Federal Highway Administration
Western Federal Lands Highway Division
SCOPING REPORT

Department of Defense

Fergus, Judith Basin, and Wheatland Counties

Montana

MT DAR MALM 2021 (2)

Malmstrom AFB Timber Bridges

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I. EXECUTIVE SUMMARY

A. Summary of Project Proposal including Comments/ Recommendations from PDC

The Malmstrom Air Force Base (AFB) Timber Bridges scoping effort was initiated by the Western Federal Lands Highway Division (WFLHD) of the Federal Highway Administration (FHWA), in coordination with the Department of Defense (DOD) and the Montana Department of Transportation (MDT), to program the potential replacement of up to eight existing timber bridges on routes located on the Defense Access Road (DAR) System used by Malmstrom AFB. The purpose of this report is to document existing conditions and develop replacement options and cost estimates. In correspondence with MDT, it is their desire to replace these bridges instead of rehabilitation due to their age, deteriorated condition, and the goal to replace all timber bridges in their inventory. With the assumption that all bridges will be replaced, no rehabilitation options were considered.

During development of this report one bridge included in this project, the Wolf Creek Bridge (P00081012+05301) located west of Denton on MT-81, burned to the ground in the West Wind Fire first reported on November 30, 2021. MDT is currently leading the design of a replacement bridge which is expected to be constructed in the Summer of 2022. Because of this, the bridge has been removed from the project and scoping report.

B. General Route and Project Information

Five of the eight structures are located on Montana State Highway 81 (MT-81), and the other three are located on Montana State Secondary Highways (S-238, S-297, and S-400). See **Figure 1** for an overall vicinity map for the project area. All routes are state routes, with some gravel portions being county-maintained. The project area for S-400 is a part of the DAR Program, having a calcium chloride stabilized aggregate surface and undergoing aggregate maintenance projects every 5-10 years.

This project will replace these bridges with new structures, either bridges or culverts. The new structures will be on similar horizontal and vertical alignments to reduce roadway work and minimize or eliminate the need for guardrail and new right-of-way acquisition. The new structures will be designed to meet FHWA and MDT standards.

C. Location

The eight sites are located within Fergus, Judith Basin, and Wheatland Counties in central Montana. The five bridges located on MT-81 sit between the town of Coffee Creek and the junction of MT-81 and U.S. Highway 191 from mile post 6.5 to 36.6. The bridge located on S-400 is 6 miles southwest of Hobson at mile post 5.8. The bridge located on S-238 is 9 miles southeast of Lewistown at mile post 10.6. The bridge located on S-297 is 1 mile north of Shawmut at mile post 0.9. A summary of the bridge locations is provided in **Table 1**.

NBI/MDT Bridge ID	County	Location	Route	Mile Post	Crossing	Latitude	Longitude
P00081006+05001/06207	Fergus	Coffee Creek	MT-81	6.5	Coffee Creek	47°20’41.00”	110°04’15.57”
P00081019+09951/06209	Fergus	6M SE Denton	MT-81	19.9	Dry Wolf Creek	47°17’08.14”	109°49’17.15”
P00081030+06301/06212	Fergus	11M W Brooks	MT-81	30.6	Stock Pass	47°14’37.91”	109°36’50.52”
P00081034+09001/06216	Fergus	6M W Brooks	MT-81	34.9	Stock Pass	47°13’33.90”	109°31’57.16”

NBI/MDT Bridge ID	County	Location	Route	Mile Post	Crossing	Latitude	Longitude
P00081036+06001/06219	Fergus	4M W Brooks	MT-81	36.6	Stock Pass	47°12’43.00”	109°30’24.00"
P00400005+08001/06754	Judith Basin	6M SW Hobson	S-400	5.8	Hauck Coulee	46°55’26.71”	109°55’26.71”
S00238010+06001/06436	Fergus	9M SE Lewistown	S-238	10.6	E FK Big Spring Creek	46°59’24.29”	109°16’27.64”
S00297000+09001/06606	Wheatland	1M N Shawmut	S-297	0.9	Deadman’s Basin Canal	46°21’30.23”	109°31’41.22”

Table 1: Bridge Locations

D. Deficiencies/Needs Identified during Scoping

These timber bridges, built between 1934 and 1962, have multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though none of the bridges are load restricted, repairs have been completed on critical elements to restore capacity and extend their service life. Work completed on these bridges includes the repair of timber stringers using steel hangers as well as repair of deteriorated timber piling sections using steel stiffeners, concrete jackets, fiber reinforced polymer (FRP) jackets, and installation of helper piles. The bridge rail on some bridges has also been replaced. In addition, critical bridge elements that have been identified as having advanced deterioration or decay, specifically timber piling at the water or ground level, need repairs to maintain capacity and stay open to traffic. MDT has limited resources to put towards these repairs, and the continued repair of these timber bridges is no longer cost effective. Because of this, replacement of the bridges with new structures is preferred, which will provide a longer service life and reduce future maintenance needs.

E. Purpose/Objectives

The purpose of this project is to replace the existing timber bridges with new structures to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System. Replacement will provide structures with a longer service life, wider roadway surface resulting in increased safety, ability to carry modern vehicle loading, and reduced future maintenance needs.

F. Recommendations and Costs

Below is the estimated cost for the project based on the recommended structure type for each site. This cost assumes all eight bridges are constructed in one project. See **Appendix C** for a breakdown of costs for each individual site.

PE Cost	CE Cost	CN Cost*	Total
$1,350,000	$1,250,000	$5,100,000	**$7,700,000**

Table 2: Summary of Estimated Construction Costs
*Assumes 20% contingency

Year 2022	Year 2023	Year 2024	Year 2025	Year 2026
$7,700,000	$7,950,000	$8,200,000	$8,450,000	$8,750,000

Table 3: Summary of Estimated Construction Costs Including Inflation
*Assumes 3% inflation rate

G. Environmental/Special Issues

A Categorical Exclusion (CE) is the expected level of environmental documentation for this project. One CE document that covers all project sites is expected for construction, along with a separate CE that would cover preliminary geotechnical investigations. One mobilization for all environmental field work to reduce costs and duration is likely appropriate. All project sites will be considered to be within grizzly bear habitat.

H. Time Required for Project Development and Construction

Based on input from FHWA and Department of Defense personnel during the site visit, this could be let as either a single project or split into multiple smaller projects based on factors such as funding availability, location, complexity/structure type, and/or project development time, with the goal to begin construction no later than 2024. Based on all bridges being replaced in a single project, the following project development schedule is proposed. If separated into smaller projects, construction of some structures may be able to be completed in Summer-Fall of 2023. Though construction may be separated into smaller projects, NEPA documentation is expected to be completed for all project sites at one time.

Proposed Preliminary Engineering Schedule (based on all bridges being replaced in a single project):

- FY 2022
  - Winter-Spring: Approval of Scoping Report
  - Summer-Fall: Preliminary Environmental Investigation, Hydraulic/Geotechnical Investigation and Analysis
  - Summer-Fall: Resource Studies (biological, Waters of the U.S, cultural)
  - Fall: Preliminary 30% PS&E Development
- FY 2023
  - Winter: Preliminary 30% PS&E Development
  - Winter-Spring: Plan-in-Hand (70%) PS&E Development
  - Spring: Plan-in-Hand Field Review
  - Spring-Summer: Permitting
  - Summer: Final (95%) PS&E Development
  - Summer-Fall: Signoff (100%) PS&E Development
- FY 2024
  - Winter-Spring: Advertisement
  - Spring: Award

Proposed Construction Schedule (based on all bridges being replaced in a single project):

- FY 2024
  - Spring-Summer: Notice to Proceed/Material Procurement/Mobilization
  - Spring-Summer: Detour Construction/Removal of Existing Structures
  - Summer-Fall: Construction of New Structures
  - Fall: Detour Removal/De-Mobilization
- FY 2025
  - Winter-Spring: Material Procurement/Mobilization
  - Spring-Summer: Detour Construction/Removal of Existing Structures
  - Summer-Fall: Construction of New Structures
  - Fall: Detour Removal/De-Mobilization

I. Contracting Recommendation / Strategies

It is recommended that a design-bid-build contracting method be used for this project.

J. Risks Associated with Delivery

There is minimal risk associated with project delivery, either as a single project or multiple projects.

Environmental compliance, permitting, potential right-of-way acquisition, materials and labor costs, and funding availability pose the largest risks to project delivery.

Close coordination with MDT Bridge and MDT Right-of-Way will be critical to meet project delivery timelines and to ensure that all standards, review processes, documentation, and right-of-way acquisition (if needed) are completed to Montana state highway requirements.

K. Contacts

Contact and Title	Curtis Jorgenson, Project Manger	**Contact and Title**	Bryan Hall, Project Manager
Agency	Western Federal Lands	**Agency**	Defense Access Road Program
Phone Number	360-619-7519	**Phone Number**	618-220-5253
Email Address	Curtis.Jorgenson@dot.gov	**Email Address**	bryan.l.hall6.civ@mail.mil

Contact and Title	Stephanie Brandenberger, State Bridge Engineer
Agency	Montana Department of Transportation
Phone Number	406-444-6260
Email Address	stbrandenberger@mt.gov

II. PROJECT DESCRIPTION

A. PROJECT SUMMARY

Description	Comment
General project description and nature of work	The project will replace up to eight timber bridges in Central Montana to meet the Transporter-Erector (T-E) route standards for the Minuteman Missile Base Road System. These bridges are reaching the end of their service life and show signs of deterioration. Due to the need for continuous repair and high maintenance costs, rehabilitation of these structures was not considered. Replacement will provide structures with a longer service life, wider roadway surface resulting in increased safety, ability to carry modern vehicle loading, and reduced future maintenance needs.
Major issues and concerns	No major issues or concerns have been identified within the scope of the project. The scale of environmental impacts may change depending on the structure type chosen at each site and may result in additional environmental review. Potential right-of-way acquisition may cause a delay in project development but will be avoided if possible. Providing environmental support for geotechnical drilling actions will be critical to maintaining the schedule.
Relevant project history	The scoping portion of this project was initiated in September of 2021. No recent projects have been identified but maintenance work completed on these bridges includes the repair of timber stringers using steel hangers and helper beams, as well as repair of deteriorated timber piling sections using steel stiffeners, concrete jackets, fiber reinforced polymer (FRP) jackets, and installation of helper piles. The bridge rail on some bridges has also been replaced. The Wolf Creek Bridge just west of Denton burned to the ground in the West Wind fire in November of 2021, and MDT is developing the design of a replacement bridge to be constructed in the summer of 2022.

