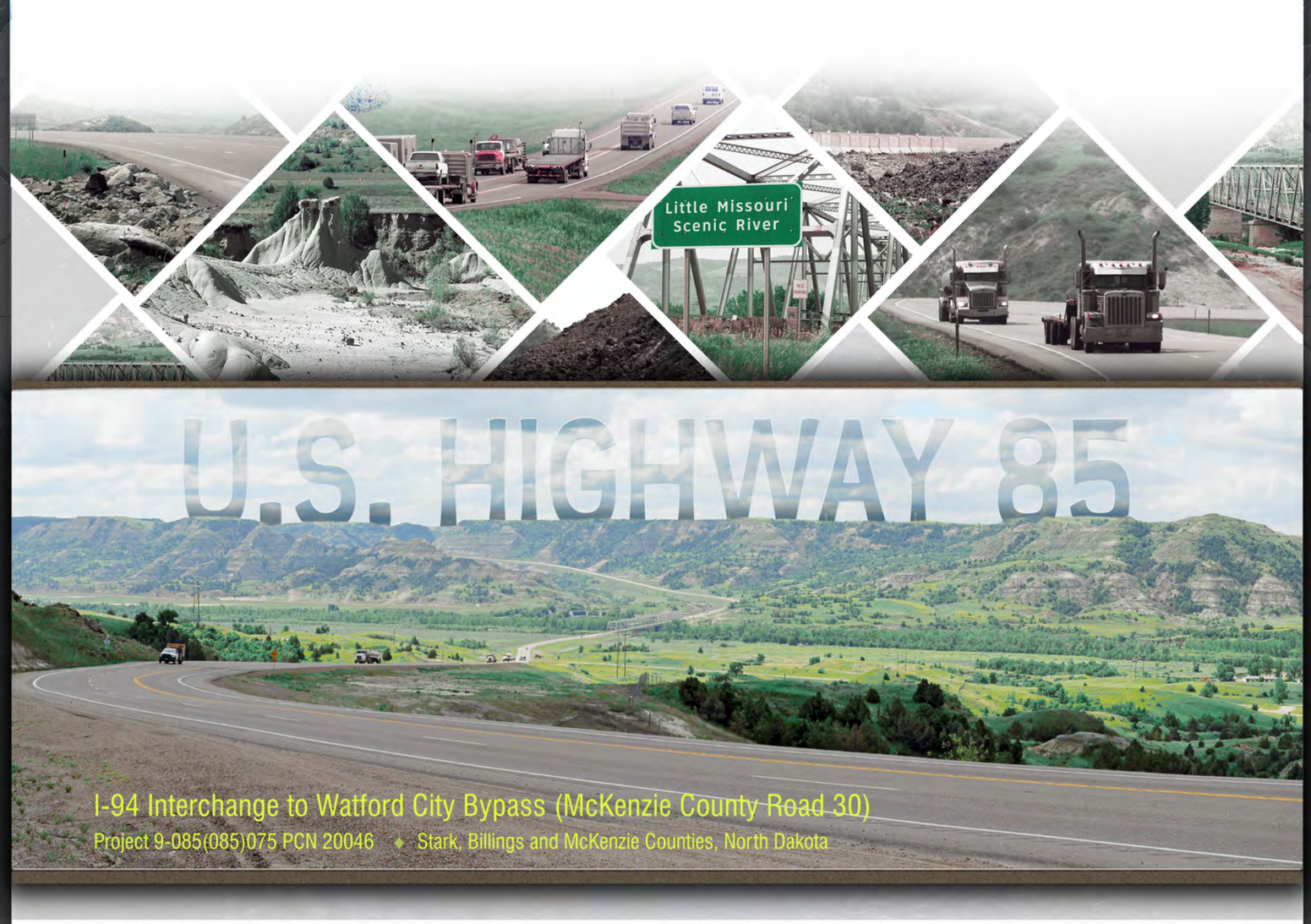

I-94 Interchange to Watford City Bypass (McKenzie County Road 30)

Project 9-085(085)075 PCN 20046 ♦ Stark, Billings and McKenzie Counties, North Dakota

U.S. Department of Transportation
Federal Highway Administration

NDDOT
North Dakota Department of Transportation

KLJ

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Final Environmental Impact Statement & Record of Decision

This Record of Decision (ROD) documents the Federal Highway Administration's (FHWA) decision on the Environmental Impact Statement (EIS) and Nationwide Section 4(f) Programmatic Evaluation for the US Highway 85 Project. The FHWA has prepared a single document that consists of the Final EIS and ROD pursuant to Public Law 112-141, 126 Stat. 405, Section 1319(b); the FHWA has determined that statutory considerations do not preclude issuance of a combined document pursuant to Section 1319. Because the Final EIS and ROD are combined, the ROD refers to the Final EIS for details. Readers are referred to the full EIS for a complete description of pertinent subjects.

The full Final EIS and ROD can be found at the North Dakota Department of Transportation central office and online at: https://www.dot.nd.gov/projects/williston/US85I94/. For additional information, please contact:

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STATUTE OF LIMITATIONS

The FHWA may publish a notice in the *Federal Register*, pursuant to 23 United States Code § 139(1), once the ROD is approved. If such notice is published, a claim arising under federal law seeking judicial review of a permit, license, or approval issued by a federal agency for a highway or public transportation capital project shall be barred unless it is filed within 150 days after publication of a notice in the *Federal Register* announcing that the permit, license, or approval is final pursuant to the law under which judicial review is allowed. If no notice is published, then the periods of time that otherwise are provided by the federal laws governing such claims will apply.

Record of Decision Contents

Documents Appended by Reference*

» Crash Prediction Evaluation Report (2018)

* For more information or to obtain a copy of a document appended by reference, please contact:

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What is the Record of Decision?

The purpose of this Record of Decision (ROD) is to document the Federal Highway Administration's (FHWA) decision on the US Highway 85 Project (project). This ROD has been prepared in accordance with the *National Environmental Policy Act* (NEPA), as amended, FHWA NEPA implementing regulations in 23 Code of Federal Regulations (CFR) 771, Council on Environmental Quality (CEQ) regulations in 40 CFR 1500-1508, and Section 4(f) of the *Department of Transportation Act*.

The project encompasses approximately 62 miles of roadway in western North Dakota. The project begins at the Interstate 94 (I-94) interchange and extends north to the Watford City Bypass (McKenzie County Road 30). The goal of the project is to essentially maintain and follow the existing US Highway 85 alignment, utilizing the existing infrastructure to minimize potential impacts on environmental, socioeconomic, and human-made resources, to the maximum extent practicable. The proposed action is to expand this segment of US Highway 85 to a four-lane highway with flexible design options to avoid or minimize impacts and rehabilitate or replace the historic Long X Bridge over the Little Missouri River. As described in **Section 1.3** of the Final EIS, the purpose of the project is to address the current and future needs of the project corridor pertaining to:

- Social Demands and Economic Development
- System Linkage/Connectivity
- Safety
- Capacity/Traffic Volumes
- Transportation Demand/Roadway Classification
- Slope Instability or Landslides
- Ecological Connectivity

The project is being led by the FHWA in cooperation with the North Dakota Department of Transportation (NDDOT). The FHWA and NDDOT are joint lead agencies and are the primary entities responsible for compliance with NEPA. The project is part of a larger overall effort by the NDDOT and FHWA to expand US Highway 85 to four lanes between I-94 and US Highway 2. The project also has three cooperating agencies and numerous participating agencies.

A Draft Environmental Impact Statement (EIS) was developed for the project that describes the project's purpose and need, environmental setting of the project corridor, alternatives and options carried forward for detailed analysis, alternatives and options eliminated from further detailed analysis, and construction methods and phasing. The Draft EIS also identifies the Preferred Alternative; discloses potential impacts on, and environmental commitments and permits required for, environmental, cultural, socioeconomic, and human-made resources; and summarizes the Section 4(f) evaluation and agency and public involvement completed for the project.

- On May 1, 2018, the Draft EIS was approved and signed by the FHWA and NDDOT.
- On May 8, 2018, the Draft EIS was distributed to the cooperating and participating agencies.
- On May 9, 2018, a lead and cooperating agencies meeting was held.
- On May 11, 2018, a Notice of Availability was published in the *Federal Register* (Volume 83, Number 92) announcing the availability of the Draft EIS for public review and comment.
- From May 11 to June 25, 2018, a 45-day comment period was provided to agencies and the public, whereby agencies and members of the public could submit comments on the Draft EIS.
- On May 21, 2018, a lead, cooperating, and participating agencies meeting was held, and between May 29 and 31, 2018, three public hearings were held to discuss the Draft EIS.

Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law on July 6, 2012, with an effective date of October 1, 2012. MAP-21 includes several provisions designed to accelerate decision-making into project delivery, such as encouraging concurrent issuance of a Final EIS and ROD. Under this provision, the typical 30-day review period between the Notice of Availability for the Final EIS and the issuance of the ROD is not applicable.

Cooperating Agencies:

- National Park Service
- US Forest Service
- US Army Corps of Engineers

Participating Agencies:

- Bureau of Indian Affairs
- Bureau of Land Management
- US Environmental Protection Agency
- US Fish and Wildlife Service
- Western Area Power Administration
- North Dakota Department of Health
- North Dakota Department of Mineral Resources
- North Dakota Game and Fish Department
- North Dakota Highway Patrol
- North Dakota State Water Commission
- State Historic Preservation Office
- Tribal Consultation Committee
- City of Belfield
- City of Watford City
- Billings County
- McKenzie County
- Stark County

In coordination with the NDDOT, the FHWA has determined that a combined Final EIS and ROD was appropriate for this project. With this ROD, the NDDOT and FHWA are selecting Alternative B with Options FF-1, INT-2, and LX-3 for implementation. The Selected Alternative has also incorporated numerous flexible design options to avoid and minimize impacts. These flexible design options include the following: flush, center median through the Badlands and south of Watford City; modified ditch sections and backslopes in select locations; shifted alignments in select locations; curb and gutter through Fairfield; reduced speed limit through the Badlands; and use of retaining walls within the Badlands.

What alternatives and options were considered?

All of the alternatives and options for the project were developed and evaluated through a three-phase, multiple-step screening process, as described in **Section 3.6.1** of the Final EIS. Potential alternatives and options were evaluated in each step, and those that were not carried forward to the next step, were eliminated from further screening, consideration, and detailed analysis.

- Phase I: Develop Full Range of Reasonable Alternatives
  - » Step 1: Define Range of Reasonable Alternatives
  - » Step 2: Evaluate Against Previous Reports and Studies
  - » Step 3: Evaluate Against Project Purpose and Need/Project Goals
  - » Step 4: Summarize Findings and Conduct Phase II
- Phase II: Desktop Review of Reasonable Alternatives
  - » Step 1: Evaluate Against Project Constraints and Design Criteria and Standards
  - » Step 2: Agency Involvement and Public Alternatives Workshops
  - » Step 3: Summarize Findings and Conduct Phase III
- Phase III: Engineering and Environmental Impact Analysis of Reasonable Alternatives
  - » Step 1: Engineering Analysis
  - » Step 2: Environmental Impact Analysis
  - » Step 3: Recommend Preferred Alternative

Recommendations for additional alternatives and options were evaluated during the Value Engineering Study, as described in **Section 3.6.3** of the Final EIS. The Value Engineering Study was completed to provide recommendations for (1) validating current alternatives already developed; (2) providing additional alternatives to consider; and (3) enhancing the current alternatives. The recommendations were reviewed, categorized, and screened to determine which recommendations should be incorporated into the planning and preliminary design of the project.

Value Engineering is defined as a systematic process of review and analysis of a project, during the concept and design phases, by a multidiscipline team of individuals that are not involved in the project.

During the three-phase, multiple-step screening process and Value Engineering Study, numerous alternatives and options were considered and evaluated. The following paragraphs provide brief summaries of the alternatives and options that were carried forward for detailed analysis in the EIS; the principal features of these alternatives and options are detailed in **Chapter 3** of the Final EIS.

No Action Alternative

CEQ regulations require consideration of the No Action Alternative (no-build). Therefore, the No Action Alternative (Alternative A) was carried forward for detailed analysis in the EIS.

The No Action Alternative serves as a baseline against which the impacts of potential build alternatives can be evaluated.

Under Alternative A, the existing infrastructure would remain as it is today; approximately 62 miles of US Highway 85, from the I-94 interchange to the Watford City Bypass (McKenzie County Road 30) would not be expanded; and the existing Long X Bridge would not be rehabilitated or replaced.

Alternative A would not provide the system linkage and connectivity of a continuous four-lane roadway from I-94 to the junction of US Highway 2. Additionally, Alternative A would not meet the purpose of, and need for, the project, as it fails to address social demands, safety, capacity, transportation demand, slope instability, and ecological connectivity.

Build Alternatives

Two primary build alternatives were carried forward for analysis in the EIS: Alternatives B and C. These two build alternatives represent what would be the typical section for the majority of the 62-mile-long project corridor.

Alternatives B and C would begin at the northern end of the I-94 interchange. Restriping would occur at the interchange, a free-flowing right-hand turn lane would be added to the I-94 westbound ramp, and the right-hand southbound lane of US Highway 85 would become a designated right-hand turn lane onto the I-94 westbound on-ramp.

Alternative B: Divided, Four-lane Highway with a Depressed, Center Median. Alternative B would expand the majority of the 62-mile-long project corridor to a divided, four-lane section with a depressed, center median. The existing highway would be utilized to the extent practicable to carry two lanes of one-way directional traffic and a new two-lane highway would be constructed adjacent. The existing roadway would require widening of the outside shoulder to achieve the proposed 8-foot-wide shoulder. The slope across the roadway (i.e., superelevation) on most of the existing horizontal curves would need to be corrected with an asphalt overlay, and one existing crest vertical curve (i.e., hilltop at reference point [RP] RP 88.5) would need to be reconstructed to meet the proposed design speed of 70 miles per hour (mph).

Alternative C: Divided, Four-lane Highway with a Flush, Center Median. Alternative C would expand the majority of the 62-mile-long project corridor to a divided, four-lane section with a flush, paved center median. Expansion would occur equally to both sides of the existing roadway. Superelevation rates on some of the existing horizontal curves would need to be corrected with an asphalt overlay to meet the proposed design speed of 65 mph. As an additional safety measure, rumble strips would be installed within non-turning lane segments of the flush, center median to discourage drivers from using the center median as a passing lane.

Alternatives B and C. Alternatives B and C would expand the existing roadway as described above, except Fairfield, the Badlands, and Watford City (as described in **Section 3.3** of the Final EIS). These deviations and other features common to the alternatives are as follows:

- The existing roadway through the Badlands and near Watford City would be expanded to a divided, four-lane section with a flush, paved center median with reduced speeds.
- Pedestrian facilities (i.e., a trail) would be constructed on the east side of US Highway 85 from the northern project terminus to McKenzie County Road 34.
- At Horseshoe Bend, an active landslide area north of the Theodore Roosevelt National Park (TRNP)—North Unit entrance near RP 128, an anchored, drilled shaft structure would be installed to improve stability of the landslide.
- Three wildlife crossings would be constructed at RPs 122.5, 126.1, and 126.6, and wildlife fencing would be installed from RP 120.9 to 128.9.
- The South Branch of the Green River and Spring Creek bridges would be replaced with box culverts, and the existing reinforced concrete box culverts and structural plate pipe culverts would be extended.
- Some of the centerline culverts could require bends or manholes, and culverts that did not meet the minimum hydraulic requirements would either be replaced or a new pipe would be installed adjacent to the existing culvert.
- The four existing, in-use cattle passes would be extended, and the one cattle pass that is not in use would be evaluated for removal. If additional cattle passes are warranted, they would be added during right-of-way (ROW) negotiations.
- Intelligent Transportation System devices would be reset, reinstalled, or added; intersection illumination lighting would be expanded; and destination lighting would be installed.

Options

In addition to Alternatives B and C, options have been developed at key locations along the project corridor where additional design considerations are needed. These locations include Fairfield, North Dakota Highway 200 (ND-200)/US Highway 85 intersection, and the Long X Bridge. The options for these locations are summarized in the following paragraphs.

Fairfield Options

Option FF-1: Existing Alignment—Urban. Option FF-1 would include constructing an urbanized, four-lane section with a design and posted speed limit of 45 mph through Fairfield.

The typical section of the following three bypass options would match the typical section of the selected roadway alternative (i.e., Alternative B or Alternative C). The design speed of all three bypass options would match the design speed of the selected roadway alternative.

Option FF-2: West Bypass. Option FF-2 would include constructing a bypass around the community of Fairfield, approximately 0.4 miles west of the existing alignment.

Option FF-3: East Bypass 1. Option FF-3 would include constructing a bypass around the community of Fairfield, approximately 0.3 miles east of the existing alignment.

Option FF-4: East Bypass 2. Option FF-4 would include constructing a bypass around the community of Fairfield, approximately 0.5 miles east of the existing alignment.

ND-200/US Highway 85 Options

Option INT-1: Standard Intersection. Option INT-1 would consist of a standard intersection layout, typical of a four-lane highway. The intersection would function as it does currently with a stop sign along ND-200 (east leg) and along the gravel roadway on the western side of the intersection (west leg).

Option INT-2: Multi-lane Roundabout. Option INT-2 would consist of reconstructing the ND-200/US Highway 85 intersection to a multi-lane roundabout configuration at a 25-mile-per-hour design speed.

Long X Bridge Options

The existing Long X Bridge is a cantilevered, sub-divided, Warren through truss with three spans. It is one of four remaining examples of a Warren through truss in the state of North Dakota. The Long X Bridge is *Eligible* for listing on the National Register of Historic Places (NRHP) under Criterion C for its unique design.

Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge. Option LX-1 would include rehabilitating the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches. This vertical clearance would accommodate 99.9 percent of the permitted over-height loads. The bridge would also be strengthened to carry a new permitted legal load of 129,000 pounds. Other rehabilitation actions would include: replacing the existing deck, traffic barrier, and deck expansion joints; installing shear studs on the stringers; removing and reinstalling the original steel railing during deck replacement; repairing substructure concrete cracks and spalls; and sandblasting and repainting the bridge the same or similar color. As part of Option LX-1, a new two-lane bridge would be constructed approximately 25 feet east of the existing bridge.

Based on coordination with the North Dakota State Historic Preservation Office (SHPO), the scope of the Long X Bridge rehabilitation, as defined, would have a *No Adverse Effect* determination. The SHPO has also concurred that the proximity of a new two-lane bridge would have a *No Adverse Effect* determination.

Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use. Option LX-2 would include retaining the existing Long X Bridge for an alternate use and constructing a new four-lane bridge approximately 25 feet to the east. The existing Long X Bridge could remain in-place and serve as an example of a Warren through truss bridge as an alternate use. The existing bridge would need to be fenced/blocked at the ends to prevent all access onto the bridge. The bridge would also be sandblasted and repainted the same or similar color. The NDDOT would continue to be responsible for maintenance of the bridge.

Option LX-2 would retain the Long X Bridge's original location, historic integrity, and value. The SHPO has also concurred that the proximity of a new four-lane bridge would have a *No Adverse Effect* determination.

Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge. Option LX-3 would include removal (i.e., adoption and/or demolition) of the existing Long X Bridge and construction of a new four-lane bridge approximately 25 feet to the east. The bridge would be made available for adoption under the Bridge Adoption Program in coordination with the FHWA, NDDOT, and SHPO. Due to the size of the structure, only one segment of the bridge would need to be adopted. In order to entice potential adoptees, the NDDOT would fund the disassembly, loading, and transport of one of the segments of the bridge within a 100-mile radius of its current location over the Little Missouri River. If a successful adoption occurs, the method of removal would be detailed in the final design plans in order to preserve the historic integrity of the adopted section. Any portion of the bridge that is not adopted would be demolished. The exact method of demolition would be determined by the contractor. Prior to commencement of bridge removal activities, a demolition plan would be submitted by the contractor to the NDDOT for review and approval.

Removal of the Long X Bridge would be considered an *Adverse Effect* by the SHPO.

What is the Environmentally Preferable Alternative?

CEQ regulations require identification of the Environmentally Preferable Alternative in the spirit of the environmental policy set forth by NEPA. In their *Forty Most Asked Questions Concerning CEQ's NEPA Regulations* guidance, the CEQ clarifies the definition of the Environmentally Preferable Alternative as, "The alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances

historic, cultural, and natural resources." Note that the lead agencies are not required to choose the Environmentally Preferable Alternative as the Selected Alternative.

The NDDOT and FHWA determined the Environmentally Preferable Alternative by comparing potential impacts on the biological and physical environment, and cultural resources from the alternatives and options considered in the Final EIS. Based on the analysis of impacts, with this ROD, the NDDOT and FHWA are identifying Alternative C with Options FF-1, INT-1, and LX-1 as the Environmentally Preferable Alternative. The following paragraphs provide brief summaries of the rationale for the Environmentally Preferable Alternative. The environmental consequences for each of the alternatives and options are detailed in **Chapter 5** of the Final EIS.

Alternative C: Divided Flush

Alternative C has been identified as the Environmentally Preferable Alternative because the construction footprint would be smaller than Alternative B. This would result in fewer impacts on the biological and physical environment, such as land use, farmland, public lands (i.e., Little Missouri National Grasslands [LMNG]), water resources, wildlife, visual resources, and vegetation.

Option FF-1: Existing Alignment—Urban

Option FF-1 has been identified as part of the Environmentally Preferable Option because the construction footprint would be smaller than Options FF-2, FF-3, and FF-4. This would result in fewer impacts on the biological and physical environment, such as land use, farmland, geological resources, wildlife, and vegetation.

Option INT-1: Standard Intersection

Option INT-1 has been identified as part of the Environmentally Preferable Alternative because the construction footprint would be slightly smaller than Option INT-2. This would result in fewer impacts on the biological and physical environment, such as land use and farmland. However, the differences between Options INT-1 and INT-2 are minor, whereby impacts on the biological and physical environment are comparable in many regards, including land use, farmland, geology, water resources, wildlife, visual resources, and vegetation.

Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge

Option LX-1 has been identified as part of the Environmentally Preferable Alternative because the construction footprint would be slightly smaller than Options LX-2 and LX-3. This would result in fewer impacts on the biological and physical environment, such as land use, public lands, water resources, wildlife, and vegetation. In addition, the historic Long X Bridge would remain part of the transportation system and would have a *No Adverse Effect* determination. However, apart from LX-3 having an *Adverse Effect* determination, the differences between Options LX-1, LX-2, and LX-3 are minor, whereby the impacts on the biological and physical environment are comparable in many regards, including land use, public lands, water resources, wildlife, and vegetation.

What is the Selected Alternative?

The NDDOT and FHWA have identified Alternative B with Options FF-1, INT-2, and LX-3 as the Selected Alternative. The Selected Alternative was chosen based on the alternative the NDDOT and FHWA believe would fulfill their statutory mission and responsibilities, giving consideration to social, economic, environmental, technical, and other factors. The Selected Alternative was identified after considering the goals and objectives identified in the project's purpose and need, all of the potential alternatives and options, engineering and environmental studies conducted for the project, and all of the public and agency comments received throughout the EIS process. With this ROD, the NDDOT and FHWA are identifying the Preferred Alternative that was disclosed in the Draft EIS as the Selected Alternative. The following paragraphs provide brief summaries of the rationale for the Selected Alternative.

Alternative B: Divided Depressed

Alternative B has been identified as the Selected Alternative over the Environmentally Preferable Alternative (i.e., Alternative C), because of the additional safety benefits associated with a depressed median and wider overall median width. While Alternatives B and C both meet the purpose of, and need for, the project, more weight was given to social demands and improving safety along the project corridor in identifying the Selected Alternative. The principal advantage of a depressed median and wider overall median width under Alternative B is the ability to provide additional separation, and therefore, greater protection from head on crashes compared to Alternative C.

The FHWA conducted a Highway Safety Manual (HSM) analysis of Alternatives B and C utilizing the Interactive Highway Safety Design Model (IHSDM). The analysis of Alternatives B and C is documented in the Crash Prediction Evaluation Report (**appended by reference**). Results indicate that Alternative C[1] is expected to experience 4.3 percent more fatal and injury crashes than Alternative B over the analysis period (2015 to 2040).

In addition to reducing the potential for fatal and injury crashes, the wider median under Alternative B also allows crossing and left-turning vehicles to slow down or stop between the one-way roadways to take advantage of breaks in traffic. This provides improved safety for traffic crossing and entering the highway. In addition, during nighttime and low light conditions, headlight glare can be significantly reduced by providing additional separation between opposing lanes of traffic.

Throughout project development, public comments have repeatedly identified safety improvements as a primary need along the project corridor. The Selected Alternative was identified as the alternative that best satisfies this need and provides drivers the safest practicable roadway design. Upon consideration of the safety benefits of Alternative B over Alternative C, the US Army Corps of Engineers concluded in their Clean Water Act Section 404(b)(1) analysis that Alternative B is the Least Environmentally Damaging Practicable Alternative. The Section 404(b)(1) analysis is included within **Appendix F. Wetlands and Other Waters** of the Final EIS. The Selected Alternative was also identified as the alternative that best met the goals and missions of the NDDOT, State of North Dakota, and FHWA:

- The mission of the NDDOT is to safely move people and goods.
- The State of North Dakota implemented the Vision Zero initiative in January 2018, which is North Dakota's primary traffic safety initiative. The mission of this initiative is to eliminate fatalities and serious injuries caused by motor vehicle crashes.
- The federal-aid highway program's mandate to provide for safe and efficient transportation

While safety was identified as one of the primary needs of the project, additional needs and considerations also factored into the design of the project alternatives. Flexible design options were incorporated into the project in order to avoid and minimize impacts, while still addressing the project's purpose and need. These flexible design options were developed based on public and agency input as well as known environmental and physical constraints along the project corridor. The following flexible design options were incorporated into the project and are common to both the Selected Alternative (i.e., Alternative B) and the Environmentally Preferable Alternative (i.e., Alternative C):

- Modified ditch section and backslope in select locations to reduce the project footprint.
- Shifted alignment in select locations to avoid sensitive resources.
- Reduced speed limit through the Badlands.
- Use of retaining walls through the Badlands to reduce the project footprint and minimize impacts on public lands.
- Narrowed center median width in select location within the badlands to reduce the project footprint and minimize impacts on public lands.
- Flush, center median through the Badlands and south of Watford City to reduce the project footprint and minimize impacts on public lands.

Option FF-1: Existing Alignment—Urban

Option FF-1 has been identified as part of the Selected Alternative and Environmentally Preferable Alternative because of public comments received from Fairfield-area residents and through coordination with the Billings County Commission. Based on this input, it was determined that the optimal solution was to remain on-alignment through Fairfield to minimize social and economic impacts. It was determined that a bypass alignment would divide farming and ranching land, and would divert traffic around town, which could reduce traffic to businesses along the highway. Flexible design options would be implemented to keep the highway on the existing alignment while minimizing impacts to the adjacent properties.

Option INT-2: Multi-lane Roundabout

Option INT-2 has been identified as part of the Selected Alternative over the Environmentally Preferable Alternative (recall the minor difference in impacts between Options INT-1 and INT-2) because of the additional safety benefits over Option INT-1 through the incorporation of a roundabout (note minor differences in impacts between Options INT-1 and INT-2). Roundabouts are associated with a significant reduction in the rate of fatal crashes and serious injury crashes compared to standard intersections due to a reduction in conflict points and lower intersection speeds.

Option LX-3: New Four-lane Bridge, Remove Existing Long-X Bridge

Option LX-3 has been identified as part of the Selected Alternative over the Environmentally Preferable Alternative (recall the minor difference in impacts between Options LX-1, LX-2, and LX-3) because Options LX-1 and LX-2 were determined to not be feasible and prudent under *Section 4(f) of the Department of Transportation Act* as

1 The IHSDM software is not able to model a divided roadway with a flush median. Therefore, Alternative C was modeled using a 20-foot-wide, depressed median rather than a 20-foot-wide, flush median.

described below in **Is Section 4(f) approval required for the Selected Alternative?**.

Is Section 4(f) approval required for the Selected Alternative?

Chapter 6 of the Final EIS provides an overview of the Section 4(f) process and an evaluation of Section 4(f) properties pursuant to Section 4(f) of the *Department of Transportation Act*. The Selected Alternative requires Section 4(f) approval, *de minimis* impact determination, or exception from approval for four Section 4(f) properties:

- Long X Bridge
- TRNP – North Unit
- TRNP – North Unit Entry Sign
- Dolyniuk Homestead

The Selected Alternative includes Option LX-3, which would require the removal of the existing Long X Bridge. The SHPO has concurred that this would result in an *Adverse Effect* on the bridge. The FHWA determined that the Nationwide Section 4(f) Programmatic Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges is applicable to the project. The three alternatives that need to be evaluated in the Nationwide Section 4(f) Programmatic Evaluation were considered: the No Action Alternative (Alternative A), Rehabilitation of the Bridge Without Affecting the Historic Integrity of the Bridge (Option LX-1), and Building on a New Location without Using the Old Bridge (Option LX-2). Measures to minimize harm on the Long X Bridge have been incorporated into the project. Based on the Nationwide Section 4(f) Programmatic Evaluation in **Section 6.9.1** of the Final EIS, the FHWA has determined that Option LX-3 is the only feasible and prudent option for the Long X Bridge.

For the TRNP – North Unit, TRNP – North Unit Entry Sign, and Dolyniuk Homestead, there is no difference in Section 4(f) uses among alternatives and options. The Selected Alternative would require the replacement of approximately 1 mile of fencing within the TRNP – North Unit adjacent to US Highway 85 and a Special Use Permit to access 0.5 acres of the TRNP – North Unit for construction of an anchored drilled shaft structure. This would result in an exception from Section 4(f) approval for temporary occupancy. Measures to minimize harm on the TRNP – North Unit have been incorporated into the project. The National Park Service (NPS) has concurred the conditions of the exception for temporary occupancy; this concurrence is included within **Appendix B** of the Final EIS.

The Selected Alternative would require the TRNP – North Unit Entry Sign to be removed and reset (both intact) in close proximity to its existing location. Measures to minimize harm on the TRNP – North Unit Entry Sign have been incorporated into the project. The SHPO has concurred with a *No Adverse Effect* determination for the relocation of the sign. Therefore, the FHWA has determined that there would be a de minimis impact. The NPS has concurred with the *de minimis* impact determination. SHPO and NPS concurrence are included within **Appendix B** of the Final EIS.

The Selected Alternative would require the removal of the Dolynuik Homestead (historic building remnants). Measures to minimize harm on the Dolynuik Homestead have been incorporated into the project. The SHPO has concurred with a *No Adverse Effect* determination for the removal of the building remnants. Therefore, the FHWA has determined that there would be a *de minimis* impact. SHPO concurrence is included within **Appendix B** of the Final EIS.

What are the environmental commitments for the Selected Alternative?

The Final EIS identifies 56 environmental commitments that are described in detail within **Chapter 5** and summarized within **Section 7.2** of the Final EIS. In addition to the provisions within the NDDOT Standard Specifications for Road and Bridge Construction, these commitments were developed to avoid, minimize, and compensate for environmental impacts resulting from the project. These commitments will be incorporated into the Construction Specifications and Special Provisions to the Construction Specifications for the project, such that the construction contractor will be contractually bound to carry out the commitments. All practicable measures to minimize environmental harm have been incorporated into the project.

What are the monitoring and enforcement programs for the Selected Alternative?

The Final EIS identifies 12 permits and approvals for the project that are described in detail within **Chapter 5** and summarized within **Section 7.3** of the Final EIS. These permits and approvals include monitoring and enforcement measures specific to the given permit or approval. Some of these measures are currently known and have been incorporated into the Final EIS as commitments, while others will be determined during the final design, permitting, and ROW acquisition processes. All monitoring and enforcement measures will be incorporated into the Construction Specifications and Special Provisions to the Construction Specifications for the project. In addition, the Final EIS identifies the following monitoring and enforcement programs as commitments, as detailed in **Chapter 5** and summarized within **Section 7.2** of the Final EIS:

- Paleontological monitoring
- Noxious weed management plan
- Long X Bridge demolition plan
- Wildlife crossing Memorandum of Agreement (MOA)
- Raptor nest survey
- Migratory bird survey, if necessary
- Sharp-tailed grouse lek survey
- Aquatic nuisance species inspection
- Wildlife crossing effectiveness monitoring
- Woody vegetation impact assessment
- Cultural resources inadvertent discovery plan
- Long X Bridge MOA
- Asbestos Notification of Demolition and Renovation

What is the FHWA's decision?

Based on the information contained in the Final EIS and ROD, the FHWA concludes that the Selected Alternative is:

- Alternative B: Divided, Four-lane Highway with a Depressed, Center Median
- Option FF-1: Existing Alignment—Urban
- Option INT-2: Multi-lane Roundabout
- Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge

The Selective Alternative meets the purpose and need for the project, and has incorporated numerous flexible design options to avoid and minimize impacts. While Option FF-1 is part of the Environmentally Preferable Alternative, Alternative B and Options INT-2 and LX-3 were selected for implementation instead of the Environmentally Preferable Alternative due to the added safety benefits of Alternative B and Option INT-2, and pursuant to Section 4(f) for Option LX-3. The FHWA also concludes that all practicable measures to minimize environmental harm have been incorporated into the project.

Based on the considerations identified in the Section 4(f) evaluation, the FHWA concludes that there are no feasible and prudent alternatives to the use of Section 4(f) resources and that the proposed action includes all possible planning to minimize harm to the identified Section 4(f) resources resulting from such use.

3/5/19
Date of Approval

Wendall L. Meyer, FHWA Division Administrator

FHWA-ND-EIS-19-01-F
Project No. 9-085(085)075, PCN 20046

Stark, Billings, and McKenzie Counties, North Dakota

Final Environmental Impact Statement/Nationwide Section 4(f) Programmatic Evaluation

Submitted Pursuant to 42 U.S.C. § 4332(2)(c) and 49 U.S.C. § 303 by the
U.S. Department of Transportation
Federal Highway Administration
North Dakota Department of Transportation

Cooperating Agencies:
US Army Corps of Engineers
National Park Service – Theodore Roosevelt National Park
US Forest Service – Dakota Prairie Grasslands

3/4/19
Date of Approval — Ron Henke, Deputy Director for Engineering — for NDDOT

3/5/19
Date of Approval — Wendall L. Meyer, Division Administrator — for FHWA

U.S. Department of Transportation
Federal Highway Administration

NDDOT
North Dakota Department of Transportation

KLJ

This Final Environmental Impact Statement (EIS) and Nationwide Section 4(f) Programmatic Evaluation describes the Federal Highway Administration (FHWA) and North Dakota Department of Transportation proposal to expand US Highway 85 from the Interstate 94 (I-94) interchange to the Watford City Bypass (McKenzie County Road 30), a total of approximately 62 miles. The proposed action is to expand this segment of US Highway 85 to a four-lane highway with flexible design options to avoid or minimize impacts and rehabilitate or replace the historic Long X Bridge. Two primary build alternatives (Alternatives B and C) and one no-build alternative (Alternative A) are evaluated in detail in this EIS. As part of Alternatives B and C, options have been developed at key locations along the project corridor: four options in Fairfield (Options FF-1, FF-2, FF-3, and FF-4), two options for the North Dakota Highway 200/US Highway 85 intersection (Options INT-1 and INT-2), and three options for the Long X Bridge (Options LX-1, LX-2, and LX-3). In addition, Alternatives B and C include flexible design options through the Badlands area and near Watford City; the construction of three wildlife crossings; modifications to existing bridges, culverts, and cattle passes; incorporation of a trail; and other improvements (e.g., access, North Dakota Highway Patrol truck inspection sites and chain up areas, Intelligent Transportation System devices, lighting). The project has three Section 4(f) properties: the Theodore Roosevelt National Park (TRNP) – North Unit, historic building remnants of the Dolyniuk Homestead, and Long X Bridge. For Alternatives B and C, the use of the historic building remnants would result in a *de minimis* determination. The TRNP – North Unit would result in an exception for temporary occupancy, and the TRNP – North Unit Entry Sign would result in a *de minimis* determination. Option LX-1 would result in a *de minimis* determination, Option LX-2 would have no use under Section 4(f), and Option LX-3 would result in a permanent use. The FHWA and NDDOT have recommended that the Preferred Alternative include a combination of the following: Alternative B, with Options FF-1, INT-2, and LX-3, as well as flexible design options through the Badlands area and near Watford City; three wildlife crossings; a trail; modifications to existing bridges, culverts, and cattle passes; and other improvements.

The FHWA has prepared a single document that consists of the Final EIS and Record of Decision (ROD) pursuant to Public Law 112-141, 126 Stat. 405, Section 1319(b); the FHWA has determined that statutory considerations do not preclude issuance of a combined document pursuant to Section 1319.

The full Final EIS and ROD can be found at the North Dakota Department of Transportation central office and online at: https://www.dot.nd.gov/projects/williston/US85I94/. For additional information, please contact:

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U.S. HIGHWAY 85

I-94 Interchange to Watford City Bypass (McKenzie County Road 30)

Project 9-085(085)075 PCN 20046 • Stark, Billings and McKenzie Counties, North Dakota

Executive Summary

For the Final Environmental Impact Statement

U.S. Department of Transportation
Federal Highway Administration

NDDOT
North Dakota Department of Transportation

KLJ

Prepared by:

North Dakota Department of Transportation
Bismarck, North Dakota

http://www.dot.nd.gov

DIRECTOR
Thomas K. Sorel

PROJECT DEVELOPMENT DIRECTOR
Robert A. Fode, PE

FEBRUARY 2019

This Executive Summary highlights the findings and conclusions of the Environmental Impact Statement (EIS) and Nationwide Section 4(f) Programmatic Evaluation for the US Highway 85 Project. The Executive Summary uses concise language to summarize complex subjects. Readers are referred to the full EIS for a complete understanding of these subjects.

The full EIS can be found at the North Dakota Department of Transportation central office and online at: https://www.dot.nd.gov/projects/williston/US85I94/. For additional information, please contact:

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Executive Summary Contents

What is an Executive Summary?

This Executive Summary is intended to provide a brief summary of the US Highway 85 Final Environmental Impact Statement (EIS). This includes the purpose and need for the project, project alternatives, anticipated impacts and proposed mitigation and minimization measures. This Executive Summary also identifies the lead federal agency's Preferred Alternative for the project.

All of these elements are discussed in greater detail within the full Final EIS document.

What is the US Highway 85 Widening Project?

The US Highway 85 Project (project) encompasses approximately 62 miles of roadway in Stark, Billings, and McKenzie counties, North Dakota. Please refer to **Figure ES-1, Project Location Map**. The project begins at the Interstate 94 (I-94) interchange and extends north to the Watford City Bypass (McKenzie County Road 30). The proposed action is to expand this segment of US Highway 85 from a two-lane highway to a four-lane highway with flexible design options to avoid or minimize impacts and rehabilitate or replace the historic Long X Bridge over the Little Missouri River. The goal of the project is to essentially maintain and follow the existing US Highway 85 alignment, utilizing the existing infrastructure to minimize potential impacts on environmental, socioeconomic, and human-made resources, to the maximum extent practicable.

The project is being led by the Federal Highway Administration (FHWA) in cooperation with the North Dakota Department of Transportation (NDDOT). The FHWA and NDDOT are functioning as joint lead agencies and are the primary entities responsible for compliance with the *National Environmental Policy Act* (NEPA) for which this Final EIS has been prepared. In addition, the proposed project has three cooperating agencies: the National Park Service (NPS), US Army Corps of Engineers (USACE), and US Forest Service (USFS).

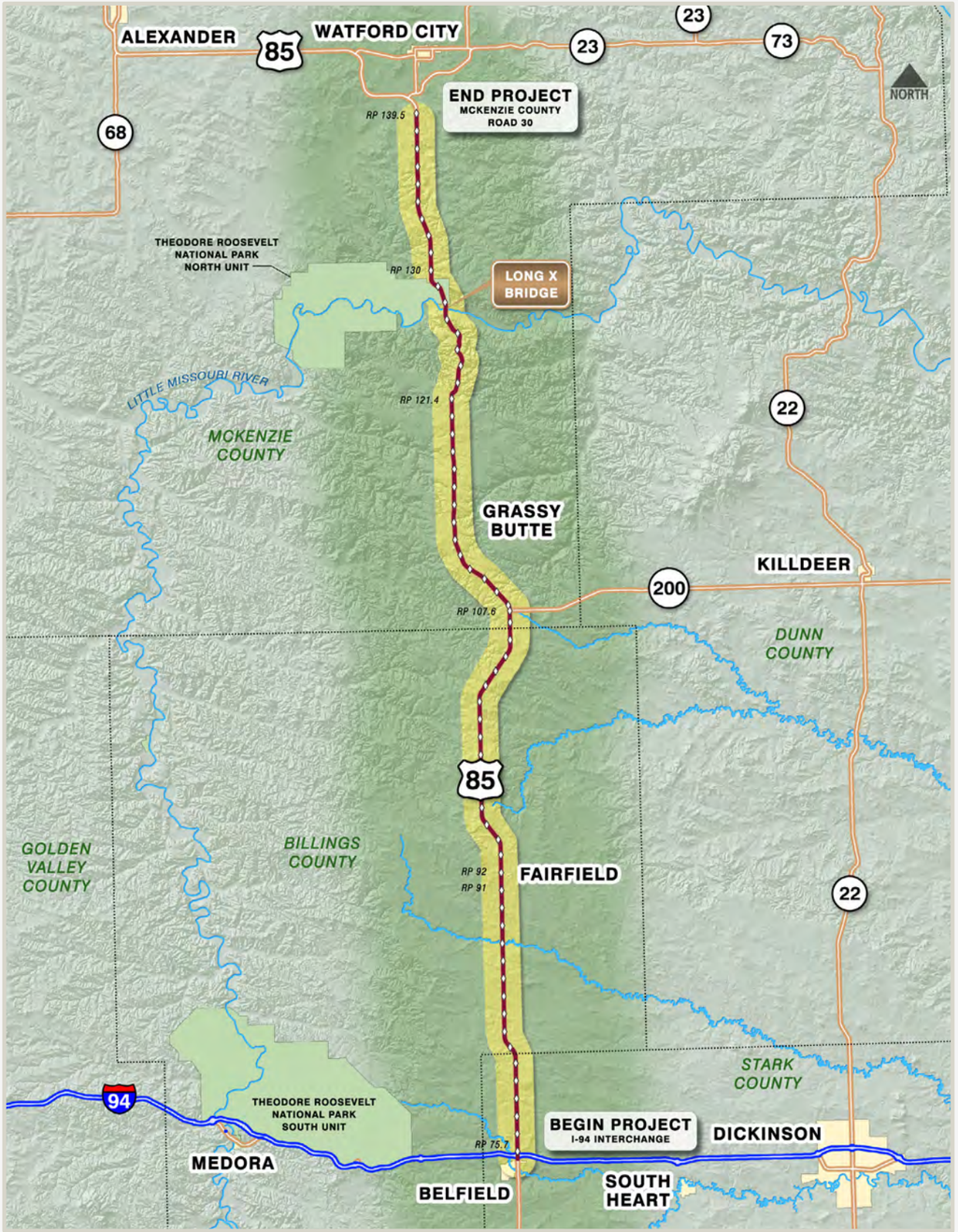

Figure ES-1, Project Location Map

What are the existing conditions within the project corridor?

The proposed project is located in western North Dakota in a predominantly rural landscape dominated by cropland and rangeland. Two unincorporated communities, Fairfield and Grassy Butte, are located along the highway. Fairfield is currently bisected by US Highway 85, while Grassy Butte is located along the west side of the highway. North Dakota Highway 200 (ND-200) intersects US Highway 85 at approximately the middle of the project corridor. ND-200 is the only paved highway that intersects the project corridor between the I-94 interchange and Watford City Bypass. Land ownership along the project corridor is a mixture of private and public, with public lands being under the management of the NPS and USFS. The most distinct segment of the project corridor is the 7-mile stretch that bisects the Little Missouri Badlands, an area characterized by highly eroded buttes and hillsides composed of soft silts and clays with sparse vegetation. Through this stretch of roadway, US Highway 85 travels through the eastern edge of the Theodore Roosevelt National Park (TRNP)—North Unit.

The existing project corridor consists of a two-lane, paved roadway with 12-foot-wide driving lanes and variable shoulder widths. Passing lanes are largely absent from the project corridor. The 7-mile-long stretch of roadway that traverses the Badlands contains a southbound climbing lane south of the Little Missouri River and a northbound climbing lane north of the Little Missouri River. The climbing lanes allow for passing opportunities through the Badlands.

U.S. HIGHWAY 85

Long X Bridge along US Highway 85 is one of only two public bridges that cross the Little Missouri River north of I-94. This truss-style bridge has a vehicle height restriction of 15 feet, 8 inches (actual bridge height clearance is 16 feet). Over-height vehicles traveling along US Highway 85 are currently forced to detour around the Long X Bridge via North Dakota Highway 22 (ND-22). Since 2011, there have been seven major incidents of over-height vehicles hitting the Long X Bridge resulting in numerous closures. These closures result in both social and economic impacts on the region. In order to address these issues, there is a need for a bridge capable of accommodating taller loads by either reducing or eliminating height restrictions.

Why is the project needed and what is its purpose?

The stretch of US Highway 85 located within the project corridor has experienced significant traffic volume increases since 2010, largely due to increased oil and gas exploration associated with the Bakken Formation oil play. This traffic growth has created demand for an improved transportation facility capable of addressing the social and economic issues that have developed within the area. The purpose of the project is to address the current and future needs of the project corridor. The needs that have been identified for the project are as follows:

- **Social Demands and Economic Development:** The rapid development of the oil and gas industry in western North Dakota has placed strain on local towns and communities throughout the region. The influx of new people, rise in traffic volumes, and expanded economic opportunities have transformed the social atmosphere of the area. These changes have created a demand for an improved highway system capable of addressing the social and economic needs of the region. The

- **System Linkage/Connectivity:** US Highway 85 covers approximately 105 miles from I-94 to the junction of US Highway 2 near Williston. Of these 105 miles of roadway, approximately 43 miles have been expanded from a two-lane to a four-lane highway. The remaining 62 miles of US Highway 85 located within the project corridor currently consist of a two-lane, undivided highway. The goal of the project is to establish a connective link by constructing a continuous, four-lane highway from the I-94 interchange to the Watford City Bypass. In addition to connecting the missing four-lane link along US Highway 85, the project would also enhance the overall four-lane infrastructure within North Dakota.

- **Safety:** Compared to other major highways throughout the state, the stretch of US Highway 85 along the project corridor is subject to a disproportionately high percentage of large truck traffic relative to the average daily traffic (ADT) (approximately 33 percent). On a two-lane highway with limited passing opportunities, this high percentage of truck traffic can result in drivers engaging in risk-taking behavior to maneuver around slower moving vehicles. During the public scoping process, 37 percent (57 out of 153) of commenters identified safety as a concern along the project corridor. Although crash data does not indicate that this segment of highway is statistically more dangerous than other highways within the state, public perception and user experiences highlight and heighten the need for a safer roadway.

- **Capacity/Traffic Volumes:** Based on the results of the capacity analysis completed for the project, the project corridor would begin to experience unacceptably poor traffic conditions by year 2040, highlighting the need for capacity improvements along the entire project corridor.

- **Transportation Demand/Roadway Classification:** US Highway 85 is part of the National Highway System (NHS), which is a network of roadways important to the nation's economy, defense, and mobility. In addition, US Highway 85 is classified as an Interregional System road. These roads require a high degree of mobility and reliability in order to support economic activity. Traffic congestion along the project corridor has increased substantially, such that traffic flow (including the over-the-road movement of goods and services) is impeded, which in turn restricts intra- and interstate commerce. Such conditions conflict with the goals and policies for US Highway 85.

- **Slope Instability or Landslides:** Approximately 7 miles of the project corridor are located within the Badlands, an area historically prone to landslides. Over the past 10 years, this stretch of roadway has been closed or partially closed to traffic on three separate occasions due to landslides. Roadway failure as a result of landslides can affect both the reliability and safety of the roadway. Therefore, design of this roadway segment requires that special consideration be given to the geotechnical landscape to reduce the potential for landslides.

- **Ecological Connectivity:** While the primary needs of the project are focused on the human environment, it is also important that the project identify the ecological implications

and look for ways to address or offset potential impacts. Primary ecological concerns associated with most rural transportation projects include the loss of habitat connectivity and potential for wildlife-vehicle collisions.

What are the alternatives analyzed in this EIS?

Methodologies for alternatives analysis were developed in collaboration with cooperating agencies. These methodologies were used to screen out alternatives and explain how alternatives were selected to be carried forward for detailed analysis in this EIS. All potential alternatives and options for the project were evaluated through a screening process, and recommendations for additional alternatives and options were evaluated as they arose. Following the conclusion of the alternatives screening process, a total of three alternatives were carried forward for detailed analysis in this EIS. These alternatives are as follows:

- Alternative A: No Action
- Alternative B: Divided, four-lane highway with a depressed, center median
- Alternative C: Divided, four-lane highway with a flush, center median

In addition to these two primary build alternatives, options have been developed at key locations along the project corridor where additional design considerations are needed. These locations include Fairfield, the ND-200/US Highway 85 intersection, and the Long X Bridge.

No Action Alternative

The No Action Alternative (Alternative A) serves as a baseline against which the impacts of potential build alternatives can be evaluated. Under the No Action Alternative, approximately 62 miles of US Highway 85, from the I-94 interchange to the Watford City Bypass (McKenzie County Road 30) would not be expanded and the existing Long X Bridge would not be rehabilitated or replaced.

Build Alternatives

Alternative B: Divided Depressed. Alternative B would expand the highway to a divided, four-lane section with a depressed, center median. Please refer to **Figure ES-2, Typical Section for Divided, Depressed Median**. The existing highway would be utilized to the extent practicable to carry two lanes of one-way directional traffic and a new two-lane highway would be constructed adjacent. Design criteria for Alternative B include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 70 miles per hour (mph).
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- Outside paved shoulders (i.e., right side of an individual roadway) would be a minimum of 8 feet wide.
- Inside paved shoulders (i.e., left side of an individual roadway) would be 4 feet wide at minimum.
- Depressed median width would be 52 feet (shoulder to shoulder).
- Total width of the roadway from outside shoulder to outside shoulder would be 124 feet.

A roadway constraints assessment was completed for Alternative B to determine which side of the existing roadway would be the most optimal for expansion based on a number of criteria. The goal of this assessment was to avoid impacts on existing resources (e.g., homes, buildings, large utilities, cultural resources) while minimizing the number of crossovers (i.e., transitions from expanding on one side of the existing roadway to expanding on the other).

Alternative C: Divided Flush. Alternative C would expand the highway to a divided, four-lane section with a flush, center median. Please refer to **Figure ES-3, Typical Section for Divided, Flush Median on page ES-8**. Expansion associated with Alternative C would occur equally to both sides of the existing roadway. As an additional safety measure, rumble strips would be installed within non-turning lane segments of the flush, center median to discourage drivers from using the center median as a passing lane. Design criteria for Alternative C include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 65 mph.
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- Outside paved shoulders would be a minimum of 8 feet wide.
- Opposing directions of traffic would be separated by a paved, 20-foot-wide, flush median.
- Total width from outside shoulder to outside shoulder would be 84 feet.

Alternatives B and C would begin at the northern end of the I-94 interchange. To tie the project into the two-lane typical section south of the I-94 interchange, restriping of the interchange would be required. The addition of a US Highway 85 northbound lane would be achieved by adding a free-flowing right-hand turn lane to the I-94 westbound off-ramp. Conversely, the addition of a US Highway 85 southbound lane would be achieved by adding a designated right-hand turn lane onto the I-94 westbound on-ramp.

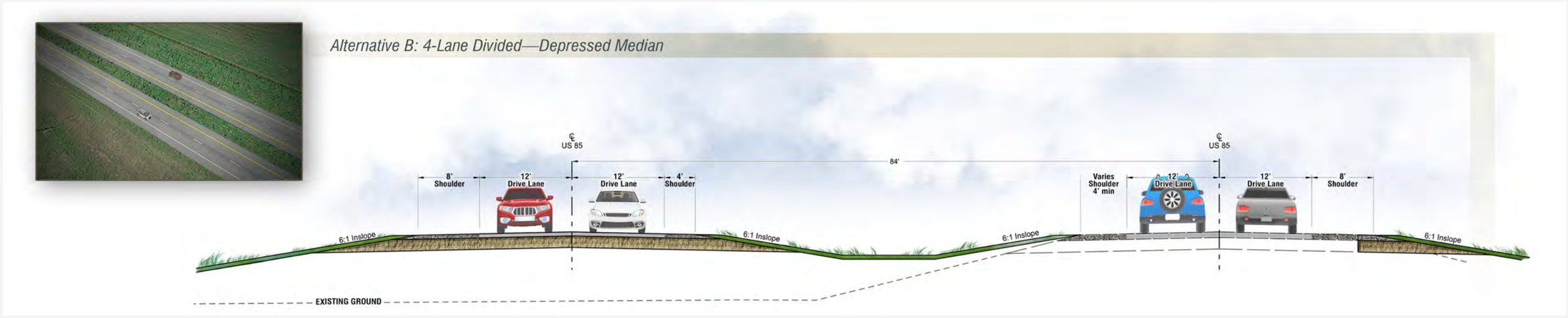

Figure ES-2, Typical Section for Divided, Depressed Median

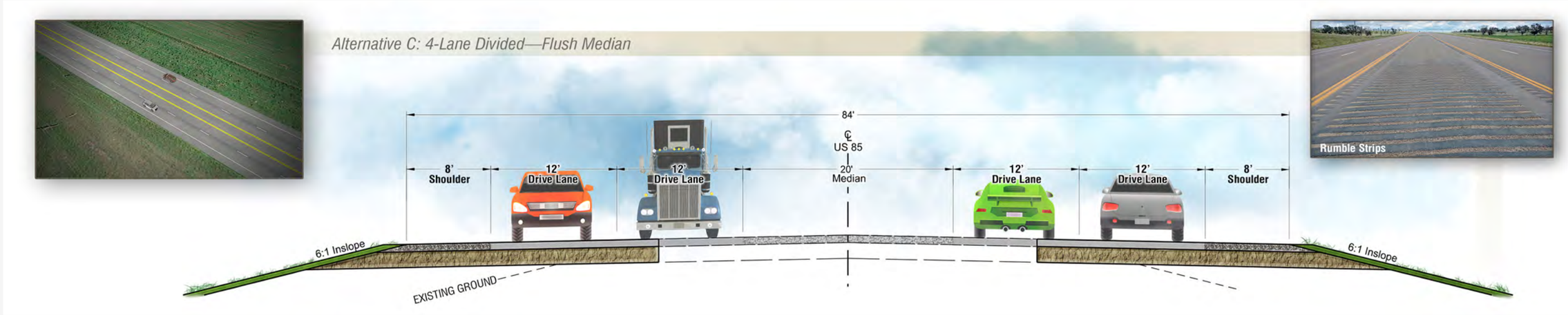

Figure ES-3, Typical Section for Divided, Flush Median

The two build alternatives carried forward for analysis in this EIS represent what would be the typical section for the majority of the 62-mile-long project corridor. Two locations where this typical section would vary include the 7-mile-long stretch of roadway occurring through the Badlands and the northernmost 2 miles near Watford City.

Through the Badlands segment of the project corridor, the roadway footprint would be reduced to the maximum extent practicable to minimize environmental and socioeconomic impacts, as well as minimize impacts on the TRNP—North Unit, while still addressing the project's purpose and need. Flexible design options, such as retaining walls and varying median widths, have been incorporated. The typical roadway section for the Badlands segment south of the Little Missouri River would consist of two 12-foot-wide driving lanes in each direction; 8-foot-wide shoulders; a 20-foot-wide flush, center median; and a posted speed limit of 65 mph. North of the Little Missouri River, near the entrance to the TRNP—North Unit, the center median width would be reduced to 12 feet, along with a posted speed limit of 60 mph. This 12-foot-wide median would be maintained to approximately reference point (RP) 130 at the northern end of the Badlands before transitioning back to the selected roadway alternative typical section.

To facilitate turning movements into the TRNP—North Unit, a southbound right-hand turn lane and northbound left-hand turn lane have been incorporated into the project design. All three of the scenic overlooks located along the Badlands segment of the project corridor at RP 123.8, RP 124.9, and RP 127.5 would be retained (although reduced in size), and additional striping would be incorporated to better direct vehicle movement and use. At Horseshoe Bend, an active landslide area north of the TRNP—North Unit entrance near RP 128, an anchored, drilled shaft structure would be installed to improve stability of the landslide.

To minimize potential impacts on the existing infrastructure near Watford City, the roadway design beginning at RP 136.1 and terminating at the northern end of the project corridor would consist of a divided, four-lane roadway with a flush, 20-foot-wide median that would be offset 30 feet west of the existing roadway centerline. This segment of roadway would have a 65-mph posted speed limit and the same design criteria as Alternative C. The typical section for this segment would tie into and match the existing typical section of the Watford City Bypass.

As part of both of the build alternatives, the following would also occur:

- Construction of an 8-foot-wide, asphalt-paved trail (i.e., shared-use path) with potential trailheads, along US Highway 85 from the planned Watford City trail system to McKenzie County Road 34. This trail would be located on the east side of the highway and would be open to bicyclists and pedestrians. The trail would not be open to motorized vehicle use.
- Construction of three wildlife crossings within the Badlands segment of the project corridor. The wildlife crossings are intended to function as a system in conjunction with wildlife fencing, gates and guards, and jump-outs.
  - Wildlife crossing underpass at RP 122.5
  - Wildlife crossing underpass at RP 126.1
  - Long X Bridge (i.e., wildlife crossing underpass with waterflow) at RP 126.6.
  - Wildlife fencing along both sides of US Highway 85 with jump-outs from RP 120.9 to RP 128.9.
- Replacement of the South Fork Green River and Spring Creek bridges with box culverts.
- Extension of five reinforced concrete box culverts (RCBCs) and two structural plate pipe culverts (SPPCs).
- Extension of four cattle passes (currently in-use) and potential removal of one cattle pass (not currently in-use).
- Relocation, realignment, and consolidation of access points, where feasible.
- Reconstruction of the existing North Dakota Highway Patrol (NDHP) Truck Inspection Site at approximately RP 120.3 at RP 120.6 that would also function as a tire chain up area, construction of an additional NDHP Truck Inspection Site between RP 77 and 78, and construction of an additional chain up area at RP 130.4.
- Resetting or reinstallation of several existing Intelligent Transportation System (ITS) devices (e.g., traffic camera, weigh-in-motion) and the addition of several ITS devices.
- Expansion of the existing intersection illumination lighting at the McKenzie County Road 30/US Highway 85 intersection and ND-200/US Highway 85 intersection.
- Installation of destination lighting (i.e., two lights at an intersection to alert drivers to the presence of an intersection) at 10 additional intersections throughout the project corridor.

Fairfield Options

Four roadway expansion options are under consideration for the community of Fairfield. Please refer to **Figure ES-4, On-Alignment and Bypass Options for Fairfield**.

Option FF-1: Existing Alignment – Urban. Option FF-1 would include constructing an urbanized, four-lane section with reduced speeds through Fairfield. Please refer to **Figure ES-5** for a depiction of the urbanized, four-lane section. Design criteria utilized for Option FF-1 include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 45 mph.
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- 12-foot-wide center median.
- Outside paved shoulders.
- Curb and gutter would be installed along the outside edge of the shoulder and storm sewer would be installed to handle drainage from the roadway surface

Option FF-2: West Bypass. Option FF-2 would include constructing a bypass around the community of Fairfield, approximately 0.4 miles west of the existing alignment. The total bypass length would be approximately 2.0 miles. The typical section and design speed would match the selected roadway alternative (i.e., Alternative B: Divided Depressed or Alternative C: Divided Flush).

Option FF-3: East Bypass 1. Option FF-3 would include constructing a bypass around the community of Fairfield, approximately 0.3 miles east of the existing alignment. The total bypass length would be approximately 2.4 miles. The typical section and design speed would match the selected roadway alternative.

Option FF-4: East Bypass 2. Option FF-4 would include constructing a bypass around the community of Fairfield, approximately 0.5 miles east of the existing alignment. The total bypass length would be approximately 2.7 miles. The typical section and design speed would match the selected roadway alternative.

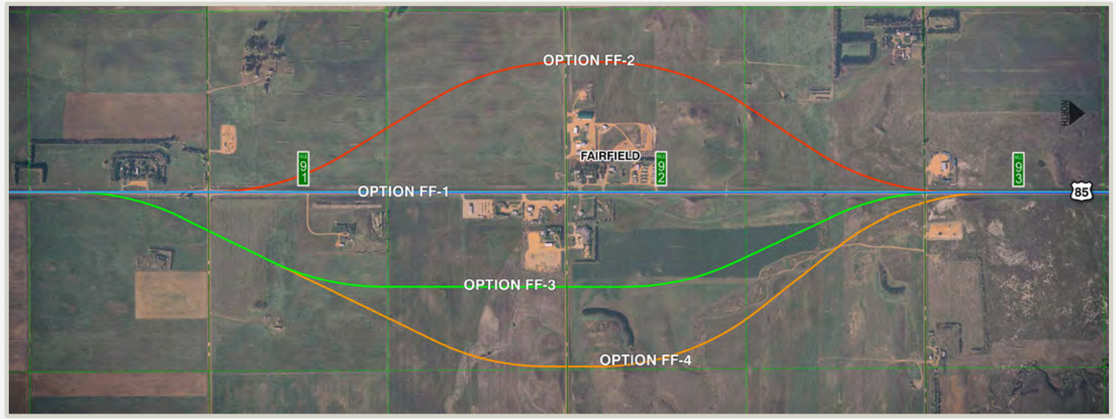

Figure ES-4, On-Alignment and Bypass Options for Fairfield

ND-200/US Highway 85 Intersection Options

Two options are under consideration for the ND-200/US Highway 85 intersection.

Option INT-1: Standard Intersection. Option INT-1 would consist of a standard intersection layout, typical of a four-lane highway. The intersection would function as it does currently with a stop signs along ND-200 (east leg) and the gravel roadway on the western side of the intersection (west leg).

Option INT-2: Multi-lane Roundabout. Option INT-2 would consist of reconstructing the ND-200/US Highway 85 intersection to a multi-lane roundabout configuration. Please refer to **Figure ES-6, Multi-lane Roundabout Illustration on page ES-10**. The roundabout island would have a diameter of 150 feet surrounded by an 18-foot-wide truck apron. The truck apron is intended to accommodate the rear wheels of long vehicles and trailers navigating through the roundabout. Driving lanes through the roundabout would be 18 feet wide resulting in a total roundabout diameter of 258 feet.

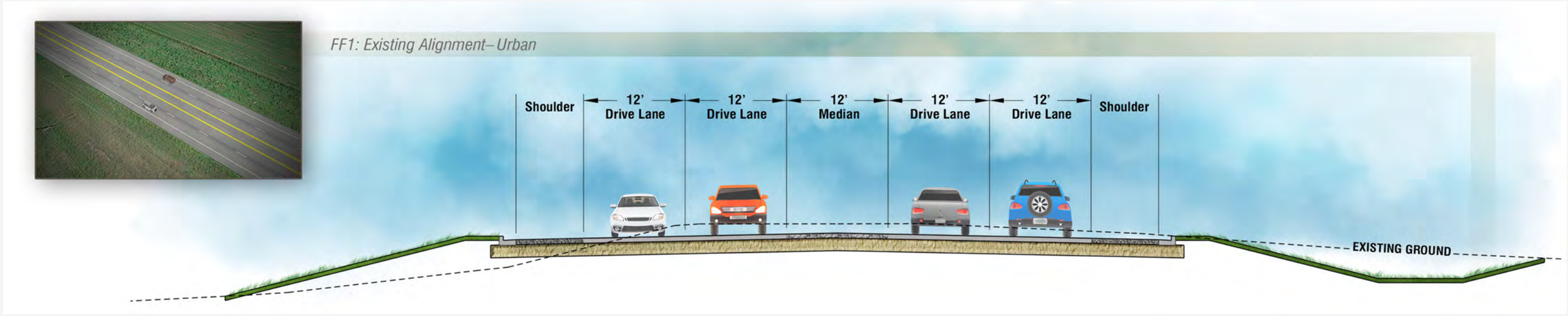

Figure ES-5, Typical Section for Urbanized, Four-lane Section

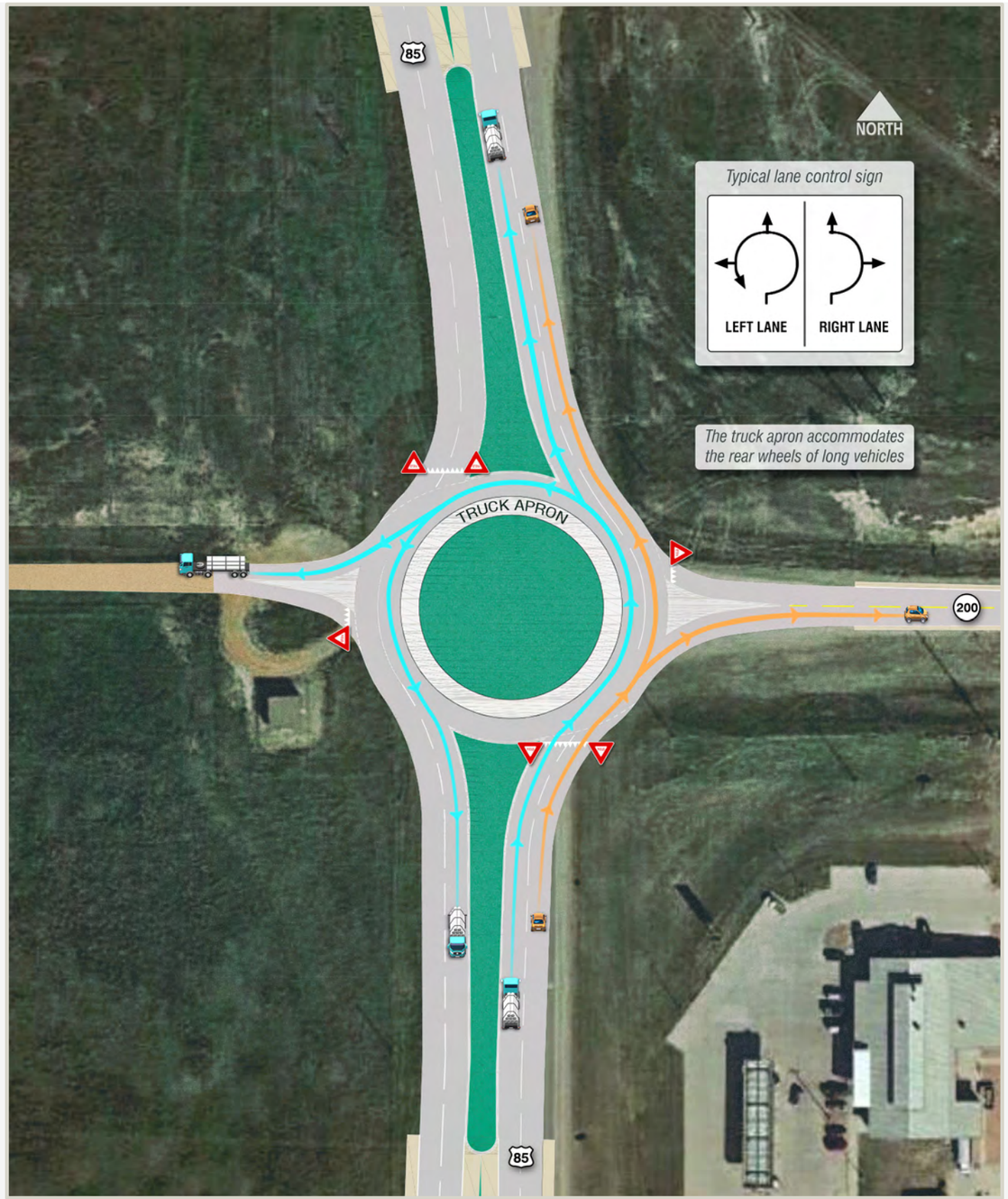

Figure ES-6, Multi-lane Roundabout Illustration

Long X Bridge Options

The Long X Bridge is eligible for listing on the National Register of Historic Places (NRHP) under Criterion C for its unique design. The bridge was constructed in 1959. It is 969 feet long with two 12-foot driving lanes, and has a roadway width of 30 feet and vertical clearance of 16 feet. Three bridge options are under consideration for the Long X Bridge.

Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge. Option LX-1 would include rehabilitating the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches. Option LX-1 would also include constructing a new two-lane bridge east of the existing bridge. The new bridge would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures. Based on coordination with the North Dakota State Historic Preservation Office (SHPO), the scope of Option LX-1, as defined, would have a *No Adverse Effect* determination. Please refer to **Figure ES-7 and Figure ES-8 on page ES-11.**

Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use. Option LX-2 would include retaining the existing Long X Bridge for an alternate use and constructing a new four-lane bridge to the east. The existing Long X Bridge could remain in-place and serve as an example of a Warren through truss bridge as an alternate use. The existing bridge would need to be fenced/blocked at the ends to prevent access onto the bridge. The location of the new four-lane bridge would provide approximately 25 feet of horizontal clearance between the existing and new structures. Based on coordination with the SHPO, the scope of Option LX-2, as defined, would have a *No Adverse Effect* determination. Please refer to **Figure ES-9 and Figure ES-10 on page ES-11.**

Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge. Option LX-3 would include removal (i.e., demolition or adoption) of the existing Long X Bridge and constructing a new four-lane bridge to the east. The new four-lane bridge would be offset approximately 25 feet east of the existing Long X Bridge. The SHPO has concurred that removal of the Long X Bridge would be an *Adverse Effect*. Please refer to **Figure ES-11 and Figure ES-12 on page ES-11**

What is the Preferred Alternative?

The agency's Preferred Alternative is the alternative the agency believes would fulfill its statutory mission and responsibilities, while giving consideration to economic, environmental, technical, and other factors.

After considering all of the potential alternatives, collaborating with the public and cooperating and participating agencies, and conducting engineering and environmental studies for the project, the NDDOT and FHWA have recommended that the Preferred Alternative include a combination of the following:

- Alternative B: Expand the existing roadway to a divided, four-lane section with a depressed, center median in all areas of the project corridor except Fairfield, the Badlands, and Watford City.
- Option FF-1: Expand the existing roadway through Fairfield to a four-lane, urban section with reduced speeds.
- Option INT-2: Construct a multi-lane roundabout at the ND-200/US Highway 85 intersection.
- Option LX-3: Replace the Long X Bridge with a new four-lane bridge.

How much would the project cost?

Planning level cost estimates were developed for Alternatives B and C and their associated options. The cost estimates are based upon the preliminary engineering analysis that was used for evaluating the alternatives and options. The cost estimates were prepared using 2017 dollars, and inflationary measures for future construction have not been included. Please refer to **Table ES-1, Planning Cost Estimate on page ES-12**.

Figure ES-7, Option LX-1 Simulation A (looking northeast)

Figure ES-8, Option LX-1 Simulation B (looking north)

Figure ES-9, Option LX-2 Simulation A (looking northeast)

Figure ES-10, Option LX-2 Simulation B (looking north)

Figure ES-11, Option LX-3 Simulation A (looking northeast)

Figure ES-12, Option LX-3 Simulation B (looking north)

Table ES-1, Planning Cost Estimate

	Alternative B Four-Lane Divided, Depressed Median*	Alternative C Four-Lane Divided, Flush Median*
Cost without Options	**$419**	**$389**
FAIRFIELD OPTIONS		
FF-1: Existing Alignment – Urban	$12	
FF-2: West Bypass	$16	$15
FF-3: East Bypass 1	$16	$15
FF-4: East Bypass 2	$17	$15
ND-200/US HIGHWAY 85 INTERSECTION OPTIONS		
INT-1: Standard Intersection	$3	$3
INT-2: Multi-lane Roundabout	$4	$4
LONG X BRIDGE OPTIONS		
LX-1: New Two-Lane Bridge, Rehabilitate Existing Long X Bridge	$35	
LX-2: New Four-Lane Bridge, Retain Existing Long X Bridge for Alternate Use	$40	
LX-3: New Four-Lane Bridge, Remove Existing Long X Bridge	$36	
ADDITIONAL OPTIONS		
Trail	$1	
Wildlife Crossing System	$7	
Preferred Alternative Cost:	**$479**	

**All costs rounded to nearest million and include 10 percent contingency, 6 percent design engineering, 10 percent construction engineering, utility relocation, and right-of-way (ROW) costs.*

How would the project be constructed?

Construction phasing would depend upon how much funding is available and how it is programmed for construction. The first construction priority is the Long X Bridge. The project would consist of rehabilitating or replacing the Long X Bridge and constructing approximately 1 mile of approach roadway on each side of the bridge. This may include construction of the bighorn sheep underpass at RP 126.1. Funding has not been identified for any additional projects; however, after the Long X Bridge portion of the project is completed, the second priority would be constructing the roadway from the northern end of the corridor, Watford City Bypass (McKenzie County Road 30), to the ND-200/US Highway 85 intersection. The final priority would be constructing the roadway from the ND-200/US Highway 85 intersection to the Interstate 94 (I-94) interchange in Belfield. It is anticipated the actual construction projects would likely occur in 8- to 10-mile-long segments.

What are the anticipated project impacts?

Land Use

Direct land use conversion associated with Alternatives B and C would primarily affect agricultural pasture and cropland. Non-agricultural grasslands, forested areas, and developed lands would also be impacted to a lesser degree. Alternative B would impact more acreage then Alternative C, while Options FF-2, FF-3, and FF-4 would impact more acreage than Option FF-1. The ND-200/US Highway 85 intersection options and Long X Bridge options would result in minor amounts of land use conversion, with only negligible variations between the options.

ROW acquisition for Alternatives B and C would be required adjacent to the existing roadway corridor. The ND-200/US Highway 85 intersection, Fairfield, and Long X Bridge options would also require additional ROW. Please refer to **Table ES-2, Permanent ROW/Easement on Private and Federal Lands**.

Social

Expanding US Highway 85 to four lanes would provide a safer and more reliable highway corridor for the traveling public. Reliability would be improved by reducing over-height restrictions, providing additional driving lanes and expanding roadway shoulders. Alternative B would provide additional safety benefits over Alternative C through the incorporation of a depressed, center median. The depressed, center median would provide an additional level of protection from head on crashes.

Construction of Alternatives B and C and the associated options would require the acquisition of ROW from public and private property owners (see previous **Land Use** section). ROW needs would vary between the two alternatives: Alternative B would primarily require ROW from one side of the existing highway, while Alternative C would require less ROW overall, but from both sides of the existing highway. No homes or businesses would be relocated as a result of the project; however, the expanded roadway footprint would bring the highway closer to homes, businesses, and community services located adjacent to the project corridor. Under both Alternatives B and C, access would be maintained for all residences and businesses; however, access consolidation would occur.

Table ES-2, Permanent ROW/Easement on Private and Federal Lands

	Permanent ROW Required – Private (acres)	Permanent Easement Required – Federal (acres)		Total (acres)
		USFS	NPS	
ALTERNATIVE B				
Route without options	70.0	70.0	9.4*	**841.7**
Options with Alternative B				
INT-1	2.1	—	—	**2.1**
INT-2	2.6	—	—	**2.6**
FF-1	20.6	—	—	**20.6**
FF-2	97.1	—	—	**97.1**
FF-3	105.2	—	—	**105.2**
FF-4	111.9	—	—	**111.9**
LX-1	5.4	1.2	—	**6.6**
LX-2	9.2	3.0	—	**12.2**
LX-3	9.2	3.0	—	**12.2**
ALTERNATIVE C				
Route without options	520.8	53.8	9.4*	**574.6**
Options with Alternative C				
INT-1	1.0	—	—	**1.0**
INT-2	2.6	—	—	**2.6**
FF-1	20.4	—	—	**20.4**
FF-2	79.1	—	—	**79.1**
FF-3	86.9	—	—	**86.9**
FF-4	96.0	—	—	**96.0**
LX-1	5.4	1.2	—	**6.6**
LX-2	9.2	3.0	—	**12.2**
LX-3	9.2	3.0	—	**12.2**

*Note: *Permanent easement acquisition from the NPS would consist of a Highway Easement Deed that would include the same area as the existing Deed (i.e., 9.21 acres for the highway and 0.17 acres for a drainage easement), but for a four-lane rather than a two-lane highway. The reissued Deed would include an additional 0.2 acres impacted by a recent, landslide repair project (unrelated to the proposed action identified in this EIS) that was covered under a Special Use Permit (MWR-THRO-6000-2011-012).*

Social impacts on the community of Fairfield associated with Option FF-1 are anticipated to be minor, as the overall makeup of the community would remain largely unchanged. Options FF-2, FF-3 and FF-4 would remove mainline traffic from traveling through Fairfield such that drivers travelling along US Highway 85 desiring to stop in Fairfield would be required to turn off of mainline US Highway 85 to access the community. Social impacts and changes in community cohesion for the community of Grassy Butte are anticipated to be minor under both alternatives.

During the scoping period, numerous public comments were received expressing concern for the Badlands and TRNP – North Unit. To address these concern, design of the typical roadway section through this segment of the project corridor was modified to minimize the roadway footprint (this design would be identical under Alternatives B and C). Impacts on the Badlands and TRNP – North Unit as a result of the project are anticipated to be minor due to minimization measures incorporated into the project design and the presence of the existing highway.

During construction, two lanes of traffic would be maintained and reasonable construction access to properties and roadways would be maintained. Speed limits within construction zones would be reduced, which would temporarily increase travel times, and accessing properties may require minor detours. Visitors to the TRNP – North Unit and Little Missouri National Grasslands (LMNG) may experience noise and visual impacts during construction that could detract from the wilderness experience that many visitors desire when recreating in these areas (see **Public Lands on page ES-13** and **Visual on page ES-14**).

Public Lands

Public lands along the project corridor consist of the TRNP–North Unit, managed by the NPS, and the LMNG, managed by the USFS. Through the Badlands segment of the project corridor, the roadway footprint was reduced to the maximum extent practicable in order to minimize impacts on adjacent federal lands.

A new Highway Easement Deed from the NPS would be required for the project; however, due to the incorporation of these design modifications, the new Deed associated with this project would encompass the same area as the existing Deed. In addition, a Special-Use Permit from the NPS would be required for construction of the Horseshoe Bend landslide stabilization.

An additional permanent easement would be required from the USFS for construction of Alternatives B and C, respectively (see **Table ES-2 on page ES-12**). These additional permanent easement needs are primarily located outside of the Badlands segment and would not affect USFS Inventoried Roadless Areas.

Visitors to the TRNP–North Unit and LMNG may experience noise and visual impacts during construction that could detract from the wilderness experience that many visitors desire (see **Visual on page ES-14**). Reasonable construction access to public lands and facilities would be maintained during construction.

Water Resources

The proposed project would impact the Little Missouri River (a designated State Scenic River that is also listed on the Nationwide Rivers Inventory [NRI]) via construction of a new two- or four-lane bridge. A new bridge, regardless of the selected option, would result in the placement of two bridge piers within the river channel. In addition, rock riprap would be installed at these pier locations to prevent scouring. The riprap would be buried to minimize impacts on the riparian corridor. Additionally, Option LX-3 would include removal (i.e., demolished or adopted) of the existing Long X Bridge, which would result in temporary impacts on the Little Missouri River. Regardless of the selected alternative or options, construction and operation of the project is not anticipated to violate any provisions of the *Little Missouri State Scenic River Act*. Construction of the project would temporarily impact the outstandingly remarkable scenic value of the Little Missouri River; however, permanent impacts to the outstandingly remarkable scenic, cultural, and historic vales that qualify the river for listing on the NRI are not anticipated.

Permanent and temporary wetland impacts are anticipated. Apart from the Fairfield Options, Alternatives B and C would permanently impact 26.85 and 19.00 acres of wetlands, respectively. Options FF-1, FF-2, FF-3, and FF-4 would permanently impact an additional 0.06 to 0.81 acres of wetlands, depending on the alternative and option selected. Options INT-1 and INT-2 would permanently impact an additional 0.02 to 0.03 acres of wetlands, respectively, depending on the alternative selected. In addition, Alternatives B and C and the Long X Bridge Options would permanently impact Other Waters. Alternatives B and C and the Fairfield Options would require wetland mitigation per Section 404 *Clean Water Act* regulations and/or Executive Order (EO) 11990.

Alternatives B and C would result in the placement of fill within a Federal Emergency Management Agency (FEMA)-mapped floodplain boundary; however, the project is anticipated to be in accordance with the National Flood Insurance Program. A floodplain development permit would be acquired prior to any construction occurring within the identified floodplain. Impacts on riverine floodplains (not FEMA-mapped) and riparian corridors from Alternatives B and C and their options are anticipated to be minor.

Construction activities would have the potential to temporarily degrade water quality as a result of sedimentation and soil erosion during construction activities. These impacts would be minimized through the incorporation of best management practices. Long term water quality impacts as a result of the project are not anticipated.

Wildlife

Operation of roadways can result in habitat loss, degradation, and fragmentation; barriers to wildlife movement; and mortality from wildlife-vehicle collisions (Clevenger and Huijser 2011). To offset project impacts on wildlife mobility and habitat connectivity, three wildlife crossings (i.e., structures along roadways that provide wildlife habitat connections) have been incorporated into the project design. The crossings are intended to facilitate movement for terrestrial wildlife along the project corridor, particularly bighorn sheep, mule deer, and white-tailed deer. All three wildlife crossings would be located within the Badlands segment of the project corridor and are intended to function as a system in conjunction with wildlife fencing.

For species protected by the *Endangered Species Act*, the project may affect, but is not likely to adversely affect, the Dakota skipper due to suitable habitat occurring adjacent to the project corridor. In addition, due to disturbance and conversion of potential habitat, the project may affect, but is not likely to adversely affect, the gray wolf, whooping crane, and northern long-eared bat.

Proposed construction and operation activities would have the potential to contribute sound and visual stimuli at levels that could result in the temporary avoidance of habitat and behavioral effects. Stormwater from the roadway surface or construction areas has the potential to result in water quality impacts, which could cause the temporary avoidance of habitat by individuals or direct injury, mortality, or impairment of bodily functions of individuals.

Construction would result in habitat loss, as non-roadway areas would be cleared for the expanded roadway. Alternative C would result in less habitat loss than Alternative B due to a narrower roadway footprint. Of the Fairfield Options, Option FF-1 would have the least impacts on habitat, as construction would occur along the existing alignment. To minimize these impacts, all temporarily disturbed areas would be re-seeded following project completion. In addition, several construction timing restrictions and survey requirements would be implemented as follows:

- To minimize impacts on fish during the spawning period, work within the South Branch of the Green River, Little Missouri River, and Spring Creek would not occur between April 15 and June 1.
- To minimize impacts on the bighorn sheep during lambing season, construction activities from approximately RP 124.1 to RP 126.4 would be limited to an area generally defined by ROW/easement or the surface of the roadway, inslopes, and ditches from April 1 to July 15.
- If construction activities during the migratory bird nesting and breeding season in North Dakota (between February 1 and July 15), work areas would be mowed and/or grubbed prior to the nesting and breeding season. If mowing and/or grubbing is not completed prior to the nesting and breeding season, a qualified biologist would conduct pre-construction

surveys for migratory birds, including raptors. If active nests are identified, the NDDOT would coordinate with the US Fish and Wildlife Service (USFWS) prior to commencement of work to determine any measures necessary to minimize harm. In addition, the NDDOT Standard Special Provision for the *Migratory Bird Treaty Act* would be included with the Construction Specifications. This Special Provision includes stipulations pertaining to nests during construction activities involving bridges, box culverts, and structural plate culverts.

- To minimize potential impacts on sharp-tailed grouse breeding habitat, spring surveys of known leks (i.e., breeding sites) identified in the Biological Evaluation (2017) that was prepared for the project would be conducted prior to commencement of construction activities. If a lek site is determined to be active, all construction activity within 1 mile of the active lek site would be suspended for the first two hours of daylight beginning at sunrise for the time period of May 1 to June 15.

- Suitable habitat for the Dakota skipper (a federally-listed threatened species) was identified along the project corridor, outside of the project construction limits. During construction, this area would be fenced to prevent direct impact. In addition, a 15 mph speed limit would be maintained within a 0.6-mile radius of the identified Dakota skipper habitat (RP 121.5 to RP 122.9) for all construction vehicles traveling off of the existing roadway within the limits of construction from June 15 to July 15.

Historic and Archeological Preservation

The Class III Cultural Resources Inventory completed for the project identified a total of nine sites *Eligible* for listing on the NRHP within the survey corridor. Of these, six would be fully avoided by construction of the project. The three remaining sites that would be impacted by construction of the project are as follows:

- Dolyniuk Homestead: Due to the nature and location of the Dolyniuk Homestead, design of the project was not able to avoid impacting the site under Alternative B or C. To mitigate the permanent impact, the NDDOT, in coordination with the SHPO, has developed a mitigation approach. This approach includes documentation of the Dolyniuk Homestead site as well as the Gregory Homestead (an additional nearby historic-era site). With this mitigation, the SHPO has concurred with a *No Adverse Effect* determination.

- TRNP–North Unit Entry Sign: The TRNP–North Unit Entry Sign cannot be avoided by Alternative B or C. To minimize impacts, the sign would be removed prior to project construction. Upon project completion, the sign would be reset, intact, in close proximity to its original location. With the mitigation, SHPO has concurred with a *No Adverse Effect* determination.

- Long X Bridge: Impacts on the Long X Bridge would vary based on the selected bridge option.
  - Option LX-1 would rehabilitate the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches, and would also strengthen the bridge to allow it to carry a new legal load of 129,000 pounds. Based on coordination with the SHPO, Option LX-1 would have a *No Adverse Effect* determination.
  - Option LX-2 would retain the existing Long X Bridge for an alternate use. The bridge would likely remain in-place with gates installed at both ends to deter pedestrian use. Based on coordination with the SHPO, Option LX-2 would have a *No Adverse Effect* determination.
  - Option LX-3 would include demolition of the existing Long X Bridge resulting in an *Adverse Effect*. A Memorandum of Agreement (MOA) has been signed between the FHWA, NDDOT, and SHPO to mitigate for the *Adverse Effect* on the Long X Bridge.

Visual

Perceived visual impacts can vary from one individual to the next. In order to assess impacts on visual quality, viewers have been divided into two groups:

- Neighbors: Viewers that live, recreate, work, or conduct business in view of the roadway.
- Travelers: Viewers that utilize the roadway, including commuters, tourists, or shippers that move goods.

A particular individual can be both a neighbor and a traveler, and they may act as various types of viewers depending on their purpose at a particular time.

Alternative C would result in fewer impacts on visual resources than Alternative B due to a narrower roadway footprint. Permanent impacts on visual resources would occur along an existing transportation corridor. The new and modified features would be consistent with existing transportation facilities in the area. As such, impacts on visual resources in the rolling prairie (i.e., outside of the Badlands) are generally anticipated to be compatible with the existing visual character for neighbors and travelers such that impacts on visual quality would be negligible.

Within and around the community of Fairfield, visual impacts would vary based upon the selected Fairfield Option. Option FF-1 would maintain US Highway 85 on its current alignment through town, resulting in minimal visual impacts. Options FF-2, FF-3 and FF-4 would result in the construction of a bypass around the community of Fairfield. Neighbors may consider visual quality to be negatively impacted by Options FF-2, FF-3, and FF-4. To the contrary, travelers along Options FF-2, FF-3, and FF-4 may perceive the roadway through a natural setting to be an improvement upon visual quality compared to the exiting alignment through Fairfield.

Through the Badlands, permanent impacts on visual resources would also be confined to an existing transportation corridor, and many of the new and modified features would be consistent with existing transportation facilities in the area; however, some changes may be perceived by neighbors and travelers as incompatible with the existing visual character. These changes would include extensive cut sections, wildlife fencing, and Long X Bridge options.

Light pollution from vehicle headlights would continue to occur throughout the project corridor. Any increases in light pollution from headlights associated with the annual increase in traffic along the

corridor is anticipated to be compatible with the existing visual character and lightscapes along the project corridor such that impacts on visual quality would be negligible.

Light pollution from existing and proposed roadway lighting would occur within the rolling prairie landscape unit. The addition of destination lighting and expanded intersection illumination lighting would impact lightscapes; however, lighting would occur along an existing transportation corridor where headlights are already common. Additional lighting may be perceived by neighbors as a reduction in visual quality.

During roadway construction, temporary impacts on visual resources are anticipated to occur. Workers, heavy equipment, haul trucks, passenger vehicles, materials, lighting, and dust would be present along the project corridor within the ROW and temporary easements during construction activities. Fugitive dust control measures would be implemented as necessary during construction, and a temporary slatted chain-link fence would be placed along portions of the Long X Bridge staging areas to provide visual screening between construction activities and the TRNP—North Unit. Temporary impacts on visual resources as a result of construction activities are anticipated to be similar between alternatives and options.

Utilities

Construction of the project would impact existing utilities along the project corridor, with Alternative B resulting in greater impacts than Alternative C. All impacts on existing utilities would be coordinated with applicable utility companies during the final design phase of the project. Utilities would typically be relocated back within the newly acquired NDDOT ROW or in a utility easement acquired by the utility company adjacent to the ROW. Utilities that are relocated back within NDDOT ROW are included in the proposed action for this project. Any utility relocations that occur outside of NDDOT ROW would be required to obtain individual state and federal approvals, as necessary.

During final design, the NDDOT would provide a more detailed set of utility coordination plans and ROW limits to the impacted utility companies and would also work with the utilities to ensure avoidance of known sensitive resources (i.e., cultural resources, wetlands, USFS-designated sensitive plant populations). Impacts associated with utility relocations would vary based on the type of utility. Below-ground pipelines typically require clearing/disturbance of the entire construction corridor with the majority of the disturbed area reclaimed following construction. Below-ground electrical and communication lines typically result in less disturbance as they are either plowed in, or installed in a narrow trench with minimal permanent ground disturbance following reclamation. Permanent ground disturbance for overhead utilities is typically only associated with the footprint of the pole or concrete foundation. Temporary ground disturbance for overhead utilities is usually limited to equipment movement between structure locations.

What Section 4(f) properties are located along the project corridor and how would they be impacted by the project?

Section 4(f) of the *Department of Transportation Act* requires FHWA and other US Department of Transportation (USDOT) agencies to provide consideration for parks, recreational areas, wildlife and waterfowl refuges, and historic sites during transportation project development.

A total of 15 properties protected by Section 4(f) were identified along the project corridor. Of these, 11 would be avoided by the project and have no use under Section 4(f). Use of the four remaining properties is summarized in **Table ES-3**.

Table ES-3, Summary of Anticipated Section 4(f) Properties Uses & Approval Options

Section 4(f) Property	Use	Approval Option
TRNP		
NPS-managed property within the Administrative Boundary	Temporary Occupancy—0.5 acres	Exception for Temporary Occupancy
TRNP—North Unit Entry Sign (32MZ154)	Relocation of Sign—*No Adverse Effect*	*De minimis*
LONG X BRIDGE (32MZ1807)		
Option LX-1	Permanent—*No Adverse Effect*	*De minimis*
Option LX-2	No Use	Not applicable, because the original location of the bridge, historic integrity, and value would be maintained
Option LX-3	Permanent—*Adverse Effect*	Nationwide Programmatic Section 4(f) Evaluation for Historic Bridges
HISTORIC SITE (32BI56)		
Dolyniuk Homestead	Permanent—*No Adverse Effect*	*De minimis*

What public and agency outreach efforts were conducted for the project?

Throughout the development of the project, numerous efforts were made to solicit input and feedback from federal, state, and local agencies; special interest groups, committees, and associations; tribes and tribal groups; and members of the public. This input and feedback was used in the development of the purpose and need for the project; development and analysis of project alternatives; and in the selection of the Preferred Alternative. Please refer to **Table ES-4 on page ES-16** for a summary of these outreach efforts.

The Notification of Availability (NOA) of the Draft EIS for review and comment was published in the *Federal Register* on May 11, 2018 and local newspapers. Following publication of the NOA, three public hearings were held in Belfield, Fairfield, and Watford City. In addition, a 45-day comment period (May 11 to June 25, 2018) was provided to allow agencies and the public to review and comment on the Draft EIS. All comments received during the Draft EIS comment period have been addressed in a Draft EIS Public and Agency Involvement Report (2019), and comments warranting a revision have been incorporated into the Final EIS. Changes from the Draft EIS to the Final EIS are listed on **page ix**, prior to Chapter 1 of the Final EIS.

What environmental commitments have been made for the project?

Please refer to **Table ES-5, Environmental Commitments Summary on page ES-17** for a summary of the environmental commitments (excluding any NDDOT Standard Specifications) that would be implemented to avoid, minimize, and compensate for environmental impacts resulting from the project.

What areas of controversy have been identified through project development?

Areas of controversy for the project and alternatives include the following:

- Public comments have expressed concern regarding the projects impact on the Badlands, TRNP—North Unit, and USFS Inventoried Roadless Areas.
- Public comments have expressed concern that the alternatives developed and carried forward for detailed analysis do not constitute a reasonable range of alternatives as required in 23 Code of Federal Regulations (CFR) 771.123. FHWA and NDDOT have concluded that the alternatives and options identified in this document constitute a reasonable range of alternatives and believe this conclusion is supported by the robust alternatives development and screening process completed for the project.

Are there any major unresolved issues associated with the project?

There are no major unresolved issues associated with the project.

