Preliminary Engineering Scan Memorandum

To: Shane Stack, P.E., Missoula County Public Works Director
Erik Dickson, P.E., Assistant Director/County Engineer
From: Jacob Roske, P.E.
Date: 12/13/2024
Re: Owl Creek Road Bridge – Preliminary Engineering Scan

1. Background Information

This memorandum presents the findings of a preliminary scan that has been performed to explore the replacement of the existing bridge. This scan focuses on identifying key scope, schedule, and budget aspects of a potential bridge replacement project.

The findings of this memo are preliminary in nature as a formal analysis has not been performed. High level desktop review has been performed for applicable disciplines and a site visit was performed by DJ&A on November 19, 2024. This work is completed as part of preliminary engineering services authorized under a Professional Services Agreement between DJ&A and Missoula County (signed 11/14/24).

2. Project Description

The Owl Creek Road Bridge crosses Owl Creek five miles south of Seeley Lake at milepost 0.65 of Placid Lake Road, west of Highway 83. The existing bridge was constructed in 1970 and is a double lane single span timber bridge that is roughly 40-feet long. The existing structure is located at:

- Owl Creek Road Bridge (Structure #: 03745) – Latitude/Longitude: (47.11580, -113.45713)

3. Existing Conditions

3.1. Existing Bridge & Roadway

The following table provides information on the existing structure and roadway:

Roadway Width:	24 ft	**Deck Width:**	25.6 ft
Roadway Surface:	Asphalt	**Clearance Width:**	24 ft
Bridge Material:	Timber	**Railing Type:**	W-Beam w/ Timber Posts
Bridge Length:	36 ft	**Approach Railing:**	12 ft Runs
Number of Spans:	1	**Abutment Type:**	Timber Pile

The National Bridge Inventory (NBI) lists the bridge's condition as follows:

Bridge Condition:	P - Poor
Deck Condition Rating (58):	7 – Good Condition
Superstructure Condition Rating (59):	7 – Good Condition
Substructure Condition Rating (60):	4 – Poor Condition
Channel Protection Condition Rating (61):	8 – Channel protection is stable
Bridge Railings (36A):	0 – Does not meet current standards
Bridge Guardrail Ends (36D):	0 – Does not meet current standards

Observations from the site visit confirmed these findings with the deck and superstructure generally appearing to be in good condition but significant signs of rot/deterioration in the timber substructure members was observed. It should also be noted that the bridge appears to be undersized and the stream is currently attacking Abutment 2. The bridge is constructed approximately flat with the roadway gradually climbing (+ 1%) through the project site. See **Figures 1 - 3** for photos of the existing structure.

3.2. Stream

The bridge crosses Owl Creek. This creek meanders through the area, with two large curves just upstream from the bridge. The stream continues this snaking pattern downstream of the bridge before discharging into the Clearwater River. See **Figure 4** for an aerial image of the bridge location and the stream. See **Figures 5 & 6** for upstream and downstream photos of the stream. The bridge is not centered on the stream with a vegetated bank along the Abutment 1 side connecting the floodplain and the stream flowing against Abutment 2, with large woody debris upstream of the bridge. Significant scour and head cutting is observed against Abutment 2 and upstream of the bridge (see **Figure 7**). The stream appears to be significantly more stable downstream of the bridge with a vegetated floodplain being observed stream left and established trees along the bank at stream right. The stream had an observed bankfull width of roughly 30'.

3.3. Environmental Resources

The environmental resources that were observed on site and verified in a desktop review are summarized herein. An environmental scan memo is included in the appendices which contains a more detailed summary of the resources identified within the project site.

The bridge is located in the Placid Creek watershed. Owl Creek is a tributary of the Clearwater River, both of which are categorized as perennial streams/rivers with groundwater being part of the Seeley-Swan subarea groundwater aquifer. The bridge is not located within a special flood hazard area as designated by FEMA. The wetlands of the project area are classified as Freshwater Forested/Shrub and Palustrine Emergent wetlands with forested riparian areas. These conditions were observed both around and on the project site with forested areas being observed directly adjacent to the stream. See **Figure 8** for a photo of the typical riparian zone that was observed. Bull trout are special status biological species that have designated critical habitat within the project area, as well as there being the potential of Bald Eagles occurring in the project area. Migratory bird nests were observed on the underside of the structure. The bridge is older than 50 years and therefore may be eligible for the National Register of Historic Places. Prime, unique, or farmland of statewide importance was found within the project area but the bridge and roadway constitute "lands already in urban development" excluding the project from requirements set forth by the Farmland Protection Policy Act. The project is within the Blackfoot Valley Conservation Area which may require Section 4(f) and/or 6(f) analysis to be performed for the project.

3.4. Geological & Geotechnical

No geotechnical investigation was performed at the site, but a site visit and geological desktop review were performed. Results of these efforts show that the project site is located in an area of alluvium deposits which were apparent as the creek bottom consisted of cobbles, boulders, gravel, sand, and silt. See **Figure 9** for a photo of the observed stream substrate. Geologic mapping shows the alluvial deposits are underlain by the Helena Formation which consists of beds of limestone interbedded with dolomite, siltite, and argillite. No major signs of clay or silt deposits were observed.

3.5. Roadway Safety

The roadway appears to have good sight distance, shoulders, and cut and fill grades by visual observation. It appears to be designed adequately for the intended purpose. The bridge railing does not appear to have been designed for traffic loading but is in fair condition. The approach railing consists of approximately 12-foot-long sections, ending in flared end shoes. These end sections appear to be in fair condition, with some damage due to possibly being struck. The bridge is missing two object markers. Alternative transportation on the bridge could include foot and bicycle traffic, but there are no signs of heavy alternative transportation usage. There are two features in close proximity to the bridge with the intersection of Many Rivers Road being within 50' of the southeast corner of the bridge and a land use parking area located within 60' of the northwest corner of the bridge.

3.6. Utilities, Right of Way & Alternate Access

Utilities were observed in the vicinity of the bridge. Missoula Electric Cooperative's underground power was evident by the transformer that was located near the southeast corner of the bridge. Underground telecommunication cables are assumed to also be running underground and through a steel conduit connected to the downstream edge of the bridge with a junction box and pedestal also near the southwest corner of the bridge. No obvious signs of natural gas were observed, and it was later confirmed with NorthWestern Energy that no natural gas infrastructure is near the bridge. See **Figure 10-11** for a photo of the observed utilities.

Private property signs were observed near the project site with a fence line noted on the south of the road and a Nature Conservancy land use sign to the north of the bridge. The road closely follows the property line between two different private property owners to the north and south of the bridge. The property to the north appears to be owned by Montana Checkerboard LCC while the property to the south appears to be a private citizen landowner. Preliminary right of way (RW) desktop review of online public records shows there is an existing 60' wide county road RW at the site. Site survey will be necessary to accurately locate the centerline of the right of way but it appears to be in the general vicinity of the centerline of the road.

Riverview Drive provides a potential five mile detour from Seeley Lake to Placid Lake, while Jocko Canyon Road also provides a lengthy detour route from the Mission Valley via Highway 93. Multiple public access routes are therefore available as alternate access detour routes.

4. Proposed Conditions

4.1. Bridge Type, Size, and Location

See **Appendix A** for a schematic depiction of the assumed bridge layout. It is assumed that the new bridge will be designed and constructed in accordance with current AASHTO and MDT standards.

Type

The bridge type is assumed to be prestressed concrete founded on steel piles. Prestressed concrete will require less maintenance than steel and will help provide a structure with greater longevity.

Size

The bridge size that is assumed at this time is a 65' span with a 28' wide travel way. The bridge will be skewed 25 degrees to more closely match the stream. The increased deck width will accommodate (2)-12' lanes with (2)-2' shoulders, providing continuity to the existing roadway.

Location

The bridge location is assumed to be in the same location as the existing bridge with a formal detour route being established for contractor and public access. The new bridge is close to being centered on the existing structure with slightly more additional length being added behind Abutment 2.

4.2. Hydrologic and Hydraulic Considerations

A preliminary desktop review and rough analysis based on field measurements shows the existing bridge provides roughly 2'-3" of freeboard for the hundred-year (Q100) flood event. At normal flow conditions, the water level essentially comes in contact with Abutment 2. This condition is not advisable for floodplain continuity, scour mitigation, or facilitating terrestrial aquatic organism passage. Therefore, it is recommended that additional bridge length be provided. It is also recommended that a spill through cross section be used to improve hydraulic conditions. The assumed superstructure will be roughly 37" deep and the current superstructure is roughly 32" deep. The proposed condition was also evaluated which dropped the flood elevation by around 10". Assuming finished grade matches the existing condition, roughly 2.5' of freeboard will be provided with the proposed conditions. See **Appendix B** for a memorandum summarizing the preliminary H&H desktop review.

4.3. Environmental Considerations

Montana DNRC's joint permit application will be used to reduce the number of separate permit applications required. The joint permit application will provide coverage for the following permits which are anticipated for this project:

- US Army Corps of Engineers (USACE) (federal government) - Section 404 permit
- MT Department of Environmental Quality (state government) - Section 401 permit
- MT Department of Environmental Quality (state government) - 318 (turbidity) Authorization
- MT Fish, Wildlife, and Parks (state government) - SPA 124 permit
- MT DNRC (state government) - Navigable river land use license or easement
- County Floodplain Administrators (local government) - Floodplain permits

Additional information needed to properly complete a joint permit application for this project includes detailed aquatic resource delineation and mapping meeting USACE standards.

Storm water permits will also be required at the state and county level and will be the contractor's responsibility during construction.

It is anticipated that consultation will be required with USFWS to fulfill biological resource requirements for applicable endangered species. It is expected that consultation will not require preparation of Biological Assessments with the anticipation of the project tiering to existing formal Biological Opinion documents.

Consultation with SHPO will be required due to the age of the bridge and a Class I cultural resources assessment and Class III cultural resources survey will need to be performed to comply with Section 106 of the National Historic Preservation Act.

It is likely that this project is eligible for a Categorical Exclusion (CE) for the required level of environmental document under state (MEPA) and federal (NEPA) requirements as it classifies as a bridge replacement

project. See **Appendix C** for a memorandum which summarizes the environmental scan performed for this project and provides additional details.

4.4. Geotechnical Considerations

Site observations and desktop review show that the site and the assumed bridge type would lend well to spread footing or driven pile foundations. Spread footings would need to be buried below scour depth, which would equate to roughly 15' tall concrete walls. Any efficiency gained in a shorter bridge would likely be offset in these abutments. Steel piles will therefore be assumed on this bridge. Based on similar bridge foundation designs conducted by our geotechnical partner and their knowledge of the area, they anticipate a conservative maximum length of the piles to be 40 to 50' from the bottom of the pile cap. It is recommended that a minimum of one exploratory drilling be bored at each abutment location on the order of 75' deep to inform final foundation design recommendations. See **Appendix D** for a memorandum which summarizes the geotechnical scan performed for this project.

4.5. Safety Considerations

The adjacent intersection with Many Rivers Road and the parking are to the northwest of the bridge will cause for some customization of approach railing with a potential need for exceptions or variances. Increasing the bridge travel width to 28' will improve safety for vehicles and the occasional foot/bike traffic the bridge sees and reduce the likely hood of impacts to the approach railing. Many Rivers Road is a private road that appears to have low usage so there is minimal concern with the bridge now being closer to this intersection.

4.6. Utility, ROW & Alternate Access Considerations

The existing telecommunications line and pedestal will need to be removed from the existing bridge and likely be moved to either the new structure or below the stream. Underground power appears to be in close vicinity due to a transformer located near the southeast corner of the bridge. Future utility needs should also be considered in the design process.

The existing right of way is likely wide enough if the bridge is replaced in its current position. The centerline of the ROW can be verified as part of the engineering survey to define the limits of the existing easement. A Retracement Certificate of Survey would likely not be necessary.

Multiple options for publicly accessible alternate access make this site a good candidate for temporary detours during construction. See **Appendix E** for a schematic view of the possible Riverview Drive route.

4.7. Construction Considerations

Prestressed decked bulb tee girders begin to be efficient at a 65' span and also eliminate the need to cast a concrete deck onsite, reducing field labor and construction schedule. Steel pile foundations will provide safeguards against scour and potential efficiency due to the fact that this bridge may be bundled with other bridges that will be constructed with steel pile. In that scenario, this bridge would be the only structure in the bundle with tall and complex concrete walls buried below scour. The contractor and public will require access to both sides of the stream and will utilize the detour routes accordingly. Instream work is not currently proposed.

5. Project Cost and Schedule

The bridge replacement project is estimated to cost $2,075,000 which includes engineering, construction, and contingency. See **Appendix F** for a Rough Order of Magnitude (ROM) cost estimate of the assumed bridge replacement project.

Assuming a successful grant award notification in June 2025, it is feasible that the bridge construction could be completed as early as fall of 2028 with project closeout in 2029. See **Appendix G** for a high-level estimate of the project schedule.

