February 28, 2024

**M E M O R A N D U M**

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**FROM:** Michael E. Menghini, P.E., State Bridge Engineer, Cheyenne

**PROJECT:** CN02113, Laramie County Road No. 124-2, Bridge Over Lodgepole Creek

**SUBJECT:** Final Reconnaissance Report

**WYOMING DEPARTMENT OF TRANSPORTATION**
**BY: Jacobs Engineering**

# FINAL RECONNAISSANCE REPORT FOR PROJECT CN02113 LARAMIE COUNTY ROAD NO. 124-2 BRIDGE OVER LODGEPOLE CREEK

**DATE OF INSPECTION:** November 30, 2023 (virtual meeting only; no group site visit)

**WRITTEN BY:** Taylor Johnson, P.E., Jacobs Engineering

**INSPECTION PERSONNEL:**
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James Malek, Utilities & Right-of-Way, Jacobs Engineering
Nathan Vaughn, P.E., Survey, Jacobs Engineering
Chris Russell, P.E., Geotechnical, Shannon & Wilson

**INTENT:** Replace the following bridge using Bridge Formula Program (BFP) funds:

| Str No. | Feature Intersected | Route | RM | Location |
|---|---|---|---|---|
| DPI | Lodgepole Creek | ML9382I (County Road 124-2) | 5.30 | Sec 36, T16N, R67W |

| EXISTING CONDITIONS: STRUCTURE INFORMATION | |
|---|---|
| Year Built: | 1935 |
| Back-Back Abutment Length: | 143’-4” |
| Maximum Span Length: | 36’-0” |
| Bridge Roadway Width: | 24’-0” |
| Skew: | 0 degrees |
| Superstructure Type: | 4 Simple Spans – Steel Stringer/Girder |
| Abutment Type: | Concrete Spill-Through |
| Abutment Foundation: | Spread Footing |
| Pier / Bent Type: | Concrete Cap & Column |
| Pier / Bent Foundation: | Spread Footing |
| **Inventory Ratings** | |
| HS20 Truck (36 tons) | 33 tons |
| WY Type 3 Truck (22 tons): | 25 tons |
| WY Type 3S2 Truck (39.95 tons): | 43 tons |
| WY Type 3-3 Truck (40.5 tons): | 45 tons |
| Type SU4 Truck (27.0 tons): | 26 tons |
| Type SU5 Truck (31.0 tons): | 29 tons |
| Type SU6 Truck (34.75 tons): | 29 tons |
| Type SU7 Truck (38.75 tons): | 30 tons |
| **NBI Condition Ratings** | |
| Deck: | 4 Poor |
| Superstructure: | 6 Satisfactory |

| EXISTING CONDITIONS: STRUCTURE INFORMATION | |
|---|---|
| Substructure: | 4 Poor |
| NHPP Performance Rating | Poor |
| Current Bridge Inspection Report: | December 12, 2022 |
| Other: | n/a |
| Comments: Minor to moderate width longitudinal and transverse cracking in deck surface with abrasion and large aggregate exposed, several delaminated areas, and rebar exposed with minor section loss at north end of deck and west side of soffit; steel girders at Bent 2 have surface rust with minor pitting, exterior girders of end spans have bullet holes through webs and bullet holes in adjacent diaphragms; spalling with exposed reinforcing at west end of center bent cap and wide vertical cracking extending from anchor bolt at north bent cap, minor spalls and abrasion at bent columns with exposed reinforcing near waterline and mid-height at center bent; large areas of moderate spalling with exposed reinforcing at both abutments, minor cracking and spalling with exposed reinforcing on wingwalls; surface rust on all bearings with pack rust at east bearing of north abutment, two western bearings at north abutment have beveled sole plates installed incorrectly, loose anchor bolts at several locations; moderate spalls with exposed reinforcing throughout both curbs with surface rust on metal railing; settlement and/or seepage erosion under both abutment caps and around all wingwalls. | |

| EXISTING CONDITIONS: BRIDGE/LAND USE | |
|---|---|
| Utilities on Bridge: | None observed |
| Land Use Requirements (Stockpass or Other): | None |
| Agricultural Use or Resource Recovery Vehicle Use (Local Roads only): | Agricultural vehicle use |
| Existing Vertical Clearance: | n/a; no crossroad |
| Other: | Overhead utility (unknown type), buried fiber, and buried telephone parallel to road along west side of ROW |