Table ES-4, Summary of Outreach Efforts

Public/Agency Coordination Effort	Date	Location
MAILINGS		
Scoping Letters	November 2, 2015	N/A
PUBLIC MEETINGS		
Public Scoping Meeting	November 9, 2015	Belfield, ND
Public Scoping Meeting	November 10, 2015	Watford City, ND
Public Alternatives Workshop	July 25, 2016	Belfield, ND
Public Alternatives Workshop	July 26, 2016	Watford City, ND
Fairfield Community Stakeholder Meeting	December 1, 2016	Fairfield, ND
Stakeholder Group Meeting #1	February 8, 2017	Fairfield, ND
Stakeholder Group Meeting #2	October 30, 2017	Fairfield, ND
Public Hearing	May 29, 2018	Belfield, ND
Public Hearing	May 30, 2018	Fairfield, ND
Public Hearing	May 31, 2018	Watford City, ND
AGENCY MEETINGS		
Agency Scoping Meeting	November 9, 2015	Bismarck, ND
Lead and Cooperating Agencies Working Session #1	October 28, 2015	Dickinson, ND
Lead and Cooperating Agencies Working Session #2	January 29, 2016	Bismarck, ND
Lead and Cooperating Agencies Working Session #3	March 24, 2016	Dickinson, ND
Lead and Cooperating Agencies Working Session #4	June 29, 2016	Bismarck, ND
Lead, Cooperating, and Participating Agencies Meeting	July 21, 2016	Bismarck, ND
Lead and Cooperating Agencies Working Session #5	December 9, 2016	Dickinson, ND
Lead and Cooperating Agencies Working Session #6	April 3, 2017	Bismarck, ND
Lead and Cooperating Agencies Working Session #7	June 16, 2017	Bismarck, ND
Lead and Cooperating Agencies Working Session #8	August 30, 2017	Dickinson, ND
Lead and Cooperating Agencies Working Session #9	October 26, 2017	Bismarck, ND
Lead and Cooperating Agencies Working Session #10	December 13, 2017	Dickinson, ND
Lead and Cooperating Agencies Working Session #11	May 9, 2018	Bismarck, ND
Lead, Cooperating, and Participating Agencies Meeting	May 21, 2018	Bismarck, ND
Lead and Cooperating Agencies Working Session #12	September 10, 2018	Bismarck, ND

What other federal actions are required for the project?

The following federal permits/approvals would be required for the project.

- Section 401 of the *Clean Water Act* Certification (unless waived) from the NDDH
- Section 404 of the *Clean Water Act* Permit from the USACE
- Special-Use Permit from the NPS
- Highway Easement Deed from the NPS
- Permanent Easement from the USFS
- Section 4(f) of the *Department of Transportation Act* of 1966 (U.S.C. § 303) concurrence from the NPS and approval/determination from the FHWA
- Section 106 of the *National Historic Preservation Act* concurrence from the SHPO
- Section 7 of the *Endangered Species Act* concurrence from the USFWS

Table ES-5, Environmental Commitments Summary

NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
1	All areas temporarily disturbed by construction would be restored.	Completion of construction	Land Use, Prime and Unique Farmlands, Water Resources, Wildlife, Vegetation, Section 4(f)
2	Two lanes of traffic along US Highway 85 and reasonable construction access for all residences, businesses, and public lands would be maintained. Temporary signage pertaining to roads, businesses, and public facilities would be installed during construction as necessary.	Throughout construction	Land Use, Social, Public Lands, Economics, Pedestrians and Bicyclists
3	Borrow sites, waste sites, gravel source locations, and staging areas identified by the contractor (i.e., not included in this EIS) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental clearance on these sites to comply with all federal and state laws and regulations that govern the protection of wetlands, threatened and endangered species, and cultural resources. Material sources include rock riprap and material from commercial sources, and any other area of planned ground-disturbing activities, such as staging area(s), plant site(s), stockpile area(s), waste site(s), and haul road(s). These sites would not be permitted on any federal or public lands or within the bighorn sheep lambing areas located adjacent to the project corridor.	Prior to and throughout construction	Land Use, Water Resources, Wildlife, Historic and Archaeological Preservation
4	If Alternative C or different option(s) are later determined to be the Preferred Alternative, a Natural Resources Conservation Service (NRCS)-CPA-106 Form would be completed and coordination with the NRCS would occur.	Prior to construction	Prime and Unique Farmlands
5	Waste material would be disposed of in accordance with state and federal laws, and in a manner that avoids impacts on water channels and riparian areas.	Throughout construction	Prime and Unique Farmlands, Water Resources, Wildlife
6	Paleontological monitoring would occur through the Badlands area, with paleontological monitors following earth-moving equipment and examining excavated sediments and road cuts for evidence of significant fossil resources. In the event that significant fossils are uncovered, work would be halted within 100 feet of the discovery site until the fossils are assessed and mitigation measures are discussed amongst the NDDOT, a qualified paleontologist, and an authorized agency representative for resources located on public land. If located on private land, the landowner would be included in the assessment and mitigation. Outside of the Badlands area, all other areas through the Sentinel Butte and Golden Valley formations and Coleharbor Group, where excavation and expansion of road cuts would occur, would be spot-check inspected (i.e., windshield survey for bedrock) once during excavation and once after excavation is completed. Where bedrock is identified, the area would be surveyed on-foot and visually inspected for fossils of any kind.	Prior to and throughout construction	Paleontology
7	Temporary mailboxes would be supplied during construction as necessary.	Throughout construction	Social
8	Landowner negotiations would occur regarding the extension of existing cattle passes or incorporation of new cattle passes. If additional cattle passes are requested by adjacent landowners, these requests would be considered utilizing the NDDOT Cattle Pass Consideration process (State Form Number 10155).	Prior to construction	Social, Public Lands, Economics
9	Temporary and/or permanent replacement fencing would be provided, as necessary, to maintain existing fencing connectivity. Apart from wildlife fencing associated with wildlife crossings, fencing installed on USFS-managed lands would meet or exceed specifications provided by the USFS in **Appendix B. Agency Correspondence**.	Throughout and completion of construction	Social, Public Lands, Economics
10	Roadway design plans pertaining to USFS-managed lands, including permanent erosion control measures, would be submitted to the USFS for review prior to construction and a preconstruction field review with the USFS would occur to review design plans and stipulations with the contractor and NDDOT.	Prior to construction	Public Lands
11	The contractor would remain apprised of fire danger conditions and follow applicable fire restrictions and safe fire practices, including fire stipulations for USFS-managed lands provided by the USFS in **Appendix B. Agency Correspondence**.	Throughout construction	Public Lands
12	The Medora and McKenzie Grazing Associations would be informed of respective impacted USFS grazing allotments prior to construction.	Prior to construction	Public Lands
13	Unless otherwise noted within this EIS, all range infrastructure (e.g., fences, gates, water developments) would remain functional during and upon completion of construction.	Throughout and completion of construction	Public Lands, Economics
14	Timing of construction activities would be limited in proximity to the TRNP–North Unit. Timing restrictions would extend from RP 126 to RP 130. In this area, regular construction activities (i.e., all activities except pile driving) would be limited to 8 am to 10 pm central time (7 am to 9 pm mountain time). Pile driving activities in this area would be limited to 8 am to 7 pm central time (7 am to 6 pm mountain time). Certain construction activities may require work outside of these times. The contractor would be required to notify the NDDOT prior to working outside of the established times, and the NDDOT would notify the NPS. Should construction fall behind schedule, sustained 24-hour construction may be required. In the event that sustained 24-hour construction becomes necessary, the NDDOT would coordinate with NPS prior to commencing this schedule. Prior to developing the Special-Use Permit for temporary construction activities on NPS-managed lands, discussions would be had regarding extenuating circumstances that may necessitate 24-hour construction and additional conditions that may accompany 24-hour construction.	Throughout construction	Public Lands, Noise, Visual
15	Landowner negotiations would occur regarding impacts on existing stock ponds and necessary mitigation or compensation, including coordination with the USFS and the associated grazing permit holder for a stock pond located on USFS-managed lands near RP 110.33. Permitting may be required for mitigation actions depending upon the nature and location of the mitigation. Coordination with the USACE would be required if the proposed activity involves jurisdictional waterbodies. Additionally, if the proposed activity involves the diversion or impoundment of 12.5 acre-feet or more of water for livestock, a permit from the NDSWC would be required, and any industrial use of water would require a permit from the NDSWC.	Prior to and throughout construction	Public Lands, Water Resources
16	A noxious weed management plan would be implemented during construction and re-seeded areas would be maintained until such time that the vegetation is consistent with surrounding undisturbed areas and the site is free of noxious weeds. Any state- or county-listed noxious weeds identified on USFS-managed lands along the project corridor would be controlled in coordination with the USFS in compliance with the 2007 DPG Noxious Weed Management Project EIS.	Throughout and completion of construction	Public Lands, Wildlife, Vegetation
17	All construction equipment and vehicles to be used on USFS- or NPS-managed lands would be pressure washed and free of noxious weeds and plant propagules (i.e., seeds and vegetative parts that may sprout) prior to entrance onto the project site. This would include equipment and vehicles intended for off-road as well as on-road use, whether they are owned, leased, or borrowed by the contractor or any subcontractor. Cleaning of vehicles and equipment would occur off-site.	Prior to and throughout construction	Public Lands, Wildlife, Vegetation
18	The seed mixture for the Badlands area (i.e., RP 121.4 to RP 130.0) would be developed in coordination with the NDDOT, FHWA, USFS, NPS, and Tribal Consultation Committee (TCC). The seed mixture for USFS-managed lands outside of the Badlands area would be in accordance with USFS Seed Mixture #37-28A Scenario #13. The seed mixture for all other areas would follow the NDDOT Standard Specifications for Road and Bridge Construction, and may include a pollinator component.	Prior to construction	Public Lands, Wildlife, Vegetation
19	The TRNP–North Unit Entry Sign would be removed (intact) and reset in accordance with a Special Provision of the Construction Specifications that would be drafted for the sign.	Prior to and completion of construction	Public Lands, Historic and Archaeological Preservation, Section 4(f)

… table continued on page ES-18 …

NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
20	Long-term, fixed lighting associated with staging areas between RP 126 and 130 would consist of downcast, shielded lighting. Lighting would not be in use 24 hours per day unless NDDOT obtains permission from the NPS for limited duration 24-hour lighting. Short-term, fixed and/or mobile lighting would not consist of downcast, shielded lighting. This lighting would be limited to the duration of construction activities, as described above.	Throughout construction	Public Lands, Visual
21	Visual screening (e.g., slatted chain link fencing) would be installed prior to construction along the western- and northern-most sides of the Long X Bridge staging areas. Visual screening would be an earth-tone color.	Throughout construction	Public Lands, Visual
22	A grinding technique (similar to Next Generation Concrete Surface treatments) would be implemented on the new Long X Bridge to minimize noise.	Throughout construction	Noise
23	Prior to commencement of bridge removal activities under Option LX-3, a demolition plan would be submitted by the contractor to the NDDOT for review and approval. Removal activities would not commence until approval of the demolition plan has been received from the NDDOT. If the bridge is adopted, the SHPO would also review and approve the demolition plan. All portions of the existing bridge that extend above the river bottom would be removed and disposed of at an approved facility or salvaged. Debris and water used during concrete sawing would be prevented from falling into the river to the extent practicable. Debris and temporary fill material would be removed from the river channel to the extent practicable.	Prior to and throughout construction	Water Resources
24	The streamgage located on the Long X Bridge would continue to be operational during construction activities. Under Option LX-3, coordination with the US Geological Survey and NDSWC would occur during final design to incorporate necessary design features into the plan set and/or contract provisions for the relocation.	Prior to and throughout construction	Water Resources
25	During the use of any causeway or bypass, water flow would be maintained by installing temporary culverts or by leaving part of the channel open.	Throughout construction	Water Resources
26	Sandblasting and painting for Options LX-1 and LX-2 would include full containment of the bridge during sandblasting to facilitate collection, removal, and disposal of the existing paint and sandblasting materials. Containment would remain in-place during the application of the new paint system.	Throughout construction	Water Resources
27	Rock riprap and box culvert bottoms would be buried to minimize impacts on channels and riparian corridors.	Throughout construction	Water Resources
28	During final design, wetland and Other Waters impacts would be refined, and additional avoidance and minimization measures would be analyzed. Unavoidable permanent impacts would be mitigated for in accordance with EO 11990 and Section 404 of the *Clean Water Act*. Wetland mitigation is anticipated to be accomplished through the creation of wetland mitigation site(s) and/or mitigated at a wetland mitigation bank. Mitigation would be determined during final design and permitting.	Prior to and completion of construction	Water Resources, Wildlife
29	The NDDOT would coordinate with the North Dakota Game and Fish Department (NDGF) during final design of the bighorn sheep wildlife underpass. The NDDOT would coordinate with the NDGF, USFS, and NPS during final design of the wildlife fencing and associated features.	Prior to construction	Wildlife
30	The NDDOT and NDGF have entered into an MOA to continue coordination with regard to pronghorn crossings, including reanalyzing the crossings during final design.	Prior to construction	Wildlife
31	The NDDOT Utility Engineer or consultant would request that utility companies install line markers (bird diverters) on overhead utility lines to be raised, lowered, and/or moved to reduce the risk of flight collisions for birds, including the whooping crane. The utility company would determine the type, number and placement/spacing of the line markers and may conclude that the placement of line markers is not feasible in certain situations.	Prior to construction	Wildlife
32	A field survey for raptor nests would be completed during the breeding and nesting season in North Dakota (February 1 to August 15) in accordance with the Eagle and Raptor Aerial Nest Survey Report and Biological Evaluation (BE) that were developed for the project. If any nests are found, appropriate minimization measures (such as timing restriction and avoidance buffers) would be implemented.	Prior to construction	Wildlife
33	If construction activities occur during the migratory bird nesting and breeding season in North Dakota (between February 1 and July 15), work areas would be mowed and/or grubbed prior to the nesting and breeding season. If mowing and/or grubbing is not completed prior to the nesting and breeding season, a qualified biologist would conduct pre-construction surveys to check the status of existing and historical nests and search for new nests, for migratory birds, including raptors, and their nests within the work areas. If active nests are identified, the NDDOT would coordinate with the USFWS prior to commencement of work to determine any measures necessary to minimize harm. In addition, the NDDOT Standard Special Provision for the Migratory Bird Treaty Act would be included with the Construction Specifications. This Special Provision includes stipulations pertaining to nests during construction activities involving bridges, box culverts, and structural plate culverts.	Prior to construction	Wildlife
34	To minimize potential impacts on sharp-tailed grouse breeding habitat, spring surveys of known leks (i.e., breeding sites) identified in the BE that was prepared for the project would be conducted prior to commencement of construction activities. If a lek site is determined to be active, all construction activity within 1 mile of the active lek site would be suspended for the first two hours of daylight beginning at sunrise for the time period of May 1 to June 15.	Prior to and throughout construction	Wildlife
35	Temporary fencing between construction activities and identified potential Dakota skipper habitat would be installed. A speed limit of 15 miles per hour would be maintained within a 0.6-mile radius of the identified Dakota skipper habitat (RP 121.5 to RP 122.9) for all construction vehicles traveling off of the existing roadway within the limits of construction from June 15 to July 15.	Prior to and throughout construction	Wildlife
36	Equipment that was last used outside of North Dakota or within a Class I infested waterbody would be inspected by the NDGF prior to being placed within waters of the state (as defined in North Dakota Century Code Chapter 60-01-01) to minimize the risk of spreading aquatic nuisance species.	Prior to and throughout construction	Wildlife
37	To minimize impacts on fish during the spawning period, work in the South Branch of the Green River, Little Missouri River, and Spring Creek would not occur between April 15 and June 1, except within coffer dams installed outside of this timeframe.	Throughout construction	Wildlife
38	In the event that any threatened or endangered species are identified within 1 mile of construction activities, the contractor would be required to notify the project engineer immediately. The project engineer would then cease all construction activities; establish a minimum 0.5-mile avoidance area; and immediately notify and coordinate with the USFWS, FHWA, and NDDOT. The contractor would not resume work within the avoidance area until the project engineer has confirmed with the agencies that work may proceed (i.e., either species have left the area or approved minimization measures have been implemented). A threatened and endangered species poster or pamphlet would be provided on all job sites.	Throughout construction	Wildlife
39	To minimize impacts on the bighorn sheep during lambing season, construction activities from approximately RP 124.1 to RP 126.4 would be limited to an area generally defined by ROW/easement or the surface of the roadway, inslopes, and ditches from April 1 to July 15.	Throughout construction	Wildlife
40	To minimize impacts on fish species, instream riverine water flow would be maintained at baseline depth during construction to allow fish passage.	Throughout construction	Wildlife
41	The NDGF and NDDOT would coordinate to monitor the effectiveness and manage the wildlife crossings. In addition, the NDDOT, NDGF, NPS and USFS would coordinate to maintain the wildlife fencing and associated features.	Completion of construction	Wildlife

… table continued on page ES-19 …

NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
42	The area near the wildlife underpass at RP 126.1 within the NDDOT easement would be cleared of woody vegetation to improve sight lines for bighorn sheep as they approach the underpass.	Throughout construction	Wildlife, Vegetation
43	For each construction phase, impacts on woody vegetation would be assessed and recorded during construction. The NDDOT would coordinate with the NDGF to determine future mitigation needs and methods.	Throughout and completion of construction	Wildlife, Vegetation
44	An inadvertent discovery plan would be developed for the project prior to construction that would outline procedures and requirements in the event that cultural resources are discovered during construction.	Prior to construction	Historic and Archaeological Preservation
45	Under Option LX-2, to maintain the integrity of the historic Long X Bridge, a mechanism would be created in coordination with the NDDOT, FHWA, and SHPO to ensure continued maintenance so the bridge does not fall into neglect.	Prior to construction	Historic and Archaeological Preservation
46	Under Option LX-3, in accordance with the Bridge Adoption Program (23 United States Code [U.S.C.] 144), the Long X Bridge was made available for adoption and advertised for 30 days. If no successful adoption occurs, an MOA containing alternate mitigation measures has been signed between the FHWA, NDDOT, and SHPO. The MOA and related documentation, developed in consultation with the SHPO and consulting parties (i.e., TCC), would be filed with the Advisory Council on Historic Preservation (ACHP) at the conclusion of the consultation process.	Prior to construction	Historic and Archaeological Preservation, Section 4(f)
47	The mitigation approach for the permanent impact on the Dolyniuk Homestead includes documentation of the site, as well as the nearby Gregory Homestead, in 2018.	Prior to construction	Historic and Archaeological Preservation, Section 4(f)
48	State Form Number 17987 Asbestos Notification of Demolition and Renovation form would be submitted to the North Dakota Department of Health (NDDH) at least 10 working days prior to demolition of the South Branch of the Green River Bridge and Spring Creek Bridge, and renovation or removal of the Long X Bridge. In addition, all regulated "asbestos-containing materials (ACMs) identified at the Long X Bridge would be removed by properly certified and licensed individual(s), and an asbestos management/removal plan would be developed prior to renovation or removal. All waste ACMs would be properly disposed of in an approved landfill, in accordance with local, state, and federal regulations. Confirmation on whether or not the materials covering the communication box and conduit on the Long X Bridge are ACMs and proper removal of these materials prior to renovation or removal of bridge would be coordinated with the owner of the utilities prior to implementation of the project.	Prior to and throughout construction	Hazardous Waste
49	All hazardous wastes generated as a result of the project would be handled in accordance with the Resource Conservation and Recovery Act (RCRA) Subtitle C waste management program and the requirements and regulations of the NDDH.	Throughout construction	Hazardous Waste
50	If the contractor encounters abnormal conditions (e.g., presence of barrels, obnoxious odors, excessively hot earth, smoke) during construction that indicate the presence of hazardous materials or toxic wastes anywhere the contractor performs work, the contractor would immediately suspend the work and notify the project engineer. The contractor would continue construction in other areas of the project, but would not resume work in the area of the abnormal condition, unless directed to by the project engineer.	Throughout construction	Hazardous Waste
51	Lead-based paint associated with the Long X Bridge would be properly removed or stabilized prior to renovation or removal of the structure and disposed of at an off-site facility approved for lead waste.	Throughout construction	Hazardous Waste
52	Upon funding and the initiation of final design, the NDDOT would coordinate with utility companies to minimize impacts on utilities, avoid known sensitive resources (i.e., cultural resources, wetlands, USFS-designated sensitive plant populations), and coordinate ROW and easement acquisition activities.	Prior to construction	Energy, Utilities
53	Any utility relocations that occur outside of NDDOT ROW or USFS easements would be required to obtain individual state and federal approvals, as necessary. This would include obtaining a ROW permit from the NPS for any relocations occurring on NPS-managed lands.	Prior to construction	Energy, Utilities
54	Any USFS-designated sensitive plant species or USFS-designated watch plant species observed during construction would be reported to the USFS.	Throughout construction	Vegetation
55	Where avoidance is possible, fencing would be installed to minimize impacts on the population of Hooker's townsendia daisy identified in the BE that was prepared for the project to prevent disturbance to the maximum extent practicable.	Prior to construction	Vegetation
56	The NDDOT would be responsible for the control of noxious weeds within NDDOT ROW/easements after construction of the project.	Completion of construction	Vegetation

Contents

Figures

Tables

Appendices

Documents Appended by Reference*

- Access Memorandum (2017)
- Alternatives Methodology Report (2018)
- Asbestos Survey Report for NDDOT Bridge No. 0085-084.342 (Green River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-126.562 (Little Missouri River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-136.949 (Spring Creek) (2017)
- Badlands Alternative Alignment Memorandum (2017)
- Biological Evaluation (2017)
- Bridge Design Criteria Document (2016)
- Cattle Pass and Stock Pond Memorandum (2017)
- Class III Cultural Resource Inventory in Billings, McKenzie and Stark Counties, North Dakota, Parts I and II (2016)
- Coordination Plan (2016)
- Culvert Hydrologic & Hydraulic Analysis—Existing Conditions Technical Memorandum (2017)
- Dakota Skipper Field Botany Survey Report (2017)
- Draft EIS Public and Agency Involvement Report (2019)
- Eagle and Raptor Aerial Nest Survey Report (2016)
- Field Wetland Delineation Report (2016)
- Geotechnical Data Report (2016)
- Geotechnical Data Report Addendum (2017)
- Geotechnical Design Memoranda (2017)
- Green River and Spring Creek Structure Concept Memorandum (2017)
- Horseshoe Bend Landslide Mitigation Considerations Memorandum (2017)
- Horseshoe Bend Landslide Mitigation Considerations Memorandum Addendum (2017)
- Horseshoe Bend Summary Memorandum (2017)
- Hydraulic Analysis and Structure Selection Report (2017)
- Little Missouri River Crossing Feasibility Study (2013)
- Map Book (2016)
- McKenzie County Alternative Analysis Memorandum (2017)
- Nationwide Rivers Inventory Consultation Package (2019)
- Noise Report (2017)
- Northern Long-eared Bat Habitat Assessment & Acoustic Survey Plan (2016)
- Northern Long-eared Bat Summer Acoustic Survey Results Report (2016)
- Paleontological Field Survey Report (2017)
- Phase I Environmental Site Assessment (2017)
- Phase II Evaluative Testing of 13 Sites on Private Lands in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Seven Sites on Federal Land in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Three Sites on Private Land in McKenzie County, North Dakota (2017)
- Preliminary Design Revisions Memorandum (2018)
- Programmatic Biological Assessment Project Submittal Package (2017)
- Public Alternatives Workshop Report (2017)
- Quiet Pavement Memorandum (2017)
- Right of Way Methodology Document (2017)
- Roadway Design Criteria Document (2016)
- Scenic Overlook Memorandum (2017)
- Scoping Report (2016)
- SPreAD Memorandum for Temporary Pile Driving Activities (2018)
- SPreAD Memorandum for the Badlands Area (2017)
- Subsurface Characterization Report (2016)
- Subsurface Characterization Report Addendum (2017)
- Traffic Operations Report (2016)
- Trail Memorandum (2017)
- Tree Survey Memorandum (2017)
- Utility Coordination Memorandum—Preliminary Engineering (2017)
- Value Engineering Study Evaluation and Screening Process Report (2017)
- Vertical Clearance Study and Recommendations Report (2016)
- Viewshed Analysis Methodology Memorandum (2017)
- Wildlife Crossing/Accommodation Volume I: Need and Feasibility Assessment (2017)
- Wildlife Crossing/Accommodation Volume II: Technical Report (2018)

* For more information or to obtain a copy of a document appended by reference, please contact:

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Acronyms

Symbols

µg/m3 (micrograms per cubic meter)

A

AAQM (Ambient Air Quality Monitoring)
AASHTO (American Association of State Highway and Transportation Officials)
ACBM (asbestos-containing building material)
ACHP (Advisory Council on Historic Preservation)
ACMs (asbestos-containing materials)
ADT (average daily traffic)
APE (area of potential effect)

B

BA (Biological Assessment)
BCE (Before Common Era)
BEA (Bureau of Economic Analysis [US])
BE (Biological Evaluation)
BGEPA (Bald and Golden Eagle Protection Act)
BIA (Bureau of Indian Affairs)
BLM (Bureau of Land Management)
BLS (Bureau of Labor Statistics [US])
BMPs (best management practices)

C

CCC (Civilian Conservation Corps)
CEQ (Council on Environmental Quality)
CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)
CFR (Code of Federal Regulations)
CH_4 (methane)
CO_2 (carbon dioxide)
CO (carbon monoxide)

D

dBA (A-weighted decibels)
dB (decibel)
dBZ (Z-weighted decibels)
DEM (digital elevation model)
de minimis (lacking significance or importance; so minor as to merit disregard)
DHHS (Department of Health and Human Services)
DOI (Department of the Interior)
DPG (Dakota Prairie Grasslands)

E

EA (Environmental Assessment)
ECOS (Environmental Conservation Online System)
e.g. (*exempli gratia*, "for example")
EIA (Energy Information Administration)
EIS (Environmental Impact Statement)
EO (Executive Order)
ESA (Endangered Species Act)
ESA (Environmental Site Assessment)
ETS (Environmental & Transportation Services)
et seq. (*et sequentes*, "and the following")

F

FAST (Fixing America's Surface Transportation Act)
FEMA (Federal Emergency Management Agency)
FHWA (Federal Highway Administration)
FIRMs (Flood Insurance Rate Maps)
FPPA (Farmland Protection Policy Act)

G

GHGs (greenhouse gases)

H

HDD (Horizontal Directional Drilling)
HSM (Highway Safety Manual)
Hz (hertz)

I

I-94 (Interstate 94)
i.e. (*id est*, "that is")
IHSDM (Interactive Highway Safety Design Model)
in situ ("on site", "in position")
IPaC (Information for Planning and Conservation)
IPCC (Intergovernmental Panel on Climate Change)
ITS (Intelligent Transportation System)

K

kHz (kilohertz)

L

LEP (limited English proficiency)
L_{eq} (equivalent sound level)
LMNG (Little Missouri National Grasslands)
LOS (level of service)
LRFD (Load and Resistance Factor Design)
LRMP (Land and Resource Management Plan)

M

MA (Management Area)
MAP-21 (Moving Ahead for Progress in the 21st Century Act)
MAs (Management Areas)
MBTA (Migratory Bird Treaty Act)
MDOT (Michigan Department of Transportation)
MIS (Management Indicator Species)
MnDOT (Minnesota Department of Transportation)
MOA (Memorandum of Agreement)
mph (miles per hour)
MVMT (million vehicle miles traveled)

N

N_2O (nitrous oxide)
NAAQS (National Ambient Air Quality Standards)
NAC (Noise Abatement Criteria)
ND-16 (North Dakota Highway 16)
ND-22 (North Dakota Highway 22)
ND-200 (North Dakota Highway 200)
NDAC (North Dakota Administrative Code)
NDCC (North Dakota Century Code)
NDDA (North Dakota Department of Agriculture)
NDDH (North Dakota Department of Health)
NDDMR (North Dakota Department of Mineral Resources)
NDDOT (North Dakota Department of Transportation)
NDGF (North Dakota Game and Fish Department)
NDHP (North Dakota Highway Patrol)
NDIC (North Dakota Industrial Commission)
NDPDES (North Dakota Pollutant Discharge Elimination System)
NDPRD (North Dakota Parks and Recreation Department)
NDSWC (North Dakota State Water Commission)
NDTD (North Dakota Tourism Division)
NEPA (National Environmental Policy Act)
NFS (National Forest System)
NHI (Natural Heritage Inventory)
NHPA (National Historic Preservation Act)
NHS (National Highway System)
NIH (National Institutes of Health)
NO_2 (nitrogen dioxide)
NOA (Notification of Availability)
NOI (Notice of Intent)
NO_x (nitrogen oxides)
NPS (National Park Service)
NRCS (Natural Resources Conservation Service)
NRHP (National Register of Historic Places)
NRI (Nationwide Rivers Inventory)

O

O_3 (ozone)
OSHA (Occupational Safety and Health Administration)

P

PBA (Programmatic Biological Assessment)
Pb (lead)
PFYC (Potential Fossil Yield Classification)
$PM_{2.5}$ (particulate matter equal to or less than 2.5 microns in diameter)
PM_{10} (particulate matter equal to or less than 10 microns in diameter)
PM (particulate matter)
ppb (parts per billion)
ppm (parts per million)
PRPA (Paleontological Resources Preservation Act)

R

RCBCs (reinforced concrete box culverts)
RCRA (Resource Conservation and Recovery Act)
right-of-way (ROW)
ROD (Record of Decision)
ROW (right-of-way)
RP (reference point)

S

SAAQS (State Ambient Air Quality Standards)

SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users)

SHPO (State Historic Preservation Office)

SHSND (State Historical Society of North Dakota)

SIP (State Implementation Plan)

SO_2 (sulfur dioxide)

SPPCs (structural plate pipe culverts)

SPreAD (System for the Prediction of Acoustic Detectability)

STIP (Statewide Transportation Improvement Program)

SWPPP (Stormwater Pollution Prevention Plan)

T

TCC (Tribal Consultation Committee)

THPO (Tribal Historic Preservation Office)

TMDLs (total maximum daily loads)

TNM (Traffic Noise Model)

TRE (Theodore Roosevelt Expressway)

TRNP (Theodore Roosevelt National Park)

U

UP (Union Pacific)

USACE (US Army Corps of Engineers)

U.S.C. (United States Code)

USDA (US Department of Agriculture)

USDOT (US Department of Transportation)

USEPA (US Environmental Protection Agency)

USFS (US Forest Service)

USFWS (US Fish and Wildlife Service)

USGS (US Geological Survey)

UST (underground storage tank)

W

WAPA (Western Area Power Administration)

Changes since the Draft Environmental Impact Statement

The following changes have been made to the Final Environmental Impact Statement (EIS) for the US Highway 85 Project since the Draft EIS. In addition, minor updates to punctuation, spelling, grammar, and references have been incorporated. Changes made in response to public and agency comments on the Draft EIS are noted where applicable.

Executive Summary

- What are the alternatives analyzed in this EIS?; Build Alternatives: Revised to incorporate chain up areas per comment on the Draft EIS.
- Figure ES-9, Option LX-2 Simulation A; Figure ES-10, Option LX-2 Simulation B; Figure ES-11, Option LX-3 Simulation A; Figure ES-12, Option LX-3 Simulation B: Revised simulations per updated design.
- Table ES-2, Permanent ROW/Easement on Private and Federal Lands: Revised impacts per updated right-of-way (ROW)/easements.
- What are the anticipated project impacts?: Wildlife: Revised bighorn sheep timing restriction area commitment per North Dakota Game and Fish Department (NDGF) correspondence.
- What public and agency outreach efforts were conducted for the project?: Revised per public hearings held.
- Table ES-4, Summary of Outreach Efforts: Revised per public hearings; lead, cooperating, and participating agencies meeting; and lead and cooperating agencies working sessions held.
- Table ES-5, Environmental Commitments Summary: Revised per updates to Chapter 5; revised bighorn sheep timing restriction area commitment per NDGF correspondence; and clarified NDSWC permitting commitment, and revised wetland and Other Waters commitment per comments on the Draft EIS.

Chapter 1. Purpose and Need

- 1.3.1. Social Demands and Economic Development: Revised oil and gas statistics per updated data.
- 1.5. What is the EIS process?: Revised process per Final EIS.

Chapter 2. Environmental Setting

No change from Draft EIS.

Chapter 3. Alternatives

- Figure 37, Option LX-2 Simulation A; Figure 38, Option LX-2 Simulation B; Figure 39, Option LX-3 Simulation A; Figure 40, Option LX-3 Simulation B: Revised simulations per updated design.
- 3.3.4.3 Offset Alignment from RP 125.6 to 125.9: Added section per updated design.
- 3.3.8. What measures would be implemented to facilitate wildlife movement?: Revised details for wildlife underpass at reference point (RP) 126.1 per updated design.
- Figure 44, Examples of Wildlife Overpass at RP 126.1: Removed span bridge per updated design.
- Table 3, Proposed Structures: Revised per updated design.
- 3.3.12. What would happen to North Dakota Highway Patrol Truck Inspection Sites?: Revised to incorporate chain up areas per comment on the Draft EIS.

Chapter 4. Construction Methods and Phasing

- 4.6 How would the Long X Bridge be removed?: Revised bridge adoption discussion per Memorandum of Agreement regarding Long X Bridge Mitigation.
- 4.7 How would staging areas and construction access be provided at the Little Missouri River?: Revised temporary easements area per updated ROW/easements.
- Figure 50, Construction Easements for the Long X Bridge Options: Revised temporary easements area per updated ROW/easements.
- 4.9 How would the wildlife crossings be constructed?: Revised bighorn sheep underpass fencing discussion per updated project phasing.

Chapter 5. Affected Environment and Environmental Consequences

5.2. Land Use

- Table 8, Temporary Easement on Private and Federal Lands, and Table 9, Permanent ROW/Easement on Private and Federal Lands: Revised impacts per updated ROW/easements.

5.3 Prime and Unique Farmland

- 5.3.4. How would prime and unique farmlands be directly and indirectly affected by operation and construction of the project?: Revised impacts per updated design.

5.6. Social

- 5.6.5. How would the social environment be directly and indirectly affected by operation of the project?: Revised to incorporate chain up areas per comment on the Draft EIS and to incorporate grazing on US Forest Service (USFS)-managed lands.
- 5.6.6 How would the social environment be directly and indirectly affected by construction of the project?: Revised to incorporate temporary signage during construction.

5.8. Public Lands

- 5.8.5. How would the Little Missouri National Grasslands be affected by operation and construction of the project?: Revised grazing allotment impact assessment per updated ROW/easements and added additional commitments per USFS Letter with Specialist Concurrence received, including USFS review of plans and field review, fire stipulations, temporary signage during construction, grazing association coordination, range infrastructure, range water pipelines, and fencing specifications.
- Table 14, Permanent USFS Easements per DPG Management Area, and Table 15, Temporary and Permanent Easements/ROW in Grazing Allotments: Revised impacts per updated ROW/easements.

5.9. Economics

- 5.9.1. What are the regional economic characteristics along the project corridor?: Revised oil and gas statistics per updated data.
- 5.9.3. How would the economic environment be directly and indirectly affected by operation and construction of the project?: Added additional commitment per USFS Letter with Specialist Concurrence received regarding range infrastructure, and incorporated grazing on USFS-managed lands and temporary signage.

5.13. Water Resources

- 5.13.1. What water resources are located along the project corridor?: Added description of wetland types and functions per comment on the Draft EIS and added NRI discussion.
- 5.13.3. How would rivers listed on the NRI and designated State Scenic Rivers be directly and indirectly affected by operation and construction of the project? (Formerly How would Designated State Scenic Rivers be directly and indirectly affected by operation and construction of the project): Revised impact assessment per additional

Little Missouri Scenic River Commission Meeting and added NRI discussion.

- 5.13.4. How would wetlands and Other Waters be directly and indirectly affected by operation and construction of the project?: Added impact calculation methodology, revised mitigation and permitting requirements, and indirect effects discussions per comments on the Draft EIS.
- Table 23, Permanent Wetland Impacts by Wetland Type (New table): Added table per comment on the Draft EIS.
- 5.13.6. How would riverine floodplains and riparian corridors be directly and indirectly affected by operation and construction of the project?: Revised impact assessment regarding river morphology per comment on the Draft EIS.
- 5.13.7. How would water quality be directly and indirectly affected by operation and construction of the project?: Revised North Dakota State Water Commission permitting requirement per comment on the Draft EIS.

5.14. Wildlife

- 5.14.7. What wildlife crossings would be incorporated into the project?: Revised details for wildlife underpass at RP 126.1 per updated design and to add additional commitment per USFS Letter with Specialist Concurrence received regarding removal of vegetation associated with the wildlife underpass at RP 126.1.
- 5.14.8. How would wildlife be directly and indirectly affected by construction of the project?: Revised bighorn sheep timing restriction area commitment per NDGF correspondence.
- Figure 75, Bighorn Sheep Timing Restriction Area: Revised bighorn sheep timing restriction area per NDGF correspondence.

5.18. Energy

- Table 25, Energy Infrastructure Impact Summary (Formerly Table 24): Revised impacts per updated design.

5.19. Utilities

- Table 26, Utility Impact Summary (Formerly Table 25): Revised impacts per updated design.

5.20. Vegetation

- 5.20.2. What noxious or invasive vegetation occurs along the project corridor?: Added North Dakota Department of Agriculture noxious weed information per comment on the Draft EIS.
- 5.20.5. How would vegetation be directly and indirectly affected by operation and construction of the project?: Added additional commitments per USFS Letter with Specialist Concurrence received, including treatment of noxious weeds and reporting USFS-designated sensitive plant species or USFS-designated watch plant species.

Chapter 6. Section 4(f) Evaluation

- 6.1.1. What is the meaning of use under Section 4(f)?: Added constructive use detail per comment on the Draft EIS.
- 6.7. Which Section 4(f) properties were identified along the project corridor, but would not be subject to use from the alternatives and options?: Added constructive use detail per comment on the Draft EIS.
- 6.8. TRNP—North Unit: Added constructive use detail per comment on the Draft EIS.
- Figure 86, Option LX-2 Simulation A; Figure 87, Option LX-2 Simulation B; Figure 88, Option LX-3 Simulation A; Figure 89, Option LX-3 Simulation B: Revised simulations per updated design.

Chapter 7. Summary of Impacts, Commitments, and Permits

- Table 31, Summary of Impacts (Formerly Table 30): Revised per updates to Chapter 5.
- Table 32, Environmental Commitments Summary (Formerly Table 31): Revised per updates to Chapter 5; revised bighorn sheep timing restriction area commitment per NDGF correspondence; and clarified NDSWC permitting commitment, and revised wetland and Other Waters commitment per comments on the Draft EIS.

Chapter 8. Cumulative Effects

- 8.4.1. Oil and Gas Developments: Revised oil and gas statistics per updated data. Corrected pipeline discussion per comment on the Draft EIS.
- 8.5.5. Water Resources: Added NRI discussion.

Chapter 9. Public Involvement and Agency Coordination

- 9.3.2.1. When and why were the lead and cooperating agencies working sessions held?: Revised per additional meetings held.
- 9.3.6.2. When are the public hearings?: Revised per lead, cooperating, and participating agencies meeting and public hearings held.
- 9.3.7.1. What was the purpose of the Little Missouri Scenic River Commission meetings?: Revised per additional meeting held.

Appendices

Appendix A. Notice of Intent

No change from Draft EIS.

Appendix B. Agency Correspondence

- B.1. Natural Resources Conservation Service CPA-106 Form: Replaced document per revised form.
- B.2. US Forest Service Acceptance of Biological Evaluation: Replaced document with "US Forest Service Letter with Specialist Concurrence" per letter received.
- B.8. Memorandum of Agreement regarding Long X Bridge Mitigation: Added document per signed Memorandum of Agreement.
- B.9. National Park Service Section 4(f) Concurrence: Added document per letter received.

Appendix C. Proposed Right-of-Way & Easements

- C.1. Stark County Maps, C.2. Billings County Maps, and C.3. McKenzie County Maps: Revised maps per updated design and ROW/easements.

Appendix D. SPreAD Analysis

No change from Draft EIS.

Appendix E. Visual Assessment Results

- E.1. Existing Conditions and Simulated Changes: Revised visual simulation for Theodore Roosevelt National Park (TRNP)—North Unit Temporary Administrative Center per updated design.

Appendix F. Wetlands and Other Waters

- F.1. Wetland and Other Waters Impact Tables, F.2. Wetland and Other Waters Impact Figures, and F.3. Section 404(b)(1) Evaluation: Added appendix per comments on the Draft EIS.

Chapter 1. Purpose and Need

Important topics in this chapter:

List of documents appended by reference in this chapter:

- Alternatives Methodology Report (2018)
- Draft EIS Public and Agency Involvement Report (2019)
- Public Alternatives Workshop Report (2017)
- Scoping Report (2016)
- Traffic Operations Report (2016)
- Value Engineering Study Evaluation and Screening Process Report (2017)

1.1. What is the US Highway 85 Project?

The US Highway 85 Project (project) encompasses approximately 62 miles of roadway in western North Dakota. The project begins at the Interstate 94 (I-94) interchange and extends north to the Watford City Bypass (McKenzie County Road 30). Please refer to **Figure 1, Project Location Map.** The goal of the project is to essentially maintain and follow the existing US Highway 85 alignment, utilizing the existing infrastructure to minimize potential impacts on environmental, socio-economic, and human-made resources, to the maximum extent practicable. The proposed action is to expand this segment of US Highway 85 to a four-lane highway with flexible design options to avoid or minimize impacts and rehabilitate or replace the historic Long X Bridge over the Little Missouri River.

The project is part of a larger overall effort by the North Dakota Department of Transportation (NDDOT) and Federal Highway Administration (FHWA) to expand US Highway 85 to four lanes between I-94 and US Highway 2. The project is related to, but separate from, the following projects, which have been completed along the US Highway 85 corridor. Please refer to **Figure 2, Previous Projects on US Highway 85 on page 4**.

- Williston Truck Reliever Route: This project extended US Highway 85 around the western edge of Williston, North Dakota. The intent of the project was to improve traffic flow through Williston by providing an alternate route around the corporate limits of the city for through traffic. The typical section for this roadway consists of a four-lane highway with a flush, center median. Construction of this project was completed in 2015.

- US Highway 85 McKenzie County Road 16 to Junction US Highway 2: This project involved expanding US Highway 85 from a rural, two-lane highway to a four-lane highway with a flush, center median between McKenzie County Road 16 and the junction of US Highway 2. In addition, this project involved replacing the existing two-lane bridge over the Missouri River with a new four-lane bridge. Construction of this project began in 2014 and was completed in the fall of 2017.

- US Highway 85 Watford City to McKenzie County Road 16: This project involved expanding US Highway 85 between Watford City and McKenzie County Road 16 from a rural, two-lane highway to a four-lane highway with a flush, center median. Construction of this project was completed in 2014.

- Alexander Bypass: This project involved constructing a highway bypass to reroute US Highway 85 around the corporate limits of Alexander, North Dakota. The typical section for this roadway consists of a four-lane highway with a flush, center median. Construction of this project was completed in 2014.

- Watford City Bypass: This project involved constructing a highway bypass around the corporate limits of Watford City, connecting US Highway 85 and North Dakota Highway 23. The typical section for this roadway consists of a four-lane highway with a flush, center median. Construction of this project was completed in 2015.

1.2. Who is leading the project?

The project is being led by the FHWA in cooperation with the NDDOT. The FHWA and NDDOT are functioning as joint lead agencies and are the primary entities responsible for compliance with the *National Environmental Policy Act* (NEPA) for which this Environmental Impact Statement (EIS) is being prepared.

1.3. What is the purpose of the US Highway 85 Project and why is it needed?

US Highway 85 is one of the primary arterial roadways accessing the Bakken Formation oil play in western North Dakota. Over the past several years, average daily traffic (ADT) volumes along this stretch of roadway have experienced a significant increase. Please refer to **Figure 3, ADT 2009–2017 (RP 107.8) on page 4** for a graphical representation of traffic volumes over time at reference point (RP) 107.8 located just north of the ND Highway 200 (ND-200)/US Highway 85 intersection (NDDOT 2017A).

The Bakken Formation oil play is a contiguous area of black shale, siltstone, and sandstone that underlies large areas of northwestern North Dakota, northeastern Montana, southern Saskatchewan, and southwestern Manitoba.

A highway reference point is the location, in miles, from the beginning of a highway within the state, also commonly known as a mile marker.

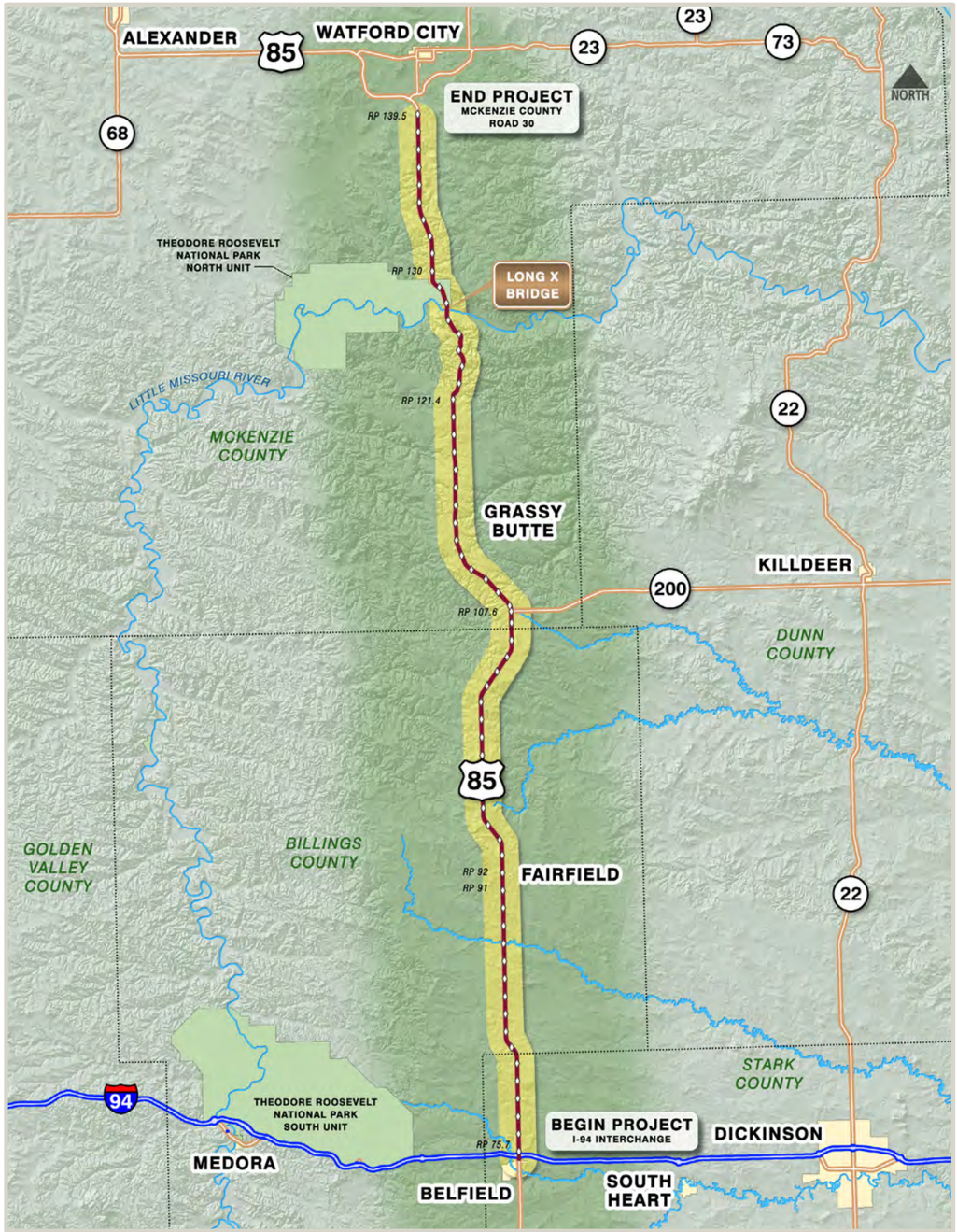


Figure 1, Project Location Map

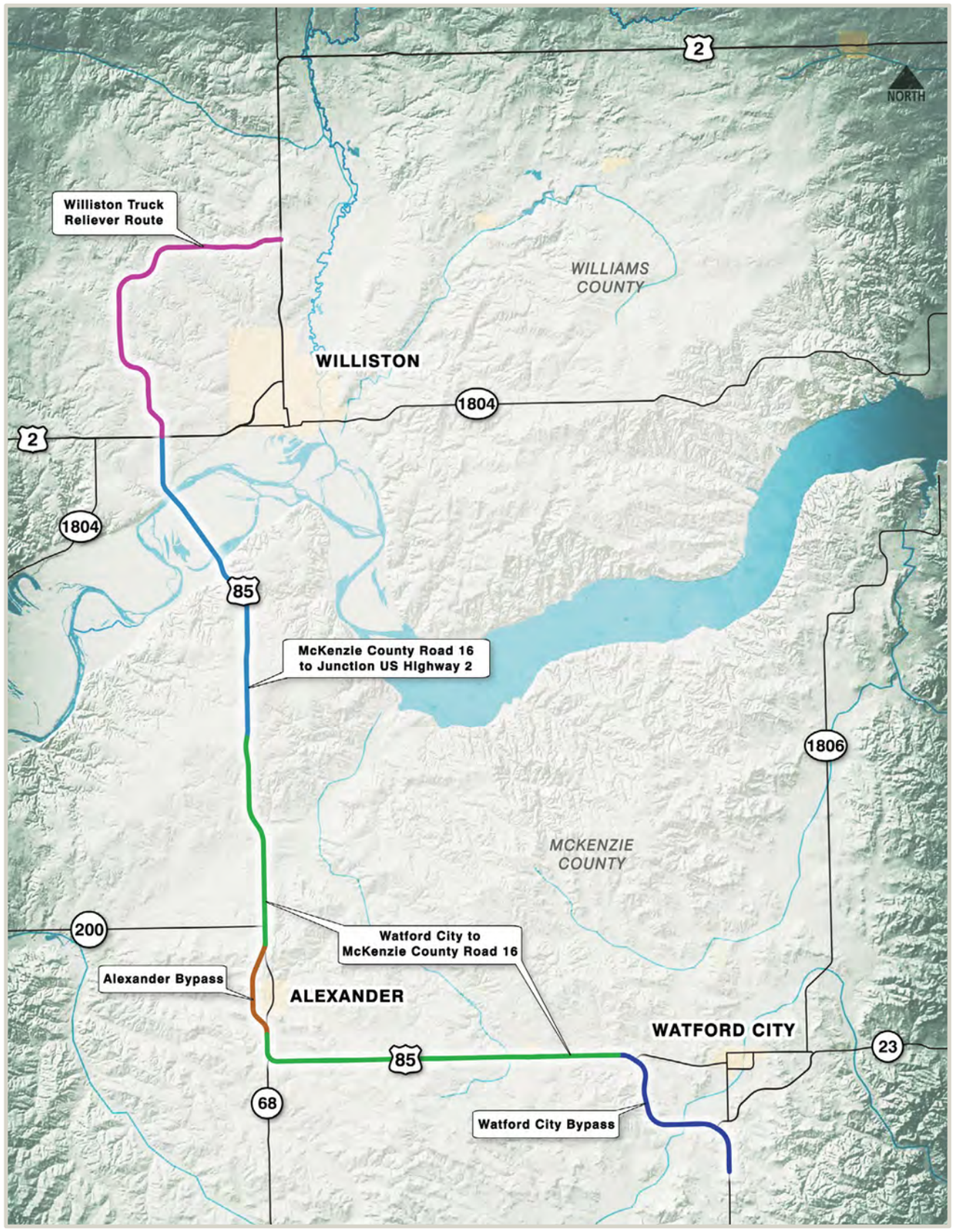


Figure 2, Previous Projects on US Highway 85

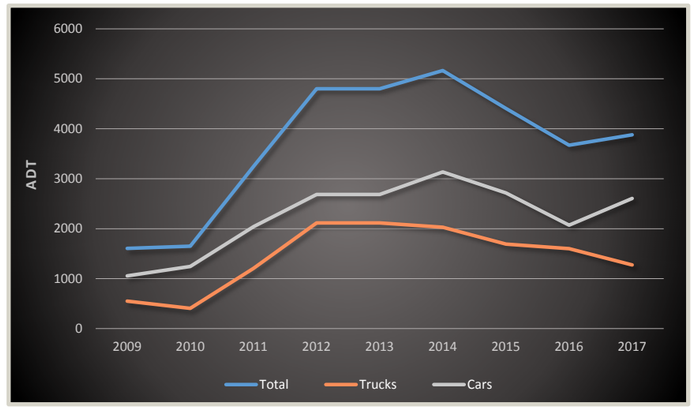


Figure 3, ADT 2009–2017 (RP 107.8)

The purpose of the project is defined as what is to be achieved by carrying out the project.

The need for the project is defined as the problem or opportunity that the project is intending to solve or satisfy.

This traffic growth has created the demand for an improved transportation facility capable of addressing the social and economic issues that have developed within the area. The purpose of the proposed action is to provide a transportation corridor that would:

- Address social demands created by the rise in traffic volumes and influx of people, and facilitate economic development within the region by providing an efficient and reliable highway system
- Accommodate a mix of industrial, agricultural, and passenger traffic, while providing reasonable accommodations for oversized loads and ample passing opportunities for the traveling public
- Improve system linkage within the region and state by expanding the existing highway on essentially its current alignment to create a continuous four-lane highway from the I-94 interchange to US Highway 2
- Improve safety along the project corridor for the traveling public
- Provide highway capacity to accommodate current and future traffic volumes
- Satisfy transportation demands associated with the US Highway 85 corridor, while maintaining compatibility with federal land management agencies
- Improve roadway reliability by addressing current height and width restrictions associated with the Long X Bridge and slope stability and landslide issues along the roadway corridor
- Reduce the potential for wildlife/vehicle-related crashes, and minimize wildlife habitat fragmentation

The purpose of the project, as identified previously, is being driven by underlying needs. These needs are addressed in detail in the following sections.

1.3.1. Social Demands and Economic Development

The rapid development of the oil and gas industry in western North Dakota has placed strain on local towns and communities throughout the region. Between 1950 and 2010, North Dakota had the second slowest population growth in the United States; between 2010 and 2014, North Dakota had the fastest population growth in the United States (Mather and Jarosz 2014). According to the US Census Bureau, the population of McKenzie County increased approximately 98 percent to 12,621 individuals between April 1, 2010, and July 1, 2016 (US Census Bureau 2016b). A study published by North Dakota State University in 2013 estimates that this population increase will continue, with McKenzie County anticipated to grow to more than 16,500 residents by the year 2020 (Bangsund and Hodur 2013).

Spurring this population growth has been the rapid creation of new jobs brought on by the oil and gas industry in western North Dakota. According to Gallup's annual ranking of state job markets, North Dakota ranked number one for six consecutive years (2009 to 2014), adding nearly 98,000 jobs (26.6 percent increase) over the time period (Saad 2015). While many of these jobs were directly associated with the oil and gas industry, nearly all job service sectors experienced sustained growth over this time period (BLS 2017).

The influx of new people, rise in traffic volumes, and expanded economic opportunities all transformed the social atmosphere of the area. These changes created a demand for an improved highway system capable of addressing the social and economic needs of the region.

This growth trend began to reverse in 2015, when the price per barrel of oil began falling due to a worldwide surplus in the crude oil supply (NDIC 2018A, UP 2017, UP 2014).

- From 2013 to 2014, North Dakota experienced an approximate 21 percent annual increase in oil production, and West Texas Intermediate crude oil traded as high as $107.00 per barrel in 2014.
- From 2014 to 2015, there was an approximate 8.9 percent annual increase in oil production in North Dakota, and West Texas Intermediate crude oil traded as high as $61.00 per barrel in 2015.
- From 2015 to 2016, North Dakota experienced an approximate 12 percent annual decrease in oil production, and West Texas Intermediate crude oil traded as high as $54.00 per barrel in 2016.

The sharp decline in oil prices impacted western North Dakota as oil companies were forced to lay off workers and significantly cut back on development of new wells. In 2014, an average of 190 active drilling rigs were operating within the state. In 2015 and 2016, the number of active drilling rigs dropped to 91 and 35, respectively (NDIC 2018A).

In 2017, oil production began to recover and increase as the price per barrel of oil increased. According to Short-term Energy Outlooks developed by the US Energy Information Administration (EIA), Brent spot prices averaged $53.00 per barrel in December 2016 and $64.00 per barrel in December 2017 (the highest monthly average since November 2014). Annual crude oil production in North Dakota increased approximately 3.8 percent from 2016 to 2017 (from 380.4 to 394.8 million barrels) (EIA 2017C, EIA 2018, NDIC 2018A).

In 2018, oil production and the price per barrel of oil continued to increase even further than in 2017. Brent spot prices averaged $74.00 per barrel in June 2018, and the EIA forecasts Brent spot prices to average $73.00 per barrel during the second half of 2018. Between January and April 2018, there was a total of approximately 142.3 million barrels of oil produced in North Dakota, which is 15.9 percent more than what was produced between January and April 2017 (approximately 122.8 million barrels) (EIA 2018, NDIC 2018A).

The EIA forecasts total United States crude oil production to average 10.8 million barrels per day in 2018 and 11.8 million barrels per day in 2019. If realized, both of these forecasted levels would surpass the previous record of 9.6 million barrels per day in 1970 (EIA 2018).

More than 12,500 wells have been drilled in the region between 2009 and 2017 (NDIC 2017). These wells require a maintenance and operation workforce that will remain in the area as long as the wells remain active. According to the Department of Mineral Resources, the price point at which production from existing wells would be shut-in is 15 dollars per barrel (NDIC 2015A). Based on the level of development and population growth that has already occurred within the region, the return to pre-2009 activity levels is unlikely in the near future.

Along the project corridor exists a contrasting array of land uses ranging from communities to oil and gas developments, to public lands and wilderness areas. Consequently, this diversity of land uses also results in a diversity of highway users. The majority of the traffic increases over the past several years can be attributed to industrial development; however, local, agricultural, and recreational traffic still utilize the project corridor on a daily basis. Therefore, it is important that any proposed roadway improvements along this corridor are designed to accommodate the mix of industrial, agricultural, and passenger traffic within the region and address the needs of each user group.

Despite the increase in oil and gas activity over the past several years, agriculture still accounts for a large percentage of overall land use, employment, and economic output in western North Dakota. Approximately 60 percent of the total acreage of McKenzie County is identified as land in farms, while the market value of agricultural products produced within the county exceeds $100 million annually (USDA 2012A). Access to grain elevators within the area is limited, with the nearest elevators located in Watford City, Belfield, and Killdeer. US Highway 85 is a critical connective link for accessing these elevators and functions as a main artery for the agricultural community within the region. Large agricultural equipment is a common sight along the project corridor, highlighting a need for sufficient shoulder widths, access, and passing opportunities.

US Highway 85 travels through the Theodore Roosevelt National Park (TRNP)– North Unit. The TRNP includes three units (i.e., North Unit, South Unit, and Elkhorn Ranch Unit) and is one of the largest tourism draws in the state. The administrative boundary of the TRNP includes both public and private lands. Private lands (i.e., inholdings) consist of properties that were privately owned prior to establishment of the park's administrative boundary and are not open to the public. The entrance to the TRNP–North Unit is located along US Highway 85, just north of the Long X Bridge (approximately 14 miles south of Watford City and 50 miles north of Belfield). Please refer to **Figure 4, TRNP–North Unit**. From 2012 to 2017, the TRNP– North Unit averaged nearly 99,000 visitors annually, the majority of whom accessed the park via the US Highway 85 project corridor. As shown in **Figure 5,**

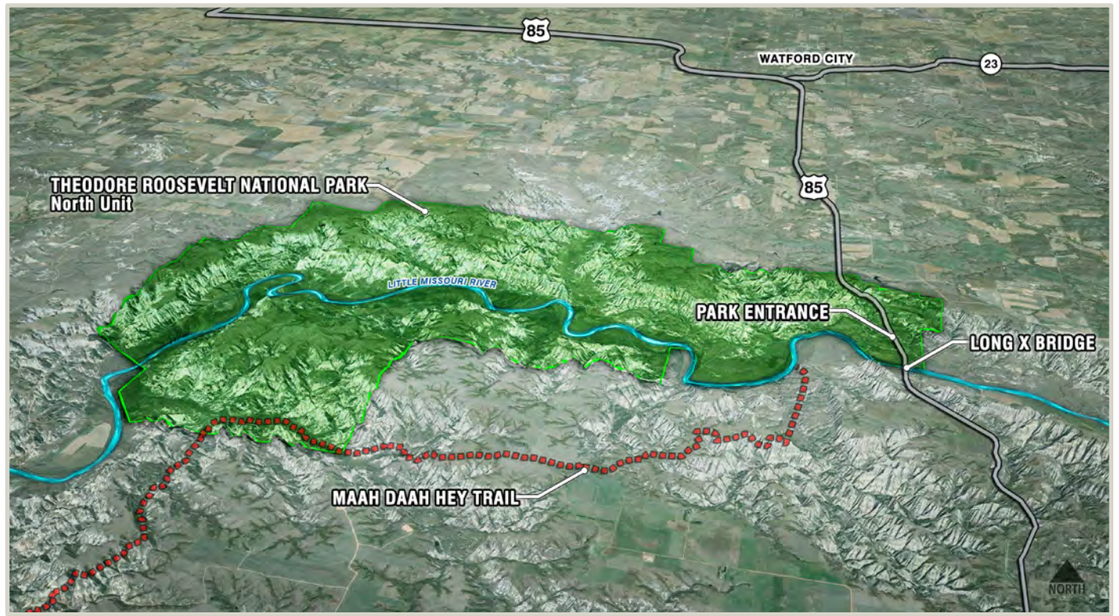


Figure 4, TRNP–North Unit

TRNP–North Unit Annual Visitors, the number of annual visitors to the TRNP–North Unit has increased since 2008, peaking in 2012 and 2016 when it experienced nearly 130,000 and 120,000 visitors, respectively (NPS 2017A).

The Little Missouri National Grasslands (LMNG) covers an area of more than one million acres in western North Dakota. The LMNG is managed by the US Forest Service (USFS) and borders the TRNP, which is managed by the National Park Service (NPS). Please refer to **Figure 6, Overview of Federal Property along Project Corridor on page 6**. The LMNG is the largest National Grassland in the United States, highlighted by mixed-grass prairies and Badlands topography. As demonstrated in **Figure 6**, the LMNG is noncontiguous with intermixed land ownership; private and state parcel ownership is alongside, in between, and among federal parcels. Each USFS-managed parcel of land within the LMNG has been assigned a Management Area (MA) designation, which defines the goals and allowable uses for the parcels. In addition, some areas are designated by the USFS as Inventoried Roadless Areas. Inventoried Roadless Areas, the Nonmotorized Backcountry Recreation MA, and Suitable for Wilderness MA include restrictions for new roadway construction. As is the case for the TRNP–North Unit, US Highway 85 borders numerous parcels and functions as one of the primary arterial roadways for accessing the LMNG.

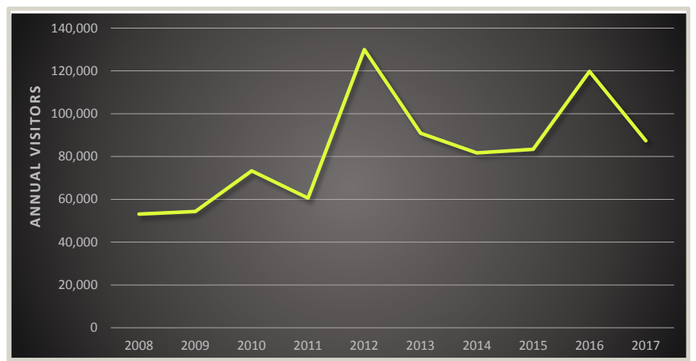


Figure 5, TRNP–North Unit Annual Visitors

U.S. HIGHWAY 85

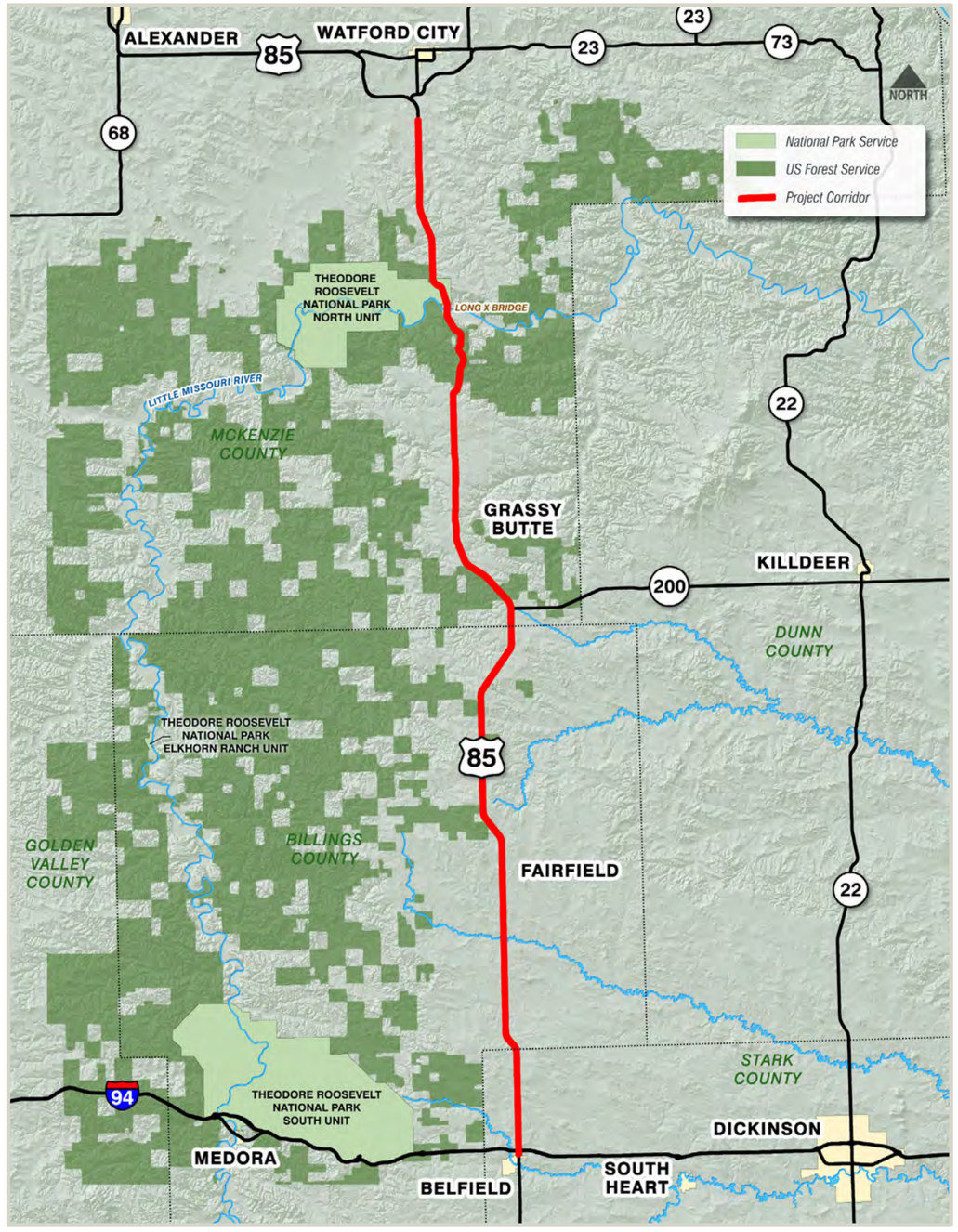


Figure 6, Overview of Federal Property along Project Corridor

Visitors to the TRNP and LMNG are often families, tourists, and recreationists that may not be familiar with the area or may not drive the corridor on a regular basis. In order to accommodate these users, there is a need for adequate turn lanes, signage, and access control to reduce the uncertainty often experienced when traveling on unfamiliar roadways. In addition, there is also the need for a reliable transportation corridor that is not subject to frequent closures. This need transcends user groups and affects both daily and infrequent users of the US Highway 85 project corridor.

Western North Dakota is a relatively undeveloped area with only a handful of major roadways servicing the region. The three paved highways running north from I-94 include North Dakota Highway 22 (ND-22), US Highway 85, and North Dakota Highway 16 (ND-16). ND-22 and US Highway 85 account for the vast majority of daily vehicular travel. To compound the lack of major roadways within the area, there is also a lack of roadways (paved or unpaved) that cross the Little Missouri River. The only two public bridges that cross the Little Missouri River north of I-94 include the Long X Bridge, along US Highway 85, and the Lost Bridge, along ND-22. The Long X Bridge is a truss-style bridge with overhead cross members that place a vehicle height restriction on the bridge of 15 feet, 8 inches (actual bridge height clearance is 16 feet). Over-height vehicles traveling along US Highway 85 are currently forced to detour around the Long X Bridge via ND-22. Depending upon the final destination, this detour can result in an average of 50 additional highway miles traveled one-way. Please refer to **Figure 7, Potential Detour Mileages on page 7**. Between July 2013 and July 2015, a total of 263 over-height permits were submitted to the NDDOT and denied due to the existing height restriction of the Long X Bridge. It is believed that this figure only accounts for a portion of the total over-height vehicles forced to detour around the Long X Bridge, as operators knowledgeable of the existing height restrictions apply for over-height permits utilizing alternate routes.

Existing height restrictions associated with the Long X Bridge indirectly affect more than just over-height vehicles. Since 2011, there have been seven major incidents of over-height vehicles hitting the Long X Bridge resulting in one instance of full closure for five days for analysis and repair, three instances of overnight closures of approximately two weeks each for repairs, and one planned closure to repair the most recent damage. When closures occur, all traffic along this stretch of US Highway 85 is forced to detour around and utilize alternate routes, resulting in social and economic impacts on all user groups. The frequency of these closures is such that the NDDOT has installed a permanent bridge closed sign (which folds down when not in use) at the ND-200/US Highway 85 intersection. In order to address these issues, there is a need for a bridge capable of accommodating taller loads by either reducing or eliminating height restrictions.

Historic Long X Bridge showing height clearance of 16 feet

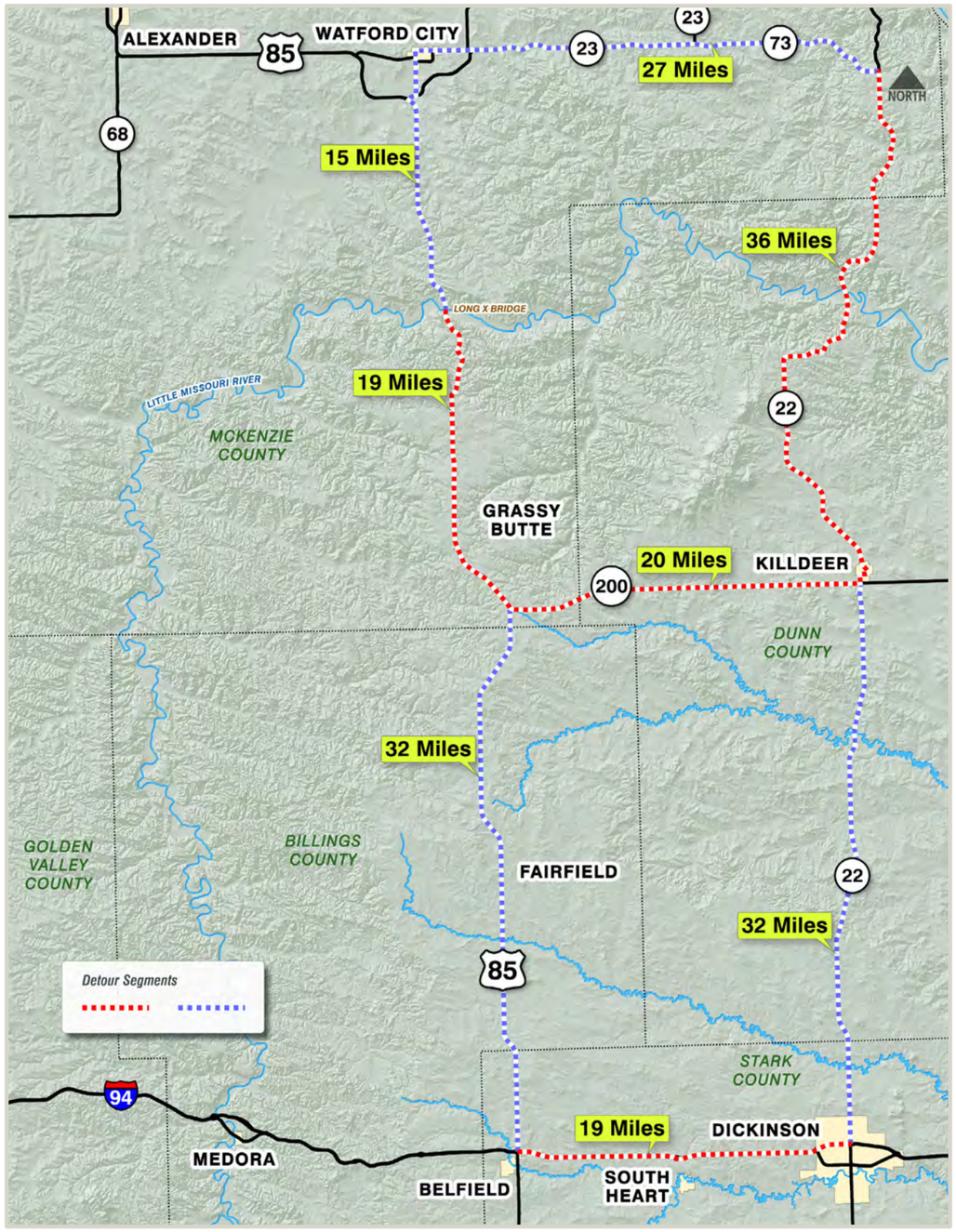


Figure 7, Potential Detour Mileages

In addition to the height restriction, the Long X Bridge is also relatively narrow, with a total horizontal clearance of 30 feet (i.e., two 12-foot-wide driving lanes with 3-foot-wide shoulders on each side). As mentioned previously, large industrial and agricultural loads are common along the project corridor. From January 2014 to November 2015, more than 24,000 legally permitted over-width vehicles crossed the Long X Bridge. While the majority of these loads are able to cross the bridge without disrupting traffic, approximately 1,200 loads were 15 feet wide or greater. These wider loads often necessitate the temporary closure of opposing traffic in order to cross the bridge. This further impacts the overall reliability of the roadway and highlights the need for a bridge capable of accommodating larger loads.

1.3.2. System Linkage/Connectivity

US Highway 85 covers approximately 105 miles from I-94 to the junction of US Highway 2 near Williston. Of these 105 miles of roadway, the northernmost 43 miles between Williston and Watford City have been expanded from a two-lane to a four-lane highway. As noted previously, projects associated with this expansion include the Watford City Bypass, Alexander Bypass, and US Highway 85 expansion projects between Watford City and the junction of US Highway 2. The remaining 62 miles of US Highway 85 located within the project corridor are currently a two-lane, undivided highway.

The goal of the project is to establish a connective link by constructing a continuous, four-lane highway from the I-94 interchange to the Watford City Bypass, with flexible design options to avoid or minimize impacts. In addition to connecting the missing four-lane link along US Highway 85, the project would also provide the missing link to the overall four-lane infrastructure within North Dakota. As can be seen in **Figure 8, Existing Four-Lane Infrastructure**, western North Dakota currently has a gap in its north/south four-lane infrastructure.

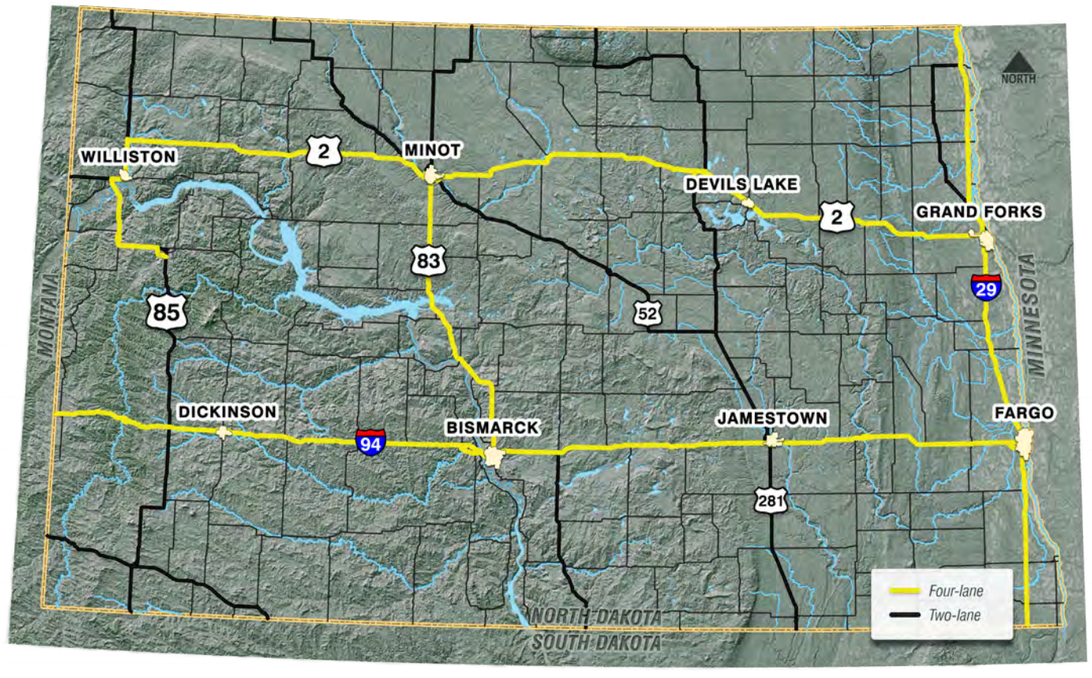


Figure 8, Existing Four-Lane Infrastructure

Traffic demand on US Highway 85

1.3.3. Safety

According to the Traffic Operations Report (**appended by reference**) prepared for the project, there were a total of 342 reported crashes that occurred along the project corridor between June 2010 and May 2015. Of these reported crashes, 90 resulted in injuries and 10 resulted in fatalities. During that timeframe, the corridor had a crash rate per million vehicle miles traveled (MVMT) of 0.70 compared to the 2014 statewide average of 1.55.

As previously noted, traffic along this stretch of US Highway 85 has increased significantly since 2010. In addition, compared to other major highways throughout the state, this stretch of US Highway 85 is subject to a disproportionately high percentage of large truck traffic relative to the ADT (approximately 33 percent). On a two-lane highway with limited passing opportunities, this high percentage of truck traffic can result in drivers engaging in risk-taking behavior to maneuver around slower moving vehicles. Consequently, six of the 10 reported fatal crashes resulted from head-on collisions.

Public comments have cited safety as a major need for the project. During the public scoping process, 37 percent (57 out of 153) of commenters identified safety as a concern along the project corridor. Many of the commenters expressed concerns with unsafe passing conditions, vehicle-wildlife collisions, speeding traffic, a lack of entrance/exit points and turn lanes, multiple types of vehicles and trucks using the highway, and unsafe conditions on the Long X Bridge. As a solution to safety concerns on US Highway 85, several commenters suggested the project roadway be expanded to four lanes to safely accommodate current and future traffic volumes and decrease crash exposure from passing slower-moving vehicles and trucks. As a solution to the safety concerns on the Long X Bridge, several commenters suggested that a new bridge be constructed adjacent to the Long X Bridge.

Although crash data does not indicate that this segment of highway is statistically more dangerous than other highways within the state, public perception and user experiences highlight and heighten the need for a safer roadway. As identified in the Scoping Report (**appended by reference**), public commenters have described the project corridor as, "very, very dangerous" citing "close calls one after another". Crash data only account for reported accidents and do not take into account unreported accidents or near misses. Based on public comments, crash data also fails to account for perceived driver safety and comfort.

Another safety concern identified during the scoping period relates to the safety hazard created when a vehicle is stopped along the side of the highway. Current highway design standards require 8-foot-wide shoulders on rural arterial highways, such as US Highway 85. Existing shoulders along the project corridor vary in width, with some sections of roadway having shoulder widths of 4 feet or less. These narrow shoulder widths create conflict points when vehicles are forced to pull off the roadway, creating safety issues for both the stopped vehicle and other roadway users. Narrow shoulders also impede the ability of law enforcement officers to enforce traffic laws.

1.3.4. Capacity/Traffic Volumes

A capacity analysis was conducted for the project in 2016 (documented in the Traffic Operations Report– **appended by reference**) to determine delay and level of service (LOS). LOS is a term used to describe the operational performance of a transportation corridor. It is a grade value ranging from 'A' to 'F' that corresponds to specific traffic characteristics. LOS 'A' represents a free-flowing system with unimpeded traffic, while LOS 'F' represents a congested system with a breakdown of traffic flow. Please refer to **Figure 9, LOS Overview**.

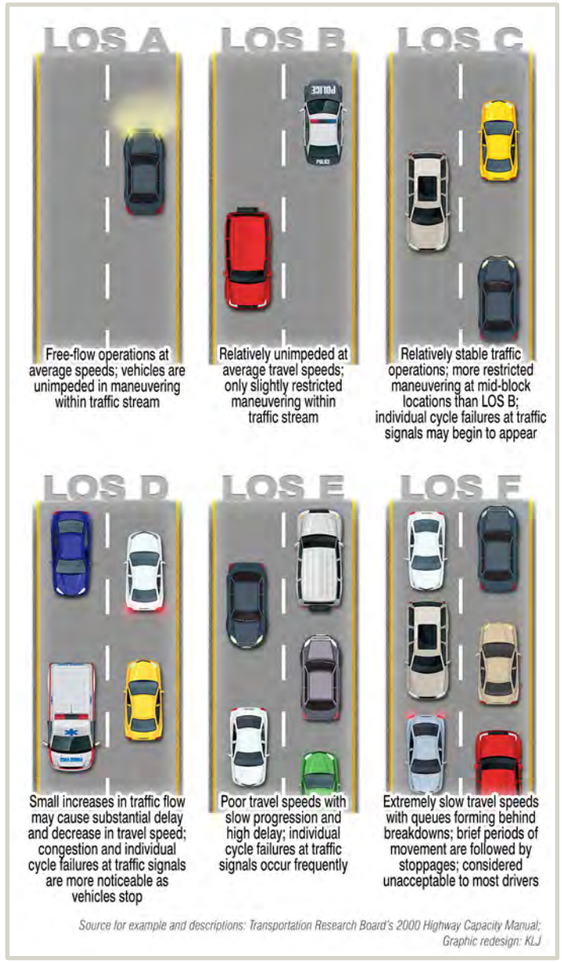


Figure 9, LOS Overview

According to the NDDOT Traffic Operations Manual, LOS 'A' or 'B' is desirable, with LOS 'C' being the minimum acceptable level. Similarly, the NDDOT specifies that LOS 'D,' 'E,' and 'F' correspond to unacceptably poor traffic conditions.

The capacity analysis completed for the project analyzed current and future traffic volumes to determine the LOS based on the existing two-lane roadway configuration. Four representative segments of roadway within the project corridor were analyzed, the result of which can be seen in **Table 1** and **Figure 10, Segment Capacity Analysis LOS on page 9**.

Table 1, Segment Capacity Analysis LOS (Existing Geometry)

Location	LOS	
	2015	2040
22nd St N to Fairfield 20th St	C	D
McKenzie County Rd 50 N to Main St	B	D
RP 121 to RP 123	C	D
22nd St NW to McKenzie County Rd 30	D	E

As shown in **Table 1**, 2015 segment capacity analysis ranges from LOS 'B' to LOS 'D', but as traffic volumes increase, the roadway begins to experience LOS issues ranging from LOS 'D' to LOS 'E' by the year 2040 under existing geometry. As stated previously, LOS 'D' and 'E' correspond to unacceptably poor traffic conditions, highlighting the need for capacity improvements along the entire project corridor.

1.3.5. Transportation Demand/Roadway Classification

US Highway 85 is part of the National Highway System (NHS), which is a network of roadways important to the nation's economy, defense, and mobility. One of the policies for NHS roads is that they "adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance…" In addition, US Highway 85 is classified as an Interregional System road. These roads require a high degree of mobility and reliability in order to support economic activity. According to the NDDOT Design Manual, accommodation of truck traffic is a priority along these roads. Also, US Highway 85 is designated as a High Priority Corridor by the United States Congress, and is part of a larger multi-state, north-south corridor designated as the Ports-to-Plains Alliance. The portion of the Ports-to-Plains Alliance within North Dakota is identified as the Theodore Roosevelt Expressway (TRE).

Traffic along the corridor has experienced unprecedented growth in recent years, primarily due to truck and commercial traffic related to oil and gas development in western North Dakota. As a result, traffic congestion within the corridor has increased substantially, so much so that traffic flow (including the over-the-road movement of goods and services) is impeded, which in turn restricts intra- and interstate commerce. Such conditions conflict with the goals and policies for US Highway 85 as designated previously.

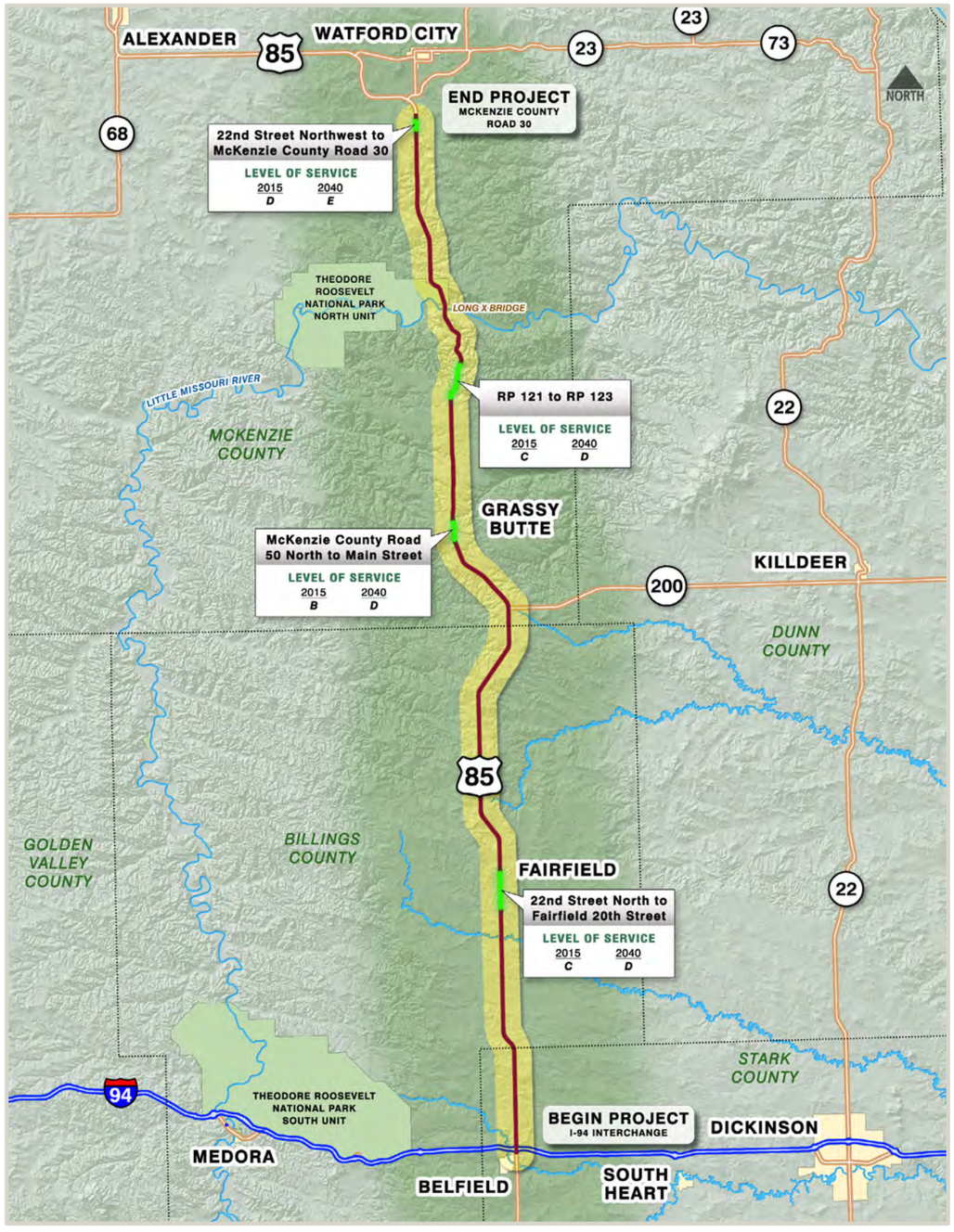


Figure 10, Segment Capacity Analysis LOS

The 2017 North Dakota Legislative Session increased the maximum gross vehicle weight from 105,500 pounds to 129,000 pounds on select designated permittable routes within the state, one of which is US Highway 85. As a result of the increase, NDDOT performed a load rating analysis of the Long X Bridge to determine if the current bridge would be capable of handling the increased gross vehicle weight. This analysis found that under a 129,000-pound load, numerous truss members would be overstressed by approximately 10 percent, highlighting the need for strengthening of the existing structure or replacement with a new structure capable of handling heavier loads.

1.3.6. Slope Instability or Landslides

Roadway reliability is a key consideration in any roadway design project. Roadway reliability is based on frequency and duration of closure to the traveling public. A roadway with a high degree of reliability is rarely closed to traffic, while a roadway with a low degree of reliability is frequently closed to traffic. As previously discussed, one factor currently affecting the reliability of US Highway 85 within the project corridor is the Long X Bridge, due to the existing dimension limitations. A second limiting factor has to do with the geologically active region in which the highway traverses.

Jersey barrier along roadway in landslide area

Approximately 7 miles of the project corridor is located within the Badlands, an area historically prone to landslides. Over the past 10 years, this stretch of roadway has been closed or partially closed to traffic on three separate occasions due to landslides. Although gravity is the ultimate driving force of landslides, there are numerous other contributing factors, including slope, soil composition, soil saturation, and vibration. The North Dakota Geological Survey tracks and maps landslides throughout the state. As can be seen in **Figure 11, Historic Landslides,** the project corridor through the Badlands has

Figure 11, Historic Landslides

been subject to extensive landslide activity. Roadway failure as a result of landslides can affect both the reliability and safety of the roadway. Therefore, design of this roadway requires that special consideration be given to the geotechnical landscape to reduce the potential for impacts due to landslides.

1.3.7. Ecological Connectivity

Primary ecological concerns associated with most rural transportation projects include the loss of habitat connectivity and potential for wildlife-vehicle collisions. US Highway 85 currently functions as a primary transportation corridor within the region, and forecasted traffic volumes indicate that traffic volumes will continue to rise over the next 20 years. Studies have shown that wildlife avoidance of roadways is based on numerous factors, including traffic volumes, roadway geometry, and roadway surfacing. In general, paved roadways present more of a barrier than unpaved roadways, higher traffic volumes present more of a barrier than lower traffic volumes, and wider roadways (higher number of driving lanes) present more of a barrier than narrower roadways. While the primary needs of the project are focused on the human environment, it is also important that the project identify the ecological implications and look for ways to address or offset potential impacts.

The US Highway 85 project corridor spans approximately 62 miles north to south and traverses through two ecoregions as defined by the US Environmental Protection Agency (USEPA) (Bryce *et al.* Undated). The majority of the corridor occurs within the Missouri Plateau ecoregion, characterized by 'wide-open spaces', rolling hills, and a mosaic of agricultural fields and short-grass prairie. The Badlands ecoregion comprises the remainder of the project corridor. As the name implies, this ecoregion is confined to the Badland areas surrounding the Little Missouri River. The landscape is characterized by highly eroded buttes and hillsides composed of soft silts and clays with sparse vegetation.

Weasel observed during cultural survey

Pronghorn observed in area

Bighorn sheep observed crossing roadway

Wildlife are abundant throughout the corridor. Large mammals include white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), and the occasional moose (*Alces alces*). Other mammals known to inhabit the area include coyote (*Canis latrans*), red fox (*Vulpes vulpes*), mountain lion (*Puma concolor*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), black-tailed prairie dog (*Cynomys ludovicianus*), and many more.

1.4. *Why have the FHWA and NDDOT prepared an EIS?*

NEPA requires an EIS be prepared for major federal actions that significantly affect the quality of the human environment. Initial discussions between the FHWA and NDDOT determined that significant impacts as a result of this project were likely due to the scope and location of the proposed action. Therefore, it was decided to initiate the EIS process at the onset of project development.

1.5. *What is the EIS process?*

The EIS process begins with publishing a Notice of Intent (NOI) in the *Federal Register*. The NOI serves as a legal notice, issued by the lead federal agency, that an EIS will be prepared. The NOI for this project was published on October 6, 2015 (Volume 80, Number 193). Please refer to **Appendix A. Notice of Intent**. Once the NOI has been filed, the scoping process can officially begin.

Scoping efforts for this project included public input meetings, an agency scoping meeting, and scoping letters. A Scoping Report (**appended by reference**) was prepared in 2016 to document the project scoping process and serve as a foundation for preparation of this EIS.

> Scoping is the process of gathering public and agency input regarding the proposed action and is a means of determining the scope of the project.