Figures

Figure 1- Existing Bridge and Roadway: Bridge Elevation

Figure 2 – Existing Bridge and Roadway: Typical Bridge Abutment

Figure 3 - Existing Bridge and Roadway: Bridge Deck

Figure 4 - Stream: Bridge Location

Figure 5 – Stream: Upstream View of Owl Creek

Figure 6 – Stream: Downstream View of Owl Creek

Figure 7 - Stream: Scour at Upstream Corner of Abutment 2

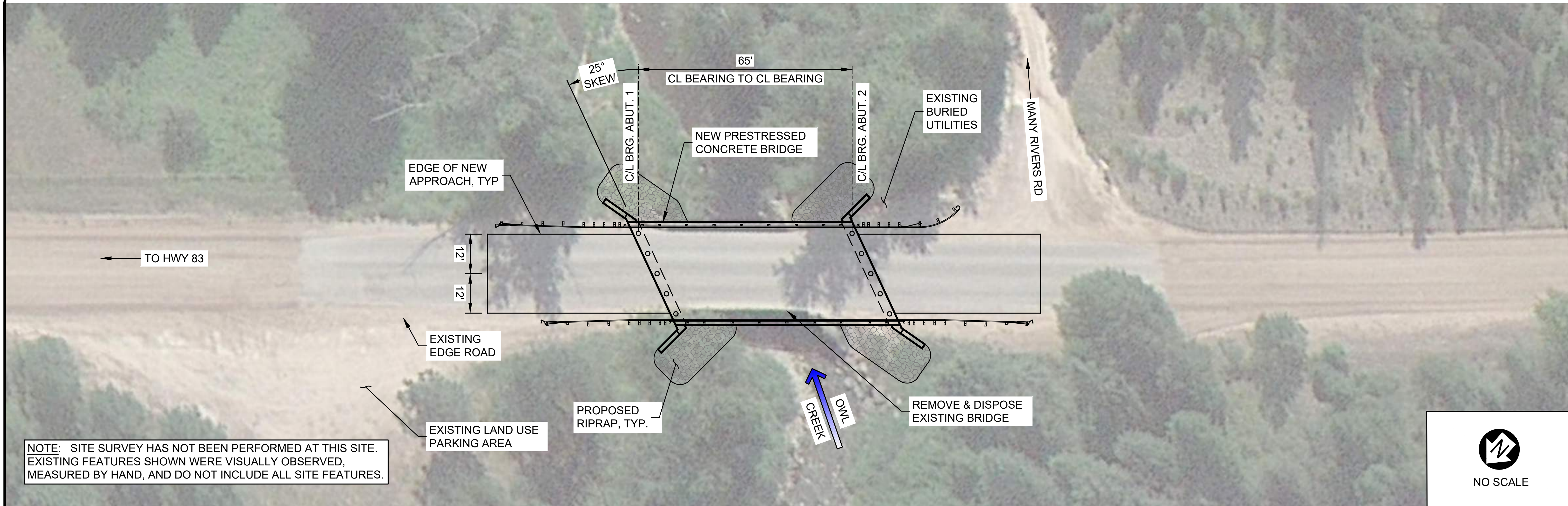
Figure 8 – Environmental Resources: Typical Riparian Zone

Figure 9 – Geological and Geotechnical: Stream Substrate

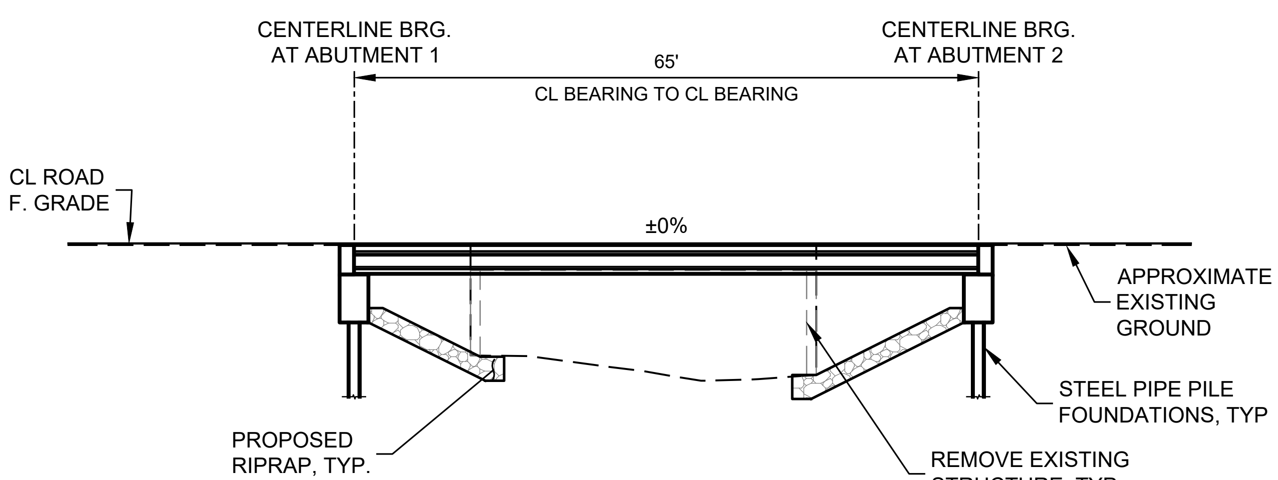
Figure 10 – Utilities, ROW & Alternate Access: Existing Utilities

Figure 11 – Utilities, ROW & Alternate Access: Existing Utilities

Appendix A: Schematic Bridge Layout

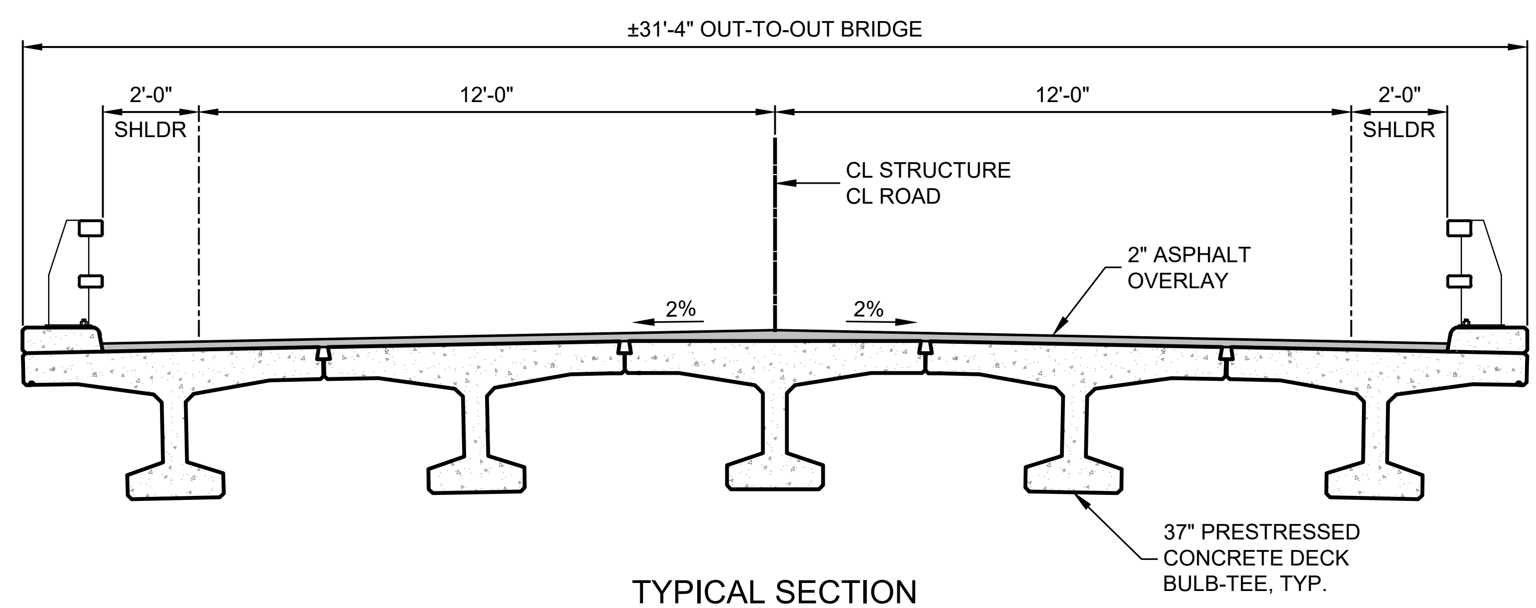


PLAN



ELEVATION

NO SCALE



TYPICAL SECTION

NO SCALE

NOTE: ELEVATION SHOWN IS APPROXIMATE.

REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER JWR PROJ. NO. 7593
DRAWN JWR DATE 11/27/24
CHECKED AW SURVEYED -

DJ&A ENGINEERS PLANNERS SURVEYORS

OWL CREEK BRIDGE REPLACEMENT
MISSOULA COUNTY

SCHEMATIC LAYOUT

SHEET 1 OF 1

Appendix B: Hydrologic and Hydraulic Scan Memo

2000 Maple Street
Missoula, MT 59808
406.721.4320
djanda.com

Memo

To: Missoula County
From: DJ&A, P.C.
Date: November, 2024
Re: Missoula County Bridge Scans – Owl Creek Bridge

DJ&A has performed a high-level hydrologic and hydraulic (H&H) scan to inform the future replacement of Owl Creek Bridge on Placid Lake Road. Field measurements and observations were conducted in November, 2024. This memo provides a summary of site conditions, preliminary analysis, and recommendations. Supporting documents, including field notes, a USGS StreamStats report, and HY-8 modeling outputs, are attached.

Figure 1: Owl Creek Bridge Vicinity Map

Site Description: The Owl Creek Bridge, located 0.65 miles west of Highway 83 near Seely Lake, Montana, is a 40-foot span timber bridge with a skew of approximately 15 degrees to the stream alignment (Figure 2). The site is within a forested riparian area characterized by ponderosa pine, grasses, and shrubs. Observations of large woody debris upstream suggest potential for blockage and material transport (Figure 5).

Key Site Features:

- Bridge opening: ~34 feet (perpendicular to the stream flow)
- Bankfull width: ~26 feet

Figure 2: Owl Creek Bridge

- Substrate: Predominantly gravel and rounded cobbles
- Scour evidence: Upstream side of Abutment 2, armored with large riprap (Figures 2, 3, and 4)

Figure 3: Abutment 2

Preliminary Analysis and Assumptions:
HY-8, a tool primarily designed for modeling culverts, was utilized in this study to conduct a high-level preliminary hydrologic and hydraulic analysis for the bridge site. Two year and One Hundred year storm event flows (Q2 and Q100) were obtained from USGS StreamStats (Table 1). Mannings n roughness coefficient used for HY-8 modeling was 0.055 (estimated based on Yochum & Bledsoe, 2010).

Table 1: Peak Discharges for Owl Creek

Storm Event	Owl Creek Bridge (StreamStats)
2-year	675 cfs
100-year	1,820 cfs

Figure 4: Upstream side of abutment 2, armored with large riprap

Findings: Existing conditions were modeled in HY-8 using Q100 from StreamStats for the Owl Creek Bridge location, the existing bridge meets minimum freeboard requirements of 2-feet. HY-8 model shows approximately 2'-3" of freeboard with the existing structure. Looking downstream at the bridge, water on the right side is up against Abutment 2 (Figure 2). There is room at this crossing to lengthen the bridge by 20 feet in the northeast direction to widen the opening, reduce constriction, and to match conditions on the left side of the stream. This adjustment would improve flow conditions during high water events and help mitigate scour risks. With the bridge lengthened 20 feet to the southwest, the freeboard would be increased to approximately 3'-1". Importantly, this modification would not encroach on the intersection with Many Rivers Road to the southwest, shown in Figure 6.