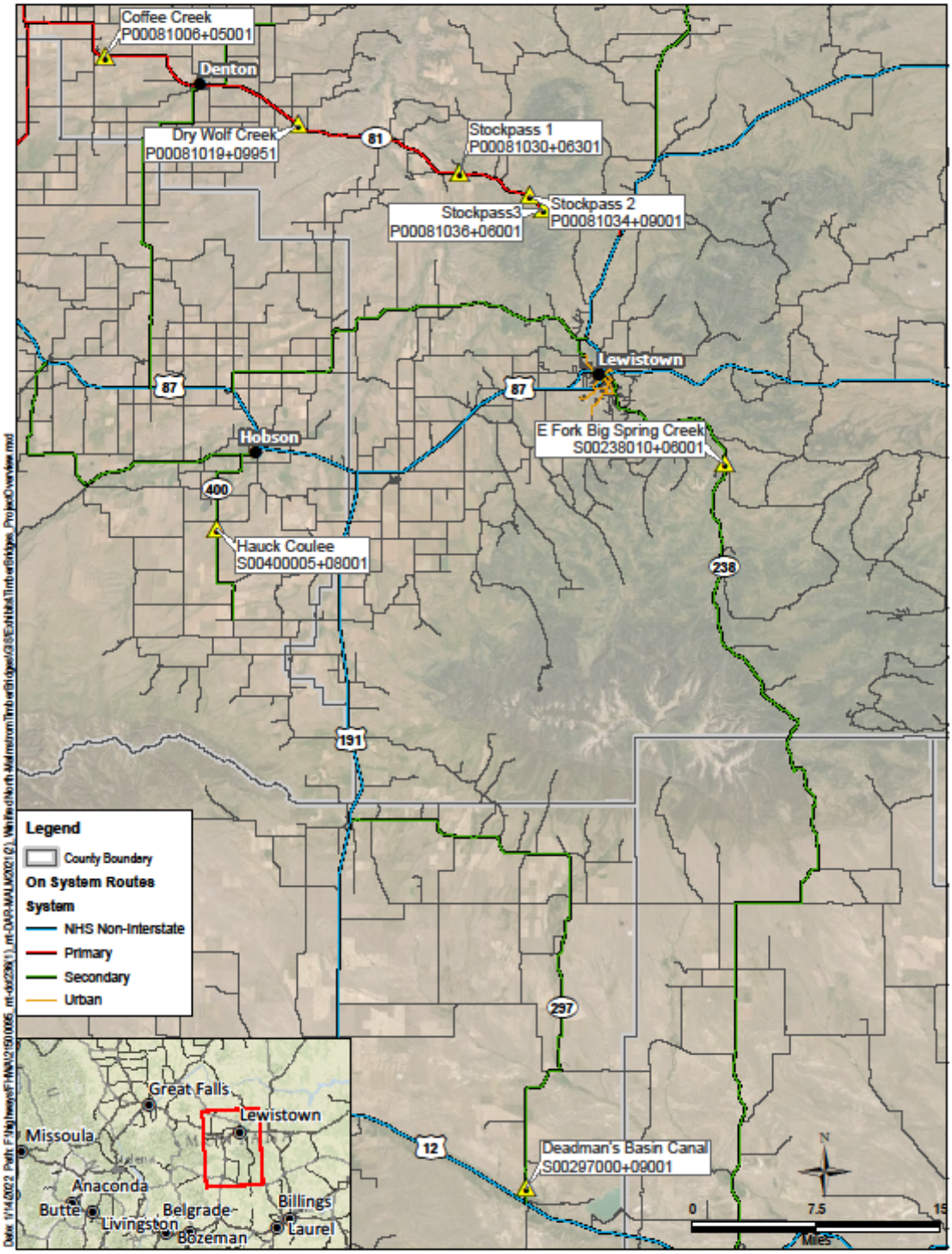

Figure 1: Project Location Map

B. ROUTE IDENTIFICATION & EXISTING CONDITIONS

Description	Response	Comment
Road Name and Route ID Number:	MT-81, C000081	
GPS Coordinates Start	47° 20’ 41.0” N, 110° 04’ 15.7” W	
GPS Coordinates End	47° 12’ 43.1” N, 109° 30’24.2” W	
Milepost Start	6.5	
Milepost End	36.6	
Length	30.1 miles	
Functional Classification	Rural Minor Arterial	
Posted Speed	70 mph	Through the town of Denton, the speed limit is reduced to 25 mph
Terrain	Rolling	
Existing Number of Lanes (each direction)	1 lane	1 lane is provided in each direction
Existing Travel Way Width	24 feet	The width increases to 28-31 feet in sections where structure replacement has recently been completed
Existing Shoulder Width	0 feet	The shoulder width increases to 2-4 feet in sections when structure replacement has recently been completed
Existing Shoulder Type	Paved	
Existing Bench Width	Varies	Bench width varies throughout but generally matches the existing structure widths at the project sites
Clear Zone/Roadside Hazards	Shrubs, unshielded steep fill slopes	Existing structure railing exists at each project site
Major Intersection Roads	None	
Current ADT	272-355	MDT Traffic Data
Seasonal ADT	272-355	MDT Traffic Data did not provide seasonal ADT data
% Buses	0	MDT Traffic Data did not provide % Buses data
% Trucks	10-13	MDT Traffic Data

Description	Response	Comment
Road Name and Route ID Number:	S-400, C000400	
GPS Coordinates Start	46° 55’ 59.7” N, 109° 55’ 26.7” W	
GPS Coordinates End	46° 55’ 57.6” N, 109° 55’ 26.8” W	
Milepost Start	5.75	
Milepost End	5.85	
Length	500 feet	
Functional Classification	Rural Major Collector	
Posted Speed	45 mph	
Terrain	Rolling	
Existing Number of Lanes (each direction)	1 lane	1 lane is provided in each direction
Existing Travel Way Width	19 feet	Existing travel way is a calcium chloride stabilized-aggregate surface in this location
Existing Shoulder Width	0 feet	
Existing Shoulder Type	Not Applicable	
Existing Bench Width	Varies	Bench width varies throughout but generally matches the existing structure width at the project site
Clear Zone/Roadside Hazards	Unshielded steep fill slopes	No existing structure railing at project site
Major Intersection Roads	None	
Current ADT	74	MDT Traffic Data
Seasonal ADT	74	MDT Traffic Data did not provide seasonal ADT data
% Buses	0	MDT Traffic Data did not provide % Buses data
% Trucks	1	MDT Traffic Data

Description	Response	Comment
Road Name and Route ID Number:	S-238, C000238	
GPS Coordinates Start	46° 59’ 25.5” N, 109° 16’ 27.7” W	
GPS Coordinates End	46° 59’ 23.5” N, 109° 16’ 27.6” W	
Milepost Start	10.55	
Milepost End	10.65	
Length	500 feet	
Functional Classification	Rural Major Collector	
Posted Speed	45 mph	
Terrain	Rolling	
Existing Number of Lanes (each direction)	1 lane	1 lane is provided in each direction
Existing Travel Way Width	25 feet	
Existing Shoulder Width	0 feet	
Existing Shoulder Type	Paved	
Existing Bench Width	Varies	Bench width varies throughout but generally matches the existing structure width at the project site
Clear Zone/Roadside Hazards	Shrubs, unshielded steep fill slopes	No existing structure railing at project site
Major Intersection Roads	None	
Current ADT	169	MDT Traffic Data
Seasonal ADT	169	MDT Traffic Data did not provide seasonal ADT data
% Buses	0	MDT Traffic Data did not provide % Buses data
% Trucks	<1	MDT Traffic Data

Description	Response	Comment
Road Name and Route ID Number:	S-297, C000297	
GPS Coordinates Start	46° 21’ 29.1” N, 109° 31’ 41.1” W	
GPS Coordinates End	46° 21’ 31.5” N, 109° 31’ 41.2” W	
Milepost Start	0.4	
Milepost End	1.4	
Length	500 feet	
Functional Classification	Rural Major Collector	
Posted Speed	70 mph	
Terrain	Rolling	
Existing Number of Lanes (each direction)	1 lane	1 lane is provided in each direction
Existing Travel Way Width	26 feet	
Existing Shoulder Width	1 foot	
Existing Shoulder Type	Paved	
Existing Bench Width	Varies	Bench width varies throughout but generally matches the existing structure width at the project site
Clear Zone/Roadside Hazards	Unshielded steep fill slopes	Existing structure railing exists at project site
Major Intersection Roads	None	
Current ADT	73	MDT Traffic Data
Seasonal ADT	73	MDT Traffic Data did not provide seasonal ADT data
% Buses	0	MDT Traffic Data did not provide % Buses data
% Trucks	<1	MDT Traffic Data

III. PROJECT SUMMARY, SCHEDULE, ESTIMATE, & CONTACTS

A. SUMMARY

Description	Response	Description	Response
Project Type	Bridge	**Partner Agency**	Department of Defense Montana Dept of Transportation
State	MT	**County**	Fergus, Judith Basin, Wheatland

B. SCHEDULE

Proposed Preliminary Engineering Schedule (based on all bridges being replaced in a single project):

- FY 2022
  - Winter-Spring: Approval of Scoping Report
  - Summer-Fall: Preliminary Environmental Investigation, Hydraulic/Geotechnical Investigation and Analysis
  - Summer-Fall: Resource Studies (biological, Waters of the U.S, cultural)

    - Fall: Preliminary 30% PS&E Development
- FY 2023
    - Winter: Preliminary 30% PS&E Development
    - Winter-Spring: Plan-in-Hand (70%) PS&E Development
    - Spring: Plan-in-Hand Field Review
    - Spring-Summer: Permitting
    - Summer: Final (95%) PS&E Development
    - Summer-Fall: Signoff (100%) PS&E Development
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Proposed Construction Schedule (based on all bridges being replaced in a single project):

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    - Spring-Summer: Notice to Proceed/Material Procurement/Mobilization
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    - Fall: Detour Removal/De-Mobilization
- FY 2025
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    - Summer-Fall: Construction of New Structures
    - Fall: Detour Removal/De-Mobilization

	Duration	Comment
PS&E Development (Months)	**12**	Schedule assumes all bridges replaced in one project
Environmental Compliance / Permitting (Months)	**6**	Schedule assumes all bridges replaced in one project
Construction (Months)	**14**	Schedule assumes all bridges replaced in one project over two construction seasons

C. ESTIMATE

Below is the estimated cost for the project based on the recommended structure type for each site. This cost is based on all eight bridges being constructed in one project and includes detour costs. See Appendix C for a breakdown of costs for each individual site.

Preliminary Engineering (PE)	Environmental Mitigation (if required)	Construction Engineering (CE)	Construction (CN)*	Total**
$1,350,000	$0	$1,250,000	$5,100,000	$7,700,000

*Assumes 20% contingency

** Year 2022 dollars

D. PRINCIPAL CONTACTS

Contact and Title	Curtis Jorgenson, Project Manger	Contact and Title	Bryan Hall, Project Manager
Agency	Western Federal Lands	Agency	Defense Access Road Program
Phone Number	360-619-7519	Phone Number	618-220-5253
Email Address	Curtis.Jorgenson@dot.gov	Email Address	bryan.l.hall6.civ@mail.mil

Contact and Title	Stephanie Brandenberger, State Bridge Engineer
Agency	Montana Department of Transportation
Phone Number	406-444-6260
Email Address	stbrandenberger@mt.gov

IV. AVAILABLE DATA, CRASH DATA, & WORK LIMITATIONS

A. AS-BUILTS AND REPORTS

Data	Description
Bridge Plans and As-Builts	Bridge Plans and As-Builts from MDT
Bridge Inspection Reports	Bridge Inspection Reports from MDT
Engineering Study Report	Structure Recommendation Report from Central Federal Lands Highway Division

B. CRASH HISTORY

Data	Response	Comment
Crash History Requested?	No	
Crash History Obtained and Analyzed?	No	
Anecdotal Crash History?	Yes	From MDT's public crash database, from 2016-2020 two accidents were reported on MT-81 near the stock pass at MP 30.6 and one crash was reported on S-400 near the Hauck Coulee Bridge. No crash details are provided by MDT in their public database.
Will alternate routes (detours/diversions) be provided for during construction?	Yes	At all sites, detours built adjacent to the existing roadway are expected. This will allow for traffic to be maintained through the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Detour structures will consist of a bridge or buried culvert structure.
Traffic restrictions during construction?	No	

C. WORK LIMITATIONS / GENERAL CONSTRUCTABILITY

Description	Response	Comment
Seasonal or Time Restrictions	Yes	All work is expected to take place between April and November, the typical construction season in Montana.
Designated Staging Area(s) or other ancillary sites?	No	There is adequate room for staging at all sites. It is expected that staging areas will be secured by the contractor.
Overarching Major Impacts to Cost or Schedule	No	
Overarching Constructability Concerns	No	
Anticipated Material Sources for major items (i.e., Borrow, Aggregate, Asphalt)	Yes	Material Sources will be needed for asphalt and riprap. Commercial material sources are anticipated to be determined by the contractor as developing a non-commercial source likely would not be cost effective.
Waste Areas Needed?	Yes	Waste areas may be needed for existing timber and reinforced concrete bridge components. Potential collection points for timber and reinforced concrete waste are Great Falls, Lewistown, Bozeman, and Billings, with all project sites within 100 miles of these collection points. Special use permits to dispose of this material are not expected to be needed. If asbestos is present on the structure, any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Hauling or Load Restrictions?	Yes	The bridge just west of the Coffee Creek bridge is soon to be load posted by MDT for Special Hauling Vehicles (SHVs), but the posting and restrictions have not yet been finalized. This should not cause significant issues to construction.
Potential Water Sources?	Yes	Water sources will be needed for proper compaction of aggregates and watering for dust control during construction. These sources are expected to be permitted by the contractor.