Following completion of the scoping process, project alternatives are developed. The project alternatives development process begins by developing a full range of alternatives. For this project, a three-phase screening process (described in detail in **Chapter 3**) was used to evaluate and develop a range of reasonable alternatives. The range of reasonable alternatives were then presented to agencies and the public and carried forward for analysis in this Final EIS. An Alternatives Methodology Report and a Public Alternatives Workshop Report were developed in 2017 and 2018 to document the alternatives development process and input received from agencies and the public on the alternatives and options. A Value Engineering Study was conducted in June 2017 by engineers and planners who were not involved in development of the project to validate the alternatives, provide additional alternatives to consider, and enhance the currentalternatives.Recommendations developed during the Value Engineering Study were reviewed, categorized, and screened to determine which recommendations should be incorporated into the planning and preliminary design of the project. A Value Engineering Study Evaluation and Screening Process Report was developed in 2017 to document the Value Engineering Study process. All of these reports are **appended by reference**.

> Value Engineering is a systematic process of review and analysis of a project, during the concept and design phases, by a multidiscipline team of individuals that are not involved in the project.

The Draft EIS was based on the information gathered during the scoping process, as well as the expertise of the lead, cooperating, and participating agencies. The basic content of the Draft EIS contains a full description of the proposed action and associated alternatives, as well as a full description of the affected environment and potential direct, indirect, and cumulative impacts of the alternatives. The Draft EIS also identified a Preferred Alternative. The Draft EIS was distributed to agencies and the public for review and comment.

After the Draft EIS comment period concluded, preparation of the Final EIS began. The Final EIS addresses comments received during the Draft EIS comment period and incorporated revisions when appropriate. Comments received during the Draft EIS comment period are addressed in the Final EIS; however, not all comments warranted a revision. All comments received during the Draft EIS comment period have been addressed in a Draft EIS Public and Agency Involvement Report (2019) (**appended by reference**), and comments warranting a revision have been incorporated into the Final EIS.

The final step in the EIS process is to issue a Final EIS/Record of Decision (ROD). The ROD identifies the selected alternative; provides an explanation as to why the selected alternative was chosen; identifies all other alternatives considered, including the environmentally preferable alternative; and includes an explanation of which mitigation measures were or were not adopted and why.

1.5.1. Who are the lead agencies?

Under NEPA, the lead agency or agencies have the primary responsibility for preparing the EIS. The joint lead agencies for the project are the NDDOT and FHWA.

1.5.2. Who are the cooperating agencies?

As defined by NEPA, a cooperating agency is any federal agency that has jurisdiction by law or special expertise with respect to any environmental issue that should be addressed in the EIS. Cooperating agencies are typically invited by the lead agency; however, agencies can also request the lead agency designate it as a cooperating agency. The cooperating agencies for the project and their associated missions are as follows:

- NPS: The mission of the NPS is to preserve unimpaired the natural and cultural resources and values of the NPS system for the enjoyment, education, and inspiration of present and future generations.
- USFS: The mission of the USFS is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.
- US Army Corps of Engineers (USACE): The mission of the USACE Regulatory Program is to protect the Nation's aquatic resources, while allowing reasonable development through fair, flexible, and balanced permit decisions.

1.5.3. Who are the participating agencies?

Unlike lead and cooperating agencies, participating agencies are not identified within NEPA. Participating agencies were established under the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU), which established new procedures to be followed when preparing an EIS for highway projects. The intent is to provide additional project input opportunities for governmental agencies at any level. Participating agencies for the project are listed in **Table 2, Participating Agencies.**

SAFETEA-LU was signed into law on August 10, 2005, to establish funding for highways, highway safety, and public transportation. Additionally, it established a new environmental review process for transportation projects developed as EISs.

Table 2, Participating Agencies

FEDERAL
Bureau of Indian Affairs (BIA)
Bureau of Land Management (BLM)
US Environmental Protection Agency (USEPA)
US Fish and Wildlife Service (USFWS)
Western Area Power Administration (WAPA)
STATE
North Dakota Department of Health (NDDH)
North Dakota Department of Mineral Resources (NDDMR)
North Dakota Game and Fish Department (NDGF)
North Dakota Highway Patrol (NDHP)
North Dakota State Water Commission (NDSWC)
State Historic Preservation Office (SHPO)
Tribal Consultation Committee (TCC)
LOCAL
City of Belfield
City of Watford City
Billings County
McKenzie County
Stark County

1.5.4. What other actions are necessary to complete the project?

In addition to an EIS, it is anticipated the project may require the following approvals and permits:

- North Dakota Pollutant Discharge Elimination System (NDPDES) Permit from the NDDH
- Section 401 of the *Clean Water Act* Certification (unless waived) from the NDDH
- Section 404 of the *Clean Water Act* Permit from the USACE
- Special-Use Permit from the NPS
- Highway Easement Deed from the NPS
- Permanent Easement from the USFS
- Temporary Water Permit from the NDSWC
- Section 106 of the *National Historic Preservation Act* (NHPA) concurrence from the SHPO
- Section 7 of the *Endangered Species Act* (ESA) concurrence from the USFWS
- Section 4(f) of the *Department of Transportation Act* of 1966 (United States Code [U.S.C.] § 303) concurrence from the NPS and approval/determination from the FHWA
- Floodplain Development Permit from the Stark County Floodplain Administrator
- Haul permit(s) from counties, as necessary

Chapter 2. Environmental Setting

The intent of this chapter is to provide an overview of the US Highway 85 project corridor.

Important topics in this chapter:

Figure 12, Environmental Setting Overview

2.1. What is the environmental setting along the US Highway 85 project corridor?

The US Highway 85 project corridor contains numerous uniquely distinct features and landscapes that collectively form the overall project setting.

Please refer to **Figure 12, Environmental Setting Overview**, which illustrates the reference points (RP) along the project corridor. The RPs are grouped into seven setting areas for ease of discussion of the varying landscape along the corridor. An example of typical topography within each setting area is shown in the following subsections.

2.1.1. Setting Area 1: RP 75.7 to RP 91.4

The southern end of the project corridor begins at the Interstate 94 (I-94) interchange, along the northern edge of the City of Belfield. According to the US Census Bureau, in 2016, the estimated population of Belfield was 1,013 individuals (US Census Bureau 2016a).[1] Like many towns in western North Dakota, Belfield has experienced population and economic growth over the past 10 years as the result of oil and gas development. The I-94 interchange is a significant traffic volume contributor to US Highway 85, north of Belfield. Average daily traffic (ADT) volumes along US Highway 85, north of the I-94 interchange, are nearly double the ADT volumes along US Highway 85, south of the I-94 interchange.

Oil well

Progressing north from Belfield, the landscape is dominated by rolling hills with occasional residential homes and farmsteads, and oil and gas well pads scattered throughout. Land use along this stretch of the corridor is primarily cropland with pasture land interspersed. The South Branch of the Green River crosses the corridor approximately 13 miles north of Belfield, while wetlands and minor drainages are located sporadically throughout. Property ownership adjacent to this segment of the project corridor is entirely private, with no state or federal land interests.

Setting Area 1, example landscape

1 Population data for Belfield in 2017 is not yet available; therefore, data from 2016 is used.

2.1.2. Setting Area 2: RP 91.4 to RP 92.0

Approximately 16 miles north of Belfield is the small unincorporated community of Fairfield. According to the US Census Bureau, in 2015, the estimated population of Fairfield and the surrounding area was 190 individuals (US Census Bureau 2015a).[2] The community of Fairfield is bisected by US Highway 85 with residential and commercial properties located on both sides. Notable places within Fairfield include Prairie Elementary School, Billings County Rural Fire Hall, Fairfield Post Office, and Club 85. Currently, posted speed limits along US Highway 85 are reduced from 65 miles per hour (mph) to 45 mph through Fairfield. This is the only community located along the project corridor that is currently subject to speed limit reductions.

Setting Area 2, community of Fairfield

2.1.3. Setting Area 3: RP 92.0 to RP 107.6

Continuing north from Fairfield, the landscape begins to transition gradually from primarily cropland to a mixture of cropland and pasture land. Exposed buttes and deeper drainages emerge as the landscape begins to show signs of erosional influences associated with the Little Missouri River. In contrast to the project corridor occurring south of Fairfield, the project corridor occurring north of Fairfield is bordered by a combination of private and publicly-owned property under the management of the US Forest Service (USFS).

Setting Area 3, example landscape

2.1.4. Setting Area 4: RP 107.6

Approximately 16 miles north of Fairfield, North Dakota Highway 200 (ND-200) intersects US Highway 85. This is the only major highway intersection along the project corridor. ND-200 runs east from this intersection to Killdeer, where it intersects with North Dakota Highway 22 (ND-22). Similar to I-94, ND-200 is another significant traffic volume contributor to US Highway 85. The 2017 ADT volumes along US Highway 85 increase from 3,880 vehicles per day, south of the ND-200 intersection, to 4,680 vehicles per day, north of the ND-200 intersection; an approximate 21 percent increase (NDDOT 2017a). Infrastructure around this intersection includes the Sweet Crude Travel Center, located in the southeastern corner of the intersection, as well as numerous overhead utility lines.

Setting Area 4, Sweet Crude Travel Center

Setting Area 4, ND-200 Intersection

2.1.5. Setting Area 5: RP 107.6 to RP 121.4

The landscape north of ND-200 remains relatively consistent for the next 14 miles, containing a mixture of cropland and pasture land with both private and public land ownership. Located along this stretch of the project corridor is the unincorporated town of Grassy Butte. Unlike Fairfield, Grassy Butte is located entirely along the western side of US Highway 85 and is not bisected by the roadway. According to the US Census Bureau, in 2015, the estimated population of Grassy Butte and the surrounding area was 175 individuals (US Census Bureau 2015a).[3] Notable places within Grassy Butte include the Grassy Butte Post Office, which is listed on the National Register of Historic Places (NRHP), and St. Peter Canisius Catholic Church.

Setting Area 5, Grassy Butte Post Office
—Photo: Wikipedia.com; ©public domain

2.1.6. Setting Area 6: RP 121.4 to RP 130.0

Approximately 9 miles north of Grassy Butte, the landscape of the project corridor changes abruptly as it enters the Badlands. The Badlands are characterized by highly eroded buttes and hillsides composed of soft silts and clays with sparse vegetation. The total length of the project corridor occurring within the Badlands is approximately 7 miles. Topographic relief in this area changes quickly as the roadway descends more than 600 feet to reach the Little Missouri River, before ascending more than 400 feet on the north side of the Little Missouri River to climb back out of the Badlands. Soils within this region are historically unstable due to their composition of soft silts and clays,

2 Population data for individuals living within the boundaries of the Fairfield postal code in 2016 and 2017 is not yet available; therefore, data from 2015 is used. Due to the unincorporated status of Fairfield, the population of the Fairfield community located along the project corridor is unavailable.

3 Population data for individuals living within the boundaries of the Grassy Butte postal code in 2016 and 2017 is not yet available; therefore, data from 2015 is used. Due to the unincorporated status of Grassy Butte, the population of the Grassy Butte community located along the project corridor is unavailable.

Setting Area 6, view east toward Long X Road

making the area susceptible to landslide activity. Landownership through the Badlands is a mixture of private and public. Public property includes the LMNG (managed by the USFS) and the Theodore Roosevelt National Park (TRNP) – North Unit (managed by the National Park Service [NPS]).

Contained within this segment is the historic Long X Bridge, which carries US Highway 85 over the Little Missouri River. The Long X Bridge was constructed in 1959 and is approximately 970 feet long. The structure has been determined eligible for listing on the NRHP. Over the past 10 years, numerous over-height vehicle collisions have damaged the portals and overhead cross members.

Setting Area 6, Long X Bridge

2.1.7. Setting Area 7: RP 130.0 to RP 139.5

Continuing north from the Badlands, the landscape transitions back to a mixture of cropland and pasture land with entirely private land ownership. Spring Creek crosses the corridor approximately 2 miles south of McKenzie County Road 30. Development becomes increasingly prevalent as the corridor nears the Watford City Bypass, located just south of the town of Watford City. Construction of the Watford City Bypass was completed in 2015 and consists of a four-lane, divided highway with a flush, center median. The project would tie into the Watford City Bypass, whereby providing a continuous four-lane highway along US Highway 85 from the I-94 interchange to Williston.

Setting Area 6, example landscape

Setting Area 7, Watford City Bypass

Chapter 3. Alternatives

This chapter describes the alternatives, options, and concepts that have been carried forward for further detailed analysis in this Environmental Impact Statement (EIS); how the alternatives, options, and concepts were developed; and the alternatives, options, and concepts that were considered, but eliminated from further detailed analysis. This chapter also provides a description of the Preferred Alternative.

Important topics in this chapter:

List of documents appended by reference in this chapter:

- Access Memorandum (2017)
- Alternatives Methodology Report (2017)
- Badlands Alternative Alignment Memorandum (2018)
- Bridge Design Criteria Document (2016))
- Cattle Pass and Stock Pond Memorandum (2017)
- Culvert Hydrologic & Hydraulic Analysis - Existing Conditions Technical Memorandum (2017)
- Green River and Spring Creek Structure Concept Memorandum (2017)
- Horseshoe Bend Landslide Mitigation Considerations Memorandum (2017)
- Horseshoe Bend Landslide Mitigation Considerations Memorandum Addendum (2017)
- Little Missouri River Crossing Feasibility Study (2013)
- Map Book (2016)
- McKenzie County Alternative Analysis Memorandum (2017)
- Preliminary Design Revisions Memorandum (2018)
- Public Alternatives Workshop Report (2017)
- Roadway Design Criteria Document (2016)
- Scenic Overlook Memorandum (2017)
- Trail Memorandum (2017)
- Utility Coordination Memorandum – Preliminary Engineering (2017)
- Value Engineering Study Evaluation and Screening Process Report (2017)
- Vertical Clearance Study and Recommendations Report (2016)
- Wildlife Crossing/Accommodation Volume I: Need and Feasibility Assessment (2017)
- Wildlife Crossing/Accommodation Volume II: Technical Report (2018)

3.1. What is the No Action Alternative?

The No Action Alternative (Alternative A) serves as a baseline against which the impacts of potential build alternatives can be evaluated. Under the No Action Alternative, approximately 62 miles of US Highway 85, from the Interstate 94 (I-94) interchange to the Watford City Bypass (McKenzie County Road 30) would not be expanded and the existing Long X Bridge would not be rehabilitated or replaced.

Of the 105 miles of US Highway 85 between I-94 to the junction of US Highway 2, the northernmost 43 miles between Williston and Watford City have been expanded from two lanes to four lanes. The existing project corridor between I-94 and Watford City consists of a two-lane, paved roadway with 12-foot-wide driving lanes and variable shoulder widths. The No Action Alternative would not provide the system linkage and connectivity of a continuous four-lane roadway from I-94 to the junction of US Highway 2.

Passing lanes are largely absent from the project corridor. The 7-mile-long stretch of roadway that traverses the Badlands contains a southbound climbing lane south of the Little Missouri River and a northbound climbing lane north of the Little Missouri River. The climbing lanes allow for passing opportunities through the Badlands. On a two-lane highway with limited passing opportunities, the high percentage of truck traffic traveling down US Highway 85 can result in drivers engaging in risk-taking behavior to maneuver around slower moving vehicles.

Three bridge structures are located along the project corridor to carry US Highway 85 over the South Branch of the Green River, Little Missouri River, and Spring Creek. The South Branch of the Green River and Spring Creek structures are three-span, concrete bridges with no overhead height restrictions. They are in good overall condition with sufficiency ratings of 88.3 and 83.2, respectively. The Long X Bridge is a three-span, steel truss bridge that carries US Highway 85 over the Little Missouri River. This bridge has a height restriction of 16 feet and is in fair condition, with a sufficiency rating of 71.0. As discussed in **Chapter 1**, the Long X Bridge has been hit on numerous occasions by over-height vehicles over the past several years.

The sufficiency rating, which can range from 100 (new bridge) to zero (entirely deficient), is a method of evaluating highway bridge data by calculating four separate factors to obtain a numeric value that is indicative of bridge sufficiency to remain in service.

Under the No Action Alternative, the existing infrastructure would remain as it is today and expansion of the roadway would not occur. This alternative would not meet the purpose and need for the project, as it fails to address social demands, system linkage/connectivity, safety, capacity, transportation demand, slope instability, and ecological connectivity. Therefore, this alternative has not been selected as the Preferred Alternative, but has been retained in this EIS to provide a comparison of effects (baseline) between it and the build alternatives.

3.2. What build alternatives have been carried forward for further analysis?

Two primary build alternatives have been carried forward for analysis in this EIS. These two alternatives are as follows:

- Alternative B: Divided, four-lane highway with a depressed, center median
- Alternative C: Divided, four-lane highway with a flush, center median

In addition to these two primary build alternatives, options have been developed at key locations along the project corridor where additional design considerations are needed. These locations include Fairfield, the North Dakota Highway 200 (ND-200)/US Highway 85 intersection, and the Long X Bridge.

The Preferred Alternative, identified in **Section 3.5**, consists of a primary alternative and options.

3.3. What would the build alternatives look like?

The two build alternatives carried forward for analysis in this EIS represent what would be the typical section for the majority of the 62-mile-long project corridor. Two locations where this typical section would vary include the 7-mile-long stretch of roadway occurring through the Badlands and the northernmost 2 miles near Watford City. Design details specific to these two locations are presented in **Sections 3.3.4 on page 27 and 3.3.6 on page 33**, respectively.

Alternative B: Divided Depressed. Alternative B would expand the highway to a divided, four-lane section with a depressed, center median. Design criteria for Alternative B include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 70 miles per hour (mph).
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- Outside paved shoulders would be a minimum of 8 feet wide.
- Inside paved shoulders (i.e., left side of an individual roadway) would be 4 feet wide at minimum.
- Depressed median width would be 52 feet (shoulder to shoulder).
- Total width of the roadway from outside shoulder to outside shoulder would be 124 feet.

Please refer to **Figure 13, Typical Section for Divided, Depressed Median** for a depiction of the divided, four-lane section with a depressed median. Under Alternative B, the existing highway would be utilized to the extent practicable to carry two lanes of one-way directional traffic and a new two-lane highway would be constructed adjacent. The existing roadway would require widening of the outside shoulder to achieve the proposed 8-foot-wide shoulder. The slope across the roadway (i.e., superelevation) on most of the existing horizontal curves would need to be corrected with an asphalt overlay, and

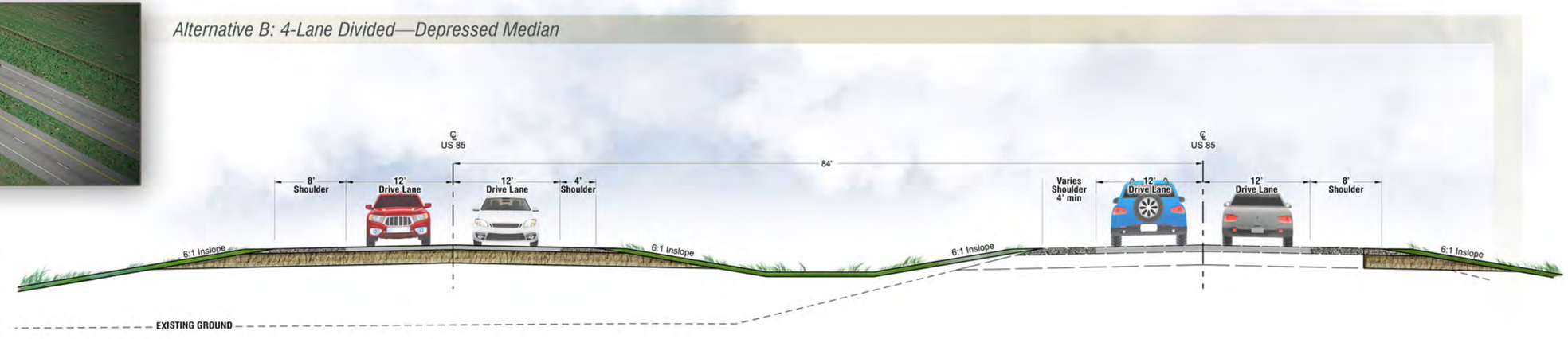


Figure 13, Typical Section for Divided, Depressed Median

one existing crest vertical curve (i.e., hilltop at reference point [RP] 88.5) would need to be reconstructed to meet the proposed design speed of 70 mph.

A detailed Map Book was created in 2016 (**appended by reference**) as part of a roadway constraints assessment to determine which side of the existing roadway would be the most optimal for expansion based on a number of criteria. The goal of this assessment was to avoid impacts on existing resources (e.g., homes, buildings, large utilities, cultural resources) while minimizing the number of crossovers (i.e., transitions from expanding on one side of the existing roadway to expanding on the other). The proposed roadway would transition from west of the existing alignment to east and vice versa at the following RP locations: RP 81, RP 83, RP 83.8, RP 91–93.5 (Fairfield on alignment), RP 111.7, RP 114–115, RP 116, RP 120.2 to 130 (Badlands), and RP 136. In addition, the roadway is proposed to be shifted at the following locations to avoid impacts on existing homes: RP 79.9, RP 111.1, and RP 114–115. **Figure 14, Proposed Side of Expansion for Alternative B** depicts which sides of the existing alignment the highway would be expanded under Alternative B.

Figure 15, Example of Divided Four-lane Section with a Flush, Center Median along US Highway 85

Alternative C: Divided Flush. Alternative C would expand the highway to a divided, four-lane section with a flush, center median. Design criteria for Alternative C include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 65 mph.
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- Outside paved shoulders would be a minimum of 8 feet wide.
- Opposing directions of traffic would be separated by a paved, 20-foot-wide, flush median.
- Total width from outside shoulder to outside shoulder would be 84 feet.

Please refer to **Figure 15, Example of Divided Four-lane Section with a Flush, Center Median along US Highway 85**, and **Figure 16, Typical Section for Divided, Flush Median on page 23** for a depiction of the divided, four-lane section with a flush median. Superelevation rates on some of the existing horizontal curves would need to be corrected with an asphalt overlay to meet the proposed design speed of 65 mph. As an additional safety measure, rumble strips would be installed within non-turning lane segments of the flush, center median to discourage drivers from using the center median as a passing lane.

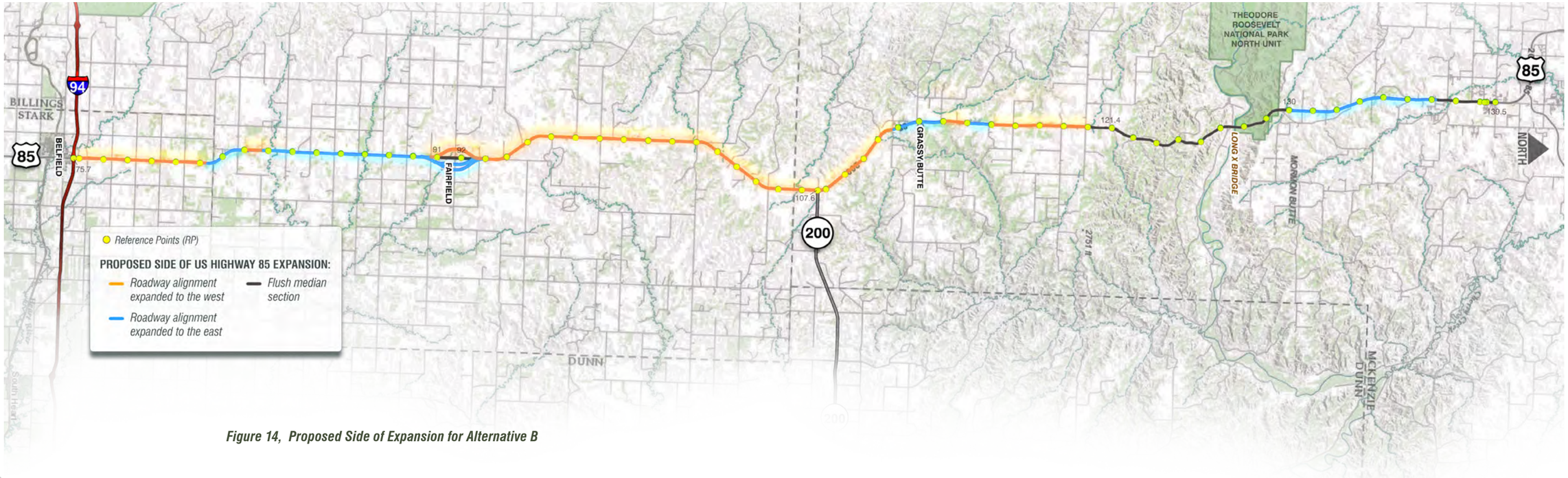


Figure 14, Proposed Side of Expansion for Alternative B

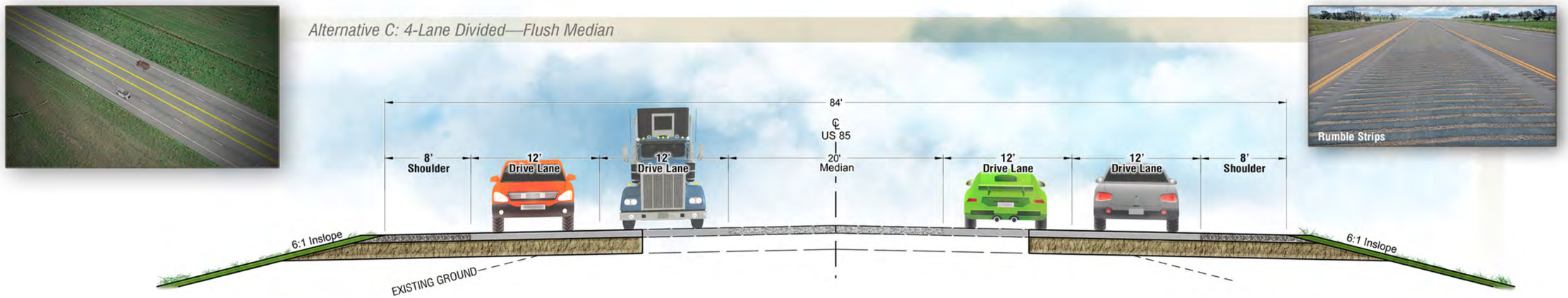


Figure 16, Typical Section for Divided, Flush Median

Expansion associated with Alternative C would occur equally to both sides of the existing roadway.

3.3.1. What would happen at the I-94 interchange?

Alternatives B and C would begin at the northern end of the I-94 interchange. To tie the project into the two-lane typical section south of the I-94 interchange, restriping of the interchange would be required. Please refer to **Figure 17, I-94 Interchange.** The addition of a northbound lane would be achieved by adding a free-flowing right-hand turn lane to the I-94 westbound off-ramp. Conversely, to drop a southbound lane, the right-hand southbound lane of US Highway 85 become a designated right-hand turn lane onto the I-94 westbound on-ramp.

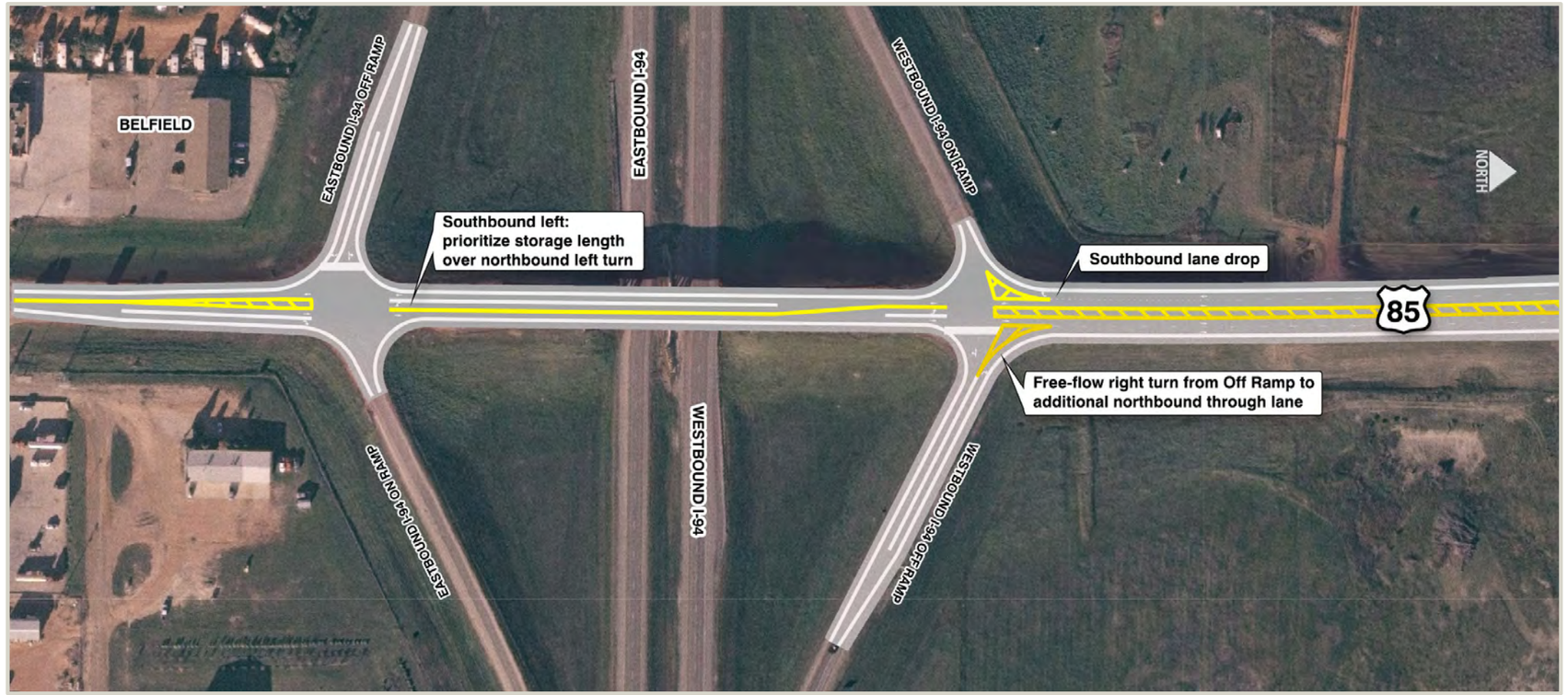


Figure 17, I-94 Interchange

3.3.2. What options are being analyzed for Fairfield?

Four roadway expansion options for Fairfield are considered in this EIS. These options are as follows:

- Option FF-1: Existing Alignment–Urban
- Option FF-2: West Bypass
- Option FF-3: East Bypass 1
- Option FF-4: East Bypass 2

3.3.2.1. Fairfield On-Alignment Option

One option is being considered for staying on alignment through the unincorporated community of Fairfield.

Option FF-1: Existing Alignment–Urban. Option FF-1 would include constructing an urbanized, four-lane section with reduced speeds through Fairfield. Please refer to **Figure 18, Typical Section for Urbanized, Four-lane Section** for a depiction of the urbanized, four-lane section.

Design criteria utilized for Option FF-1 include the following:

- Roadway would have a design speed, as well as a posted speed limit, of 45 mph.
- Roadway section would consist of two 12-foot-wide driving lanes in each direction.
- 12-foot-wide center median.
- Outside paved shoulders.
- Curb and gutter would be installed along the outside edge of the shoulder, and storm sewer would be installed to handle drainage from the roadway surface.

3.3.2.2. Fairfield Bypass Options

Three Fairfield bypass options have been carried forward for analysis in this EIS. These bypass options would route US Highway 85 around the community of Fairfield on a newly constructed alignment. The typical section of the bypass options would match the typical section of the selected roadway alternative (i.e., Alternative B: Divided Depressed or Alternative C: Divided Flush). The design speed of all three bypass options would match the design speed of the selected roadway alternative.

All mainline traffic along US Highway 85 would be diverted onto the bypass alignments, whereby drivers wanting to access the community of Fairfield would need to turn off the highway to do so. Intersections at both the northern and southern ends of the bypass options would allow drivers to access the existing segment of US Highway 85 through town. The alignments for all three bypass options cross a small unnamed stream. The drainage area is large enough that centerline culverts would not be adequate for the water flows. The anticipated structure at this site is an 8-foot-wide by 5-foot-tall concrete box culvert. The exact location, length, and elevation of the structure would vary with each option. Please refer to **Figure 19, On-Alignment and Bypass Options for Fairfield**. The three bypass options are further described in the following paragraphs:

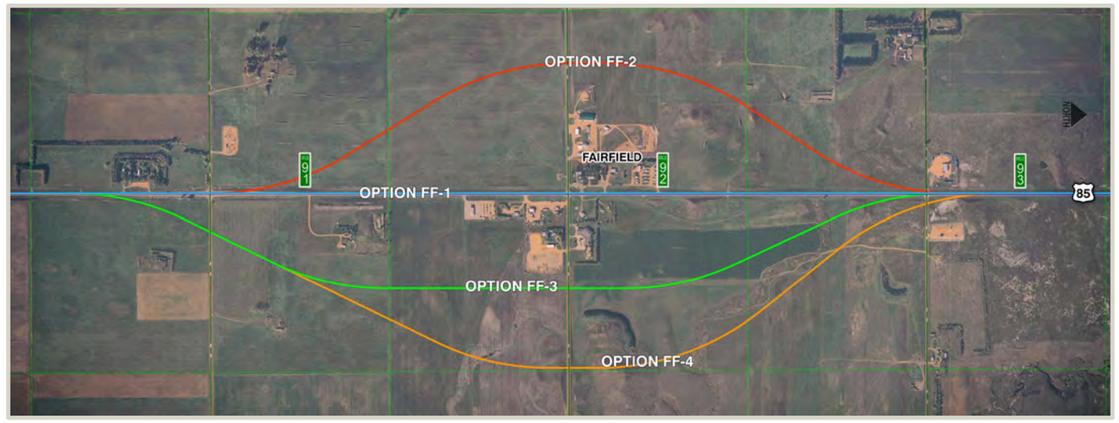


Figure 19, On-Alignment and Bypass Options for Fairfield

Option FF-2: West Bypass. Option FF-2 would include constructing a bypass around the community of Fairfield, approximately 0.4 miles west of the existing alignment. The bypass alignment would diverge from the existing alignment at the intersection with 21st Street SW. The main access point to Fairfield would be from 20th Street SW. The bypass would tie back into the existing alignment of US Highway 85 at the intersection of 19th Street SW. The total bypass length would be approximately 2.0 miles. Please refer to **Figure 19** and **Figure 20, Option FF-2 on page 25,** for a depiction of Option FF-2 around Fairfield.

Option FF-3: East Bypass 1. Option FF-3 would include constructing a bypass around the community of Fairfield, approximately 0.3 miles east of the existing alignment. The bypass alignment would diverge from the existing alignment just south of St. Demetrius Ukrainian Catholic Church. The intersection of 21st Street SW would be realigned to provide a 90-degree intersection. The main access point to Fairfield would be from 20th Street SW. The bypass would tie back into the existing alignment of US Highway 85 at the intersection of 19th Street SW. The total bypass length would be approximately 2.4 miles. Please refer to **Figure 19** and **Figure 21, Option FF-3 on page 25,** for a depiction of Option FF-3 around Fairfield.

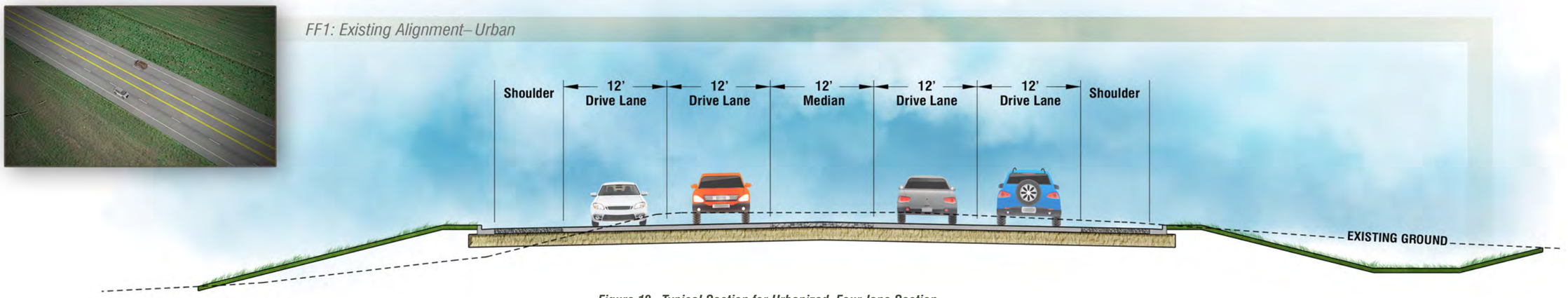


Figure 18, Typical Section for Urbanized, Four-lane Section

Option FF-4: East Bypass 2. Option FF-4 would include constructing a bypass around the community of Fairfield, approximately 0.5 miles east of the existing alignment. The bypass alignment would diverge from the existing alignment just south of St. Demetrius Ukrainian Catholic Church. The main access point to Fairfield would be from 20th Street SW. The bypass would tie back into the existing alignment of US Highway 85 just north of the intersection of 19th Street SW. The intersections of 19th Street SW and 21st Street SW would be realigned to provide a 90-degree intersection. The total bypass length would be approximately 2.7 miles. Please refer to **Figure 19 on page 24** and **Figure 22, Option FF-4** for a depiction of Option FF-4 around Fairfield.

Figure 20, Option FF-2

Figure 21, Option FF-3

Figure 22, Option FF-4

3.3.3. What options are being analyzed at the ND-200/US Highway 85 intersection?

Two options are under consideration for the ND-200/US Highway 85 intersection:

1. Option INT-1: Standard Intersection
2. Option INT-2: Multi-lane Roundabout

Option INT-1: Standard Intersection. Option INT-1 would consist of a standard intersection layout, typical of a four-lane highway. The intersection would function as it does currently with a stop sign along ND-200 (east leg) and along the gravel roadway on the western side of the intersection (west leg). The existing turn lanes would be maintained, which consist of a northbound right and southbound left along US Highway 85, as well as a designated right-hand turn lane along ND-200 for traffic wanting to travel northbound on US Highway 85. Configuration of this option would vary slightly depending upon the selected roadway alternative. In addition, traffic signals could be added in the future, if warranted. Please refer to **Figure 23, Standard Intersection Illustration**.

Option INT-2: Multi-lane Roundabout. Option INT-2 would consist of reconstructing the ND-200/US Highway 85 intersection to a multi-lane roundabout configuration at a 25 mph design speed. A multi-lane roundabout functions similar to a single-lane roundabout. Vehicles entering the roundabout are forced to the right and must yield to traffic already established in the roundabout. Unlike a single-lane roundabout, drivers entering a multi-lane roundabout must select between two lane options based on their desired turning movement. Proper lane selection would be similar to a standard intersection layout. Drivers using the right lane could either turn right or continue straight. Drivers using the left lane could either go straight, turn left, or continue through the roundabout and essentially complete a U-turn. Please refer to **Figure 24, Multi-lane Roundabout Illustration**.

The roundabout island would have a diameter of 150 feet surrounded by an 18-foot-wide truck apron. The truck apron is intended to accommodate the rear wheels of long vehicles and trailers navigating through the roundabout. Driving lanes through the roundabout would be 18 feet wide resulting in a total roundabout diameter of 258 feet.

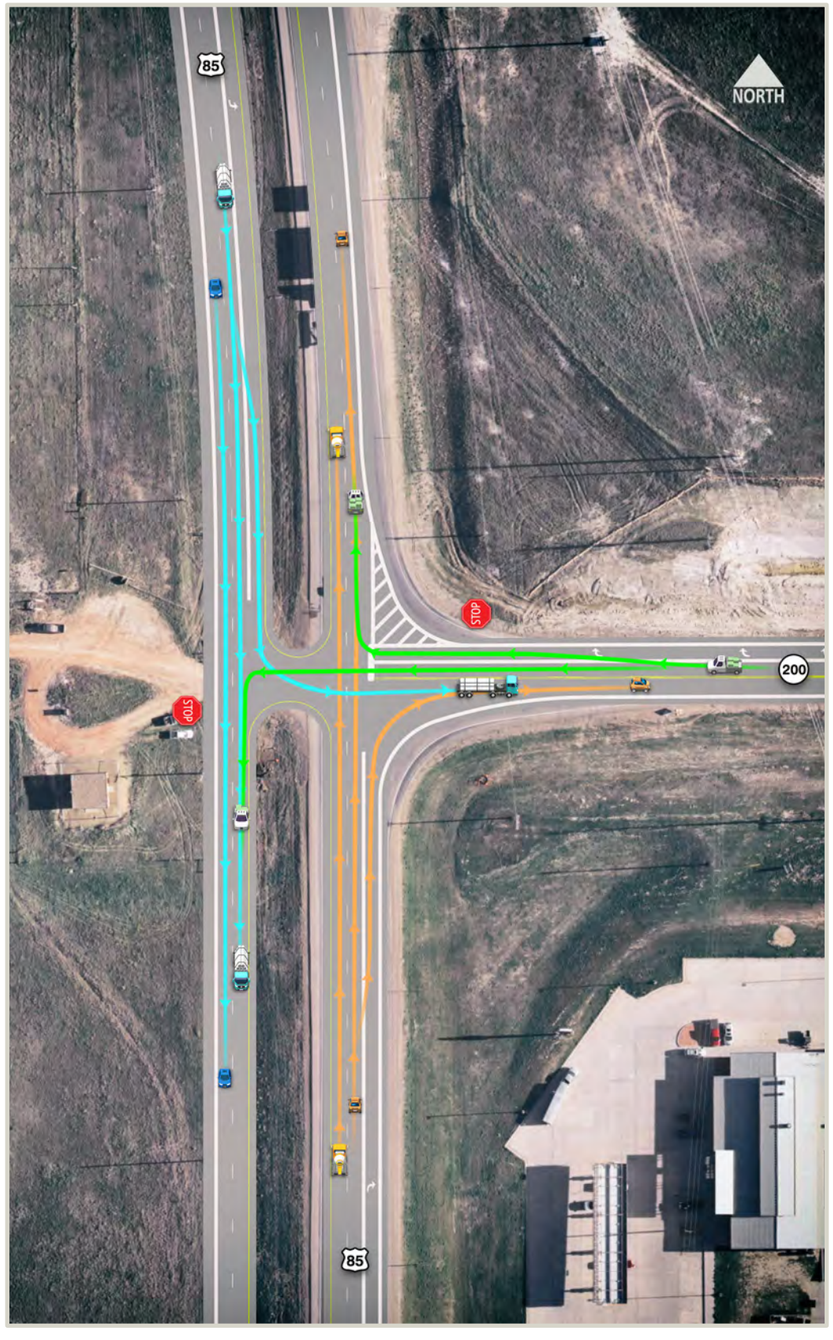


Figure 23, Standard Intersection Illustration

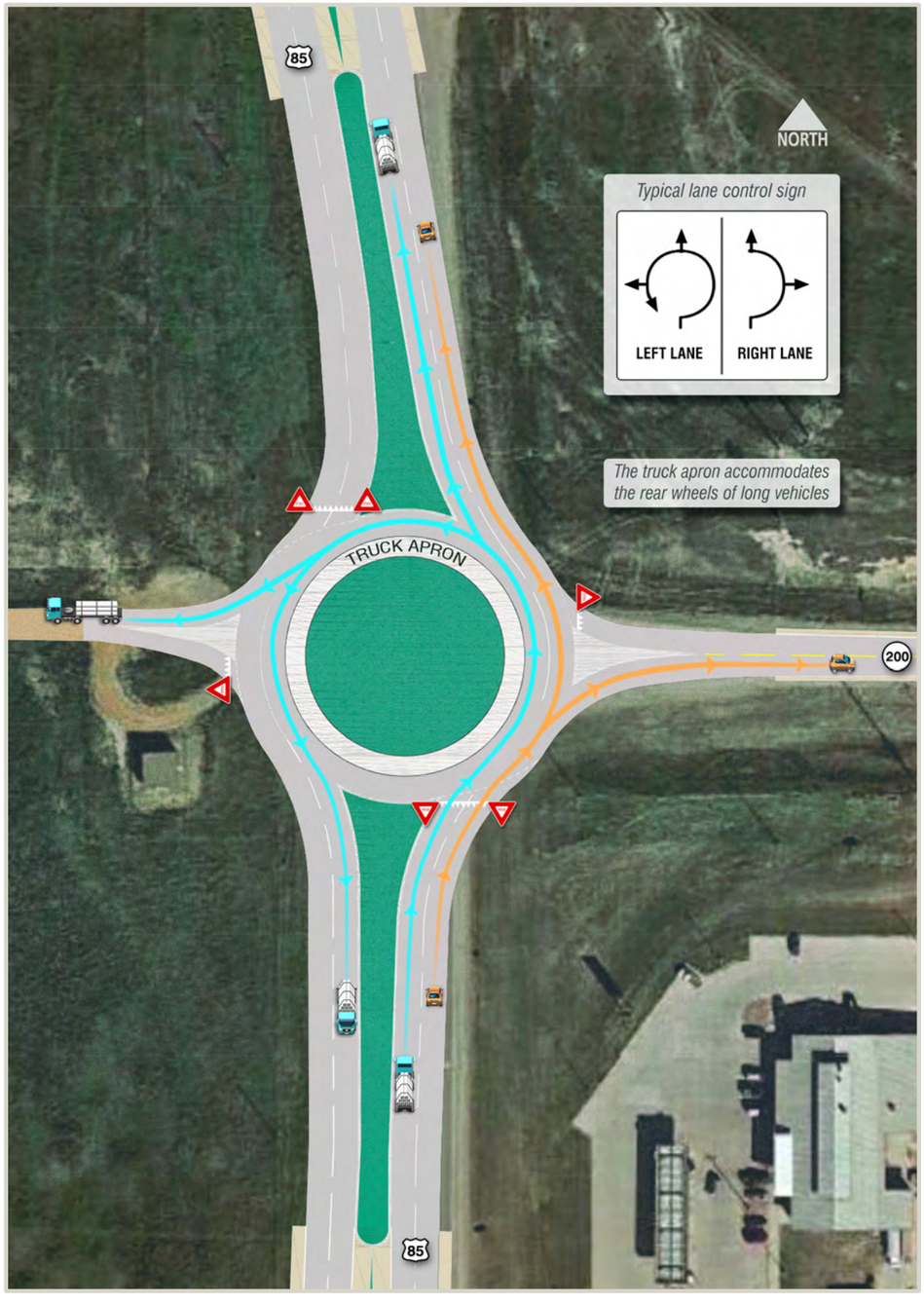


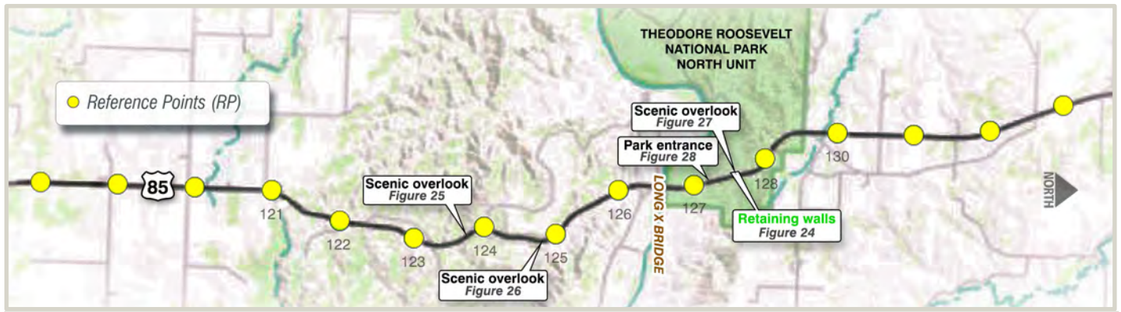
Figure 24, Multi-lane Roundabout Illustration

3.3.4. What would happen through the Badlands (RP 122 to RP 130)?

Through the Badlands segment of the project corridor, the roadway footprint has been reduced to the maximum extent practicable to minimize environmental and socioeconomic impacts, as well as minimize impacts on the Theodore Roosevelt National Park (TRNP) – North Unit, while still addressing the project's purpose and need. Flexible design options, such as retaining walls and varying median widths, have been incorporated.

The typical roadway section for the Badlands segment south of the Little Missouri River would consist of two 12-foot-wide driving lanes in each direction; 8-foot-wide shoulders; a 20-foot-wide flush, center median; and a posted speed limit of 65 mph. The roadway configuration near the Little Missouri River would vary depending upon the selected bridge option, but would maintain the 12-foot driving lane width. North of the Little Missouri River, near the entrance to the TRNP – North Unit, the center median width would be reduced to 12 feet, along with the posted speed limit of 60 mph. This 12-foot-wide median would be maintained to approximately RP 130 at the northern end of the Badlands before transitioning back to the selected roadway alternative typical section.

Installation of retaining walls would be required at multiple locations through the Badlands section of the project corridor to minimize the roadway footprint. These retaining walls would consist of colored concrete to allow them to blend into the natural landscape (see **Figure 25** and **Figure 32 on page 29**). The exact size and dimensions would be determined during final design.



Overview of locations shown in **Figure 25** through **Figure 29**

Figure 25, Retaining Walls along TRNP – North Unit

Figure 26, Scenic Overlook at RP 123.8

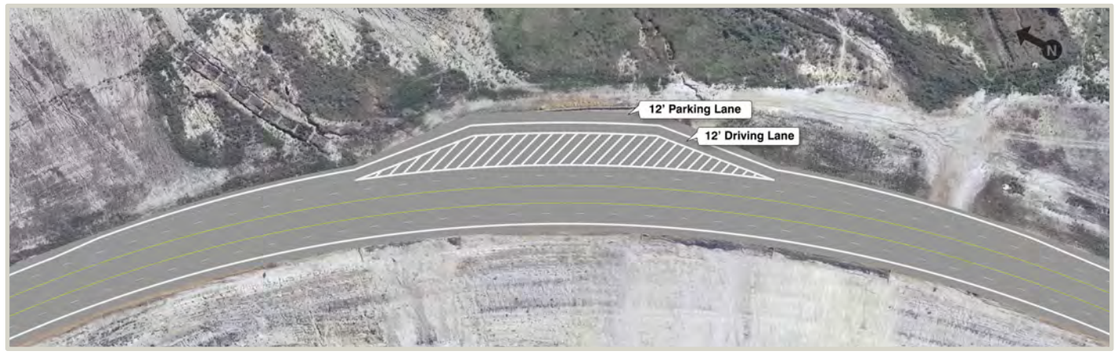


Figure 27, Scenic Overlook at RP 124.9

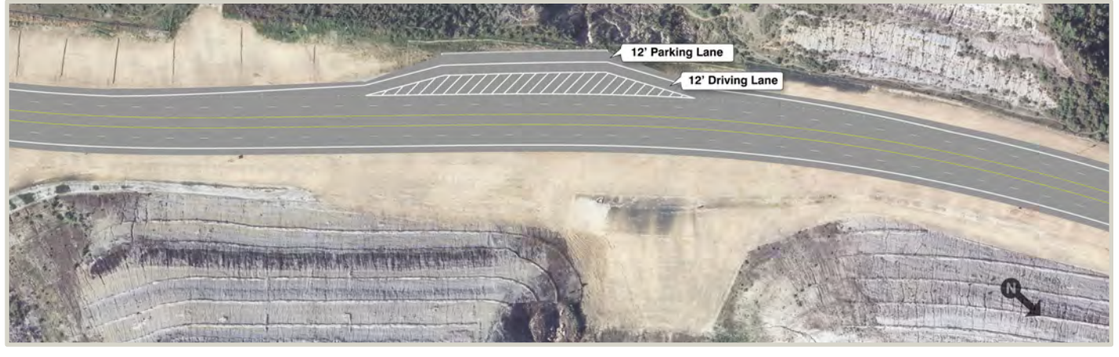


Figure 28, Scenic Overlook at RP 127.5

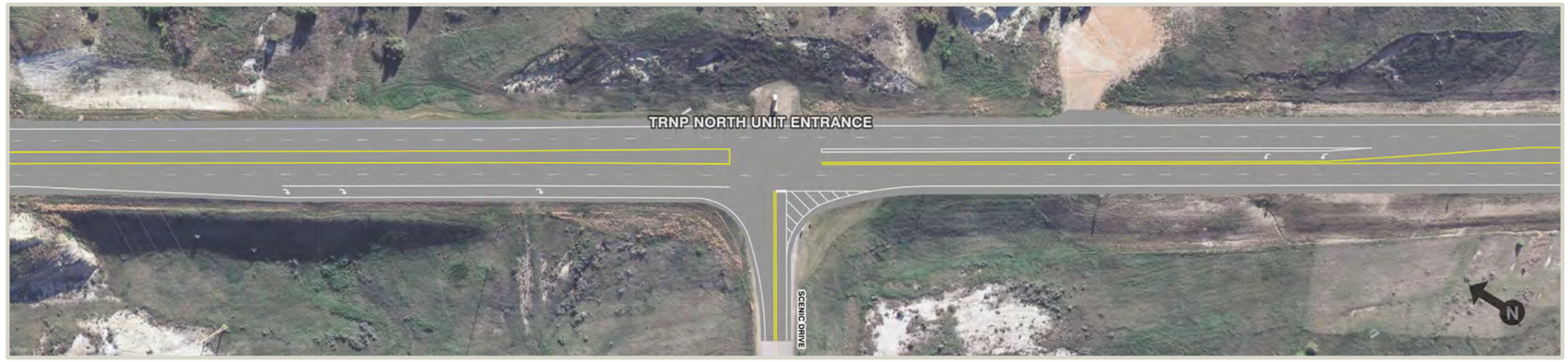


Figure 29, TRNP – North Unit Entrance

To facilitate turning movements into the TRNP – North Unit, a southbound right-hand turn lane and northbound left-hand turn lane have been incorporated into the project design. These turn lanes would allow drivers entering the park to remove themselves from the mainline traffic before decelerating (see **Figure 29, TRNP – North Unit Entrance)**.

There are currently three scenic overlooks located along the Badlands segment of the project corridor at RP 123.8, RP 124.9, and RP 127.5. All three of these scenic overlooks would be retained (although reduced in size) and additional striping would be incorporated to better direct vehicle movement and use. Striping would be used to delineate a 12-foot-wide parking lane, a 12-foot-wide driving lane, and a variable-width painted median. Please refer to **Figure 26 through Figure 28 on page 27.** A Scenic Overlook Memorandum was prepared in 2017 to develop design criteria for the three scenic overlooks (**appended by reference**).

Please refer to **Figure 30** for a simulation of the four-lane section with a 12-foot-wide median through the Badlands.

Figure 30, Four-lane Simulation with a 12-foot-wide Median through the Badlands

3.3.4.1. Curve Realignment at RP 121

The existing horizontal and vertical curves near RP 121 are proposed to be realigned to improve sight distance and driver expectancy as the terrain changes entering the Badlands from the south. There has been a history of crashes at this location from vehicles running off the curve. The proposed realignment would lower the existing hill to improve visibility for drivers approaching the changing terrain. In addition, the roadway would be shifted west to avoid impacts on Western Area Power Administration's (WAPA) overhead transmission line. See **Figure 31, Curve Realignment at RP 121.**

Figure 31, Curve Realignment at RP 121

3.3.4.2. Offset Alignment from RP 124.2 to 125.4

The existing horizontal alignment from RP 124.2 to 125.4 is proposed to be shifted 40 feet to the east to minimize the amount of earthwork required to stabilize the west backslope through this area. The west backslope has a history of slumping, and the North Dakota Department of Transportation (NDDOT) has installed jersey barriers and periodically removes debris from the roadway. This shifted alignment would allow the lower stable portion of the slope to remain in place; therefore, reducing the amount of earthwork required to correct the landslide and associated impacts. The upper portion of the slope would need to be graded flatter to correct the landslide issues. Please refer to **Figure 32, Slide Area Realignment on page 29.**

3.3.4.3. Offset Alignment from RP 125.6 to 125.9

The existing horizontal alignment from RP 125.6 to 125.9 is proposed to be shifted 14 feet to the east to avoid cutting into the backslope of a large butte located on the west side of the highway. This shifted alignment would reduce the amount of earthwork required and avoid the need to acquire additional easement from the US Forest Service (USFS) through this area.

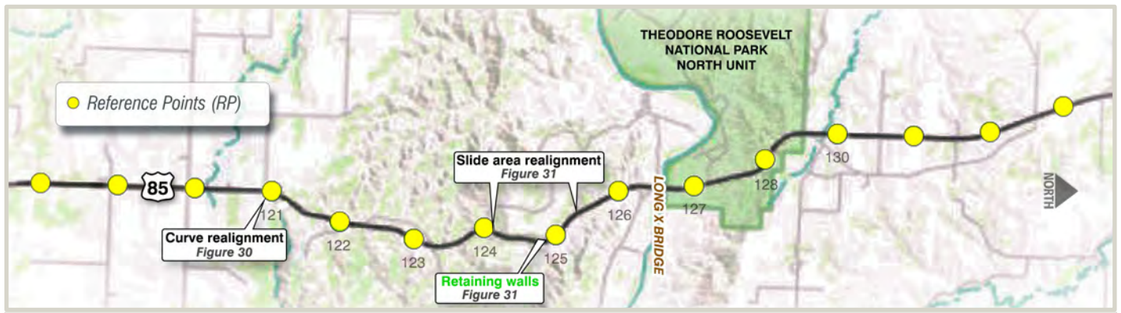
3.3.4.4. RP 128 Horseshoe Bend

A Horseshoe Bend Landslide Mitigation Considerations Memorandum and Addendum were developed in 2017 to summarize preliminary geotechnical design recommendations for the landslide at Horseshoe Bend near RP 128. Both of these documents are **appended by**

reference. Landslide mitigation options were considered and it was determined that an anchored, drilled shaft structure would be constructed and the existing alignment would be maintained. The following paragraphs provide a summary of the structure that would be implemented as part of the project.

A single row of drilled shafts would be installed within the existing NDDOT highway easement. A drilled shaft is reinforced concrete column cast where soil was removed by earth drilling equipment. Ground anchors would likely be installed near the tops of shafts to help hold them in position against the pressure from the landslide. A reinforced concrete cap beam would be installed atop the drilled shafts to tie the individual drilled shafts and ground anchors together and increase the stiffness of the structure. This concrete cap would be colored to blend in with the natural landscape. **Figure 33, Anchored, Drilled Shaft Structure near Painted Canyon and 3-D Model of Below Grade Structural Elements on page 30** provides a depiction of the anchored, drilled shaft structure along I-94 near Painted Canyon adjacent to the TRNP—South Unit, as well as a 3-D model of what the below grade structural elements would look like, as an example of what would occur at Horseshoe Bend.

The anchored, drilled shaft structure would not extend beyond the apparent limits of the active landslide; however, it would extend beyond the western limit of roadway distress. Although landslide movement could potentially continue to occur west of the structure, landslide activity in this area does not appear to be currently contributing to roadway distress. In addition, the risk of continued movement in this area is relatively low, based on the history of landslide distress in this area. The western limit of roadway distress has not significantly changed over the last 25 years.



Overview of locations shown in **Figure 31** and **Figure 32**

Figure 32, Slide Area Realignment

3.3.5. What options are being analyzed for the Long X Bridge?

The existing Long X Bridge is a cantilevered, sub-divided, Warren through truss with three spans. The bridge was constructed in 1959. It is 969 feet long with two driving lanes and has a roadway width of 30 feet and vertical clearance of 16 feet. The Long X Bridge is one of four remaining examples of a Warren through truss in the state of North Dakota. The bridge is eligible for listing on the National Register of Historic Places (NRHP) under Criterion C for its unique design. For more information regarding the bridge's listing on the NRHP, please refer to **Section 5.15. Historic and Archaeological Preservation on page 94**.

Three bridge rehabilitation/replacement options are under consideration for the Long X Bridge:

- Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge
- Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use
- Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge

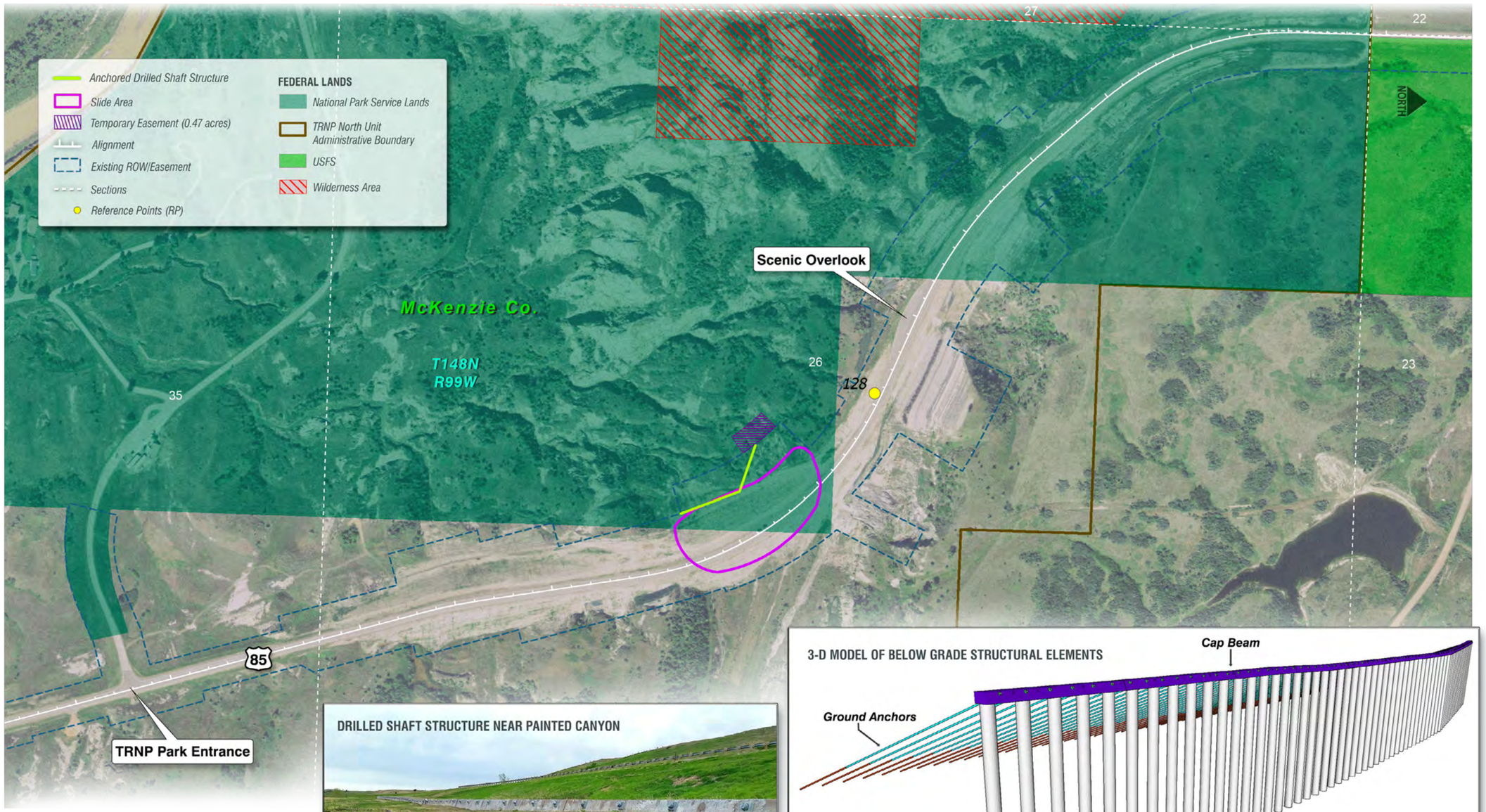


Figure 33, Anchored, Drilled Shaft Structure near Painted Canyon and 3-D Model of Below Grade Structural Elements

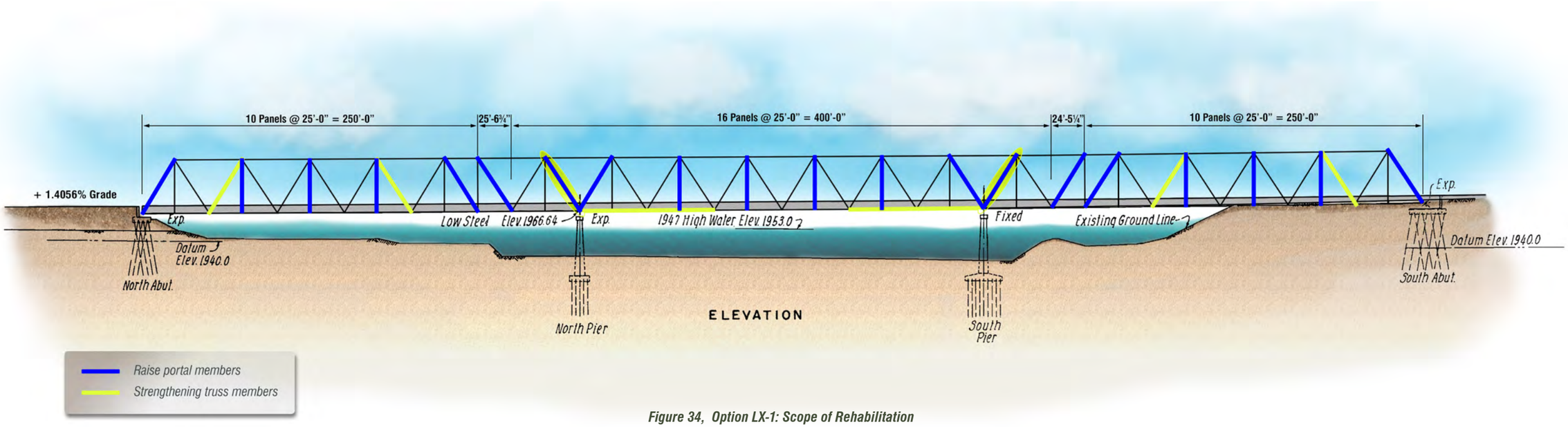


Figure 34, Option LX-1: Scope of Rehabilitation

Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge. Option LX-1 would include rehabilitating the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches. This vertical clearance was selected based on findings presented in the Vertical Clearance Study and Recommendations Report that was prepared for the project in 2016 (**appended by reference**). This report analyzed permitted over-height loads on highways within the Bakken region to determine the percent of permitted loads that could be accommodated under various clearance heights. The recommendation identified in this report was to provide a vertical clearance of 20 feet, 6 inches with an allowable permitted vehicle height of 20 feet (allowing for 6 inches of free-board). This recommended vertical clearance would accommodate 99.9 percent of the permitted over-height loads analyzed in the study.

To increase the vertical clearance, the horizontal braces (i.e., portals) spanning between the trusses would be raised in 20 locations along the length of the bridge. Raising the portals would require modification or replacement of the v-shaped, diagonal braces connecting the portals to the top chords of the trusses. The bridge would also be strengthened to carry a new permitted legal load of 129,000 pounds. This would entail installing cover plates on 16 bottom chord and 12 diagonal truss members. Please refer to **Figure 34, Option LX-1: Scope of Rehabilitation.**

The rehabilitation under Option LX-1 would also include replacement of the deck and installation of shear studs on the stringers. The traffic barrier on the bridge would be replaced with a new barrier meeting current standards. The original steel railing would be removed during deck replacement and reinstalled to retain the original look and feel of the bridge. The deck expansion joints would be replaced, and substructure concrete cracks and spalls would be repaired as needed. The bridge would also be sandblasted and repainted the same or similar color. Please refer to **Figure 35 below** and **Figure 36 on page 32** for Option LX-1 Simulations.

In addition to rehabilitating the Long X Bridge, Option LX-1 would also include constructing a new two-lane bridge east of the existing bridge. The new bridge would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures.

Figure 35, Option LX-1 Simulation A (looking northeast)

Figure 36, Option LX-1 Simulation B (looking north)

Original considerations for alternate use included use of the bridge as a pedestrian facility. Through coordination with resource agencies, it was determined that such use would conflict with proposed wildlife crossing measures, as detailed in **Section 3.3.8**. Specifically, there was concern that use of the bridge as a pedestrian facility would increase the potential for disturbing bighorn sheep during the lambing season, as bighorn sheep are more likely to display a flight reaction in response to pedestrian traffic than vehicle traffic. Therefore, alternate use of bridge as a pedestrian facility was eliminated from further consideration.

Design of the new bridge is described as follows:

- Five-span structure, approximately 789 feet long by 42 feet, 6 inches wide.
- Bridge superstructure would consist of either steel plate girders or prestressed concrete I-girders.
- Superstructure would be supported by concrete substructures, supported by deep foundations (e.g., piling or drilled shafts).
- Bridge would match the grade/deck elevation of the existing bridge.
- The bridge deck would be cast-in-place concrete and provide:
  - Two 12-foot-wide driving lanes.
  - 8-foot-wide outside shoulders.
  - 1-foot, 3-inch-wide exterior traffic barriers.

Based on coordination with the North Dakota State Historic Preservation Office (SHPO), the scope of the Long X Bridge rehabilitation, as defined, would have a *No Adverse Effect* determination. The SHPO has also concurred that the proximity of a new two-lane bridge would have a *No Adverse Effect* determination.

Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use. Option LX-2 would include retaining the existing Long X Bridge for an alternate use and constructing a new four-lane bridge to the east. The existing Long X Bridge could remain in-place and serve as an example of a Warren through truss bridge as an alternate use. The existing bridge would need to be fenced/blocked at the ends to prevent all access onto the bridge. The bridge would also be sandblasted and repainted the same or similar color. Please refer to **Figure 37** and **Figure 38** for Option LX-2 Simulations.

Figure 37, Option LX-2 Simulation A (looking northeast)

Figure 38, Option LX-2 Simulation B (looking north)

Under Option LX-2, a new four-lane bridge would be constructed east of the existing bridge and would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures. Design of the new bridge is described as follows:

- Five-span structure, approximately 789 feet long by 85 feet wide.
- Bridge superstructure would consist of either steel plate girders or prestressed concrete I-girders.
- Superstructure would be supported by concrete substructures, supported by deep foundations (e.g., piling or drilled shafts).
- Bridge would match the grade/deck elevation of the existing bridge.
- The bridge deck would be cast-in-place concrete and provide:
  - Four 12-foot-wide driving lanes.
  - 10-foot-wide outside shoulders.
  - 6-foot-wide inside shoulders.
  - 1-foot, 3-inch-wide exterior traffic barriers and 2-foot, 6-inch-wide median traffic barrier.

Option LX-2 would retain the Long X Bridge's original location, historic integrity, and value. The NDDOT would continue to be responsible for maintenance of the bridge. The SHPO has also concurred that the proximity of a new four-lane bridge would have a *No Adverse Effect* determination.

Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge. Option LX-3 would include removal (i.e., demolished or adopted) of the existing Long X Bridge and construction of a new four-lane bridge to the east. Removal of the Long X Bridge would be considered an *Adverse Effect* by the SHPO. Details regarding removal of the existing Long X Bridge and the associated mitigation are discussed in **Chapter 4**.

Under Option LX-3, a new four-lane bridge would be constructed east of the existing bridge and would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures. Please refer to **Figure 39** and **Figure 40** for Option LX-3 Simulations.

Design of the new bridge would be as follows:

- Five-span structure, approximately 789 feet long by 85 feet wide.
- Bridge superstructure would consist of either steel plate girders or prestressed concrete I-girders.
- Superstructure would be supported by concrete substructures, supported by deep foundations (e.g., piling or drilled shafts).
- Bridge would match the grade/deck elevation of the existing bridge.
- The bridge deck would be cast-in-place concrete and provide:
  - Four 12-foot-wide driving lanes.
  - 10-foot-wide outside shoulders.
  - 6-foot-wide inside shoulders.
  - 1-foot, 3-inch-wide exterior traffic barriers and 2-foot, 6-inch-wide median traffic barrier.

3.3.6. What would happen near Watford City?

As the project corridor nears Watford City, it becomes increasingly constrained by adjacent development and infrastructure. Numerous businesses are located along both sides of the project corridor, as well as several large overhead utilities along the eastern side of the project corridor. The McKenzie County Alternative Analysis Memorandum and Preliminary Design Revisions Memorandum were prepared in 2017 and 2018, respectively, to document the process and methodology utilized to develop roadway alternatives from RP 130.5 to 139.5 (**appended by reference**). To minimize potential impacts on the existing infrastructure, the roadway design beginning at RP 136.1 and terminating at the northern end of the project corridor would consist of a divided, four-lane roadway with a flush, 20-foot-wide median that would be offset 40 feet west of the existing roadway centerline. This segment of roadway would have a 65-mph posted speed limit and the same design criteria as Alternative C. The typical section for this segment would tie into and match the existing typical section of the Watford City Bypass.

Figure 39, Option LX-3 Simulation A (looking northeast)

Figure 40, Option LX-3 Simulation B (looking north)

3.3.7. What pedestrian facilities may be incorporated into the project?

As part of the scoping process for the project, McKenzie County requested that a trail (i.e., shared-use path), be incorporated into the project design. This trail would be located along the east side of the US Highway 85 spanning approximately 8.9 miles from the northern project terminus, south to McKenzie County Road 34. It would be an 8-foot-wide, asphalt-paved trail that would be open to bicyclists and pedestrians. The trail would not be open to motorized vehicle use. A Trail Memorandum was prepared in 2017 to document the process utilized to design the trail (**appended by reference**).

At the northern end, the trail would connect to the Watford City trail system at McKenzie County Road 30 (in the future as planned) or a future trailhead may be developed near this intersection if a connection to the Watford City trail system isn't yet built. At the southern end, the trail would terminate at McKenzie County Road 34 where a trailhead may be constructed. There are currently no connecting trail facilities at this location; however, McKenzie County has indicated that future trail development in this area is planned. Potential environmental and socioeconomic impacts from construction and use of the trail are evaluated in this EIS. Please refer to **Figure 41, Trail Alignment** for an overview of the trail and **Figure 42, Trail Typical Sections** for design options for the trail.

3.3.8. What measures would be implemented to facilitate wildlife movement?

To address concerns associated with the loss of wildlife mobility and habitat connectivity, along with safety and economic losses due to wildlife-vehicle collisions, three wildlife crossings (i.e., structures along roadways that provide wildlife habitat connections) have been incorporated into the project. The wildlife crossings would be located within the Badlands segment of the project corridor and are intended to function as a system in conjunction with wildlife fencing and jump-outs.

Wildlife jump-outs are one-way escape ramps designed to allow animals to escape from fenced roadway corridors to safety.

The location and design of these crossings were developed through the completion of a two-part assessment that is summarized in the following documents: (1) Wildlife Crossing/Accommodation Volume I: Need and Feasibility Assessment (2017) and (2) Wildlife Crossing/Accommodation Volume II: Technical Report (2018). Both documents are **appended by reference**.

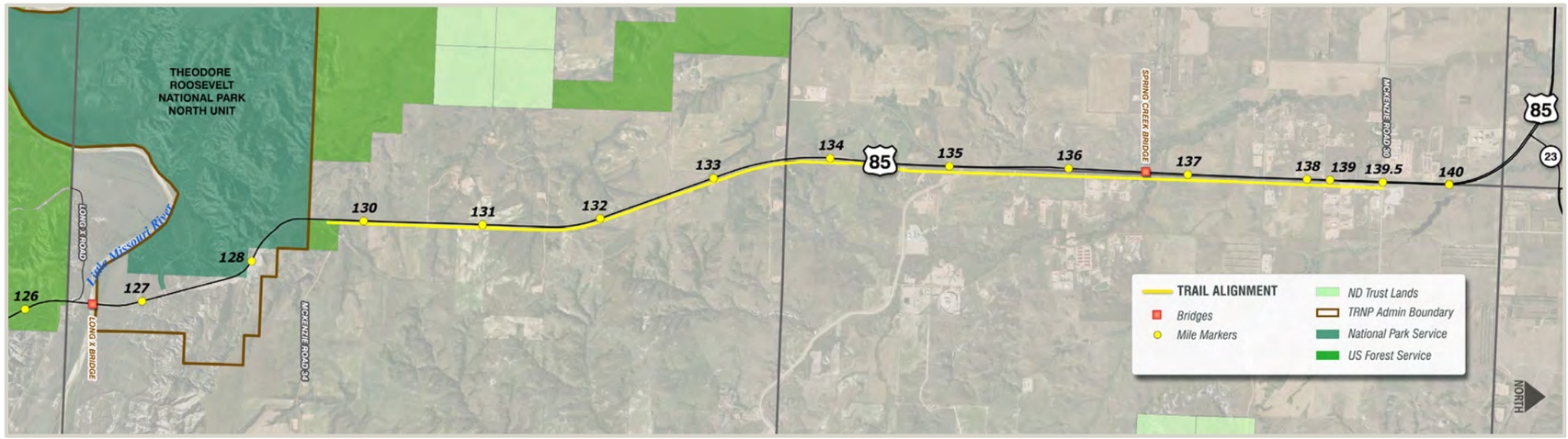


Figure 41, Trail Alignment

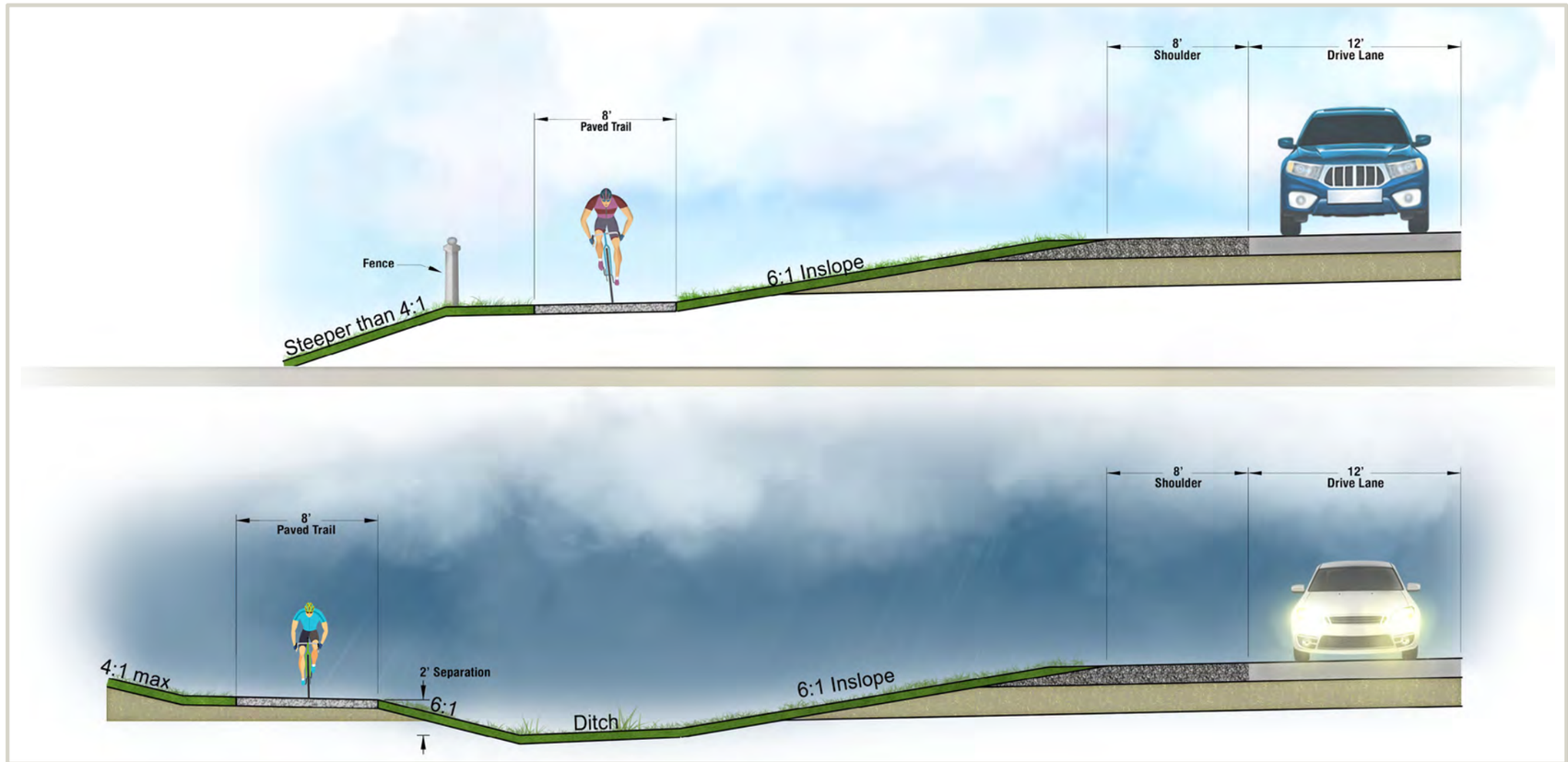


Figure 42, Trail Typical Sections

Figure 43, Simulation of Wildlife Underpass at RP 122.5

Figure 44, Example Arch Structure for Wildlife Underpass at RP 126.1

Additional information regarding the design and features of the crossings is presented as follows:

- Wildlife Crossing Underpass at RP 122.5. This crossing, located within the Badlands, would consist of a concrete box culvert approximately 10 feet tall, 20 feet wide, and 136 feet long. The size of the structure is based on criteria recommended for mule deer. Please refer to **Figure 43, Simulation of Wildlife Underpass at RP 122.5**.

- Wildlife Crossing Underpass at RP 126.1. This crossing, intended for bighorn sheep, would consist of a concrete three-side arch bridge structure. The crossing would provide a minimum opening within the arch of 15 feet high by 40 feet wide, with a length of 148 feet. Please refer to **Figure 44, Example Arch Structure for Wildlife Underpass at RP 126.1**.

- Long X Bridge at RP 126.6. The banks below the existing bridge provide relatively flat benches, approximately 80 feet wide on each bank, and the bridge provides approximately 30 feet and 19 feet of clearance over the benches on the southern and northern banks, respectively. New bridges constructed as part of Option LX-1, LX-2, or LX-3 would be designed to maintain the bench width and would provide approximately 4 feet less vertical clearance due to the need to match the roadway surface profile of the existing bridge.

- Wildlife Fencing from RP 120.9 to RP 128.9. South of the Long X Bridge, approximately 5.6 miles of continual, wildlife fencing would be installed within NDDOT right-of-way (ROW) on both sides of US Highway 85. North of Long X Bridge, approximately 2.2 miles of wildlife fencing would be installed within NDDOT ROW along the east side of US Highway 85. Along the west side, wildlife fencing may be installed between the Long X Bridge and existing TRNP–North Unit fencing (location and extent of this fencing would be determined during landowner ROW negotiations). In addition, approximately 0.3 miles of wildlife fencing would be installed within NDDOT ROW along the west side of US Highway 85, north of the TRNP–North Unit boundary. Inside bighorn sheep primary range (RP 124.1 to RP 128.9), fencing would be 10 feet tall; outside of primary bighorn sheep range (RP 120.9 to RP 124.1), fencing would be 8 feet tall. Fencing would terminate outside of the Badlands area. Where fencing intersects roadways and approaches, a wildlife/cattle guard or gate would be installed to maintain continuity of the wildlife barrier. Final gate and guard design would be coordinated with North Dakota Game and Fish Department (NDGF) and landowners. Approximately 25 jump-outs, or escape ramps, would be incorporated into the wildlife fencing. In addition, jump-outs would be added to the existing NPS fence located on the west side of US Highway 85 north of the Long X Bridge.

3.3.9. What would happen to existing bridges, culverts, and cattle passes?

3.3.9.1. Bridges and Stream Culverts

Aside from the Long X Bridge discussed separately in this chapter, there are nine other structures on the project corridor, including the following:

- Two bridges:
  - One bridge, at RP 84.342, crosses the South Branch of the Green River.
  - One bridge, at RP 136.949, crosses Spring Creek.
- Five reinforced concrete box culverts (RCBCs) and two structural plate pipe culverts (SPPCs).
  - All of these culverts are located on small unnamed streams.

The Green River and Spring Creek Structure Concept Memorandum was developed for the project in 2017 (**appended by reference**). As a result of the expansion of US Highway 85 from two to four lanes, the South Branch of the Green River bridge would be replaced with a box culvert, the Spring Creek bridge would be replaced with a box culvert, and the RCBCs and SPPCs would be extended to accommodate the new roadway footprint. **Table 3, Proposed Structures** summarizes the structure changes for Alternatives B and C.

Table 3, Proposed Structures

RP	Existing Structure	Alternative B	Alternative C
84.342	75-foot-long, three-span bridge	Double barrel box culvert: 184 feet long, 9 feet wide, and 10 feet tall (each barrel)	Double barrel box culvert: 136 feet, 9 feet wide, and 10 feet tall (each barrel)
87.681	Double 8 feet x 5 feet x 85 feet RCBC	Extend culvert 88 feet east	Extend culvert 25 feet west and 26 feet east
88.002	Triple 10 feet x 8 feet x 85 feet RCBC	Extend culvert 88 feet east	Extend culvert 25 feet west and 26 feet east
89.111	Triple 10 feet x 8 feet x 96 feet RCBC	Extend culvert 11 feet west and 98 feet east	Extend culvert 31 feet west and 32 feet east
92.442	Double 5 feet x 4 feet x 79 feet RCBC	Extend culvert 12 feet west and 101 feet east	Extend culvert 31 feet west and 36 feet east
117.723	Double 10 feet x 6 feet x 184 feet RCBC	Extend culvert 98 feet west	Extend culvert 41 feet west and 33 feet east
128.900	Single 9 feet, 6 inches x 228 feet SPPC	Not applicable (structure occurs along roadway segment where divided depressed median is not under consideration)	Extend culvert 46 feet west and 42 feet east
136.219	Single 8 feet x 102 feet SPPC	Extend culvert 51 feet west	Extend culvert 51 feet west
136.949	90-foot-long, three-span bridge	Double barrel box culvert: 148 feet long, 11 feet wide, and 12 feet tall (each barrel)	Double barrel box culvert: 148 feet long, 11 feet wide, and 12 feet tall (each barrel)

3.3.9.2. Culverts

A Culvert Hydrologic & Hydraulic Analysis - Existing Conditions Technical Memorandum was prepared in 2017 to document the process utilized to assess existing culverts along the project corridor (**appended by reference**). Existing culverts along the project corridor were analyzed to determine hydraulic capacity and were checked to ensure they meet the requirements of the North Dakota Stream Crossing Statutes and Rules, as well as the NDDOT Design Manual. The majority of the culverts analyzed are hydraulically sufficient and would be extended with the expanded roadway. Some of the culverts may require bends or manholes to change the alignment of the culvert to better fit the steam channel when it is extended. Culverts that do not meet the minimum hydraulic requirements would either be replaced or a new pipe would be installed adjacent to the existing culvert. This determination would be made during the final design.

3.3.9.3. Cattle Passes

A Cattle Pass and Stock Pond Memorandum was prepared in 2017 to identify and assess impacts on existing cattle passes and stock ponds along the project corridor (**appended by reference**). Currently, there are a total of five cattle passes within the project corridor that cross US Highway 85, four of which appear to be in use. The existing cattle passes that are in use would be extended as part of Alternatives B and C. The cattle pass not in use would be evaluated for removal. During the public scoping process, comments were received from landowners requesting cattle passes for their operations. If additional cattle passes are warranted, they would be added through the ROW acquisition process and would follow the NDDOT Cattle Pass Justification process, as defined in the NDDOT ROW Manual.

3.3.10. What would happen to existing utilities?

A Utility Coordination Memorandum—Preliminary Engineering was completed for the project in 2017 in order to identify existing utilities and utility conflicts along the project corridor (**appended by reference**). Utility companies would be contacted and coordination would begin as soon as the NDDOT secures funding and initiates the final design phase of the project. The NDDOT would provide a more detailed set of utility coordination plans and ROW limits to the impacted utility companies during the design phase of the project. The NDDOT would also coordinate ROW acquisition activities with the utility companies that are looking for an adjacent easement with the same landowner(s).

Utilities would typically be relocated back within the newly acquired NDDOT ROW or in a utility easement acquired by the utility company adjacent to the ROW. The utility companies typically would try to share an easement if they are compatible to be located within the easement; however, the larger overhead transmission power facilities and transmission pipelines typically require their own easement and a much larger easement than typical distribution utilities.

All attempts were made to identify and disclose impacts associated with utility relocations resulting from construction and operation of the project; however, only utilities that are relocated back within NDDOT ROW and USFS easements are included in the proposed action for this project. Therefore, any utility relocations that occur outside of NDDOT ROW or easements, or on NPS-managed lands, would be required to obtain individual state and federal approvals as necessary. This would include obtaining a ROW permit from the NPS for any relocations occurring on NPS-managed lands.

3.3.11. How would existing access along the project be maintained?

According to the NDDOT Design Manual, highways within the state should have a maximum of five access points per side, per mile, including section lines, with a minimum spacing of 500 feet. To reduce potential conflict points, accesses should be reduced to the extent possible while still providing reasonable access to adjacent properties. The following recommendations have been made for the project:

- Field drives and private drives should be relocated to side streets and section line roads, where feasible.
- Offset three-legged intersections should be realigned to form four-legged intersections, where feasible.
- Properties with multiple access points onto US Highway 85 (e.g., 'loop' driveways) should be consolidated.

The need for access consolidation would vary depending on the selected alternative, with Alternative B having a greater need for access consolidation than Alternative C. Under Alternative B, median crossovers would need to be installed at access points to facilitate full access. In places where it is determined unreasonable to consolidate or remove an access point, consideration would be given to create a right-in/right-out access without installing a median crossover. This would allow for access to be maintained while reducing the number of potential conflict points.

An Access Memorandum was prepared in 2017 to provide a recommended access plan for the project corridor (**appended by reference**). Final access determination would be determined during final design as part of the ROW acquisition and landowner negotiation process.

3.3.12. What would happen to North Dakota Highway Patrol Truck Inspection Sites?

Truck Inspection Sites provide the North Dakota Highway Patrol (NDHP) with the ability to set up periodic check points to pull trucks over off the shoulder of the highway to conduct safety and compliance inspections. During the project scoping process, the NDHP requested that the existing Truck Inspection Site, located north of Grassy Butte at approximately RP 120.3, be maintained with the project. They also requested that another Truck Inspection Site be added either between RP 77 and RP 78 or between RP 83 and RP 85 as part of the project. In addition, the NDHP later requested in their comments on the Draft EIS turnout areas added on both sides of the Badlands for truck drivers to chain up and remove chains from their tires. They indicated these areas will be even more important as legal weights have recently increased to 129,000 pounds.

> Truck Inspection Sites are paved turnouts (approximately 300 feet long by 30 feet wide with 300-foot-long approach and exit tapers) located along the highway.

The existing Truck Inspection Site located at approximately RP 120.3 would be relocated to RP 120.6 at the south end of the Badlands. This would serve as a combined Truck Inspection Site and chain up area. An additional chain up area would be constructed at RP 130.4 near the north end of the Badlands. In addition, a new Truck Inspection Site would be constructed between RP 77 and 78. The Truck Inspection Sites and chain up areas would be located along both sides of the highway for use by both northbound and southbound traffic.

3.3.13. What other improvements would be made as part of the project?

3.3.13.1. Intelligent Transportation System Devices

There are several Intelligent Transportation System (ITS) devices currently located along the project corridor that would need to be either reset or reinstalled as part of the project. The following is a list of the current ITS devices that would need to be reset or reinstalled:

> ITS devices are utilized to manage, inform, and encourage the traveling public to make safer and more efficient use of the transportation system.

- Automated Traffic Recorder (RP 80.9)
- Camera (RP 80.9)
- Environmental Sensor Station (RP 113.7)
- Automated Traffic Recorder (RP 113.7)
- Camera (RP 126.5)
- Camera (RP 137.28)
- Weigh in Motion (RP 137.28)

There are also ITS devices that would be added along the corridor as a part of the project. These include the following:

- Dynamic Message Sign (RP 78 Northbound)
- Vertical Gates (I-94 Interchange Ramps)
- Dynamic Message Sign (RP 140.5 Southbound)
- Vertical Gates (Watford City Bypass)

3.3.13.2. Lighting

Intersection illumination lighting is proposed at the McKenzie County Road 30/US Highway 85 intersection and ND-200/US Highway 85 intersection. Both intersections currently have illumination lighting, which would be expanded as part of the project.

Other intersections along the project corridor warrant the installation of destination lighting. Destination lighting consists of two lights at an intersection to alert drivers to the presence of an intersection. **Table 4, Destination Lighting** provides a list of the intersections proposed to have destination lighting installed as a part of the project.

Table 4, Destination Lighting

Intersection	RP
30th Street SW	81.55
27th Street SW	84.73
23rd Street SW	88.73
20th Street SW	91.73
14th Street SW	98.02
10th Street/Upper Magpie Road	102.02
2nd Street SW	111.73
McKenzie County Road 50	112.80
McKenzie County Road 37	136.77
22nd Street NW	137.64

3.4. How much would it cost to construct the alternatives?

Planning level cost estimates were developed for Alternatives B and C and their associated options. Please refer to **Table 5, Planning Cost Estimate**. The cost estimates are based upon the preliminary engineering analysis that was used for evaluating the alternatives and options. The cost estimates were prepared using 2017 dollars, and inflationary measures for future construction have not been included.

Funding for the majority of the proposed project has not yet been identified, but would likely involve the use of both state and federal funds. The Long X Bridge replacement/rehabilitation is the only portion of the project for which funding has been identified. State funding has been programmed in the Statewide Transportation Improvement Program (STIP) for the Long X Bridge portion of the project; however, federal funds may be identified in the future.

3.5. What is the Preferred Alternative?

The agency's Preferred Alternative is the alternative the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors.

