PACIFICORP ENERGY
A DIVISION OF PACIFICORP

825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Electronically filed on October 22, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: Wallowa Falls Hydroelectric Project (FERC Project No. P-308)
Response to Request for Additional Information

Dear Ms. Bose:

PacifiCorp Energy is submitting this letter, with enclosures, in response to the Federal Energy Regulatory Commission's (Commission), July 24, 2014 Request for Additional Information for the Wallowa Falls Hydroelectric Project (Project). The Commission's specific information requests and the corresponding responses are provided in **Schedule A and associated attachments**, below.

In addition, at the Commission's request PacifiCorp has included with this filing the Oregon State Historic Preservation Office findings on our National Register eligibility determinations, **Schedule B**.

This letter and its enclosures have been filed electronically along with our Confidential Information Notice. The security classification of each component in this packet is shown in the enclosure list of both letter and Notice.

PacifiCorp is submitting this cover letter and electronic copy of the Request for Additional Information and corresponding enclosures to the entities on the enclosed Distribution List. All documents can be viewed on PacifiCorp's website under the "Final License Application tab" at (http://www.pacificorp.com/es/hydro/hl/wf.html#).

If you have any questions concerning these documents, please contact Russ Howison at 503.813.6626.

Sincerely,

Mark Sturtevant
Managing Director, Hydro Resources

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

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825 NE Multnomah, Suite 1500
Portland, Oregon 97232

CONFIDENTIAL INFORMATION NOTICE

October 22, 2014

eFile:	Kimberly D. Bose Regional Engineer, FERC/DC Via eLibrary at www.ferc.gov

Subject: **Wallowa Falls Hydroelectric Project (FERC Project No. P-308)**
Response to Request for Additional Information

With this Notice is a packet of information from PacifiCorp Energy which contains public- and security-classified documents. The following table displays each document's function and title as well as its confidential classification as defined in 18 CFR 388.112 and in the Federal Energy Regulatory Commission's "Guidance Notice Clarifying Procedures for Submitting Non-Public Materials" (March 12, 2009). When a document is classified "Privileged" or "CEII", please ensure there is no unauthorized disclosure.

Encl:	Confidential Information Notice – Public
	Letter – Public
	Schedule A - Public (Schedule A, Attachment D provided via CD)
	Schedule B - Public

Thank you for your attention to this request. If you have any questions concerning the classifications of these documents, please contact those cited in the letter.

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

Distribution List
Wallowa Falls Hydroelectric Project (FERC Project No. P-308)
Request for Additional Information

Federal Government Agencies

Advisory Council on Historic Preservation, John Eddins, Program Analyst, Old Post Office Building, 1100 Pennsylvania Avenue, NW, Suite 803, Washington, DC 20004

Bureau of Indian Affairs, Northwest Regional Office, Attn: FERC Coordinator, 911 NE 11th Avenue, Portland, Oregon 97232-4169

Bureau of Land Management, Lands and Minerals Adjudication Section, Attn: FERC Withdrawal Recordation, P.O. Box 2965, Portland, Oregon 97208-2965

FERC – Portland Regional Office, Attn: Matt Cutlip, 805 SW Broadway, Suite 550, Portland, OR 97205

EPA Region 10, Oregon Operations Office, 805 SW Broadway, Suite 500, Portland, OR 97205

NMFS, Eastern Oregon Habitat Office, Attn: Spencer Hovekamp, 3502 Highway 30, LaGrande, OR 97850

NMFS Northwest Regional Office, Hydropower Division, Attn: Keith Kirkendall, 1201 NE Lloyd Blvd, Suite 1100, Portland, OR 97232

U.S. Army Corps of Engineers, PO Box 2870, Portland, OR 97208-2870

U.S. Bureau of Land Management, State Director, PO Box 2965, Portland, OR 97208-2965

U.S. Bureau of Reclamation, Klamath Basin Area Office, 6600 Washburn Way, Klamath Falls, OR 97603-9365

U.S. Coast Guard, MSO Portland, 6767 N Basin Avenue, Portland, OR 97217-3929

U.S. Forest Service, Daniel Gonzales, Energy Coordinator, PNW Forestry and Range Sciences Lab, 1401 Gekeler Lane, La Grande, OR 97850

USDOI NPS, Pacific West Region, Outdoor Recreation Planner, Attn: Susan Rosebrough, 909 1st Avenue, Suite 500, Seattle, WA 98104-1059

USDOI, Office of Environ Policy & Compliance, Attn: Allison O'Brien, Acting Environmental Officer, 620 SW Main Street, Portland, OR 97205

USFWS, La Grande Fish & Wildlife Office, Attn: Gretchen Sausen, 3502 Hwy 30, LaGrande, OR 97850

USFWS, La Grande Fish & Wildlife Office, Attn: Gary Miller, 3502 Hwy 30, LaGrande, OR 97850

Wallowa-Whitman National Forest, Attn: Sweyn Wall, PO Box 905, Joseph, OR 97846

Native American Groups
Bureau of Indian Affairs, Umatilla Agency, P.O. Box 520, Pendleton, OR 97801

Confederated Tribes of the Colville Reservation, Attn: Arrow Coyote, P.O. Box 150, Nespelem, WA 99155

Confederated Tribes of the Colville, Guy Moura, Tribal Historic Preservation Officer, P.O. Box 150 Nespelem, WA 99155

Confederated Tribes of Umatilla, Catherine Dixon, Principle Investigator, 46411 Timine Way, Pendleton, OR 97801

Nez Perce Tribe, Keith Patrick Baird, P.O. Box 365, Lapwai, ID 83540-0365

Nez Perce Tribe, Mitch Daniel (mitchd@nezperce.org)

Federal Representatives and Senators
Honorable Ron Wyden, United States Senate, 223 Dirksen Senate Office Building, Washington, DC 20510-3703

State Government Agencies
ODEQ, Water Quality Division, Attn: Marilyn Fonseca, 811 SW 6th Avenue, Portland, OR 97204

ODEQ, Water Quality Division, Attn: John Dadoly, 700 SE Emigrant Ave - Suite 330, Pendleton, OR 97801

Oregon Dept of Agriculture, Attn: Jim Johnson, Natural Resources Division, 635 Capitol Street NE, Salem, OR 97301-2564

ODFW, Attn: Ken Homolka, 3406 Cherry Avenue, NE, Salem, OR 97303

ODFW, Attn: Tim Hardin, 3406 Cherry Avenue, NE, Salem, OR 97303

ODFW, Energy, Infrastructure & Eco, Systems Services Division, Attn: Joe Zisa, Division Supervisor, 2600 SW 98th Avenue, Ste 100, Portland, OR 97266-1325

ODFW, Attn: Elizabeth Moats, Hydro Coordinator NE Region, 107 – 20th St., La Grande, OR 97850

ODFW, Enterprise Field Office, Attn: Jeff Yanke, 65495 Alder Slope Road, Enterprise, OR 97828

Oregon Dept of Land Conservation and Development, Attn: Paul Curcio, Director, 635 Capital Street NE, Ste. 150, Salem, OR 97301

Oregon State Marine Board, 435 Commercial Street, NE, Salem, OR 97310-0001

OPRD, State Historic Preservation Officer – Roper Roper, 725 Summer St NE, Suite C, Salem OR 97301

OPRD, Attn: Jim Hutton, NE District Manager, 65068 Old Oregon Trail, Meacham, OR 97895

OPRD, Attn: Jim Morgan, 725 Summer Street NE, Suite C, Salem, OR 97301-1266

OPRD, Attn: Kammie Bunes, 725 Summer Street NE, Suite C, Salem, OR 97301-1266

OSU Extension Services, Attn: Director, Extension Administration 101 Ballard Hall, Corvallis, OR 97331-3606

Water Resources Department, Attn: Mary S. Grainey, 725 Summer Street NE, Suite A, Salem OR 97301

Wallowa Soil and Water Conservation District, Attn: Cynthia Warnock, 401 N.E. 1st Street – Suite E, Enterprise, OR 97846

Wallowa-Whitman National Forest, Attn: Steve Ellis, Forest Supervisor, P.O. Box 907, Baker City, OR 97814-3840

Wallowa-Whitman National Forest, Attn: Tony King, Zone Archaeologist, PO Box 905, Joseph, OR 97846

City, County and Municipal Government Agencies

City of Baker, Attn: Planning Department, P.O. Box 650, Baker City, OR 97814

City Administrator's Office, 108 N.E. 1st St., Enterprise, OR 97828

City of Haines, P.O. Box 208, Haines, OR 97833

City of Joseph, Attn: Donna Warnock, City Recorder, PO Box 15, Joseph, OR 97846

City of La Grande, Planning Division, P.O. Box 670, La Grande, OR 97850

City of Lostine, 128 Highway 82, Lostine, OR 97857

City of Wallowa, Attn: Lori Waters, P.O. Box 487, Wallowa, OR 97885

Joseph Chamber of Commerce, P.O. Box 13, Joseph, OR 97846

Wallowa County Planning Dept., Attn: Harold Black, 101 S. River St., Room B-1, Enterprise, OR 97828

Wallowa County Board of Commissioners, Mike Hayward, Chairman, 101 S. River Street, Rm 202, Enterprise, OR 97828

Wallowa County Board of Commissioners, Susan Roberts, Commissioner, 101 S. River Street, Rm 202, Enterprise, OR 97828

Wallowa County Board of Commissioners, Paul Castilleja, Commissioner, 101 S. River Street, Rm 202, Enterprise, OR 97828

Wallowa Lake Rural Fire Protection District, Attn: Chief Matt Walker, P.O. Box 922, Joseph, OR 97846

Utilities

Mid-West Electric Consumers Association, Attn: Thomas P. Graves, 4350 Wadsworth Blvd – Suite 330, Wheat Ridge, CO 80033-4641

National Rural Electric Cooperative, Wallace F. Tillman, General Counsel, 4301 Wilson Blvd, Arlington, VA 22203

Public Utility Commission of Oregon, Attn: Secretary, P.O. Box 1088, Salem, OR 97308-2148

Southwestern Power Resources Commission, Attn: Ted Coombes, Exec. Director, PO Box 471827, Tulsa, OK 74147-1827

Non-Governmental Office

Lovinger, Norling, Kaufmann, Attn: Jeffrey Lovinger, 825 NE Multnomah St., Suite 925, Portland, OR 97232

Interested Parties

Flying Arrow Resort, Ron Woodin, 59752 Wallowa Lake Hwy, Joseph Or 97846

Robert B. Heckendorn, 84747 Talemena Drive, Wallowa Lake, OR 97885
Mail to: 611 Hathaway Street, Moscow, ID 83843 or heckendo@uidaho.edu

Hal and Cheryl Henderson, 59705 Wallowa Lake Highway, Joseph, OR 97846
Mail to: fgrsk8fan@yahoo.com

Schedule A – Additional Information Requests

Winter Channel Ice Formation and Flooding

1) Anecdotal information in the project record indicates that flooding in the East Fork bypassed reach can occur under existing conditions during the December through February period when ice forms in the stream channel. In a letter filed on May 15, 2014, Mr. Ron Woodin, a property owner along the East Fork, provided photographic evidence of flooding on his property that appeared to occur during a period of channel ice formation in December 2013. In a July 15, 2014 telephone conversation with Commission staff,[1] Mr. Woodin provided additional information on the circumstances of the flooding event and confirmed that it occurred on December 11 or 12, 2013.

   To conduct our analysis of the potential for downstream flooding in the East Fork bypassed reach under existing and proposed operations, we need additional information on project operation and hydrologic conditions during the December 2013 period of channel ice formation. Therefore, please provide the following additional information for the period of December 1 through December 31, 2013:

   (a) a summary of daily average flows in the bypassed reach as measured at the project's compliance gage downstream of the East Fork Dam;

   (b) a summary of the daily average powerhouse discharge during this period; and

   (c) if available, any additional water temperature or stream flow data (e.g., daily averages by monitoring location) recorded during this period.

PacifiCorp Response*: A summary of data requested in items (a) (b) and (c) above is provided in Attachment A. The column titled BPU Q contains daily average flows in cubic feet per second (cfs) for the bypassed reach as measured at the Project's compliance gage downstream of the East Fork Dam. This is the gage location referred to as East Fork Wallowa River Bypassed Reach – Upper End (BPU) in the FERC approved study plan for water resources. The column titled Generator Q contains daily average powerhouse discharge in cfs. The column titled BPL Q contains daily average flows in cfs for the bypassed reach as measured at the lower bypass reach gage adjacent to the Flying Arrow Resort. This is the gage location referred to as East Fork Wallowa River Bypassed Reach – Lower End (BPL) in the FERC approved study plan for water resources. The columns titled BPU TEMP and BPL TEMP contain temperature data in degrees Celsius as measured at BPU and BPL respectively. Finally, Project generation in kilowatt hours is provided in the far right hand column.*

It should be noted that an unplanned maintenance outage occurred between December 2, and December 6, 2013. The generator was off line and the intake headgate was closed for a portion of the days of December 2 and December 6, 2013. The generator was off line and

[1] *See* telephone conversation memo filed on July 16, 2014

the intake headgate was closed for the entire days of December 3, 4, and 5. During the period of the outage, all inflow to the Project forebay was spilled over the dam.

PacifiCorp maintains that the BPL Q data between the dates of December 3, and December 11, are not representative of true flow volume in the lower bypassed reach for these dates. The high readings were likely the result of channel ice formation and\or instrument icing in the lower East Fork Wallowa River which caused a pool to form at the gage pressure transducer. This is consistent with the flooding reported by Mr. Woodin during this period in his letter of May 15, 2014. The BPL transducer is located directly adjacent to Mr. Woodin's residence.

Additional information regarding East Fork Wallowa River flows and local weather conditions during November and December 2013 is provided in Attachment B. Figure B-1 contains air temperature data from the Joseph airport (elevation 4,121 feet) and the Mount Howard SNOTEL site (elevation 7,910 feet). Figure B-2 shows East Fork Wallowa River flows and water temperature as reported in Attachment A. Figures B-3 through B-6 show similar data plots for the 2011 and 2012 winter periods when freezing water temperatures (and presumably ice formation) also occurred as reported in the Water Resources Updated Study Report (*PacifiCorp 2013). Wallowa Falls Hydroelectric Project, FERC Project No. P-308, Study Progress Report (Final Technical Report), Water Resources* *http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Wallowa%20Falls/02_WF_Water_Resources_Updated_Study_Report.log.pdf*

PacifiCorp makes the following observations from the data presented in Figures B-1 through B-6:

a) *The weather conditions surrounding the December 2013 event are striking in that very cold conditions developed and prevailed from December 2-14 following quite mild conditions in late November (Figure B-1). Mean daily air temperatures were below freezing (-0°C, 32°F) throughout the period at both the Mt. Howard SNOTEL station and the Joseph Airport. From December 4-8, conditions got very cold – mean daily air temperatures were actually below -18°C (0°F) at Mt Howard and around -15°C (5°F) at Joseph.*
b) *Also, note that the air temperature data indicate that a temperature inversion occurred in the area during about December 8-18 (Figure B-1). During this time, air temperatures at the Joseph airport were consistently colder (by up to several degrees F) than at Mt. Howard. This may be a factor in the duration of freezing water temperature conditions (and presumably ice formation) at the BPL site as discussed further below.*
c) *The precipitation data (columns in Figure 1) indicate that nearly an inch of precipitation fell during December 1-4, 2013. This is a relatively significant amount for this area. However, because air temperatures were rapidly dropping, PacifiCorp suggests that this precipitation, although significant, did not produce significant additional runoff (and increased flow) in the East Fork Wallowa River. This is a factor in interpreting the high flow estimate (of about 125 cfs on December 10) at the BPL gage site as discussed further below.*
d) *Coincident with the onset of the December 2013 cold period, water temperatures in the East Fork Wallowa River dropped precipitously, reaching freezing or near-freezing*

conditions about December 3-4 at both the BPU and BPL sites. Water temperatures at the BPL site remained below freezing until December 11, while water temperatures at the BPU site were below freezing for a much shorter period, returning to above freezing on December 6. The difference between sites in this regard may be due, at least in part, to the air temperature inversion as noted above. For example, the water temperatures at the BPU site trended consistently upward from near 0°C (32°F) on December 5 to about 2°C (36°F)_on December 15 as mean air temperatures at Mt. Howard were trending consistently upward from about -20°C (-4°F) on December 5 to about 2°C (36°F) on December 15.

e) *The longer duration of freezing water temperature conditions at the BPL site are likely due, at least in part, to the inversion as noted above. However, looking over all six Figures, it is evident that freezing water temperature conditions have generally occurred more frequently at the BPL site than at the BPU site. This phenomenon was described in the Water Resources Updated Study Report (relative to the 2011 and 2012 data in Figures B-3 through B-6), and was ascribed to several factors, including: (1) a larger relative magnitude of baseflow at the BPU site that likely increases the groundwater-related thermal load at that site (this load is warmer than ambient stream temperatures in winter and cooler than ambient in summer); (2) thermal mass provided by the Project forebay's water volume, which further retains thermal load at the BPU site (which is located just below the forebay); (3) the effect of winter air temperature inversion (as noted above) that causes cold air pooling around the BPL site area; and (4) differences in stream channel geometry and hydraulics that may further explain more frequent ice formation at the BPL site than at the Upper site.*

f) *PacifiCorp suggests, air temperature conditions are the predominant factor leading to ice formation in the East Fork Wallowa River, as observed at the BPL site in particular. In fact, essentially every instance of freezing water temperatures at the BPL site (i.e., when values drop to -0.1°C (31.8°F) in the graphs) correlates directly to days when the mean air temperature is below freezing (less than 0°C, 32°F) at* ***both*** *Mt Howard and the Joseph Airport. It is on these days that air temperature conditions are consistently below freezing both spatially and temporally in the area.*

g) *On the other hand, the effect that Project operations might have on ice formation, particularly at the BPL site, is not obvious. As Figures B-1 through B-6 indicate, ice formation has occurred at the BPL site both when the powerhouse was operating (which reduced flows in the East Fork Wallowa River bypassed reach by about 8 to 10 cfs) and when the powerhouse was not operating (which allows flows in the East Fork Wallowa River bypassed reach to be about 8 to 10 cfs higher than they would be otherwise under powerhouse operations). The data shown in Figures 1 through 6 indicates that freezing water temperatures (and presumably ice formation) occurred under about the same cold air temperature conditions with or without powerhouse operations. Further, the points in time when water temperatures reached freezing (-0.1°C, 31.8°F) and then subsequently warmed back to above freezing do not correspond directly to the times when changes in powerhouse operations (i.e., diversion of flow for generation) occurred.*

h) *While Project operations might not have a significant effect on occurrence and duration of freezing water temperatures (and ice formation) in the vicinity of BPL, it is likely that changes in flow related to powerhouse operations could affect the magnitude of backwater effects where significant ice formation ("ice damming") occurs. For*

example, the December 2013 flow data from the BPL site (Figure B-2) shows a precipitous increase in flow about December 3 that is coincident with the onset of the freezing of the water at that site. In fact, the plot of this flow is literally "off the chart" (due to the manual scaling to better show the other plot lines), reaching a peak calculated flow of 125 cfs on December 10. Due to likely ice damming (backwater) effects, this 125 cfs peak flow estimate is not considered realistic. However, the corresponding stage reading (upon which this flow value was estimated) is likely an accurate reflection of the rise in water level caused by the backwater effects from ice formation in the BPL channel. By comparison, a similar precipitous increase in flow is evident in the December 2011 flow data when the powerhouse was operating (second page, lower graph), reaching a peak calculated flow of 72 cfs on December 10, 2011 (also off the charts due to manual scaling). Assuming all else equal (may or may not be a reasonable assumption), the difference between the stage (water level) at an estimated flow of 125 cfs (when the powerhouse was not operating) and 72 cfs (when the powerhouse was operating) suggest that the additional spill to the East Fork Wallowa River bypassed reach during the December 2013 event could have resulted in an increase in backwater level of about 0.3 feet (4 inches) at the BPL gage site in this instance.

i) The relatively brief period of freezing water temperatures recorded at the BPU site on December 4-5, 2013 is the only instance when freezing water temperatures have been recorded at this site during the relicensing studies. In this instance, the freezing water temperature at the BPU site appears to coincide with the combination of two specific conditions: (1) the complete shutdown of powerhouse operations on December 3-5; and (2) air temperatures in the area that were at their lowest, coldest point (e.g., daily means of near or below 0°F, -18°C) on December 4-5 (Figures B-1 and B-2). PacifiCorp's interpretation of the data before, during, and after this instance suggest that freezing water temperatures at the BPU site likely would not have occurred but for both of these conditions occurring simultaneously. Otherwise, water temperatures at the Upper site have consistently stayed above about 1.5°C (35°F) throughout the winters of collected data, owing to factors such as listed in paragraph (e) above.

j) The December 2013 data indicate that the return to above freezing water temperature conditions at the BPL site (and presumably the ice "break-up") occurred on December 11. One explanation for the occurrence of the "break-up" on December 11 could be that daytime (maximum) air temperatures in the area on December 11 exceeded freezing (32°F, 0°C) for the first time since December 3. Another explanation could be that the build-up of ice that caused the backwater conditions in the BPL channel simply gave way at this particular time due to rising stage/head pressures and/or consistently warming temperatures.

Powerhouse Outage Events

2) In your August 8, 2011 Additional Information Request (AIR) response, you provide a description of powerhouse outages that occurred over the current license period up to July 31, 2011. However, there is no information in the project record to describe any events that occurred after July 31, 2011.

To assist in our analysis of project effects on ice formation, downstream flooding, and aquatic resources in the project area, please provide a detailed description of any

powerhouse outage events that occurred from August 1, 2011 to present, including a description of the cause, date, and duration of each of the events, as well as an explanation of whether the penstock headgate was opened or closed during each of the events.

***PacifiCorp Response**; The requested Powerhouse outage information is provided in Attachment C. A total of 13 outages occurred between August 1, 2011 and October 21, 2014. Six of these entailed the headgate closing.*

Bypassed Reach Flow Modeling

3) To analyze the effect of increasing stream flows in the bypassed reach on downstream flooding, we need to develop a steady flow hydraulic model for the East Fork bypassed reach. To assist in model development, please provide the cross section survey data collected for the PHABSIM model from your IFIM study in tabular format (e.g., Excel) and, if available, georeferenced electronic format (e.g., AutoCAD drawing file, ArcGIS shapefile) along with a file detailing the data's geographic projection and vertical datum. Please ensure the top of bank station points for each cross section are labeled.

   In addition, please provide design information including survey data or as-built plans for all existing in-stream structures (e.g., bridges, culverts, the abandoned USGS gauge weir) that could affect stream flow at flood stage. Specifically, you should provide this information for all existing structures along the East Fork bypassed reach from the proposed tailrace pipe outfall location downstream to the West Fork confluence, including the Bailey Road Bridge on the West Fork. The survey data or as-built plans should include the following:

   (a) bridge deck or inline structure width;
   (b) bridge high and low chord elevations and stationing across the stream channel and overbanks on both the upstream and downstream sides;
   (c) bridge or inline structure upstream and downstream embankment side slopes;
   (d) bridge pier widths and stationing;
   (e) bridge abutment slopes;
   (f) culvert type, material, and configuration, or the appropriate Federal Highway Administration nomograph chart and scale numbers;[2]
   (g) culvert length;
   (h) upstream and downstream culvert invert elevations and centerline stationing;
   (i) inline structure gate type (e.g., sluice, rotary), height, width, invert elevation, and centerline stationing;
   (j) points of intersection of the abutments with the ground;
   (k) points of intersection of the embankments with the ground;
   (l) stream channel geometry; and
   (m) any other ground point geometry integral to the modeling of the structure.

[2] Federal Highway Administration. 1985. Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5, U.S. Department of Transportation, September 1985, Washington, DC.

Please also provide photographs of all existing in-stream structures showing: the upstream structure face, the downstream structure face, views from the structure facing upstream, and views from the structure facing downstream.

PacifiCorp Response*; The requested cross section survey data collected for the PHABSIM model from the IFIM study is provided in Attachment D, provided via CD. The cross section survey data, with labeled "top-of-bank stations", is provided in the Excel file. The file names beginning with "Wall IFIFM…" constitute a georeferenced shapefile (ArcGIS). The data's geographic projection and vertical datum is included in the file titled Wall_IFIM_Transects.prj file.*

Design drawings for the Bailey Lane Bridge, Powerhouse Road (State Highway 351) Bridge, USGS Weir and three county water and sewer lines that cross the East Fork Wallowa River are provided in Attachment E. Also included in Attachment E are two transmittal memos from Anderson Perry & Associates, an engineering consultant that provides engineering services to Wallowa County. The transmittal memos provide context for the Bailey Lane Bridge and county water and sewer line drawings and describe the risks to the county sewer system associated with potential flooding of the septic tanks on the Woodin property. Photos of the Bailey Lane Bridge, State Highway 351 Bridge and USGS Weir are provided in Attachment F.

Tailrace Alternatives

4) To protect bull trout from the effects of dewatering in the project tailrace channel, you propose to construct a new tailrace pipe to permanently re-route the powerhouse discharge from the existing tailrace channel to a new outfall location in the East Fork bypassed reach. The Wallowa County Board of Commissioners and land owners along the East Fork bypassed reach recently filed letters expressing concerns about the effects of the proposed tailrace pipe re-route and bypassed reach flow increases on flooding of sewer and water infrastructure and personal property. To alleviate the flooding risk in the East Fork, the commenters recommend alternatives that include continuing to discharge powerhouse flows to the West Fork. You considered several of these alternatives during pre-filing stakeholder consultation, but did not analyze their benefits and costs in the license application.

   We need to assess all reasonable alternatives to the proposed tailrace re-route as part of our environmental analysis. Therefore, please provide an evaluation of the environmental effects, benefits, and costs of the following alternatives that were discussed with licensing stakeholders during pre-filing consultation: (1) permanently dewatering the existing tailrace channel and constructing a pipe along the existing tailrace channel alignment to continue to convey powerhouse flows to the West Fork; (2) continuing to use the existing tailrace channel to convey powerhouse flows to the West Fork, but constructing a permanent fish passage barrier at the existing tailrace channel confluence with the West Fork to prevent fish from migrating into the tailrace channel; and (3) permanently dewatering the existing tailrace channel and constructing a pipe along a different alignment that discharges to a more-stable channel location upstream of the current discharge location on the West Fork.

Additionally, please include an analysis of the environmental effects, benefits, and costs of the following additional alternatives: (1) seasonal shutdown of the proposed tailrace pipe with a discharge of powerhouse flows to the existing tailrace channel during winter periods of channel ice formation in the bypassed reach, and (2) permanently dewatering the existing tailrace channel and constructing a pipe to convey powerhouse flows that extends farther downstream of the existing tailrace channel alignment/discharge point to an area of the West Fork with a more-stable channel that wouldn't be as susceptible to channel migration.

PacifiCorp Response; *A discussion of the environmental effects, benefits, and costs of the five tailrace alternatives identified above is provided below. One additional alternative (f) is also discussed.*

a) ***Permanently dewatering the existing tailrace channel and constructing a pipe along the existing tailrace channel alignment to continue to convey powerhouse flows to the West Fork:*** *This alternative would include construction of a new intake structure near the existing powerhouse tailrace, a new buried conveyance pipeline (consisting of a 30-inch (76.2 cm) diameter-approximate, 1,000-foot (305 m) long pipe-approximate), and a reinforced concrete outfall structure that would discharge powerhouse flows into the West Fork Wallowa River at the confluence with the current tailrace. Planning and construction for this alternative would be approximately three (3) years.*

Although the alignment for pipe construction would differ from the proposed rerouted tailrace, there would be temporary effects associated with the construction similar to the proposed Project.

As described in Section 2.2.3 of the License Application Exhibit E, PacifiCorp would implement a number of BMPs for erosion, sediment, and spill prevention and control, and fish protection during proposed construction activities. BMPs would be determined in consultation with and approved by applicable regulatory agencies, such as DEQ (related to applicable 401 Water Quality Certification) and the U.S. Army Corps of Engineers and Oregon Department of State Lands (DSL) (related to applicable Section 404 and DSL Removal-Fill Permits).

For water quality, short-term (temporary) increases in turbidity and suspended sediment in the West Fork are expected as a result of the construction activities associated with this alternative. These short-term construction-related effects could occur from the temporary placement of a cofferdam and excavation and disturbance of stream channel substrate in the localized area of the discharge pipe outfall.

Although such construction activities in and along the West Fork would be unavoidable, they would not be expected to adversely affect overall water quality conditions of the West Fork Wallowa River. The area of construction-related activities, extent and duration of in-water work, and associated disturbance would be relatively small, and the construction-related effects would be short-

term and temporary in nature. In addition, the implementation of the proposed construction-related BMPs would be expected to prevent or minimize the discharge of eroded soils, sediments, or other potential contaminants into the stream channel that might be caused from construction activities.

Under this alternative, PacifiCorp proposes increased instream flow releases in the East Fork bypassed reach of a year-round flow of 4 cubic-feet-per-second (cfs) as measured at the proposed compliance gage location. The increased minimum flow release of 4 cfs would substantially increase the availability and usability of aquatic habitat in the entire bypassed reach over the current 0.8 cfs minimum flow release.

This alternative would not realize the same aquatic habitat benefits in the lower East Fork Wallowa River bypassed reach as the proposed new tailrace discharge location on the East Fork Wallowa River. Rerouting the tailrace to the East Fork would increase the amount of aquatic habitat available in the lower section of the bypassed reach, compared to current conditions, by restoring the natural hydrology to the lower 2,600-foot (793 m) portion of the reach. This alternative would result in all powerhouse flows being discharged into the West Fork Wallowa River rather than the East Fork bypassed reach.

Assuming that this alternative would include an outfall structure with a velocity barrier which meets the requirements of Section 5.4 – Velocity Barriers in the 2011 NMFS Anadromous Salmonid Passage Facility Design (NMFS 2011) to prevent all fish species and life stages from entering the pipeline, this alternative would eliminate the risk of stranding Endangered Species Act (ESA)-listed bull trout (Salvelinus confluentus), kokanee (Oncorhynchus nerka), and other aquatic species in the existing tailrace when unit trips cause the headgate to close as described in the License Application Exhibit E, Section 2.1.

The main channel of the existing tailrace is currently used by bull trout, brook trout (Salvelinus fontinalis), rainbow trout (Oncorhynchus mykiss), kokanee, mountain whitefish (Prosopium williamsoni), and sculpin (Cottid ssp.), this tailrace alternative would result in the existing tailrace no longer being available to support fish. This alternative effectively removes all available fish habitat (985 feet, 300 m) not including side channels) between the powerhouse and West Fork Wallowa River. Though the main tailrace channel is assumed to be cold water refugia for bull trout during the summer months, it presents the significant risk of fish stranding and subsequent desiccation due to unit trips that result in the penstock headgate closing. PacifiCorp maintains the risk of stranding ESA-listed bull trout outweighs the benefit of existing habitat conditions in the current tailrace.

Although fish use of the tailrace side-channels is certainly possible, it is likely not significant. To date, no fish have ever been captured or directly observed in the tailrace side-channels. Therefore, removal of these side channels is not expected to have a significant impact on aquatic habitat or species therein.

Based on historical flow data it is estimated that this alternative would maintain, depending on time of year, up to 30-50 percent of the current flow in the West Fork Wallowa River in the section from the present Project tailrace discharge and the confluence of the East Fork Wallowa River with the West Fork Wallowa River.

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Upon completion of this alternative, it is expected these wetlands will completely dry up and eventually become upland habitat.

The lower portion of the current tailrace alignment (approximately 200+feet) is either immediately adjacent to or within the active West Fork Wallowa River channel. Given the deep alluvium and dynamic fluvial geomorphological processes along the West Fork at this location, the lower section of pipe and outfall structure would be susceptible to frequent damage from high flow events, including annual spring runoff.

The capital costs of this alternative are estimated to be $1,750,000. Annual operation and maintenance costs could vary considerably depending on how much damage the lower pipe and outfall structure incur. Annual operation and maintenance costs are estimated to be $2,500.

b) Continuing to use the existing tailrace channel to convey powerhouse flows to the West Fork, but constructing a permanent fish passage barrier at the existing tailrace channel confluence with the West Fork to prevent fish from migrating into the tailrace channel: *This alternative would include construction of a new permanent fish passage barrier to prevent all fish species and life stages from entering the existing tailrace. Given the gradient, substrate, and channel conditions at the existing tailrace channel confluence with the West Fork, an effective and permanent barrier would be difficult to design. Planning and construction for this alternative would be approximately three (3) years.*

The disturbed area for this alternative would be limited to the fish barrier facility footprint near the West Fork confluence. There would be temporary effects associated with the construction. As described in Section 2.2.3 of the License Application Exhibit E, PacifiCorp would implement a number of BMPs for erosion, sediment, and spill prevention and control, and fish protection during proposed construction activities. BMPs would be determined in consultation with and approved by applicable regulatory agencies, such as DEQ (related to applicable 401 Water Quality Certification) and the U.S. Army Corps of Engineers and DSL (related to applicable Section 404 and DSL Removal-Fill Permits).