V. FUNCTIONAL CONSIDERATIONS

A. HIGHWAY DESIGN & SAFETY

Description	Response	Comment
Road Name and Route ID Number:	MT-81, S-400, S-238, S-297	
PROPOSED DESIGN STANDARDS		
Design Vehicle	Interstate Semi-Trailer (WB-62)	
Design ADT	Unknown	Existing ADT is between 73-355, depending on site. Significant future ADT growth is not expected at any of the sites.
Design Speed	55 mph	Rural Minor Arterial (MT-81) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
	50 mph	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Travel Way Width	28-32 feet (MT-81) 22 feet (S-400) 28 feet (S-238) 28 feet (S-297)	On MT-81, new bridges will have a width of 32 feet which meets MDT Design Standards and matches the width of recently constructed bridges on this route. New culverts will have a roadway width of 28 feet which matches the existing roadway width.
Shoulder Width	2-4 feet (MT-81) 0 feet (S-400) 2 feet (S-238) 2 feet (S-297)	Recommended shoulder widths from MDT's Route Segment Plan.
Shoulder Type	Paved	MT-81, S-238, and S-297
	Unpaved	S-400
Min. Horiz. Radius	960 feet	Rural Minor Arterial (MT-81) Based on MDT's Road Design Manual, 2016.
	760 feet	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Road Design Manual, 2016.
Crown	2%	Any new bridges and reconstructed paved roadways are expected to have a 2% crown. Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
	4%-5%	Reconstructed unpaved routes are DAR Program routes which are built to maintain a 4-5% crown. Based on AASHTO Geometric Design of Highways and Streets, 2018, for unpaved roads.
Superelevation	8% Max.	Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Superelevation Runoff	260 feet Max.	Rural Minor Arterial (MT-81) Based on MDT's Road Design Manual, 2016. Value shown is for minimum horizontal radius and maximum superelevation.

Description	Response	Comment
	240 feet Max.	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Road Design Manual, 2016. Value shown is for minimum horizontal radius and maximum superelevation.
Min. Vertical Curve (K Value)	114	Rural Minor Arterial (MT-81) Based on MDT's Road Design Manual, 2016.
	84	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Road Design Manual, 2016.
Maximum Grade	5%	Rural Minor Arterial (MT-81) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
	7%	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Min. Stopping Sight Distance	495 feet	Rural Minor Arterial (MT-81) Based on MDT's Road Design Manual, 2016.
	425 feet	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Road Design Manual, 2016.
Horiz. Clearance to Structure	2 feet min.	Based on AASHTO Geometric Design of Highways and Streets, 2018.
Min. Clear Zone	18 feet	Rural Minor Arterial (MT-81) Based on MDT's Road Design Manual, 2016.
	14 feet	Rural Major Collector (S-400, S-238, and S-297) Based on MDT's Road Design Manual, 2016.
Foreslope	1V:6H	DHV > 200 (MT-81) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
	1V:4H	DHV < 200 (S-400, S-238, and S-297) Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Backslope	1V:5H (0-5') 1V:4H (5-10')	Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Ditch Type (V-ditch or trapezoidal) and Width	Trapezoidal	Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Ditch Depth	2 feet min.	Based on MDT's Baseline Criteria Practitioner's Guide, 2021.
Safety Edge	Yes	Safety edge will be evaluated in the design phase for use on this project.

Description	Response	Comment
PROPOSED DESIGN FEATURES		
Realignment or grade change required?	Yes/No	Vertical grade raises may be needed at some sites to accommodate deeper structure superstructure sections. Any grade raises will be determined in design.
Will there be any widening off the existing bench?	Yes	MT-81 roadway width will need to transition out to the new structure width (32 feet).
Will profile be raised due to proposed pavement structural section?	No	
Additional work required at intersections or driveways?	No	
Exist/Proposed Parking/ Pullouts/Vistas?	No	
Exist/Proposed Pedestrian and/or Bicycle Facilities?	No	
Exist/Proposed Roadside Features (gates, shelters, etc.)	No	
Exist/Proposed Fencing?	Yes	Existing fence connecting to stock passes may need to be replaced, depending on landowner negotiations.
ABA/ADA Accommodations?	No	
Seeding and Revegetation	Yes	Any disturbed ground and slopes will be reseeded.
Special Features (Railroad Crossings, etc.)	No	
Architectural or decorative aspects to be incorporated (stone masonry, stone curb, rock facing, etc.)	No	
HIGHWAY SAFETY CONSIDERATIONS		
Overall Proven Safety Countermeasures	No	
Typical Section Optimization?	No	The current typical section appears to be appropriate for current and future traffic. No further analysis is recommended.
Roadway Edge Drop-off Concerns?	No	
Superelevation corrections?	No	
Additional work required to address Sight Distance Issues?	No	
Clear Zone and Roadside Hazards	No	No significant roadside hazards were identified at any of the sites. Approach guardrail will be installed at locations to protect slopes as required near structure ends. Low volume roads will be evaluated during design to see if approach guardrail could be eliminated.
NPS – Traffic Barrier Inventory recommended improvements?	No	

Description	Response	Comment
Existing/Proposed Barrier?	Yes	All bridge rail and approaches will meet AASHTO and MDT standards.
Barrier Type/Typical Section	Yes/No	MDT is currently transitioning from a Type W830 open rail system to a MASH compliant 42" open rail system with a box beam approach section. This system is in the final stages of testing and is expected to be fully implemented by the construction of this project. It is anticipated that this will be the rail used for any new bridges. This is a curb mounted rail that will require all deck drainage to be carried off the bridge ends and not through scuppers/deck drains.
Aesthetic barrier preference?	No	
Proposed signing (regulatory, warning) and supports?	Yes	MUTCD signing will be replaced and added where needed.
Proposed signing (guide, special sign needs, etc.)	Yes	MUTCD signing will be replaced and added where needed.
Proposed Pavement Markings (Longitudinal)	Yes	Pavement marking types, sizes, and material will be determined in design.
Existing Passing Zone Concerns?	No	
Proposed Pavement Markings (Others)	No	
Existing/Proposed permanent traffic control (special signs, markings, rumble strips, etc.) Roadside Delineators	No	
Centerline, edge line/shoulder, transverse rumble strips?	No	
Multimodal Crossing Treatments	No	
Speed Concerns?	No	
TEMPORARY TRAFFIC CONTROL		
Anticipated Method(s) of Temporary Traffic Control		Standard TTC methods are proposed, and specific needs will be identified in design.
Will alternate routes (detours/diversions) be provided for during construction?	No	At all sites, detours built adjacent to the existing roadway are expected. This will allow for traffic to be maintained through the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Detour structures will consist of a bridge or buried culvert structure.
Temporary traffic control/traffic restrictions during construction?	Yes	Detour geometry and timing would need to be discussed with Malmstrom AFB, as it may affect missile facility transportation.
Can the road be closed for construction?	No	

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

B. SURVEY

Description	Response	Comment
Existing survey, mapping, and/or control?	Yes	Survey, mapping, and control were completed as part of the scoping effort in the fall of 2021. According to the Montana LiDAR Inventory, LiDAR is available for the Deadman's Basin Canal project site and will be completed for the MT-81 corridor and the E FK Big Spring site in the summer of 2022. No LiDAR is available or is currently planned for the Hauck Coulee project site.
Special features requiring survey	No	
Seasonal restrictions?	No	
Describe terrain (slopes, vegetation, etc.)	Terrain and vegetation did not affect survey efforts.	
Is field survey required?	No	Field Survey is complete. Additional pick-up survey may be needed and will be identified in design.
Recommended survey Method	Ground Survey	
Recommended Survey Limits		Survey limits at each site extended approximately 550 feet along the existing centerline roadway and 150 feet upstream and downstream of the existing bridge.
Utility Survey Required	No	Utility Survey has been completed.
Property/ ROW/ Cadastral Survey Required	No	Property/ROW/Cadastral Survey has been completed.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

C. ENVIRONMENT

Description	Response	Comment
Type of NEPA document anticipated	CE	A Categorical Exclusion (CE) is the expected level of environmental documentation for this project. To meet the proposed schedule, two separate CE documents may be needed, including one to allow for geotechnical drilling activities to be completed to maintain the proposed schedule and one for the structure replacements.
State environmental compliance (CEQA or SEPA) required (CA and WA Projects respectively)?	No	
NPS - Environmental Screening Form (ESF) required?	No	
Potential use of programmatic agreements?	No	
Public involvement required?	No	
AIR QUALITY		
Non-attainment or maintenance area?	No	A review of information on the Montana Department of Environmental Quality (MDEQ) website shows that the project area is not located in or near any designated Nonattainment and Maintenance Areas. This means the project area is considered to be in attainment of the NAAQS.
Exempt from requirement to perform an air quality analysis to determine conformity per 40 CFR 93.126?	Yes	40 CFR 93.126 lists bridge reconstruction projects (with no additional travel lanes) as being exempt from conformity determination requirements.
If conformity applies, is the project included in the STIP or regional TIP air quality conformity analysis?	No	Not applicable.
Adding or removing lanes, signalization, and/or alignment changes?	No	
State or local air quality studies required?	No	

Description	Response	Comment
BIOLOGICAL RESOURCES		
Federal T&E or candidate species in the area?	Yes	The U.S. Fish and Wildlife Service (USFWS) Ecological Services Montana Field Office online summary of listed Species by County (dated October 1, 2021) lists one Endangered species (Pallid Sturgeon – Fergus County), two Threatened species (Grizzly Bear and Canada Lynx – Judith Basin and Wheatland County), one proposed for listing (Whitebark Pine – Fergus County, Judith Basin County, and Wheatland County), and one candidate species (Monarch Butterfly – Fergus County, Judith Basin County, and Wheatland County). The USFWS Information, Planning and Conservation (IPac) website was consulted in January 2022 to identify federal T & E or candidate species that could occur in the vicinity of the project. The IPaC review indicated the Canada Lynx and the Monarch Butterfly as species potentially occurring in the general area of the project locations. These are likely the federally-listed species of interest for the projects.
Potential for suitable habitat of any federally-listed species in/near the project area?	Yes	The general project area likely provides suitable habitat for the Monarch Butterfly. **Monarch Butterfly.** Monarch butterflies prefer open places, native prairie, foothills, open valley bottoms, open weedy fields, roadsides, pastures, marshes, suburban areas, and are rarely above the treeline in alpine terrain during migration.
Designated critical habitat in the project area?	No	The USFWS Environmental Conservation Online System (ECOS) Critical Habitat Online Mapper was consulted to help identify critical habitat in the project area. The online mapping showed there is no critical habitat located in the project area. Though the project is not currently within grizzly bear critical habitat, it will be considered within grizzly bear critical habitat for environmental documentation.

Description	Response	Comment
Local knowledge of state-protected or other sensitive species in the area (including eagles, and migratory birds)?	Yes	A review of the Montana Natural Heritage Program (MNHP) database in January 2022 identified several known plants, fish, and wildlife identified as Montana Species of Concern occurring within the general project areas. Migratory birds have been observed in the project area including Bobolink, Ferruginous Hawk, and Sprague's Pipit.
Are there BLM- or USFS-sensitive species in the project area?	Yes	The list of species of concern above include BLM and USFS-sensitive species in the project area.
Migratory bird nesting observed in the project area?	Unknown	It is unknown if migratory bird nests have been observed in the project area.
Wildlife or aquatic organism passage issues?	No	
Known noxious weed occurrences or concerns regarding noxious weeds?	Yes	According to the Montana Fish Wildlife and Parks Field Guide, there are over 25 noxious weeds present in Fergus, Judith Basin, and Wheatland Counties. It is likely one or more of these noxious weeds occurs within the project areas. Best management practices will be incorporated into the project to limit the spread of any noxious weed.
Biological resource surveys required?	Yes	Biological resource surveys are required.
Is a BA/BE required?	Yes	A BA is needed to evaluate the effects of the proposed project on protected USFWS natural resources.
CULTURAL RESOURCES		
New ground disturbance outside the existing roadway prism?	Yes	New ground disturbance outside the existing roadway prism will be required for replacement of the existing bridges with a wider travel way and increase in shoulder widths.
Previously surveyed for cultural resources?	Unknown	The necessary resource studies will be completed as part of the project.
Evaluated for eligibility for the National Register of Historic Places (NRHP)?	Unknown	The necessary resource studies will be completed as part of the project.
Properties (buildings, bridges, trails, etc.) thought to be older than 50 years?	Yes	The timber bridges were constructed between 1934 and 1962.
Apparent / unique / suspect structures of possible historical interest?	Unknown	The necessary resource studies will be completed as part of the project.