After considering all the potential alternatives, collaborating with the public and cooperating and participating agencies, and conducting engineering and environmental studies for the project, the NDDOT and Federal Highway Administration (FHWA) have recommended that the Preferred Alternative include a combination of the following:

- Alternative B: expand the existing roadway to a divided, four-lane section with a depressed, center median in all areas of the project corridor except Fairfield, the Badlands, and Watford City.
  - » The existing roadway through the Badlands and Watford City would be expanded, as previously described in **Sections 3.3.4 and 3.3.6**, respectively.
  - » Pedestrian facilities would be constructed, as previously described in **Section 3.3.6**.
  - » At Horseshoe Bend, an anchored, drilled shaft structure would be installed, as previously described in **Section 3.3.4.4**.
  - » Three wildlife crossings would be constructed, and wildlife fencing would be installed, as previously described in **Section 3.3.8**.
  - » The South Branch of the Green River and Spring Creek bridges would be replaced with box culverts, and the existing RCBCs and SPPCs would be extended, as previously described in **Section 3.3.9.1**.
  - » Some of the centerline culverts could require bends or manholes, and culverts that did not meet the minimum hydraulic requirements would either be replaced or a new pipe would be installed adjacent to the existing culvert, as previously described in **Section 3.3.9.2**.
  - » The four existing, in-use cattle passes would be extended, and the one cattle pass that is not in use would be evaluated for removal. If additional cattle passes are warranted, they would be added during ROW negotiations, as previously described in **Section 3.3.9.3**.
  - » ITS devices would be reset, reinstalled, or added; intersection illumination lighting would be expanded; and destination lighting would be installed, as previously described in **Section 3.3.13**.
- Option FF-1: expand the existing roadway through Fairfield to a four-lane, urban section with reduced speeds.
- Option INT-2: construct a multi-lane roundabout at the ND-200/US Highway 85 intersection.
- Option LX-3: replace the Long X Bridge with a new four-lane bridge.

Table 5, Planning Cost Estimate

	Alternative B Four-Lane Divided, Depressed Median*	Alternative C Four-Lane Divided, Flush Median*
Cost without Options	**$419**	**$389**
FAIRFIELD OPTIONS		
FF-1: Existing Alignment – Urban	$12	
FF-2: West Bypass	$16	$15
FF-3: East Bypass 1	$16	$15
FF-4: East Bypass 2	$17	$15
ND-200/US HIGHWAY 85 INTERSECTION OPTIONS		
INT-1: Standard Intersection	$3	$3
INT-2: Multi-lane Roundabout	$4	$4
LONG X BRIDGE OPTIONS		
LX-1: New Two-Lane Bridge, Rehabilitate Existing Long X Bridge	$35	
LX-2: New Four-Lane Bridge, Retain Existing Long X Bridge for Alternate Use	$40	
LX-3: New Four-Lane Bridge, Remove Existing Long X Bridge	$36	
ADDITIONAL OPTIONS		
Trail	$1	
Wildlife Crossing System	$7	
Preferred Alternative Cost:	**$479**	

**All costs rounded to nearest million and include 10 percent contingency, 6 percent design engineering, 10 percent construction engineering, utility relocation, and ROW costs.*

3.6. Were other alternatives and options considered for the project?

The methodologies for alternatives analysis were developed in collaboration with cooperating agencies. The methodologies are used to explain how alternatives were selected to be carried forward for detailed analysis in an EIS. All of the potential alternatives and options for the project were evaluated through a screening process, and recommendations for additional alternatives and options were evaluated during the Value Engineering Study, as described in the Value Engineering Study Evaluation and Screening Process Report developed in 2017 (**appended by reference**). An Alternatives Methodology Report (**appended by reference**) was developed in 2018, which documents the methodology and results of the alternatives screening and Value Engineering Study. The following subsections provide further details regarding the alternatives screening process and Value Engineering Study.

3.6.1. Alternatives Screening Process

Alternatives and options were developed and evaluated by screening them in three phases, each of which included multiple steps. The alternatives were evaluated in each step, and those that were not carried forward to the next step, were eliminated from further screening, consideration, and detailed analysis. A summary of the three phases and steps within them are discussed as follows. Please refer to **Figure 45, Alternatives Methodology Process on page 38.** Additional information regarding eliminated alternatives can be found in **Section 3.6.2**.

3.6.1.1. Phase I: Develop Full Range of Reasonable Alternatives

Phase I of the screening process assessed potential alternatives by screening them against broader criteria to allow for a full range of reasonable alternatives. Prior to Phase I, preliminary desktop information was gathered for both engineering and environmental data, fieldwork and land surveying were conducted for the project area, agency and public scoping meetings were held, and a draft purpose and need was developed. All of this information was considered during Phase I, which included four steps: (1) Define Range of Reasonable Alternatives, (2) Previous Reports and Studies, (3) Project Purpose and Need/Project Goals, and (4) Summarize Findings and Conduct Phase II.

> According to the Council on Environmental Quality (CEQ), reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (CEQ 1981).

Step 1: Define Range of Reasonable Alternatives

In Step 1, numerous roadway expansion alternatives (for the entire corridor, Fairfield, and the Badlands) and bridge rehabilitation/replacement alternatives were preliminarily evaluated for their reasonability and feasibility in accordance with the CEQ definition of what makes an alternative initially reasonable. The NDDOT and FHWA used past practices and reasonable judgement when assessing the feasibility of preliminary alternatives.

Part of assessing the reasonability of the preliminary alternatives was to determine their ability to meet current and future traffic projections and whether or not they were excessive, unnecessary, reasonable, and/or feasible from a geotechnical, engineering, technical, economic, and safety standpoint using common sense and considering the amount of space available.

Step 2: Previous Reports and Studies

In Step 2, conclusions and recommendations from various reports (e.g., Ports-to-Plains Feasibility Study [2001], Ports-to-Plains Corridor Development and Management Plan [2004], Heartland Expressway Economic and Engineering Feasibility Study [1993], Heartland Expressway Corridor Development and Management Plan [2014], and Little Missouri River Crossing Feasibility Study Report [2013]) were considered. The alternatives carried forward from Step 1 were evaluated to determine whether or not they were consistent with these previous reports and studies.

Step 3: Project Purpose and Need/Project Goals

In Step 3, the alternatives carried forward from Step 2 were evaluated to determine whether or not they were consistent with, and would meet the objectives of, the purpose and need and project goals. Please refer to **Section 1.3 on page 3** for a description of the project's purpose and need and project goals.

Step 4: Summarize Findings and Conduct Phase II

In Step 4, the alternatives that were eliminated from further screening, consideration, and detailed analysis were summarized. The summaries included the reason(s) the alternatives were eliminated. The alternatives that were carried forward to Phase II were also summarized. These alternatives were determined to be reasonable and feasible from a geotechnical, engineering, technical, economic, and safety standpoint using common sense (Step 1); consistent with the conclusions and recommendations of previous reports and studies (Step 2); and consistent with, and would meet the objectives of, the purpose and need/project goals (Step 3).

3.6.1.2. Phase II: Desktop Review of Reasonable Alternatives

Phase II of the screening process involved a desktop review and analysis of the alternatives carried forward from Phase I. Phase II included three steps: (1) Project Constraints and Design Criteria and Standards, (2) Agency Involvement and Public Alternatives Workshops, and (3) Summarize Findings and Conduct Phase III.

Step 1: Project Constraints and Design Criteria and Standards

In Step 1, the roadway expansion alternatives (for the entire corridor, Fairfield, and the Badlands) and bridge rehabilitation/replacement alternatives carried forward from Phase I were rigorously explored and objectively evaluated considering roadway and bridge design criteria and standards, geotechnical criteria, and project constraints. The roadway design criteria and standards were developed in accordance with the following:

- Design Standards for Highways (23 Code of Federal Regulations [CFR] § 625)
- American Association of State Highway and Transportation Officials (AASHTO) Policy for Geometric Design of Highways and Streets
- NDDOT Design Manual
- NDDOT Standard Specifications for Road and Bridge Construction
- Manual of Uniform Traffic Control Devices

Some of the more significant roadway design criteria and standards regarded design speed, shoulder and median design, and roadway width. The bridge design criteria and standards were developed in accordance with the following:

- AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications
- NDDOT Design Manual
- Project-specific hydraulic and geotechnical recommendations

Some of the more significant bridge design criteria and standards regarded vertical clearance, bridge geometry and grade, and structure types. Roadway and bridge design criteria were summarized in Roadway Design Criteria and Bridge Design Criteria documents (2016), respectively (**appended by reference**).

The roadway constraints assessment consisted of a high-level, mile-by-mile desktop review. For each of the 62 miles of the corridor, a 250-foot-wide assessment area was added to the east and west sides of the existing roadway. Once all of the constraints within the 250-foot-wide assessment area were identified, it was determined (using engineering judgement) which side of the existing roadway would be the most optimal for expansion. The expansion was then further refined to minimize transitions across the existing roadway. A detailed map book showing the roadway expansion, including the existing roadway, the side of the roadway deemed the most optimal for expansion, and all of the identified constraints within the 250-foot-wide assessment area is **appended by reference**.

The bridge constraints assessment consisted of a high-level desktop review, whereby the existing Long X Bridge was assessed for constraints in the immediate surrounding area. Some of the constraints identified included utilities, a farmstead located immediately southeast of the existing bridge, and slope stability concerns caused by historic landslides on the southwestern side of the existing bridge.

Step 2: Agency Involvement and Public Alternatives Workshops

In Step 2, the alternatives carried forward from Step 1 were presented to cooperating and participating agencies at the lead, cooperating, and participating agencies meeting and the public at two public alternatives workshops and the Fairfield community stakeholder meeting. Additional alternatives and options developed during Phase II for the ND-200/US Highway 85 intersection, the proposed trail, and wildlife crossing and accommodations were also presented at the meetings.

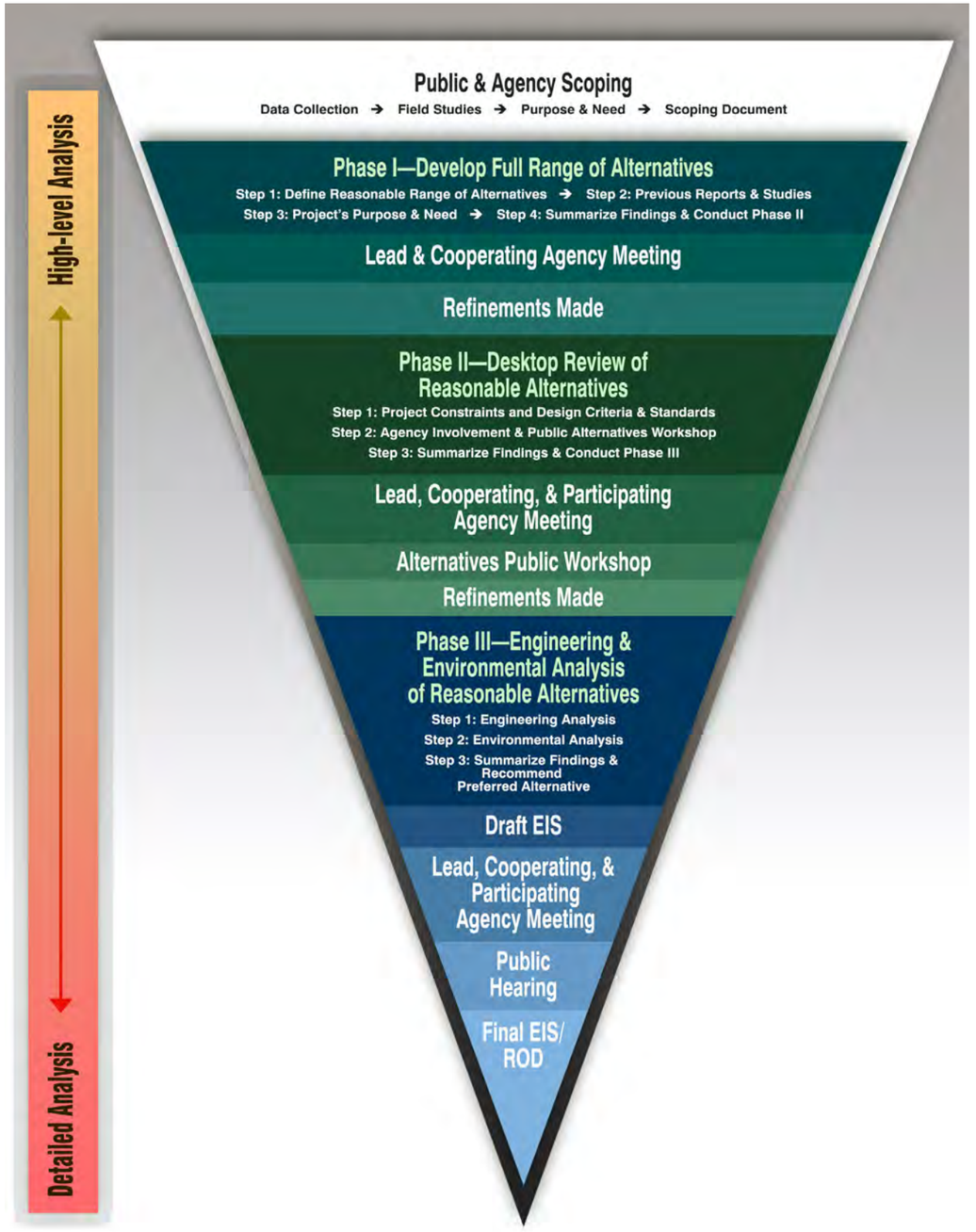


Figure 45, Alternatives Methodology Process

The lead, cooperating, and participating agencies meeting was held in Bismarck on July 21, 2016. The public alternatives workshops were held in Belfield on July 25, 2016, and Watford City on July 26, 2016. In addition, a 30-day comment period (from July 25 to August 26, 2016) was provided to agencies and the public. The Fairfield community stakeholder meeting was held in Fairfield on December 1, 2016. In addition, a 30-day comment period for the Fairfield area was provided to agencies and the public from December 1 to 31, 2016. A Public Alternatives Workshop Report summarizing the meetings and comments received was developed and is **appended by reference**. The alternatives and options presented during these meetings were further evaluated to determine whether or not they were consistent with input received from agencies and the public.

Step 3: Summarize Findings and Complete Phase III

In Step 3, the alternatives and options that were eliminated from further screening, consideration, and detailed analysis were summarized. The summaries included the reason(s) the alternatives and options were eliminated. The alternatives and options that were carried forward to Phase III were also summarized. These alternatives and options were determined to be consistent with the roadway and bridge design criteria and standards, geotechnical standards, and project constraints (Step 1), as well as input received from agencies and the public (Step 2).

3.6.1.3. Phase III: Engineering and Environmental Impact Analysis of Reasonable Alternatives

Phase III (final phase of the screening process) included three steps: (1) conduct an engineering analysis of the reasonable alternatives and options carried forward from Phase II; (2) develop the EIS, which includes analyzing the potential environmental, socioeconomic, and cultural impacts from the reasonable alternatives and options carried forward from Phase II and screened through the engineering analysis; and (3) identify the alternative preferred by the NDDOT and FHWA in the EIS.

Step 1: Engineering Analysis

In Step 1, the roadway expansion alternatives (for the entire corridor, Fairfield, and the Badlands) and ND-200/US Highway 85 intersection alternatives carried forward from Phase II were screened through an engineering analysis that included evaluating typical sections, roadway geometrics, the construction footprint, ROW needs, drainage requirements, construction phasing, construction traffic control, utility impacts, and cost estimates. The bridge rehabilitation/replacement alternatives carried forward from Phase II were screened through an engineering analysis that included evaluating the bridge geometry, structural capacity, constructability, construction staging and schedule, hydraulic and geotechnical considerations, and estimated construction cost.

Step 2: Environmental Impact Analysis

In Step 2, the alternatives and options carried forward from Step 1 are analyzed in this EIS for their potential environmental, socioeconomic, and cultural impacts. Avoidance, minimization, mitigation and conservation measures, and best management practices (BMPs) are also assessed to determine if the potential impacts can be reduced from their level of significance.

Step 3: Recommend Preferred Alternative

In Step 3, the alternative preferred by the NDDOT and FHWA is recommended, based on the alternatives and options analyzed in the EIS. As previously stated in **Section 3.5 on page 37**, the agency's Preferred Alternative is the alternative the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors.

3.6.2. What alternatives and options were eliminated from further detailed analysis during the alternatives screening?

During the three-phase, multiple-step screening process, numerous alternatives and options were considered and evaluated. As previously discussed, the alternatives and options that were not carried forward to the following step, were eliminated from further screening, consideration, and detailed analysis. Please refer to **Table 6, Alternatives and Options Considered but Eliminated During Alternatives Screening on page 40** for a summary of the alternatives and options that were eliminated and a brief discussion regarding why they were eliminated.

3.6.3. Value Engineering Study

Value Engineering is defined as a systematic process of review and analysis of a project, during the concept and design phases, by a multidiscipline team of individuals that are not involved in the project. The team identifies the function of a project and generates alternatives through creative thinking that supports those functions. The team evaluates and screens the ideas that provide the most value and they develop those ideas into recommendations.

A Value Engineering Study was completed to provide recommendations for (1) validating current alternatives already developed; (2) providing additional alternatives to consider; and (3) enhancing the current alternatives. The recommendations were reviewed, categorized, and screened to determine which recommendations should be incorporated into the planning and preliminary design of the project.

The first step in the process included organizing the recommendations into one of four categories: (1) Cost-Saving/Consider During Final Design, (2) Under Consideration, (3) Previously Ruled Out/Reconsider, and (4) Move Forward to Screening. The second step included taking the recommendations identified for screening through the alternatives screening process (previously discussed).

All of the recommendations categorized as Cost-Saving/Consider During Final Design were identified as having a cost-saving benefit and will be considered and evaluated during the final design phase of the project. These recommendations would minimally change the overall project footprint and/or impact area. A determination would be made during the final design phase, how or if, the recommendation would be incorporated into the project.

All of the recommendations categorized as Under Consideration have been previously proposed in the preliminary design and/or are currently being considered and evaluated in this EIS. All of the recommendations categorized as Previously Ruled Out/Reconsider and Move Forward to Screening were screened through the alternatives screening process (i.e., Phases I, II, and III).

Table 7, Recommendations Evaluated Through Alternatives Screening Process on page 43 provides a summary of the recommendations that were evaluated through the alternatives screening process. All of the recommendations were eliminated during the alternatives screening process, and therefore, were ruled out/eliminated from further consideration.

Table 6, Alternatives and Options Considered but Eliminated During Alternatives Screening

Alternative/Option Eliminated	Phase/Step	Reason for Elimination
ROADWAY EXPANSION (ENTIRE CORRIDOR)		
Six-Lane Highway	Phase I, Step 1	Would be excessive and unnecessary considering current and future traffic projections; would not be cost effective.
Elevated Roadway [a]	Phase I, Step 1	Would have height and width restrictions; could prohibit overpass wildlife corridor/crossings; would not be cost-effective; would have issues with access on and off the highway.
One-way Pair [b]	Phase I, Step 1	Would have issues with access on and off the highway.
Construct a Pipeline	Phase I, Step 1	Would only increase the capability of moving certain products (e.g., oil and gas, water) and not people and other goods; would not meet current and future traffic projections or improve system linkage within the region and state.
Public Transit System (e.g., Bus)	Phase I, Step 1	Would only increase the capability of moving people and not products and other goods; would not meet the current and future traffic projections or improve system linkage within the region and state.
Super 2 Highway (two-lane highway with periodic passing lanes and turn lanes)	Phase I, Step 3	Would not improve system linkage within the region and state.
Major Rehabilitation of Existing Roadway with Wider Shoulders (8 feet wide)—No Passing Lanes Added	Phase I, Step 3	Would not result in increased capacity; would not increase operational effectiveness or address capacity-related deficiencies (e.g., percent time spent following) associated with passing demand and ability; would not result in increased safety.
Four-lane Section Outside Existing Alignment: Divided—1 to 2 miles away; Four Lanes on New Alignment	Phase I, Step 3	Would not utilize the existing alignment, as required to meet the purpose and need/project goals.
Four-lane Section Outside Existing Alignment: Divided—1 to 2 miles away (Northbound or Southbound); Two Lanes on New Alignment	Phase I, Step 3	Would not utilize the existing alignment, as required to meet the purpose and need/project goals.
Four-lane Section using Existing Alignment: Undivided	Phase II, Step 1	Would not meet the criteria and standards regarding medians in the AASHTO Green Book (Section 7.2.10); undivided, multi-lane arterials have significantly more collisions than multi-lane facilities with medians; therefore, multi-lane, undivided facilities are discouraged.
Public Suggested Alternative: Expand ND-16 from a Two-lane to a Four-lane Highway (in lieu of Expanding US Highway 85 from a Two-lane to a Four-lane Highway)	Phase II, Step 2	Would not address the high traffic volumes and associated congestion and lack of passing opportunities on US Highway 85; was not identified as a designated corridor by the Ports-to-Plains.
ROADWAY EXPANSION (FAIRFIELD)		
Four-lane Section using Existing Alignment: Divided – Depressed Median	Phase I, Step 1	Due to its sizing requirements, multiple properties (e.g., residential homes, farmsteads, and businesses) would need to be relocated.
Major Rehabilitation of Existing Roadway with Wider Shoulders (8 feet wide)—Turn Lanes Added	Phase I, Step 3	Would not increase operational effectiveness or address capacity-related deficiencies (i.e., percent time spent following) associated with passing demand and ability; would not result in increased safety.
Three-lane Section	Phase I, Step 3	Would not improve system linkage within the region and state.
Four-lane Section using Existing Alignment: Undivided	Phase II, Step 1	Would not meet the criteria and standards regarding medians in the AASHTO Green Book (Section 7.2.10); undivided, multi-lane arterials have significantly more collisions than multi-lane facilities with medians; therefore, multi-lane, undivided facilities are discouraged.
Public Suggested Alternative: Construct a Two-lane Northbound Bypass around One Side of Fairfield and Construct a Two-lane Southbound Bypass around the Other Side of Fairfield	Phase II, Step 2	Would result in greater environmental, socioeconomic, and cultural impacts than a single four-lane bypass around one side of Fairfield, as more ground-disturbance would be required; would have issues with access.
Four-lane Section using Existing Alignment: Divided – Flush Median	Phase III, Step 1	This alternative is similar to the four-lane, urban section alternative; however, it was determined that this alternative would require wider footprint and more land space. Therefore, this alternative was eliminated, since the four-lane, urban section alternative would achieve the same continuous four-lane section through Fairfield on the existing alignment with a smaller footprint.
ROADWAY EXPANSION (BADLANDS) [c]		
Four-lane Section using Existing Alignment: Divided – Depressed Median	Phase I, Step 1	Would have geotechnical and engineering issues; would conflict with overhead transmission lines.

Notes:

a. *An elevated roadway would involve converting the existing US Highway 85 to one-way traffic and constructing an elevated roadway above the existing US Highway 85 with two lanes running in the opposite direction.*

b. *A one-way pair would involve converting the existing US Highway 85 to one-way southbound traffic and converting ND-22 to one-way northbound traffic (or vice versa).*

c. *A Badlands Alternative Alignment Memorandum was prepared in 2017 that documents alternative alignments considered that would reroute US Highway 85 away from the TRNP – North Unit. In addition, prior to initiating this EIS, the NDDOT prepared the Little Missouri River Crossing Feasibility Study Report in 2013 that analyzed alignments through the Badlands and concluded that alignments following the existing roadway were the most feasible. Both of these documents are* **appended by reference**.

… table continued on page 41 …

Alternative/Option Eliminated	Phase/Step	Reason for Elimination
Construct a Tunnel	Phase I, Step 1	Would have geotechnical, engineering, drainage, and reliability issues; would not be cost-effective.
Alternative Alignment (Outside Existing Alignment)	Phase I, Step 1	Would have geotechnical and engineering issues.
Major Rehabilitation of Existing Roadway with Wider Shoulders (8 feet wide)—Turn Lanes Added	Phase I, Step 3	Would not increase operational effectiveness or address capacity-related deficiencies (i.e., percent time spent following) associated with passing demand and ability; would not result in increased safety.
Super 2 with Passing Lanes and Truck-Climbing Lanes	Phase I, Step 3	Would not improve system linkage within the region and state.
Four-lane Section using Existing Alignment: Undivided	Phase II, Step 1	Would not meet the criteria and standards regarding medians in the AASHTO Green Book (Section 7.2.10); undivided, multi-lane arterials have significantly more collisions than multi-lane facilities with medians; therefore, multi-lane, undivided facilities are discouraged.
Public Suggested Alternative: Keep Badlands Section of US Highway 85 as a Two-lane Highway and Reduce Design/Posted Speed Limit	Phase II, Step 2	Would not address the project's purpose and need to improve system linkage within the region and state by creating a continuous four-lane highway from the I-94 interchange to US Highway 2; would not provide the missing link to the overall four-lane infrastructure within North Dakota.
Five Bypass Alignments Around TRNP	Phase III, Step 1	Would require excessive earthwork; would have significant geotechnical issues; would need to be constructed through pristine areas of the Badlands; some would further bisect bighorn sheep critical range (i.e., areas important for lambing); would still be within the administrative boundary of the TRNP; some would not provide direct access to TRNP–North Unit (i.e., visitors traveling northbound to TRNP–North Unit would need to travel around park via northbound lanes, then change direction and travel back to park entrance via southbound lanes).
Alignment East of TRNP	Phase III, Step 1	Would require excessive earthwork; would have significant geotechnical issues; would need to be constructed through pristine areas of the Badlands; would bisect private property; would further bisect bighorn sheep critical range (i.e., areas important for lambing); would not provide direct access to TRNP–North Unit (i.e., visitors traveling northbound to TRNP–North Unit would need to travel around park via new alignment, then change direction and travel back to park entrance via existing roadway).
ND-200/US HIGHWAY 85 INTERSECTION		
J-Turn Layout	Phase III, Step 1	Would increase travel time and distance for left turn movements and through side street movements; unfamiliarity with J-turn design could negatively affect public acceptance; large oversized vehicles might have difficulty maneuvering J-turn configuration.
LONG X BRIDGE REHABILITATION/REPLACEMENT		
Construct a Bridge to Span the Badlands (1 to 2 miles long)	Phase I, Step 1	Would not provide access to the TRNP; would not meet current and future traffic projections; would not be cost-effective; would impact the viewshed and have engineering issues.
Construct Single-lane Structure on Each Side of Existing Long X Bridge for Trucks (Oversized/Overweight Loads); Cars Use Existing Bridge	Phase I, Step 1	Would force all trucks (e.g., overweight/oversized loads) to the right lanes, which could increase safety risks; trucks would need to rapidly change lanes and ensure they selected the correct lane, which could result in increased accidents; would not alleviate issues with the existing narrow bridge.
Construct a Two-lane Structure Adjacent to Long X Bridge (No Modifications to Long X Bridge). Oversized Permitted Loads Routed to new Two-lane Bridge with Road Closure/Traffic Control	Phase I, Step 3	Would not alleviate issues with over height loads at the bridge; specifically, unpermitted, over height loads that have caused damage to the bridge in the past. Would require road closures for all oversized loads in opposing lanes. Does not meet criteria for reliable roadway.
Increase Vertical Clearance of Long X Bridge (Two-lane, Two-way Traffic)	Phase I, Step 3	Would not improve system linkage within the region and state.
Retain Existing Long X Bridge for Alternative Use (i.e., Pedestrian Facility) and Construct a New Four-lane Bridge Adjacent to the Existing Bridge	Phase II, Step 2	Use of the existing bridge as a pedestrian facility would conflict with the proposed wildlife crossing at Long X Bridge; use of the existing bridge as a pedestrian facility would increase the potential for disturbing bighorn sheep during the lambing season (bighorn sheep are more likely to display a flight reaction in response to pedestrian traffic than vehicle traffic).
New Bridge Construction West of the Long X Bridge	Phase III, Step 1	Due to geotechnical concerns (e.g., potential landslide issues) on the western side of the Long X Bridge, alternatives to construct a two- or four-lane bridge adjacent to the west of the existing bridge were deemed inconsistent with the engineering analysis.
WATFORD CITY TRAIL		
West Side Shared-use Path – Cut or Fill Section	Phase III, Step 1	Though this option was determined to be consistent with the initial engineering analysis, after further analysis it was determined that the option for a shared-use path on the eastern side of US Highway 85 was more optimal.
Shared-use Path (Watford City to Southern Side of Long X Bridge)	Phase III, Step 1	Upon further coordination with the North Dakota Game and Fish Department (NDGF), it was determined that the shared-use path needed to end at the entrance to the TRNP – North Unit (as opposed to the southern side of the Long X Bridge) to avoid potential human-wildlife conflicts, particularly for bighorn sheep during the lambing period.

Notes:

a. An elevated roadway would involve converting the existing US Highway 85 to one-way traffic and constructing an elevated roadway above the existing US Highway 85 with two lanes running in the opposite direction.

b. A one-way pair would involve converting the existing US Highway 85 to one-way southbound traffic and converting ND-22 to one-way northbound traffic (or vice versa).

c. A Badlands Alternative Alignment Memorandum was prepared in 2017 that documents alternative alignments considered that would reroute US Highway 85 away from the TRNP–North Unit. In addition, prior to initiating this EIS, the NDDOT prepared the Little Missouri River Crossing Feasibility Study Report in 2013 that analyzed alignments through the Badlands and concluded that alignments following the existing roadway were the most feasible. Both of these documents are **appended by reference**.

… table continued on page 42…

Alternative/Option Eliminated	Phase/Step	Reason for Elimination
Shared-use Path (Watford City to TRNP – North Unit entrance)	Phase III, Step 2	Upon further coordination with the NPS, it was determined that the shared-use path needed to end outside of NPS-managed lands to minimize impacts on the TRNP – North Unit.
WILDLIFE CROSSINGS AND ACCOMMODATIONS		
Two Crossings between Grassy Butte and Fairfield	Phase II, Step 2	These two wildlife crossings, located at RP 95.002 and RP 108.450 or RP 110.492 between Grassy Butte and Fairfield, are not proposed for further consideration due to concerns with constructability and implementation of the crossings. However, because construction of the project is not anticipated to begin in this area for several years, these wildlife crossings may be considered for implementation at a later time upon coordination with the NDGF. The NDDOT is committed to reanalyzing these wildlife crossings at the time of final design.
Wildlife Overpass at RP 121.8	Phase III, Step 1	Would require grade raise to meet the minimum criteria of 130 to 165 feet wide; there are private lands on either side of the roadway; there are no large mammal observations in the vicinity.
Wildlife Overpass at RP 128.5 (Concepts 2A, 2B, and 3)	Phase III, Step 1	Could have issues regarding the maintenance of, and snow removal from the retaining walls associated with these concepts.
Wildlife Overpass at RP 128.5	Phase III, Step 2	This crossing was initially proposed for further consideration. The crossing did not present any engineering issues that would have otherwise precluded it from further consideration and the proposed location was well suited from an engineering and ecological standpoint. This crossing was ultimately eliminated from further consideration to minimize impacts on the TRNP – North Unit.
Demolish Existing South Branch of the Green River Bridge, Construct Two Two-lane Bridges (Alternative B) or Construct One Four-lane Bridge (Alternative C), including Pathways beneath new Bridge(s) to Accommodate Wildlife	Phase III, Step 1	Preliminary hydraulic analysis at the South Branch of the Green River crossing location indicated that a box culvert would suffice from a hydraulic capacity standpoint and new bridge(s) would not be necessary. Box culverts also afford construction and maintenance cost savings compared to bridges and improve driver safety by eliminating guardrails.
Demolish Existing Spring Creek Bridge, Construct One Four-lane Bridge, including Pathways beneath new Bridge to Accommodate Wildlife	Phase III, Step 1	Preliminary hydraulic analysis at the Spring Creek crossing location indicated that a box culvert would suffice from a hydraulic capacity standpoint and a new bridge would not be necessary. Box culverts also afford construction and maintenance cost savings compared to bridges and improve driver safety by eliminating guardrails.
Demolish Existing South Branch of the Green River Bridge and Construct Single Barrel Concrete Box Culvert, including Terrestrial Wildlife Accommodation	Phase III, Step 1	The NDDOT consulted with the NDGF, who prefers sinking the box 1 foot below the ground elevation and maintaining the connectivity of the aquatic resource. However, sinking the box culvert below the stream bed conflicts with providing crossing accommodations through the box for terrestrial mammals.
Demolish Existing Spring Creek Bridge and Construct Double Barrel Concrete Box Culvert, including Terrestrial Wildlife Accommodation	Phase III, Step 1	The NDDOT consulted with the NDGF, who prefers sinking the box 1 foot below the ground elevation and maintaining the connectivity of the aquatic resource. However, sinking the box culvert below the stream bed conflicts with providing crossing accommodations through the box for terrestrial mammals.
Retain Existing South Branch of the Green River Bridge and Construct One Two-lane Bridge (Alternative B) or Widen Existing Bridge (Alternative C) to Four Lanes	Phase III, Step 1	Existing bridge would require a traffic barrier retrofit. The cost for this option would be greater than replacing the bridge with a new box culvert.
Retain Existing Spring Creek Bridge and Widen Existing Bridge to Four Lanes	Phase III, Step 1	Existing bridge would require a traffic barrier retrofit. The cost for this option would be greater than replacing the bridge with a new box culvert.

Notes:

a. *An elevated roadway would involve converting the existing US Highway 85 to one-way traffic and constructing an elevated roadway above the existing US Highway 85 with two lanes running in the opposite direction.*

b. *A one-way pair would involve converting the existing US Highway 85 to one-way southbound traffic and converting ND-22 to one-way northbound traffic (or vice versa).*

c. *A Badlands Alternative Alignment Memorandum was prepared in 2017 that documents alternative alignments considered that would reroute US Highway 85 away from the TRNP – North Unit. In addition, prior to initiating this EIS, the NDDOT prepared the Little Missouri River Crossing Feasibility Study Report in 2013 that analyzed alignments through the Badlands and concluded that alignments following the existing roadway were the most feasible. Both of these documents are* **appended by reference**.

Table 7, Recommendations Evaluated Through Alternatives Screening Process

Recommendation	Considered Reasonable/ Feasible	Phase/Step Eliminated	Reasoning
R3-A: CR 30 Frontage/Backage Roads	No	Phase I, Step 1	There are no individual access points on US Highway 85 between McKenzie County Road 30 and the intersection of the proposed backage road. Therefore, there would be no benefit in constructing a backage road to eliminate access points since there are none.
R2-C: Turbo Roundabout	No	Phase I, Step 1	This recommendation was considered infeasible due to operational limitations for large trucks, oversize loads, and snow removal in a rural location. There aren't any of these intersections currently operating in the United States.
B9: Glue-Laminated Bridge for Wildlife Crossing	No	Phase I, Step 1	A similar arch structure with retaining walls was previously considered and ruled out/eliminated, as there could be issues regarding the maintenance of, and snow removal from, the crossing, and the structure wouldn't be as open, discouraging wildlife to use the crossing. In addition, this structure type is not common in North Dakota or in the United States, and it would likely be difficult to obtain materials, which would subsequently make it cost-prohibitive.
S1: Pedestrian Underpass at Fairfield	No	Phase I, Step 1	There aren't pedestrian facilities or documented pedestrian crossing movements in Fairfield.
CS3: Construction Staging Area: RP 125 East	No	Phase I, Step 1	The roadway inslopes at this location are generally 3:1 or 4:1, and the bottom of the valley is approximately 100 feet lower than the highway. The slope of this site and the elevation would make it infeasible as a staging area. In addition, it is also located within the bighorn sheep critical range, which is subject to timing restrictions during the lambing season.
E3: Incorporate Structures in Constrained Areas	No	Phase I, Step 1	Cost, maintenance, deicing requirements, access, and grades on structures would make this recommendation infeasible.
E4: Terraced Roadway	No	Phase I, Step 1	Cost, maintenance, drainage, access, and grades would make this recommendation infeasible.
W2-D: Bison Exclusion, Management Plan with NPS	No	Phase I, Step 1	This was not considered a reliable method. Neither the NPS nor NDDOT have the additional resources required for this approach.
W2-E: Bison Exclusion, Animal Detection with Deterrent	No	Phase I, Step 1	This is an unproven system that would create too great of a risk for bison leaving the TRNP.
T1: At-Grade Pedestrian Crossing at Proper Location	No	Phase I, Step 1	At-grade pedestrian crossings on a rural high-speed highway would create safety concerns.
R1-C: Depressed Flush Median	No	Phase I, Step 3	This is not consistent with the goal of utilizing the existing infrastructure. This recommendation would require removing most of the existing roadway.
R1-F: Reduce Inside Driving Lane to 11 feet	No	Phase II, Step 1	This recommendation does not meet minimum travel way or lane width requirements. It would require approval of a design exception, and there are no circumstances that justify the need for a design exception.
R1-H: Typical Section Through Fairfield, Reduce Inside Lane to 11 feet and Shoulder Width to 4 feet	No	Phase II, Step 1	This recommendation does not meet minimum travel way, lane width, or shoulder requirements. It would require approval of a design exception, and there are no circumstances that justify the need for a design exception.
P1: Waste Soil Locations: South of Long X Bridge	No	Phase II, Step 1	The south abutment of Long X Bridge is proposed to be designed to resist landslide movement. Adding additional fill in this area may increase instability and cost; would not be able to raise the grade enough to buttress the landslide.
P2: Waste Soil Locations: Horseshoe Bend	No	Phase II, Step 1	The Horseshoe Bend area has been plagued by landsliding for decades. Adding more weight in this area poses a risk for causing additional and more severe landslides.
E5: Raise Profile of South Abutment at Little Missouri River Crossing	No	Phase II, Step 1	The south abutment of Long X Bridge is proposed to be designed to resist landslide movement. Adding additional fill in this area may increase instability and cost; would not be able to raise the grade enough to buttress the landslide.
W2-B: Bison Exclusion, Narrow Gates	No	Phase II, Step 2	The NDGF commented that the overpass crossing should have a clear line-of-sight or "openness" for animals to feel secure using the crossing. Gates would not provide the openness the bighorn sheep need to feel secure to cross.
W2-C: Bison Exclusion, Rock/Gabion Mounds	No	Phase II, Step 2	The NDGF commented that the overpass crossing should have a clear line-of-sight for animals to feel secure using crossing. This would not provide a clear line-of-sight and would preclude other species from using the crossing.
P3: Waste Soil Locations: North of Long X Bridge	No	Phase II, Step 2	The NPS expressed concerns with visual impacts from the project. Excess soil wasted near the TRNP would be a visual impact.
CS4: Construction Staging Area: Horseshoe Bend	No	Phase II, Step 2	The NPS expressed concerns with visual impacts from the project. There are other locations outside of the Badlands that could serve as staging areas.

… table continued on page 44 …

Recommendation	Considered Reasonable/ Feasible	Phase/Step Eliminated	Reasoning
B2: Steel beams for Little Missouri River Crossing	No	Phase III, Step 1	The five-span steel and concrete bridge options were developed through a Bridge Type Study that considered a variety of span arrangements. Removing piers and increasing span lengths would increase the structure cost. This is due to the fact most of the piers in the current configuration would not require cofferdams and would be fairly simple to construct. The potential savings of reducing the number of piers would be relatively minor compared to the additional superstructure cost associated with longer spans. If deeper water or more challenging foundation conditions were a factor, reduction of piers may be more beneficial. In addition, hydraulic analysis has shown that the addition of a bridge next to the existing bridge causes a (small) increase in water surface elevations regardless of the number of piers. Therefore, the hydraulic benefit in reducing the number of piers is very limited and not a driving reason to reduce the number of piers.
B8: Use Excess Fill for Arch Embankment Wildlife Crossing	No	Phase III, Step 1	An arch structure previously considered for the wildlife overpass would have required approximately 40,000 cubic-yards of borrow material, some of which would have needed to meet specific requirements to be used as reinforcing fill for retaining walls. As such, the amount of material is insignificant when compared to large amount of waste material estimated. Building an arch structure for this purpose alone would increase the structure cost and provide minimal benefit.
B4: Keep Existing South Branch of the Green River/ Spring Creek Bridge for Divided Alternative	No	Phase III, Step 1	This concept was considered as part of the South Branch of the Green River structure concept development process. Retaining the existing bridge and constructing a new bridge adjacent was found to cost approximately $240,000 more than full replacement with a box culvert. At Spring Creek, this option is not under consideration due to the lack of a divided median roadway alternative at this location.
B6: Post Tension Bridge	No	Phase III, Step 1	Post tensioned bridges (e.g., segmental concrete bridges) are generally not considered economical for this size of structure. This is due to the large costs associated with setting up the concrete casting operations and post tensioning systems. Similar to the consideration for longer steel spans, unless savings can be gained by eliminating disproportionate costly foundations, a specialty superstructure would add significant costs to the project, rather than provide savings.
W1: Wildlife Overpass Alternative, Sensors/DMS Warnings	No	Phase III, Step 1	Driver warning systems have low to medium effectiveness. False positives, false negatives, and system downtime can result in drivers losing faith in the detection system, thus diminishing their effectiveness.
T3: Move Pedestrian Underpass to Spring Creek	No	Phase III, Step 1	If the underpass were moved to Spring Creek, the grade of US Highway 85 would need to be raised approximately 7 feet in order to keep the path above the design flood elevation and provide adequate vertical clearance under the structure. If a bridge is constructed for stream flows, incorporating the path and grade raise would result in increased bridge length and an estimated additional cost of $400,000.00 to $500,000.00. If a box culvert is constructed for stream flows, the path would need to be provided with a separate and higher box culvert, similar to what is proposed for the current crossing location, except it would require a grade raise. Therefore, moving the pedestrian crossing to Spring Creek would add cost.
T2: Keep Trail on West Side	No	Phase III, Step 1	To construct a trail along the western side of US Highway 85 from Watford City to the TRNP– North Unit, an at-grade pedestrian crossing would be required at the US Highway 85/ North Dakota Highway 23 intersection (signalized intersection), north of the project corridor. An at-grade pedestrian crossing at this intersection would present a safety hazard.

Chapter 4. Construction Methods and Phasing

The construction activities and methods, along with proposed scenarios of the expected sequencing and scheduling for the roadway, bridges, and utilities are discussed in this chapter.

Important topics in this chapter:

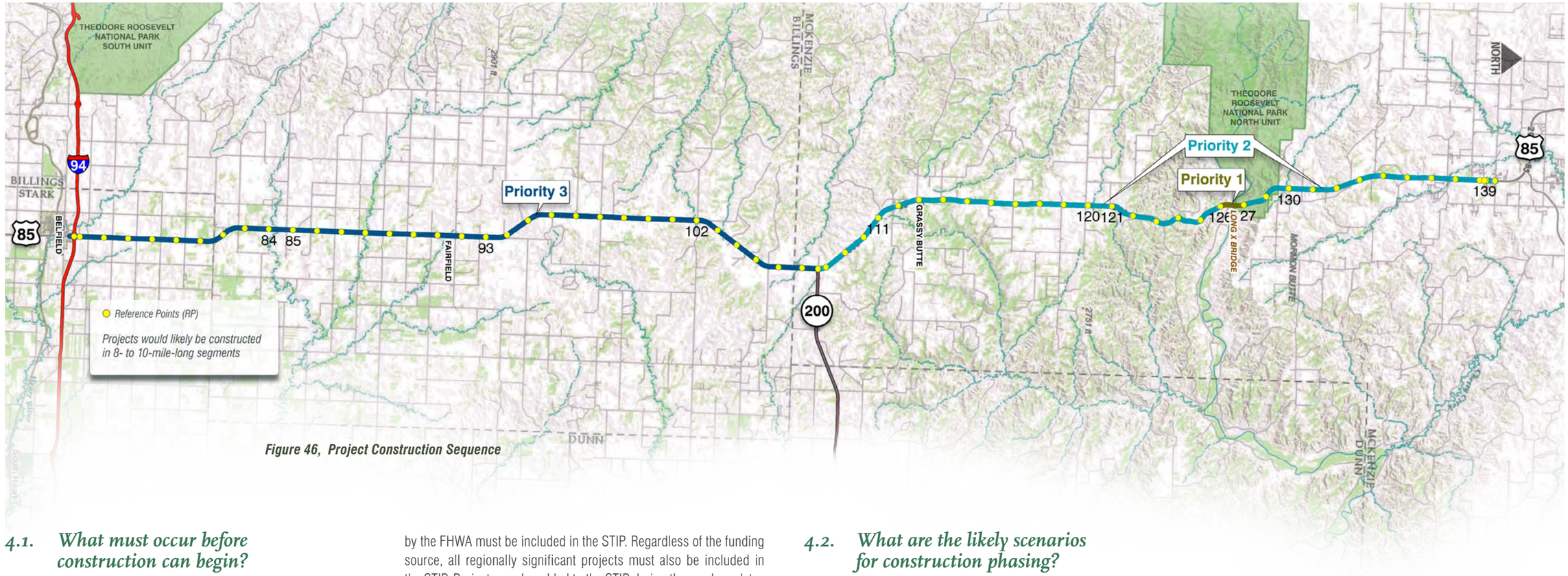


Figure 46, Project Construction Sequence

4.1. What must occur before construction can begin?

Prior to commencement of construction, environmental clearance must be obtained; funding needs to be authorized; and final design, permitting, and right-of-way (ROW) acquisition needs to be completed.

Environmental clearance would be obtained through a Record of Decision (ROD). The ROD would need to be signed by the lead agency, Federal Highway Administration (FHWA) and either adopted or approved by the three cooperating agencies (i.e., National Park Service [NPS], US Army Corps of Engineers [USACE], and US Forest Service [USFS]). The *Moving Ahead for Progress in the 21st Century Act* (MAP-21) has allowed for concurrent ROW and design during the environmental phase; however, the project sponsor does take the risk of obtaining ROW for an alternative that is not chosen.

Funding for the project would need to be authorized, and the project would need to be added or amended to the Statewide Transportation Improvement Program (STIP). All projects receiving federal funding through Title 23 United States Code (U.S.C.) or requiring an action by the FHWA must be included in the STIP. Regardless of the funding source, all regionally significant projects must also be included in the STIP. Projects can be added to the STIP during the yearly updates or by amendment. The North Dakota Department of Transportation (NDDOT) solicits public involvement at the time the STIP is updated or amended. Funding has been programmed for the Long X Bridge portion of the project, and the Long X Bridge is currently listed in the STIP and scheduled for construction in 2018.

Once funding has been authorized for one or more project segments, the project(s) would move into the final design, permitting, and ROW acquisition phase. The final details of the roadway design, drainage design, construction traffic control/phasing, and final ROW and easement needs would then be determined. Coordination with the necessary utilities regarding the movement of utility lines or pipelines would be conducted, and applicable permits would be acquired. ROW and temporary easements would be acquired as needed for the project. The project(s) would likely be bid in the fall or winter, and construction would likely commence in the spring or early summer, as weather permits.

A temporary easement is land made available to the contractor for a limited time for construction activities.

4.2. What are the likely scenarios for construction phasing?

Construction phasing would depend upon how much funding is available and how it is programmed for construction. The first priority that is scheduled for construction is the Long X Bridge. This project would consist of rehabilitating or replacing the Long X Bridge and constructing approximately 1 mile of approach roadways on each side of the bridge. This may include construction of the bighorn sheep underpass at RP 126.1. Funding has not been identified for any additional projects; however, after the Long X Bridge portion of the project is completed, the second priority would be constructing the roadway from the northern end of the corridor, Watford City Bypass (McKenzie County Road 30), to the North Dakota Highway 200 (ND-200)/US Highway 85 intersection. The final priority would be constructing the roadway from the ND-200/US Highway 85 intersection, to the Interstate 94 (I-94) interchange in Belfield. It is anticipated the actual construction projects would likely occur in 8- to 10-mile-long segments. Please refer to **Figure 46, Project Construction Sequence**.

4.3. How would the roadway be constructed (construction methods)?

It is anticipated that each construction segment would take two construction seasons to complete, with the first season consisting of utility relocation, culvert installation, topsoil removal, grading, graveling, seeding, and erosion-control. The second season would consist of paving (i.e., surfacing), pavement marking, and permanent sign installation and associated safety items.

The first stage of construction would include establishing work zones, staging areas, and temporary work zone traffic-control signing. Temporary erosion-control devices would be installed as necessary, prior to any ground-disturbing activities. Staging areas and borrow sources would be cleared and topsoil would be removed and stockpiled for use during reclamation. Temporary fencing would be installed along pastures used for livestock grazing, and fencing would be provided at all times along the Theodore Roosevelt National Park (TRNP) – North Unit.

Roadway construction would begin by removing the existing topsoil in areas where the roadway would be expanded (Alternative C) or constructed on a new alignment (Alternative B). The topsoil would be stockpiled and replaced after grading operations have occurred. Best construction practices would be used to prevent erosion. After the topsoil is removed and salvaged, earthwork grading operations would begin. These operations include a combination of hauling and placing fill material (i.e., soil) in areas that require additional material and removing excess material in cut areas. Work on approaches (e.g., field drives, section lines, and private driveways) would include placement of fill material to widen existing approaches and to construct new approaches as necessary. During the grading operations, drainage structures (i.e., culverts) would be extended and/or installed as required through the roadway and approaches to maintain existing drainage patterns.

Once the grading operations are completed the following activities would occur:

- Gravel would be placed on the surface of the roadway
- Topsoil would be replaced
- Seeding and erosion-control protection (e.g., seeding, straw mulch) would be installed
- Permanent fencing would be installed

The roadway would be paved the following construction season.

Timing of construction activities would be limited in proximity to the TRNP—North Unit. Timing restrictions would extend from reference point (RP) 126 to RP 130. In this area, regular construction activities (i.e., all activities except pile driving) would be limited to 8 am to 10 pm central (7 am to 9 pm mountain). Certain construction activities would require work outside of these times. The contractor would be required to notify the NDDOT prior to working outside of the established times, and the NDDOT would notify the NPS. Should construction fall behind schedule, sustained 24-hour construction may be required. In the event that sustained 24-hour construction becomes necessary, the NDDOT would coordinate with the NPS prior to commencing this schedule. Prior to developing the Special-Use Permit for temporary construction activities on NPS-managed lands, discussions would be had regarding extenuating circumstances that may necessitate 24-hour construction and additional conditions that may accompany 24-hour construction.

In the realignment areas and reconstruction areas (i.e., Badlands, near Watford City, and Fairfield [Option FF-1]), it is anticipated the existing roadway surfacing would be removed during grading operations and a temporary paved surface would be in-place during the winter months until the final paving operation occurs the following construction season. Upon completion of roadway paving and pavement marking, permanent signs (e.g., curve warning signs, speed limit signs) and associated safety items would be installed to complete the project.

Construction of the trail could be completed in conjunction with construction of the roadway. Grading operations for the trail could occur concurrently with the grading operations of the new roadway. The surfacing of the trail could occur the following construction season when the roadway is surfaced or at a later date depending on when funding for the trail is received.

4.4. How would a new bridge across the Little Missouri River be constructed?

Bridge substructures (i.e., piers and abutments) would be constructed of concrete and supported by a deep foundation system. The deep foundation system could consist of driven piles or drilled shafts. A pier is a bridge component used to support the part of the bridge that carries traffic (superstructure). There would be a total of four piers: one on the south bank of the river, two in the river channel, and one on the north bank of the river. A typical pier consists of foundation piling, footing, and columns (or wall). Please refer to **Figure 47, Example Bridge Pier**.

Driven piles are deep foundation elements driven to a design depth or resistance. Drilled shafts are deep foundation elements that are constructed by placing fluid concrete in a drilled hole.

Cofferdams are watertight enclosures pumped dry to permit construction work below the waterline.

Construction of supporting piers and footings in the river would be accomplished using cofferdams (refer to **Figure 48**) or earthen ring dikes. Once the cofferdams or ring dikes are in place, the contractor would need to excavate the channel bottom inside the cofferdam to the required pier foundation elevation. The deep foundation would be installed in the ground and the concrete footing would be placed on top of the foundation. After the footing and pier column are constructed, the excavated material would be backfilled and any excess material would be removed from the channel and disposed of at an approved location. Upon completion of construction, all temporary fills and structures would be removed and the stream bed and banks would be restored to pre-construction condition.

Land pier construction would be similar, except cofferdams or ring dikes would not be needed. Construction activities would include excavation to the bottom of the footing, approximately 6 to 8 feet below the existing ground surface. Rock riprap (i.e., loose stone used to form a protective mat) would be added at the northern abutment (i.e., bridge end) and all piers to reduce stream channel erosion. Any riprap installed within the designated wildlife crossing area on the northern bank of the river would be buried under topsoil, and all other riprap would be buried 1-foot below the channel bottom elevation. The bridge superstructure would consist of a reinforced concrete deck, supported by either prestressed concrete or steel-plate girders.

To facilitate access for construction equipment, materials, and labor forces, the bridge contractor would need to place temporary fill in the channel to construct a causeway or bypass. Please refer to **Figure 49** for an example of a causeway. River flow would be maintained by installing temporary culverts or by leaving part of the channel open. Depending on the water depths at the time of construction, the contractor may construct a temporary work bridge in lieu of a causeway.

As with roadway construction, the timing of bridge construction activities would be limited in proximity to the TRNP—North Unit, and work outside of the timing restrictions may be required. In addition to the timing restriction for regular construction activities, pile driving activities in this area would be limited to 8 am to 7 pm central (7 am to 6 pm mountain).

4.5. How would the Long X Bridge be rehabilitated?

For Option LX-1, access for the rehabilitation of Long X bridge would be provided from the bridge deck, approach roadways, and river banks. Traffic would be maintained on the new bridge while rehabilitation work is being completed. Modifications to the truss portals and strengthening of the chord members would be performed from the deck surface with small cranes and access equipment (e.g., scissor lift). Deck replacement may require temporary fill and grading on the

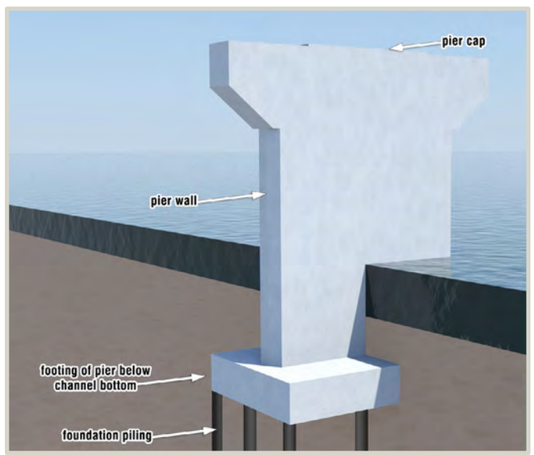


Figure 47, Example Bridge Pier

Figure 48, Example of a Cofferdam

Figure 49, Example of a Causeway

banks adjacent to the bridge to provide stable access and level work surfaces for construction equipment (e.g., cranes, ready mix trucks, concrete pump trucks).

The anticipated construction sequence for rehabilitation would begin with the contractor working from the existing deck to perform the modifications to the truss portals and install the strengthening plates on the truss members. The contractor would then remove the existing deck and traffic barriers and install the shear studs on the existing stringers. The bridge would then be contained, sandblasted, and painted. The final construction phase would include pouring the new deck concrete and installing the new expansion joints, traffic barriers, and guardrail.

Under Option LX-2, work associated with the existing Long X Bridge would be limited to painting and installing fence/barrier(s) at the ends of the bridge to prevent access. This work could be completed from the river banks and deck surface.

Sandblasting and painting for Options LX-1 and LX-2 would include full containment of the bridge during sandblasting to facilitate collection, removal, and disposal of the existing paint and sandblasting materials. Containment would remain in-place during the application of the new paint system as well.

As with roadway and bridge construction, the timing of bridge rehabilitation activities would be limited in proximity to the TRNP—North Unit, and work outside of the timing restrictions may be required.

4.6. How would the Long X Bridge be removed?

Under Option LX-3, the Long X Bridge would be removed (i.e., adopted and/or demolished). The bridge would be made available for adoption under the Bridge Adoption Program in coordination with the FHWA, NDDOT, and State Historic Preservation Office (SHPO). Due to the size of the structure, only one segment of the bridge would need to be adopted. In order to entice potential adoptees, the NDDOT would fund the disassembly, loading, and transport of one of the segments of the bridge within a 100-mile radius of its current location over the Little Missouri River. If a successful adoption occurs, the method of removal would be detailed in the final design plans in order to preserve the historic integrity of the adopted section. Prior to commencement of bridge removal activities, a demolition plan would be submitted by the contractor to the NDDOT for review and approval. Removal activities would not commence until approval of the demolition plan has been received from the NDDOT. If the bridge is adopted, the SHPO would also review and approve the demolition plan.

Any portion of the bridge that is not adopted would be demolished. The exact method of demolition would be determined by the contractor. Typical bridge demolition begins with removal of the bridge deck using a concrete saw to cut the deck into manageable sized pieces before loading onto trucks for disposal or salvage. Debris and water used during concrete sawing would be prevented from falling into the river to the extent practicable. Removal of the steel superstructure would likely be facilitated by the use of shaped charges. The shaped charges would cut the bridge into pieces and allow it to drop to the ground and river below. All components would then be removed and loaded onto trucks for disposal or salvage.

A shaped charge is an explosive device that directionally focuses its energy release.

All piers and abutments would be removed to a depth of 1-foot below the river bottom. Debris and temporary fill material would be removed from the river channel to the extent practicable. Shaped charges may also be used for the piers, or they could be removed with conventional construction equipment, such as crane and wrecking ball, excavators with jackhammer attachments, trucks, and other equipment.

Established load restrictions for state and county roadways would be followed, and haul permits would be acquired as needed for removal of debris. Bridge removal would be staged from the existing ROW. As with construction activities, the timing of bridge demolition activities would be limited in proximity to the TRNP—North Unit, and work outside of the timing restrictions may be required.

An asbestos survey was completed for the existing bridge in 2017. Results of the survey identified one asbestos-containing building material (ACBM) associated with a caulking compound on the northern bridge abutment. An Asbestos Notification of Demolition and Renovation form (SFN17987) would be submitted to the North Dakota Department of Health (NDDH) prior to bridge removal. Lead-based paint is also present on the existing bridge. The proper forms and notification would be submitted to the NDDH, and the lead-contaminated painted steel would be properly disposed at an off-site facility approved to handle lead-painted steel.

4.7. How would staging areas and construction access be provided at the Little Missouri River?

The land adjacent to a bridge under construction is often used to facilitate construction by providing areas for the following:

- Construction equipment staging and maintenance
- Stockpile areas of raw materials prior to their incorporation into the construction operation
- Temporary field office(s) and storage facilities
- Access to the bridge work area
- Laydown area for existing bridge components prior to disposal

The contractor would have access to all land within the existing and proposed ROW to facilitate construction operations and staging. To provide the contractor potential additional land to use for these purposes, temporary construction easements would be obtained for the project. **Figure 50, Construction Easements for the Long X Bridge Options on page 50** shows the potential work area likely to be used by the contractor for Options LX-1, LX-2, and LX-3. The final size and location of the temporary easements would be determined through negotiations with the adjacent landowners to obtain these easements. The work area would consist of the existing and proposed permanent ROW, along with two temporary construction easements, described as follows:

- Temporary Easement 1: would consist of a strip of land west of the existing ROW, on the northern side of the Little Missouri River. The western boundary of the easement would be 200 feet from the existing roadway centerline. Activities in the easement would likely be for bridge rehabilitation associated with Option LX-1 or LX-2, or bridge removal associated with Option LX-3. Activities would include temporary roads for construction equipment access (e.g., cranes, concrete pump truck, ready mix trucks), short-term materials storage for items to be incorporated into the work, and temporary lay down areas for existing bridge components as they are removed and loaded onto trucks for removal from the site.

- Temporary Easement 2: would consist of a rectangular parcel of land east of the existing ROW, on the northern side of the Little Missouri River. The eastern boundary of the easement would be 500 feet from the existing roadway centerline. This parcel could be used for the main contractor staging area, including temporary field offices and storage facilities, construction equipment storage and maintenance, stockpile areas, access to the work area, and laydown and assembly areas.

Similar activities as described for Temporary Easement 1 would take place on the southwestern side of the existing bridge; however, a temporary easement is not anticipated in this area due to the width of the existing ROW.

Since this work area is located near the TRNP—North Unit (approximately 0.5 miles), and tourism season and construction season coincide, it may be necessary to screen some of the work area from the view from the TRNP—North Unit. A temporary slatted chain-link fence could be placed along the northern and western boundaries of Temporary Easements 1 and 2 to provide some measure of visual screening. Use of these temporary easements would be limited to the timeframe allowed for construction of the selected option. All areas disturbed by construction would be restored after construction is completed. See **Figure 50, Construction Easements for the Long X Bridge Options on page 50**.

4.8. How would other structures be constructed?

The South Branch of the Green River and Spring Creek bridges would require a temporary bypass for construction equipment to access the work area. The bypass would include a culvert to maintain stream flow. The existing bridges would be replaced with box culverts. Construction activities would consist of the following:

- Excavating the existing roadway embankment down to the bottom of box culvert elevation
- Placement of culvert foundation materials
- Placement of the precast culvert sections
- Following placement of the culvert sections, the culvert would be backfilled, and the roadway section above would be constructed

Traffic would be maintained on the existing bridges while the new box culverts are constructed in stages. The existing bridges would be removed once new structure construction has advanced enough to allow two lanes of traffic on the new structures. The existing bridges would be removed. The existing piers and abutments would be removed to a depth of 1-foot below existing ground elevation.

The box culverts and structural plate pipe culverts to be extended would be constructed from the ditch areas adjacent to the roadway. Construction would require excavation in the stream channels to achieve the proper culvert elevation.

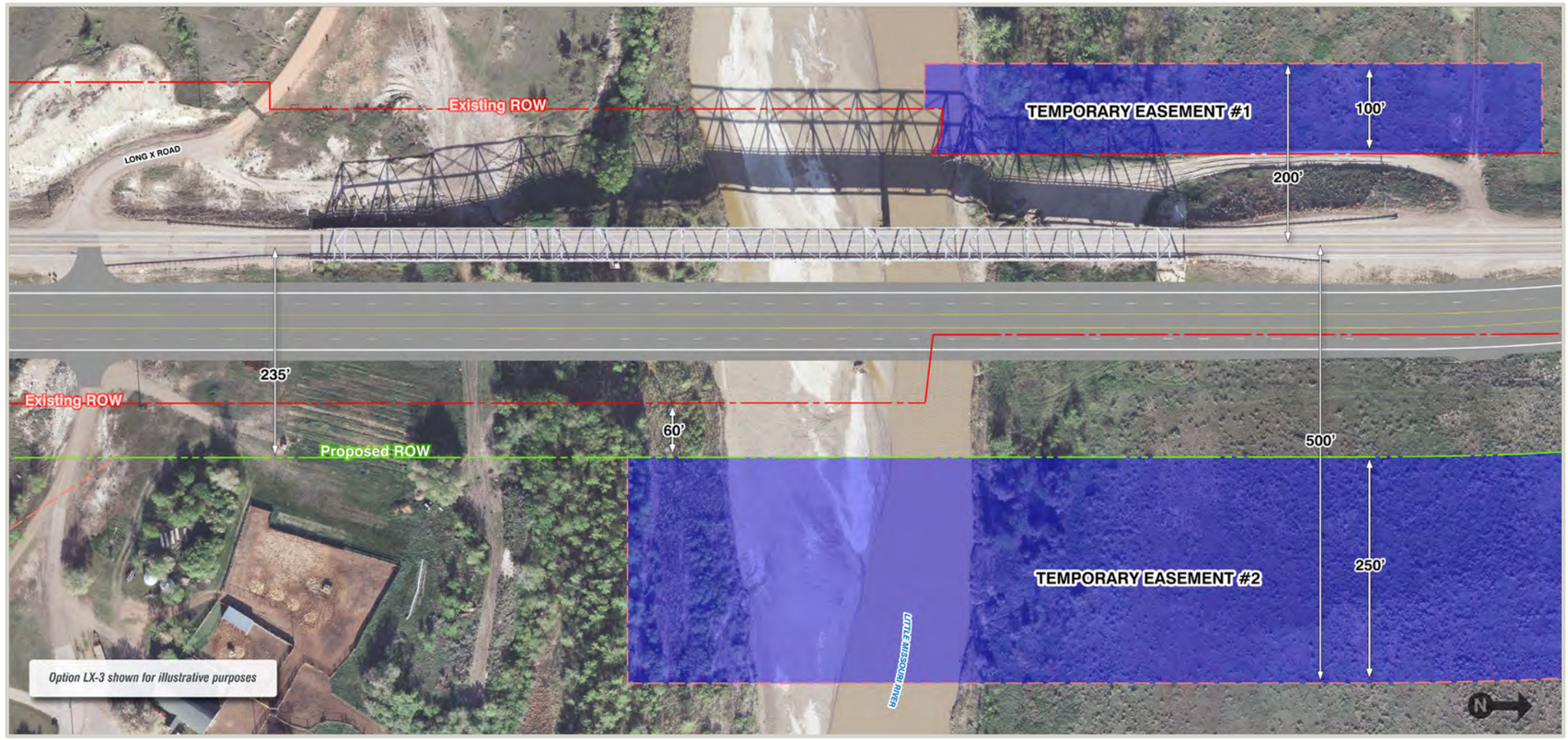


Figure 50, Construction Easements for the Long X Bridge Options

4.9. How would the wildlife crossings be constructed?

The mule deer underpass would consist of a concrete box culvert. Construction would likely be completed in two stages. First, the contractor would construct a portion of the structure while traffic is using the existing roadway and/or a temporary bypass within the existing ROW. Traffic would then be moved to travel over the completed first stage while the rest of structure is built. Construction activities would consist of excavation of the existing roadway embankment down to the bottom of box culvert elevation, placement of culvert foundation materials, and placement of the precast culvert sections. Following completion of culvert construction, the culvert would be backfilled, and the roadway section above would be constructed.

The bighorn sheep underpass would consist of a pile-supported concrete arch structure. Construction would likely be completed in two stages. First, the contractor would construct a portion of the structure while traffic is using the existing roadway and/or a temporary bypass within the existing ROW. Traffic would then be moved to travel over the completed first stage while the rest of structure is built. Construction activities would consist of excavation of the existing roadway embankment down to the foundation elevation, pile driving, placement of foundation materials, and construction of the concrete structure. Following completion of structure construction, the structure would be backfilled, and the roadway section above would be constructed.

The bighorn sheep underpass is proposed to be constructed concurrently with the Long X Bridge. Wildlife fencing and associated features between the structures would be installed at a later time when the adjacent roadway widening projects are completed. Fencing may be installed in segments as construction is completed (e.g., north of the Long X Bridge) to facilitate a complete wildlife crossing system.

4.10. How would traffic be maintained during construction?

Two-way traffic would be maintained at all times during construction. Traffic would be maintained on the existing roadway to the extent possible during construction for both Alternatives B and C.

- For Alternative B, traffic would be maintained on the existing roadway while the new roadway section is constructed adjacent to the existing roadway. In transition areas, where the proposed roadway crosses from one side to another, specific traffic-control phasing plans would be developed.
- For Alternative C, traffic would be maintained on the existing roadway surface and the roadway would be expanded one side at a time. After the first side is expanded, traffic would be shifted onto the newly expanded section while the opposite side of the roadway is expanded.

For both alternatives, at locations where the roadway is being realigned or reconstructed, specific traffic-control phasing plans would be developed.

Within the realignment and reconstruction areas (i.e., Badlands, near Watford City, and Fairfield [Option FF-1]), a specific traffic-control phasing plan would be developed that would maintain two-way traffic using temporary roadways. It is anticipated that the roadway would be constructed half at a time and traffic would be shifted accordingly to accommodate construction. Similar phasing would be required at the ND-200/US Highway 85 intersection for Option INT-2. A temporary bypass roadway would be constructed to maintain traffic as the roundabout is constructed half at a time. Temporary bypass roadways may also be required for construction of the wildlife underpasses.

For Options LX-1, LX-2, and LX-3, traffic would use the existing bridge while the adjacent new bridge is constructed. Traffic would then be moved to the new bridge (i.e., two lanes head-to-head for Option LX-1 and two lanes in each direction for Options LX-2 and LX-3) while the existing bridge is rehabilitated or removed. Bridge construction could be completed concurrent with associated roadway construction, but would likely require a longer timeframe and may take up to two construction seasons (including removal of the existing bridge for Option LX-3).

4.11. How would staging areas, borrow sites, and waste sites be determined?

Borrow sites, waste sites, gravel source locations, and staging areas (not previously discussed) would be determined by the contractor and approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental clearance on these sites to comply with all federal and state laws and regulations that govern the protection of wetlands and threatened and endangered species. In addition, these sites must comply with Section 106 of the *National Historic Preservation Act* (NHPA). Material sources include riprap and material from commercial sources, and any other area of planned ground-disturbing activities, such as staging area(s), plant site(s), stockpile area(s), waste site(s), and haul road(s). These sites would not be permitted on any federal or public lands or within the bighorn sheep lambing areas located adjacent to the project corridor.

4.12. What lighting would be utilized during construction?

Construction is anticipated to primarily occur during daylight hours; however, nighttime (i.e., the time shortly before sunset until shortly after sunrise) construction would likely occur, which would necessitate lighting. It is anticipated that early morning and evening construction activities would occur regularly, particularly during times of the year with short days, and that overnight construction would also be required at times. Nighttime work may occur during certain construction activities that cannot be interrupted prior to completion, or on account of weather conditions (e.g., pouring bridge deck concrete outside of the heat of the day). Overnight construction may also become necessary in order to maintain project schedule in the event that the contractor falls behind.

Nighttime construction would include the use of headlights and warning lights (e.g., strobe, flashing) on vehicles and equipment, as well as temporary fixed and/or equipment-mounted lighting (e.g., light plant or balloon lighting, see **Figure 51**) to illuminate workspaces. Stationary work zones, such as staging areas or areas where prolonged construction activities would occur (e.g., bridge construction), would generally be outfitted with fixed, and/or equipment-mounted lighting. Mobile work zones, such as paving, may utilize fixed sources to illuminate a given distance for a work night and/or equipment-mounted lighting that moves with operations.

Long-term, fixed lighting associated with staging areas near TRNP—North Unit (i.e., between RP 126 and 130) would consist of downcast, shielded lighting. Lighting would not be in use 24 hours per day in this area unless NDDOT obtains permission from the NPS for limited duration 24-hour lighting. Short-term, fixed and/or mobile lighting would not consist of downcast, shielded lighting. This lighting would be limited to the duration of construction activities.

4.13. What construction would be associated with relocating utilities?

Installation methods of above and below ground utilities are dictated by the type and size of utility, construction constraints, soil or geologic conditions, regulatory requirements, and company preference. Overhead utilities are typically associated with electrical or communication lines, while pipelines are almost always buried. The amount of ground-disturbing activities and temporary or permanent impact on resources is dependent on the construction method and location of the utility easement.

Figure 51, Example Light Plant

4.13.1. Overhead Electrical and Communication Lines

In general, overhead utilities consist of low-voltage electrical distribution or communication lines, and high-voltage electrical transmission lines. Construction methods are similar for both types of lines; however, impacts from the different utility and installation methods may vary. Low-voltage lines typically consist of single wooden pole structures between 30 to 40 feet in height and spaced between 200 to 300 feet. High-voltage lines typically utilize a larger wood laminated structure, double wooden H structure, steel single pole structure, or steel lattice structure spaced 300 feet to over 0.5 miles apart. Depending on the structure, concrete foundations may be poured to anchor the structure in place. Low-voltage lines, or wooden pole structures, typically involve the use of an auger to dig a hole of approximately 6 to 10 feet deep based on the size and type of structure prior to installing the wooden pole and tamping it into place. An auger or backhoe excavator may be used to dig a hole if a concrete foundation is to be poured for larger structures. Structures placed on a concrete foundation are typically bolted to the foundation. Boom trucks, or lifts, are used for installing structural components. Once structures have been erected, the utility line is strung between structures using wheeled equipment, or helicopters for high-voltage lines. Lines are then lifted into place through a pulley system connected to equipment on the ground or through use of a helicopter. Boom trucks, or lifts, are typically used for attaching the line to the structure. Permanent ground disturbance for overhead utilities is typically only associated with the footprint of the pole or concrete foundation, except where substations are necessary. Most temporary impacts within the utility easement are associated with equipment moving between structure locations.

4.13.2. Below-ground Electrical and Communication Lines

Below-ground electrical and communication utilities are typically installed though use of a plow on tracked equipment, backhoe excavator, and boring machines. Lines that would extend parallel to the roadway would likely be plowed in to a depth of 36 inches below the ground surface (dependent on utility preference or regulatory requirement). Tracked equipment with a reel holder for holding the line and a plow in the back for installing the line would travel down the utility easement. Where splices in the line are necessary, a backhoe excavator is typically used to dig a pit to maintain burial depth of the line and install an aboveground control box or manhole to access below-ground equipment.

In situations requiring roadway crossings, areas of construction constraints, or other factors that prohibit or limit ground-disturbing activities, horizontal directional drilling (i.e., boring) would be used leaving no surface disturbance. Bell holes are typically dug by a backhoe excavator on both sides of the proposed bore. A bore machine is set up on one side of the drill location and drill pipe is drilled below the area to be avoided. Depth of the drill is based largely on soil conditions, resource, or infrastructure being avoided or regulatory requirements. Once the bore hole has been drilled between the bell holes, a casing, or the utility line, is attached to the drill pipe and pulled back through the hole before being spliced to the line in an above or below-ground equipment.

In areas of rocky conditions, backhoe excavators may be used to remove rock or may be used instead of a plow to install the line. In addition, trenchers may be used per contractor preference or for constructability reasons in certain soil types or rocky conditions.

4.13.3. Below-ground Pipelines

Pipelines are typically installed below-ground using a backhoe excavator or trencher. Smaller flexible lines may be installed through use of a plow. Installation methods can vary greatly based on the type of pipeline. Water lines are typically installed at a minimum of 7 feet deep to protect against freezing over winter, while gas, oil, or other lines are buried around 48 inches to the top of pipe. Burial depth is largely dependent on regulatory requirements for the type of product being transported, temperature considerations, or protection of the pipeline integrity.

For larger pipelines paralleling the roadway that require use of a backhoe excavator or large trencher for digging a trench, initial construction would involve clearing brush, trees, and vegetation from the construction area. After clearing, the construction area would be graded per design specifications. This would involve leveling and smoothing the construction area to create an even working surface for equipment and vehicles. Prior to trench excavation, individual joints of the pipe would be strung along the ROW and arranged to be accessible to construction personnel. Trenching in uplands would consist of excavating the trench for the pipeline with a backhoe excavator or trencher. Excavated material would be sidecast within the approved construction area, separate from topsoil, to prevent soil mixing during construction. The pipeline joints would then be welded or connected through other means based on pipeline material before being placed in the trench through use of a stringing machine, boom truck, or other equipment. Backfilling would follow pipe installation and generally consists of replacing the material excavated from the trench (i.e., first the subsoil and then the topsoil). Trench breakers would be installed as necessary in sloped areas, to protect against subsurface water flow erosion along the pipe after the trench is backfilled.

In situations requiring roadway crossings, areas of construction constraints, or other factors that prohibit or limit ground-disturbing activities, horizontal directional drilling would be used, leaving no surface disturbance. Bell holes are typically dug by a backhoe excavator on both sides of the proposed bore. A bore machine is set up on one side of the drill location and drill pipe is drilled below the area to be avoided. Depth of the drill is based largely on soil conditions, resource, or infrastructure being avoided or regulatory requirement. Once the bore hole has been drilled between the bell holes. A casing, or the pipeline, is attached to the drill pipe and pulled back through the hole before being spliced, welded, or connected through other means.

Chapter 5. Affected Environment and Environmental Consequences

This chapter provides an inventory and evaluation of the existing environment to form a baseline from which impacts of the project alternatives can be assessed. In compliance with NEPA and implementing regulations and related guidance outlined in 23 U.S.C. § 109(h) and 23 CFR § 771, the description of the affected environment focuses on those environmental, cultural, socioeconomic, and human-made resources potentially subject to impacts. This chapter also summarizes the potential direct (i.e., same time and place) and indirect (i.e., different time and/or place) impacts on environmental, cultural, socioeconomic, and human-made resources from the project alternatives, as well as potential mitigation measures for adverse impacts.

Unless defined elsewhere, the term 'study area' refers to a 1,000-foot-wide corridor centered on the existing roadway, expanding to approximately 5,500 feet around Fairfield and up to 2,500 feet through the Badlands. The total area encompassed within the study area is approximately 8,750 acres. Direct impacts occur within the study area; however, indirect impacts may extend beyond the study area, depending on the resource. Direct impacts were assessed quantitatively and/or qualitatively, depending on the resource; indirect impacts were assessed qualitatively. Impacts were assessed within a temporal span starting with project construction through 2040, the year for which forecasted traffic data is available (i.e., accounting for the typical 20- to 30-year design life of roadways).

Important topics in this chapter:

...continued on page 54

“How was noise analyzed for the project?” on page 80

“How would wetlands and Other Waters be directly and indirectly affected by operation and construction of the project?” on page 85

“How would wildlife be directly and indirectly affected by construction of the project?” on page 91

“What is the process for tribal consultation?” on page 95

“Are there historic and archaeological resources in the project corridor?” on page 94

“Would there be irreversible/irretrievable commitments of resources from operation and construction of the project?” on page 109

List of documents appended by reference in this chapter:

- Asbestos Survey Report for NDDOT Bridge No. 0085-084.342 (Green River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-126.562 (Little Missouri River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-136.949 (Spring Creek) (2017)
- Biological Evaluation (2017)
- Class III Cultural Resource Inventory in Billings, McKenzie and Stark Counties, North Dakota, Parts I and II (2016)
- Dakota Skipper Field Botany Survey (2017)
- Eagle and Raptor Aerial Nest Survey Report (2016)
- Field Wetland Delineation Report (2016)
- Geotechnical Data Report (2016)
- Geotechnical Data Report Addendum (2017)
- Hydraulic Analysis and Structure Selection Report (2017)
- Map Book (2016)
- Nationwide Rivers Inventory Consultation Package (2019)
- Noise Report (2017)
- Northern Long-eared Bat Habitat Assessment & Acoustic Survey Plan (2016)
- Northern Long-eared Bat Summer Acoustic Survey Results Report (2016)
- Paleontological Field Survey Report (2017)
- Phase I Environmental Site Assessment (2017)
- Phase II Evaluative Testing of 13 Sites on Private Lands in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Seven Sites on Federal Land in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Three Sites on Private Land in McKenzie County, North Dakota (2017)
- Preliminary Geotechnical Design Memoranda (2017)
- Programmatic Biological Assessment Project Submittal Package (2017)
- Quiet Pavement Memorandum (2017)
- Right of Way Limits Methodology Document (2016)
- SPreAD Memorandum for Temporary Pile Driving Activities (2018)
- SPreAD Memorandum for the Badlands Area (2017)
- Subsurface Characterization Report (2016)
- Subsurface Characterization Report Addendum (2017)
- Traffic Operations Report (2016)
- Tree Survey Memorandum (2017)
- Viewshed Analysis Methodology Memorandum (2017)
- Wildlife Crossing/Accommodation Volume I: Need and Feasibility Assessment (2017)
- Wildlife Crossing/Accommodation Volume II: Technical Report (2018)

5.1. *What environmental resource categories are not relevant to this EIS?*

All potentially relevant resource categories were initially considered for analysis in this Environmental Impact Statement (EIS). However, some environmental resource categories that are often analyzed in environmental documents have been omitted from this EIS. The basis for such exclusions is provided as follows:

- Coastal Barriers and Coastal Zone. The project is not located in a coastal barrier or coastal zone area. Therefore, analysis of coastal barriers and coastal zone is not included in this EIS.
- Joint Development. No joint development measures are included as part of the project. Therefore, analysis of joint development is not included in this EIS.
- Section 6(f) of the *Land and Water Conservation Act*. No Land and Water Conservation Fund project sites are located within or immediately adjacent to the project corridor (Duttenhefner 2017). Therefore, analysis of Section 6(f) of the *Land and Water Conservation Act* is not included in this EIS.
- Relocations. The project would not require the relocation of any homes or businesses. Therefore, analysis of relocations is not included in this EIS.
- Wild and Scenic Rivers. There are no nationally designated wild and scenic rivers in North Dakota. Therefore, analysis of wild and scenic rivers is not included in this EIS.

5.2. *Land Use*

5.2.1. What is the existing land use along the project corridor?

The term 'land use' refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas.

Land use along the project corridor is largely dominated by agricultural cropland and rolling grasslands, except for the 7-mile stretch of corridor that traverses through the Badlands. The Badlands are characterized by highly eroded buttes and hillsides composed of soft silts and clays with sparse vegetation. Topographic relief in this area changes quickly, and soils within this region are historically unstable due to their composition of soft silts and clays, making the area susceptible to landslide activity.

Landownership adjacent to the project corridor is a mixture of public and private. Public lands include the Theodore Roosevelt National Park (TRNP) – North Unit, under the management of the National Park Service (NPS), as well as numerous parcels of the Little Missouri National Grasslands (LMNG), under the management of the US Forest Service (USFS). These lands are open to the public and provide recreational opportunities. Please refer to **Section 5.8. Public Lands on page 69**, for further discussion of the management of these areas, recreational opportunities within these areas, and visitor use and experience of these areas.

Privately owned property along the project corridor is managed under Stark, Billings, and McKenzie counties' zoning, except for property located within Belfield, which operates under its own zoning ordinances. Two unincorporated communities, Fairfield and Grassy Butte, are located along the project corridor with the majority of the project corridor being described as rural. Residential houses, farmsteads, and oil and gas wells are scattered throughout the project corridor.

5.2.2. What County and City Comprehensive Plans apply to the project corridor?

5.2.2.1. Billings County Comprehensive Plan

The Billings County Comprehensive Plan (Billings County 1998) provides an overall description of the land, demographics, economy, and future growth of Billings County. In addition, the plan identifies five goals, each of which outlines objectives and associated policies. These goals combine to provide guidelines to ensure appropriate land use and future development in Billings County.

One goal identified is to "protect and guide development of non-urban areas of Billings County." One of the objectives of this goal is to "promote a safe and adequate transportation system within Billings County." The associated policies for this objective are as follows (Billings County 1998):

- Ensure an adequate and convenient local transportation network within Billings County
- Ensure adequate, efficient, and reliable routes for the transfer of agricultural products from farms/ranches to markets
- Ensure adequate, efficient, and reliable transportation routes for purposes of emergency vehicle access
- Encourage a cooperative working relationship with officials from bordering counties to meet transportation system objectives
- Take advantage of available outside funds for the construction and maintenance of transportation facilities
- Promote adequate roads and bridges

Another goal identified is to "provide for emergency management." The objective of this goal is to "facilitate provision of adequate and efficient public services." Two of the associated policies for this objective include ensuring efficient and reliable access routes for emergency service providers to all residents of Billings County and promoting adequate roads and bridges. The remaining goals identified in the Billings County Comprehensive Plan focus on regulating the construction, alteration, repair, or use of buildings; conserving and developing natural resources; and lessening governmental expenditures (Billings County 1998).

Billings County land use zones along the project corridor include agricultural, industrial, commercial with residential spot zoning, residential, and public use (e.g., USFS-managed lands).

5.2.2.2. McKenzie County Comprehensive Plan

The 2025 McKenzie County Comprehensive Plan from 2016, "…serves as McKenzie County's blueprint or constitution for all future land use and development decisions" (McKenzie County 2016). This comprehensive plan has been developed to manage and plan for future development within the county in an organized manner. Excluding major cities (i.e., Watford City, Alexander, and Arnegard), it is anticipated that there will be 18,000 to 25,000 residents within McKenzie County by 2025.

The McKenzie County Comprehensive Plan identifies key goals for all land uses, including transportation. Transportation goals identified in the comprehensive plan are as follows: "To improve safety for county motorists through roadway upgrades, budgeting, and maintenance of state and county roadways and identify and implement measures that promote safety and ease of movement for heavy truck traffic integrating into the traffic stream" (McKenzie County 2016). One of the objectives identified is to work with the North Dakota Department of Transportation (NDDOT) on the design and construction of a trail that connects Watford City with the TRNP – North Unit.

To better plan for this type of growth, McKenzie County has developed three different designations for growth areas within the county: Growth Focus Areas, Transition Areas, and Additional Areas. For each designation, goals, objectives, and implementation strategies are defined for several categories of land uses, including transportation.

Growth Focus Areas are identified areas for future permanent development where, "orderly, contiguous, and cost-efficient" growth can occur. They occur adjacent to, or encompass, cities, unincorporated communities, or major road intersections. Growth Focus Areas along the project corridor include Grassy Butte and the North Dakota Highway 200 (ND-200)/US Highway 85 intersection.

Transition Areas are also designated for future development, but include temporary components, such as temporary workforce housing (McKenzie County 2016). Establishing these areas allows for organized development and elevated standards to be in-place as needed to improve the health, safety, and visual qualities in McKenzie County. Two Transition Areas are located along the project corridor, south of Watford City.

Additional Areas, as defined in the McKenzie County Comprehensive Plan, are areas where future land use development may occur within the county's jurisdiction, but are not established under a Growth Focus Area or Transition Area. These areas make up the remaining portion of the county's jurisdiction and allow existing land uses in these areas to maintain conformance with the McKenzie County Comprehensive Plan.

The intention of these areas is that, if the land use proposed is not consistent with the existing land use, the area can be converted back once the proposed land use is complete. Conditional permit applications for temporary housing located in Additional Areas undergo an in-depth review by the county. This review is subject to greater scrutiny as compared to similar applications within designated Transition Areas. Additional Areas, identified as industrial, are located within the project corridor, just south of Watford City.

McKenzie County land use zones within the project corridor include agricultural, commercial, industrial, and public use (i.e., USFS- and NPS-managed lands).

5.2.2.3. Stark County Comprehensive Plan

The 2010 Stark County Comprehensive Plan provides the outline for the county's long-range development. It also provides a background of the county's existing land uses and the goals, objectives, and implementation strategies for future development. One of the plan's objectives is to provide and maintain an adequate transportation system (Stark County 2010). Stark County land use zones within the project corridor include agricultural, residential-agriculture, residential, commercial-retail, and industrial.

5.2.2.4. City of Belfield Comprehensive Plan

Belfield, located in the southern portion of the project corridor, has its own comprehensive plan. Agriculture has been the backbone of the local economy, which is being challenged due to the rapid development of energy resources. The goals and objectives identified in the Belfield Comprehensive Plan follow the goals and objectives identified for Stark County, including identifying a symbiotic balance between the traditional use of the land and future development. Belfield supports road improvement and bridge replacement programs (City of Belfield 2013).

5.2.3. How would land use be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, it is assumed that current land use trends and conditions would continue to persist. Although Alternative A would not result in direct land use impacts, it may affect future development along the US Highway 85 corridor. Alternative A would not comply with county or city planning documents that identify improvement of transportation systems as one of their goals and objectives.

5.2.4. How much ROW would be required for operation and construction of the project?

The goal of the proposed project is to essentially maintain and follow the existing US Highway 85 alignment, utilizing the existing infrastructure to minimize potential impacts and include flexible design options to avoid and minimize impacts. These design options were built into the project and include:

- Modified ditch section and backslope in select locations
- Shifted alignment in select locations to avoid sensitive resources
- Curb and gutter, and flush, center median under Option FF-1 through Fairfield
- Reduced speed limit through the Badlands
- Use of retaining walls within the Badlands
- Narrowed center median width in select locations within the Badlands
- Flush, center median through the Badlands and south of Watford City

A Right of Way Limits Methodology Document was prepared in 2016 to define the strategy for estimating right-of-way (ROW) and construction easements required along the project corridor (**appended by reference**). ROW and easement acquisition and land use conversion for Alternatives B and C would be required adjacent to the existing roadway corridor with varying acreage. The ND-200/US Highway 85 intersection, Fairfield, and Long X Bridge options would also require varying additional ROW and easements. Please refer to **Table 8, Temporary Easement on Private and Federal Lands** and **Table 9, Permanent ROW/Easement on Private and Federal Lands on page 57** for a summary of the ROW and easements required for Alternatives B and C and their options. Please refer to **Appendix C. Proposed Right-of-Way & Easements**, for maps of ROW and easements required for Alternatives B and C and their options. Alternative B would require a greater amount of conversion than Alternative C, due to the wider roadway footprint. Alternative B would only require ROW and easement acquisition along one side of the existing roadway at most locations (except for the Badlands segment), while Alternative C would require ROW and easement acquisition from both sides. The roadway design, and ROW and easement requirements for the Badlands segment of the project corridor and the northernmost 2 miles of the project corridor, prior to tying into the Watford City Bypass, would be the same for both alternatives.

Table 8, Temporary Easement on Private and Federal Lands

	Temporary Easement Required – Private (acres)	Temporary Easement Required – Federal (acres)		Total (acres)
		USFS	NPS	
ALTERNATIVE B				
Route without options	88.2	—	0.5	**88.7**
Options with Alternative B				
INT-1	0.2	—	—	**0.2**
INT-2	0.2	—	—	**0.2**
FF-1	4.1	—	—	**4.1**
FF-2	4.5	—	—	**4.5**
FF-3	5.4	—	—	**5.4**
FF-4	4.4	—	—	**4.4**
LX-1	8.4	—	—	**8.4**
LX-2	9.6	—	—	**9.6**
LX-3	9.6	—	—	**9.6**
ALTERNATIVE C				
Route without options	107.1	—	0.5	**107.6**
Options with Alternative C				
INT-1	—	—	—	**0.0**
INT-2	0.3	—	—	**0.3**
FF-1	3.3	—	—	**3.3**
FF-2	5.4	—	—	**5.4**
FF-3	5.6	—	—	**5.6**
FF-4	5.0	—	—	**5.0**
LX-1	8.4	—	—	**8.4**
LX-2	9.6	—	—	**9.6**
LX-3	9.6	—	—	**9.6**

Acquisition of a permanent easement from the USFS would be required for both alternatives. In addition, a new Highway Easement Deed from the NPS would be required for the project that would include language for the construction, operation, and maintenance of the expanded roadway. The project would not require additional area under the Deed; however, an additional 0.2 acres would be added to account for a recent, unrelated landslide repair project covered under a Special-Use Permit. It was understood by the NDDOT, FHWA, and NPS during the permitting process for the landslide repair project that this additional area would be added to the forthcoming US Highway 85 Highway Easement Deed.

Temporary easements in the form of a Special-Use Permit from the NPS would be required for both alternatives for construction of the Horseshoe Bend landslide stabilization (approximately 0.5 acres). Please refer to the **Section 5.8. Public Lands on page 69** for further discussion regarding impacts on USFS- and NPS-managed lands.

Temporary construction easements would be required along the majority of the project corridor. In addition to the temporary easements identified in this EIS, the contractor may require the temporary use of other areas during construction. These areas would be used for staging and storage areas, and access routes. Any areas identified by the contractor (i.e., not included in this EIS) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental approval on these sites to comply with all federal and state laws and regulations. These sites would not be permitted on any federal or public lands. Land use patterns would not be substantially impacted by temporary construction use since the affected areas would be restored following construction.

Table 9, Permanent ROW/Easement on Private and Federal Lands

	Permanent ROW Required – Private (acres)	Permanent Easement Required – Federal (acres)		Total (acres)
		USFS	NPS	
ALTERNATIVE B				
Route without options	762.3	70.0	9.4*	**841.7**
Options with Alternative B				
INT-1	2.1	—	—	**2.1**
INT-2	2.6	—	—	**2.6**
FF-1	20.6	—	—	**20.6**
FF-2	97.1	—	—	**97.1**
FF-3	105.2	—	—	**105.2**
FF-4	111.9	—	—	**111.9**
LX-1	5.4	1.2	—	**6.6**
LX-2	9.2	3.0	—	**12.2**
LX-3	9.2	3.0	—	**12.2**
ALTERNATIVE C				
Route without options	521.4	53.8	9.4*	**584.6**
Options with Alternative C				
INT-1	1.0	—	—	**1.0**
INT-2	2.6	—	—	**2.6**
FF-1	20.4	—	—	**20.4**
FF-2	79.1	—	—	**79.1**
FF-3	86.9	—	—	**86.9**
FF-4	96.0	—	—	**96.0**
LX-1	5.4	1.2	—	**6.6**
LX-2	9.2	3.0	—	**12.2**
LX-3	9.2	3.0	—	**12.2**

*Note: *Permanent easement acquisition from the NPS would consist of a Highway Easement Deed that would include the same area as the existing Deed (i.e., 9.21 acres for the highway and 0.17 acres for a drainage easement), but for a four-lane rather than a two-lane highway. The reissued Deed would include an additional 0.2 acres impacted by a recent, landslide repair project (unrelated to the proposed action identified in this EIS) that was covered under a Special-Use Permit (MWR-THRO-6000-2011-012).*

5.2.5. What land uses would be directly and indirectly affected by operation and construction of the project?

Direct land use conversion associated with Alternatives B and C would primarily affect agricultural pasture and cropland. Non-agricultural grasslands, forested areas, and developed lands would also be impacted to a lesser degree. Alternative B would impact more acreage than Alternative C, while Options FF-2, FF-3, and FF-4 would impact more acreage than Option FF-1. The ND-200/US Highway 85 intersection options and Long X Bridge options would result in minor amounts of land use conversion, with only negligible variations between the options.

Indirect land use impacts may also occur. During and after construction, access to parcels (e.g., residential, oil and gas, agricultural) would be maintained; however, some parcels may become too small or inconvenient to utilize for their current use (e.g., agriculture), resulting in land use changes. Areas where this might occur are rare, since the project would follow an existing roadway as closely as possible. The most likely scenario where existing land use abandonment may occur would be associated with Options FF-2, FF-3, and FF-4.

None of the alternatives or options are anticipated to cause growth-inducing effects or result in regional land use pattern changes.