Figure 5: Looking upstream from the Owl Creek Bridge

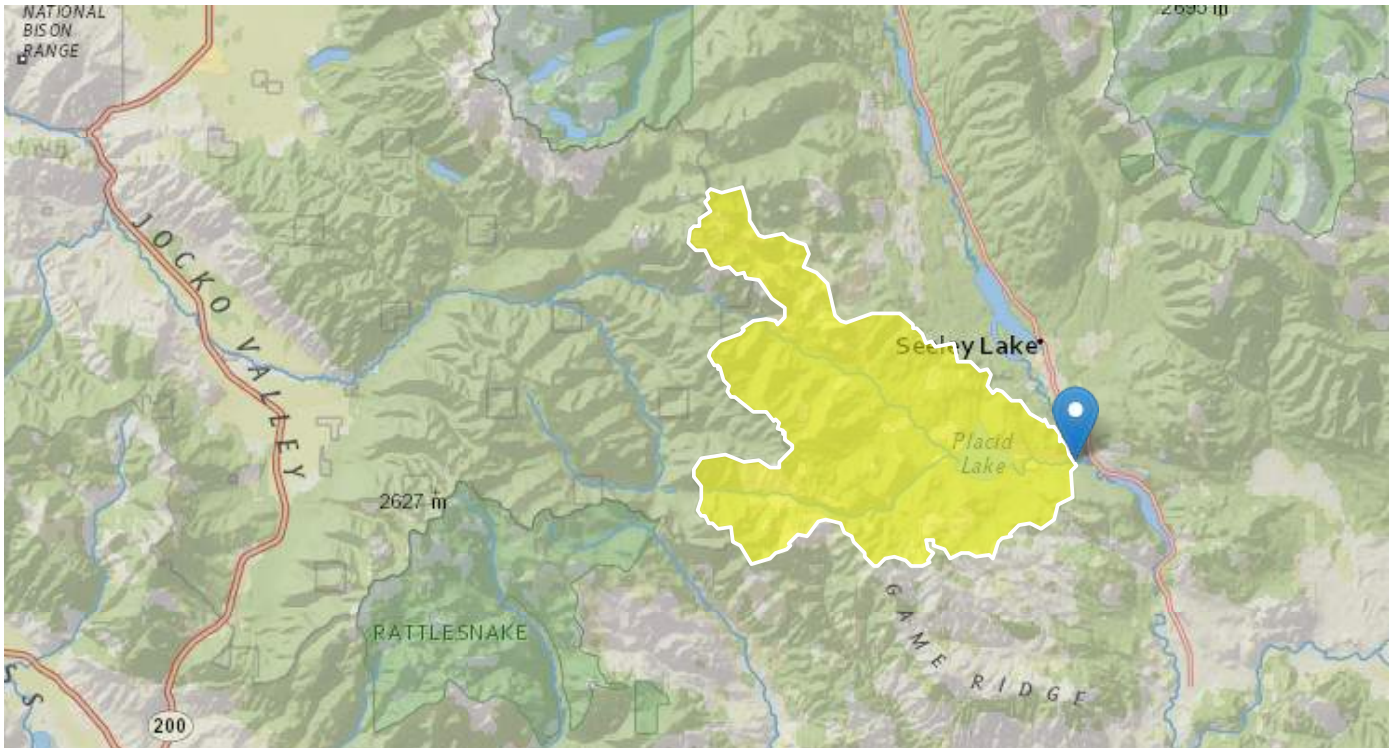
The proposed modifications to lengthen the bridge aim to achieve a “no-rise” certification, ensuring that water surface elevations during a 100-year flood event would likely remain unchanged. This adjustment would enhance the bridge’s resilience to flooding while maintaining compliance with floodplain management requirements.

Figure 6: Google Earth image

Attached documents include a USGS StreamStats report and HY-8 report for the existing conditions and the proposed lengthened bridge.

StreamStats Report

Region ID: MT
Workspace ID: MT20241118192733635000
Clicked Point (Latitude, Longitude): 47.11573, -113.45721
Time: 2024-11-18 12:28:00 -0700



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CHANWD_RS	Channel width determined from remotely sensed data sources, including aerial imagery	0	feet
CONTDA	Area that contributes flow to a point on a stream	90.6	square miles
DRNAREA	Area that drains to a point on a stream	90.6	square miles
FOREST	Percentage of area covered by forest	80.3	percent
PRECIP	Mean Annual Precipitation	37.48	inches
SLOP50_30M	Percent area with slopes greater than 50 percent from 30-meter DEM.	2.5	percent

Parameter Code	Parameter Description	Value	Unit
WACTCH	Width of active channel	0	feet
WBANKFULL	Width of channel at bankfull	0	feet

Peak-Flow Statistics

Peak-Flow Statistics Parameters [W Region BasinC 2015 5019F]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	90.6	square miles	0.6	2470
PRECIP	Mean Annual Precipitation	37.48	inches	14.6	62.1
FOREST	Percent Forest	80.3	percent	20.4	99.1

Peak-Flow Statistics Parameters [W Region Active Channel SIR 2020 5142]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
WACTCH	Width Of Active Channel	0	feet	3	213

Peak-Flow Statistics Parameters [W Region Bankfull SIR 2020 5142]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
WBANKFULL	Width Of Bankfull Channel	0	feet	5	246

Peak-Flow Statistics Parameters [W Region Aerial Photo SIR 2020 5142]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CHANWD_RS	Channel_Width_remotely_sensed	0	feet	2.3	203.8

Peak-Flow Statistics Flow Report [W Region BasinC 2015 5019F]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
66.7-percent AEP flood	567	ft^3/s	232	1390	59.4
50-percent AEP flood	675	ft^3/s	285	1600	56.5
42.9-percent AEP flood	727	ft^3/s	310	1710	55.7
20-percent AEP flood	955	ft^3/s	421	2170	53.4

Statistic	Value	Unit	PIL	PIU	ASEp
10-percent AEP flood	1190	ft^3/s	529	2680	52.8
4-percent AEP flood	1430	ft^3/s	635	3220	53.2
2-percent AEP flood	1620	ft^3/s	706	3720	54.2
1-percent AEP flood	1820	ft^3/s	779	4250	56
0.5-percent AEP flood	2020	ft^3/s	842	4850	58
0.2-percent AEP flood	2240	ft^3/s	895	5610	61.4

Peak-Flow Statistics Disclaimers [W Region Active Channel SIR 2020 5142]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [W Region Active Channel SIR 2020 5142]

Statistic	Value	Unit
Active chan width 66.7 percent AEP flood	0	ft^3/s
Active Channel Width 50-percent AEP flood	0	ft^3/s
Active chan width 42.9 percent AEP flood	0	ft^3/s
Active Channel Width 20-percent AEP flood	0	ft^3/s
Active Channel Width 10-percent AEP flood	0	ft^3/s
Active Channel Width 4-percent AEP flood	0	ft^3/s
Active Channel Width 2-percent AEP flood	0	ft^3/s
Active Channel Width 1-percent AEP flood	0	ft^3/s
Active Channel Width 0.5-percent AEP flood	0	ft^3/s
Active Channel Width 0.2-percent AEP flood	0	ft^3/s

Peak-Flow Statistics Disclaimers [W Region Bankfull SIR 2020 5142]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [W Region Bankfull SIR 2020 5142]

Statistic	Value	Unit
Bankfull width 66.7 percent AEP flood	0	ft^3/s
Bankfull Width 50-percent AEP flood	0	ft^3/s
Bankfull width 42.9 percent AEP flood	0	ft^3/s
Bankfull Width 20-percent AEP flood	0	ft^3/s

Statistic	Value	Unit
Bankfull Width 10-percent AEP flood	0	ft^3/s
Bankfull Width 4-percent AEP flood	0	ft^3/s
Bankfull Width 2-percent AEP flood	0	ft^3/s
Bankfull Width 1-percent AEP flood	0	ft^3/s
Bankfull Width 0.5-percent AEP flood	0	ft^3/s
Bankfull Width 0.2-percent AEP flood	0	ft^3/s

Peak-Flow Statistics Disclaimers [W Region Aerial Photo SIR 2020 5142]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [W Region Aerial Photo SIR 2020 5142]

Statistic	Value	Unit
Rem sens chan width 66.7 percent AEP fld	0	ft^3/s
Rem_sens_chan_width_50_percent_AEP_flood	0	ft^3/s
Rem sens chan width 42.9 percent AEP fld	0	ft^3/s
Rem_sens_chan_width_20_percent_AEP_flood	0	ft^3/s
Rem_sens_chan_width_10_percent_AEP_flood	0	ft^3/s
Rem_sens_chan_width_4_percent_AEP_flood	0	ft^3/s
Rem_sens_chan_width_2_percent_AEP_flood	0	ft^3/s
Rem_sens_chan_width_1_percent_AEP_flood	0	ft^3/s
Rem_sens_chan_width_0_5_pct_AEP_flood	0	ft^3/s
Rem_sens_chan_width_0_2_pct_AEP_flood	0	ft^3/s

Peak-Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
66.7-percent AEP flood	567	ft^3/s	232	1390	59.4
50-percent AEP flood	675	ft^3/s	285	1600	56.5
42.9-percent AEP flood	727	ft^3/s	310	1710	55.7
20-percent AEP flood	955	ft^3/s	421	2170	53.4
10-percent AEP flood	1190	ft^3/s	529	2680	52.8

Statistic	Value	Unit	PIL	PIU	ASEp
4-percent AEP flood	1430	ft^3/s	635	3220	53.2
2-percent AEP flood	1620	ft^3/s	706	3720	54.2
1-percent AEP flood	1820	ft^3/s	779	4250	56
0.5-percent AEP flood	2020	ft^3/s	842	4850	58
0.2-percent AEP flood	2240	ft^3/s	895	5610	61.4
Active chan width 66.7 percent AEP flood	0	ft^3/s			
Active Channel Width 50-percent AEP flood	0	ft^3/s			
Active chan width 42.9 percent AEP flood	0	ft^3/s			
Active Channel Width 20-percent AEP flood	0	ft^3/s			
Active Channel Width 10-percent AEP flood	0	ft^3/s			
Active Channel Width 4-percent AEP flood	0	ft^3/s			
Active Channel Width 2-percent AEP flood	0	ft^3/s			
Active Channel Width 1-percent AEP flood	0	ft^3/s			
Active Channel Width 0.5-percent AEP flood	0	ft^3/s			
Active Channel Width 0.2-percent AEP flood	0	ft^3/s			
Bankfull width 66.7 percent AEP flood	0	ft^3/s			
Bankfull Width 50-percent AEP flood	0	ft^3/s			
Bankfull width 42.9 percent AEP flood	0	ft^3/s			
Bankfull Width 20-percent AEP flood	0	ft^3/s			
Bankfull Width 10-percent AEP flood	0	ft^3/s			
Bankfull Width 4-percent AEP flood	0	ft^3/s			
Bankfull Width 2-percent AEP flood	0	ft^3/s			
Bankfull Width 1-percent AEP flood	0	ft^3/s			
Bankfull Width 0.5-percent AEP flood	0	ft^3/s			
Bankfull Width 0.2-percent AEP flood	0	ft^3/s			
Rem sens chan width 66.7 percent AEP fld	0	ft^3/s			
Rem_sens_chan_width_50_percent_AEP_flood	0	ft^3/s			
Rem sens chan width 42.9 percent AEP fld	0	ft^3/s			
Rem_sens_chan_width_20_percent_AEP_flood	0	ft^3/s			
Rem_sens_chan_width_10_percent_AEP_flood	0	ft^3/s			
Rem_sens_chan_width_4_percent_AEP_flood	0	ft^3/s			
Rem_sens_chan_width_2_percent_AEP_flood	0	ft^3/s			
Rem_sens_chan_width_1_percent_AEP_flood	0	ft^3/s			

Statistic	Value	Unit	PIL	PIU	ASEp
Rem_sens_chan_width_0_5_pct_AEP_flood	0	ft^3/s			
Rem_sens_chan_width_0_2_pct_AEP_flood	0	ft^3/s			

Peak-Flow Statistics Citations

Sando, Roy, Sando, S.K., McCarthy, P.M., and Dutton, D.M.,2016, Methods for estimating peak-flow frequencies at ungaged sites in Montana based on data through water year 2011: U.S. Geological Survey Scientific Investigations Report 2015–5019–F, 30 p. (https://doi.org/10.3133/sir20155019)

Chase, K.J., Sando, R., Armstrong, D.W., and McCarthy, P., 2021, Regional regression equations based on channel-width characteristics to estimate peak-flow frequencies at ungaged sites in Montana using peak-flow frequency data through water year 2011 (ver. 1.1, September 2021): U.S. Geological Survey Scientific Investigations Report 2020–5142, 49 p. (https://doi.org/10.3133/sir20205142)

Low-Flow Statistics

Low-Flow Statistics Parameters [W Region LowFlow GLS 2015 5019G]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	90.6	square miles	6.4	2520
SLOP50_30M	Slopes_gt_50pct_from_30m_DEM	2.5	percent	1.87	67.5

Low-Flow Statistics Flow Report [W Region LowFlow GLS 2015 5019G]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
7 Day 10 Year Low Flow	3.77	ft^3/s	1.25	11.4	68.5

Low-Flow Statistics Citations

McCarthy, P.M., Sando, Roy, Sando, S.K., and Dutton, D.M.,2016, Methods for estimating streamflow characteristics at ungaged sites in western Montana based on data through water year 2009: U.S. Geological Survey Scientific Investigations Report 2015–5019–G, 19 p. (https://doi.org/10.3133/sir20155019)

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 13]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	90.6	square miles	0.1	10000

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 13]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	91900	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

Channel-width Methods Weighting

No method weighting results returned.

Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 50.00 cfs

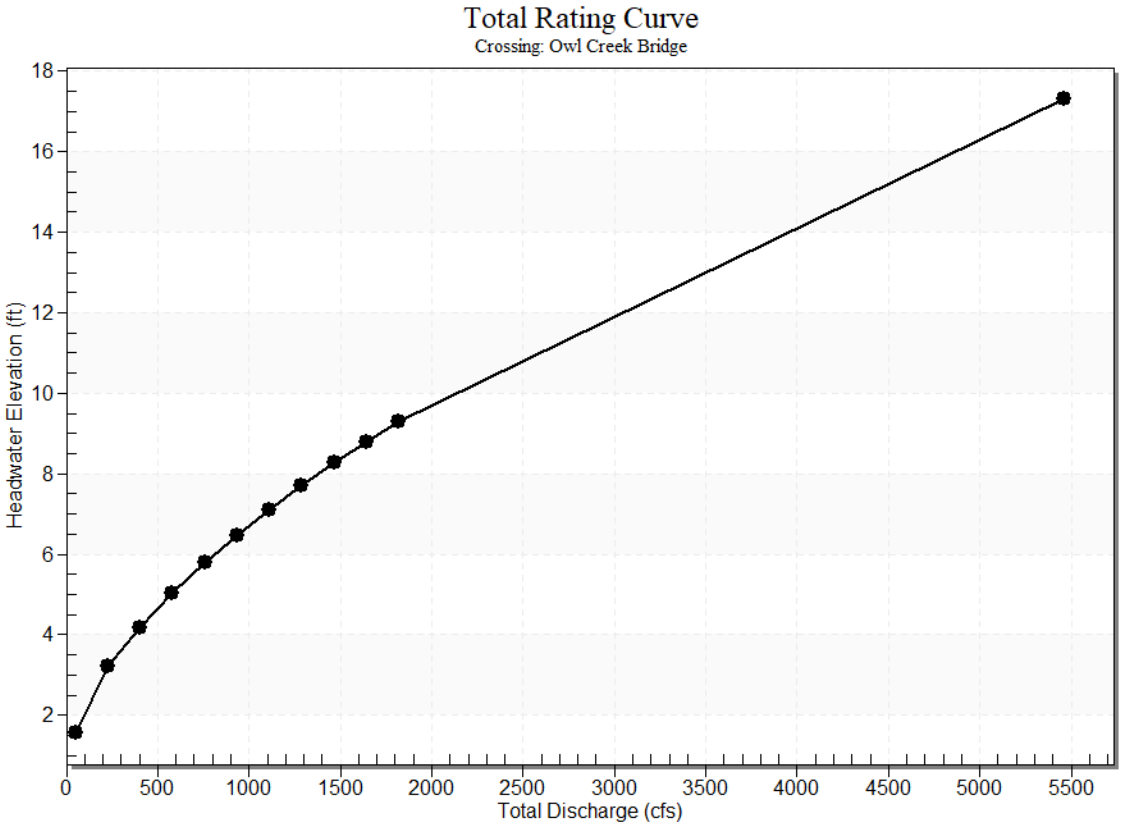
Design Flow: 1820.00 cfs

Maximum Flow: 1820.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: Owl Creek Bridge

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1.57	50.00	50.00	0.00	1
3.21	227.00	227.00	0.00	1
4.19	404.00	404.00	0.00	1
5.04	581.00	581.00	0.00	1
5.79	758.00	758.00	0.00	1
6.48	935.00	935.00	0.00	1
7.11	1112.00	1112.00	0.00	1
7.70	1289.00	1289.00	0.00	1
8.26	1466.00	1466.00	0.00	1
8.79	1643.00	1643.00	0.00	1
9.30	1820.00	1820.00	0.00	1
15.30	4274.68	4274.68	0.00	Overtopping

Rating Curve Plot for Crossing: Owl Creek Bridge



Culvert Data: Culvert 1

Table 1 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50.00 cfs	50.00 cfs	1.57	1.38	1.502	3-M2t	1.53	0.98	1.05	1.05	4.08	2.16
227.00 cfs	227.00 cfs	3.21	2.37	3.135	3-M2t	3.10	2.07	2.52	2.52	4.90	3.61
404.00 cfs	404.00 cfs	4.19	3.18	4.118	3-M2t	3.90	2.81	3.48	3.48	5.10	4.31
581.00 cfs	581.00 cfs	5.04	3.72	4.965	3-M2t	4.57	3.26	4.24	4.24	5.49	4.81

758.00 cfs	758.00 cfs	5.79	4.21	5.720	3-M2t	5.17	3.65	4.90	4.90	5.89	5.19
935.00 cfs	935.00 cfs	6.48	4.66	6.406	3-M2t	5.71	4.02	5.48	5.48	6.28	5.51
1112.00 cfs	1112.00 cfs	7.11	5.08	7.041	3-M2t	6.22	4.37	6.00	6.00	6.65	5.79
1289.00 cfs	1289.00 cfs	7.70	5.48	7.633	3-M2t	6.69	4.69	6.48	6.48	7.01	6.03
1466.00 cfs	1466.00 cfs	8.26	5.88	8.193	3-M2t	7.15	5.01	6.93	6.93	7.35	6.25
1643.00 cfs	1643.00 cfs	8.79	6.34	8.725	3-M2t	7.58	5.31	7.34	7.34	7.68	6.45
1820.00 cfs	1820.00 cfs	9.30	6.79	9.233	3-M2t	8.00	5.60	7.74	7.74	7.99	6.63

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

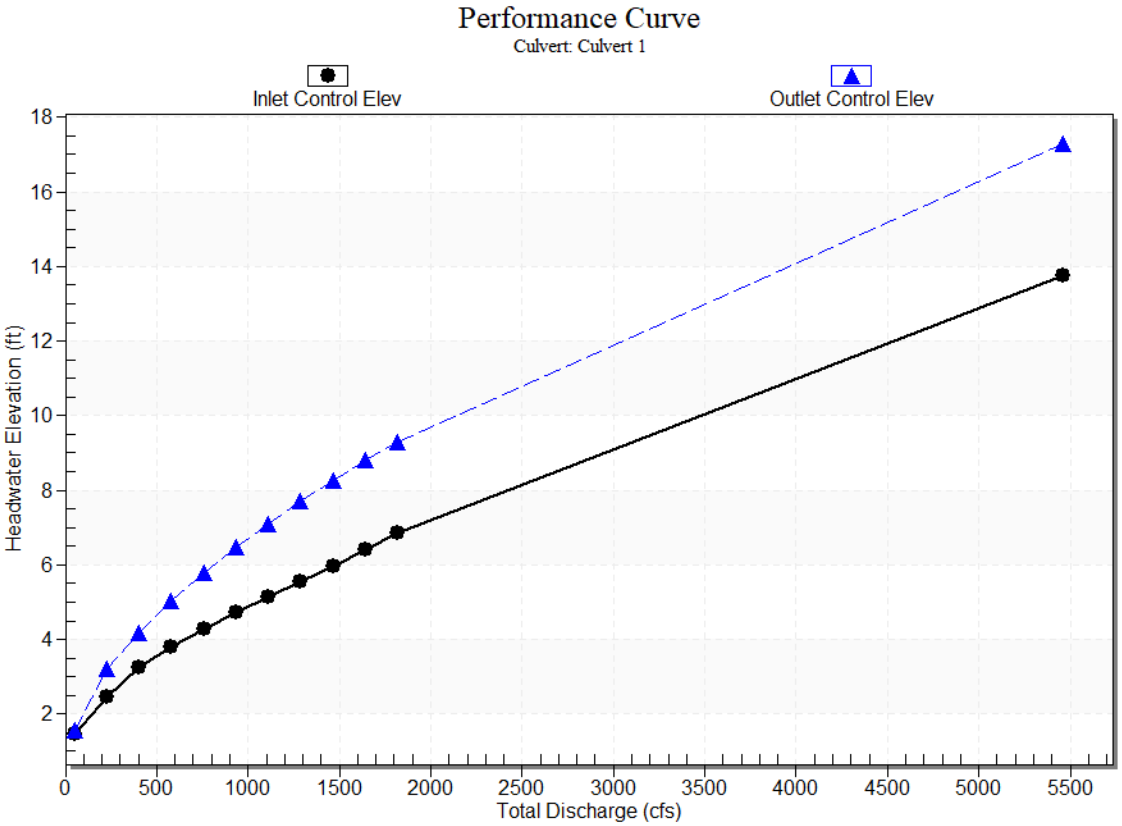
Inlet Elevation (invert): 0.07 ft,

Outlet Elevation (invert): 0.00 ft

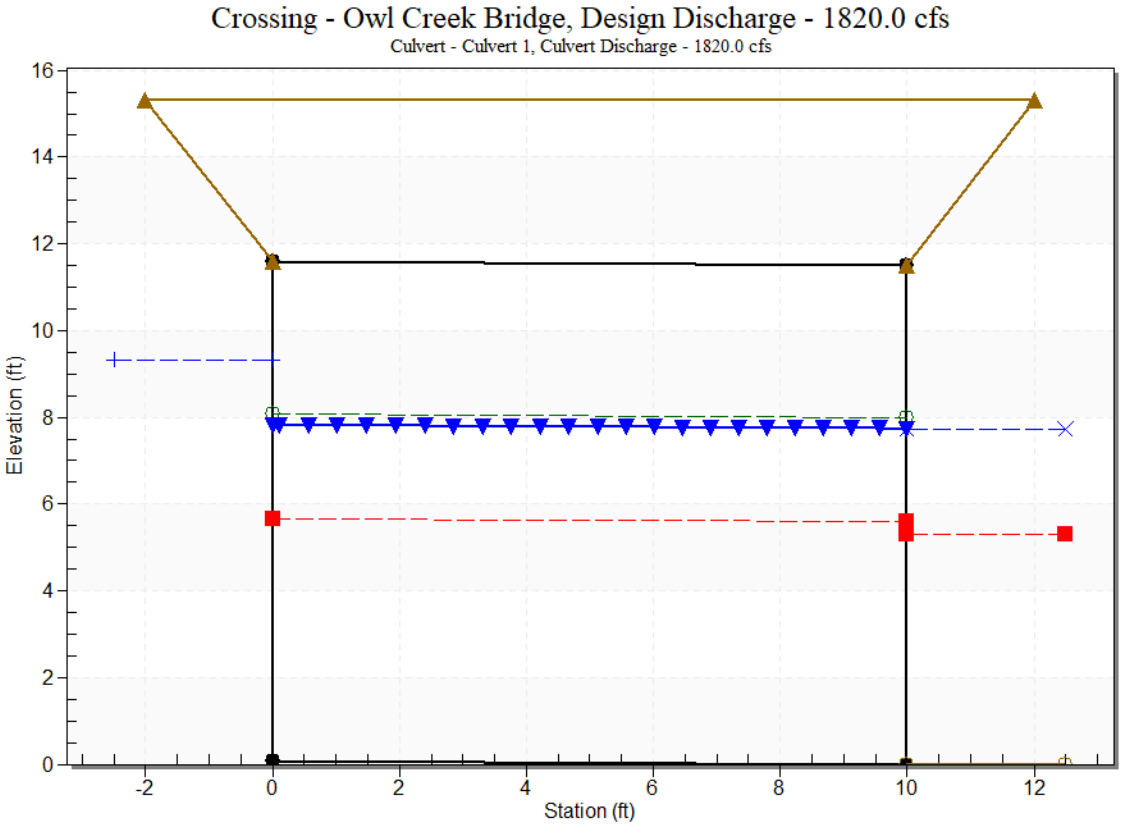
Culvert Length: 10.00 ft,

Culvert Slope: 0.0070

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 0.07 ft

Outlet Station: 10.00 ft

Outlet Elevation: 0.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: User Defined

Barrel Span: 34.86 ft

Barrel Rise: 11.51 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0200 (top and sides)

Manning's n: 0.0550 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Data for Crossing: Owl Creek Bridge

Table 2 - Downstream Channel Rating Curve (Crossing: Owl Creek Bridge)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
50.00	1.05	1.05	2.16	0.46	0.39
227.00	2.52	2.52	3.61	1.10	0.44
404.00	3.48	3.48	4.31	1.52	0.46
581.00	4.24	4.24	4.81	1.85	0.47
758.00	4.90	4.90	5.19	2.14	0.48
935.00	5.48	5.48	5.51	2.39	0.48
1112.00	6.00	6.00	5.79	2.62	0.49
1289.00	6.48	6.48	6.03	2.83	0.49
1466.00	6.93	6.93	6.25	3.03	0.50
1643.00	7.34	7.34	6.45	3.21	0.50
1820.00	7.74	7.74	6.63	3.38	0.50

Tailwater Channel Data - Owl Creek Bridge

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 20.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0070

Channel Manning's n: 0.0550

Channel Invert Elevation: 0.00 ft

Roadway Data for Crossing: Owl Creek Bridge

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 15.30 ft

Roadway Surface: Paved

Roadway Top Width: 14.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 50.00 cfs

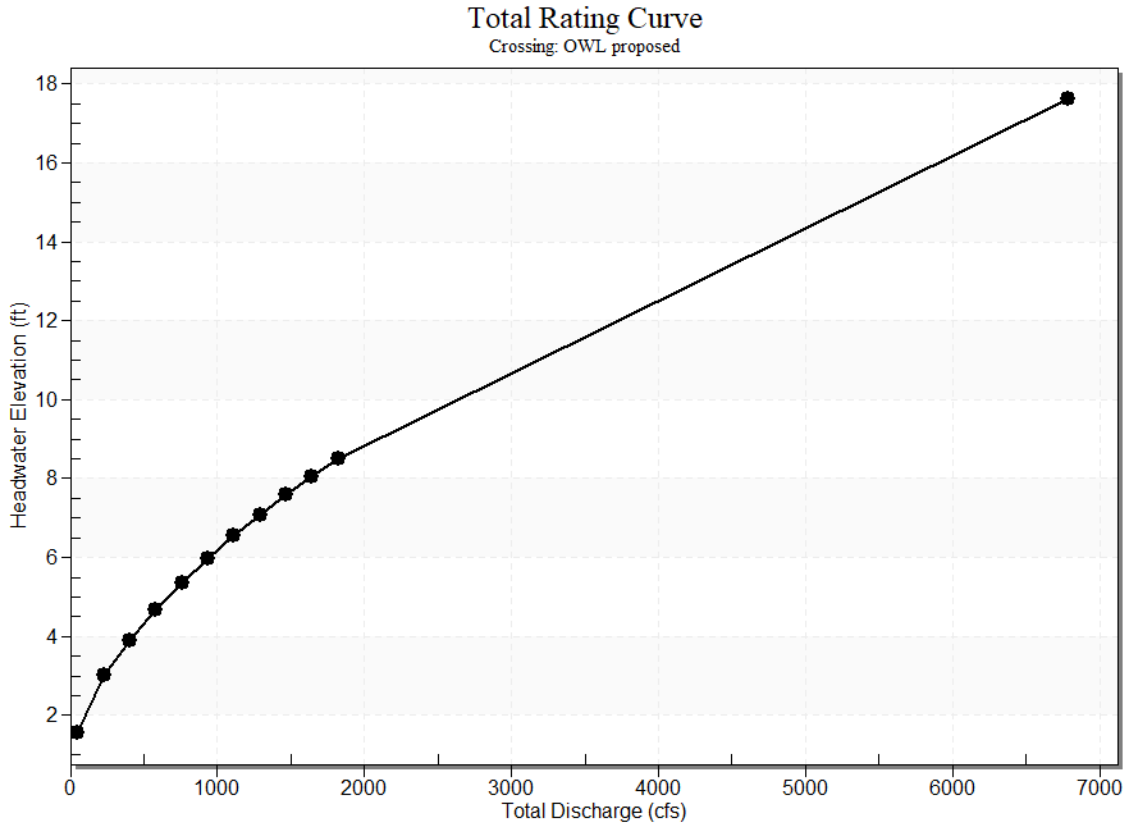
Design Flow: 1820.00 cfs

Maximum Flow: 1820.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: OWL proposed

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1.57	50.00	50.00	0.00	1
3.01	227.00	227.00	0.00	1
3.90	404.00	404.00	0.00	1
4.68	581.00	581.00	0.00	1
5.37	758.00	758.00	0.00	1
5.99	935.00	935.00	0.00	1
6.56	1112.00	1112.00	0.00	1
7.08	1289.00	1289.00	0.00	1
7.58	1466.00	1466.00	0.00	1
8.05	1643.00	1643.00	0.00	1
8.49	1820.00	1820.00	0.00	1
15.30	5156.52	5156.52	0.00	Overtopping

Rating Curve Plot for Crossing: OWL proposed



Culvert Data: Culvert 1

Table 1 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50.00 cfs	50.00 cfs	1.57	1.37	1.465	3-M2t	1.48	0.96	1.05	1.05	3.74	2.16
227.00 cfs	227.00 cfs	3.01	2.34	2.913	3-M2t	2.88	1.94	2.52	2.52	3.85	3.61
404.00 cfs	404.00 cfs	3.90	2.79	3.802	3-M2t	3.49	2.53	3.48	3.48	3.73	4.31
581.00 cfs	581.00 cfs	4.68	3.26	4.577	3-M1t	4.00	2.97	4.24	4.24	3.90	4.81

758.00 cfs	758.00 cfs	5.37	3.62	5.265	3-M1t	4.46	3.28	4.90	4.90	4.13	5.19
935.00 cfs	935.00 cfs	5.99	3.95	5.887	3-M1t	4.87	3.56	5.48	5.48	4.37	5.51
1112.00 cfs	1112.00 cfs	6.56	4.26	6.456	3-M1t	5.25	3.82	6.00	6.00	4.61	5.79
1289.00 cfs	1289.00 cfs	7.08	4.56	6.985	3-M1t	5.61	4.07	6.48	6.48	4.83	6.03
1466.00 cfs	1466.00 cfs	7.58	4.84	7.480	3-M1t	5.96	4.30	6.93	6.93	5.05	6.25
1643.00 cfs	1643.00 cfs	8.05	5.11	7.947	3-M1t	6.28	4.53	7.34	7.34	5.26	6.45
1820.00 cfs	1820.00 cfs	8.49	5.37	8.390	3-M1t	6.59	4.75	7.74	7.74	5.47	6.63

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

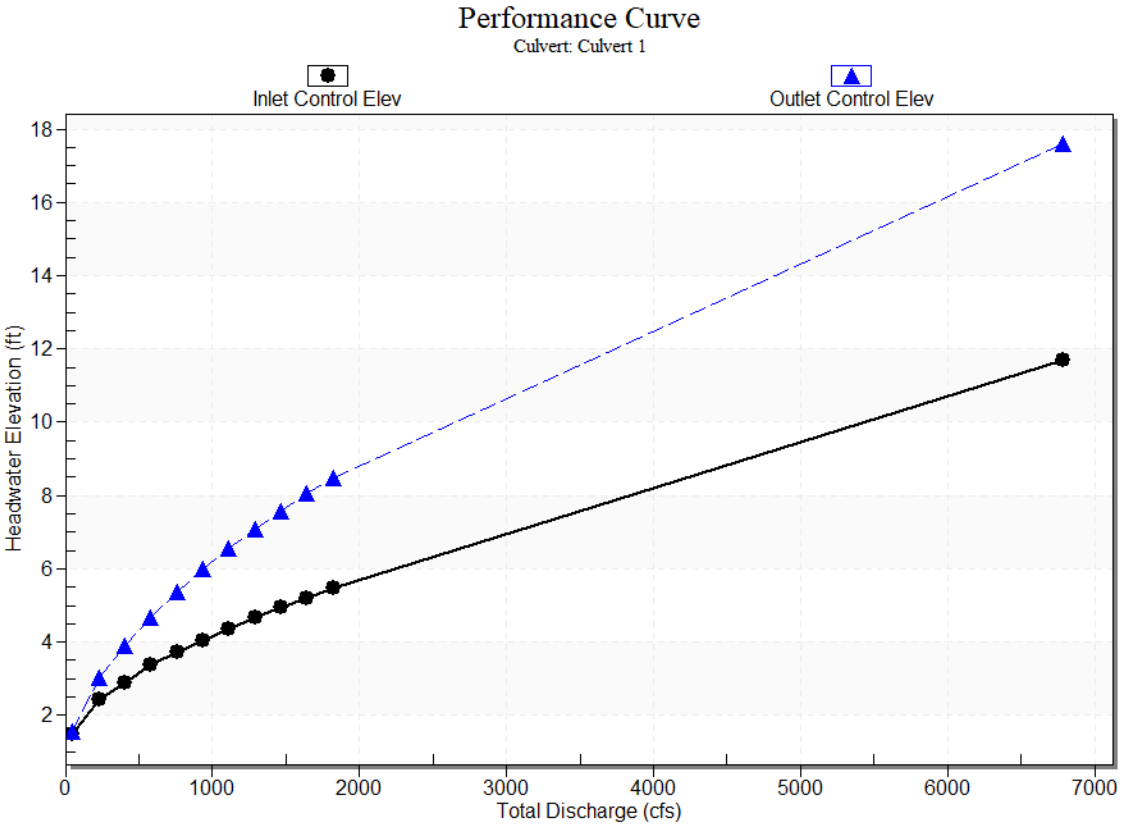
Inlet Elevation (invert): 0.10 ft,

Outlet Elevation (invert): 0.00 ft

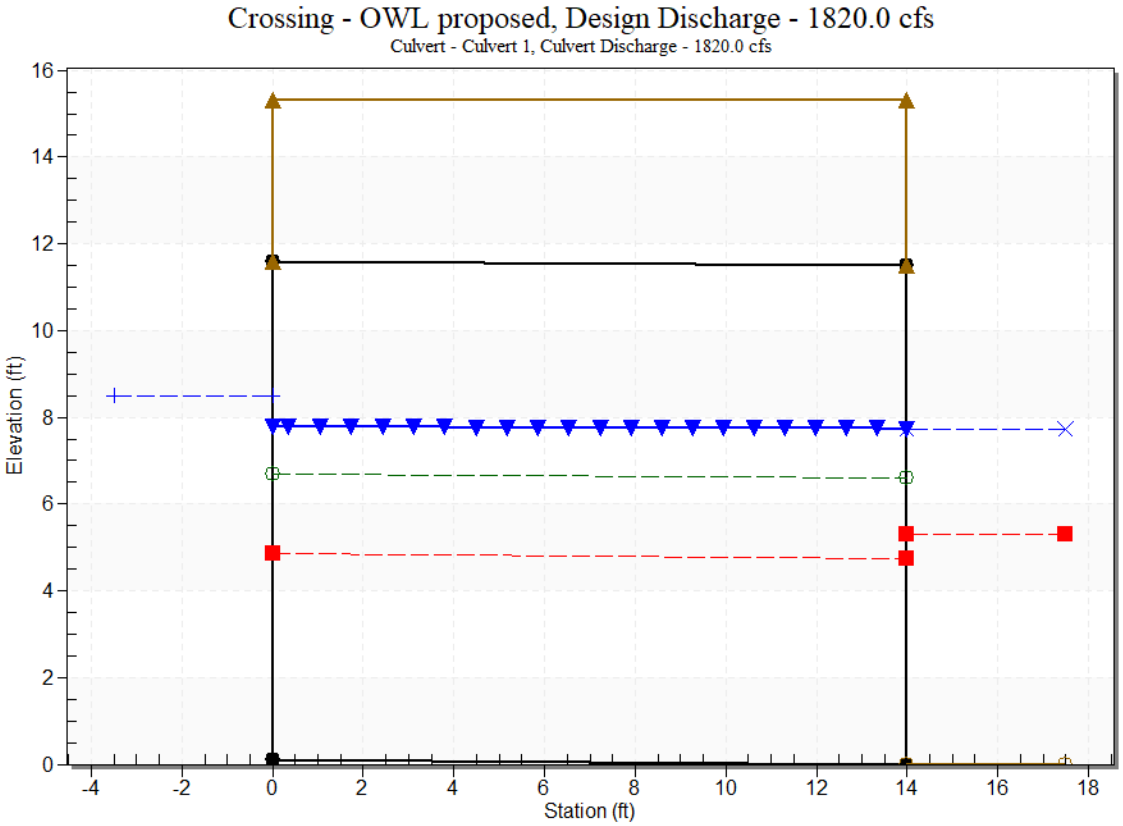
Culvert Length: 14.00 ft,

Culvert Slope: 0.0071

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 0.10 ft

Outlet Station: 14.00 ft

Outlet Elevation: 0.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: User Defined

Barrel Span: 52.65 ft

Barrel Rise: 11.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0200 (top and sides)

Manning's n: 0.0550 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: OWL proposed

Table 2 - Downstream Channel Rating Curve (Crossing: OWL proposed)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
50.00	1.05	1.05	2.16	0.46	0.39
227.00	2.52	2.52	3.61	1.10	0.44
404.00	3.48	3.48	4.31	1.52	0.46
581.00	4.24	4.24	4.81	1.85	0.47
758.00	4.90	4.90	5.19	2.14	0.48
935.00	5.48	5.48	5.51	2.39	0.48
1112.00	6.00	6.00	5.79	2.62	0.49
1289.00	6.48	6.48	6.03	2.83	0.49
1466.00	6.93	6.93	6.25	3.03	0.50
1643.00	7.34	7.34	6.45	3.21	0.50
1820.00	7.74	7.74	6.63	3.38	0.50

Tailwater Channel Data - OWL proposed

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 20.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0070

Channel Manning's n: 0.0550

Channel Invert Elevation: 0.00 ft

Roadway Data for Crossing: OWL proposed

Roadway Profile Shape: Constant Roadway Elevation

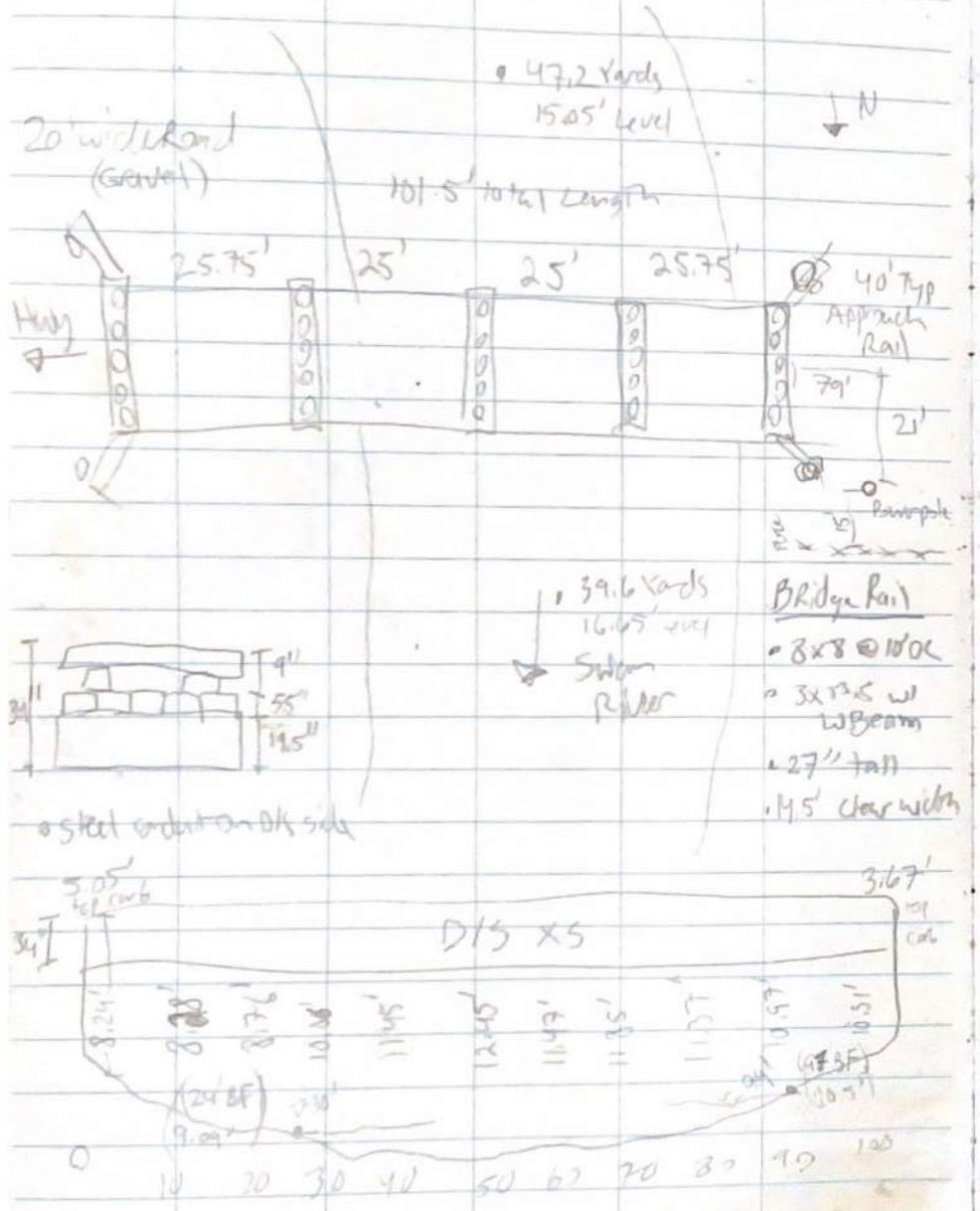
Crest Length: 100.00 ft

Crest Elevation: 15.30 ft

Roadway Surface: Paved

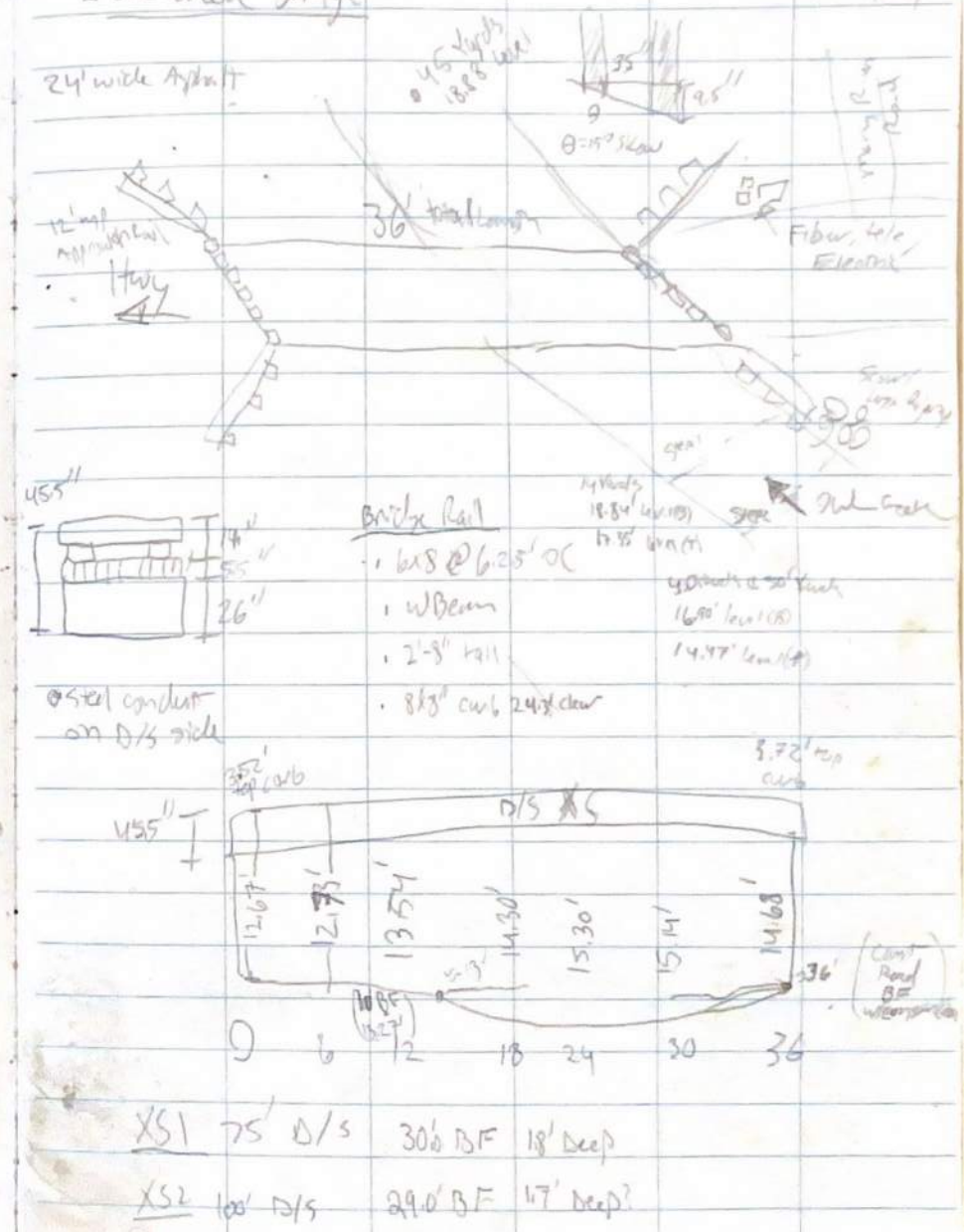
Kraft Creek Bridge

11/19/24



Owl Creek Bridge

11/19/24



XS1 75' D/S 30.0 BF 18' Deep

XS2 100' D/S 29.0' BF 47' Deep?

Appendix C: Environmental Scan Memo

2000 Maple Street
Missoula, MT 59808
406.721.4320
djanda.com

Memo

To: Missoula County
From: DJ&A, P.C.
Date: December 2024
Re: Owl Creek Bridge Project – Environmental Scan

Purpose

The purpose of this memorandum is to identify potential environmental concerns and how they could relate to the future scope, schedule, and budget of the proposed Owl Creek bridge replacement. Generally speaking, the memo addresses aquatic, biological, and cultural resources of the proposed project area. An overview of the following applicable resources from the Montana Department of Transportation's Consultant Design Activities 111 and 182 is provided within this memo: aquatic resources including surface water and groundwater; floodplains and floodways; riparian areas and wetlands; prime, unique, or farmland of statewide importance; and section 4(f) and 6(f) properties. Finally, this memo presents potential permitting, consultation/coordination, and compliance requirements applicable to the Owl Creek Bridge Project.

Project Description

DJ&A was contracted by Missoula County to perform preliminary engineering services for the Owl Creek Bridge Project. This phase of the project focuses on the development of Preliminary Engineering Scan Memos, such as this memo, to explore replacement of the existing bridge. The replacement is assumed to be constructed in the same location as the existing bridge with the proposed configuration of the new bridge being explored in this work. The existing bridge is located on Placid Lake Road at 47.1158081683°N, -113.4571320012°W and spans Owl Creek south of Seeley Lake, MT. The proposed project would replace the 55-year-old timber bridge that is roughly 40-feet long and consists of a single span. Construction timing is contingent upon funding allocation and future project development.

Analysis

For the purposes of this memo, a half mile buffer around the existing bridge was applied to create the project area. The half mile buffer encompasses both the existing and anticipated footprint of the replacement bridge and also accounts for potential alignment or configuration alternatives that may be developed in the future. The buffer may also account for turnaround, staging, or material source areas associated with bridge replacement. Analysis areas for different resources throughout this memo may vary according to the extent and availability of data used to support the analysis and may differ from the project area. If the analysis area does differ from the project area it is defined for the applicable data source throughout this memo.

An environmental summary report was obtained from the Montana Natural Heritage Program (MTNHP) on November 26, 2024, with the analysis area consisting of all Public Land Survey System sections within one (1) mile of the Owl Creek Bridge, resulting in nine (9) total sections (5,760 acres) (MTNHP 2024). This analysis area is the smallest available unit of analysis.

Data included within this report include: species occurrences, observations, potential occurrence, survey results, land cover, wetland and riparian mapping, land management, and invasive and pest species. Resulting data are filtered to include: Montana Species of Concern (SOC), Special Status (SS), Important Animal Habitat (IAH), and Potential SOC. An additional SOC Occurrences report for Bald Eagle (*Haliaeetus leucocephalus*) was also provided given close proximity to nests/territories.

A U.S. Fish and Wildlife (USFWS) Information for Planning and Consultation (IPaC) report was generated for the project area on November 21, 2024 in order to identify any federally listed species or designated critical habitat with potential to be impacted by activities occurring within the project area; this report also addresses bald and golden eagle and Birds of Conservation Concern (BCCs) potentially impacted by activities occurring within the project area (U.S. Fish & Wildlife Service (USFWS) 2024a).

A site visit occurred on November 19, 2024, during which a DJ&A environmental scientist conducted a preliminary site evaluation of conditions and natural resources present or potentially present near the existing bridge.

Aquatic Resources

Surface Water and Groundwater

Owl Creek Bridge lies within the Placid Creek watershed (Hydrologic Unit Code (HUC) 1701020310) and, more specifically, the Placid Lake subwatershed (HUC 170102031004). Owl Creek is a tributary of the Clearwater River both of which are categorized as a perennial stream/rivers in the National Hydrography Dataset (NHD). Owl Creek, the Clearwater River, and unnamed intermittent tributaries make up the surface waters of the project area (USGS 2023). Within the project area Owl Creek generally flows from west to east through a natural riparian area parallel and passing under Placid Lake Road. Groundwater of the project area is part of the Seeley-Swan subarea groundwater aquifer. This aquifer is a surficial aquifer comprised mostly of unconsolidated sediments deposited by streams, glaciers, or by meltwater from glaciers (Smith, LaFave, and Patton 2013).

Floodplains and Floodways

National Flood Insurance Rate Maps (FIRM) produced through the Federal Emergency Management Agency (FEMA) indicate that the project area is within a special flood hazard area (SFHA) meaning the area is subject to inundation by the 1% annual chance flood (i.e., 100-year flood). According to FIRM panel 30063C1027F, Owl Creek Bridge itself lies outside any SFHA (FEMA 2015).

Riparian Areas and Wetlands

In addition to Owl Creek, the USFWS National Wetlands Inventory (NWI) indicates the primary wetlands of the project area as Freshwater Forested/Shrub (PSS) and Palustrine Emergent wetland (PEM). The project area also contains forested riparian areas. These areas are categorized as ‘Rp1FO’ in NWI meaning they are riparian systems, related to flowing water or lotic, and have woody vegetation greater than 6 meters in height or forested (NWI 2024). These NWI data, including riparian area characteristics and wetlands, were observed during the site visit.

Potential Permitting Requirements

When proposed work is located in, above, or near waterways, various federal, state, and local permits may be required contingent upon the specific location and scope of the proposed work. DJ&A has reviewed federal, state, and local guidance regarding permitting requirements for work occurring in, above, or near waterways in the state of Montana and Missoula County. DJ&A has developed permitting recommendations for Missoula County based on proposed project work and

associated activities. Table 1 summarizes potential permit requirements for the proposed project and provides rationale and brief notes for each. Permits identified as potentially applicable to the project include:

- Clean Water Act Section 404 Nationwide Permit 3 – Maintenance (NWP 3);
- Clean Water Act Section 401 Water Quality Certification;
- Montana Stream Protection Act (SPA) 124 Permit;
- Short-Term Water Quality Standard for Turbidity (318 Authorization);
- Missoula County Storm Water Permit; and
- Missoula County Floodplain Development Permit.

