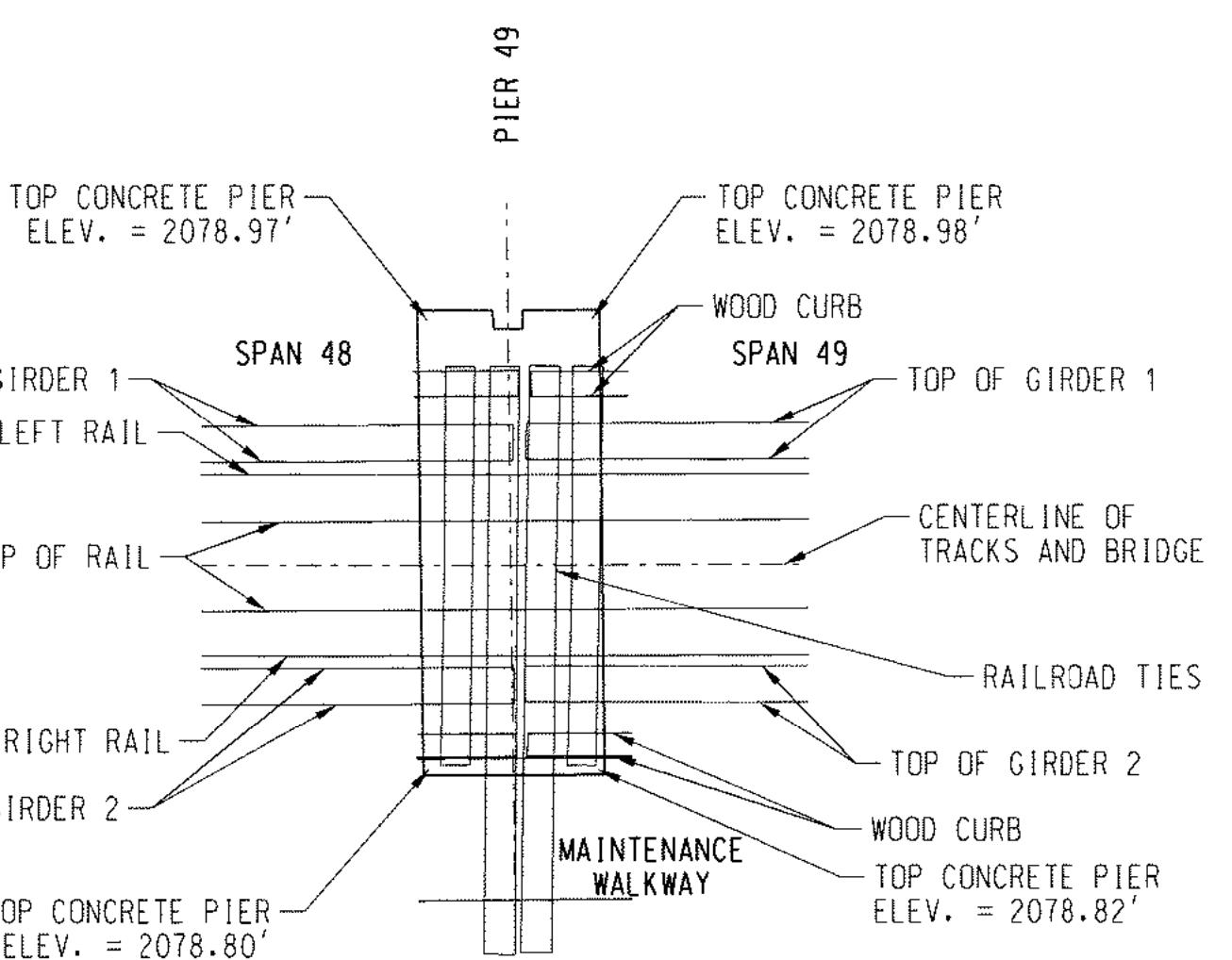
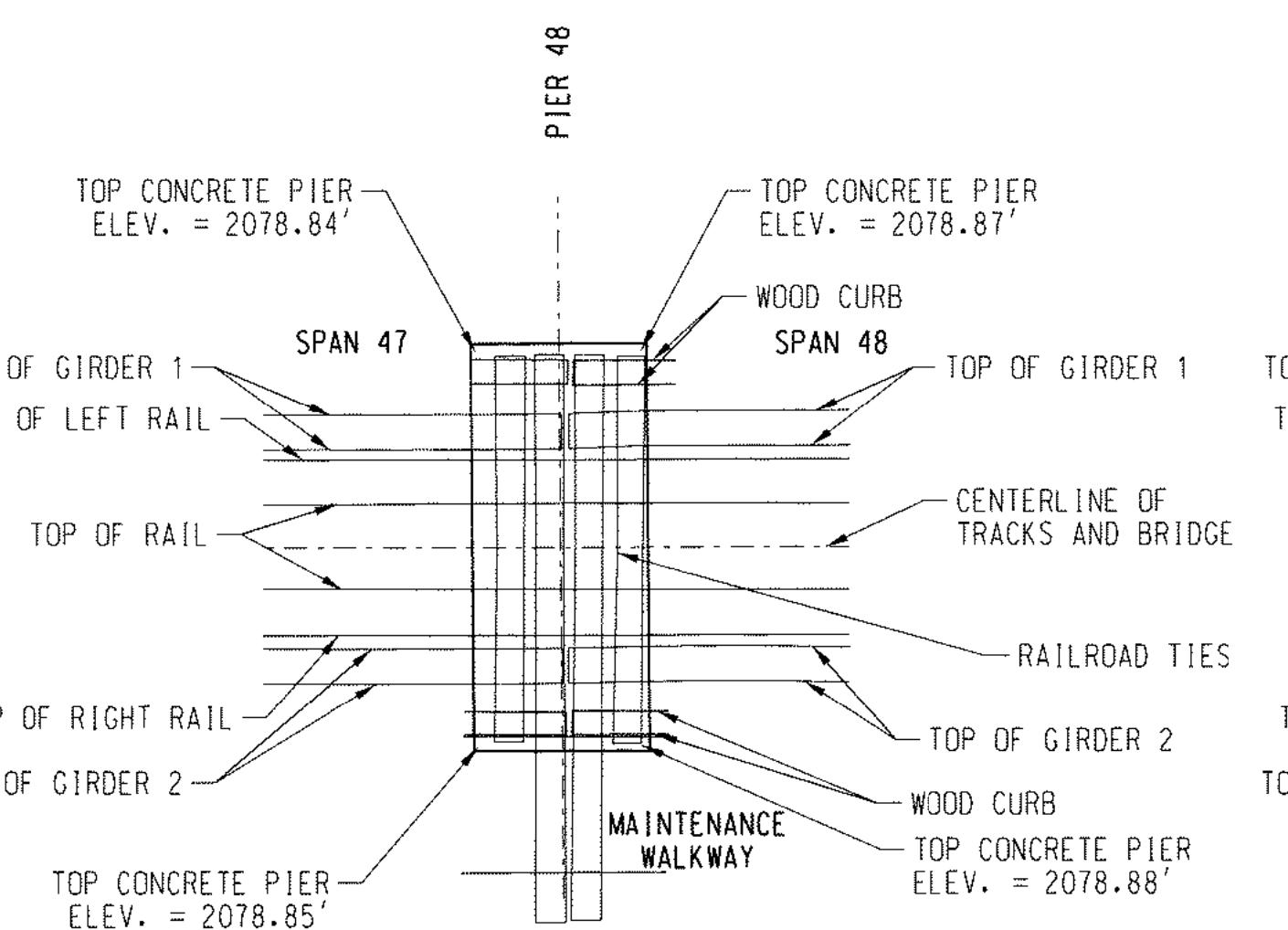
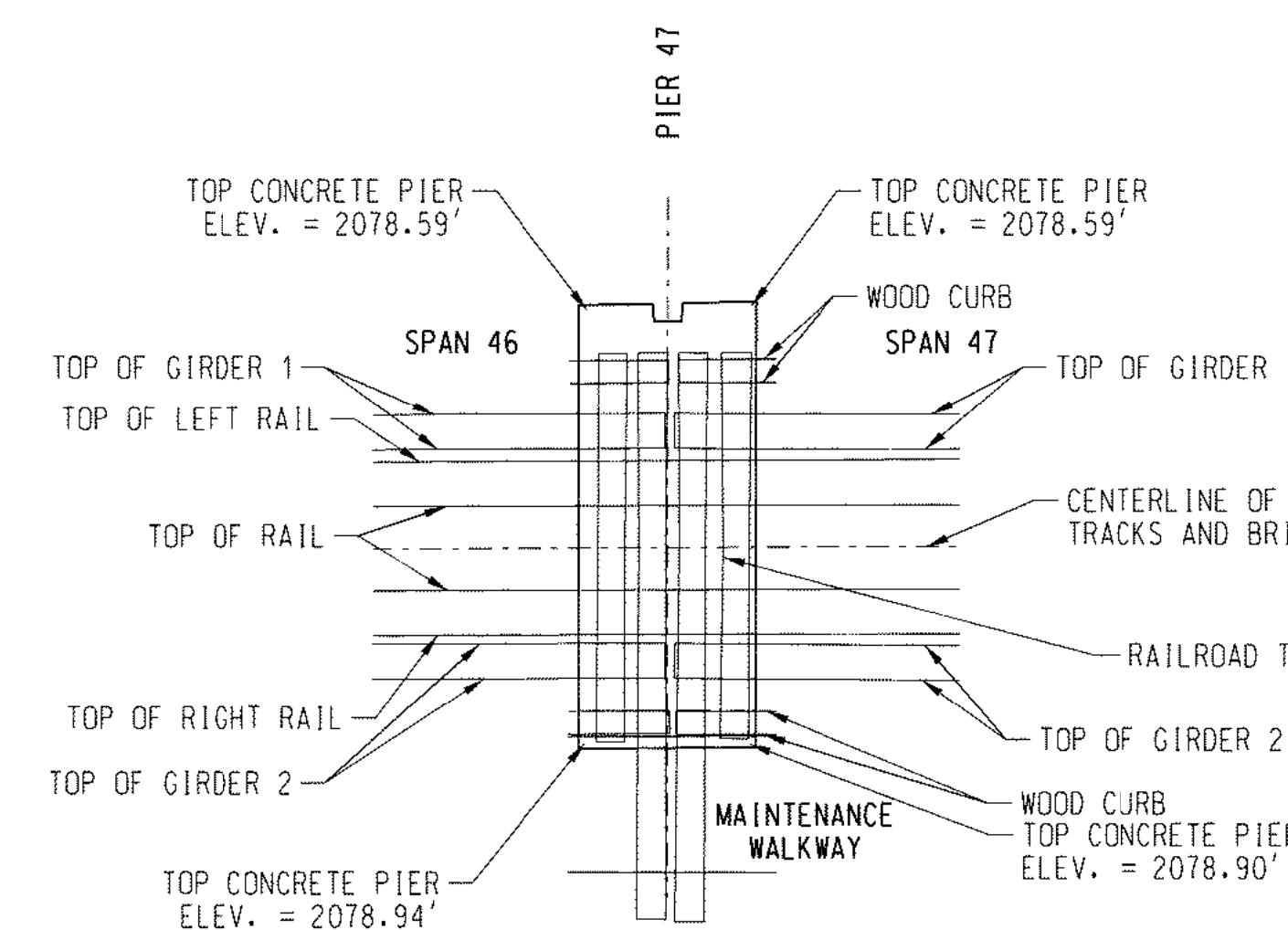
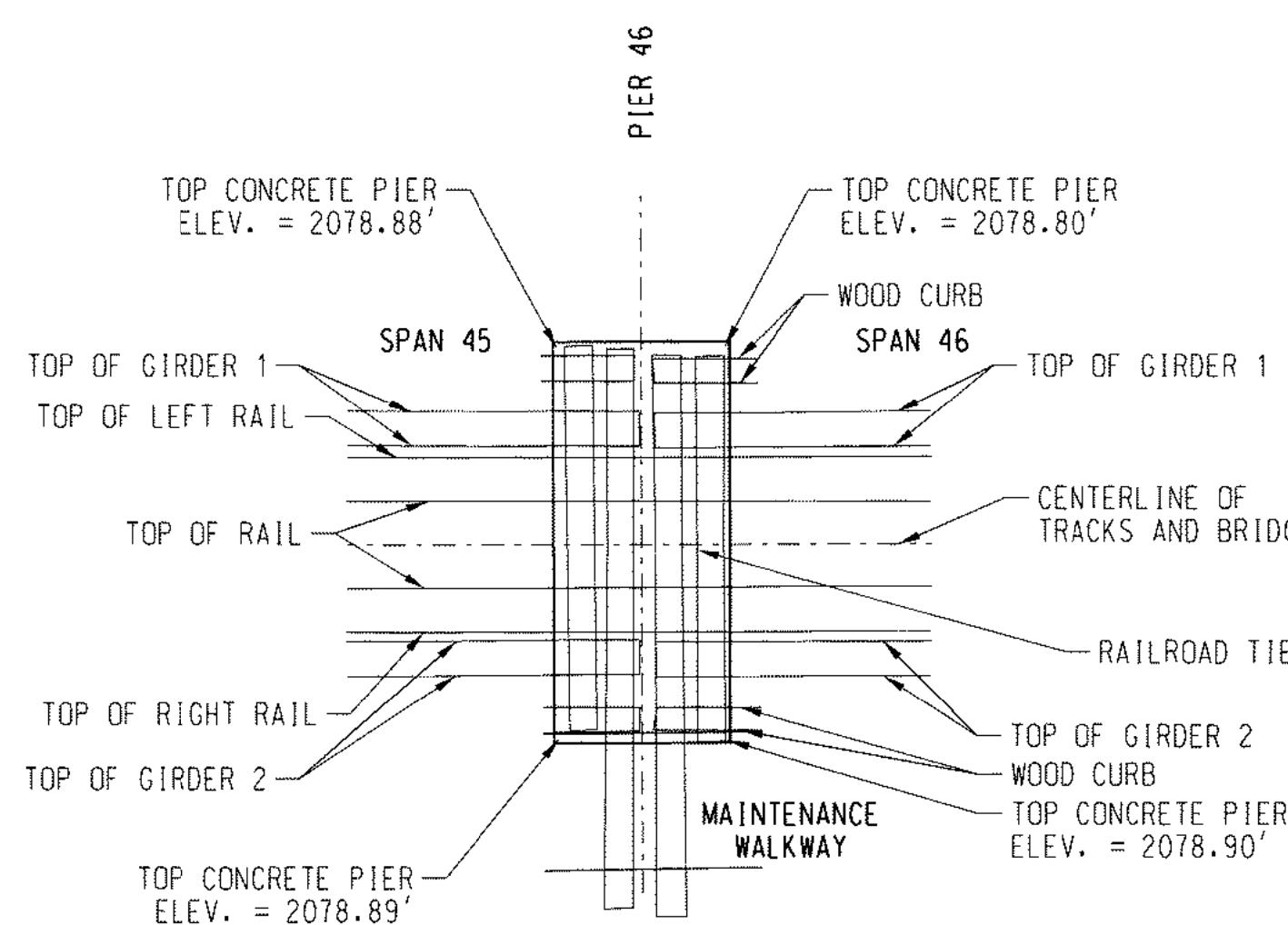
81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID

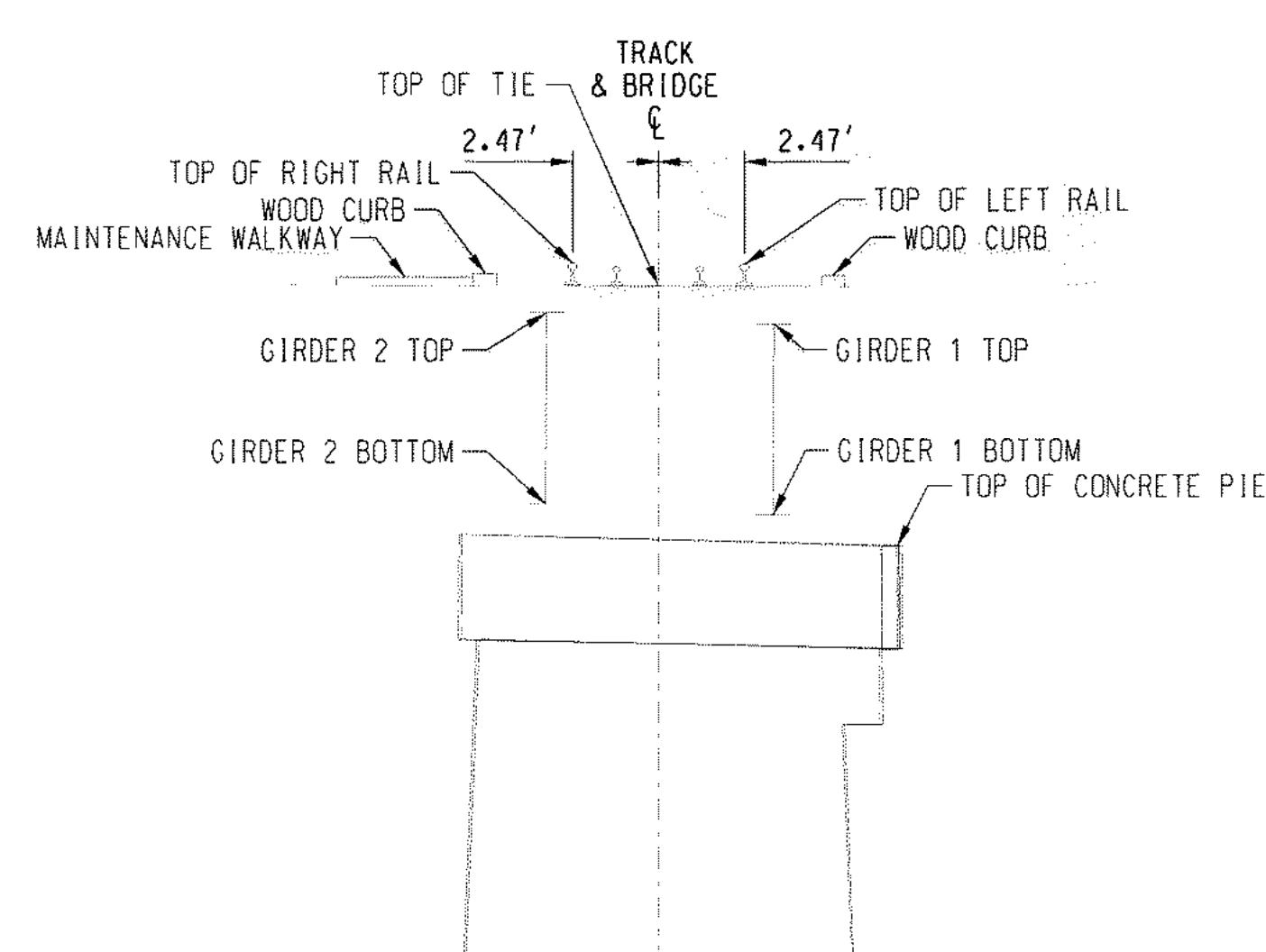
WEST
TO EAST ALGOMA, ID

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



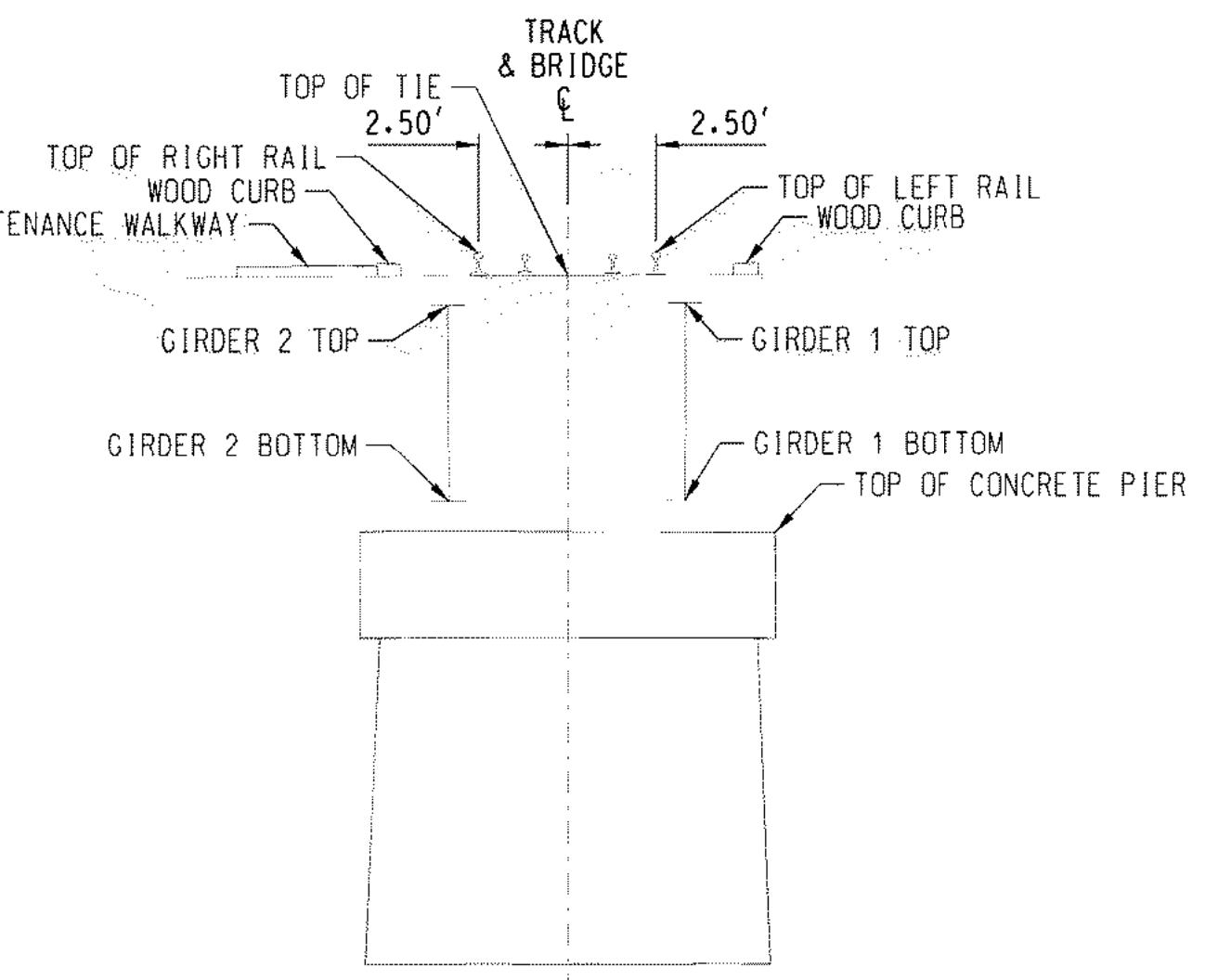
PIER 46
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.73' | 2086.09' | 2086.73' |



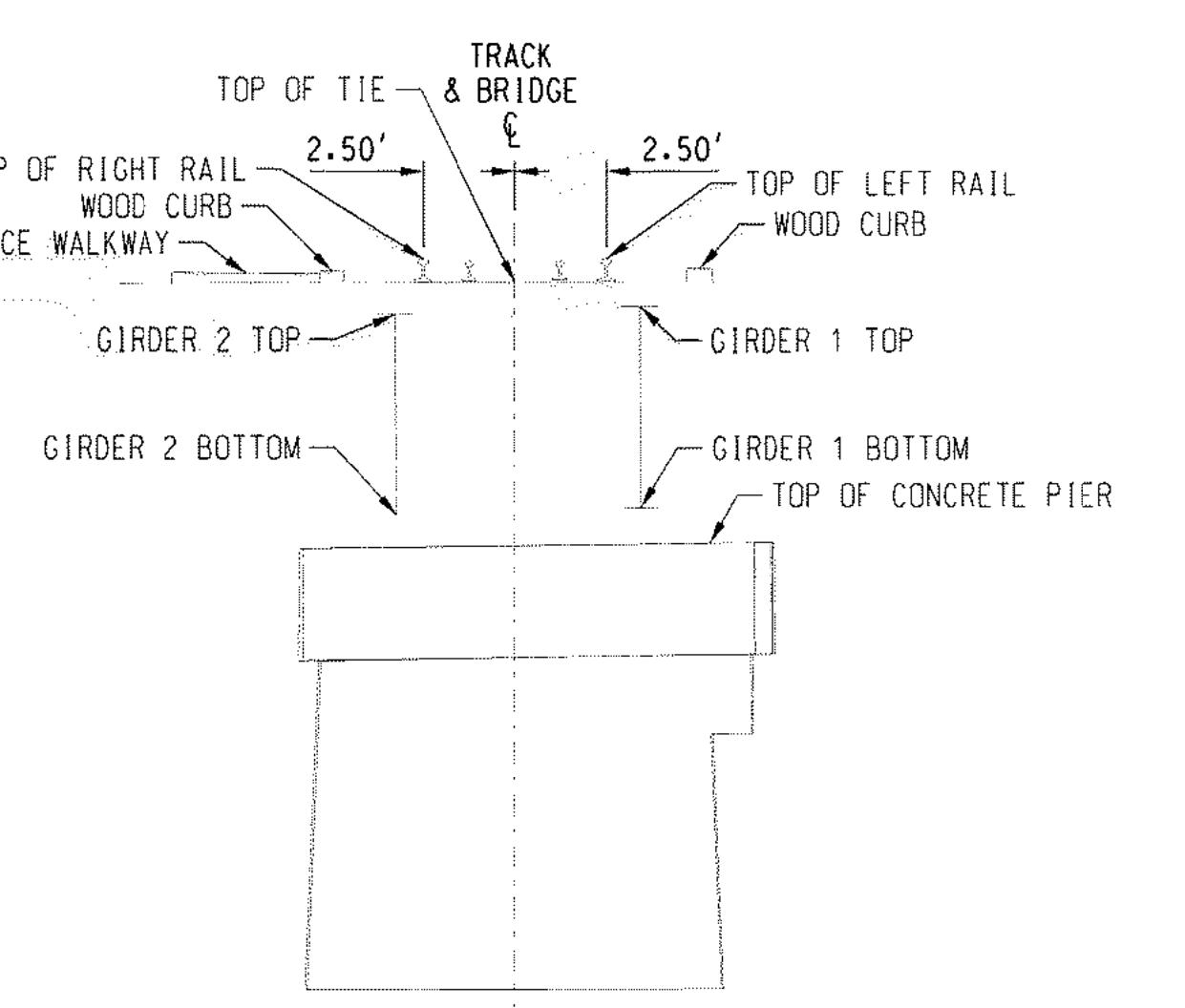
PIER 47
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.74' | 2086.10' | 2086.77' |



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' |



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 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' |

| TABLE OF GIRDER ELEVATIONS | | |
|----------------------------|---------------|------------------|
| LOCATION | TOP OF GIRDER | BOTTOM OF GIRDER |
| GIRDER 1 SPAN 46 | 2085.02' | 2079.48' |
| GIRDER 2 SPAN 46 | 2085.34' | 2079.81' |
| GIRDER 1 SPAN 47 | 2085.31' | 2079.75' |
| GIRDER 2 SPAN 47 | 2085.27' | 2079.60' |

| 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' |

| 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.

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

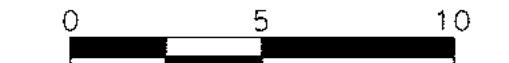
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90

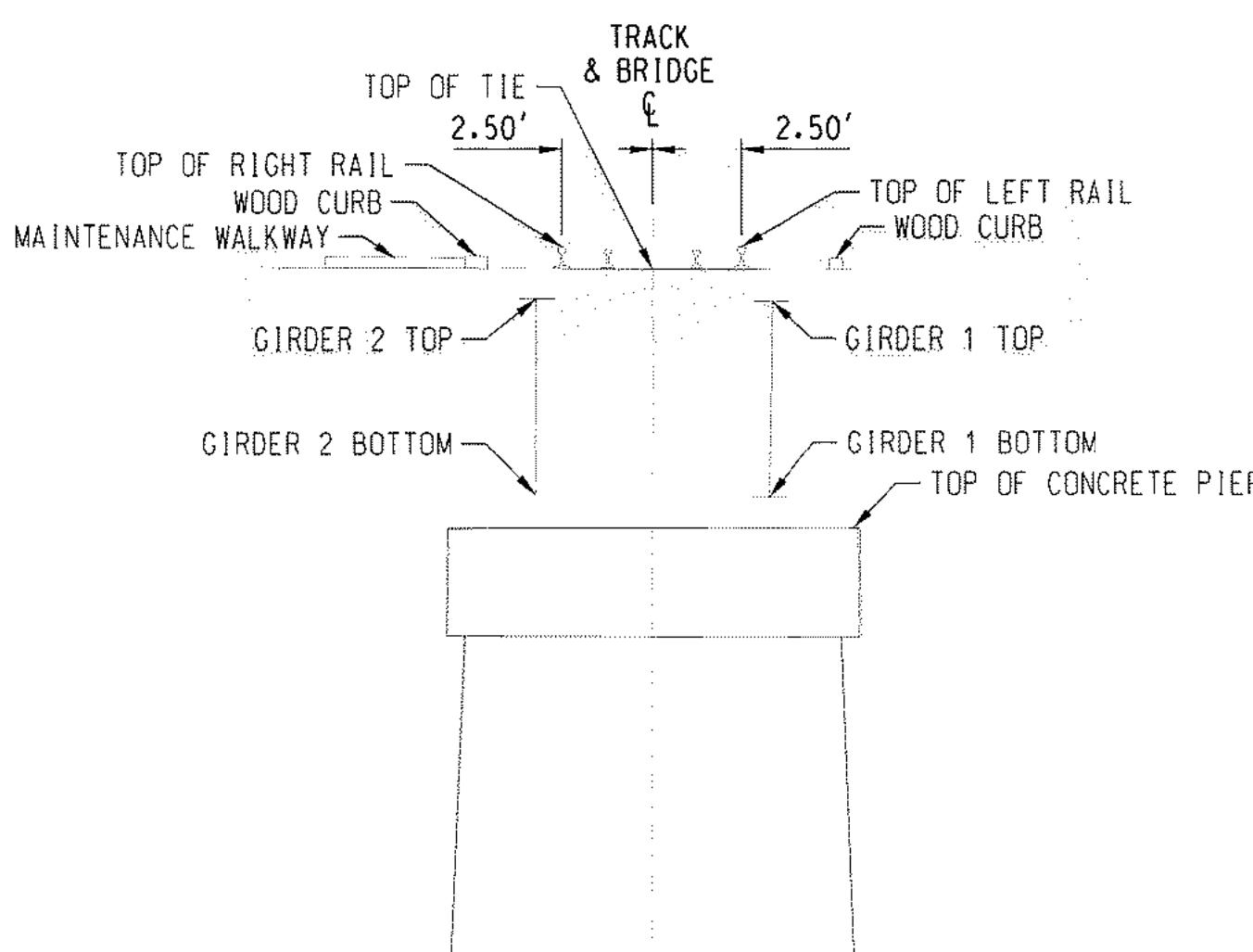
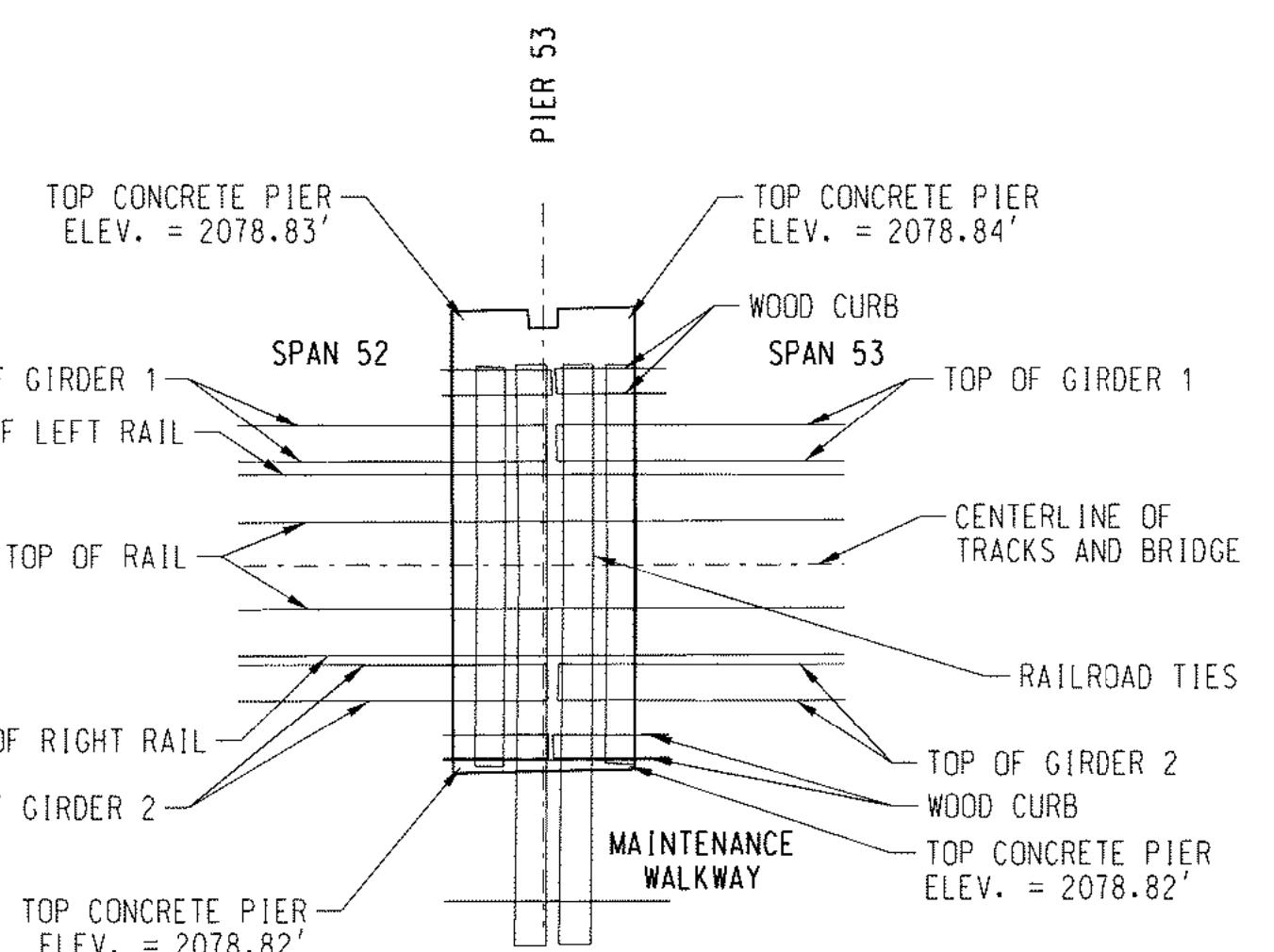
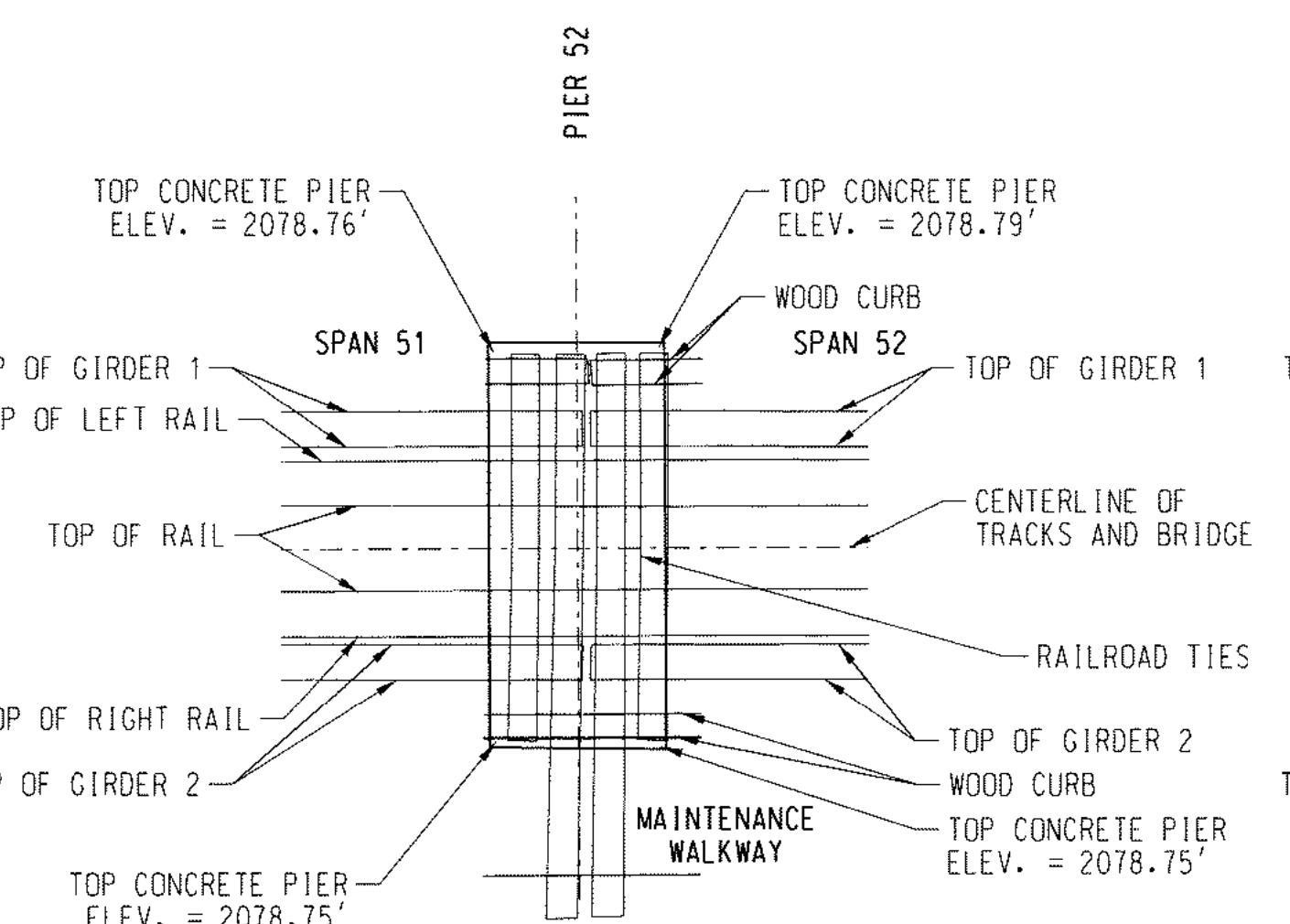
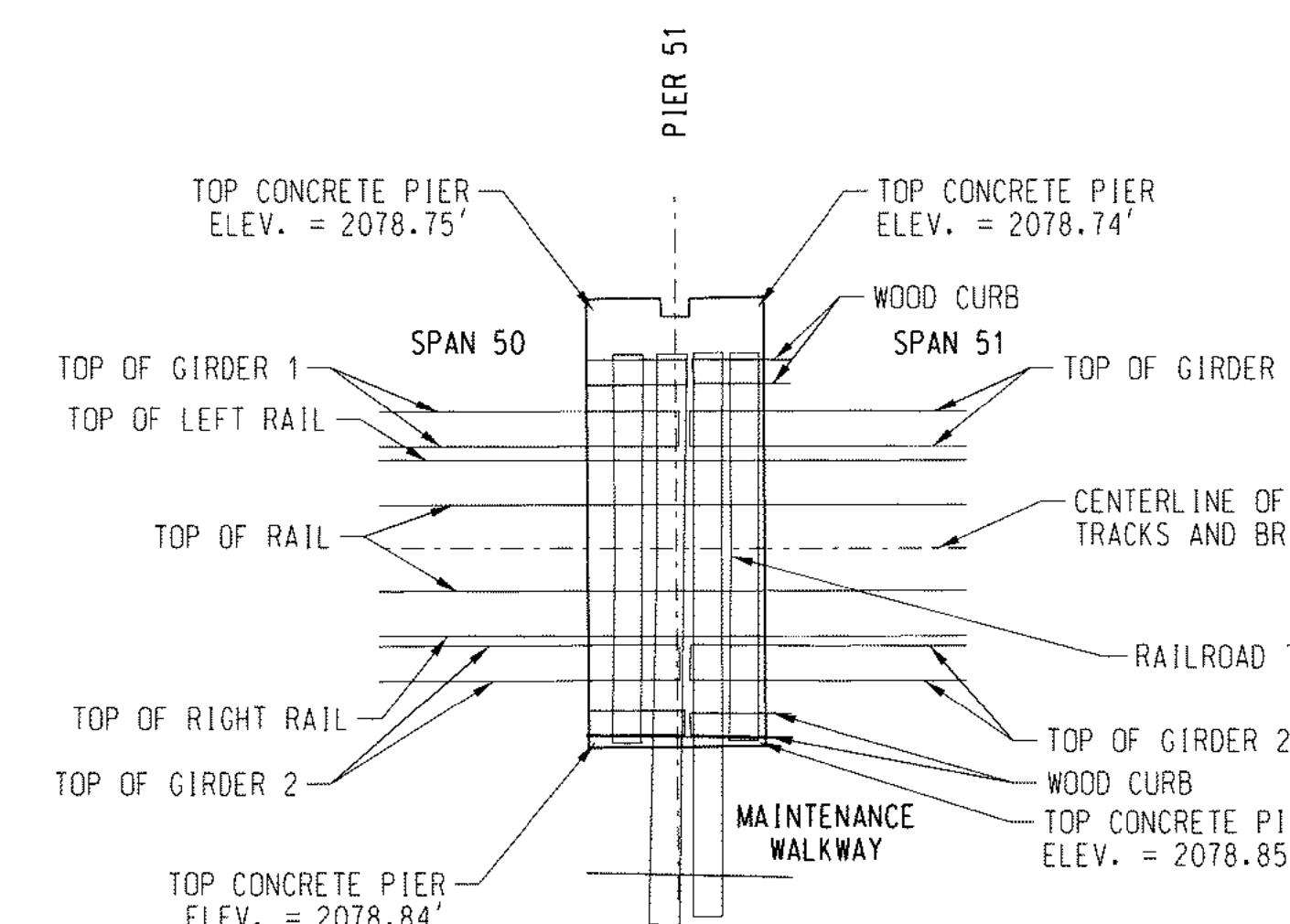
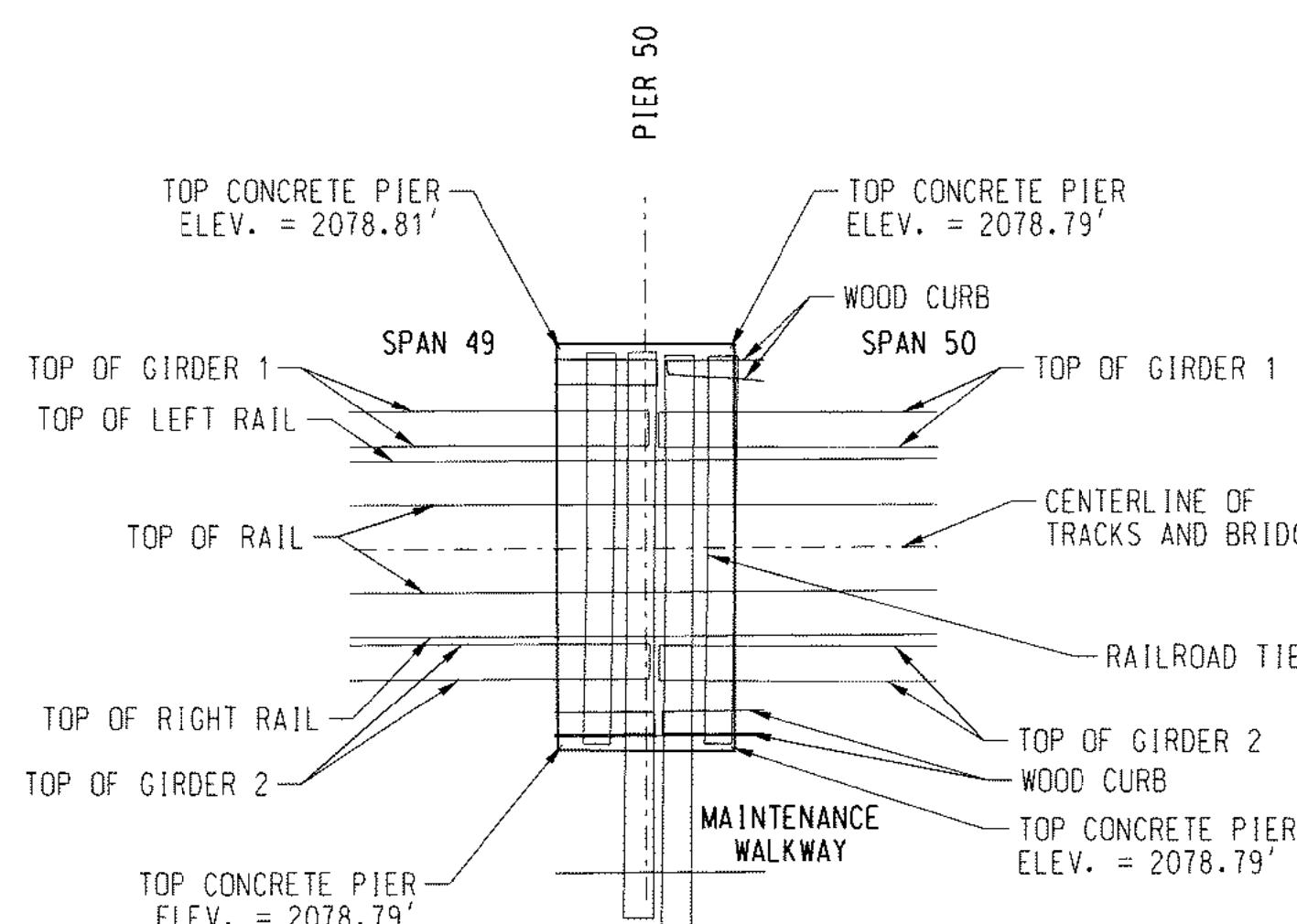
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

PIER PLAN & PROFILES

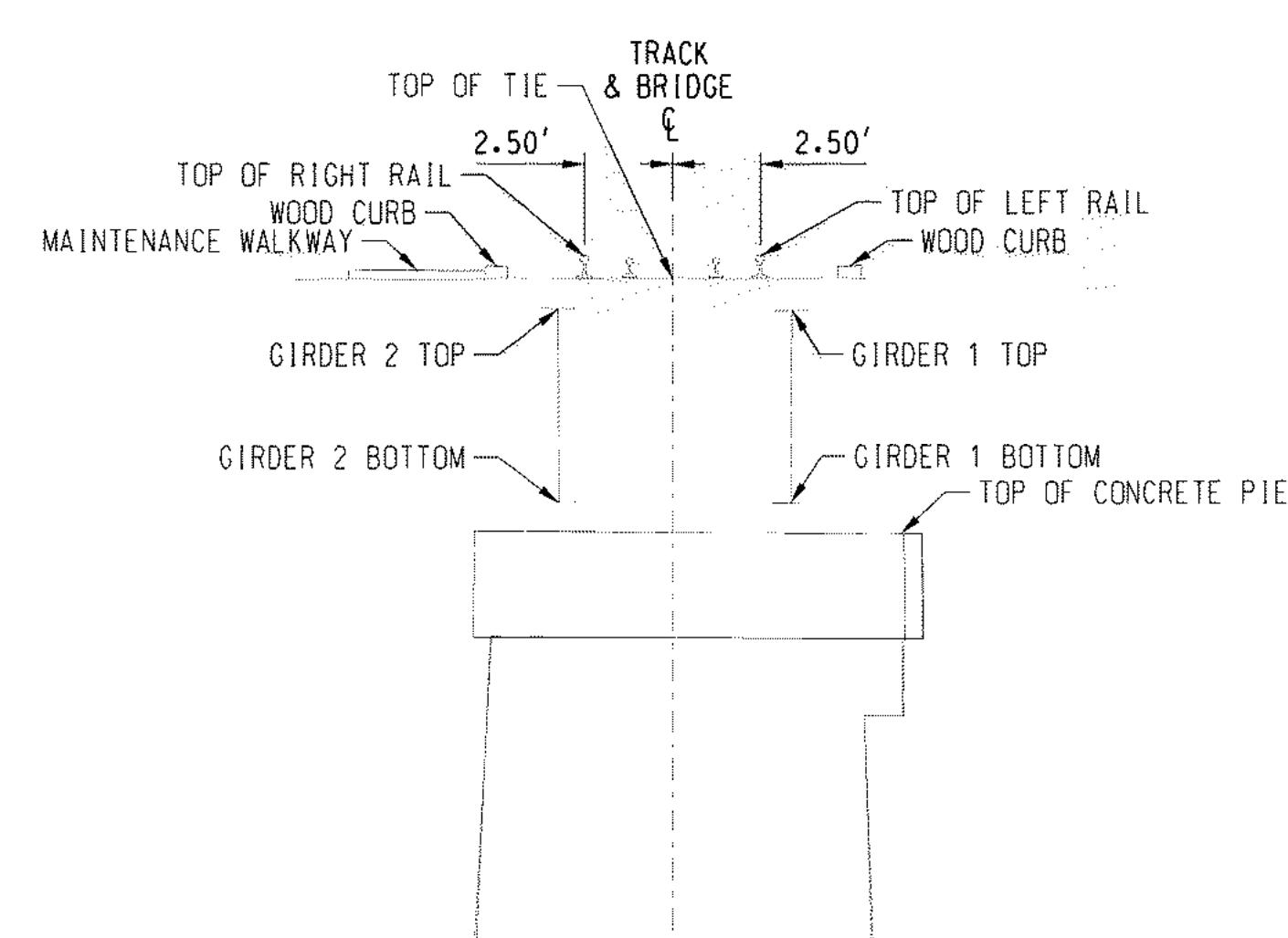
PLAN NO: 0045-003.900-013 SHEET: 13 OF 24

PIER PLAN & PROFILES

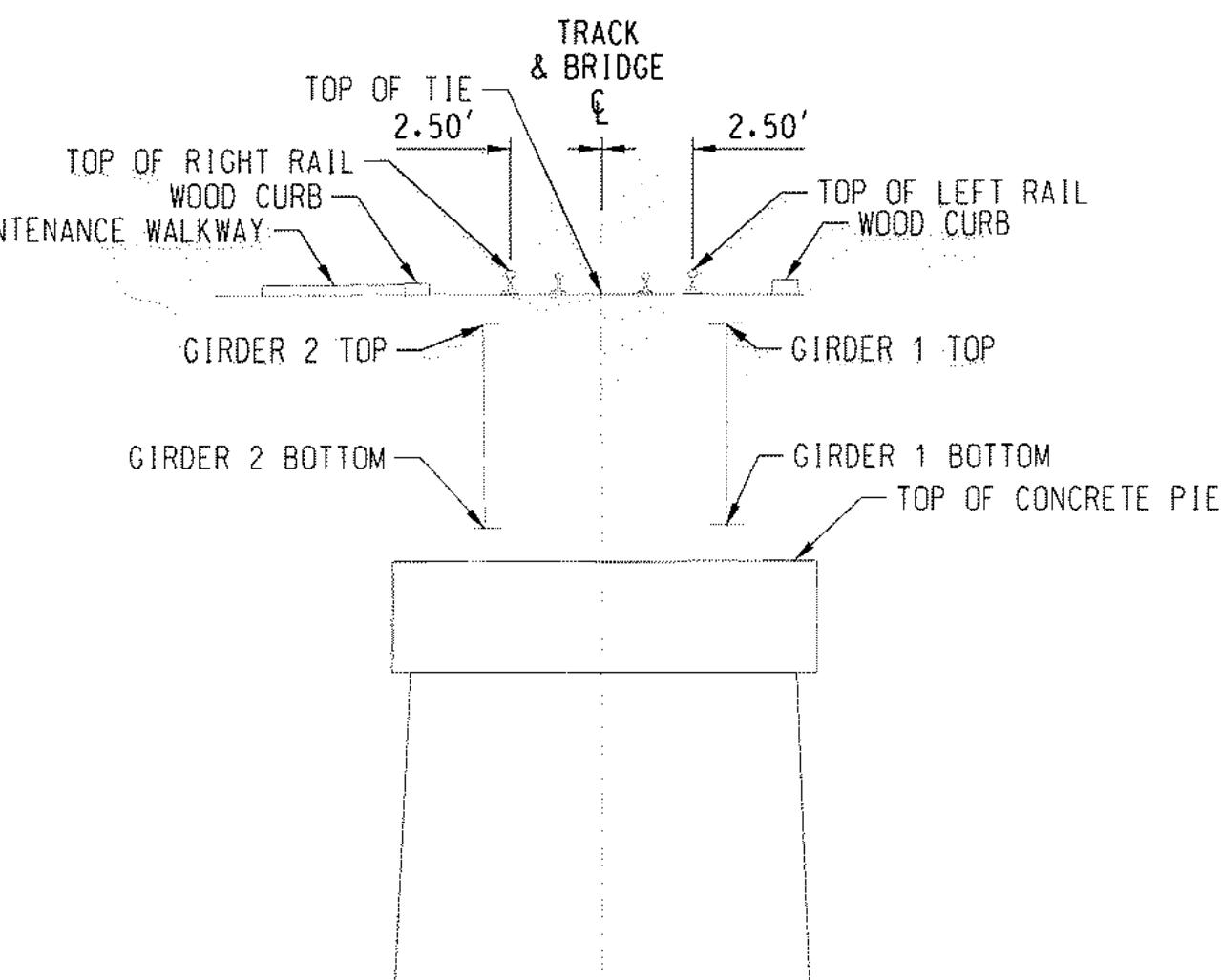
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 50
LOOKING RAILROAD EAST

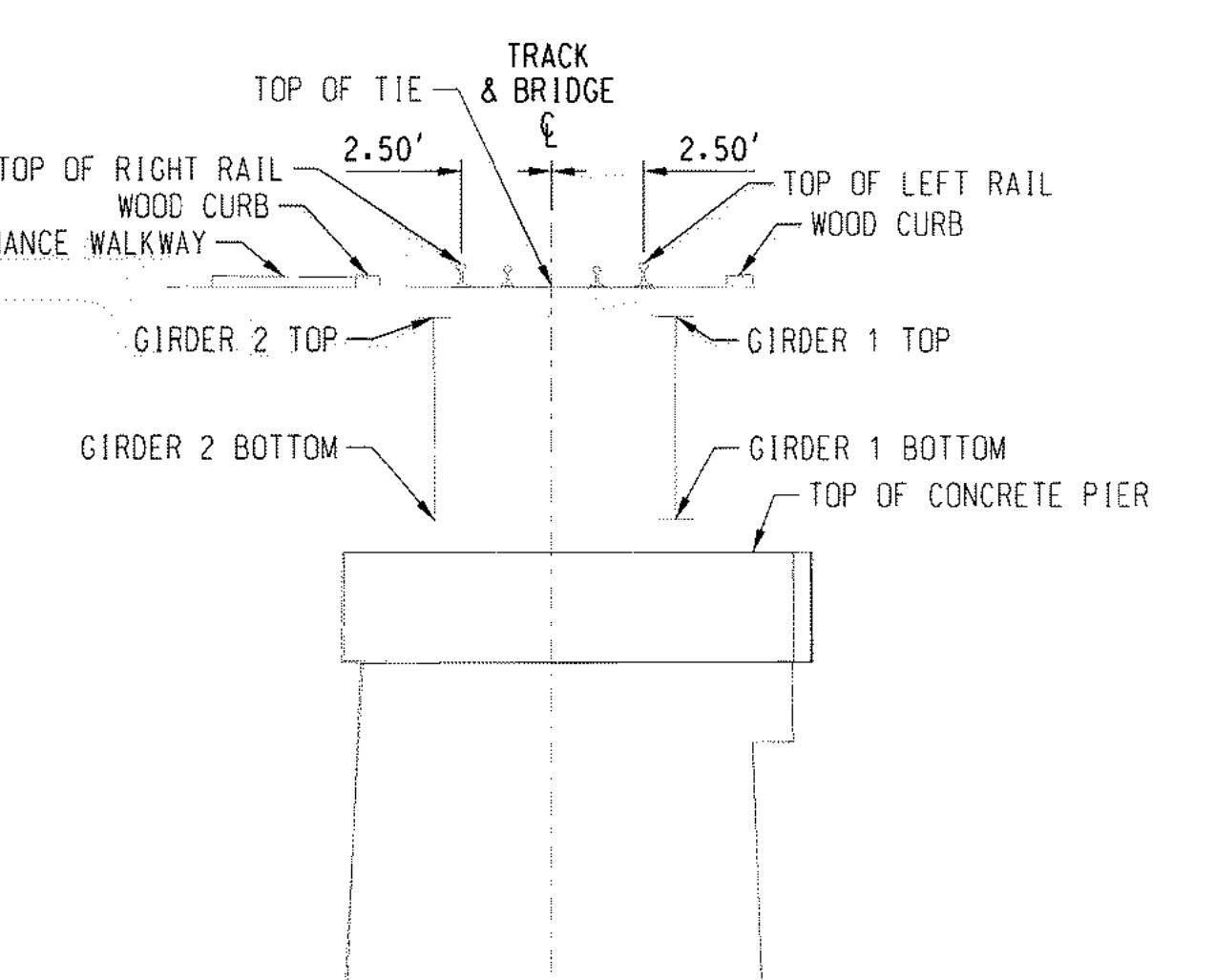
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.73' | 2086.08' | 2086.73' |

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' |

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' |

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 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' |

| 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' |

| 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' |

| 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.