5.2.6. How would land management be directly and indirectly affected by operation and construction of the project?

Alternatives B and C and their options would be consistent with the goals to improve transportation infrastructure, as discussed in the city and county comprehensive plans. Note that the trail from Watford City to McKenzie County Road 34 would be in partial fulfillment of the McKenzie County goal to construct a trail from Watford City to the TRNP–North Unit. The trail terminus was developed in coordination with the NPS and McKenzie County. If haul routes on county roads would be utilized, the necessary permit(s) would be acquired. Where Alternatives B and C cross federal lands, the NPS and USFS would be able to continue to manage these lands as they are intended. Refer to **Section 5.8. Public Lands** for further discussion regarding impacts on USFS- and NPS-managed lands.

5.2.7. How would land be acquired on federal lands for operation and construction of the project?

As previously discussed, Alternatives B and C and their options would require the acquisition of permanent easements from the USFS, a new Highway Easement Deed from the NPS, and a Special-Use Permit for temporary construction activities from the NPS. For federal agencies to grant easement across federal lands, it has to be determined that there is no feasible and prudent alternative or all possible planning has taken place to minimize and mitigate harm to the federal lands.

To acquire easement across NPS-managed lands, the NPS must receive a formal notice regarding the request and then would review the environmental analysis. Per 23 United States Code (U.S.C.) § 317, the NPS has four months from the date of notification to reply to the Federal Highway Administration's (FHWA) request for land. The NPS can then (1) deny the request in writing that the request is "…contrary to the public interest or inconsistent with the purposes for which such land or materials have been reserved" or (2) agree to the transfer, with conditions deemed necessary for adequate protection and utilization of the land (NPS 2004).

Forest Service Manual 2700 – Special Uses Management, Chapter 2730—Road and Trail Right-of-Way Grants (2015) provides the process for acquiring easements across USFS-managed lands. For easements across USFS-managed lands, all *National Environmental Policy Act* (NEPA) provisions must be met, including a NEPA analysis that considers alternative forms of access across lands. In reviewing the NEPA analysis, the USFS would make a determination to grant easements if a project allowed the USFS to meet the management objectives of their land (USFS 2015).

5.2.8. How would ROW be acquired on private lands for operation and construction of the project?

Acquisition of real property from private ownership would follow the regulations and procedures identified in the NDDOT Right-of-Way Acquisition Procedures Manual and outlined in Title II and Title III of the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, including amendments. Fair and equitable treatment would be provided to individuals that may have their property acquired by the project, including compensation for parcels deemed too small or inconvenient to utilize for their current use (e.g., agriculture) during the ROW acquisition process.

5.3. *Prime and Unique Farmlands*

5.3.1. What are prime and unique farmlands and how are they regulated?

Prime and unique farmlands and farmland of statewide or local importance are provided protection by the *Farmland Protection Policy Act* (FPPA) of 1981 (subtitle I of Title XV, Section 1539-1549). The Natural Resources Conservation Service (NRCS) is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act. For projects that have a linear- or corridor-type configuration connecting two distant points and crossing several different tracts of land, an NRCS-CPA-106 Form, Farmland Conversion Impact Rating for Corridor Type Projects, is prepared. The NRCS-CPA-106 Form provides a ranked score based on a variety of metrics, including total acres of prime or unique farmlands, percent of the corridor that is being farmed, amount of on-farm investments, and corridor compatibility with agricultural use. Alternatives can receive a score of up to 260; a score above 160 would indicate a major impact on farmland that could require mitigation. The scoring also allows the relative impacts on farmland for each alternative to be compared.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. This may include lands currently used to produce livestock and/or timber. Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables (USDA 2012B).

Farmland of statewide or local importance includes areas other than prime and unique farmland that are used for production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate state or unit of local government agency or agencies, with the approval of the Secretary of Agriculture (USDA 2012B).

The main commodities in Stark, Billings, and McKenzie counties have been agricultural until recent years with the expansion of oil and gas development in these areas. Even with the oil and gas boom, these counties still have a strong agricultural base. The top agricultural commodities in these counties include wheat and other grains, oilseeds, dry beans, and dry peas. Billings and McKenzie counties also have cattle and calves listed in their top three agricultural commodities (USDA 2012A).

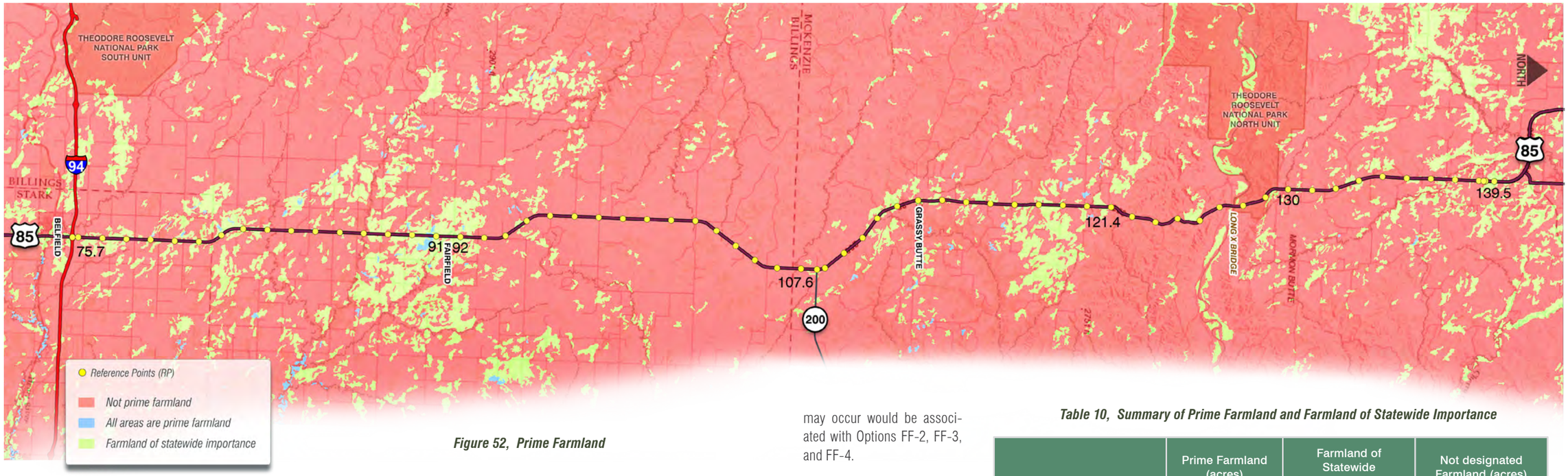


Figure 52, Prime Farmland

5.3.2. Are there prime and unique farmlands located along the project corridor?

The study area contains prime farmland and farmland of statewide importance; however, there is no unique farmland within the study area. As shown in **Figure 52, Prime Farmland**, areas of prime farmland along the project corridor are primarily located south of Fairfield, while farmland of statewide importance is distributed throughout.

5.3.3. How would prime and unique farmlands be affected if US Highway 85 is not expanded?

Under Alternative A (no-build), no impacts on prime or unique farmlands would be expected.

5.3.4. How would prime and unique farmlands be directly and indirectly affected by operation and construction of the project?

Alternatives B and C would result in the permanent conversion of prime farmland and farmland of statewide importance to a transportation corridor. As shown in **Table 10, Summary of Prime Farmland and Farmland of Statewide Importance**, Alternative B would convert more acres of prime farmland and farmland of statewide importance than Alternative C.

In addition, all four Fairfield options would convert prime farmland, as well as farmland of statewide importance, and Option INT-1 under Alternative C at the ND-200/US Highway 85 intersection would convert farmland of statewide importance. None of the Long X Bridge options would result in the conversion of prime farmland or farmland of statewide importance.

Direct impacts on prime farmland and farmland of statewide importance were minimized by following the existing highway alignment as closely as possible and utilizing as much of the existing infrastructure as feasible.

Indirect impacts on prime farmland and farmland of statewide importance may occur. During and after construction, access to all agricultural parcels would be maintained; however, landowners may determine some agricultural parcels to be too small or inconvenient to continue utilizing for agricultural purposes. Areas where this might occur are rare, since the project would follow an existing roadway as closely as possible. The most likely scenario where agricultural abandonment may occur would be associated with Options FF-2, FF-3, and FF-4.

Please refer to **Appendix B. Agency Correspondence**, for the NRCS CPA-106 Form that was completed for the Preferred Alternative. Approximately 223.0 acres of prime farmland and farmland of statewide importance would be permanently converted as a result of the Preferred Alternative. The Preferred Alternative received a total score of 93 out of 260 (a score above 160 would indicate a major impact on farmland that could require mitigation). An NRCS-CPA-106 Form was not completed for Alternative C or Options FF-2, FF-3, FF-4, INT-2, LX-1, or LX-2 because they are not identified as part of the Preferred Alternative. If Alternative C or different options, are later determined to be the Preferred Alternative,

Table 10, Summary of Prime Farmland and Farmland of Statewide Importance

	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Not designated Farmland (acres)
ALTERNATIVE B			
Route without options	1.0	204.9	750.2
Options with Alternative B			
INT-1	—	—	2.7
INT-2	—	—	2.2
FF-1	3.8	13.1	9.0
FF-2	7.5	71.1	25.5
FF-3	11.0	84.3	18.7
FF-4	13.0	67.0	40.6
LX-1	—	0.2	16.6
LX-2	—	0.2	21.7
LX-3	—	0.2	20.8
ALTERNATIVE C			
Route without options	0.7	150.4	558.6
Options with Alternative C			
INT-1	—	—	2.8
INT-2	—	—	0.9
FF-1	3.8	16.0	9.5
FF-2	7.6	61.5	18.9
FF-3	10.4	73.1	11.6
FF-4	12.3	56.8	37.0
LX-1	—	0.2	16.6
LX-2	—	0.2	21.7
LX-3	—	0.2	20.8

an NRCS-CPA-106 Form would be completed and coordination with the NRCS would occur.

Temporary impacts on prime farmland and farmland of statewide importance (e.g., stormwater erosion, contamination from waste materials) could occur during construction activities. Prior to construction activities, the contractor would be required to obtain a North Dakota Pollutant Discharge Elimination System (NDPDES) permit and develop a Stormwater Pollution Prevention Plan (SWPPP). As part of the NDPDES permit, the contractor would have a plan for erosion- and sediment-control. In addition, waste material would be disposed of in accordance with state and federal laws. The SWPPP would outline phasing for erosion- and sediment-controls, stabilization measures, pollution-prevention measures, and prohibited discharges. The SWPPP would also include best management practices (BMPs) to minimize erosion and sedimentation (e.g., fiber rolls, straw waddles, erosion mats, silt fencing, and turbidity barriers) during construction. Upon completion of construction, areas disturbed would be restored to their pre-construction state.

5.4. *Geology*

5.4.1. What are the geologic, physiographic, and topographic characteristics of the project corridor?

In order to determine the geological features, subsurface conditions, and location and status of landslides along the project corridor, a geotechnical investigation was completed for the project. Information in this section, unless cited otherwise, is derived from the following reports:

- Preliminary Geotechnical Design Memoranda (2017)
- Subsurface Characterization Report and Addendum (2016 and 2017, respectively)
- Geotechnical Data Report and Addendum (both 2017)

Landslide is a general term used to describe the downslope movement of soil, rock, and organic materials under the effects of gravity and also the landform that results from such movements. There are a number of types of landslides based on the material and movement of materials such as, rockfalls, slides, transitional, spread, and slow earthflow (Highland and Bobrowsky 2008).

All of these reports are **appended by reference**.

Geological resources consist of the Earth's surface and subsurface materials. Areas with similar geological resources are called physiographic provinces, whereby geological resources share characteristics such as geology, physiography, topography, geologic hazards, and paleontology. Paleontological resources are addressed in **Section 5.5. Paleontology on page 62**.

The project corridor lies within the Great Plains Province, which is divided into the Missouri Plateau, Little Missouri Badlands, Coteau Slope, and Missouri Coteau. The project corridor stretches across the Missouri Plateau and Little Missouri Badlands. The broad valleys, hills, and buttes of the Missouri Plateau are the result of erosion of flat-lying beds of sandstone, siltstone, claystone, and lignite. The majority of these sediments belong to the units within the Fort Union Group and Golden Valley Formation and were deposited by ancient rivers flowing away from the Rocky Mountains 65 to 50 million years ago. The variety of landforms found in the Missouri Plateau and Little Missouri Badlands within the project corridor are due to the differences in resistance to erosion among these sediments (Biek and Murphy 1997).

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural features and human-made alterations of landforms.

Based on a review of geological maps of the Long X Divide Quadrangle (Murphy and Gonzales 2003) and Lone Butte Quadrangle (Murphy 2003), surficial deposits along and adjacent to the project corridor within the Badlands area largely include the following:

- Quaternary (Recent-Pleistocene)
  - » Artificial deposits – composed of engineered fill.
  - » Alluvial deposits – composed of sand, silt, clay, and gravel mapped along the northern and southern sides of the Little Missouri River.
  - » Landslide deposits – composed of a variable mixture of strata and deposits that have slid to the base of steep slopes and mapped within the Badlands area on the northern and southern sides of the Little Missouri River.
- Tertiary (Eocene-Paleocene)
  - » Golden Valley Formation – composed of brightly colored claystones, mudstones, and sandstones in the lower part and buff to tan clay-rich sandstones in the upper part.
  - » Sentinel Butte Formation – composed of gray to brown interbedded sandstones, siltstones, mudstones, claystones, carbonaceous shales, and lignite.

The topography of the project corridor varies from the southern boundary at the Interstate 94 (I-94) interchange, to the northern boundary at the Watford City Bypass. The southern portion of the project corridor (I-94 to Fairfield) is relatively flat with an elevation of approximately 2,600 to 2,700 feet above mean sea level. Continuing north (Fairfield to Grassy Butte), rolling hills and exposed buttes become more frequent with elevations ranging from 2,600 to 2,800 feet above mean sea level. The Badlands portion of the project corridor consists of steep slopes and highly eroded topography. The elevation dramatically ranges and varies from 1,900 to 2,700 feet above mean sea level. North of the Badlands, the topography transitions back to rolling terrain, with some areas of steeper slopes and elevations ranging from approximately 2,300 to 2,500 feet above mean sea level.

5.4.2. Where are the landslide-prone areas along the project corridor?

Geotechnical investigations performed between 2014 and 2017, identified key features along the project corridor, including landslide scarps (i.e., features that identify active or recently active landslides), landslide toes (i.e., accumulations of landslide debris at the base of a landslide feature), landslide spills (i.e., areas where landslide debris has progressed downslope beyond the lower limits of the landslide feature), areas of standing water and groundwater seepage, hydrophytic vegetation (i.e., plants that thrive in wet conditions), erosional rills and gullies, culvert locations, rock and soil exposures, and cut and fill slope extents.

Landslide features were classified into the following four categories:

- Active – a landslide that is currently moving
- Dormant – a landslide that appears to be currently inactive
- Relict – an ancient landslide (generally well-vegetated) that appears to have developed under different conditions than are currently present
- Mitigated – a landslide that has been previously repaired by engineering means

A total of 21 landslides were identified along the project corridor that were considered significant, five of which are considered active, five are dormant, five are relict, and six are mitigated. General information regarding landslide features identified along the project corridor (from the southern end to the northern end) is provided as follows:

Southern end of the project corridor to the southern edge of the Badlands

- Area is relatively stable
- Few slopes show evidence of rilling and sheet erosion
- There are a few, relatively small landslide features

Southern portion of the Badlands

- Historical and recent landsliding is prevalent on both sides of US Highway 85
- Landslide features are approximately 100 feet wide
- Please refer to **Figure 53, Historic Landslide Area and Surface Geology on page 60** and **Figure 54, Google Earth Aerial Image of Mapped Landslides (Southern Portion of Badlands) on page 61**.

Central portion of the Badlands to the southern side of the Little Missouri River

- Landsliding is widespread
- Landslides are characterized by large, deep-seated slope failures that likely occurred under different climatic or geomorphological conditions than are currently present
- Landslide masses are approximately 1,000 to 2,000 feet wide or more
- Considered relatively stable with only localized areas of reactivation

U.S. HIGHWAY 85

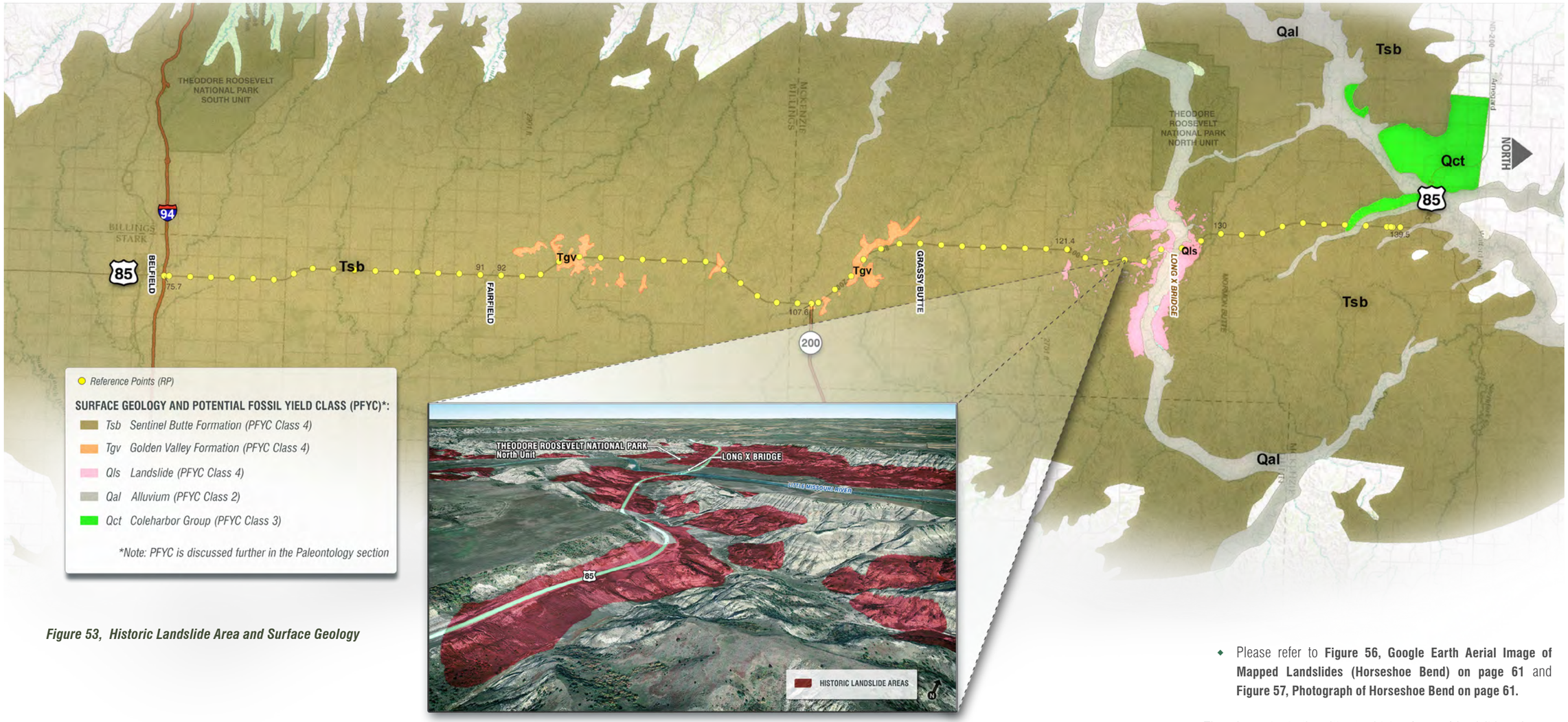


Figure 53, Historic Landslide Area and Surface Geology

Little Missouri River

- Relatively large landslide complex near the south bank of the river
  - Includes the southern abutment of the Long X Bridge
  - Terminates between the southern abutment and adjacent pier of the Long X Bridge
  - Extends approximately 800 feet downstream and 2,000 feet upstream
  - Movement has recently occurred near the south abutment of the Long X Bridge
  - Please refer to **Figure 55, Google Earth Aerial Image of Mapped Landslides (Long X Bridge) on page 61**
- Relatively shallow, small landslides (slope failures) in the south bank of the river
  - Begin approximately 150 feet west of the Long X Bridge
  - Extends approximately 1,000 feet upstream
  - Recent landslide activity is evident

Northern side of the Little Missouri River to the northern end of the project corridor

- Area lies within a massive landslide that likely originated under different climatic or geomorphological conditions than are currently present
- Recent landslide activity is evident at Horseshoe Bend where highway realignment and reconstruction activities previously occurred to address chronic landslide issues. In absence of stabilization measures, this area likely poses the greatest threat to the roadway.
  - Please refer to **Figure 56, Google Earth Aerial Image of Mapped Landslides (Horseshoe Bend) on page 61** and **Figure 57, Photograph of Horseshoe Bend on page 61.**

Though gravity is the ultimate driving force of landslides, there are several contributing factors including slope, climate, erosion, vegetation, overloading, geology, and soil stability. Unstable ground in western North Dakota is mainly the result of mass-wasting (i.e., mass slope movement) processes. The units most affected are mudstones, siltstones, and sandstones of the Fort Union Group underlying the majority of the Badlands (Highland and Bobrowsky 2008, Trimble 1979).

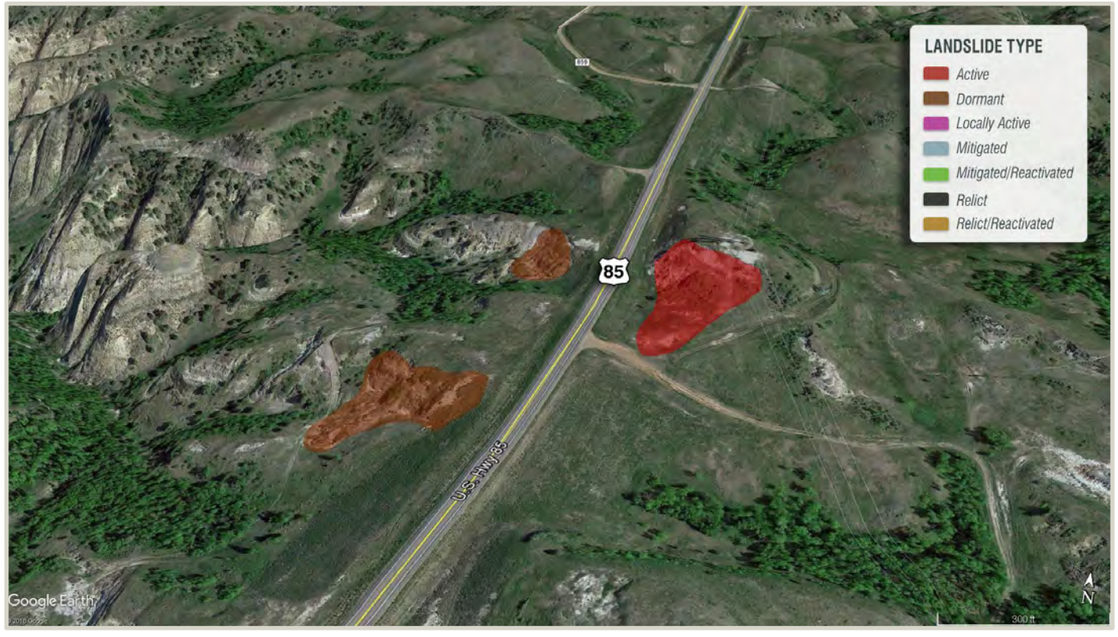


Figure 54, Google Earth Aerial Image of Mapped Landslides (Southern Portion of Badlands)

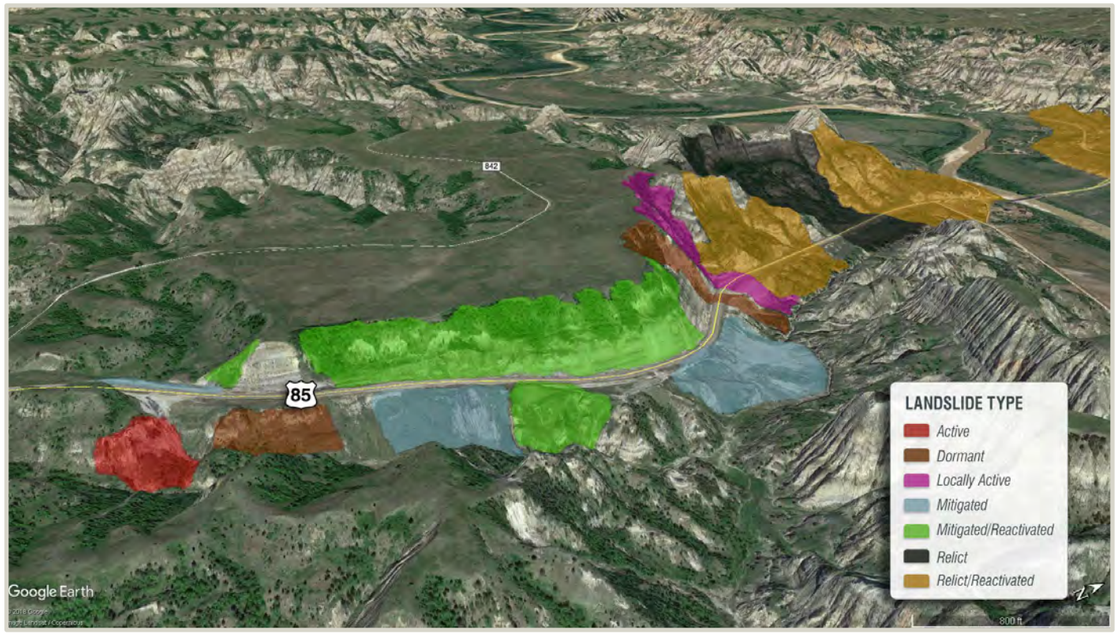


Figure 55, Google Earth Aerial Image of Mapped Landslides (Long X Bridge)

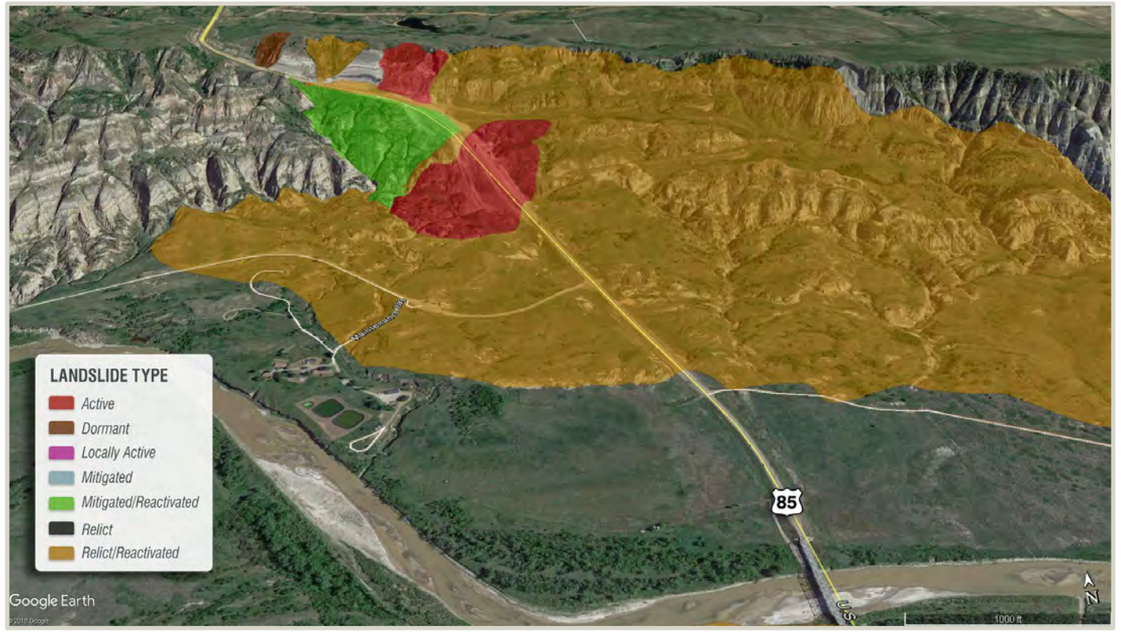


Figure 56, Google Earth Aerial Image of Mapped Landslides (Horseshoe Bend)

Figure 57, Photograph of Horseshoe Bend

5.4.3. How would geological resources be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, the overall nature of the geological resources in the area is not anticipated to change.

Slope stability issues would continue along the project corridor, especially in landslide-prone areas and areas considered highly erodible. As such, pavement remediation work (e.g., slope reconstruction and buttress fill construction), earthwork, and grading improvements to mitigate a slope failure and slope erosion would continue. This could result in temporary impacts on traffic flow as roadways are closed or partially closed during improvements/repair.

5.4.4. How would geological resources be directly and indirectly affected by operation and construction of the project?

The project would result in the permanent modification of terrain to accommodate the wider roadway footprint. Alternative B would have a larger overall footprint than Alternative C; however, within the Badlands segment of the project corridor, where geologic activity is the greatest, the roadway footprint would be the same for both alternatives. Regardless of the selected alternative and options, the overall nature of the geological resources throughout the project corridor is not anticipated to change.

Indirect impacts on geological resources may occur as a result of increased erosion potential. The project would increase impervious surface area, resulting in increased stormwater runoff velocity and volume, which could result in increased erosion and sedimentation over time. Alternative C would result in a greater amount of impervious surface than Alternative B due to the paved center median; however, project design through the Badlands segment of the project corridor would be the same for both alternatives. Options FF-2, FF-3, and FF-4 would result in a greater amount of impervious surface than Option FF-1, as Option FF-1 would occur along the existing alignment. Options INT-1 and INT-2 would both result in an increase in impervious surface; however, appreciable differences between the options are not anticipated.

Steep slopes and moisture-laden sediments can increase the likelihood of landslides. Slopes created for the roadway would be constructed in accordance with design standards, and a slope stability analysis would be conducted during final design for any slopes designed steeper than a three to one ratio. Culverts would be installed as necessary to maintain existing drainage patterns to minimize the likelihood of creating moisture-laden sediments.

In landslide-prone areas through the Badlands, benching and cut/fill slope recommendations provided in the Preliminary Geotechnical Design Memoranda (2017) (**appended by reference**) would be incorporated into the final design to address slope stability issues. Installation of retaining walls would be required at multiple locations through the Badlands area of the project corridor to minimize the roadway footprint. These retaining walls would be designed to blend in with the surrounding landscape. The exact size and dimensions would be determined during final design.

The east side of the existing Long X Bridge has been determined to be more geologically stable than the west side. Therefore, the new bridge structure, regardless of the selected option, would be located east of the existing bridge. To further protect the new bridge from landslide activities, it is anticipated that drilled shafts with ground anchors would be utilized at the south bridge abutment. Drilled shafts are deep foundations created by drilling a hole, installing reinforcing steel (i.e., rebar), and filling with concrete. The purpose of these drilled shafts is to provide a line of foundation that extends below the fault plane of the landslide to aid in resisting ground movement.

Drilled shafts would also be installed within the vicinity of Horseshoe Bend to stabilize the active landslide within this area. These drilled shafts would be similar in nature to the drilled shafts installed at Long X Bridge; however, the scope would be greater as more shafts would be required to achieve the desired level of stabilization.

5.5. *Paleontology*

5.5.1. Are there paleontological resources within the project corridor?

Per the *Paleontological Resources Preservation Act* (PRPA), a subtitle of the *Omnibus Public Land Management Act* (16 U.S.C. 470aaaa to aaa-11; 2009), paleontological resources are "…any fossilized remains, traces, or imprints of organisms, preserved in or on the Earth's crust that are of paleontological interest and provide information about the history of life on Earth…" Paleontological resources do not include archaeological resources or cultural items.

The PRPA requires the US Department of Agriculture (USDA) and US Department of the Interior (DOI) to issue regulations to manage and protect paleontological resources on federal lands. The USFS passed its Final Rule for Paleontological Resources Preservation in the *Federal Register* effective on May 18, 2015. The DOI's proposed rule of implementing regulations of the PRPA was published in the *Federal Register* on December 7, 2016. Additionally, state level requirements for the assessment and management of paleontological resources on lands managed by the State of North Dakota or its political subdivisions are located within North Dakota Century Code (NDCC) 54-17.3 and North Dakota Administrative Code (NDAC) 43-04.

The Bureau of Land Management (BLM) Potential Fossil Yield Classification (PFYC) system is used to classify the paleontological resource potential of rock units to assess potential impacts on these resources and determine mitigation requirements. The BLM PFYC system classifies geologic units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher fossil potential. The classification values are provided as follows:

- Class 1—Very Low
  - » Not likely to contain recognizable fossils.
  - » Assessment or mitigation is unnecessary or very rare.
- Class 2—Low
  - » Not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.
  - » Assessment or mitigation is unnecessary or very rare.
- Class 3—Moderate or Unknown
  - » Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential.
  - » Ground disturbing activities may require field assessment.
- Class 4—High
  - » Contain a high occurrence of significant fossils, but fossils might vary in occurrence and predictability.
  - » Surface disturbing activities could adversely affect paleontological resources.
- Class 5—Very High
  - » Consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.
  - » A field survey by a qualified paleontologist is often needed prior to ground-disturbing activities.

The locations of paleontological resources are closely related to the geologic units (i.e., formations) in which they are found. Finding paleontological resources can be predicted largely from the geologic units present at a given location. Paleontological resources often erode out of unvegetated, exposed sediment (e.g., bedrock) or exposed geological formations. An example of a typical fossil location is depicted in **Figure 58, Typical Fossil Site with Fossils.**

The findings of the paleontological resource assessment and field survey conducted for the project are detailed in the Paleontological Field Survey Report (2017) (**appended by reference**). The survey included the existing NDDOT ROW (i.e., approximately 100 feet from the existing roadway centerline) and an additional 500 feet from the existing roadway centerline in land areas under federal management. In the Badlands area of the project corridor, approximately 1,500 feet on each side of the existing roadway centerline was included to adequately cover landslide areas. An example of an area with a higher fossil potential in the Badlands area is provided in **Figure 59, Area with a Higher Fossil Potential on page 63**.

Figure 58, Typical Fossil Site with Fossils

Figure 59, Area with a Higher Fossil Potential

The project corridor primarily rests on, or moves through, three geologic units that contain exposed bedrock: Sentinel Butte Formation, Golden Valley Formation, and the Coleharbor Group. The majority of the exposed bedrock throughout the project corridor is from the Sentinel Butte Formation with minor contributions from the Golden Valley Formation and Coleharbor Group. The Sentinel Butte and Golden Valley formations are classified as Class 4 areas, and the Coleharbor Group is classified as a Class 3 area. Quaternary alluvium and landslide deposits, which also occur along the project corridor, are classified as Class 2 and Class 4 areas, respectively. Please refer to **Figure 53, Historic Landslide Area and Surface Geology on page 60** for a depiction of the PFYC classes occurring along the project corridor.

Bedrock in the context of paleontological surveys includes areas of any consolidated rock (most often sedimentary rock)—exposed or underlying loose sediments or surface materials.

More than 70 fossil occurrences were recorded *in situ* and as float during the field survey (primarily in the Badlands area). All of the fossil occurrences were located in the Sentinel Butte Formation (Class 4), except for one, which was observed and documented in the Golden Valley Formation (Class 4).

In situ refers to fossils that are in place or within their original substrate. Float refers to loose fossils or fossils transported from their original location.

The definition of a fossil's significance varies among agencies. Under the Final Rule for Paleontological Resources Preservation, the USFS distinguishes 'common' fossils from those that are not plentiful, rare, and/or unique (i.e., significant). Under NDAC 43-04, vertebrate fossils are assumed to be significant, while the majority of invertebrate, plant, and trace fossils are not. However, invertebrate, plant, and trace fossils may be considered significant depending on their rarity or context.

Five of the fossil occurrences recorded during the field survey were determined to be significant vertebrate fossils. These fossils were found as float in the Sentinel Butte Formation and were collected, identified, and prepared for curation. In addition, one insignificant invertebrate representative sample was found *in-situ* in the Sentinel Butte Formation and was collected and prepared for curation. No other fossils were collected.

5.5.2. How would paleontological resources be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, impacts on paleontological resources would not be expected.

5.5.3. How would paleontological resources be directly and indirectly affected by operation and construction of the project?

Ground-disturbing activities would have the potential to impact or uncover buried paleontological resources. The potential to impact or uncover paleontological resources would be the highest in the Sentinel Butte Formation and Quaternary landslide deposits (primarily in the Badlands area), where fossils are more likely to consistently occur.

Paleontological monitoring would occur through the Badlands area. Monitoring would take place during construction with paleontological monitors[1] following earth-moving equipment and examining excavated sediments and road cuts for evidence of significant fossil resources. In the event that significant fossils are uncovered, work would be halted within 100 feet of the discovery site until the fossils are assessed and mitigation measures are discussed amongst the NDDOT, a qualified paleontologist,[2] and an authorized agency representative for resources located on public land. If located on private land, the landowner would be included in the assessment and mitigation.

Outside of the Badlands area, all other areas through the Sentinel Butte and Golden Valley formations and Coleharbor Group, where excavation and expansion of road cuts would occur, would be spot-check inspected (i.e., windshield survey for bedrock) once during excavation and once after excavation is completed. Where bedrock is identified, the area would be surveyed on-foot and visually inspected for fossils of any kind.

Indirect effects on paleontological resources may occur in the event that significant paleontological resources are discovered during project construction. Such a discovery would foreseeably result in future paleontological investigations occurring within and around the area of discovery.

1 A paleontological monitor is an individual who has knowledge and experience recognizing, collecting, and salvaging fossil materials.

2 A qualified paleontologist is an individual with a graduate degree in paleontology or geology and is proficient and experienced in recognizing, identifying, documenting, and collecting fossils in the field.

5.6. *Social*

5.6.1. What communities, community services, churches, and businesses occur along the project corridor?

The study area occurs within Stark, Billings, and McKenzie counties. Incorporated communities along the study area include Belfield to the south and Watford City to the north. Unincorporated communities in between include Fairfield and Grassy Butte. In addition, there are farms; ranches; residences; recreational facilities; and oilfield, agricultural, and commercial services, such as well pads, oil and gas infrastructure, cattle passes, and stock ponds, scattered throughout the project corridor. Police and ambulance services along the project corridor are provided by respective counties and cities. Fire services are provided by several fire districts along the project corridor, and the USFS has primary jurisdiction over wildfires around the TRNP and LMNG.

Belfield is a small town with a population of approximately 1,000 people (US Census Bureau 2016a). Community services (e.g., school districts, recreation, churches, medical, emergency services) in Belfield include a post office, police department, public kindergarten through 12th grade school (Belfield School District), parks, campgrounds, and churches. Businesses include gas stations; restaurants; various stores; hotels; banks; and automotive, farm, and oilfield services. Two gas stations (i.e., Cenex and Conoco), Trapper's Inn Motel & Campground, and Trapper's Kettle restaurant are located immediately south of the I-94 interchange, with access points along US Highway 85. The I-94 interchange is a significant traffic volume contributor to US Highway 85 north of Belfield. Average daily traffic (ADT) volumes (2017) along US Highway 85 north of the I-94 interchange are nearly double the ADT volumes along US Highway 85 south of Belfield.

Various oilfield services are located just north of the I-94 interchange. Approximately 6 miles north of the interchange, there is a cluster of residences near the Stark and Billings county line (i.e., Six Mile Corner). The St. Stanislaus Catholic Cemetery is located approximately 6.5 miles north of the interchange on the western side of US Highway 85, and the St. Boniface Cemetery is located approximately 10 miles north of the interchange in close proximity to the western side of US Highway 85. Several of the roads intersecting US Highway 85, north of the interchange provide recreational access to LMNG parcels.

Approximately 16 miles north of Belfield is the small community of Fairfield, where approximately 190 people live within the Fairfield postal code (US Census Bureau 2015a). The community of Fairfield is bisected by US Highway 85, with residential and commercial properties located on both sides. Community services and businesses within Fairfield include a preschool to 8th grade school (Billings County School District) in close proximity to US Highway 85, Billings County Rural Fire Hall, a post office, recreational vehicle park, restaurant, and bar. The St. Demetrius Ukrainian Catholic Church and St. Mary's Cemetery are located approximately 1 mile south of Fairfield.

Sweet Crude Travel Center, located at the intersection of US Highway 85 and ND-200

Approximately 16 miles north of Fairfield, ND-200 intersects US Highway 85. Apart from the I-94 interchange, this is the only major highway intersection along the project corridor. ND-200 runs east from this intersection to the City of Killdeer, where it intersects North Dakota Highway 22 (ND-22). Similar to I-94, ND-200 is another significant traffic volume contributor to US Highway 85. ADT volumes (2017) along US Highway 85 north of ND-200 are 22 percent greater than ADT volumes south of ND-200. The Sweet Crude Travel Center is located at this intersection.

Approximately 5 miles north of ND-200 is the small community of Grassy Butte, where approximately 175 people live within the Grassy Butte postal code (US Census Bureau 2015a). Unlike Fairfield, Grassy Butte is located entirely along the western side of US Highway 85 and is not bisected by the roadway. Community services and businesses within Grassy Butte include a post office, a park, gas station, and two bars. Near Grassy Butte, the North Dakota Highway Patrol (NDHP) has existing highway turnouts on both sides of US Highway 85.

Approximately 9 miles north of Grassy Butte, the landscape of the project corridor changes abruptly as it enters the Badlands associated with the Little Missouri River. The Badlands extend for approximately 7 miles along the project corridor. Community services in the Badlands area include three scenic overlooks, access to Summit Campground, the Civilian Conservation Corps (CCC) Campground (including access to the Maah Daah Hey Trail), the entrance to the TRNP—North Unit, and a portion of the LMNG.

Approximately 11 miles north of the Badlands is the town of Watford City, with a population of approximately 6,400 (US Census Bureau 2016a). Development becomes increasingly prevalent as the corridor nears the Watford City Bypass (the end terminus of the project), located just south of Watford City. Salem Cemetery is located approximately 3 miles south of McKenzie County Road 30 on the eastern side of US Highway 85. Community services in Watford City include a post office, police department, public kindergarten through 12th grade school (McKenzie County School District), the University of Mary Watford City campus, parks, campgrounds, golf course, medical facilities, and churches. Businesses include gas stations; restaurants; various stores; hotels; banks; and automotive, farm, and oilfield services.

Club-85, located in Fairfield, along US Highway 85

Grassy Butte, located on the western side of US Highway 85

5.6.2. What travel patterns occur along the project corridor?

Western North Dakota is a relatively undeveloped area with only a handful of major roadways. US Highway 85 provides connectivity between Williston, Watford City, and I-94 through the heart of the Bakken Formation oil play in North Dakota. Watford City and Williston are two of the primary centers of oil and gas-related activity in North Dakota; therefore, many vehicles, including heavy truck traffic, make multiple trips between Williston and I-94. Other highway users include visitors of recreational facilities and local traffic. Local traffic includes commuters, school buses, emergency vehicles, and agricultural vehicles and equipment. Visitors of both the TRNP and LMNG are often tourists that may not be familiar with the area.

US Highway 85 is classified as an Interregional System highway, has been designated as a High Priority Corridor by the United States Congress and is part of the Ports-to-Plains Alliance's Theodore Roosevelt Expressway (TRE) section. Goals and policies associated with these designations focus on mobility, reliability, and ability to support economic activity. Of the 105 miles of US Highway 85 between I-94 to the junction of US Highway 2 (both four-lane, east-west directional highways), the northernmost 43 miles between Williston and Watford City have been expanded from two lanes to four lanes. The project corridor consists of the remaining 62 miles, which is currently a two-lane highway. Major intersections occur where the project begins and ends, at the I-94 interchange and Watford City Bypass, respectively, and at the junction of ND-200. There are currently no pedestrian or bicycle facilities along or intersecting the project corridor.

U.S. HIGHWAY 85

Emergency services in western North Dakota are limited due to the predominately rural nature of the area. Primary medical facilities servicing residents along the project corridor are located in Watford City, Killdeer, and Dickinson, with Dickinson having the only hospital of the three. Fire services along the project corridor are located in Belfield, Fairfield, Grassy Butte, and Watford City. In addition, the USFS McKenzie and Medora ranger districts each have fire crews based out of their district offices. Law enforcement services are provided by each county's respective sheriff's office, as well as the NDHP and city police forces in Belfield and Watford City. Due to the rural nature and lack of major roadways, US Highway 85 is the primary travel corridor utilized by emergency services for responding to incidents within the region. West of the project corridor, between I-94 and the Little Missouri River, there are no other highways that can be used to access this area due to the lack of bridges across the Little Missouri River. Please refer to **Figure 60, Emergency Services.**

The McKenzie County School District, Billings County School District, and Belfield Public Schools all utilize the US Highway 85 project corridor for local bus routes. Billings and McKenzie counties have both identified multiple bus routes that utilize the corridor on a daily basis during the school year. These routes include stops along US Highway 85 for residents that live adjacent to the highway. In addition, students in Grassy Butte attend school in Watford City and are bussed approximately 30 miles daily each way along US Highway 85.

There are many access points along the project corridor, including public roads, private driveways, and field approaches. According to the NDDOT Design Manual, the basic guidelines for establishing access points are based on a maximum of five accesses per side, per mile, including section lines (Section III–16.01). In some locations, there are too many access points, access points are offset, and/or properties have multiple access points.

The only two bridges that cross the Little Missouri River north of I-94 are the Long X Bridge, along US Highway 85 within the project corridor, and the Lost Bridge, along ND-22. Over-height loads frequently travel on state and local roadways in the Bakken region. The Long X Bridge has a vehicle clearance of 16 feet, with an allowable vehicle height of 15 feet, 8 inches. Loads greater than 14 feet, 6 inches high are required to obtain a permit from the NDHP. Between June 2013 through December 2015, approximately 138,800 over-height permits were issued along major roadways in western North Dakota. The Long X Bridge clearance was inadequate for 28 percent (39,000) of permit applications. Over-height vehicles traveling along US Highway 85 are currently forced to detour around the Long X Bridge via ND-22. Since 2011, there have been seven major incidents of over-height vehicles hitting the Long X Bridge resulting one instance of full closure for five days for analysis and repair, three instances of overnight closures of approximately two weeks each for repairs, and one planned closure to repair the most recent damage. These closures force all traffic utilizing the Long X Bridge to detour.

During the oil boom in western North Dakota, traffic within the project corridor increased dramatically. Although recent trends in the oil and gas industry have reduced new well development, traffic associated with the maintenance and operation workforce of existing wells is anticipated to continue as long as the wells remain active. Traffic within the study area is expected to continue to grow approximately 2.5 percent each year. There are no passing lanes along the project corridor; however, there are climbing lanes within the Badlands area. Please refer to **Table 11, 2015 and 2040 Traffic Conditions** for a summary of the 2015 ADT and projected 2040 ADT on these roadways from the Traffic Operations Report completed in 2016 (**appended by reference**).

Table 11, 2015 and 2040 Traffic Conditions

Major Intersection along US Highway 85	2015 ADT	2040 ADT
I-94 – South Ramps (RP 75.762)	6,780	12,500
I-94 – North Ramps (RP 75.762)	5,635	10,400
20th Street SW (RP 91.8, Fairfield)	3,485	6,450
ND-200 (RP 107.645)	3,450	6,400
2nd Street SW (RP 111.8, Grassy Butte)	4,095	7,600
McKenzie County Road 50 (RP 112.9)	4,185	7,750
Long X Road (RP 126.2)	4,225	7,800
McKenzie County Road 30 (RP 139.4)	12,025	22,250

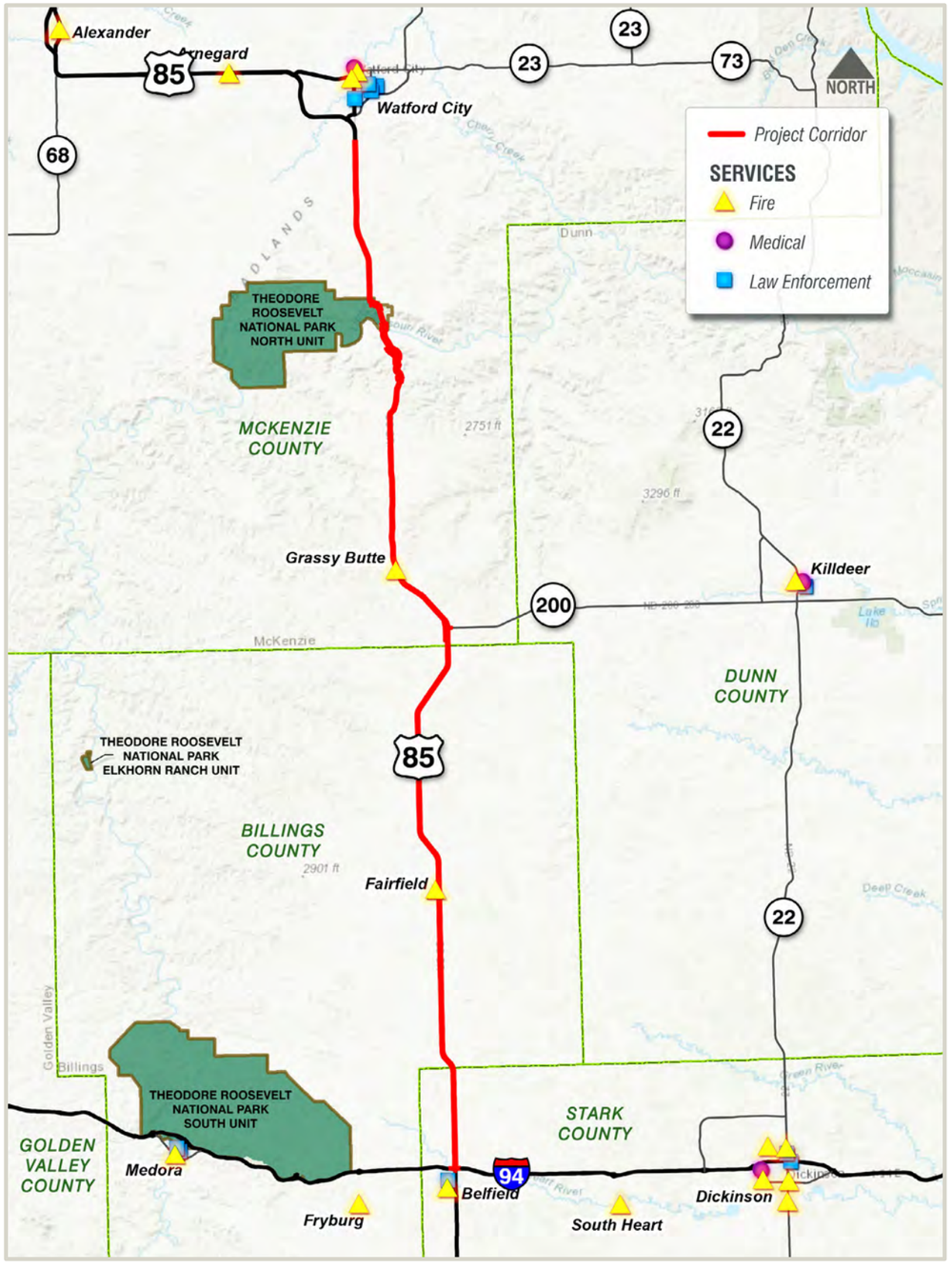


Figure 60, Emergency Services

As a result of increased traffic volumes, the level of service (LOS) (i.e., operational performance) of the roadway has declined. According to the NDDOT Traffic Operations Manual, an LOS 'A' or 'B' is desirable, with LOS 'C' being the minimum acceptable condition. Similarly, the NDDOT specifies that LOS 'D,' 'E,' and 'F' correspond to unacceptably poor traffic conditions. The LOS along four representative segments of roadway along the project corridor were analyzed under the existing two-lane configuration in the Traffic Operations Report. In 2015, three segments had acceptable LOS, and the segment just south of Watford City had an unacceptable LOS D. By 2040, all segments analyzed are anticipated to provide an unacceptable LOS.

5.6.3. What safety concerns occur along the project corridor?

Public comments have cited safety as a major need for the project. During the public scoping process, 37 percent (57 out of 153) of commenters identified safety as a concern along the project corridor. Many of the commenters expressed concerns with lack of passing opportunities, vehicle-wildlife collisions, speeding traffic, a lack of entrance/exit points and turn lanes, multiple types of vehicles and trucks using the highway, and current height restrictions associated with the Long X Bridge.

Based on data obtained from the NDDOT, between June 2010 and May 2015, there were a total of 342 reported crashes that occurred along the project corridor. Of these crashes, 90 resulted in injuries and 10 resulted in fatalities. Run-off-the-road/fixed-object type crashes comprised 49 percent of the total crashes, rear-end collisions comprised 21 percent, and head-on/opposite direction sideswipe crashes comprised 10 percent. Six of the 10 fatal crashes resulted from head-on collisions. One area with a pattern of vehicle crashes has been identified, which is located at reference point (RP) 121, just south of the Badlands. In this location, vehicles failing to navigate the curve has resulted in several crashes.

Although these crash numbers seem high, the actual crash rate along the project corridor during this time frame was 0.70 per million vehicle miles traveled (MVMT) as compared to a statewide average of 1.55. What these numbers fail to account for are unreported crashes, near misses, and public perception. The two-lane highway with limited passing opportunities and above average truck traffic promotes a greater tendency for drivers to engage in high-risk passing behaviors. These high-risk behaviors can make drivers uncomfortable and create a perception of unsafe driving conditions, highlighted by numerous public comments indicating avoidance of the project corridor when possible.

Another safety issue highlighted by the NDHP is the variable shoulder width along the project corridor. Narrow shoulder widths along some segments of the existing roadway present safety issues when vehicles breakdown or during law enforcement traffic stops. Narrow shoulders limit the ability to provide separation between stopped vehicles and mainline traffic creating potential conflict points. NDHP has indicated that narrow should widths hinder their ability to enforce traffic laws along the corridor.

In addition to safety concerns created by the presence of other drivers, the North Dakota Game and Fish Department (NDGF) and general public have identified safety concerns associated with wildlife-vehicle interactions. For example, in 2012–2013, the NDGF relocated the Mormon Butte herd of bighorn sheep due to a high number of bighorn sheep vehicle strikes. For details pertaining to wildlife-vehicle interactions, please refer to **Chapter 3. Alternatives**, and **Section 5.14. Wildlife**.

5.6.4. How would the social environment be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, there would be no construction-related impacts on communities, community services, or businesses, as no roadway construction would occur. The travelling public would continue to experience US Highway 85 in its current, two-lane configuration. Travelers would continue to experience high traffic volumes that are projected to increase, as well as an LOS that is projected to be deficient by 2040. Reliability and capacity of the congressionally designated high-priority corridor would not be improved, and the two-lane corridor would continue to lack opportunities for passing and turn lanes for passenger vehicles, school buses, emergency vehicles, and heavy trucks and equipment.

There would continue to be no pedestrian or bicyclist facilities along the project corridor. Access points would remain unconsolidated and offset. Over-height vehicles would continue to experience a height restriction at Long X Bridge, resulting in continued detours. Over-height vehicle collisions with the Long X Bridge would continue to present a safety hazard for the travelling public and necessitate detours. The potential head-on/opposite-direction sideswipe crashes, run-off-the-road/fixed-object crashes, and wildlife-vehicle collisions would remain unchanged. Agency and public concerns with regard to safety would not be addressed.

5.6.5. How would the social environment be directly and indirectly affected by operation of the project?

Expanding US Highway 85 to a four-lane highway would have numerous associated direct and indirect social impacts both locally and regionally. From a regional standpoint, expanding US Highway 85 to four lanes would provide a safer and more reliable highway corridor for the traveling public. Reliability would be improved by reducing over-height restrictions, providing additional driving lanes and expanding roadway shoulders. The project would address safety issues along the project corridor by incorporating the following features:

- Improving access control
- Adding turning lanes
- Widening shoulders
- Adding lanes to allow for passing movements
- Reducing the potential for crashes at the Long X Bridge by relieving and/or removing height restrictions
- Reducing the potential for crashes at the curve near RP 121 by improving roadway geometry
- Reducing the potential for wildlife-vehicle collisions by constructing wildlife crossings

Alternative B would provide additional safety benefits over Alternative C through the incorporation of a depressed, center median. The depressed, center median would provide an additional level of protection from head on crashes, which accounted for 6 of the 10 recorded fatal crashes that occurred within the project corridor between June 2010 and May 2015.

Emergency services within the region would also benefit from construction of the project. Two driving lanes in each direction would create a free-flowing transportation corridor that would improve response times for first responders. Additional driving lanes and expanded shoulders would also make enforcement of traffic laws easier for law enforcement personnel by providing additional space for pulling vehicles over and an opportunity for other drivers to merge into the left lane when passing a stopped vehicle on the right shoulder. In addition, new NDHP turnouts would be constructed on both sides of US Highway 85, north of the I-94 interchange between RP 77 and RP 85. The existing NDHP turnouts north of Grassy Butte would also be reconstructed.

Construction of Alternatives B and C and the associated options would require the acquisition of ROW from public and private property owners/managers. ROW needs would vary between the two alternatives: Alternative B would primarily require ROW from one side of the existing highway, while Alternative C would require less ROW overall, but from both sides of the existing highway. A detailed Map Book was created in 2016 (**appended by reference**) as part of a roadway constraints assessment for Alternative B to determine which side of the existing roadway would be optimal for expansion. The intent of the constraints analysis was to avoid impacts on existing resources (e.g., homes, buildings, large utilities, cultural resources) while minimizing the number of crossovers (i.e., transitions from expanding on one side of the existing roadway to expanding on the other).

None of the build alternatives or options would result in the relocation of homes or businesses; however, the expanded roadway footprint would bring the highway closer to homes, businesses, and community services located adjacent to the project corridor. Alternative C would bring the roadway closer to more homes along the project corridor than Alternative B due to the roadway being expanded on both sides. Alternative C would bring the roadway closer to approximately 70 residences along the corridor as compared to Alternative B, which would bring the roadway closer to approximately 20 residences.

Under both Alternatives B and C, access would be maintained for all residences and businesses. Consolidation of field drive access points would likely occur under both alternatives. In addition, under Alternative B, some field drive accesses may be converted to right-in/right-out (i.e., no median crossover would be provided). Final determination of access modifications would occur during final design and ROW negotiations. Mailboxes impacted by construction of the project would be relocated following project construction in coordination with the US Postal Service.

Agriculture has been identified as one of the primary economic drivers within the region. Construction of Alternatives B and C and their options would have both positive and negative impacts on the agricultural community. Positive impacts would be associated with the wider overall roadway, allowing farmers and ranchers to utilize the highway for moving large pieces of equipment without backing up traffic, as is common under existing roadway conditions. Farmers and ranchers would also benefit from the improved roadway reliability and safety during day-to-day operations. Potential negative impacts associated with Alternatives B and C and their options would include access consolidation, increased barrier to livestock rotation, and minor loss of grazing and/or cropland.

As previously mentioned, access would be maintained for all parcels; however, some parcels that currently have multiple access points may be subject to access consolidation in order to improve access control on and off the highway. These access modifications would be coordinated with adjacent landowners during final design and ROW negotiations.

During final design and ROW negotiations, negotiations would also occur regarding the extension of existing cattle passes or incorporation of new cattle passes. Currently, landowners with parcels on both sides of the highway are able to coordinate with the NDHP to temporarily close the highway to traffic in order to move livestock across the highway. With the expanded roadway under Alternatives B and C, the NDHP may be less likely to close the highway to move livestock, which would force ranchers to utilize other measures for moving livestock. If additional cattle passes are requested by adjacent landowners, these requests would be considered utilizing the NDDOT Cattle Pass Consideration process (State Form Number 10155), which includes a cost/benefit analysis to determine if installation of a cattle pass is justified. If it is not justified, the adjacent landowner would typically be required to contribute funds for construction. For information regarding grazing on USFS-managed lands, please refer to **Section 5.8. Public Lands**.

The most constrained segment of the project corridor, in terms of adjacent development/infrastructure, is through the community of Fairfield. Keeping US Highway 85 on-alignment through Fairfield (i.e., Option FF-1) would require some ROW acquisition at select locations; however, the expanded roadway would fit within the existing ROW along the majority of the roadway corridor. Curb and gutter have been incorporated into the proposed typical section for Option FF-1 to minimize the roadway footprint. Social impacts on the community of Fairfield associated with Option FF-1 are anticipated to be minor, as the overall makeup of the community would remain largely unchanged. Drivers needing to cross US Highway 85 would be forced to navigate a wider roadway section; however, the posted speed limit through Fairfield would remain at 45 miles per hour (mph), and the two lanes of traffic in each direction would reduce vehicle stacking, creating additional breaks in traffic flow. Negative impacts on local businesses are not anticipated with implementation of Option FF-1, as through traffic would remain on the existing alignment.

Options FF-2, FF-3 and FF-4 would remove mainline traffic from traveling through Fairfield. Because Option FF-1 would be similar to existing conditions, impacts on local businesses are not anticipated. Under Options FF-2, FF-3, and FF-4, drivers travelling along US Highway 85 desiring to stop in Fairfield would be required to turn off of mainline US Highway 85 to access the community. This could result in fewer overall stops being made in Fairfield, as the default condition would be to continue along US Highway 85 around Fairfield. Fewer stops in Fairfield could negatively impact local businesses. To the contrary, a reduction in traffic volumes in the community would improve mobility within town, improve safety, and would result in a quieter overall atmosphere. These changes may have a beneficial impact on the community, whereby the existing highway would function more like a 'main street' in Fairfield.

Prairie Elementary is located along the eastern edge of Fairfield. Option FF-3 would bypass Fairfield to the east, offsetting the highway approximately 300 feet from the edge of school property. Please refer to **Figure 61, Prairie Elementary Relative to East Fairfield Bypass Options**. Option FF-4 would require more ROW acquisition than Option FF-3, but would provide additional buffer between the roadway and school (approximately 1,500 feet from the edge of school property). All three of the bypass options would retain the posted speed limit of the highway (i.e., 70 mph for Alternative B and 65 mph for Alternative C) and would not be subject to speed reductions. Fairfield residents have expressed concern that school buses and local residences would experience difficulties merging into traffic at those rates of speed. As part of the 2016 Traffic Operations Report (**appended by reference**), a traffic control analysis was completed for the entire project corridor to determine if signalized intersections would be warranted; signalized intersections are not warranted for any of the proposed Fairfield options.

The St. Demetrius Ukrainian Catholic Church and St. Mary's Cemetery are located on the western side of US Highway 85, approximately 1 mile south of Fairfield. The church currently has two access points along US Highway 85 and the cemetery has one. Under Alternative B, a new two-lane roadway would be constructed to the east, avoiding both locations. Under Alternative C, the existing roadway would be expanded to both sides, which would bring the roadway closer to both properties. To minimize impacts, modified ditch sections would be implemented adjacent to these locations. Under both alternatives, consolidation of access points would occur at the St. Demetrius

Ironwork cross at St. Boniface Cemetery

Figure 61, Prairie Elementary Relative to East Fairfield Bypass Options

Ukrainian Catholic Church to improve access control along the highway. Access to St. Mary's Cemetery would be maintained in its current location.

Two additional cemeteries are located along the project corridor with direct access along US Highway 85: St. Boniface Cemetery, located approximately 6 miles south of Fairfield, and Community Cemetery, located approximately 4 miles north of Grassy Butte. In addition, Salem Cemetery is located along the project corridor with access from a gravel road off of US Highway 85, approximately 4 miles south of McKenzie County Road 30. St. Boniface and Community cemeteries are located along the western side of the highway and Salem Cemetery is located along the eastern side of the highway. None of these cemeteries would be directly impacted by construction of Alternative B or C. Alternative C would bring the roadway closer to all three cemeteries, while Alternative B would bring the roadway closer to Community and Salem cemeteries. Access to the cemeteries would be maintained regardless of the selected alternative.

The community of Grassy Butte is currently located on the western side of US Highway 85. Under Alternative B, the roadway would be expanded to the east in order to avoid impacting the community. Alternative C would expand the roadway on both sides of the existing highway; however, most of the residences and businesses within Grassy Butte are offset far enough off the highway such that the effect of bringing the roadway closer to these properties would be negligible. Social impacts and changes in community cohesion are anticipated to be minor under both alternatives.

At the ND-200/US Highway 85 intersection, traffic patterns would be similar to existing conditions under Option INT-1; however, drivers making turns would be required to navigate additional lanes of traffic. Under Option INT-2, traffic would be required to navigate a multi-lane roundabout, which would be the first of its kind in North Dakota. Due to its unfamiliarity within the state, drivers may experience uncertainty during initial use. This uncertainty would be temporary as drivers become more familiar with the multi-lane roundabout layout and function. Overall, Option INT-2 is anticipated to provide added safety benefits compared to Option INT-1, as roundabouts are associated with a significant reduction in the rate of fatal crashes and serious injury crashes compared to standard intersections (MnDOT 2017).

Options LX-1, LX-2, and LX-3 would alter travel patterns and improve reliability by relieving and/or removing height restriction constraints (i.e., detours and crash potential) in this location. Under Option LX-1, the existing Long X Bridge would be rehabilitated to increase the vertical clearance to 20 feet, 6 inches for southbound traffic, which would reduce, but not eliminate the potential for over-height vehicles to strike the bridge. Under Option LX-1, southbound over-height vehicles could be detoured onto the northbound traffic lanes in order to cross the Little Missouri River via the new two-lane bridge. This scenario would require a temporary roadway closure and assistance from the NDHP. Northbound traffic under Option LX-1 and all traffic under Options LX-2 and LX-3 would be free of height restrictions at the Long X Bridge location. Under Option LX-2, the existing bridge would be retained for alternate use as an example of a Warren through truss due to its historic nature. Under Option LX-3, the existing bridge would be removed, which would require the development of a mitigation plan in coordination with the North Dakota State Historic Preservation Office (SHPO).

During the public scoping period, numerous public comments were received expressing concern for the Badlands and TRNP—North Unit. To address these concern, design of the typical roadway section through this segment of the project corridor was modified to minimize the roadway footprint (this design would be identical under Alternatives B and C). The roadway footprint has been minimized by incorporating a 20-foot-wide flush median typical section that narrows down to 12 feet north of the Little Missouri River. In addition, retaining walls, modified ditch and back slope sections, and reduced speed limits have all been incorporated. No permanent ROW from the TRNP—North Unit would be required; however, temporary ROW would be required during construction.

Impacts on the Badlands and TRNP—North Unit are anticipated to be minor due to the presence of the existing highway. The project would modify visual resources along the project corridor; however, at most locations within the park, the visual difference between existing and proposed roadway would be negligible. Please refer to **Section 5.17. Visual on page 98**. Construction of the project is not anticipated to be a direct traffic contributor to the roadway; therefore, traffic noise variations between Alternative A (no-build) and Alternatives B and C (build alternatives) are predicted to be negligible. The project would include replacement of all three scenic overlooks in their existing locations. These scenic overlooks would be slightly reduced in size and would include striping to direct vehicles and usage. Access to the TRNP—North Unit would be improved through the incorporation of designated northbound and southbound turn lanes at the park entrance. In addition, visitors traveling to the park would benefit from the improved US Highway 85 corridor.

The 2016 Traffic Operations Report (**appended by reference**) completed for the project indicates that traffic along this stretch of US Highway 85 is projected to grow at a rate of approximately 2.5 percent annually regardless of if the proposed project is constructed. Therefore, operation of the project is not anticipated to be a direct traffic contributor, nor is it anticipated to result in induced growth within the region.

5.6.6. How would the social environment be directly and indirectly affected by construction of the project?

During construction, travel patterns would remain similar to existing conditions, as two lanes of traffic would be maintained and reasonable construction access to properties and roadways would be maintained. Temporary signage pertaining to roads, businesses, and public facilities would be installed during construction as necessary. Speed limits within construction zones would be reduced, which would temporarily increase travel times, and accessing properties may require minor detours.

Construction activities would result in temporary visual impacts for highway users and residents in the form of disturbed land, construction materials and equipment, workers, construction lighting, and dust. Fugitive dust control measures (e.g., watering, windbreaks and barriers, vehicle access control) would be implemented as necessary during construction in accordance with the NDDOT Standards and Specifications for Road and Bridge Construction and SWPPP. Highway users and residents would also experience temporary construction noise.

Construction activities may impact existing mailboxes and fencing. Temporary and/or permanent replacement fencing and mailboxes would be provided, as necessary.

Visitors to the TRNP—North Unit and LMNG may experience noise and visual impacts during construction that could detract from the wilderness experience that many visitors desire. In order to minimize these impacts, timing of construction activities would be limited in proximity to the TRNP—North Unit. For more detailed TRNP—North Unit and LMNG information, please refer to **Section 5.8. Public Lands**.

5.7. *Environmental Justice*

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons' benefits, or subject persons to discrimination because of their income, race, color, or national origin.

The US Department of Transportation and FHWA have issued the following guidance for addressing minority, low-income, and vulnerable-age populations to ensure that agency actions do not have disproportionately high and adverse effects on environmental justice populations:

- US Department of Transportation Order 5610.2(A), Final US Department of Transportation Environmental Justice Order
- FHWA Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 13166, Improving Access to Services for Persons with Limited English Proficiency requires federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so individuals with LEP can have meaningful access to them.

5.7.1. What minority, low-income, vulnerable-age, and LEP populations occur along the project corridor?

Minority populations, as defined by Council on Environmental Quality (CEQ) guidance under NEPA (40 Code of Federal Regulations [CFR] § 1500–1508), US Department of Transportation Order 5610.2(a), and FHWA Order 6640.23A include individuals in the following population groups: American Indian and Alaska Native, Asian, Black or African American, Hispanic or Latino (of any race), and Native Hawaiian and Other Pacific Islander. Environmental justice populations should be identified where either: (1) the minority population of the affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For the purposes of this EIS, minority population percentages that are 'meaningfully greater' are at least 10 percentage points higher than for the entire state of North Dakota. An environmental justice population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the previously stated thresholds.

A disproportionately high and adverse effect is (1) predominantly carried by a minority or low-income population and (2) suffered by the minority or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority or non-low-income population (FHWA 2015A).

A low-income individual is defined as a person whose median income is at or below the Department of Health and Human Services poverty guidelines. Low-income population means any readily identifiable group of low-income individuals who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a project. Low-income populations are determined by the US Census Bureau and the Department of Health and Human Services based on poverty thresholds and guidelines developed each year (DHHS Undated). US Census Bureau data is also utilized for determining LEP populations (i.e., those of whom English is not their first spoken language) and vulnerable-age populations (i.e., populations under the age of 18 and over the age of 65). CEQ guidance does not provide specific criteria for determining low-income, vulnerable-age, or LEP populations as it does for minority populations. Therefore, for purposes of this analysis, the criteria for minority populations, which are previously discussed, will be used.

The primary source for information on racial, ethnic, and low-income statistics is the US Census Bureau. The most recent census data available (i.e., 2011–2015 5-year average American Community Survey) was used to determine the minority, age, languages, and income characteristics of the population along the project corridor. Data was analyzed to the smallest geographic unit available (i.e., census tract data on a county-wide basis). The Census Tracts for Billings, Stark, and McKenzie counties are 9631, 9623, and 9640, respectively (US Census Bureau 2015c). The data analyzed is presented in **Table 12, Race and Ethnicity Characteristics** and **Table 13, Age, Language, and Income Characteristics**.

Table 12, Race and Ethnicity Characteristics

Race and Origin	State of North Dakota	Census Tract 9640 in Stark County	Census Tract 9631 in Billings County	Census Tract 9623 in McKenzie County
American Indian and Alaska Native	5.3%	1.0%	3.2%	1.1%
Asian	1.2%	—	—	1.0%
Black or African American	1.6%	—	—	—
Hispanic* or Latino (of any race)	2.9%	2.0%	—	4.2%
Native Hawaiian and Other Pacific Islander	—	—	—	—
White	88.7%	98.0%	96.8%	94.8%
Other Race	0.8%	1.0%	—	—
Two or More Races	2.2%	—	—	3.1%

Sources: US Census Bureau 2015c

*Note: *Hispanic denotes a place of origin.*

Table 13, Age, Language, and Income Characteristics

Parameter [a]	State of North Dakota	Census Tract 9640 in Stark County	Census Tract 9631 in Billings County	Census Tract 9623 in McKenzie County
Population	672,591	1,527	897	1,539
Under 18 Years of Age	25.8%	21.8%	18.3%	23.7%
65 Years of Age and Over	14.2%	16.4%	17.4%	13.3%
Median Household Income [b]	$57,181	$72,099	$70,469	$72,794
Living Below Poverty [b]	11.5%	6.7%	10.3%	13.7%
Speak a Language Other than English [b]	5.6%	6.7%	9.4%	5.1%

Sources: US Census Bureau 2015c

Notes:

a. *Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a 90 percent margin of error. In addition to sampling variability, the US Census Bureau 2011–2015 American Community Survey estimates are subject to non-sampling error, which is not represented in these tables.*

b. *Data was available by county level, not Census Tract level.*

As shown in the tables, a majority of the population along the project corridor is White, between 18 and 65 years of age, and has a median household income of approximately $70,000. Most individuals live above the poverty level and speak English. Based on review of this information, there are no environmental justice populations located along the project corridor.

5.7.2. How would minority, low-income, vulnerable-age, and LEP populations be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, there would be no direct or indirect impact on environmental justice populations, as no such populations are present along the project corridor.

5.7.3. How would minority, low-income, vulnerable-age, and LEP populations be directly and indirectly affected by operation and construction of the project?

Operation and construction of the project would not directly or indirectly impact environmental justice populations, as no such populations are present along the project corridor.

5.8. Public Lands

Public lands along the project corridor consist of the TRNP–North Unit and LMNG.

5.8.1. What is Theodore Roosevelt National Park?

Theodore Roosevelt National Memorial Park was established in 1947, which was redesignated by Congress in 1978 as Theodore Roosevelt National Park (NPS 2014). The TRNP is managed by the NPS, which was created by the *Organic Act* of 1916 with the mission to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The NPS operates in accordance with Management Policies 2006, which directs each park to create a foundation statement that details its purpose, significance, fundamental resources and values, and interpretive themes (NPS 2006). According to the TRNP Foundation Document, the purpose of the TRNP is to memorialize Theodore Roosevelt and his conservation legacy. The NPS considered the TRNP to be significant on account of the Little Missouri River Badlands, which consist of a unique, colorful, and rugged landscape formed by 65 million years of erosion that has exposed geological strata. The Badlands include varied habitats, abundant wildlife, fossils, petrified wood, and cultural resources (NPS 2014).

Wilderness Act of 1964; (16 U.S.C. 1131-1136, 78 Stat. 890), approved September 3, 1964, designates by Congress wilderness areas, which are defined as "...an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain ..." and as "Federal land retaining its primeval character and influence, without permanent improvements or human habitation..."

The TRNP currently protects more than 70,000 acres of land located in Billings and McKenzie counties, including approximately 29,920 acres of designated wilderness area, known as the Theodore Roosevelt Wilderness (NPS 2014). The park is made up of three units: the Elkhorn Ranch Unit (218 acres), the North Unit (24,070 acres), and the South Unit (46,159 acres) (NPS 2015c). The project corridor intersects the east edge of the TRNP–North Unit, where the NDDOT currently has a Highway Easement Deed from the NPS for the existing two-lane US Highway 85 transportation corridor. In addition, roadways extending from US Highway 85 along the project corridor provide access to the TRNP–South Unit and TRNP–Elkhorn Ranch Unit. Please refer to **Figure 62, Theodore Roosevelt National Park on page 70**.

The administrative boundary of the TRNP includes both public and private lands. Private lands (i.e., inholdings) consist of properties that were privately owned prior to establishment of the park's administrative boundary and are not open to the public. Over 700,000 people visit the TRNP each year. Of these visitors, an average of nearly 99,000 (2012–2017) visit the TRNP–North Unit each year. The park offers two visitor centers in the TRNP–South Unit and one visitor center in the TRNP–North Unit. Currently, TRNP–North Unit is utilizing a temporary administrative center until a replacement for the permanent visitor center can be constructed. Outdoor recreational opportunities at the TRNP include backcountry camping, bicycling, canoeing/kayaking, fishing, cross-country skiing, snowshoeing, hiking, horseback riding, and wildlife viewing (NPS 2015c, NPS 2016a, NPS 2017b, NPS 2015b).

The entrance to the TRNP–North Unit is located off of US Highway 85. US Highway 85 is at an incline in this location, as the highway transitions between the Little Missouri River bottom and the Badlands to the north. Approaching the park entrance, US Highway 85 includes a right-turn lane for southbound traffic and a climbing lane for northbound traffic. On the western side of US Highway 85, NPS-managed lands are fenced to keep bison in the park.

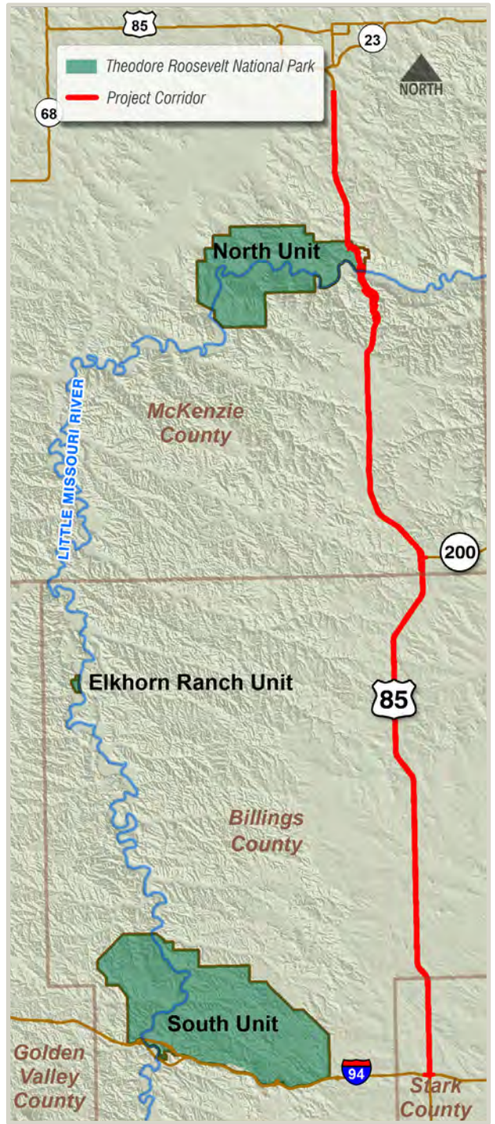


Figure 62, Theodore Roosevelt National Park

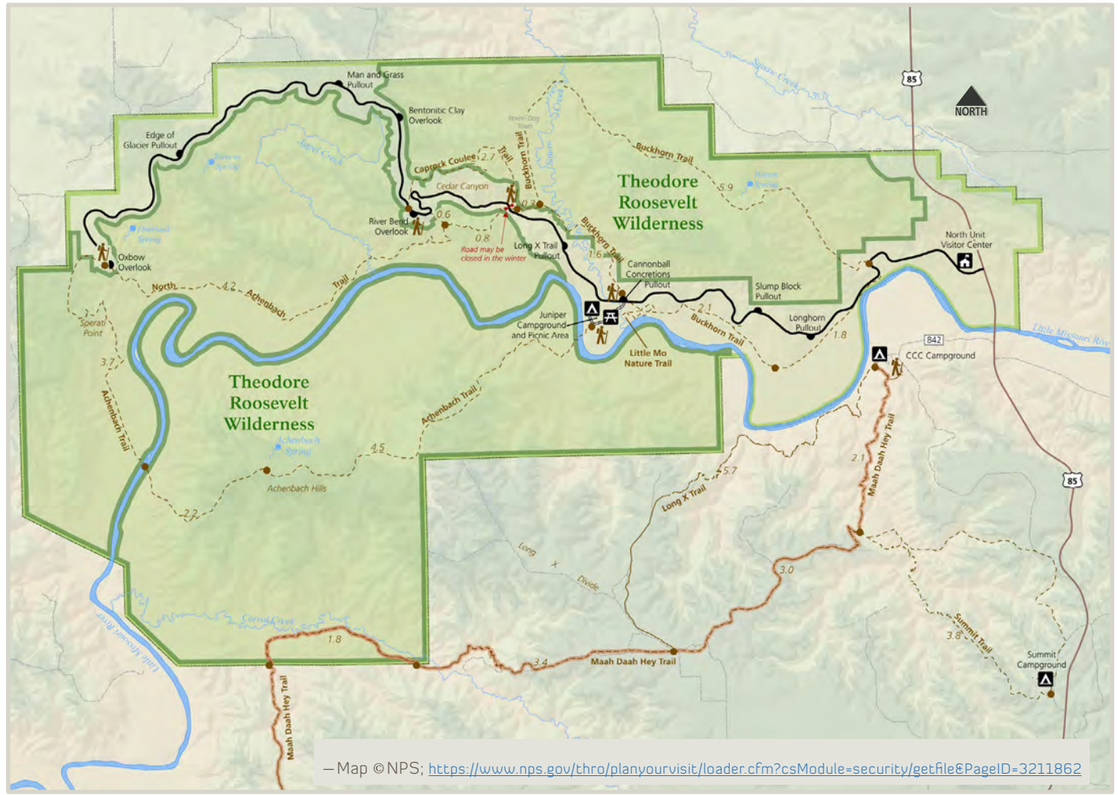


Figure 63, TRNP – North Unit

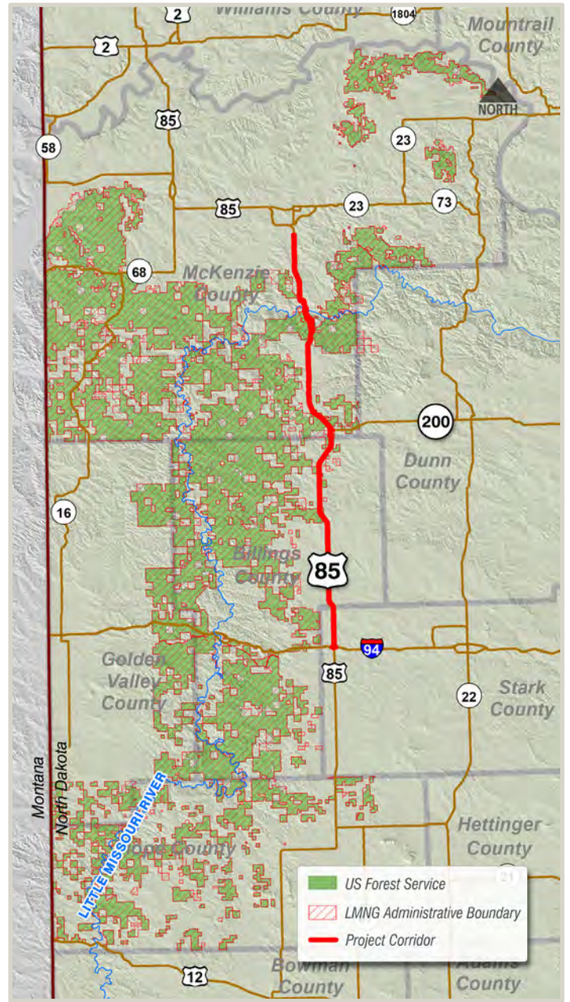


Figure 64, Little Missouri National Grasslands

The Theodore Roosevelt National Park North Unit State Scenic Byway extends from US Highway 85 through the TRNP – North Unit (NDPRD Undated). With the exception of the Scenic Byway corridor, all of the TRNP – North Unit west of US Highway 85 is part of the Theodore Roosevelt Wilderness. The TRNP – North Unit offers a visitor's center, trailheads, overlooks and pullouts, camping, picnicking, NPS employee housing, and park maintenance facilities (NPS Undated(a)). Please refer to **Figure 63, TRNP – North Unit**.

5.8.2. What are the Little Missouri National Grasslands?

The LMNG is managed by the USFS. The mission of the USFS is to "sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations" (USFS Undated(f)). The LMNG is one of four National Grasslands that make up the Dakota Prairie Grasslands (DPG) (USFS Undated(b)).

The DPG, established in 1998, encompasses approximately 1.26 million acres of federal land, in addition to state and private lands across North Dakota and South Dakota. The DPG Land and Resource Management Plan (LRMP), provides management direction for the DPG (USFS 2001). The goals of the DPG are to ensure sustainable ecosystems, provide multiple benefits to people, provide scientific and technical assistance, and provide effective public service. The DPG goal to ensure sustainable ecosystems includes sustaining wildlife and plant populations, whereas the DPG goal to provide multiple benefits to people includes improving outdoor recreational opportunities, providing forage for livestock, and providing opportunities for oil and gas development.

The LMNG makes up much of the DPG, spanning over 1 million acres in western North Dakota. The grassland is divided into two ranger districts: Medora and McKenzie (USFS 2001). The project corridor intersects the eastern edge of both LMNG ranger districts, where NDDOT currently has an easement from the USFS for the US Highway 85 transportation corridor. Roadways extending from US Highway 85 along the project corridor provide access to a large portion of the LMNG. Some USFS-managed lands are fenced along US Highway 85 to allow for livestock grazing. Please refer to **Figure 64, Little Missouri National Grasslands**.

The LMNG occurs within two USFS Geographic Areas: Badlands and Rolling Prairie (USFS 2001). The Badlands consists of colorful, highly dissected drainages; grassy ridgelines; and buttes associated with the Little Missouri River, which includes unique vegetative and wildlife communities. The Rolling Prairie is characterized by open and scenic rolling plains and includes the largest intact natural grassland area in North Dakota. Both Geographic Areas are managed for native plant communities, soil health and water quality, undeveloped landscapes with scenic integrity, perpetuation of outdoor recreation opportunities, and maintenance of infrastructure.

The USFS has designated Recreation Opportunity Spectrum settings and Scenic Integrity Objectives for each Geographic Area (USFS 2001). Much of the project corridor on the LMNG occurs within or adjacent to a 'Rural' Recreation Opportunity Spectrum setting, which consists of a substantially modified natural area with readily evident human activity. Small portions of the project corridor are associated with 'Roaded Natural' and 'Semi-primitive Nonmotorized' Recreation Opportunity Spectrum settings. The Roaded Natural setting consists of a predominantly natural-appearing area with moderate human activity. The Semi-primitive Nonmotorized setting occurs within the Badlands, and consists of a predominantly natural or natural-appearing area with low human activity and no motorized recreation. Much of the project corridor on the LMNG is classified as having 'low' Scenic Integrity Objective (i.e., moderately altered), except for areas occurring within the Badlands, which have 'moderate' to 'high' Scenic Integrity Objectives (i.e., appears unaltered).

The DPG is also divided into Management Areas (MAs) that are managed for a particular emphasis (i.e., prescription) (USFS 2001). Prescriptions range from 1 to 6, with 1 having the least disturbance and 6 having the most. The majority of USFS-managed lands along the project corridor occurs within or adjacent to MA 6.1 Rangeland with Broad Resource Emphasis. Additional USFS-managed lands occur within the Badlands, which are within or immediately adjacent to MA 3.65 Rangelands with Diverse Landscapes, MA 3.51 Bighorn Sheep Habitat, MA 1.31 Non-motorized Backcountry Recreation, and MA 1.2a Suitable for Wilderness. Please refer to **Figure 65, DPG MAs and Associated Recreational Opportunities on page 72**. Prescriptions for the MAs along the project corridor include the following:

- 1.2a Suitable for Wilderness: This MA is managed to remain suitable for designation as a Wilderness Area in the future. Any activities that threaten wilderness characteristics are not permitted, including new road construction. No new utility development or special-use facilities are permitted. Infrastructure development apart from new road construction is allowed, providing it is subordinate to the landscape or consistent with the character of the area.

- 1.31 Non-motorized Backcountry Recreation: This MA is managed to provide opportunities for non-motorized, semi-primitive recreation in a natural-appearing area. Motorized vehicle use is prohibited, except for administrative and emergency purposes. Existing utilities may be maintained; however, new utilities are only permitted in association with existing rights. No new special-use facilities are permitted apart from existing rights. Road construction and reconstruction is also prohibited. Infrastructure development apart from road construction or reconstruction is allowed, providing it is subordinate to the landscape or consistent with the character of the area.

- 3.51 Bighorn Sheep Habitat: This MA is managed to provide and improve habitat for the bighorn sheep. Conflicts are to be resolved in favor of bighorn sheep, including livestock forage allocation. Snowmobile use is prohibited, and travel restricted to protect sheep during critical periods. New utility corridors are allowed if they do not degrade the area; however, new travel routes across bighorn sheep habitat are not permitted.

- 3.65 Rangelands with Diverse Landscapes: This MA is managed for a diversity of plants and animals, as well as ecological processes and functions. Various rangeland uses are provided in a way that maintains a natural appearing landscape. Much of the prescription for this MA defaults to general DPG and/or respective Geographic Area Direction. With regard to utilities, new utilities are allowed along roads or other previously disturbed areas.

- 6.1 Rangeland with Broad Resource Emphasis: This MA consists of rangeland managed for a variety of ecological and human needs. Human development and activity is widespread, including motorized transportation on and off roads. Much of the prescription for this MA defaults to general DPG and/or respective Geographic Area Direction. Landscape fragmentation from roadways and other activities that degrade the ecosystem are discouraged. Grazing practices are designed for healthy plant communities.

Management Areas 1.31 and 1.2a occur within a USFS Inventoried Roadless Area. Inventoried Roadless Areas are large, undeveloped tracts of land that USFS has identified as meeting the criteria for designation under the *Wilderness Act* (USFS 2000). Roads may not be constructed or reconstructed in Inventoried Roadless Areas unless they meet a specific exception specified in 36 CFR 294.12, such as roadway safety issues or for Federal Aid Highway projects where there is no other reasonable and prudent alternative.

Several field surveys were conducted in 2015 and 2016 to determine baseline wildlife, vegetation, and habitat conditions along the project corridor. The Biological Evaluation (BE) (2017) (**appended by reference**) includes the findings of botany and wildlife surveys on the LMNG, and discusses the potential impacts of the project on raptors, *Endangered Species Act* (ESA)-listed wildlife species and associated Critical Habitat, USFS-designated sensitive wildlife species, USFS-designated Management Indicator Species (MIS), USFS-designated sensitive plant species, USFS-designated watch plant species, and plant species of concern. Please refer to **Section 5.14. Wildlife**, and **Section 5.20. Vegetation**, for a summary of the BE.

Recreation Opportunity Spectrum: A system of planning and managing recreational resources by categorizing recreational opportunities into eight classes based on the extent of change to natural environment, type of facilities provided, degree of outdoor skills needed to enjoy an area, and density of recreation uses.

Scenic Integrity Objective: The state of naturalness or of human disturbance based on deviation from existing landscape character.

Recreational opportunities on the LMNG include hiking, camping, horseback riding, photography, canoeing, wildlife viewing, fishing, and hunting (USFS Undated(d)). LMNG facilities adjacent to the project corridor include the Summit and CCC campgrounds. Summit Campground is located approximately 0.1 mile west of US Highway 85, and is accessed by a 1-mile gravel road loop off of US Highway 85 (USFS Undated(e)). This campground includes a short hiking trail and is the trailhead to the Summit Trail. The Summit Trail is currently closed until slumping can be repaired (Morel 2017). Access to the CCC Campground is from a gravel road extending approximately 1 mile west of US Highway 85 (USFS Undated(a)). This campground is located along both the Long X and Summit trails and is the North Trailhead of the Maah Daah Hey Trail. The Maah Daah Hey Trail is a 96-mile-long, non-motorized, hiking, biking, and horseback trail through the LMNG extending from the CCC Campground to Sully Creek State Park, south of the TRNP—South Unit (USFS Undated(c)). Please refer to **Figure 65, DPG MAs and Associated Recreational Opportunities on page 72**.

In addition to recreation, the other human uses of the LMNG include oil and gas development and livestock grazing. There are 632 producing or soon to be producing oil and gas wells (i.e., active, confidential, drilling, or permitted status) within the LMNG administrative boundary, of which 515 are located on USFS-managed lands. None of the wells on the LMNG occur within 0.5 miles of US Highway 85 (NDIC 2018b). There are four grazing associations (i.e., groups of ranchers permitted by the USFS to graze) on USFS-managed lands within the LMNG, with a total of 433 grazing allotments (i.e., designated grazing areas) (USFS 2001, USFS 2017). Of these, members of the Medora and McKenzie County Grazing Associations hold 15 allotments spanning a total of 57,626.7 acres on private and USFS-managed lands that are located immediately adjacent to the project corridor. Allotments include fencing and may contain stock ponds and/or cattle passes to move livestock under a roadway.

5.8.3. How would public lands be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A there would be no direct impact on public lands, as no roadway construction would occur. However, visitors, employees, and other users of the TRNP—North Unit and LMNG would continue to experience US Highway 85 in its current, two-lane form. As discussed in **Section 5.6. Social**, the travelling public would continue to experience high traffic volumes that are projected to increase, as well as a LOS that is projected to be deficient by 2040.

The two-lane corridor would continue to lack opportunities for passing and turn lanes. In particular, US Highway 85 would continue to lack a northbound left-turn lane for travelers accessing the TRNP—North Unit. Access points would remain unconsolidated and offset, such as the offset access points associated with the northern entrance to the Summit Campground access road. There would continue to be no pedestrian or bicyclist facilities along the project corridor. Over-height vehicle collisions with the Long X Bridge would continue to present a safety hazard for the travelling public and necessitate detours. The potential for crashes would remain unchanged. Wildlife crossings would not be incorporated into US Highway 85 on or adjacent to public lands.

5.8.4. How would Theodore Roosevelt National Park be directly and indirectly affected by operation and construction of the project?