| EXISTING CONDITIONS: HYDRAULICS | |
|---|---|
| Erosion or Scour Issues: | Lower sloping abutment under bridge is stabilized with rock and wire-encased rock. Appears to be soil loss at upper abutment where the bottom of the abutment foundation is exposed. Embankments on either side of the bridge are highly vegetated with no visual evidence of scour or erosion. |
| Debris or Ice Issues: | No debris observed at the piers or abutments. Debris potential is grass and brush. Ice issues are estimated to be low. |
| Overtopping Issues: | None – high embankment |
| Ordinary High Water Observation: | OHW marks observed on pier around 2 feet above standing water elevation |
| Freeboard: | 14’ estimated from Inspection Report |

| EXISTING CONDITIONS: HYDRAULICS | |
|---|---|
| Other: | FEMA Zone A flood hazard area as shown on FIRM Map 560021C 0825F for Laramie County, Wyoming, effective date January 17, 2007.<br><br>Channel upstream, downstream and at crossing appears to be stable with 1.5’ to 2.0’ of standing water under the bridge.<br><br>Highly vegetated silt channel.<br><br>Double 6’ x (depth unknown) box culvert at 45-degree-skew at irrigation ditch north of bridge.<br><br>Wire encased riprap on lower sloped abutment.<br><br>Structural wall across channel just upstream of bridge. Diversion structure from irrigation ditch at north end of wall.<br><br>Piped scuppers from bridge deck drain to channel below. |

| EXISTING CONDITIONS: GEOLOGY | |
|---|---|
| Roadway Settlement Issues: | None identified by Jacobs personnel during site visit |
| Structure Settlement Issues: | Cause of possible settlement/seepage under abutment caps and wingwalls is unknown at this time |
| Other Problem Issues: | None identified by Jacobs personnel during site visit |

| EXISTING CONDITIONS: GEOLOGY | |
|---|---|
| Other: | Geological maps indicate the north approach embankment overlies alluvial terrace deposits consisting of a mixture of sand, gravel, and occasional cobbles and boulders with lenses of silt and clay. Soil within the channel is identified as recent alluvium, consisting of an unconsolidated mixture of clay, silt, sand, and gravel. Bedrock underlying the alluvial deposits and mapped at the south approach embankment is identified as Miocene-age Ogallala Formation, consisting of unconsolidated to well-cemented, interbedded sandstone, siltstone, and gravel-to-boulder conglomerate with occasional thin beds of volcanic ash, claystone, and limestone. |

| EXISTING CONDITIONS: ROADWAY | |
|---|---|
| Posted Speed Limit: | 55-mph |
| Functional Classification: | Minor collector (per Cheyenne Master Transportation Plan) |
| Horizontal Alignment: | Tangent |
| Vertical Profile: | Sag curve |
| Current ADT (Year): | 445 (2022) |
| Projected ADT (Year): | 623 (2042) |
| Typical Section Width: | Existing roadway width is 26’± |
| Type of Approach Guardrail: | None present |
| R/W Limits: | 100’± left and right of centerline |
| Existing Fencing: | 3-wire fence along ROW |
| Existing Surfacing: | Asphalt |
| Other: | |

| EXISTING CONDITIONS: ENVIRONMENTAL | |
|---|---|
| Wetlands: | The bridge crosses over Lodgepole Creek which appears to meander inside a large wetland system on both the east and west sides of the existing bridge |
| Terrestrial Wildlife (Raptors, Sage Grouse, Prebles Mouse, etc): | IPaC lists the Preble's meadow jumping mouse, tri-colored bat, piping plover, whooping crane, pallid sturgeon, monarch butterfly, Ute Ladies'-tresses and western prairie fringed orchid as potentially occurring within the proposed project area. Woody debris, shrubs, and large wetlands surrounded by grassy uplands within project survey area likely provide suitable habitat for Preble's Mouse. Bridge could provide roosting habitat for tri-colored bat. Contains highest predicted concentrations of riparian bird migration and wetland bird migration and medium predicted concentrations of raptor and sparse grassland bird migration. |
| Aquatic Wildlife: | The stream is identified as a class green ribbon stream for fishing. |