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

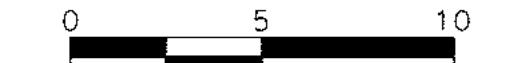
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-014
SHEET: 14 OF 24

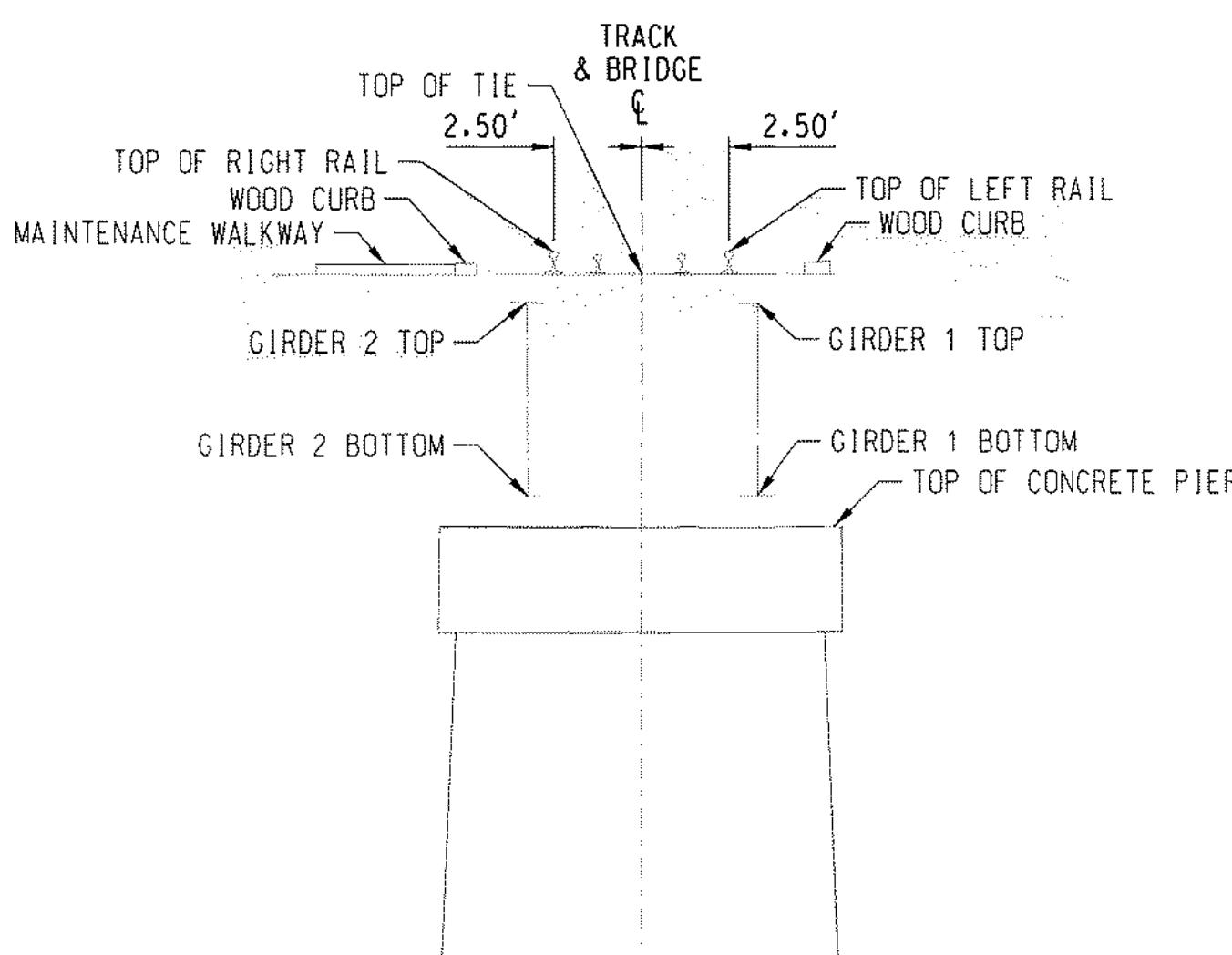
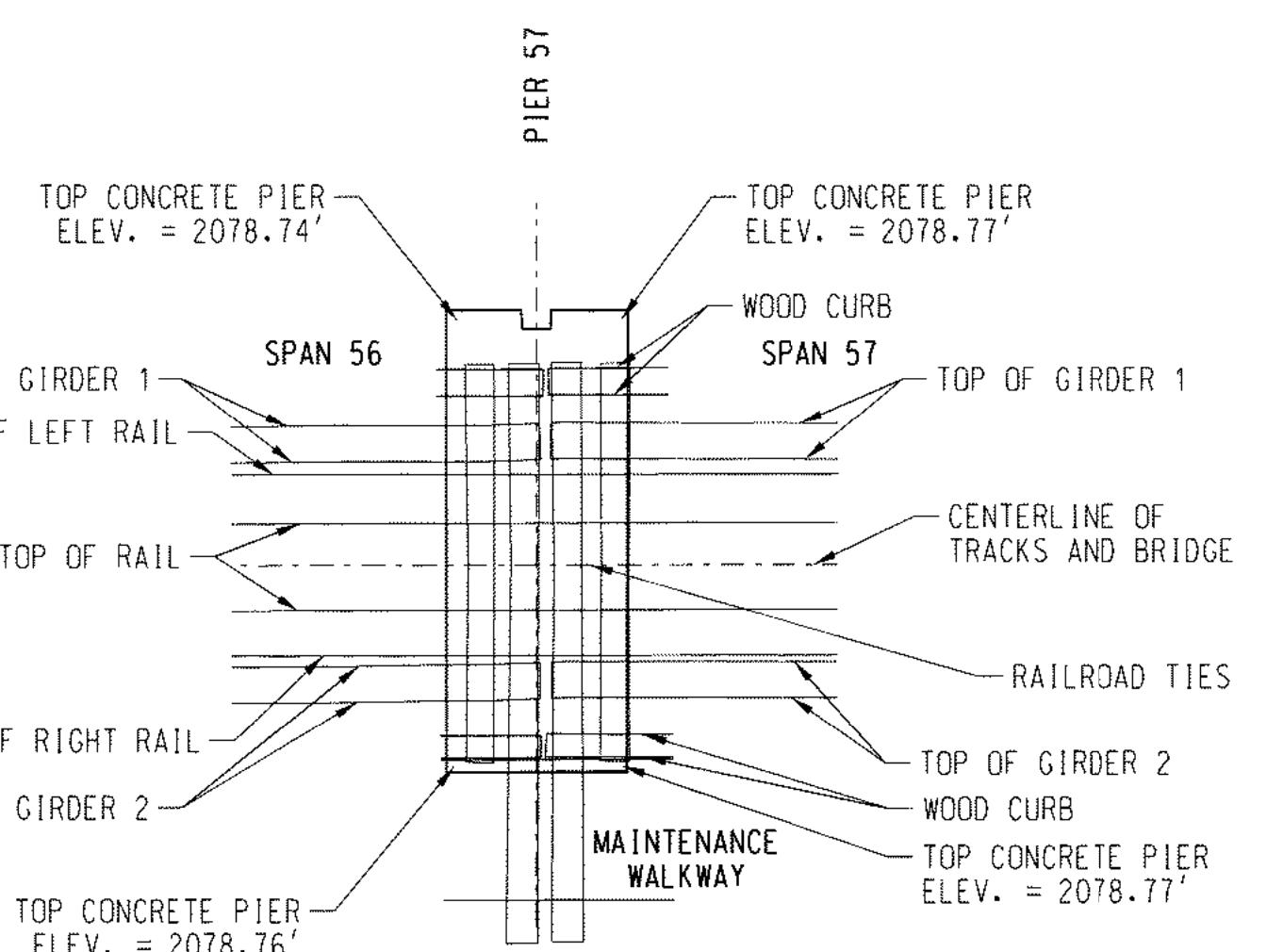
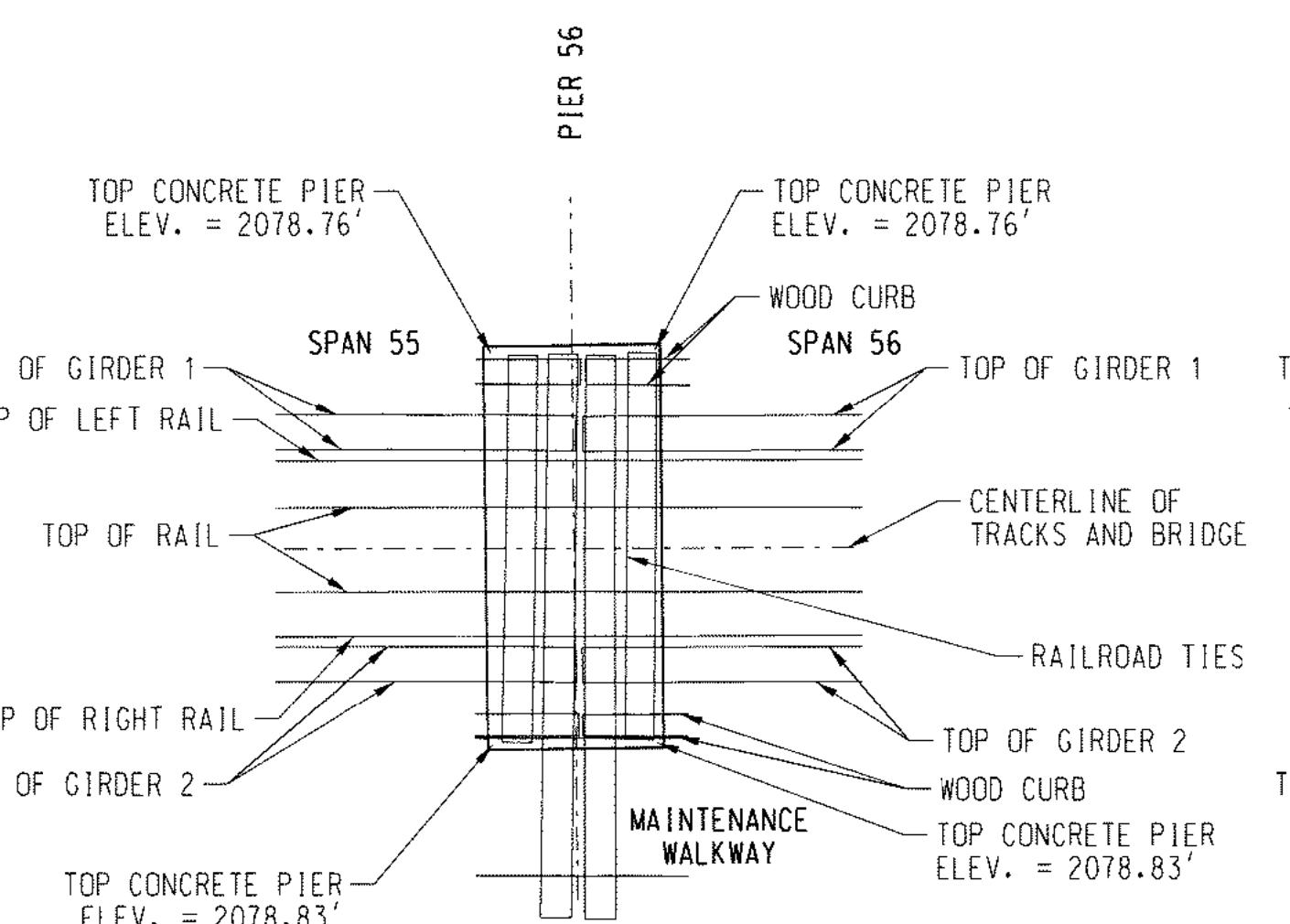
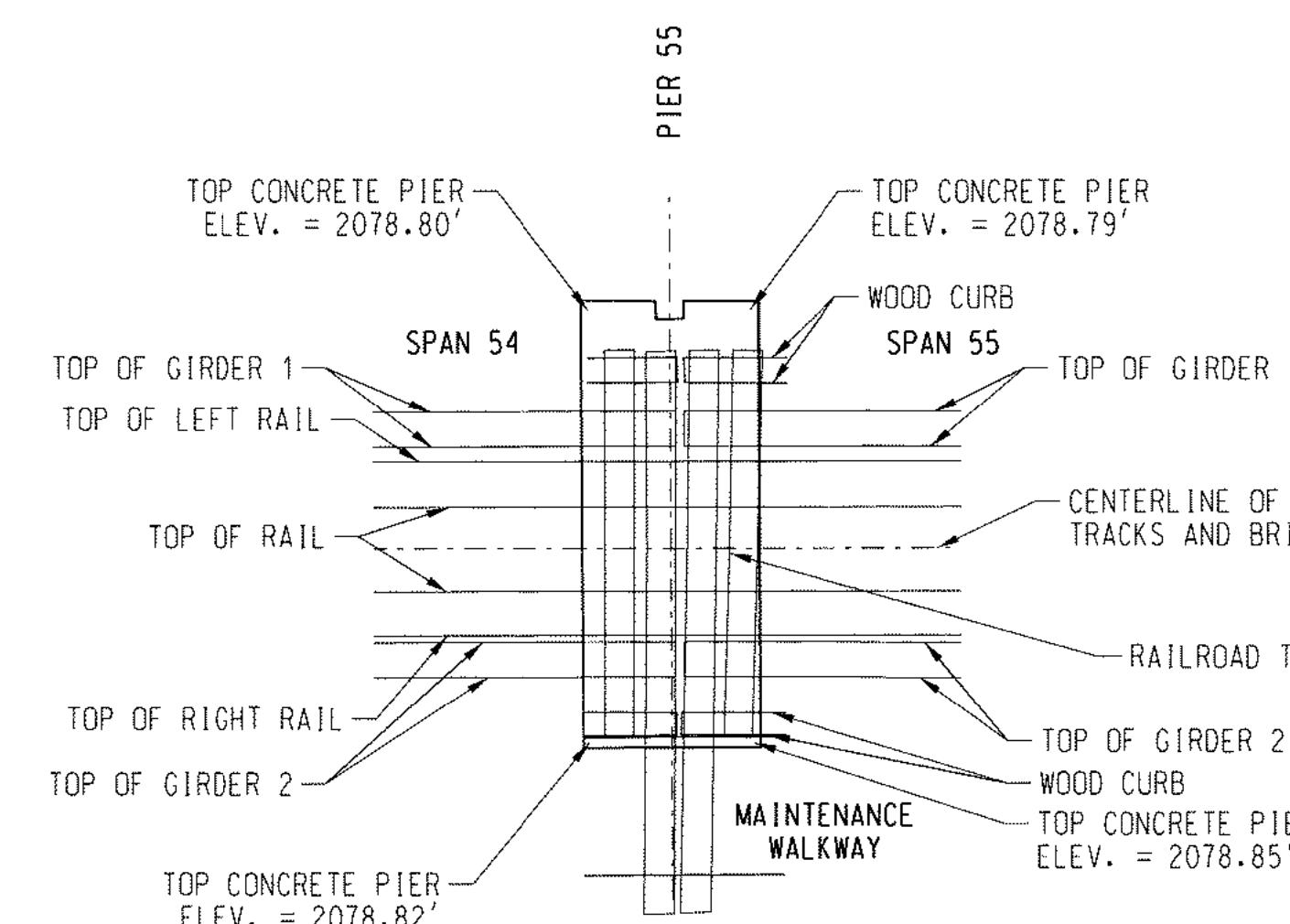
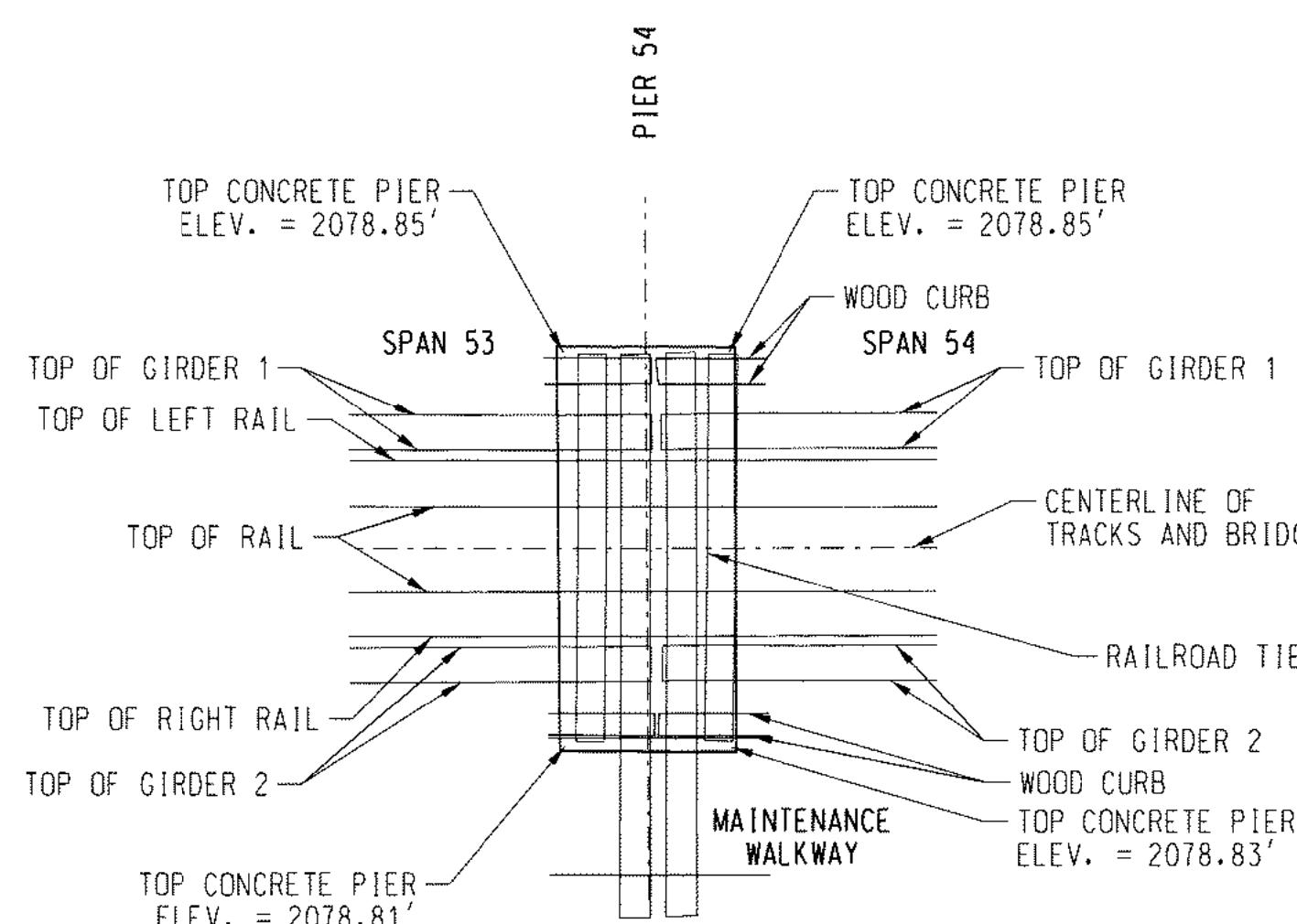


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

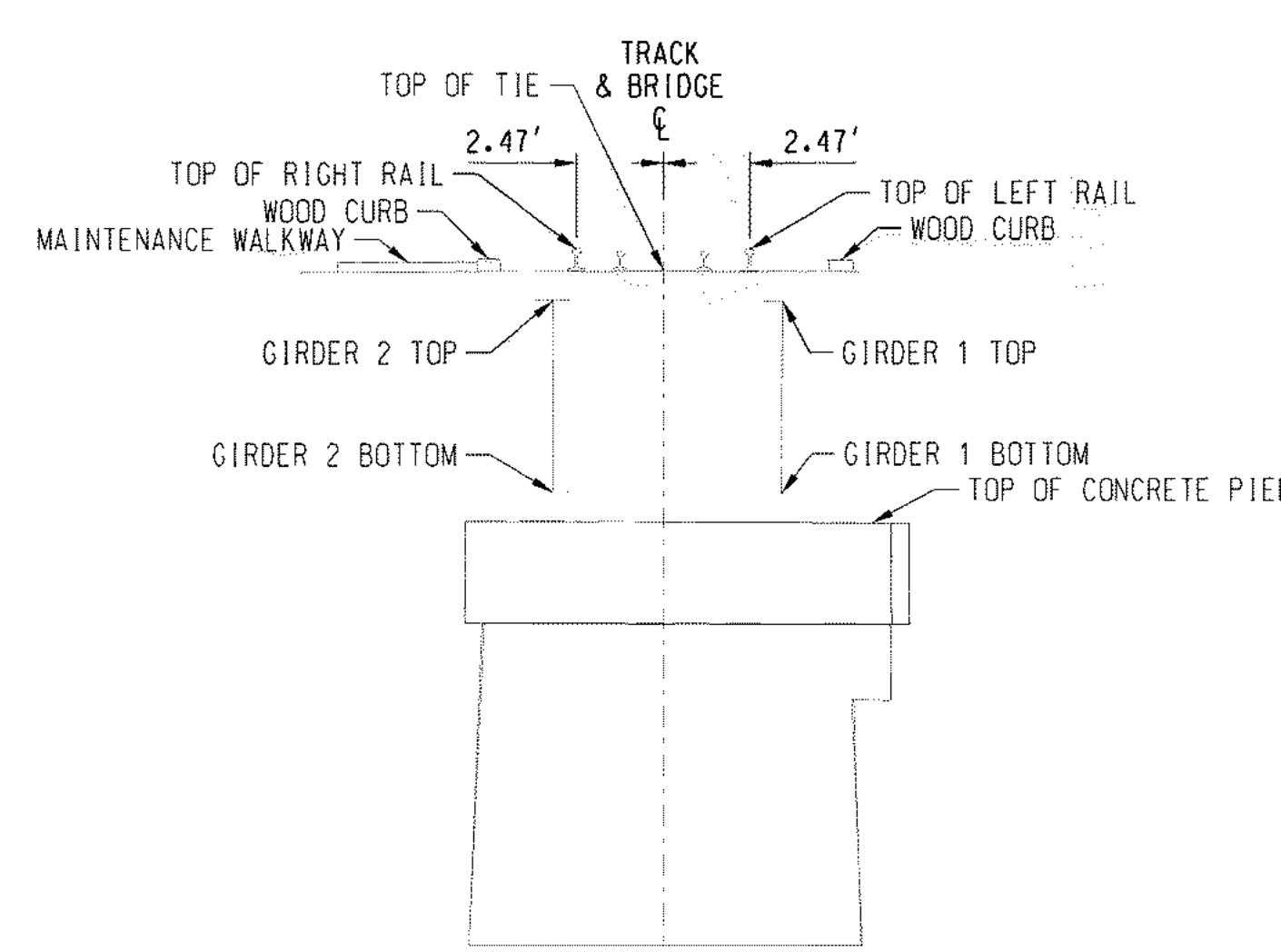
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

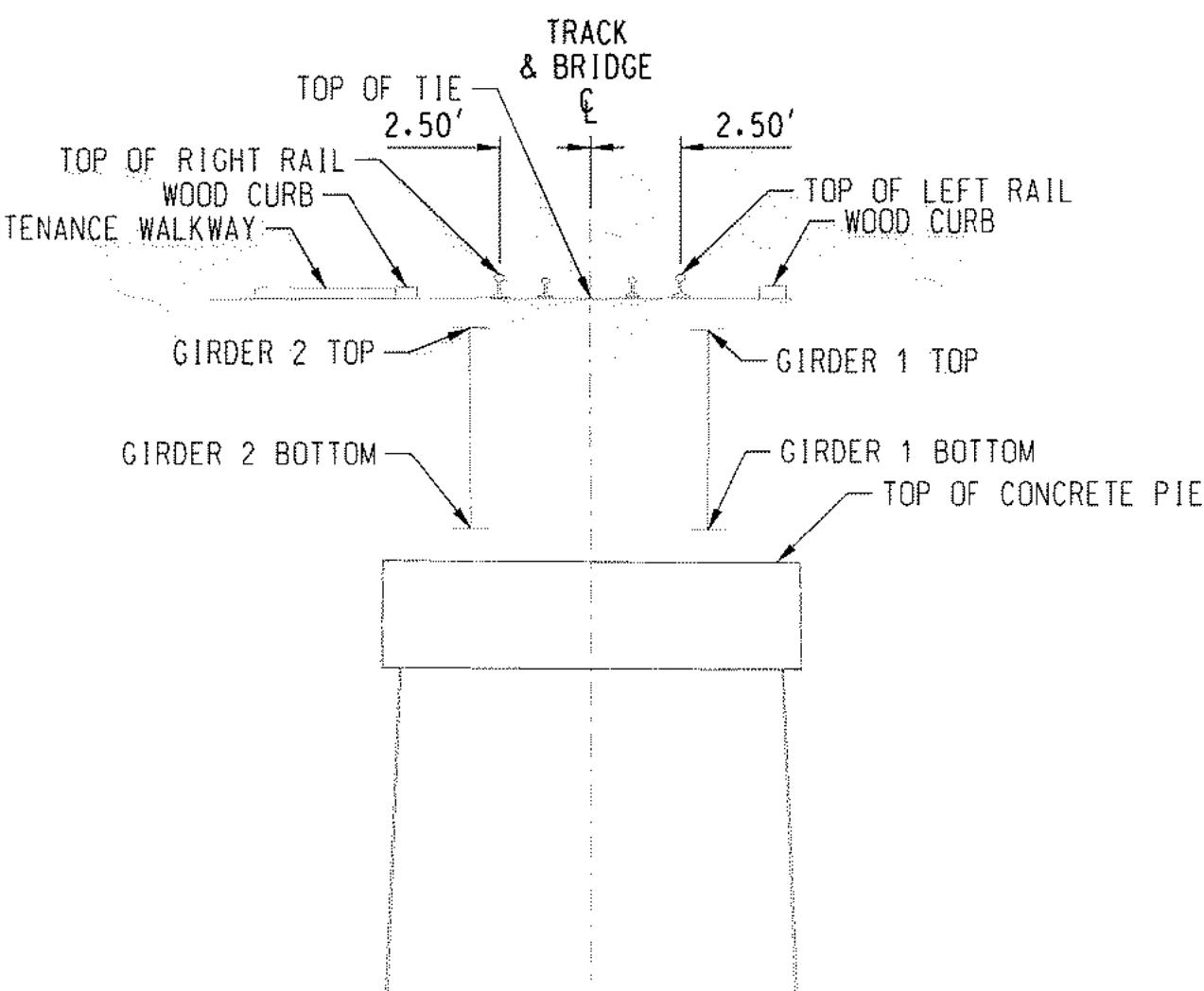
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 54
LOOKING RAILROAD EAST

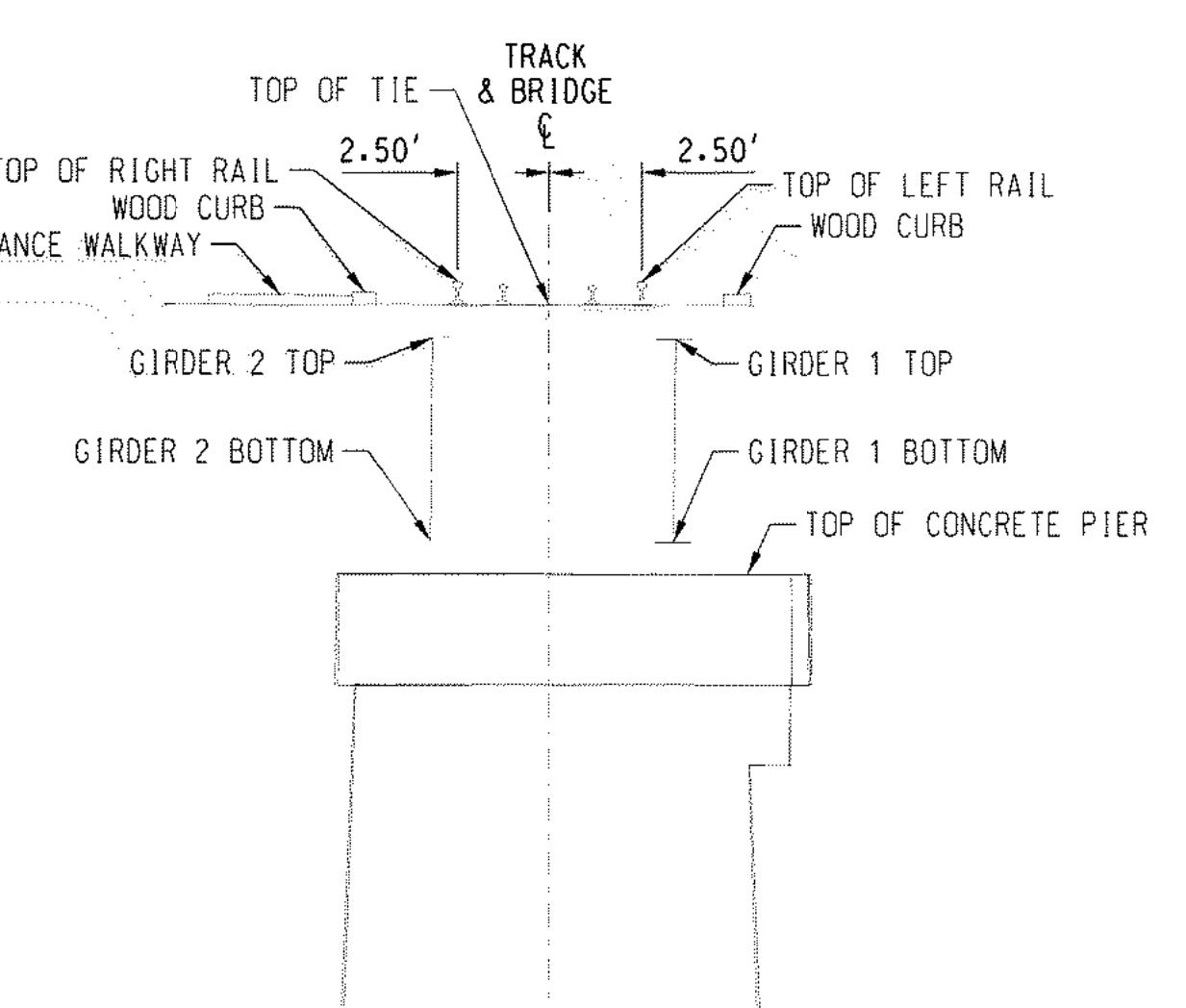
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.72' | 2086.10' | 2086.71' |

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' |

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' |

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 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' |

| 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' |

| 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' |

| 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

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

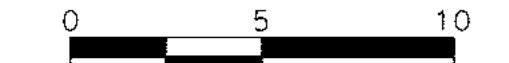
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-015 SHEET: 15 OF 24

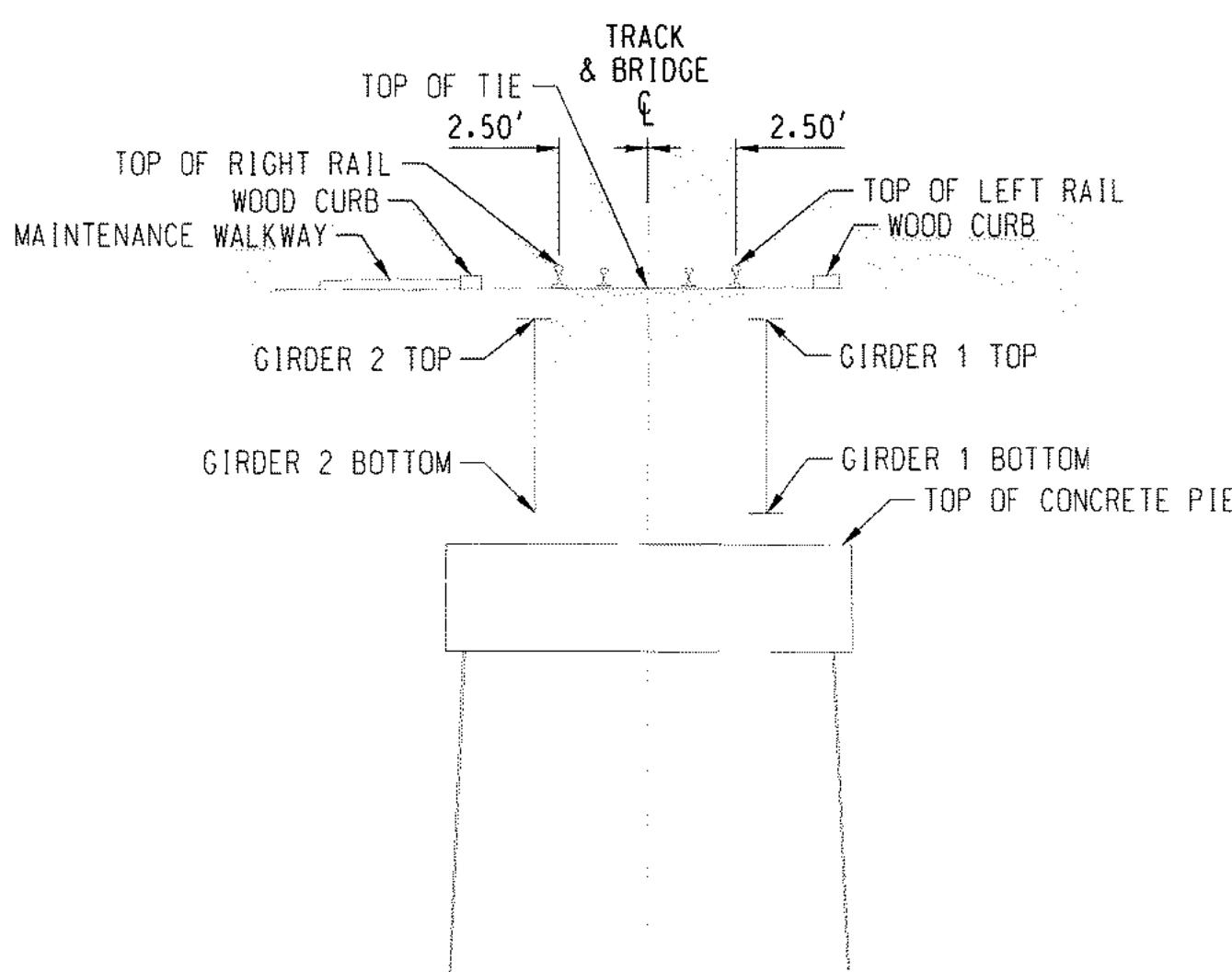
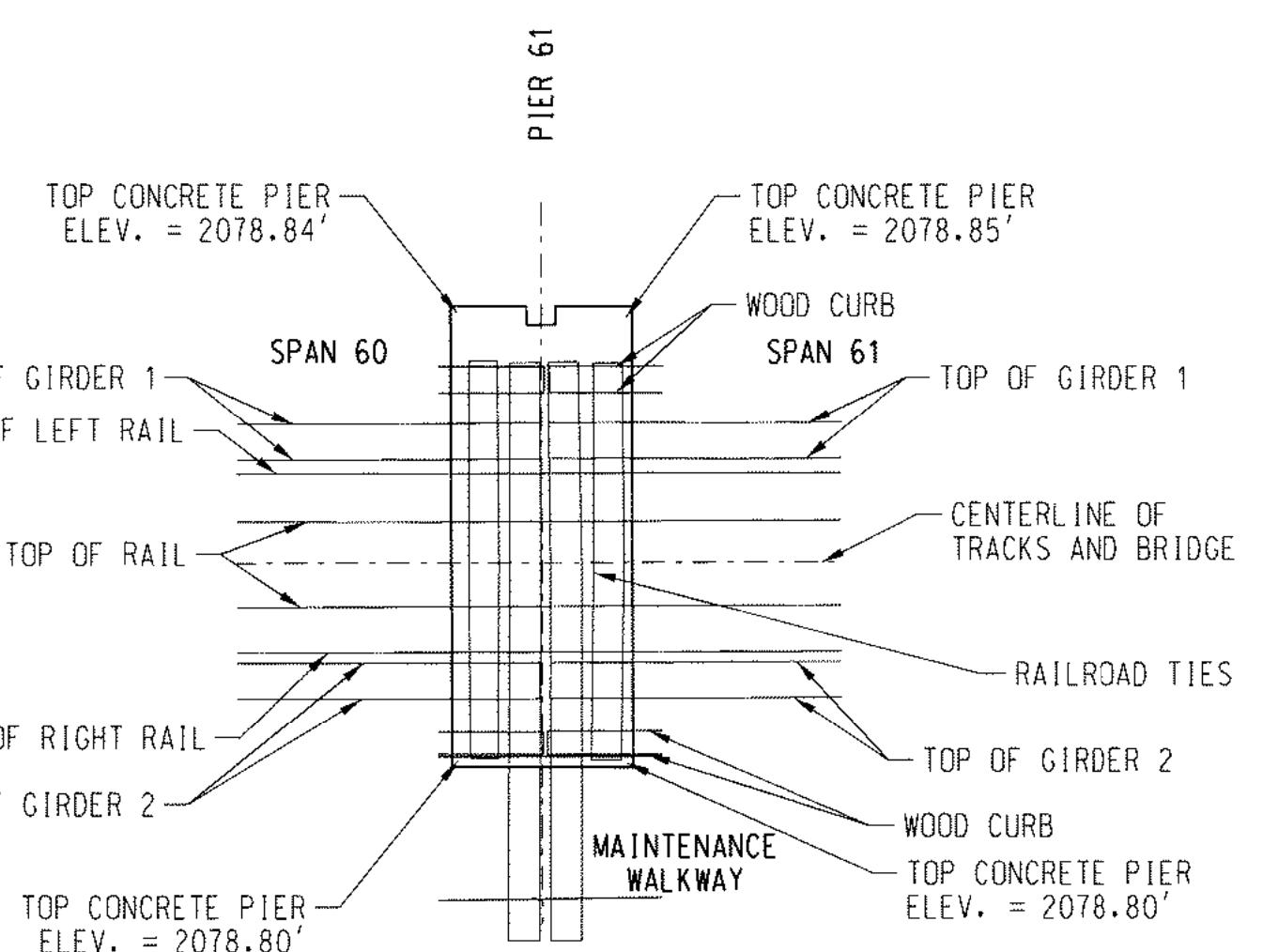
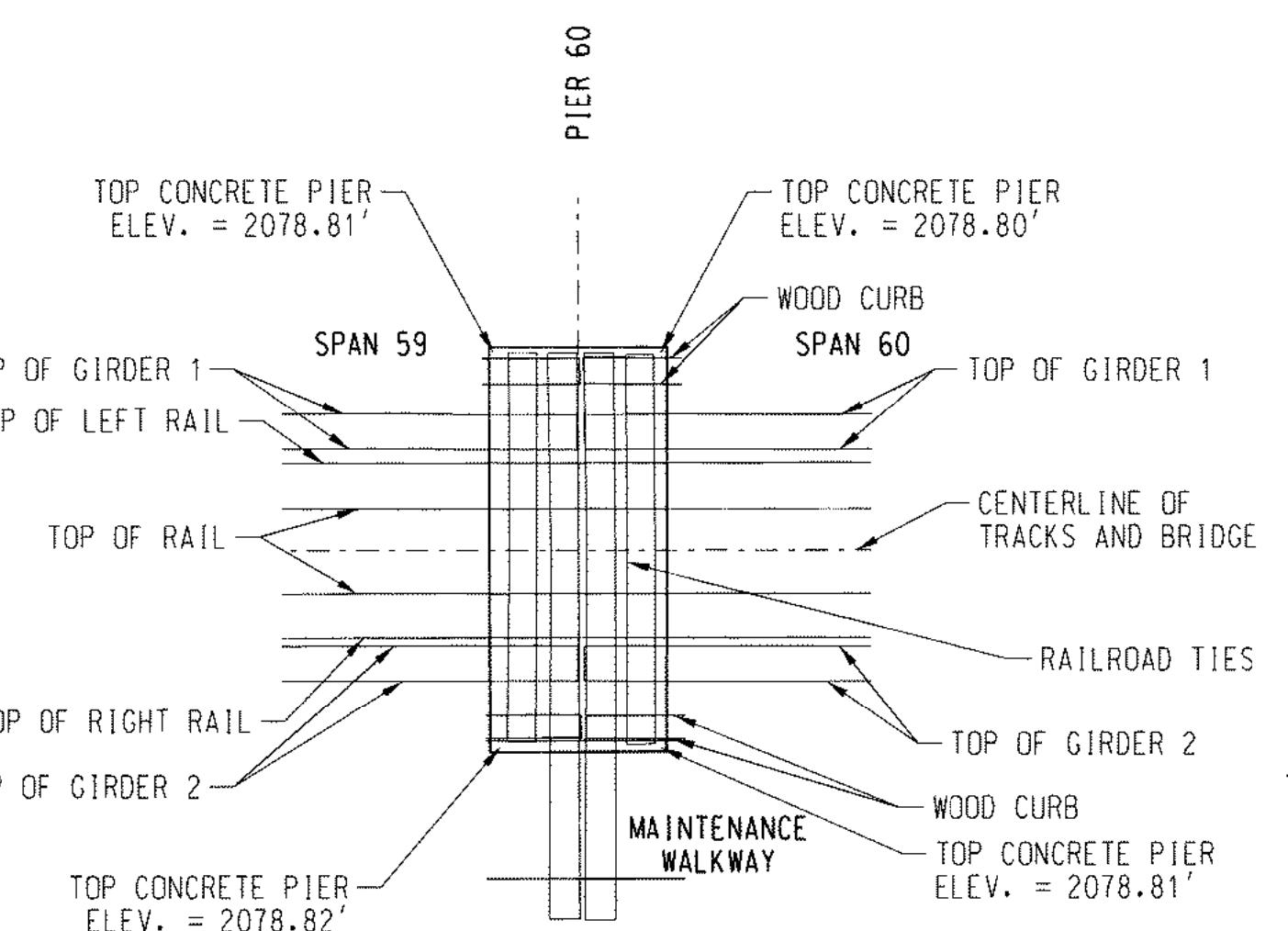
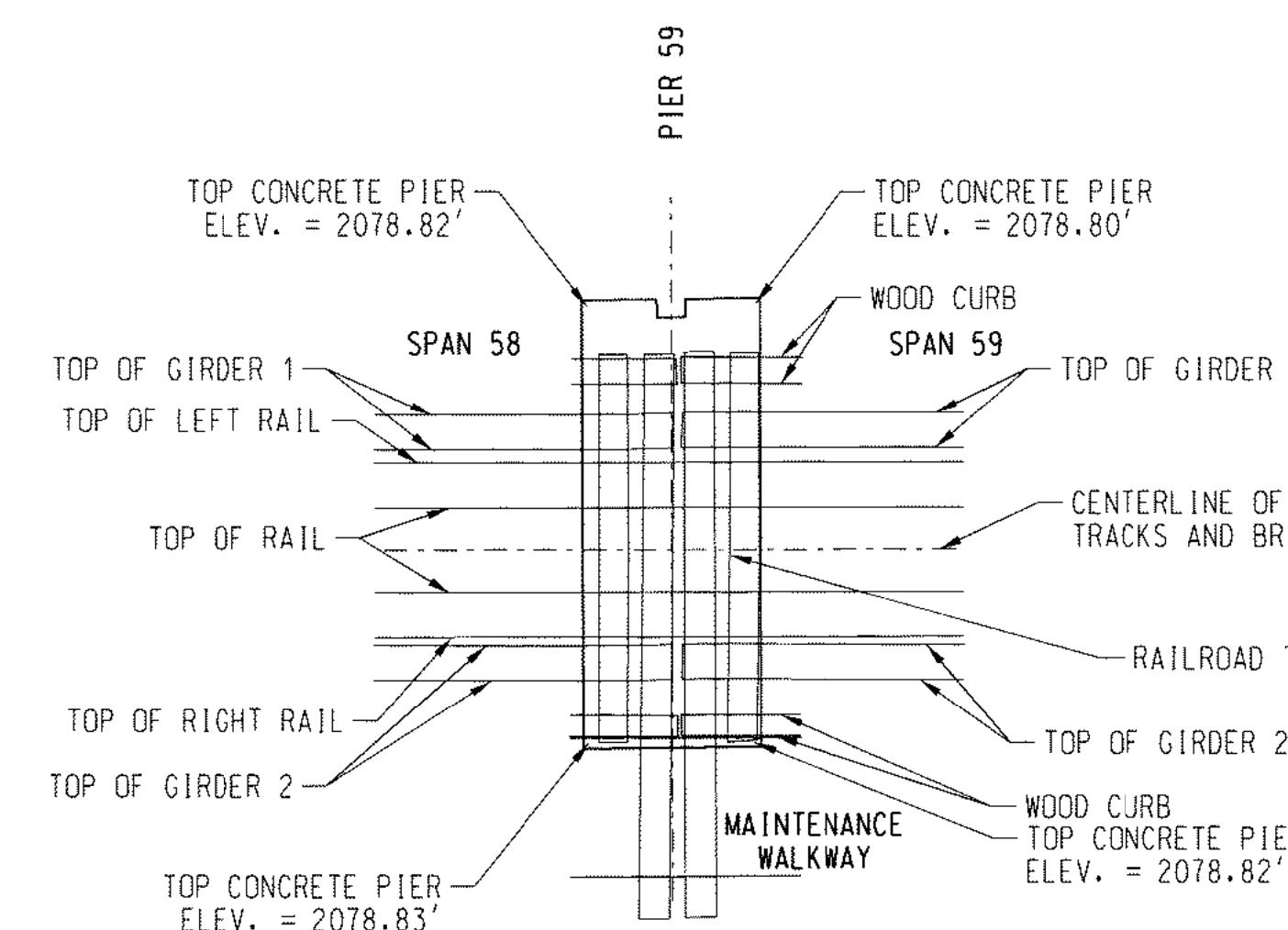
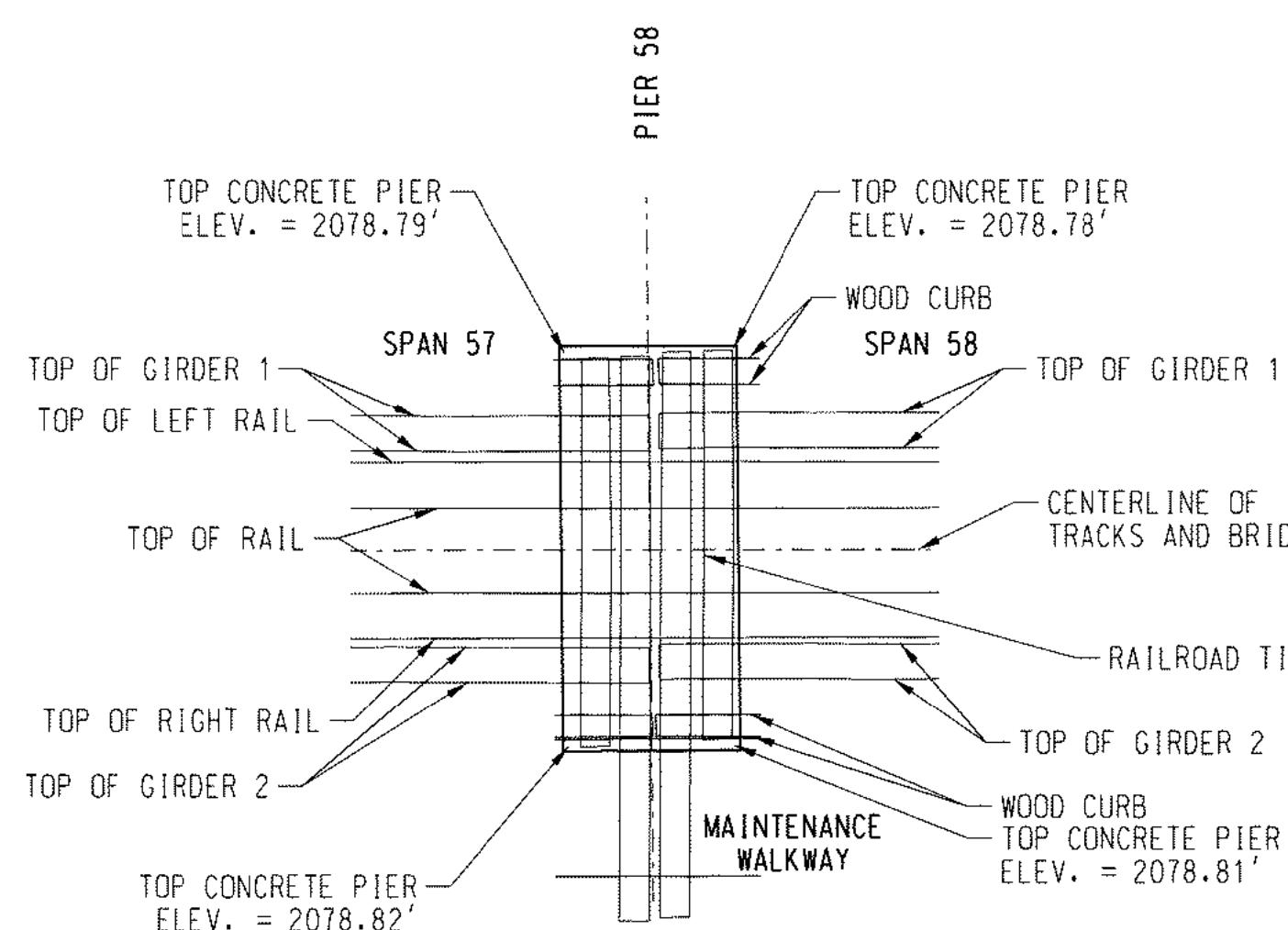