During the public scoping process, 29 percent (44 out of 153) of public commenters addressed public lands (i.e., the TRNP and/or LMNG) and/or the Badlands. One of the most common comments received from the public was in regard to expanding US Highway 85 through the Badlands to four lanes (i.e., divided, four-lane section with a flush median). Several members of the public expressed concern with the wilderness experience in the Badlands and TRNP—North Unit (e.g., solitude, serenity, quietness, landscape) being diminished. The commenters expressed opposition to the roadway expansion, stating that the wildlife and recreation/tourism opportunities would be adversely impacted from traffic lights and noise, increased air pollution, and visual intrusions. A few members of the public stated that the range of reasonable alternatives for roadway expansion through the Badlands was lacking, and that other alternatives (e.g., bypass around the TRNP, smaller roadway expansion) should be assessed. Some members of the public were in favor of the roadway expansion through the Badlands, stating that it would decrease safety risks for the traveling public and address truck traffic.

U.S. HIGHWAY 85

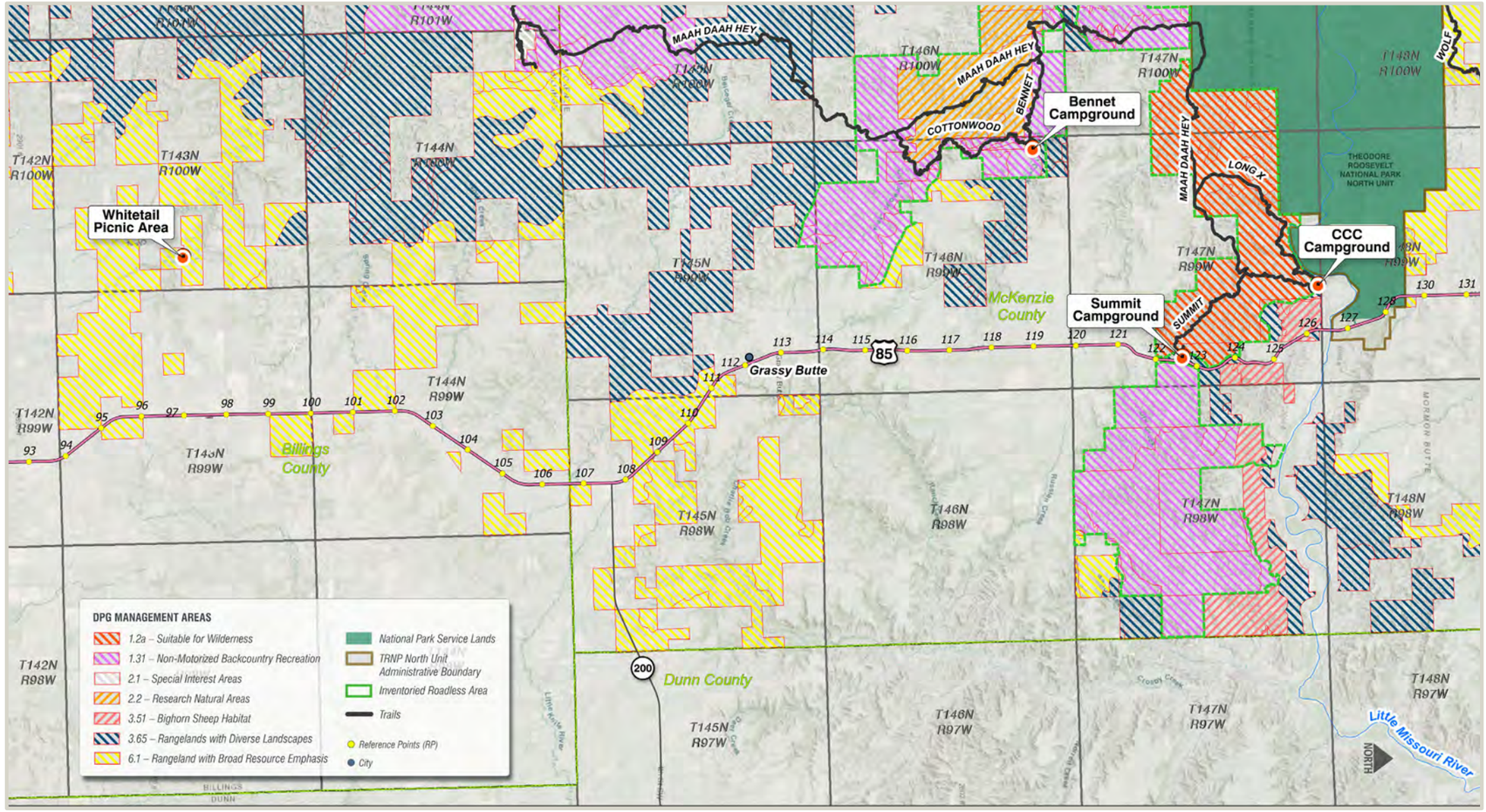


Figure 65, DPG MAs and Associated Recreational Opportunities

In response to public comments, the roadway footprint through the Badlands segment of the project corridor was reduced to the maximum extent practicable. Design modifications in the Badlands area include a 20-foot-wide flush median typical section that narrows down to 12 feet north of the Little Missouri River, retaining walls, modified ditch and back slope sections, and reduced speed limits have all been incorporated. Several other concepts through the Badlands were considered in addition to design modification in response to public comments, such as retaining a two-lane highway through the Badlands and several alignments that would avoid the TRNP–North Unit. A two-lane roadway was eliminated, as it would not meet the purpose of, and need for, the project (e.g., improved four-lane highway system linkage and increasing capacity to accommodate traffic volumes). The TRNP–North Unit avoidance alternatives were eliminated for several reasons, including disturbance of pristine Badland areas, indirect access to the TRNP–North Unit, and impacts on important bighorn sheep habitat.

Prior to construction, the NDDOT would need to expand ROW and easements to accommodate the expanded roadway footprint and construction activities. A new Highway Easement Deed from the NPS would be required for the project; however, due to the incorporation of design modifications, the new Deed associated with this project would encompass the same area as the existing Deed. An additional 0.2 acres would be included in the new Highway Easement Deed to account for a recent landslide repair project (unrelated to the proposed action identified in this EIS) that was previously authorized under a Special-Use Permit. The new Deed would include language for the construction, operation, and maintenance of the expanded roadway

In addition to the new Highway Easement Deed, a Special-Use Permit from the NPS would be required for construction of the Horseshoe Bend landslide stabilization. Additional temporary impacts on NPS-managed lands that would not require an easement or permit would result from the in-kind replacement of approximately 1 mile of existing NPS fencing that would be impacted by construction activities, and installation of wildlife jump-outs along existing NPS fence. For more detailed land acquisition information, please refer to **Section 5.2. Land Use**.

Due to public and agency concerns raised with regard to the wilderness experience in the Badlands and TRNP–North Unit, additional noise and visual analyses were conducted in the Badlands area. A System for the Prediction of Acoustic Detectability (SPreAD) analysis was conducted to supplement the standard noise analysis required by the FHWA (i.e., Traffic Noise Model [TNM] 2.5 noise pursuant to 23 CFR 772). While 23 CFR 772 requires the identification of noise impacts, consideration of noise abatement, and construction of feasible and reasonable noise abatement for humans, the SPreAD analysis assesses how sound would propagate in the Badlands area.

The project corridor currently experiences noise caused by vehicles, including heavy trucks that utilize US Highway 85. Future traffic volumes along the project corridor are projected to increase at the same rate with or without implementation of the project. Therefore, the project is not anticipated to result in noise impacts. As identified in the Noise Report (2017) (i.e., TNM 2.5 results) for the project (**appended by reference**), none of the modeled receptors associated with the project are predicted to have traffic noise impacts, as none of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA Noise Abatement Criteria (NAC), and none of the modeled receptors would have an increase of 15 A-weighted decibel (dBA) from existing conditions (i.e., substantial increase).

Visitors to the TRNP–North Unit may experience noise impacts during construction that could detract from the wilderness experience that many visitors desire. In particular, pile driving associated with the Long X Bridge would create temporary noise impacts that would vary in degree based on location and daily atmospheric conditions. As identified in the SPreAD Memorandum for the Badlands Area (2017) for the project (**appended by reference**), noise propagation from the point sound sources positioned along the roadway in the Badlands area is largely influenced by topography and elevation. The noise from the point sound sources is predicted to travel farther in flat areas or areas with elevation lower than the point sound sources. In addition, the noise doesn't typically spread beyond where it encounters areas of higher elevation or other topographic changes that block or reduce noise. Depending on terrain and sound frequency, sound from point sources is predicted to spread between approximately 500 feet and 0.75 miles from the roadway; spreading farther near the Little Missouri River area, in flatter terrain. For the wilderness area of the TRNP–North Unit, based on the 'worst-case scenario' methodology, sound emitted from the point sound sources (at various frequencies) would only influence the far eastern border of the wilderness area. Higher noise levels (above 44.9 Z-weighted decibels [dBZ]) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway). For more detailed noise information, please refer to **Section 5.12. Noise**.

The new roadway would permanently alter visual resources along the project corridor in the vicinity of the TRNP–North Unit by expanding the roadway to four lanes (including slope modification), constructing a new bridge over the Little Missouri River, potential alteration or removal of the existing Long X Bridge, addition of wildlife fencing, shifting the park entry sign, and installing retaining walls and an anchored drilled shaft structure. Please refer to **Figure 66, Project Components near the TRNP–North Unit**. The severity of these impacts is subjective, depending on the perspective and perception of the observer/user. These impacts would be concentrated around US Highway 85 and would dissipate with distance from the roadway, and are not anticipated to diminish the visual quality of the TRNP–North Unit for park users or diminish visitors' experience. For more detailed visual information, please refer to **Section 5.17. Visual**.

Visitors to the TRNP–North Unit may experience visual impacts during construction that could detract from the wilderness experience that many visitors desire. Temporary visual impacts would include disturbed land, staging areas, construction materials and equipment, workers, construction lighting, and dust.

Upon completion of the project, TRNP users would experience roadway operational and safety improvements along the project corridor. The LOS along the project corridor would improve as a result of added roadway capacity. In addition, reliability of the transportation network would be improved and identified safety concerns along the project corridor would be addressed. To facilitate turning movements at the entrance to the TRNP–North Unit, a northbound left turn lane would be added to allow drivers to remove themselves from the mainline traffic before decelerating. All of these benefits would extend to TRNP users. For more detailed operational and safety improvement information, please refer to **Section 5.6. Social**.

During construction activities, visitors to the TRNP–North Unit may experience restricted access to the Little Missouri River near the Long X Bridge for pedestrians, fishing, and canoers/kayakers. While two lanes of traffic on US Highway 85 and reasonable construction access to the TRNP would be maintained during construction, reduced speed limits within construction zones may temporarily increase travel times for TRNP–North Unit visitors.

In addition to other project commitments, several commitments were developed in coordination with the NPS to minimize temporary construction impacts for the TRNP–North Unit in particular. These commitments would be refined and incorporated into the Special-Use Permit for work on NPS-managed lands. The commitments pertaining to the TRNP–North Unit lands include:

- Reasonable construction access to the TRNP–North Unit would be maintained.
- Timing of construction activities would be limited in proximity to the TRNP–North Unit. Timing restrictions would extend from RP 126 to RP 130. In this area, regular construction activities (i.e., all activities except pile driving) would be limited to 8 am to 10 pm central time (7 am to 9 pm mountain time). Pile driving activities in this area would be limited to 8 am to 7 pm central time (7 am to 6 pm mountain time). Certain construction activities may require work outside of these times. The contractor would be required to notify the NDDOT prior to working outside of the established times, and the NDDOT would notify the NPS. Should construction fall behind schedule, sustained 24-hour construction may be required. In the event that sustained 24-hour construction becomes necessary, the NDDOT would coordinate with NPS prior to commencing this schedule. Prior to developing the Special-Use Permit for temporary construction activities on NPS-managed lands, discussions would be had regarding extenuating circumstances that may necessitate 24-hour construction and additional conditions that may accompany 24-hour construction.
- Long-term, fixed lighting associated with staging areas between RP 126 and 130 would consist of downcast, shielded lighting. Lighting would not be in use 24 hours per day unless NDDOT obtains permission from the NPS for limited duration 24-hour lighting. Short-term, fixed and/or mobile lighting would not consist of downcast, shielded lighting. This lighting would be limited to the duration of construction activities, as described previously.
- Visual screening (e.g., slatted chain link fencing) would be installed prior to construction along the western- and northern-most sides of the Long X Bridge staging areas. Visual screening would be an earth-tone color.
- The TRNP–North Unit Entry Sign would be removed (intact) and reset just east of the exiting sign in accordance with a Special Provision to the Construction Specifications that would be drafted for the sign relocation.
- To reduce the potential for spreading of noxious weeds and invasive species, all construction equipment and vehicles to be used on USFS- or NPS-managed lands would be

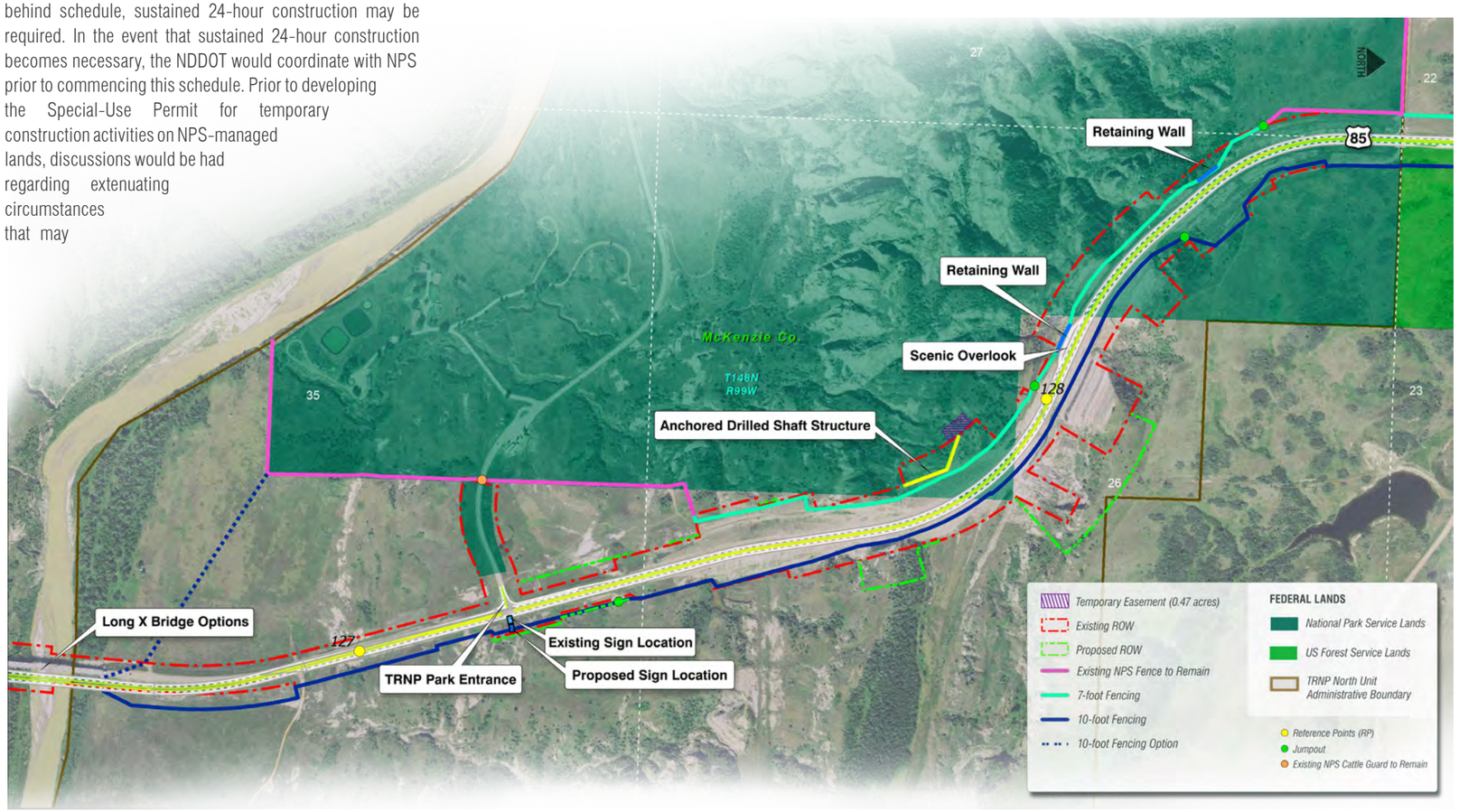


Figure 66, Project Components near the TRNP–North Unit

pressure washed and free of noxious weeds and plant propagules (i.e., seeds and vegetative parts that may sprout) prior to entrance onto the project site. This would include equipment and vehicles intended for off-road as well as on-road use, whether they are owned, leased, or borrowed by the contractor or any subcontractor. Cleaning of vehicles and equipment would occur off-site. Disturbed, non-roadway areas would be re-seeded, and a noxious weed management plan would be implemented during construction. For more detailed vegetation information, please refer to **Section 5.20. Vegetation**.

5.8.5. How would the Little Missouri National Grasslands be affected by operation and construction of the project?

Many of the aforementioned public comments pertaining to public lands and the Badlands apply to the LMNG. As such, the reduced roadway footprint, design modifications, additional concepts considered, noise and visual analyses, safety and operational improvements, and temporary construction impacts pertaining to the TRNP (see **Section 5.8.4**) are applicable to the LMNG. For more detailed operational and safety improvement, noise, and visual information, please refer to **Section 5.6. Social**, **Section 5.12. Noise**, and **Section 5.17. Visual**.

Prior to construction, the NDDOT would need to expand ROW and easements to accommodate the expanded roadway footprint and construction activities. While the roadway footprint was narrowed along the entire Badlands area where some of the USFS-managed lands along the project corridor are located, the project would still require permanent USFS easements to expand the roadway, construct the proposed wildlife underpass at RP 122.5, and install wildlife exclusionary fencing along the roadway. Roadway design plans pertaining to USFS-managed lands, including permanent erosion control measures, would be submitted to the USFS for review prior to construction and a preconstruction field review with the USFS would occur to review design plans and stipulations with the contractor and NDDOT. In addition, the contractor would remain apprised of fire danger conditions and follow applicable fire restrictions and safe fire practices, including fire stipulations for USFS-managed lands provided by the USFS in **Appendix B. Agency Correspondence**.

A majority of direct impacts on USFS-managed lands (i.e., permanent easements) would occur in MA 6.1 Rangeland with Broad Resource Emphasis, which occurs within the Rolling Prairie Geographic Area. A minor amount of direct impacts would occur in MA 3.65 Rangelands with Diverse Landscapes. The project would not directly impact MA 1.2a Suitable for Wilderness, MA 1.31 Non-motorized Backcountry Recreation, MA 3.51 Bighorn Sheep Habitat, or the Inventoried Roadless area, all of which occur within the Badlands Geographic Area. Alternative B would require more permanent USFS easement than Alternative C. Permanent USFS easements required for the Long X Bridge options would vary, but would be minimal. Please refer to **Table 14, Permanent USFS Easements per DPG Management Area**. For more detailed land acquisition and wildlife crossing information, please refer to **Section 5.2. Land Use**, and **Section 5.14. Wildlife**.

Table 14, Permanent USFS Easements per DPG Management Area

	Permanent USFS Easement Required (acres)		Total Permanent USFS Easement Required (acres)
	MA 3.65	MA 6.1	
ALTERNATIVE B			
Route without options	0.8	67.3	**68.1**
ALTERNATIVE C			
Route without options	0.8	51.6	**52.4**
Options pertaining to USFS-managed lands with Alternatives B and C			
LX-1	1.2	—	**1.2**
LX-2	3.0	—	**3.0**
LX-3	3.0	—	**3.0**

Direct and indirect impacts on MA 6.1 would occur along an existing transportation corridor characterized by existing human development; therefore, this portion of the project is anticipated to be consistent with DPG LRMP direction for the MA, Rolling Plains Geographic Area, and the DPG. Since direct and indirect impacts on MA 3.65 would occur along an existing transportation corridor, a reduced roadway footprint and flexible design options were utilized, and wildlife crossings for bighorn sheep and other wildlife have been incorporated into the project, this portion of the project is anticipated to be consistent with DPG LRMP direction for the MA, Badlands Geographic Area, and DPG. There would be no direct impacts on MA 1.2a, MA 1.31, MA 3.51, or the Inventoried Roadless Area, and indirect impacts on these areas would occur along an existing transportation corridor. Therefore, this portion of the project is anticipated to be consistent with DPG LRMP direction for the MAs, Badlands Geographic Area, and DPG.

The project would not directly impact any recreational facilities on the LMNG; however, to improve access to and from the northern entrance to the Summit Campground access road, the roadway would potentially be shifted slightly north so that it is directly across from the access point on the eastern side of US Highway 85. Visual and noise impacts from construction activities may extend to users of Summit Campground due to its proximity to US Highway 85. Temporary signage pertaining to roads, businesses, and public facilities would be installed during construction as necessary, including USFS facilities.

The project would include a system of wildlife crossings throughout the Badlands area, which is intended to improve habitat connectivity and reduce the potential for wildlife-vehicle collisions. Immediately adjacent to USFS-managed lands, two wildlife underpasses and the Long X Bridge would facilitate bighorn sheep and other wildlife movement. In addition to improving habitat connectivity for wildlife in general, fencing associated with the crossings would allow for the re-introduction of bighorn sheep northeast of the Long X Bridge. As such, wildlife habitat would be improved within the LMNG and Badlands. For more wildlife crossing information, please refer to **Section 5.14. Wildlife**.

The project would not impact oil and gas well pads on or off USFS-managed lands; however, oilfield infrastructure (e.g., pipelines, communication, and power lines) would be impacted that may service well pads. Impacted utilities would typically be relocated into the newly acquired NDDOT ROW or in a utility easement acquired by the utility company adjacent to the ROW. For more detailed utility information, please refer to **Section 5.19. Utilities**.

All 15 USFS grazing allotments adjacent to the project corridor would be impacted by the project. Alternative B would require more permanent easement/ROW in grazing allotments than Alternative C, and Alternative C would require more temporary easement/ROW in grazing allotments than Alternative B. Options LX-2 and LX-3 would require more permanent easements/ROW in a grazing allotment than Option LX-1. These impacts are not anticipated to necessitate alteration of existing allotment management plans. The Medora and McKenzie Grazing Associations would be informed of respective impacted allotments prior to construction. Please refer to **Table 15, Temporary and Permanent Easements/ROW in Grazing Allotments**.

Unless otherwise noted within this EIS, all range infrastructure (e.g., fences, gates, water developments) would remain functional during and upon completion of construction. In addition to impacted stock ponds on private land (see **Section 5.13. Water Resources**), one existing stock pond on USFS-managed lands (near RP 110.33) would be impacted. Mitigation (e.g., stock pond expansion or new stock pond creation) and/or compensation for this impact would be coordinated with the USFS and associated grazing permit holder during the final design and ROW negotiation process. Impacts on range water pipelines on or associated with USFS-managed lands would be addressed during utility coordination. For more detailed utility information, please refer to **Section 5.19. Utilities**.

Table 15, Temporary and Permanent Easements/ROW in Grazing Allotments

	Permanent Easement/ROW Required (acres)	Temporary Easement/ROW Required (acres)	Total (acres)
ALTERNATIVE B			
Route without options	128.7	4.5	**133.2**
ALTERNATIVE C			
Route without options	101.9	9.5	**111.4**
Options pertaining to grazing allotments with Alternatives B and C			
LX-1	0.5	—	**0.5**
LX-2	2.1	—	**2.1**
LX-3	2.1	—	**2.1**

No cattle passes would be impacted on or immediately adjacent to USFS-managed lands; however, one cattle pass occurring on private land within a USFS grazing allotment would be impacted. During the final design and ROW negotiation process, coordination would take place with the adjacent landowners to determine if existing cattle passes along the project corridor should be extended or removed if they are no longer in use. During construction, temporary livestock fencing would be utilized to maintain fencing connectivity around allotments as necessary, with permanent fencing installed upon completion of construction activities. Wildlife-friendly livestock fencing would be utilized in combination with wildlife underpasses to keep livestock from utilizing the underpasses, while allowing wildlife to pass through the fencing. For more detailed wildlife crossing information, please refer to **Section 5.14. Wildlife**. Apart from wildlife fencing associated with wildlife crossings, fencing installed on USFS-managed lands would meet or exceed specifications provided by the USFS in **Appendix B. Agency Correspondence**.

5.9. *Economics*

5.9.1. What are the regional economic characteristics along the project corridor?

US Highway 85 is part of the National Highway System (NHS), which is a network of roadways important to the nation's economy, defense, and mobility. In addition, US Highway 85 is classified as an Interregional System Highway, has been designated as a High Priority Corridor by the United States Congress, and is part of the Ports-to-Plains Alliance's TRE section. Goals and policies associated with these designations focus on mobility, reliability, and ability to support economic activity. Of the 105 miles of US Highway 85 between I-94 and the junction of US Highway 2 (both four-lane, east-west directional highways), the northernmost 43 miles between Williston and Watford City have been expanded from two lanes to four lanes; the project corridor constitutes the remaining 62 miles.

Currently, industries utilizing the Long X Bridge experience a vehicle clearance of 16 feet, with an allowable vehicle height of 15 feet, 8 inches. Within North Dakota, loads greater than 14 feet, 6 inches high are required to obtain a permit from the NDHP. Between June 2013 through December 2015, approximately 138,800 over-height permits were issued along major roadways in western North Dakota. The Long X Bridge clearance was inadequate for 28 percent (39,000) of permit applications. Over-height vehicles traveling along US Highway 85 are currently forced to detour around the Long X Bridge via ND-22. Since 2011, there have been seven major incidents of over-height vehicles hitting the Long X Bridge resulting in one instance of full closure for five days for analysis and repair, three instances of overnight closures of approximately two weeks each for repairs, and one planned closure to repair the most recent damage. These closures force all traffic utilizing the Long X Bridge to detour.

The economy of western North Dakota is driven by agriculture, the oil and gas industry, and tourism. Major economic centers in western North Dakota include Williston, Dickinson, Watford City, and, to a lesser extent, Belfield, with the latter two located immediately north and south of the project corridor, respectively. Along the project corridor, the communities of Fairfield and Grassy Butte generate additional economic activity, along with oil and gas development, farming, and ranching in rural areas. There are existing highway-related businesses (e.g., gas stations, motels, restaurants) located in Belfield. Two gas stations (i.e., Cenex and Conoco), Trapper's Inn Motel & Campground, and Trapper's Kettle restaurant are located immediately south of the I-94 interchange, with access points along US Highway 85. Various oilfield services are located just north of the I-94 interchange. Highway-related businesses in Fairfield include a recreational vehicle park, restaurant, and bar. The Sweet Crude Travel Center is located at the intersection of US Highway 85 and ND-200. Grassy Butte offers a gas station, two bars, and oilfield services. In Watford City highway-related businesses include gas stations; restaurants; hotels; and automotive, farm, and oilfield services.

The main agricultural commodities in Stark, Billings, and McKenzie counties include cattle, wheat and other grains, oilseeds, dry beans, and dry peas. There are more than 1,600 farms spanning over 2.6 million acres in Stark, Billings, and McKenzie counties. The total market value of agricultural commodities sold from these farms is over $300 million dollars per year (USDA 2012A).

Due to the advancement in deep Horizontal Directional Drilling (HDD) techniques in the Bakken and Three Forks formations, North Dakota entered its third oil boom in the early 2000s, which peaked in 2012 (NDIC 2015B, SHSND 2016). McKenzie, Billings, and Stark counties are among 17 counties in western North Dakota that are actively producing oil and gas (Job Service North Dakota 2017). There are 322 producing or soon to be producing oil and gas wells (i.e., active, confidential, drilling, or permitted status) in Stark County, 590 in Billings County and 4,743 in McKenzie County (NDIC 2018B). Please refer to **Figure 67, Regional Oil Wells**. Of these, 63 wells are within 0.5 miles of the project corridor. US Highway 85 is one of the arterial roadways for oil and gas activity within the region for transporting goods, equipment, and personnel.

From 2009 to 2016, annual crude oil production in North Dakota increased approximately 377 percent (from 79.7 to 380.3 million barrels per year). began to reverse in 2015, when the price per barrel of oil began falling due to a worldwide surplus in the crude oil supply (NDIC 2018A).

- From 2013 to 2014, North Dakota experienced an approximate 21 percent annual increase in oil production.
- From 2014 to 2015, there was an approximate 8.9 percent annual increase in oil production in North Dakota.
- From 2015 to 2016, North Dakota experienced an approximate 12 percent annual decrease in oil production.

This sharp decline in oil prices has impacted western North Dakota as oil companies have been forced to lay off workers and significantly cut back on development of new wells. In 2014, an average of 190 active drilling rigs were operating within the state. In 2015 and 2016, the number of active drilling rigs dropped to 91 and 35, respectively (NDIC 2018A).

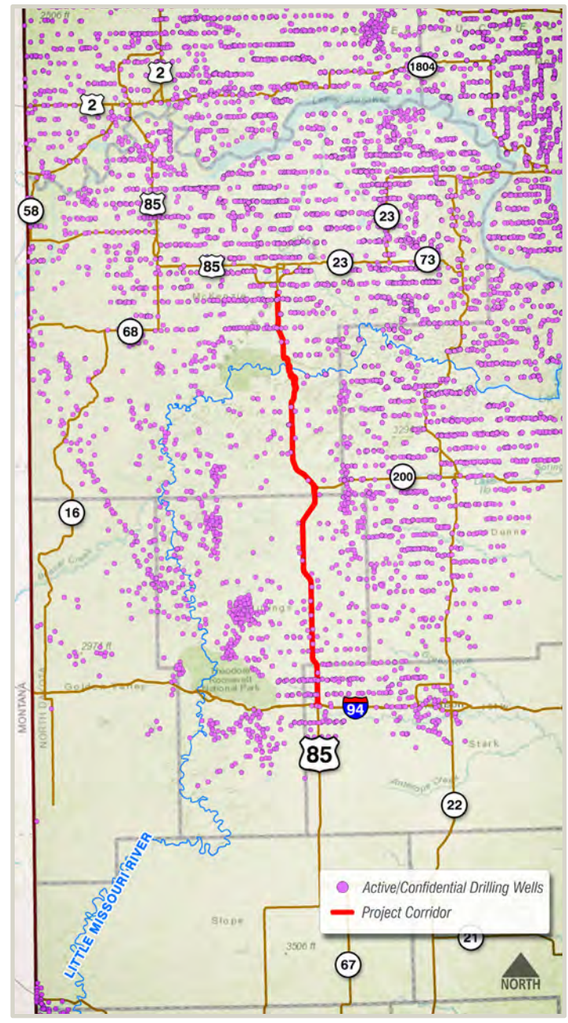


Figure 67, Regional Oil Wells

In 2017, oil production began to recover and increase as the price per barrel of oil increased. According to Short-term Energy Outlooks developed by the US Energy Information Administration (EIA), Brent spot prices averaged $53.00 per barrel in December 2016 and $64.00 per barrel in December 2017 (the highest monthly average since November 2014). Annual crude oil production in North Dakota increased approximately 3.8 percent from 2016 to 2017 (from 380.4 to 394.8 million barrels) (EIA 2017c, EIA 2018, NDIC 2017).

In 2018, oil production and the price per barrel of oil continued to increase even further than in 2017. Brent spot prices averaged $74.00 per barrel in June 2018, and the EIA forecasts Brent spot prices to average $73.00 per barrel during the second half of 2018. Between January and April 2018, there was a total of approximately 142.3 million barrels of oil produced in North Dakota, which is 15.9 percent more than what was produced between January and April 2017 (approximately 122.8 million barrels) (EIA 2018, NDIC 2018a).

More than 12,500 wells have been drilled in the region between 2009 and 2017 (NDIC 2017). These wells require a maintenance and operation workforce that will remain in the area as long as the wells remain active. According to the Department of Mineral Resources, the price point at which production from existing wells would be shut-in is 15 dollars per barrel (NDIC 2015a). Based on the level of development and population growth that has already occurred within the region, the return to pre-2009 activity levels is unlikely in the near future.

In 2013, a total of 24 million people visited North Dakota. These visitors generate 5 percent of state and local taxes each year (NDTD 2015). Tourism has been active in western North Dakota since the days of Theodore Roosevelt (i.e., the 1880s). Recreationists in western North Dakota have access to vast swaths of public lands, including TRNP and LMNG. Over 700,000 people visit the TRNP each year. Of these visitors, an average of nearly 99,000 (2012–2017) visit the TRNP – North Unit each year, the majority of whom accessed the park via the US Highway 85 project corridor. Outdoor recreational opportunities in western North Dakota include backcountry and modern camping, bicycling, canoeing/kayaking, fishing, cross-country skiing, snowshoeing, hiking, horseback riding, wildlife viewing, photography, fishing, and hunting (USFS Undated(d), NPS 2015c, NPS 2016a, NPS 2017a, NPS 2015b).

The five-year average (2011 to 2015) median household income for Stark, Billings, and McKenzie counties was $72,099, $70,469, and $72,794, respectively. These values are above the State of North Dakota's average of $57,181 (US Census Bureau 2015b). There are significantly more jobs in Stark County than in McKenzie County, and significantly more jobs in McKenzie County than Billings County. The largest employers in these counties are Mining, Quarrying, and Oil and Gas Extraction; Construction; Government and Government Enterprises; Transportation and Warehousing; and Retail Trade (BEA 2016).

5.9.2. How would the economic environment be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, the project corridor would remain a two-lane highway. As such, the anticipated benefits of the TRE (i.e., stimulation of transportation opportunities and added opportunities for economic growth) would not occur (TRE Undated), and the reliability and capacity of the congressionally designated high-priority corridor would not be improved.

The industries dependent on the project corridor would continue to experience US Highway 85 in its current, two-lane configuration. Reliability and capacity would not be improved, and the two-lane corridor would continue to lack opportunities for passing and turn lanes for all highway users. Existing height restrictions associated with the Long X Bridge would not be addressed. Over height vehicles would continue to utilize suboptimal routes to reach their destination, resulting in lost time and money. Additionally, the potential for over height vehicles striking the Long X Bridge would persist.

Businesses would not experience consolidation or modification of access points. Cattle passes would not be impacted, and there would be no change to existing highway closure options for moving livestock across US Highway 85. There would be no potential for removal of mainline traffic from traveling through Fairfield, which could result in both positive and negative economic impacts on the community.

Under Alternative A, there would be no expenditure of local, state, or federal funds for project construction. As such, the regional economy would not experience a temporary increase in construction employment opportunities and subsequent increase in payroll taxes, sales receipts, and indirect purchases of goods and services that would occur if the project were constructed.

5.9.3. How would the economic environment be directly and indirectly affected by operation and construction of the project?

Under Alternatives B and C, the project corridor would be expanded to a four-lane highway. The project would bring the TRE closer to completion and would improve the reliability and capacity of the congressionally designated high-priority corridor. The TRE is anticipated to stimulate transportation opportunities extending more than 100 miles from the corridor and add opportunities for economic growth (TRE Undated).

The project would improve the reliability and capacity of US Highway 85 for industries dependent upon the project corridor by providing a four-lane highway, including opportunities for passing and turn lanes. Options LX-1, LX-2, and LX-3 may indirectly alter travel patterns and improve reliability by relieving and/or removing height restriction constraints (i.e., detours and crash potential) associated with the Long X Bridge. This would reduce the likelihood of detours and decrease or remove the potential for collisions with the bridge. These improvements have the potential to decrease the cost of doing business as a result of less travel time and potential damage to equipment.

Access would be maintained for all businesses, although consolidation of field drive access points would likely occur. Under Alternative B, some field drive accesses may be converted to right-in/right-out (i.e., no median crossover would be provided). Final determination of access modifications would occur during final design and ROW negotiations. Some cropland and grazing land would be converted into a transportation corridor. These modifications are not anticipated to result in economic impacts on businesses.

During final design and ROW negotiations, negotiations would also occur regarding impacts on range infrastructure. Unless otherwise noted within this EIS, all range infrastructure (e.g., fences, gates, water developments) would remain functional during and upon completion of construction. Negotiations would include the extension of existing cattle passes or incorporation of new cattle passes. Currently, landowners owning parcels on both sides of the highway have the ability to coordinate with the NDHP to temporarily close the highway to traffic in order to move livestock across the highway. With the expanded roadway under Alternatives B and C, the NDHP may be less likely to close the highway to move livestock, which would force ranchers to utilize other measures for moving livestock. If additional cattle passes are requested by adjacent landowners, these requests would be considered utilizing the NDDOT Cattle Pass Consideration process (State Form Number 10155), which includes a cost/benefit analysis to determine if installation of a cattle pass is justified. If it is not justified, the adjacent landowner would typically be required to contribute funds for construction. In addition, for any fencing impacted during construction activities, temporary and/or replacement permanent fencing would be provided, as necessary. For information regarding grazing on USFS-managed lands, please refer to **Section 5.8. Public Lands**. The potential modifications of operations and contribution of funds for cattle passes may result in minor economic impacts on ranching businesses.

Three of the Fairfield options, Options FF-2, FF-3, and FF-4, would remove mainline traffic from traveling through Fairfield, while Option FF-1 would maintain mainline traffic on the exiting alignment through town. Because Option FF-1 would be similar to existing conditions, economic impacts on local businesses are anticipated to be minor. Under Options FF-2, FF-3, and FF-4, drivers travelling along US Highway 85 desiring to stop in Fairfield would be required to turn off

of mainline US Highway 85 to access the community. This could result in fewer overall stops being made in Fairfield, as the default condition would be to continue along US Highway 85 around Fairfield. Fewer stops in Fairfield may result in fewer payroll taxes, sales receipts, and the indirect purchase of goods and services at local businesses. To the contrary, a reduction in traffic volumes in the community would improve mobility within town, improve safety, and would result in a quieter overall atmosphere. These changes may have an indirect beneficial impact on the overall business environment, whereby the existing highway would function more like a 'main street' in Fairfield.

Construction of the project would result in an expenditure of local, state, and/or federal funds for project construction. Apart from the options, Alternative B would cost approximately $419 million, while Alternative C would cost approximately $389 million. The Fairfield options would add approximately $12 to $17 million, the ND-200 intersection options would add $3 to $4 million, and the Long-X Bridge options would add $35 to $40 million. In addition, the trail between McKenzie County Road 30 and McKenzie County Road 34 would add approximately $1 million, and the wildlife crossing system would add $7 million. Overall, the Preferred Alternative (i.e., Alternative B with Options FF-1, INT-2, and LX-3, including the trail and wildlife crossing system) would cost approximately $479 million. For more detailed cost information, please refer to **Section 3.4**. The regional economy would experience a temporary increase in construction employment opportunities and subsequent increase in payroll taxes, sales receipts, and indirect purchases of goods and services as a result of construction activities.

During construction, travel patterns would remain similar to existing conditions, as two lanes of traffic would be maintained and reasonable construction access to properties and roadways would be maintained. Temporary signage pertaining to roads, businesses, and public facilities would be installed during construction as necessary. Speed limits within construction zones would be reduced, which would temporarily increase travel times, and accessing businesses may require minor detours. Increased travel times may result in a temporary increase in cost of doing business during construction activities.

5.10. *Pedestrians and Bicyclists*

5.10.1. What pedestrian and bicycle facilities are available along the project corridor?

Currently, there are no pedestrian or bicycle facilities located within the study area. In the Badlands area, the USFS maintains and operates several unpaved hiking/biking trails west of US Highway 85, including the Summit Trail, Long X Trail, and Maah Daah Hey Trail. Please refer to **Figure 68, USFS Trails**. These trails can be accessed via connector roadways off of US Highway 85, including Long X Road and Forest Service Road 859 (Summit Campground Loop). In addition, US Highway 85 is the primary roadway servicing the TRNP – North Unit, which contains numerous hiking trails that are open to foot travel, and biking is permitted on all park roads.

5.10.2. How would pedestrians and bicyclists be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, pedestrian and bicyclist facilities would not be added to the corridor and current conditions would persist.

5.10.3. How would pedestrians and bicyclists be directly and indirectly affected by operation and construction of the project?

Alternatives B and C include an 8-foot-wide, paved trail located along the east side of US Highway 85 between Watford City and McKenzie County Road 34. At the northern end, the trail would connect to the Watford City trail system at McKenzie County Road 30 (in the future as planned) or a future trailhead may be developed near this intersection if a connection to the Watford City trail system isn't yet built. At the southern end, the trail would terminate at McKenzie County Road 34 where a trailhead may be constructed. There are currently no connecting trail facilities at this location; however, McKenzie County has indicated that future trail development in this area is planned.

The trail would have a total length of approximately 8.9 miles and would be open to both pedestrians and bicyclists; no motorized-vehicle or equestrian-use would be permitted. Beneficial impacts would be expected, as the trail would provide additional opportunities for pedestrians and bicyclists within the area.

None of the existing pedestrian and bicycle facilities located near the study area would be directly impacted by construction of the project. During construction, users accessing these trails via US Highway 85 could experience delay; however, reasonable construction access to Long X Road and Forest Service Road 859 would be maintained.

Pedestrians and bicyclists may also experience indirect benefits from construction of the project. As previously stated, numerous trails can be accessed via connector roadways off of US Highway 85. Improving the reliability and capacity of the highway would improve users' abilities to access these trails.

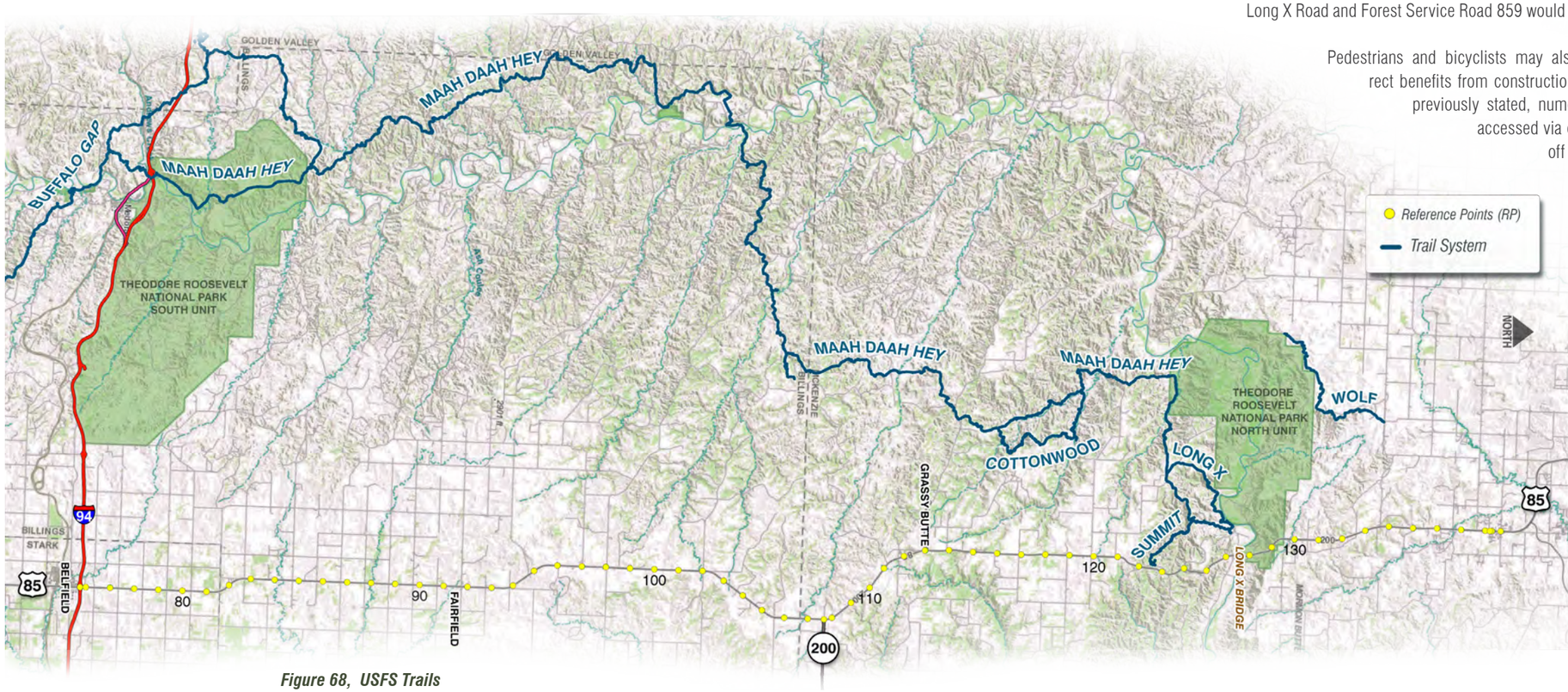


Figure 68, USFS Trails

5.11. *Air Quality*

5.11.1. What are the current air quality conditions in the study area?

The *Clean Air Act*, as amended, requires the US Environmental Protection Agency (USEPA) to establish air quality standards for pollutants considered harmful to public health and the environment by setting limits on emission levels of various types of air pollutants. The North Dakota Department of Health (NDDH) operates and maintains a network of Ambient Air Quality Monitoring (AAQM) sites throughout the state. The nearest AAQM sites to the project corridor are the TRNP–North Unit AAQM site and Painted Canyon AAQM site. The TRNP–North Unit AAQM site is located approximately 2.5 miles west-southwest of the Long X Bridge. The Painted Canyon AAQM site is located approximately 10 miles west of the US Highway 85/I-94 interchange (NDDH 2016).

Criteria pollutants tracked under the USEPA's National Ambient Air Quality Standards (NAAQS) include sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), and carbon monoxide (CO). In addition, the NDDH has established State Ambient Air Quality Standards (SAAQS) for criteria pollutants. State standards must be as stringent as, but may be more stringent than, federal standards.

Monitoring data indicate that federal and state ambient air quality standards were met at both AAQM sites located near the project in 2015 (NDDH 2016). Please refer to **Table 16, 2015 Monitoring Results for TRNP–North Unit and Painted Canyon AAQM Sites**.

The USEPA utilizes the following classifications for each of the six criteria pollutants:

- **Attainment** indicates that the air quality within an area meets the NAAQS.
- **Nonattainment** indicates that one or more criteria pollutant ambient concentrations are greater than NAAQS.
- **Maintenance** indicates that an area was previously designated nonattainment, but is now in attainment.
- **Unclassifiable** indicates that there is not enough information to appropriately classify an area, so the area is considered as being in attainment.

As of February 13, 2017, the USEPA has determined the entire state of North Dakota is in attainment for NAAQS (USEPA 2017). The NDDH has also determined that the entire state of North Dakota is in attainment for all SAAQS (NDDH 2016).

The *Clean Air Act* affords additional air quality protection near Class I areas. Class I areas include national parks greater than 6,000 acres in size, national monuments, national seashores, and federally designated wilderness areas larger than 5,000 acres designated prior to 1977. There are four Class I areas in North Dakota including the TRNP–North Unit (McKenzie County), TRNP–South Unit (Billings County), TRNP–Elkhorn Ranch Unit (Billings County), and Lostwood National Wildlife Refuge Wilderness Area (Burke County) (NDDH 2010). The nearest Class I area to the project corridor is the TRNP–North Unit. In the northern portion of the project corridor, US Highway 85 runs through the eastern portion of the TRNP–North Unit.

The NDDH implements the Prevention of Significant Deterioration Program as part of the State Implementation Plan (SIP). Visibility impairment in North Dakota's Class I areas is primarily due to sulfates, nitrates, and organic carbon. North Dakota's SIP for Regional Haze focuses primarily on controlling sources of SO_2 and nitrogen oxides (NO_x), which form sulfates and nitrates in the atmosphere. For sulfates, the contributing sources are primary point sources (i.e., localized, stationary sources), and for nitrates, the contributing sources are primary point, area, and mobile sources (e.g., vehicles, airplanes, locomotives). Organic carbon aerosols generally originate from fire (e.g., wild fire or prescribed burning) and fugitive dust sources. Most of the visibility impact in North Dakota's Class I areas is due to emissions from sources located outside the boundaries of North Dakota. Control of emissions from sources located inside the boundaries of North Dakota has only a small effect on visibility conditions in North Dakota's Class I areas. In addition, North Dakota can only require emission controls for sources within its boundaries (NDDH 2010).

Table 16, 2015 Monitoring Results for TRNP–North Unit and Painted Canyon AAQM Sites

Criteria Pollutant Monitored	TRNP–North Unit AAQM Site	Painted Canyon AAQM Site	NAAQS	SAAQS
SO_2 (1-hour)	6 ppb	5 ppb	75 ppb	0.075 ppm
NO_2 (1-hour)	12 ppb	—	100 ppb	0.1 ppm
NO_2 (Annual Average)	1.66 ppb	—	53 ppb	0.053 ppm
O_3 (8-hour)	58 ppb	58 ppb	0.070 ppm	0.075 ppm
$PM_{2.5}$ (24-hour)	18 $\mu g/m^3$	17 $\mu g/m^3$	35 $\mu g/m^3$	35 $\mu g/m^3$
$PM_{2.5}$ (3-year Average)	3.4 $\mu g/m^3$	4.9 $\mu g/m^3$	12 $\mu g/m^3$ *	12 $\mu g/m^3$ *
PM_{10} (24-hour)	57 $\mu g/m^3$	—	150 $\mu g/m^3$	150 $\mu g/m^3$

Source: NDDH 2016

Key: ppb = parts per billion; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

*Note: * To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12 $\mu g/m^3$.*

5.11.2. How is climate change currently influencing the project area?

According to *Climate Change Impacts in the United States: The Third National Climate Assessment* (Chapter 19: Great Plains) developed by the Intergovernmental Panel on Climate Change (IPCC), North Dakota's increase in annual temperature over the past 130 years is the fastest in the contiguous United States, and the number of days with temperatures over 100 degrees Fahrenheit is projected to double in the Northern Plains by 2050. These increases in extreme heat will likely lead to increases in surface water losses, heat stress, and demand for air conditioning (IPCC 2014).

The Great Plains is home to a diverse cultural, geographical, and economic population that will likely experience impacts of climate change in different ways. Remotely located populations, including indigenous Tribes and elderly residents, face greater challenges in responding to climate change because of the lack of development, public health resources, and access to other public services and communications systems. As patterns of temperature and precipitation change, the Great Plains region is expected to face increased competition for water supplies for use by homes, businesses, agriculture, and energy production. Precipitation in the winter and spring is projected to increasingly fall in the form of very heavy precipitation events, which can increase flooding and runoff that reduce water quality and cause soil erosion. Agriculture in the Great Plains region utilizes more than 80 percent of the land area. In the long-term, climate impacts are anticipated to have increasingly detrimental effects that increase variability in crop and agricultural production. Climate change may also cause a northward shift in lands used for agricultural production as temperature and water stresses rise. Climate and land use are changing simultaneously in the Great Plains and altering many ecosystems (Shafer *et al.* 2014).

The US Energy Information Administration (EIA) publishes annual estimates and projections for energy consumption for major energy end-use sectors (i.e., residential, commercial, industrial, and transportation) and the electric power sector by major fuel type/energy source. According to the EIA, since the late 1990s, the transportation sector has produced the most carbon dioxide (CO_2) emissions of all the end-use sectors, and only the transportation sector had increased emissions in 2015 (approximate 2.1 percent increase). The increase was linked to a 28 percent decrease in gasoline prices from 2014 to 2015, along with the continued economic recovery, which led to higher fuel consumption (EIA 2017b).

Greenhouse gases (GHGs) (i.e., carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], and fluorinated gases) are primarily produced by the burning of fossil fuels and through industrial and biological processes.

The following summarizes the 2015 CO_2 emissions in the United States, North Dakota, and transportation sector (EIA 2017a, EIA 2016):

United States
- Total CO_2 emissions: 5,259 million metric tons
- Transportation sector emissions: 1,863 million metric tons
  - Contributed 35 percent to total United States emissions
  - Major sources included light trucks (34 percent), cars and motorcycles (24 percent), and other trucks (23 percent)

North Dakota
- Total CO_2 emissions: 57 million metric tons
  - Contributed 1.1 percent to total United States emissions
- Transportation sector emissions: 9 million metric tons
  - Contributed 16 percent to total North Dakota emissions
  - Contributed 0.5 percent to United States transportation sector emissions

Besides contributing to changes in the climate through emissions, transportation systems can also be affected by climate change. Climate trends affect the design of transportation infrastructure. As climatic conditions shift, portions of this infrastructure are increasingly subject to climatic stresses that reduce the reliability and capacity of transportation systems. Transportation systems will likely be affected directly, through infrastructure damage, and indirectly, through changes in trade flows, agriculture, energy use, and settlement patterns (Schwartz *et al.* 2014).

The FHWA provides technical assistance to state, regional, and local transportation agencies to enhance sustainability, improve resilience, and reduce energy use and emissions on highway systems. These efforts improve project delivery, protect highway systems for the future, and reduce the cost of transportation. To address the potential threat to transportation infrastructure from extreme weather, sea level change, and changes in environmental conditions, FHWA is working with states and metropolitan areas to improve system performance, efficiency, and project delivery; expand transportation choices; reduce emissions and other environmental impacts; and establish a network of alternative fueling infrastructure (FHWA 2017).

5.11.3. How would air quality and climate change be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, emissions of criteria pollutants from vehicles traveling along the existing roadway would continue and slightly increase as traffic volumes grow, and passing and congestion increases. However, any increases in emissions of criteria pollutants along the corridor are not anticipated to result in visual impairment of any Class I areas, cause or contribute to a violation of any NAAQS or SAAQS, or expose sensitive receptors to substantially increased PM concentrations. With the federal requirements for on- and off-road engines, criteria pollutant emissions from vehicles traveling on the existing roadway are anticipated to be minor and are not expected to adversely impact North Dakota's reasonable progress goals for 2018. In addition, under Alternative A, fugitive dust emissions resulting from the construction of the roadway would not occur.

Traffic along the roadway would continue to contribute toward United States and North Dakota GHG inventories. However, emissions from the annual traffic increase would represent a minor contribution toward United States and North Dakota GHG inventories.

5.11.4. How would air quality and climate change be directly and indirectly affected by operation of the project?

The 2016 Traffic Operations Report (**appended by reference**) completed for the project indicates that traffic along this stretch of US Highway 85 is projected to grow at a rate of approximately 2.5 percent annually regardless of if the proposed project is constructed. Therefore, operation of the project is not anticipated to be a direct traffic contributor. According to the capacity analysis conducted as part of the Traffic Operations Report, expanding the existing two-lane roadway to a four-lane roadway would improve the ability for vehicles to pass and improve the reliability of US Highway 85. Following construction of the project, the LOS along the project corridor is projected to be between 'A' and 'B' by 2040.

Emissions of criteria pollutants from vehicles traveling along the project corridor would continue to occur; however, these emissions may be attenuated by eliminating the need for passing maneuvers and reducing roadway congestion. Any increases in fugitive dust or emissions of criteria pollutants associated with the annual increase in traffic along the corridor are not anticipated to result in visual impairment of any Class I areas, cause or contribute to a violation of any NAAQS or SAAQS, or expose sensitive receptors to substantially increased PM concentrations. With the federal requirements for on- and off-road engines and continued fugitive dust management practices, fugitive dust and criteria pollutant emissions from vehicles traveling on the existing roadway are anticipated to be minor and are not expected to adversely impact North Dakota's reasonable progress goals for 2018. Traffic along the roadway would also contribute toward United States and North Dakota GHG inventories. However, emissions from the annual traffic increase would represent a minor contribution toward United States and North Dakota GHG inventories.

Variations in air quality and climate change impacts between alternatives and options are anticipated to be negligible.

5.11.5. How would air quality and climate change be directly and indirectly affected by construction of the project?

Construction activities would result in short-term emissions of criteria pollutants from construction equipment and the combustion of fuels from on-road haul trucks transporting materials and construction commuter vehicles. In addition, construction activities would generate PM emissions as fugitive dust from ground-disturbing activities. Fugitive dust emissions from construction activities would be greatest during initial site-preparation activities and would vary from day to day, depending on the construction phase, level of activity, and prevailing weather conditions. Fugitive dust control measures (e.g., watering, windbreaks and barriers, vehicle access control) would be implemented as necessary during construction in accordance with the NDDOT Standards and Specifications for Road and Bridge Construction and the SWPPP.

All emissions from construction activities would be temporary in nature and would not result in visual impairment of any Class I areas. Construction activities are not anticipated to cause or contribute to a violation of any NAAQS or SAAQS or expose sensitive receptors to substantially increased pollutant concentrations. Because the state of North Dakota has been classified by the USEPA as in attainment for NAAQS and SAAQS, a General Conformity analysis would not be required.

Emissions associated with fossil fuel combustion from the operation of construction equipment, on-road haul trucks transporting materials, and construction commuter vehicles traveling to and from the work sites would represent a minor contribution toward United States and North Dakota GHG inventories. Emissions from construction activities are not anticipated to impede the United States' goal to reduce GHG emissions by 26 to 28 percent by 2025, as these emissions would be localized and temporary in nature.

Alternative B would result in more acres of ground disturbance than Alternative C; however, temporary air quality impacts are anticipated to be similar between the alternatives. In addition, significant variations in direct or indirect air quality impacts between the various options are not anticipated. Similarly, variations in direct or indirect GHG emissions between alternatives and options are anticipated to be negligible.

5.12. *Noise*

5.12.1. What is the difference between sound and noise?

Sound is vibrational disturbance capable of being detected by the ear. Sound can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Noise is unwanted sound. Noise is a subjective term, because sound levels can be perceived differently by different people. Human response to sound varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day.

Environmental noise is characterized by dBA, which best replicate how sound is received by the human ear. The human ear can barely perceive a noise level change of 3 dBA, but can readily perceive a noise level change of 5 dBA. The human ear perceives a noise level change of 10 dBA as a doubling in noise. Please refer to **Table 17, Common Indoor and Outdoor Sound Sources on page 80** for a summary of the estimated sound levels for common indoor and outdoor sounds.

The degree to which environmental noises affect humans or wildlife species depends on the ambient sound conditions, as well as an individual's auditory sensitivity. Ambient sound conditions can vary substantially by time of day, day of the week, and season. Cooling air temperatures between day and night can change the direction of sound waves' refraction and increase sound levels near the ground. This is one reason that distant sounds are more audible at night.

Determining the impact of environmental noise depends on the characteristics of the listener, as well as defining a threshold for what constitutes a disturbance. In some environments, simply having a mechanical noise that is audible may constitute a sufficient disturbance for humans. In other environments, sounds may only become disturbing if they exceed typical sound levels or occur at unusual times of day. For wildlife species, noise disturbances are typically described in terms of impacts that are likely to be biologically detrimental. Noise disturbances can cause increased stress levels or other physiological effects in individual animals, mask detection and discrimination of communication signals between animals, or reduce habitat quality for populations.

Table 17, Common Indoor and Outdoor Sound Sources

Sound Sources	Sound Level (dB)	Effect
Boom Cars	145	–
Jet Engines (near)	140	–
Shotgun Firing; Jet Engine (100 to 200 feet)	130	–
Rock Concerts	110–140	Threshold of pain begins around 125 dB
Discotheque/Boom Box; Thunderclap (near)	120	Threshold of sensation begins around 120 dB
Stereos (more than 100 watts)	110–125	
Symphony Orchestra; Chainsaw; Jackhammer	110	Regular exposure to sound over 100 dB longer than 1 minute risks permanent hearing loss
Snowmobile	105	
Jet Flyover (1,000 feet)	103	
Electric Furnace Area; Garbage Truck; Cement Mixer	100	No more than 15 minutes of unprotected exposure recommended for sounds between 90 and 100 dB
Farm Tractor	98	
Newspaper Press	97	
Subway; Motorcycle (25 feet)	88	Very annoying
Lawnmower; Food Blender	85–90	85 dB is the level at which hearing damage (8 hours) begins
Recreational Vehicles; Television	70–90	
Diesel Truck (40 mph, 50 feet)	84	–
Average City Traffic; Garbage Disposal	80	Annoying; interferes with conversation; constant exposure may cause damage
Washing Machine	78	–
Dishwasher	75	–
Vacuum Cleaner; Hair Dryer	70	Intrusive; interferes with telephone conversation
Normal Conversation	50–65	Comfortable hearing levels are under 60 dB
Quiet Office	50–60	
Refrigerator Humming	40	–
Whisper; Broadcasting Studio	30	Very quiet
Rustling Leaves	20	Just Audible
Normal Breathing	10	–

Key: dB = decibel

Source: NIH 2010

5.12.2. How was noise analyzed for the project?

Traffic noise along the project corridor (particularly in the Badlands segment) has been identified as a major concern amongst the public and agencies. In addition, the NPS has stated that there is significant traffic noise emanating from the existing Long X Bridge.

Traffic Noise Analysis. A traffic noise analysis, using FHWA TNM 2.5, was conducted for the project in accordance with the Procedure for Abatement of Highway Traffic Noise and Construction Noise (23 CFR § 772), FHWA Highway Traffic Noise Analysis and Abatement Policy Guidance (FHWA 2010), and NDDOT Noise Policy and Guidance (NDDOT 2011). The purpose of the noise analysis was to (1) determine the existing and projected future traffic noise levels for the no-build alternative (i.e., Alternative A) and (2) determine the projected future traffic noise levels for the two primary build alternatives (i.e., Alternatives B and C) and their options.

Noise Abatement Criteria are objective absolute noise levels for varying land use categories that are used to determine if and where traffic noise impacts occur. Residential buildings have an NAC of 67 dBA. This is the lowest assigned NAC occurring within the project corridor.

SPreAD Analysis. Two SPreAD analyses were conducted for the project: a traffic SPreAD analysis and pile driving SPreAD analysis. The traffic SPreAD analysis was conducted to supplement TNM 2.5, but is not a standard requirement for the FHWA or NDDOT. The purpose of the traffic SPreAD analysis was to assess how sound (i.e., traffic) propagates in the Badlands area and potentially influences wildlife. In addition, numerous public comments were received during the public scoping process regarding potential noise impacts on the TRNP – North Unit and surrounding Badlands resulting from construction of the proposed bridge. Therefore, the pile driving SPreAD analysis was conducted to assess how sound (i.e., temporary pile driving activities) propagates from the Long X Bridge construction area in the Badlands.

Quiet Pavement Assessment. A quiet pavement assessment was completed and memorandum was developed for the project. The purpose of the quiet pavement assessment was to review possible methods to reduce traffic noise.

The Noise Report (2017), two SPreAD Memorandums (2017 and 2018), and Quiet Pavement Memorandum (2017) (**appended by reference**) are summarized in the following subsections.

5.12.3. Traffic Noise Analysis (TNM 2.5)

5.12.3.1. What were the results of the traffic noise modeling?

The results of the existing and future (2040) traffic noise modeling conducted for Alternative A (no-build) and future (2040) traffic noise modeling for Alternatives B and C and their options are provided as follows.

The NAC for residential facilities, campgrounds, cemeteries, parks, historical markers, and DPG MAs is 67 dBA. The NAC for restaurants, bars, and motels is 72 dBA.

Existing No-Build Model

- The highest traffic noise level recorded at receptor locations along the project corridor was 65.2 dBA.
- None of the modeled receptors have existing noise levels that approach, meet, or exceed their assigned FHWA NAC.

Future (2040) No-Build Model

- The highest traffic noise level predicted at receptor locations along the project corridor is 66.0 dBA.
- None of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC.
- None of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase).

Future (2040) Build Model

- With exception to Fairfield and the ND-200/US Highway 85 intersection, the highest traffic noise levels predicted at receptor locations along the project corridor is 65.7 dBA.
  - » None of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC.
  - » None of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase).
- In Fairfield, with Options FF-1, FF-2, FF-3, and FF-4, the highest traffic noise levels predicted at receptor locations along the project corridor is 66.6 dBA. The receptor location with predicted traffic noise levels at 66.6 dBA falls under Activity Category E, which has an FHWA NAC of 72 dBA. The highest traffic noise levels predicted at the remaining receptor locations is 65.7.
  - » None of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC (i.e., Activity B/C = 67 dBA and Activity E = 72 dBA).
  - » None of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase).
- At the ND-200/US Highway 85 intersection, with Options INT-1 and INT-2, the highest traffic noise levels predicted at receptor locations along the project corridor is 63.6 dBA.
  - » None of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC.
  - » None of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase).

5.12.4. SPreAD Analysis

5.12.4.1. What is SPreAD and how is it different than TNM 2.5?

SPreAD models how sound propagates in forested or other natural ecosystems, and incorporates wind and atmospheric effects, ground and vegetation effects, and sound source characteristics (Reed et al. 2010). SPreAD is different than TNM 2.5 in that it illustrates how sound spreads/travels from designated points that are assigned a continuous decibel level. Meaning, the sound being emitted from the designated points is constant. SPreAD does not estimate noise impacts from existing roadways or proposed future roadways like TNM 2.5; rather, it uses an assigned decibel level (typically higher than what would be expected under future conditions) for point sound sources positioned along a roadway. SPreAD also assigns a decibel level to what would be considered the ambient noise environment; this is typically lower than the average noise level in the existing environment.

SPreAD illustrates that the sound coming from the point sound sources spreads/travels out until it dissipates to the point where the sound level reaches the ambient level. Using a higher decibel level for the point sound sources and a lower decibel level for the ambient noise environment allows the model to spread the sound further, which provides a worst-case scenario estimate of sound propagation.

Unlike typical traffic noise analyses, the SPreAD analysis calculates the movement of sound (at different frequency levels) through the surrounding environment in Z-weighting, expressed as dBZ. Z-weighting calculates the sound levels for all frequencies (Gracey &

Associates Undated). This is especially important for predicting the impacts of noise on wildlife, because animal species vary in their acoustic sensitivity to different frequencies.

5.12.4.2. What are the results of the traffic SPreAD analysis?

Results of the traffic SPreAD analysis are provided in **Appendix D. SPreAD Analysis,** beginning on **page D-3**. The calculated existing equivalent sound level (L_{eq}) for Site Numbers 2 through 11 and predicted spread of sound for each of the frequencies considered (i.e., 400 hertz [Hz] to 2 kilohertz [kHz]) are summarized in **Table 18, Results of Traffic SPreAD Analysis**.

5.12.4.3. What are the results of the pile driving SPreAD analysis?

Results of the pile driving SPreAD analysis are provided in **Appendix D. SPreAD Analysis,** beginning on **page D-13**. The calculated existing L_{eq} for Site Numbers 4 through 11 and predicted spread of sound for each of the frequencies considered (i.e., 400 Hz to 2 kHz) are summarized in **Table 19, Results of Long X Bridge Pile Driving SPreAD Analysis**.

5.12.5. Quiet Pavement Assessment

During the preliminary engineering phase of the project, quiet pavements were assessed to evaluate whether or not they would reduce traffic noise more than standard pavements. Quiet pavements are typically asphalt or concrete pavements that use a combination of the following principles to reduce noise (FHWA 2007):

- Texture: having a negative low texture reduces noise.
- Porosity: higher porosity can absorb noise in the voids (i.e., roadway surface openings) and reduce the contact area. Porosity values greater than 20 percent are especially effective at reducing traffic noise.
- Stiffness: a lower stiffness reduces the noise, since the pavement would be approaching the stiffness properties of the tire.

Results of the quiet pavement assessment indicate that quiet pavements have the benefit of noticeably reducing traffic noise when they are first installed; however, the noise-reducing properties of many of the existing quiet pavements reduce with time as the voids fill in. In some cases, noise levels from quiet pavements are similar to those of a standard pavement within only a few years of installation.

The increased voids in quiet pavements would cause durability issues with the freeze-thaw cycles in North Dakota and lead to a shorter pavement life than a dense, graded, asphalt pavement. Also, the standard maintenance practices with chip sealing and applying sand/salt during the winter would cause the voids to be filled. An additional concern with many of the porous-quiet asphalts is that more deicing chemicals and salt mixtures may be needed to prevent ice from forming on the road, since the increased surface area of the quiet pavements cause the roadway to cool and form ice faster than a standard pavement.

In addition, many vehicles in North Dakota use chains and studded tires during the winter, which would reduce the noise reducing capabilities of the pavements.

Next Generation Concrete Surface uses an innovative grinding technique that is similar to conventional diamond grinding. However, instead of just grinding grooves parallel to the centerline, it will also flatten the areas between the grooves to give a more uniform surface. The grooves are typically spaced farther apart than conventional diamond grinding. Next Generation Concrete Surface treatments on concrete pavements have shown initial noise reduction, but are also prone to losing noise reducing capabilities as the pavement wears. The NDDOT has implemented a similar grinding technique on new concrete bridge deck construction.

Table 18, Results of Traffic SPreAD Analysis

Hz/kHz	Existing L_{eq} (dBZ)	Description of Area of Noise Influence
400 Hz	31.0 to 44.5	Area of noise influence ends between approximately 500 feet and 0.25 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound level (below 35 dB). There are very few, small pockets of higher noise levels (above 44.9 dBZ) constrained to immediate roadway area (i.e., within approximately 500 feet from roadway).
500 Hz	29.4 to 43.5	Area of noise influence ends between approximately 500 feet and 0.5 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). A few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway area (i.e., less than 500 feet from roadway) and a larger portion of higher noise levels is constrained to immediate Little Missouri River area (i.e., approximately 0.25 miles from roadway).
630 Hz	27.8 to 44.0	Area of noise influence ends between approximately 500 feet and 0.75 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). A few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway area (i.e., less than 500 feet from roadway) and a larger portion of higher noise levels is constrained to immediate Little Missouri River area (i.e., less than 0.25 miles from roadway).
800 Hz	26.4 to 44.2	Area of noise influence ends between approximately 500 feet and 0.75 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). A few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway area (i.e., less than 500 feet from roadway) and a larger portion of higher noise levels is constrained to immediate Little Missouri River area (i.e., approximately 0.25 miles from roadway).
1 kHz	25.9 to 43.4	Area of noise influence ends between approximately 500 feet and 0.5 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). Very few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway area (i.e., less than 500 feet from roadway) and a portion of higher noise levels is constrained to immediate Little Missouri River area (i.e., less than 0.25 miles from roadway).
1.25 kHz	20.3 to 41.2	Area of noise influence ends between approximately 500 feet and 0.5 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). Very few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway and Little Missouri River area (i.e., less than 500 feet from roadway).
1.6 kHz	25.9 to 37.7	Area of noise influence ends between approximately 500 feet and 0.5 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). Very few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway and Little Missouri River area (i.e., less than 500 feet from roadway).
2 kHz	26.0 to 33.5	Area of noise influence ends between approximately 500 feet and 0.25 miles from roadway, depending on topography and elevation. After that point, sound conditions fall below the ambient sound levels (below 35 dB). Very few, small pockets of higher noise levels (above 44.9 dBZ) are constrained to immediate roadway and Little Missouri River area (i.e., less than 500 feet from roadway).

Table 19, Results of Long X Bridge Pile Driving SPreAD Analysis

Hertz/ Kilohertz	Existing L_{eq} (Site No. 4-11)	Description of Area of Noise Influence
400 Hz	31.0 to 44.5 dBZ	The area of noise influence ends between approximately 0.25 and 1.5 miles from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) travel farther in flatter terrain, nearest to the Little Missouri River. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
500 Hz	29.4 to 43.5 dBZ	The area of noise influence ends between approximately 0.25 and 1.25 miles from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) travel farther in flatter terrain, nearest to the Little Missouri River. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
630 Hz	27.8 to 44.0 dBZ	The area of noise influence ends between approximately 500 feet and 1.25 miles from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) travel farther in flatter terrain, nearest to the Little Missouri River. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
800 Hz	26.4 to 44.1 dBZ	The area of noise influence ends between approximately 250 feet and 1.25 miles from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) travel farther in flatter terrain, nearest to the Little Missouri River. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
1 kHz	25.9 to 43.2 dBZ	
1.25 kHz	20.3 to 40.1 dBZ	The area of noise influence ends between approximately 250 feet and 1 mile from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) travel farther in flatter terrain, nearest to the Little Missouri River. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
1.6 kHz	25.9 to 36.4 dBZ	The area of noise influence ends between approximately 250 feet and 1 mile from the point sound source, depending on terrain and elevation. Higher noise levels (i.e., above 44.9 dB) are primarily isolated to the Little Missouri River area, where the terrain is flatter. Higher terrain/geographical features act as sound barriers in several locations, where the sound conditions fall below the ambient sound level (below 35 dB).
2 kHz	27.2 to 33.5 dBZ	

5.12.6. What direct and indirect noise impacts would occur if US Highway 85 is not expanded?

Under Alternative A, there would be no change from the current noise environment, and no additional impacts, beyond what is currently being experienced on the ambient noise environment.

Based on the results from the TNM no-build scenario, none of the modeled receptors associated with Alternative A are predicted to have traffic noise impacts, as none of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC, and none of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase).

5.12.7. What direct and indirect noise impacts would occur as a result of project operation?

Based on the results from the TNM build scenario, none of the modeled receptors associated with Alternative B or C or their options are predicted to have traffic noise impacts, as none of the modeled receptors would have noise levels that approach, meet, or exceed their assigned FHWA NAC, and none of the modeled receptors would have a 15-dBA increase from existing conditions (i.e., substantial increase). As part of Options LX-1, LX-2, and LX-3, the NDDOT would implement a grinding technique (similar to Next Generation Concrete Surface treatments) on the new bridge to minimize noise.

Findings of the SPreAD analysis suggests that noise propagation from the point sound sources positioned along the roadway in the Badlands area is largely influenced by topography and elevation. The noise from the point sound sources is predicted to travel farther in flat areas or areas with elevation lower than the point sound sources. In addition, the noise doesn't typically spread beyond where it encounters areas of higher elevation or other topographic changes that block or reduce noise.

Frequencies with the furthest spread of sound from the point sound sources are 630 and 800 Hz. At these frequencies, sound is predicted to spread between approximately 500 feet and 0.75 miles from the roadway; spreading farther near the Little Missouri River area, in flatter terrain. Higher noise levels (above 44.9 dBZ) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway) and Little Missouri River area (i.e., approximately 0.25 miles from the roadway).

Frequencies with the least spread of sound from point sound sources are 400 Hz and 2 kHz. At these lower- and upper-range frequencies, sound is predicted to spread between approximately 500 feet and 0.25 miles from the roadway; spreading farther near the Little Missouri River area, in flatter terrain. Higher noise levels (above 44.9 dBZ) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway).

For the wilderness area of the TRNP—North Unit, based on the worst-case scenario methodology, sound emitted from the point sound sources (at various frequencies) would only influence the far eastern border of the wilderness area. Higher noise levels (above 44.9 dBZ) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway).

5.12.8. What direct and indirect noise impacts would occur as a result of project construction?

Noise from construction activities associated with Alternatives B and C and their options would vary depending on the type of equipment used, the area that the action would occur in and the distance from the noise source. Temporary impacts on the noise environment would be expected during construction activities associated with Alternatives B and C and their options. The noise emanating from construction equipment would be localized, short-term, and intermittent during machinery operations. Heavy construction equipment would be operated periodically during construction; therefore, noise levels from the equipment would fluctuate throughout the day (and night should 24-hour construction occur).

In general, the most constant noise source during construction is from engine noise. Mobile equipment generally operates intermittently or in cycles of operation, while stationary equipment (e.g., generators, compressors) generally operates at fairly constant sound levels. Trucks would likely be present during most phases of construction, but would not likely be confined to the project site; therefore, noise from trucks could result in greater impacts than noise from other construction equipment. Other common construction noise sources would include impact equipment, which could be pneumatic, hydraulic, or electric powered.

Temporary pile driving activities are anticipated to occur during construction of Options LX-1, LX-2, and LX-3 in the Badlands area. Pile driving hammers generate noise when the hammer strikes the pile (i.e., blows). For Options LX-1, LX-2, and LX-3, the bridge superstructure would consist of either steel plate girders or prestressed concrete I-girders. **Table 20, Long X Bridge Pile Driving Activities** provides a summary of the pile driving activities that could occur for the Long X Bridge options. Option LX-1 would require the least amount of piles, blows, and days of pile driving compared to Options LX-2 and LX-3, which would require the same amount of piles, blows, and days of pile driving. Utilizing a steel superstructure would require less piles, blows, and days of pile driving as compared to a prestressed concrete I-girder superstructure design.

Table 20, Long X Bridge Pile Driving Activities

Option	Number of Piles	Total Blows	Total Days of Pile Driving*
STEEL PLATE GIRDER SUPERSTRUCTURE			
Option LX-1	88	86,160	**10**
Option LX-2	132	129,240	**14**
Option LX-3	132	129,240	**14**
PRESTRESSED CONCRETE I-GIRDER SUPERSTRUCTURE			
Option LX-1	92	89,700	**10**
Option LX-2	144	139,860	**15**
Option LX-3	144	139,860	**15**

*Note: *Total number of days of pile driving is approximated.*

Results of the SPreAD analysis for the Long X Bridge pile driving activities indicate that for the majority of the frequencies assessed, the area of noise influence ends approximately 1.25 miles from the pile driving activities, depending on the terrain and elevation. Higher noise levels (i.e., above 44.9 dB) are primarily isolated to the flatter areas (i.e., Little Missouri River area). The noise doesn't typically spread beyond where it encounters areas of higher elevation or other topographic changes that block or reduce noise.

Noise from construction activities near the TRNP—North Unit would be minimized by implementing timing restrictions. Please refer to **Section 5.8.4** for details.

5.13. *Water Resources*

5.13.1. What water resources are located along the project corridor?

Surface water resources located along and adjacent to the project corridor include rivers, creeks, wetlands, and artificial stock ponds. Larger named waterbodies include the Little Missouri River, South Branch of the Green River, and Spring Creek. The Little Missouri River is listed on the Nationwide Rivers Inventory (NRI) and is designated by the State of North Dakota as a State Scenic River. NRI river segments are potential candidates for inclusion on the National Wild and Scenic River System. The *Little Missouri State Scenic River Act* provides for the preservation of the Little Missouri River, as nearly as possible, in its present state, which means that the river will be maintained in a free-flowing natural condition without impoundment, diversion, straightening, or other modification of the waterway. The US Geological Survey (USGS), in cooperation with the North Dakota State Water Commission (NDSWC), operates a streamgage on the existing Long X Bridge that provides information utilized for management of the Little Missouri River under the *Little Missouri State Scenic River Act*. The streamgage consists of a gage house on the wing wall, radar on the bridge rail and bubbler by the bridge pier. Please refer to **Figure 69, Streamgage Gage House**.

All surface water resources present within the project study area were identified and delineated in conjunction with a field aquatic resource delineation completed for the project. During the field aquatic resource delineation, a total of 429 wetlands (164.08 acres) and six areas of Other Waters (13.55 acres) were identified within the study area. Wetlands included basins, slope wetlands, ditches, stock ponds, sedimentation ponds, dammed areas, and riverine floodplains. Some

Figure 69, Streamgage Gage House

of these wetlands are isolated, while others occur as complexes. Their functions include water storage, groundwater recharge, trapping sediments, filtering water, and/or providing habitat. Other Waters include portions of rivers and unnamed tributaries. A Field Wetland Delineation Report (2016) was completed for the project and is **appended by reference**.

Floodplains, as identified by the Federal Emergency Management Agency (FEMA) in Flood Insurance Rate Maps (FIRMs), are limited along the project corridor, with the only mapped floodplain occurring approximately 6 miles north of Belfield. Please refer to **Figure 70, FEMA FIRM**. In contrast, floodplains, as defined in terms of river morphology, are present throughout the project corridor in association with the numerous named and unnamed rivers, streams, and creeks that bisect US Highway 85.

According to the NDSWC, one shallow groundwater aquifer (i.e., Little Missouri River Aquifer) is located within the project study area (NDSWC 2017). Please refer to **Figure 71, Shallow Groundwater Aquifers on page 84**. The Little Missouri River Aquifer is classified as a glaciofluvial aquifer. Glaciofluvial aquifers form through the deposition of sand and gravels from glacial melt water. As the name implies, this aquifer is associated with the Little Missouri River and is recharged primarily by precipitation and inflow from adjoining bedrock. Generally speaking, it is a long and narrow aquifer (approximately 40 miles long by three-fourths of a mile wide) with a maximum recorded thickness of 176 feet (Croft 1985). Geotechnical investigations completed for the project identified the top elevation of the aquifer as occurring within 20 feet of the ground surface near the Little Missouri River.

In addition, there are a total of 40 groundwater wells located within the project study area, the majority of which are classified as domestic (NDSWC 2017).

5.13.2. How would water resources be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A (no-build), no direct or indirect impacts on water resources would be expected. No wetland mitigation sites would be constructed in conjunction with Alternative A.

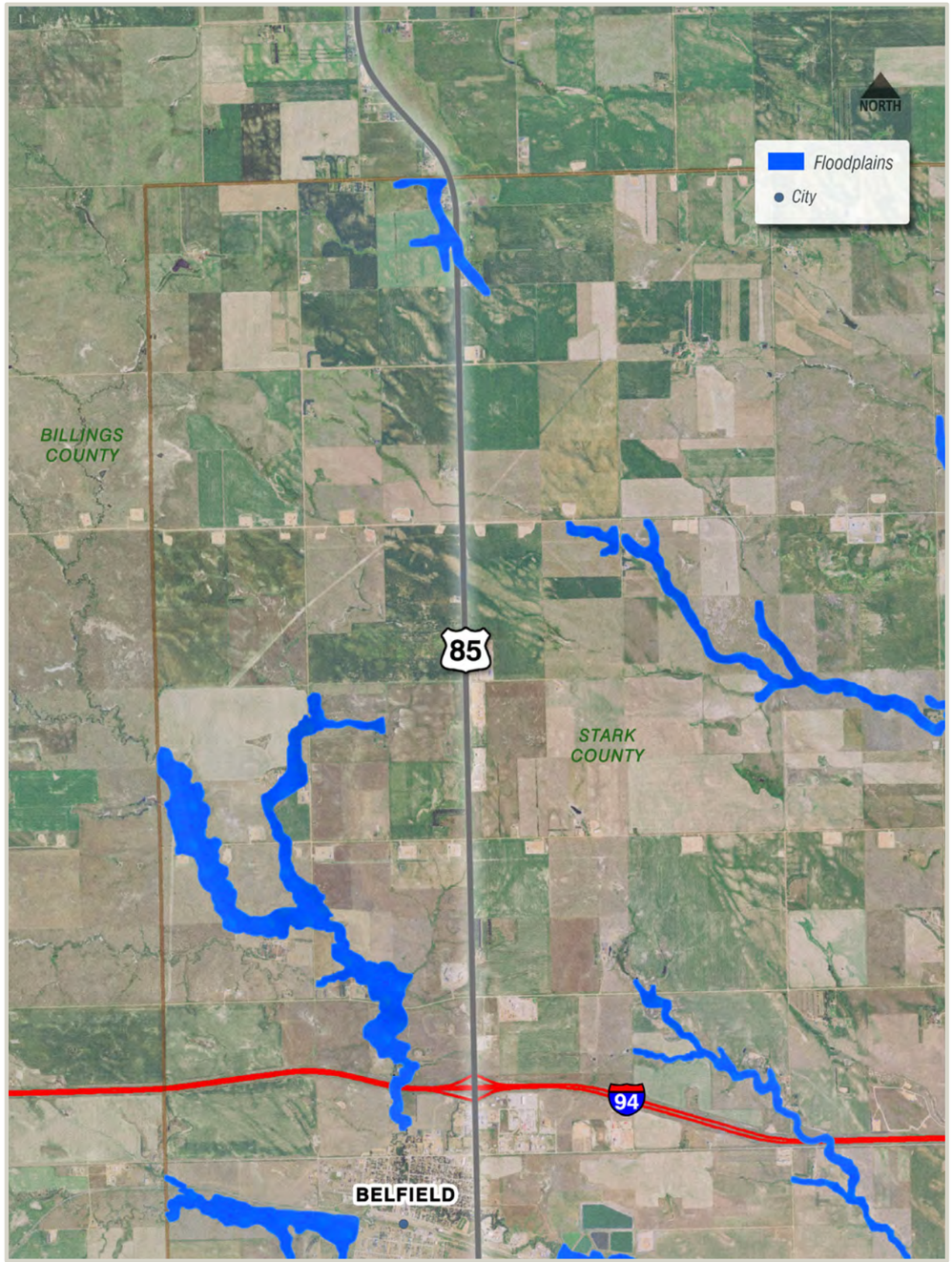


Figure 70, FEMA FIRM

5.13.3. How would rivers listed on the NRI and designated State Scenic Rivers be directly and indirectly affected by operation and construction of the project?

The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more 'outstandingly remarkable' natural or cultural values judged to be at least regionally significant. In order to be listed on the NRI, a river must be free-flowing and possess one or more Outstandingly Remarkable Values (i.e., scenic, recreational, geologic, fish, wildlife, cultural, historic, and other similar value) (NPS 2017c, NPS 2016b).

Approximately 231 miles of the Little Missouri River, from the southern boundary of the Little Missouri National Grasslands near Marmarth, North Dakota, to the confluence with Lake Sakakawea (omitting the entire river segment within the TRNP–North, South, and Elkhorn Ranch units) was listed on the NRI in 1982 (updated in 1993). The river possesses the following Outstandingly Remarkable Values: scenic, cultural, and historic (NPS 2017c). The CEQ, under 5(d)(1) *Wild and Scenic River Act* authority, provides guidance to federal agencies with permitting and/or granting authority for projects on or near rivers listed on the NRI. In accordance with the Presidential memorandum dated August 2, 1979, all agencies must "take care to avoid or mitigate adverse effects" to rivers identified in the NRI (NPS 2018).

The NRI is overseen by the NPS, who has developed a consultation process for projects potentially affecting rivers listed on the NRI. On December 4, 2018, formal consultation with the NPS was initiated regarding the portion of the Little Missouri River listed on the NRI within the project corridor. Based on the studies and analysis completed for the project, the FHWA and NDDOT believe that construction and operation of the Preferred Alternative would not result in the loss or depreciation of the Little Missouri River's outstandingly remarkable cultural or historic value. While construction of the project is anticipated to result in temporary impacts on the outstandingly remarkable scenic value of the river, these impacts have been minimized via the incorporation of construction commitments such that the outstandingly remarkable scenic value of the Little Missouri River would be maintained following project construction. The NPS issued a response letter on December 21, 2018. This letter included an appreciation for avoidance and minimization measures that have been incorporated into the project and provided recommendations to further reduce impacts on the Little Missouri River. An NRI Consultation Package was prepared for the project in 2019 (**appended by reference**) to document the NRI consultation.

U.S. HIGHWAY 85

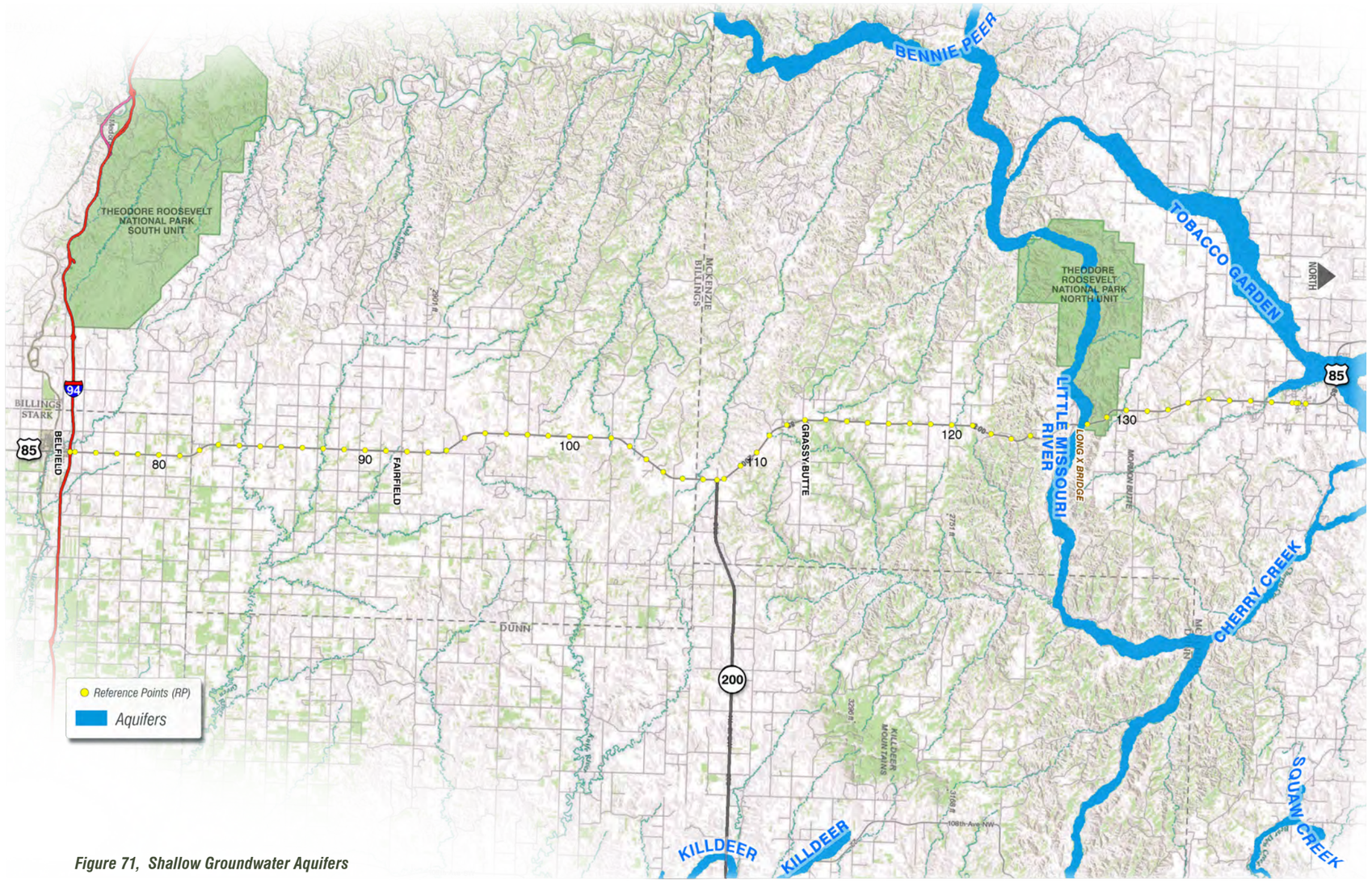


Figure 71, Shallow Groundwater Aquifers

The Little Missouri River is North Dakota's only designated State Scenic River. This designation is established in NDCC 61-29, also known as the *Little Missouri State Scenic River Act*. The Act contains provisions for management of the river and establishes an advisory group known as the Little Missouri River Commission.

The commission is composed of the director of the North Dakota Parks and Recreation Department (NDPRD), state health officer of the NDDH, and chief engineer of the NDSWC (or their designated representatives) and one member from McKenzie, Billings, Slope, Golden Valley, Dunn, and Bowman counties. The duties of the commission are to "advise local or other units of government to afford the protection adequate to maintain the scenic, historic, and recreational qualities of the Little Missouri River and its tributary streams."

During the initial scoping phase of the project, attempts were made to consult with the Little Missouri River Commission regarding the project. Through this effort, it was concluded that the commission had not meet since August of 2007. In June of 2017, Governor Burgum initiated the process of reinstating the Little Missouri River Commission and asked appropriate counties to reestablish membership. A meeting of this reestablished commission was held on August 9, 2017. At this meeting, the NDDOT gave a presentation on the project and answered questions. A second meeting was held on October 11, 2017, at which NDDOT provided updates on the project and answered questions. A third meeting was held on June 5, 2018, at which the NDDOT gave a presentation discussing the Preferred Alternative for the project, including Option LX-3, staging areas, and environmental impacts and commitments. At the conclusion of the presentation and corresponding discussion, Chair Schettler asked the commissioners if they wanted to provide any comments regarding the bridge. Secretary Baker indicated the direction would be for the commission to provide a motion to provide a comment if so desired; no motion or comment was made.

In accordance with the *Little Missouri State Scenic River Act*, channelization, reservoir construction, dredging, or diversion (except for agricultural, recreational, or temporary uses) of the Little Missouri River or its tributary streams is prohibited; however, diking and riprapping for bank erosion-control is permitted. The project would directly impact the Little Missouri River through the construction of a new bridge. The bridge, regardless of the selected option, would result in the placement of two bridge piers within the river channel. In addition, rock riprap would be installed at these pier locations to prevent scouring. The riprap would be buried below the channel bottom to minimize impacts on the river channel.

During construction, temporary impacts on the river could include the following:

- Installation of a temporary bridge, causeway, or bypass
- Installation of cofferdams or earthen ring dikes at pier locations
- Excavation within cofferdams or ring dikes
- Dewatering of cofferdams or ring dikes
- Pile driving at pier locations

All temporary materials placed in the river would be removed upon completion of construction.

In addition to construction of a new bridge structure, under Option LX-3, the existing Long X Bridge would be removed (i.e., demolished

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or adopted). The methodology for removal would be determined by the contractor (with prior approval of a demolition plan by the NDDOT); however, it is anticipated that shaped charges would be used to drop the superstructure into the river. All components would then be removed and disposed of.

A shaped charge is an explosive device that directionally focuses its energy release.

Regardless of the selected alternative or options, operation and construction of the project is not anticipated to violate any provisions of the *Little Missouri State Scenic River Act*.

The streamgage located on the Long X Bridge would continue to be operational during construction activities. Under Option LX-3, the streamgage would need to be relocated to the new bridge prior to removal of the existing Long X Bridge. Coordination with the USGS and NDSWC would occur during final design to incorporate necessary design features into the plan set and/or contract provisions for the relocation.

5.13.4. How would wetlands and Other Waters be directly and indirectly affected by operation and construction of the project?