For water quality, short-term (temporary) increases in turbidity and suspended sediment in the West Fork are expected as a result of the construction activities associated this alternative. These short-term construction-related effects could occur from the possible temporary placement of a cofferdam and excavation and disturbance of stream channel substrate in the localized area of the fish barrier facility.

Although such construction activities in and along the West Fork would be unavoidable, they would not be expected to adversely affect overall water quality conditions of the West Fork Wallowa River. The area of construction-related activities, extent and duration of in-water work, and associated disturbance would be relatively small, and the construction-related effects would be short-term and temporary in nature. In addition, the implementation of the proposed construction-related BMPs would be expected to prevent or minimize the discharge of eroded soils, sediments, or other potential contaminants into the stream channel that might be caused from construction activities.

Under this alternative, PacifiCorp proposes increased instream flow releases in the East Fork bypassed reach of a year-round flow of 4 cfs as measured at the proposed compliance gage location. The increased minimum flow release of 4 cfs would substantially increase the availability and usability of aquatic habitat in the entire bypassed reach over the current 0.8 cfs minimum flow release.

This alternative would not realize the same aquatic habitat benefits in the lower East Fork Wallowa River bypassed reach as the proposed new tailrace discharge location on the East Fork Wallowa River. Rerouting the tailrace to the East Fork would increase the amount of aquatic habitat available in the lower section of the bypassed reach, compared to current conditions, by restoring the natural hydrology to the lower 2,600-foot (793 m) portion of the reach. This alternative would result in all powerhouse flows being discharged into the West Fork Wallowa River rather than the East Fork bypassed reach.

The construction of a fish barrier facility at the confluence of the existing tailrace and West Fork Wallowa River would prevent all fish species and life stages from entering the pipeline. This alternative would eliminate the risk of stranding ESA-listed bull trout, kokanee, and other aquatic species in the existing tailrace when unit trips cause the headgate to close as described in the License Application Exhibit E, Section 2.1.

The main channel of the existing tailrace is currently used by bull trout, brook trout, rainbow trout, kokanee, mountain whitefish, and sculpin, this tailrace alternative would result in the existing tailrace no longer being available to support fish. This alternative effectively removes all available fish habitat (985 feet, 300 m) not including side channels) between the powerhouse and West Fork Wallowa River. Though the main tailrace channel is assumed to be cold water refugia for bull trout during the summer months, it presents the significant risk of fish stranding and subsequent desiccation due to unit trips that result in the

penstock headgate closing. PacifiCorp maintains the risk of stranding ESA listed bull trout outweighs the benefit of existing habitat conditions in the current tailrace.

Although fish use of the tailrace side-channels is certainly possible, it is likely not significant. To date, no fish have ever been captured or directly observed in the tailrace side-channels. Therefore, removal of these side channels is not expected to have a significant impact on aquatic habitat or species therein.

Based on historical data it is estimated that this alternative would maintain, depending on time of year, up to 30-50 percent of the current flow in the West Fork Wallowa River in the section from the present Project tailrace discharge and the confluence of the East Fork Wallowa River with the West Fork Wallowa River.

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Assuming that the unlined tailrace would remain in its current configuration with two separate channels as described in License Application Exhibit E, Section 2.2.1, this alternative would maintain these wetlands in their current condition.

The lower portion of the current tailrace alignment (approximately 200+feet) is either immediately adjacent to or within the active West Fork Wallowa River channel. Given the deep alluvium and dynamic fluvial geomorphological processes along the West Fork at this location, the fish barrier facility would be susceptible to frequent damage from high flow events, including annual spring runoff.

The capital costs of this alternative are estimated to be $775,000. However, due to the vulnerability of the fish barrier facility to flood damage it may be necessary to rebuild the facility several times over the new license term which would substantially increase capital costs under the new license. Annual operation and maintenance costs would vary considerably depending on how much damage the lower pipe and outfall structure incur. Annual operation and maintenance costs are estimated to be $5,000.

c) Permanently dewatering the existing tailrace channel and constructing a pipe along a different alignment that discharges to a more-stable channel location upstream of the current discharge location on the West Fork: *This alternative would include construction of a new intake structure near the existing powerhouse tailrace, a new conveyance pipeline (consisting of a 30-inch (76.2 cm) diameter-approximate, 1,000-foot (305 m) long buried pipe-approximate), 500-foot (152 m) long above grade pipe-approximate, and a reinforced concrete outfall structure that would discharge powerhouse flows into the West Fork Wallowa River near its confluence with BC Creek. Planning and construction for*

this alternative would be approximately three (3) years. The lower 500 feet of pipe and outfall structure would be either attached to a steep bedrock slope along the alignment or in the alluvial deposit of the south bank of the West Fork. Extensive geotechnical investigation would be required prior to development of a final design. Planning and construction for this alternative would be approximately three (3) years.

Temporary effects associated with the construction of this alternative would be similar to, though likely more extensive than, the proposed Project.

As described in Section 2.2.3 of the License Application Exhibit E, PacifiCorp would implement a number of BMPs for erosion, sediment, and spill prevention and control, and fish protection during proposed construction activities. BMPs would be determined in consultation with and approved by applicable regulatory agencies, such as DEQ (related to applicable 401 Water Quality Certification) and the U.S. Army Corps of Engineers and DSL (related to applicable Section 404 and DSL Removal-Fill Permits).

For water quality, short-term (temporary) increases in turbidity and suspended sediment in the West Fork are expected as a result of the construction activities associated with this alternative. These short-term construction-related effects could occur from the temporary placement of a cofferdam and excavation and disturbance of stream channel substrate in the localized area of the lower 500 feet of pipe and the discharge pipe outfall.

Although such construction activities in and along the West Fork would be unavoidable, they would not be expected to adversely affect overall water quality conditions of the West Fork Wallowa River in the long term. The area of construction-related activities, extent and duration of in-water work, and associated disturbance would be relatively small, and the construction-related effects would be short-term and temporary in nature. In addition, the implementation of the proposed construction-related BMPs would be expected to prevent or minimize the discharge of eroded soils, sediments, or other potential contaminants into the stream channel that might be caused from construction activities.

Under this alternative, PacifiCorp proposes increased instream flow releases in the East Fork bypassed reach of a year-round flow of 4 cubic-feet-per-second (cfs) as measured at the proposed compliance gage location. The increased minimum flow release of 4 cfs would substantially increase the availability and usability of aquatic habitat in the entire bypassed reach over the current 0.8 cfs minimum flow release.

This alternative would not realize the same aquatic habitat benefits in the lower East Fork Wallowa River bypassed reach as the proposed new tailrace discharge location on the East Fork Wallowa River. Rerouting the tailrace to the East Fork would increase the amount of aquatic habitat available in the lower

section of the bypassed reach, compared to current conditions, by restoring the natural hydrology to the lower 2,600-foot (793 m) portion of the reach. This alternative would result in all powerhouse flows being discharged into the West Fork Wallowa River rather than the East Fork bypassed reach.

Assuming that this alternative would include an outfall structure with a velocity barrier which meets the requirements of Section 5.4 – Velocity Barriers in the 2011 NMFS Anadromous Salmonid Passage Facility Design (NMFS 2011) to prevent all fish species and life stages from entering the pipeline, this alternative would eliminate the risk of stranding Endangered Species Act (ESA)-listed bull trout (Salvelinus confluentus), kokanee (Oncorhynchus nerka), and other aquatic species in the existing tailrace when unit trips cause the headgate to close as described in the License Application Exhibit E, Section 2.1.

The main channel of the existing tailrace is currently used by bull trout, brook trout (Salvelinus fontinalis), rainbow trout (Oncorhynchus mykiss), kokanee, mountain whitefish (Prosopium williamsoni), and sculpin (Cottid ssp.), this tailrace alternative would result in the existing tailrace no longer being available to support fish. This alternative effectively removes all available fish habitat (985 feet, 300 m) not including side channels) between the powerhouse and West Fork Wallowa River. Though the main tailrace channel is assumed to be cold water refugia for bull trout during the summer months, it presents the significant risk of fish stranding and subsequent desiccation due to unit trips that result in the penstock headgate closing. PacifiCorp maintains the risk of stranding ESA-listed bull trout outweighs the benefit of existing habitat conditions in the current tailrace.

Although fish use of the tailrace side-channels is certainly possible, it is likely not significant. To date, no fish have ever been captured or directly observed in the tailrace side-channels. Therefore, removal of these side channels is not expected to have a significant impact on aquatic habitat or species therein.

Based on historical data it is estimated that this alternative would maintain, depending on time of year, up to 30-50 percent of the current flow in the West Fork Wallowa River in the section from the discharge point near BC Creek and the confluence of the East Fork Wallowa River with the West Fork Wallowa River.

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Upon completion of this alternative, it is expected these wetlands will completely dry up and eventually become upland habitat.

As noted above, the lower 500 feet (152 m) of the pipe alignment (approximately 500 feet) is either immediately adjacent to or within the active West Fork Wallowa River channel. The geological conditions along this alignment are

uncertain. Given the deep alluvium and dynamic fluvial geomorphological processes along the West Fork at this location, including past debris flows, the lower section of pipe and outfall structure would be susceptible to frequent damage from high flow events, including annual spring runoff. One design alternative would be to attach the pipe to the steep bedrock slope immediately south of the active West Fork channel. This may improve durability of the pipe along most of the alignment. However, the outfall structure in particular would be susceptible to damage from high flow events.

The capital costs of this alternative are estimated to be $2,500,000. Annual operation and maintenance costs could vary considerably depending on how much damage the lower pipe and outfall structure incur. Annual operation and maintenance costs are estimated to be $2,500.

***d) Seasonal shutdown of the proposed tailrace pipe with a discharge of powerhouse flows to the existing tailrace channel during winter periods** of **channel ice formation in the bypassed reach:** This alternative would modify PacifiCorp's proposed project by shutting down the rerouted tailrace to the East Fork Wallowa River and discharging powerhouse flows into the existing tailrace channel. In order to periodically discharge powerhouse flows into the existing tailrace channel, the design of the new intake structure would need to include: 1) a control gate to shut off flow into the pipe to the east fork and, 2) a spillway and associated control gate to discharge flows into the existing tailrace channel. It is assumed that in order for this alternative to effectively reduce the flooding risk due to channel ice formation in the East Fork bypassed reach, the shutdown would need to occur from November through March, which is the period when potential channel ice formation can occur from particularly cold weather events. Planning and construction for this alternative would be approximately three (3) years.*

This alternative presents no risk to bull trout spawning or redds in the existing tailrace because it would be dry (and therefore unusable by bull trout) during the spawning period in September-October. The extent of bull trout usage of the existing tailrace during the winter months is unknown at this time. Given the close proximity of prime over-wintering habitat in Wallowa Lake, it is assumed bull trout occupancy of the Project tailrace during November-March is minimal. However, the possibility remains that fish could access the existing tailrace during the seasonal tailrace reroute shutdown and therefore would be susceptible to stranding during unit trips when the headgate closes. To alleviate this possibility, a temporary barrier (picket-weir or similar) would seasonally be constructed at the mouth of the existing tailrace channel to prohibit fish from entering it.

The construction and non-shutdown operational effects of alternative (d) would be the same as described for the tailrace reroute proposed in PacifiCorp's license application (as described in Section 3.0 of the License Application Exhibit E). However, the winter seasonal shutdown of discharge to the East Fork

under this alternative would result in significantly lesser flows in the East Fork Bypassed Reach below the reroute discharge point than would occur under a year-round operation of the reroute as proposed in PacifiCorp's license application. The lesser flows in the bypass reach during winter would result in a reduction in channel wetted perimeter of up to 3.4 feet (1 m) that could adversely affect bull trout redds. Bull trout predominately spawn near the channel margins, regardless of size of stream. Therefore, the reduction in flows (and wetted perimeter) during winter (November-March) following the bull trout spawning period (September-October) could dewater redds and/or increase the likelihood of egg loss due to reduced water flow over or through the redd (which decreases adequate egg oxygenation).

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Under this alternative, it is expected these wetlands will completely dry up and eventually become upland habitat due to the existing tailrace channel being dry 8 months of the year.

The capital costs of this alternative are estimated to be $1,825,000. This is based on the estimated costs of the proposed tailrace reroute to the East Fork Wallowa River plus the cost of the intake modifications mentioned above. Annual operation and maintenance costs are estimated to be $20,000.

e) Permanently dewatering the existing tailrace channel and constructing a pipe to convey powerhouse flows that extends farther downstream of the existing tailrace channel alignment/discharge point to an area of the West Fork with a more-stable channel that wouldn't be as susceptible to channel migration: *This alternative would include construction of a new intake structure near the existing powerhouse tailrace, a new buried conveyance pipeline (consisting of a 30-inch (76.2 cm) diameter-approximate, 1,000-foot (305 m) long pipe-approximate), and a reinforced concrete outfall structure that would discharge powerhouse flows into the West Fork Wallowa River approximately 100 feet (30 m) down-stream of the terminus of the current tailrace. Planning and construction for this alternative would be approximately three (3) years.*

Although the alignment for pipe construction would differ from the proposed rerouted tailrace, there would be temporary effects associated with the construction similar to the Proposed Project.

As described in Section 2.2.3 of the License Application Exhibit E, PacifiCorp would implement a number of BMPs for erosion, sediment, and spill prevention and control, and fish protection during proposed construction activities. BMPs would be determined in consultation with and approved by applicable regulatory agencies, such as DEQ (related to applicable 401 Water Quality Certification) and the U.S. Army Corps of Engineers and DSL (related to applicable Section 404 and DSL Removal-Fill Permits).

For water quality, short-term (temporary) increases in turbidity and suspended sediment in the West Fork are expected as a result of the construction activities associated with this alternative. These short-term construction-related effects could occur from the temporary placement of a cofferdam and excavation and disturbance of stream channel substrate in the localized area of the discharge pipe outfall.

Although such construction activities in and along the West Fork would be unavoidable, they would not be expected to adversely affect overall water quality conditions of the West Fork Wallowa River. The area of construction-related activities, extent and duration of in-water work, and associated disturbance would be relatively small, and the construction-related effects would be short-term and temporary in nature. In addition, the implementation of the proposed construction-related BMPs would be expected to prevent or minimize the discharge of eroded soils, sediments, or other potential contaminants into the stream channel that might be caused from construction activities.

Under this alternative, PacifiCorp proposes increased instream flow releases in the East Fork bypassed reach of a year-round flow of 4 cfs as measured at the proposed compliance gage location. The increased minimum flow release of 4 cfs would substantially increase the availability and usability of aquatic habitat in the entire bypassed reach over the current 0.8 cfs minimum flow release.

This alternative would not realize the same aquatic habitat benefits in the lower East Fork Wallowa River bypassed reach as the proposed new tailrace discharge location on the East Fork Wallowa River. Rerouting the tailrace to the East Fork would increase the amount of aquatic habitat available in the lower section of the bypassed reach, compared to current conditions, by restoring the natural hydrology to the lower 2,600-foot (793 m) portion of the reach. This alternative would result in all powerhouse flows being discharged into the West Fork Wallowa River rather than the East Fork bypassed reach.

Assuming that this alternative would include an outfall structure with a velocity barrier which meets the requirements of Section 5.4 – Velocity Barriers in the 2011 NMFS Anadromous Salmonid Passage Facility Design (NMFS 2011) to prevent all fish species and life stages from entering the pipeline, this alternative would eliminate the risk of stranding Endangered Species Act (ESA)-listed bull trout (Salvelinus confluentus), kokanee (Oncorhynchus nerka), and other aquatic species in the existing tailrace when unit trips cause the headgate to close as described in the License Application Exhibit E, Section 2.1.

The main channel of the existing tailrace is currently used by bull trout, brook trout (Salvelinus fontinalis), rainbow trout (Oncorhynchus mykiss), kokanee, mountain whitefish (Prosopium williamsoni), and sculpin (Cottid ssp.), this tailrace alternative would result in the existing tailrace no longer being available to support fish. This alternative effectively removes all available fish

habitat (985 feet, 300 m) not including side channels) between the powerhouse and West Fork Wallowa River. Though the main tailrace channel is assumed to be cold water refugia for bull trout during the summer months, it presents the significant risk of fish stranding and subsequent desiccation due to unit trips that result in the penstock headgate closing. PacifiCorp maintains the risk of stranding ESA-listed bull trout outweighs the benefit of existing habitat conditions in the current tailrace.

Although fish use of the tailrace side-channels is certainly possible, it is likely not significant. To date, no fish have ever been captured or directly observed in the tailrace side-channels. Therefore, removal of these side channels is not expected to have a significant impact on aquatic habitat or species therein.

Based on historical data it is estimated that this alternative would maintain, depending on time of year, up to 30-50 percent of the current flow in the West Fork Wallowa River in the section from the present Project tailrace discharge and the confluence of the East Fork Wallowa River with the West Fork Wallowa River.

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Upon completion of this alternative, it is expected these wetlands will completely dry up and eventually become upland habitat.

The outfall structure associated with this alternative would be immediately adjacent to, and discharge into, the active West Fork Wallowa River channel. Though a detailed geotechnical evaluation of the area between the powerhouse and the West Fork has not been done, this location is likely to be much less susceptible to damage from high flow events in the West Fork compared to alternatives a, b and c above.

The capital costs of this alternative are estimated to be $1,750,000. Annual operation and maintenance costs are estimated to be $1,000.

f) Permanently dewatering the existing tailrace channel and constructing an open excavated channel to convey powerhouse flows that extends farther downstream of the existing tailrace channel alignment/discharge point to an area of the West Fork with a more-stable channel that would not be as susceptible to channel migration: *This alternative would include construction of a new open excavated conveyance channel approximately 1,000-foot (305 m) long, and a discharge structure that would convey powerhouse flows into the West Fork Wallowa River approximately 100 feet (30 m) down-stream of the terminus of the current tailrace. The discharge structure would include a velocity barrier which meets the requirements of Section 5.4 – Velocity Barriers in the 2011 NMFS Anadromous Salmonid Passage Facility Design (NMFS 2011)*

Planning and construction for this alternative would be approximately three (3) years.

Although the alignment for the conveyance channel construction would differ from the proposed rerouted tailrace, there would be temporary effects associated with the construction similar to, though less extensive than, the Proposed Project.

As described in Section 2.2.3 of the License Application Exhibit E, PacifiCorp would implement a number of BMPs for erosion, sediment, and spill prevention and control, and fish protection during proposed construction activities. BMPs would be determined in consultation with and approved by applicable regulatory agencies, such as DEQ (related to applicable 401 Water Quality Certification) and the U.S. Army Corps of Engineers and DSL (related to applicable Section 404 and DSL Removal-Fill Permits).

For water quality, short-term (temporary) increases in turbidity and suspended sediment in the West Fork are expected as a result of the construction activities associated with this alternative. These short-term construction-related effects could occur from the temporary placement of a cofferdam and excavation and disturbance of stream channel substrate in the localized area of the discharge structure.

Although such construction activities in and along the West Fork would be unavoidable, they would not be expected to adversely affect overall water quality conditions of the West Fork Wallowa River. The area of construction-related activities, extent and duration of in-water work, and associated disturbance would be relatively small, and the construction-related effects would be short-term and temporary in nature. In addition, the implementation of the proposed construction-related BMPs would be expected to prevent or minimize the discharge of eroded soils, sediments, or other potential contaminants into the stream channel that might be caused from construction activities.

Under this alternative, PacifiCorp proposes increased instream flow releases in the East Fork bypassed reach of a year-round flow of 4 cfs as measured at the proposed compliance gage location. The increased minimum flow release of 4 cfs would substantially increase the availability and usability of aquatic habitat in the entire bypassed reach over the current 0.8 cfs minimum flow release.

This alternative would not realize the same aquatic habitat benefits in the lower East Fork Wallowa River bypassed reach as the proposed new tailrace discharge location on the East Fork Wallowa River. Rerouting the tailrace to the East Fork would increase the amount of aquatic habitat available in the lower section of the bypassed reach, compared to current conditions, by restoring the natural hydrology to the lower 2,600-foot (793 m) portion of the reach. This alternative would result in all powerhouse flows being discharged into the West Fork Wallowa River rather than the East Fork bypassed reach.

This alternative would include a discharge structure with a velocity barrier which meets the requirements of Section 5.4 – Velocity Barriers in the 2011 NMFS Anadromous Salmonid Passage Facility Design (NMFS 2011) to prevent all fish species and life stages from entering the pipeline, and would therefore eliminate the risk of stranding Endangered Species Act (ESA)-listed bull trout (Salvelinus confluentus), kokanee (Oncorhynchus nerka), and other aquatic species in the new open tailrace channel when unit trips cause the headgate to close as described in the License Application Exhibit E, Section 2.1.

The main channel of the existing tailrace is currently used by bull trout, brook trout (Salvelinus fontinalis), rainbow trout (Oncorhynchus mykiss), kokanee, mountain whitefish (Prosopium williamsoni), and sculpin (Cottid ssp.), this tailrace alternative would result in the existing tailrace no longer being available to support fish. This alternative effectively removes all available fish habitat (985 feet, 300 m) not including side channels) between the powerhouse and West Fork Wallowa River. Though the main tailrace channel is assumed to be cold water refugia for bull trout during the summer months, it presents the significant risk of fish stranding and subsequent desiccation due to unit trips that result in the penstock headgate closing. PacifiCorp maintains the risk of stranding ESA-listed bull trout outweighs the benefit of existing habitat conditions in the current tailrace.

Although fish use of the tailrace side-channels is certainly possible, it is likely not significant. To date, no fish have ever been captured or directly observed in the tailrace side-channels. Therefore, removal of these side channels is not expected to have a significant impact on aquatic habitat or species therein.

Based on historical data it is estimated that this alternative would maintain, depending on time of year, up to 30-50 percent of the current flow in the West Fork Wallowa River in the section from the present Project tailrace discharge and the confluence of the East Fork Wallowa River with the West Fork Wallowa River.

The existing unlined tailrace is the primary hydrological source for both the Tailrace and Campground Wetlands (License Application Appendix I). These wetlands are artifacts of the Project and are relatively small [0.03 and 0.05 acres (0.12 and 0.02 ha)]. Upon completion of this alternative, it is expected these wetlands will completely dry up and eventually become upland habitat.

The discharge structure associated with this alternative would be immediately adjacent to, and discharge into, the active West Fork Wallowa River channel. Though a detailed geotechnical evaluation of the area between the powerhouse and the West Fork has not been done, this location is likely to be much less susceptible to damage from high flow events in the West Fork compared to alternatives a, b and c above.

The capital costs of this alternative are estimated to be $850,000. Annual operation and maintenance costs are estimated to be $1,000.

Aesthetic Resources

5) In your June 25, 2014 AIR response filing, you state that you are currently reviewing the applicability of Oregon state noise standards to the project. You indicate that, if the standards apply to the project, you would hire an acoustical engineer to evaluate powerhouse noise in relation to the standards. You further indicate that installing berms or a cover over the concrete tailrace flume may help to further reduce noise but such measures have not been evaluated and may be too expensive. Please provide the results of your review of the state's noise standards and your evaluation of the project in relation to those standards along with the estimated cost of possible noise mitigation measures.

PacifiCorp Response*: Oregon's noise program (the "Noise Program") is contained in state administrative rules and the Project falls within the ambit of the state's regulations. However, the Noise Program has been defunded and the Oregon Department of Environmental Quality ("DEQ") no longer administers or enforces the noise regulations. For example, DEQ does not issue any determinations for a certification, exception or variance under the Noise Program. DEQ guidelines state that the Noise Program may be adopted and administered by local municipalities or counties.*

The Project has been operating since 1924 in the same configuration and noise from the powerhouse has been substantially the same. While development has occurred around the Project over the past 90 years, neither the county nor any agency has raised a concern about noise from Project operations.

There is no evidence to suggest that the Project is not in compliance with the Noise Program. But even if noise levels from the Project exceed the state's standards, the Project appears to meet the necessary conditions for a variance because it was developed long before the passage of Noise Program and likely prior to nearby noise sensitive properties. Moreover, there are no Wallowa County noise regulations that adopt or apply the standards from the Noise Program; and no county permits regulate noise levels from the Project. Given these circumstances, any application of the Noise Program to the Project would be unreasonable. A description of DEQ's Noise Program policy and analysis of its applicability to the Project is provided below.

Under the Noise Program, DEQ's policy was to (1) provide a coordinated state-wide program of noise control to protect the health, safety, and welfare of Oregon citizens from the hazards and deterioration of the quality of life imposed by excessive noise emissions; and (2) develop a program for the control of excessive noise sources which shall be undertaken in a progressive manner, and each of its objectives shall be accomplished by cooperation among all parties concerned. [3]

[3] OAR 340-035-0005.

The Noise Program regulates industrial noise sources. "Industrial or Commercial Noise Source" means that source of noise which generates industrial or commercial noise levels.[4] *An "Industrial or Commercial Noise Level" means those noises generated by a combination of equipment, facilities, operations, or activities employed in the production, storage, handling, sale, purchase, exchange, or maintenance of a product, commodity, or service and those noise levels generated in the storage or disposal of waste products.*[5]

Under the Noise Program: "No person owning or controlling an existing industrial or commercial noise source shall cause or permit the operation of that noise source if the statistical noise levels generated by that source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 7, except as otherwise provided in these rules."[6]

Noise levels are evaluated relative to noise sensitive properties. A "Noise Sensitive Property" means real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries.[7]

The regulations also provide for exceptions upon written request to DEQ. For instance, DEQ may authorize an exception for an "industrial or commercial facility previously established in areas of new development or noise sensitive property."[8] *In addition DEQ may grant a variance from any requirement of the Noise Program "if it finds that strict compliance with such rule, regulation, or order is inappropriate because of conditions beyond the control of the persons granted such variance or because of special circumstances which would render strict compliance unreasonable, or impracticable . . . or because strict compliance would result in substantial curtailment or closing down of a business, plant, or operation[.]"*[9]

In 2004 DEQ revised the Noise Program, stating the following in OAR 340-035-0110:

> *In 1991, the Legislative Assembly withdrew all funding for implementing and administering ORS Chapter 467 and the Department's noise program. Accordingly, the Commission and the Department have suspended administration of the noise program, including but not limited to processing requests for exceptions and variances, reviewing plans, issuing certifications, forming advisory committees, and responding to complaints. Similarly, the public's obligations to submit plans or certifications to the Department are suspended.*

[4] OAR 340-035-0015(23).
[5] OAR 340-035-0015(24).
[6] OAR 340-035-0035(1)(a).
[7] OAR 340-035-0015(38).
[8] OAR 340-035-0035(6)(b).
[9] OAR 340-035-0100(1).

Following the defunding of the Noise Program, DEQ issued guidance stating that enforcement and administrative of noise is largely a matter for local and county agencies.[10] *Wallowa County has not adopted any noise rules or imposed any conditions that pertain to the noise levels from the Project.*

The Project was initially constructed in 1921 by the Enterprise Electric Company and the original license was issued on June 27, 1924. The entire FERC Project boundary is located within Wallowa County. Power generation facilities and power transmission are allowed as conditional uses in all three of the county land use designations. Therefore, the Project is consistent with the Wallowa County Comprehensive Plan.[11] *Furthermore, no county permits impose noise conditions on the development and operation of the Project; and no Wallowa County noise regulations restrict or condition the operation of the Project.*

While the Project meets the definition of an industrial or commercial noise source, PacifiCorp has no evidence to suggest that noise levels from the Project exceed state standards relative to noise sensitive properties. However, even assuming that the Project may potentially exceed noise standards, the Project would be eligible for an exception.[12] *For example, the Project was developed prior to the passage of the Noise Program and noise sensitive properties in the area. Likewise, the Project would be eligible for a variance because substantial curtailment of the Project could result in substantial adverse economic impacts to the facility. PaciCorp cannot apply for either an exception or a variance because DEQ is not administering the Noise Program. Even if PaciCorp wanted to submit a plan or certification to DEQ, the agency will not evaluate the request because it has suspended the Noise Program.*

Given the age and history of the Project and given that historical development of nearby noise sensitive properties was beyond PacifiCorp's control, it would unreasonable and unfair to impose any noise-related conditions from the Noise Program on the Project should they apply. This is particularly so because DEQ is unable to administer the program and provide the Project an exception or variance determination.

In conclusion, the Project has been operating for the last ninety years in essentially the same configuration, with the same levels of noise. During this time, development has occurred in the general vicinity of the powerhouse, presumably with a complete awareness of any noise emitted from the Project. In the time since the Project began operation, PacifiCorp has not been required to obtain any noise permit or reduce noise levels, and PacifiCorp is unaware of any state or local regulator, with jurisdiction over noise abatement, that has concerns with the levels of noise coming from the Project.

There is no evidence to suggest that the Project is not in compliance with the Noise Program. Moreover, given that the program has been defunded and that DEQ will not issue

[10] http://www.deq.state.or.us/AQ/noise/index.htm.

[11] *Wallowa County Comprehensive Plan*, 2003; *see also, Wallowa Fall Hydroelectric Project, FERC No. P-308, Final License Application for Minor Water Power Project Under 5 MW*, Exhibit E (Vol. II of V) (Feb. 2014); *and Wallowa Fall Hydroelectric Project, FERC No. P-308, Updated Study Report, Land Use* (Dec. 2013).

[12] OAR 340-035-0035(6)(b).

any determinations or approvals, it would be unreasonable to apply conditions of the Noise Program to the Project – particularly since the Project predates the program; and it likely predates any noise sensitive properties in the area.

Regarding possible noise mitigation measures, installing berms or a cover at the concrete tailrace box flume to reduce powerhouse noise were evaluated. Installation of a berm to reduce powerhouse noise would not be effective or practical. For a berm to reduce noise there must be enough height to the berm to deflect or interrupt point to point transmission of noise to a sensitive receptor. The area between the tailrace and the State Highway 351 terminus-turn-around (approximately 15 feet, 4.5m) does not have enough horizontal room for a berm to be constructed high enough to be effective.

Due to maintenance staff need for access to the tailrace flume, a cover directly over the tailrace flume would not be practical. To accommodate cost and practical concerns, a noise-insulated building that would allow for tailrace maintenance was considered. The metal sided and roofed building would be similar in design, appearance, and construction to the existing powerhouse. The building would be approximately 20-feet wide by 25-feet long by 15-feet high, have a pitched-roof, and would be built over the tailrace flume. It would connect to the existing powerhouse building, and have a 7-foot opening at the downstream end of the tailrace flume to allow access to both sides of the flume. It would be open to the elements at the downstream end. Lights would be located within the building for worker safety and near the entrance. The interior sides and roof of the building would be lined with a noise insulation material commonly used on industrial buildings to reduce noise. It is anticipated that the building would be fairly effective at muffling noise to the southwest and northeast of the powerhouse. It is also anticipated that noise leaving the open end (northwest) of the building would be less than what can now be heard northwest of the building, but would still be heard to some degree.

The capital cost is approximately $250,000. Annual maintenance costs are estimated to be $2,000.