| EXISTING CONDITIONS: ENVIRONMENTAL | |
|---|---|
| Historical Bridge Status: | Per review of the Wyoming SHPO inventory database and WyoTrack, the project area does not contain any properties listed on the National Register (NRHP 2023). However, one historic district, within the project area (SHPO 2023: LA1562, Yellowstone Highway), was previously recorded and determined to be eligible (by SHPO) for listing in the National Register of Historic Places (NRHP) under Criteria A and C. The County Road 124-2/Yellowstone Highway Bridge (Structure DPI) over the Lodgepole Creek, built in 1935 appears to have association with the historic roads' earlier period of significance between 1920-1939, and possibly an association as a New Deal public works project. A 1947 historic aerial shows the concrete deck of the bridge at the project area (NETR 2023). |
| Other: | The area contains plugged oil and gas wells located within two miles northeast and southeast of the proposed project area. The area has moderate potential for exploitable oil and gas fields. The area also contains good potential for wind power. |

| RECOMMENDATIONS: ROADWAY | |
|---|---|
| Survey Type: | Planimetric and Topographic survey |
| Design Speed: | 55-mph |
| Horizontal Alignment: | Maintain existing to extent possible |
| Vertical Alignment: | Maintain existing to extent possible |
| Proposed Roadway Guardrail: | MGS |

| RECOMMENDATIONS: ROADWAY | |
|---|---|
| Proposed Roadway Width (Shoulder and Travel Lane): | Per BROS Design Guide & WYDOT Road Design Guide;<br>Minor collector roadway width of 26' or per minimum as noted in current edition of the AASHTO Roadside Design Guide, whichever is greater. Laramie County prefers 32' width per County Land Use Regulations and AASHTO Roadside Design Guide indicates 32' width as well. |
| Clear Zone: | 10 feet |
| Detour: | It was discussed at Recon. Inspection that full closure is possible, detour to I-25 (Exits 21 and 25) |
| Fencing Type: | Fencing impacted by project will be replaced in-kind. No new fencing will be constructed. |
| Surfacing: | Propose replace roadway in-kind with asphalt surface or as required by roadway width. |
| Staging Area: | Staging along ROW during full closure. Borrow to be possibly pulled from within ROW, from state land adjacent to project site, or to be contractor furnished. Resident Engineer will assist with finalizing during design development. |

| RECOMMENDATIONS: HYDRAULICS | |
|---|---|
| Design Frequency: | Jacobs and WYDOT Bridge Program will discuss anticipated impacts to nearby properties and select the appropriate design frequency early during Preliminary design phase considering the following:<br>• Potential impact to developed property<br>• Potential impact to upstream facilities<br>• FEMA Zone A mapped<br>• Local (Laramie County) Floodplain requirements |
| Review Frequency: | 100/500-year scour design/review |
| Drift Potential: | Grasses, brush, and possible woody debris from trees along the channel. |
| Ice Potential: | Ice potential anticipated to be low |
| Desired Freeboard: | Freeboard to be determined early during Preliminary design phase along with design frequency as listed above |
| Other: | Mapped Zone A; demonstrate less than 1-foot water surface elevation increase, unless Laramie County Floodplain Administrator requires tighter regulation. |

| RECOMMENDATIONS: STRUCTURE | |
|---|---|
| Proposed Structure: | Multi-span bridge is anticipated |
| Design Specification(s): | AASHTO LRFD Bridge Design Specifications, 9th Edition |
| Design Loading: | HL93 |
| Bridge Rail Type (MASH or NCHRP 350)(Crash Level): | TL3BRGRAIL-NCHRP350 |
| Proposed Wearing Surface: | Concrete wearing surface for bridge |

| RECOMMENDATIONS: STRUCTURE | |
|---|---|
| Required Vertical Clearance: | n/a; no cross road |
| Cross Road Collision Force Strategy (Clear Zone or TL-5 Level Barrier) | n/a; no cross road |
| Staging Requirements: | Replace bridge in single stage |
| Detour Structure: | n/a |
| Utilities Attached to Bridge: | None |
| Disposition of Existing Bridge: | Existing bridge to become property of contractor, subject to historical determination. |
| Other: | |

| RECOMMENDATIONS: GEOLOGY | |
|---|---|
| Proposed Roadway Investigations: | Approach roadway pavement section |
| Proposed Structure Investigations: | Multi-span bridge and retaining walls. Borings through existing bridge structure (will require repair following drilling) are anticipated to be a better alternative to drill rig access into the channel due to wetlands being identified and soft soils anticipated. .<br><br>Bridge borings should include rock coring if the bedrock at the site is characterized by high enough strength / cementation to allow for adequate core recovery.<br><br>Boring locations anticipated to be within R/W. If access onto adjacent property/properties is needed for drilling equipment to traverse to a boring location, consultant will work with District to obtain permission for impacts outside R/W as necessary. |