Joint Permit Application

The MT DNRC, along with participating agencies, created a Joint Application Form to help reduce the number of separate applications to be submitted for proposed work located in, above, or near waterways in the state of Montana. The use of this Joint Application is recommended for this project. The permitting process takes 30–90 days following completion of aquatic resource delineations and preparation of a complete Joint Application. The MT DNRC permitting webpage[1] provides additional information including Joint Application instructions[2]. These instructions explain everything required to properly complete a Joint Application.

[1] https://dnrc.mt.gov/licenses-and-permits/stream-permitting/
[2] https://dnrc.mt.gov/_docs/permits-services/Joint-Application-Direction-Final.pdf

Table 1 Summary of Potential Permit Requirements for the Owl Creek Bridge Project

Permit	Agency	Applicable (Yes / No)	Rationale	Notes
Federal				
Clean Water Act Section 404 Nationwide Permit 3–Maintenance (NWP 3)	U.S. Army Corps of Engineers (USACE)	Yes	Owl Creek is a potential water of the U.S (WOTUS). Project work constitutes repair, rehabilitation, or replacement of a previously authorized, currently serviceable structure.	There are no acreage thresholds associated with NWP 3. A pre-construction notification (PCN) is required for this project as Owl Creek is occupied designated critical habitat for the federally listed bull trout *(Salvelinus confluentus)*.
Rivers and Harbors Act Section 10 Permit	USACE	No	Owl Creek is not a jurisdictional waterway under Section 10 of the Rivers and Harbors Act.	N/A
National Pollutant Discharge Elimination System (NPDES) Permit	U.S. Environmental Protection Agency (EPA)	No	Project activities may result in the discharge of a pollutant (stormwater) into potential WOTUS; however, the state of Montana issues pollutant discharge permits through the Montana Pollutant Discharge Elimination System (MPDES). EPA issues NPDES permits on tribal lands only in Montana. Additionally, the project will not disturb 1 acre or greater.	If the project would disturb 1 acre or greater, a MPDES Storm Water Construction Permit (MTR100000) issued by the Montana Department of Environmental Quality (MT DEQ) would be required.
State				
Clean Water Act Section 401 Water Quality Certification	MT DEQ	Yes	Project requires a Clean Water Act Section 404 permit (NWP 3).	NWP 3 is certified by MT DEQ meaning projects operating under NWP 3 are approved. Certification letter available for project files.
SPA 124 Permit	Montana Fish, Wildlife, and Parks (MT FWP)	Yes	Project activities may impact the banks of Owl Creek.	A Notice of Construction (application) must be submitted to MT FWP, which has up to 30 days to review the application, perform an on-site investigation, and approve, modify, or deny the application. An application must be submitted for review not less than 60 days before the intended start of construction. There is no application fee.
Short-Term Water Quality Standard for Turbidity (318 Authorization)	MT DEQ	Yes	Project activities may cause short term or temporary violations of state surface water quality standards for turbidity.	The authorization may be obtained from MT DEQ or may be waived by MT FWP during its review process under the SPA 124 Permit. There is an application fee of $250.
MPDES Storm Water Construction Permit	MT DEQ	No	Project activities would not disturb 1 acre or greater.	Though 1 acre or greater will not be disturbed, storm water Best Management Practices (BMPs) to be implemented.
Municipal Separate Storm Sewer System (MS4) General Permit	MT DEQ	No	Missoula County holds an active MS4 General Permit issued by MT DEQ.	A Storm Water Permit issued by Missoula County may be required.

Permit	Agency	Applicable (Yes / No)	Rationale	Notes
Montana Natural Streambed and Land Preservation Act (310 Permit)	MT DNRC-Missoula Conservation District	No	This permit applies only to private or nongovernmental applicants.	Joint Application sometime referred to as "310 Joint Application" will still be used to obtain all permits identified as applicable to this project.
Montana Land-Use License or Easement on Navigable Waters	MT DNRC	No	Owl Creek is not considered a navigable waterway by MT DNRC.	N/A
Montana Water Use Act (Water Reservation)	MT DNRC	No	Project activities will not result in new or additional water rights nor change or modify existing water rights; no water reservation would be implemented for the proposed project.	N/A
Streamside Management Zone Law	MT DNRC	No	Project activities do not include commercial forest practices.	N/A
Local				
Missoula County Storm Water Permit	Missoula Public Works and Mobility Department	Possible	Project falls within Missoula County's MS4 area and project activities may disturb 2,500 square feet or greater of land or change the grade of the project area by more than three (3) feet.	Storm Water Permit application shall be submitted to Development Services, along with the relevant fee, no greater than 180 days and no less than 60 days from the start date of construction. Existence of any cooperating County/City MS4 permit agreement or use should be explored.
City or County Floodplain Development Permit	Missoula County Floodplain Administrator	Possible	Owl Creek Bridge itself is located outside any FEMA mapped SFHA, however; the project area is adjacent to a Zone AE (base flood elevations determined) SFHA.	A Floodplain Development Permit cannot be issued until all other applicable permits are issued first. Permit fees range from $897 to $1,050.

Biological Resources

Special Status Species

Special status species includes those with federal or state protections or management emphasis. Evaluated species include those protected under the Endangered Species Act, Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act; Montana Species of Concern (SOC); Montana Special Status Species (SSS); Montana Species of Greatest Conservation Need (SGCN); Montana Species of Greatest Information Need (SGIN); U.S. Forest Service (USFS) Sensitive Species; and USFS Species of Conservation Concern (SOCC). Potential impacts and anticipated mitigations are summarized in Potential Impacts and Compliance.

Federally Listed Species and Designated Critical Habitat

Federally listed species and final designated critical habitat occur within the project area (Table 2). Mitigations will likely be required to avoid potential impacts (see Compliance).

Table 2 Federally Listed Species Potentially Affected by Project Activities Occurring within the Project Area

Category	Common Name	Scientific Name	Designated Critical Habitat within Project Area	Status
Mammals	Canada Lynx	*Lynx canadensis*	None	Threatened
	Grizzly Bear	*Ursus arctos horribilis*	None	Threatened
	North American Wolverine	*Gulo gulo luscus*	None	Threatened
Birds	Yellow-billed Cuckoo	*Coccyzus americanus*	None	Threatened
Fishes	Bull Trout	*Salvelinus confluentus*	Present	Threatened
Invertebrates	Monarch	*Danaus plexippus*	None	Candidate

Source: (USFWS 2024a)

Bald and Golden Eagles

Both bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) have the potential to occur within the analysis area and may be affected by project activities (USFWS 2024a). Bald eagles are likely to occur within the analysis area, and suitable nesting and foraging habitat is present. Active nests and territories occur within the analysis area (MTNHP 2024). Golden eagle have a relatively low likelihood of occurrence within the analysis area. There is no suitable nesting habitat for golden eagle within the analysis area, but foraging habitat is present. Mitigations may be required to avoid potential impacts (see Compliance).

Migratory Birds and Birds of Conservation Concern

Suitable habitat for a wide variety of migratory birds and birds of conservation concern occurs within the analysis area. Active nests may be present, and inactive American dipper (*Cinclus mexicanus*) and unconfirmed cliff swallow (*Petrochelidon pyrrhonota*) migratory bird nests were observed on the existing bridge structure during a site visit conducted on November 19, 2024 (Figure 1). Mitigations will likely be required to avoid potential impacts (see Compliance).

Figure 1 American dipper and unconfirmed cliff swallow nests observed underneath Owl Creek Bridge on November 19, 2024

USFS

Species designated as USFS Sensitive and USFS SOCC may be present within the analysis area on lands administered by the USFS. No such lands exist within the immediate vicinity of the existing bridge. Potential impacts to these species will be considered, but further mitigations are not anticipated (see Potential Impacts).

State of Montana

Suitable habitat for multiple SOC, SSS, SGCN, and SGIN occurs within the analysis area, and individuals may occur. Potential impacts to these species will be considered, but further mitigations are not anticipated (see Potential Impacts).

Cultural Resources

The Owl Creek Bridge and nearby infrastructure may have potential historic significance and be eligible for listing on the National Register of Historic Places. For this reason, the infrastructure would be subject to review under the National Historic Preservation Act. Consultation with the state historic preservation office (SHPO) is recommended for a determination on the historic significance. Consultation with local tribes and/or tribal historic preservation office (THPO) is also recommended.

Prime, Unique, or Farmland of Statewide Importance

A Web Soil Survey report was generated for the project area. As indicated in Table 3 below five Soil Map Units (SMU) are found in the immediate vicinity of the existing bridge.

Table 3 Farmland Ratings of Project Area Soil Map Units

Map Unit Symbol	Map Unit Name	Rating	Acres in Project Area	Percent of Project Area
*31	Courville gravelly silt loam, 8 to 30 percent slopes	Not prime farmland	135.3	26.3%
32	Courville-Mitten gravelly silt loams, 30 to 60 percent slopes	Not prime farmland	35.3	6.9%
*42	Glaciercreek gravelly silt loam, 0 to 4 percent slopes	Not prime farmland	9.6	1.9%
*73UB	Typic Cryaquepts-Elvick family, complex, outwash terraces	Not prime farmland	112.7	21.9%
95	Rumblecreek gravelly loam, 4 to 30 percent slopes	Not prime farmland	21.3	4.1%

Map Unit Symbol	Map Unit Name	Rating	Acres in Project Area	Percent of Project Area
*105	Totelake gravelly loam, 2 to 8 percent slopes	Farmland of local importance	46.6	9.1%
124	Wildgen gravelly loam, 4 to 30 percent slopes	Not prime farmland	12.2	2.4%
125	Wildgen-Winkler, cool, gravelly loams, 15 to 30 percent slopes	Not prime farmland	36.8	7.2%
126	Wildgen-Winkler, cool, gravelly loams, 30 to 60 percent slopes	Not prime farmland	14.8	2.9%
127	Wildgen, dry-Winkler complex, 15 to 30 percent slopes	Not prime farmland	0.8	0.2%
*128	Wildgen, dry-Winkler complex, 30 to 60 percent slopes	Not prime farmland	74.1	14.4%
129	Winfall gravelly loam, 4 to 30 percent slopes	Not prime farmland	15.0	2.9%
		TOTAL	**514.5**	**100.0%**

*Indicates SMU found in the immediate vicinity of the existing bridge.
Source: (USDA 2024)

One of the five SMU's found in the immediate vicinity of the existing bridge has a farmland classification of 'farmland of local importance' within the state of Montana. However, it is assumed that proposed project activities would not result in irreversible conversion of farmland to nonagricultural use and any disturbance associated with general construction activities would be negligible both temporally and spatially with regards to farmlands or soil. The existing bridge and associated roadway constitute "lands already in urban development", making these areas exempt from requirements set forth within the Farmland Protection Policy Act.

Section 4(f) and 6(f) Properties

The project area is within the Blackfoot Valley Conservation Area, portions of which may constitute both Section 4(f) and Section 6(f) properties. Proposed project activities would not be expected to result in any impacts to said properties or their intended use; however, recreation access to these properties may be restricted or impeded by the implementation of the proposed project. Section 4(f) and 6(f) analysis may be required for the project.

Potential Impacts

The potential impacts of the proposed project are presented below. Anticipated impacts are subject to change pending project design and alternative development.

Aquatic Resources

The proposed project may result in minimal impacts to potential WOTUS and waters of the state. Project activities occurring below the OHWM or within wetlands would necessitate the implementation of mitigations and conservation measures specified by corresponding permits. Any potential impacts to aquatic resources would be further mitigated by the implementation of standard mitigation measures and best management practices associated with project activities.

Biological Resources

Anticipated project activities necessary to complete the proposed work have the potential to result in minimal impacts to special status species. Construction activities and associated noise, dust, vibrations, heavy equipment operation, and human presence are likely to result in short-term disturbance and displacement of individuals. If necessary, vegetation removal or modification would

result in negligible loss of habitat. No impacts to special status plant species are anticipated. Standard mitigation measures and best management practices would be implemented to reduce potential impacts to special status species. Mitigation measures will likely be necessary to avoid or minimize potential impacts to bull trout and associated designated critical habitat, migratory birds including active nests, bald eagle including active nests, and golden eagle. Applicable mitigation measures may include: seasonal timing restrictions, pre-construction surveys, monitoring, and tailored construction and design criteria. Project activities would also be subject to additional conservation measures and construction parameters identified through consultation with USFWS to avoid or minimize potential impacts to federally listed species and/or final designated critical habitat. To avoid potential impacts to active migratory bird nests, it would be prudent to discourage the establishment of active nesting through the removal of existing inactive nests (USFWS 2024b). The following seasonal timing restrictions and/or work periods may be applicable to the project dependent upon activity type and affected species and are subject to modification pending consultation:

Bull trout

- May 1 through August 31: in-channel disturbance within spawning and rearing habitat.
- July 1 through September 30: in-water work and/or impact pile driving not attenuated for noise within foraging, migrating, and overwintering habitat.

Bald eagle

- February 1 through August 15: activity restrictions within 0.5 mile of any primary active bald eagle nest.

Migratory birds/BCCs

- August 16 through April 15: vegetation removal and/or modification.

Cultural Resources

Replacement of the existing bridge may constitute an impact to infrastructure with potential historic significance. Mitigations, if required for this potential impact, would be identified during Section 106 consultation.

Section 4(f) and 6(f) Properties

Recreation access to portions of the Blackfoot Valley Conservation Area may be restricted or impeded by the implementation of the proposed project. Alternative access may be available; however, Section 4(f) and Section 6(f) analysis may be required for the project.

Compliance

In support of expected permitting and as required by regulatory agencies, any waters of the state and potential WOTUS, including wetlands (i.e. aquatic resources) that may be impacted by the project need to be delineated. Delineation results are best presented in an aquatic resources delineation report meeting USACE standards. Additional information needed to properly complete a Joint Application for this project include detailed maps meeting USACE standards and identifying whether the project area falls within sage grouse core or connected habitat or any component of the National Wild and Scenic River System, neither of which apply to the project area.

The proposed project will require formal consultation with USFWS based upon the presence of bull trout and final designated critical habitat. It is anticipated that the project will tier to the 2020 *Standard Local Operating Procedures for Endangered Species for Nationwide Permits affecting Bull Trout and Kootenai River White Sturgeon in Northern Idaho, Western Montana, and Northeast Washington*

Biological Opinion (hereafter referenced as SLOPES BO). In the event that the proposed project does not conform to the requirements of the BO, additional formal consultation would be necessary. This consultation would require the preparation of a Biological Assessment (BA) by the proponent and issuance of a Biological Opinion (BO) by the USFWS.

It is anticipated that informal consultation with the USFWS will be necessary to fulfill Section 7 Consultation requirements for Canada lynx, grizzly bear, North American wolverine, and monarch.

Due to the potential historic significance of project area infrastructure a Class I cultural resources assessment of the project area should be conducted. A Class III cultural resources survey in areas where ground disturbance is anticipated will need to be conducted to comply with Section 106 of the National Historic Preservation Act. Consultation with local tribes and SHPO as Section 106 consultation should continue through all phases of the project.

If state funds are used on the proposed project, the act of funding is considered a “state action”, triggering the need to fulfill requirements set forth by the Montana Environmental Policy Act (MEPA). At the state level, the replacement of an existing bridge is eligible for a Categorical Exclusion (CE) according to Montana Code Annotated (MCA) 18.2.261, requiring the completion of a CE documentation form. Similarly, if the project were to receive federal funding, the project would trigger the need to fulfill obligations under the National Environmental Policy Act (NEPA) with replacement of the existing bridge being eligible for a CE.

References

FEMA. 2015. "National Flood Hazard Layer Viewer." https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd (accessed November 2024).

Montana Natural Heritage Program. 2024. *Environmental Summary Report for Custom Location in Missoula County.*

Smith, Larry N., John I. LaFave, and Thomas W. Patton. 2013. "Montana Ground Water Assesment Atlas NO. 4."

U.S. Department of Agriculture (USDA). 2024. Natural Resources Conservation Service Web Soil Survey. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.html (accessed November 2024).

U.S. Fish & Wildlife Service (USFWS). 2024a. *IPaC Resource List: Custom Location Missoula County, Montana.*

_____2024b. "Nuisance Swallows.

_____2023. National Wetland Inventory (NWI) – Wetlands Mapper https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/ (accessed November 2024).

United States Geological Survey (USGS). 2023. National Hydrography Dataset (NHD) - USGS National Map Downloadable Data Collection: USGS - National Geospatial Technical Operations Center (NGTOC). https://apps.nationalmap.gov/downloader/ (accessed November 2024).

Appendix D: Geotechnical Scan Memo

TETRA TECH

December 9, 2024

Jacob Roske, P.E.
DJ&A
2000 Maple St
Missoula, MT 59808

SUBJECT: Preliminary Geotechnical Recommendations
Missoula County Bridges – Owl Creek
Seeley Lake, Montana

Dear Mr. Roske:

Tetra Tech has completed a geotechnical site visit at the Owl Creek Bridge Replacement site near Seeley Lake, Montana. This memo describes our site visit, as well as preliminary foundation recommendations for the new bridge.

Existing and New Bridge

The Owl Creek Bridge is located on Placid Lake Road and crosses Owl Creek at approximately mile post 0.65 (47.115808168254944, -113.45713200115534). The existing bridge is an approximately 55-year-old timber bridge that consists of a single 40-foot span.

The new bridge is anticipated to be a single-span, two-lane, prestressed concrete bridge on the order of 60 feet in length.

Site Visit

The site visit was completed on November 14th, 2024, to observe the site geology, drill rig access, take photos, and determine potential foundation alternatives.

A review and observations of the site geology, and a geologic desktop study, shows that the bridge site is located in an area of alluvium deposits. This could be seen at the site as the creek bottom consisted of cobbles, boulders, gravel, sand, and silt. Underlying the alluvial deposits at depth is the Helena Formation which consists of beds of limestone interbedded with dolomite, siltite, and argillite. A photo log from the site visit is attached.

During the site visit, drilling access was also assessed. The roadway appears to be wide enough for future drilling to take place on either side of the roadway at each bridge abutment and still allow vehicles to pass. Due to the required closure of one lane of traffic, traffic control, or at a minimum, signs and cones will be needed to alert vehicles to drilling activities.

Preliminary Foundation Recommendations

Based on the observations during the site visit, our geologic desktop study, and our knowledge of the general geology in the area, spread footings are a suitable foundation type to support the new bridge abutments. Driven H-pile or pipe piles could also be utilized, however, there is a possibility that piles could refuse at a shallower depth due to dense cobble, boulder, and gravel deposit, and thus not achieve the depth required for lateral capacity.

Based on similar bridge foundation designs conducted by Tetra Tech in the past, and our knowledge of the area, we anticipate the following approximate foundation design parameters:

Spread Footings: LRFD Factored bearing pressure = 8,000 psf assuming LRFD resistance factor of 0.45.

Driven Pile Foundations: H-pile or pipe piles, anticipated pile depth below pile cap elevation = 40 to 50 feet depending on pile type and size.

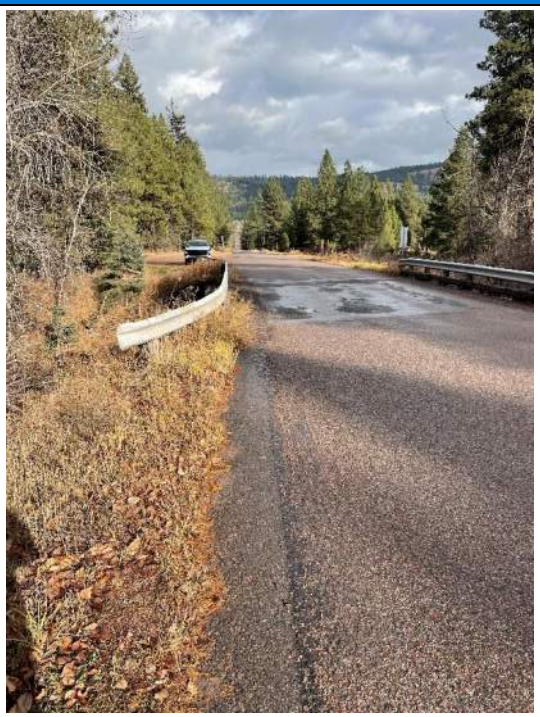
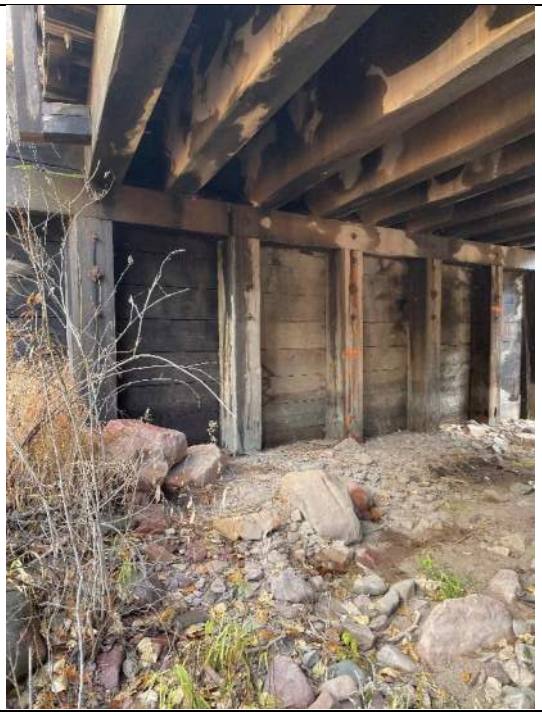
For future final foundation design recommendations, Tetra Tech recommends drilling a minimum of one boring to depths on the order of 75 feet at each bridge abutment.

If you have any questions, please contact me at (406) 543-3045.

Respectfully submitted,

Tetra Tech

Marco Fellin, P.E.
Senior Geotechnical Engineer

PHOTOGRAPH LOG – Owl Creek	
December 9, 2024	
	
Photo 1: Looking west across the bridge	Photo 2: Looking east across the bridge
	
Photo 3: View of west abutment	Photo 4: View of east abutment

Appendix E: Detour Route

POSSIBLE OWL CREEK BRIDGE DETOUR ROUTE

Appendix F: ROM Cost Estimate

ENGINEERS ROM COST ESTIMATE

Owl Creek Road Bridge Replacement

Prepared By:	DJ&A ENGINEERS PLANNERS SURVEYORS
Job No: **7593**	
Computed: **JR**	Date: **11/26/2024**
Checked: **TE**	Date: **12/13/2024**

LINE ITEM NO.	PAY ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	Total
	0010	*MOBILIZATION (12%)*	LS	1	$115,106	$115,106
	0020	*SURVEY AND STAKING, BRIDGE*	LS	1	$25,000	$25,000
	0030	*CONTRACTOR QUALITY CONTROL AND ASSURANCE (2%)*	LS	1	$17,485	$17,485
	0040	*TEMPORARY TRAFFIC CONTROL*	LS	1	$25,000	$25,000
	0050	*SOIL EROSION & POLLUTION CONTROL (2%)*	LS	1	$17,485	$17,485
	0060	*REMOVAL OF EXISTING BRIDGE*	LS	1	$65,000	$65,000
	0070	*PLACED RIPRAP, CLASS 3*	CY	200	$150	$30,000
	0080	*CONCRETE FILLED STEEL PIPE PILE, IN PLACE*	LF	500	$500	$250,000
	0090	*STRUCTURAL CONCRETE, PILE CAPS & END DIAPHRAGMS*	CY	70	$2,250	$157,500
	0100	*PRECAST, PRESTRESSED CONCRETE DECKED BULB-TEE GIRDERS*	LF	335	$750	$251,250
	0110	*BRIDGE RAIL*	LF	130	$350	$45,500
	0120	*APPROACH RAIL & TERMINAL SECTION*	EA	4	$7,500	$30,000
	0130	*APPROACH ROADWAY IMPROVEMENTS*	LF	150	$300	$45,000

Notes:

- Bridge is replaced in same location as existing bridge.
- Assumes 28' travel way.
- 30% Contingency is applied for Scoping Phase.
- Assumed (1) 65' Span.
- Assumed 50' long steel piles with 5 per abutment.
- Alternate detour route is assumed feasible.

SUBTOTAL (CN)	**$1,074,326**	
CONTINGENCY	30%	$322,298
SUBTOTAL	**$1,396,624**	
INFLATION	4%	
(NO. YEARS)	4	$237,229
SUBTOTAL	**$1,633,853**	
INCIDENTAL CONST. (IC)	1%	$16,339
RIGHT OF WAY (RW)	1%	$16,339
CE	10%	$163,385
PE	15%	$245,078
TOTAL ESTIMATED PROJECT COST		**$2,074,993**

Appendix G: Project Schedule

ESTIMATED PROJECT SCHEDULE

Project Title **OWL CREEK BRIDGE REPLACEMENT**

Location MISSOULA COUNTY
SEELEY LAKE, MT

	2025						2026												2027												2028												2029											
	Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
ACTIVITY	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
ENGINEERING CONTRACT																																																				
GRANT AWARDED TO COUNTY																																																				
ENGINEERING CONSULTANT PROCUREMENT																																																			
GRANT AGREEMENT SIGNED																																																			
SCOPING																																																			
CONTRACT WITH CONSULTANT																																																			
PE - PRELIMINARY DESIGN																																																			
FIELD WORK																																																			
30% PRELIMINARY DESIGN																																																			
NEPA																																																			
PE - FINAL DESIGN																																																			
60% DESIGN																																																			
ROW																																																			
PERMITTING																																																			
90% DESIGN																																																			
100% DESIGN																																																			
CE - CONSTRUCTION CONTRACT																																																			
BIDDING																																																			
AWARD																																																			
NTP ISSUED																																																			
CE & CN - CONTSTRUCTION																																																			
CONTRACTOR SUBMITTALS & PRE-PLANNING																																																			
SUPERSTRUCTURE FABRICATION																																																			
CONTRACTOR MOBILIZATION																																																			
PROJECT CONSTRUCTION																																																			
PROJECT CLOSEOUT																																																			

2000 Maple Street, Missoula, MT 59808
T 406.721.4320
djanda.com