Description	Response	Comment
Tribes who will have an interest in the project?	Yes	According to the US Department of Housing and Urban Development's Tribal Directory Assessment Tool (TDAT) (available at https://egis.hud.gov/tdat/), the following Native American Tribes may have potential interests in Fergus, Judith Basin, and Wheatland County: • Apache Tribe of Oklahoma • Crow Tribe of Montana • Fort Belknap Indian Community of the Fort Belknap Indian Reservation • Nez Perce Tribe • Shoshone-Bannock Tribes of the Fort Hall Reservation • Confederated Salish and Kootenai Tribes of the Flathead Reservation
Traditional Cultural Properties (TCPs) in the area?	Unknown	Cultural resource studies are required.
Cultural resource surveys required?	Yes	Cultural resource studies are required.
ENERGY		
Affect energy use as a result of changes to traffic patterns or volumes, or involve speed zone changes?	No	
HAZARDOUS MATERIAL		
Documented hazardous sites in the project area?	No	According to the MDEQ Facilities mapper, there are no hazardous sites listed in or around the project areas.
Undocumented sites and/or possible hazardous waste on the project?	No	Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Structure with potential to contain hazardous material to be altered or demolished?	No	
Will further investigation be required for the project?	No	
Summarize the contaminated site impacts and mitigation measures, if any.		There will be no anticipated impacts to known contaminated sites. If contaminated sites are encountered during construction, mitigation of the site will be required depending on the type of contamination.

Description	Response	Comment
LAND USE / PLANNING		
Require land use actions from FLMA or local jurisdictions?	No	
Are there federal, state, or local land use plans in effect for the project area?	No	
Concerns regarding consistency with federal, state, or local land use policies or plans?	No	
Coastal Zone Management Act apply?	No	
Result in the conversion of prime farmland, unique farmland, or land of statewide or local importance as defined by Farmland Protection Policy Act?	No	The Natural Resources Conservation Service (NRCS) Web Soil Survey online mapping for the project corridors indicates areas of soils classified as Farmland of Statewide Importance, all areas are Prime Farmland, and Prime Farmland if irrigated throughout the project areas. Conversion of farmland is not anticipated as a result of this project.
Any other specially designated or protected lands that may be affected?	Unknown	
NOISE		
Will there be any shift in horizontal or vertical alignment as defined in 23 CFR 772.5?	No	
Does project increase the number of through travel lanes?	No	
Roadway located on a new alignment?	No	
Removal of topographical features which currently shield receptors?	No	
Are there buildings/activity areas within 200 feet of proposed right-of-way line?	No	
Does the project add or substantially alter a weigh station, rest area, ride-share lot, or toll plaza?	No	
Are there sensitive noise receptors within the project area?	No	
SECTION 4(f)		
Parks, wildlife refuges, historic properties, recreational areas, campgrounds, trails, etc. that may be impacted?	No	

Description	Response	Comment
SECTION 6(f)		
Land & Water Conservation Funds used to acquire parks, or to make improvements, etc. in the project area?	No	
May the project require conversion and/or acquisition of a 6(f) property?	No	
SOCIOECONOMICS		
Displacements or relocations?	No	
Divide or disrupt an established community, or affect neighborhood character or stability?	No	
Affect minority, elderly, handicapped, low income, transit-dependent, or other specific interest group?	No	
Potential to impact the local or regional economy?	No	
Potential to affect travel patterns and accessibility (e.g. vehicular, commuter, bicycle, or pedestrian)?	Unknown	Vehicular travel patterns may be temporarily impacted during construction. The level of impact will be based on the detour selected and duration, which will be determined in the design phase but are expected to be minimal.
Potential to affect school boundaries, recreation areas, churches, businesses, police and fire protection, etc.?	No	
Is an Environmental Justice (EJ) population, as identified in Executive Order 12898, present within ½ mile of the project area?	No	
VISUAL		
Designated state or federal scenic route?	No	
Major cuts/fills associated with this project?	No	
Bridges or large retaining walls anticipated?	Yes	
Adversely affect or substantially degrade the existing visual character or quality of the site or its surroundings?	No	

Description	Response	Comment
WATERWAYS / WATER QUALITY		
Navigable waterway(s) within the project area?	No	
Water quality- impaired stream (303(d)-listed) impacted?	No	
Outstanding Resource Waters affected?	No	
Active well impacted?	No	
Will permanent stormwater treatment be required for areas of proposed new impervious surfaces?	No	
WETLANDS AND WATERS OF THE U.S.		
Estimate the number and size of streams and/or wetlands within the project area and regulatory authority for each	Unknown	Mapping of Waters of the US has not been completed for the project to date.
Intermittent streams, ephemeral drainages, or perennial rivers/streams?	Yes	According to the National Hydrographic Datum, the East Fork Big Spring Creek is a perennial stream and the Hauck Coulee, Dry Wolf Creek, Coffee Creek and the remaining timber bridge crossings on MT-81 are intermittent streams. Deadman's Basin Canal is a supply canal.
Potential to affect surface waters, including wetlands? (e.g., ground disturbance, in-water work, adding impervious surface, changing run-off patterns, etc.)?	Unknown	Mapping of Waters of the US has not been completed for the project to date.
Riparian or wetland vegetation evident from visual inspection?	Unknown	Mapping of Waters of the US has not been completed for the project to date.
Delineation of waters of the U.S. including wetlands and other special aquatic sites need to be completed for the project area?	Yes	Mapping of Waters of the US has not been completed for the project to date.
WILDERNESS		
Occur in or near designated wilderness?	No	

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

D. PERMITS

Description	Response	Comment
Section 404 / 401 Permit		
Dredge from or discharge to a water of the U.S.?	Unknown	Mapping of Waters of the US has not been completed for this project to date.
Dredge from or discharge to a special aquatic site?	Unknown	Mapping of Waters of the US has not been completed for this project to date.
Water diversion needed?	No	
Channelization, channel realignment, or channel armoring required?	No	
Does the project qualify for a Nationwide Permit (NWP)?	Yes	Area of disturbance anticipated to be below the threshold to trigger an individual permit.
If project qualifies for a NWP, can the project comply with NWP general and regional conditions?	Yes	Area of disturbance anticipated to be below the threshold to trigger an individual permit.
Would the project cause the loss of less than either 1/2 acre of non-tidal waters of the U.S. or 1/3 acre of tidal waters of the U.S.?	Yes	Area of disturbance anticipated to be below the threshold to trigger an individual permit.
Would the project cause the loss of less than 1/10 acre of wetlands?	Unknown	Area of disturbance anticipated to be below the threshold to trigger an individual permit.
Will the project require compensatory mitigation?	Unknown	Mapping of Waters of the US has not been completed for this project to date.
Any Corps-approved mitigation bank or in-lieu fee programs that service the project area?	Yes	Middle Missouri River Bank.
NPDES Permit		
Is the project likely to disturb more than one acre of ground AND discharge to a water of the U.S?	<1 ac	Grading activities along the road to increase the travel way and shoulder width increases where structure replacement is to be completed.
Subject to any state, county, or local sediment/erosion management plan (MS4)?	No	
Subject to a state or basin sediment/erosion management plan?	No	Montana Pollutant Discharge Information System (MPDES) permit.
Cooperator/Partner willing to assume responsibility for the NPDES Permit upon completion of construction?	Unknown	To be determined.
Other Permits / Authorizations		
Right of Entry	No	
FLMA special use permit	No	

Description	Response	Comment
Staging area permit?	Unknown	Special Use Permits may be needed for staging/storage areas.
Disposal/waste area permit?	Unknown	Special Use Permits may be needed for staging/storage areas.
Material source permit?	Yes	Project is anticipated to be a commercial source secured by the contractor.
Asphalt or concrete batch plant permit?	No	
Utility line or buried pipe permit?	No	
Dewatering permit?	No	
Water rights or appropriation approval?	No	
Local, County, or State air quality permit	No	
County road access or encroachment permit?	Unknown	Haul road agreements may be required from Fergus, Judith Basin, and Wheatland County depending on contractor operations.
State highway access or encroachment permit?	Yes	An encroachment permit will be required by the Montana Department of Transportation.
Stream alteration permit?	No	
Other	Yes	A floodplain permit will be required for the East Fork Big Spring Creek project site.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

E. UTILITIES

Description	Response	Comment
Known utilities within project area?	Yes	See **Appendix A** for list of utilities, locations, owners, and contact information.
Anticipated utility impacts?	Yes	Some utilities may need to be relocated to accommodate replacement structures but are expected to remain within the existing R/W.
Existing utility agreements or easements?	Unknown	
Special considerations or utility impact or relocation?	Yes	Some utilities may need to be relocated within existing R/W. Utilities attached to existing bridges will need to be removed and re-attached to the new structure or buried.

Description	Response	Comment
Irrigation ditches?	Yes	Deadman's Basin Supply Canal north of Shawmut. Operated by Deadman's Basin Water Users Association.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

F. RIGHT-OF-WAY

Description	Response	Comment
Existing ROW?	Yes	See *Right-of-Way Report*, dated December 2021 for maps showing property ownership and potential R/W needs for each site. This report was developed as part of the scoping phase of this project.
Additional ROW Required?	Unknown	On MT-81, for the stock passes at MP 34.1 and 36.6, guardrail is expected to be required to prevent the end of the new structures from extending beyond the limits of the existing R/W to the north. If guardrail is not installed, new R/W is likely needed to extend the end of the new structures beyond the clear zone.
FLMA Transfer?	No	
Temporary Construction Easement Required?	Unknown	East Fork Big Spring Creek bridge detour could potentially need a temporary construction easement, depending on the ultimate type, width, and elevation of detour determined during design.
Private Parcel Acquisition?	Unknown	Private parcel acquisition may be required at the stock passes at MP 34.1 and 36.6 if guardrail is not installed and additional R/W is needed to extend the end of the new structures beyond the clear zone.
ROW Fence Requirements?	Yes	Existing right-of-way fences connect to existing stock passes. Replacement fencing may be negotiated with landowners as part of stock pass agreement process.
Maintaining Agency involved with Permit to Enter process for field work?	No	

Description	Response	Comment
Are there railroad interests in the project area?	No	On MT-81, a railroad line runs parallel and to the south of the existing roadway adjacent to the Coffee Creek Bridge at MP 6.5 that is owned by MDT and operated by Central MT Rail.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	No major impacts to cost or schedule are anticipated as part of this function. If additional R/W is needed, to mitigate this risk any R/W needs will be identified early in the design process to allow for time for acquisition. If delays are expected to be incurred, these structures can be let in a separate project.
Constructability Concerns	None.

G. GEOTECHNICAL

Description	Response	Comment
Summary of geotechnical features/design		For this scoping report, it is assumed that new bridge structures will be founded on a deep foundation, likely driven steel pipe or HP piles. Buried culvert structures are expected to be founded on an aggregate base. During the preliminary engineering phase, a full geotechnical investigation will need to be completed to determine the appropriate foundation type for each site and structure type. This will include determination of the number borings and their depth, research into any available geotechnical-related information, any available geotechnical/hazard reports, and a foundation recommendation. Boring logs from recent bridge replacements on MT-81 show clayey sands and gravels to a depth of ranging from 15-feet to 30-feet with shale below to a depth ranging from 50-feet to 70-feet, the limits of the borings.