LITERATURE CITED

NMFS (National Marine Fisheries Service). 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

PacifiCorp 2013. Wallowa Falls Hydroelectric Project, FERC Project No. P-308, Study Progress Report (Final Technical Report), Water Resources http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Wallowa%20Falls/02_WF_Water_Resources_Updated_Study_Report.log.pdf

PacifiCorp 2014. Wallowa Falls Hydroelectric Project, FERC Project No. P-308, License Application, Appendix I, Riparian and Wetland Area Map http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Wallowa%20Falls/WF_App_I_Riparian_Map.pdf

Schedule A – Attachment A

Winter Channel Ice Formation and Flooding

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

ATTACHMENT A

Wallowa Falls (FERC Project No. 308) Bypassed Reach Flow, Temperature and Generation

Date	BPU Q (CFS)	Generator Q (CFS)	BPL Q (CFS)	BPU TEMP (degrees C)	BPL TEMP (degrees C)	Generation (KWH)
12/01/13	6.10	9.6	6.88	2.25	3.10	672
12/02/13	10.76	4.2	12.01	1.19	1.82	294
12/03/13	12.10	0.0	22.38	0.30	-0.07	0
12/04/13	11.54	0.0	50.18	-0.07	-0.09	0
12/05/13	11.48	0.0	82.76	-0.07	-0.09	0
12/06/13	9.13	4.0	96.93	0.05	-0.10	276
12/07/13	4.16	9.7	90.30	0.35	-0.10	681
12/08/13	4.05	9.5	90.00	0.39	-0.11	669
12/09/13	3.81	9.5	99.20	0.93	-0.11	666
12/10/13	3.41	9.5	124.95	1.13	-0.12	664
12/11/13	3.55	9.5	97.81	1.16	0.19	664
12/12/13	3.70	9.6	5.19	1.49	1.14	672
12/13/13	3.29	9.7	5.55	1.67	1.66	682
12/14/13	3.11	9.6	5.10	1.69	1.75	673
12/15/13	3.17	9.6	5.01	1.90	1.97	675
12/16/13	3.14	9.8	4.82	1.64	1.79	684
12/17/13	3.22	9.6	4.51	1.83	1.81	674
12/18/13	3.10	9.7	4.55	1.88	2.01	681
12/19/13	3.00	9.5	4.78	0.95	1.06	664
12/20/13	3.22	9.5	4.33	1.00	0.64	666
12/21/13	3.63	9.5	5.53	1.53	1.61	666
12/22/13	3.42	9.6	5.20	1.80	1.92	673
12/23/13	3.64	9.5	5.19	2.06	2.23	664
12/24/13	3.20	9.5	4.90	0.87	1.13	668
12/25/13	3.13	9.4	4.61	1.05	0.87	658
12/26/13	3.11	9.7	4.58	1.55	1.51	682
12/27/13	2.99	9.8	4.33	1.66	1.55	684
12/28/13	2.72	9.6	4.53	1.35	1.48	676

12/29/13	2.83	9.7	4.05	0.91	0.82	678
12/30/13	2.87	9.7	4.31	1.66	1.62	682
12/31/13	2.84	9.6	4.53	1.97	2.07	675
Average	**4.63**	**8**	**28.03**	**1.23**	**1.13**	**583**

Notes
BPU: Gaging station located approx. 30 feet downstream of diversion dam
Q: Flow in cubic feet per second (CFS)
BPL: Gaging station located approx. 1000 feet upstream of mouth of East Fork
Red text indicates flows are not representative. May be due to channel ice.
C: celsius
Negative temperature readings may be a result of instrument icing

Schedule A – Attachment B1 (Figures 1 & 2)
Winter Channel Ice Formation and Flooding

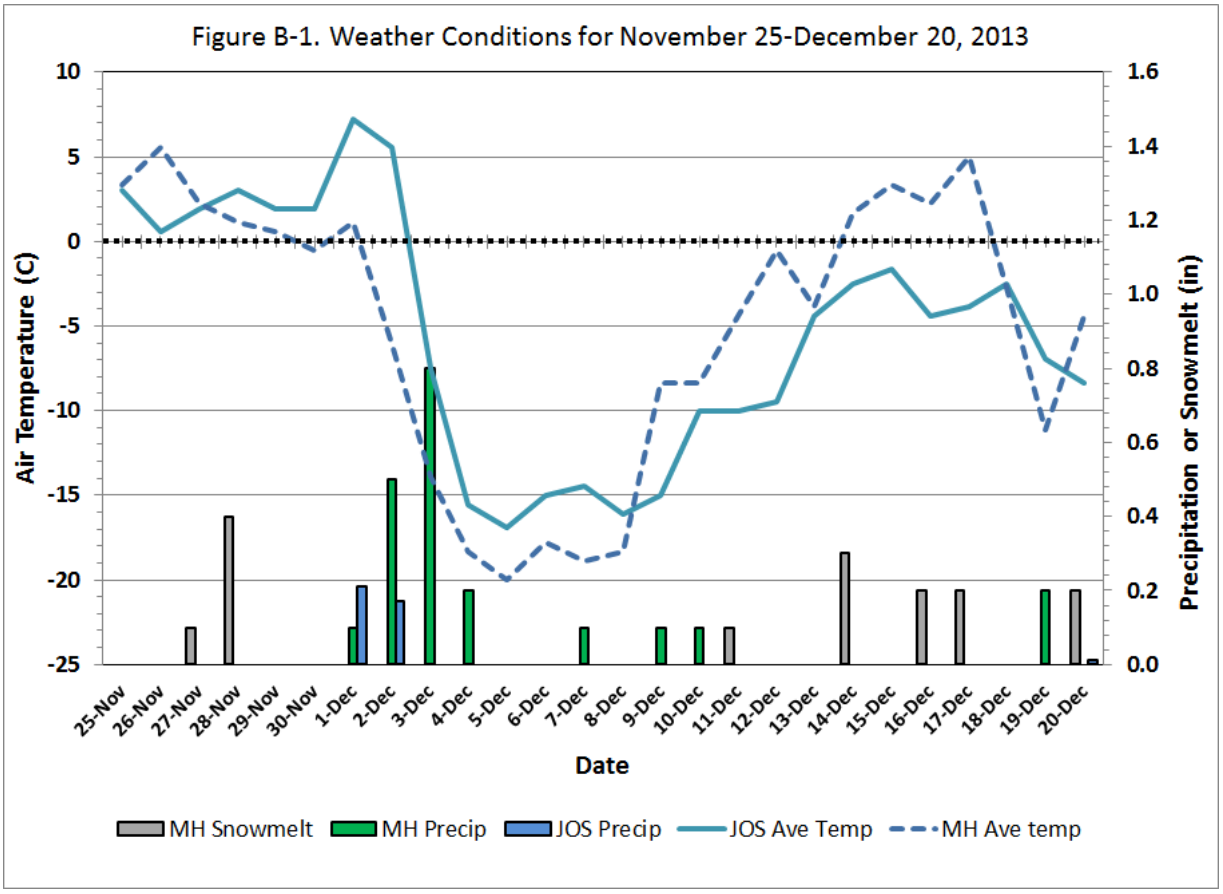


Figure B-1. Weather Conditions for November 25-December 20, 2013
Air Temperature (C)
Precipitation or Snowmelt (in)
Date
MH Snowmelt
MH Precip
JOS Precip
JOS Ave Temp
MH Ave temp

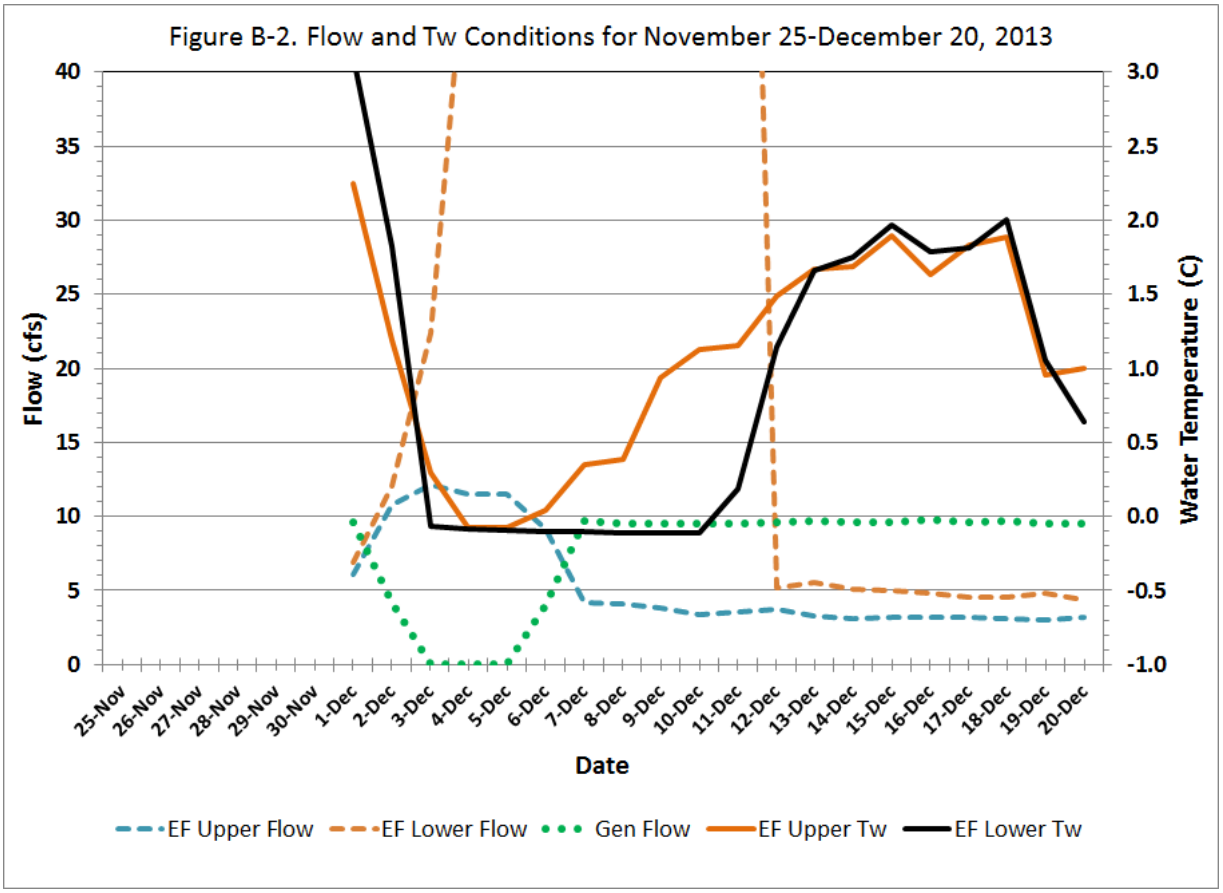


Figure B-2. Flow and Tw Conditions for November 25-December 20, 2013
Flow (cfs)
Water Temperature (C)
Date
EF Upper Flow
EF Lower Flow
Gen Flow
EF Upper Tw
EF Lower Tw

Schedule A – Attachment B2 (Figures 3 & 4)
Winter Channel Ice Formation and Flooding

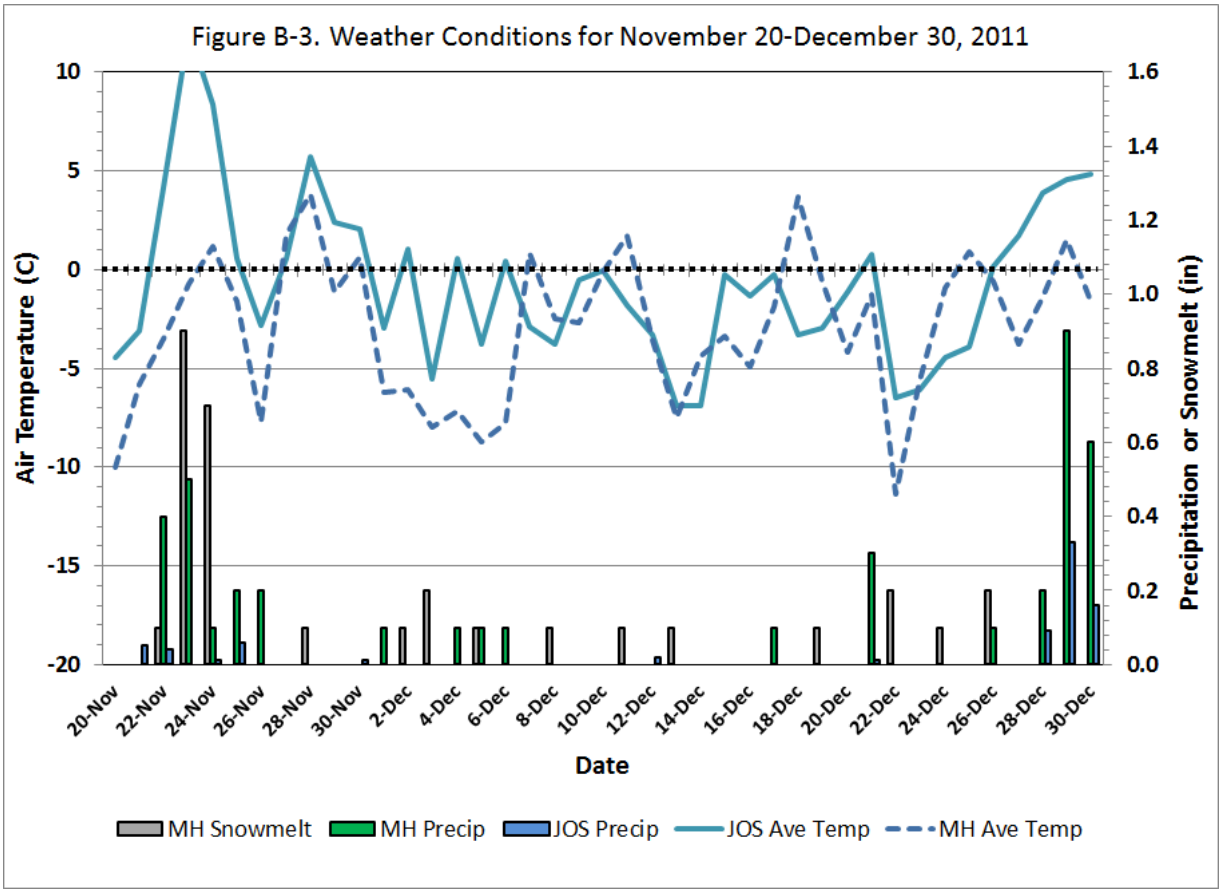


Figure B-3. Weather Conditions for November 20-December 30, 2011
Air Temperature (C)
Precipitation or Snowmelt (in)
Date
MH Snowmelt
MH Precip
JOS Precip
JOS Ave Temp
MH Ave Temp

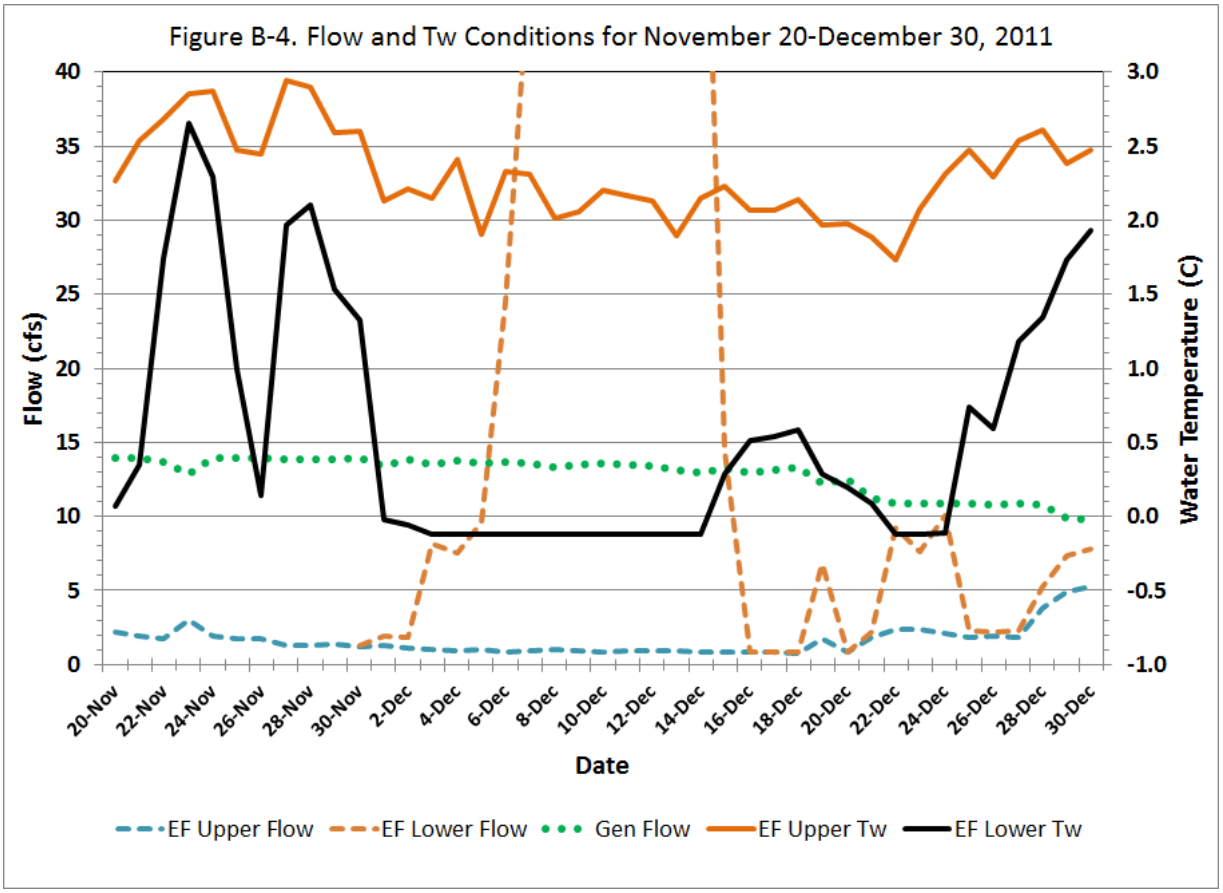


Figure B-4. Flow and Tw Conditions for November 20-December 30, 2011
Flow (cfs)
Water Temperature (C)
Date
EF Upper Flow
EF Lower Flow
Gen Flow
EF Upper Tw
EF Lower Tw

Schedule A – Attachment B3 (Figures 5 & 6)

Winter Channel Ice Formation and Flooding

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

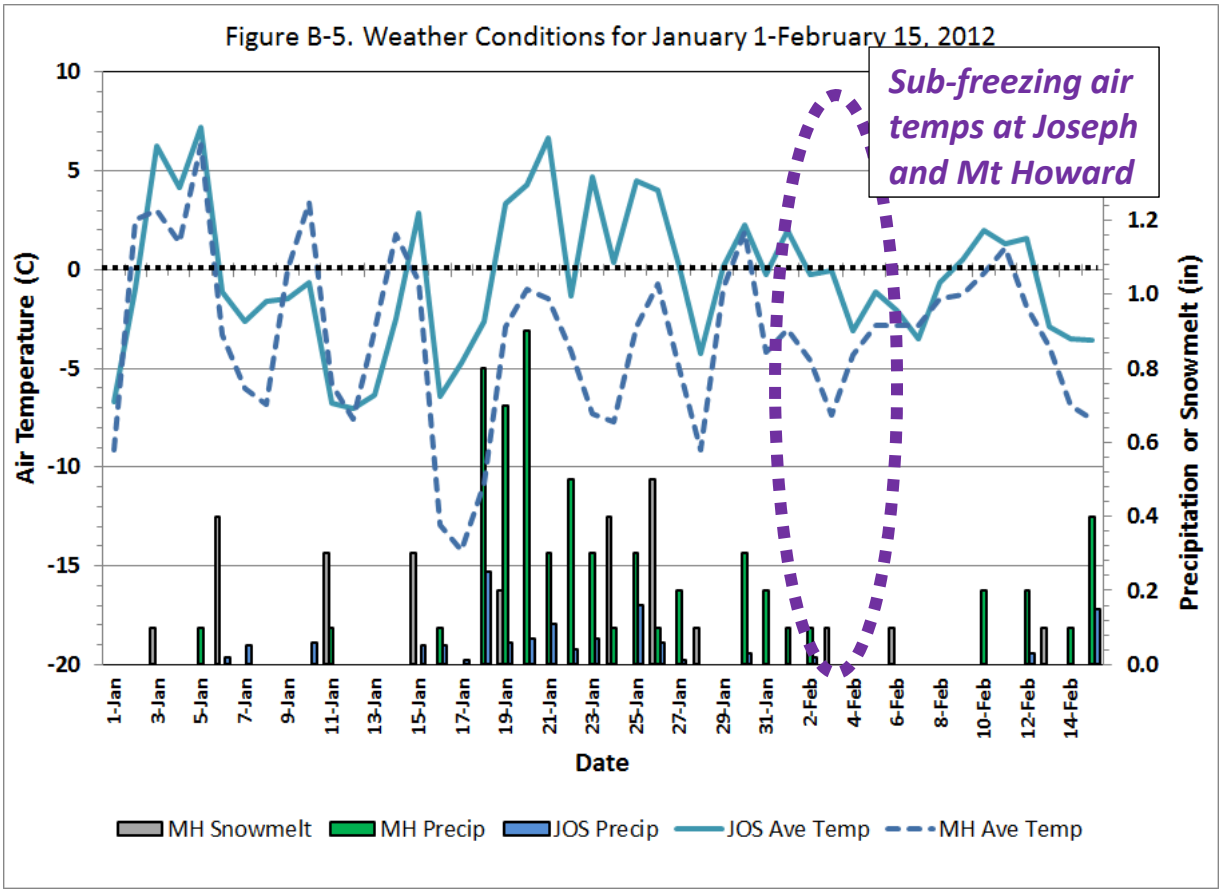


Figure B-5. Weather Conditions for January 1-February 15, 2012
Sub-freezing air temps at Joseph and Mt Howard
Air Temperature (C)
Precipitation or Snowmelt (in)
Date
MH Snowmelt
MH Precip
JOS Precip
JOS Ave Temp
MH Ave Temp

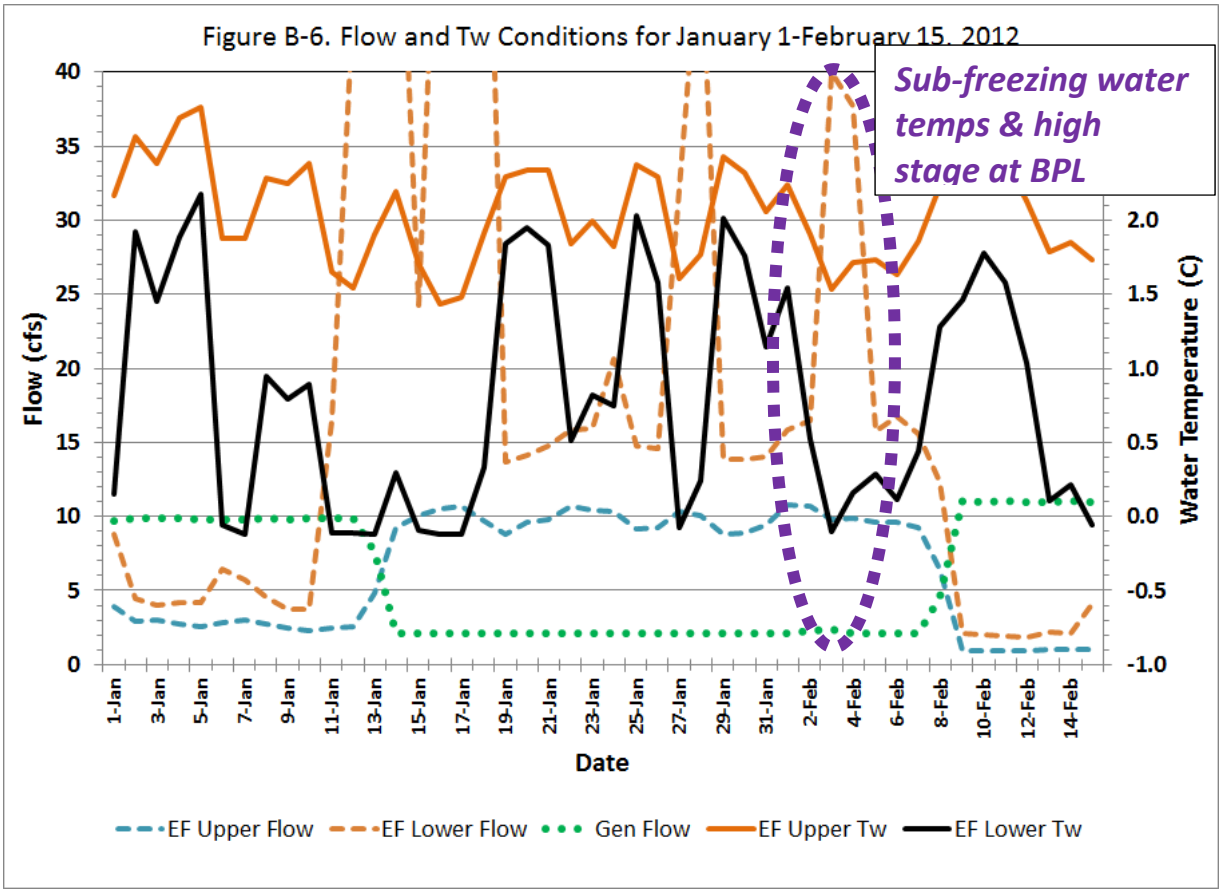


Figure B-6. Flow and Tw Conditions for January 1-February 15, 2012
Sub-freezing water temps & high stage at BPL
Flow (cfs)
Water Temperature (C)
Date
EF Upper Flow
EF Lower Flow
Gen Flow
EF Upper Tw
EF Lower Tw

Schedule A – Attachment C
Powerhouse Outage Events

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

PacifiCorp Energy
Hydro Resources Department
Wallowa Falls Hydroelectric Project Outage Report

Unit : All Units - Wallowa Falls Hydroelectric Project
Forced Outage Type : All Internal and External Outage Types
Forced Outage Cause: All Causes

From : 8/1/2011
To : 10/13/2014

Blue shading indicates confirmed or possible headgate closure.

Outage Number	Outage Start (Date/Time)	Cause	Explanation	Classification	Unit Name	Outage End (Date/Time)	Estimated RTS Date	Unit MW Capacity	Duration (Hours)	Potential Lost Generation (MWHrs)
11537	1/13/2012 15:30:00 PM		Unplanned: Broken turbine bucket			2/1/2012 08:00:00 AM				
11537 cont	2/1/2012 08:50:00 AM		Unplanned: Unknown cause, headgate closed			2/2/2012 16:10:00 PM				
11710	2/3/2012 09:44:00 AM		Unplanned: Faulty DC field cable on generator			2/7/2012 14:20:00 PM				
11740	2/8/2012 16:01:00 PM		Unplanned: Faulty electrical relay			2/8/2012 18:40:00 PM				
12085	7/6/2012 09:14:00 AM		Planned: Stator cleaning, headgate closed			7/13/2012 09:30:00 AM				
11510	8/13/2012 07:34:00 AM		Planned: annual maintenance, headgate closed			8/16/2012 15:30:00 PM				
12275 & 12394	8/24/2012 15:53:00 PM		Planned: Battery maintenance & repair PLC			9/13/2012 17:40:00 PM				
12521	10/09/2012 14:50:00 PM		Unplanned: Turbine Bearing Oil leak			10/10/2012 18:21:00 PM				
12524	10/12/2012 16:13:00 PM		Unplanned: Turbine Bearing Oil problems			11/1/2012 17:55:00 AM				
12646	11/19/2012 22:30:00 PM		Unplanned: Electrical Storm in area			11/20/2012 14:33:00 AM				
12326	8/26/2013 09:03:00 AM		Planned: annual maintenance, headgate closed			9/26/2013 14:10:00 PM				
13825	12/2/2013 11:50:00 AM		Planned: Switchyard electrical equipment repair, headgate closed			12/5/2013 13:22:00 AM				
14086	2/14/2014 16:00:00 PM		Unit intentionally shut down for penstock protection, headgate closed			8/27/2014 08:20:00 AM				

PHABSIM transect data provided via CD

Schedule A – Attachment D
Bypassed Reach Flow Modeling

Schedule A – Attachment E
Bypassed Reach Flow Modeling

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

Howison, Russ

From: Dave Wildman <dwildman@andersonperry.com>
Sent: Friday, August 01, 2014 4:58 PM
To: Howison, Russ
Cc: Mike Hayward (mhayward@co.wallowa.or.us)
Subject: Wallowa Falls Hydro
Attachments: Sheet A-25s.pdf; Sheet A-07s.pdf; Sheet A-06s.pdf; img-801162815-0001.pdf; Sheet A-37rev.pdf

Russ,

As we discussed the other day, I am forwarding some information for your use related to your Wallowa Falls hydro project. You had asked for some information related to water, sewer, and bridge infrastructure in the vicinity of the E. Fork Wallowa River. Attached you will find scanned copies of drawings showing approximate water and sewer line alignments on the E. Fork. These water and sewer systems are operated by the Wallowa Lake County Service District (WLCSD).

With regard to the WLCSD infrastructure, it appears that a few key facilities could be impacted by the proposed change in flows in the E. Fork. First, a primary 8" water transmission main from the water supply sources and reservoir to the southeast side of the community crosses under the E. Fork at the Powerhouse Road bridge. Any potential negative impacts to this pipeline would cut off the water supply to the southeast side of the community. Second, there is both a 6" sewer collection system pipeline and a 4" water distribution pipeline crossing the E. Fork a few hundred feet northwest of Bailey Lane (as shown in the attached drawing sheet A-07 and noting that the existing 4" water line is shown crossing the E. Fork east of the sewer line). As I mentioned in our conversation, I believe the 4" water pipeline may already exposed in the creek.

We also discussed the Bailey Lane bridge. I have attached the record drawings we have that show some of the details related to the bridge structure, elevations of bridge girders, and some information related to projected river water levels with different design storm events.

I hope this is helpful. Let me know if you need anything else.

Thanks,
Dave

David Wildman, P.E.
Senior Engineer
Anderson Perry & Associates, Inc.
1901 N. Fir / P.O. Box 1107
La Grande, Oregon 97850
541-963-8309 phone
541-963-5456 fax
541-786-0688 cell
dwildman@andersonperry.com
www.andersonperry.com

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

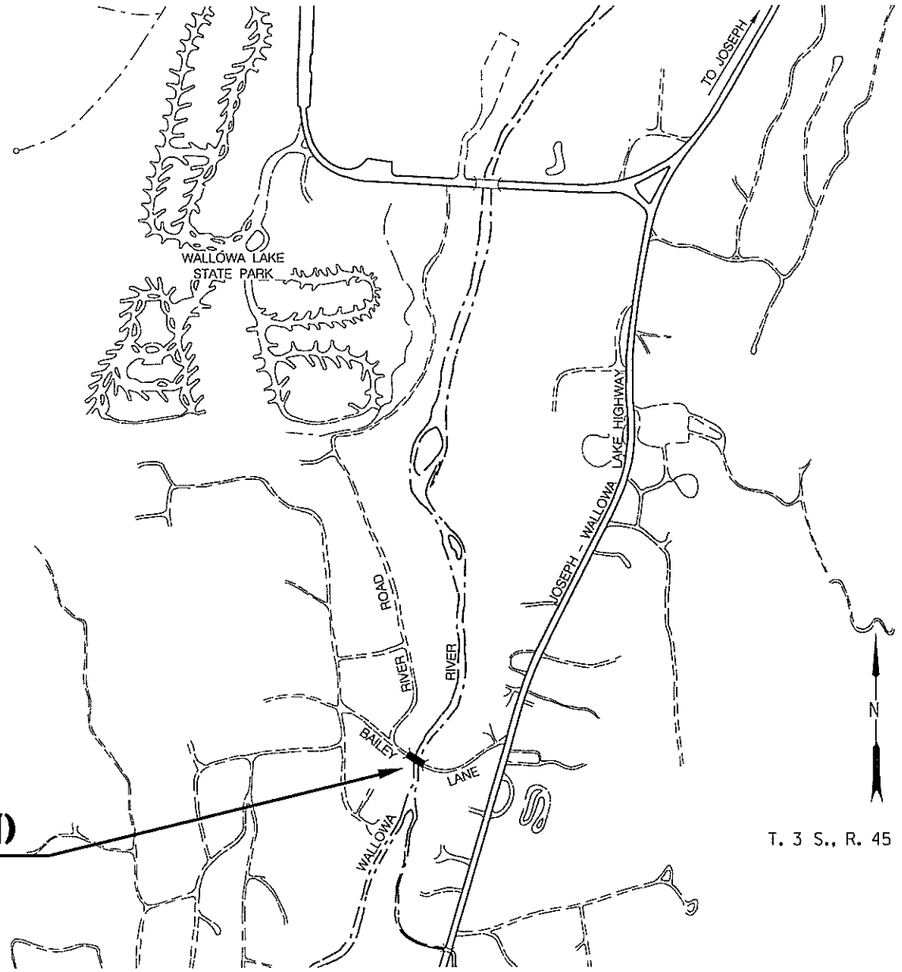
PLANS FOR PROPOSED PROJECT

GRADING AND STRUCTURE

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.

BAILEY LANE

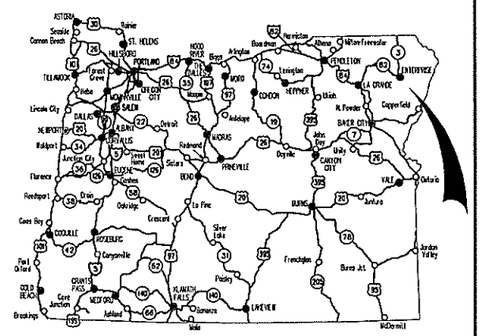
WALLOWA COUNTY
JULY 2004



T. 3 S., R. 45 E., W.M.

PROJECT X-BRO-C063 (014)

STA. "L" 9+50 TO 13+00



Overall Length Of Project - 0.07 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Pape	COMMISSIONER
John Russell	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
WALLOWA COUNTY
BY:
ANDERSON-PERRY & ASSOC., INC.

REVISED AS CONSTRUCTED
05-23-05 CONTRACT 13033
PROJ. MGR. Allen Rieke

OREGON DEPARTMENT OF TRANSPORTATION CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-BRO-C063 (014)	1

NOT REVISED AS CONSTRUCTED
05-23-05 CONTRACT 13033

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index of Sheets
2	Typical Sections
2A	Details
2B	Traffic Control Plan
3	Alignment and General Construction
GHA-1	Erosion Control Plan

BRIDGE NO.	DRAWING NO.	DESCRIPTION
19939	WALLOWA RIVER (BAILEY LANE) BRIDGE	
	65634	Plan and Elevation
	65635	Foundation Data
	65636	Bent Plan and Elevation
	65637	Bent Details
	65638	Wingwall Details
	65639	Bridge Details
	65640	Concrete Baluster Rail Details I
	65641	Concrete Baluster Rail Details II

Standard Drg. Nos.

RD700	– Monolithic Curb and Sidewalk
RD715	– Approaches and Non-Sidewalk Driveways
RD945	– Traffic Control Plans
RD950	– Barricades
RD1040	– Sediment Fence
BR165	– Standard Bridge End Panel
BR420	– 26" Precast Prestressed Slab
BR445	– General Details For Boxes and Slabs
BR450	– Precast Prestressed Slabs
TM100	– Temporary Signs
TM200	– Permanent Sign Installation
TM206	– Sign Bracing and Mounting Details
TM214	– Wood Post Sizing Charts

anderson perry & associates, inc.

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

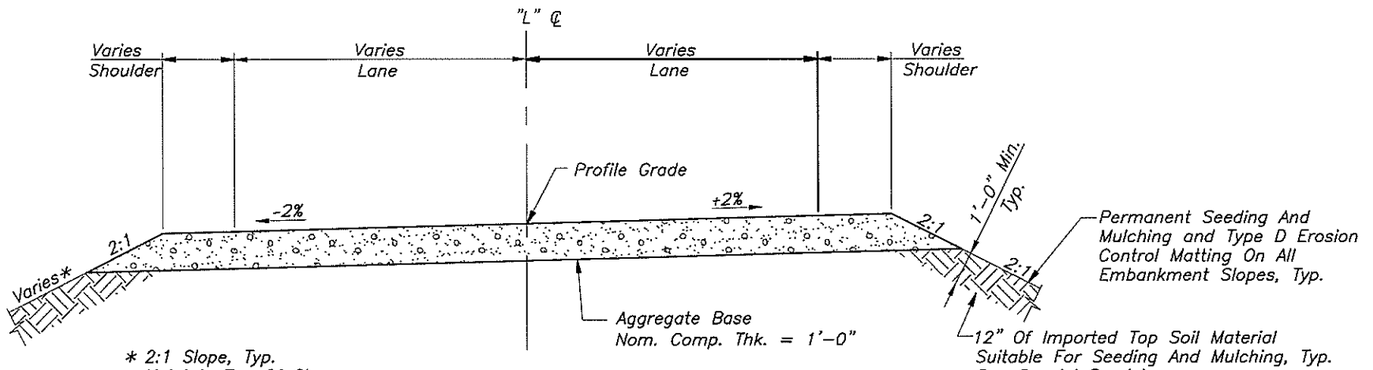
Reviewed By – G. Bornstedt
Designed By – A. Rieke
Drafted By – L. Hubof

INDEX OF SHEETS

SHEET NO. 1A

R:\ODOT\BRIDGES_2004\BAILEY\DWG\AA-Bailey\INDEX.dwg, index, 10/8/2008 11:24:28 AM, lhubof

REVISED AS CONSTRUCTED
05-23-05 CONTRACT 13033



TYPICAL SECTION
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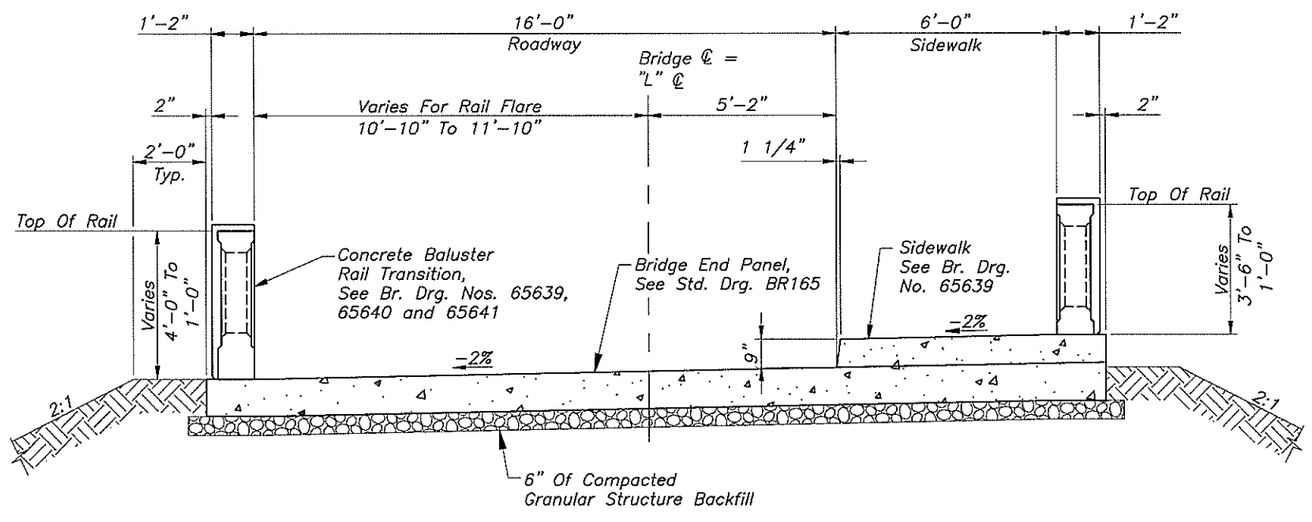


SECTION AT BRIDGE END PANEL
Scale: 1/2" = 1'-0"

Note:
For Sidewalk Reinforcement
See Br. Drg. No. 65639

For Bridge End Panel Reinforcement
See Std. Drg. BR165

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

Reviewed By – G. Bornstedt
Designed By – A. Rieke
Drafted By – L. Hubof

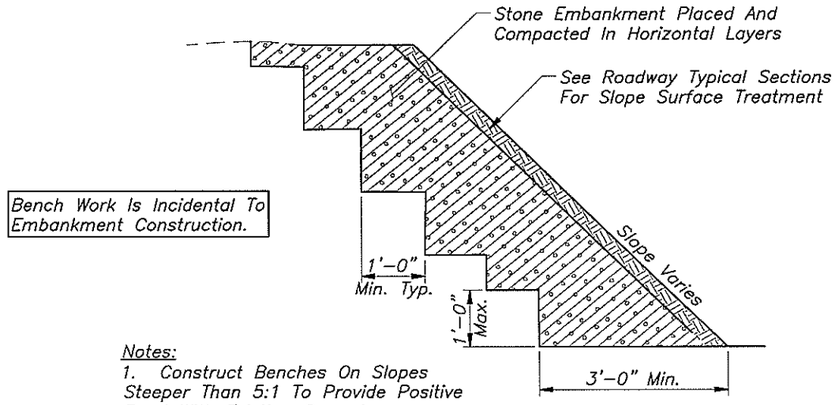
anderson perry & associates, inc.

TYPICAL SECTIONS

SHEET NO. 2

R:\ODOT\BRIDGES 2004\BAILEY\DWG\As-Built\RDWY2-DET.dwg, TYP-SECT, 10/8/2008 11:27:21 AM, lhubof

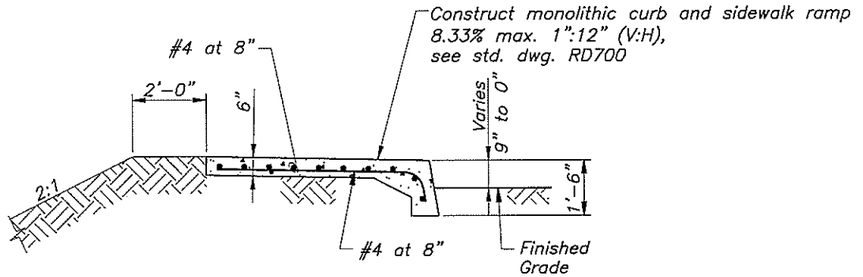
REVISED AS CONSTRUCTED
05-23-05 CONTRACT 13033



Notes:
1. Construct Benches On Slopes Steeper Than 5:1 To Provide Positive Bond With Existing Ground.

2. Side-slopes Are Shown As Horizontal To Vertical.

STANDARD EMBANKMENT WIDENING CONSTRUCTION
Scale: N.T.S.



SECTION A
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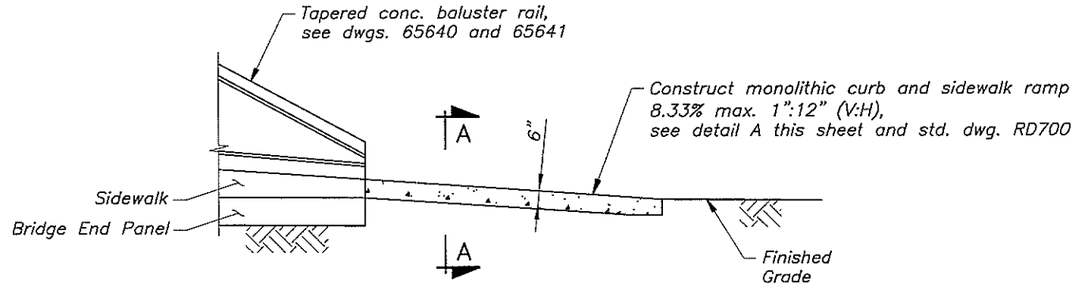


SIDEWALK RAMP DETAIL
Scale: 1/2" = 1'-0"

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

Reviewed By – G. Bornstedt
Designed By – A. Rieke
Drafted By – L. Hubof

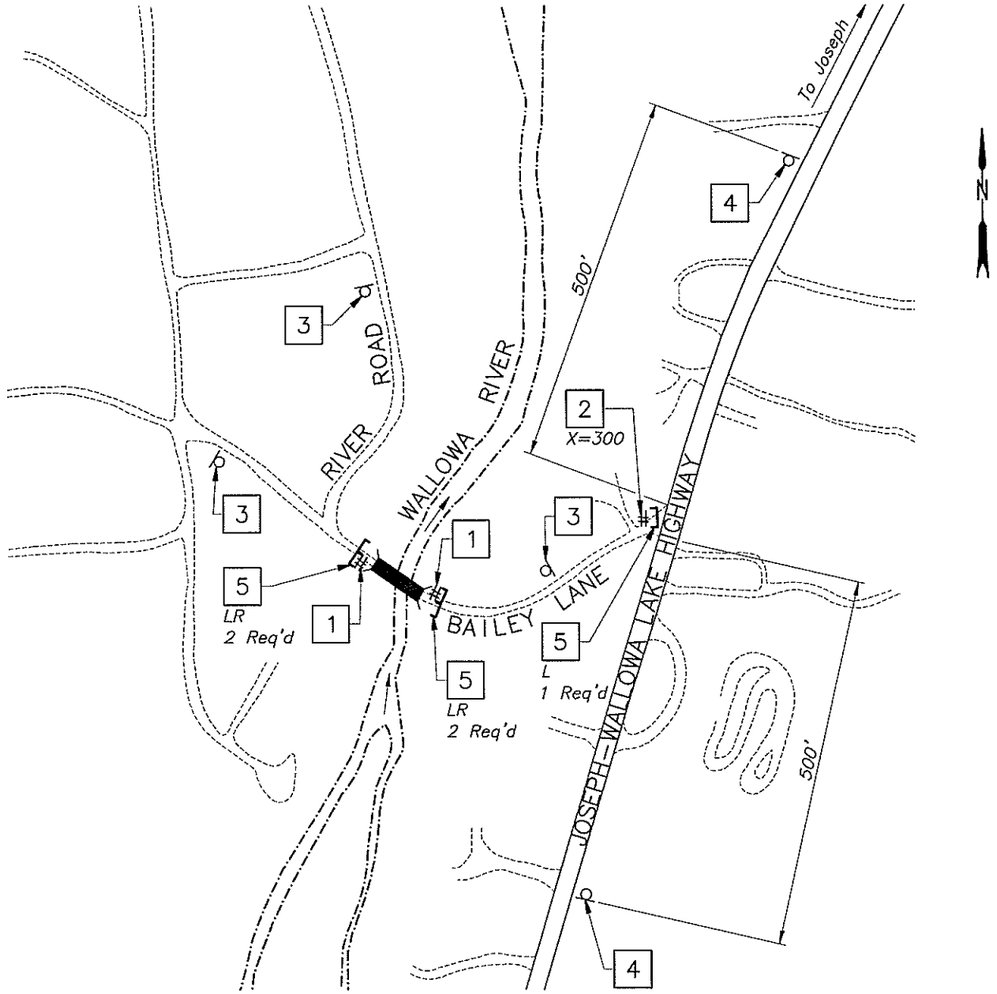
anderson perry & associates, inc.

DETAILS

SHEET NO. 2A

R:\ODOT\BRIDGES 2004\BAILEY\DWG\Arc Bailey RDWY-DET.dwg, RDWY-DET, 10/8/2008 11:26:40 AM, lhubof

NOT REVISED AS CONSTRUCTED
05-23-05 CONTRACT 13033



1

ROAD CLOSED

4' X 2'-6"
R11-2
2 Required
Mount On Temporary Sign Support
Locate 15 Ft. Behind Barricade

2

BRIDGE OUT
X FEET AHEAD
LOCAL TRAFFIC ONLY

5' X 2'-6"
TYPE '00'
1 Required
Mount On Temporary Sign Support
Locate 15 Ft. Behind Barricade

3

ROAD CLOSED AHEAD

4' X 4'
Type '00'
3 Required

4

BAILEY LANE
CLOSED
TO THRU TRAFFIC

5' X 2'-6"
Type '00'
2 Required

5

8' B(111)
R Or L Or LR Barricades
5 Required

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

Reviewed By – G. Bornstedt
Designed By – A. Rieke
Drafted By – L. Hubof

anderson perry & associates, inc.

TRAFFIC CONTROL PLAN

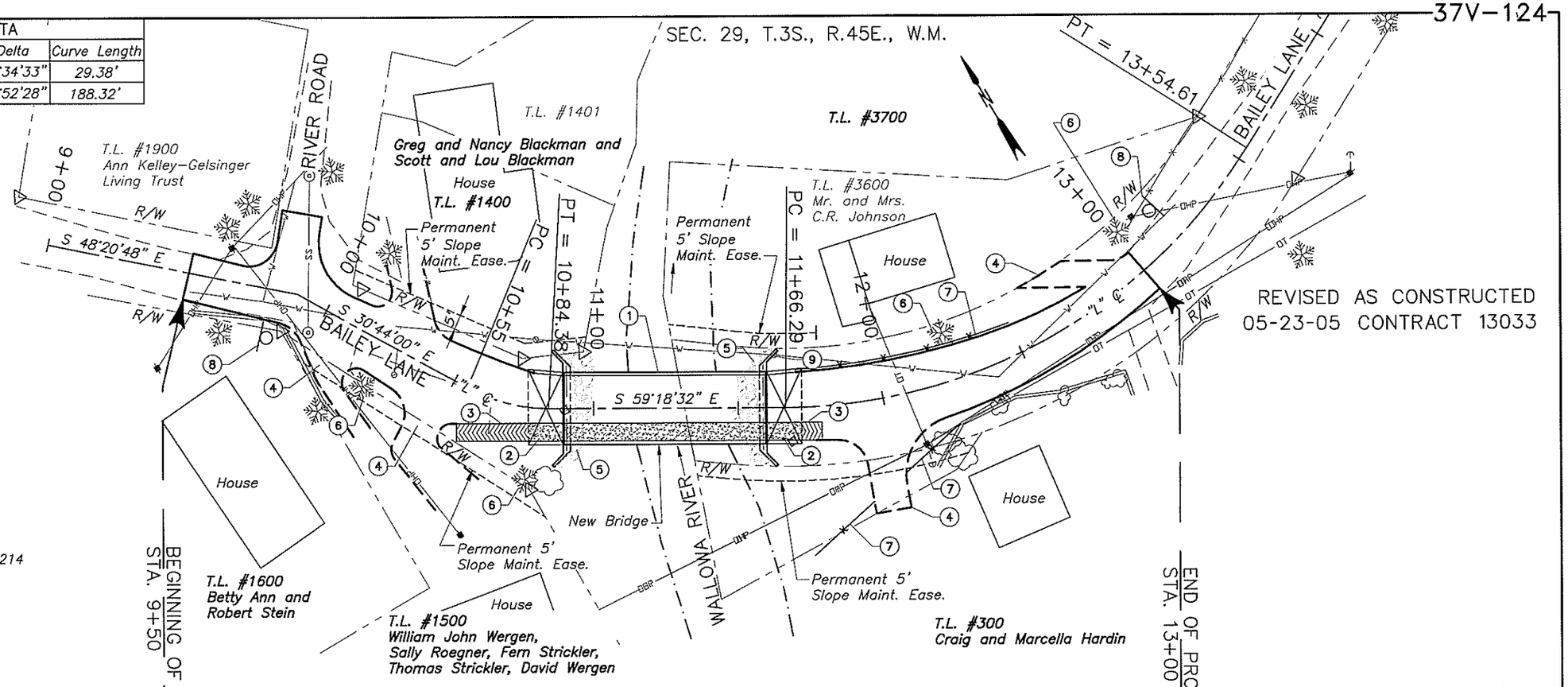
SHEET NO. **2B**

E:\ODOT\BRIDGES_2004\BAILEY\DWG\Ae-Built\RDWY-TCP.dwg, TCP, 10/8/2008 11:28:26 AM, hubof

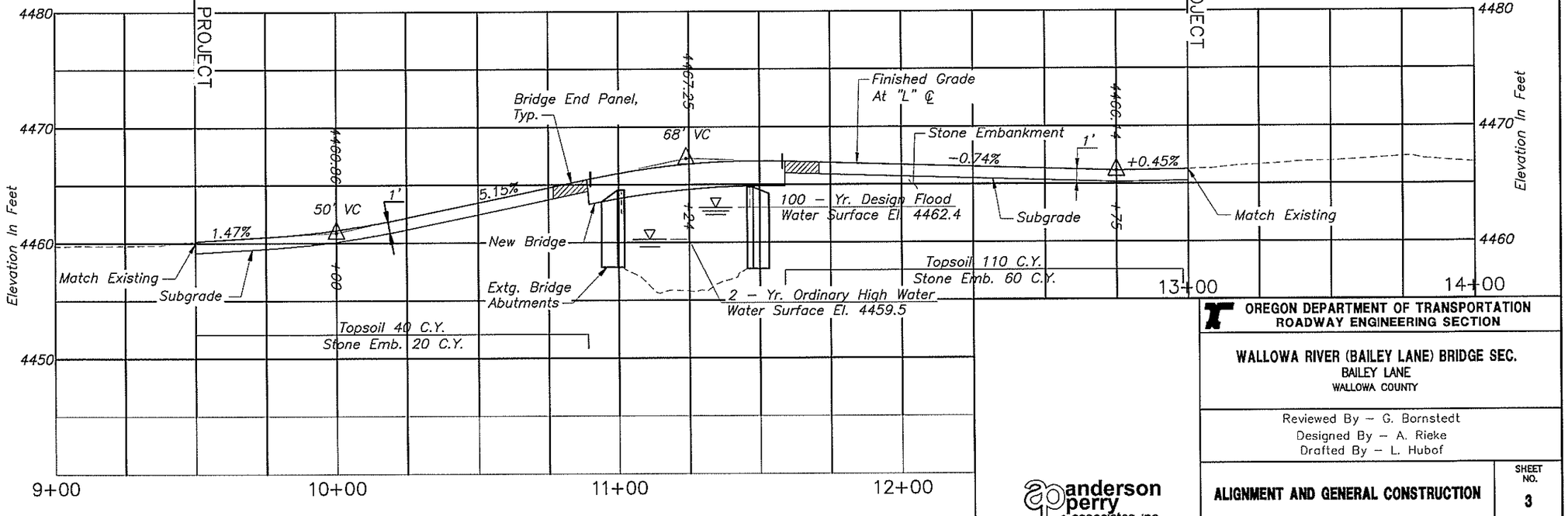
37V-124

HORIZONTAL CURVE DATA				
Station	Radius	Tangent	Delta	Curve Length
10+55 To 10+84.38	58.90	15.00	28°34'33"	29.38'
11+66.29 To 13+54.61	186.44	103.08	57°52'28"	188.32'

1. Const. 68' Structure Roadway Width 16' With 6' Walk Rt. With End Panels, Length=12'-0"
2. Const. Sidewalk See Br. Drg. No. 65639
3. Const. Monolithic Curb And Sidewalk (2 Locations) See Sht. 2A And Std. Drg. RD700
4. Const. Approach (5 Locations) See Std. Drg. RD715
5. Const. Loose Riprap, Class 200, At New Wingwalls And Between New Pilecaps And Existing Abutment Walls. All New Riprap To Be Placed Above Ordinary Highwater Elevation. Approx. 100 Tons
6. Protect Existing Trees As Marked By Engineer. See Special Provisions.
7. New Wood Pole Fence
8. Install New Permanent Sign – 2 "One Lane Bridge" W5-3, 36" x 36" See Std. Drgs. TM200, TM206 And TM214
9. Protect Water Valve Box



Notes:
1. All Dimensions And Elevations Are Shown In Feet Unless Otherwise Noted.
2. Elevations Shown Are Based on NGVD '29.
3. Right-Of-Way Lines Determined By Found Monuments and Field Survey.
4. Survey Control Point Z 537 (OSHD) Is About 5.9 Mi. S. Of Joseph, OR, Along The Joseph-Wallowa Lake Hwy. To Powerhouse Rd., then 0.6 Mi. S. On Powerhouse Road To A Conc. Bridge Crossing The E. Fork Of The Wallowa River. Standard OSHD Disk In The N.W. Corner Of The Footpath Of The Bridge; Stamped "Z 537 1956".



OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

WALLOWA RIVER (BAILEY LANE) BRIDGE SEC.
BAILEY LANE
WALLOWA COUNTY

Reviewed By – G. Bornstedt
Designed By – A. Rieke
Drafted By – L. Hubof

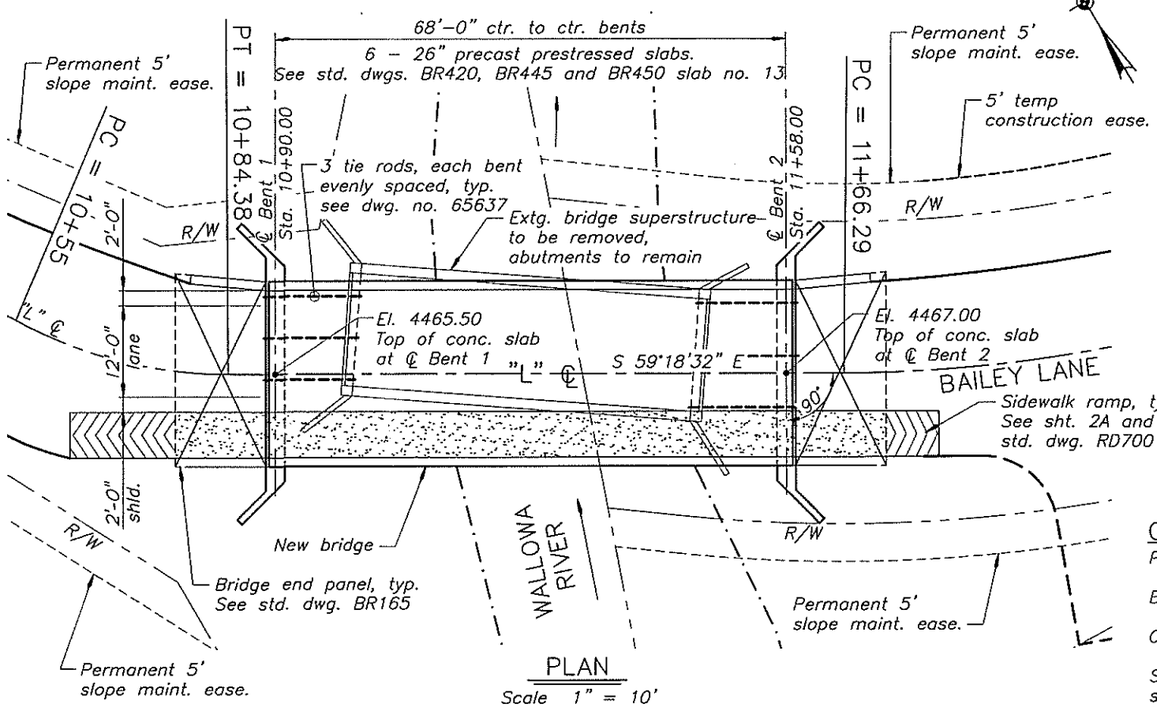
anderson perry & associates, inc.

ALIGNMENT AND GENERAL CONSTRUCTION

SHEET NO. 3

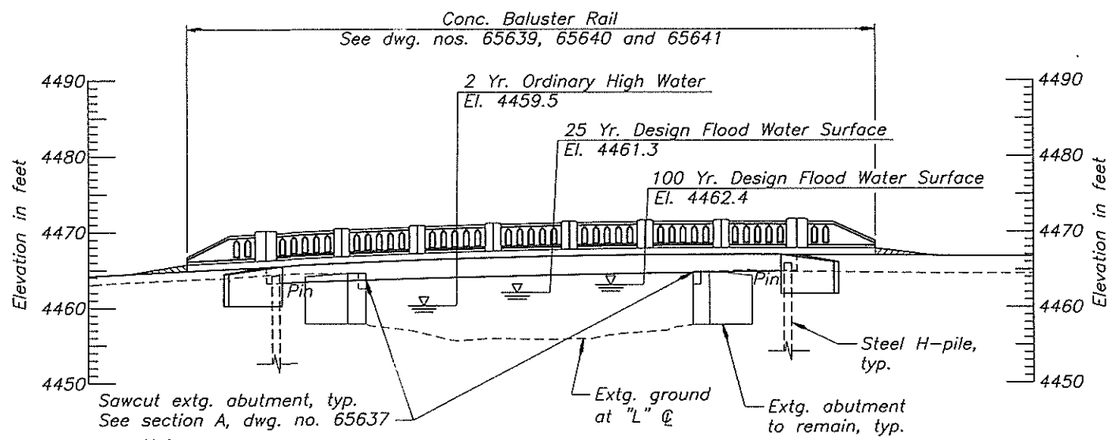
R:\ODOT\BRIDGES_2004\BAILEY\DWG\As-Built\RDWY-PP.dwg, PLAN-PROFILE, 10/8/2008 11:29:28 AM, lhubof

HORIZONTAL CURVE DATA				
Station	Radius	Tangent	Delta	Curve Length
10+55 To 10+84.38	58.90	15.00	28°34'33"	29.38'
11+66.29 To 13+54.61	186.44	103.08	57°52'28"	188.32'



PLAN

Scale 1" = 10'

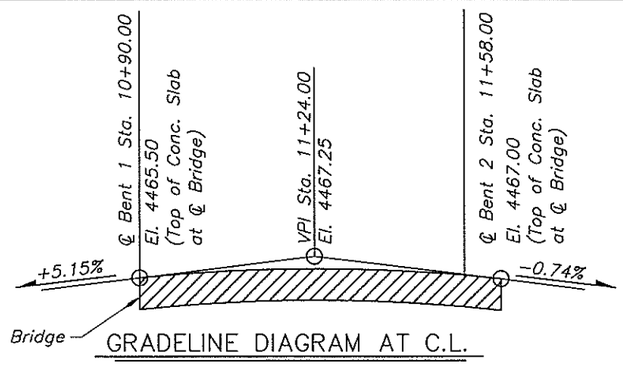


Note:
Elevations shown are based on NGVD '29.

ELEVATION

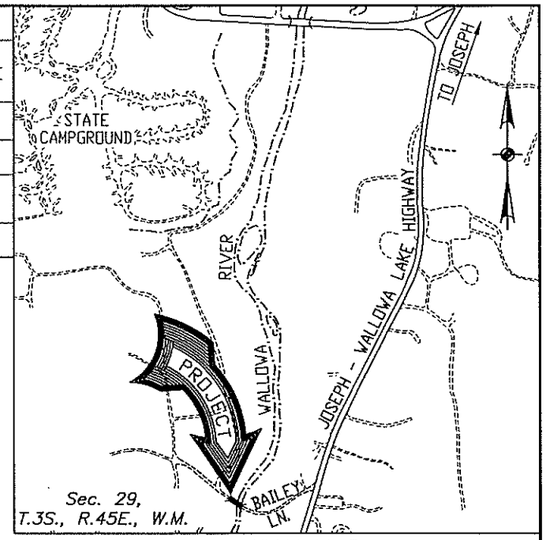
Scale 1" = 10'

HYDRAULIC DATA					
ITEMS	(UNITS)	ORDINARY HIGH WATER	DESIGN FLOOD	BASE FLOOD	MAX. POSSIBLE FLOOD
Discharge	$\frac{ft^3}{s}$	800	1680	2350	2770
Recurrence Interval	(yrs.)	2	25	100	500
High water elevation at upstream face of bridge	(ft.)	4459.5	4461.3	4462.4	4463.4
Backwater	(ft.)	–	0.8	1.1	1.5



GRADELINE DIAGRAM AT C.L.

No Scale



LOCATION MAP

No Scale

GENERAL NOTES:

Provide all materials and perform all work according to the 2002 Oregon Standard Specifications for Construction.

Bridge is designed for HS-25 loading.

Concrete members except pre-stressed members are designed by Load Factor Design Method.

Seismic design is in accordance with the AASHTO Division I-A, Seismic Design, "Standard Specifications of Highway Bridges". The site peak bedrock acceleration coefficient (A) is ±0.09g with a 500-year return period and the assumed site coefficient (S) is 1.2. The soil profile type is S_{II}.

All Bents, provide HP 12 x 53, ASTM (A36) piling with reinforced tips driven to an ultimate capacity of 296 kips per pile. Pile tip elevation for minimum pile penetration at Bents is elevation 4445 feet. Drive piling to the specified ultimate capacity using driving criteria developed from the ODOT Gates Equation. The factor of safety for the applied structural load is 3.0.

Provide all reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60. (Provide field bent stirrups according to ASTM Specification A706.) Use the following splice lengths unless shown otherwise:

Reinforcing Splice Lengths (Class B) Grade 60										
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14 and #18
Uncoated	1'-0"	1'-4"	1'-8"	2'-0"	2'-8"	3'-6"	4'-4"	5'-7"	6'-9"	Not permitted
Coated	1'-5"	1'-10"	2'-4"	2'-10"	3'-9"	4'-11"	6'-1"	7'-10"	9'-6"	Not permitted

Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.

Concrete shall be Class 3600 – (3/4" or 1 1/2") psi, except prestressed slabs. Prestressed slab concrete shall be Class 6000. The minimum concrete strength at transfer of prestress shall be 4500 psi.

Epoxy coat reinforcing steel in the upper portion of the prestressed slab. This includes top longitudinal bars, top transverse stirrup ties and bars extending from the prestressed slab into the parapets, bridge rail, curbs and sidewalks.

Place bars 2" clear of the nearest face of concrete unless shown otherwise. The top bends of stirrups extending from prestressed precast units may be shop or field bent unless shown otherwise.

Provide prestressing steel according to details plans.

△	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof
CHECKED: George Bornstedt
DESIGNED: Allen Rieke

DESIGNER

REGISTERED PROFESSIONAL ENGINEER 9546 Oregon JULY 22, 1977 ALLEN C. RIEKE EXPIRES 12-31-04 SIGNED 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

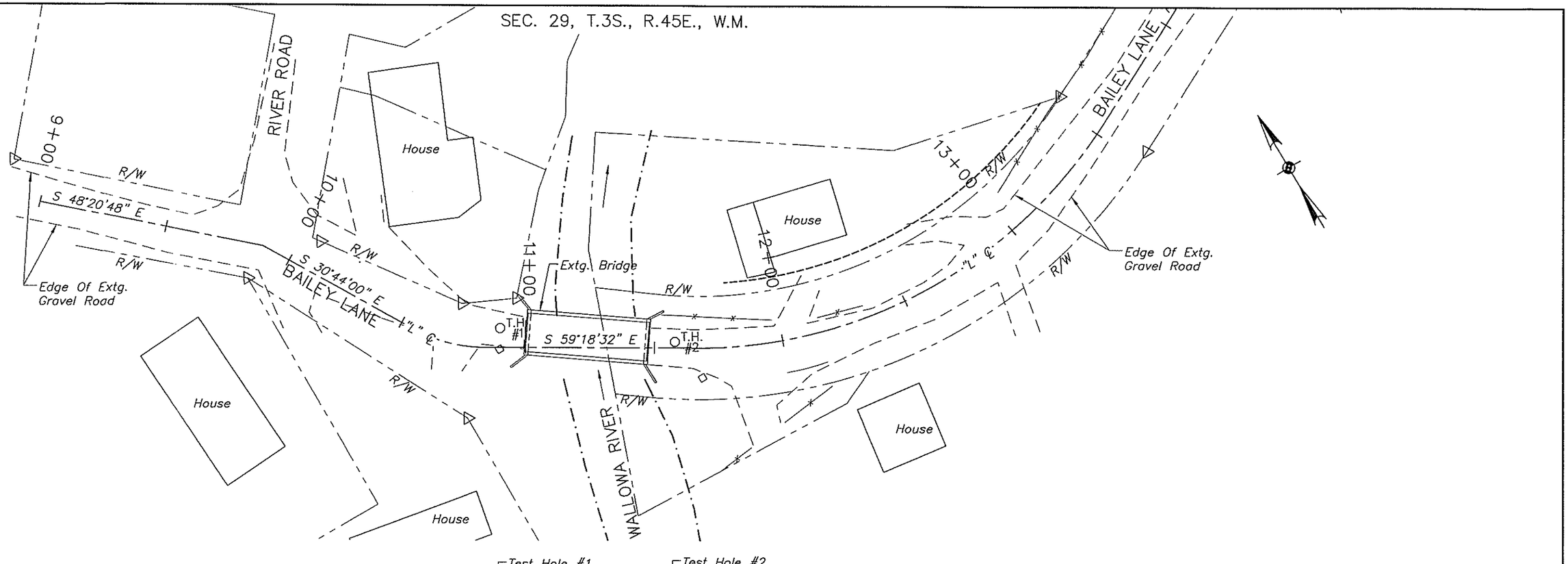
PLAN AND ELEVATION

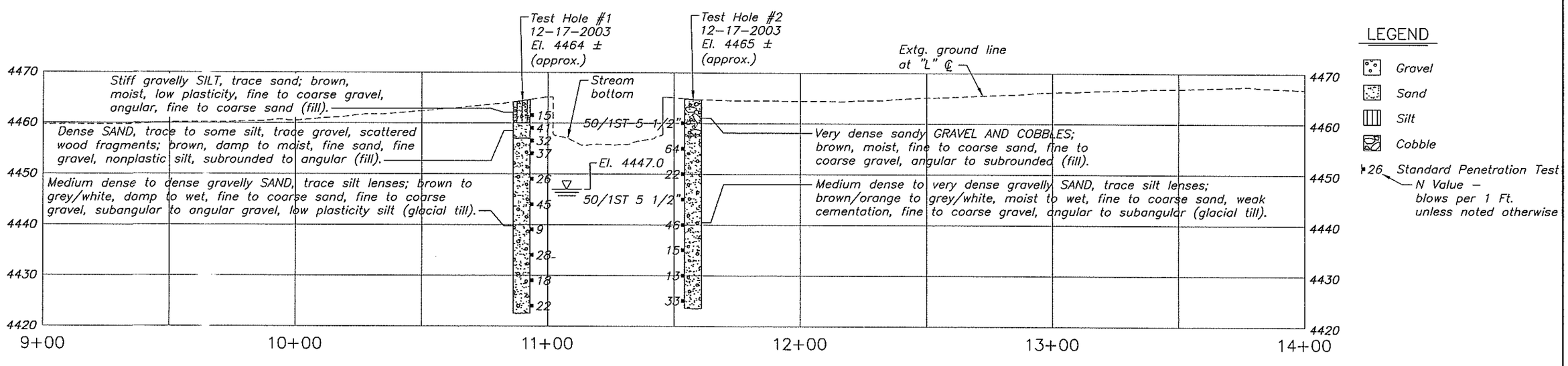
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER
REGION 10	OREGON DIVISION	X-BRO-C063 (014)

SHEET 1 OF 8

DRAWING NO. 65634

SEC. 29, T.3S., R.45E., W.M.





LEGEND

- Gravel
- Sand
- Silt
- Cobble
- 26 Standard Penetration Test — N Value — blows per 1 Ft. unless noted otherwise

	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof
CHECKED: George Bornstedt
DESIGNED: Tim Pfeiffer

DESIGNED
REGISTERED PROFESSIONAL ENGINEER 18,066 OREGON JULY 21, 1972 TIMOTHY J. PFEIFFER
Exp. 12-31-04

anderson perry & associates, inc.
ENGINEERING SURVEYING MATERIALS TESTING
LA GRANDE, OR. WALLA WALLA, WA. BAKER CITY, OR.

BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

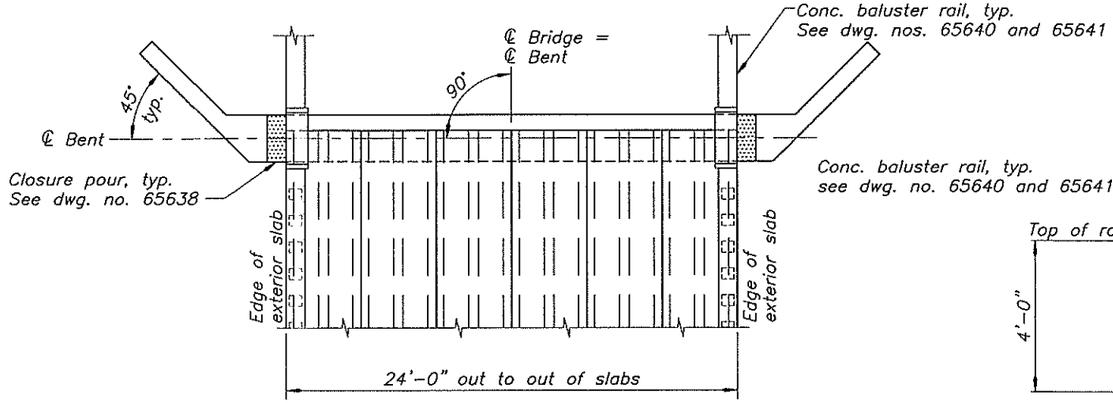
WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

FOUNDATION DATA

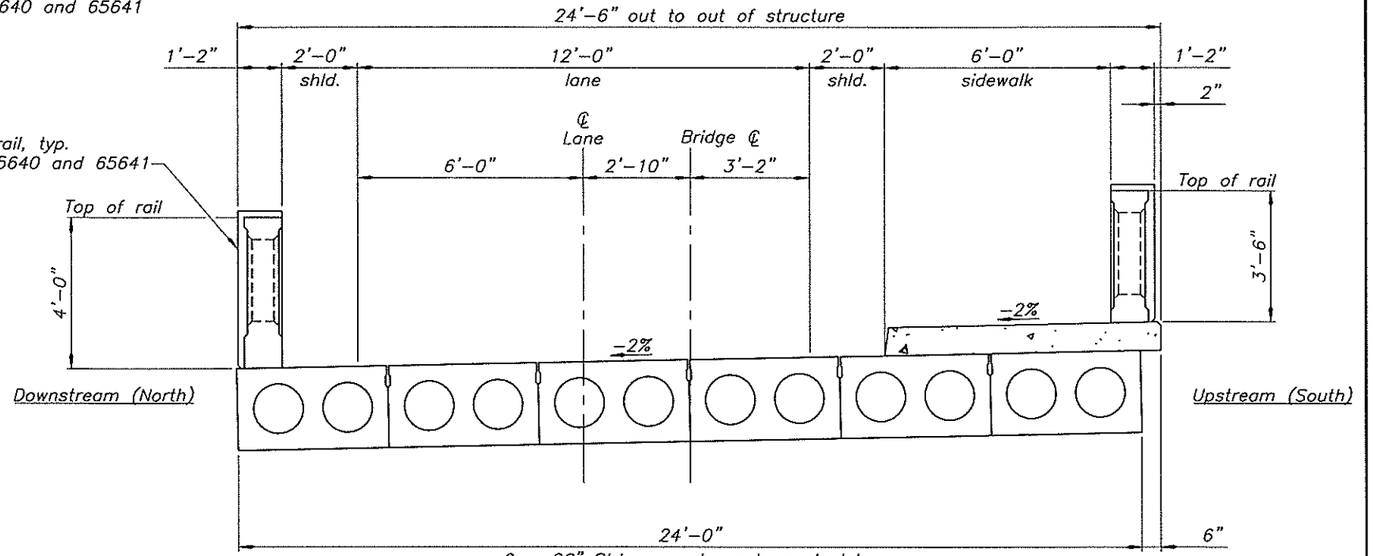
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER
REGION 10	OREGON DIVISION	X-BRO-C063 (014)

SHEET 2 OF 8

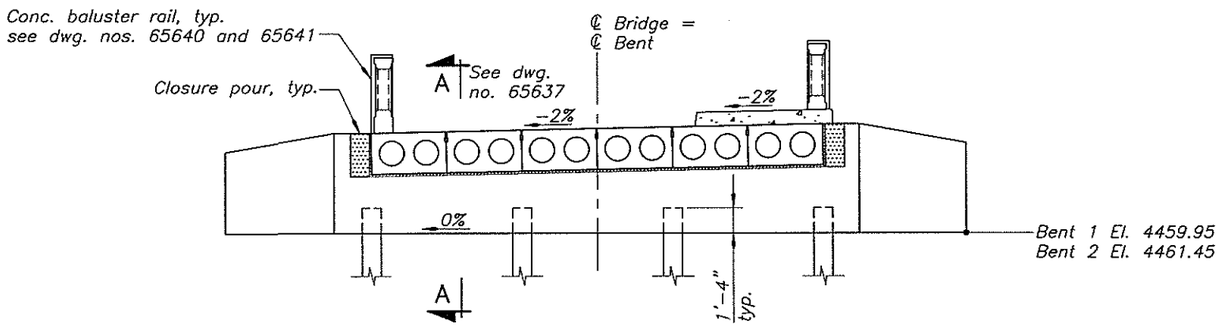
DRAWING NO. 65635



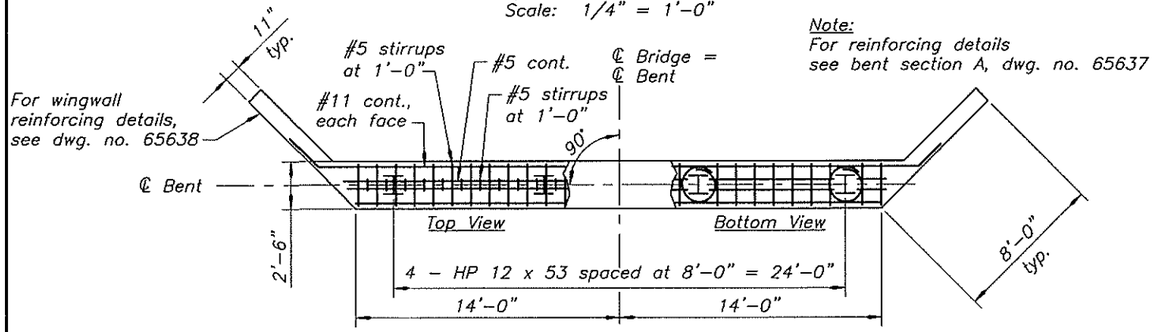
PLAN – BENT 2
(BENT 1 SIMILAR)
Scale: 1/4" = 1'–0"



ELEVATION
Scale: 1/2" = 1'–0"



ELEVATION – BENT 2
(BENT 1 SIMILAR)
Scale: 1/4" = 1'–0"



Note:
For reinforcing details see bent section A, dwg. no. 65637

PILE CAP – BENT 2
(BENT 1 SIMILAR)
Scale: 1/4" = 1'–0"

① AS-CONSTRUCTED PILE TIP ELEVATIONS

PILE LOCATION	ELEVATIONS
BENT #1 - PILE #1 - 12' LEFT	4435.3
BENT #1 - PILE #2 - 4' LEFT	4437.1
BENT #1 - PILE #3 - 4' RIGHT	4437.3
BENT #1 - PILE #4 - 12' RIGHT	4438.5
BENT #2 - PILE #1 - 12' LEFT	4402.9
BENT #2 - PILE #2 - 4' LEFT	4403.2
BENT #2 - PILE #3 - 4' RIGHT	4406.6
BENT #2 - PILE #4 - 12' RIGHT	4407.0

△	DATE	REVISION	BY
①	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubot
CHECKED: George Bornstedt
DESIGNED: Allen Rieke

DESIGNER
REGISTERED PROFESSIONAL ENGINEER 9345 OREGON MAY 22, 1977 ALLEN C. RIEKE
EXPIRES: 12-31-04
SIGNED: 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

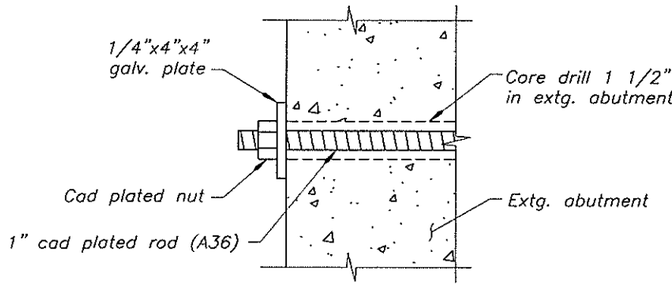
BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

BENT PLAN AND ELEVATION

FEDERAL HIGHWAY ADMINISTRATION | REGION 10 | OREGON DIVISION
PROJECT NUMBER: X-BRO-C063 (014)

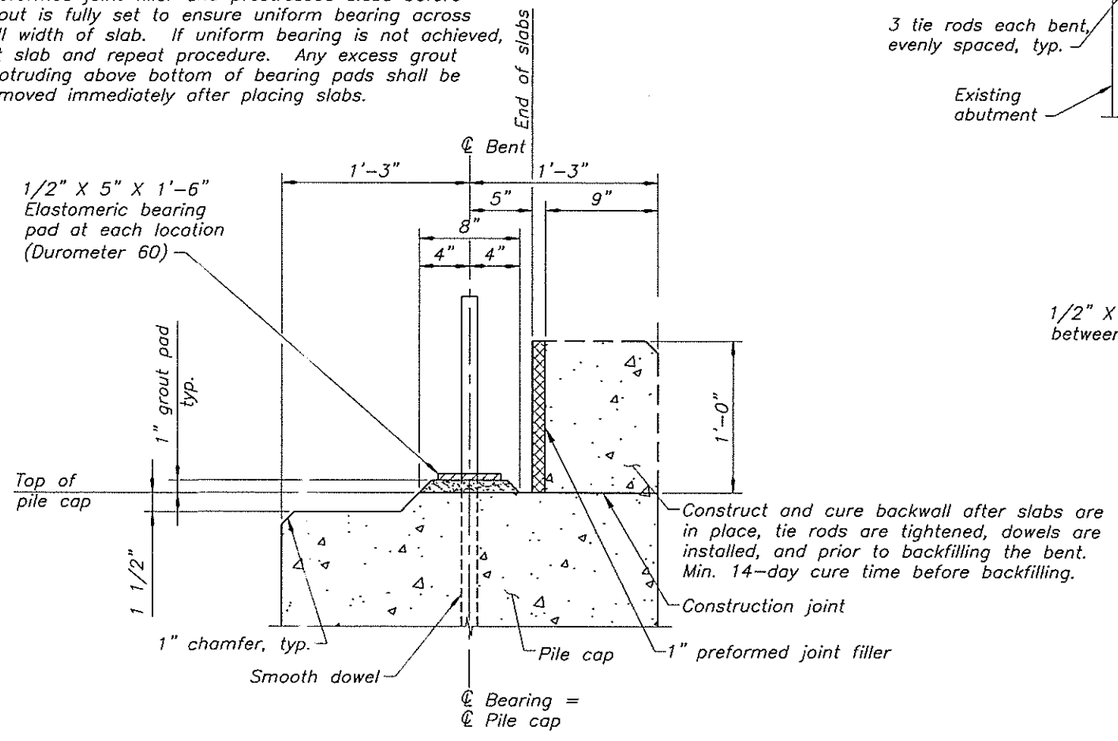
SHEET 3 OF 8
DRAWING NO. 65636



TIE ROD DETAIL AT EXISTING ABUTMENT

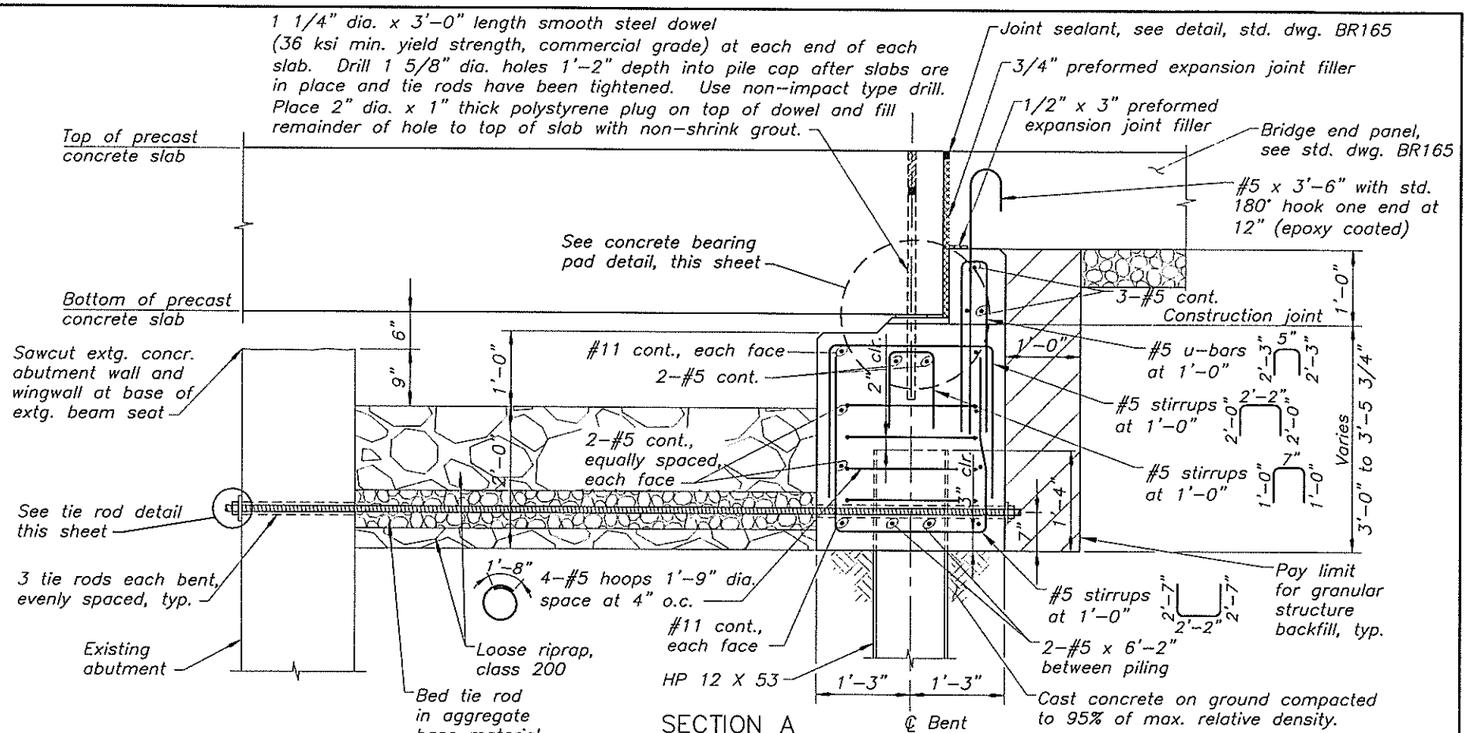
Scale: N.T.S.

<u>Note:</u>
Place 1" non-epoxy grout layer immediately before placing slabs. Place elastomeric bearing pads, preformed joint filler and prestressed slabs before grout is fully set to ensure uniform bearing across full width of slab. If uniform bearing is not achieved, lift slab and repeat procedure. Any excess grout protruding above bottom of bearing pads shall be removed immediately after placing slabs.



CONCRETE BEARING PAD DETAIL

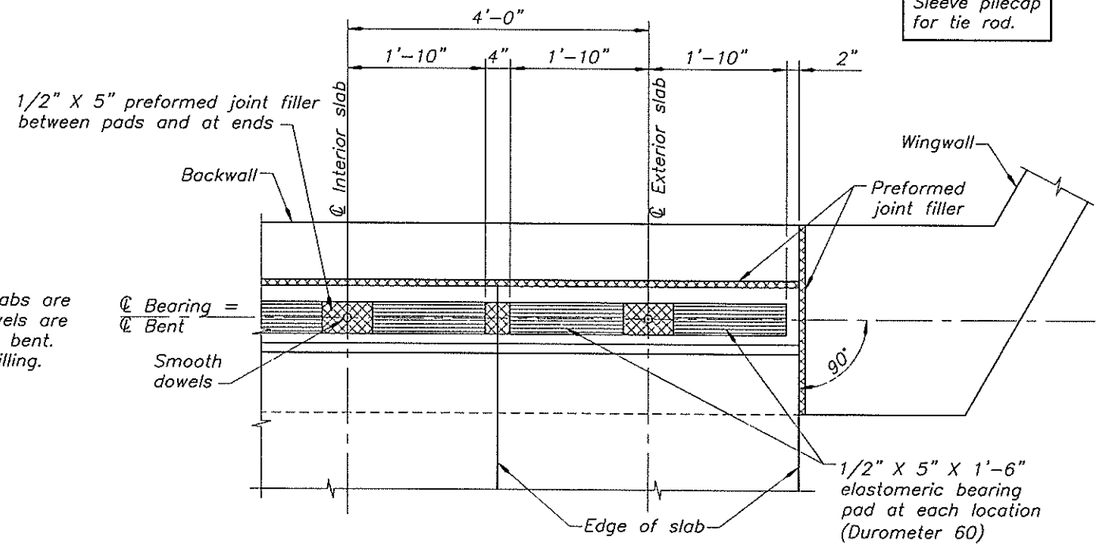
Scale: 1/2"=1'-0"



SECTION A

Scale: 1"=1'-0"

<u>Note:</u>
Sleeve pilecap for tie rod.



BEARING PAD LAYOUT DETAIL

Scale: 1"=1'-0"

△	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof
CHECKED: George Bornstedt
DESIGNED: Allen Rieke

DESIGNER
REGISTERED PROFESSIONAL ENGINEER 9345 OREGON JULY 22, 1977 ALLEN C. RIEKE
EXPIRES 12-31-04
SIGNED 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

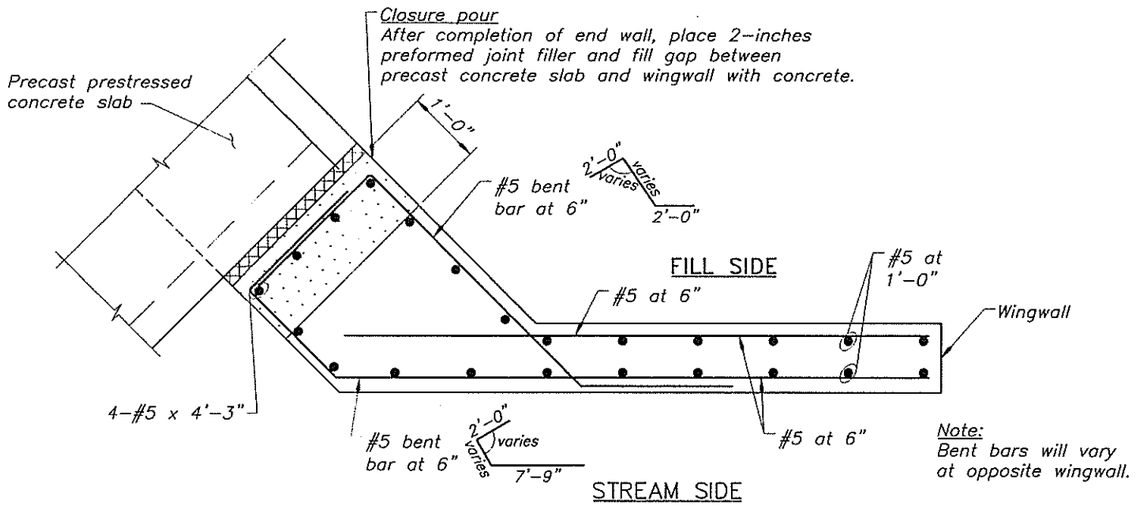
BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

BENT DETAILS

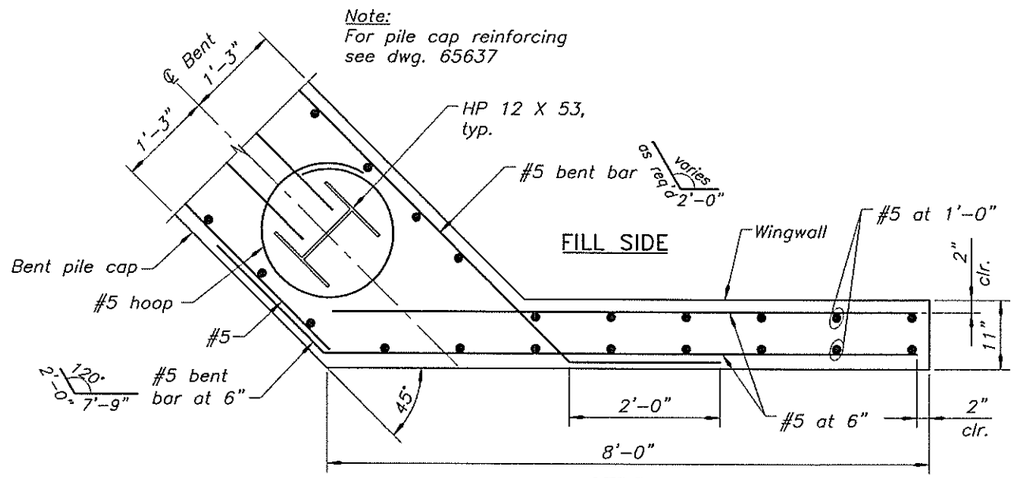
FEDERAL HIGHWAY ADMINISTRATION | REGION 10 | OREGON DIVISION | PROJECT NUMBER X-BRO-C063 (014)

SHEET 4 OF 8
DRAWING NO. 65637



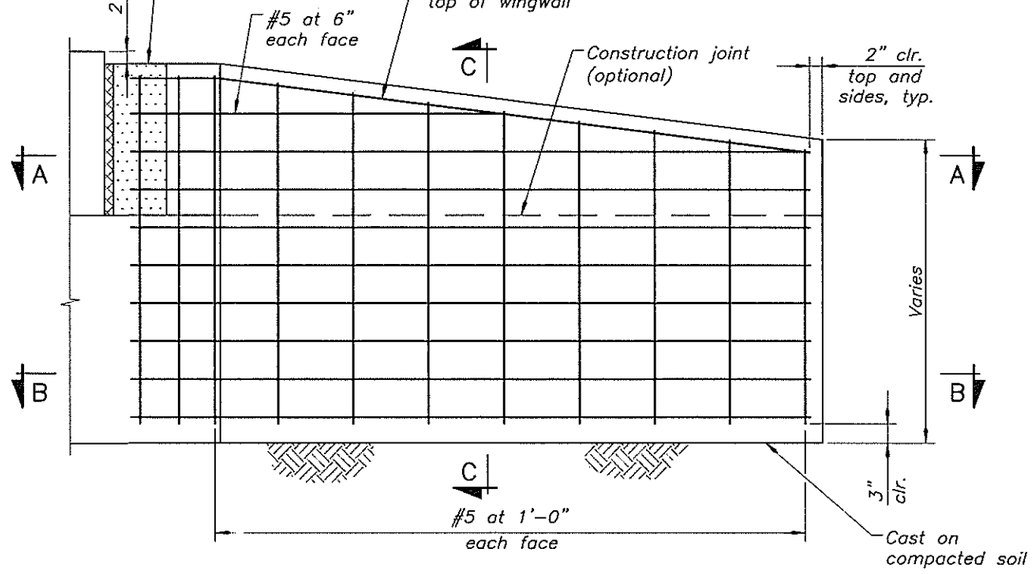
Note:
Bent bars will vary at opposite wingwall.