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

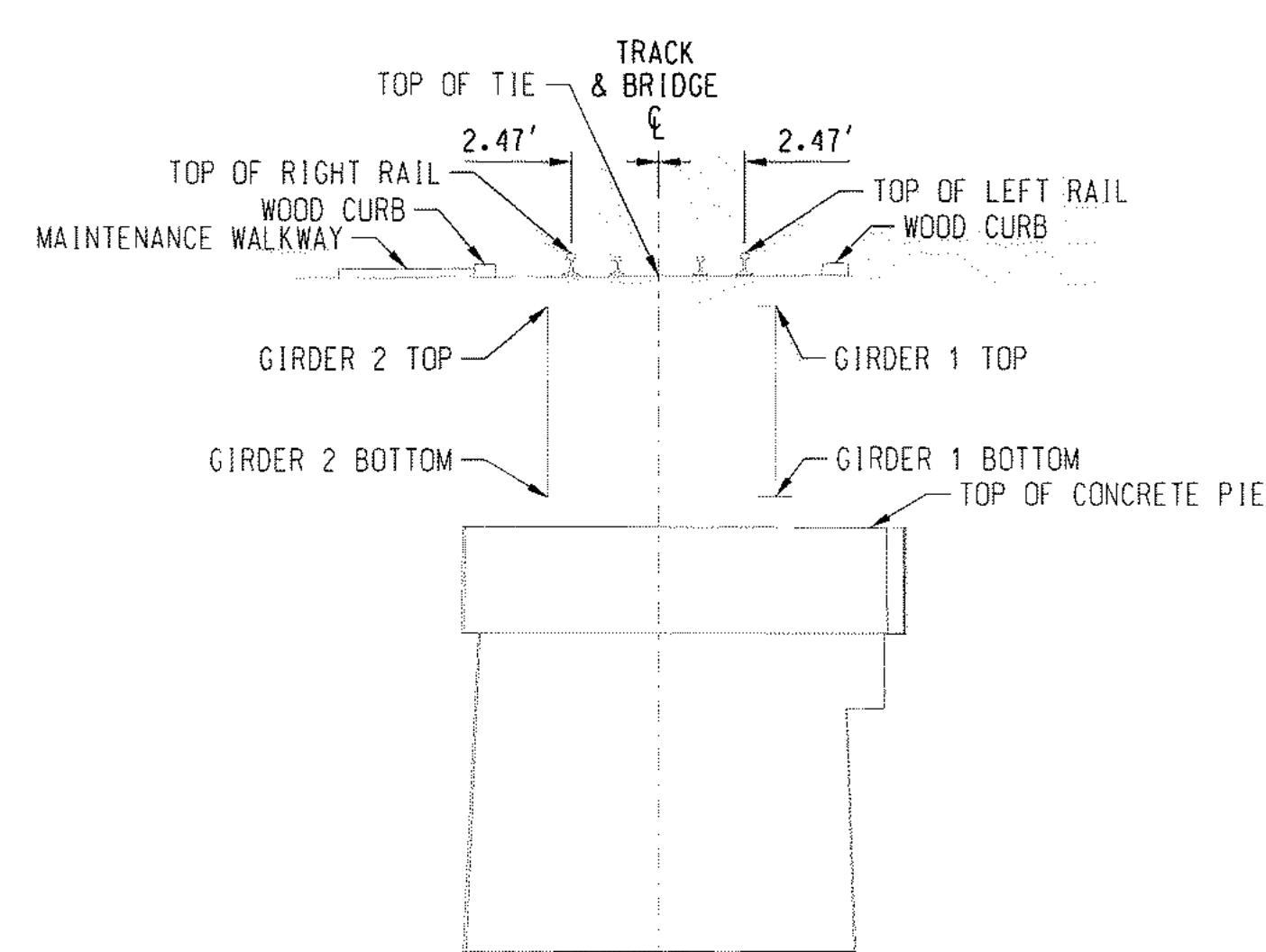
81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

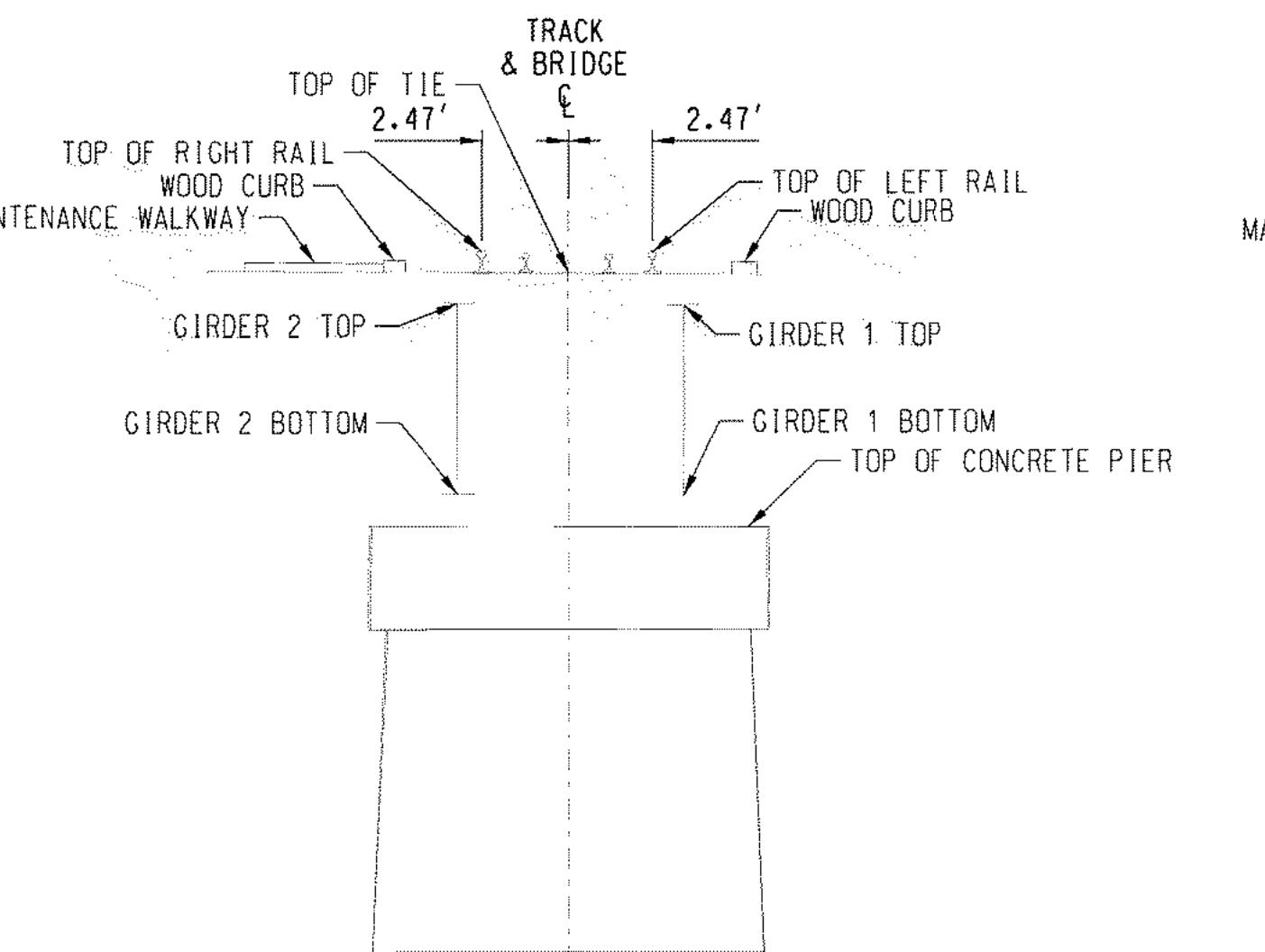
EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


SCALE IN FEET
HORIZONTAL SCALE: 1" = 5'
PIER 58
LOOKING RAILROAD EAST

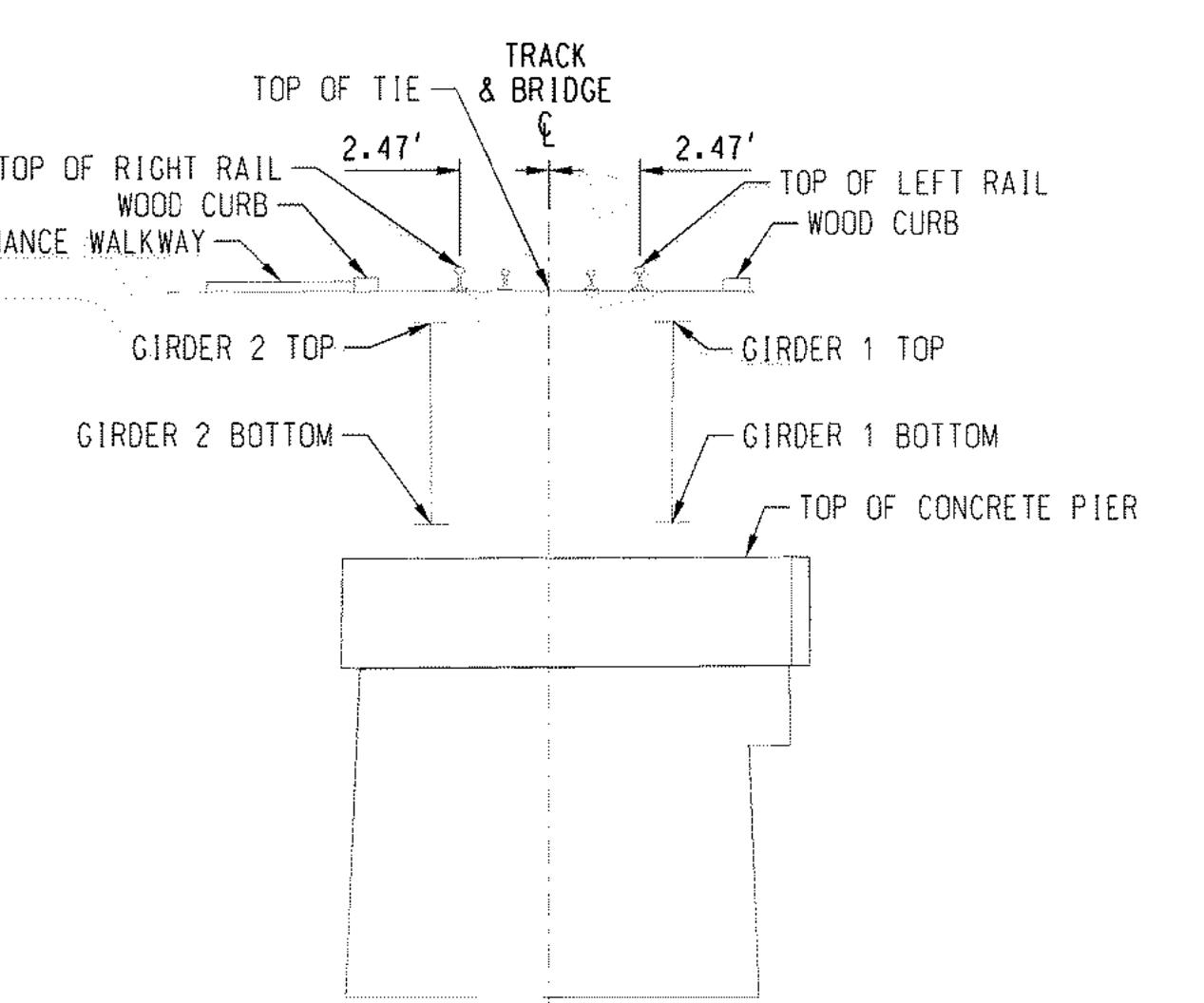
| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.71' | 2086.06' | 2086.71' |

PIER 59
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.75' | 2086.11' | 2086.74' |

PIER 60
LOOKING RAILROAD EAST

| TABLE OF ELEVATIONS | | | |
|---------------------|---------------|------------|----------------|
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
| ELEVATION | 2086.78' | 2086.16' | 2086.79' |

PIER 61
LOOKING RAILROAD EAST

| 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 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 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 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 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

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

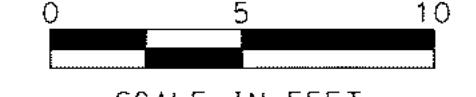
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-016 SHEET: 16 OF 24

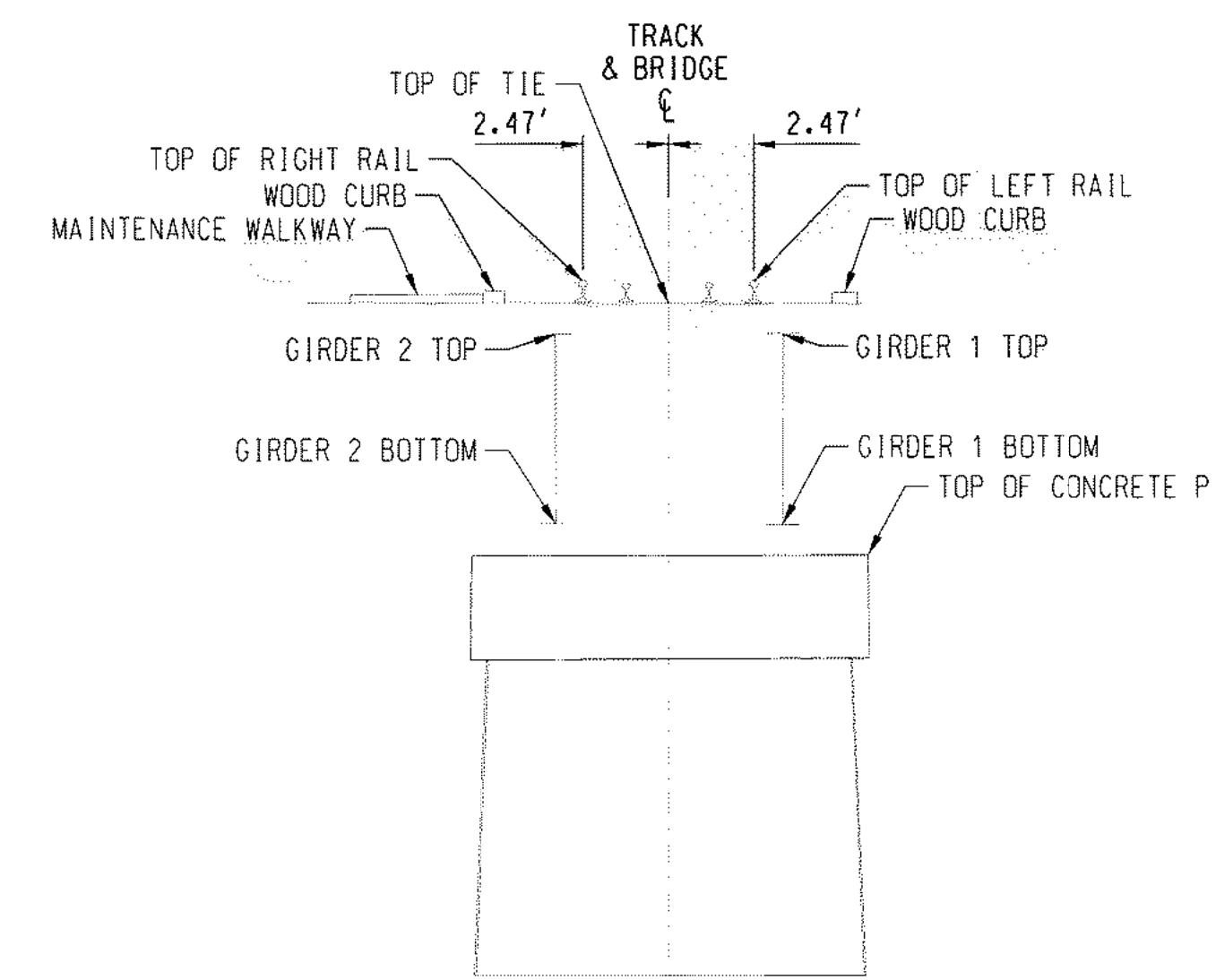
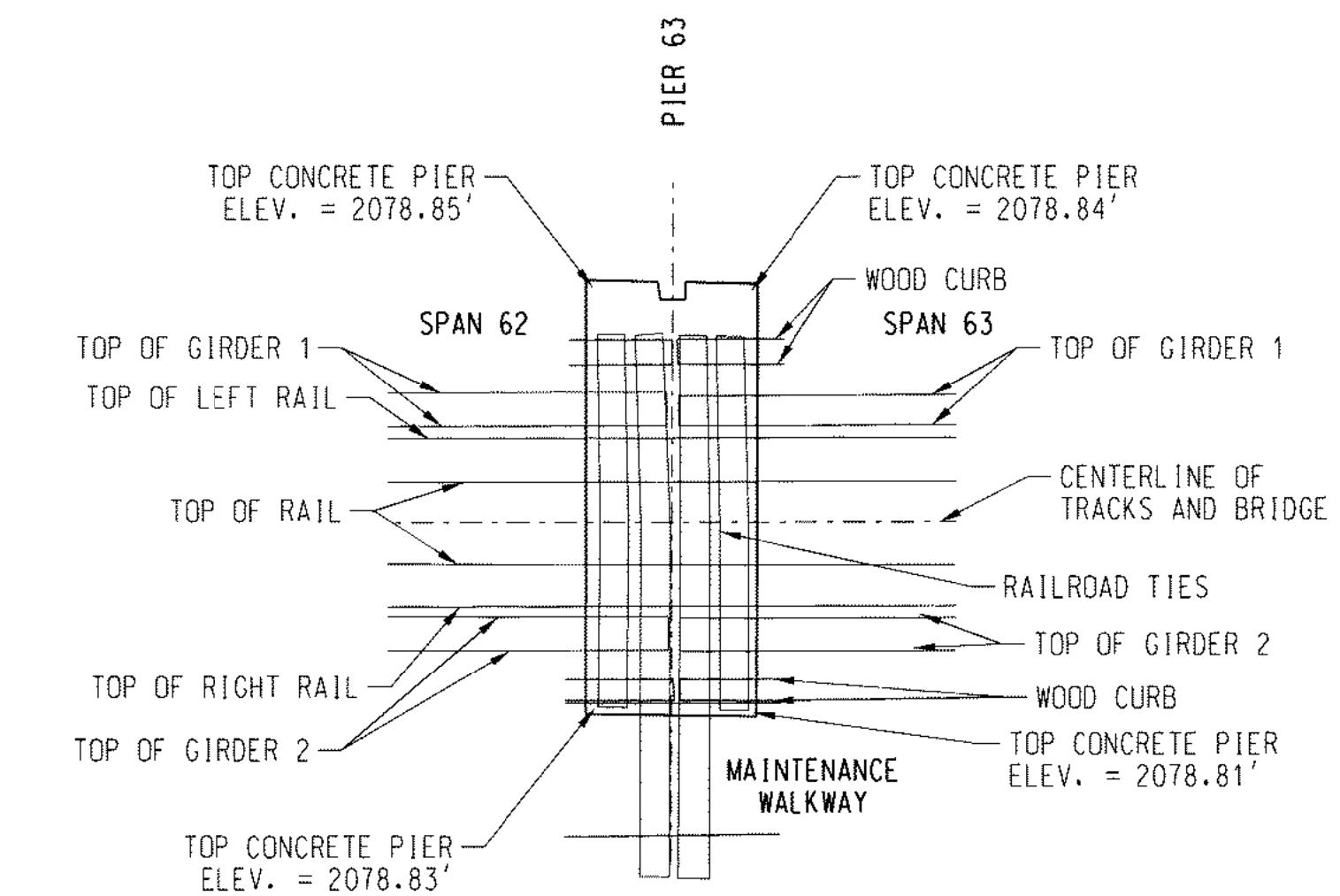
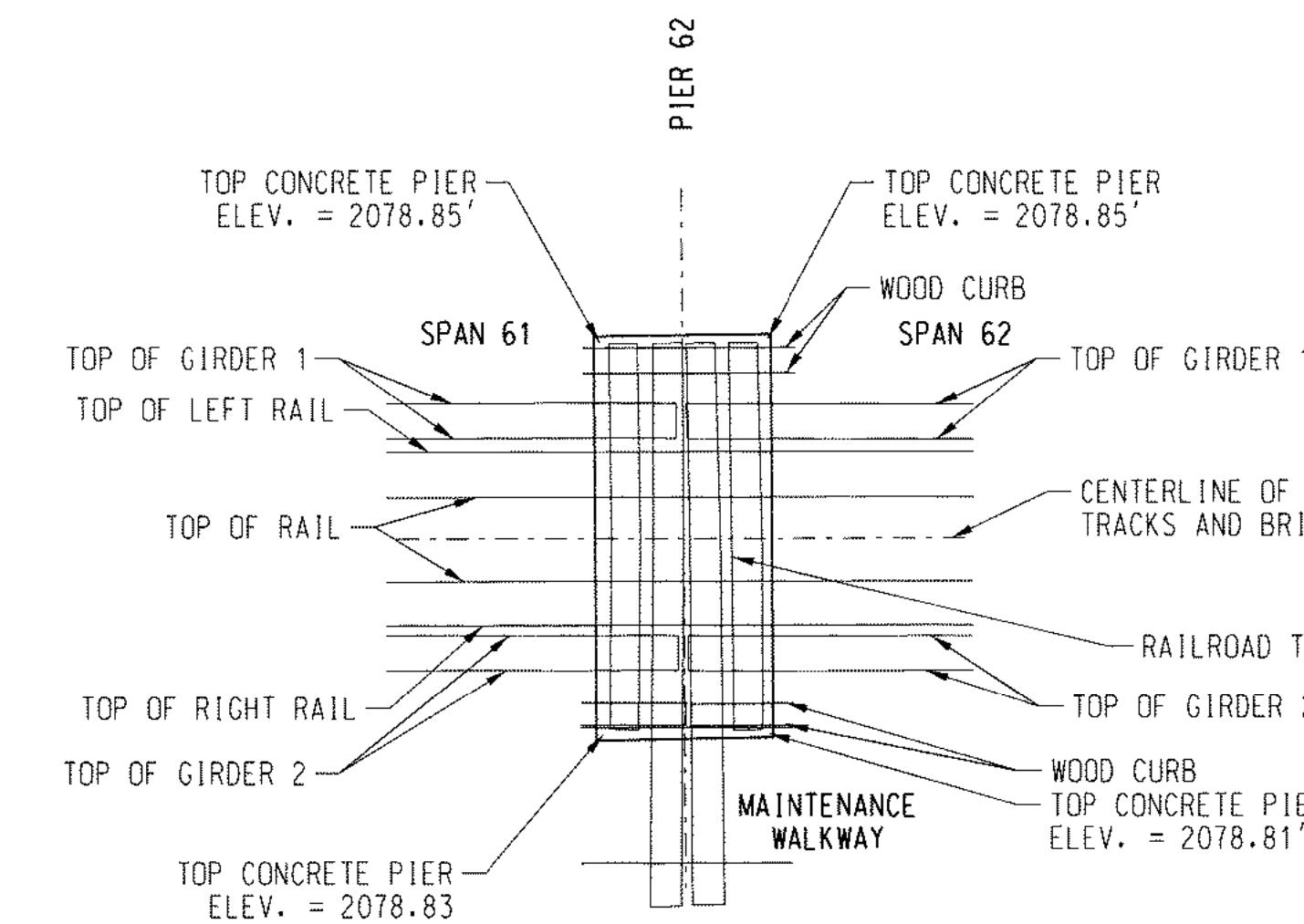


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. IDWEST
TO EAST ALGOMA, ID


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' |

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.

- 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.

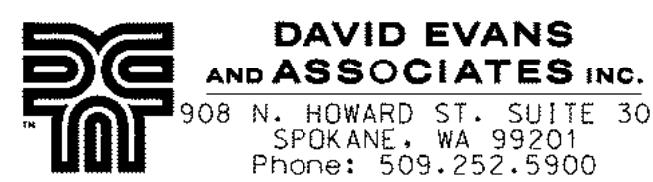
PRELIMINARY

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

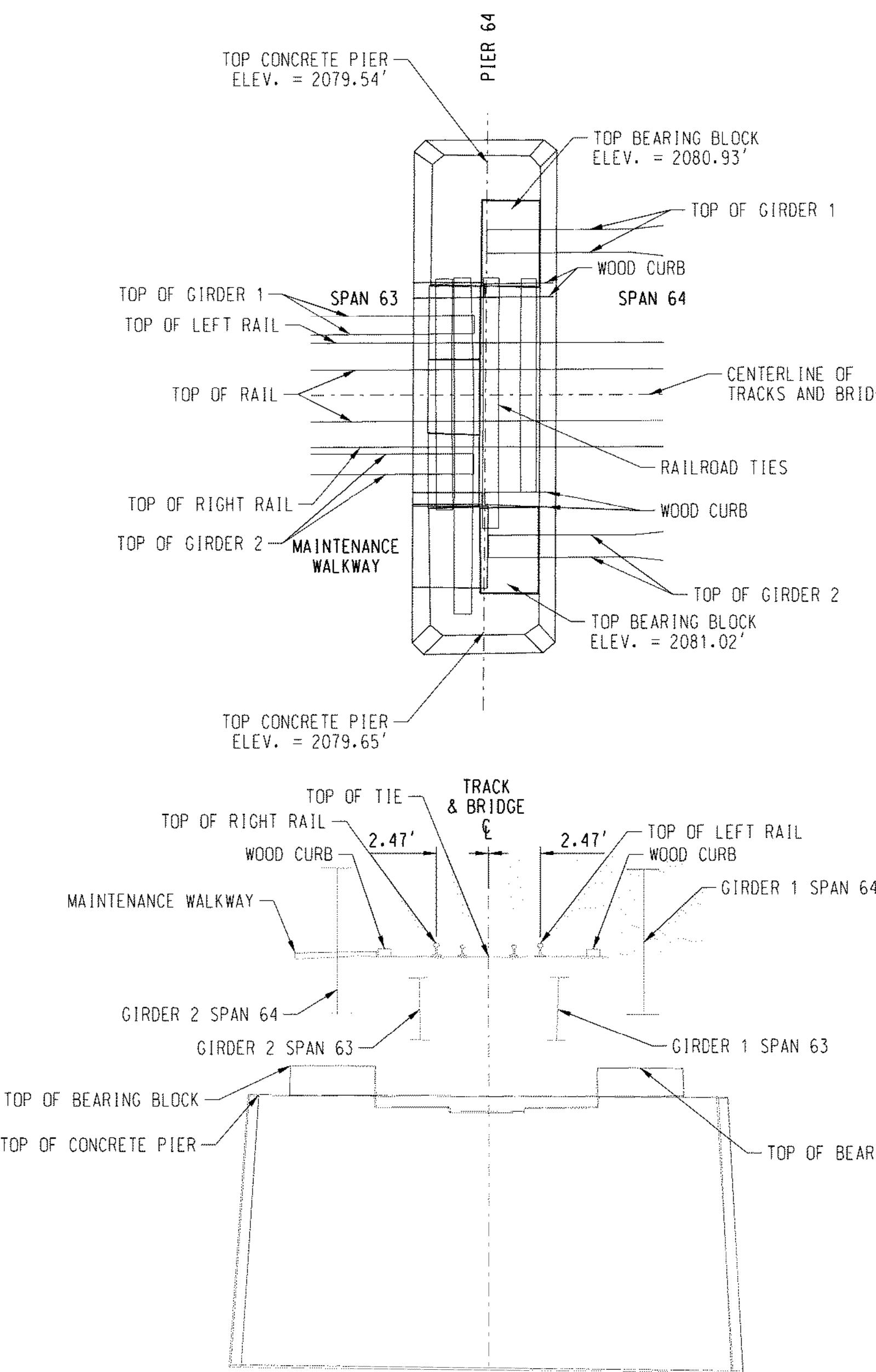
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-017 SHEET: 17 OF 24



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

PIER PLAN & PROFILES

EAST
TO SANDPOINT JCT. ID



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' |

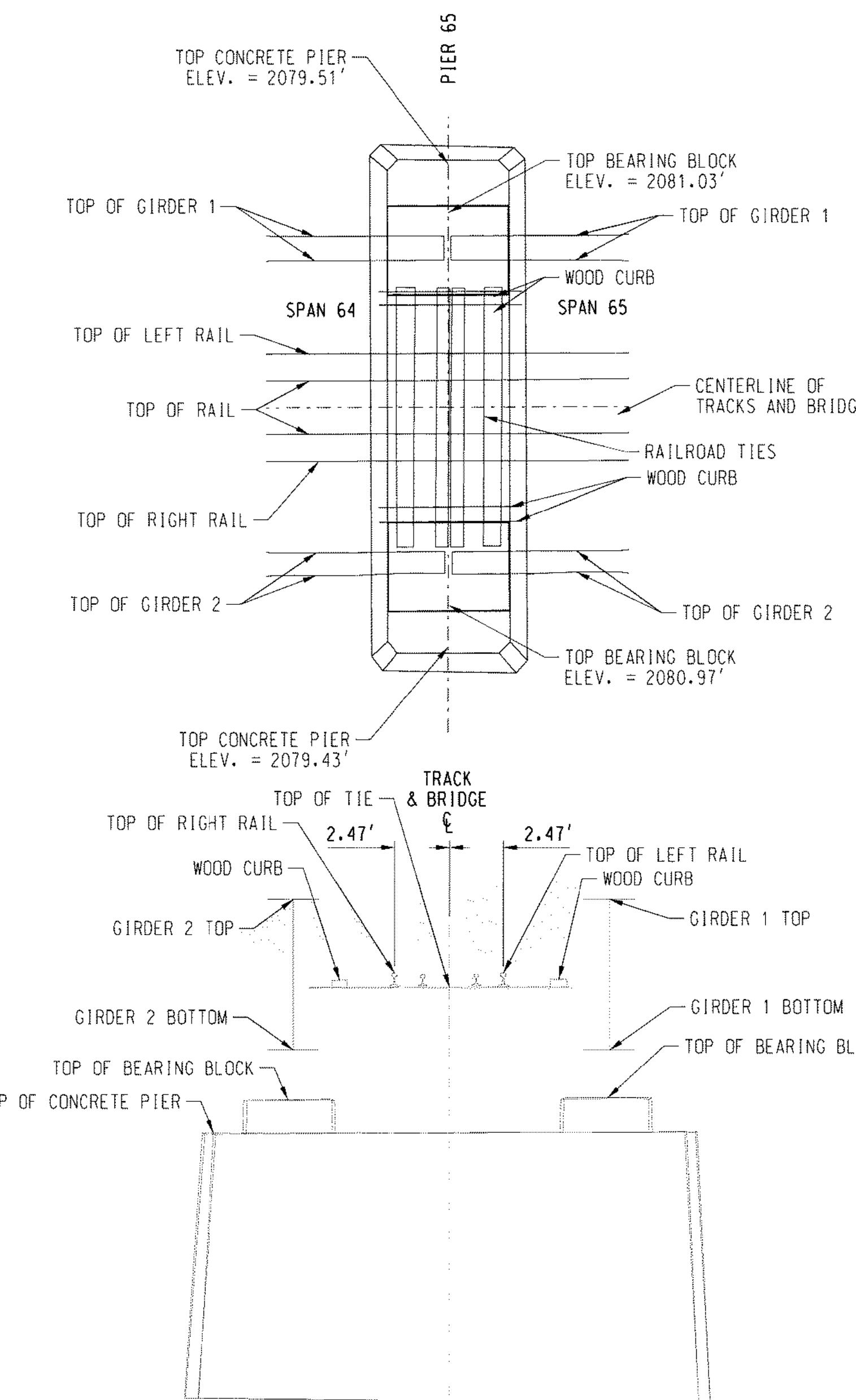


DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

- 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.

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

WEST
TO EAST ALGOMA, ID



PIER 65
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS

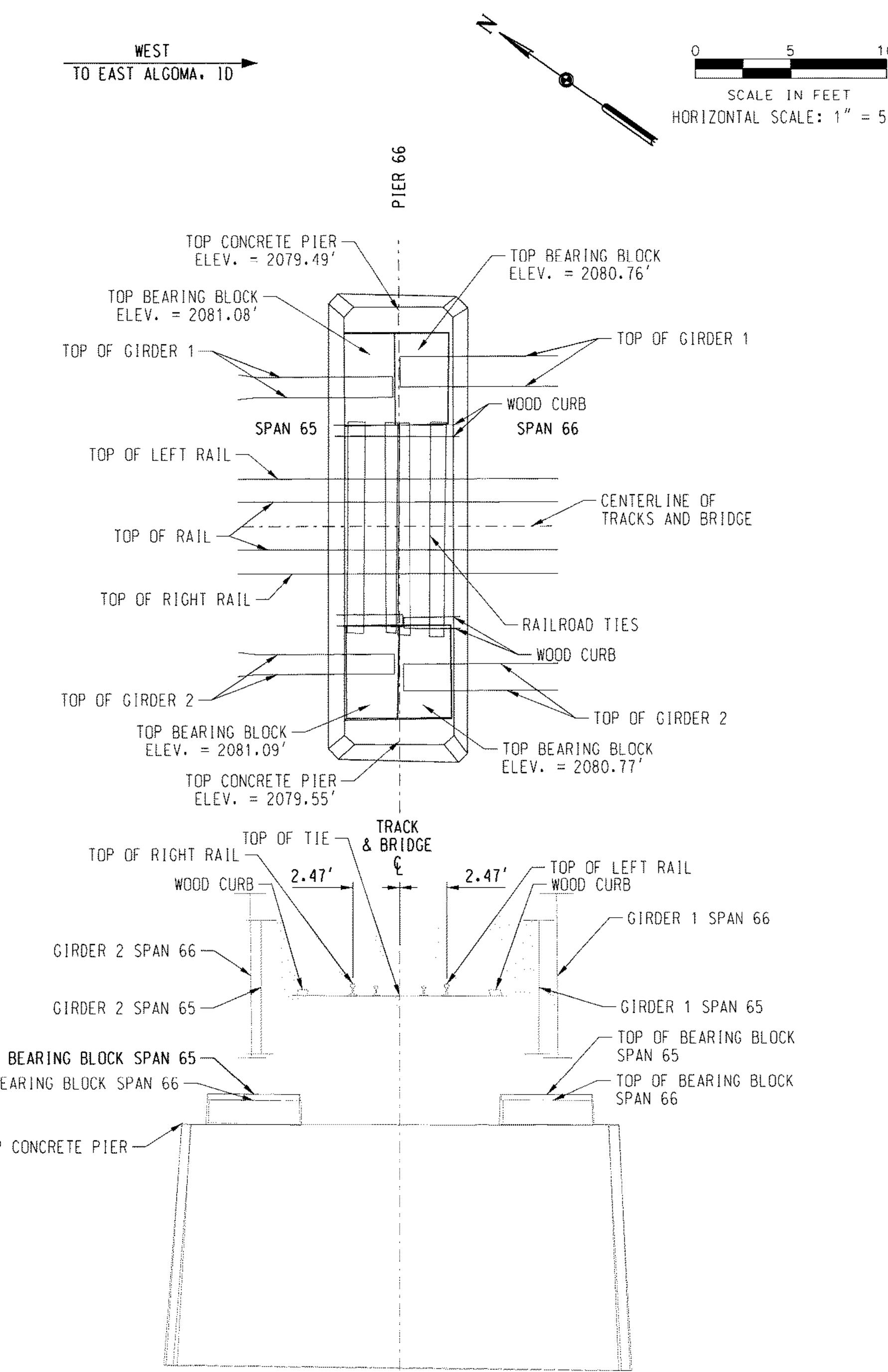
| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.85' | 2086.19' | 2086.84' |

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' |

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.



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' |

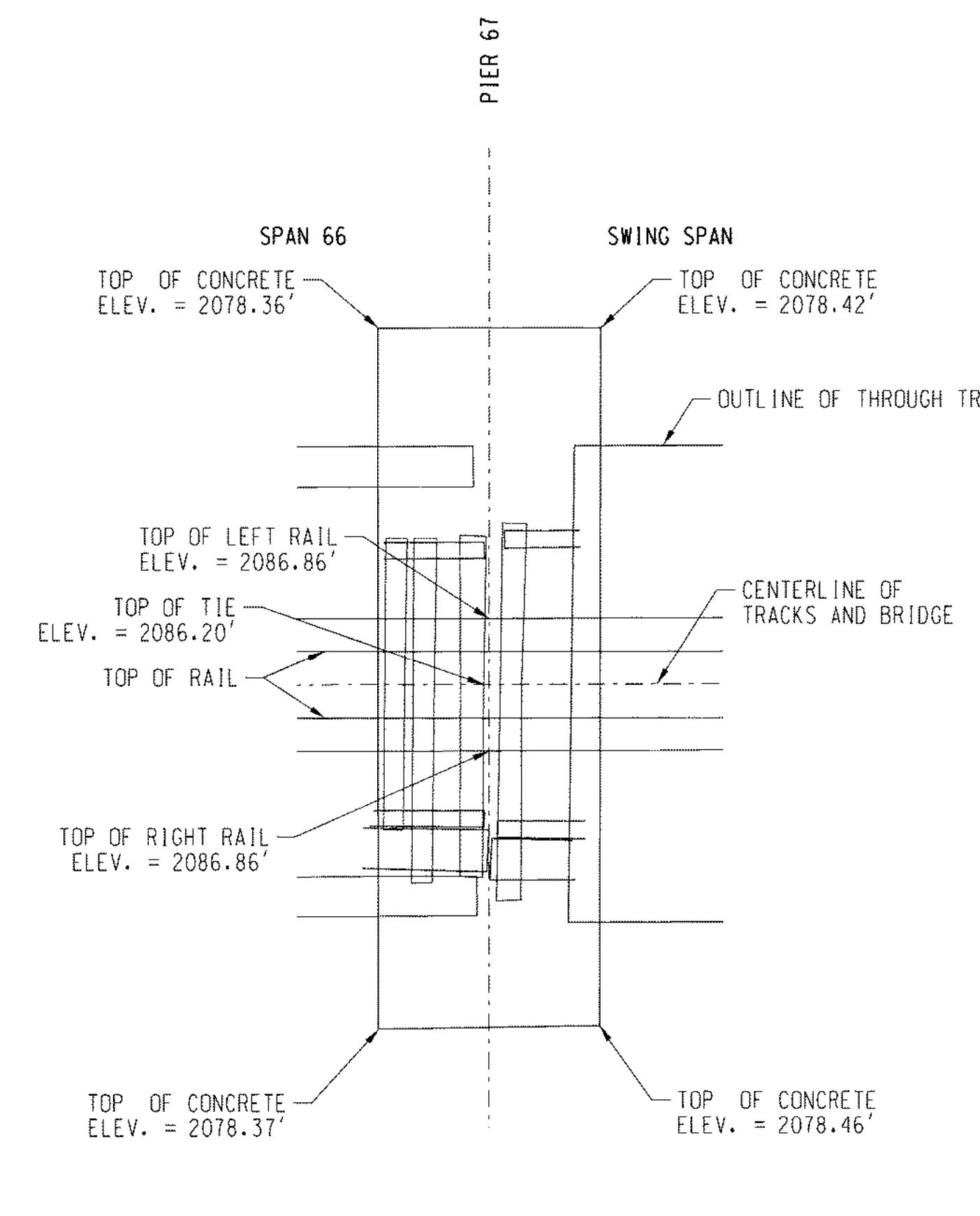
| | | | |
|-----------|--------------|-----------|----------------------------------|
| DES: | BNSF RAILWAY | | |
| DRAWN: | KMD | CHECK: | DDHA/AKY |
| DATE: | SEPT. 2016 | AUTH: | |
| LINE SEG: | 0045 | APPROVED: | ASST. DIRECTOR STRUCTURES DESIGN |
| | | PLAN NO: | 0045-003.900-018 |
| | | SHEET: | 18 OF 24 |

PIER PLAN & PROFILES

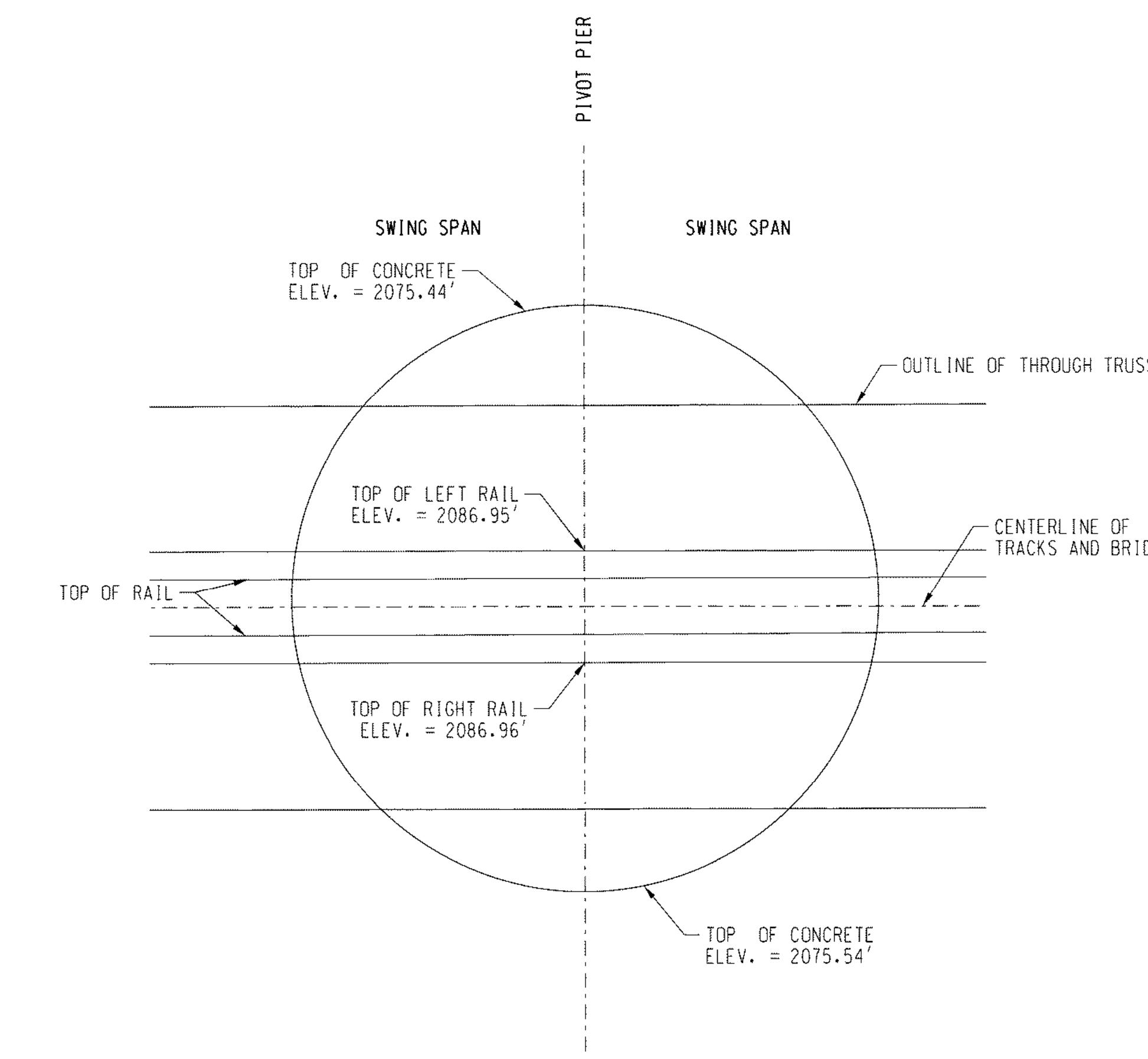


EAST
TO SANDPOINT JCT. ID

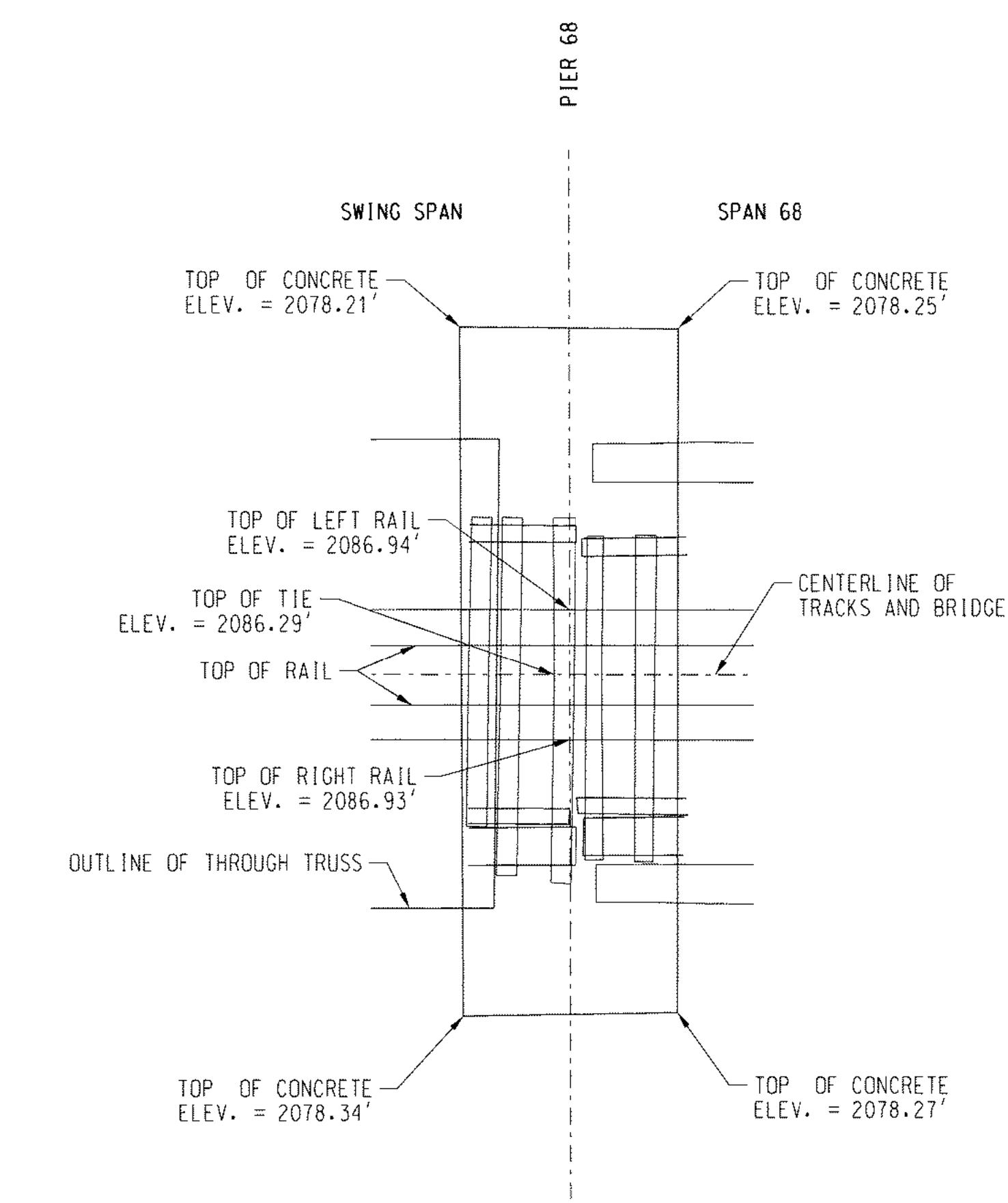
WEST
TO EAST ALGOMA, ID



PIER 67



PIVOT PIER



PIER 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

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

BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED: *[Signature]*
ASST. DIRECTOR STRUCTURES DESIGN