Description	Response	Comment
Regional and Local Geological Setting?	Yes	As documented at https://mrdata.usgs.gov/geology/state/state.php?state=MT, project areas are designated predominantly as 1) alluvial gravels and sands, 2) shale, limestone, and dolostone of the Marias River Formation from the Cretaceous period, and 3) mudstone, shale, sandstone, limestone, and gypsum of the Rierdon and Piper and Swift Formations from the Jurassic period.
Existing and potential geological hazards	Unknown	No existing or potential geotechnical hazards were identified during the site visit.
Nearby faults and seismicity design parameters	No	From the USGS Unified Hazard Tool, no faults are located in the project vicinity. The average peak ground acceleration is 0.05g with the project site located in Seismic Zone 1. Site Class B is estimated.
Existing geotechnical structures?	Yes	Existing bridge foundations consisting of timber piling are present.
Geotechnical Repair Areas	No	
Surface or groundwater problem areas?	No	
Subsurface investigation requirements and access	Yes	All sites will require a subsurface investigation, the extent to be determined by the structure type selected. Site access is good, and little to no clearing will be needed. Since the new structures are expected to be built on the existing horizontal alignment, borings can be completed within the existing R/W. The appropriate permits, approvals, environmental requirements, and method of investigation will be determined during the preliminary engineering phase.
NPS – Wall Inventory Program recommendations?	No	

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	No major impacts to cost or schedule are anticipated as part of this function. The existing structures do not show signs of settlement or movement and similar structures have been built in the area recently with no identified geotechnical issues. This project is in a low seismic activity area.
Constructability Concerns	None.

H. PAVEMENTS AND MATERIALS

Description	Response	Comment
Summary of Preliminary Pavement & Materials Recommendations (including unbound surfacing and pavement preservation treatments)		On MT-81, S-238, and S-297, asphalt will be placed on the reconstructed approaches matching existing. On S-400, the approaches will be gravel to match existing. Pavement and gravel recommendations will be determined during the design phase.
Pavement construction or maintenance history known?	Yes/No	4" of new calcium-chloride-treated aggregate was added to S-400 during 2016 construction season.
Pavement distress?	Yes/No	Fergus County noted that the existing surface on S-238 is in fair to poor condition.
Are pavement preservation treatments appropriate for segments or the entire project?	Yes/No	MDT currently has an overlay and chip seal planned for the MT-81 project area during FY 2023. Project tie-ins may need to match chip seal surface and/or any rumble strips added. Timing of project subject to change.
Is pavement rehabilitation appropriate for segments or the entire project?	No	
Is pavement reconstruction appropriate for segments or the entire project?	No	
Will segments or areas of the project have unbound surfacing material (i.e. gravel)?	Yes	The reconstructed roadway on S-400 will have a gravel surface to match existing.
Areas of special concern for pavement design, material selection, and/or follow-up field investigation?	Yes	The reconstructed roadway on S-400 will tie into existing stabilized aggregate (with Calcium Chloride), typical of most DAR Program routes for Malmstrom AFB. DAR Program routes are built to maintain a 4-5% crown and may undergo aggregate and calcium chloride maintenance projects every 5-10 years.
Pavement structure depths known or estimated?	No	
Traffic volumes including truck percentages by classification known?	Yes	On MT-81, truck percentages vary from 10-13%. On S-400, S-238, and S-297 truck percentages at 1% or less.
WFL standard specifications and SCRs expected to be used for all material?	Yes	Additional MDT specifications or revisions to WFL specifications may be needed.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.

Risks for this function	Comment
Constructability Concerns	None.

I. HYDROLOGY/HYDRAULICS

Description	Response	Comment
Summary of Preliminary Hydraulic Design		A preliminary hydraulic analysis was completed as part of the scoping effort to determine the appropriate structure type for each site, either a new bridge or buried culvert structure. The analysis was based on the 50-year flood event and each new structure was sized to match or improve existing hydraulic conditions. During the design phase, a full hydraulic analysis will need to be completed to verify the preliminary analysis. No hydraulic issues or concerns were identified during the site visit.
Specific state or local design standards/requirements	Unknown	Specific state or local design standards/requirements will be determined in the design phase.
Condition or performance problems with minor drainage structures?	No	
Existing major culvert structures (over 48" rise) being retained?	No	
Exist/Proposed LWCs?	No	
Existing bridge/open bottom structure on project?	Yes	The eight existing timber bridges are open bottom and do not exhibit any scour issues.
Proposed major structure? (Culvert >48" or bridge)	Yes	Five culverts and three bridges are proposed as part of this project.
Proposed open bottom structures?	Yes	The three bridges proposed would be open bottom structures.
Proposed geotechnical walls located within or adjacent to channels?	No	
Fish passage concerns?	No	
Channel migration concerns?	No	
Within designated FEMA floodplain?	Yes/No	Most sites are in unmapped areas. East Fork Big Spring Creek is a Zone A designated floodplain.
Channel degradation or aggradation concerns?	No	
Scour, erosion, deposition of sediment or debris, abrasion or corrosion of structure material at culvert inlets or outlets	No	

Description	Response	Comment
Describe channel bed and bank material		The existing channel bed and bank material varies at each site but mainly consists of sedimentary silt, gravel, and riprap with organic material where vegetation is present.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

J. STRUCTURES

Description	Response	Comment
Existing structures (bridge, retaining wall, tunnel)?	Yes	Eight existing timber bridges are located within the project limits. All eight bridges will be replaced with new structures.
BRIDGE DESIGN STANDARDS		
Bridge Width	28 to 32 feet (curb to curb)	The bridges on MT-81 are expected to have a 32-foot width, matching the width of recently constructed bridges on this route. The proposed bridges on S-238 and S-297 are expected to have 28-foot widths, meeting MDT minimum width standards for these routes.
Bridge Loading	HL-93, Transporter-Erector Vehicle	The bridges will be developed in English units and will be designed to meet AASHTO LRFD Bridge Design Specification and MDT standards. It will be designed for HL-93 and Transporter-Erector (T-E) loading.
Bridge Railing	AASHTO	MDT is currently transitioning from a Type W830 open rail system to a MASH compliant 42” open rail system with a box beam approach section. This system is in the final stages of testing and is expected to be fully implemented by the construction of this project. It is anticipated that this will be the rail used for any new bridges. This is a curb mounted rail that will require all deck drainage will be carried off the bridge ends and not through scuppers/deck drains. This rail is preferred by MDT in this region due to its advantages for snow removal and reduction in drifting.

P00081006+05001 (06207), MT-81 (MP 6.5), Coffee Creek	
Description	**Comment**
Summary of Preliminary Structure Design	Based on the preliminary hydraulic analysis, a RCB with a 15' span x 10' rise will meet the hydraulic needs for this crossing. A culvert structure would provide a 28-ft roadway width with an asphalt surface, matching existing, and has the potential to eliminate the need for guardrail as the ends could be extended outside the clear zone. Since a RCB will satisfy hydraulic needs, a bridge was not considered at this site.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 10/10/1950 MDT Bridge Rail Revision Plans dated 06/19/2018 MDT Inspection Report dated 09/03/2020
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 1/21 feet Total Bridge Length: 21 feet Curb to Curb Width: 25 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge appears to provide an adequate bridge opening with no scour, deposition of sediment, or debris build up observed during the site visit or identified in the inspection reports. No apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 386 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the water or ground level. Standing water under the bridge was present during the site visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 8 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs have been completed on critical elements to restore capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge rail was replaced in 2018 with MDT's W740 rail and Box Beam Approach Section Type 1. No utilities are attached to the bridge, but a buried fiber optic line runs adjacent to the roadway to the north within the existing R/W limits.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 24 feet wide with two lanes of travel and no shoulders. MDT Box Beam Approach Section Type 1 is attached to the bridge rail on all four corners.

P00081006+05001 (06207), MT-81 (MP 6.5), Coffee Creek	
Description	**Comment**
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 120 feet to the north and 50 feet to the south.
Posted speed	70 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The RCB culvert will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge and Road Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	The majority of the bridges along this route are constructed of timber superstructures and substructures. New structures recently constructed along this route include steel girder and concrete beam bridges and reinforced concrete box culverts.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	New bridge railing recently constructed along this route is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials – Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products – Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.

P00081006+05001 (06207), MT-81 (MP 6.5), Coffee Creek	
Description	**Comment**
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and bridge appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure and partial construction of the new culvert adjacent to the existing roadway could eliminate the need for a separate detour structure reducing costs.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	N/A
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	N/A
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	A RCB culvert is an economical structure type that meets the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

P00081019+09951 (06209), MT-81 (MP 19.9), Dry Wolf Creek	
Description	**Comment**
Summary of Preliminary Structure Design	Based on preliminary hydraulic analysis, a single-span or multi-span bridge was identified as a viable option for replacement and is expected to have a 32-ft roadway width, which meets MDT standards and matches the roadway width of recently constructed bridges on this route. If standard 1:2 fill slopes are used, the new length is estimated to be approximately 75-ft, with the new bridge potentially shifted to the east to better align with the channel. The existing horizontal alignment is expected to be maintained, but a vertical grade raise may be needed to accommodate a

P00081019+09951 (06209), MT-81 (MP 19.9), Dry Wolf Creek	
Description	**Comment**
	deeper girder section and still meet hydraulic requirements. Further investigation will be needed to determine any grade raise requirements for the different beam types and span lengths, with a focus on minimizing impacts off the bridge. Both steel and prestressed concrete girders are applicable for this site, with steel girders potentially being the preferred option due to their lesser depth and longer span capabilities compared to prestressed concrete girders. The deck and driving surface are expected to be concrete.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 02/18/1947 MDT Inspection Report dated 09/04/2020
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 3/19 feet Total Length: 57 feet Curb to Curb Width: 24 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge appears to provide an adequate bridge opening with no scour, deposition of sediment, or debris build up observed during the site visit or identified in the inspection reports. No apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 2079 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the water or ground level. One pile has been repaired with steel braces. Standing water under the bridge was present during the site visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 8 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs have been completed on critical elements to restore capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge appears to have its original timber rail. No utilities were identified in this portion of the corridor.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 24 feet wide with two lanes of travel and no shoulders. There is no approach rail attached to the original timber bridge railing.

P00081019+09951 (06209), MT-81 (MP 19.9), Dry Wolf Creek	
Description	**Comment**
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 50 feet to the north and 50 feet to the south.
Posted speed	70 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The bridge will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	The majority of the bridges along this route are constructed of timber superstructures and substructures. New structures recently constructed along this route include steel girder and concrete beam bridges and reinforced concrete box culverts.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	New bridge railing recently constructed along this route is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.

P00081019+09951 (06209), MT-81 (MP 19.9), Dry Wolf Creek	
Description	**Comment**
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and bridge appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	To improve hydraulic performance, spill through abutments are proposed for this site.
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	A deep foundation system utilizing reinforced concrete abutments supported on driven piles is anticipated. The final foundation solution will be based on recommendations by a professional geotechnical engineer. Both semi-integral and integral abutment types will be considered in design.
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	Both steel girder and prestressed concrete beam bridges are economical structure types used frequently in new bridge construction in Montana. Both will meet the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

P00081030+06301 (06212), MT-81 (MP 30.6), Stock Pass	
Description	**Comment**
Summary of Preliminary Structure Design	Due to the use of the existing timber structure as a stock pass and lack of significant hydraulic opening needs, a bridge was not considered at this site. It is expected that the existing timber stock pass will be replaced with a reinforced concrete box (RCB) culvert. A RCB can be placed with little to no cover, eliminating or reducing the need for a vertical grade raise. The existing stock pass opening is a 6’ span x 6’ rise, but negotiations with adjacent landowners may lead to a larger opening. The existing horizontal alignment is expected to be maintained, but if a taller opening is requested it may require a vertical grade raise. An 8’ span x 6’ rise RCB would provide

P00081030+06301 (06212), MT-81 (MP 30.6), Stock Pass	
Description	**Comment**
	a 28-ft roadway width with an asphalt surface, meeting the recommended width in MDT's Route Segment Plan, and has the potential to eliminate the need for guardrail as the ends could be extended outside the clear zone.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 10/14/1932 MDT Inspection Report dated 10/03/2019
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 1/11.5 feet Total Bridge Length: 11.5 feet Curb to Curb Width: 27 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge was installed for use as a stock pass and the only flow through the opening appears to be from spring runoff and rainstorms. No scour, deposition of sediment, restriction of debris passage, or apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 13 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the ground level. No water was present during the site visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 8 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs have been completed on critical elements to restore capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge rail timber posts appears to have been replaced, likely by MDT maintenance staff, but no plans were found. No utilities are attached to the bridge, but a buried fiber optic line and overhead power lines runs adjacent to the roadway to the north within the existing R/W limits.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 24 feet wide with two lanes of travel and no shoulders. There is no approach rail attached to the timber bridge railing.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 40 feet to the north and 60 feet to the south.
Posted speed	70 MPH

P00081030+06301 (06212), MT-81 (MP 30.6), Stock Pass	
Description	**Comment**
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The RCB culvert will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge and Road Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	The majority of the bridges along this route are constructed of timber superstructures and substructures. New structures recently constructed along this route include steel girder and concrete beam bridges and reinforced concrete box culverts.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	New bridge railing recently constructed along this route is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and stock pass appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure and partial construction of the new culvert adjacent to the existing roadway could eliminate the need for a separate detour structure reducing costs.