SECTION A
Scale: 1" = 1'-0"

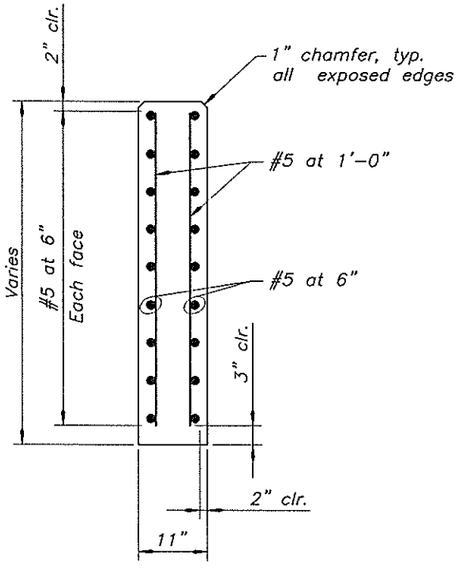


SECTION B
Scale: 1" = 1'-0"

Note:
Top of wingwall to be 2-inches below top of concrete slab



WINGWALL — ELEVATION
Scale: 1" = 1'-0"



SECTION C
Scale: 1" = 1'-0"

	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof
CHECKED: George Bornstedt
DESIGNED: Allen Rieke

DESIGNER
REGISTERED PROFESSIONAL ENGINEER 9545 OREGON JULY 22, 1977 ALLEN C. RIEKE
EXPIRES 12-31-04
SIGNED 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

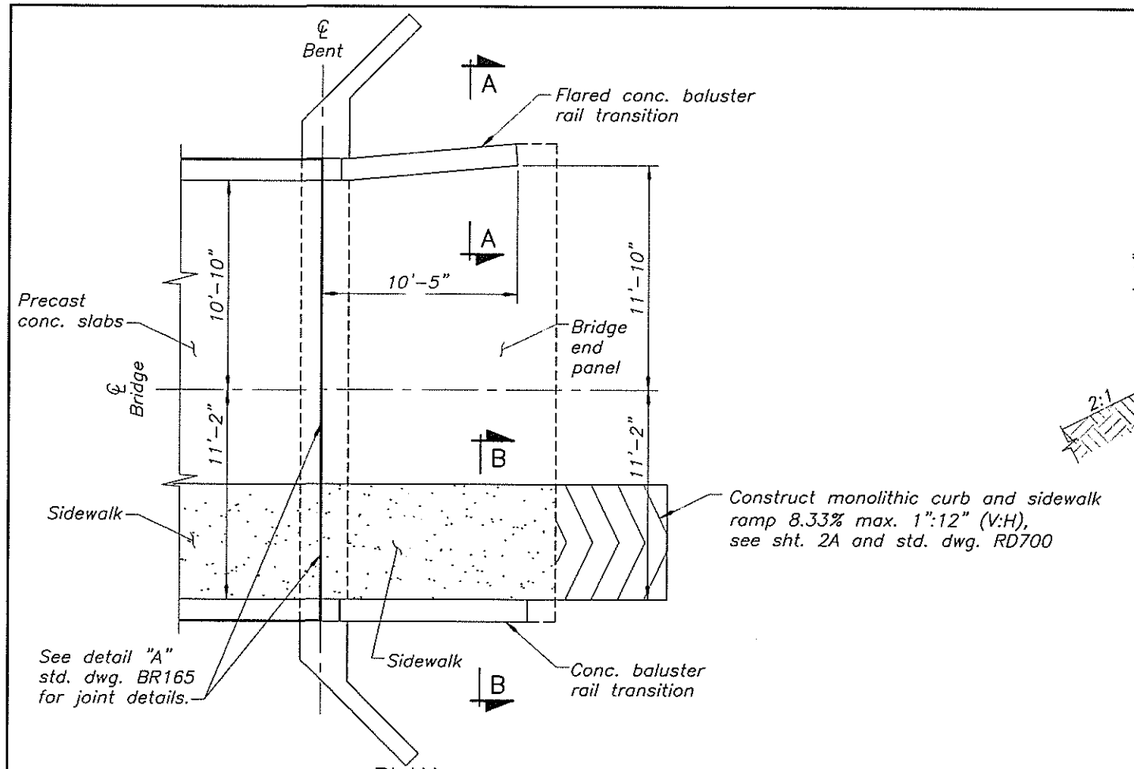
BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

WINGWALL DETAILS

FEDERAL HIGHWAY ADMINISTRATION | REGION 10 | OREGON DIVISION | PROJECT NUMBER X-BRO-C063 (014)

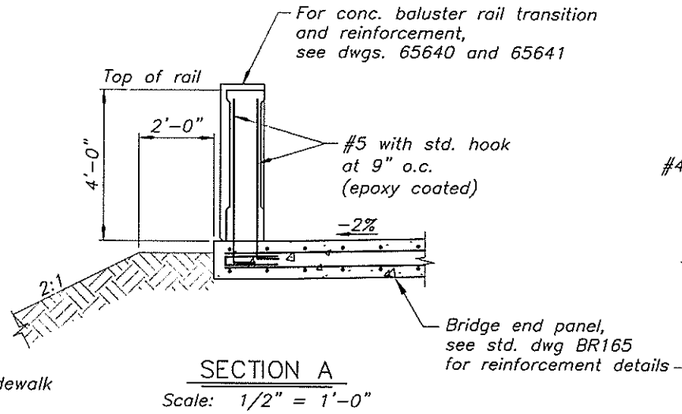
SHEET 5 OF 8
DRAWING NO. 65638



PLAN

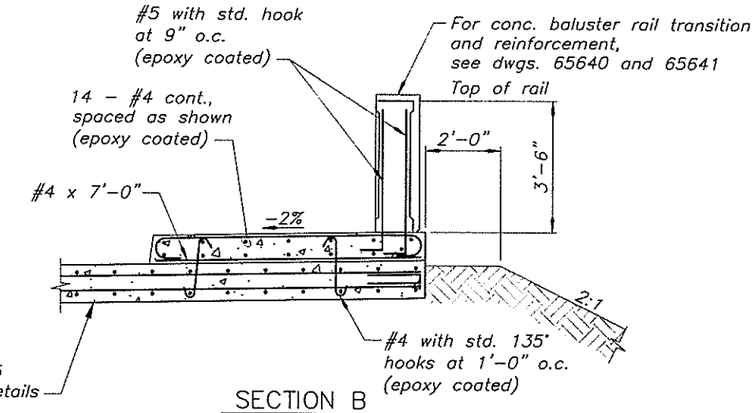
(BENT 2 – BENT 1 SIMILAR)

Scale: 1/4" = 1'-0"



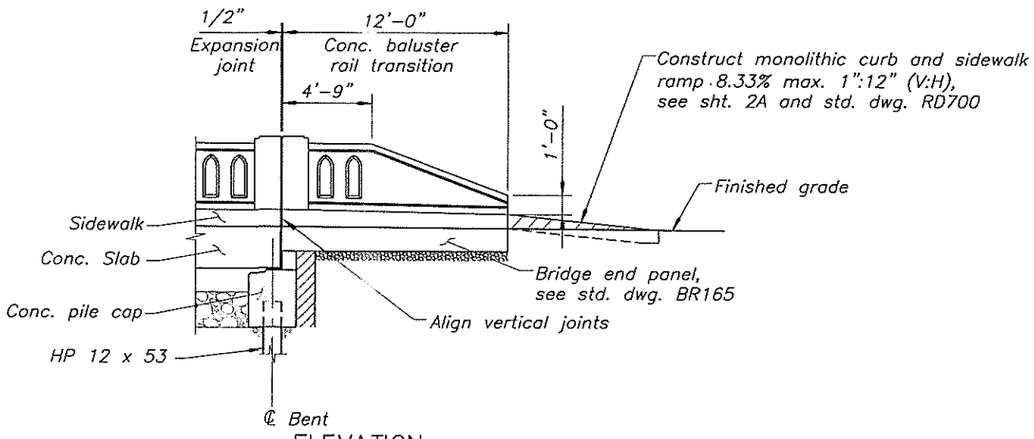
SECTION A

Scale: 1/2" = 1'-0"



SECTION B

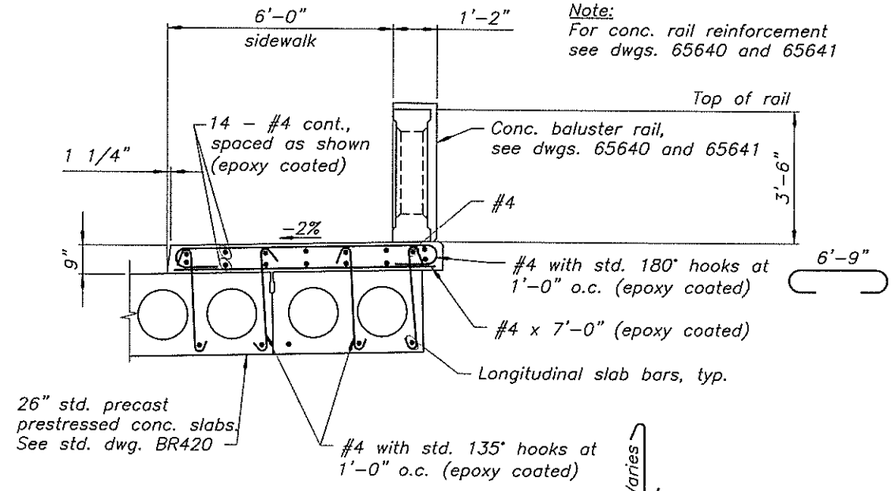
Scale: 1/2" = 1'-0"



ELEVATION

(BENT 2 – BENT 1 SIMILAR)

Scale: 1/4" = 1'-0"



SIDEWALK REINFORCEMENT DETAIL – BRIDGE

Scale: 1/2" = 1'-0"

	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof

CHECKED: George Bornstedt

DESIGNED: Allen Rieke

DESIGNER

REGISTERED PROFESSIONAL ENGINEER 9346 OREGON JULY 22, 1977 ALLEN C. RIEKE EXPIRES 12-31-04 SIGNED 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

BRIDGE NO. 19939

DATE Jun. 2004

CALC. BOOK

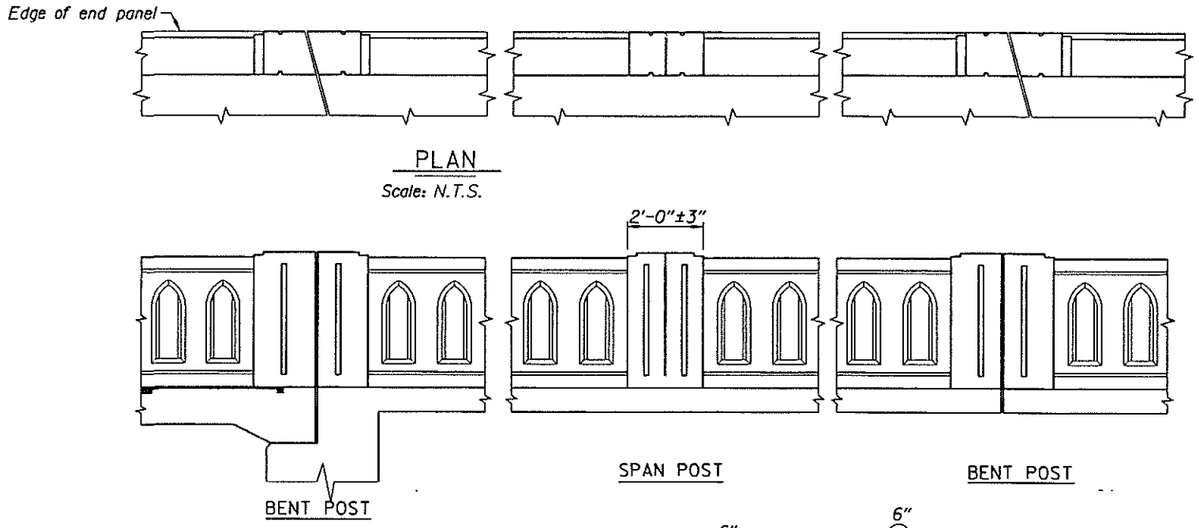
WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

BRIDGE DETAILS

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER
REGION 10	OREGON DIVISION	X-BRO-C063 (014)

SHEET 6 OF 8

DRAWING NO. 65639

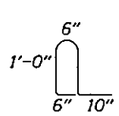


PLAN
Scale: N.T.S.

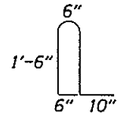
ELEVATION
Scale: N.T.S.

SPAN POST

BENT POST



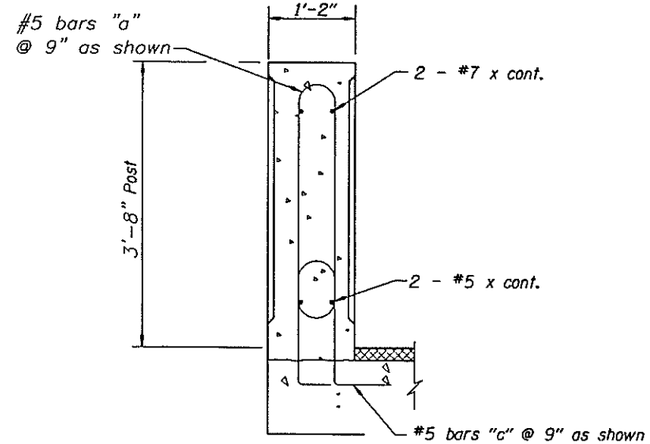
BAR "b"



BAR "c"

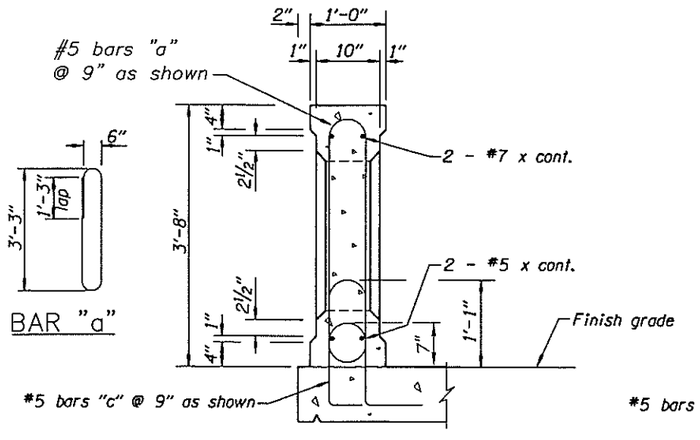
GENERAL NOTES

Construct posts and openings normal to deck.
Remove any form material from expansion joint and span post openings.



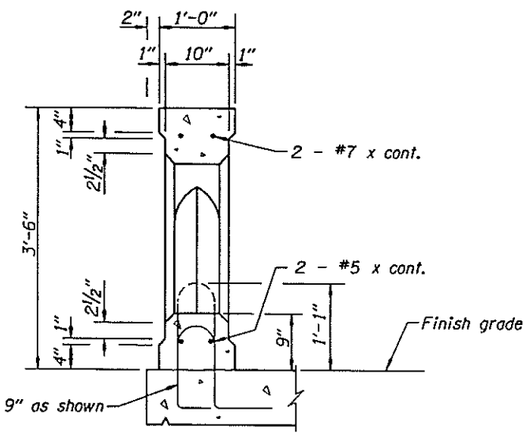
SECTION AT BENT POST OR SPAN POST
Scale: N.T.S.

Notes:
1. *For rail heights see dwg. 65636*
2. *Sidewalk mounted baluster rail (upstream side) is 3'–6" from sidewalk to top of rail.*
3. *Dimensions shown on this sheet are for sidewalk mounted (3'–6") rail.*
4. *For slab mounted bridge rail (downstream side) use the following schedule for reinforcement vertical dimensions:*
   - *bar "a" = 3'–9"*
   - *bar "b" = 1'–5"*
   - *bar "c" = 1'–11"*



BAR "a"

SECTION AT SPAN POST
Scale: N.T.S.



SECTION AT WINDOW
Scale: N.T.S.

	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof
CHECKED: George Bornstedt
DESIGNED: Allen Rieke

DESIGNER
REGISTERED PROFESSIONAL ENGINEER 9345 OREGON JULY 22, 1977 ALLEN C. RIEKE
EXPIRES 12-31-04
SIGNED 06-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

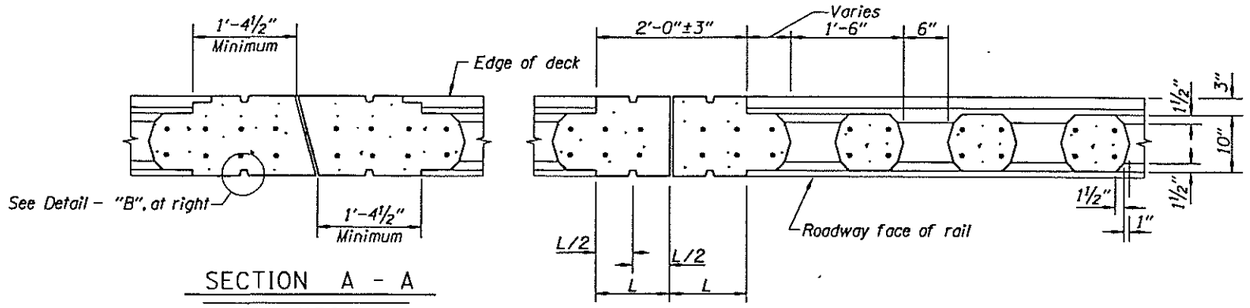
BRIDGE NO. 19939
DATE Jun. 2004
CALC. BOOK

WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

CONCRETE BALUSTER RAIL DETAILS I

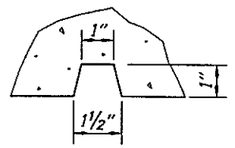
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER
REGION 10	OREGON DIVISION	X-BRO-C063 (014)

SHEET 7 OF 8
DRAWING NO. 65640



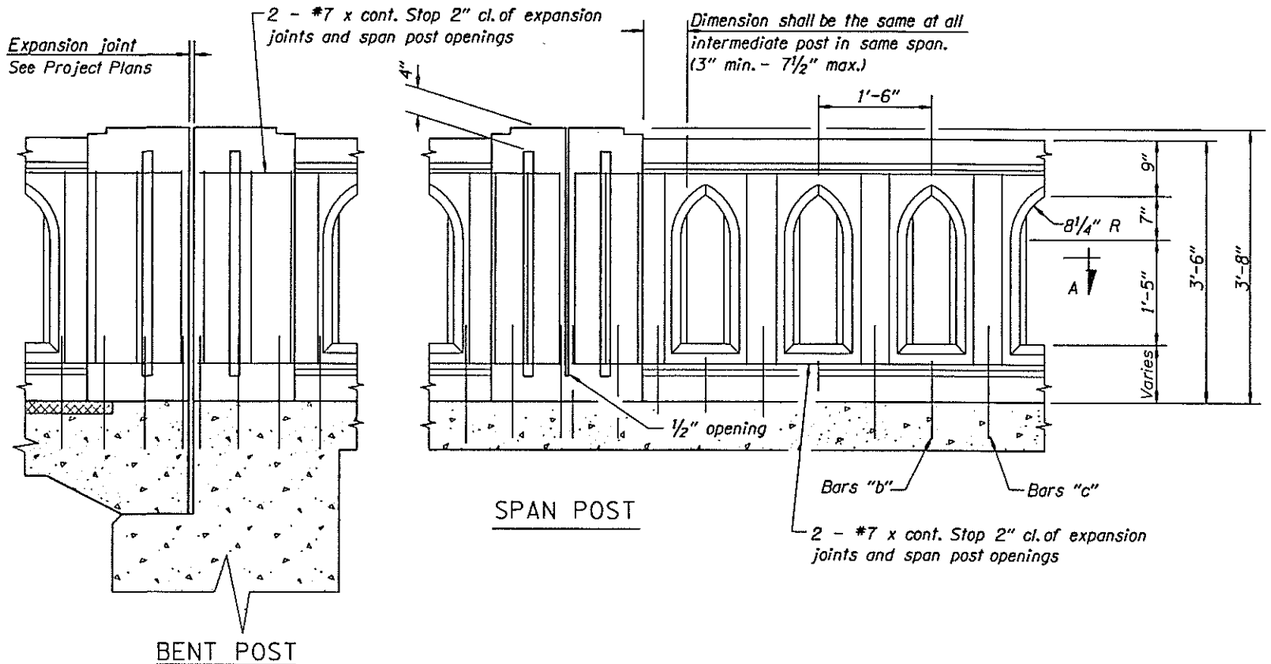
SECTION A - A

Scale: N.T.S.



DETAIL "B"

Scale: N.T.S.

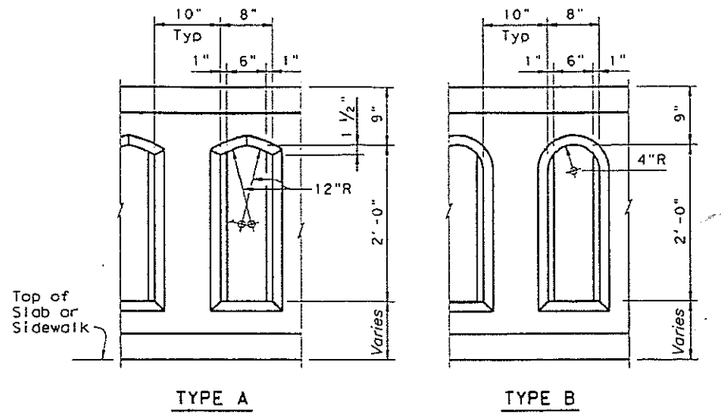


BENT POST

SPAN POST

POST ELEVATION DETAILS

Scale: N.T.S.



TYPE A

TYPE B

WINDOW TYPES

△	DATE	REVISION	BY
	7-24-08	As Constructed	LDH

DRAFTED: Lisa Hubof

CHECKED: George Bornstedt

DESIGNED: Allen Rieke

DESIGNER

REGISTERED PROFESSIONAL ENGINEER 9345 OREGON JULY 22, 1977 ALLEN C. RIEKE EXPIRES 12-31-04 SIGNED 08-09-04

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

ACCOMPANIED BY DWGS.

BRIDGE NO. 19939

DATE Jun. 2004

CALC. BOOK

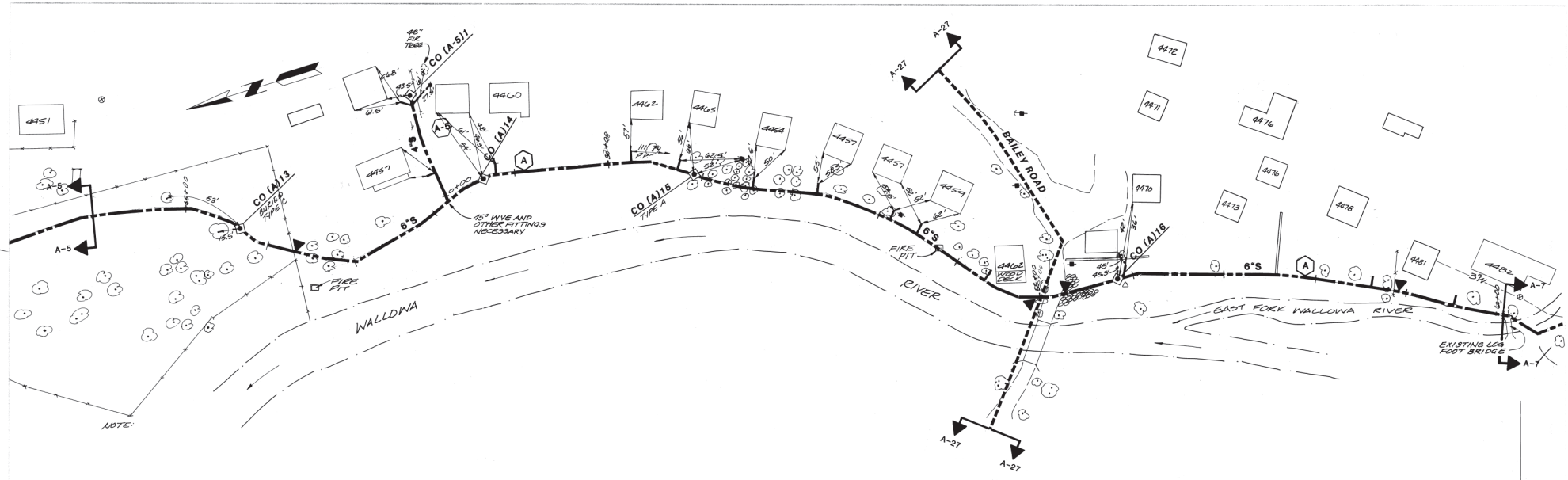
WALLOWA RIVER BRIDGE
BAILEY LANE
WALLOWA COUNTY

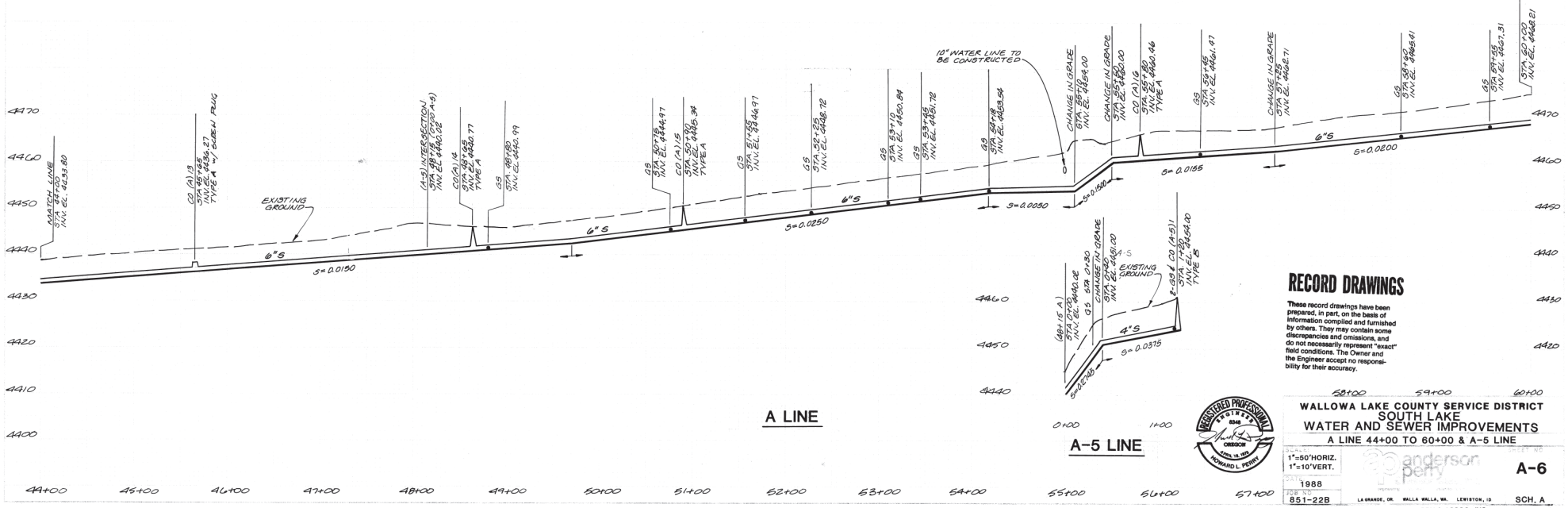
CONCRETE BALUSTER RAIL DETAILS II

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER
REGION 10	OREGON DIVISION	X-BRO-C063 (014)

SHEET 8 OF 8

DRAWING NO. 65641





RECORD DRAWINGS

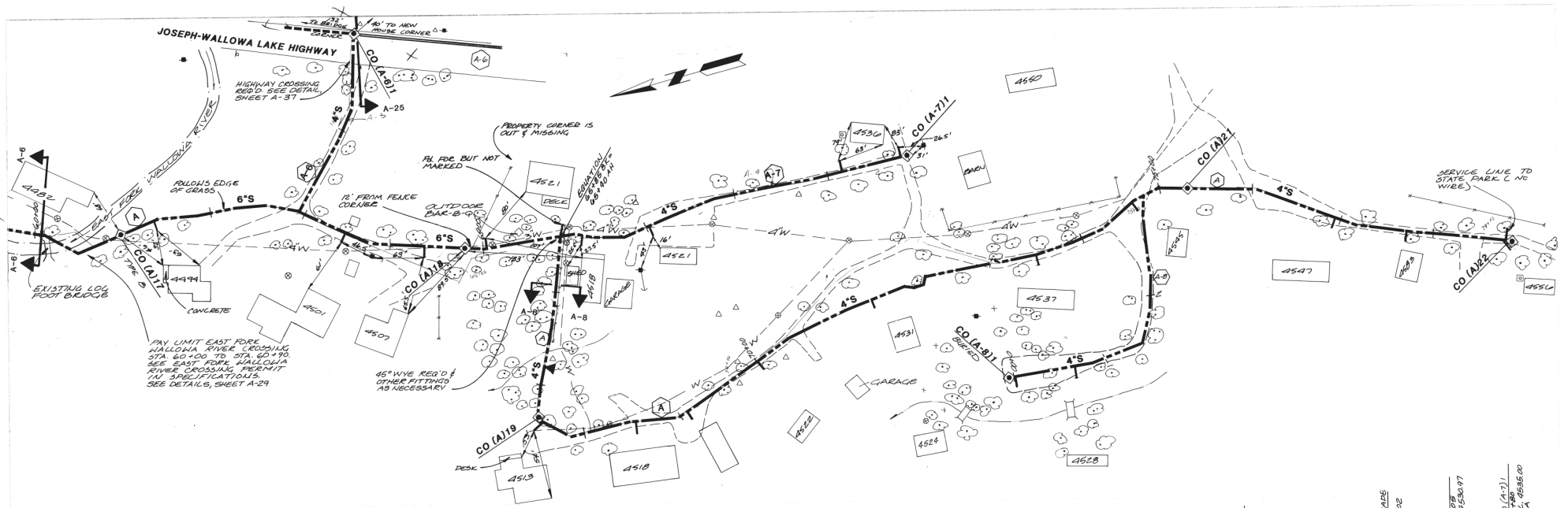
These record drawings have been prepared, in part, on the basis of information compiled and furnished by others. They may contain some discrepancies and omissions, and do not necessarily represent "exact" field conditions. The Owner and the Engineer accept no responsibility for their accuracy.

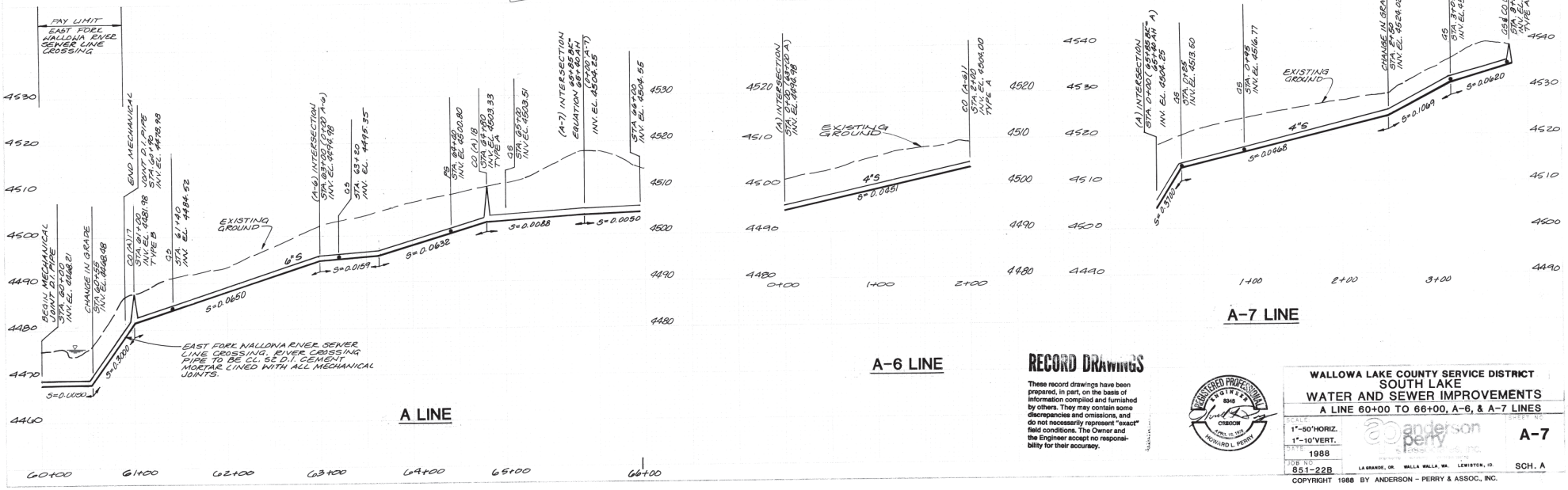
REGISTERED PROFESSIONAL ENGINEER 6348 OREGON APRIL 19, 1972 LEONARD L. PERRY

WALLOWA LAKE COUNTY SERVICE DISTRICT
SOUTH LAKE
WATER AND SEWER IMPROVEMENTS
A LINE 44+00 TO 60+00 & A-5 LINE

SCALE	1"=50'HORIZ. 1"=10'VERT.	SHEET NO. A-6
DATE	1988	
JOB NO.	851-22B	SCH. A

anderson perry — LA GRANDE, OR. WALLA WALLA, WA. LEWISTON, ID





RECORD DRAWINGS

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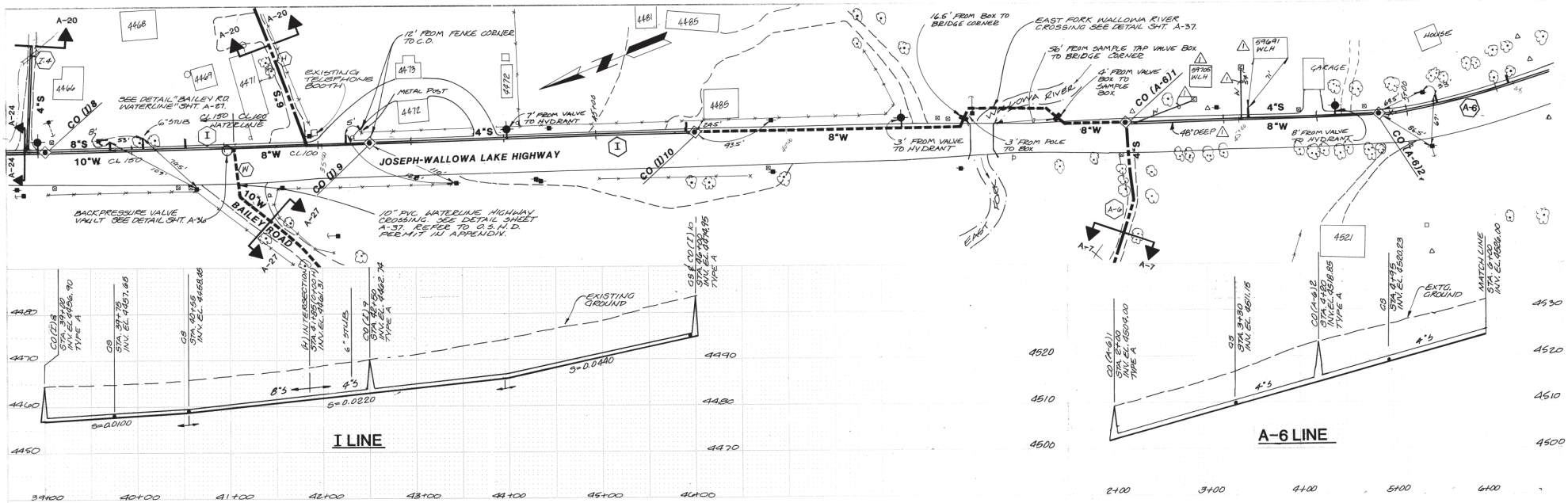
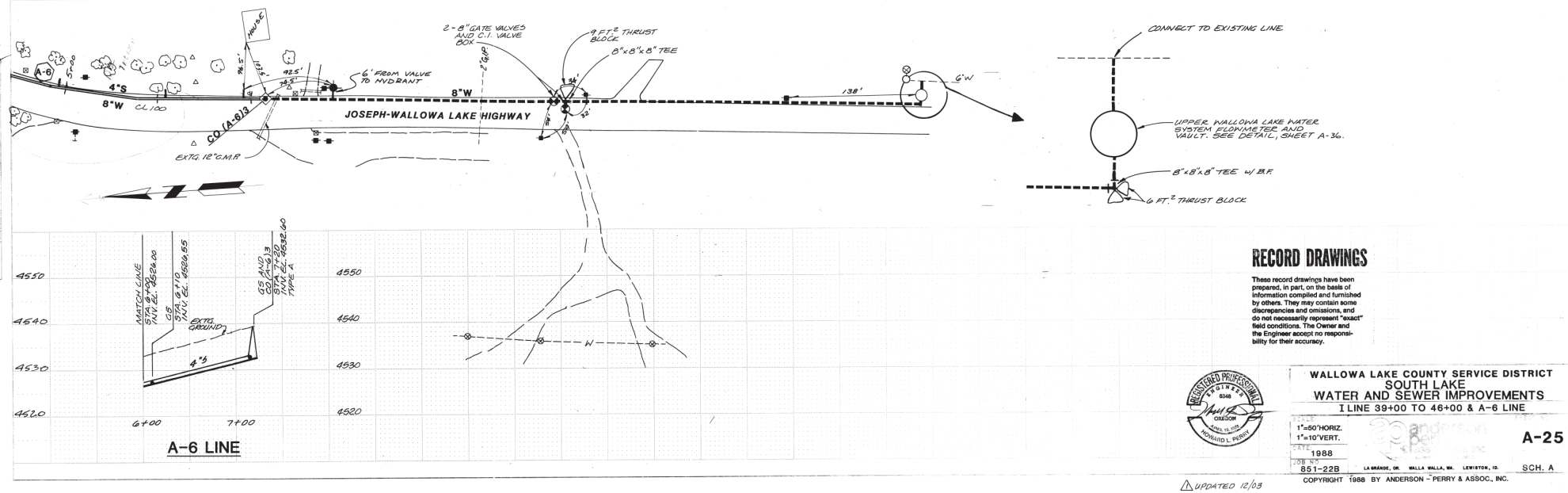
REGISTERED PROFESSIONAL ENGINEER 9348 OREGON APRIL 19, 1974 HOWARD L. PERRY

WALLOWA LAKE COUNTY SERVICE DISTRICT
SOUTH LAKE
WATER AND SEWER IMPROVEMENTS
A LINE 60+00 TO 66+00, A-6, & A-7 LINES

SCALE	1"-50'HORIZ. 1"-10'VERT.
DATE	1988
JOB NO.	851-22B
SHEET NO.	A-7
DRAWING NO.	SCH. A

anderson perry & ASSOC. INC.
LA GRANDE, OR. WALLA WALLA, WA. LEWISTON, ID.





RECORD DRAWINGS

These record drawings have been prepared, in part, on the basis of information compiled and furnished by others. They may contain some discrepancies and omissions, and do not necessarily represent "exact" field conditions. The Owner and the Engineer accept no responsibility for their accuracy.

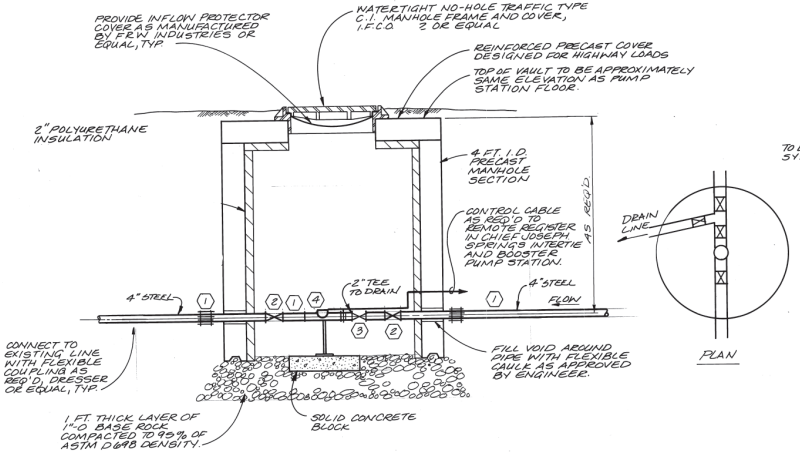
REGISTERED PROFESSIONAL ENGINEER 8348 OREGON JUNE 15, 1972 HOWARD L. PERRY

WALLOWA LAKE COUNTY SERVICE DISTRICT
SOUTH LAKE
WATER AND SEWER IMPROVEMENTS
I LINE 39+00 TO 46+00 & A-6 LINE

SCALE 1"=50'HORIZ. 1"=10'VERT.
DATE 1988
JOB NO. 851-22B
LA GRANDE, OR. WALLA WALLA, WA. LEWISTON, ID.

A-25
SCH. A

UPDATED 12/03

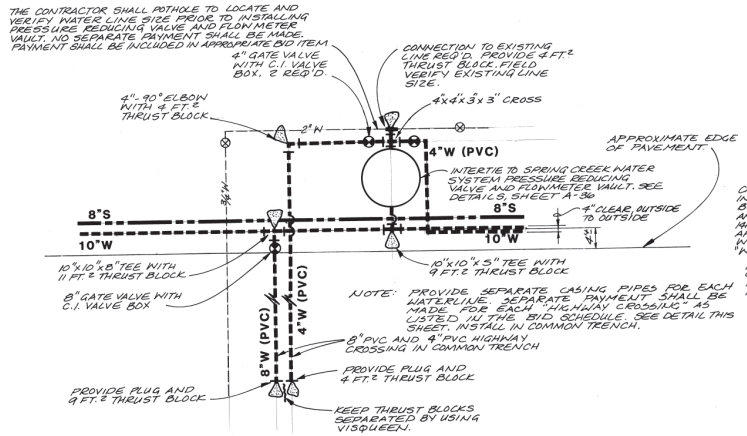


CHIEF JOSEPH SPRINGS FLOWMETER VAULT

3/4" = 1'-0"

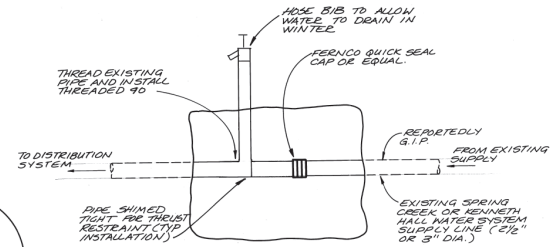
FITTING SCHEDULE

1. 2" dia. spool, length as required.
2. 2" gate valve.
3. 2" dia. 1-foot long spool with union.
4. 2" turbine flowmeter with Pulser-RM meter head and remote mount register indicating in gallons, Neptune or approved equal.



INTERTIE TO SPRING CREEK WATER SYSTEM

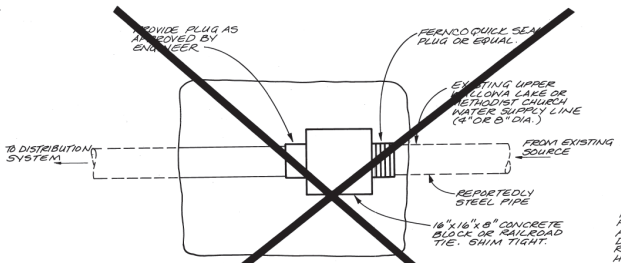
N.T.S.



PLAN

CAPPING SPRING CREEK & KENNETH HALL WATER SYSTEMS

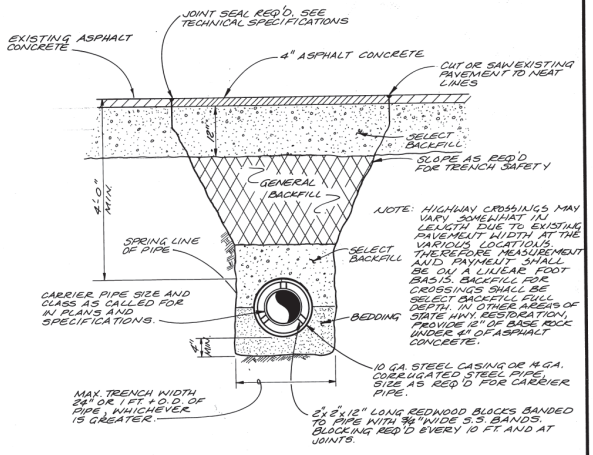
N.T.S.



PLAN

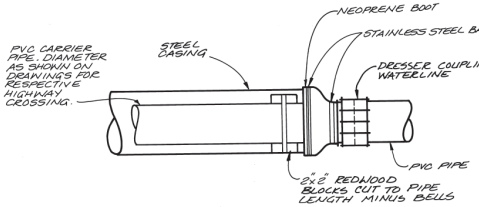
CAPPING UPPER WALLOWA LAKE & METHODIST CHURCH WATER SYSTEMS

N.T.S.



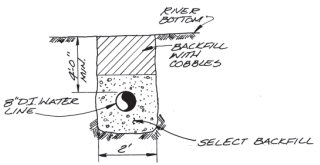
HIGHWAY CROSSING TRENCH DETAIL

N.T.S.



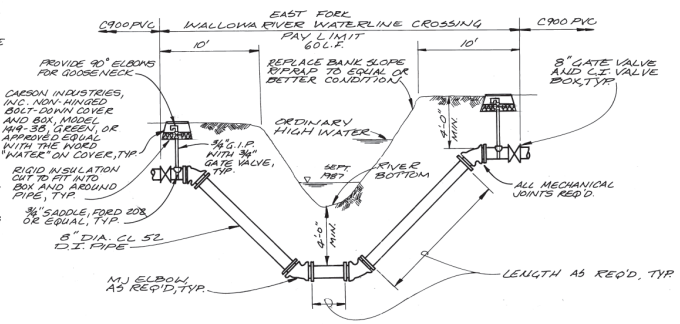
HIGHWAY CROSSING SECTION

N.T.S.



RIVER CROSSING SECTION

N.T.S.



EAST FORK WALLOWA RIVER WATER LINE CROSSING

N.T.S.

RECORD DRAWINGS

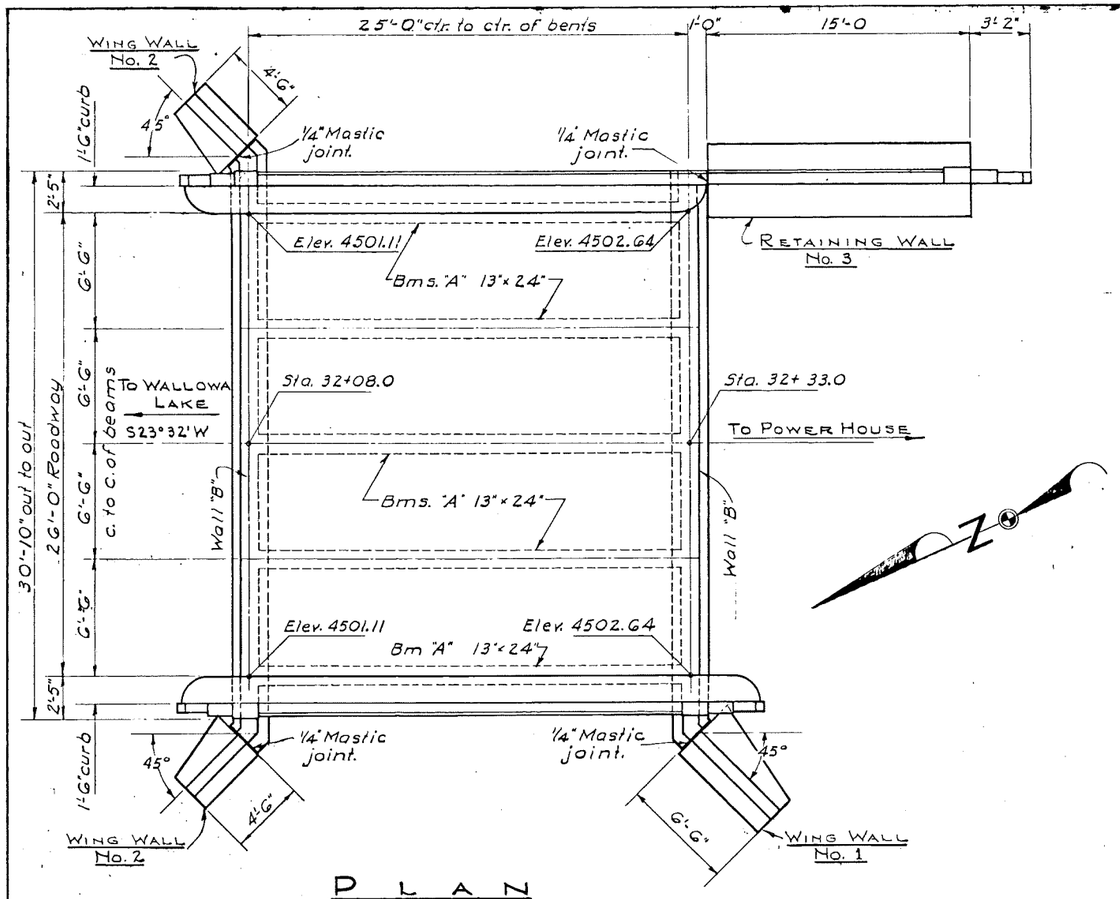
These record drawings have been prepared, in part, on the basis of information compiled and furnished by others. They may contain some discrepancies and omissions, and do not necessarily represent "exact" field conditions. The Owner and the Engineer accept no responsibility for their accuracy.

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 13, 1984 — JAMES J. HOLT — 12,555

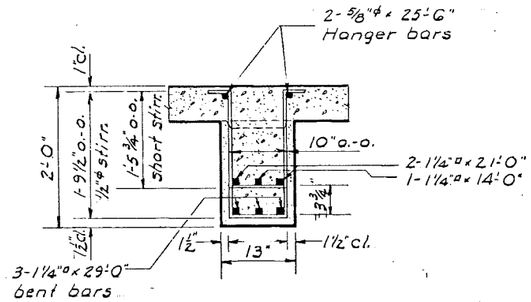
WALLOWA LAKE COUNTY SERVICE DISTRICT
SOUTH LAKE
WATER AND SEWER IMPROVEMENTS
MISCELLANEOUS WATER SYSTEM DETAILS

SCALE:	SHEET NO.
AS SHOWN	A-37
DATE: 1988	
JOB NO. 851-42	SCH. A

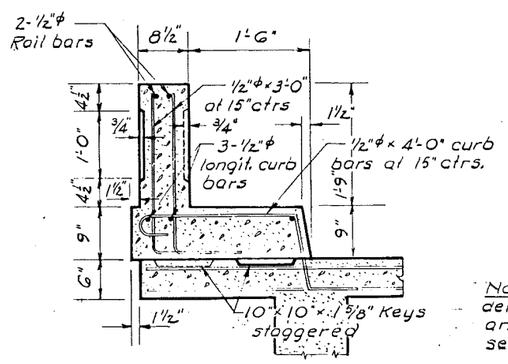
anderson perry & associates, inc. engineering · surveying · materials testing
LA GRANDE, OR WALLA WALLA, WA LEWISTON, ID.



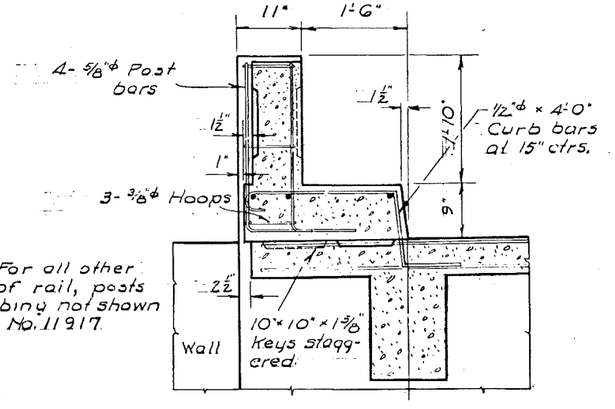
PLAN



BEAM "A"
SCALE 1"=1'-0"



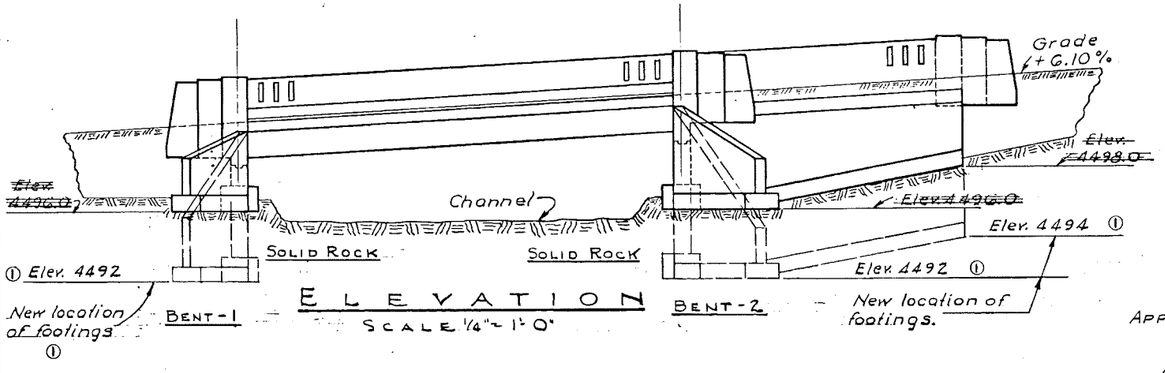
RAIL SECTION
SCALE 1"=1'-0"



POST SECTION
SCALE 1"=1'-0"

NOTE: For all other details of rail, posts and curbing not shown see dwg No. 11917.

GENERAL NOTES:
All concrete shall be class "A" mix and shall attain a breaking strength of 3,300 p.s.i. in 28 days (fc = 1320 p.s.i.). All reinforcing steel shall be intermediate grade deformed bars. Bars #3 to #11 inclusive shall be lapped 20 dia. unless noted otherwise. 1½" ϕ bars shall be lapped 60 dia. at all splices unless noted or shown otherwise. Bars #3 to #11 inclusive shall conform to A.S.T.M. specification A 305-50 T (fs = 20,000 p.s.i.). All bars shall be placed 2" clear of nearest concrete face unless noted or shown otherwise.
Bridge designed for H20-S16-44 loading.
All material and workmanship shall conform to the specifications of the OREGON STATE HIGHWAY COMMISSION.



ELEVATION
SCALE 1/4"=1'-0"

APPROVED:
BRIDGE ENGINEER

① Revised June 21, 1955

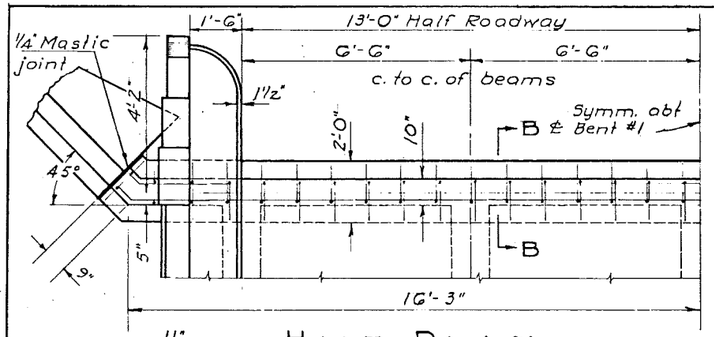
OREGON
STATE HIGHWAY COMMISSION

EAST FORK WALLOWA RIVER BRIDGE
WALLOWA LAKE LODGE-POWER HOUSE SECTION
WALLOWA COUNTY
PLAN & ELEVATION

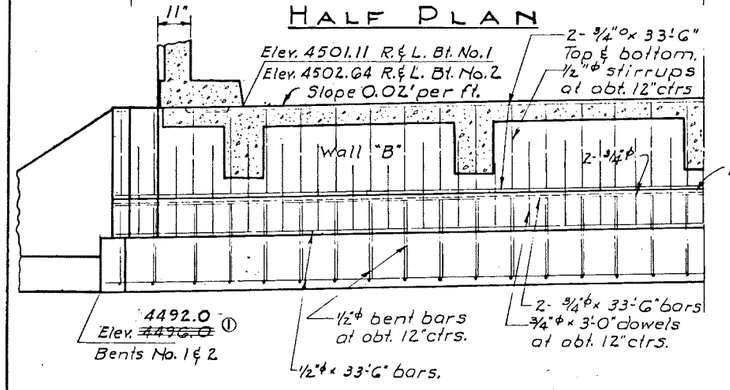
SCALE NOTED
JULY 2, 1954
CALC. BK. No. 359
ACCOMP. BY DWGS No. 11593 & 11917.

DRAWN BY F.G.G.
CHECKED BY W.H.R

SHEET 1 OF 3
BRIDGE No. 7918
DWG. No. 11592



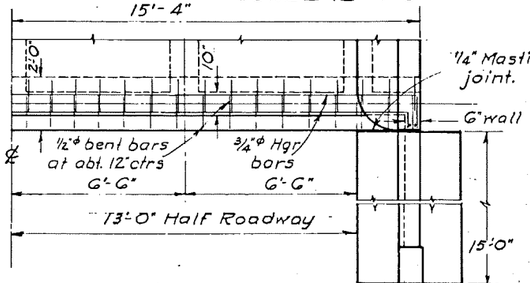
HALF PLAN



HALF ELEVATION

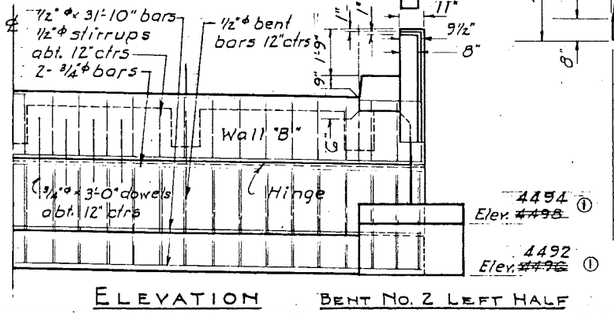
BENT No. 1
& BENT No. 2 RIGHT HALF

SCALE 1/2" = 1'-0"



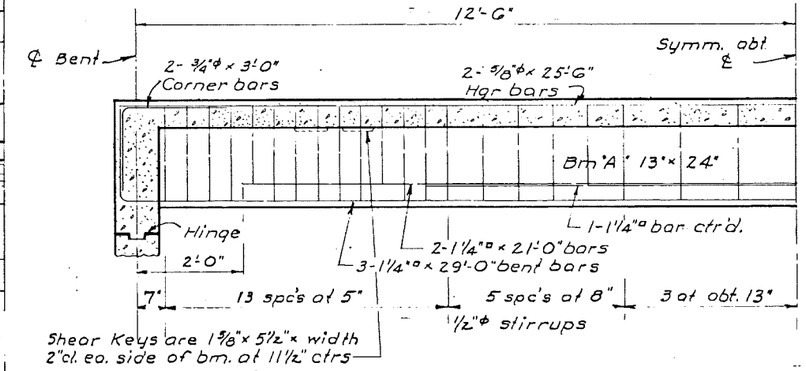
PLAN

BENT No. 2 LEFT HALF



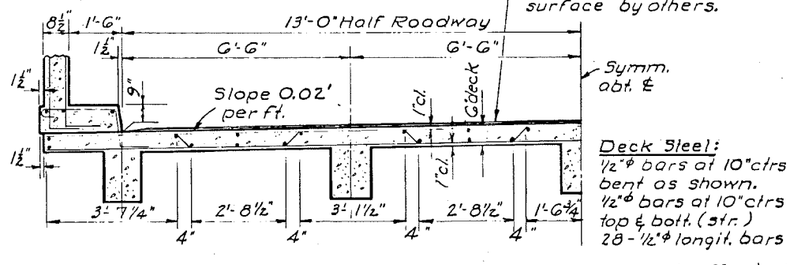
ELEVATION

BENT No. 2 LEFT HALF



HALF LONGIT. BEAM SECTION

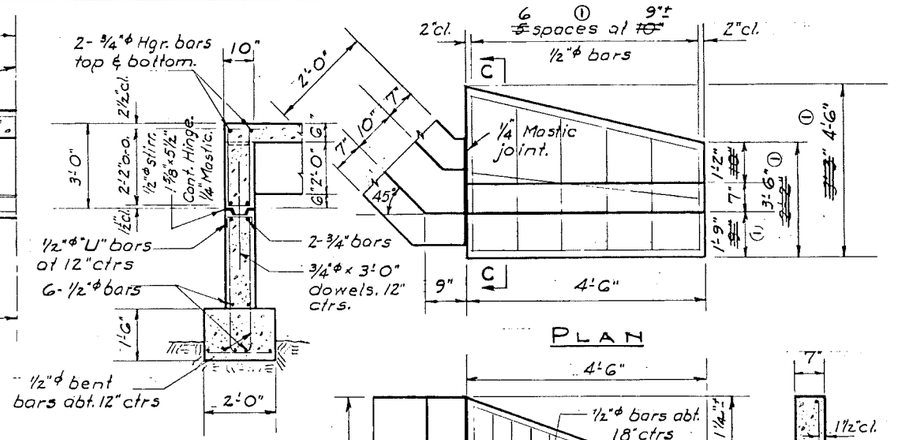
SCALE 3/4" = 1'-0"



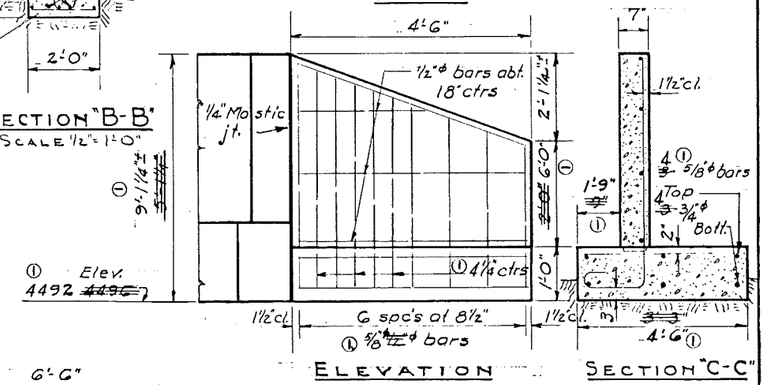
TYPICAL DECK SECTION

SCALE 1 1/2" = 1'-0"

Deck Steel:
1/2"ø bars at 10" ctrs bent as shown.
1/2"ø bars at 10" ctrs top & bott. (3 tr.)
28 - 1/2"ø longit. bars



PLAN



SECTION "B-B"

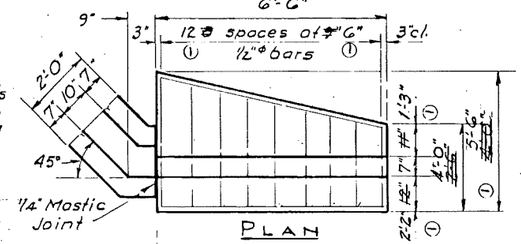
SCALE 1/2" = 1'-0"

ELEVATION

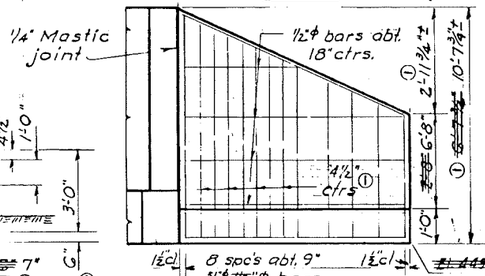
SECTION "C-C"

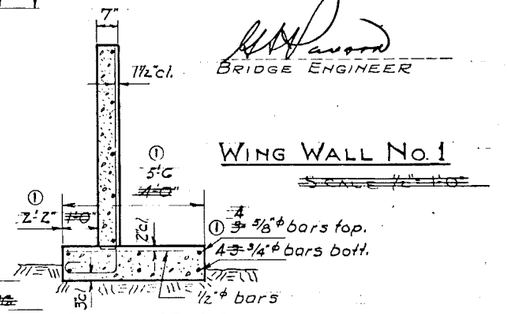
WING WALL No. 2

~~SCALE 1/2" = 1'-0"~~



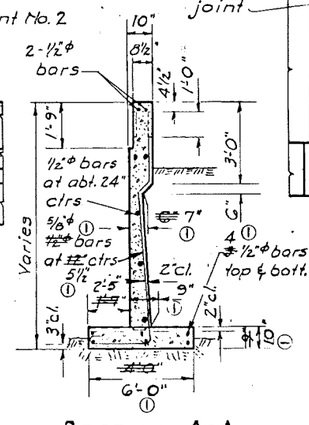
PLAN





WING WALL No. 1

~~SCALE 1/2" = 1'-0"~~



SECTION A-A

Revised June 21, 1955
① (No Scale)

PLAN

ELEVATION

RETAINING WALL No. 3

~~SCALE 3/4" = 1'-0"~~

APPROVED:

BRIDGE ENGINEER

OREGON
STATE HIGHWAY COMMISSION

EAST FORK WALLOWA RIVER BRIDGE
GENERAL DETAILS

SCALE NOTED
JULY 9, 1954
CHECKED BY W.H.R.
DRAWN BY F. G.

SHEET 2 OF 3
BRIDGE No. 7918
DWG. No. 11593

9-197

133250

File No. Washington .... Field ~~[illegible]~~

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

Description Prepared 7/1/26 (DATE)

by G.H.Canfield

Description of Gaging Station on East Fork Wallowa River

Near Joseph State of Oreg.

Prepare description in accordance with outline on back of Form 9-277. Plot cross section to scale. Use Form 9-213A for sketch and cross section. Initial and date all sheets.

Lat. 45°16'10", long. 117°13'00" - ~~Umatilla~~ Wallowa Nat'l Forest Map-Mar. 1936

1.- Location. In ~~N~~SE. ¼ sec. 29, T. 3 S., R. 45 E., one fourth mile above junction with West Fork, one mile below dam of Enterprise Electric Co., one mile above head of Wallowa ~~County~~ Lake, and 6 miles above Joseph, Wallowa County.

2.- Establishment. July 27, 1924 by G. H. Canfield, assisted by Lewis A. Stanley, watermaster.

3.- Gage. Vertical enamel-faced 0-3.3 section fastened to base of large tree flush with edge on right bank; 100 yards above bridge on road to power house of Enterprise Electric Co.; read by Wayne K. Wagner, chief operator at plant - distance ¼ mile. Also gage at dam from which head on spillway can be obtained by multiplying gage reading by 0.63; read about once a month. The length of crest is 21.6 feet and tables for rectangular contracted weir was checked by one discharge measurement and is used in computing discharge.

Superseded by later description 4/14/50

See end of description #1

* 4.- Bench Marks. ~~Head of 20-d nail driven into tree opposite 3.00 on gage.~~ Gone, 9-16-32
#2 " " " " " "pine" " gage - ~~5.20~~ 5.09

9/ 5.- [illegible]

6.- Discharge measurements.- Made at all except extremely high stages, by wading or from plank 10 feet below gage; channel straight 10 feet above and 4 feet below; bed fairly smooth, but current swift. At extremely high stages, at bridge 100 yards downstream where the section is very poor because of angle and rough section.

7.- Floods.-

8.- Point of zero flow. 0.30 foot ± .2 foot.

9.- Winter flow.- Seriously affected by ice, especially anchor ice during the winter.

10.- Regulation. The diversion dam and intake of the Enterprise Electric Co., one mile upstream regulate the flow to some extent although the plant does not divert all the flow except during extremely low water - maximum diversion, 9 second-feet in 1925.

11.- Diversions.- None except that noted above.

12.- Accuracy.- Good.

13.- Cooperation.- Enterprise Electric Co., F.P.C. license No. 308, furnished gage readings, and pays for services and expenses of making measurements and computations. This company was purchased by the Pacific Power & Light Co., Portland, Oreg. in 1926.

* B.M. #3. P. P. & L. Co. bronze tablet in top of small boulder about 2" above ground level and 30 feet northwest of gage; on left bank; stamped "4524-1933". Elevation, 7.34 feet gage datum. Altitude

5.- Control.- Control is unreinforced concrete weir approximately 12 feet wide between natural banks with a rise of 1 inch per foot of length from center. Top width is 6", base width 11", max. height 12" above stream bed on downstream side. Stream bed level with crest on upstream side.

Point of zero flow 0.54 ft. ght. as constructed on Mar. 28, 1934. Crest lowered at times while clearing control of ice with ice chisel. Point of zero flow 0.40 ft. on Oct. 13, 1936.

4.- Bench marks.- BM #1 is Water-Resources bronze tablet in concrete cone 25 feet west of gage; elevation, 8.41 feet above zero of gage or 4526.10' above m.s.l. (1929 gen.adj.).
B.M. #2.- Head of 20 d nail driven into pine tree opposite gage; elevation, 5.09 feet above zero of gage.
B.M. #3.- P.P. & L. Co. bronze tablet in small boulder about 2 inches above ground level, 30 feet northwest of gage, stamped "4524-1933"; elevation, 7.34 feet above zero of gage and 4,525.03 feet above mean sea level (1929 gen. adj.).
Zero of gage is 4,517.69 feet above m.s.l. (1929 gen.adj.). Levels run by John Kovtynovich on Aug. 5, 1939, to ascertain elevations above mean sea level, starting from B.M. 11 (P.P. & L.) in boulder 100 feet northwest of power plant, disk stamped "4646.3-11-1929"; elevation, 4,646.271 feet above mean sea level (gen.adj.of 1929).

9-197
(May 1949)

Superseded by description dated 10-7-58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

13325000

File No. { Washington / Field ~~1022~~

Description Prepared 4-14-50 (Date)

by D. L. Miller

Description of Gaging Station on East Fork Wallowa River ~~Creek~~

~~At~~ Near Joseph State of Oregon

Prepare description in accordance with outline on back of Form 9-277. Plot cross section to scale. Use Form 9-213A for sketch and cross section. Initial and date all sheets.

1. Location.- Water-stage recorder, lat. 45°16'10", long. 117°13'00" - Wallowa National Forest Map - Mar. 1936 - in SE¼ sec. 29, T. 3 S., R. 45E., one fourth mile above confluence with West Fork, one mile below dam of Pac. Power and Light Co., one mile above head of Wallowa Lake, and 6 miles above Joseph, Wallowa County.

2. Establishment.- July 27, 1924, by G. H. Canfield assisted by Lewis A. Stanley, watermaster.

April 7, 1950, recorder installed in timber shelter over concrete well by D. L. Miller and D. Hansen.

3. Gage.- Stevens A-35 water-stage recorder in insulated timber shelter over concrete well connected to the river by two 2" intakes with flushing equipment. Outside staff is 0 - 3.34 feet section mounted on plank on cottonwood tree on right bank opposite gage house. Inside gage 0 - 6.74 feet is on a 2" x 6" bolted to the concrete well.

Physical features of station

Well		~~5.0 feet sq. outside - 3.75 feet sq. inside~~
House		5.0 feet sq. outside with half log siding
Bottom of Well		~~Elevation 0.00 foot~~
"	" lower intake (~~invert~~)	" 0.54 "
"	" upper intake (~~invert~~)	" 1.42 "
"	" house floor	" 7.50 feet
"	" bench	" 10.50 "

Cross section control crest as shown

4. Reference marks.- R. M # 1 is Water-Resources bronze tablet in concrete cone 10 feet bankward from downstream, bankward corner of gage house; elevation, 8.41 feet above zero of gage or 4526.10 above m. s. l. (1929 gen. adj.)

R. M. # 3. P. P. & L. Co. bronze tablet in small boulder 2 inches above ground level about 7 feet north of R. M # 1 stamped "4524 - 1933"; elevation, 7.34 feet above zero of gage and 4525.69 feet above m. s. l. (1929 gen. adj.)

R. M. # 4 is top of step bolt set in concrete well on streamward downstream corner; elevation, 7.278 feet above zero of gage or 4524.968 feet above m.s.l. (~~1929 gen. adj.~~)

U. S. GOVERNMENT PRINTING OFFICE 16—58616-1

Zero of gage is 4,517.69 feet above m.s.l. (1929 gen. adj.). Levels run by John Kovtynovich on Aug. 5, 1939, to ascertain elevations above mean sea level, starting from B.M. 11 (P. P. & L.) in boulder 100 feet northwest of power plant, disk stamped "4646.3-11-1929"; elevation, 4,646.271 feet above mean sea level (gen. adj. of 1929).

5. Control.- Control is a concrete V type weir 14 feet long and 10 feet wide with cross section as shown on attached sheet.

6. Discharge measurements.- Made at all but extremely high stages by wading on the control or from plank 10 feet above gage; at extremely high stages at bridge 100 yards downstream where the section is poor because of angle and rough section.

7. Floods.- Maximum discharge, 300 sec.-ft. July 25, 1937 (from floodmarks).

8. Point of zero flow.- 1.31 feet.

9. Winter flow.- Seriously affected by ice, especially anchor ice.

10. Regulation.- The diversion dam and intake of the Pacific Power and Light Co., one mile upstream regulate the flow to some extent although the plant does not divert all the flow except during extremely low water - maximum diversion, ~~x second-feet for 1935~~ about 17 second-feet.

11. Diversions.- None except that noted above.

12. Accuracy.- Good.

13. Cooperation.- Pacific Power and Light Co., F.P.C. license No. 308, paid the construction costs for the house and well and pays for the operation of the station. The U. S. Geological Survey furnished the recorder.

16—58616-1 U. S. GOVERNMENT PRINTING OFFICE

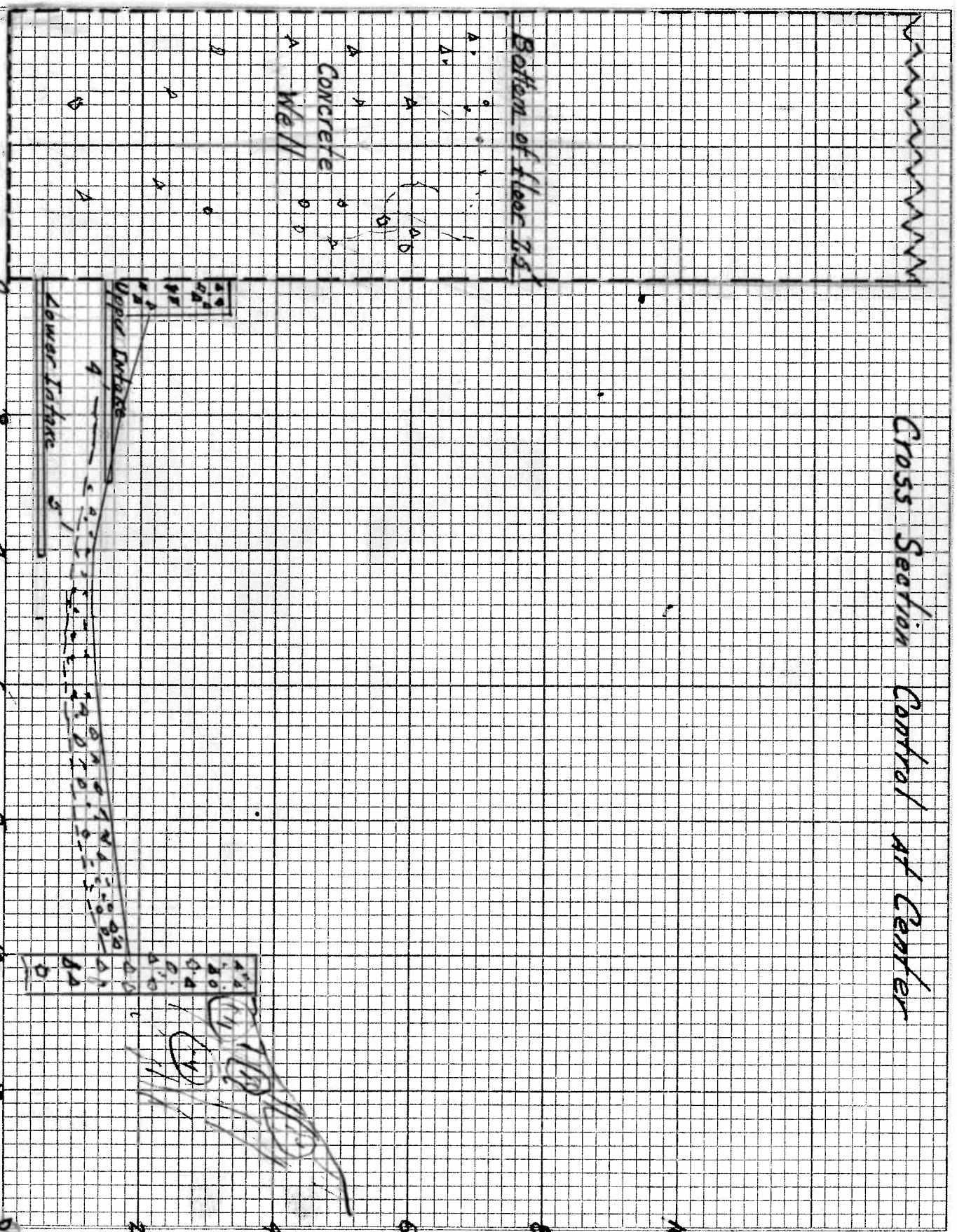
9—213-A
(November 1939)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

File Number { Washington ..... District 1822

East Fork Wallowa River near Joseph, Oreg

GPO 16—13468-1



(DO NOT USE THIS SPACE EXCEPT FOR BINDING PURPOSES)

ev. ft.

Sheet No. 1 of 1 sheets. Prepared by BZM Date 4-11-50 Checked by ..... Date .....

3

9-197
(Nov. 1954)

Superseded 8-22-68

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

13-3250.00
File No. { Washington
Field 1833

Revised
Description Prepared Oct. 7, 195(
(Date)
by E. A. Oster
Description verified by J.F.C. 12-14-60

Description of Gaging Station on East Fork Wallowa River near Joseph, Oreg.

(Prepare description in accordance with outline on back of Form 9–277. Plot cross section to scale. Use Form 9–213A or 9–213E for cross section. Use second page of this form for sketch if room is available, otherwise use Form 9–213C or 9–213H. Initial and date all sheets.)

16—58616-2 GPO

1. Location.--Water-stage recorder, lat 45°16'20", long 117°12'35" - "Joseph" 15-min. quadrangle ~~Wallowa National Forest Map - Mar. 1936~~ - in NE¼ sec. 29, T. 3 S., R. 45 E., a quarter of a mile above confluence with West Fork, one mile below dam of Pacific Power and Light Company, one mile upstream from Wallowa Lake, and ~~4~~ 5½ miles south of Joseph, Wallowa County. See attached sketch.

2. Establishment.--July 27, 1924, by G. H. Canfield assisted by Lewis A. Stanley, watermaster.

April 7, 1950, recorder installed in timber shelter over concrete well by D. L. Miller and D. Hansen.

3. Gage.--Stevens A-35 water-stage recorder in insulated timber shelter over concrete well connected to the river by two 2" intakes with flushing equipment; electrically heated during winter. Outside staff is 0 - 3.34 ft section mounted on 4"x4" post under left end of footbridge at gage. Inside gage 0 - 6.74 ft is on a 2" x 6" bolted to the concrete well.

Physical features of station

Well	5.0 ft sq outside- 3.75 ft sq inside.
House	5.0 ft sq outside with half log siding.
Bottom of well	Elevation 0.00 ft
Bottom of lower intake (invert)	Elevation 0.54 ft
Bottom of upper intake (invert)	Elevation 1.42 ft
Bottom of house floor	Elevation 7.50 ft
Bottom of bench	Elevation 10.50 ft

Cross section control crest as shown on attached sketch.

4. Benchmarks.-- B.M. #1 is Water-Resources bronze tablet in concrete cone 10 ft bankward from downstream bankward corner of gage house; elevation, 8.41 ft above zero of gage or 4,526.10 ft above m.s.l. (1929 gen. adj.).

B.M. #3, P.P. & L. Co. bronze tablet in small boulder 2 inches above ground level about 7 ft north of B.M. #1 stamped "4524 - 1933"; elevation, 7.36 ft above zero of gage and 4525.05 ft above m.s.l. (1929 gen. adj.).

B.M. #4 is top of step bolt set in concrete well on streamward downstream corner; elevation, 7.278 ft above zero of gage or 4,524.968 ft above m.s.l. (1929 gen. adj.)

Zero of gage is 4,517.69 ft above m.s.l. (1929 gen. adj.). Levels run by John Kovtynovich on Aug. 5, 1939, to ascertain elevations above mean sea level, starting from B.M. (P.P. & L.) in boulder 100 ft northwest of powerplant, disk stamped "4646.3-11-1929"; elevation, 4,646.271 ft above mean sea level (gen. adj. of 1929).

5. Control.--Control is a concrete V-type weir 14 ft long and 10 ft wide with cross section as shown on attached sheet.

6. Discharge measurements.--Made at all but extremely high stages by wading at fair sections upstream; at extremely high stages at foot-bridge 100 ft upstream.

7. Floods.--Maximum discharge, 450 cfs July 25, 1937 (gage height, 3.63 ft, from floodmarks).

8. Point of zero flow.-- ~~kx3kxfx~~ 1.20 ft as determined Sept. 1, 1960 at a stage of 145 ft.

9. Winter flow.--Seriously affected by ice, at times each winter.

10. Regulation.--The diversion dam and intake of the Pacific Power and Light Co., one mile upstream, regulate the flow to some extent although the plant does not divert all the flow except during extremely low water - maximum diversion, about 17 cfs.

11. Diverions.--None except that noted above.

12. Accuracy.--Good.

13. Cooperation.--Pacific Power and Light Co., F.P.C. license No. 308, paid the construction costs for the house and well and pays for the operation of the station. The U. S. Geological Survey furnished the recorder.

9-197
(Nov. 1964)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File No. | Washington
Field 13-3250.00

Description Revised 8-22-68 (Date)
by D.H.Giles

Description of Gaging Station on East Fork Wallowa River near Joseph, Oreg.

(Prepare description in accordance with outline on back of Form 9-277. Plot cross section to scale. Use Form 9-213A or 9-213E for cross section. Use second page of this form for sketch if room is available, otherwise use Form 9-213C or 9-213H. Initial and date all sheets.)

☆ GPO 1964—O-756-264

1. Location.--Lat 45°16'20", long 117°12'35", in NE¼ sec.29, T. 3 S., R.45 E., on left bank 0.2 mile upstream from confluence with West Fork, 1 mile upstream from Wallowa Lake, 5.5 miles south of Joseph, and at mile 55.0.
   See road log shown on attached sheet.

2. History.--July 27, 1924, by G. H. Canfield assisted by Lewis A. Stanley, watermaster.
   April 7, 1950, recorder installed in timber shelter over concrete well by D.L. Miller and D. Hansen. Analog recorder replaced with digital Oct. 12, 1967.

3. Drainage area.--10.3 sq mi.

4. Gage.--Fischer-Porter 30-minute punch water-stage recorder equipped with float drive and index in insulated timber shelter over concrete well to the river by two 2" intakes with flushing equipment. Outside staff is 0-3.34 ft section mounted on 4"x4" post under left end of footbridge at gage. Inside gage 0-6.74 ft is on a 2"x6" bolted to the concrete well.

Gage-house features	Elev., in feet, above gage datum
Bottom of well	0.00
Bottom of lower intake (invert)	0.54
Bottom of upper intake (invert)	1.42
Bottom of house floor	7.50
Bottom of bench	10.50

5. Bench marks.-- R.M. 1 is Water-Resources bronze tablet in concrete cone 10 ft bankward from downstream bankward corner of gage house; elevation, 8.41 ft ~~above zero of gage~~ gage datum or 4,526.10 ft above m.s.l. (1929 gen. adj.).
   R.M.3, P.P. & L. Co. bronze tablet in small boulder 2 inches above ground level about 7 ft north of B.M. 1 stamped "4524 - 1933"; elevation, 7.36 ft ~~above zero of gage~~ gage datum and 4525.05 ft above m.s.l. (1929 gen. adj.).
   R.M. 4 is top of step bolt set in concrete well on streamward downstream corner; elevation, 7.278 ft above zero of gage or 4,524.968 ft above m.s.l. (1929 gen.adj.)

   Datum zero of gage is 4,517.69 ft above m.s.l. (1929 gen. adj.). Levels run by John Kovtynovich on Aug. 5, 1939, to ascertain elevations above mean sea level, starting from B.M. (P.P.& L.) in boulder 100 ft northwest of powerplant, disk stamped "4646.3-11-1929"; elevation, 4646.271 ft above mean sea level (gen. adj. of 1929).

6. Control.--Control is a concrete-flume. Gradient of streambed to control is steep and changes frequently due to the shifting of gravel and cobblestone.

7. Discharge measurements.--Low and medium flow measurements made at fair section on concrete flume at gage or at same section from bridge for high flows.

8. Floods.--Maximum discharge, 450 cfs July 25, 1937 (gage height, 3.63 ft, from floodmarks).

9. Point of zero flow.--1.20 ft as determined Sept. 1, 1960, at a stage of 1.45 ft.

10. Winter flow.--Seriously affected by ice, at times each winter.

11. Regulation.--The diversion dam and intake of the Pacific Power and Light Co., one mile upstream, regulate the flow to some extent although the plant does not divert all the flow except during extremely low water -- maximum diversion, about 17 cfs,

12. Diversions.--None except that noted above.

13. Accuracy.--Good.

14. Cooperation.--Pacific Power and Light Co., FPC license No. 308, paid the construction costs for the house and well and pays for the operation of the station. The U.S. Geological Survey furnished the recorder.

15. Maps.--Wallowa National Forest Map March 1936.

16. Photographs.--

17. Indirect measurement.--None.

Road Log:

14-3250.00 East Fork Wallowa River near Joseph, Oreg.

0.0 miles - From Postoffice in Joseph take paved road to Wallowa Lake

0.5 miles - Keep left on road to Wallowa Lake.

1.3 miles - Chief Joseph monument and axis of Wallowa Lake dam.

5.6 miles - Take road to left. Upper end of Wallowa Lake.

6.2 miles - Station is directly to left (east) of road about 200 ft.

Howison, Russ

From: Dave Wildman <dwildman@andersonperry.com>
Sent: Friday, October 17, 2014 5:14 PM
To: Howison, Russ
Cc: Mike Hayward (mhayward@co.wallowa.or.us); McCune, Kimberly; Don Butler (wdjibutler@gmail.com)
Subject: RE: Wallowa Falls Hydro
Attachments: img-X17163928-0001.pdf; img-X17164222-0001.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Russ,

Sorry for the delay in responding to this and for your reminder call the other day. With regard to potential flooding of the septic tanks at the Woodin (Flying Arrow) property, it may be helpful for you to have some background information. Attached are two figures from the District's 2003 Water and Wastewater Study showing the Wallowa County Service District's Wastewater Collection System layout and configuration. I've also scanned a page from the study describing the wastewater system history and overview. With this background information, it is apparent that flooding of the septic tanks at the Flying Arrow site could result in potential impacts to the operation of the District's sewage collection system and/or the City of Joseph's wastewater treatment plant. Since the magnitude of the flooding is unknown, it is assumed that the septic tanks would be submerged for some time and that a significant volume of floodwater would be pouring into the septic tanks.

With inundated septic tanks, excess flows would be conveyed to the collection system. If the collection system piping reached capacity because of the excess flows, sewage overflows could occur at any of the cleanouts or manholes shown between the Flying Arrow site and the south lake sewage equalization tank on the northwest end of the collection system (shown in Figure 1-3). Many of the cleanouts are in close proximity to the Wallowa River. If an overflow did not occur in the collection system, the capacity of the equalization tank could be exceeded with the excess flows. This would then result in the peak flows being conveyed straight through the equalization tank (which is intended to buffer typical peak flows) and being conveyed directly to the sewage pump station (also shown in Figure 1-3). Should the capacity of the two pumps in the sewage pump station be exceeded with the excess flows, water levels would rise in the wet well that the sewage pumps sit in until sewage overflowed out of the wet well and into the marina parking lot. If the pumps were able to keep up with the excess flows and convey the increased flow through the District's 10" pressure sewer (shown on Figure 1-4) to the City of Joseph's Wastewater treatment plant, the capacity of the treatment plant may be exceeded. This could result in inadequately treated wastewater being discharged to the Wallowa River during the winter months (when the City discharges directly to the river), or in over-application of water to the recycled wastewater irrigation site (during summer months). The City of Joseph would likely receive a violation from DEQ for non-compliance with conditions of their NPDES permit in either situation. The City of Joseph would likely turn to the District to help remedy the situation and pay any fines levied on the City by DEQ.

I hope this provides adequate background information on the potential impacts of septic tank flooding at the Woodin (Flying Arrow) property. Please feel free to contact me with any questions.

Dave Wildman, P.E.
Senior Engineer
Anderson Perry & Associates, Inc.
1901 N. Fir / P.O. Box 1107
La Grande, Oregon 97850

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From: Howison, Russ [mailto:Russ.Howison@pacificorp.com]
Sent: Wednesday, September 17, 2014 4:06 PM
To: Dave Wildman
Cc: Mike Hayward (mhayward@co.wallowa.or.us); McCune, Kimberly
Subject: RE: Wallowa Falls Hydro

Dave,

Thanks again for the information on the county infrastructure that we need to provide to FERC. After some discussion with FERC officials on the nature of their information request, I think it would be very helpful if you could develop a few paragraphs that describe the potential risk to the county sewer collection system in the event the two septic tanks on the Woodin property (Flying Arrow Resort) were inundated by flooding from the East Fork. What would inundation of these septic tanks do to the functionality of the larger sewer system?

I would appreciate any additional information you could provide related to this issue.

Regards,
Russ Howison
PacifiCorp Energy

From: Dave Wildman [mailto:dwildman@andersonperry.com]
Sent: Friday, August 01, 2014 4:58 PM
To: Howison, Russ
Cc: Mike Hayward (mhayward@co.wallowa.or.us)
Subject: Wallowa Falls Hydro

Russ,

As we discussed the other day, I am forwarding some information for your use related to your Wallowa Falls hydro project. You had asked for some information related to water, sewer, and bridge infrastructure in the vicinity of the E. Fork Wallowa River. Attached you will find scanned copies of drawings showing approximate water and sewer line alignments on the E. Fork. These water and sewer systems are operated by the Wallowa Lake County Service District (WLCSD).

With regard to the WLCSD infrastructure, it appears that a few key facilities could be impacted by the proposed change in flows in the E. Fork. First, a primary 8" water transmission main from the water supply sources and reservoir to the southeast side of the community crosses under the E. Fork at the Powerhouse Road bridge. Any potential negative impacts to this pipeline would cut off the water supply to the southeast side of the community. Second, there is both a 6" sewer collection system pipeline and a 4" water distribution pipeline crossing the E. Fork a few hundred feet northwest of Bailey Lane (as shown in the attached drawing sheet A-07 and noting that the existing 4" water line is shown crossing the E. Fork east of the sewer line). As I mentioned in our conversation, I believe the 4" water pipeline may already exposed in the creek.

We also discussed the Bailey Lane bridge. I have attached the record drawings we have that show some of the details related to the bridge structure, elevations of bridge girders, and some information related to projected river water levels with different design storm events.

I hope this is helpful. Let me know if you need anything else.

Thanks,
Dave

David Wildman, P.E.
Senior Engineer
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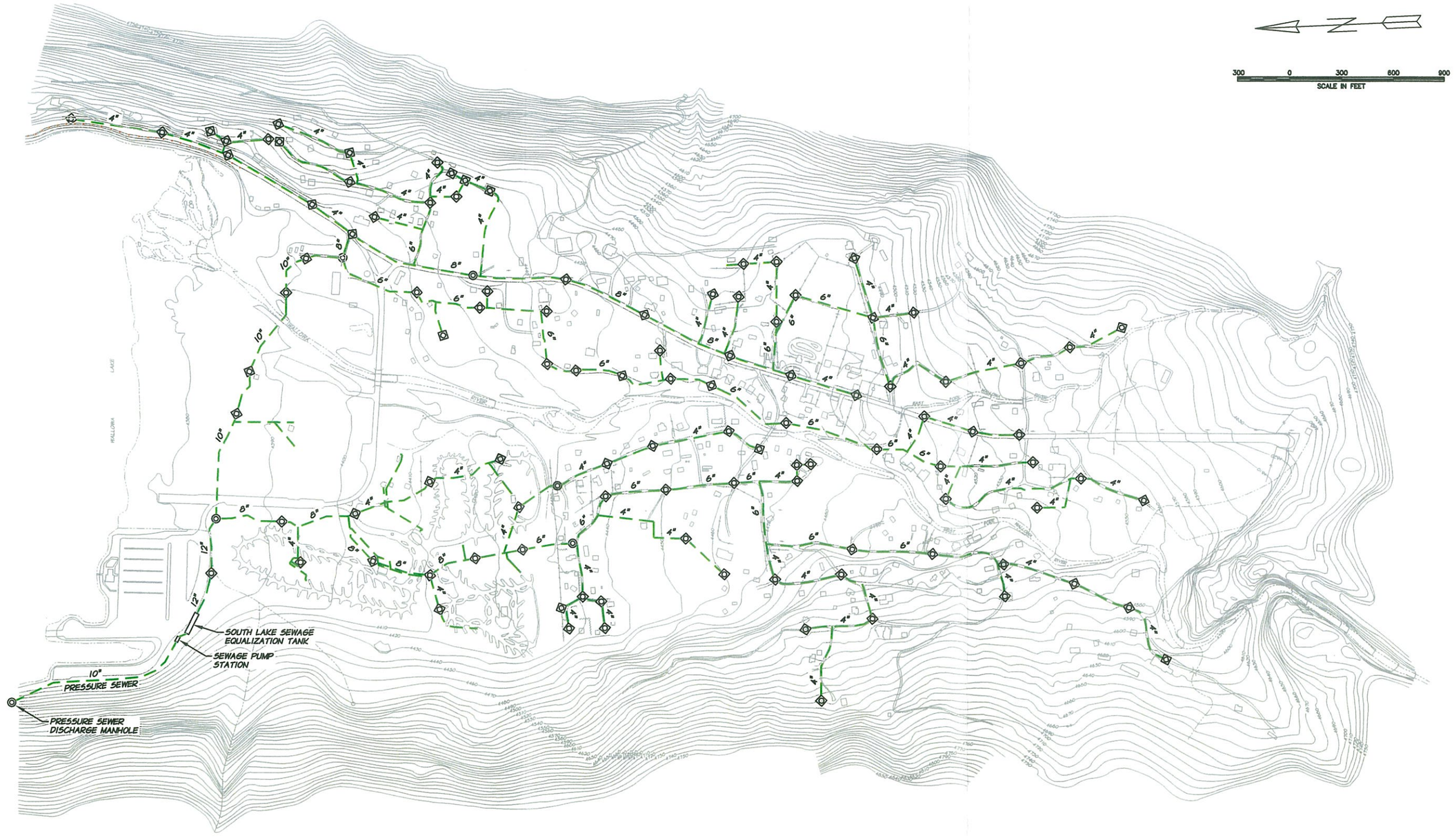

LEGEND

EXISTING MANHOLE

EXISTING CLEANOUT

EXISTING SEWER MAIN AND SIZE

anderson perry & associates, inc.

WALLOWA LAKE COUNTY
SERVICE DISTRICT
WATER/WASTEWATER SYSTEM STUDY
EXISTING WASTEWATER SYSTEM
(SOUTH END OF LAKE)

FIGURE
1-3

2500 0 2500 5000 7500

SCALE IN FEET

WLCSD BOUNDARY

WALLOWA – WHITMAN NATIONAL FOREST

WALLOWA LAKE

JOSEPH-WALLOWA LAKE HWY. NO. 351

MARKS RD.

PRAIRIE CR. CEMETERY RD.

LITTLE SHEEP CREEK HWY.

JOSEPH

Silver Lake Ditch

EDGE WATER DR.

LAKE SHORE RD.

SKI RUN RD.

OLLOKOT LN.

CHIEF JOSEPH LP.

RIVER Ditch

Cove

Moonshine Ditch

PACIFIC

PRESSURE SEWER DISCHARGE MANHOLE

SEE FIGURE 1-3 FOR SOUTH END OF LAKE COLLECTION SYSTEM.

LEGEND

EXISTING 10" PRESSURE SEWER

anderson perry & associates, inc.

WALLOWA LAKE COUNTY
SERVICE DISTRICT
WATER/WASTEWATER SYSTEM STUDY
EXISTING WASTEWATER SYSTEM
(WEST SIDE OF LAKE)

FIGURE
1-4

1988 Water System Improvements Project Summary. The 1988 Water System Improvements Project combined the six systems into one large system, as shown on Figure 1-2. A full-size drawing is included in a packet at the end of this study. The overall system has three sources of supply which meet current drinking water regulations. These are the State Park Springs, Chief Joseph Springs, and Well No. 1. The water system is served by a new 300,000-gallon reservoir that provides equalizing, emergency, and fire reserve storage. New water mains have been constructed to connect the six original systems together, and fire hydrants have been installed along the new water mains. Due to the great variation in elevation of the services, pressure reducing valves were installed at most interties to the old existing systems, as well as at key locations within systems. Old sources of supply that were subject to contamination, and which did not meet health standards, were disconnected and abandoned. The current supply sources generally provide sufficient volume to meet present demands, including residential fire flow using storage volume.

WASTEWATER SYSTEM HISTORY

Prior to the 1988 Water and Sewer Improvements Project, there was no public wastewater collection or treatment system to provide service within the boundaries of the Service District. All of the cabins, summer homes, businesses, commercial units, and the State Park had their own individual on-site systems. These systems consisted of anything from 55-gallon drums with holes punched in them to septic systems that met DEQ requirements at the time of their installation. With groundwater gradients toward the lake, the impact of effluent from the on-site systems did impact the water quality of Wallowa Lake.

In 1988, the Service District's Water and Sewer Improvements Project created the wastewater system that provides service to most of the users within the District's boundary. The system provides service for residents at the south end of the lake and along the west shore. Figure 1-3 shows the wastewater collection system for the south end of the lake. It is primarily a gravity collection system that collects sewage effluent from businesses, residents, and Wallowa Lake State Park. All raw wastewater flows into septic tanks where the solids settle out. The liquid portion, or effluent, then flows by gravity to a sewage pump station located near the marina that pumps the effluent through a pressure sewer line along the west side of the lake. Sewer connections along the west side of the lake consist of septic tank effluent pump systems (STEP). Each connection has a septic tank and an effluent pump that pumps the liquid portion of the wastewater into the pressure main. No wastewater service is provided by the Service District north of the dam. Pressure piping crosses the Wallowa River and eventually flows into the City of Joseph's sewer collection system.

Schedule A – Attachment F
Bypassed Reach Flow Modeling

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

Photo 1: Bailey Lane Bridge, upstream structure face, looking downstream

Photo 2: Bailey Lane Bridge, upstream structure face, looking downstream

Photo 3: Bailey Lane Bridge, west abutment

Photo 4: Bailey Lane Bridge, west abutment, upstream face

Photo 5: Bailey Lane Bridge, east abutment, upstream face

Photo 6: Bailey Lane Bridge, west abutment, downstream face

Photo 7: Bailey Lane Bridge, west abutment, downstream face

Photo 8: Bailey Lane Bridge, east abutment, downstream face

Photo 9: Bailey Lane Bridge, east abutment, downstream face

Photo 10: State Highway 351 Bridge, upstream face, looking downstream

Photo 11: State Highway 351 Bridge, south abutment, upstream face

Photo 12: State Highway 351 Bridge, north abutment, upstream face

Photo 13: State Highway 351 Bridge, north abutment, upstream face

Photo 14: State Highway 351 Bridge, north abutment, under bridge

Photo 15: State Highway 351 Bridge, north abutment, under bridge

Photo 16: State Highway 351 Bridge, north abutment, under bridge, looking downstream

Photo 17: State Highway 351 Bridge, north abutment, downstream face

Photo 18: State Highway 351 Bridge, south abutment, downstream face

Photo 19: State Highway 351 Bridge, south abutment, downstream face

Photo 20: State Highway 351 Bridge, north abutment, downstream face

Photo 20: USGS Weir, downstream face, looking upstream

Photo 21: USGS Weir, top view from east bank

Photo 22: USGS Weir, top view from west bank

Schedule B
Oregon State Historic Preservation Office Findings on Wallowa Falls National Register Eligibility Determinations

The security classification of each enclosed document is identified in the Enclosure Chart.
If identified as Privileged, Protected or Critical Energy Infrastructure Information (CEII), DO NOT RELEASE.

Oregon
John A. Kitzhaber, MD, Governor

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July 7, 2014

Mr. Russ Howison
PacifiCorp
825 NE Multnomah Ste 1500
Portland, OR 97232

RE: SHPO Case No. 10-1647
Wallowa Falls Hydro Proj FERC No 308-005
Hydro licensing/initial study report for integrated licensing process (1/2013)
PacifiCorp Energy/FERC
3S 45E 20, 32, 33, Joseph vicinity, County

Dear Mr. Howison:

We have reviewed the materials submitted on the project referenced above, and we concur with the determination that the Wallowa Falls Hydroelectric Project is not eligible for listing in the National Register of Historic Places due to multiple alterations resulting in an irreversible loss of integrity. We also concur that the two buildings within Wallowa Lake State Park (Maintenance Garage and storage building) and not eligible for listing in the National Register, due to a failure to meet any of the National Register Criteria for historic significance. We therefore also concur that there will be no historic properties affected for this undertaking.

This letter refers to above-ground historic resources only. Comments pursuant to a review for archaeological resources will be sent separately.

This concludes the requirement for consultation with our office under Section 106 of the National Historic Preservation Act (per 36 CFR Part 800) for above-ground historic properties. Please feel free to contact me if you have any questions, comments or need additional assistance.

Sincerely,

Jason Allen, M.A.
Historic Preservation Specialist
(503) 986-0579
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