| RECOMMENDATIONS: GEOLOGY | |
|---|---|
| Other Investigations: | Stream bed/banks – bulk samples will be collected for gradation analysis for use in scour / hydraulic evaluation. |
| Other: | Full corrosion lab testing suite will be conducted on samples collected during geotechnical investigation to evaluate in-situ corrosion properties for proposed structural elements. |

| RECOMMENDATIONS: ENVIRONMENTAL | |
|---|---|
| Environmental Document Type: | Categorical Exclusion |
| Archeological Clearance/Cultural Delineation: | Clearance/Cultural delineation and site visit will be required to verify the bridge type and to record and evaluate known historic features within the project area, with inventory forms completed on WyoTrack, submitted to SHPO. Need to determine if bridge was considered eligible and/or contributing resource when road was considered eligible. If bridge is deemed eligible, would result in “adverse effect” under Section 106 and require an MOA to be developed. If deemed eligible, would then also require Programmatic 4(f) analysis as demolishing historic resource would be considered a “use”. If bridge is deemed not eligible, then Section 4(f) would not apply. Project area also considered to have high archaeological sensitivity due to its proximity to Lodgepole Creek, thus a surface only archaeological pedestrian survey is recommended, no digs are anticipated. |

| RECOMMENDATIONS: ENVIRONMENTAL | |
|---|---|
| Public Involvement: | Contact will be made with individual landowners as needed; Level A public involvement. |
| Other: | Early coordination with design team to establish staging, borrow pit, water quality control measures and other potentially ground disturbing activities (if needed). Waters of the US and endangered species habitat field survey recommended. Project area above 5,500 feet elevation (6,130 feet) but with updated programmatic guidance coming out end of next year, may need to consider and look for Ute Ladies Tresses/suitable habitat. Known populations of Ute's Ladies Tresses on Lodgepole Creek near Burns, WY approximately 25-miles east of project site. Need to determine Preble's Mouse habitat and determine mitigation approach for potential impacts. Need to consider tri-colored bat roosting habitat under bridge or in nearby trees. Recommend raptor surveys. Need to also consider aquatics for potential construction timing restrictions for in-stream work and dewatering permits if necessary. |

| RECOMMENDATIONS: RIGHT OF WAY | |
|---|---|
| Land Survey: | To be completed by Consultant |
| Acquisitions or Easements Anticipated: | Potential acquisitions and easements to be determined during design development |
| Construction Permits Anticipated: | Construction permits not anticipated |
| Other: | |

| PROJECT WORK PLAN | |
|---|---|
| Anticipated Letting Fiscal Year: | 2028 |
| Preliminary/Design Engineering (WYDOT or Consultant): | Jacobs (and subconsultants) will be the consultant for final design |
| Construction Engineering (WYDOT or Consultant) | WYDOT,<br>Jacobs will provide design clarifications/corrections during construction, respond to RFIs, provide or assist with Record Drawings, and review structural shop drawings. |
| Other: | |

| CN02113 PRELIMINARY COST ESTIMATE | |
|---|---|
| **Preliminary Engineering** | |
| Consultant | $1,020,000 |
| WYDOT | $50,000 |
| **Preliminary Engineering Subtotal** | **$1,070,000** |
| **Construction** | |
| Bridge Construction | $2,055,000 |
| Road Construction | $865,000 |
| *Inflation | $630,000 |
| Construction Engineering (~10%) | $355,000 |
| **Construction Subtotal** | **$3,905,000** |
| **Total Estimated Project Cost** | **$4,975,000** |

*Inflation is based on approximately 5.0% for each year until 2028.

The above costs are for a bridge length of 155’ and out-to-out width of 35.33’ and a cost per square foot of $375, minimal approach roadway work, with the new bridge placed in

the same location as the existing bridge and are dependent on the final alignment and structure selection. These costs do not include right-of-way and utility costs.

Jacobs

APPROVED BY:

3/1/2024

Michael E. Menghini, P.E. — Date
State Bridge Engineer, Cheyenne

Christina Spindler — 3/18/24

Christina Spindler, P.E. — Date
State Highway Development Engineer, Cheyenne

R Tarango — 03.25.2024

Ralph Tarango, P.E. — Date
District Engineer, Laramie

Brian Lovett — Date
Chair, Laramie County Board of County Commissioners

CONCURRED BY:

Keith R. Fulton, P.E. — Date
Assistant Chief Engineer – Engineering & Planning, Cheyenne

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COMMENTS: