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MEMORANDUM

To: Jason Johnson, Bonner County Planning and Zoning Department

cc: Spencer Ferguson, P.E., Bonner County Engineer

Mayor Jeff Connolly, City of Priest River

Steve Gill, Idaho Department of Environmental Quality

From: Derek Forseth, P.E., Alta Science and Engineering

Date: June 25, 2025

Project: Two Rivers Shoreline Stabilization Project

Subject: **Floodplain Development Permit Application – Justification for No-Rise Certification**

1 Purpose

This memorandum provides justification for issuing a No-Rise Certification for the Two Rivers Shoreline Stabilization Project located in Priest River, Idaho. The project will include stabilization of approximately 3,350 feet of shoreline owned by the City of Priest River, spanning both the Priest River (within a regulatory floodway) and the Pend Oreille River (Lake Pend Oreille, within a regulatory floodplain). Attached are relevant figures pertaining to Idaho Flood Hazards.

The purpose of this document is to establish that the proposed shoreline stabilization efforts will not cause any increase in flood elevations or conveyance within the regulatory floodway during the 100-year flood event, as required by Bonner County's flood damage prevention ordinances. Additionally, it demonstrates that the project will not result in a rise exceeding one foot in flood elevations within the regulated floodplain areas along both the Pend Oreille River and the Priest River.

Given the hydrological characteristics specific to the project area—including flood elevations influenced by the Albeni Falls Dam, situated less than five miles from the site—and the constraints of available FEMA data, this memorandum provides a practical alternative analytical approach to meet the requirements for a No-Rise Certification.

2 Project Description

The proposed project involves riprap shoreline stabilization along the riverbank of a large parcel of land owned by the City of Priest River; the land touches both the Pend Oreille River (Lake Pend Oreille) and Priest River with banks of approximately 2,575 linear feet and 775 linear feet, respectively. The primary objective of this stabilization is to prevent further erosion of the City of Priest River's Property, to provide protection to aquatic resources and to provide access points to facilitate public recreational activities (a City park). A bid alternate is included as part of the design within the first 700 feet of Pend Oreille stabilization alignment; this alternate (if selected)

will provide additional access points (peninsulas) to facilitate marina docks and an additional public beach between the access points. Design specifications and shoreline stabilization for bid alternate items will remain the same as base bid items as shown in the project plans.

The Priest River will be armored with Federal Highway Administration (FHWA) Class II riprap (~9-inch riprap) at a 2 feet thickness near the mouth of the Priest River and transition to FHWA Class I riprap (~6-inch) at a 1.5 feet thickness as the shoreline moves out of the point of confluence. All riprap sections on the Priest River Section utilize a 2:1 graded slope, a geotextile separation fabric, a 6-inch base of aggregate, and riprap armor built up to 1 ft above the base flood elevation (BFE). Select areas will incorporate live stake plantings. Riprap sections are provided throughout the attached project Drawings; details for these sections are provided on sheet D1 (see Appendix).

3 Regulatory Context

Title 14 of Bonner County's Code of Ordinances requires a No-Rise Certification for any development within the regulatory floodway. This certification, supported by hydraulic modeling, demonstrates that the proposed project will not result in the increase in the Base Flood Elevation (BFE) and will not increase the water surface top width during a 1-percent-annual-chance (100-year) flood event.

For project components located within the Pend Oreille River regulatory floodplain, outside of the Priest River floodway, standard NFIP and County regulations generally permit a cumulative increase in BFE of no more than 1.0 foot, provided that the development does not increase the risk of flooding to existing structures. However, for the Two Rivers shoreline stabilization project, the analysis confirms that the proposed improvements meet the more stringent 'no-rise' criteria, ensuring no adverse impacts to the flood-carrying capacity of the river or neighboring properties.

4 Analysis of Available Data

To fulfill the requirements of a No-Rise Certification, an attempt was made to acquire and utilize comprehensive hydraulic model data for the Priest River. A request for such data was submitted to the Federal Emergency Management Agency (FEMA) in September of 2024. FEMA provided scanned HEC-2 model data from the 1980s for the Priest River (see Appendix); no information was provided for the Pend Oreille River (Lake Pend Oreille).

Upon review, this 1980s model output for Priest River was found to be insufficient for conducting an accurate and representative hydraulic model for the following reasons:

1. **Unspecified Model Output:** The scanned 1980 data lacks clear documentation regarding what exactly the model output represents (e.g., water surface elevations, velocities, etc.), making its direct application or interpretation for a precise flood elevation analysis problematic.
2. **Lack of Pend Oreille River Backwater Consideration:** The provided 1980 model data does not adequately account for the significant backwater effects from the Pend Oreille River (Lake Pend Oreille) on the Priest River at its mouth. This is confirmed in Section 3.2 of the 2014 Bonner County Flood Insurance Study (FIS), which states:

   "The computed water-surface elevations for Priest River in the area of the City of Priest River and Sand Creek in the City of Sandpoint are considerably lower than those elevations determined for Lake Pend Oreille. Therefore, the flood profiles (Exhibit 1) for

this study show the entire reach for Priest River, within the corporate limits, inundated with backwater from the Pend Oreille River."

The confluence of the Priest River with the Pend Oreille River (Lake Pend Oreille) means that flood elevations in this specific reach are predominantly influenced by the lake's water levels, rather than solely by the flow characteristics of the Priest River itself. Floodway data for Priest River is provided in Table 8 of the FIS (Page 42); the regulatory 1-percent-annual-chance flood water surface elevations for cross section A (the mouth of Priest River) are 2062.2 without backwater from the Pend Oreille River (Lake Pend Oreille) and 2070.2 when it is included. This results in a regulatory 1-percent-annual-chance flood water surface elevation for cross section A that is 8' greater than modelled due to the backwater from the Pend Oreille River (Lake Pend Oreille).

3. **Age and Accuracy:** Data from 1980 is significantly outdated and does not reflect current topographic, bathymetric, or hydrologic conditions. Modern modeling standards and data collection techniques far surpass those available at that time, rendering the 1980 data largely unreliable for a precise and current hydraulic analysis.

Therefore, the available 1980s Priest River model output data provided by FEMA is inadequate to construct a meaningful and accurate hydraulic model of the Priest River at its confluence with the Pend Oreille River (Lake Pend Oreille) that would yield a reliable No-Rise Certification based on traditional modeling methods.

5 Justification for Alternative Analysis

Given the limitations of available data and the unique hydrological characteristics of the project site, a detailed hydraulic model of the Priest River is not considered necessary or practical to justify a No-Rise Certification in this specific instance. Specific justifications are provided in the following sections.

5.1 Downstream Influence on the Priest River Floodway Elevation

The 2014 Bonner County FIS report consistently highlights the dominant influence of Lake Pend Oreille on the hydraulics of its tributary streams, particularly near their confluences. Section 2.3, Page 10, of the FIS report states the following:

"The sources of flooding for the City of Priest River are Priest River and Pend Oreille River. Pend Oreille River is a reservoir-like body of water due to Albeni Falls Dam. The flooding from Priest River is confined to the shore areas, but the backwater from Pend Oreille River into Priest River floods a substantially larger area."

As stated above, the Pend Oreille River's (Lake Pend Oreille) water levels are regulated by the Albeni Falls Dam, operated by the U.S. Army Corps of Engineers. This dam provides significant control over the river's elevation, including its ability to mitigate flood events. As stated in Section 2.4, Page 13 and 14 of the FIS:

"Major impoundment structures exist on Lake Pend Oreille at Albeni Falls Dam and Clark Fork at Cabinet Gorge Dam. These structures are mainly used for power production purposes. They also enable Albeni Falls Dam to control the annual minimum lake level to an elevation higher than would be experienced under natural conditions and to reduce the maximum lake level for floods with peaks between 80,000 and 220,000 cfs."

The 100-year flood elevation at the mouth of the Priest River is predominantly a function of the regulated 100-year flood elevation of the Pend Oreille River (Lake Pend Oreille), rather than a

dynamic flow event purely within the Priest River. Backwater from the Pend Oreille River (Lake Pend Oreille) is shown to influence the flood elevation of Priest River during a 100-year flood event for over a mile up the river according to the Flood Profile for Priest River provided on page 88 of the FIS.

Additionally, in Section 3.1, Table 5, page 18 of the FIS, the peak discharge for the Pend Oreille River at Albini Falls Dam during a 100-year flood event is 159,000 cubic feet per second (cfs). With the dam's capacity to mitigate 220,000 cfs, any minor displacement of water along the project shoreline or within the immediate project area will be absorbed by the vast volume of the Lake Pend Oreille system without measurable impact.

5.2 Inaccurate Priest River Floodway Boundary Due to Backwater

The 2014 Bonner County FIS Report acknowledges that the floodway elevations for streams discharging into Pend Oreille, including the Priest River, are significantly influenced by the backwater effects of the lake. However, the floodway boundaries do not reflect the full extent of the backwater. which reaches far outside the floodway boundaries, especially at the mouth of the Priest River. This is clearly seen in the Idaho Flood Hazard Figures provided in Appendix A.

Attempting to create a highly refined hydraulic model for the Priest River in this zone would be an academic exercise with limited practical relevance for a no-rise determination, as the controlling factor of water surface elevation for this section of the Priest River is the lake's regulated elevation by the Albeni Fall's Dam.

5.3 Insufficient Data for a Thorough and Accurate Analysis (Traditional Model)

As previously detailed in Section 4, the lack of current, comprehensive, and well-documented hydraulic data for the Priest River, particularly data that accurately represents the complex interaction with Lake Pend Oreille, precludes the development of a modern, defensible hydraulic model necessary for a traditional No-Rise Certification. Allocating substantial resources to produce new, comprehensive topographic and bathymetric datasets, followed by the construction of an intricate hydraulic model for a project of this scale, is neither a practical nor required approach in light of existing mitigating considerations.

5.4 Net Volume Reduction within the Floodplain and Floodway

The proposed riprap shoreline stabilization project is designed to result in a net reduction in the volume of material within the regulated floodway of the Priest River and the floodplain of the Pend Oreille River. By excavating and removing a greater volume of existing bank material than the volume of rock and fill being placed, the project increases the available cross-sectional area for flood conveyance.

While hydraulic elevations are influenced by both channel geometry and surface roughness (Manning's n), the substantial net volumetric reduction is intended to offset potential increases in flow resistance caused by the riprap. This net loss of fill provides a physical basis for the expectation that the project will not adversely impact flood elevations.

6 Alternative Analysis for Floodway

To demonstrate the no-rise condition, a volumetric displacement analysis was conducted. This approach was selected because the available bathymetric and LiDAR data, while highly accurate for the project shoreline, does not span the full width of the floodway to support a stable 1D or 2D hydraulic model. In this specific context—a dam-controlled system where the project results in a net removal of material—a geometric comparison provides a conservative and quantifiable demonstration of compliance.

The drawings for this project were produced using AutoCAD Civil 3D. The existing surface for the project site was constructed using LiDAR data and Bathymetry data collected for the project site by a licensed surveyor. The design surface was produced in Civil 3D using the program's grading tools to accurately model the design surface and quantify volumes for fluctuating cross sections along the shoreline. The Priest River Section of the project is approximately 775 linear feet of the project's graded alignment.

The impacted shoreline is shown in yellow on the flood map below. The cross-section span is at the "limit of study" which is located at the mouth of the Priest River. The FEMA-designated floodway elevation is 2070.2 feet (NAVD88) and is shown on the cross section as the 100-year floodway elevation.

Figure 1. Impacted Shoreline of Priest River

The bathymetric information LiDAR data collected does not fully span the width of the floodway and lacks tie-in to adjacent topographic features on the East Side; the cross sectional top width of the cross section analyzed is approximately 340 feet (see Figure 2) rather than the 545 feet width provided in Table 8 of the FIS for Priest River. Under these circumstances, the cross-sectional area analyzed underrepresents the actual floodway volume.

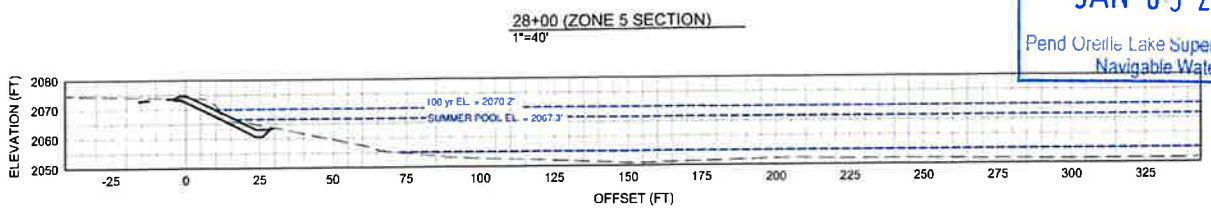

Figure 2. Priest River Cross Section Evaluated for Analysis

The values presented in Table 1 represent the characteristic extents of the mouth of Priest River (floodway boundary) and the corresponding impacts to the shoreline. This analysis assumes Manning's n remains unchanged. The proposed shoreline will consist of vegetated riprap, which exhibits hydraulic roughness characteristics similar to the existing moderately vegetated banks. Because the project increases the available cross-sectional area while maintaining a similar roughness coefficient, the flow capacity is maintained.

Calculations were performed using an averaging approach: the net difference between cut and fill was evaluated and then distributed across the total length of impacted shoreline, resulting in an estimate of average fill per unit width of shoreline. A similar method was applied to the floodway, where the total volume of floodwater was calculated per unit width. Dividing this volume by the analyzed floodway width provided an estimate of the average floodwater depth across the section.

Table 1. Priest River Volume Based Analysis at Q100

Description	Value	Unit
Length of Priest River Floodway Shoreline	**775**	**LF**
Total Fill	1517	CY
Total Cut	2607	CY
Net Cut and Fill	**-1090**	**CY**
Net Cut and Fill per LF of Shoreline	**-1.4**	**CY/LF**
Total Floodway Width Analyzed	334	LF
Existing Cross Sectional Water Volume	5453	CF/LF
Design Cross Sectional Water Volume	5415	CF/LF
Average depth of flow in floodway	16.33	FT
% Water Volume Decrease in Floodway Section	**0.007**	**%**
Decrease in Floodway Depth	**0.11 ft**	**FT**

LF = Linear Feet

SF = Square Feet

CY = Cubic Yard

As shown by the calculations in Table 1, the floodway would theoretically decrease if only analyzed through a volumetric perspective. Furthermore, because the water surface elevations in this reach are influenced by downstream dam operations, the localized geometric changes proposed are negligible relative to the overall system storage. The volumetric analysis confirms

that even under free-flowing conditions, the net removal of 1,090 CY in the of material in the Priest River Floodway ensures that the project does not contribute to a rise in the Base Flood Elevation (BFE).

This straightforward, quantifiable approach directly addresses the core principle of a No-Rise Certification – ensuring no adverse impact on flood elevations – without the need for a complex hydraulic model given the specific site condition.

7 Conclusion

Page 1 of the attached documents includes the completed page Engineering "No-Rise" of the FEMA Certification Procedures for "No-Rise" Certification for Proposed Developments and Regulatory Floodway document.

This page has been sealed by a Professional Engineer of Idaho and certifies that the project design meets the NFIP requirement in 44 CFR 60.3(d)(3) and Bonner County Title 14 floodway standards, i.e., the proposed encroachment will not result in any increase in flood levels during the occurrence of the base (100-year) flood discharge.

For the Pend Oreille (Lake Pend Oreille) Floodplain components, the project meets Bonner County Title 14 General and Specific Standards for development within the SFHA and does not produce a rise approaching the one-foot cumulative allowance for regulated floodplains, nor does it increase flood risk to existing structures.

Accordingly, the submitted package satisfies Bonner County Floodplain Development Permit requirements for both the regulatory floodway (no-rise) and the regulated floodplain (standards compliance), as documented herein and in the attached exhibits.

We respectfully request the Bonner County Planning Department's approval to accept the supporting justification outlined in this memorandum for the No-Rise Certification of the Two Rivers Park Shoreline stabilization project.

Sincerely,

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Idaho Department of Lands

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Pend Oreille Lake Supervisory Area

Navigable Waters