P00081030+06301 (06212), MT-81 (MP 30.6), Stock Pass	
Description	**Comment**
Consider feasibility of spill through vs. vertical abutment types for the structural layout	N/A
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	N/A
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	A RCB culvert is an economical structure type that meets the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

P00081034+09001 (06216), MT-81 (MP 34.9), Stock Pass	
Description	**Comment**
Summary of Preliminary Structure Design	Due to the use of the existing timber structure as a stock pass and lack of significant hydraulic opening needs, a bridge was not considered at this site. It is expected that the existing timber stock pass will be replaced with a reinforced concrete box (RCB) culvert. A RCB can be placed with little to no cover, eliminating or reducing the need for a vertical grade raise. The existing stock pass opening is 6’ span x 6’ rise, but negotiations with adjacent landowners may lead to a larger opening. The existing horizontal alignment is expected to be maintained, but if a taller opening is requested it may require a vertical grade raise. An 8’ span x 6’ rise RCB would provide a 28-ft roadway width with an asphalt surface, meeting the recommended width in MDT’s Route Segment Plan, and has the potential to eliminate the need for guardrail as the ends could be extended outside the clear zone. If the RCB end is extended outside the clear zone to the north, additional R/W may be needed unless guardrail is installed reducing the required length.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 10/14/1932 MDT Inspection Report dated 10/03/2019

P00081034+09001 (06216), MT-81 (MP 34.9), Stock Pass	
Description	**Comment**
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 1/11.5 feet Total Bridge Length: 11.5 feet Curb to Curb Width: 27 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge was installed for use as a stock pass and the only flow through the opening appears to be from spring runoff and rainstorms. No scour, deposition of sediment, restriction of debris passage, or apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 77 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the ground level. No water was present during the site visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 8 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs have been completed on critical elements to restore capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge appears to have its original timber rail. No utilities are attached to the bridge, but a buried fiber optic line runs adjacent to the roadway to the south within the existing R/W limits and overhead power lines run adjacent to the north just outside the R/W limits.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 24 feet wide with two lanes of travel and no shoulders. There is no approach rail attached to the timber bridge railing.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 30 feet to the north and 40 feet to the south.
Posted speed	70 MPH

P00081034+09001 (06216), MT-81 (MP 34.9), Stock Pass	
Description	**Comment**
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The RCB culvert will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge and Road Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	The majority of the bridges along this route are constructed of timber superstructures and substructures. New structures recently constructed along this route include steel girder and concrete beam bridges and reinforced concrete box culverts.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	New bridge railing recently constructed along this route is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and stock pass appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure and partial construction of the new culvert adjacent to the existing roadway could eliminate the need for a separate detour structure reducing costs.

P00081034+09001 (06216), MT-81 (MP 34.9), Stock Pass	
Description	**Comment**
Consider feasibility of spill through vs. vertical abutment types for the structural layout	N/A
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	N/A
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	A RCB culvert is an economical structure type that meets the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

P00081036+09001 (06219), MT-81 (MP 36.6), Stock Pass	
Description	**Comment**
Summary of Preliminary Structure Design	Due to the use of the existing timber structure as a stock pass and lack of significant hydraulic opening needs, a bridge was not considered at this site. It is expected that the existing timber stock pass will be replaced with a reinforced concrete box (RCB) culvert. A RCB can be placed with little to no cover, eliminating or reducing the need for a vertical grade raise. The existing stock pass opening is 6’ span x 6’ rise, but negotiations with adjacent landowners may lead to a larger opening. The existing horizontal alignment is expected to be maintained, but if a taller opening is requested it may require a vertical grade raise. An 8’ span x 6’ rise RCB would provide a 28-ft roadway width with an asphalt surface, meeting the recommended width in MDT’s Route Segment Plan, and has the potential to eliminate the need for guardrail as the ends could be extended outside the clear zone. If the RCB end is extended outside the clear zone to the north, additional R/W may be needed unless guardrail is installed reducing the required length.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 10/14/1932 MDT Inspection Report dated 10/03/2019

P00081036+09001 (06219), MT-81 (MP 36.6), Stock Pass	
Description	**Comment**
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 1/11.5 feet Total Bridge Length: 11.5 feet Curb to Curb Width: 27 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge was installed for use as a stock pass and the only flow through the opening appears to be from spring runoff and rainstorms. No scour, deposition of sediment, restriction of debris passage, or apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 20 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the ground level. No water was present during the site visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 8 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs have been completed on critical elements to restore capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge rail appears to have been replaced with w-beam and steel posts, likely by MDT maintenance staff, but no plans were found. A buried fiber optic lines runs adjacent to the roadway to the north within the existing R/W limits.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 24 feet wide with two lanes of travel and no shoulders. The steel w-beam extends past the bridge ends acting as approach rail.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 30 feet to the north and 50 feet to the south.
Posted speed	70 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The RCB culvert will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge and Road Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.

P00081036+09001 (06219), MT-81 (MP 36.6), Stock Pass	
Description	**Comment**
Note bridge superstructure and substructure types along the route	The majority of the bridges along this route are constructed of timber superstructures and substructures. New structures recently constructed along this route include steel girder and concrete beam bridges and reinforced concrete box culverts.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	New bridge railing recently constructed along this route is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and stock pass appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure and partial construction of the new culvert adjacent to the existing roadway could eliminate the need for a separate detour structure reducing costs.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	N/A
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	N/A

P00081036+09001 (06219), MT-81 (MP 36.6), Stock Pass	
Description	**Comment**
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	A RCB culvert is an economical structure type that meets the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

P00400005+08001 (06754), S-400 (MP 5.8), Hauck Coulee	
Description	**Comment**
Summary of Preliminary Structure Design	Based on the preliminary hydraulic analysis, a RCB with an 8' span x 7' rise will meet the hydraulic needs for this crossing. A culvert structure would provide a 22-ft roadway width with a gravel surface, matching existing, and has the potential to eliminate the need for guardrail as the ends could be extended outside the clear zone. Since a RCB will satisfy hydraulic needs, a bridge was not considered at this site.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	US Dept. of Commerce, Bureau of Public Roads Original Bridge Plans dated 05/1961 MDT Inspection Report dated 09/03/2020
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Concrete Slab on Timber Piling # of Spans/Length: 1/16 feet Total Bridge Length: 16 feet Curb to Curb Width: 21 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge appears to provide an adequate bridge opening with no scour, deposition of sediment, or debris build up observed during the site visit or identified in the inspection reports. No apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 142 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the water or ground level. No water was present during the site visit but standing water has been observed at the site during previous visits. From the bridge plans provided by MDT, actual pile depths were not reported and minimum required pile depths were not identified.

P00400005+08001 (06754), S-400 (MP 5.8), Hauck Coulee	
Description	**Comment**
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs to critical elements are needed to maintain capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge has concrete curb with no railing. No utilities are attached to the bridge, but there is a proposed underground fiber optic line that would run adjacent and to the west of the roadway outside the existing R/W limits that is not expected to have an impact on the project.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The gravel roadway approaches are 19 feet wide with two lanes of travel and no shoulders. There is no approach railing attached to the bridge.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 32 feet to the west and 28 feet to the east.
Posted speed	45 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The RCB culvert will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge and Road Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	There is one other bridge on this route crossing Big Coulee southeast of the site. It has the same superstructure and substructure type consisting of a concrete slab supported on timber piles.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	The other bridge on this route has the same bridge railing type, concrete curb with no railing. New bridge railing recently constructed in this vicinity is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.

P00400005+08001 (06754), S-400 (MP 5.8), Hauck Coulee	
Description	**Comment**
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and bridge appears feasible. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, a buried culvert structure could be used as the detour structure and partial construction of the new culvert adjacent to the existing roadway could eliminate the need for a separate detour structure reducing costs.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	N/A
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	N/A
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	A RCB culvert is an economical structure type that meets the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.

P00400005+08001 (06754), S-400 (MP 5.8), Hauck Coulee	
Description	**Comment**
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

S00238010+06001 (06436), S-238 (MP 10.6), E Fork Big Spring Creek	
Description	**Comment**
Summary of Preliminary Structure Design	Based on preliminary hydraulic analysis a single-span bridge was identified as a viable option for replacement and is expected to have a 28-ft roadway width, which meets MDT minimum standards for on-system bridges. If standard 1:2 fill slopes are used, the new length is estimated to be approximately 60-ft. A new bridge would be built in the same location as the existing and the existing horizontal and vertical alignment is expected to be maintained. Both steel and prestressed concrete girders are applicable for this site, with the deck and driving surface expected to be concrete.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Inspection Report dated 07/28/2021
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Concrete Slab on Timber Piling # of Spans/Length: 1/21 feet Total Length: 21 feet Curb to Curb Width: 20 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge appears to provide an adequate bridge opening with no deposition of sediment or debris build up observed during the site visit or identified in the inspection reports. No apparent scour or instabilities around the existing structure were observed but the approach roadways did wash out in 2011 due to flooding. A beaver dam upstream of the crossing is restricting flow. For a 50-year flood event, flow through the crossing is calculated to be 526 cubic feet per second (cfs).
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the water level. One pile supporting the timber plank wingwall has failed. Flowing water through the bridge opening was present during the site visit. No actual pile depths were found since no as-builts were found.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs to critical elements are needed to maintain capacity and extend the service life.

S00238010+06001 (06436), S-238 (MP 10.6), E Fork Big Spring Creek	
Description	**Comment**
Bridge railing, transitions, and existing utilities.	The bridge has concrete curb with no railing. A buried fiber optic line to the east, a buried telephone line to the west, and overhead power lines to the west run adjacent to the roadway. The telephone line to the east is attached to the existing bridge as it crosses the creek.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 25 feet wide with two lanes of travel and no shoulders. There is no approach rail attached to the bridge.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. There is no dedicated ROW at this site as the road travels through a permanent easement from adjacent landowners. From centerline roadway the easement limits are approximately 26-ft to the west and 36-ft to the east.
Posted speed	45 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The bridge will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	There are two other bridges on this route, one to the north and one to the south. The bridge to the north has the same superstructure and substructure type as this bridge, consisting of a concrete slab founded on timber piling. The bridge to the south has both a timber superstructure and substructure.
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	The bridge to the north has the same bridge railing type, concrete curb with no railing. The timber bridge to the south has no curb or railing. New bridge railing recently constructed in this vicinity is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.

S00238010+06001 (06436), S-238 (MP 10.6), E Fork Big Spring Creek	
Description	**Comment**
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour built adjacent to the existing roadway and bridge appears feasible, likely to the east. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. Based on the crossing hydraulics, two detour options appear viable, either a buried culvert or bridge structure. But due to the need for a large culvert and the amount of temporary fill needed, a bridge structure detour is expected.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	To improve hydraulic performance, spill through abutments are proposed for this site.
Locate possible locations for retaining walls and potential wall types	No permanent potential retaining wall locations were identified at this site. A temporary retaining wall to facilitate a detour within the existing easement may be needed, but likely will be contractor designed.
Consider possible foundation types and semi integral vs. integral abutment types	A deep foundation system utilizing reinforced concrete abutments supported on driven piles is anticipated. The final foundation solution will be based on recommendations by a professional geotechnical engineer. Both semi-integral and integral abutment types will be considered in design.
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	Both steel girder and prestressed concrete beam bridges are economical structure types used frequently in new bridge construction in Montana. Both will meet the needs of this crossing and serviceability requirements of MDT and this route.

S00238010+06001 (06436), S-238 (MP 10.6), E Fork Big Spring Creek	
Description	**Comment**
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

S00297000+09001 (06606), S-297 (MP 0.9), Deadman's Basin Canal	
Description	**Comment**
Summary of Preliminary Structure Design	Based on preliminary hydraulic analysis, a single-span or multi-span bridge was identified as a viable option for replacement and is expected to have a 28-ft roadway width, which meets MDT minimum standards for on-system bridges. The new length is estimated to be approximately 60-ft, the same as the existing bridge. A new bridge would be built in the same location as the existing and the existing horizontal alignment is expected to be maintained, but a vertical grade raise may be needed if the single-span option is selected to accommodate a deeper girder section and still meet hydraulic requirements. Further investigation will be needed to determine any grade raise requirements for the different beam types and span lengths, with a focus on minimizing impacts off the bridge. Both steel and prestressed concrete girders are applicable for this site, with steel girders potentially being the preferred option due to their lesser depth and longer span capabilities compared to prestressed concrete girders. The deck and driving surface are expected to be concrete.
Structure as-builts, contract plans, inspection reports, structure ratings, NBIS reports, etc. available?	MDT Original Bridge Plans dated 07/17/1958 MDT Inspection Report dated 11/16/2020
Determine type and measure span length, bridge width, curb-to-curb width, etc.	Type: Timber # of Spans/Length: 3/19 feet Total Length: 57 feet Curb to Curb Width: 24 feet
Hydraulic conditions, including bridge opening (waterway) characteristics, visible scour, deposition of sediment, debris passage, or apparent instabilities around the structure.	The existing bridge crosses an irrigation canal and appears to provide an adequate bridge opening with no scour, deposition of sediment, or debris build up observed during the site visit or identified in the inspection reports. No apparent instabilities around the existing structure were observed. For a 50-year flood event, flow through the crossing is calculated to be 984 cubic feet per second (cfs), not including regulated flows.

S00297000+09001 (06606), S-297 (MP 0.9), Deadman's Basin Canal	
Description	**Comment**
Foundation conditions including shallow or deep, founding material (rock or soil) and groundwater conditions	The existing deep timber piling foundation shows signs of deterioration, specifically at the water or ground level. Standing water under the bridge was present during the site visit but the canal did not appear active at the time of the visit. From the bridge plans provided by MDT, actual pile depths were not reported but the minimum required pile depth on the plans is 10 feet.
Apparent structure condition.	The bridge has multiple structural deficiencies which are documented in recent MDT Bridge Inspection Reports. Though the bridge is not load restricted, repairs to critical elements are needed to maintain capacity and extend the service life.
Bridge railing, transitions, and existing utilities.	The bridge appears to have its original timber rail. A buried fiber optic line runs adjacent to the roadway to the east but is outside the existing R/W and is not expected to be impacted by this project.
Potential structure removal issues, ie. hazardous material (paint), access limitations, etc.?	No structure removal issues were identified during the site visit. Before removal, each bridge will be sampled to determine if asbestos is present on the structure. If present any materials containing asbestos will be removed and disposed of in a manner that meets current regulations.
Provide photos of all structures, any apparent deficiencies, and upstream and downstream stream channels.	See **Appendix B** for site photos.
Document typical roadway section and approach railing. When available, obtain roadway plan and profile sheets, mapping, and ROW limits	The asphalt roadway approaches are 26 feet wide with two lanes of travel and no shoulders. W-beam approach rail with timber posts is attached to the original timber bridge railing.
Document potential environmental issues and apparent ROW limits	No significant environmental issues were identified during the site visit and desktop evaluation. The ROW limits extend approximately 70 feet to the west and 70 feet to the east.
Posted speed	70 MPH
Discuss structure design criteria or special design criteria (exceptions to AASHTO LRFD Design Specifications) required by local/state/owner agencies. Include special loading conditions (i.e. snow loads, overload vehicles, etc.) and load rating requirements.	The bridge will be designed to AASHTO LFRD Bridge Design Specifications and MDT Bridge Design Standards with no exceptions expected. The new structure will be designed to meet Transporter-Erector (T-E) Route Standards for the Minuteman Missile Base Road System.
Note bridge superstructure and substructure types along the route	There is one other bridge to the north crossing Roberts Creek that was built in 1974. The superstructure consists of prestressed concrete beams and concrete deck while the superstructure consists of a deep driven pile foundation.

S00297000+09001 (06606), S-297 (MP 0.9), Deadman's Basin Canal	
Description	**Comment**
Note bridge rail types in the vicinity. Include owner agency preferences and crash test level requirements	The bridge to the north has MDT T-5 bridge railing which is a concrete curb with steel railing. New bridge railing recently constructed in this vicinity is MDT Type W830 Bridge Rail, which is a steel railing system on a concrete curb. Box Beam Approach Sections, Type 1 are attached to the bridge rail. This rail is preferred due its advantages for snow removal and reduction in drifting. This rail meets NCHRP 350 TL-4 crash testing standards.
Locate nearest ACI ready mix concrete plants, PCI girder fabrication plant, and AISC structural steel fabrication plants as applicable	ACI Ready Mix Concrete Plants: *United Materials - Great Falls, MT* *Knife River – Billings and Belgrade, MT* *Kenyon-Noble – Bozeman, MT* PCI Girder Fabrication Plant: *Forterra Building Products - Billings, MT* *Missoula Concrete Construction – Missoula, MT* AISC Structural Steel Fabrication Plant: *TrueNorth Steel - Billings, MT* *Allied Steel – Lewistown, MT* *RTI Fabrication – Plains, MT*
Describe work areas adjacent to proposed alignment. Determine available staging areas and potential erection locations	There appears to be adequate work areas adjacent to the site for staging areas and potential erection locations.
Describe site accessibility including local roadway geometry and local bridge weight limits as it affects member hauling limitations	No site accessibility concerns were identified during the site visit or desktop evaluation.
Discuss road/bridge closure and detour options, with consideration to temporary bridge if necessary. Investigate existing structure for construction staging feasibility	A detour adjacent to the existing roadway and bridge appears feasible, likely to the east. This would allow for traffic to be maintained though the construction site and avoid the need for a full closure of the roadway and the need to provide a bypass route around the site. Due to the low ADT as this site, there is potential that the detour could be reduced to a single lane with alternating traffic. A bridge structure detour may be needed if construction takes place while the canal is full, but if completed while the canal is dry a buried culvert detour likely could be used.
Consider feasibility of spill through vs. vertical abutment types for the structural layout	To improve hydraulic performance, spill through abutments are proposed for this site.
Locate possible locations for retaining walls and potential wall types	No potential retaining wall locations were identified at this site.
Consider possible foundation types and semi integral vs. integral abutment types	A deep foundation system utilizing reinforced concrete abutments supported on driven piles is anticipated. The final foundation solution will be based on recommendations by a professional geotechnical engineer. Both semi-integral and integral abutment types will be considered in design.

S00297000+09001 (06606), S-297 (MP 0.9), Deadman's Basin Canal	
Description	**Comment**
Address economical structure types to meet the serviceability requirements of the agency or route as they relate to type and volume of traffic	Both steel girder and prestressed concrete beam bridges are economical structure types used frequently in new bridge construction in Montana. Both will meet the needs of this crossing and serviceability requirements of MDT and this route.
Determine estimated construction season limits and multi-season impacts to project	The standard MDT construction season runs from mid-April to mid-November. It is expected this structure can be constructed within this time frame.
Determine aesthetic requirements and owner agency special requests	No aesthetic requirements or owner agency special requests have been identified at this point in project development and none are expected.
Determine maintenance concerns (i.e. chloride use on roads, painting vs. weathering steel, drift issues)	No maintenance concerns have been identified at this point in project development and none are expected. This structure type provides a long service life with low future maintenance costs.

Risks for this function	Comment
Potential Major Impacts to Cost or Schedule	None.
Constructability Concerns	None.

VI. TECHNOLOGY AND INNOVATION INITIATIVES

BRIDGES (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Geosynthetic Reinforced Soil – Integrated Bridge System (EDC-1/2)	Yes	This type of bridge system will be considered for use at the stock pass crossings since there is no hydraulic flow that could potentially undermine the abutments.
Prefabricated Bridge Elements and Systems (EDC-1/2)	Yes	Prefabricated bridge elements will be investigated for use for both the superstructure and substructure.
Slide-in Bridge Construction (EDC-2)	No	Slide-in-Bridge construction and associated costs is not practical for this project.
Composite bridge decking for moveable bridges (Highways for Life)	No	While composite bridge decking can provide benefit to existing weight restricted bridges, it is not a practical solution since there are no movable bridges as part of this project.
Fully precast bridge bents for use in seismic regions (Highways for Life)	No	This project is not in a high seismic region.

BRIDGES (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Full depth ultra-high performance concrete waffle bridge panels (Highways for Life)	Yes	Full depth UHPC waffle bridge panels are a potential solution as a bridge deck if a precast bridge option is chosen. UHPC for joints between precast superstructure members will also be considered.

CONSTRUCTION (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Three-Dimensional Modeling (EDC-2)	No	Due to the size and low complexity of the project, three-dimensional modeling is not warranted for this project.
Alternative Technical Concepts (EDC-2)	No	Due to the low complexity and method of project delivery, alternative technical concepts are not applicable to this project.
Construction Manager/General Contractor (EDC-1/2)	No	The CM/GC delivery method is not applicable for this project due to the low complexity and well-defined means of construction for the project.
Design Build (EDC-1/2)	No	A design-build delivery method is not the optimum method of project delivery due to the size and low complexity of the project.

PAVEMENT (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Aggregate Image Measurement System 2 (Highways for Life)	No	Due to the small scale and intended use of the pavement on this project, aggregate image measurement is not justifiable.
Asphalt Binder Cracking Device (Highways for Life)	No	The use of an asphalt binder cracking device is not justified due to the small extent of paving on the project.
Intelligent Asphalt Compaction Analyzer (Highways for Life)	No	Due to the small scale and intended use of the pavement, an intelligent asphalt compaction analyzer is not justifiable.
Intelligent Compaction and Construction (EDC-2)	No	Intelligent compaction is not justified for the small scale of this project.
Precast Concrete Pavement Systems (Highways for Life)	No	Due to the small scale of the project a precast concrete pavement system is not applicable to this project.
Warm Mix Asphalt (EDC-1)	No	It is not justifiable to require plant and mix design modifications for the relatively small amount of pavement required on this project.

PLANNING / ENVIRONMENT (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Expanding the Use of Programmatic Agreements (EDC-1)	No	Environmental conditions on the project likely won't allow the use of PAs
Implementing Quality Environmental Documentation (EDC-2)	Yes	The NEPA documents and supporting reports can utilize the recommendations.
Programmatic Agreements (EDC-2)	No	Environmental conditions on the project likely won't allow the use of PAs

SAFETY (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
All Weather Pavement Marking System (Highways for Life)	No	All weather pavement marking is not justified due to the minimal amount of pavement markings that will be required.
Automated Pavement Marker (Highways for Life)	No	An automated pavement marker is not warranted for this project considering the small amount of pavement markings needed.
High Friction Surfaces (EDC-2)	No	High friction surfaces are not justified as the project occurs in an area with minimal crashes reported in the area in the last five years.
Intersection and Interchange Geometrics (EDC-2)	No	Intersection and interchange geometrics are not applicable to this project.
Road Safety Audits (FHWA Safety)	No	The partner agencies have reported that the accident rate is very low.
Safety Edge (EDC-1)	Yes	Safety edge will be evaluated in the design phase for use on this project.

SAFETY PRODUCT PERFORMANCE EVALUATIONS (http://www.fhwa.dot.gov/accelerating/innovation.cfm)		
Description	**Response**	**Comment**
Sequential Dynamic Curve Warning System (Highways for Life)	No	A sequential dynamic curve warning system is not justifiable for this project.

VII. APPENDIX A – UTILITY INFORMATION

UTILITY CONTACT INFORMATION				
Bridge/Stock Pass	**Company**	**Address**	**Contact**	**Phone Number**
E Fork Big Spring Creek	Mid-Rivers Telephone Cooperative	904 C Ave/PO Box 280 Circle, MT 59215	Larry Phillips	(406) 535-7501
Hauck Coulee, E Fork Big Spring Creek	Fergus Electric Cooperative	84423 US HWY 87, Lewistown, MT 59457	Melanie Foran	(406) 538-3465
E Fork Big Spring Creek	NorthWestern Energy - Gas Transmission	11 E. Park St., Butte, MT 59701	Joe Carmody	(406) 422-3276
Coffee Creek, Wolf Creek, Hauck Coulee, Deadman's Basin Canal	Triangle Communications	P.O. Box 1140, Havre, MT 59501	Scott Leeds Bruce Kudrna	(406) 394-2786 (406) 394-2751
Stock Pass #1-3, E Fork Big Spring Creek	Lumen/CenturyLink	Attn: Relocations Department 1025 Eldorado Boulevard, Broomfield, CO 80021	Brent Bushnell	(406) 441-7649
Deadman's Basin Canal	Deadman's Basin Water Users Association	125 Autumn Road, Roundup, MT 59072	Leon Hammond	(406) 323-3407

VIII. APPENDIX B – SITE PHOTOS

COFFEE CREEK BRIDGE, P00081006+05001 (06207)

A2

DRY WOLF CREEK BRIDGE, P00081019+09951 (06209)

STOCKPASS #1, P00081030+06301 (06212)

STOCKPASS #2, P00081034+09001 (06216)

STOCKPASS #3, P00081036+06001 (06219)

HAUCK COULEE BRIDGE, S00400005+08001 (06754)

EAST FORK BIG SPRING CREEK BRIDGE, S00238010+06001 (06436)

DEADMAN'S BASIN CANAL BRIDGE, S00297000+09001 (06606)

B2

IX. APPENDIX C – COST ESTIMATES

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
Scoping Level Cost Estimate Summary

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	MT-81 (MP 6.5) Coffee Creek	$266,000.00	1.0	LPSM	$266,000
	MT-81 (MP 19.9) Dry Wolf Creek	$880,900.00	1.0	LPSM	$880,900
	MT-81 (MP 30.6) Stock Pass	$155,500.00	1.0	LPSM	$155,500
	MT-81 (MP 34.9) Stock Pass	$155,500.00	1.0	LPSM	$155,500
	MT-81 (MP 36.6) Stock Pass	$155,500.00	1.0	LPSM	$155,500
	S-400 (MP 5.8) Hauck Coulee	$169,000.00	1.0	LPSM	$169,000
	S-238 (MP 10.6) E FK Big Spring Creek	$724,500.00	1.0	LPSM	$724,500
	S-297 (MP 0.9) Deadman's Basin Canal	$694,500.00	1.0	LPSM	$694,500
				Subtotal 1 =	$3,201,400
	Temporary Traffic Control		5%		$160,000
	Erosion Control		1%		$34,000
	Schedule		0.5%		$16,000
	Contractor QC/QA		5%		$160,000
	Sampling & Testing		5%		$160,000
	Survey		5%		$160,000
	Contingency		20%		$640,000
				Subtotal 2 =	$4,531,400
	Mobilization		12%		$546,000
				Subtotal 3 =	$5,077,400
				Total Estimated Construction Cost =	**$5,100,000**
				Preliminary Engineering =	**$1,350,000**
	Estimated Right of Way	$ -	0	ACRES	**$0**
				Total Estimated Preliminary Engineering Costs	**$1,350,000**
				Construction Engineering =	**$700,000**
				Construction Modification Contingency =	**$550,000**
				Total Estimated Cost, 2022 =	**$7,700,000**
				Total Estimated Cost, 2023 =	**$7,950,000**
				Total Estimated Cost, 2024 =	**$8,200,000**
				Total Estimated Cost, 2025 =	**$8,450,000**
				Total Estimated Cost, 2026 =	**$8,750,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
MT-81 (MP 6.5) Coffee Creek Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Bridge	$30,000.00	1.0	LPSM	$30,000
	Buried Culvert Detour	$54,000.00	1.0	LPSM	$54,000
	New 15' x 10' RCB	$2,800.00	65.0	LNFT	$182,000
				Subtotal 1 =	$266,000
	Temporary Traffic Control		5%		$13,000
	Erosion Control		1%		$3,000
	Schedule		0.5%		$1,000
	Contractor QC/QA		5%		$13,000
	Sampling & Testing		5%		$13,000
	Survey		5%		$13,000
	Contingency		20%		$53,000
				Subtotal 2 =	$375,000
	Mobilization		12%		$45,000
				Subtotal 3 =	$420,000
		Total Estimated Construction Cost =			**$420,000**
		Preliminary Engineering (15%) =			**$63,000**
	Estimated Right of Way	$ -	0	ACRES	**$0**
		Total Estimated Preliminary Engineering Costs			**$63,000**
		Construction Engineering (10%) =			**$42,000**
		Construction Modification Contingency (10%) =			**$42,000**
		Total Estimated Cost, 2022 =			**$567,000**
		Total Estimated Cost, 2023 =			**$590,000**
		Total Estimated Cost, 2024 =			**$610,000**
		Total Estimated Cost, 2025 =			**$630,000**
		Total Estimated Cost, 2026 =			**$650,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
MT-81 (MP 19.9) Dry Wolf Creek Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Bridge	$40,000.00	1.0	LPSM	$40,000
	Buried Culvert Detour	$54,000.00	1.0	LPSM	$54,000
	New 75' x 35.3' Bridge ($250 sqft)	$661,875.00	1.0	LPSM	$661,900
	Approach Roadway and Guardrail Work	$125,000.00	1.0	LPSM	$125,000
				Subtotal 1 =	$880,900
	Temporary Traffic Control		5%		$44,000
	Erosion Control		1%		$9,000
	Schedule		0.5%		$4,000
	Contractor QC/QA		5%		$44,000
	Sampling & Testing		5%		$44,000
	Survey		5%		$44,000
	Contingency		20%		$176,000
				Subtotal 2 =	$1,245,900
	Mobilization		12%		$150,000
				Subtotal 3 =	$1,395,900
				Total Estimated Construction Cost =	**$1,400,000**
				Preliminary Engineering (30%) =	**$420,000**
	Estimated Right of Way	$ -	0	ACRES	**$0**
				Total Estimated Preliminary Engineering Costs	**$420,000**
				Construction Engineering (15%) =	**$210,000**
				Construction Modification Contingency (10%) =	**$140,000**
				Total Estimated Cost, 2022 =	**$2,170,000**
				Total Estimated Cost, 2023 =	**$2,240,000**
				Total Estimated Cost, 2024 =	**$2,310,000**
				Total Estimated Cost, 2025 =	**$2,380,000**
				Total Estimated Cost, 2026 =	**$2,460,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
MT-81 (MP 30.6, 34.9, 36.6) Stock Pass Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Stock Pass	$15,000.00	1.0	LPSM	$15,000
	Buried Culvert Detour	$30,000.00	1.0	LPSM	$30,000
	New 8' x 6' RCB	$1,700.00	65.0	LNFT	$110,500
				Subtotal 1 =	$155,500
	Temporary Traffic Control		5%		$8,000
	Erosion Control		1%		$2,000
	Schedule		0.5%		$1,000
	Contractor QC/QA		5%		$8,000
	Sampling & Testing		5%		$8,000
	Survey		5%		$8,000
	Contingency		20%		$31,000
				Subtotal 2 =	$221,500
	Mobilization		12%		$27,000
				Subtotal 3 =	$248,500
				Total Estimated Construction Cost =	**$250,000**
				Preliminary Engineering (15%) =	**$37,500**
	Estimated Right of Way	$ -	0	ACRES	**$0**
				Total Estimated Preliminary Engineering Costs	**$37,500**
				Construction Engineering (10%) =	**$25,000**
				Construction Modification Contingency (10%) =	**$25,000**
				Total Estimated Cost, 2022 =	**$337,500**
				Total Estimated Cost, 2023 =	**$350,000**
				Total Estimated Cost, 2024 =	**$370,000**
				Total Estimated Cost, 2025 =	**$390,000**
				Total Estimated Cost, 2026 =	**$410,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
S-400 (MP 5.8) Hauck Coulee Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Bridge	$30,000.00	1.0	LPSM	$30,000
	Buried Culvert Detour	$54,000.00	1.0	LPSM	$54,000
	New 8' x 7' RCB	$1,700.00	50.0	LNFT	$85,000
				Subtotal 1 =	$169,000
	Temporary Traffic Control		5%		$8,000
	Erosion Control		1%		$2,000
	Schedule		0.5%		$1,000
	Contractor QC/QA		5%		$8,000
	Sampling & Testing		5%		$8,000
	Survey		5%		$8,000
	Contingency		20%		$34,000
				Subtotal 2 =	$238,000
	Mobilization		12%		$29,000
				Subtotal 3 =	$267,000
				Total Estimated Construction Cost =	**$270,000**
				Preliminary Engineering (15%) =	**$40,500**
	Estimated Right of Way	$ -	0	ACRES	**$0**
				Total Estimated Preliminary Engineering Costs	**$40,500**
				Construction Engineering (10%) =	**$27,000**
				Construction Modification Contingency (10%) =	**$27,000**
				Total Estimated Cost, 2022 =	**$364,500**
				Total Estimated Cost, 2023 =	**$380,000**
				Total Estimated Cost, 2024 =	**$400,000**
				Total Estimated Cost, 2025 =	**$420,000**
				Total Estimated Cost, 2026 =	**$440,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
S-238 (MP 10.6) E FK Big Spring Creek Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Bridge	$30,000.00	1.0	LPSM	$30,000
	Bridge Detour	$100,000.00	1.0	LPSM	$100,000
	New 60' x 31.3' Bridge ($250 sqft)	$469,500.00	1.0	LPSM	$469,500
	Approach Roadway and Guardrail Work	$125,000.00	1.0	LPSM	$125,000
				Subtotal 1 =	$724,500
	Temporary Traffic Control		5%		$36,000
	Erosion Control		1%		$7,000
	Schedule		0.5%		$4,000
	Contractor QC/QA		5%		$36,000
	Sampling & Testing		5%		$36,000
	Survey		5%		$36,000
	Contingency		20%		$145,000
				Subtotal 2 =	$1,024,500
	Mobilization		12%		$123,000
				Subtotal 3 =	$1,147,500
				Total Estimated Construction Cost =	**$1,150,000**
				Preliminary Engineering (30%) =	**$345,000**
	Estimated Right of Way	$ -	0	ACRES	**$0**
				Total Estimated Preliminary Engineering Costs	**$345,000**
				Construction Engineering (15%) =	**$172,500**
				Construction Modification Contingency (10%) =	**$115,000**
				Total Estimated Cost, 2022 =	**$1,782,500**
				Total Estimated Cost, 2023 =	**$1,840,000**
				Total Estimated Cost, 2024 =	**$1,900,000**
				Total Estimated Cost, 2025 =	**$1,960,000**
				Total Estimated Cost, 2026 =	**$2,020,000**

MT DAR MALM 2021(2), Malmstrom AFB Timber Bridges
S-297 (MP 0.9) Deadman's Basin Canal Scoping Level Cost Estimate

Item No.	Item	Unit Price	Quantity	Unit	Total Cost
	Removal of Bridge	$40,000.00	1.0	LPSM	$40,000
	Buried Culvert Detour	$60,000.00	1.0	LPSM	$60,000
	New 60' x 31.3' Bridge ($250 sqft)	$469,500.00	1.0	LPSM	$469,500
	Approach Roadway and Guardrail Work	$125,000.00	1.0	LPSM	$125,000
				Subtotal 1 =	$694,500
	Temporary Traffic Control		5%		$35,000
	Erosion Control		1%		$7,000
	Schedule		0.5%		$3,000
	Contractor QC/QA		5%		$35,000
	Sampling & Testing		5%		$35,000
	Survey		5%		$35,000
	Contingency		20%		$139,000
				Subtotal 2 =	$983,500
	Mobilization		12%		$118,000
				Subtotal 3 =	$1,101,500
		Total Estimated Construction Cost =			**$1,110,000**
		Preliminary Engineering (30%) =			**$333,000**
	Estimated Right of Way	$ -	0	ACRES	**$0**
		Total Estimated Preliminary Engineering Costs			**$333,000**
		Construction Engineering (15%) =			**$166,500**
		Construction Modification Contingency (10%) =			**$111,000**
		Total Estimated Cost, 2022 =			**$1,720,500**
		Total Estimated Cost, 2023 =			**$1,780,000**
		Total Estimated Cost, 2024 =			**$1,840,000**
		Total Estimated Cost, 2025 =			**$1,900,000**
		Total Estimated Cost, 2026 =			**$1,960,000**