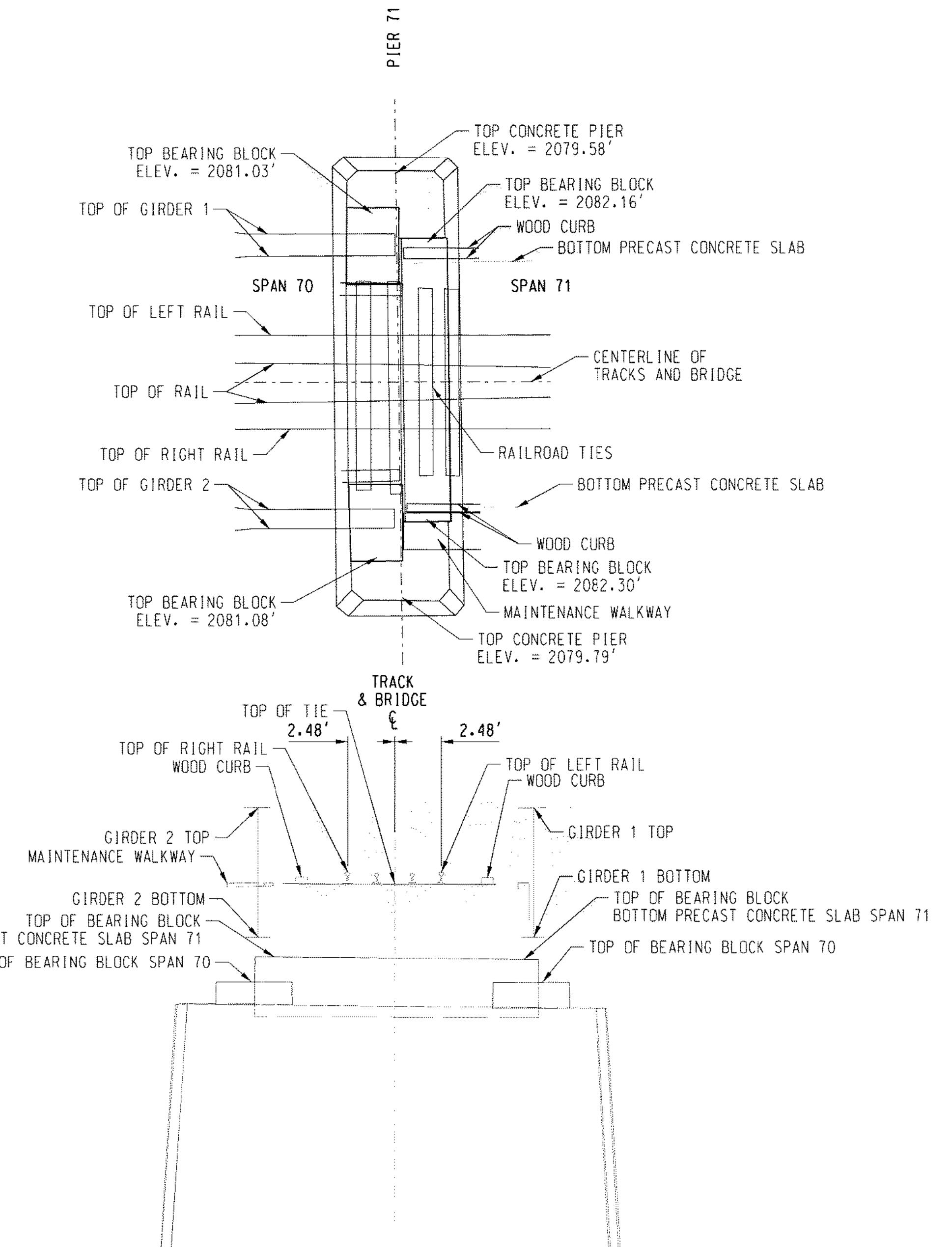
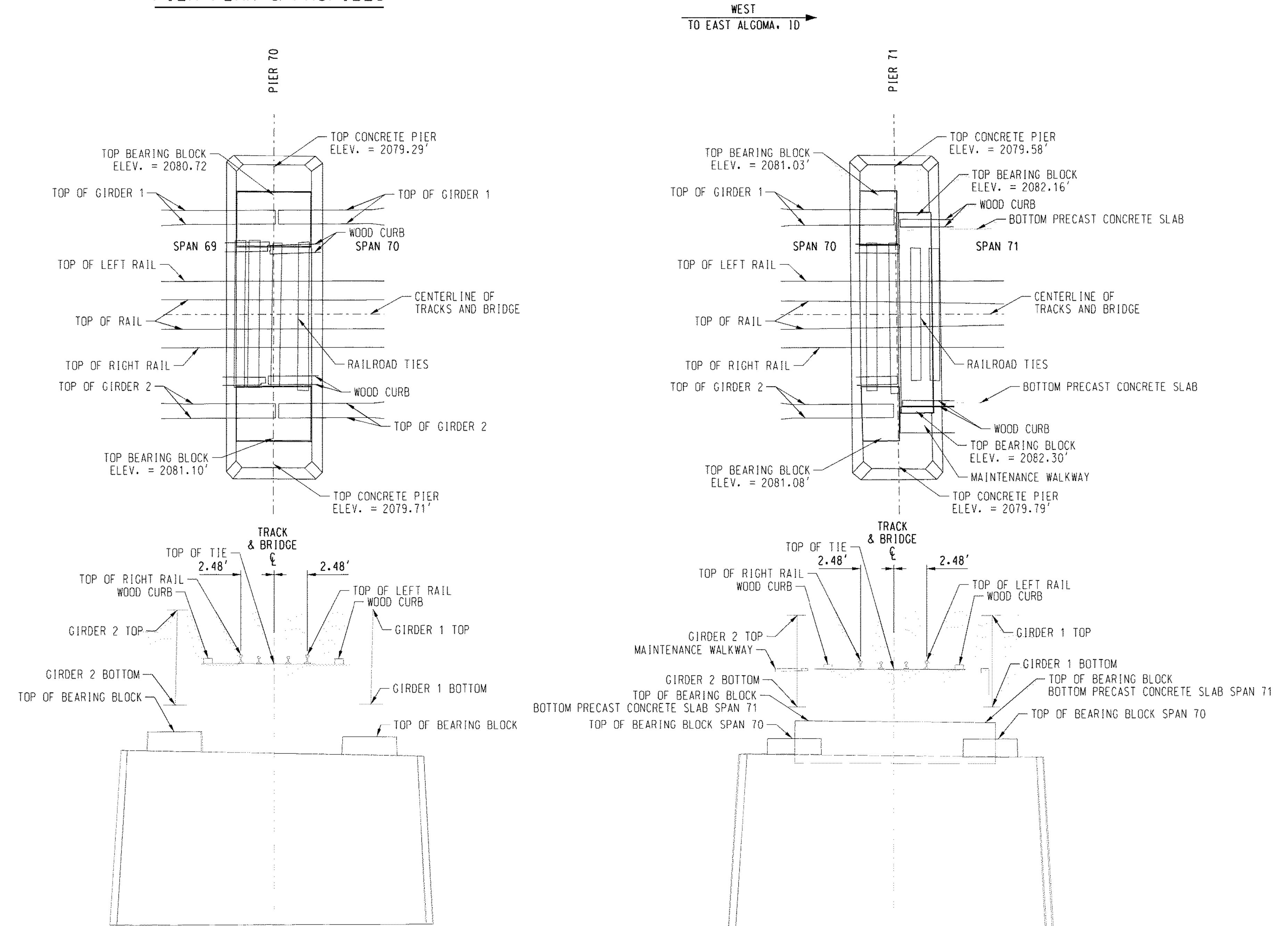
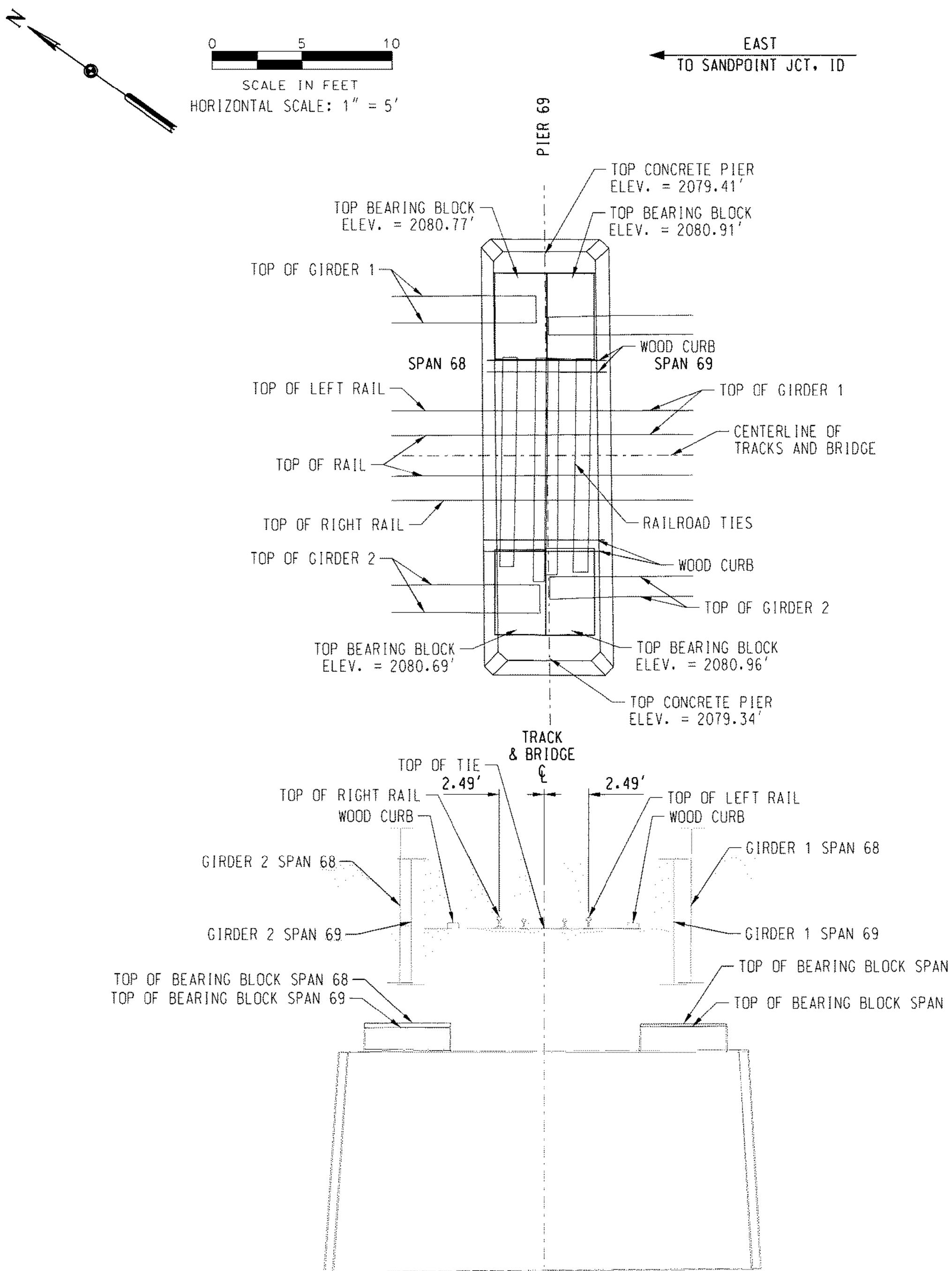
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-019 SHEET: 19 OF 24



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.

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 GIRDERS | BOTTOM OF GIRDERS |
|------------------|----------------|-------------------|
| 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' |

- 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.

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 GIRDERS | BOTTOM OF GIRDERS |
|------------------|----------------|-------------------|
| 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' |

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: 0045-003.900-020 SHEET: 20 OF 24



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

81
Know what's below.
Call before you dig.

PIER PLAN & PROFILES

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

EAST
TO SANDPOINT JCT. ID

WEST
TO EAST ALGOMA, ID

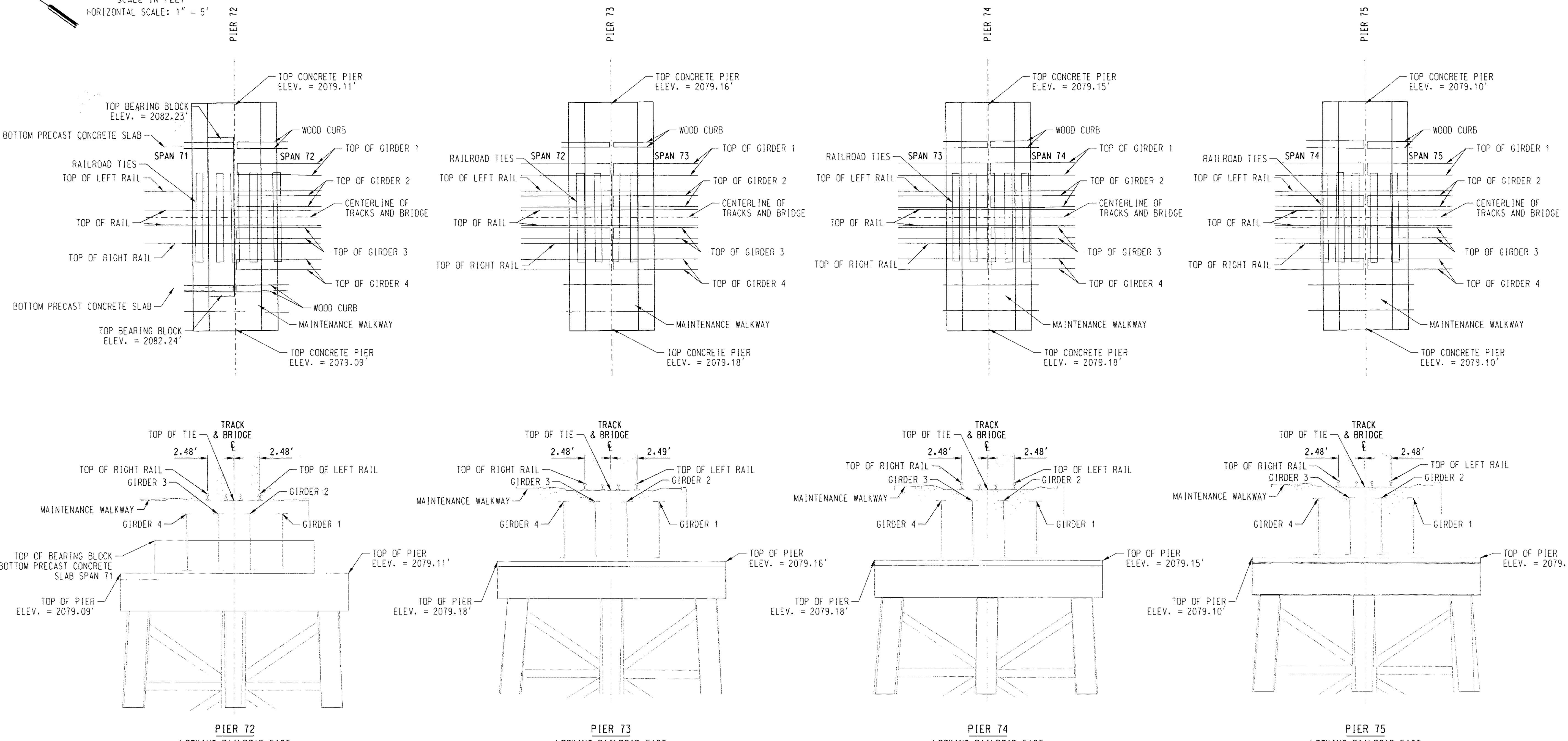


TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.68' | 2085.72' | 2086.69' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.55' | 2085.92' | 2086.57' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.49' | 2085.85' | 2086.50' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.45' | 2085.82' | 2086.47' |

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.

- 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.

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: 0045-003.900-021 SHEET: 21 OF 24



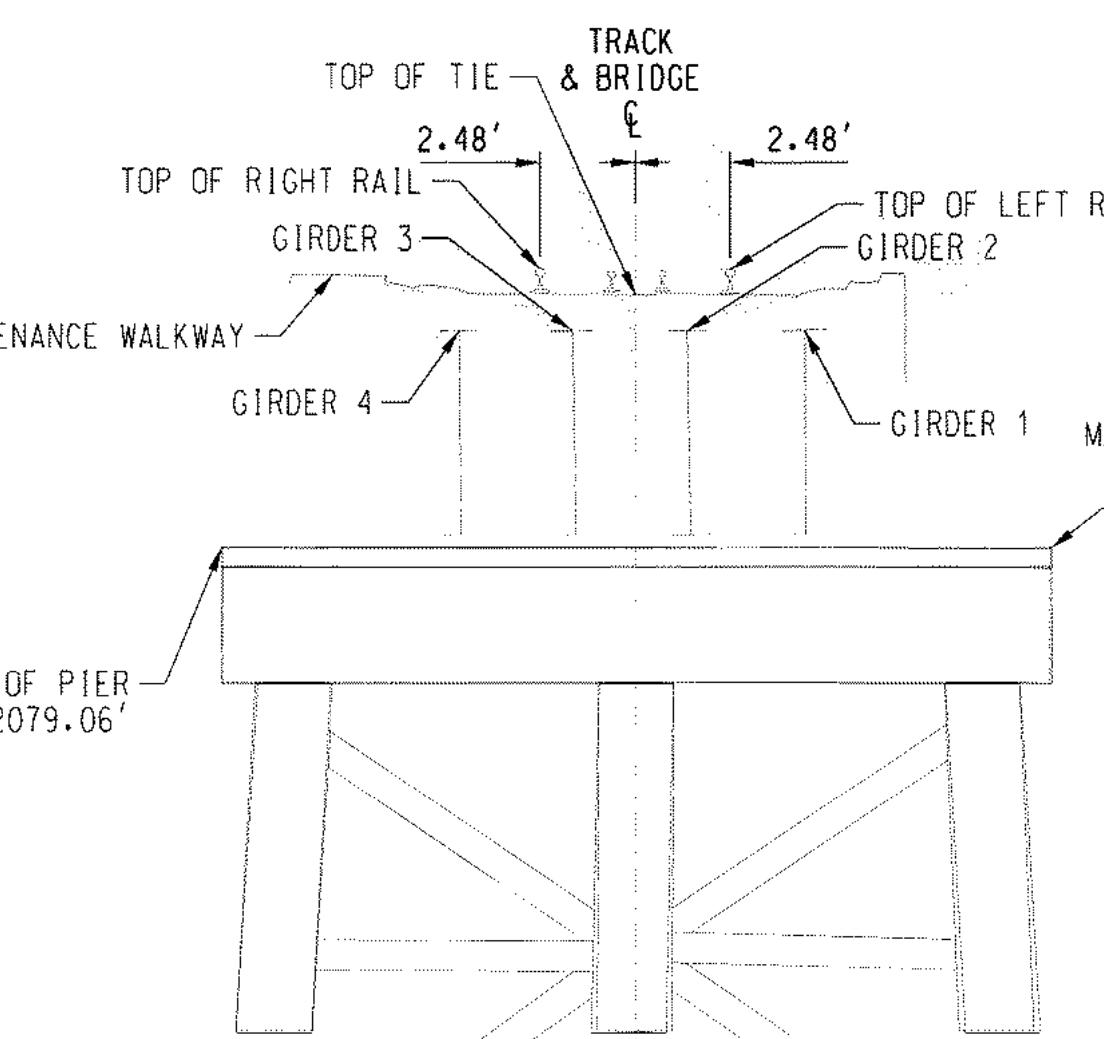
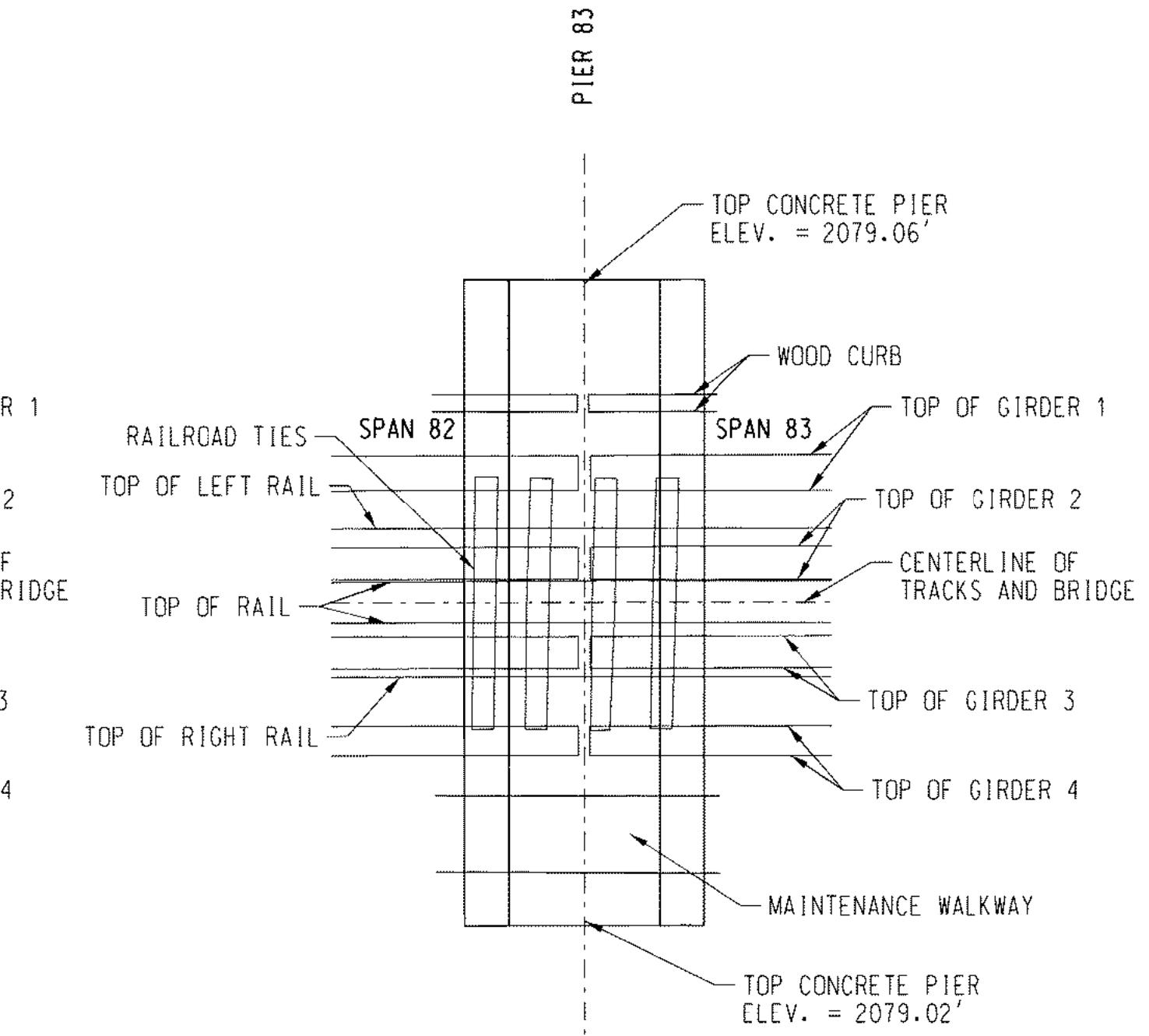
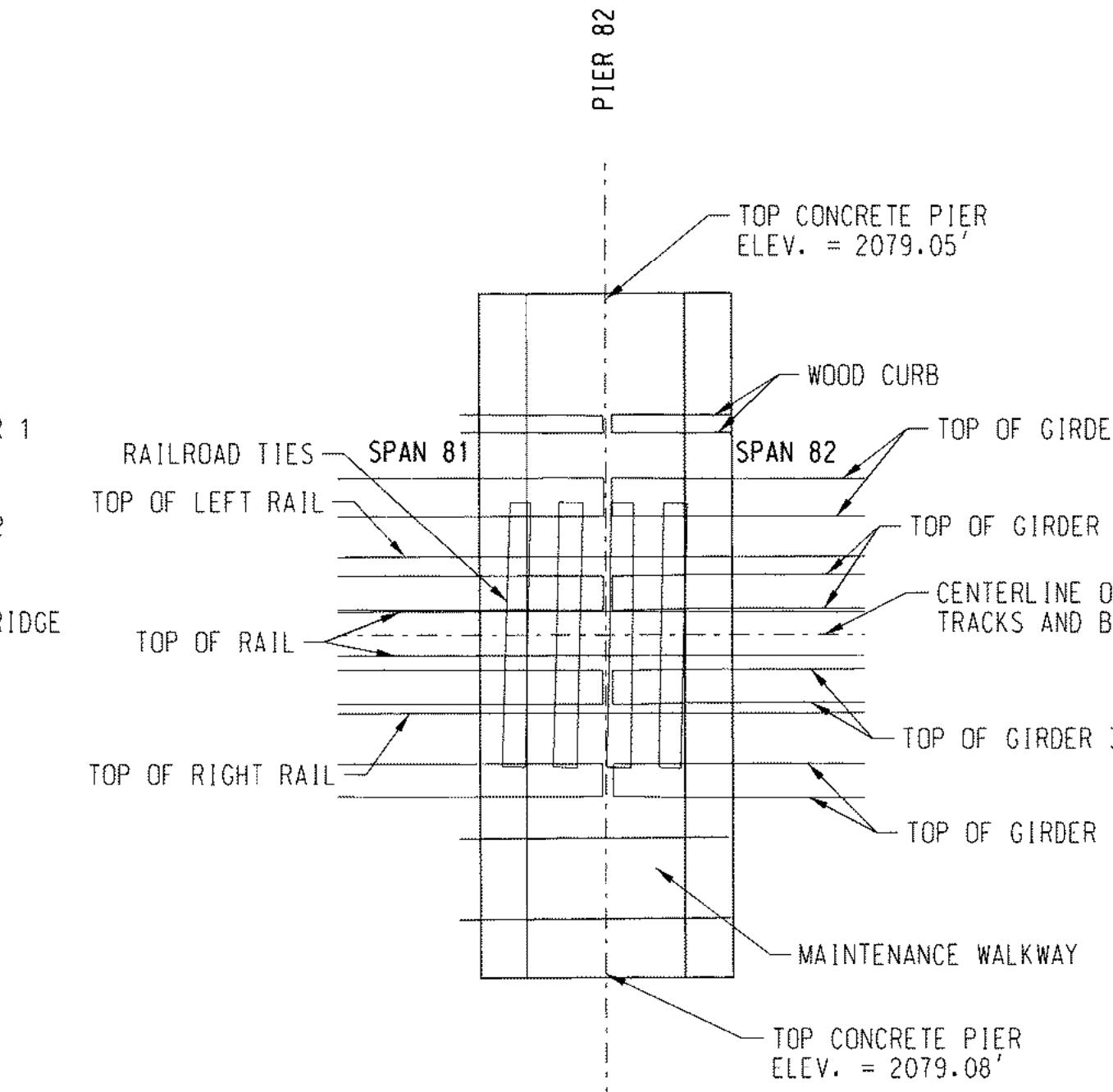
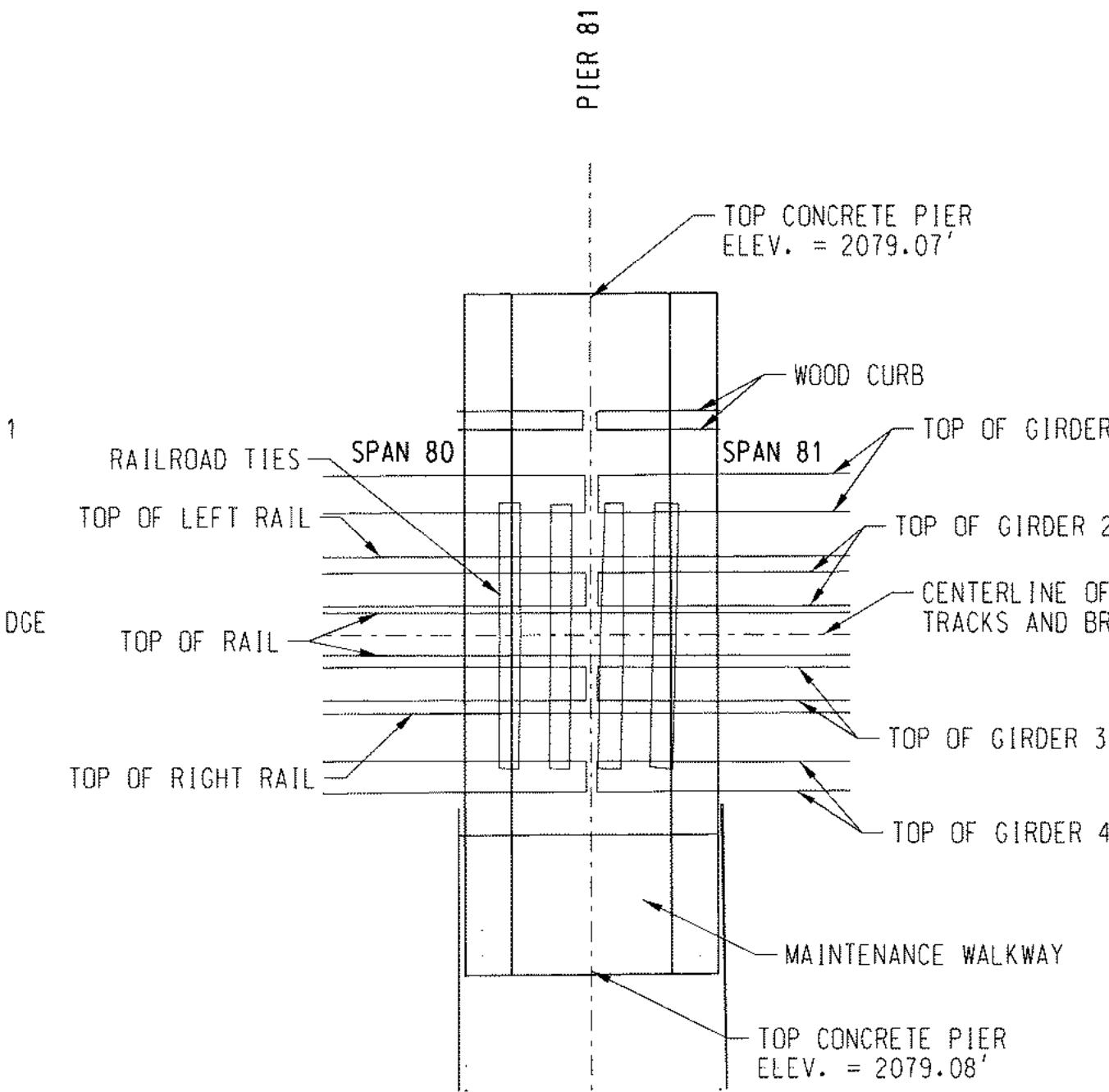
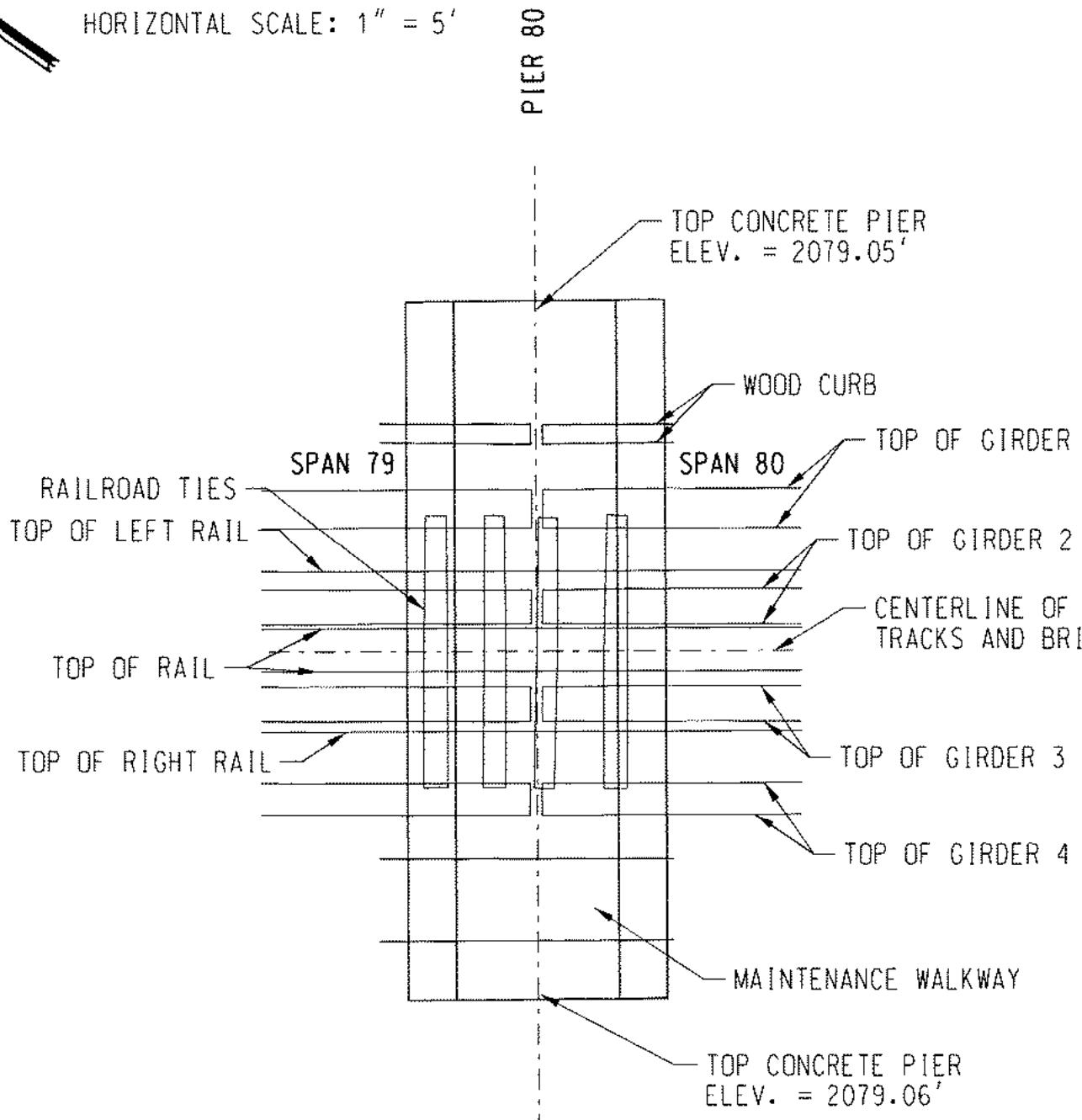
DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPokane, WA 99201
Phone: 509.252.5900

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

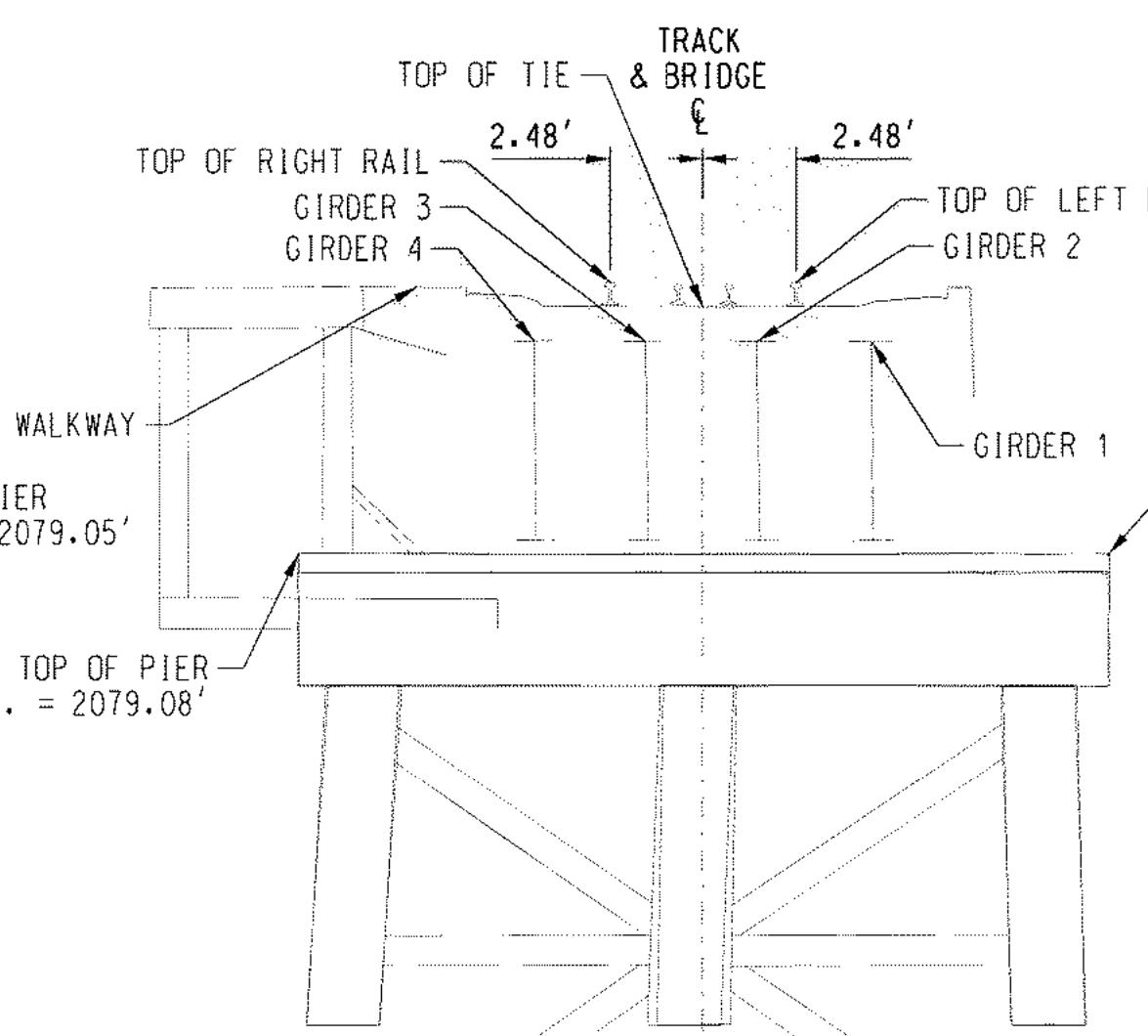
PIER PLAN & PROFILES

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

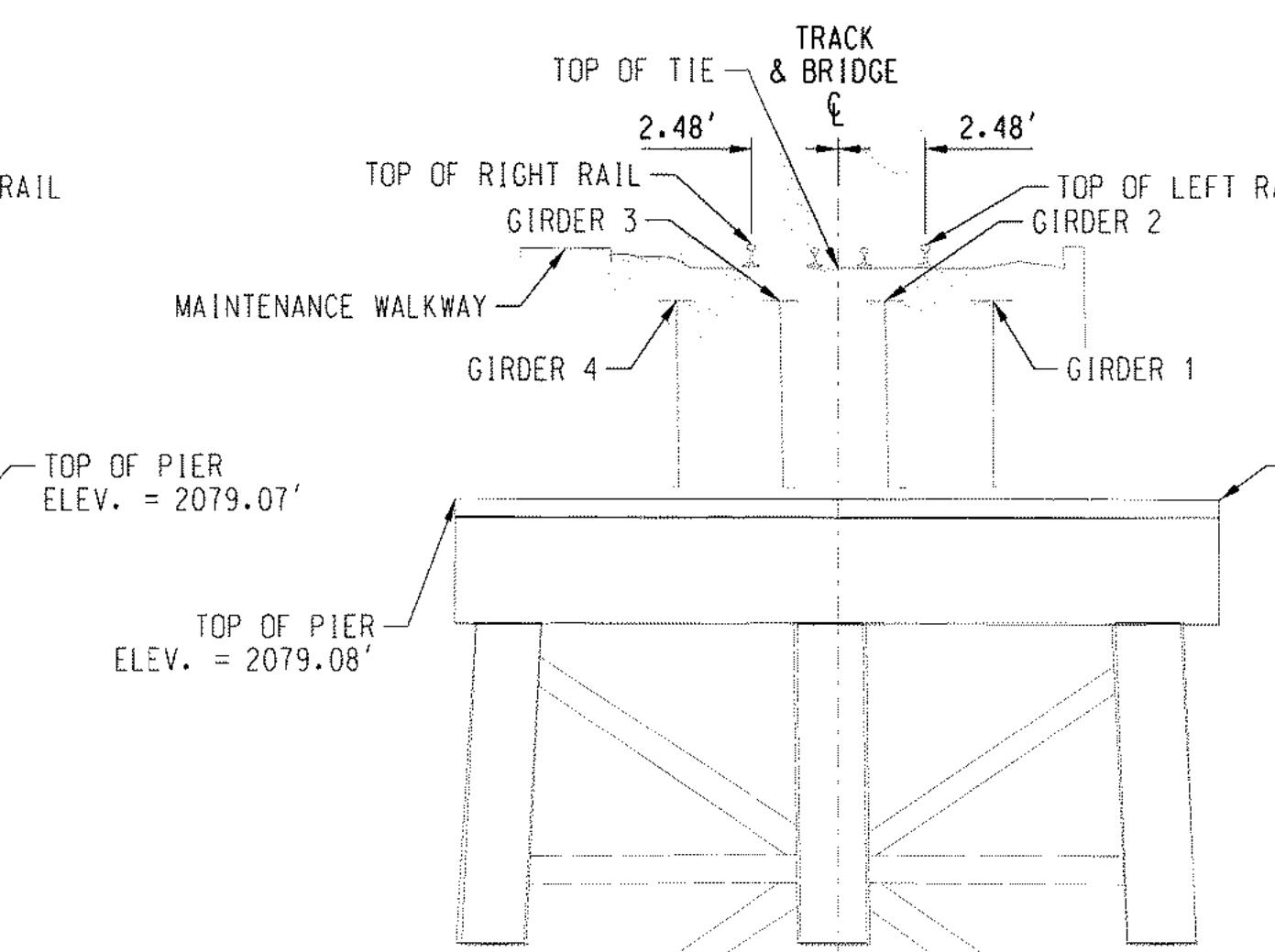
EAST
TO SANDPOINT JCT. ID



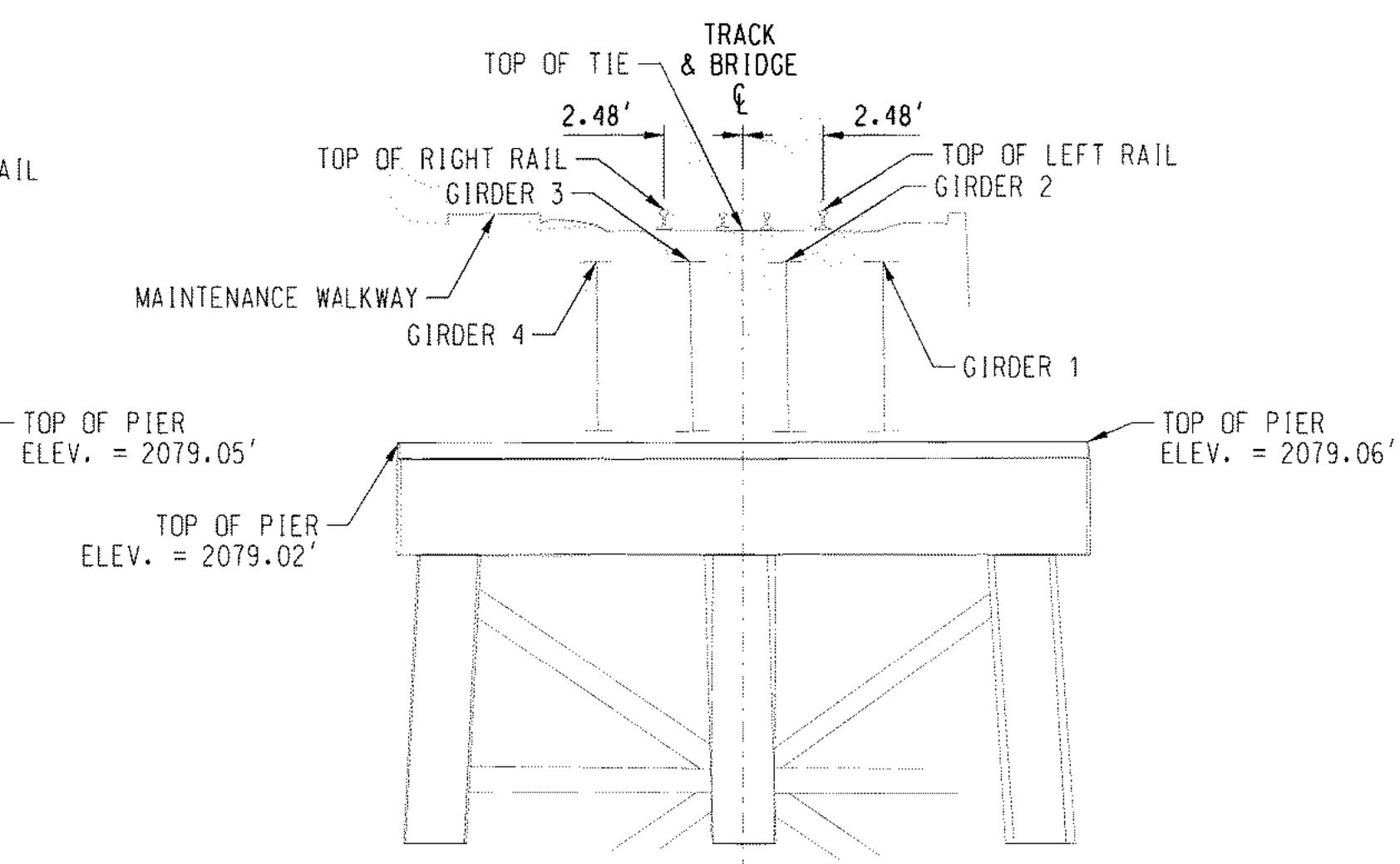
PIER 80
LOOKING RAILROAD EAST



PIER 81
LOOKING RAILROAD EAST



PIER 82
LOOKING RAILROAD EAST



PIER 83
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.32' | 2085.67' | 2086.34' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.31' | 2085.67' | 2086.33' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.31' | 2085.66' | 2086.32' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.33' | 2085.68' | 2086.35' |

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.

- 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.

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

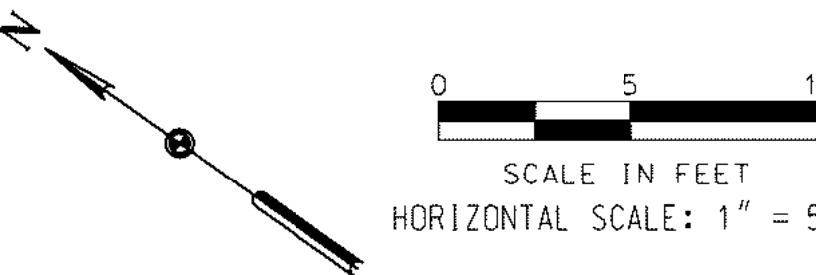
SANDPOINT JCT. ID TO EAST ALCOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-023 SHEET: 23 OF 24



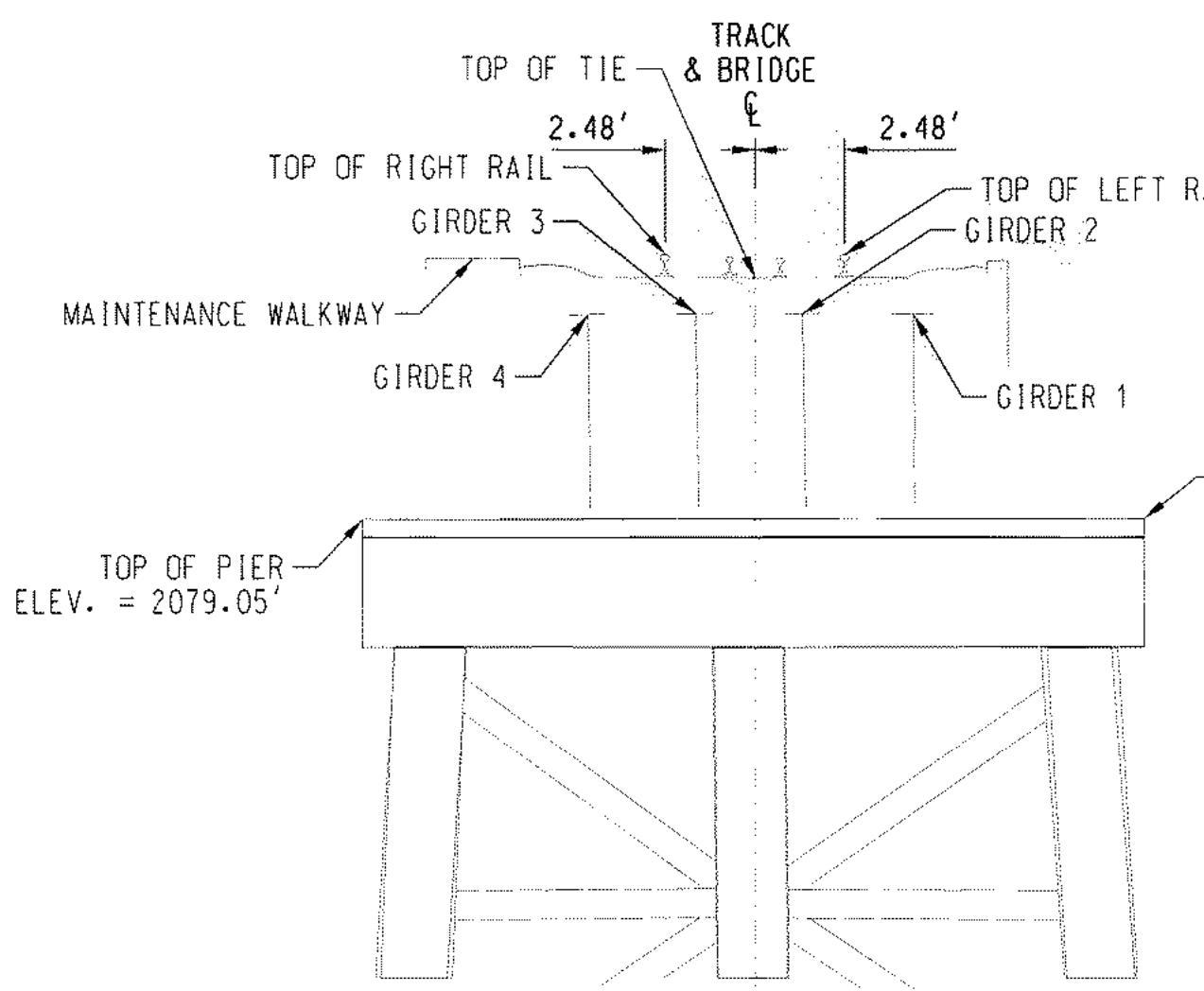
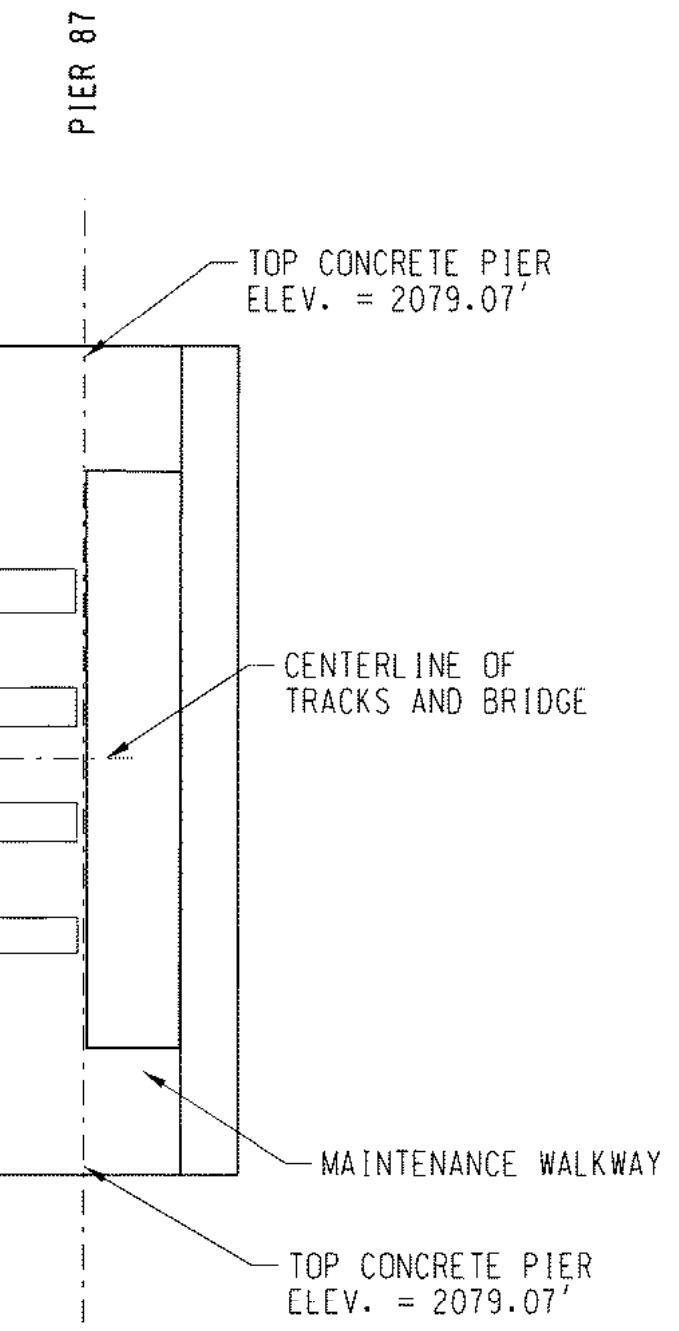
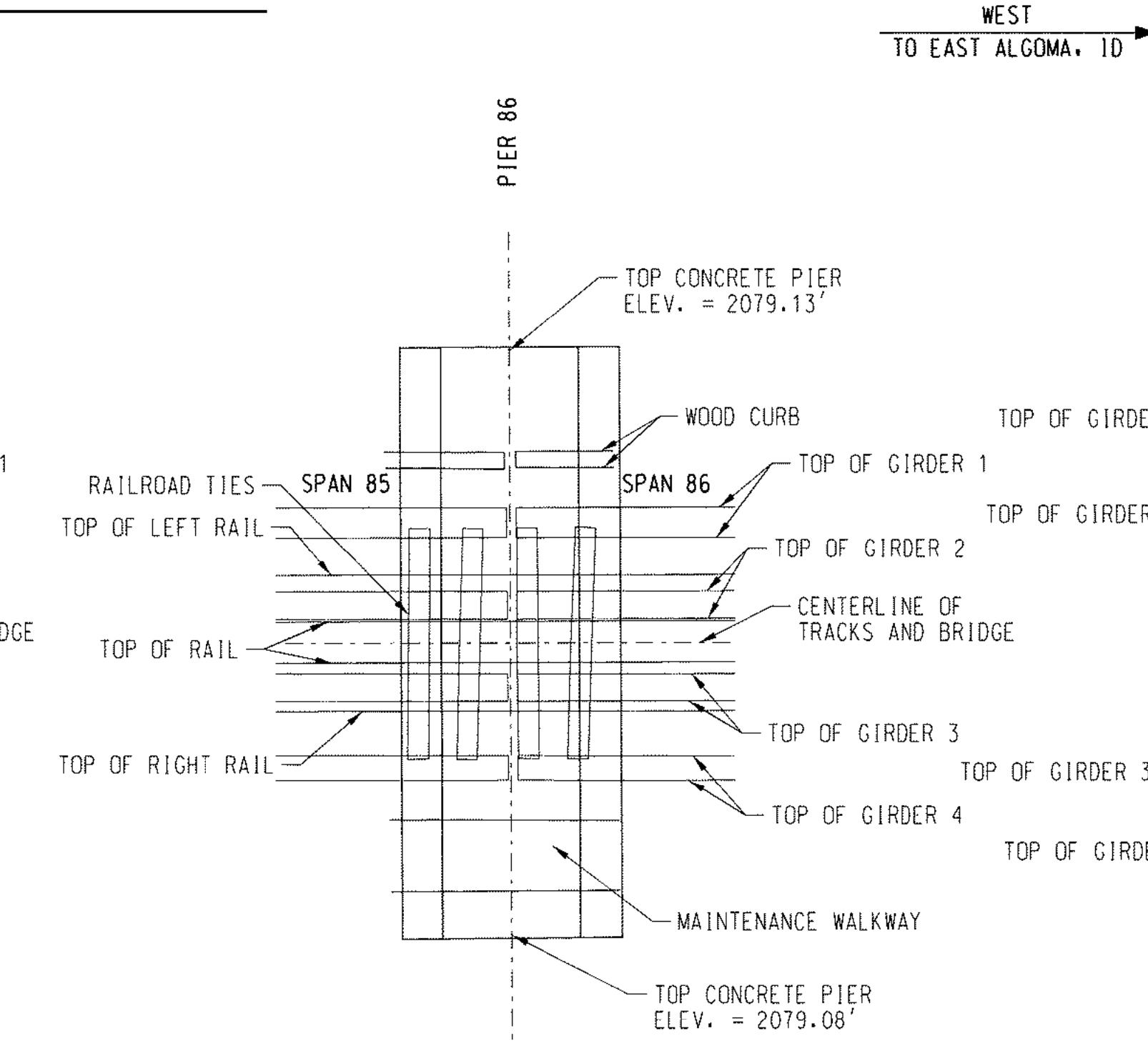
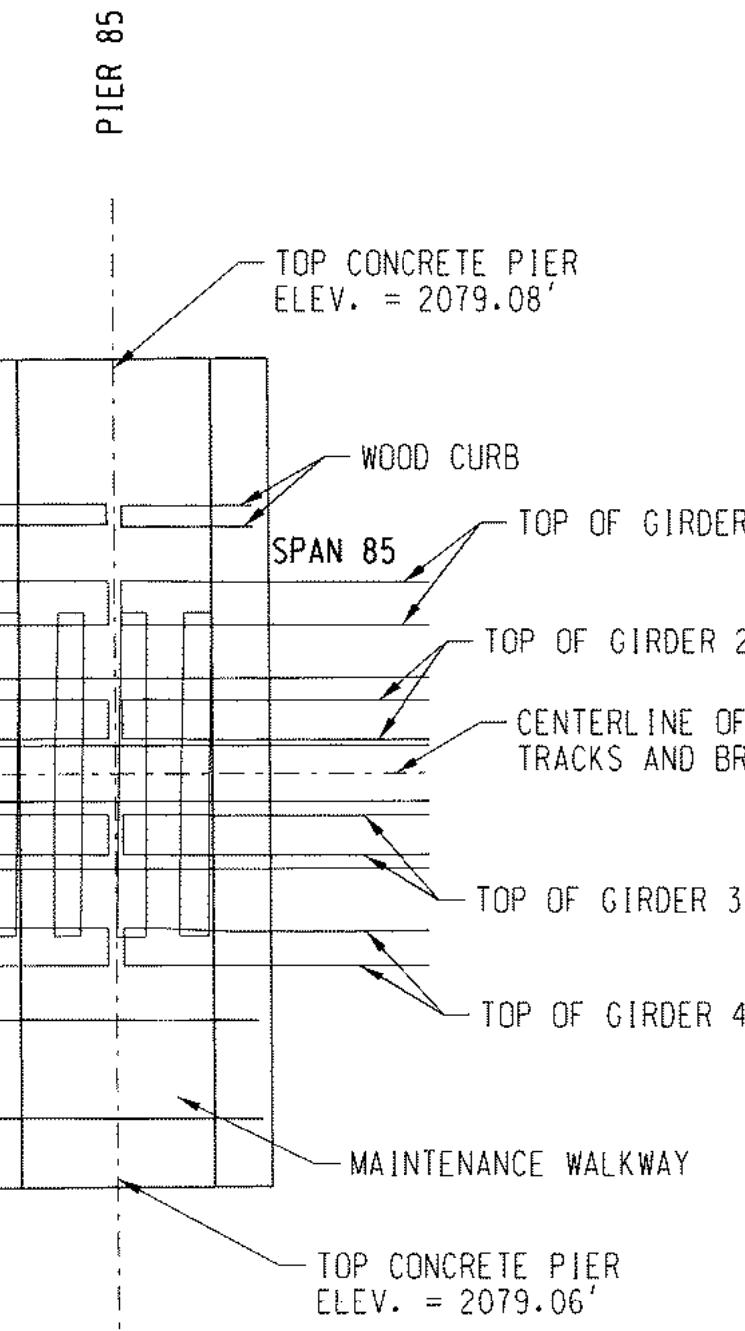
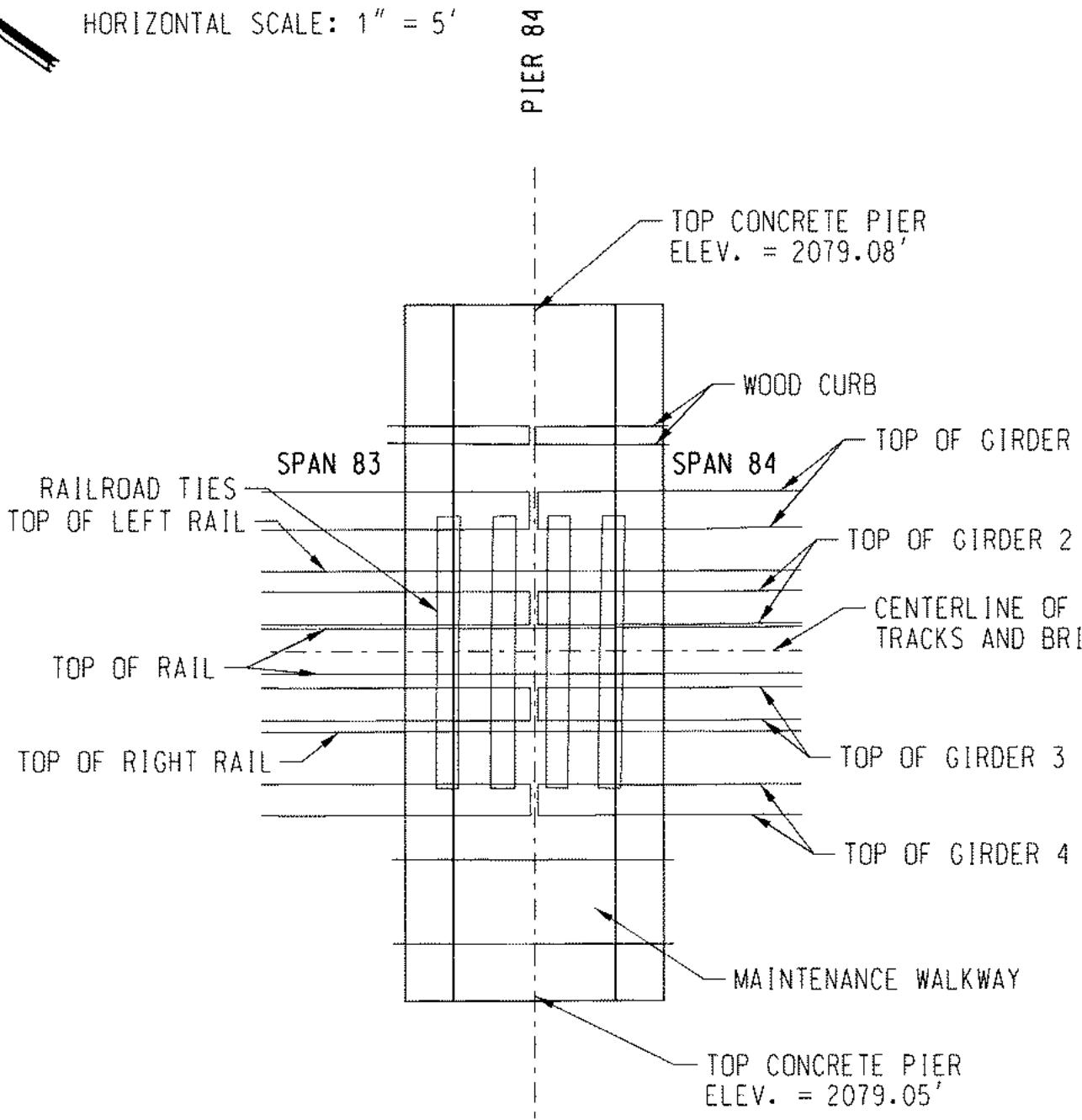
DAVID EVANS
AND ASSOCIATES INC.
908 N. HOWARD ST. SUITE 300
SPOKANE, WA 99201
Phone: 509.252.5900

81
Know what's below.
Call before you dig.

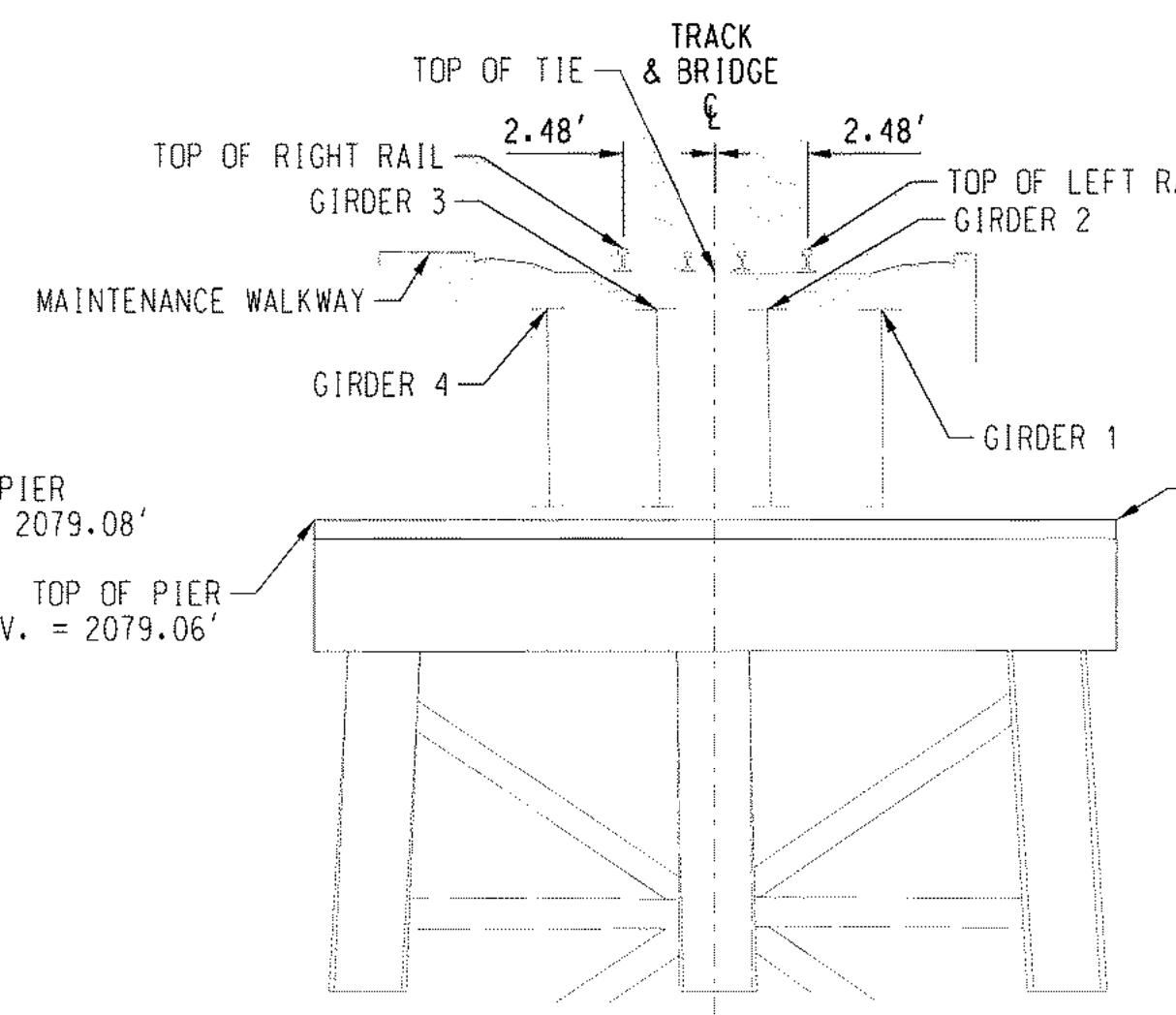
PIER PLAN & PROFILES



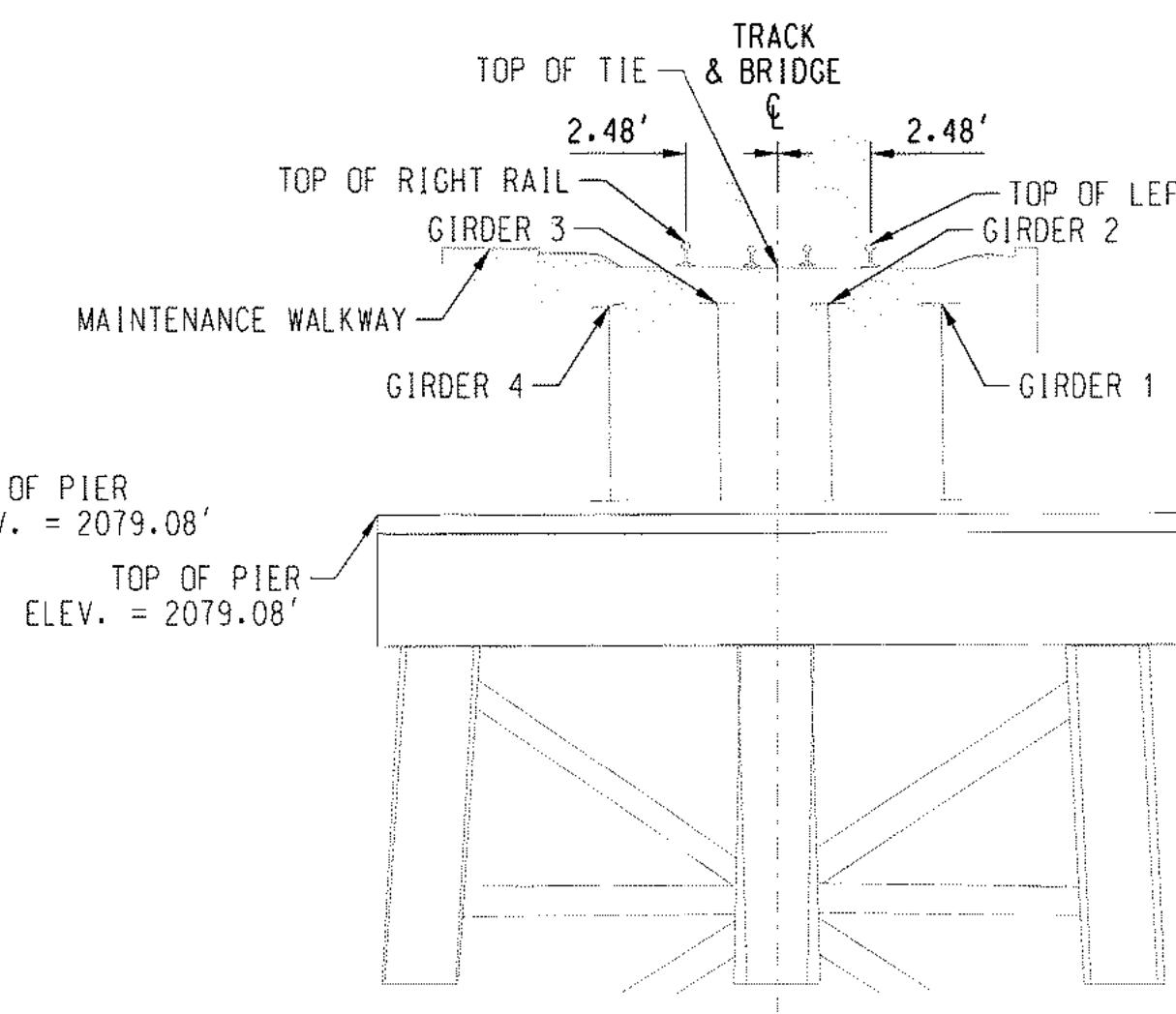
EAST
TO SANDPOINT JCT. ID



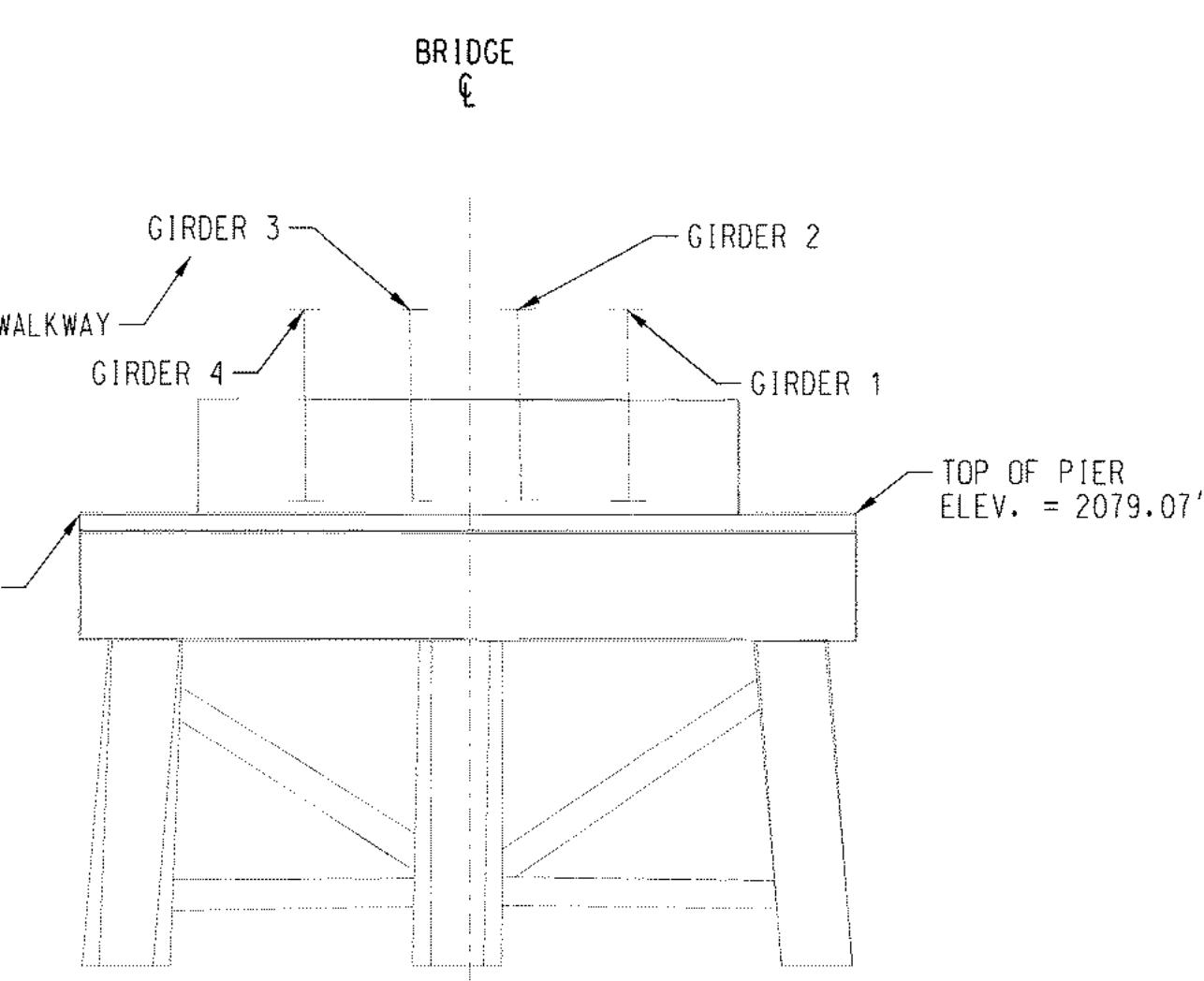
PIER 84
LOOKING RAILROAD EAST



PIER 85
LOOKING RAILROAD EAST



PIER 86
LOOKING RAILROAD EAST



PIER 87
LOOKING RAILROAD EAST

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.36' | 2085.72' | 2086.38' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.36' | 2085.73' | 2086.39' |

TABLE OF ELEVATIONS

| LOCATION | TOP LEFT RAIL | TOP OF TIE | TOP RIGHT RAIL |
|-----------|---------------|------------|----------------|
| ELEVATION | 2086.40' | 2085.77' | 2086.42' |

- 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

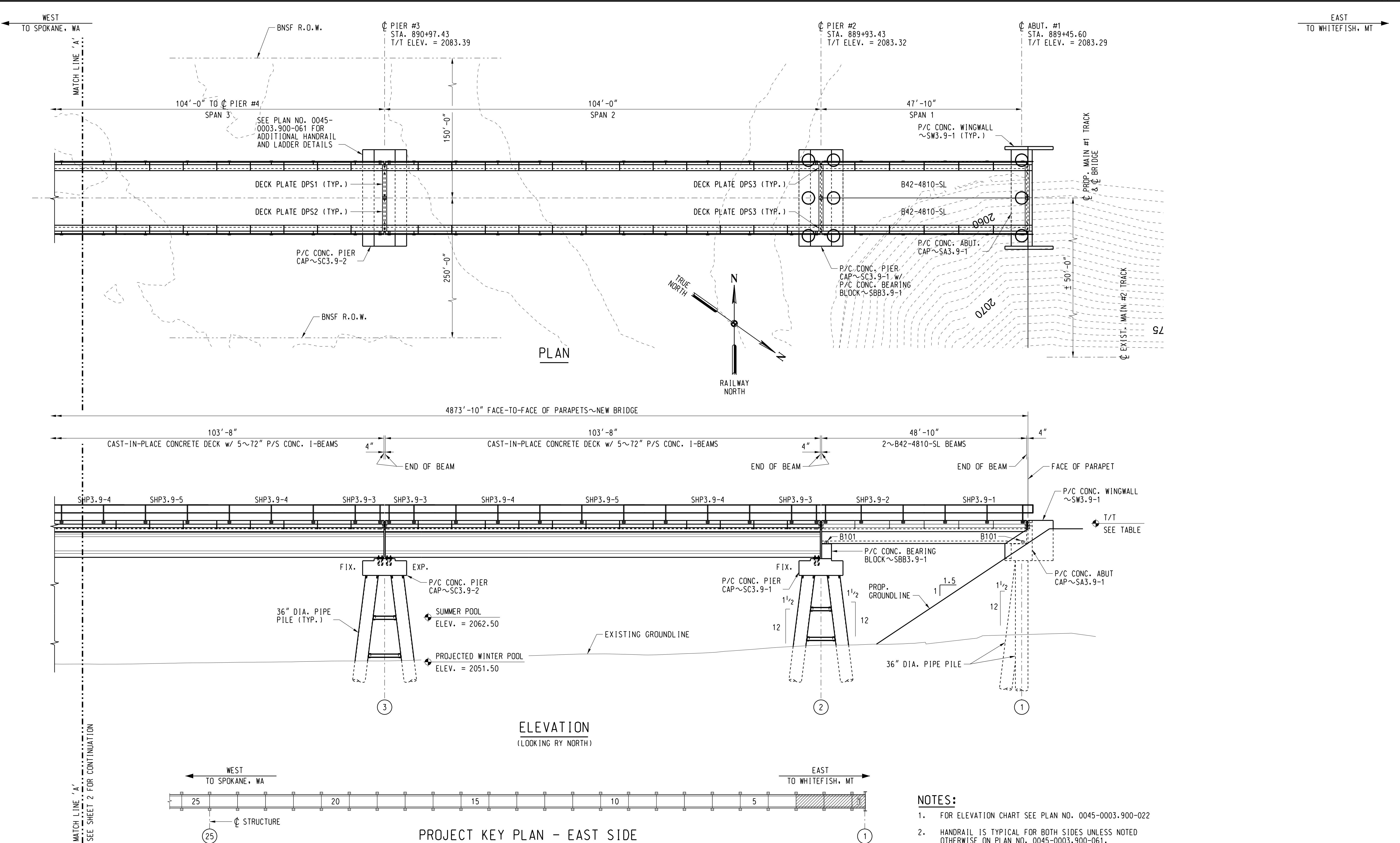
SANDPOINT JCT. ID TO EAST ALGOMA, ID
BRIDGE NO. 003.90
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PIER PLAN & PROFILES
PLAN NO: 0045-003.900-024 SHEET: 24 OF 24



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

81
Know what's below.
Call before you dig.

Attachment F: Proposed Bridge Plans



NOTE

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.

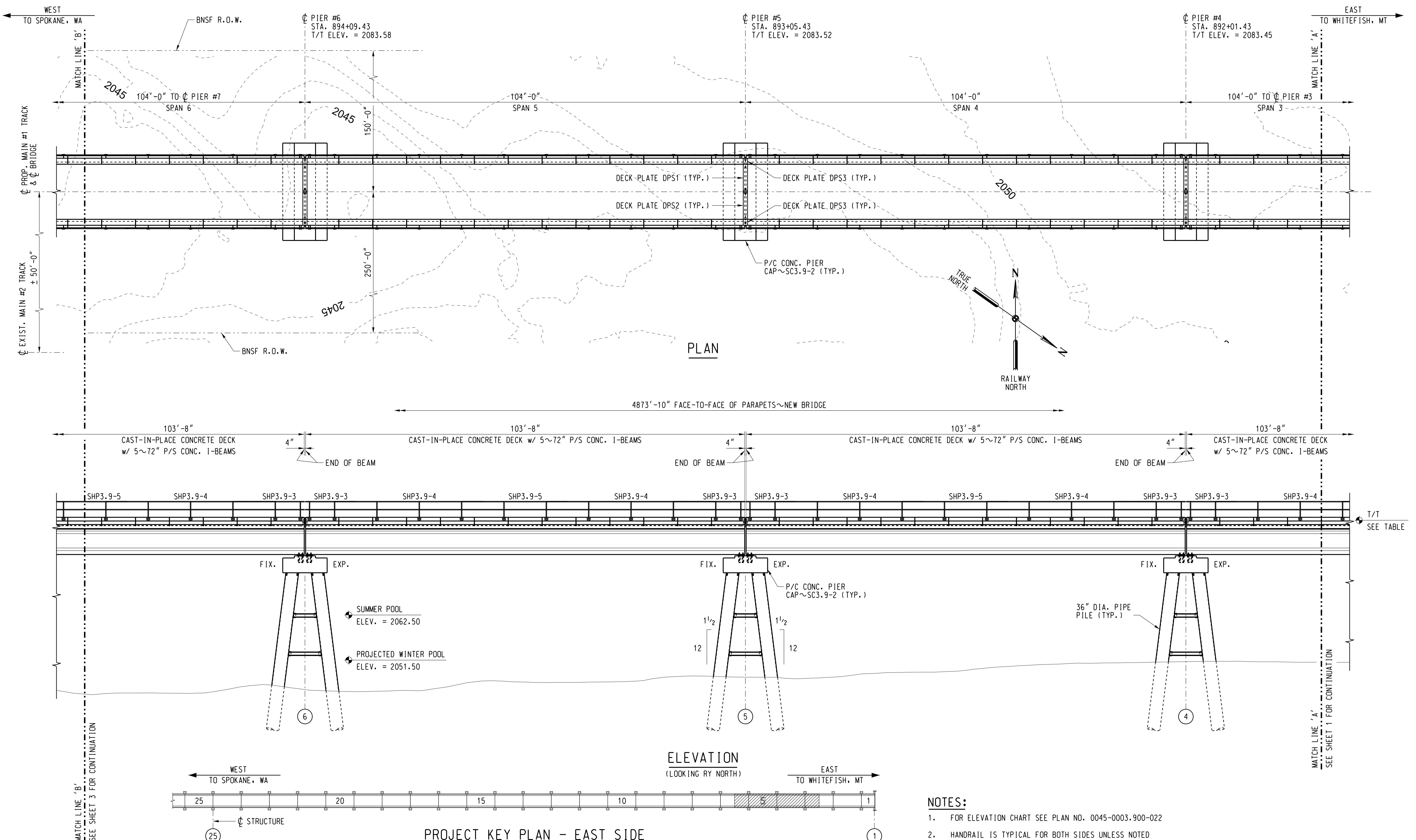
| | |
|-----------|-------|
| DES: | TJH |
| DRAWN: | GTJ |
| CHECK: | MAF |
| DATE: | MAR 2 |
| AUTH: | XXX-1 |
| LINE SEG: | O |



RAILWAY

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (1 OF 18)

Page 1 of 1

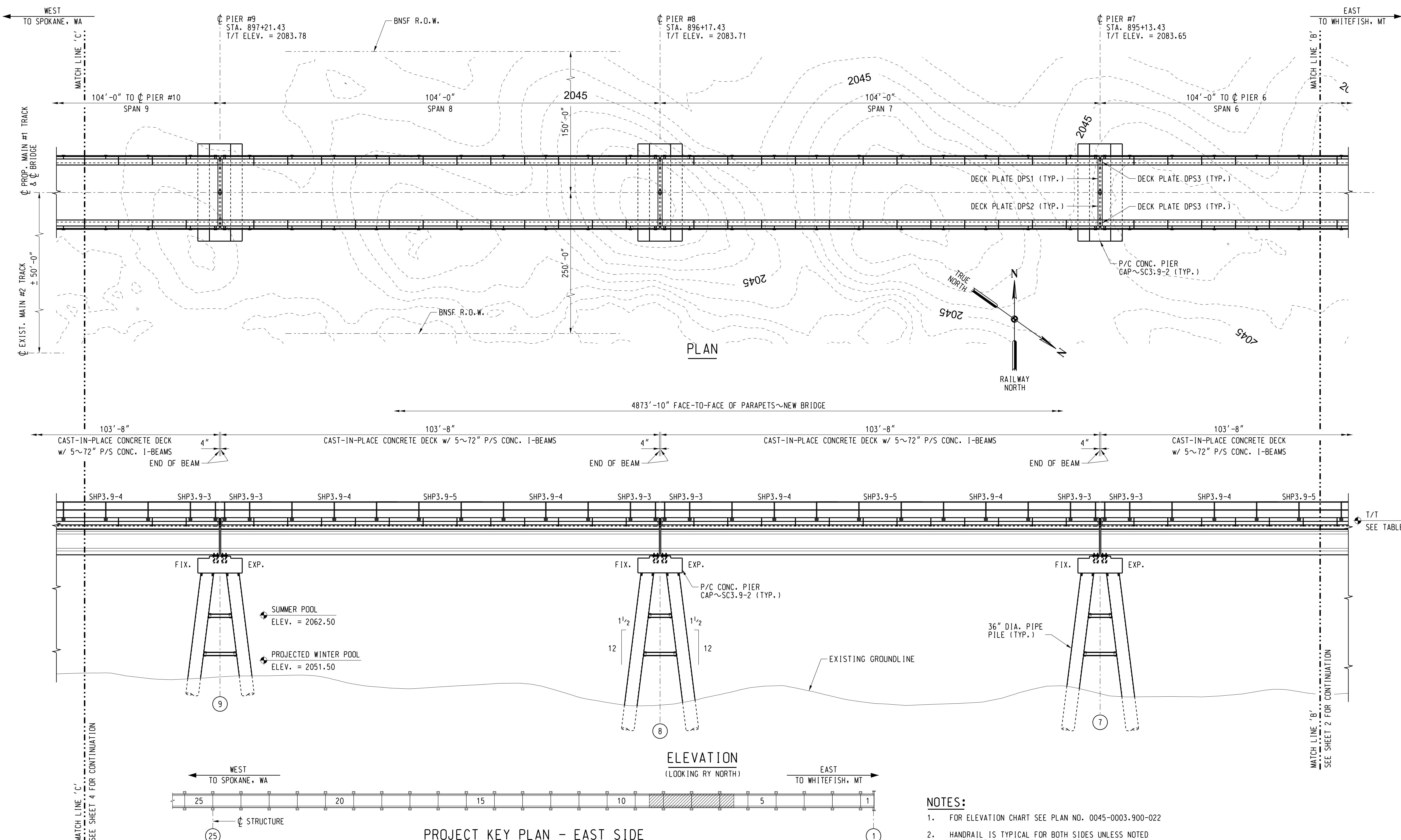
**NOTES:**

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

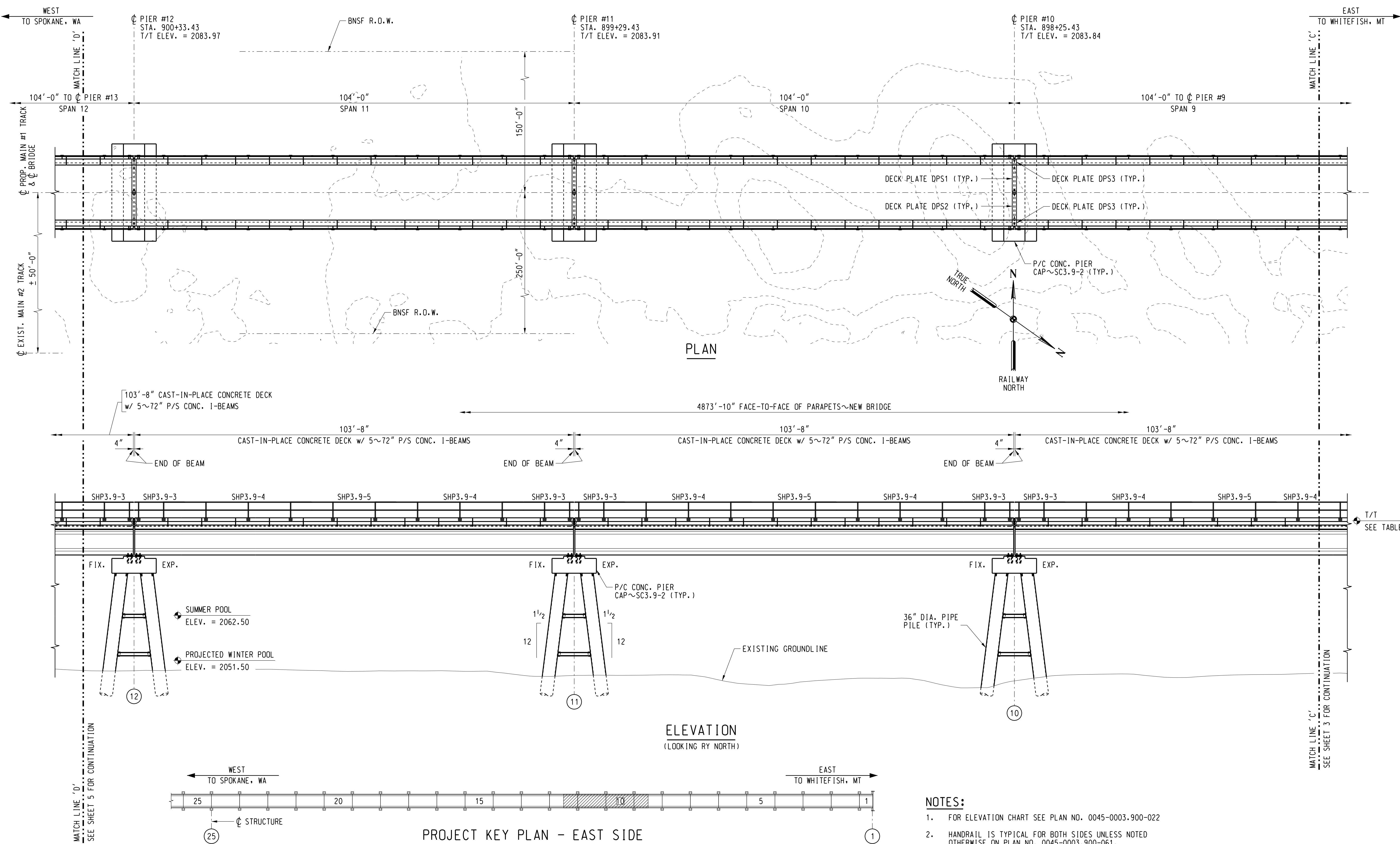
**NOTES:**

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



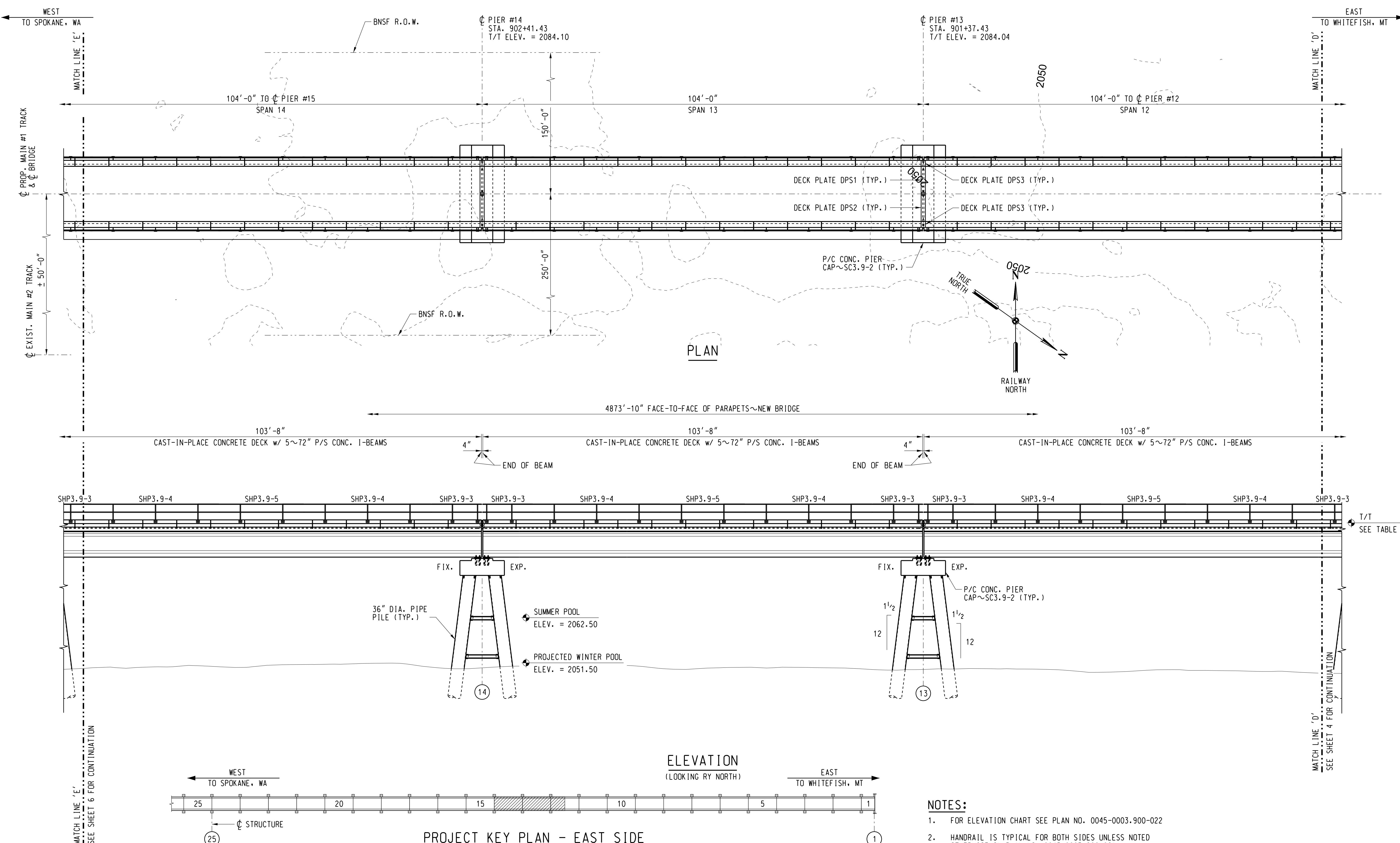
NOTES:

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

**NOTES:**

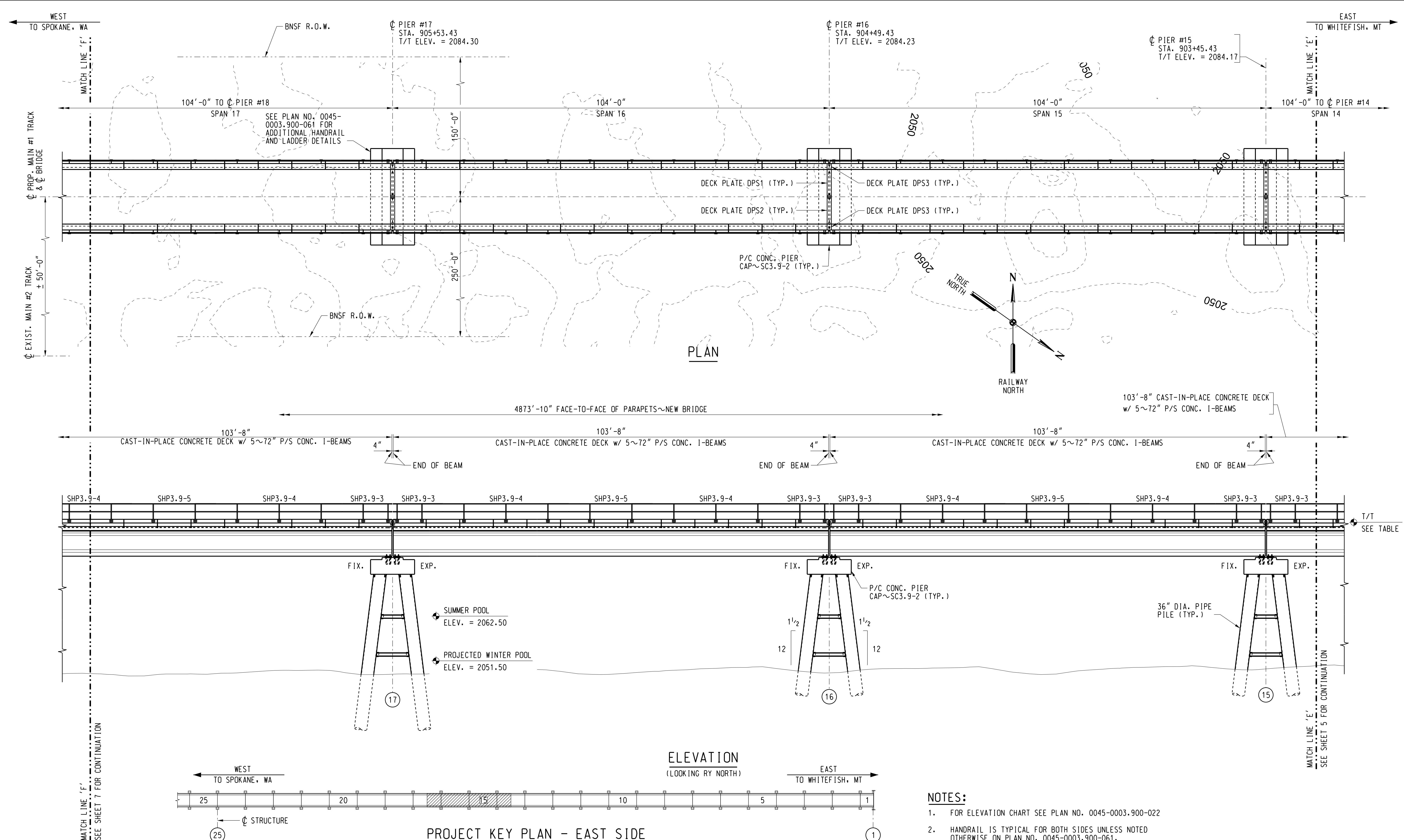
1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2019
AUTH: XXX-XXXX
LINE SEG: 0045

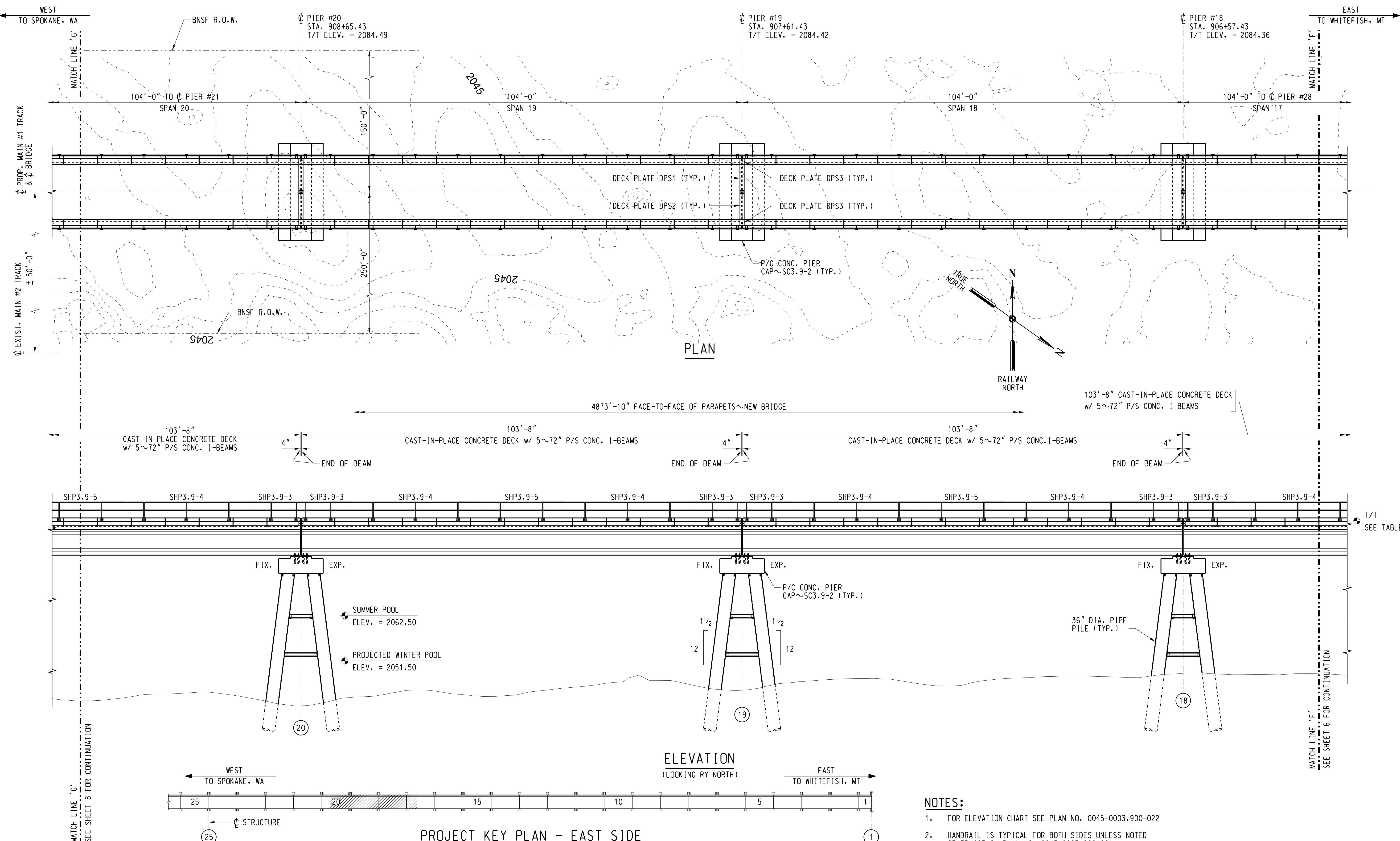
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

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



| | | |
|----------------|------------------------------------|---|
| 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 | | GENERAL PLAN & ELEVATION (6 OF 18) |
| AUTH: XXX-XXXX | APPROVED: | PLAN NO: 0045-0003.900-008 |
| LINE SEG: 0045 | ASST. DIRECTOR STRUCTURES DESIGN | SHEET: 08 OF |

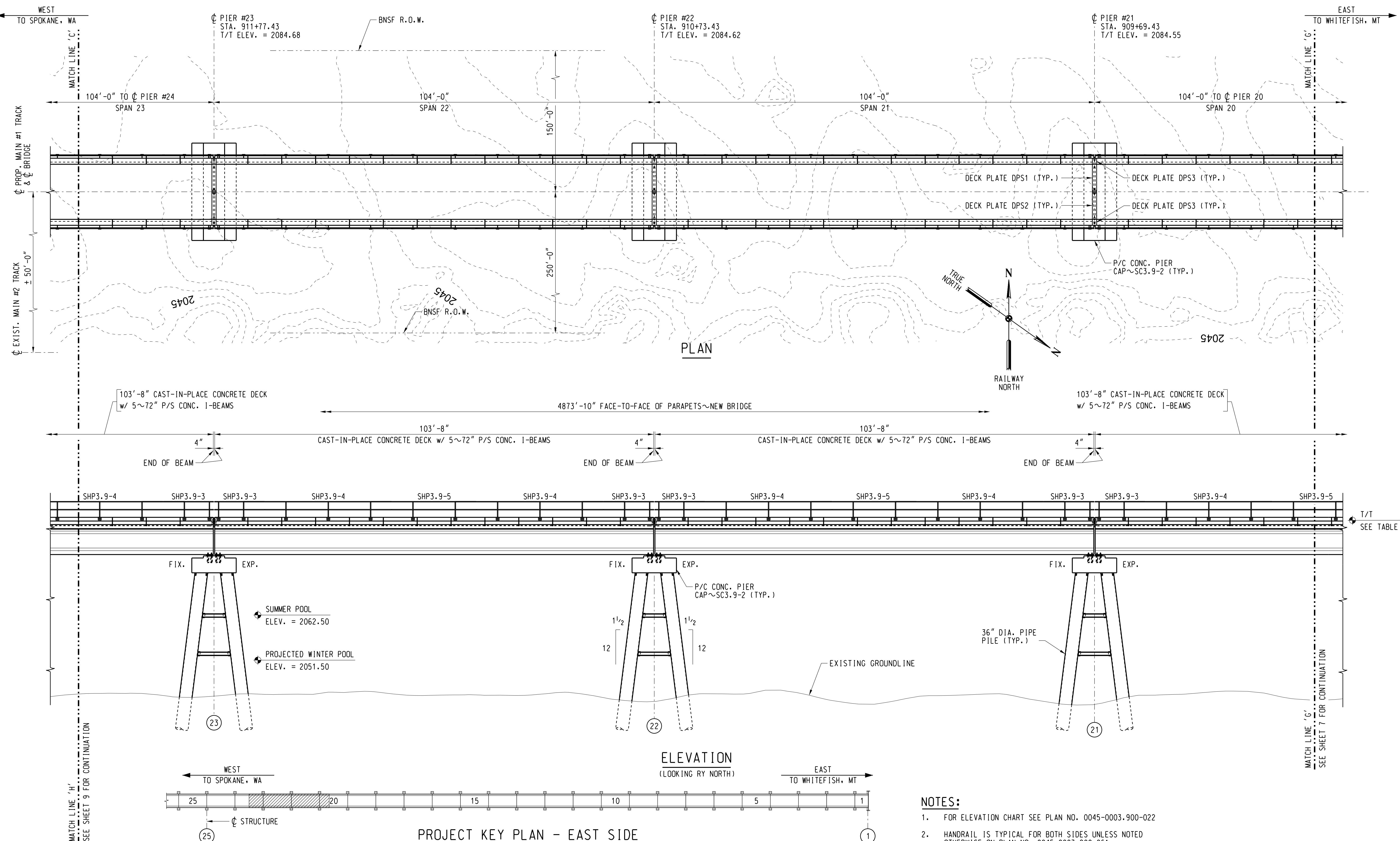
**NOTES:**

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

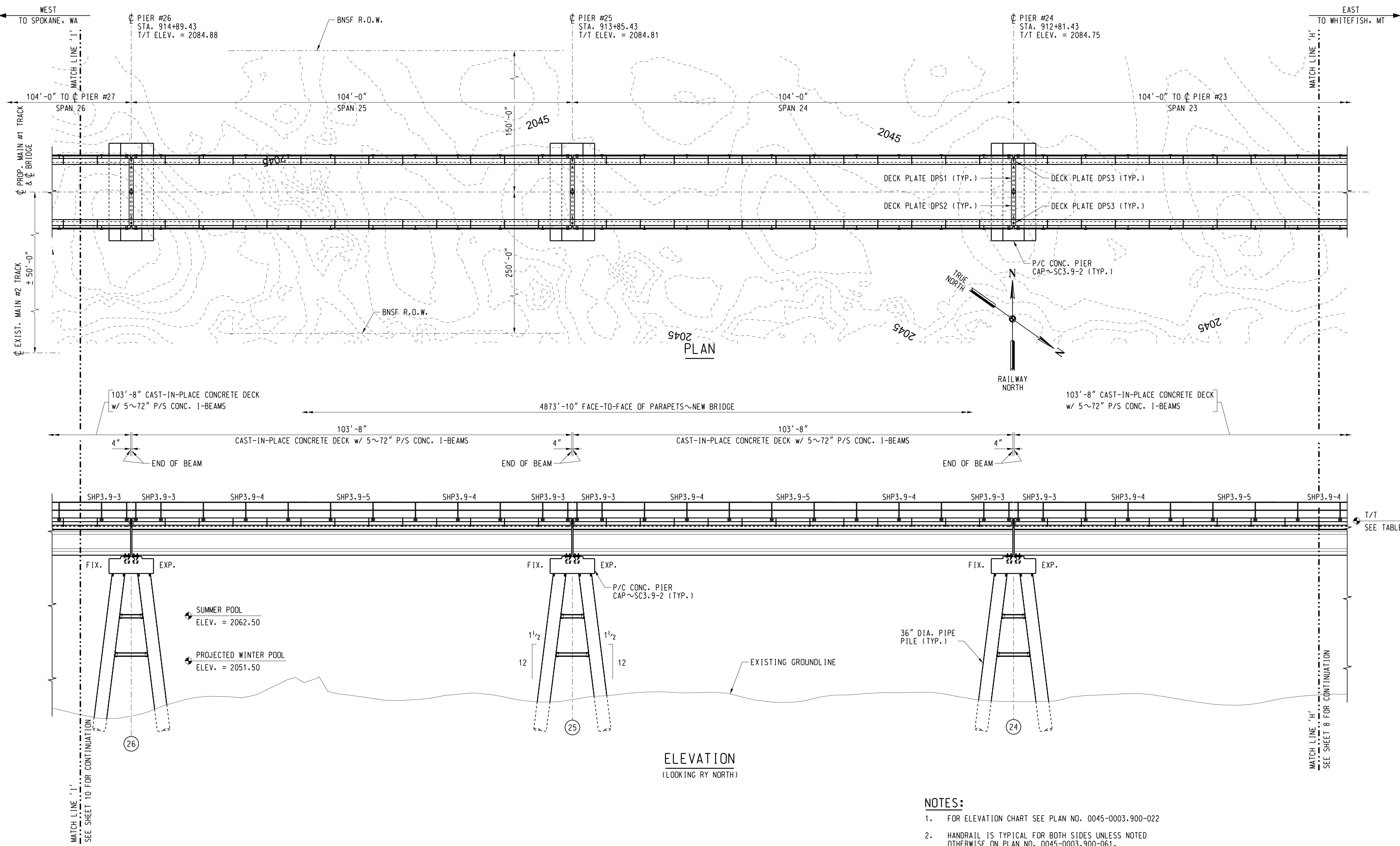
**NOTES:**

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

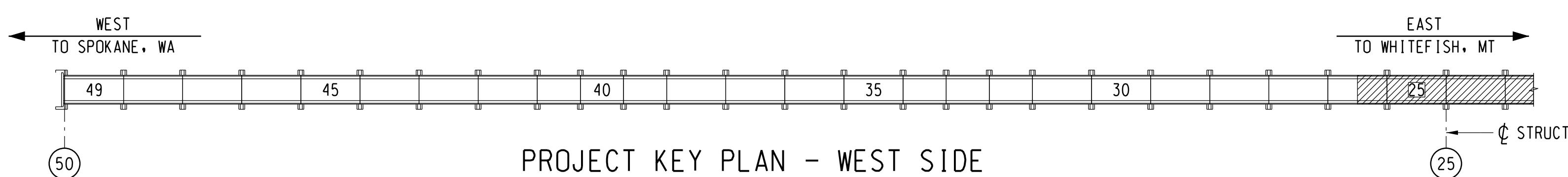
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

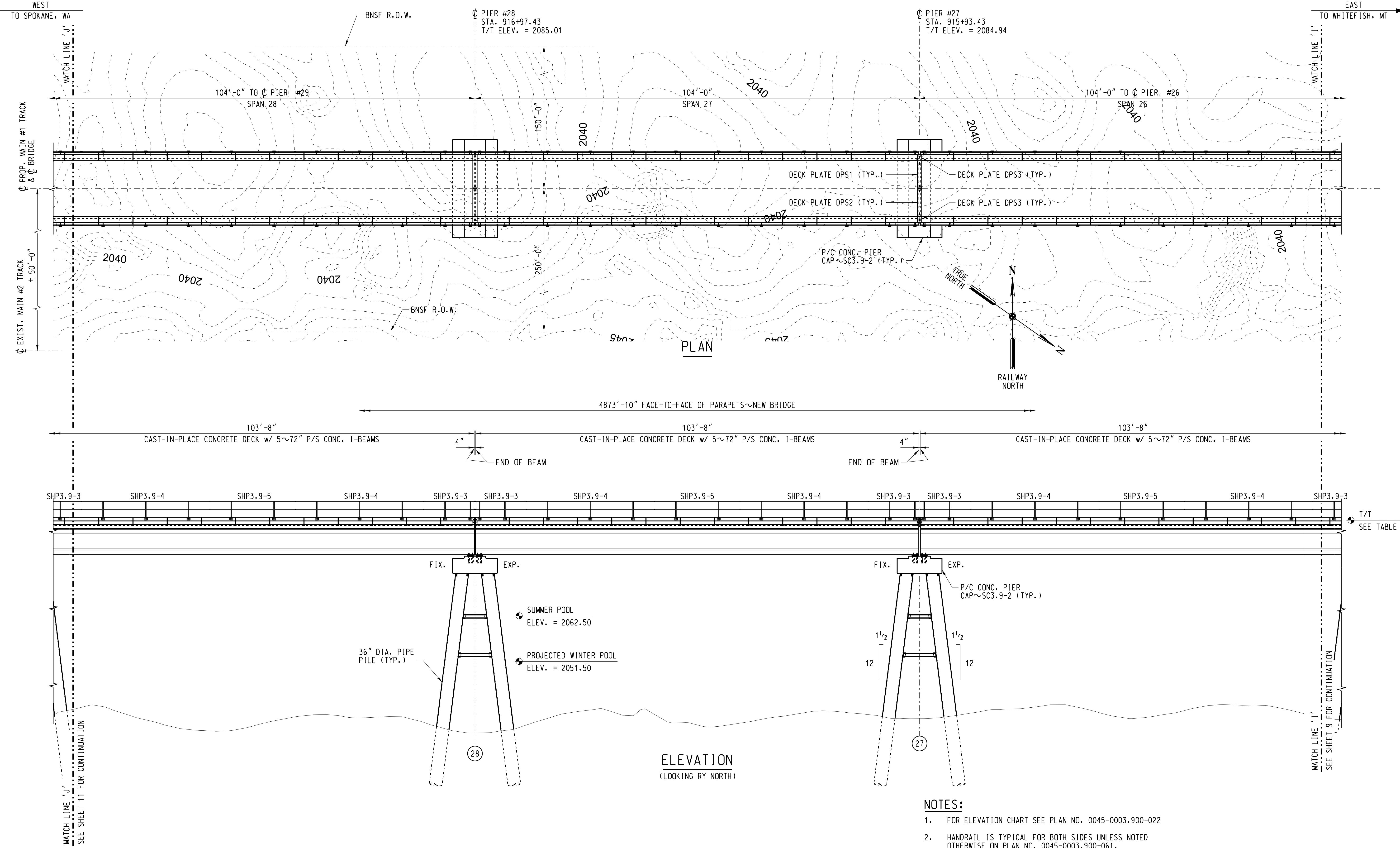
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (8 OF 18)
PLAN NO: 0045-0003.900-010
SHEET: 10 OF

**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 | 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 | | GENERAL PLAN & ELEVATION (9 OF 18) |
| AUTH: XXX-XXXX | APPROVED: ASST. DIRECTOR STRUCTURES DESIGN | PLAN NO: 0045-0003.900-011 |
| LINE SEG: 0045 | | SHEET: 11 OF |





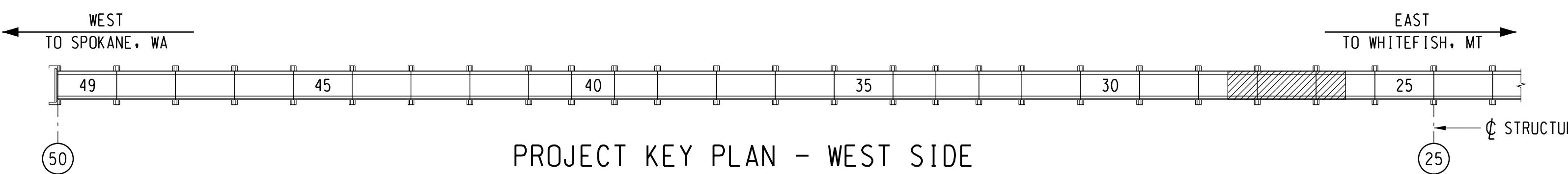
NOTES:

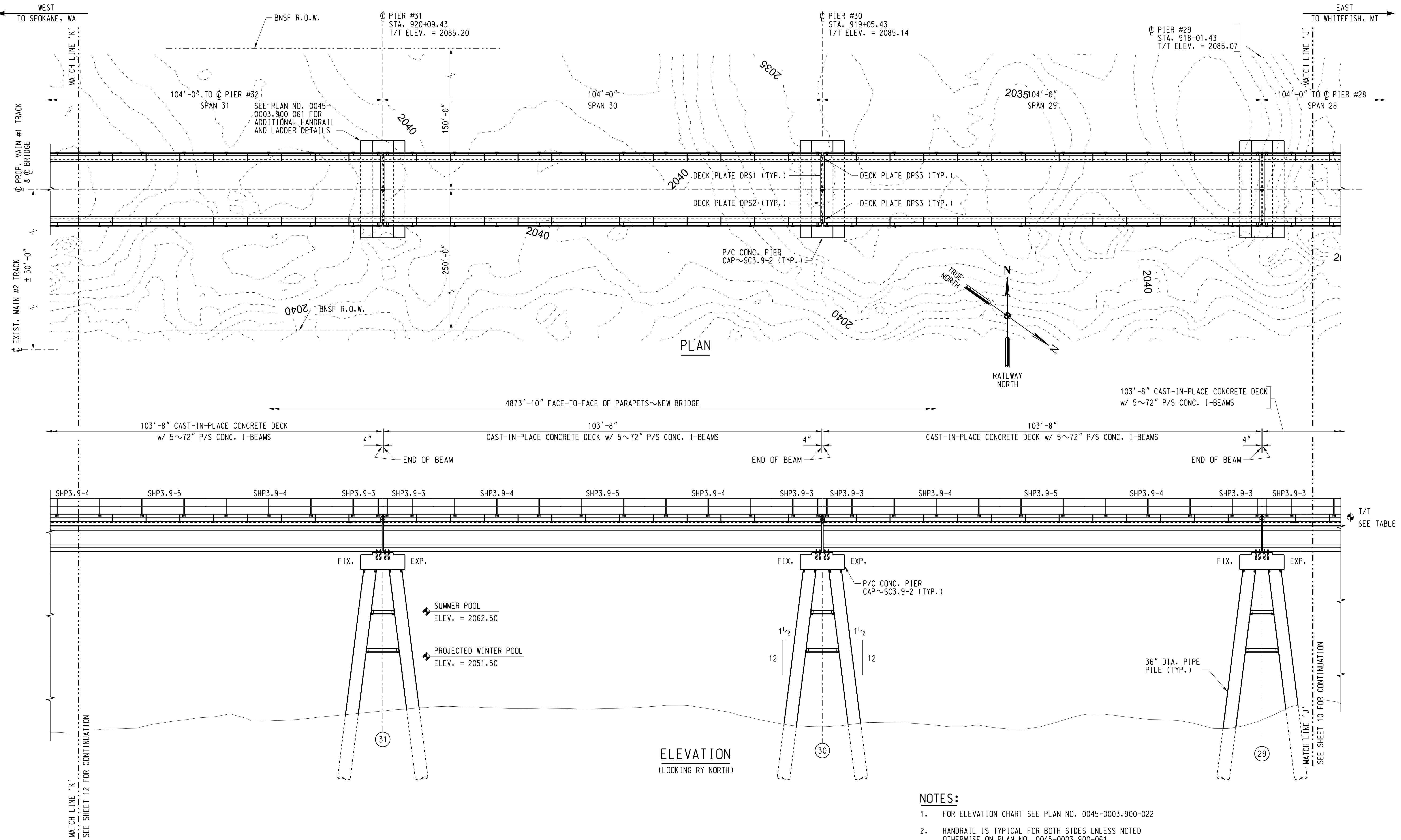
- FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
- HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

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



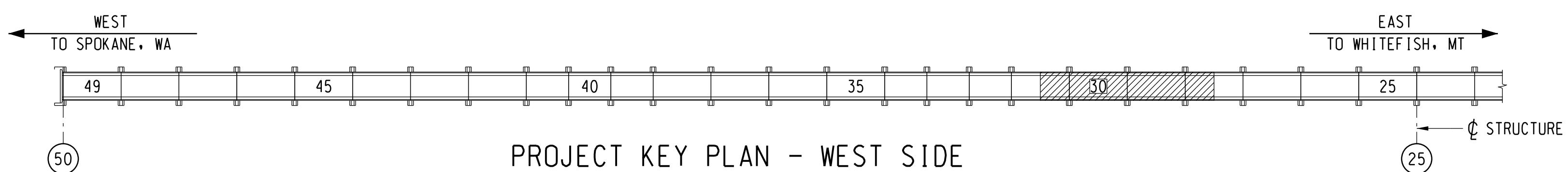
**NOTES:**

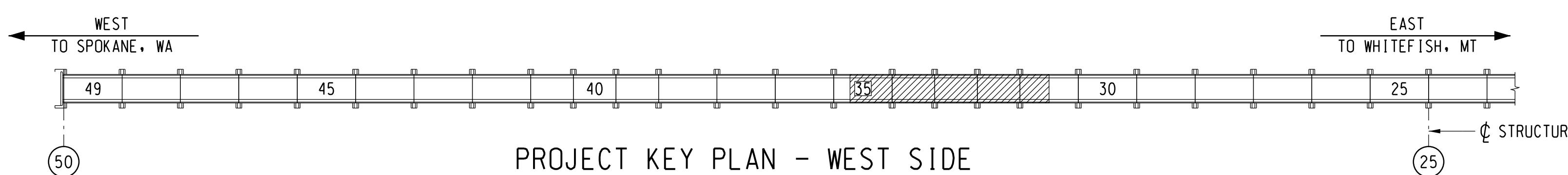
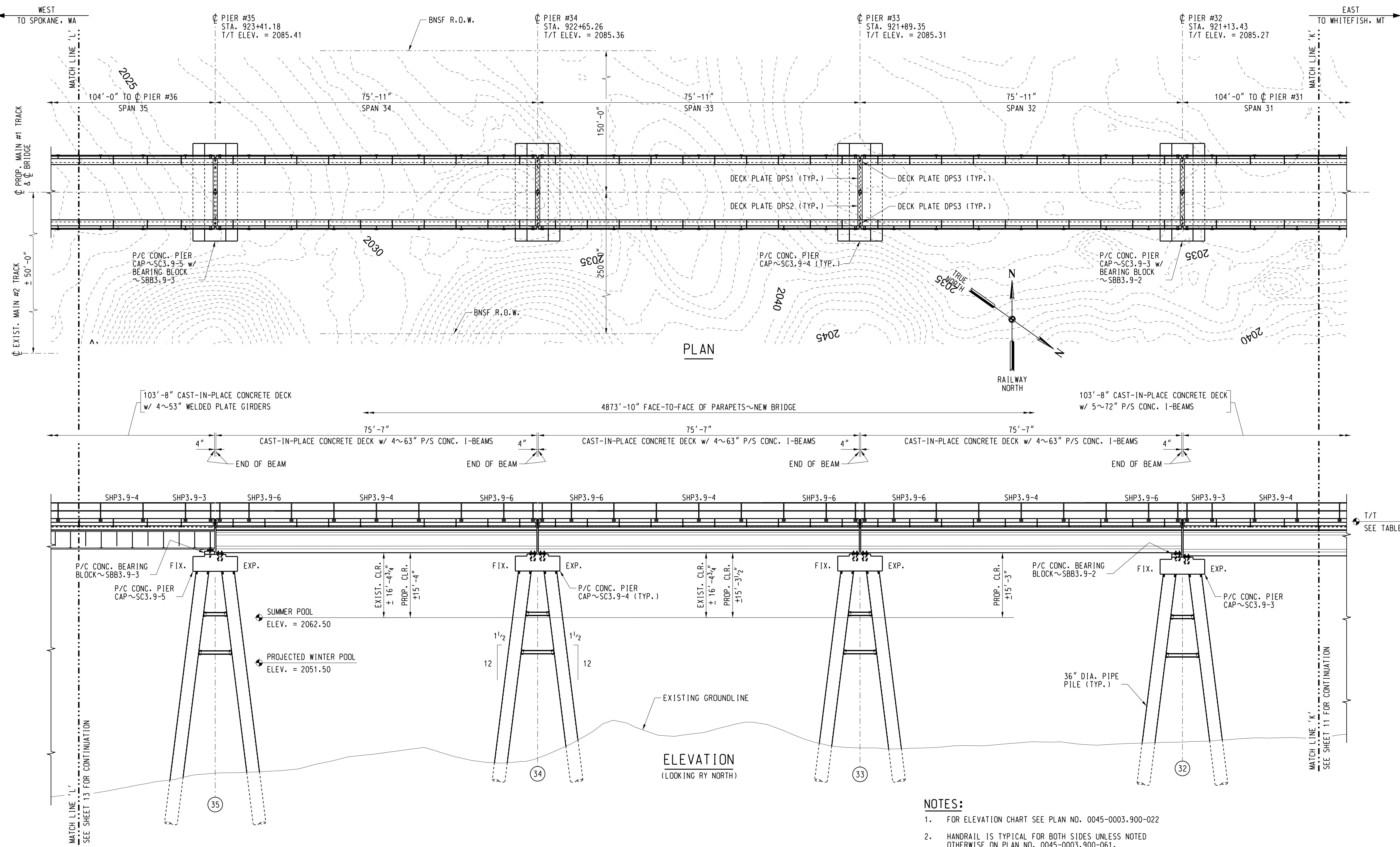
1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2019
AUTH: XXX-XXXX
LINE SEG: 0045

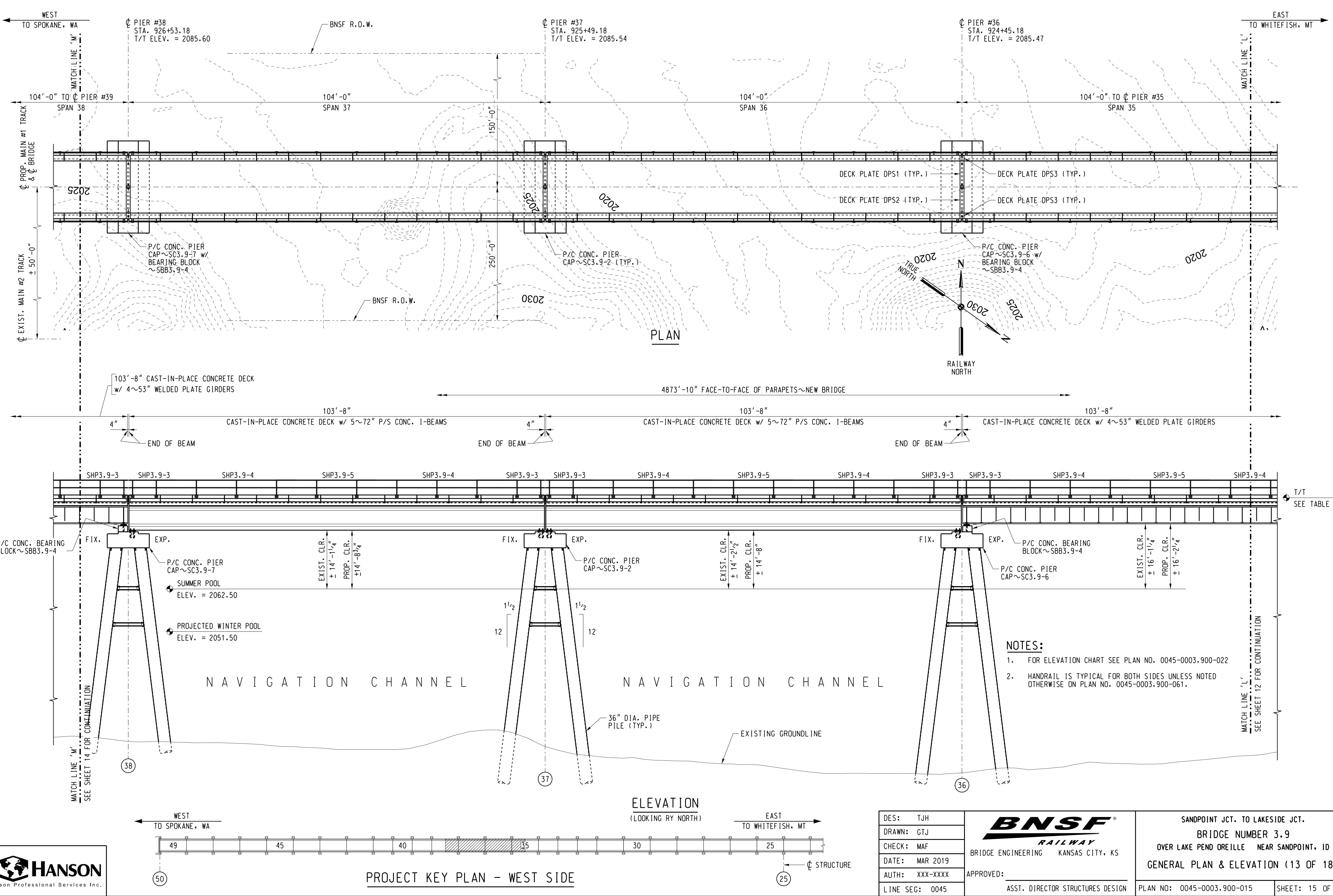
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

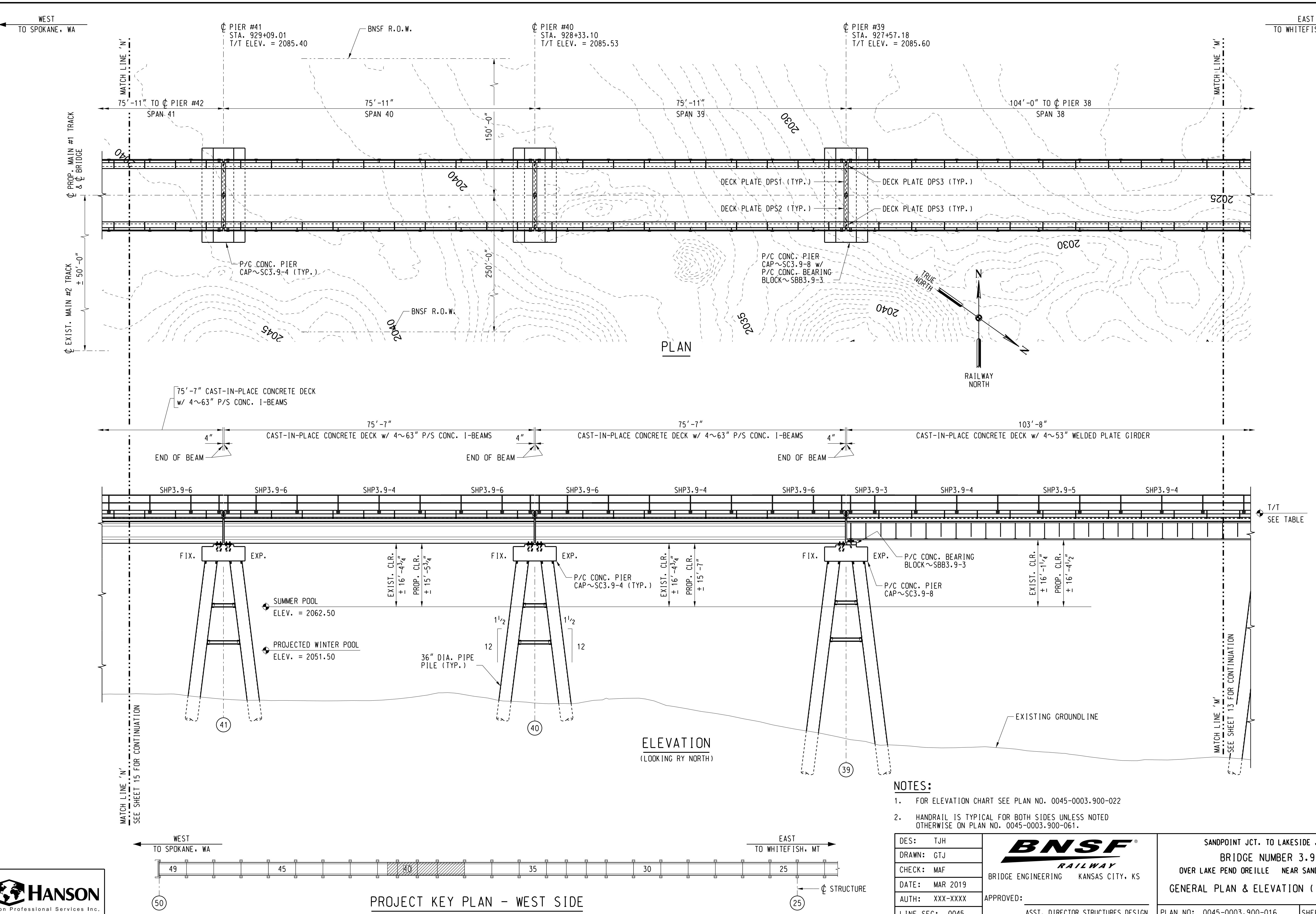
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (11 OF 18)
PLAN NO: 0045-0003.900-013 SHEET: 13 OF

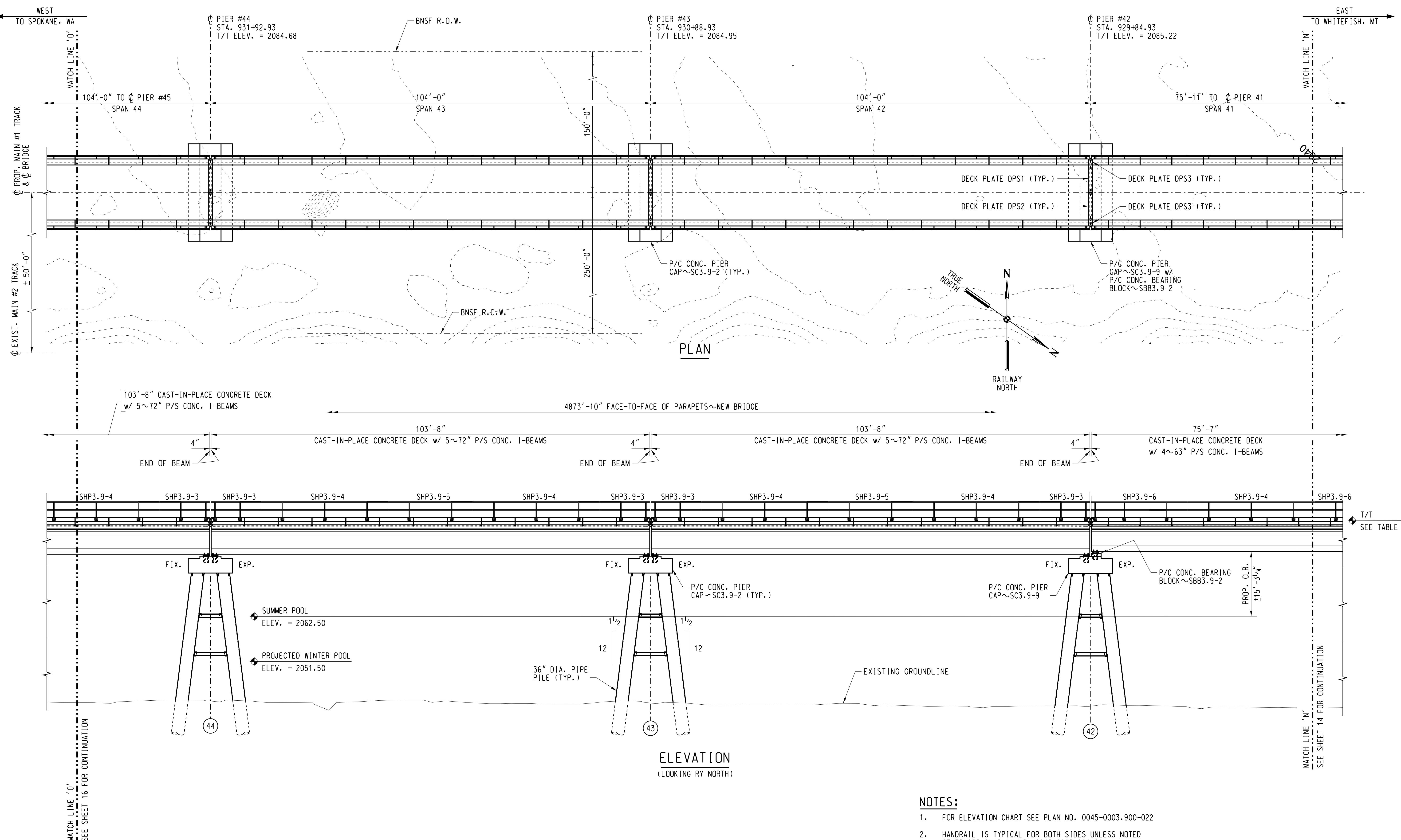




| | | |
|----------------|--|---|
| DES: TJH | BNSF RAILWAY | SANDPOINT JCT. TO LAKESIDE JCT. |
| DRAWN: GTJ | BRIDGE ENGINEERING KANSAS CITY, KS | BRIDGE NUMBER 3.9 |
| CHECK: MAF | | OVER LAKE PEND OREILLE NEAR SANDPOINT, ID |
| DATE: MAR 2019 | | GENERAL PLAN & ELEVATION (12 OF 18) |
| AUTH: XXX-XXXX | APPROVED: ASST. DIRECTOR STRUCTURES DESIGN | PLAN NO: 0045-0003.900-014 |
| LINE SEG: 0045 | | SHEET: 14 OF |







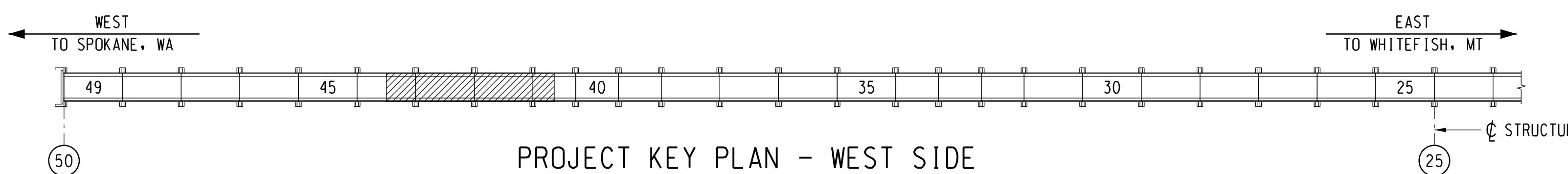
NOTES:

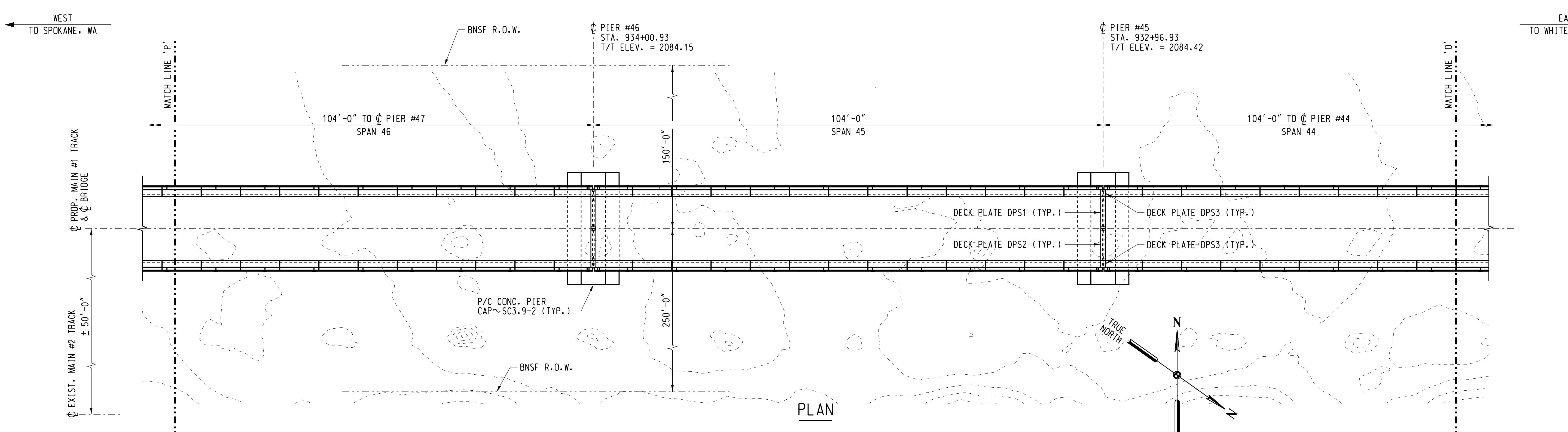
1. FOR ELEVATION CHART SEE PLAN NO. 0045-0003.900-022
2. HANDRAIL IS TYPICAL FOR BOTH SIDES UNLESS NOTED OTHERWISE ON PLAN NO. 0045-0003.900-061.

DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2019
AUTH: XXX-XXXX
LINE SEG: 0045

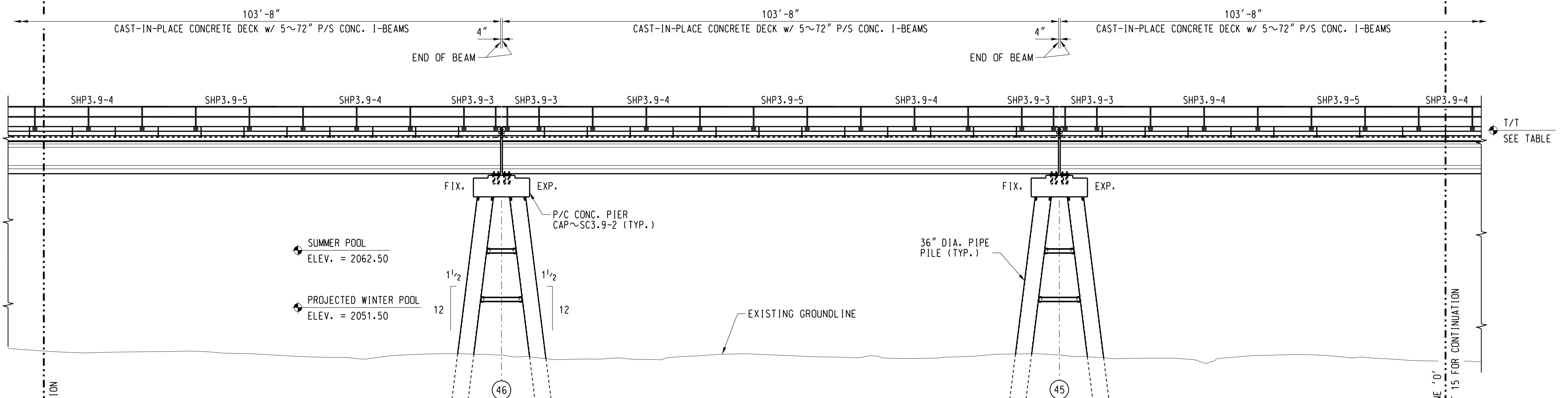
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

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





4873'-10" FACE-TO-FACE OF PARAPETS~NEW BRIDGE

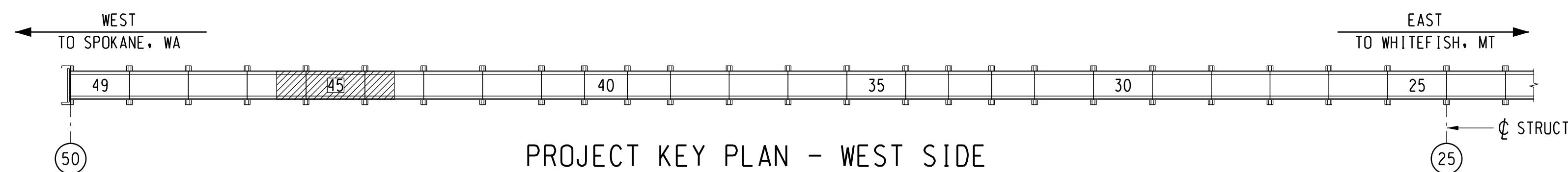
**ELEVATION**
(LOOKING RY NORTH)**NOTES:**

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.

DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2019
AUTH: XXX-XXXX
LINE SEG: 0045

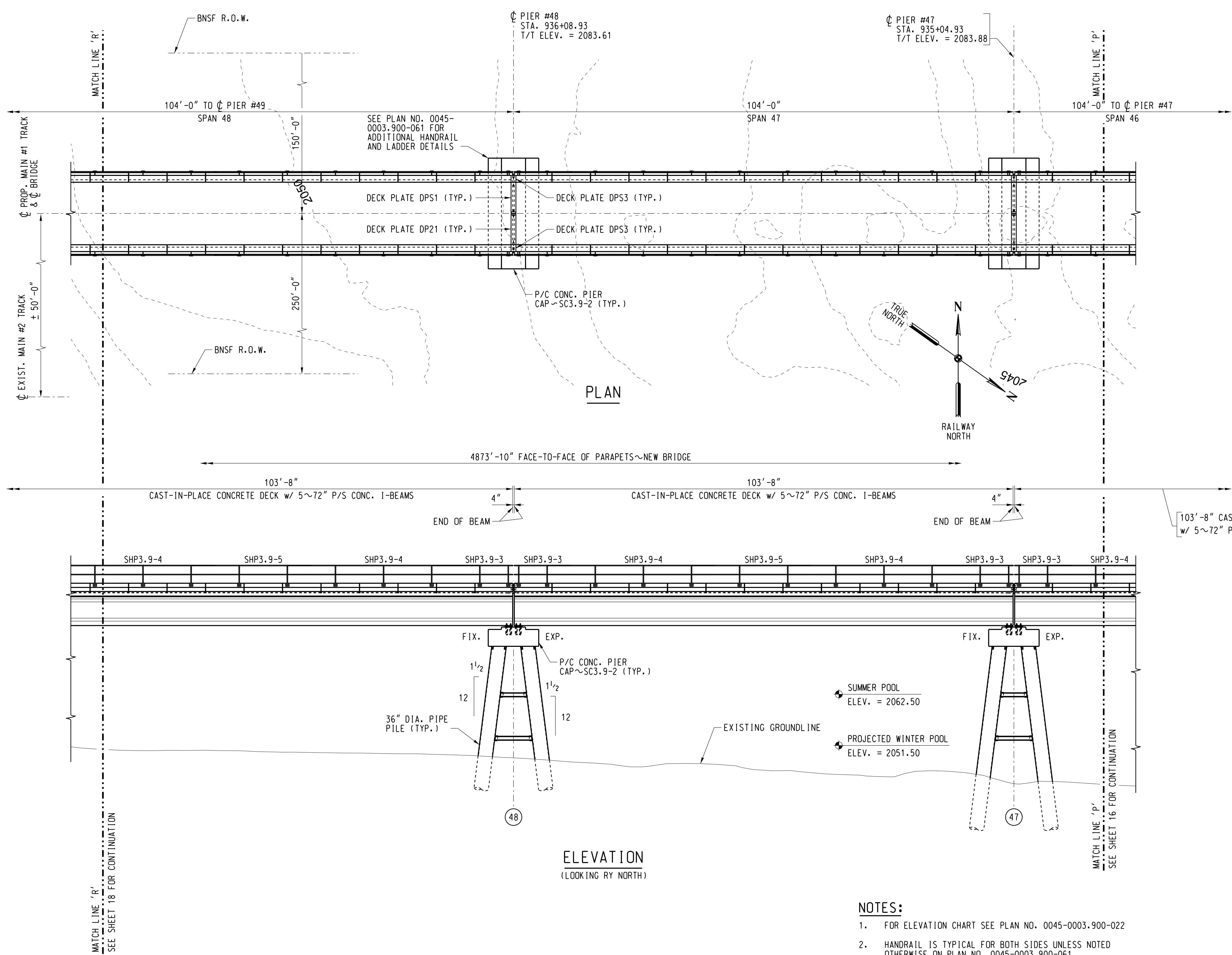
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

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



WEST
TO SPOKANE, WA

EAST
TO WHITEFISH, MT



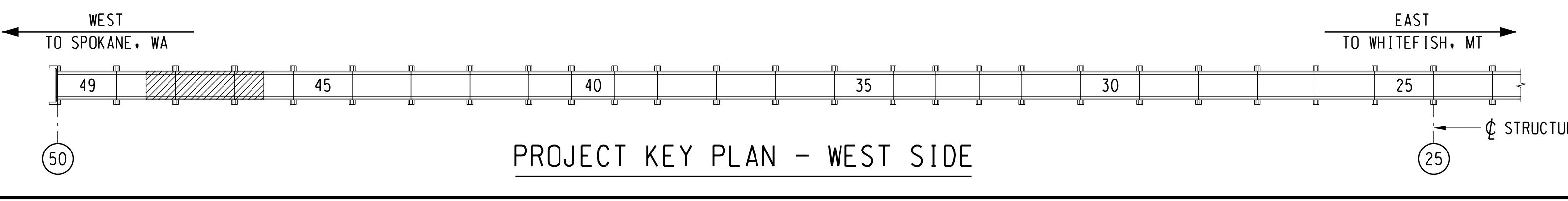
NOTES:

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.

DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2019
AUTH: XXX-XXXX
LINE SEG: 0045

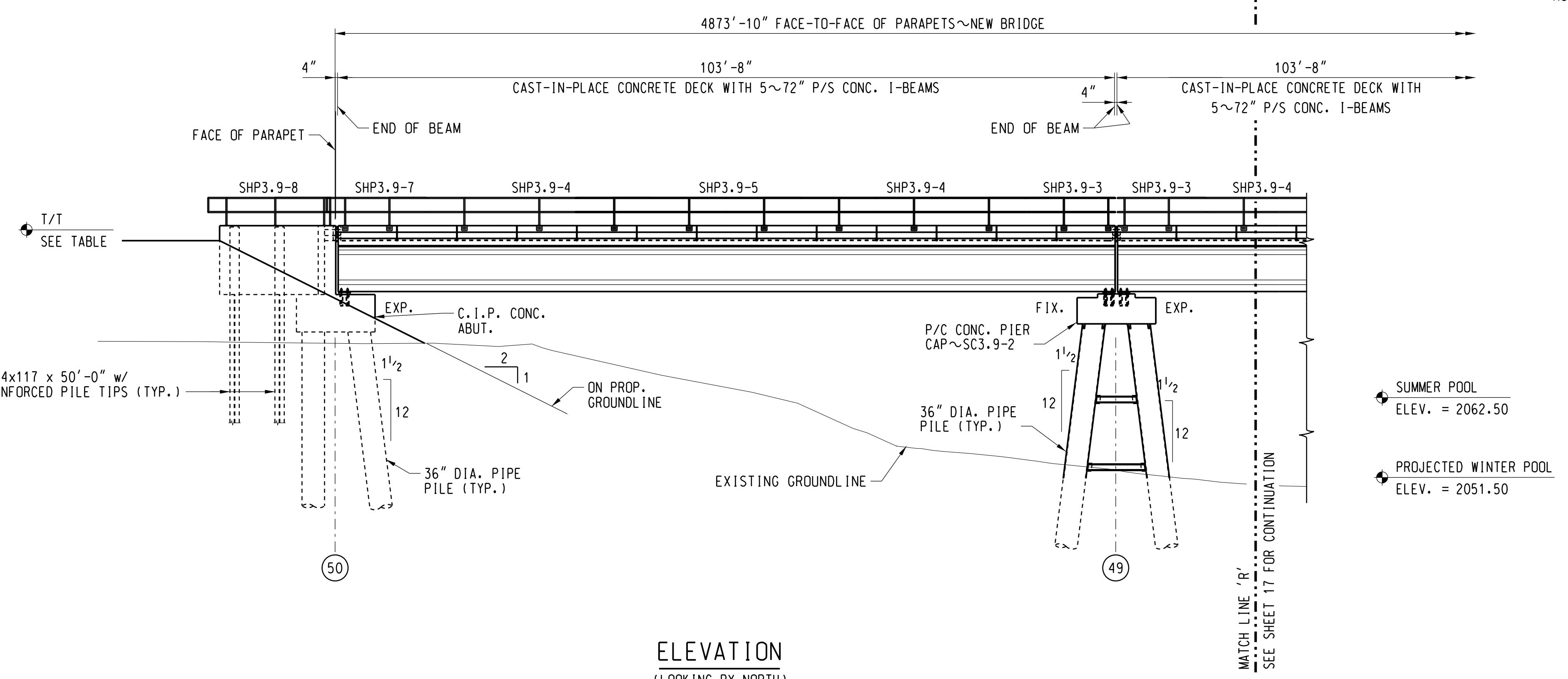
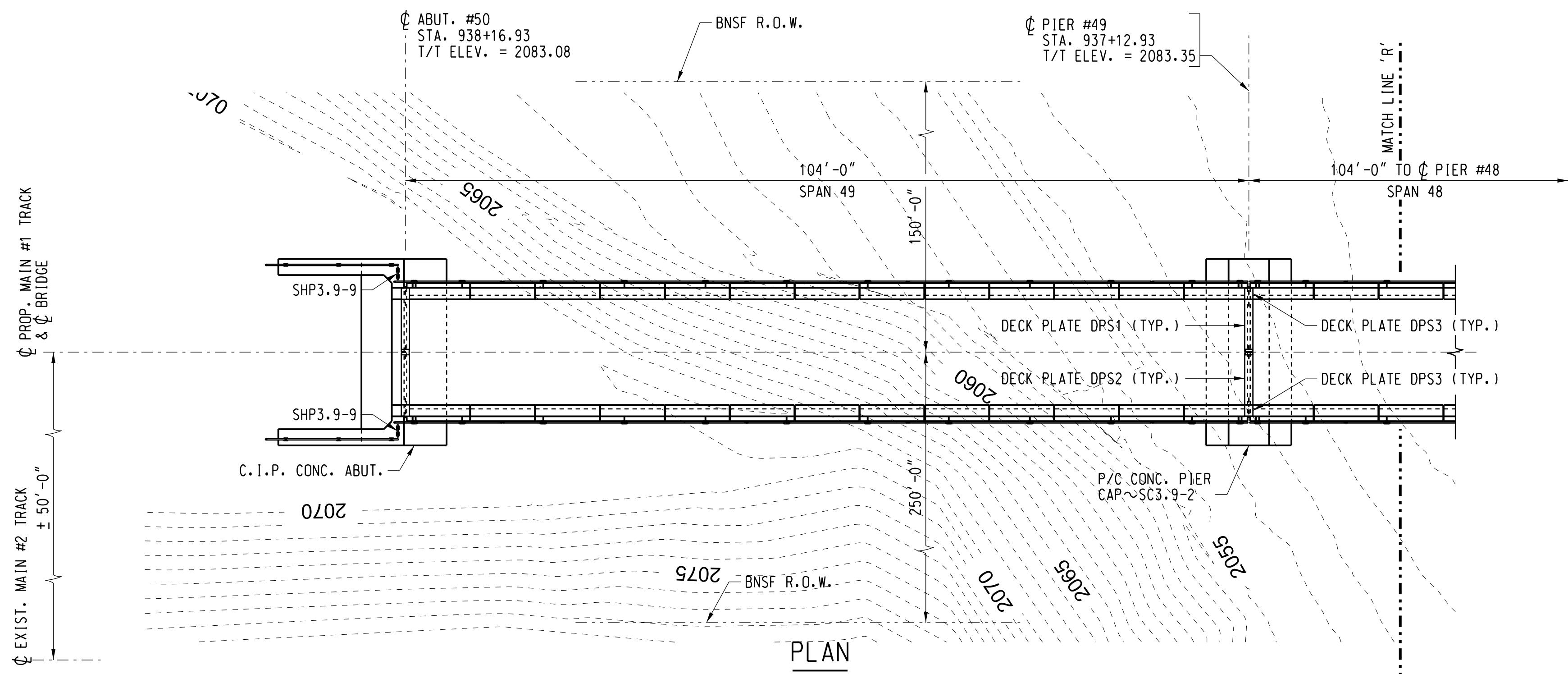
BNSF
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS
APPROVED:
ASST. DIRECTOR STRUCTURES DESIGN

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



WEST
TO SPOKANE, WA

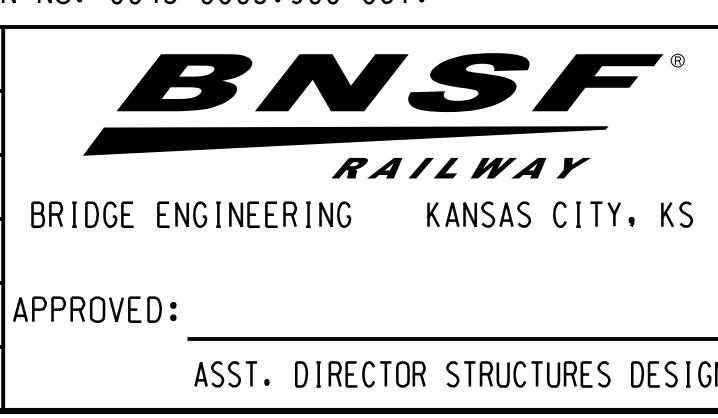
EAST
TO WHITEFISH, MT



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.

| | |
|-----------|----------|
| DES: | TJH |
| DRAWN: | GTJ |
| CHECK: | MAF |
| DATE: | MAR 2019 |
| AUTH: | XXX-XXXX |
| LINE SEG: | 0045 |



SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
GENERAL PLAN & ELEVATION (18 OF 18)

File Location: M:\jgh\0003900-020\020.dwg
Hanson Professional Services Inc.

PROJECT KEY PLAN - WEST SIDE

WEST TO SPOKANE, WA

EAST TO WHITEFISH, MT

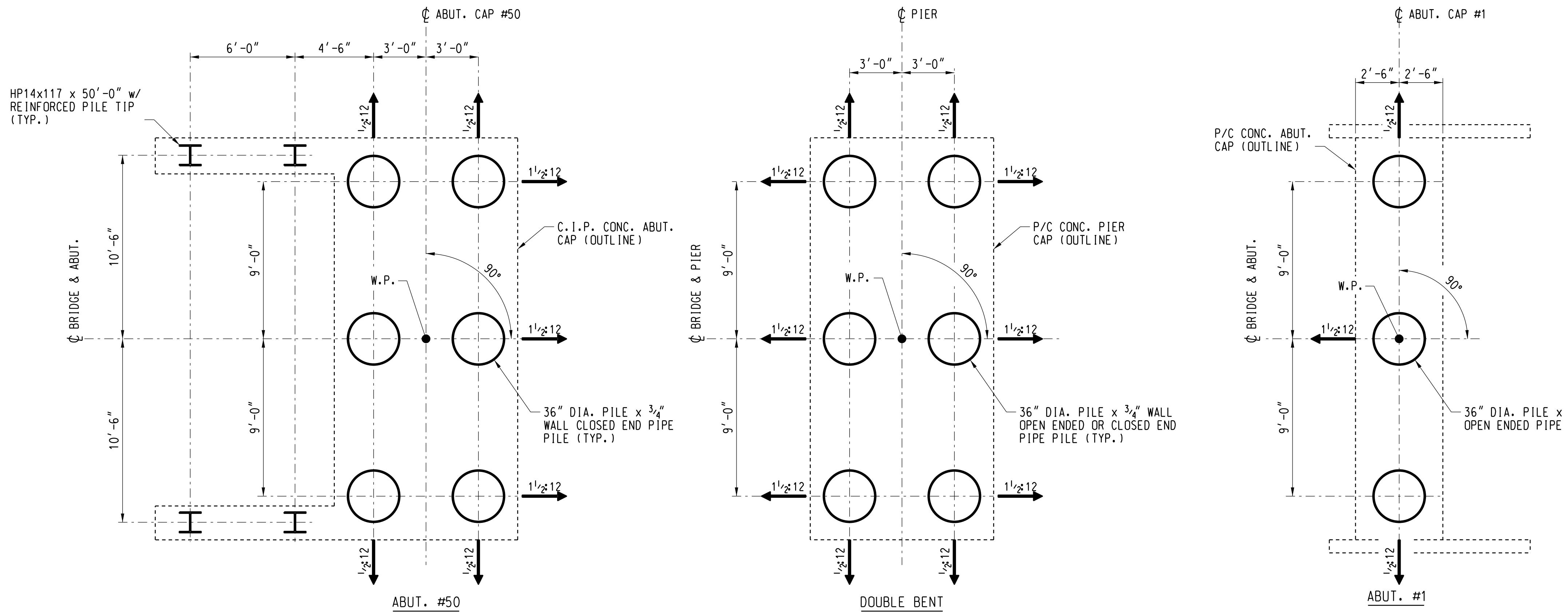
STRUCTURE

50 45 40 35 30 25 25

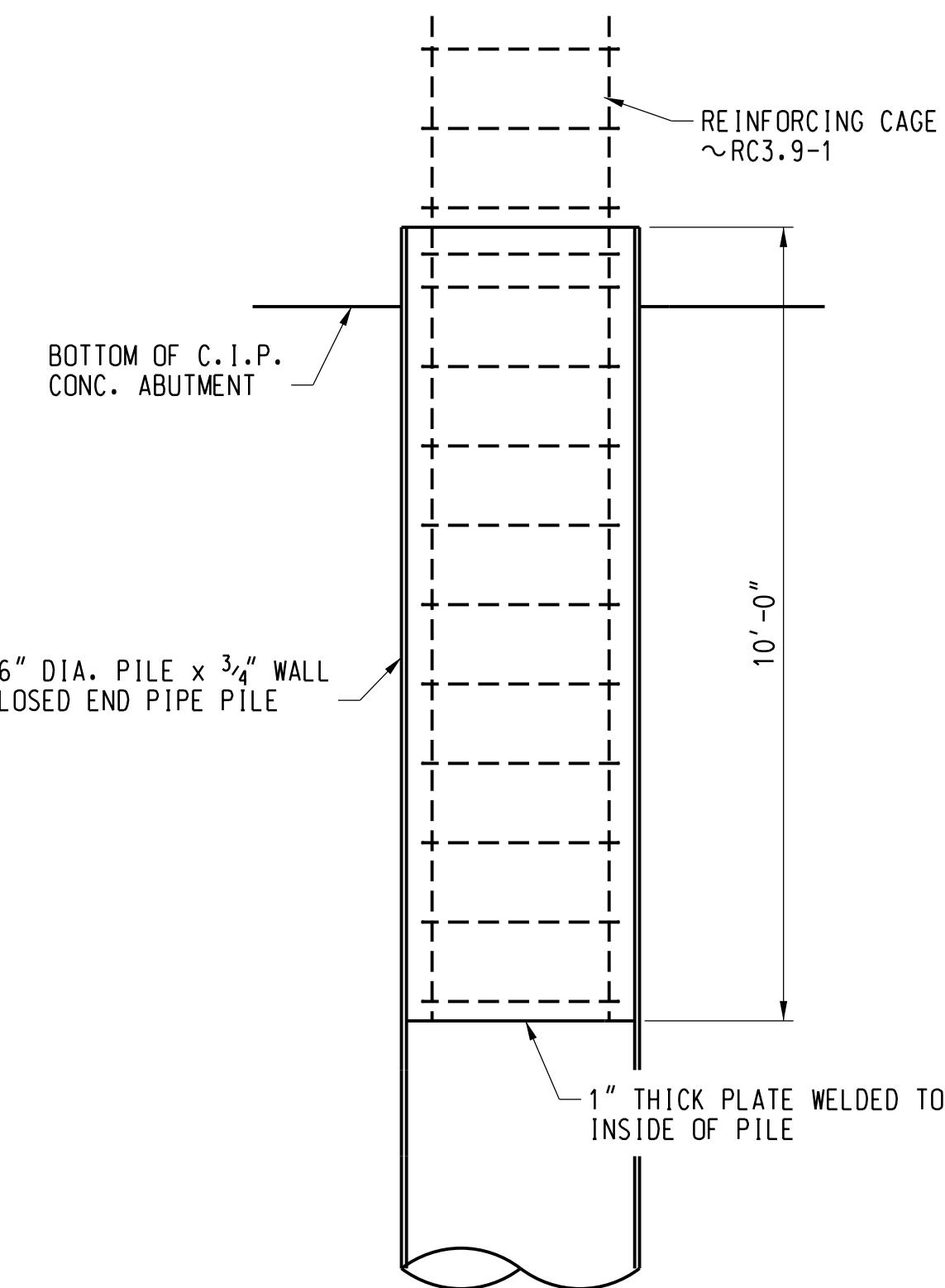
PLAN NO: 0045-0003.900-020 | SHEET: 20 OF

WEST
TO SPOKANE, WA

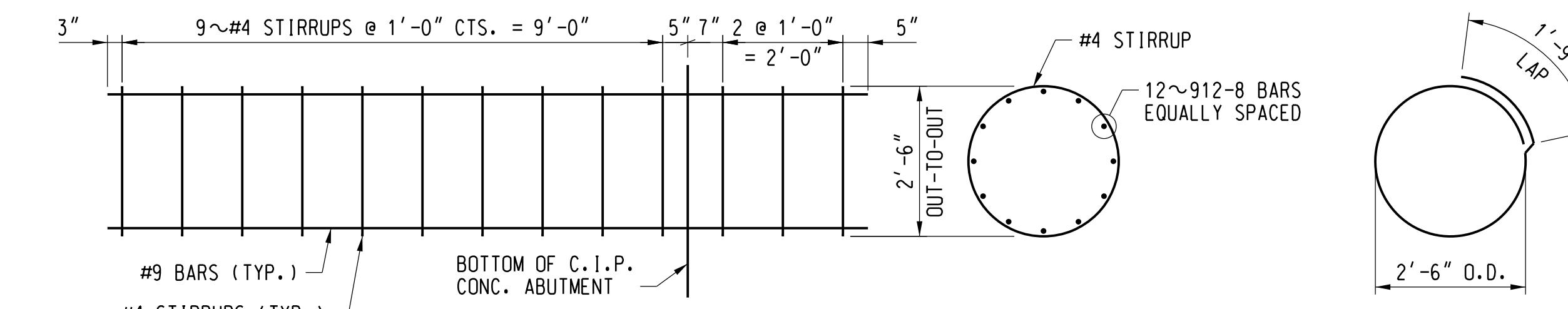
EAST
TO WHITEFISH, MT



TYPICAL PILE LAYOUT DIAGRAMS - PIERS & ABUTMENTS



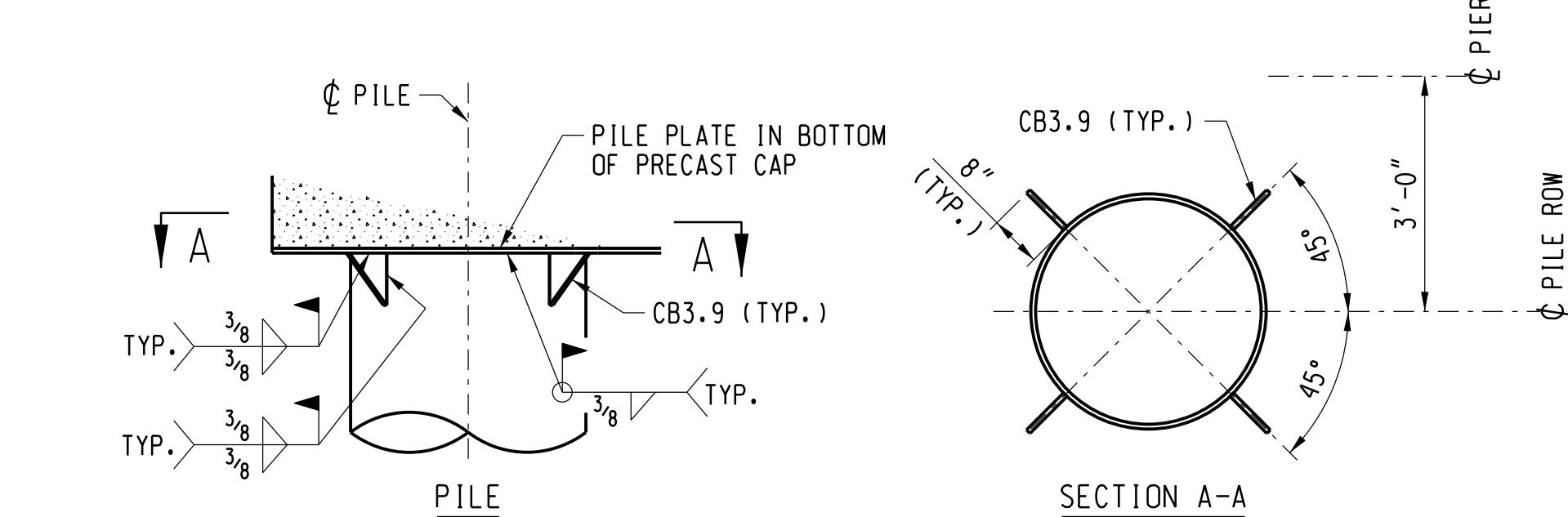
TYPICAL ABUT. #50 PILES



REINFORCING CAGE - RC3.9-1

12~#9 BARS x 12'-8"
13~#4 STIRRUPS
WEIGHT (EACH CAGE) = 601 LBS.

CONNECTION BAR CB3.9
1~BAR 8" x 3/4" 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.

| | |
|-----------|----------|
| 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

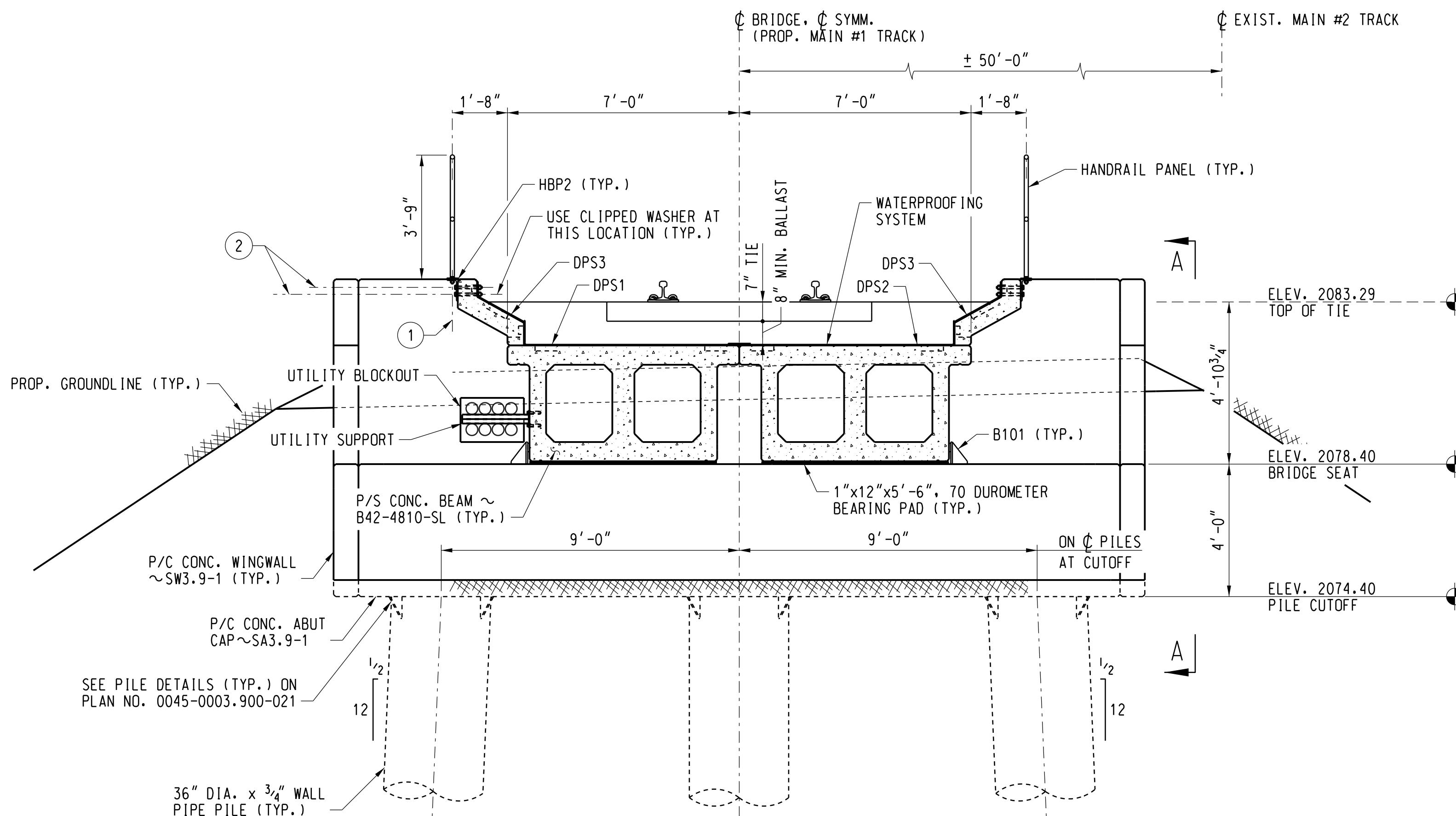
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
PILE LAYOUT PLAN & DETAILS
PLAN NO: 0045-0003.900-021 SHEET: 21 OF

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).

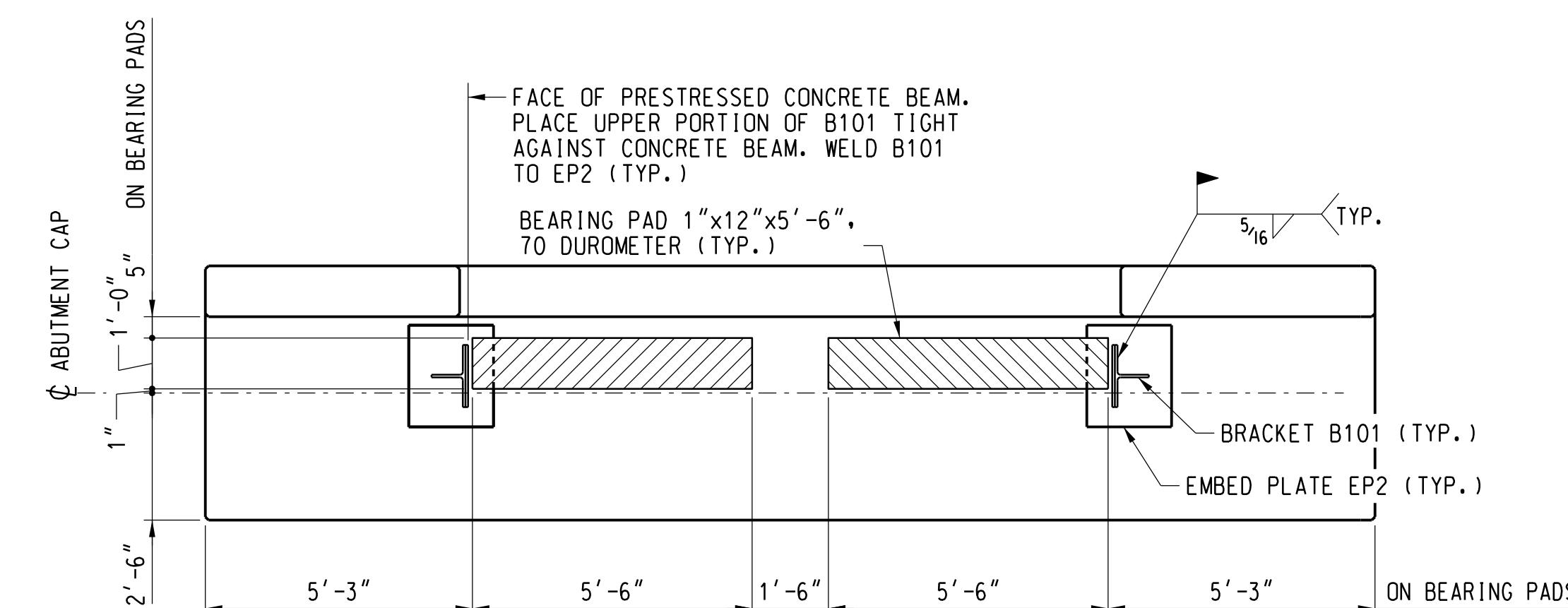
TABLE OF ELEVATIONS - BRIDGE 3.9

| 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'-10 ³ / ₄ " | - | - | - | 56571.02 | 33071.74 |
| PIER 2 | 2083.32 | 2078.43 / 2074.82 | 2070.82 | 1918.8 | 152 | 415 | 12'-6" | 15'-3 ³ / ₄ " | 8'-2" | 10'-1" | 56532.05 | 33099.48 |
| PIER 3 | 2083.39 | 2074.88 | 2070.88 | 1898.9 | 172 | 570 | 12'-6" | 15'-4 ¹ / ₂ " | 8'-2" | 10'-1 ¹ / ₄ " | 56447.33 | 33159.79 |
| PIER 4 | 2083.45 | 2074.95 | 2070.95 | 1899.0 | 172 | 570 | 12'-6" | 15'-5 ¹ / ₂ " | 8'-2 ¹ / ₄ " | 10'-1 ¹ / ₄ " | 56362.60 | 33220.10 |
| PIER 5 | 2083.52 | 2075.01 | 2071.01 | 1899.0 | 172 | 570 | 12'-6" | 15'-6" | 8'-2 ¹ / ₄ " | 10'-1 ¹ / ₂ " | 56277.88 | 33280.42 |
| PIER 6 | 2083.58 | 2075.07 | 2071.07 | 1899.1 | 172 | 570 | 12'-6" | 15'-6 ³ / ₄ " | 8'-2 ¹ / ₂ " | 10'-1 ³ / ₄ " | 56193.15 | 33340.73 |
| PIER 7 | 2083.65 | 2075.13 | 2071.13 | 1899.1 | 172 | 570 | 12'-6 ¹ / ₄ " | 15'-7 ¹ / ₂ " | 8'-2 ¹ / ₂ " | 10'-2" | 56108.43 | 33401.04 |
| PIER 8 | 2083.71 | 2075.20 | 2071.20 | 1895.2 | 176 | 570 | 12'-6" | 15'-8 ¹ / ₂ " | 8'-2 ¹ / ₂ " | 10'-2" | 56023.70 | 33461.36 |
| PIER 9 | 2083.78 | 2075.26 | 2071.26 | 1895.3 | 176 | 570 | 12'-6 ¹ / ₄ " | 15'-9" | 8'-2 ³ / ₄ " | 10'-2 ¹ / ₄ " | 55938.98 | 33521.67 |
| PIER 10 | 2083.84 | 2075.32 | 2071.32 | 1895.3 | 176 | 570 | 12'-6 ¹ / ₄ " | 15'-9 ³ / ₄ " | 8'-2 ³ / ₄ " | 10'-2 ¹ / ₂ " | 55854.25 | 33581.99 |
| PIER 11 | 2083.91 | 2075.38 | 2071.38 | 1895.4 | 176 | 570 | 12'-6 ¹ / ₄ " | 15'-10 ¹ / ₂ " | 8'-3" | 10'-2 ³ / ₄ " | 55769.53 | 33642.30 |
| PIER 12 | 2083.97 | 2075.45 | 2071.45 | 1895.5 | 176 | 570 | 12'-6 ¹ / ₄ " | 15'-11 ¹ / ₂ " | 8'-3" | 10'-3" | 55684.80 | 33702.61 |
| PIER 13 | 2084.04 | 2075.51 | 2071.51 | 1895.5 | 176 | 570 | 12'-6 ¹ / ₄ " | 16'-0" | 8'-3" | 10'-3" | 55600.08 | 33762.93 |
| PIER 14 | 2084.10 | 2075.57 | 2071.57 | 1895.6 | 176 | 570 | 12'-6 ¹ / ₄ " | 16'-0 ³ / ₄ " | 8'-3" | 10'-3 ¹ / ₄ " | 55515.36 | 33823.24 |
| PIER 15 | 2084.17 | 2075.63 | 2071.63 | 1895.6 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-1 ¹ / ₂ " | 8'-3 ¹ / ₄ " | 10'-3 ¹ / ₄ " | 55430.63 | 33883.55 |
| PIER 16 | 2084.23 | 2075.70 | 2071.70 | 1895.7 | 176 | 570 | 12'-6 ¹ / ₄ " | 16'-2 ¹ / ₂ " | 8'-3 ¹ / ₄ " | 10'-3 ¹ / ₂ " | 55345.91 | 33943.87 |
| PIER 17 | 2084.30 | 2075.76 | 2071.76 | 1895.8 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-3" | 8'-3 ¹ / ₄ " | 10'-3 ³ / ₄ " | 55261.18 | 34004.18 |
| PIER 18 | 2084.36 | 2075.82 | 2071.82 | 1895.8 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-3 ³ / ₄ " | 8'-3 ¹ / ₂ " | 10'-4" | 55176.46 | 34064.49 |
| PIER 19 | 2084.42 | 2075.88 | 2071.88 | 1895.9 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-4 ¹ / ₂ " | 8'-3 ¹ / ₂ " | 10'-4 ¹ / ₂ " | 55091.73 | 34124.81 |
| PIER 20 | 2084.49 | 2075.95 | 2071.95 | 1896.0 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-5 ¹ / ₂ " | 8'-3 ³ / ₄ " | 10'-4 ¹ / ₄ " | 55007.01 | 34185.12 |
| PIER 21 | 2084.55 | 2076.01 | 2072.01 | 1896.0 | 176 | 570 | 12'-6 ¹ / ₂ " | 16'-6" | 8'-3 ³ / ₄ " | 10'-4 ¹ / ₂ " | 54922.28 | 34245.43 |
| PIER 22 | 2084.62 | 2076.07 | 2072.07 | 1895.1 | 177 | 570 | 12'-6 ¹ / ₂ " | 16'-6 ³ / ₄ " | 8'-3 ³ / ₄ " | 10'-4 ³ / ₄ " | 54837.56 | 34305.75 |
| PIER 23 | 2084.68 | 2076.13 | 2072.13 | 1895.1 | 177 | 570 | 12'-6 ¹ / ₂ " | 16'-7 ¹ / ₂ " | 8'-4" | 10'-5" | 54752.83 | 34366.06 |
| PIER 24 | 2084.75 | 2076.19 | 2072.19 | 1895.2 | 177 | 570 | 12'-6 ³ / ₄ " | 16'-8 ¹ / ₄ " | 8'-4" | 10'-5" | 54668.11 | 34426.38 |
| PIER 25 | 2084.81 | 2076.26 | 2072.26 | 1895.3 | 177 | 570 | 12'-6 ¹ / ₂ " | 16'-9" | 8'-4" | 10'-5 ¹ / ₄ " | 54583.38 | 34486.69 |
| PIER 26 | 2084.88 | 2076.32 | 2072.32 | 1895.3 | 177 | 570 | 12'-6 ³ / ₄ " | 16'-9 ³ / ₄ " | 8'-4 ¹ / ₄ " | 10'-5 ¹ / ₂ " | 54498.66 | 34547.00 |
| PIER 27 | 2084.94 | 2076.38 | 2072.38 | 1895.4 | 177 | 570 | 12'-6 ³ / ₄ " | 16'-10 ¹ / ₂ " | 8'-4 ¹ / ₄ " | 10'-5 ³ / ₄ " | 54413.93 | 34607.32 |
| PIER 28 | 2085.01 | 2076.44 | 2072.44 | 1895.4 | 177 | 570 | 12'-6 ³ / ₄ " | 16'-11 ¹ / ₄ " | 8'-4 ¹ / ₄ " | 10'-6" | 54329.21 | 34667.63 |
| PIER 29 | 2085.07 | 2076.51 | 2072.51 | 1895.5 | 177 | 570 | 12'-6 ³ / ₄ " | 17'-0" | 8'-4 ¹ / ₂ " | 10'-6" | 54244.49 | 34727.94 |
| PIER 30 | 2085.14 | 2076.57 | 2072.57 | 1895.6 | 177 | 570 | 12'-6 ³ / ₄ " | 17'-0 ³ / ₄ " | 8'-4 ¹ / ₂ " | 10'-6 ¹ / ₂ " | 54159.76 | 34788.26 |
| PIER 31 | 2085.20 | 2076.63 | 2072.63 | 1895.6 | 177 | 570 | 12'-6 ³ / ₄ " | 17'-1 ¹ / ₂ " | 8'-4 ³ / ₄ " | 10'-6 ¹ / ₄ " | 54075.04 | 34848.57 |
| PIER 32 | 2085.27 | 2077.44 / 2076.69 | 2072.69 | 1903.7 | 169 | 505 | 12'-7" | 17'-2 ¹ / ₄ " | 8'-4 ³ / ₄ " | 10'-6 ¹ / ₂ " | 53990.31 | 34908.88 |
| PIER 33 | 2085.31 | 2077.49 | 2073.49 | 1901.5 | 172 | 430 | 11'-9 ³ / ₄ " | 18'-0" | 8'-6" | 10'-9" | 53928.46 | 34952.91 |
| PIER 34 | 2085.36 | 2077.54 | 2073.54 | 1901.5 | 172 | 430 | 11'-9 ³ / ₄ " | 18'-0 ¹ / ₂ " | 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'-9 ¹ / ₄ " | 53804.77 | 35040.96 |
| PIER 36 | 2085.47 | 2078.39 / 2076.89 | 2072.89 | 1887.9 | 185 | 570 | 12'-7" | 17'- | | | | |

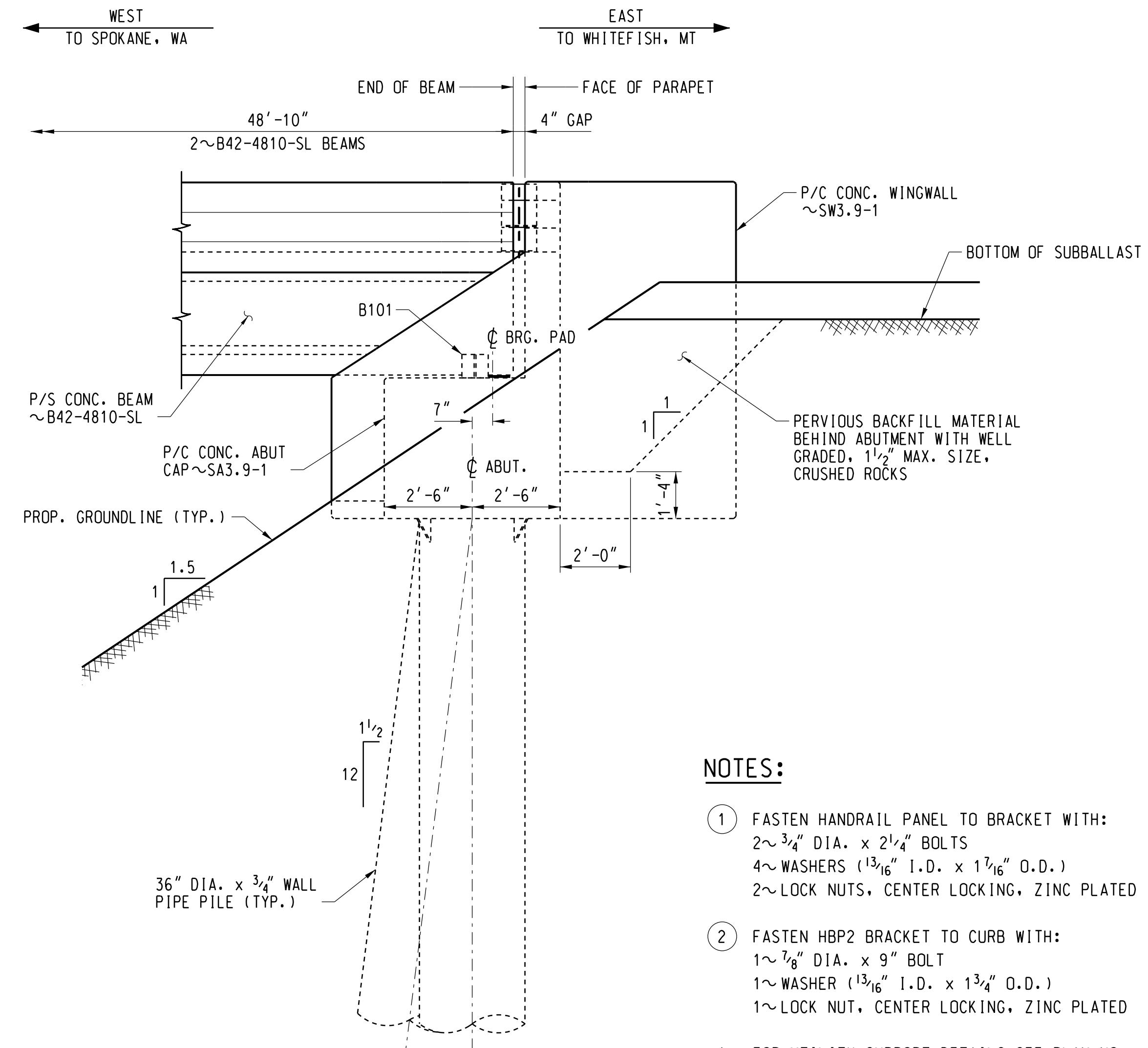


TYPICAL SECTION - ABUT. #1

(LOOKING RY EAST)



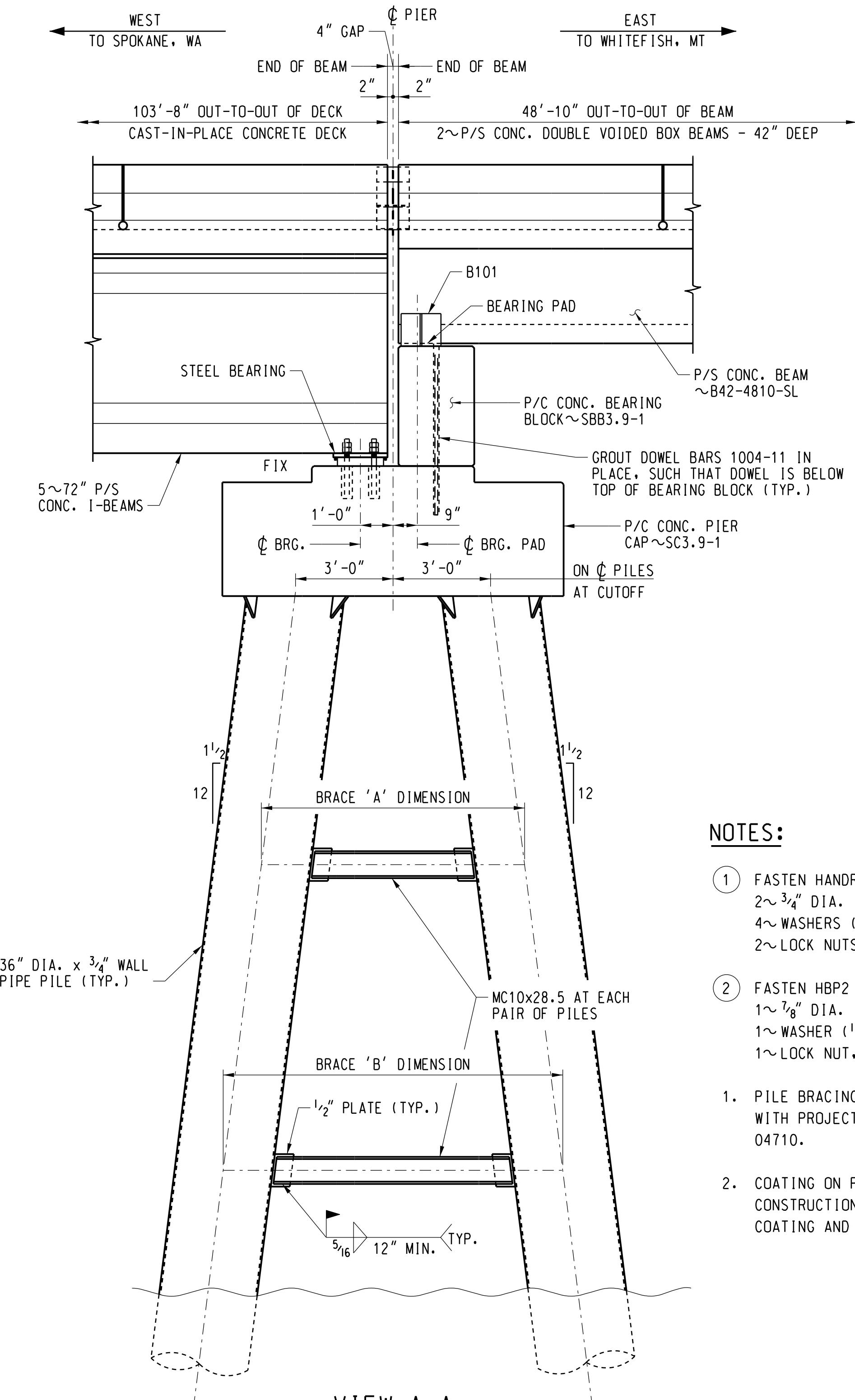
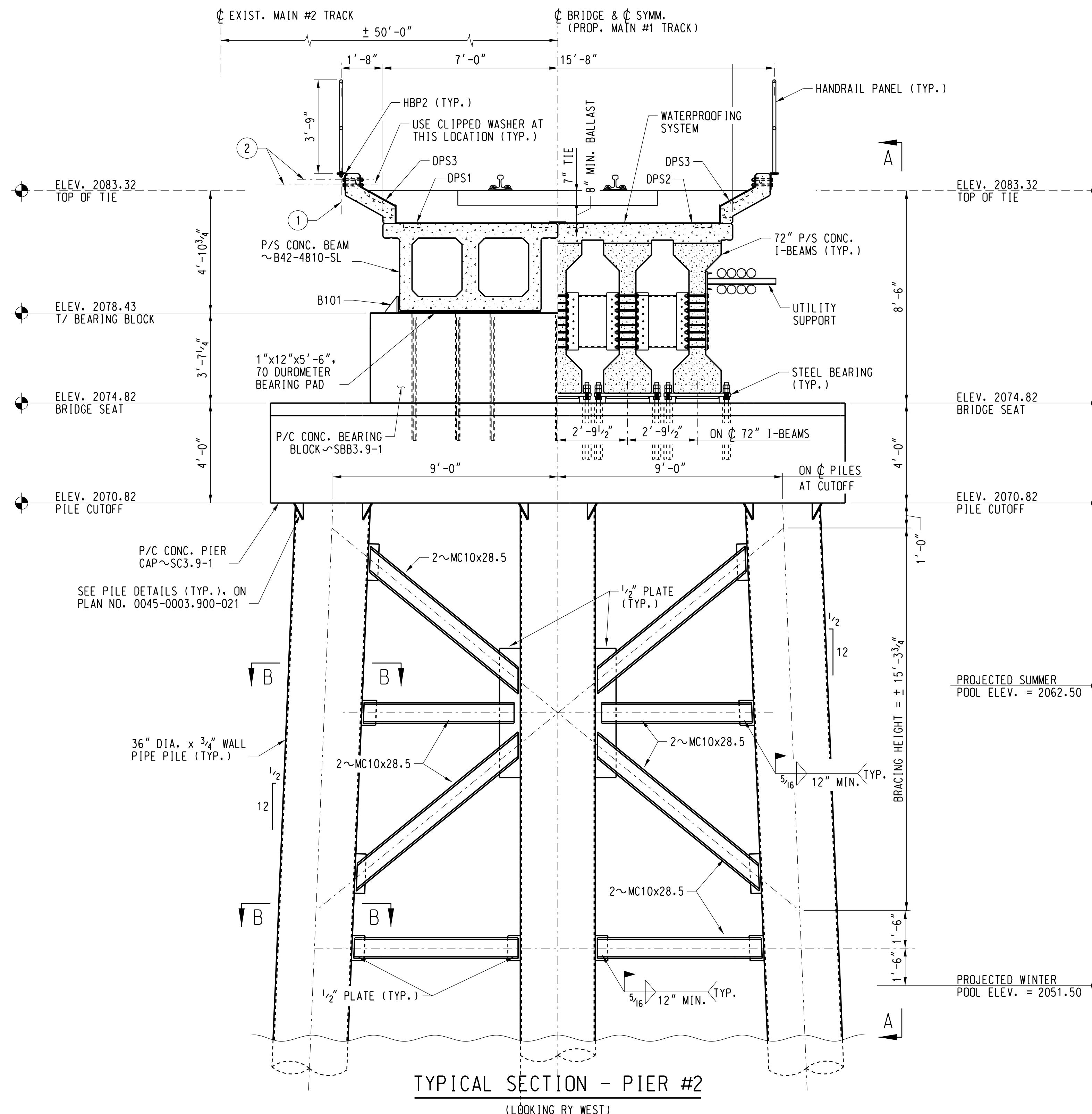
TYPICAL B101 ATTACHMENT DETAILS - ABUT. 1

**NOTES:**

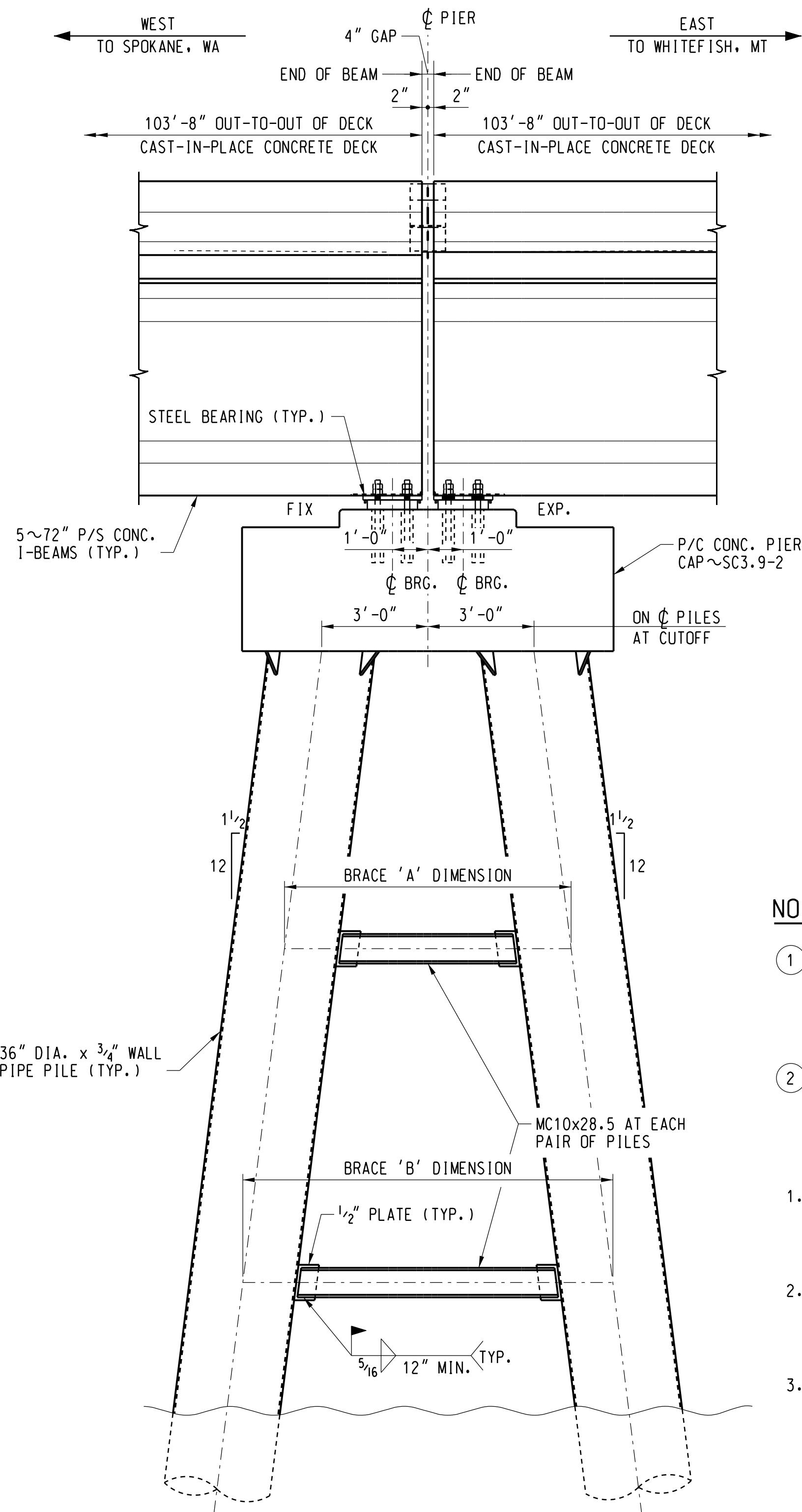
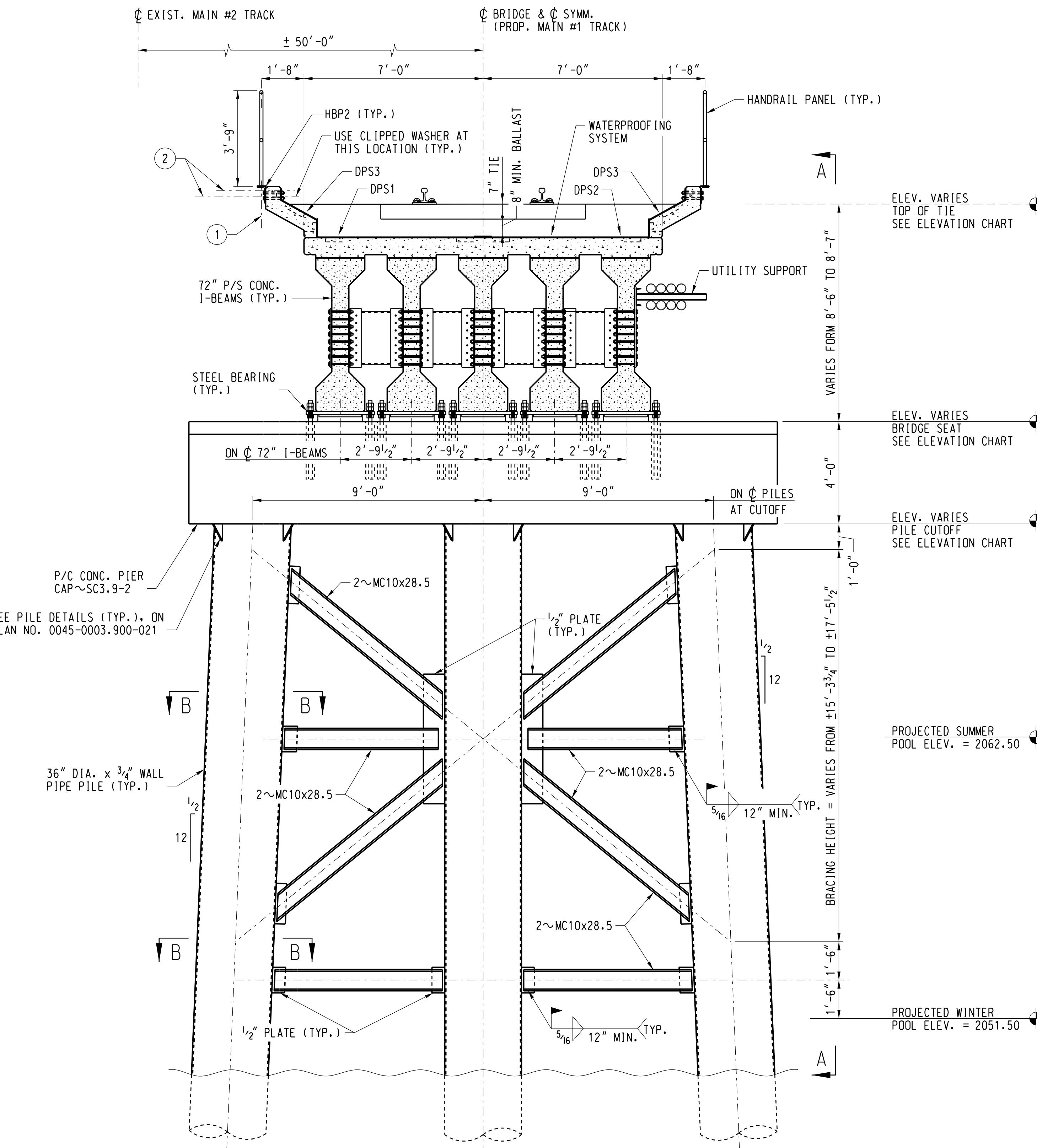
- ① FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~ 3/4" DIA. x 2 1/4" BOLTS
4~ WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~ LOCK NUTS, CENTER LOCKING, ZINC PLATED
 - ② FASTEN HBP2 BRACKET TO CURB WITH:
1~ 7/8" DIA. x 9" BOLT
1~ WASHER (13/16" I.D. x 1 3/4" O.D.)
1~ LOCK NUT, CENTER LOCKING, ZINC PLATED
1. FOR UTILITY SUPPORT DETAILS SEE PLAN NO. 0045-0003.900-054.

VIEW A-A

HANDRAIL PANELS NOT SHOWN FOR CLARITY.



| | | |
|----------------|---|---------------------------------|
| 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 | TYPICAL SECTION - PIER #2 |
| DATE: MAR 2019 | | |
| AUTH: XXX-XXXX | APPROVED: | |
| LINE SEG: 0045 | ASST. DIRECTOR STRUCTURES DESIGN | PLAN NO: 0045-0003.900-024 |
| | | SHEET: 24 OF |



HANDRAIL PANELS NOT SHOWN FOR CLARITY.

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

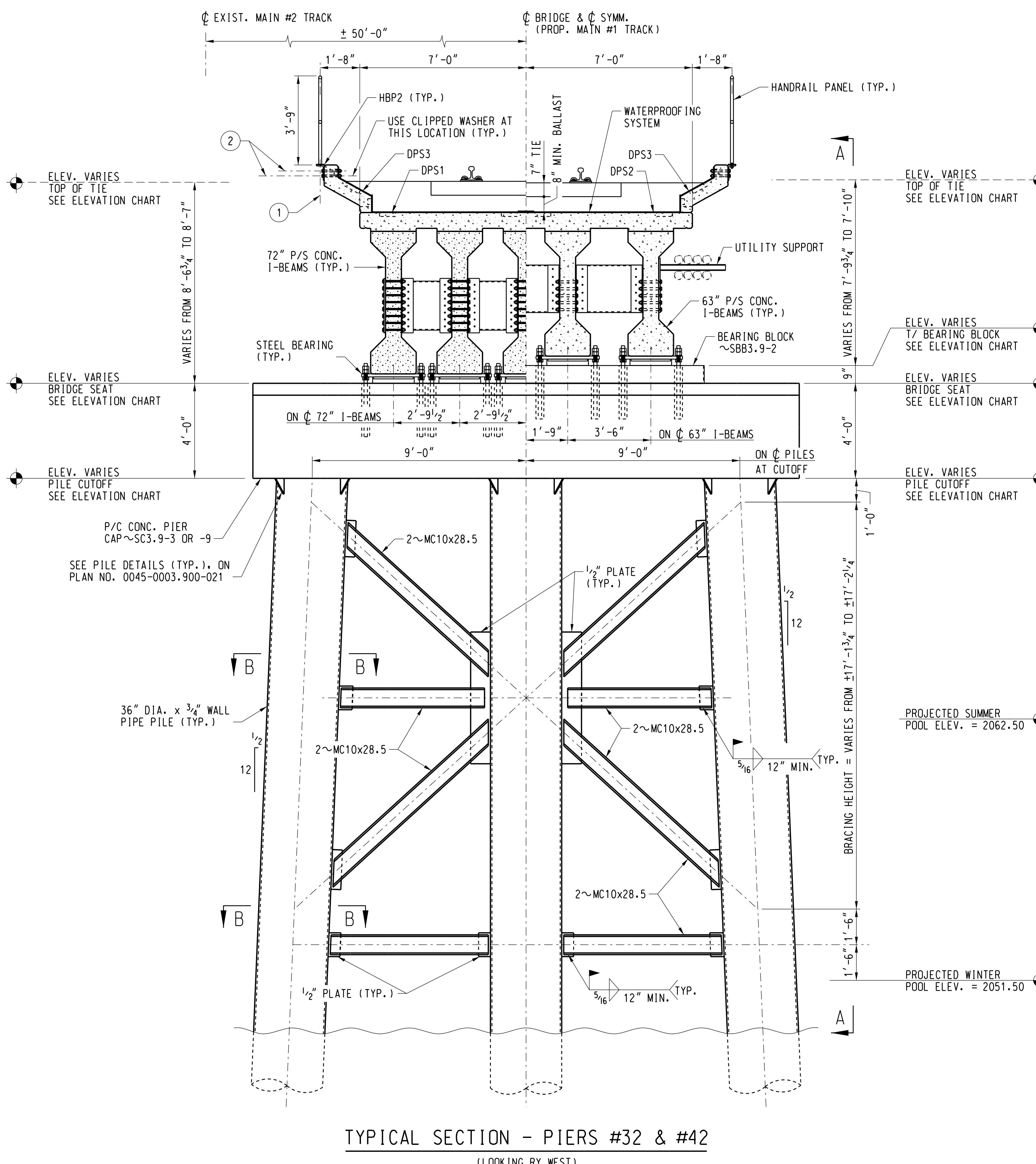
SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9

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

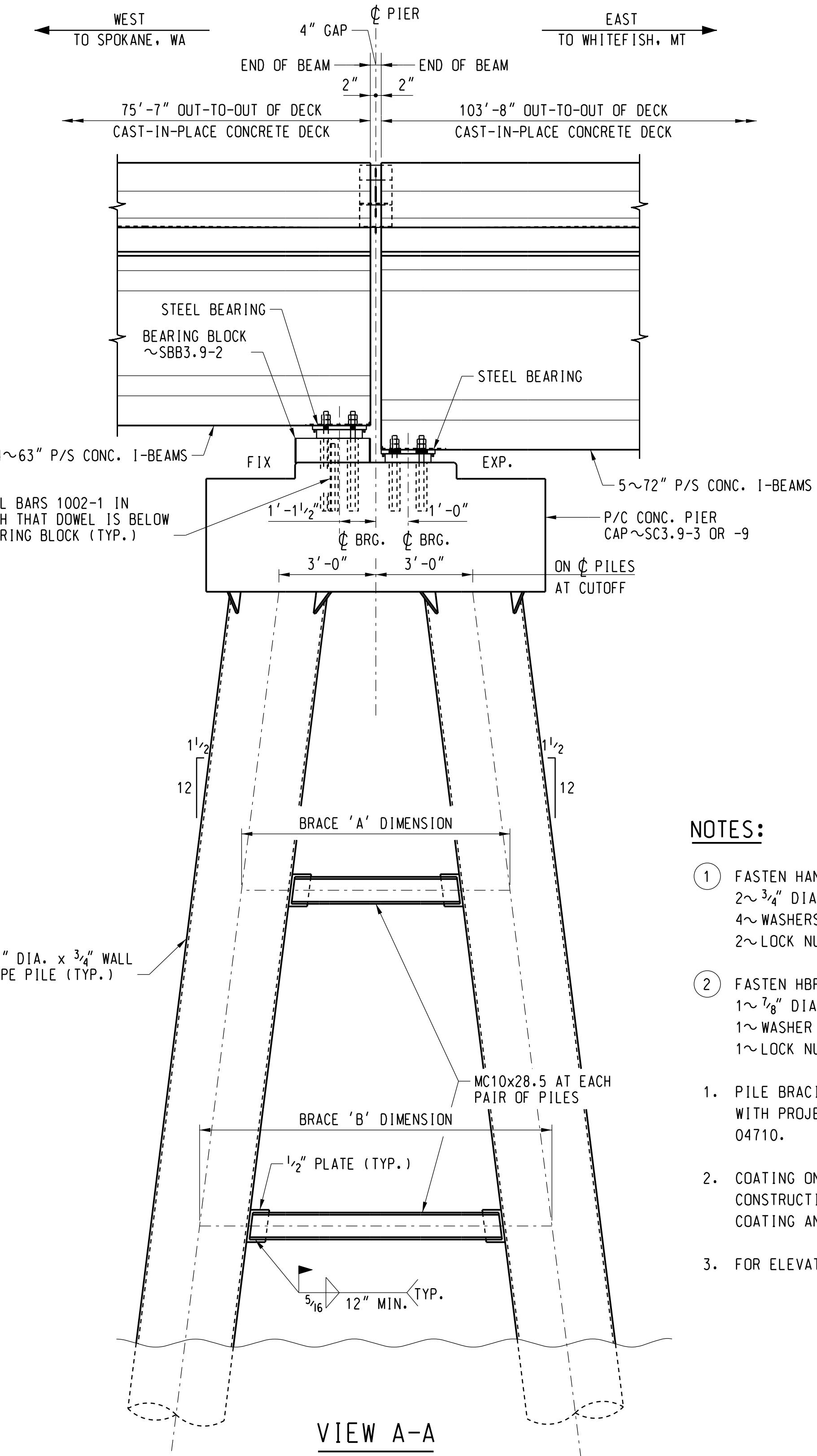


TYPICAL SECTION - PIERS #32 & #42

(LOOKING RY WEST)



Date Printed: 3/28/2019 Time Printed: 9:59:53 AM



HANDRAIL PANELS NOT SHOWN FOR CLARITY.
PIER #32 SHOWN, PIER #42 OPP. HAND

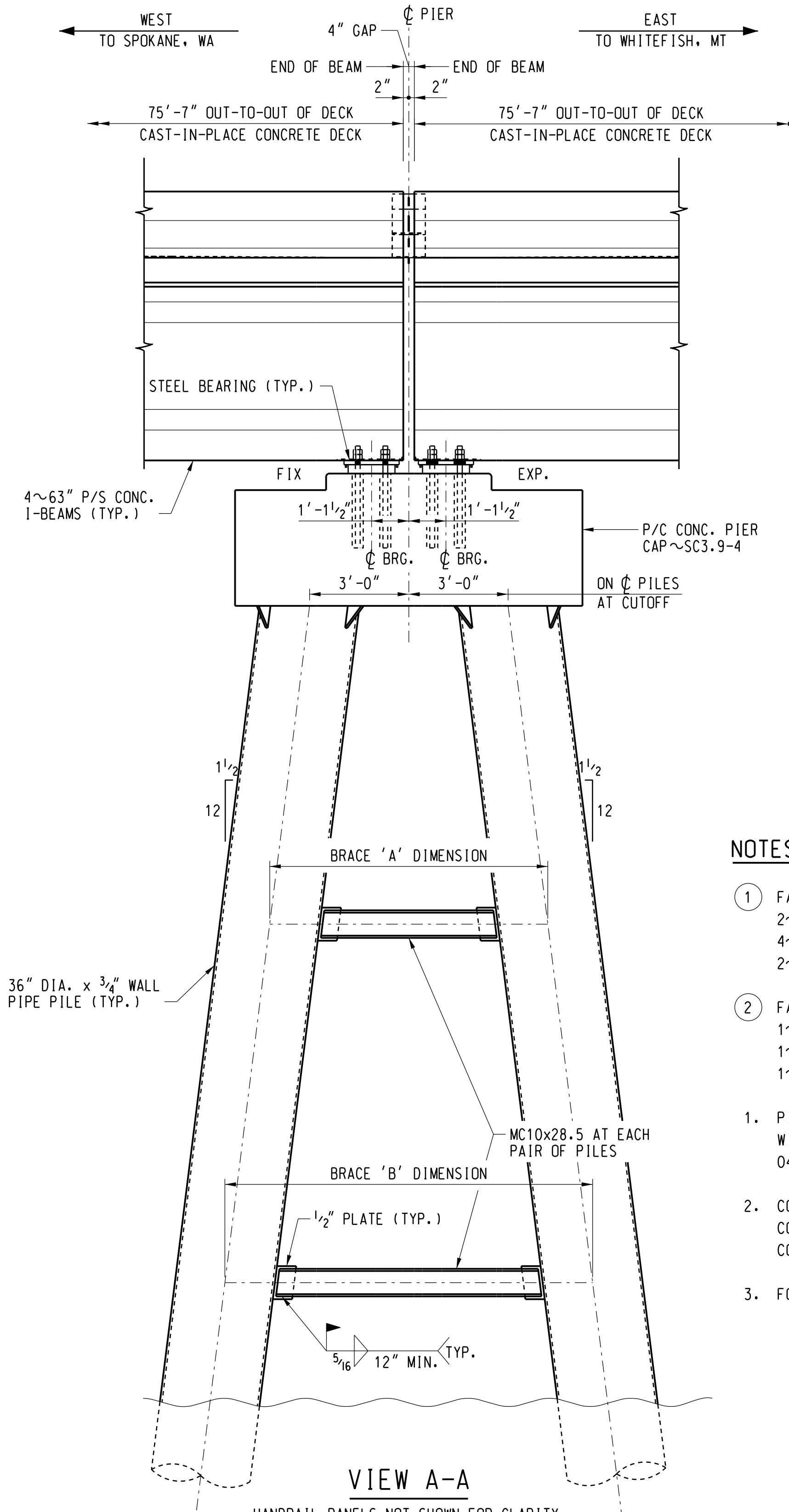
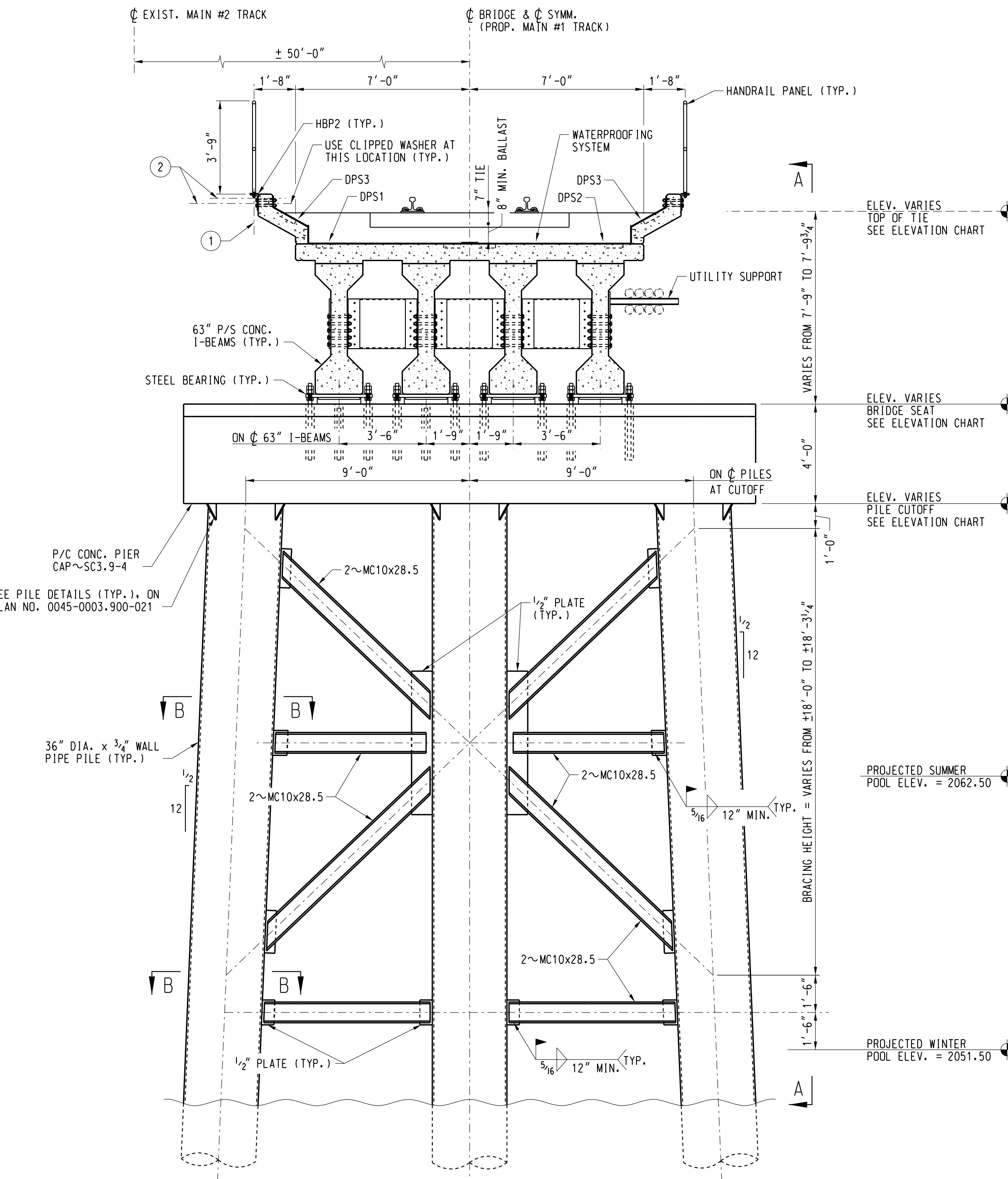
NOTE:

FOR SECTION B-B. SEE PLAN NO. 0045-0003, 900-024.

FOR SECTION B
DES: TJH
DRAWN: GTJ
CHECK: MAF
DATE: MAR 2
AUTH: XXX-
LINE SEG: 0

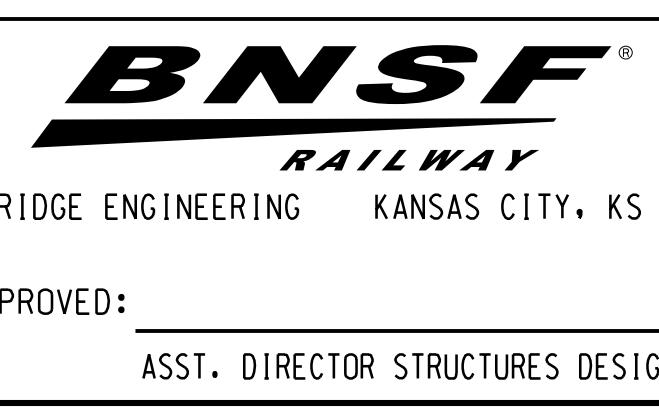
BNSF®
RAILWAY
BRIDGE ENGINEERING KANSAS CITY, KS

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID
TYPICAL SECTION
PIERS #32 & #42

**NOTE:**

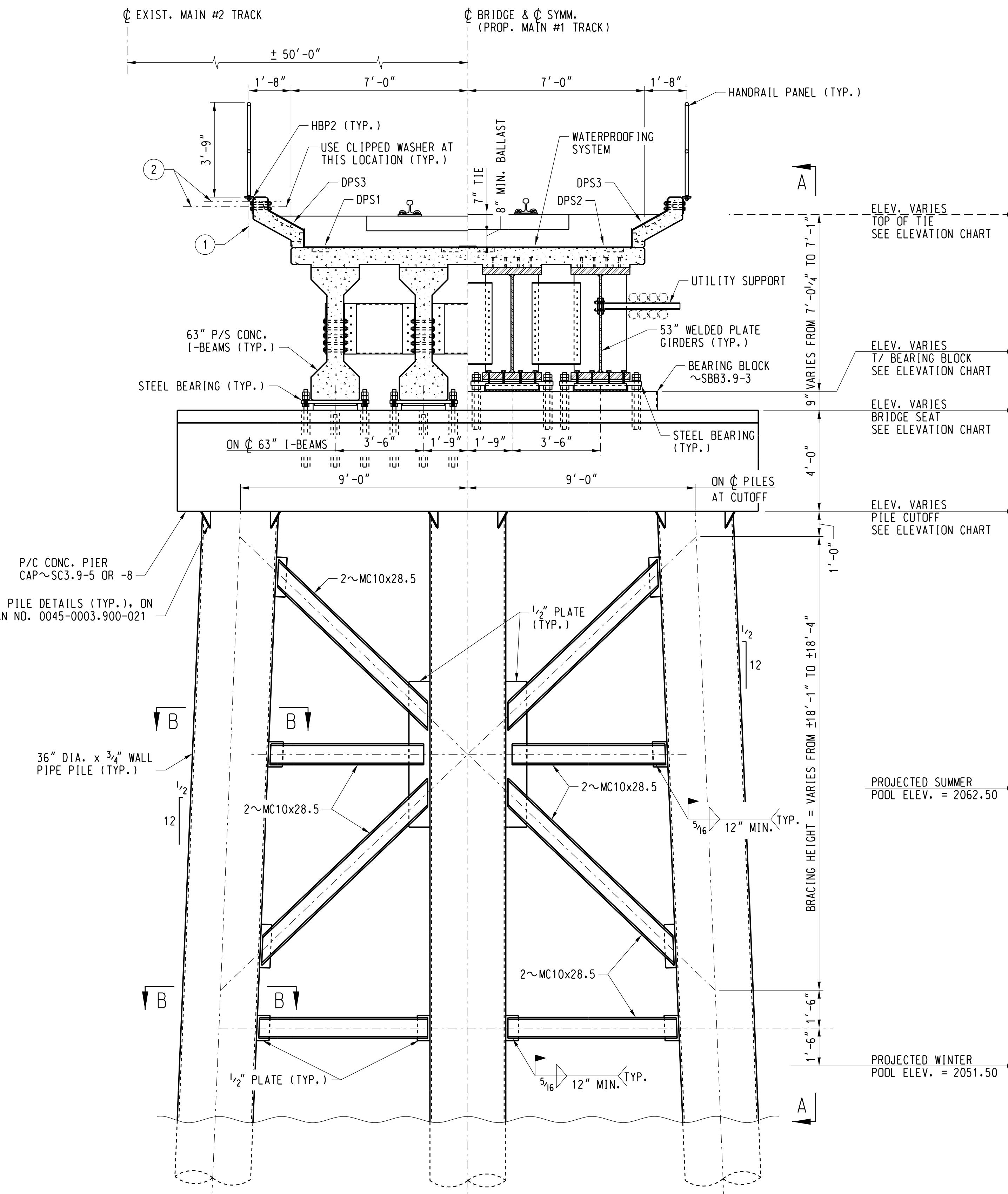
FOR SECTION B-B, SEE PLAN NO. 0045-0003.900-024.

| | |
|-----------|----------|
| DES: | TJH |
| DRAWN: | GTJ |
| CHECK: | MAF |
| DATE: | MAR 2019 |
| AUTH: | XXX-XXXX |
| LINE SEG: | 0045 |



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

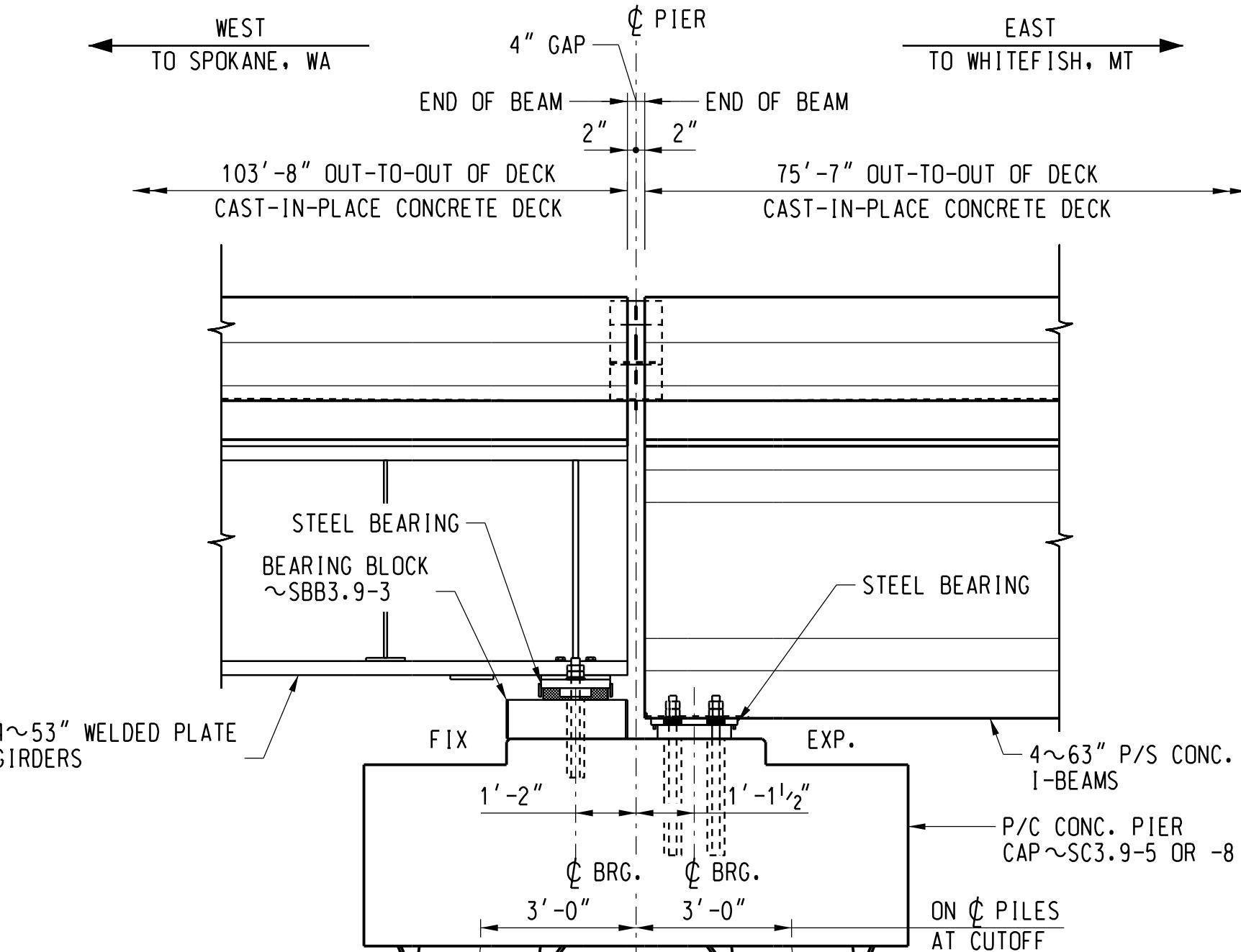


TYPICAL SECTION - PIERS #35 & #36

(LOOKING RY WEST



Date Printed: 3/28/2019 Time Printed: 10:01:37 AM



NOTES:

- 1 FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~ $\frac{3}{4}$ " DIA. x $2\frac{1}{4}$ " BOLTS
4~ WASHERS ($1\frac{3}{16}$ " I.D. x $1\frac{7}{16}$ " O.D.)
2~ LOCK NUTS, CENTER LOCKING, ZINC PLATED
 - 2 FASTEN HBP2 BRACKET TO CURB WITH:
1~ $\frac{7}{8}$ " DIA. x 9" BOLT
1~ WASHER ($1\frac{3}{16}$ " I.D. x $1\frac{3}{4}$ " 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 000 022

HANDRAIL PANELS NOT SHOWN FOR CLARITY
PIER #35 SHOWN, PIER #39 OPP. HAND.

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 |



RAILWAY

DATE: MAR 2019 BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED

AUTH: XXX-XXXX APPROVED: _____

LINE SEG: 0045 ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.

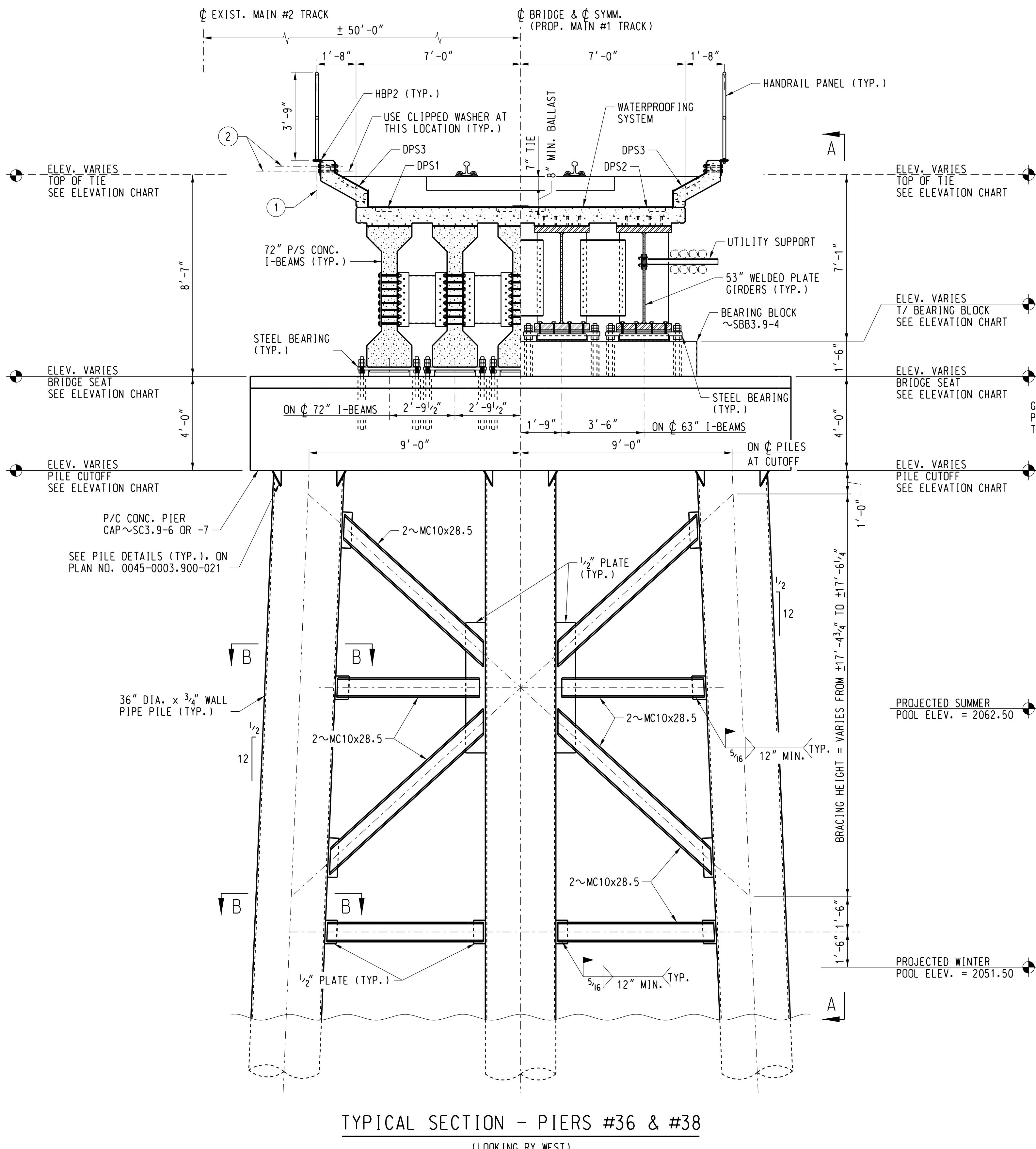
BRIDGE NUMBER 3.9

**OVER LAKE PEND OREILLE NEAR SANDPOINT
TYPICAL SECTION**

TYPICAL SECTION - PIERS #35 & #39

ITEM NO: 0045-0003.900-028 SHEET: 2

Page 1 of 1



TYPICAL SECTION - PIERS #36 & #38

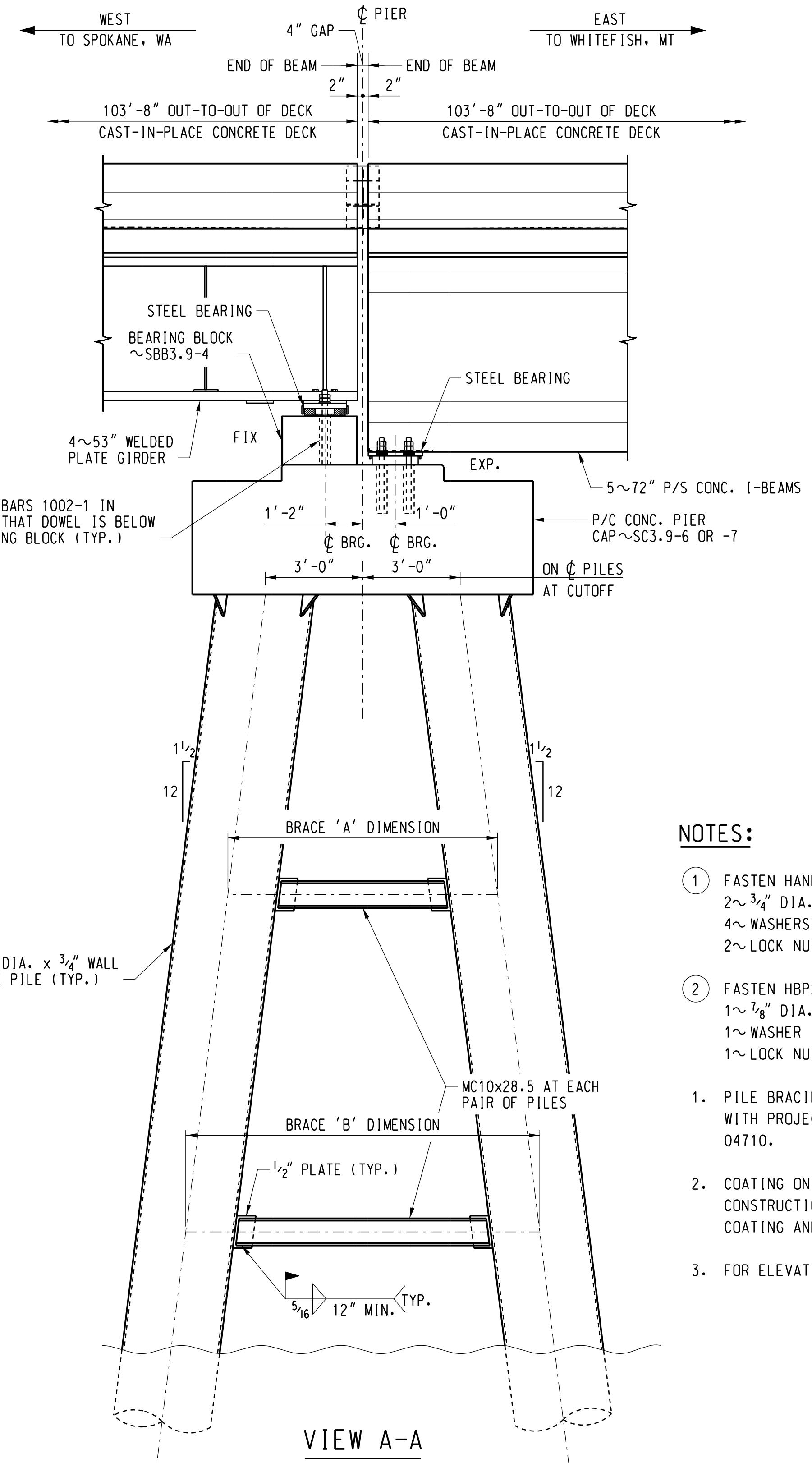
(LOOKING RY WEST)

File Location: M:\plan\400\003\0003.900\029\T\Sp32\2020\02\02FT_Tri_Sec2-029



Hanson Professional Services Inc.

Date Printed: 3/28/2019 Time Printed: 10:01:59 AM



HANDRAIL PANELS NOT SHOWN FOR CLARITY.
PIER #38 SHOWN, PIER #36 OPP. HAND

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



BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED:

ASST. DIRECTOR STRUCTURES DESIGN

SANDPOINT JCT. TO LAKESIDE JCT.
BRIDGE NUMBER 3.9

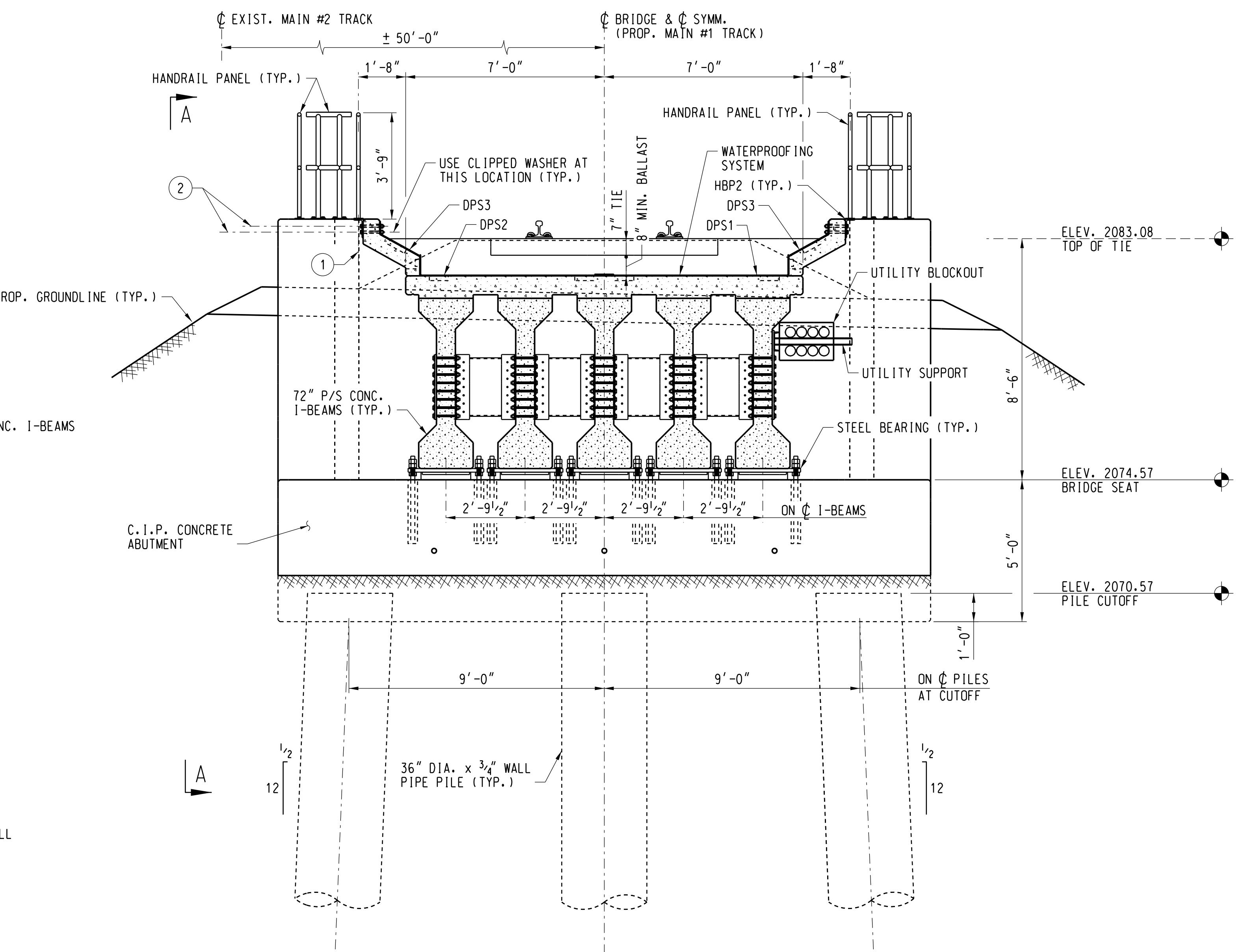
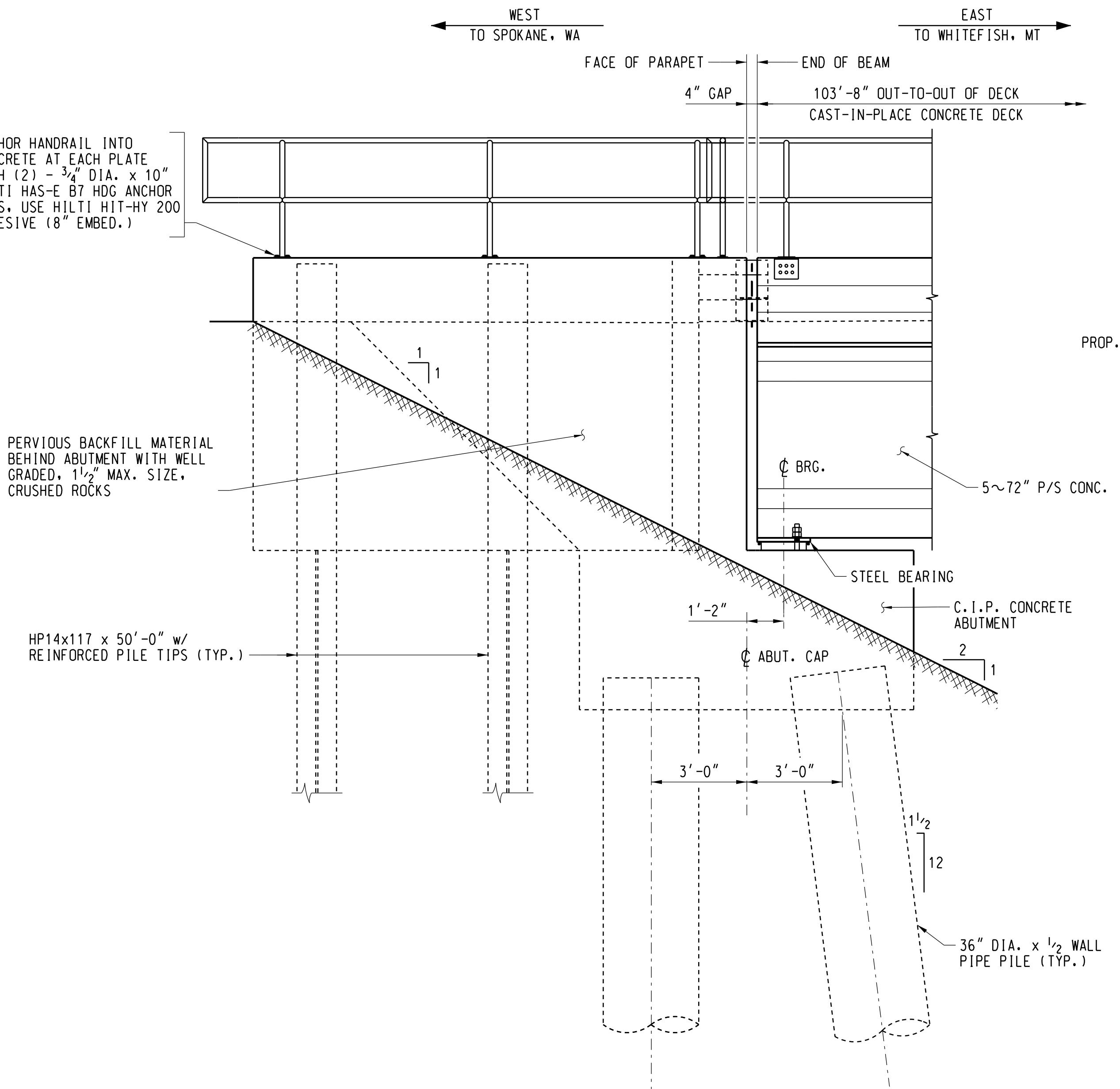
OVER LAKE PEND OREILLE NEAR SANDPOINT, ID

TYPICAL SECTION -

PIERS #36 & #38

PLAN NO: 0045-0003.900-029

SHEET: 29 OF



VIEW A-A

NOTES:

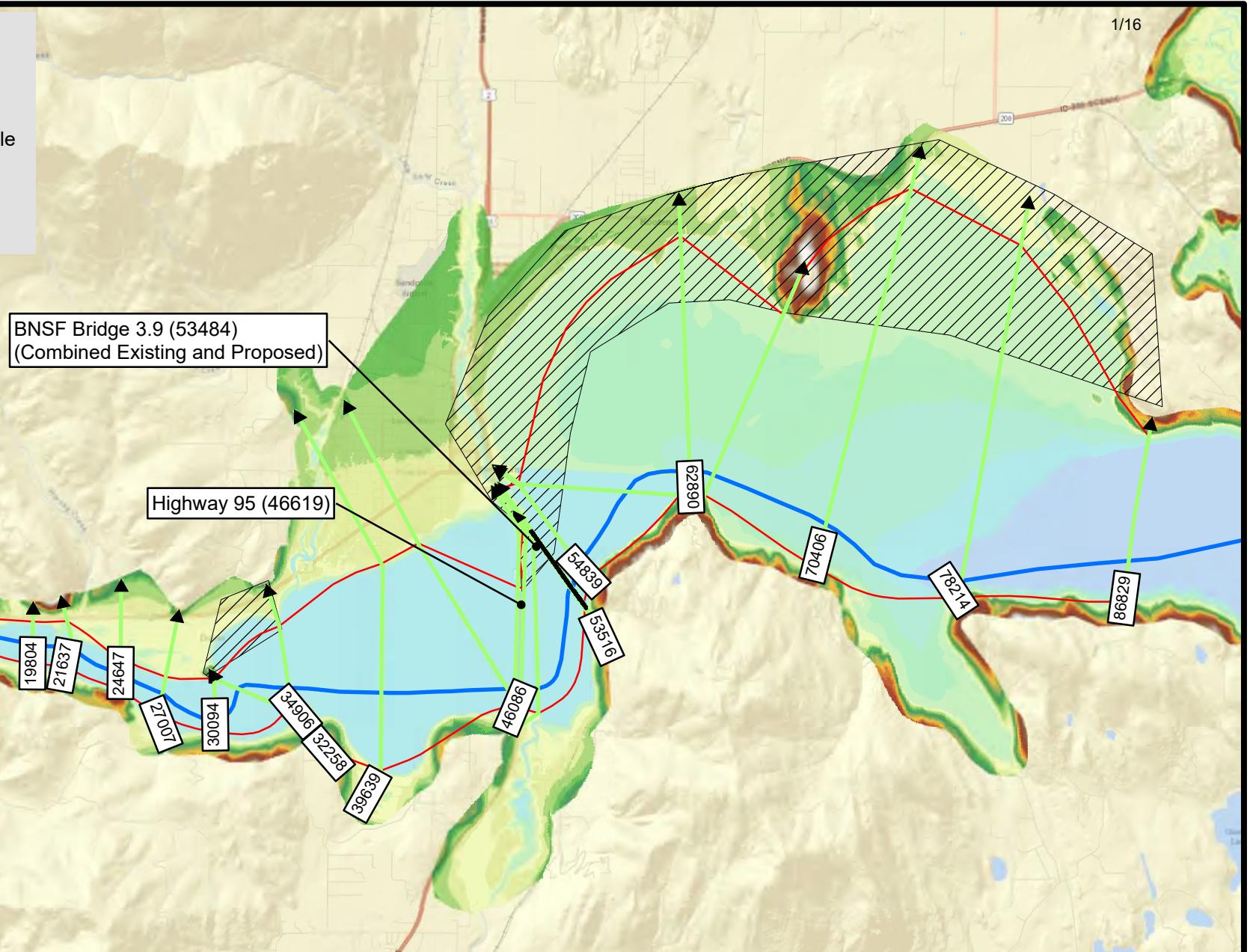
- ① FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~3/4" DIA. x 2 1/4" BOLTS
4~WASHERS (13/16" I.D. x 1 7/16" O.D.)
2~LOCK NUTS, CENTER LOCKING, ZINC PLATED
- ② FASTEN HBP2 BRACKET TO CURB WITH:
1~7/8" DIA. x 9" BOLT
1~WASHER (13/16" I.D. x 1 3/4" O.D.)
1~LOCK NUT, CENTER LOCKING, ZINC PLATED

TYPICAL SECTION - ABUT. #50
(LOOKING RY WEST)

Attachment G: Hydraulic Cross-Section Map

Legend

- XS
- Lake Pend Oreille
- Banks
- ▨ Ineffective



1 in = 7,350 ft

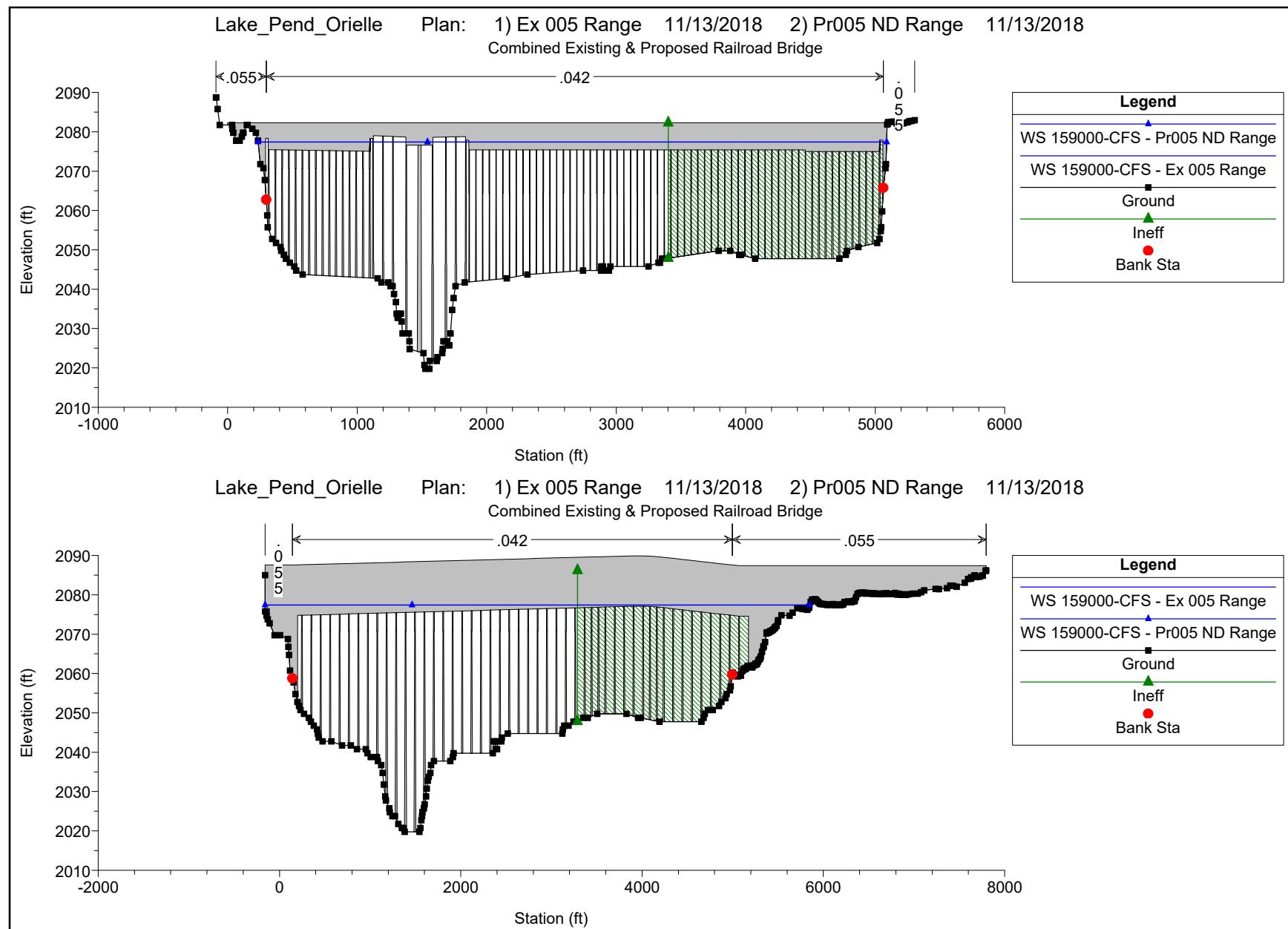
0 3,675 7,350 11,025
Feet

**Cross-Section Location Map**

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

Job Number: 14R0057

Attachment H: HEC-RAS Output



| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|------------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|------------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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 |

| Reach | River Sta | Profile | Existing Conditions | | | Proposed Conditions | | | Change | |
|------------|-----------|------------|---------------------|-------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| | | | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | Q Total (cfs) | W.S. Elev (ft) | Vel Chnl (ft/s) | W.S. Elev (ft) | Vel Chnl (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)

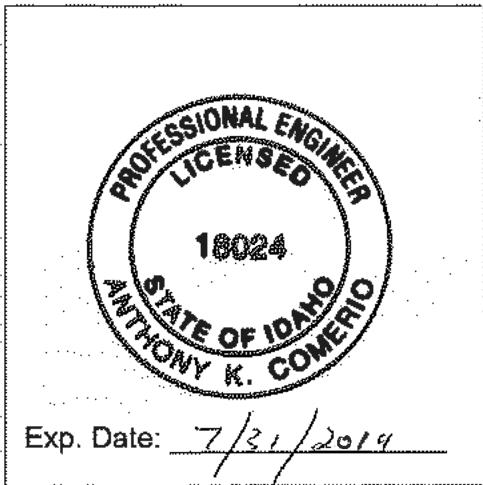
3/29/2014
(Date)

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

Title: Chief Water Resources Engineer

License Number: 18024

P.E Seal



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

Math Fletcher
(Signature)

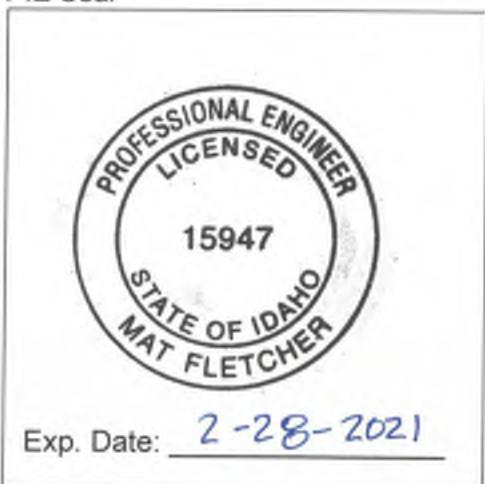
3/29/2019
(Date)

Name: Mathew A. Fletcher, P.E.

Title: Structural Engineer

License Number: 15947

P.E Seal



Exp. Date: 2-28-2021