Alternatives B and C and their options would result in temporary and permanent impacts on wetlands and Other Waters. Permanent direct impacts on wetlands would be expected primarily from the placement of fill in conjunction with the roadway expansion. As such, permanent wetland impacts were calculated based on preliminary engineering construction limits. Temporary impacts on wetlands would be associated with non-permanent fill placement and other construction activities occurring within the roadway ROW or any temporary construction easements. Therefore, wetlands within the proposed ROW or temporary easements that were not permanently impacted were considered temporarily impacted. Please refer to **Table 21, Impacts on Wetlands, Table 22, Impacts on Other Waters,** and **Table 23, Permanent Wetland Impacts by Wetland Type**. Please refer to **Appendix F. Wetlands and Other Waters** for detailed impact tables and maps.

The project could also result in indirect impacts on wetlands and Other Waters, such as changes in hydrology, water quality, and/or habitat quality. Indirect impacts would be minimized by maintaining existing drainage patterns with culverts, BMPs, re-seeding disturbed areas, and a noxious weed management plan. For details regarding water quality and vegetation, please refer to **Sections 5.13.7** and **5.20**, respectively.

Table 21, Impacts on Wetlands

	Impacts (acres)		Required Mitigation (acres)	
	Temporary	Permanent	USACE	EO 11990*
ROADWAY ALTERNATIVES				
Alternative B	21.82	26.85	13.10	6.32
Alternative C	20.58	19.00	9.01	3.03
On-Alignment Fairfield Option				
Option FF-1	0.06	0.75	—	0.01
Fairfield Bypass Options				
Option FF-2 with Alternative B	0.03	0.79	—	0.05
Option FF-2 with Alternative C	0.01	0.81	—	0.07
Option FF-3 with Alternative B	0.05	0.11	—	0.11
Option FF-3 with Alternative C	0.04	0.09	—	0.09
Option FF-4 with Alternative B	0.06	0.06	—	0.06
Option FF-4 with Alternative C	0.14	0.12	—	0.12
ND-200/US Highway 85 Intersection Options				
Option INT-1 with Alternative B	0.05	0.02	—	—
Option INT-1 with Alternative C	0.05	0.02	—	—
Option INT-2 with Alternative B	0.04	0.03	—	—
Option INT-2 with Alternative C	0.04	0.03	—	—
Long X Bridge Options				
Option LX-1	1.13	—	—	—
Option LX-2	1.13	—	—	—
Option LX-3	1.13	—	—	—

*Note: *Reflects required mitigation not already accounted for in USACE-required mitigation column.*

Table 22, Impacts on Other Waters

	Temporary Impact (linear feet)				Permanent Other Water Impacts (linear feet)			
	South Branch of the Green River	Spring Creek	Little Missouri River	Unnamed Tributary	South Branch of the Green River	Spring Creek	Little Missouri River	Unnamed Tributary
ROADWAY ALTERNATIVES								
Alternative B	49	248	—	2,639	270	182	—	—
Alternative C	92	248	—	2,639	212	182	—	—
Long X Bridge Options								
Option LX-1	—	—	305	—	—	—	78	—
Option LX-2	—	—	305	—	—	—	121	—
Option LX-3	—	—	305	—	—	—	121	—

Table 23, Permanent Wetland Impacts by Wetland Type

	Permanent Wetland Impacts by Wetland Type (acres)					
	Basin	Ditch	Fringe	Preamble	Slope	Riverine
ROADWAY ALTERNATIVES						
Alternative B	5.06	8.93	—	2.38	10.37	0.11
Alternative C	1.16	10.09	—	1.24	6.42	0.09
On-Alignment Fairfield Option						
Option FF-1	0.01	0.74	—	—	—	—
Fairfield Bypass Options						
Option FF-2 with Alternative B	0.05	0.74	—	—	—	—
Option FF-2 with Alternative C	0.07	0.74	—	—	—	—
Option FF-3 with Alternative B	0.11	—	—	—	—	—
Option FF-3 with Alternative C	0.09	—	—	—	—	—
Option FF-4 with Alternative B	0.06	—	—	—	—	—
Option FF-4 with Alternative C	0.12	—	—	—	—	—
ND-200/US Highway 85 Intersection Options						
Option INT-1 with Alternative B	—	0.02	—	—	—	—
Option INT-1 with Alternative C	—	0.02	—	—	—	—
Option INT-2 with Alternative B	—	0.03	—	—	—	—
Option INT-2 with Alternative c	—	0.03	—	—	—	—
Long X Bridge Options						
Option LX-1	—	—	—	—	—	—
Option LX-2	—	—	—	—	—	—
Option LX-3	—	—	—	—	—	—

Alternatives B and C would permanently impact 26.85 and 19.00 acres of wetlands, respectively. These impacts account for the majority of the project corridor, with minor additional impacts from the various options. Alternatives B and C would require wetland mitigation per US Army Corps of Engineers (USACE) Section 404 regulations, as well as EO 11990. Wetland mitigation per Section 404 regulations is required for permanent impacts to jurisdictional wetlands that exceed 0.10 acres per wetland, while mitigation per EO 11990 is required for permanent impacts to natural wetlands. As such, Alternative B would require compensation for a total of 19.42 acres, and Alternative C would require compensation for a total of 12.04 acres.

Section 404 of the *Clean Water Act* regulates discharges of dredged or fill materials into waters of the United States.

EO 11990 is intended to minimize impacts on wetlands and preserve their beneficial values. During project development, federal agencies must consider ways to avoid and minimize impacts on wetlands.

Impacts on wetlands from Options FF-1, FF-2, FF-3, and FF-4 would vary depending on the selected option and associated roadway alternative. Option FF-2 would result in the greatest total permanent impacts on wetlands. The Fairfield options would not require mitigation per USACE Section 404 regulations; however, they would require mitigation per EO 11990. Mitigation requirements would be similar for all of the Fairfield options.

Options INT-1 and INT-2 would each result in minor permanent and temporary wetland impacts with no mitigation required for either option. Options LX-1, LX-2, and LX-3 would result in comparable temporary impacts on wetlands as a result of construction activities, with no mitigation required for any of the options.

Other Waters mitigation per Section 404 regulations is required for permanent impacts to jurisdictional Other Waters that exceed 300 linear feet per Other Waters. Impacts on Other Waters would vary slightly based on the selected roadway alternative and Long X Bridge option; however, no mitigation would be required for impacts on Other Waters under any of the alternatives or options. Direct impacts on wetlands and Other Waters have been minimized to the extent practicable. Within the Badlands segment of the project corridor, retaining walls have been included in the project design in order to eliminate the need for large fill slopes that would have otherwise impacted several wetlands and drainages. During final design, impacts would be refined, and additional avoidance and minimization measures would be analyzed. Unavoidable permanent impacts would be mitigated for in accordance with EO 11990 and Section 404. Wetland mitigation is anticipated to be accomplished through the creation of wetland mitigation site(s) and/or mitigated at a wetland mitigation bank. Mitigation would be determined during final design and permitting. Temporarily impacted wetlands would be restored following project completion.

The project would be constructed and permitted in segments as funding becomes available. It is anticipated that the majority of these segments would be permitted under Nationwide Section 404 permits; however, based on preliminary design, several wetlands under the jurisdiction of the USACE may have permanent wetland impacts that trigger the need for an individual Section 404 permit. Before an individual Section 404 permit can be issued, analysis and comparison of alternatives in accordance with Section 404(b)(1) of the *Clean Water Act* is required. Guidelines for the implementation of Section 404(b)(1) are found in 40 CFR 230.10(a) and state "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." This requirement is often referred to as the Least Environmentally Damaging Practicable Alternative. A Section 404(b)(1) analysis has been prepared by the USACE for the project and is included in **Appendix F. Wetlands and Other Waters**. The Section 404(b)(1) analysis concluded that Alternative B is the Least Environmentally Damaging Practicable Alternative.

Any borrow sites, waste sites, gravel source locations, and staging areas identified by the contractor (i.e., not included in this EIS) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental approval on these sites to comply with all federal and state laws and regulations, including those that govern the protection of wetlands. These sites would not be permitted on any federal or public lands.

5.13.5. How would floodplains identified on FEMA FIRMs be directly and indirectly affected by operation and construction of the project?

Alternatives B and C would directly impact one area of mapped floodplain located within the project study area. The area of mapped floodplain is located in Stark County and is mapped as a Zone A floodplain.

Zone A floodplains are areas subject to inundation by a 100-year flood for which no base flood elevations have been determined.

Alternatives B and C would result in the placement of fill within the identified floodplain boundary; however, the project is anticipated to be in accordance with the National Flood Insurance Program. A floodplain development permit would be acquired from the Stark County Floodplain Administrator prior to any construction occurring with the identified floodplain.

Indirect impacts on areas of mapped floodplains are not anticipated for either alternative. In addition, none of the Fairfield, ND-200/US Highway 85 intersection, or Long X Bridge options would directly or indirectly impact mapped floodplains.

5.13.6. How would riverine floodplains and riparian corridors be directly and indirectly affected by operation and construction of the project?

Impacts on riverine floodplains and riparian corridors from Alternatives B and C are anticipated to be minor. The majority of the project would follow the existing US Highway 85 alignment, with exception to the Fairfield bypass options, none of which would directly or indirectly impact riverine floodplains or riparian corridors. The remainder of the project corridor bisects numerous named and unnamed rivers and creeks. Floodplains and riparian corridors associated with these rivers and creeks are confined to the immediate area and are generally less than 100 feet wide.

Alternatives B and C would eliminate portions of these floodplains and riparian corridors due to culvert construction/extension. The total length of culvert construction/extension would vary between alternatives at most locations, with Alternative B requiring longer culverts than Alternative C. A hydraulic analysis would be completed for each water crossing within the corridor to confirm proper sizing of the culverts. The hydraulic analysis would ensure that culvert construction/extension would not have associated indirect upstream or downstream impacts and that project-related impacts on floodplains and riparian corridors would be limited to the immediate project footprint.

US Highway 85 currently crosses Spring Creek and the South Branch of the Green River via single-span bridge structures. The hydraulic analysis completed for these waterbodies recommended replacing these structures with box culverts as opposed to bridges. Compared to bridge structures, box culverts would have a larger footprint within the channel. To minimize direct and indirect impacts on these aquatic resources, the box culverts would be buried 1-foot below the channel bottom to allow for the establishment of natural substrate. During the use of any causeway or bypass within riparian areas, water flow would be maintained by installing temporary culverts or by leaving part of the channel open.

Options LX-1, LX-2, and LX-3 would result in the construction of a new bridge structure over the Little Missouri River. All three options would be designed to match the bridge deck elevation of the existing bridge, but would be approximately 180 feet shorter in length. From a hydraulic standpoint, the existing bridge opening, as well as the bridge openings for all three proposed options, is sufficiently sized to handle all predicted flow volumes.

The existing bridge is a three-span structure, with one pier located in the river channel and one pier located along the southern side of the river channel within the riparian corridor. Option LX-1 would include constructing a new two-lane bridge, while Options LX-2 and LX-3 would include constructing a new four-lane bridge. Regardless of the selected bridge option, the new bridge would be a five-span structure, with a consistent pier spacing between all three options. Please refer to **Figure 72, Pier Spacing on page 87**.

The spacing of the four piers would consist of two piers located in the river channel, one on the northern bank, and one on the southern bank. The piers located on the northern and southern banks would be located within the riparian corridor and subject to inundation during a 25-year flood event.

All of the piers associated with Options LX-1, LX-2, and LX-3 would be 5 feet wide (perpendicular to the flow of the river). The total length of the piers would vary based on the selected option. The dimensions and total footprint of the piers within the river channel/riparian corridor are provided in **Table 24, Summary of Pier Dimensions and Footprints**.

Table 24, Summary of Pier Dimensions and Footprints

Option	Pier Dimensions (feet)	Number of Piers Within River Channel/Riparian Corridor	Total Area of Impact (acres)
LX-1	5 x 42.5	4	**0.02**
LX-2	5 x 85	4	**0.04**
LX-3	5 x 85	4	**0.04**

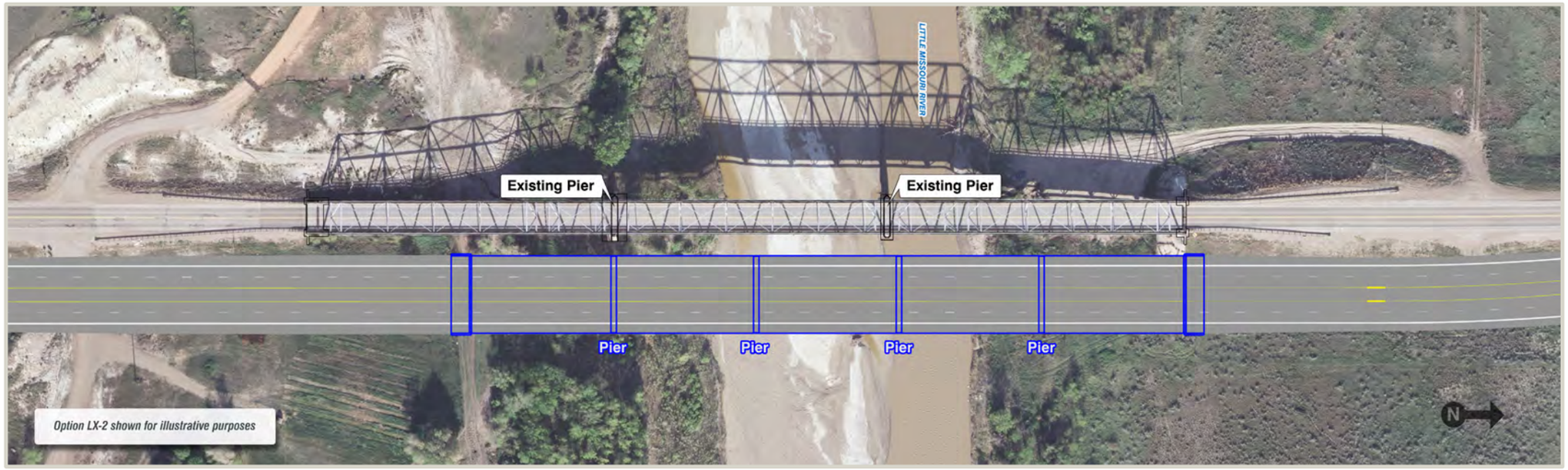


Figure 72, Pier Spacing

During construction, tree and vegetation removal, as well as the presence of construction personnel, equipment, and vehicles, would likely impair the ecological function of the riparian corridor by deterring wildlife presence and removing ground-stabilizing vegetation. The majority of these impacts would be temporary in nature and minimized through the use of BMPs.

Long-term impacts would be expected from construction of the additional bridge piers associated with the new bridge. As previously mentioned, the new bridge structure would have a total of four piers located within the river channel and associated riparian corridor. Each pier would have riprap placed at its base to act as scour protection. The riprap would be buried below the ground surface elevation to minimize impacts on the riparian corridor and river channel. The presence of additional piers within the riparian corridor could temporarily affect use of the corridor by wildlife; however, it is anticipated that wildlife would become accustomed to the new structure and long-term avoidance would not occur. The presence of additional piers may temporarily alter stream velocities, flow patterns, and river morphology until the river adjusts to these changes.

Under Options LX-1 and LX-2, the existing Long X Bridge would remain in-place upon project completion. The hydraulic analysis completed for these two options indicate upstream water elevations would increase by approximately 0.13 feet (1.6 inches) during a 25-year flood event, 0.15 feet (1.8 inches) during a 50-year flood event, and 0.20 feet (2 inches) during a 100-year flood event. With regard to the ecology and morphology of the river system, this change in flood elevation would have negligible direct and indirect impacts.

Approximately 0.15 miles upstream (i.e., west) of the Long X Bridge, on the northern side of the river, there is a series of unoccupied structures, including a log building with stucco exterior, a wood-framed dwelling, a shed, and other small structures. These structures are currently subject to minor inundation at the 25-year flood event and major inundation at the 100-year flood event. According to the Hydraulic Analysis and Structure Selection Report (2017) prepared for the Long X Bridge options (**appended by reference**), Options LX-1 and LX-2 would increase the frequency and scope of flooding-related impacts on these structures; however, the impacts of these increases are anticipated to be minor due to the current dilapidated state of the structures and projected stage increase of 2 inches or less. Option LX-3 is not anticipated to affect water levels during flood events. Pursuant to NDAC 89-14, when a bridge is constructed or replaced, it cannot be constructed in a manner that increases the likelihood of impacts due to flooding of upstream buildings and structures. However, the NDDOT may deviate from the code when deemed appropriate in coordination with the affected landowner(s).

5.13.7. How would water quality be directly and indirectly affected by operation and construction of the project?

Water quality monitoring within the state of North Dakota is primarily the responsibility of the NDDH. The NDDH maintains a system of water quality monitoring stations on numerous lakes, rivers, and streams throughout the state. One of these monitoring stations (station ID: 380059) is located on the Long X Bridge for monitoring the water quality of the Little Missouri River. The *Clean Water Act* requires states to report on the quality of their water and develop a list of water quality-limited waters needing total maximum daily loads (TMDLs) established for particular pollutants. North Dakota has developed a two-tiered priority ranking (i.e., high priority and low priority). Assessment units listed as high priority include waterbodies for which TMDLs are scheduled to be completed and submitted to the USEPA by the end of 2018. Assessment units listed as low priority do not have a specified timeline for development of TMDLs, but the NDDH will be working with USEPA to develop a method of prioritization (NDDH 2017).

TMDL is the maximum amount of a pollutant a waterbody can receive while still meeting water quality standards

Two assessment units for the Little Missouri River are located within the project study area, with US Highway 85 serving as the dividing line between the two. Both of these assessment units are listed as high priority for TMDL establishment for the bacteria *Escherichia coli* (commonly referred to as E-coli) (NDDH 2017). Bacterial contamination within waterbodies, particularity within rural areas, is typically associated with livestock (Wolfson and Harrigan 2010). Western North Dakota agriculture, especially along the Little Missouri River Valley, is dominated by cattle ranching, which is likely the primary contributing source of current E-coli levels within the Little Missouri River. Operation and construction of the project is not anticipated to contribute to these levels. No other NDDH water quality monitoring stations are located within or near the project study area.

Construction activities would have the potential to temporarily degrade water quality as a result of sedimentation and soil erosion during construction activities (e.g., roadway expansion, culvert installation, bridge removal, bridge construction) within and adjacent to the Little Missouri River, South Branch of the Green River, Spring Creek, and wetlands within or adjacent to the study area. An increase in turbidity of surface waters due to sedimentation and bridge construction activities could be damaging to aquatic life since it may block light transmission, slow biochemical and natural purification processes, and suffocate fish eggs and aquatic organisms. Several types of construction equipment and vehicles (e.g., earth-moving equipment, dump trucks, concrete trucks, cranes) would be used during construction, and associated fuels and lubricants for the equipment would be stored in staging areas. Fuel and oil from this equipment could spill or leak into project area surface waters or groundwater.

Temporary bridges and/or causeways may be installed in the Little Missouri River in conjunction with construction and removal operations. Construction of these structures may result in a temporary increase in turbidity. Additionally, turbidity may also be temporarily increased during the temporary bridge/causeway removal process. Dewatering activities would occur during construction of the new bridge and could possibly occur during the construction of a temporary bridge to isolate the work area from the water column. BMPs would be implemented during dewatering activities to minimize impacts to aquatic resources.

A Section 401 Water Quality Certification would be obtained from the NDDH Division of Water Quality to ensure that state and federal *Clean Water Act* laws are being enforced. The certification would require a multi-disciplinary approach to achieve solutions and is essential for protection of water quality and enhancement of aquatic ecological health. Additionally, if the contractor would impound, divert, or withdraw water for industrial use, a permit from the NDSWC would be obtained.

Inclusion of BMPs into the design of the project would reduce water quality impacts to negligible levels. The contractor would be required to obtain an NDPDES permit from the NDDH prior to commencement of construction. As part of the NDPDES permit, the contractor must have a plan for erosion- and sediment-control pre- and post-construction that reflects the BMPs discussed in the following paragraph. In addition, waste material would be disposed of in accordance with

state and federal laws, in a manner that avoids impacts on the river channel and associated riparian areas.

As part of the BMPs, the NDDOT would require the construction contractor to develop a SWPPP that would locate secure and contained refueling areas away from surface waters and implement maintenance and monitoring measures to reduce the potential for spills and leaks. The NDDOT would require the construction contractor to minimize the amount of stockpiled material and locate stockpiles away from surface waters. Disturbed soils in construction areas and borrow sites have heightened erosion concerns, which could lead to sedimentation and turbidity issues in local waters. To mitigate erosion concerns associated with the project, the following BMPs could be implemented to intercept and minimize stormwater runoff and thus protect surface waters: mulching, matting, and netting; filter fabric fencing; sediment traps and ponds; or surface water interceptor swales and ditches. Long-term water quality impacts would not be expected if BMPs are properly implemented, monitored, and maintained during construction. However, even with BMPs, some short-term, minor water quality impacts from erosion and sedimentation would be possible.

Sandblasting and painting for Options LX-1 and LX-2 would include full containment of the bridge during sandblasting to facilitate collection, removal, and disposal of the existing paint and sandblasting materials. Containment would remain in-place during the application of the new paint system. Sandblasting and painting are not anticipated to result in water quality impacts.

As a part of Option LX-3, the existing Long X Bridge (deck and piers) would be removed (i.e., demolished or adopted). Prior to commencement of demolition activities, a removal plan would be submitted by the contractor to the NDDOT for review and approval. Removal activities would not commence until approval of the demolition plan has been received from the NDDOT. All portions of the existing bridge that extend above the river bottom would be removed and disposed of at an approved facility. Debris and water used during concrete sawing would be prevented from falling into the river to the extent practicable. All piers would be removed to a depth of 1-foot below the river bottom, and no debris (with the exception of cuttings and other fine particles) would be allowed to remain in the river channel. Temporary water quality impacts would occur during the removal process; however, these impacts are anticipated to be minor.

5.13.8. How would groundwater wells and shallow groundwater aquifers be directly and indirectly affected by operation and construction of the project?

None of the groundwater wells located within the project study area would be directly or indirectly affected by Alternative B or C or their options. Pile driving activities associated with Options LX-1, LX-2, and LX-3 would result in the placement of piles within the Little Missouri River Aquifer; however, these piles are not anticipated to adversely impact the use, quality, or function of the aquifer.

5.13.9. How would stock ponds be directly and indirectly affected by operation and construction of the project?

A total of 30 excavated and/or impounded stock ponds were identified within the project study area. Stock ponds located along the project corridor are most commonly used as a means of providing drinking water for livestock. Construction of the project would potentially impact eight of the identified stock ponds under Alternative B and six under Alternative C. None of the options would result in impacts on stock ponds.

Impacts on existing stock ponds would be coordinated with affected landowners during the final design and ROW negotiations process. One of the stock ponds that would be impacted by Alternatives B and C is located on USFS-managed lands. Impacts on this stock pond would be coordinated with the USFS and associated grazing permit holder; mitigation and/or compensation for impacts would also be determined. Potential mitigation could include expanding existing stock ponds or creating new stock ponds at an adjacent location. Permitting may be required for such actions depending upon the nature and location of the mitigation. Coordination with the USACE would be required if the proposed activity involves jurisdictional waterbodies. Additionally, if the proposed activity involves the diversion or impoundment of 12.5 acre-feet or more of water, a permit from the NDSWC would be required.

5.14. *Wildlife*

Several field surveys were conducted in 2015 and 2016 to determine baseline wildlife and habitat conditions along the project corridor. All of the following reports were used in development of this section and are **appended by reference**:

- For ESA-listed wildlife and Critical Habitat, the NDDOT, in cooperation with the FHWA, has developed a Programmatic Biological Assessment (PBA) to analyze the impacts of the NDDOT transportation program on ESA-listed species in North Dakota. A PBA Project Submittal Package has been completed for the project. Please refer to **Appendix B. Agency Correspondence**, for the letter from PBA Project Approval form and Northern Long-eared Bat 4(d) Rule Streamlined Consultation Form.
- The BE (2017) includes the findings of botany and wildlife surveys on USFS-managed lands, and discusses the potential impacts of the project on raptors, ESA-listed wildlife species and associated Critical Habitat, USFS-designated sensitive wildlife species, and USFS-designated Management Indicator Species (MIS). Please refer to **Appendix B. Agency Correspondence**, for the letter from the USFS concurring with the findings of the BE.
- The Dakota Skipper Field Botany Survey (2017) documents areas of suitable habitat (i.e., particular plant species) for the Dakota skipper, a butterfly protected by the ESA, along the project corridor occurring in McKenzie County, which is the only county along the corridor where the Dakota skipper is thought to occur.
- The Northern Long-eared Bat Habitat Assessment & Acoustic Survey Plan (2016) and Northern Long-eared Bat Summer Acoustic Survey Results Report (2016) identify suitable habitat for the northern long-eared bat, a species project by the ESA, as well as the presence or absence of the species within suitable habitat along the project corridor.
- The Eagle and Raptor Aerial Nest Survey Report (2016) documents the presence of active and inactive potential bald and golden eagle and raptor nests along the project corridor.
- The Field Wetland Delineation Report (2016) identifies aquatic habitat occurring along the project corridor.
- The Tree Survey Memorandum (2017) documents naturally occurring tree and shrub habitat within drainages and riparian corridors along the entire project corridor.
- Wildlife Crossing/Accommodation Volume I—Need and Feasibility Assessment (2017), and Wildlife Crossing/Accommodation Volume II—Technical Report (2018) document the process for determining the need and feasibility of wildlife crossings along the project corridor.

5.14.1. What migratory birds and general wildlife species occur along the project corridor?

Numerous avian species may be present along the project corridor, many of which were observed during the various field surveys completed for the project. Observed species include: golden eagle (*Aquila chrysaetos*), bobolink (*Dolichonyx oryzivorus*), grasshopper sparrow (*Ammodramus savannarum*), loggerhead shrike (*Lanius ludovicianus*), killdeer (*Charadrius vociferous*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), sharp-tailed grouse (*Tympanuchus phasianellus*), Swainson's hawk (*Buteo swainsoni*), great horned owl (*Bubo virginianus*), and a variety of waterfowl species. Other avian species that may occur along the project corridor include wild turkey (*Meleagris gallopavo merriami*); black-capped chickadees (*Poecile atricapillus*); ring-necked pheasant (*Phasianus colchicus*); Hungarian partridge (*Perdix perdix*); white-breasted nuthatch (*Sitta carolinensis*); white-throated sparrows (*Zonotrichia albicollis*); sandhill cranes (*Grus*

canadensis); and insect-eating birds such as flycatchers, warblers, and swallows.

Mammal species observed during field surveys include: bighorn sheep (*Ovis canadensis*), Richardson's ground squirrel (*Spermophilus richardsonii*), and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*). Other species that occur along the project corridor include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), and moose (*Alces alces*).

One reptile species, bullsnake (*Pituphis catenifer*), was observed during the field surveys. Common fish species within the Little Missouri River include chubs (*Cyprinidae* spp.), minnows (*Phoxinus phoxinus*), bluegills (*Lepomis macrochirus*), carpsuckers (*Carpiodes carpio*), goldeneyes (*Hiodon alosoides*), saugers (*Sander canadensis*), and channel catfish (*Ictalurus punctatus*) (NPS Undated(b)).

Of the species observed along the project corridor during field surveys, the following are listed in North Dakota's Wildlife Action Plan (Dyke *et al.* 2015) as Species of Conservation Priority: bobolink, grasshopper sparrow, loggerhead shrike, Richardson's ground squirrel, and sharp-tailed grouse. In addition, several bat species listed on the Species of Conservation Priority list were identified along the project corridor during the northern long-eared bat acoustic survey: northern long-eared bat, Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), western small-footed myotis (*Myotis ciliolabrum*), and long-eared myotis (*Myotis evotis*).

5.14.2. What raptors occur along the project corridor?

Raptor species identified along the project corridor during field surveys consist of the golden eagle, great horned owl, and Swainson's hawk. Previously recorded raptor nests along the project corridor consist of three previous golden eagle nests. During field surveys, two of these nests were unable to be located (assumed destroyed), and the third was assumed to be occupied by a nearby pair of golden eagles. No previously undocumented eagle nests were observed during field surveys. In addition, 66 small raptor nests were identified along the project corridor, five of which were occupied (two by great horned owl, one by Swainson's hawk, and two with unknown occupants).

Under guidance from the DPG LRMP, seven raptor species are given special consideration for land management activities on USFS-managed lands: American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), golden eagle, merlin (*Falco columbarius*), and prairie falcon (*Falco mexicanus*). Of these, the bald and golden eagles are afforded further protection under the *Bald and Golden Eagle Protection Act* (BGEPA).

5.14.3. What ESA-listed wildlife species and Critical Habitats occur along the project corridor?

In accordance with Section 7 of the ESA of 1973, as amended, federal agencies are required to ensure their actions are not likely to jeopardize the continued existence of any federally listed animal or plant species. Federal agencies are also required to ensure that destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary of the DOI does not occur.

Formal consultation with the US Fish and Wildlife Service (USFWS) is required when an action may affect threatened or endangered species or designated critical habitat. While candidate and proposed species are not legally protected under the ESA, it is within the spirit of the ESA to consider said species as having significant value and worth protecting.

The USFWS Environmental Conservation Online System (ECOS): Information for Planning and Conservation (IPaC), identified the following threatened and endangered species to be considered for the project: the endangered black-footed ferret (*Mustela nigripes*), gray wolf (*Canis lupus*), whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus* albus); and the threatened northern long-eared bat (*Myotis septentrionalis*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), and Dakota skipper (*Hesperia dacotae*). No proposed or candidate species or Critical Habitats were listed as occurring along the project corridor (USFWS 2016).

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range.

A threatened species is one that is likely to become endangered in the foreseeable future.

Critical Habitat for listed species consists of areas designated for protection that contain the necessary habitat features essential to conservation of a listed species.

Proposed species or critical habitat are those that are officially proposed for listing under the ESA as threatened or endangered.

Candidate species are those that are under consideration for official listing and for which there is sufficient information to support listing.

The *Migratory Bird Treaty Act* (MBTA), 916 U.S.C. § 703–711, and EO 13186 require federal agencies to minimize or avoid impacts on over 1,000 species of migratory birds listed in 50 CFR § 10.13. The MBTA regulates impacts on these species such as direct mortality, habitat degradation, and/or displacement of individual birds. The MBTA defines 'taking' to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

The BGEPA of 1940, as amended (16 U.S.C. 668–668d), prohibits, except under certain specified conditions, the taking, possession, or commercial use of bald and golden eagles. To 'take' includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. 'Disturb' means to agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment.

5.14.4. What USFS-designated sensitive wildlife species and Management Indicator Species exist along the project corridor?

USFS-designated sensitive wildlife species are those "for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and downward trends in habitat capability that would reduce a species' existing distribution" (USFS 2005). There are 13 sensitive wildlife species with potential to occur within the BE survey area (USFS 2015); of which, 6 were identified as having suitable habitat present. Two sensitive wildlife species, the bighorn sheep and loggerhead shrike, were identified during field surveys. Relatedly, the project corridor intersects NDGF-designated bighorn sheep critical range (i.e., areas important for bighorn sheep lambing) (NDGF 2013a, Wiedmann and Hosek 2013).

USFS-designated MIS are intended to assess overall ecological conditions, as well as the impacts of activities on USFS-managed lands. Population changes in MIS are interpreted as a signal of changes in the health of the ecosystem. Suitable habitat for two MIS occurs along the project corridor: black-tailed prairie dog (*Cynomys ludovicianus*) and sharp-tailed grouse (USFS 2001). Of these, the sharp-tailed grouse was identified during field surveys.

Golden eagle nest

5.14.5. How would wildlife be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A there would be no direct or indirect impact on migratory birds, general wildlife species, raptors, ESA-listed wildlife species or Critical Habitat, North Dakota Species of Conservation Priority, USFS-designated sensitive wildlife species, or USFS-designated MIS beyond what is currently being experienced, as no roadway construction would occur. Wildlife crossings (i.e., structures along roadways that provide wildlife habitat connections) would not be incorporated along the project corridor under Alternative A. Therefore, wildlife mobility and habitat connectivity would not be improved.

5.14.6. How would wildlife be directly and indirectly affected by operation of the project?

Operation of roadways can result in habitat loss, degradation, and fragmentation; barriers to wildlife movement; and mortality from wildlife-vehicle collisions. Expanding highways increases the distance wildlife must traverse across roadways and may allow for higher traffic speeds and volumes that wildlife must navigate. In addition, divided highways, such as Alternative B, can create incomplete habitats and cause wildlife to linger near roadways within the median. High-speed traffic and high traffic volumes create the most effective barriers to wildlife movement. Depending on traffic volume, some individuals may successfully navigate across a roadway, while others may be struck by traffic or avoid the roadway completely. Arterial roadways, such as US Highway 85, typically result in avoidance by wildlife resulting in a barrier effect to movement. As traffic volumes increase, wildlife mortality may increase as well, and the number of individuals avoiding the roadway increases (Clevenger and Huijser 2011, Kreft and Schonert 2014, Jacobson *et al.* 2016, Jaeger and Fahrig 2004).

To offset impacts on wildlife mobility and habitat connectivity, three wildlife crossings have been incorporated into the project design. These crossings are further discussed in **Section 5.14.7**.

Additional lighting is proposed at multiple intersections along the US Highway 85 corridor. Light pollution reduces the visibility of stars, which could interfere with migrating birds' navigation and may cause confusion leading to collisions, mortality, or injuries (Jacobson 2005). While some studies have shown that certain species of bats (e.g., *Pipistrellus* spp.) benefit from the presence of streetlights due to increased prey availability surrounding the light sources, several species avoid illuminated areas (e.g., *Myotis* spp.). Bats that forage near lighting may be more visible to predators, experience worsening vision due to bright lights, and/or experience interference with echolocation (Patriarca and Debernardi 2010).

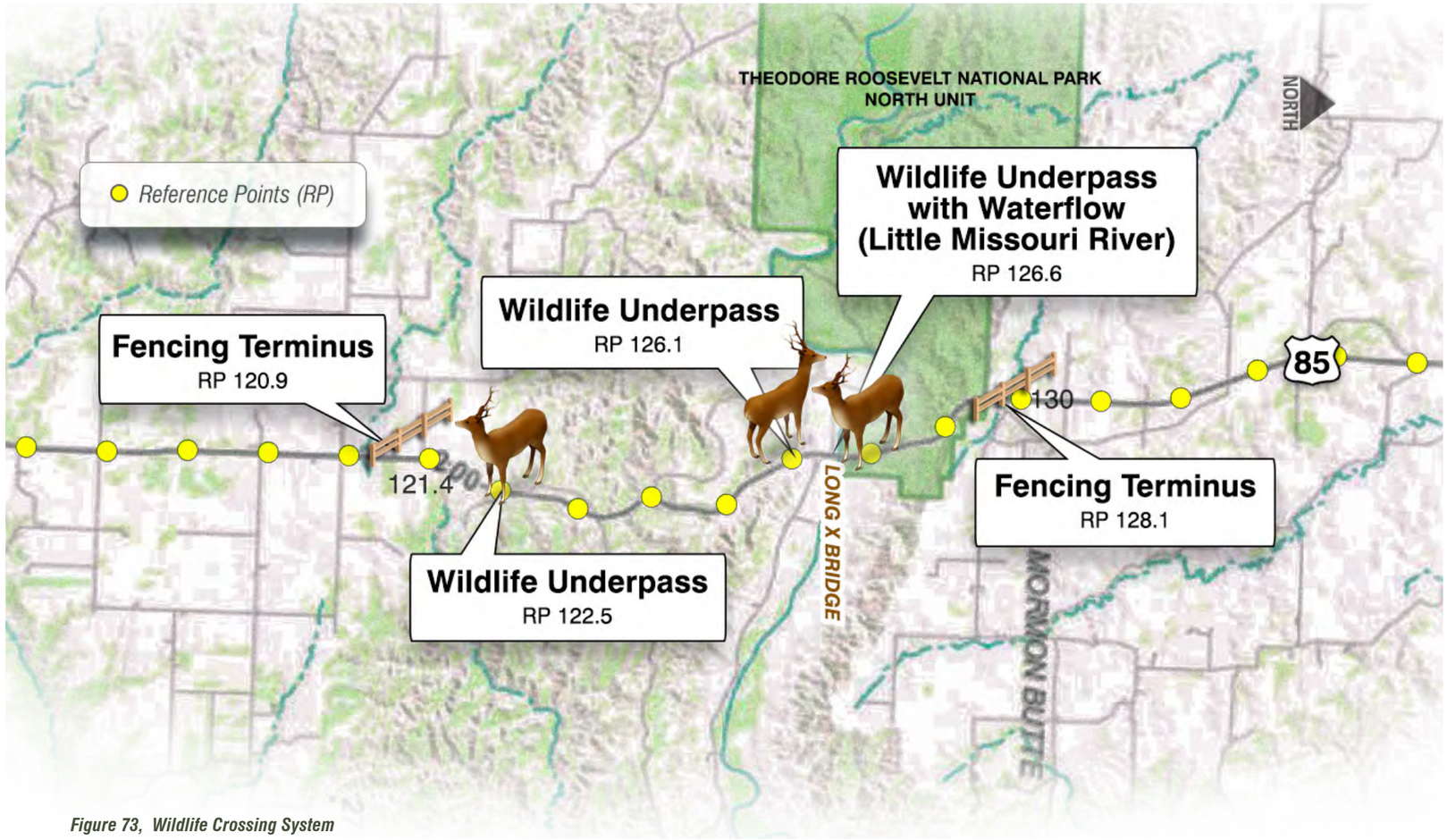


Figure 73, Wildlife Crossing System

For Options LX-1, LX-2, and LX-3, construction would include placing piers directly into the Little Missouri River. The bridge would be designed to maintain current flow volume, and the proportion of the river channel that would be occupied by the bridge would be relatively small. Impacts on fish species as a result of altered stream velocities, flow patterns, and river morphology are anticipated to be temporary as the river adjusts to these changes.

5.14.7. What wildlife crossings would be incorporated into the project?

Three wildlife crossings and associated wildlife fencing have been incorporated into the project design. The locations and designs of the proposed wildlife crossings were developed in coordination with resource agencies and documented within Wildlife Crossing/Accommodation Volumes I and II (**appended by reference**). Please refer to **Figure 73, Wildlife Crossing System**. For design details, please refer to **Chapter 3. Alternatives**. The NDGF and NDDOT would coordinate to monitor the effectiveness, and maintain and manage the wildlife crossings. In addition, the NDDOT, NDGF, NPS and USFS would coordinate to maintain the wildlife fencing and associated features. The crossings are intended to facilitate movement for terrestrial wildlife along the project corridor, particularly white-tailed deer, mule deer, and bighorn sheep.

Currently, the white-tailed deer range in North Dakota spans the entire state, though they are less populated in the far western portion of the state. The opportunistic species utilizes a broad range of habitats, from forests to agricultural lands, to populated areas, with a preference for wooded draws, lowlands, and floodplains (NDGF 2012c, Innes 2013). The current primary range of mule deer in North Dakota occurs within the Badlands associated with the Little Missouri River, with secondary range extending southwest of the Missouri River breaks (NDGF 2013b). Mule deer generally utilize grasslands and croplands associated with rough terrain (NDGF Undated).

All three wildlife crossings proposed in conjunction with this project have the potential to be used by both mule deer and white-tailed deer; however, only one was designed with deer identified as the target species. This wildlife crossing located at RP 122.5 would consist of a 10-foot-tall, 20-foot wide, 136-foot-long opening. The underpass elevation would be situated as close to the roadway surface as possible to

achieve the shortest practicable length that wildlife would have to traverse. Natural substrate (i.e., soil) and cover within the structure (e.g., small culvert(s), boulders, brush) would be incorporated to make the structure inviting for a variety of species. Wildlife exclusionary fencing would tie in to the structure to direct wildlife to the crossing. In addition, wildlife-friendly cattle exclusionary fencing would be required on the eastern side of the underpass to prevent livestock from utilizing the crossing.

Currently, the bighorn sheep range in North Dakota follows the Badlands associated with the Little Missouri River (NDGF 2013A), where the species depends on open grassland with high visibility for foraging adjacent to rugged terrain for escape (NDGF 2012A; WIEDMANN AND HOSEK 2013). Three populations of bighorn sheep have historically been known to occupy habitat adjacent to the US Highway 85 project corridor. These populations include the Long X herd and Summit herd located south of the Little Missouri River, and the Mormon Butte herd located north of the Little Missouri River. In 2012–2013, the NDGF relocated the Mormon Butte herd of bighorn sheep due to a high number of bighorn sheep vehicle strikes. The NDGF has expressed a desire to repopulate this area as it contains some of the best bighorn sheep habitat in the state. In addition, the NDGF has expressed concern that the proposed project could increase the potential for bighorn sheep vehicle strikes and isolate existing populations by fragmenting areas of suitable habitat.

At RP 126.6 (Little Missouri River), new bridges constructed as part of Option LX-1, LX-2, or LX-3 would be designed to maintain the approximate 80-foot-wide, naturally vegetated existing benches on either side of the river. While it is unlikely that this area would see frequent use by bighorn sheep due to the amount of surrounding vegetative cover, the NDGF has indicated that rams may occasionally utilize this corridor when traveling between groups of ewes. Wildlife fencing would tie into the bridge structure(s) in order to direct wildlife movement.

At RP 126.1, a new wildlife underpass would be constructed. This crossing, intended for bighorn sheep, would consist of a concrete three-side arch bridge structure. The crossing would provide a minimum opening within the arch of 15 feet high by 40 feet wide, with a length of 148 feet. Wildlife fencing would tie in to the edges of the structure to direct wildlife to the crossing. In addition, wildlife-friendly cattle exclusionary fencing would be installed on both sides of the structure to keep livestock from using the crossing while allowing wildlife to pass through. The area near the underpass within the NDDOT easement would be cleared of woody vegetation to improve sight lines for bighorn sheep as they approach the underpass. The NDDOT would coordinate with the NDGF during final design of the underpass.

All three wildlife crossings would be located within the Badlands segment of the project corridor and are intended to function as a system in conjunction with wildlife fencing. South of the Long X Bridge, approximately 5.6 miles of continual, wildlife fencing would be installed within NDDOT ROW on both sides of US Highway 85. North of Long X Bridge, approximately 2.2 miles of wildlife fencing would be installed within NDDOT ROW along the east side of US Highway 85. Along the west side, wildlife fencing may be installed between the Long X Bridge and existing TRNP—North Unit fencing (location and extent of this fencing would be determined during landowner ROW negotiations). In addition, approximately 0.3 miles of wildlife fencing would be installed within NDDOT ROW along the west side of US Highway 85, north of the TRNP—North Unit boundary. Inside bighorn sheep primary range (RP 124.1 to RP 128.1), fencing would be 10 feet tall; outside of primary bighorn sheep range (RP 120.9 to RP 124.1), fencing would be 8 feet tall. Fencing would terminate outside of the Badlands area. Where fencing intersects roadways and approaches, a wildlife/cattle guard or gate would be installed to maintain continuity of the wildlife barrier. Final gate and guard design would be coordinated with NDGF and landowners. Approximately 25 jump-outs, or escape ramps, would be incorporated into the wildlife fencing. Please refer to **Figure 74, Jump-out Example (View from Highway)**. In addition, jump-outs would be added to the existing NPS fence located on the west side of US Highway 85 north of the Long X Bridge. The NDDOT would coordinate with the NDGF, USFS, and NPS during final design of the fencing and associated features.

Figure 74, Jump-out Example (View from Highway)

Current pronghorn range in North Dakota is generally confined to south and west of the Missouri River, the far western edge designated as 'primary range' and the remainder designated as 'secondary range' (NDGF 2013C). Pronghorn depend on large, open, contiguous grassland habitat (NDGF 2012B). Two wildlife crossings targeting the pronghorn along the project corridor were considered at RP 95.0 and RP 108.5 or RP 110.5. However, these two crossings are not included in this EIS due to concerns with constructability and implementation of the crossings. The NDDOT and NDGF have entered into a Memorandum of Agreement (MOA) to continue coordination with regard to these crossings, including reanalyzing the crossings during final design.

5.14.8. How would wildlife be directly and indirectly affected by construction of the project?

Construction would result in habitat loss, as non-roadway areas would be cleared for the expanded roadway. Alternative C would result in less habitat loss than Alternative B due to a narrower roadway footprint. Option FF-1 would have the least impacts on habitat, as construction would occur along the existing alignment, followed by Options FF-2, FF-3, and FF-4 in order of increasing construction footprint. Appreciable differences in impacts on habitat between Options INT-1 and INT-2 are not anticipated. Option LX-1 may have fewer impacts on habitat, as it would only require the construction of a new two-lane bridge and rehabilitation of the existing bridge, as opposed to construction of a new four-lane bridge under Options LX-2 and LX-3.

To offset impacts on terrestrial habitat, disturbed, non-roadway areas would be re-seeded, and a noxious weed management plan would be implemented. The re-seeded areas would be maintained until such time that the vegetation is consistent with surrounding undisturbed areas and the site is free of noxious weeds. For each construction phase, impacts on woody vegetation would be assessed and recorded during construction. The NDDOT would coordinate with the NDGF to determine future mitigation needs and methods.

To reduce the potential for spreading of noxious weeds and invasive species, all construction equipment and vehicles to be used on USFS or NPS-managed lands would be pressure washed and free of noxious weeds and plant propagules (i.e., seeds and vegetative parts that may sprout) prior to entrance onto the project site. This would include equipment and vehicles intended for off-road as well as on-road use, whether they are owned, leased, or borrowed by the contractor or any subcontractor. Cleaning of vehicles and equipment would occur off-site.

To offset impacts on aquatic habitat, wetland mitigation for the project is anticipated to be accomplished through the creation of wetland mitigation site(s) and/or mitigated at a wetland mitigation bank. Mitigation would be determined during final design and permitting. To minimize impacts on fish during the spawning period, work within the South Branch of the Green River, Little Missouri River, and Spring Creek would not occur between April 15 and June 1, except within cofferdams installed outside of this timeframe. In addition, in accordance with NDCC Chapter 20.1-17, equipment that was last used outside of North Dakota or within a Class I infested waterbody would be inspected by the NDGF prior to being placed within waters of the state (as defined in NDCC Chapter 60-01-01) to minimize the risk of spreading aquatic nuisance species.

Under Options LX-1, LX-2, and LX-3, bridge construction would require placing cofferdams or earthen ring dikes within the river channel to construct each pier and a temporary causeway or bridge to construct the bridge. These structures would divert more water than the actual piers, which could temporarily affect river flows. To minimize impacts on fish species, instream riverine water flow would be maintained at baseline depth during construction to allow fish passage.

Proposed operation and construction activities would have the potential to contribute sound and visual stimuli at levels that could result in the temporary avoidance of habitat and behavioral effects. Noise pollution can harm migratory birds or other wildlife abilities to hear and to communicate with one another, thereby leading to their migration away from their natural environments. Increased noise may also mask migratory birds or other wildlife abilities to hear predators (UFBERG 2016, DOOLING AND POPPER 2007).

Stormwater from the roadway surface or construction areas has the potential to result in water quality impacts by increasing deposition of metals, oil and grease, and several other constituents (MDOT 1998).

Water quality degradation could cause the temporary avoidance of habitat by individuals or direct injury, mortality, or impairment of bodily functions of individuals.

Several measures would be implemented to minimize construction impacts on wildlife. Mufflers would be utilized on all internal combustion engines to minimize noise impacts on wildlife species. The contractor would be required to obtain a NDPDES permit and develop a SWPPP. As part of the NDPDES permit, the contractor would have a plan for erosion and sediment control. The SWPPP would outline phasing for erosion and sediment-controls, stabilization measures, pollution-prevention measures, and prohibited discharges. The SWPPP would also include BMPs to minimize erosion and sedimentation (e.g., fiber rolls, straw waddles, erosion mats, silt fencing, and turbidity barriers) during construction. In addition, waste material would be disposed of in accordance with state and federal laws, and in a manner that avoids impacts on water channels and riparian areas.

Borrow sites, waste sites, gravel source locations, and staging areas identified by the contractor (i.e., not included in this EIS) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental clearance on these sites to comply with all federal and state laws and regulations, including those that govern the protection of threatened and endangered species. Material sources include rock riprap and material from commercial sources, and any other area of planned ground-disturbing activities, such as staging area(s), plant site(s), stockpile area(s), waste site(s), and haul road(s). These sites would not be permitted on any federal or public lands or within bighorn sheep critical range located adjacent to the project corridor.

If construction activities during the migratory bird nesting and breeding season in North Dakota (between February 1 and July 15), work areas would be mowed and/or grubbed prior to the nesting and breeding season. If mowing and/or grubbing is not completed prior to the nesting and breeding season, a qualified biologist would conduct pre-construction surveys to check the status of existing and historical nests and search for new nests, for migratory birds, including raptors, and their nests within the work areas. If active nests are identified, the NDDOT would coordinate with the USFWS prior to commencement of work to determine any measures necessary to minimize harm. In addition, the NDDOT Standard Special Provision for the *Migratory Bird Treaty Act* would be included with the Construction Specifications. This Special Provision includes stipulations pertaining to nests during construction activities involving bridges, box culverts, and structural plate culverts.

Because the identified (presumed active) golden eagle nest is located approximately 1 mile from the existing roadway with no direct line-of-sight, no mitigation measures are proposed for this nest. Impacts on the other identified (active/presumed active) raptor nests would be avoided until active breeding and nesting ceases. For raptor species that are given special consideration by the USFS, the project has the potential to impact the burrowing owl and prairie falcon due to the disturbance of suitable habitat. These potential impacts are not anticipated to contribute to a trend towards federal listing or cause a loss of viability to the populations or species. The project would not impact the five remaining raptor species given special consideration by the USFS, as habitat was not identified within the BE survey area. A field survey for raptor nests would be completed during the breeding and nesting season in North Dakota (February 1 to August 15), prior to commencement of project activities to ensure no actively nesting raptors would be disturbed by the project. If any nests were found, appropriate minimization measures (such as timing restriction and avoidance buffers) would be implemented.

Although the black-footed ferret, interior least tern, piping plover, rufa red knot, and pallid sturgeon may be present in Stark, Billings, and/or McKenzie counties, there is no suitable habitat for these species within 0.5 miles of the project corridor. Therefore, the project is anticipated to have no effect on these species.

While there was suitable Dakota skipper habitat identified during field surveys, it is located outside of the construction limits. During construction activities, the suitable habitat area would be fenced to prevent direct impacts. In addition, a 15-mph speed limit would be maintained within a 0.6-mile radius of the identified Dakota skipper habitat (RP 121.5 to RP 122.9) for all construction vehicles traveling off of the existing roadway within the limits of construction from June 15 to July 15. As such, the project may affect, but is not likely to adversely affect, the Dakota skipper. Due to disturbance and conversion of potential habitat, the project may affect, but is not likely to adversely affect, the gray wolf, whooping crane, and northern long-eared bat.

In the event that any threatened or endangered species are identified within 1 mile of construction activities, the contractor would be required to notify the project engineer immediately. The project engineer would then cease all construction activities; establish a minimum 0.5-mile avoidance area; and immediately notify and coordinate with the USFWS, FHWA, and NDDOT. The contractor would not resume work within the avoidance area until the project engineer has confirmed with the agencies that work may proceed (i.e., either species have left the area or approved minimization measures have been implemented). A threatened and endangered species poster or pamphlet would be provided on all job sites. In addition, the NDDOT Utility Engineer or consultant would request that utility companies install line markers (bird diverters) on overhead utility lines to be raised, lowered, and/or moved to reduce the risk of flight collisions for birds, including the whooping crane. The utility company would determine the type, number and placement/spacing of the line markers and may conclude that the placement of line markers is not feasible in certain situations.

For USFS-designated sensitive wildlife species not addressed in other sections, the project has the potential to impact the bighorn sheep, loggerhead shrike, Ottoe skipper, tawny crescent, and Sprague's pipit on USFS-managed lands due to the disturbance of suitable habitat. The potential impacts are not anticipated to contribute to a trend towards federal listing or cause a loss of viability to the populations or species. To minimize impacts on the bighorn sheep during lambing season, construction activities adjacent to NDGF-designated bighorn sheep critical range (i.e., from approximately RP 124.1 to RP 126.4) would be limited from April 1 to July 15. The restricted area was developed in coordination with the NDGF and is defined by either ROW/easement or the surface of the roadway, inslopes, and ditches. Please refer to **Figure 75, Bighorn Sheep Timing Restriction Area on page 93**. The project would not impact the four remaining sensitive species (Baird's sparrow, long-billed curlew, northern redbelly dace, and regal fritillary on USFS-managed lands that were) not addressed in other sections, as individuals or habitat were not identified within the BE survey area.

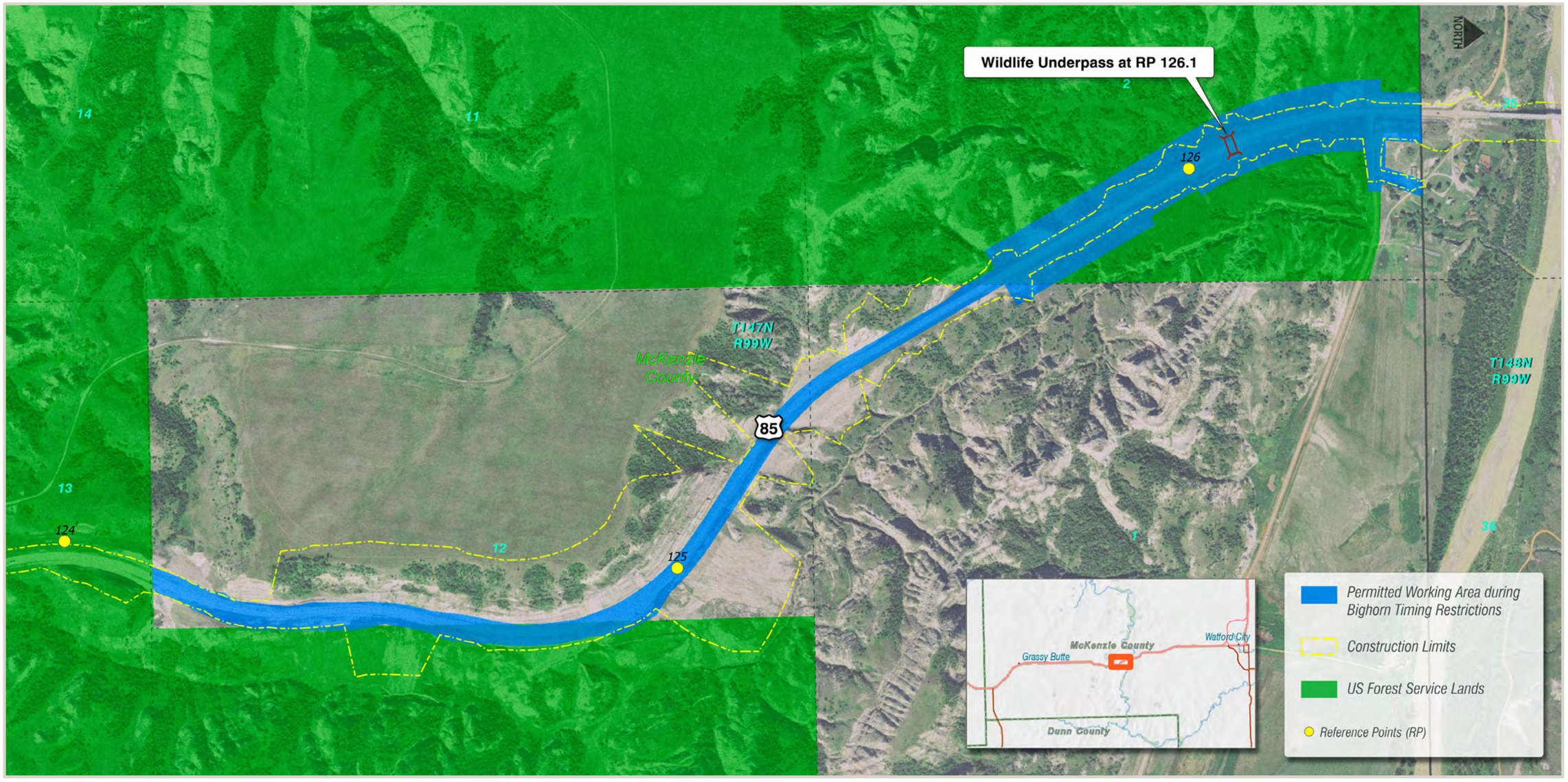


Figure 75, Bighorn Sheep Timing Restriction Area

For MIS, the project has the potential to impact the sharp-tailed grouse on USFS-managed lands due to the disturbance of suitable habitat. To minimize potential impacts on sharp-tailed grouse breeding habitat, spring surveys of known leks (i.e., breeding sites) identified in the BE (2017) (**appended by reference**) that was prepared for the project would be conducted prior to commencement of construction activities. If a lek site is determined to be active, all construction activity within 1 mile of the active lek site would be suspended for the first two hours of daylight beginning at sunrise for the time period of May 1 to June 15. The potential impacts are not anticipated to contribute to a trend towards federal listing or cause a loss of viability to the populations or species. The project is anticipated to have no impact on the black-tailed prairie dog on USFS-managed lands, as no black-tailed prairie dog colonies or individuals were identified within the BE survey area.

5.15. *Historic and Archaeological Preservation*

5.15.1. Are there historic and archaeological resources in the project corridor?

In accordance with several regulations, including 16 U.S.C. § 470hh[a]—*Confidentiality of information concerning nature and location of archaeological resources* and 43 U.S.C. § 7—*Protection of Archaeological Resources*, information concerning the nature and location of archaeological resources and traditional cultural properties, and detailed information regarding archaeological and cultural resources is confidential. Therefore, certain information is not included in this EIS. Information provided in this section was derived through coordination with SHPO and from the following reports (**appended by reference**):

- Class III Cultural Resource Inventory in Billings, McKenzie and Stark Counties, North Dakota, Parts I and II (2016)
- Phase II Evaluative Testing of 13 Sites on Private Lands in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Seven Sites on Federal Land in Billings and McKenzie Counties, North Dakota (2017)
- Phase II Evaluative Testing of Three Sites on Private Land in McKenzie County, North Dakota (2017)

Please refer to **Appendix B. Agency Correspondence**, for letters to and from the NDDOT and SHPO.

A Class III Cultural Resource Inventory was conducted along the project corridor, encompassing a survey corridor of approximately 8,785 acres on private and federal lands. The survey corridor measures from 400 to 3,300 feet on either side of the existing highway ROW. The area was inventoried in August, September, and October 2015 and March and July 2016. Evaluations of four prehistoric sites occurred in October 2015: 13 sites were tested on private land in October/November 2016 and 7 sites were tested on USFS-managed lands in May 2017. Three additional sites on private land were tested in October 2017. In addition to the inventory and evaluations, 42 shovel probe excavations were conducted in areas with potential for surface or buried cultural deposits.

Fieldwork was conducted by archaeologists, an architectural historian, and Traditional Cultural Specialists from the Standing Rock Sioux Tribe, Sisseton Wahpeton Oyate, Spirit Lake Sioux Tribe, Mandan-Hidatsa-Arikara Nation, and Turtle Mountain Band of Chippewa Indians. The SHPO accepted the Class III report on March 1, 2017.

Results of the cultural field investigations completed for the project identified a total of 72 isolated finds and 95 sites within the survey corridor. All 72 of the isolated finds have been recommended *Not Eligible*. The following summarizes the status of the 95 sites encountered in the survey corridor:

- 43 sites were previously recommended *Not Eligible*.
- 16 sites are *unevaluated* and would be avoided by the project.
- 27 sites had the potential to be impacted, were further evaluated, and determined to be *Not Eligible* in coordination with SHPO.
- 9 sites were determined *Eligible*.

The nine *Eligible* sites include the following:

1. Architectural Features (32MZ3056). This site consists of seven architectural features that exhibit building practices characteristic of a period ranging from 1945 to 1960, with moderate alterations dating from the 1970s to the present. Of the seven architectural features located on this site, the three-story Gothic-arched barn is in good condition and has been determined *Eligible* thematically and individually for listing on the NRHP under Criterion C. The remaining architectural features have been determined *Not Eligible* for listing on the NRHP.
2. Dolyniuk Homestead (32BI56). This site is a historic-era site associated with the Dolyniuk Farm and retains integrity of design, location, and setting. The site is associated with Ukrainian settlement in the region and has been determined *Eligible* under Criterion D for information potential. The information gleaned from further investigation of the site, including archaeological investigations, may yield information relevant to research questions posed within the Ukrainian Immigrant Dwellings and Churches in North Dakota from Early Settlement until the Great Depression.
3. St. Boniface Cemetery (32BI896). The St. Boniface Catholic Cemetery is in good condition and retains all aspects of its integrity. The integrity of the workmanship has been somewhat compromised, as some of the markers appeared damaged or broken.

Architectural Features, Gothic-Arched Barn (32MZ3056)

St. Stanislaus Catholic Cemetery (32BI897)

St. Mary's Cemetery (32BI898)

CRITERIA FOR EVALUATION

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of significant persons in or part; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in history or prehistory.

Section 106 of the NHPA of 1966 (16 U.S.C. § 470) as amended, requires that federally-funded projects be evaluated for the effects on historic and cultural properties included in, or eligible for listing on, the NRHP.

The *Archaeological and Historic Preservation Act of 1974* (16 U.S.C. § 461 *et seq.*, and 23 U.S.C. § 305) provides for the survey, recovery, and preservation of significant scientific, prehistoric, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federally-licensed or federally-funded project.

Dolyniuk Homestead, Ukrainian Settlement (32BI56)

St. Boniface Cemetery (32BI896)

St. Boniface is found to be historically significant under Criterion A for its association with German-Russian settlement within the context of Religion and Rural Settlement. It is also *Eligible* for listing on the NRHP under Criterion C for the artistry and design exemplified by the wrought iron crosses. The cemetery is considered *Eligible* for inclusion in the NRHP, as it satisfies Criteria Consideration D as a cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.

4. St. Stanislaus Catholic Cemetery (32BI897). The St. Stanislaus Catholic Cemetery is in good condition and retains all aspects of its integrity. The cemetery is *Eligible* for listing on the NRHP under Criterion A for its historic association with Polish settlement with the context of Religion and Rural Settlement. It is also *Eligible* under Criterion C for the artistry and design exhibited in the wrought iron crosses as well as the site's shrine cross. This site exhibits the work of artist John Paluck. The cemetery is determined *Eligible* for inclusion in the NRHP, as it satisfies Criteria Consideration D as a cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.

5. St. Mary's Cemetery (32BI898). The St. Mary's Cemetery is in excellent condition and retains all aspects of its integrity. The cemetery is *Eligible* for listing on the NRHP under Criterion A for its association with Ukrainian settlement within the context of Religion and Rural Settlement. The site is also *Eligible* under Criterion C for the artistry and design exhibited by the wrought iron crosses. The cemetery is determined *Eligible* for inclusion in the NRHP, as it satisfies Criteria Consideration D as a cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.

6. Gregory Homestead (32BI1149). This site is a 1.5-story post-and-hole dwelling clad in horizontal wood siding and insulated with sod (one architectural feature referred to as the Gregory Homestead). The original homestead claim for 160 acres was made on April 2, 1907, to George Gregory from Austria-Hungary (modern-day western Ukraine). Several structures were noted on his claim and by witnesses. Currently, no other features/structures remain.

   As a whole, the site is in poor condition, although largely unaltered. The site has been determined *Eligible* for listing on the NRHP under Criterion A, within the context of Ukrainian Immigration to North Dakota 1896–1960. This site is directly associated with the earliest settlement in a wave of Ukrainian immigration beginning in 1896.

   It has also been determined *Eligible* for listing on the NRHP under Criterion C as a representative of a method of construction. At least 30 Ukrainian communities have been identified throughout the state and each illustrates traditional practices including methods of construction. The site is found to represent a 'second-stage' within the evolution of Ukrainian immigrant architecture in which the earth house was imbued with characteristics of a more permanent residence. It retains its unaltered structural form, exhibits a distinct wattle and daub-type vernacular construction and even illustrates the use of bold color combinations readily attributed to Ukrainian settlers.

   In addition, it has been determined *Eligible* for listing on the NRHP under Criterion D. The information gleaned from further investigation of the site, including archaeological investigations, may yield information relevant to research questions.

7. TRNP—North Unit Entry Sign (32MZ154). The NPS sign marks the entrance to the TRNP—North Unit and was constructed in 1952. It has a rectangular concrete base with a rusticated, cut stone pylon, the east end of which rises in a truncated pier. The feature is in excellent condition and retains all aspects of integrity. The feature has been re-painted, but maintenance work has been completed in-kind. The site has been evaluated for eligibility against the NRHP Criteria and has been determined *Eligible* for listing on the NRHP. This entry sign is one feature associated with the larger overall cultural resource site of the TRNP—North Unit. The TRNP—North Unit contains other eligible features; however, these features are located outside of the study area.

8. Prehistoric Cultural Material Scatter (32MZ1484). This site was originally recorded and tested in 2000. Materials identified during testing were believed to be associated with Prehistoric/Village-period sites. The site has been determined *Eligible* for listing on the NRHP.

9. Long X Bridge (32MZ1807). The Long X Bridge is a cantilevered, sub-divided Warren through truss with three spans, constructed in 1959. It is 969 feet long, with two driving lanes, a roadway width of 30 feet, and vertical clearance of 16 feet. Due to the low vertical clearance, the overhead cross members have been struck seven times. These collisions have caused appreciable damage and as a result, a total of six overhead cross members have been replaced. Plates and K-braces also have been replaced in full or in part. The modern repairs have been made with similar materials, but new plates have been welded, not riveted. For this reason, the modern replacement members do not possess the same punched or drilled holes, characteristic of the original components.

   In 2010, the bridge received new double box beam rails, a new W-beam guardrail, and paint on all truss members from the roadway up to 12 feet above the roadway, and repairs were made to the west end of the southern pier cap, along with other minor repairs. After 2011, repairs were made to truss members along the western side of the feature and collision damage sustained by all sway bracing. These conditions and repairs do not affect the feature's overall historic and cultural integrity. The original substructure, deck, and railing system are not considered necessary for the bridge to be considered *Eligible*, provided that the aesthetic impression of the superstructure and its function remain intact (Hufstetler 1997).

   The site is in good condition and retains all relevant aspects of integrity. Integrity of design and materials are arguably most important to this site's ability to convey its historic character. While the Warren through truss bridge design is utilized world-wide, the Long X Bridge is one of four remaining examples of a Warren through truss in the state of North Dakota. The bridge has been determined *Eligible* for listing on the NRHP under Criterion C as a good example of a Warren through truss bridge within North Dakota.

Gregory Homestead (32BI1149)

TRNP—North Unit Entry Sign (32MZ154)

Long X Bridge (32MZ1807)

5.15.2. What is the process for tribal consultation?

The Tribal Consultation Committee (TCC) is the mechanism by which the individual Tribes choose to consult on NDDOT projects and programs. The Tribes, through the TCC, are considered consulting parties as defined in 54 U.S.C. 302706(b), which requires federal agencies to consult with any Tribe that attaches religious and cultural significance to properties that may be determined eligible for inclusion on the NRHP. For this project, the FHWA and NDDOT are the lead agencies for the Section 106 process, with each of

The *American Indian Religious Freedom Act of 1978* requires consultation with Native American groups concerning proposed actions on sacred sites on federal land or affecting access to sacred sites. It establishes federal policy to protect and preserve for American Indians, Eskimos, Aleuts, and Native Hawaiians the right to free exercise of their religion in the form of site access, use and possession of sacred objects, as well as the freedom to worship through ceremonial and traditional rites.

The Act requires federal agencies to consider the impacts of their actions on religious sites and objects important to American Indians regardless of eligibility for listing on the NRHP.

the cooperating agencies (i.e., NPS-TRNP, USACE, and USFS-DPG) having a greater role in this process to ensure that all of their Section 106 requirements are met.

The NDDOT and FHWA established a Programmatic Agreement (November 2006, revised September 2014) regarding consultation for all NDDOT projects and programs with the following Tribes[3]:

Fort Peck Assiniboine and Sioux Tribes	Northern Cheyenne Nation
Turtle Mountain Band of Chippewa Indians	Crow Nation
Mandan, Hidatsa, and Arikara Nation	Lower Sioux Indian Community
Spirit Lake Sioux Nation	Santee Sioux Nation
Sisseton-Wahpeton Oyate	Wahpekute Band of Dakotah
Standing Rock Sioux Tribe	Omaha Tribe of Nebraska

Additionally, the Crow Creek Sioux Tribe, Rosebud Sioux Tribe, Oglala Sioux Tribe, Cheyenne River Sioux Tribe, Yankton Sioux Tribe, Flandreau Santee Sioux Tribe, and Gros Ventre and Assiniboine of the Fort Belknap Indian Community participate in the meetings, but are not signatory of the Programmatic Agreement. All of the aforementioned Tribes have expressed concern and have requested to be consulted on transportation projects in North Dakota.

The FHWA is the federal agency with statutory responsibilities for administering the Federal Aid Highway Program under Title 23 U.S.C. 101 *et seq.*, and the NDDOT is the applicant for federal funds for highway construction projects in North Dakota. The NDDOT, on behalf of the FHWA, agrees to coordinate under a government-to-government relationship with federally recognized Tribal government officials or appointees with regard to federal responsibilities under Section 106 of the NHPA through the terms of the Programmatic Agreement. This does not replace the requirement for the FHWA to consult under EO 13175. Consultation under Section 106 of the NHPA by the NDDOT does not replace the FHWA's responsibilities with regard to government-to-government consultation. The FHWA participates in all TCC meetings on their own behalf. The NDDOT consults with the Tribal Historic Preservation Officers or those designated by the Tribal government to manage or advise on matters pertaining to cultural resources.

3 The Omaha Tribe of Nebraska signed the September 2014 Programmatic Agreement in support of the other Tribes, but did not intend to attend the TCC meetings regularly.

The *Native American Graves Protection and Repatriation Act of 1990* is triggered by the possession of human remains or cultural items by a federally-funded repository or by the discovery of human remains or cultural items on federal or Tribal lands and provides for the inventory, protection, and return of cultural items to the affiliated Native American group(s). Permits are required for the intentional excavation and removal of Native American cultural items from federal or Tribal lands.

The TCC, as initiated through the Programmatic Agreement, is made up of representatives appointed by each Tribe, as well as FHWA and NDDOT representatives. The TCC was formed by the Tribes, NDDOT, and FHWA to facilitate effective and culturally sensitive discussion of NDDOT and FHWA projects and processes related to cultural resources issues in transportation in North Dakota. It also streamlines the consultation process and expedites informed Tribal project review. This consultation process is a vehicle through which the NDDOT, FHWA, and federally recognized Tribes consult with regards to Section 106 of the NHPA and achieve the following:

- Define identification needs
- Gather information relative to resources of importance to the Tribes
- Evaluate these resources, as needed
- Discuss effects and methods to avoid and minimize effects, and if needed, to resolve adverse effects
- Define post review concerns and construction monitoring needs
- Develop project discovery plans

Working through the TCC has allowed a clearer understanding of relevant issues and concerns, which results in more effective cultural resources management. The TCC meetings are typically held twice a year, in April and September. This project has been discussed at the April 2017, September 2017, and April 2018 TCC meetings, and will continue to be discussed at each TCC meeting (with all of the Tribes that attend the meetings) throughout project development and as needed throughout construction.

5.15.3. How would historic and archaeological resources be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, no direct or indirect impacts on historic or archaeological resources would be expected. The NDDOT would continue to maintain the Long X Bridge under the No Action alternative, such that the historic integrity of the structure would remain. Mitigation for *Eligible* sites would not occur under Alternative A.

5.15.4. How would historic and archaeological resources be directly and indirectly affected by operation and construction of the project?

Following completion of evaluative testing a total of 16 sites remained *unevaluated* within the survey corridor. Initial review of the construction limits for all build alternatives and options indicated these 16 sites would not be affected.

Of the nine *Eligible* sites, four were identified as being potentially affected by the project. These four *Eligible* sites include the Gregory Homestead, Dolyniuk Homestead, TRNP—North Unit Entry Sign, and Long X Bridge. To avoid impacting the Gregory Homestead, the alignment of the roadway was shifted to the east for both Alternatives B and C. This alignment shift allows for full avoidance of the site boundary by the project; therefore, no impacts on the Gregory Homestead site would be expected.

Please refer to **Appendix B. Agency Correspondence**, for SHPO concurrence discussed in the following paragraphs.

Due to the nature and location of the Dolyniuk Homestead, design of the project was not able to avoid impacting the site under Alternative B or C. To mitigate the permanent impact, the NDDOT, in coordination with the SHPO, has developed a mitigation approach. This approach includes documentation of the Dolyniuk Homestead site as well as the Gregory Homestead (32BI1149). The Dolyniuk Homestead and Gregory Homestead are located within the project segment of lowest priority from a construction sequencing standpoint; however, due to the continually deteriorating nature of the sites, mitigation will be completed in 2018 in order to document the greatest amount of information possible. With this mitigation, the SHPO has concurred with a *No Adverse Effect* determination.

The TRNP—North Unit Entry Sign cannot be avoided by Alternative B or C. To minimize impacts, the sign would be removed prior to project construction. Upon project completion, the sign would be replaced, intact, in close proximity to its original location. A Special Provision to the Construction Specifications would be drafted for the Entry Sign during final design. The Special Provision would give concise and clear direction to the contractor for handling the Entry Sign. The North Dakota Cultural Resource Survey documentation for the TRNP—North Unit was also updated during the cultural survey. The site form was updated because it was lacking information for historic standing structures, and adequate descriptions and photographs. With the completed work and proposed resetting of the Entry Sign, the SHPO has concurred with a *No Adverse Effect* determination. Please refer to **Chapter 6. Section 4(f) Evaluation**.

Impacts on the Long X Bridge would vary based on the selected bridge option. Potential impacts are described as follows:

- Option LX-1: New Two-lane, Rehabilitate Existing Long X Bridge. Option LX-1 would rehabilitate the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches. To increase the vertical clearance, the horizontal braces (portals) spanning between the trusses would be raised in 20 locations along the length of the bridge. Raising the portals would require modification or replacement of the v-shaped diagonal braces connecting the portals to the top chords of the trusses.

  Rehabilitation would also include strengthening the bridge to carry the new maximum gross vehicle weight of 129,000 pounds. This would entail installing cover plates on 16 bottom chord members and 12 diagonal members. The deck would be replaced, and shear studs would be installed on the stringers. The traffic barrier on the bridge would be replaced with a new barrier meeting current standards. The original steel railing would be removed during the deck replacement and reinstalled to retain the original look and feel of the bridge. The deck expansion joints would be replaced, and substructure concrete cracks and spalls would be repaired as needed. The bridge would also be sandblasted and repainted the same or similar color. Based on coordination with the SHPO, the scope of the rehabilitation as defined, would have a *No Adverse Effect* determination. The SHPO has also concurred that the proximity of a new two-lane bridge would have *No Adverse Effect* on the bridge.

- Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use. Option LX-2 would retain the existing Long X Bridge to serve as an example of a Warren through truss bridge as an alternate use. Original considerations for alternate use included use of the bridge as a pedestrian facility. Through coordination with resource agencies, it was determined that such use would be incompatible with proposed wildlife crossing measures and was therefore eliminated from further consideration. The bridge would likely remain in-place with gates installed at both ends to deter pedestrian use. The SHPO has concurred with the determination of *No Adverse Effect* for Option LX-2. The SHPO also has concurred that the proximity of a new four-lane bridge would have *No Adverse Effect* on the bridge.

  To maintain the integrity of the historic bridge, a mechanism would be created in coordination with the NDDOT, FHWA, and SHPO to ensure continued maintenance, so the bridge does not fall into neglect.

- Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge. Option LX-3 would include removal of the existing Long X Bridge resulting in an *Adverse Effect*. An MOA has been signed between the FHWA, NDDOT, and SHPO to mitigate for the *Adverse Effect* on the Long X Bridge. Please refer to **Chapter 6. Section 4(f) Evaluation** for details and **Appendix B. Agency Correspondence** for the MOA.

In summary, Options LX-1 and LX-2 would result in a *No Adverse Effect* determination for the Long X Bridge after proper rehabilitation of the bridge. Option LX-3 would result in an *Adverse Effect* determination, which would require mitigation and a mitigation plan. On January 8, 2018, the Advisory Council on Historic Preservation (ACHP) indicated that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of their regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking and that the ACHP does not believe that their participation in the consultation to resolve adverse effects under Option LX-3 is needed. Pursuant to 36 CFR 800.6(b)(1)(iv), the MOA and related documentation, developed in consultation with the SHPO and consulting parties (i.e., TCC), would be filed with the ACHP at the conclusion of the consultation process to complete the requirements of Section 106 of the NHPA. Please refer to **Appendix B. Agency Correspondence**, for the ACHP letter and MOA.

In accordance with the Bridge Adoption Program (23 U.S.C. 144), the Long X Bridge was made available for adoption and advertised for 30 days under Option LX-3. Due to the size of the structure, only one segment of the bridge would need to be adopted. If no successful adoption occurs, an MOA containing alternate mitigation measures has been signed between the FHWA, NDDOT, and SHPO for Option LX-3. Please refer to **Appendix B. Agency Correspondence** for the MOA. Additionally, a *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges* can be found in **Chapter 6. Section 4(f) Evaluation**.

An inadvertent discovery plan would be developed for the project prior to construction that would outline procedures and requirements in the event that cultural resources are discovered during construction. In addition, borrow sites, waste sites, gravel source locations, and staging areas identified by the contractor (i.e., not included in this EIS) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental clearance on these sites to comply with all federal and state laws and regulations, including those that govern the protection of cultural resources. Material sources include rock riprap and material from commercial sources, and any other area of planned ground-disturbing activities, such as staging area(s), plant site(s), stockpile area(s), waste site(s), and haul road(s). These sites would not be permitted on any federal or public lands.

5.16. Hazardous Waste

5.16.1. What hazardous waste concerns are currently known to occur within the Phase I Environmental Site Assessment study area?

In June 2017, a Phase I Environmental Site Assessment was completed for the project (**appended by reference**). The purpose of the Phase I Environmental Site Assessment was to evaluate environmental concerns or issues that may be within the study area. The study area includes the 62-mile-long roadway and an average of 250 feet on each side of the roadway (i.e., 500-foot-wide corridor). The Phase I Environmental Site Assessment included the following:

- Visual inspections of the study area and surrounding areas (i.e., windshield survey)
- An interview with the NDDOT on their knowledge of the study area
- Interviews with state and local environmental authorities to identify any environmental concerns in connection with the study area
- A review of historical aerial photographs and maps covering the study area
- A review of federal, state, local, and Tribal government records

Environmental Data Resources Inc., an independent data research company, provided the federal, state, local, and Tribal government/regulatory agency database report. The report contains information regarding sites with reported releases of hazardous substances and petroleum products, as well as sites with the potential to release hazardous substances and petroleum products, within or near the study area (i.e., up to 1 mile from the study area).

Review of the report revealed a total of 147 sites identified in the federal, state, local, and Tribal agency databases. After review and assessment of these sites, it was determined that none of the sites were likely to present an environmental threat to the study area. The sites either did not have any reported violations or achieved compliance on previous violations, completed cleanup actions for releases of hazardous substances and/or petroleum products, have measures in place to prevent contamination, or did not have any indications of a release or other type of environmental threat to the study area. Of the 147 sites identified, 18 were identified as underground storage tank (UST) sites located within 0.25 miles of the study area. There were no UST sites identified within the boundaries of the study area.

RCRA defines a hazardous waste in 42 U.S.C. § 6903, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may: (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Upon completion of the visual inspection; interviews; and review of records, aerial photographs, and maps, the Phase I Environmental Site Assessment concluded that a Phase II Environmental Site Assessment (i.e., investigation that includes soil and groundwater sampling, analysis, and testing) was not recommended for the study area.

Asbestos is regulated by the USEPA under the *Clean Air Act*, *Toxic Substances Control Act*, and CERCLA. Standards for asbestos in North Dakota are outlined in NDAC Chapter 33-15-13, *Emission Standards for Hazardous Air Pollutants*. In accordance with NDAC 33-15-13, sampling for asbestos must be conducted for any suspect building or structure materials that will be disturbed as part of a renovation or demolition activity. Asbestos inspection surveys of the South Branch of the Green River Bridge (NDDOT Structure No. 0085-84.342), Spring Creek Bridge (NDDOT Structure No. 0085-136.949), and Long X Bridge (NDDOT Structure No. 0085-126.562) were conducted in 2017. Results of the following inspection survey reports are **appended by reference**:

- Asbestos Survey Report for NDDOT Bridge No. 0085-084.342 (Green River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-126.562 (Little Missouri River) (2017)
- Asbestos Survey Report for NDDOT Bridge No. 0085-136.949 (Spring Creek) (2017)

Results of the inspection surveys indicate that the South Branch of the Green River Bridge and Spring Creek Bridge do not contain asbestos-containing materials (ACMs). The Long X Bridge inspection survey identified four potential ACMs. All four of the potential ACMs appeared to be in good condition, and none were friable at the time of the inspection survey. Samples were only collected from two of the potential ACMs (sealing tar and a fibrous buffer pad) for laboratory analysis, as the other two potential ACMs were covering utilities (i.e., communication box and conduit), and collecting samples would have been a safety hazard. Laboratory analysis determined the sealing tar contains 6 percent chrysotile asbestos. No asbestos was identified within the fibrous buffer pad.

A hazardous substance, pursuant to the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (42 U.S.C. § 9601(14)), is defined as: "(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33; (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title; (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the *Resource Conservation and Recovery Act* (RCRA) of 1976, as amended, (42 U.S.C. § 6921); (D) any toxic pollutant listed under section 1317(a) of Title 33; (E) any hazardous air pollutant listed under Section 112 of the *Clean Air Act* (42 U.S.C. § 7412); and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator of the USEPA has taken action pursuant to Section 2606 of Title 15." The term does not include crude oil or any fraction thereof, or natural gas.

Lead in construction is regulated by the Occupational Safety and Health Administration (OSHA) under OSHA's Lead Standard for the Construction Industry (26 CFR 1926.62). Pursuant to the standard, exposure to lead during construction activities must be in accordance with permissible exposure limits for workers. The Long X Bridge is known to contain lead-based paint.

5.16.2. What direct and indirect hazardous waste-related impacts would occur if US Highway 85 is not expanded?

Under Alternative A (no-build), no hazardous waste-related impacts would be expected.

5.16.3. What direct and indirect hazardous waste-related impacts would occur from operation and construction of the project?

Hazardous waste-related impacts from operation and construction of the project are anticipated to be minor. None of the USTs or sites identified in the federal, state, local, and Tribal agency databases would be impacted by construction of any of the alternatives or options.

Prior to construction activities, the contractor would be required to obtain a NDPDES permit and develop a SWPPP. The SWPPP would outline pollution-prevention measures and prohibited discharges.

Construction activities would require the use of small amounts of hazardous materials. It is anticipated that the quantity of products containing hazardous materials used during construction would be minimal and their use would be of short duration. Minor releases during construction (e.g., accidental hazardous materials spills, leaking equipment) could occur; however, any inadvertent releases would be contained and handled in accordance with the SWPPP. The SWPPP would outline phasing for erosion- and sediment-controls, stabilization measures, pollution-prevention measures, and prohibited discharges.

The quantity of hazardous wastes generated from construction activities would be minor and would not exceed the capacities of existing hazardous waste disposal facilities. All hazardous wastes generated as a result of the project would be handled in accordance with the RCRA Subtitle C waste management program and the requirements and regulations of the NDDH.

If the contractor encounters abnormal conditions (e.g., presence of barrels, obnoxious odors, excessively hot earth, smoke) during construction that indicate the presence of hazardous materials or toxic wastes anywhere the contractor performs work, the contractor would immediately suspend the work and notify the project engineer. The contractor would continue construction in other areas of the project, but would not resume work in the area of the abnormal condition, unless directed to by the project engineer.

The South Branch of the Green River Bridge and Spring Creek Bridge would be demolished as part of the project. Results from the asbestos inspection surveys conducted for these bridges indicate that the structure materials do not contain any asbestos; therefore, no asbestos-related impacts associated with the demolition of these bridges would be expected. Results from the asbestos inspection survey for the Long X Bridge indicate that the sealing tar sampled from the bridge is a Category II Nonfriable ACM (6 percent Chrysotile).

In accordance with the requirements of NDAC 33-15-13, a State Form Number 17987 Asbestos Notification of Demolition and Renovation form would be submitted to the NDDH at least 10 working days prior to demolition of the South Branch of the Green River Bridge and Spring Creek Bridge, and renovation or removal of the Long X Bridge. In addition, all regulated ACMs identified at the Long X Bridge would be removed by properly certified and licensed individual(s), and an asbestos management/removal plan would be developed prior to renovation or removal. All asbestos-containing waste material would be properly disposed of in an approved landfill, in accordance with local, state, and federal regulations.

Confirmation on whether or not the materials covering the communication box and conduit on the Long X Bridge are ACMs and proper removal of these materials prior to renovation or removal of bridge would be coordinated with the owner of the utilities prior to implementation of the project.

Lead-based paint associated with the Long X Bridge would be properly removed or stabilized prior to renovation or removal of the structure and disposed of at an off-site facility approved for lead waste.

5.17. *Visual*

5.17.1. What is visual quality?

The FHWA's Guidelines for the Visual Impact Assessment of Highway Projects (FHWA 2015c) provide guidance on how to evaluate impacts on visual quality for roadway projects, which is based on visual resources, visual character, and viewer perception of viewsheds. Viewsheds are the whole of what a viewer can see from a given vantage point. At night, viewsheds are referred to as lightscapes. Viewsheds are limited by topography, vegetation, the built environment, atmospheric conditions, and the nature of human sight (e.g., effects of distance or lighting). Viewsheds are considered 'static' when seen from a particular point (e.g., from a scenic overlook) and 'dynamic' when seen in sequence while moving (e.g., from a moving a vehicle). Visual resources are the natural and cultural (i.e., developed) features of the environment that can be seen in a viewshed. When taken together, visual resources make up the visual character of a viewshed and contribute to the overall impression that a viewer has of the area.

Visual quality is viewers' perceptions of the visual resources that make up the visual character of a viewshed.

Viewers associated with roadways consist of neighbors and travelers. The perception viewers have of visual resources in a viewshed determines the visual quality of the area. In a natural environment, visual quality is based on whether visual resources contribute to, or detract from, a sense of natural harmony. In a cultural environment, visual quality is based on whether visual resources contribute to, or detract from, a sense of orderliness.

Neighbors are viewers that have a static view of the road, while **travelers** have a dynamic view from the road.

When changes to visual resources occur, impacts on visual quality depend on whether or not the changes are compatible with the visual character of the viewshed and how sensitive viewers are to those changes. Viewer sensitivity depends on exposure to changes and awareness of changes (FHWA 2015c):

- How close viewers are to the change
- How many viewers see the change
- How long viewers see the change
- How much attention and concentration viewers place on the change
- Level of protection of the affected visual resource (i.e., protected by local, state, or federal plans or policies, or where there is overwhelming community interest)

5.17.2. What is the visual quality along the project corridor?

5.17.2.1. Visual Resources and Character

In general, the project corridor spans two landscape units that have distinctive visual resources and character: the Badlands and rolling prairie outside of the Badlands.

The rolling prairie outside of the Badlands is characterized by the following and includes the largest intact natural grassland area in North Dakota:

- Sporadic residential, commercial, and industrial development, with denser concentrations of development in towns (i.e., Belfield, Fairfield, Grassy Butte, and Watford City)
- Historic and existing farmsteads and abandoned buildings
- St. Demetrius Ukrainian Catholic Church and cemeteries
- Several unpaved, gravel and paved roadways intersecting US Highway 85
- Overhead utility lines and other infrastructure
- Open and scenic rolling hills and plains used for cropland and pasture land
- Exposed buttes
- Scattered drainages and wetlands, South Branch of the Green River, and Spring Creek

The Badlands are characterized by colorful, stratified, highly eroded buttes and hillsides with grassy ridgelines and highly dissected drainages. The Badlands include unique vegetative and wildlife communities. In the middle of the Badlands, US Highway 85 intersects the Little Missouri River at the historic Long X Bridge. There are a few intersecting gravel/scoria roadways in this stretch, with sparse overhead utilities and other infrastructure and human development. The entrance to TRNP—North Unit is marked by a historic wood and cut-stone sign, just north of the Little Missouri River. The roadway extending into the park is designated as a State Scenic Byway. There are three scenic overlooks along US Highway 85 in the Badlands area (RP 123.8, RP 124.9, and RP 127.5) for motorists to stop and observe the landscape.

Badlands Landscape Unit

Rolling Prairie Landscape Unit

5.17.2.2. Viewers and Visual Quality

Viewers that are considered neighbors of US Highway 85 include people that live, recreate, work, or conduct business in view of the roadway. Viewers that are considered travelers along US Highway 85 consist of anyone utilizing the roadway, including commuters, tourists, or shippers that move goods. A particular individual can be both a neighbor and a traveler, and they may act as various types of viewers depending on the activity at a particular time (e.g., driving to work versus driving to a recreation area, working versus hiking in view of the roadway). Residential, recreational, governmental, and agricultural neighbors tend to value both cultural order and natural harmony, while retail, commercial, and industrial neighbors tend to place more value on cultural order than natural harmony. Commuting and shipping travelers tend to value cultural order and natural harmony to the extent that it aids in orienting themselves and navigating, while tourist travelers tend to find intrinsic value in cultural order and natural harmony as they observe passing scenery.

During the public scoping process, 29 percent (44 out of 153) of public commenters addressed the Badlands and/or public lands (i.e., the TRNP and/or LMNG), of which a substantial portion are concentrated within the Badlands. One of the most common comments received from the public regarded expanding US Highway 85 through the Badlands. Several members of the public expressed concern with the wilderness experience in the Badlands and TRNP–North Unit (e.g., solitude, serenity, quietness, landscape) being diminished. The commenters expressed opposition to the roadway expansion, stating that the wildlife and recreation/tourism opportunities would be adversely impacted from traffic lights and noise, increased air pollution, and visual intrusions. To the contrary, some members of the public were in favor of the roadway expansion through the Badlands, stating that it would decrease safety risks for the traveling public and address truck traffic.

Many of the viewsheds of western North Dakota have been impacted by rapid development of the oil and gas industry since the late 2010s. Neighbors and travelers are likely to perceive these changes as positive or negative impacts on visual quality, depending on their motives. For example, a resident or tourist may perceive oil and gas infrastructure as diminishing natural harmony, while an oilfield hauler or business owner may perceive the infrastructure as improving cultural order.

Much of the oil and gas development along the project corridor is outside of the Badlands area. Given the many comments received regarding the Badlands, it can be assumed that the visual quality of the Badlands is valued higher than areas outside the Badlands by neighbors and travelers along the project corridor. However, it can also be assumed that there are many static and dynamic viewsheds outside of the Badlands that viewers would also consider having high visual quality, based on natural harmony of the rolling plains landscape.

5.17.3. What protected visual resources occur along the project corridor?

Through agency, public, and stakeholder meetings, the TRNP–North Unit and portions of the LMNG have been identified as protected visual resources along the project corridor.

Protected visual resources are those that are afforded protection by local, state, or federal plans or policies, or where overwhelming community interest warrants protection.

The LMNG occurs within two USFS Geographic Areas: Badlands and Rolling Prairie. Both Geographic Areas are managed for undeveloped landscapes with scenic integrity, amongst other things. Much of the LMNG along the project corridor is classified as having 'low' Scenic Integrity Objective (i.e., moderately altered), except for areas occurring within the Badlands, which have 'moderate' to 'high' (i.e., appears unaltered) Scenic Integrity Objective.

The DPG MAs of concern along the project corridor with regard to visual quality include MA 1.2A Suitable for Wilderness and MA 1.31 Backcountry Non-motorized Recreation. For both MAs, natural processes (e.g., fire, insects, grazing) control vegetation, and large pasture and unobtrusive structural developments promote an open, natural-appearing landscape. Both MAs are managed to meet a 'high' Scenic Integrity Objective (USFS 2001) and occur within an Inventoried Roadless Area.

Inventoried Roadless Areas were identified and mapped in accordance with the Roadless Area Conservation Final Rule (2001), where large, undeveloped areas (i.e., typically exceeding 5,000 acres) meet the minimum criteria for wilderness consideration under the *Wilderness Act*.

- MA 1.2A Suitable for Wilderness: The USFS has identified MA 1.2A as being suitable for wilderness recommendations to Congress for inclusion in the National Wilderness Preservation System. As such, it is managed to protect wilderness characteristics,

and opportunities for primitive recreation are provided, with a moderate degree of solitude.

- MA 1.31 Backcountry Non-motorized Recreation: The USFS manages MA 1.31 to provide a variety of non-motorized, semi-primitive, un-crowded recreation opportunities in a natural-appearing landscape (i.e., less than 15 encounters with other parties per day). This MA includes trailheads, trails, signs, bridges, fences, primitive shelters, and water developments.

Other protected visual resources include the Little Missouri River and the Theodore Roosevelt National Park North Unit State Scenic Byway. The Little Missouri River connects the three units of TRNP, winds through the LMNG, and crosses US Highway 85 along the project corridor under the Long X Bridge. The *Little Missouri State Scenic River Act* (NDCC 61-29) directs the Little Missouri River Commission to advocate for the scenic qualities of the river. The Theodore Roosevelt National Park North Unit State Scenic Byway extends from US Highway 85 through the TRNP–North Unit (NDPRD Undated). The roadway is designated as a State Scenic Byway under the North Dakota Scenic Byway Program based on existing and projected scenic, natural, historic, and recreational qualities of the TRNP–North Unit. The Corridor Management Plan for the byway indicates that the scenic qualities of the byway are protected in perpetuity via the roadway's location within the TRNP (NPS 2000).

5.17.3.1. Management

The *Forest and Rangeland Renewable Resources Planning Act of 1974*, as amended by the *National Forest Management Act of 1976*, requires consideration of aesthetic impacts of USFS land management. According to Forest Service Manual 2300—Chapter 2380: Landscape Management, it is USFS' policy to (USFS 2003):

- Inventory; evaluate; manage; and, where necessary, restore scenery as a fully integrated part of the ecosystems of USFS-managed lands and of the land and resource management and planning process
- Employ a systematic, interdisciplinary approach to scenery management to ensure the integrated use of the natural and social sciences and environmental design
- Ensure scenery is treated equally with other resources
- Apply scenery management principles routinely in all USFS activities

The USFS Agriculture Handbook 701 Landscape Aesthetics: A Handbook for Scenery Management is used to determine the value and importance of scenery, and then establish goals and objectives

for land management that preserves scenic integrity (USFS 1995). The DPG LRMP includes guidelines for scenery management that include managing activities on USFS-managed lands to be consistent with the assigned Scenic Integrity Objective for a given area.

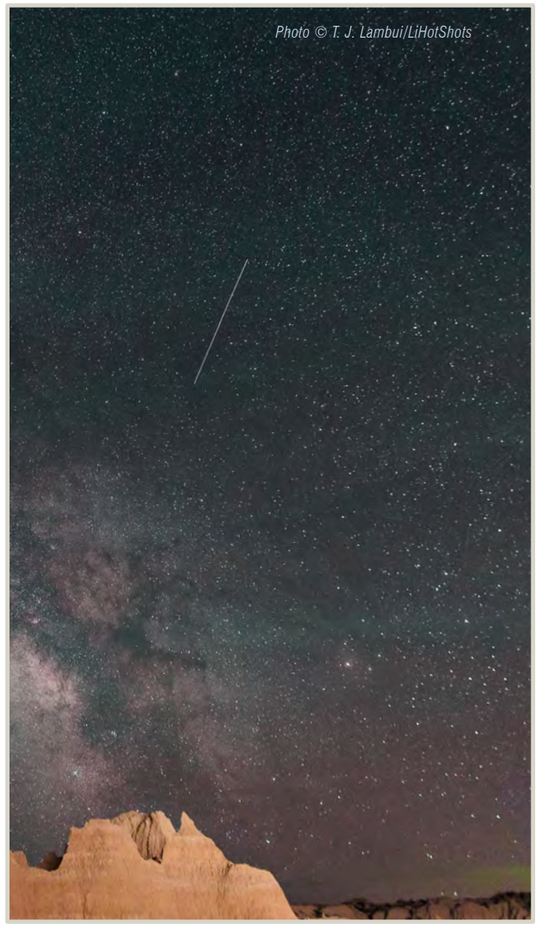
Scenic integrity is the degree of disruption of the natural landscape.

The NPS *Organic Act* directs the NPS to conserve scenery, natural and historic objects, and wildlife on NPS-managed lands, and to provide for the enjoyment of the same in such a manner, and by such means as will leave them unimpaired for the enjoyment of future generations. According to Management Policies 2006, the NPS seeks to sustain scenic vistas in general and devote wilderness areas to scenic use. In addition, the NPS seeks to preserve natural lightscapes by restricting artificial lighting, utilizing minimal-impact lighting techniques, and shielding artificial lighting, as necessary (NPS 2006). Light pollution, or artificial brightening of the night sky, can be caused by scattered light in the atmosphere (i.e., sky glow) or shining lights (i.e., glare) (NPS Undated(c)).

Natural lightscapes are resources that exist in the absence of human-induced light at nighttime. Resources can include a starry night sky or nocturnal habitat for wildlife.

Fundamental resources and values for the TRNP include the following (NPS 2014):

- The Little Missouri River, North Dakota's only State Scenic River
- Scenic views, including dark night skies and clean air, as supported by the park's *Clean Air Act* Class I designation



- Theodore Roosevelt Wilderness and other wilderness qualities that depend, in part, upon the natural beauty of the area

The NPS has recently developed a Visual Resource Program to inventory visual resources, provide guidance on the assessment of visual impacts, assist with incorporation of visual resources in planning documents, and develop visual resources policy and guidance (Meyer and Sullivan 2016). As part of the program, the NPS developed a Visual Resource Inventory system to assess scenic quality and assign scenic inventory values for particular viewing locations that park visitors utilize.

Scenic quality, in combination with the importance of the view (determined by considering the viewpoint, viewshed, and viewer), gives rise to the scenic inventory value of a particular vantage point. As of the date of this EIS, a Visual Resource Inventory has not been conducted for the TRNP (Meyer and Sullivan 2016).

Scenic quality is the value of a viewshed based on perceived attractiveness, as determined by assessing landscape character integrity, vividness, and visual harmony.

5.17.3.2. Assessment

A viewshed analysis was conducted for the TRNP–North Unit and within DPG MAs 1.2A and 1.31, in accordance with the Viewshed Analysis Methodology Memorandum (2017) developed for the project (**appended by reference**). The analysis process was developed in coordination with the NDDOT, FHWA, and cooperating agencies, including the NPS and USFS. The analysis consisted of: (1) identifying vantage points, (2) obtaining photographs from vantage points, (3) developing depictions/renderings of the viewshed from vantage points (existing conditions and simulations of the proposed improvements), and (4) developing a computer model for vantage points.

To identify vantage points, Google Earth imagery, GIS, and maps of the TRNP–North Unit and LMNG were reviewed. It is understood that visitors and recreationists vary greatly in their ability, skillset, and overall perspectives on how they interpret and use federal lands in North Dakota; however, the goal was to capture vantage points that the majority of visitors and recreationists would likely use. Locations were reviewed to assess common, high-use areas. A total of 24 vantage points were assessed: 6 occurred on the LMNG and 18 occurred within the TRNP–North Unit. Please refer to **Figure 76, Visual Assessment Overview on page 101** and **Appendix E. Visual Assessment Results**.

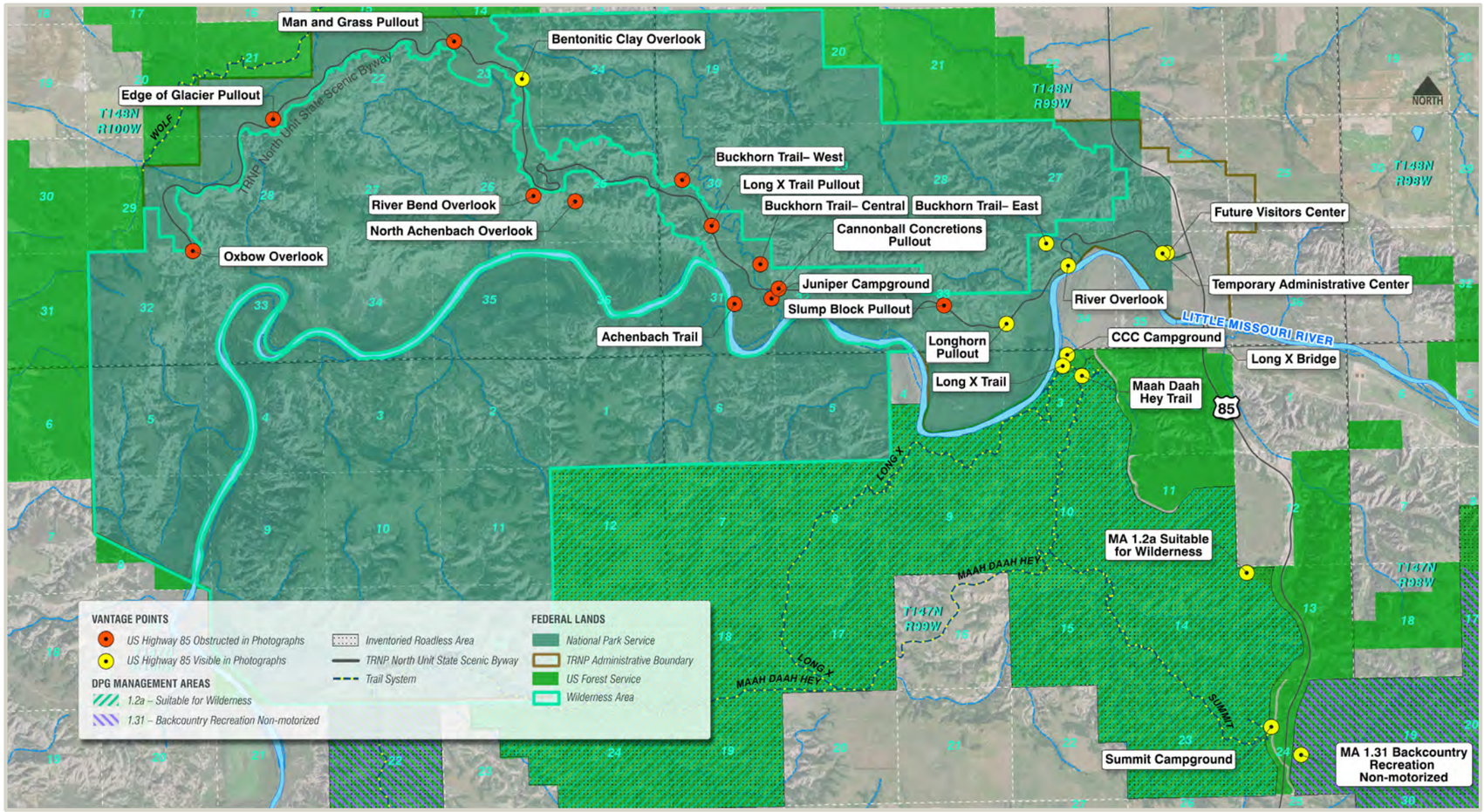


Figure 76, Visual Assessment Overview

Several photographs were obtained from the vantage points facing out toward US Highway 85 and the Long X Bridge. The depictions were modified with computer-simulated images of the proposed roadway expansion and Long X Bridge rehabilitation/replacement to depict how the view from the vantage points would or would not change with implementation of the project. Based on the photographs, US Highway 85 (i.e., vehicles, the roadway surface, and/or the Long X Bridge) is currently visible from the following 12 vantage points:

- LMNG
  - MA 1.31 Backcountry Recreation Non-motorized
  - Summit Campground
  - MA 1.2a Suitable for Wilderness
  - Maah Daah Hey Trail
  - Long X Trail
  - CCC Campground
- TRNP – North Unit
  - Temporary Administrative Center
  - Future Visitor Center
  - River Overlook
  - Buckhorn Trail – East
  - Longhorn Pullout
  - Bentonitic Clay Overlook

All of these vantage points are within 2 miles of US Highway 85, except for the Bentonitic Clay Overlook, which is approximately 5.3 miles from the highway, making the highway difficult to see.

A computer model was developed utilizing digital elevation model (DEM) data to determine the line-of-sight from each vantage point. This model represents a 'best case' line-of-sight scenario, since it does not take into account visual barriers, such as vegetation or other structures (e.g., oil and gas developments). The model is limited by relatively coarse topographical data availability (i.e., 10-meter US Geological Survey DEM accuracy versus 1- or 3-meter accuracy). The line-of-sight analysis indicated that the US Highway 85 surface is visible from the same 12 vantage points previously identified. In addition, vehicles along the roadway may be visible from an additional three vantage points: River Bend Overlook, North Achenbach Overlook, and Long X Trail Pullout.

5.17.4. How would visual quality and protected visual resources be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, there would be no direct impact on visual resources, nor on the ability of viewers to see visual resources, as no roadway construction would occur. Viewers would still be able to see the existing two-lane highway and associated features within viewsheds along the project corridor. As such, there would be no impact on visual quality along the project corridor within the rolling prairie or the Badlands landscape units, including that of protected visual resources.

There would be no potential for removal of Long X Bridge, which would allow the viewer to take in the whole of the Badlands and remove the focal point of the existing bridge. Depending on viewer perspective, neighbors and travelers may perceive the existing Long X Bridge as an iconic feature within the landscape or a cultural intrusion in an otherwise natural setting. As such, the existing Long X Bridge may be perceived as a positive or negative impact on visual quality.

Fugitive dust and criteria pollutant emissions from vehicles traveling along and adjacent to the project corridor would continue within both the rolling prairie and Badlands landscape units. Stark, Billings, and McKenzie counties would continue to implement dust-control measures along unpaved roadways, as necessary and when feasible, to minimize visual impacts of fugitive dust. Any increases in fugitive dust or emissions of criteria pollutants associated with the annual increase in traffic along the corridor are anticipated to be compatible with the existing visual character and would not impact viewers' ability to see viewsheds along the project corridor. As such, these emissions are not anticipated to impact visual quality, including that of protected visual resources. For more detailed air quality information, please refer **Section 5.11. Air Quality**.

Light pollution from vehicle headlights would continue to occur in both landscape units. As traffic congestion along US Highway 85 increases, light pollution from headlights may increase, as vehicles would take longer to move through the corridor. Any increases in light pollution from headlights associated with the annual increase in traffic along the corridor is anticipated to be compatible with the existing visual character and lightscapes along the project corridor. As such, light pollution is not anticipated to impact visual quality, including that of protected visual resources.

5.17.5. How would visual quality and protected visual resources be directly and indirectly affected by operation of the project?

Fugitive dust and criteria pollutant emissions from vehicles traveling along and adjacent to the project corridor would continue within both the rolling prairie and Badlands landscape units. Stark, Billings, and McKenzie counties would continue to implement dust-control measures along unpaved roadways, as necessary and when feasible, to minimize visual impacts of fugitive dust. Any increases in fugitive dust or emissions of criteria pollutants associated with the annual increase in traffic along the corridor are anticipated to be compatible with the existing visual character and would not impact viewers' ability to see viewsheds along the project corridor. As such, these emissions are not anticipated to impact visual quality. For more detailed air quality information, please refer **Section 5.11. Air Quality**.

Light pollution from vehicle headlights would continue to occur in both landscape units. The project is anticipated to reduce traffic congestion along US Highway 85. Therefore, light pollution from headlights may decrease, as vehicles would move through the corridor more quickly. Any increases in light pollution from headlights associated with the annual increase in traffic along the corridor is anticipated to be compatible with the existing visual character and lightscapes along the project corridor and would not impact visual quality.

5.17.5.1. Rolling Prairie Landscape Unit

Alternative C would result in fewer impacts on visual resources than Alternative B due to a narrower roadway footprint. Permanent impacts on visual resources within the rolling prairie landscape unit would occur along an existing transportation corridor. The new and modified features would be consistent with existing transportation facilities in the area. As such, impacts on visual resources are generally anticipated to be compatible with the existing visual character for neighbors and travelers, and minimal impacts on visual quality would occur within the rolling prairie landscape unit. For simulations of the roadway typical sections, please refer to **Section 3.3** in **Chapter 3**.

Light pollution from existing and proposed roadway lighting would occur within the rolling prairie landscape unit. The addition of destination lighting and expanded intersection illumination lighting would impact lightscapes; however, lighting would occur along an existing transportation corridor where headlights are already common. It is anticipated that travelers would perceive the added lighting as compatible with the visual character of a highway corridor, such that there would be minor impacts on visual quality. Neighbors of the added lighting may perceive the light pollution as incompatible with the visual character of the existing lightscape and may consider visual quality to be negatively impacted.

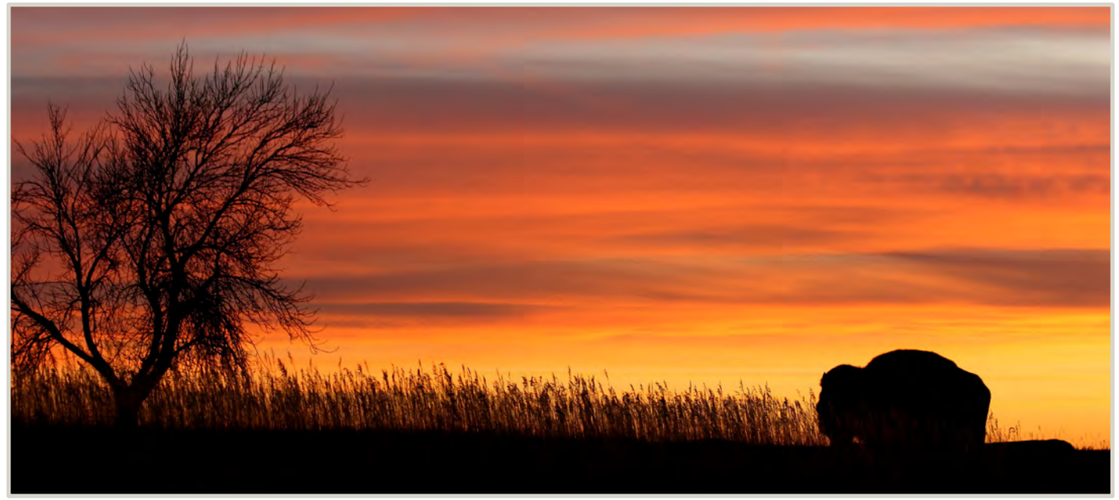
For Fairfield, Option FF-1 would have the least impacts on visual resources, as it would occur along the existing alignment, followed by Options FF-2, FF-3, and FF-4 in order of increasing roadway footprint. Option FF-1 would be generally consistent with the existing visual character by neighbors and travelers and is not anticipated to result in negative impacts on visual quality. Neighbors of Options FF-2, FF-3, and FF-4 may perceive these options as incompatible with exiting visual character due to the introduction of a new cultural feature (i.e., roadway) in a natural setting. As such, neighbors may consider visual quality to be negatively impacted by Options FF-2, FF-3, and FF-4. To the contrary, travelers along Options FF-2, FF-3, and FF-4 may perceive the roadway through a natural setting to be an improvement upon visual quality compared to the exiting alignment through Fairfield, as the roadway would pass through a natural setting rather than a developed area.

For the ND-200/US Highway 85 intersection, Options INT-1 and INT-2 are anticipated to be compatible with the existing visual character of the transportation corridor, and impacts on visual quality are not anticipated.

5.17.5.2. Badlands Landscape Unit

Based on public comments received during the scoping process, many individuals are concerned with potential impacts on the viewshed in the Badlands area. Permanent impacts on visual resources within the Badlands would be confined to an existing transportation corridor, and many of the new and modified features would be consistent with existing transportation facilities in the area. As such, many changes are anticipated to be compatible with the existing visual character for neighbors and travelers. However, some changes may be perceived by neighbors and travelers as incompatible with the existing visual character, such as modifications to, or removal of, the Long X Bridge, a new bridge, retaining walls, and wildlife fencing. Due to rugged terrain, the extent to which neighbors and travelers would be able to see the project corridor within their viewsheds would be limited. Travelers would experience a near-constant view of wildlife fencing as they pass through the Badlands area, which may result in a reduction in visual quality.

For the Long X Bridge, the new bridge under Options LX-1, LX-2, and LX-3 would be low-profile and constructed to blend with the surrounding environment to the maximum extent practicable. The removal of Long X Bridge would allow the viewer to take in the whole of the Badlands and remove the focal point of the existing bridge. Depending



on viewer perspective, neighbors and travelers may perceive the existing Long X Bridge as an iconic feature within the landscape or a cultural intrusion in an otherwise natural setting. As such, viewers may experience positive or negative impacts on visual quality as a result of modification or removal of the existing bridge, and a new, low profile bridge, depending on personal preference. For simulations of the Long X Bridge options, please refer to **Section 3.3.5** in **Chapter 3**.

5.17.5.3. Protected Visual Resources

From the vantage points where the project is visible, the project would result in modifications to roadway width, terrain, and vegetation that viewers may perceive. The most obvious modifications would be more extensive cut sections, including those that may be characterized by stratified geological layers or large flattened slopes, the wildlife fencing, and Long X Bridge options. Additional modifications throughout the project corridor would include less obvious, minor cut and fill sections, including associated vegetation modification. Vehicles (including headlights) would also be visible from these vantage points. Existing conditions alongside simulated changes based on preliminary engineering, and line-of-sight models for each vantage point are located in **Appendix E. Visual Assessment Results**. For examples of more obvious modifications depicted in the simulations, please refer to **Figure 77, Cut Section Characterized by Stratified Geological Layers (Maah Daah Hey Trail Vantage Point)**; **Figure 78, Large Flattened Slope and Wildlife Fencing (Temporary Visitor Center Vantage Point)**; and **Figure 79, Wildlife Fencing in Background (Future Visitor Center Vantage Point)**; all on **page 103**.

A summary of modifications that would be visible from each LMNG vantage point based on simulations and DEM models is as follows:

- MA 1.31 Backcountry Recreation Non-motorized: Cut section that would flatten a large slope, the wildlife fencing, and minor cut and fill sections
- Summit Campground: Wildlife fencing and minor cut and fill sections
- MA 1.2a Suitable for Wilderness: Wildlife fencing and minor cut and fill sections
- Maah Daah Hey Trail: Cut sections characterized by stratified geological layers, wildlife fencing, and minor cut and fill sections
- Long X Trail: Cut sections characterized by stratified geological layers, wildlife fencing, and minor cut and fill sections
- CCC Campground: Cut sections characterized by stratified geological layers, wildlife fencing, and minor cut and fill sections

From MA 1.31, Summit Campground, MA 1.2a, Maah Daah Hey Trail, Long X Trail, and CCC Campground vantage points within the LMNG, where more obvious modifications to the landscape would occur, it is anticipated that some viewers may notice the changes. However, the viewshed would not be appreciably limited, and impacts on the scenic integrity would be minor in these locations. In addition, it is not anticipated that the changes would interfere with the ability of the USFS to manage the affected vantage points for a 'high' Scenic Integrity Objective.

Figure 77, Cut Section Characterized by Stratified Geological Layers (Maah Daah Hey Trail Vantage Point)

Figure 78, Large Flattened Slope and Wildlife Fencing (Temporary Visitor Center Vantage Point)

Figure 79, Wildlife Fencing in Background (Future Visitor Center Vantage Point)

A summary of modifications that would be visible from each TRNP – North Unit vantage point based on simulations and DEM models is as follows :

- Temporary Administrative Center: Cut sections characterized by stratified geological layers, Long X Bridge options, cut section that would flatten a large slope, wildlife fencing, and minor cut and fill sections
- Future Visitor Center: Cut sections characterized by stratified geological layers, Long X Bridge options, cut section that would flatten a large slope, wildlife fencing, and minor cut and fill sections
- River Overlook: Cut sections characterized by stratified geological layers, Long X Bridge options, wildlife fencing, and minor cut and fill sections
- Buckhorn Trail – East: Cut sections characterized by stratified geological layers, Long X Bridge options, wildlife fencing, and minor cut and fill sections
- Longhorn Pullout: Cut sections characterized by stratified geological layers, wildlife fencing, and minor cut and fill sections
- Bentonitic Clay Overlook: Minor cut and fill sections
- River Bend Overlook: Wildlife fencing and minor cut and fill sections

- North Achenbach Overlook: Wildlife fencing and minor cut and fill sections
- Long X Trail Pullout: Wildlife fencing and minor cut and fill sections

From the Temporary Administrative Center, Future Visitor Center, River Overlook, Buckhorn Trail–East, and Longhorn Pullout vantage points within the TRNP–North Unit, where more obvious modifications to the landscape would occur, it is anticipated that some viewers may notice the changes. However, the viewshed would not be appreciably limited, and impacts on the scenic quality would be minor in these locations. From the Bentonitic Clay Overlook, River Bend Overlook, North Achenbach Overlook, and Long X Trail Pullout vantage points, it is anticipated that viewers are not likely to notice modifications due to the distance between the vantage points and US Highway 85. The project would result in negligible impacts on the scenic quality in these locations.

There would be no modifications to the landscape that would be visible from the Slump Block Pullout, Cannonball Concretions Pullout, Juniper Campground, Buckhorn Trail–Central, Achenbach Trail, Buckhorn Trail–West, Man and Grass Pullout, Edge of Glacier Pullout, or Oxbow Overlook vantage point. The project would result in no impacts on the scenic quality in these locations. Overall, it is not anticipated that the project would significantly reduce the integrity of the landscape character, vividness, or visual harmony within the TRNP–North Unit.

The project is not anticipated to increase glare or sky glow within the Badlands area. The project is anticipated to reduce traffic congestion along US Highway 85. Therefore, light pollution from headlights may decrease, as vehicles would move through the corridor more quickly. Any increases in light pollution from headlights associated with the annual increase in traffic along the corridor is anticipated to be compatible with the existing visual character and lightscapes along the project corridor.

Temporary and permanent fugitive dust and criteria pollutant emissions are not anticipated to result in visual impairment of any Class I areas (i.e., TRNP). Overall, fugitive dust and criteria pollutant emissions are not anticipated to impact the scenic integrity of the LMNG or the scenic quality of the TRNP–North Unit.

The project is anticipated to be consistent with the *Little Missouri State Scenic River Act*. Coordination with the Little Missouri River Commission has occurred, and the project would not result in permanent channelization, reservoir construction, dredging, or diversion modification of the Little Missouri River. For more detailed *Little Missouri State Scenic River Act* information, please refer **Section 5.13. Water Resources**. In addition, the project is anticipated to be consistent with the North Dakota Scenic Byway Program, as the project is not anticipated to impact the scenic, natural, historic, or recreational qualities of the TRNP–North Unit.

5.17.6. How would visual quality and protected visual resources be directly and indirectly affected by construction of the project?

During roadway construction, temporary impacts on visual resources are anticipated to occur separately in 8- to 10-mile segments, with construction in each segment lasting for two construction seasons. Temporary impacts on visual resources as a result of bridge construction, and potential renovation or removal activities at the Little Missouri River are anticipated to occur over one to two construction seasons. Workers, heavy equipment, haul trucks, passenger vehicles, materials, lighting, and dust would be present along the project corridor within the ROW and temporary easements during construction activities. For protected visual resources, temporary, direct visual impacts on NPS lands would be expected from construction activities associated with the Horseshoe Bend landslide stabilization. Direct visual impacts would also be expected on the scenic viewshed of the Little Missouri River during Long X Bridge construction activities. In addition, construction activities associated with roadway expansion and the Long X Bridge would result in temporary, indirect visual impacts on some areas of the TRNP–North Unit, DPG MAs 1.2A and 1.31, and Theodore Roosevelt National Park North Unit Scenic Byway.

Temporary light pollution from construction equipment, trucks, commuter vehicle headlights, and light plants would occur. Visual screening (e.g., slatted chain link fencing) would be installed prior to construction along the western- and northern-most sides of the Long X Bridge staging areas to provide a visual barrier between construction activities and the TRNP–North Unit. Visual screening would be an earth-tone color. Long-term, fixed lighting associated with staging areas near the TRNP–North Unit (i.e., between RP 126 and 130) would consist of downcast, shielded lighting to minimize light pollution; however, short-term, fixed and/or mobile lighting would not consist of downcast, shielded lighting. Lighting would be limited to certain construction hours near the TRNP–North Unit (i.e., 8 am to 10 pm central time [7 am to 9 pm mountain time]). Lighting would not be in use 24 hours per day unless the NDDOT obtains permission from the NPS for limited duration 24-hour lighting. Details regarding nighttime construction lighting impacting the TRNP–North Unit and other minimization measures would be determined as part of the Special-Use Permit process for work on NPS-managed lands.

Temporary fugitive dust and criteria pollutant emissions from construction equipment, on-road haul trucks transporting materials, and construction commuter vehicles would occur. Fugitive dust emissions from construction activities would be greatest during initial site-preparation activities and would vary from day to day, depending on the construction phase, level of activity, and prevailing weather conditions. Fugitive dust-control measures (e.g., watering, windbreaks and barriers, vehicle access control) would be implemented as necessary during construction in accordance with the NDDOT Standards and Specifications for Road and Bridge Construction and SWPPP. In addition, temporary light pollution from construction equipment, trucks, commuter vehicle headlights, and light plants would occur. For more detailed air quality information, please refer **Section 5.11. Air Quality**.

Alternative B would result in more acres of ground disturbance than Alternative C; however, temporary impacts on visual resources as a result of construction activities are anticipated to be similar between the alternatives. Similarly, there are minor variations in ground disturbance between the ND-200/US Highway 85 intersection and Long X Bridge options, though impacts on visual resources as a result of construction activities are anticipated to be similar among the respective options. Option FF-1 would have fewer impacts than Options FF-2, FF-3, and FF-4, as it would occur along the existing alignment and would have the smallest footprint. Options FF-2, FF-3, and FF-4 would result in comparable impacts on visual resources, though in different locations. Temporary impacts on visual resources as a result of construction activities are anticipated to be incompatible with the existing visual character for neighbors and travelers alike. As such, temporary, adverse impacts on visual quality would be expected during construction activities.

5.18. Energy

5.18.1. What energy resources and uses exist along the project corridor?

US Highway 85 is one of the primary arterial roadways accessing the Bakken Formation oil play in western North Dakota. Energy infrastructure along the project corridor includes oil and gas development and power lines. The following entities have known oil and gas infrastructure (e.g., pipelines) along the project corridor: Bridger Pipeline, Kinder Morgan, Petro Hunt, WBI Energy, ONEOK, Tesoro Logistics, Targa Badlands, Hess Corporation, Northern Border Pipeline Company, and Hillstone. In addition, the following entities have known electricity infrastructure (e.g., overhead or underground lines) along the project corridor: Roughrider Electric, McKenzie Electric Cooperative, Basin Electric, and Western Area Power Administration (WAPA).

A principal factor in energy use is vehicle fuel consumption, which is affected by total miles traveled, the number of stops and starts, sudden acceleration or deceleration, congestion, and grade steepness. Energy use along the project corridor includes vehicle fuel consumption and consumption by residences and businesses of electricity, natural gas, or other fuel used for heat and power.

5.18.2. How would energy be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, no direct impacts on oil and gas or electricity infrastructure would be expected, and there would be no short-term consumption of energy due to construction activities, as roadway construction would not occur. However, Alternative A would not address the demand for an improved highway system capable of addressing the social and economic needs of the region, which are tied to operation and maintenance of oil and gas development.

Under Alternative A, traffic along the corridor is expected to grow approximately 2.5 percent each year. A capacity analysis was conducted as part of the Traffic Operations Report completed for the project in 2017 (**appended by reference**) to determine delay and LOS (i.e., operational performance of a transportation corridor). Results from the analysis indicate that the current LOS along the project corridor ranges from 'B' to 'D' due to slower moving vehicles (approximately 35 percent of the vehicles throughout the corridor travel at speeds greater than or equal to 10 mph below the speed limit). As traffic volumes increase, the roadway would begin to experience LOS issues ranging from 'D' to 'E' by 2040. As passing demand increases, the available capacity decreases, thus causing two-lane highway service quality to deteriorate at relatively low demand flows. Sudden acceleration associated with passing, as well as congestion, reduces fuel efficiency (FHWA 2015B).

5.18.3. How would energy be directly and indirectly affected by operation and construction of the project?

The project would address the demand for an improved highway system capable of addressing the social and economic needs of the region, which are tied to operation and maintenance of oil and gas development. Traffic along the corridor is expected to grow approximately 2.5 percent each year. According to the capacity analysis conducted as part of the Traffic Operations Report (**appended by reference**), expanding the existing two-lane roadway to a four-lane roadway would improve the ability for vehicles to pass and improve the reliability of US Highway 85. Under Alternatives B and C, the LOS along the project corridor is projected to be between 'A' and 'B' by

2040. A reduction in sudden acceleration associated with passing, as well as reduced congestion, would increase fuel efficiency along the project corridor (FHWA 2015B).

Operational impacts from Options FF-1, FF-2, FF-3, and FF-4 are anticipated to be similar, with Option FF-1 having a slightly reduced vehicle energy efficiency due to the reduction in posted speed limit. However, this minor reduction may be offset by the slightly reduced travel distance associated with Option FF-1 relative to the three options that bypass Fairfield.

Operational impacts from Options INT-1 and INT-2 are also anticipated to be similar. While substituting a roundabout for a conventional signalized or signed intersection can reduce fuel consumption by reducing the amount of stop-and-go driving and idling (FHWA 2015B), traffic projections through 2040 indicate that a traffic signal is not warranted at the ND-200/US Highway 85 intersection. Therefore, Option INT-1 would not include a signal or sign during the design life of the project. Under Option INT-1, only traffic making a turn to or from ND-200 would be required to slow down and accelerate. In contrast, all traffic encountering the roundabout under Option INT-2 would be required to slow down and accelerate, which could reduce overall efficiency at the intersection compared to Option INT-1.

Appreciable differences in operation-related energy consumption between Options LX-1, LX-2, and LX-3 are not anticipated.

Impacts on oil and gas and electricity infrastructure would occur where relocations would be required to accommodate the new roadway footprint. Along the entire project corridor, except for the Fairfield options, Alternative C would impact more than twice the length of electricity line compared to Alternative B, and slightly more length of oil and gas infrastructure. Option FF-4 would have the least impact on energy infrastructure, followed by Options FF-3 and FF-1, with Option FF-2 having the greatest impact on energy infrastructure. Please refer to **Table 25, Energy Infrastructure Impact Summary**.

During the final design, permitting, and ROW acquisition phases, coordination with the necessary utilities and companies regarding the movement of impacted facilities would be conducted. At that time, any applicable permits would be acquired, and ROW and temporary construction easements would be acquired as needed for the relocations.

Construction activities would result in short-term consumption of energy due to on-road haul trucks transporting material, construction commuter vehicles, and operation of construction equipment. Additional energy from electricity utilities may be utilized for construction activities.

Table 25, Energy Infrastructure Impact Summary

Location	Impacts (linear feet)					
	Electrical Line	Oil and Gas Pipeline	Total	Electrical Line	Oil and Gas Pipeline	Total
	ALTERNATIVE B			*ALTERNATIVE C*		
Entire Corridor, except Fairfield Options	37,466	13,298	**50,764**	81,248	14,202	**95,450**
Option FF-1	700	840	**1,540**	700	840	**1,540**
Option FF-2	1,865	860	**2,725**	1,865	860	**2,725**
Option FF-3	700	865	**1,565**	700	865	**1,565**
Option FF-4	—	780	**780**	—	780	**780**

Appreciable differences in construction-related energy consumption between Alternatives B and C are not anticipated. It is anticipated that Option FF-1 would have a lower associated energy consumption during construction than the other Fairfield options due to the roadway remaining on alignment and utilizing existing infrastructure. Appreciable differences in construction-related energy consumption between Options LX-1, LX-2, and LX-3 and Options INT-1 and INT-2 are not anticipated. Regardless of the selected alternative and options, increases in electricity and energy resource demand would be temporary and are not anticipated to exceed existing capacity.

5.19. *Utilities*

5.19.1. What utilities are located along the project corridor?

Utilities located within the project corridor consist of communication lines, pipelines (e.g., natural gas, oil, and water), overhead power (distribution and transmission lines), and buried power. A Utility Coordination Memorandum—Preliminary Engineering was completed for the project in 2017 in order to identify existing utilities and utility conflicts along the project corridor (**appended by reference**).

The first step in the utility coordination process was identifying what utilities occupied or were adjacent to the project corridor. This was achieved by not only using the traditional methods of the North Dakota One Call system and the scoping letter process, but also using the services of a utility mapping company to verify and incorporate the location of the utility facilities. This extra step in the utility identification and data collection was conducted, because of the rapid change in utilities located along the corridor associated with the expansion of the oil and gas industry in western North Dakota.

Once the preliminary list of utility companies was identified, an email questionnaire was developed and sent out to each utility company to help refine the contact list and gather more detailed information about each of the utility companies. A series of two utility coordination meetings (one in Watford City and the other in Dickinson) were conducted at three different times throughout the project development phase to share information and receive input from the utility companies. Preliminary utility conflicts were identified and Utility Conflict Plans, Cross Sections, and a Utility Conflict Summary were developed for the entire project corridor.

Two plan sets were produced, one for each alternative analyzed during the preliminary engineering process. The objective of the utility coordination process was to understand where utilities may relocate their facilities and assess those impacts in this EIS. The project team worked to avoid or minimize impacts on the utility facilities where practical. The utility companies were given the utility conflict sheets, and they provided an estimated cost and preferred location for relocating their facilities.

Utilities located along the project corridor include the following:

- Basin Electric
- Bridger Pipeline (Belle Fourche)
- Century Link
- Consolidated Telecom
- Hess Corporation
- Hillstone (SBG Pipeline)
- Kinder Morgan
- McKenzie County Water Resource District
- McKenzie Electric
- Midcontinent Communications
- Nemont
- Northern Border Pipeline
- ONEOK
- Petro Hunt
- Reservation Telephone
- Roughrider Electric
- Southwest Water Authority
- Targa Badlands Pipeline
- Tesoro Logistics (High Plains Pipeline)
- WAPA
- WBI

5.19.2. How would utilities be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A (no-build), no direct or indirect impacts on utilities would be expected.

5.19.3. How would utilities be directly and indirectly affected by operation and construction of the project?

All attempts were made to identify and disclose impacts associated with utility relocations resulting from operation and construction of the project; however, only utilities that are relocated back within NDDOT ROW and USFS easements are included in the proposed action for this project. Therefore, any utility relocations that occur outside of NDDOT ROW or easements, or on NPS-managed lands would be required to obtain individual state and federal approvals, as necessary. This would include obtaining a ROW permit from the NPS for any relocations occurring on NPS-managed lands.

Under Alternatives B and C, the expansion of the roadway would impact adjacent utilities. Please refer to **Table 26, Utility Impact Summary** and **Table 27, Utility Impact Summary—Fairfield Options on page 107** for a summary of the utilities and potential impacts from construction of the project, and **Table 28, Utility Impact Summary—Public Lands on page 107** for the anticipated impacts on utilities located on USFS- and NPS-managed lands. An estimation of utility easements is shown in **Appendix C. Proposed Right-of-Way & Easements**. Alternative B would result in greater impacts on utilities than Alternative C. Of all the Fairfield options, Option FF-3 would result in the greatest impacts on utilities and Option FF-4 would result in the least.

The utility companies would be contacted, and coordination would begin to relocate the identified utilities as soon as the NDDOT secures funding and initiates the final design phase of the project. The NDDOT would provide a more detailed set of utility coordination plans and ROW and easement limits to the impacted utility companies during the design phase of the project, and would also work with the utilities to ensure avoidance of known sensitive resources (i.e., cultural resources, wetlands, USFS-designated sensitive plant populations). During final design, additional coordination and the final design details would be tailored to further reduce and minimize impacts on utilities. The NDDOT would also coordinate ROW and easement acquisition activities with the utility companies that are looking for an adjacent easement with the same landowner(s).

The utilities would typically be relocated back within the newly acquired NDDOT ROW or in a utility easement acquired by the utility company adjacent to the ROW. The utility companies would try to share an easement if they are compatible to be located within the easement. However, the larger, overhead transmission power facilities and transmission pipelines typically require their own easement, much larger than typical distribution utilities. Any utilities relocated within NDDOT ROW would be required to comply with the NDDOT Policy for Accommodation of Utilities on State Highway Right of Way, which includes environmental considerations.

Permanent ground disturbance for overhead utilities is typically only associated with the footprint of the pole or concrete foundation, except where substations are necessary. Most temporary impacts within the utility easement are associated with equipment moving between structure locations.

Impacts associated with installation of below-ground electrical and communication lines are relatively minimal. Typically, a narrow area of temporary disturbance consisting of a 3- to 12-inch trench occurs from use of a plow or trencher. A slightly wider disturbance is likely from use of a backhoe excavator installing the line, digging the bell hole for drilling, installing above or below-ground equipment, or removing rock.

Impacts associated with installation of below-ground pipelines are largely dependent on the construction area and installation method. Typically, the entire construction area is temporarily disturbed through clearing of the topsoil; however, these impacts are temporary, as most of the disturbed area is reclaimed following construction. Permanent impacts from pipeline installation would occur from above or below-ground equipment or monitoring facilities.

Table 26, Utility Impact Summary

Utility Company	Estimated Impact (linear feet) [a]		Preferred Easement Width/Location
	Alternative B	Alternative C	
OIL/GAS PIPELINES			
Bridger Pipeline (Belle Fourche)	540	1,540	No response
Hess Corporation	375	268	Crossing/maintain existing easement
Northern Border Pipeline	350	289	Crossing/maintain existing easement
Kinder Morgan	241	241	Crossing/maintain existing easement
ONEOK	7,853	8,128	Crossing/maintain existing easement
Petro Hunt	584	288	Crossing/maintain existing easement
Hillstone (SBG Pipeline)	345	235	Crossing/maintain existing easement
Targa Badlands Pipeline	1,260	966	50-foot-wide easement adjacent to NDDOT ROW
Tesoro Logistics (High Plains Pipeline)	1,750	2,247	Crossing/maintain existing easement
WBI	—	—	Crossing/maintain existing easement
Total	**13,298**	**14,202**	
COMMUNICATION LINES			
Century Link	165,725	144,445	Relocate within NDDOT ROW; additional coordination required during final design for building located at ND-200/US Highway 85 intersection
Midcontinent Communications	—	5,125	Relocate within NDDOT ROW
Consolidated Telecom	161,275	125,547	20-foot-wide easement adjacent to NDDOT ROW
Nemont	55,508	85,010	20-foot-wide easement adjacent to NDDOT ROW
Reservation Telephone	72,920	87,003	20-foot-wide easement adjacent to NDDOT ROW
Total	**455,428**	**447,130**	
POWER LINES/OVERHEAD AND BURIED			
Basin Electric	1,475	950	Crossing/maintain existing easement
McKenzie Electric	17,190	40,510	50- to 100-foot-wide depending on type of line
Roughrider Electric	17,081	21,144	20-foot-wide easement adjacent to NDDOT ROW
WAPA [b]	1,720	18,644	125-foot-wide easement adjacent to NDDOT ROW
Total	**37,466**	**81,248**	
WATER PIPELINES			
McKenzie County Water Resource District	7,280	12,678	50-foot-wide easement adjacent to NDDOT ROW
Southwest Water Authority	107,120	25,002	30-foot-wide easement adjacent to NDDOT ROW
Total	**114,400**	**37,680**	

Notes:

a. Public Land Impact Summary is included in this table.

b. The WAPA completed their own analysis of the impacts on their facilities and determined that Alternatives B and C would impact the same amount of their facility (i.e., approximately 8 miles or 42,240 linear feet). Their analysis included the stipulation that if the proposed US Highway 85 ROW overlapped their existing easement, they would want to be relocated onto a new easement.

Table 27, Utility Impact Summary—Fairfield Options

Utility Company	Type of Facility	Estimated Impact (linear feet)				Preferred Easement Width/Location
		Option FF-1	Option FF-2	Option FF-3	Option FF-4	
Century Link	Communication Line	12,920	8,795	12,130	8,880	Relocate within NDDOT ROW
ONEOK	Oil Line/Gas Lines	280	340	325	300	Crossing/maintain existing easement
Roughrider Electric	Overhead/Buried Power Line	700	1,865	700	—	20-foot-wide easement adjacent to NDDOT ROW
Southwest Water Authority	Water Line	1,230	3,060	2,800	2,765	30-foot-wide easement adjacent to NDDOT ROW
WBI	Gas Line	560	520	540	480	Crossing/maintain existing easement
Total		**15,690**	**14,580**	**16,495**	**12,425**	

Table 28, Utility Impact Summary—Public Lands

Utility Company	Type of Facility	Estimated Impact (linear feet)		Preferred Easement Width/Location
		Alternative B	Alternative C	
USFS				
Southwest Water Authority	Water Pipeline	16,719	2,300	30 feet located within or adjacent to highway easement
Roughrider Electric	Overhead/Buried Power Line	6,373	14,213	20 feet located within or adjacent to highway easement
Consolidated Telecom	Communication Line	13,776	13,776	20 feet located within or adjacent to highway easement
Nemont	Communication Line	17,765	16,495	20 feet located within or adjacent to highway easement
McKenzie Electric	Overhead/Buried Power Line	3,770	3,770	50 to 100 feet located within or adjacent to highway easement
ONEOK	Oil/Gas Line	1,800	1,800	Crossing/maintain existing easement
Tesoro Logistics (High Plains Pipeline)	Oil Line	350	350	Crossing/maintain existing easement
Reservation Telephone	Communication Line	700	700	20 feet located within or adjacent to highway easement
Century Link	Communication Line	—	2,600	Relocate within highway easement
Total		**61,253**	**56,004**	
*NPS: TRNP – NORTH UNIT**				
McKenzie Electric	Overhead/Buried Power Line	2,700	2,700	50 to 100 feet located within highway easement
Nemont	Communication Line	3,400	3,400	20 feet located within highway easement
Reservation Telephone	Communication Line	3,200	3,200	20 feet located within highway easement
Total		**9,300**	**9,300**	

*Note: *Refers to NPS-managed lands.*

5.20. Vegetation

Botanical field surveys along the project corridor were conducted in 2015 and 2016. The BE (2017) includes the findings of botany surveys on USFS-managed lands, discusses habitat suitability, and analyzes the potential effects of the project on USFS-designated sensitive plant species, USFS-designated watch plant species, and plant species of concern (i.e., identified on the NDPRD Natural Heritage Inventory [NHI]). Please refer to **Appendix B. Agency Correspondence**, for the letter from USFS concurring with the findings of the BE. The Dakota Skipper Field Botany Survey (2017) documents areas of suitable habitat (i.e., particular plant species) for the Dakota skipper, a butterfly protected by the ESA, along the portion of the project corridor located within McKenzie County, which is the only county along the corridor where the Dakota skipper is thought to occur. In addition, for woody vegetation mitigation purposes, the Tree Survey Memorandum (2017) documents the number and species of urban and naturally occurring (i.e., within drainages and riparian corridors) trees and shrubs along the entire project corridor. All of these reports are **appended by reference**.

5.20.1. What general plant and tree species occur along the project corridor?

A majority of the project corridor is dominated by crops or native plant communities with non-native plants interspersed throughout. The dominant native plant communities include western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), and silver sagebrush (*Artemisia cana*). Dominant grass species, which occur mainly on rolling hills, include western wheatgrass, blue grama, sideoats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), and green needlegrass (*Nassella viridula*).

Native communities on scoria outcroppings and butte summits are predominately composed of pussytoes (*Antennaria* spp.), plains orophaca (*Astragalus gilviflorus*), broom snakeweed (*Gutierrezia sarothrae*), rubber rabbitbrush (*Chrysothamnus nauseosus*), and little leaf eriogonum (*Eriogonum pauciflorum*). Dominant shrub species, which are scattered across plateaus and drainages, include silver sagebrush, silver buffaloberry (*Shepherdia argentea*), creeping juniper (*Juniperus horizontalis*), chokecherry (*Prunus virginiana*), and skunkbrush (*Rhus aromatica*).

Tree species include Rocky Mountain juniper (*Juniperus scopulorum*), American elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*), which grow on many of the slopes and drainages. Riparian zones consist predominately of native species, including plains cottonwood (*Populus deltoides*), sandbar willow (*Salix interior*), prairie cordgrass (*Spartina pectinata*), and American licorice (*Glycyrrhiza lepidota*). In addition to the riparian species, wetland vegetation includes three-square bulrush (*Schoenoplectus pungens*), softstem bulrush (*Schoenoplectus tabernaeomontani*), and bald spikerush (*Eleocharis erythropoda*). Crops in the region include wheat, corn, oats, barley, sorghum, and beans (USDA 2012A).

5.20.2. What noxious or invasive vegetation occurs along the project corridor?

According to NDCC Chapter 4.1-47-02, everyone is responsible for controlling the spread of noxious weeds. The North Dakota Department of Agriculture (NDDA) has identified 11 plant species that are included on the state's noxious weed list (NDDA 2017B). Counties and cities have the option to add noxious weeds to the list to be regulated in their jurisdiction. Altogether, Stark, Billings, and McKenzie counties have opted to include seven additional species to be regulated within their jurisdictions (NDDA 2017A). In addition, the USFS provides an additional list of 14 noxious and non-native, invasive species to be documented during pedestrian field surveys on USFS-managed lands (USFS 2015). The NDDA Weed Mapper includes many noxious weeds along the corridor in Stark and Billings counties; data for much of McKenzie County is not available in the mapper (NDDA 2018).

North Dakota's Noxious Weed Law (NDCC 4.1-14-01) defines weeds as species that are determined to be injurious to public health, crops, livestock, land, or other property, as determined by the State Agriculture Commissioner or county/city weed boards.

Previously disturbed areas (e.g., roadway ditches, buried utility corridors) and drainages throughout the project corridor have allowed for noxious and invasive weed species to establish. A total of 13 noxious and invasive species were identified during the field surveys for the project: absinth wormwood (*Artemisia absinthium*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), saltcedar (*Tamarix* spp.), field bindweed (*Convolvulus arvensis*), crested wheatgrass (*Agropyron cristatum*), downy brome (*Bromus tectorum*), intermediate wheatgrass (*Thinopyrum intermedium*), Kentucky bluegrass (*Poa pratensis*), quackgrass (*Elymus repens*), smooth brome (*Bromus inermis*), sowthistle (*Sonchus* spp.), and yellow or white sweetclover (*Melilotus* spp.).

5.20.3. What ESA-listed plant species, USFS-designated sensitive and watch list plant species, and plant species of concern occur along the project corridor?

There are no botanical resources listed for ESA protection within the project corridor (USFWS 2016).

USFS-designated sensitive plant species are defined as species "for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and/or habitat capability that would reduce a species' existing distribution" (USFS 2005).

There are 14 sensitive plant species with potential to occur within the BE survey area (USFS 2015), of which 12 were identified as having suitable habitat present: alkali sacaton (*Sporobolus airoides*), alyssum-leaved phlox (*Phlox alyssifolia*), blue lips (*Collinsia parviflora*), Dakota buckwheat (*Eriogonum visheri*), dwarf mentzelia (*Mentzelia pumila*), Easter daisy (*Townsendia exscapa*), Hooker's townsendia daisy (*Townsendia hookeri*), lance-leaf cottonwood (*Populus x acuminata*), Missouri foxtail cactus (*Escobaria missouriensis*), nodding wild buckwheat (*Eriogonum cernuum*), sand lily (*Leucocrinum montanum*), and Torrey's cryptantha (*Cryptantha torreyana*). Two of the sensitive plant species, Missouri foxtail cactus and Hooker's townsendia daisy, were identified during field surveys. Habitat for the limber pine (*Pinus flexilis*) and smooth goosefoot (*Chenopodium subglabrum*) did not occur within the BE survey area.

There are 24 species on the Watch Plant Species of the Little Missouri National Grassland that have the potential to occur in the BE study area, but have not been documented to occur on the LMNG (USFS 2015). None of the species on the list were identified within the BE study area.

The North Dakota Plant Species of Concern 2015 list identifies many species that are tracked in the NDPRD NHI (NDPRD 2012). The NDPRD indicated one species on the plant watch list occurs within the BE survey area: mountain meadow cinquefoil (*Potentilla diversifolia*). This species was not observed during field surveys.

Hooker's townsendia daisy observed during field survey

Missouri foxtail cactus observed during field survey

5.20.4. How would vegetation be directly and indirectly affected if US Highway 85 is not expanded?

Under Alternative A, vegetation would remain similar to current conditions, and there would be no direct or indirect impact on ESA-listed plant species, USFS-designated sensitive and watch list species, or species of concern, as no roadway construction would occur.

5.20.5. How would vegetation be directly and indirectly affected by operation and construction of the project?

Upon completion of construction activities, vehicles travelling along US Highway 85 would have the potential to spread or introduce noxious weeds along the project corridor. The spread of noxious weeds can have a negative impact on land use, recreation, livestock, and wildlife by invading plant communities and altering ecological functions. The NDDOT would be responsible for the control of noxious weeds within NDDOT ROW/easements after construction of the project. Appreciable differences in impacts on vegetation between the alternatives and options are not anticipated.

The project would permanently convert vegetated areas into a transportation corridor due to the expansion of the existing transportation corridor, and construction activities would have the potential to spread or introduce noxious weeds. Alternative C would result in less vegetation impact than Alternative B due to a narrower roadway footprint. Option FF-1 would have the least impact on vegetation of the Fairfield options, as construction would occur along the existing alignment, followed by Options FF-2, FF-3 and FF-4 in order of increasing construction footprint. Appreciable differences in impacts on vegetation between Options INT-1 and INT-2 are not anticipated. Construction of Option LX-1 may have fewer impacts on vegetation, as it would only require the construction of a new two-lane bridge and rehabilitation of the existing bridge, as opposed to construction of a new four-lane bridge under Options LX-2 and LX-3.

To reduce the potential for spreading of noxious weeds and invasive species, all construction equipment and vehicles to be used on USFS- and NPS-managed lands would be pressure washed and free of noxious weeds and plant propagules (i.e., seeds and vegetative parts that may sprout) prior to entrance onto the project site. This would include equipment and vehicles intended for off-road as well as on-road use, whether they are owned, leased, or borrowed by the contractor or any subcontractor. Cleaning of vehicles and equipment would occur off-site. Any state- or county-listed noxious weeds identified on USFS-managed lands along the project corridor would be controlled in coordination with the USFS in compliance with the 2007 DPG Noxious Weed Management Project EIS.

Disturbed, non-roadway areas would be re-seeded and a noxious weed management plan would be implemented during construction. The seed mixture for the Badlands area (i.e., RP 121.4 to RP 130.0) would be developed in coordination with the NDDOT, FHWA, USFS, NPS, and TCC. The seed mixture for USFS-managed lands outside of the Badlands area would be in accordance with USFS Seed Mixture #37-28A Scenario #13. The seed mixture for all other areas would follow the NDDOT Standard Specifications for Road and Bridge Construction, and may include a pollinator component. The re-seeded areas would be maintained until such time that the vegetation is consistent with surrounding undisturbed areas and the site is free of noxious weeds.

Alternatives B and C would impact trees along the project corridor. It is anticipated that impacts on urban (i.e., within communities) and native rural trees would be required. Alternatives B and C are anticipated to impact approximately 6,700 and 6,400 native or urban trees, respectively. Actual impacts would be assessed during construction and any necessary mitigation would be determined in coordination with the NDDOT and NDGF.

The project would have no impact on ESA-listed plant species, as no such resources occur within the project corridor. The project is not anticipated to impact USFS watch list species, as no such resources have been identified within the project corridor. The project would have no impact on the NDPRD-identified plant species of concern (mountain meadow cinquefoil), as the population is outside of the construction limits and NDDOT ROW/easements.

With regard to sensitive species, the project would impact all or much of the Hooker's townsendia daisy population (approximately 25 individuals) identified during the field survey, as it occurs with the roadway construction limits. Alternative B would impact the entire population, while Alternative C would impact at least half of the population. Impacts on this species would be minimized to the extent practicable, with fencing installed during construction in areas where avoidance is possible, if any, to prevent disturbance. In addition, impacts on unidentified populations of this species may occur due to the presence of suitable habitat.

The Missouri foxtail cactus population identified during the BE survey would be avoided, as it is outside of the construction limits and NDDOT ROW; however, impacts on unidentified populations of this species may occur due to the presence of suitable habitat.

In addition, although the species were not identified during the BE survey, the project has the potential to impact 10 additional sensitive species due to the disturbance of suitable habitat: alkali sacaton, alyssum-leaved phlox, blue lips, Dakota buckwheat, dwarf mentzelia, Easter daisy, lance-leaf cottonwood, nodding wild buckwheat, sand lily, and Torrey's cryptantha. None of the known or potential impacts are anticipated to contribute to a trend towards federal listing or cause a loss of viability to the populations or species. The project would not impact the limber pine and smooth goosefoot, as individuals or habitat were not identified within the BE survey area. Any USFS-designated sensitive plant species or USFS-designated watch plant species observed during construction would be reported to the USFS.

5.21. *Relationship between Short-term uses of the Human Environment and Maintenance and Enhancement of Long-term Productivity*

5.21.1. What are short-term uses of the human environment and maintenance and enhancement of long-term productivity?

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Short-term uses of the biophysical components (e.g., soil, water, gravel, organisms, animals) of the human environment include direct impacts, usually related to construction activities, which occur over a period of less than five years. Long-term uses of the human environment include those impacts that occur over a period of more than five years, including permanent resource loss.

5.21.2. What are the short-term uses and maintenance and enhancement of long-term productivity associated with the project?

This EIS identifies potential short-term, direct impacts during construction activities associated with the alternatives. These short-term impacts would include temporary travel delays and increases in demand for local services and energy. In addition, temporary disturbance to vegetation, wildlife, farmlands, wetlands and Other Waters, air quality, visual resources, and ambient sound levels would be expected. With implementation of mitigation measures and BMPs, these impacts would be minor.

The maintenance and enhancement of long-term productivity of the environmental resources of an area are based on several different factors, including transportation systems. Long-term productivity improvements would be expected upon completion of construction activities. The project would improve transportation systems long-term by providing an efficient, safe, and reliable roadway and would improve connectivity and system linkage from I-94, north to Watford City and recreational resources. The project would also provide long-term, safe, and efficient crossings for wildlife to cross the roadway. The long-term productivity improvements are anticipated to outweigh the potential short-term uses of the biophysical components of the human environment.

The project would be consistent with the goals, objectives, and policies listed in the Stark, Billings, and McKenzie County Comprehensive Plans, as well as the City of Belfield Comprehensive Plan. These plans consider the requirements for long-term productivity, safety, and development of the transportation system. Therefore, the project is consistent with local and county planning in the area. The contribution to the maintenance and enhancement of long-term productivity of the uses within the area is expected to outweigh the short-term impacts.

5.22. *Irreversible/Irretrievable Commitment of Resources*

5.22.1. What are irreversible/irretrievable commitments of resources?

An irreversible or irretrievable commitment of resources refers to impacts on, or losses to, resources that cannot be reversed or recovered, even after an activity has ended. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources, such as metal, wood, fuel, paper, concrete, earthen fill, and other natural resources) also are considered irretrievable, including human labor. All such resources are irretrievable in that they are used for a project, and thus, become unavailable for other purposes.

NEPA requires an analysis of significant, irreversible impacts resulting from implementation of a proposed action. Impacts that narrow the range of beneficial uses of the environment are of concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses in a project area.

5.22.2. Would there be irreversible/irretrievable commitments of resources from operation and construction of the project?

As with any construction project, certain irreversible and irretrievable commitments of natural resources, manpower, material, and fiscal resources are required. Lands acquired for ROW would be converted from their present use to transportation use. Use of the lands is considered an irreversible commitment during the time period that the land is used for a transportation facility. However, if a greater need arises for the use of the land or the transportation facility is no longer needed, the land could be converted to another use. Currently, there is no reason to believe that such a conversion would be necessary or desirable.

Fossil fuels, labor, and highway materials, such as steel, cement, aggregate, and bituminous material, would be expended to complete the project. Additionally, labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable once used. Any construction would require a substantial expenditure of local, state, and federal funds, which would not be retrievable. Generally speaking, Alternative B would require a greater commitment of ROW, labor, and funding as compared to Alternative C. Similarly, Options FF-2, FF-3, FF-4, LX-2, and LX-3 would result in the greatest commitment of irretrievable resources compared to Options FF-1 and LX-1, respectively. Regardless of the selected alternative and options, it is anticipated that the beneficial effects of the project would balance any irreversible or irretrievable commitment of resources.

Chapter 6. Section 4(f) Evaluation

This chapter provides an overview of the Section 4(f) process and an evaluation of Section 4(f) properties in accordance with guidance and regulations established in Section 4(f) of the Department of Transportation Act. This chapter also contains a Nationwide Section 4(f) Programmatic Evaluation and Approval for Federal Highway Administration (FHWA) Projects that Necessitate the Use of Historic Bridges.

Important topics in this chapter:

List of documents appended by reference in this chapter:

- Class III Cultural Resource Inventory in Billings, McKenzie and Stark Counties, North Dakota, Parts I and II (2016)
- Little Missouri River Feasibility Study Report (2013)
- Noise Report (2017)
- SPreAD Memorandum for Temporary Pile Driving Activities (2018)
- SPreAD Memorandum for the Badlands Area (2017)

6.1. What is Section 4(f)?

The *Department of Transportation Act of 1966*, 49 United States Code (U.S.C.) 303, and Section 18(a) of the *Federal-Aid Highway Act of 1968,* 23 U.S.C. 138 include a special provision, Section 4(f), which stipulates that the FHWA and other US Department of Transportation (USDOT) agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent avoidance alternative to the use of the land, and the action includes all possible planning to minimize harm to the property resulting from such use, or
- The FHWA determines that the use of the property will have a *de minimis* impact.

A *de minimis* impact is one that, after taking into account any measures to minimize harm, results in either:

(1) A Section 106 finding of *no adverse effect* or *no historic properties affected*, or

(2) A determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under Section 4(f).

6.1.1. What is the meaning of use under Section 4(f)?

According to 23 Code of Federal Regulations (CFR) 774 and the Section 4(f) Policy Paper, there are three forms of use under Section 4(f): permanent, temporary occupancy, and constructive (FHWA 2012).

- Permanent use is when a Section 4(f) property is permanently incorporated into a transportation facility.
- Temporary occupancy results when a Section 4(f) property, in whole or in part, is required for project construction-related activities. The property is not permanently incorporated into a transportation facility, but the activity is considered to be adverse in terms of the preservation purpose of Section 4(f).
- Constructive use involves no actual physical use of the Section 4(f) property via permanent incorporation of land or a temporary occupancy of land into a transportation facility. A constructive use occurs when the proximity impacts of a proposed project adjacent to, or nearby, a Section 4(f) property result in substantial impairment to the property's activities, features, or attributes that qualify the property for protection under Section 4(f). As a general matter, this means that the value of the resource, in terms of its Section 4(f) purpose and significance, will be meaningfully reduced or lost. Pursuant to 23 CFR 774.15, it is the FHWA's responsibly to determine when there is a constructive use.

Temporary occupancy is further explained in the Section 4(f) Policy Paper, if these five criteria are satisfied (23 CFR 774.13(d)), then a Section 4(f) use is not constituted. These conditions include:

1. Duration must be temporary (i.e., less than the time needed for construction of the project), and there should be no change in ownership of the land.
2. Scope of the work must be minor (i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal).
3. There are no anticipated permanent, adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property on either a temporary or permanent basis.
4. The land being used must be fully restored (i.e., the property must be returned to a condition that is at least as good as that which existed prior to the project).
5. There must be documented agreement from the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

If a temporary occupancy meets the aforementioned conditions, and therefore, does not constitute a Section 4(f) use, the temporary occupancy is considered an exception and does not require FHWA approval.

6.1.2. What are the approval options under Section 4(f)?

Depending on the use of the Section 4(f) property, three methods are available to the FHWA to approve the use:

1. Determination of a *de minimis* impact
2. Programmatic Section 4(f) Evaluation
3. Individual Section 4(f) Evaluation

A *de minimis* impact takes into account all measures to minimize harm (avoidance, minimization, mitigation, or enhancement). Use of a Section 4(f) property having a *de minimis* impact can be approved by the FHWA without the need to develop and evaluate alternatives that would avoid using the Section 4(f) property. A *de minimis* impact determination requires both agency coordination and public involvement as required in 23 CFR 77.45(b).

If the anticipated use of a Section 4(f) property is determined to be greater than a *de minimis* impact, use of the project must be approved using either a programmatic or individual Section 4(f) evaluation. Before either of these approval methods can be used, FHWA must determine that no feasible and prudent avoidance alternative exists.

Section 4(f) policy states that an alternative is not feasible if it cannot be built as a matter of sound engineering judgement (23 CFR 774.17). Alternatives that are not feasible are documented in the project file and ruled out from further consideration. If an alternative is determined feasible, it must then be determined prudent. In accordance with 32 CFR 774.17, an alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It results in unacceptable safety or operational problems;
- After reasonable mitigation, it still causes:
  - » Severe social, economical, or environmental impacts;
  - » Severe disruption to established communities;
  - » Severe disproportionate impacts on minority or low income populations; or
  - » Severe impacts on environmental resources protected under other federal statutes;
- It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
- It causes other unique problems or unusual factors; or
- It involves multiple factors that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

If a feasible and prudent alternative not involving the use of the Section 4(f) property is identified, the project cannot proceed with an alternative that results in a use of the Section 4(f) property. If no feasible and prudent alternative is identified, the project may proceed with an alternative that results in the use of a Section 4(f) property; however, if there are multiple alternatives that would result in the use of the Section 4(f) property, the alternative resulting in the least overall harm to the Section 4(f) property must be selected.

6.2. What is the proposed action?

The proposed action is to expand 62 miles of US Highway 85 from the Interstate 94 (I-94) interchange to the Watford City Bypass (McKenzie County Road 30) to a four-lane highway with flexible design options to avoid or minimize impacts and rehabilitate or replace the historic Long X Bridge over the Little Missouri River.

6.3. What is the purpose of, and need for, the project?

Details on the project's purpose and need are provided in **Chapter 1**. The purpose of the proposed action is to provide a transportation corridor that would:

- Address social demands created by the rise in traffic volumes and influx of people, and facilitate economic development within the region by providing an efficient and reliable highway system.
- Accommodate a mix of industrial, agricultural, and passenger traffic while providing reasonable accommodations for oversized loads and ample passing opportunities for the traveling public.
- Improve system linkage within the region and state by expanding the existing highway on essentially its current alignment to create a continuous four-lane highway from the I-94 interchange to US Highway 2.
- Improve safety along the project corridor for the traveling public.
- Provide highway capacity to accommodate current and future traffic volumes.
- Satisfy transportation demands associated with the US Highway 85 corridor while maintaining compatibility with federal land management agencies.
- Improve roadway reliability by addressing current height and width restrictions associated with the Long X Bridge, and addressing slope stability and landslide issues along the roadway corridor.
- Reduce the potential for wildlife/vehicle-related crashes, and minimize wildlife habitat fragmentation.

6.4. What are the alternatives and options for the project?

A No Action Alternative (Alternative A) and two primary build alternatives have been carried forward for analysis in this EIS: Alternative B—Divided, four-lane highway with a depressed, center median and Alternative C—Divided, four-lane highway with a flush, center median. Please refer to **Chapter 3**, for further discussion of the alternatives and options.

In addition to these two primary build alternatives, the following options have been developed at key locations along the project corridor where additional design considerations are needed (i.e., Fairfield, the North Dakota Highway 200 (ND-200)/US Highway 85 intersection, and the Long X Bridge):

- Fairfield
  - Option FF-1: Four-lane Urban
  - Option FF-2: West Bypass
  - Option FF-3: East Bypass 1
  - Option FF-3: East Bypass 2
- ND-200/US Highway 85 Intersection
  - Option INT-1: Standard Intersection
  - Option INT-2: Multi-lane Roundabout
- Long X Bridge
  - Option LX-1: New Two-lane Bridge, Rehabilitate Existing Long X Bridge
  - Option LX-2: New Four-lane Bridge, Retain Existing Long X Bridge for Alternate Use
  - Option LX-3: New Four-lane Bridge, Remove Existing Long X Bridge

After considering all of the potential alternatives, collaborating with the public and cooperating and participating agencies, and conducting engineering and environmental studies for the project, the North Dakota Department of Transportation (NDDOT) and FHWA have recommended that the Preferred Alternative include a combination of the following:

- Alternative B: expand the existing roadway to a divided, four-lane section with a depressed, center median in all areas of the project corridor except Fairfield, the Badlands, and south of Watford City.
  - The existing roadway through the Badlands and Watford City would be expanded as previously discussed in **Chapter 3**, **Sections 3.3.4 and 3.3.6**.
- Option FF-1: expand the existing roadway through Fairfield to a four-lane, urban section with reduced speeds.
- Option INT-2: construct a multi-lane roundabout at the ND-200/US Highway 85 intersection.
- Option LX-3: replace the Long X Bridge with a new four-lane bridge.

6.5. How were Section 4(f) properties identified for the project?

The following resources along the corridor were analyzed for Section 4(f) applicability:

- Parks and recreational areas of national, state, or local significance that are both publicly owned and open to the public.
- Publicly owned wildlife and waterfowl refuges of national, state, or local significance that are open to the public to the extent that public access does not interfere with the primary purpose of the refuge.
- Historic sites of national, state, or local significance in public or private ownership regardless of whether they are open to the public (23 U.S.C. § 138(a), 49 U.S.C. § 303(a), FHWA 2012).

Properties that fall under these three categories are not automatically subject to Section 4(f). Rather, additional considerations must be given in some instances to determine significance and/or intended use of the property before Section 4(f) applicability can be established.

The US Highway 85 project contains a number of properties meeting one or more of the three applicability categories previously identified. These resources are discussed in the following sections.

6.5.1. US Forest Service – Dakota Prairie Grasslands (DPG)

Along the project corridor there are a total of five different US Forest Service (USFS) Management Area (MA) designations assigned to the various adjacent parcels of USFS-managed lands. All USFS-managed lands along the project corridor is publicly owned and open to the public; however, Section 4(f) only applies to MAs that are primarily used for recreation, public park, or wildlife and waterfowl refuge purposes.

A Land and Resource Management Plans (LRMP) is developed through public participation and provides the guiding principles in which National Forest System (NFS) lands are managed by the USFS. Within the LRMP, each parcel of land is assigned an MA designation. MAs are designated to ensure proper rules, guidelines, and prescriptions are implemented to achieve desired conditions and standards applicable to each MA. These rules, guidelines, and prescriptions were used for assessing Section 4(f) applicability for each MA. To determine the primary use of each MA along the project corridor, the following steps were taken:

1. Identification of each of the different MAs along the project corridor.
   - DPG MA 1.2a—Suitable For Wilderness
   - DPG MA 1.31—Backcountry Recreation Non-Motorized
   - DPG MA 3.51—Bighorn Sheep Habitat
   - DPG MA 3.65—Rangelands with Diverse Natural-Appearing Landscapes
   - DPG MA 6.1—Rangeland with Broad Resource Emphasis
2. The 2002 Record of Decision for DPG Final Environmental Impact Statement (EIS) and LRMP (USFS 2002) were referenced to identify the primary use of the MAs.
   - DPG MA 1.2a—Suitable for Wilderness
     Key words from the LRMP indicate these areas are managed to protect their wilderness character for potential future listing in the National Wilderness Preservation System. The USFS will honor valid existing rights even if it means that roads may be constructed in these areas, and land exchanges will be considered to resolve issues related to valid existing rights.
   - DPG MA 1.31—Backcountry Recreation Non-Motorized
     Key words from the LRMP indicate this area is managed to provide recreation opportunities.
   - DPG MA 3.51—Bighorn Sheep Habitat
     Key words from the LRMP indicate this area is managed to provide quality forage, cover, escape terrain, and solitude for bighorn sheep.
   - DPG MA 3.65—Rangelands with Diverse Natural-Appearing Landscapes
     Key words from the LRMP indicate these areas are managed with emphasis on maintaining a naturally appearing landscape, while providing a mix of other rangeland values and uses. These areas have fewer livestock grazing developments. Oil and gas development may occur.

USFS – Dakota Prairie Grasslands

   - DPG MA 6.1—Rangeland with Broad Resource Emphasis
     Key words from the LRMP indicate these areas are managed for the diversity of native plants and animals and ecological functions and processes, while providing livestock forage and a mix of other rangeland values and uses.
3. A meeting with the USFS, FHWA, and NDDOT was held to discuss the first two steps and then identify whether or not the MAs met the Section 4(f) requirements of recreation, public park, or wildlife and waterfowl refuge.
4. The MAs that were determined a Section 4(f) property include: MA 1.31 Backcountry Recreation Non-Motorized, MA 3.51 Bighorn Sheep Habitat, and MA 1.2a Suitable for Wilderness. Concurrence and signatures were received from both the USFS and FHWA.

Additionally, the NDDOT has existing easements with the USFS for US Highway 85. The intended use of these easements is for the occupation and operation of a transportation corridor. Its intended use is not for recreation, wildlife or waterfowl refuge, or preservation of a historic site. Therefore, these existing easements are not considered Section 4(f) properties.

6.5.2. TRNP – North Unit

The Theodore Roosevelt National Park (TRNP) – North Unit is under the management of the National Park Service (NPS). Theodore Roosevelt National Memorial Park was established in 1947, which was redesignated by Congress in 1978 as Theodore Roosevelt National Park (NPS 2014). The purpose of the TRNP is to memorialize Theodore Roosevelt and his conservation legacy. The significance of the TRNP lies with the Little Missouri River Badlands, which consist of a unique, colorful, and rugged landscape formed by 65 million years of erosion that has exposed geological strata. The Badlands include varied habitats, abundant wildlife, fossils, petrified wood, and cultural resources.

Theodore Roosevelt first visited the Badlands in 1883, where he would later establish the Elkhorn Ranch.

The TRNP currently protects more than 70,000 acres of land located in Billings and McKenzie counties, including approximately 29,920 acres of designated wilderness area, known as the Theodore Roosevelt Wilderness (NPS 2014). The park is made up of three units: Elkhorn Ranch Unit (218 acres), TRNP – North Unit (24,070 acres), and South Unit (46,159 acres) (NPS 2015c). The project corridor intersects the eastern edge of the TRNP – North Unit, where the NDDOT currently has a Highway Easement Deed from the NPS for the US Highway 85 transportation corridor. In addition, roadways extending from US Highway 85 along the project corridor provide access to the TRNP – South Unit.

The administrative boundary of the TRNP includes public and private lands. Private land holdings, also known as inholdings, are parcels of property that were under private ownership prior to establishment of the park's administrative boundary. Public land holdings under the management of the NPS are open to the public, while privately owned inholdings are not. In accordance with FHWA's Section 4(f) Policy Paper, NPS-managed parcels located within the administrative boundary would be considered Section 4(f) properties. Privately owned property within the administrative boundary are not open to the public and are not managed by the NPS; therefore, private lands located within the administrative boundary of the park would not be considered Section 4(f) properties.

The NDDOT has an existing Highway Easement Deed with the NPS for US Highway 85. Due to the incorporation of design modifications, the project would not require additional area under the Deed; however, an additional 0.2 acres would be added to account for a recent, unrelated landslide repair project covered under a Special-Use Permit. It was understood by the NDDOT, FHWA, and NPS during the permitting process for the landslide repair project that this additional area would be added to the forthcoming US Highway 85 Highway Easement Deed. The intended use of this Highway Easement Deed is for the occupation and operation of a transportation corridor. Its intended use is not for recreation, wildlife or waterfowl refuge, or preservation of a historic site. Therefore, the area within the Highway Easement Deed (including the 0.2-acre Special-Use Permit area) is not considered a Section 4(f) property.

The entrance to the TRNP – North Unit is located off of US Highway 85. Approaching the park entrance, US Highway 85 includes a right-hand turn lane for southbound traffic and a climbing lane for northbound traffic. On the western side of US Highway 85, NPS lands are fenced to keep bison in the park.

6.5.3. TRNP – North Unit Entry Sign (32MZ154)

The NPS sign marks the entrance to the TRNP – North Unit and was constructed in 1952. It has a rectangular concrete base with a rusticated, cut stone pylon, the east end of which rises in a truncated pier. The feature is in excellent condition and retains all aspects of integrity. The feature has been re-painted, but maintenance work has been completed in-kind. The site has been evaluated for eligibility against the National Register of Historic Places (NRHP) criteria and has been determined *Eligible* for listing on the NRHP since it is a contributing feature (within a later period of significance) of the site. Therefore, the TRNP – North Unit Entry Sign is considered a Section 4(f) property.

TRNP – North Unit Entry Sign (32MZ154)

TNRP – North Unit

6.5.4. Long X Bridge (32MZ1807)

The Long X Bridge is one of four remaining Warren truss bridges within North Dakota on the state and county transportation system. The Long X Bridge is a cantilevered, sub-divided Warren through truss with three spans, constructed in 1959. It is 969 feet long, with two driving lanes, a roadway width of 30 feet and vertical clearance of 16 feet. The bridge was dedicated on Sunday, September 13, 1959. The ceremony included music and invocation and benediction, and remarks from the District Engineer, Commissioner, Chief Engineer, and the Governor of North Dakota. The dedication was part of a larger dedication celebration to include dedication of the Theodore Roosevelt National "Memorial" Park South Unit Visitor Center in Medora and the Squaw Creek Campground in the TRNP – North Unit near Long X Bridge.

The Warren truss was patented in England by James Warren and Willoughby Theobald Monzani in 1848. The first bridge that followed this patent was built by Jospeth Cubitt in 1852; the Dyke Railroad Bridge of the Great Northern Railroad. Examples of the Warren truss, which uses equilateral triangles to spread out the loads on the bridge, can be found everywhere in the world.

NDDOT currently has 170 truss bridges on the State Bridge Inventory. Of these, 28 are through truss bridges and 142 are pony truss bridges (this includes two recently built pedestrian bridges). The NDDOT bridge inventory currently contains four Warren though truss bridges (two on the state system, two on the county system), 18 Pratt through truss bridges (all on the county systems) and six Parker through truss bridges (three on the state system, three on the county system). A total of 16 through truss bridges have been removed from the State Bridge Inventory in the last 17 years.

Of the remaining through truss bridges on the state system, only two (Long X and Oslo) are Riveted Warren style. Please refer to **Table 29, Through Truss Bridges on State System on page 116**. The profile of the Oslo Bridge differs from the profile of the Long X Bridge due to the verticals and polygonal top being cantilevered.

Long X Bridge (32MZ1807)

Table 29, Through Truss Bridges on State System

Structure Number	Name	Year Built	Bridge Type	Water Body	NRHP Status
2-911.409	Sorlie Bridge	1929	Riveted Parker Through Truss	Red River	Listed
17-140.327	N/A	1939	Riveted Parker Through Truss	Red River	*Eligible*
0054-009.958	Oslo Bridge	1959	Riveted Warren Through Truss with Verticals and Polygonal Top Cantilevered	Red River	*Eligible*
0085-126.562	Long X Bridge	1959	Riveted Warren Through Truss	Little Missouri River	*Eligible*
0002-358.090	Kennedy Bridge	1963	Riveted Parker Through Truss	Red River	*Eligible*

The Long X Bridge has been evaluated against the NRHP Criteria and has been determined *Eligible* under Criterion C as a good example of a Warren through truss bridge within North Dakota. While the Warren through truss bridge design is utilized world-wide, the Long X Bridge is one of four remaining examples of a Warren through truss in the state of North Dakota.

Since the time it was recorded, the bridge has sustained appreciable damages from a number of collisions. Due to the low vertical clearance, the overhead cross members have been struck seven times. As a result, a total of six overhead cross members have been replaced. Plates and K-braces also have been replaced, in full, or in part. The modern repairs have been made with similar materials but new plates have been welded, not riveted. For this reason, the modern replacement members do not possess the same punched or drilled holes characteristic of the original components.

A bridge rehabilitation project was completed in 2010. The scope of this rehabilitation was as follows:

- New double box beam traffic barrier rails
- New W-beam guardrail
- Paint on all truss members below 12 feet
- New cotter pin at the south wind transfer assembly
- Slope protection and concrete abutment repairs at the north end
- Replacement of two concrete end posts and post pedestals
- Repairs to the west end of the south pier cap

In 2012, an ultrasonic pin inspection was conducted, which is conducted every eight years. The inspection found all pins to be in good condition.

The most recent bridge inspection was completed on December 6, 2017. Results of the inventory and appraisal rank the structural condition of the bridge at 5 (Above Minimum Tolerable). The deck and superstructure were in fair condition, the substructure ranked as satisfactory, and the condition of the channel and channel protection coded to reflect bank slumping. Results of the most recent inspection noted that four segments of sway bracing on the underside of the feature's deck have broken away from the stringer at center and that rivet heads are broken off at various locations. The paint on the lower portions of the truss is failing.

In terms of cultural integrity and significance, the site is in good condition and retains all relevant aspects of integrity. Integrity of design and materials are arguably most important to this site's ability to convey its historic character. The configuration of the truss and its connections are intact and therefore the feature retains integrity of design. The bridge retains integrity of materials as modern repairs and replacements have been in-kind, using methods and materials of similar type as those used during the feature's period of significance. Historically, members would have been fastened with rivets. The modern repairs are welded, but the replacements do not detract from the overall visual impression of the bridge. The site's setting is intact, and it retains integrity of location, feeling, and association. As stated in the National Register of Historic Places Multiple Property Documentation Form for Historic Bridges of North Dakota, the superstructure of a metal truss highway bridge reflects mass-production of materials as opposed to true workmanship. For this reason, integrity of workmanship is considered irrelevant to the site (Hufstetler 1997).

Summit Campground

A 2015 update to the site form noted cracking concrete pedestals along both east and west sides of the decking. Cracks were also visible in the concrete directly behind several of the vertical intermediate posts. The W-beam guardrails show signs of impact and areas of minor to moderate rust formation are present throughout the structure. These conditions and the repairs made to previous damages do not affect the feature's overall historic and cultural integrity. This is because the original substructure, deck, and railing system are not considered necessary in order for the bridge to be eligible, provided that the aesthetic impression of the superstructure and its function remain intact (Hufstetler 1997).

The Long X Bridge has been determined *Eligible* for listing on the NRHP under Criterion C as a good example of a Warren through truss bridge within North Dakota and is considered a Section 4(f) property.

Numerous collisions have caused appreciable damage to the Long X Bridge, including the bent and displaced portal member and damaged truss vertical member shown.

6.5.5. Summit Campground

The Summit Campground is located along the project corridor and managed by the USFS. The campground includes walk-in tent sites with picnic tables, pull-through camping units for recreational vehicles, picnic areas with shelters, and a vault toilet (Morel 2017). The Summit Campground is considered a Section 4(f) property.

6.5.6. Maah Daah Hey Trail

The Maah Daah Hey Trail is a single-track, 96-mile-long, non-motorized, hiking, biking, and horseback trail extending from the Civilian Conservation Corps (CCC) Campground to Sully Creek State Park, south of the TRNP—South Unit (USFS Undated(c)). The Maah Daah Hey Trail is considered a Section 4(f) property.

6.5.7. CCC Campground

The CCC Campground is located 15 miles south of Watford City, approximately 0.75 miles off of US Highway 85. The campground has three loops with 38 camping sites and a parking area at the northern trailhead for the Maah Daah Hey Trail. The CCC Campground is considered a Section 4(f) property.

6.5.8. Cultural Resources/Historic Properties

A Class III Cultural Resource Inventory and architectural survey were completed for the project. A total of 95 sites were documented in the area of potential effect (APE). Through the Section 106 process, resources were either identified as *unevaluated*, *Eligible*, or *Not Eligible* for inclusion on the NRHP.

Unevaluated sites that had potential to be impacted by construction of the project were evaluated in 2016 and 2017. None of these sites were determined to be *Eligible* for inclusion on the NRHP, and they did not warrant preservation in-place. Therefore, none are considered a Section 4(f) property.

Sites that are *Eligible* for listing on the NRHP are described in the following subsections.

6.5.8.1. Pre-historic Cultural Material Scatter (32MZ1484)

This site was originally recorded and tested in 2000. Materials identified during testing were believed to be associated with Prehistoric/Village-period sites. This site has been determined *Eligible* for listing on the NRHP under Criterion D for information potential, and therefore, is considered a Section 4(f) property.

6.5.8.2. Dolyniuk Homestead (32BI56)

This site is a historic-era site associated with the Dolyniuk Farm and retains integrity of design, location, and setting. The site is associated with Ukrainian settlement in the region and has been determined *Eligible* for listing on the NRHP under Criterion D for information potential. The information gleaned from further investigation of this site, including archaeological investigations, may yield information relevant to research questions posed within the Ukrainian Immigrant Dwellings and Churches in North Dakota from Early Settlement until the Great Depression. This site is considered a Section 4(f) property.

6.5.8.3. Gregory Homestead (32BI1149)

This site is a 1.5-story, post-and-hole dwelling clad in horizontal wood siding and insulated with sod. One architectural feature located at the site is referred to as the Gregory Homestead. The original homestead claim for 160 acres was made on April 2, 1907, to George Gregory from Austria-Hungary. Several structures were noted on his claim and by witnesses. Currently, no other features/structures remain.

As a whole, the site is in poor condition, although largely unaltered. The site has been determined *Eligible* for listing on the NRHP under Criterion A, within the context of Ukrainian Immigration to North Dakota 1896–1960. The site is directly associated with the earliest settlement in a wave of Ukrainian immigration beginning in 1896. It has also been determined *Eligible* for listing on the NRHP under Criterion C as a representative of a method of construction.

Maah Daah Hey Trail

CCC Campground

Dolyniuk Homestead (32BI56)

Gregory Homestead (32BI1149)

At least 30 Ukrainian communities have been identified throughout the state and each illustrates traditional practices, including methods of construction. The site is found to represent a 'second-stage' within the evolution of Ukrainian immigrant architecture in which the earth house was imbued with characteristics of a more permanent residence. It retains its unaltered structural form, exhibits a distinct wattle and daub-type vernacular construction, and illustrates the use of bold color combinations readily attributable to Ukrainian settlers.

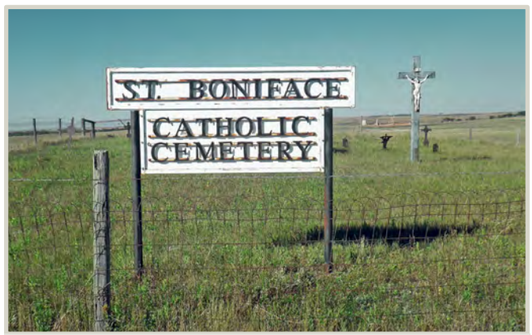
In addition, it has been determined *Eligible* for listing on the NRHP under Criterion D, for its potential to yield information significant to history; archaeological investigations may yield information relevant to research questions. The Gregory Homestead is considered a Section 4(f) property.

6.5.8.4. St. Boniface Cemetery (32BI896)

The St. Boniface Cemetery has been determined *Eligible* for listing on the NRHP under Criterion A for its association with German-Russian settlement within the context of Religion and Rural Settlement. The St. Boniface Cemetery is considered a Section 4(f) property.

6.5.8.5. St. Stanislaus Catholic Cemetery (32BI897)

The St. Stanislaus Catholic Cemetery has been determined *Eligible* for listing on the NRHP under Criterion A for its historic association with Polish settlement within the context of Religion and Rural Settlement and *Eligible* under Criterion C for the artistry and design exhibited in the wrought iron crosses, as well as the site's shrine cross. The St. Stanislaus Catholic Cemetery is considered a Section 4(f) property.



St. Boniface Cemetery (32BI896)

St. Mary's Cemetery (32BI898)

6.5.8.6. St. Mary's Cemetery (32BI898)

The St. Mary's Cemetery has been determined *Eligible* for listing on the NRHP under Criterion A for its association with Ukrainian settlement within the context of Religion and Rural Settlement and *Eligible* under Criterion C for the artistry and design exhibited by the wrought iron crosses. The St. Mary's Cemetery is considered a Section 4(f) property.

6.5.8.7. St. Demetrius Ukrainian Catholic Church (32BI924)

The St. Demetrius Ukrainian Catholic Church is the most prominent structure on-site. The site is in good condition, but has undergone extensive remodeling. Because the gradual changes to the property as a whole have been incompatible with its historic context, it is *Not Eligible* for listing on the NRHP. Therefore, it is not considered a Section 4(f) property.

St. Stanislaus Catholic Cemetery (32BI897)

St. Demetrius Ukrainian Catholic Church (32BI924)

6.5.9. Scenic Overlooks

Along the US Highway 85 corridor, there are three scenic overlooks. These overlooks are *Not Eligible* for inclusion on the NRHP. The scenic overlooks are part of the transportation facility and function specifically for transportation purposes. Therefore, they are not considered Section 4(f) properties.

Scenic Overlook

6.6. Which properties/sites along the project corridor were analyzed, but did not meet the test of Section 4(f)?

- MA 3.65—Rangelands with Diverse Natural-Appearing Landscapes
- MA 6.1—Rangeland with Broad Resource Emphasis
- NDDOT's existing easement with the USFS for US Highway 85
- Privately owned property within the administrative boundary of the TRNP is not open to the public and is not managed by the NPS
- NDDOT's existing Highway Easement Deed with the NPS for US Highway 85
- All archaeological sites *Not Eligible* for inclusion on the NRHP
- St. Demetrius Ukrainian Catholic Church (32BI924)
- Scenic overlooks

6.7. Which Section 4(f) properties were identified along the project corridor, but would not be subject to use from the alternatives and options?

Construction of the project would not result in a permanent, temporary, or constructive use of the following Section 4(f) properties:

- Summit Campground
- Maah Daah Hey Trail
- CCC Campground
- St. Boniface Cemetery (32BI896)
- St. Stanislaus Catholic Cemetery (32BI897)
- St. Mary's Cemetery (32BI898)
- Pre-historic Cultural Material Scatter (32MZ1484)
- Gregory Homestead (32BI1149)
- MA 1.31—Backcountry Recreation Non-Motorized
- MA 3.51—Bighorn Sheep Habitat
- MA 1.2a—Suitable For Wilderness

The project would not directly affect these properties on either a permanent or temporary basis. With regard to constructive use, it is the FHWA's responsibility to determine when there is a constructive use pursuant to 23 CFR 774.15. Based upon the various environmental studies completed for the project, including the Noise Report (2017), two SPreAD Memorandums (2017 and 2018), Class III Cultural Resource Inventory (2016) (**appended by reference**), and the viewshed analysis conducted for the project (see **Section 5.17 on page 98**), and in consultation with the USFS and State Historic Preservation Office (SHPO) (the officials with jurisdiction over these respective resources), it is anticipated that any effects as a result of the project would be minor relative to the existing conditions and they would not substantially impair the activities, features, or attributes that qualify these Section 4(f) properties for protection under Section 4(f). Therefore, the FHWA has determined that construction and operation of the project would not result in a constructive use of these Section 4(f) properties.

6.8. What are the Section 4(f) properties that would result in a temporary occupancy or *de minimis* impact from the alternatives and options?

There are three Section 4(f) properties that would result in either temporary occupancy or a *de minimis* impact from the alternatives and options. Please refer to **Table 30, Summary of Anticipated Section 4(f) Properties Uses & Approval Options**.

- TRNP—North Unit
- TRNP—North Unit Entry Sign (32MZ154)
- Dolyniuk Homestead (32BI56)

6.8.1. TRNP—North Unit

Alternatives B and C include the same typical section for the Badlands segment. In this segment, the roadway footprint has been reduced to the maximum extent practicable to minimize environmental and socioeconomic impacts, as well as minimize impacts on the TRNP—North Unit. A new Highway Easement Deed from the NPS would be required for the project that would include language for the construction, operation, and maintenance of the expanded roadway. Due to the incorporation of design modifications, the project would not require additional area under the Deed; however, the Deed would include the aforementioned 0.2-acre area covered under a recent, unrelated Special-Use Permit.

Alternatives B and C also include a solution for improving the stability of a landslide area at reference point (RP) 128 (i.e., Horseshoe Bend). At Horseshoe Bend, a single row of anchored drilled shafts with a reinforced concrete cap beam would be installed to improve stability of the landslide. Installation of this structure would not require incorporation of additional area into the new Highway Easement Deed; however, a Special-Use Permit to access 0.5 acres temporarily for construction of the drilled shafts would be needed. The duration of the access would be temporary and only needed during construction of the drilled shafts; no ownership of land would change. The construction activities would be minor, and there would be no anticipated permanent, adverse physical impacts. The land would be restored after construction.

Additional temporary impacts on NPS-managed lands that would not require an easement or permit would result from the in-kind replacement of approximately 1 mile of existing NPS fencing that would be impacted by construction activities, installation of wildlife jump-outs along existing NPS fence, and installation of 10-foot high wildlife fencing along the east side of US Highway 85 north of the Long X Bridge.

The temporary impacts on NPS-managed lands would result in an exception for temporary occupancy. Please refer to **Appendix B. Agency Correspondence**, for the concurrence letter from the NPS regarding the conditions of the exception for temporary occupancy.

With regard to constructive use, it is the FHWA's responsibility to determine when there is a constructive use pursuant to 23 CFR 774.15. Based upon the various environmental studies completed for the project, including the Noise Report (2017), two SPreAD Memorandums (2017 and 2018), and the viewshed analysis conducted for the project (see **Section 5.17**), and in consultation with the NPS (a cooperating agency and the official with jurisdiction over the TRNP—North Unit), it is anticipated that any effects as a result of the project would be minor relative to the existing conditions and would not substantially impair the activities, features, or attributes that qualify the TRNP—North Unit for protection under Section 4(f). Therefore, the FHWA has determined that construction and operation of the project would not result in a constructive use of the TRNP—North Unit.

6.8.2. TRNP—North Unit Entry Sign (32MZ154)

The TRNP—North Unit Entry Sign is currently located within the NDDOT ROW and cannot be avoided by either build alternative. Alternatives B and C include the same typical section for the Badlands segment. In this segment, the roadway footprint has been reduced to the maximum extent practicable to minimize environmental and socioeconomic impacts, as well as minimize impacts on the TRNP—North Unit. In order to minimize harm, the sign would be removed (intact) prior to project construction. Upon completion of construction, the sign would be reset (intact) in close proximity to its original location.

A Special Provision to the Construction Specifications would be drafted for the Entry Sign during final design. The Special Provision would give concise and clear direction to the contractor for handling the Entry Sign. The North Dakota Cultural Resource Survey documentation for the TRNP—North Unit was also updated during the cultural survey. The site form was updated because it was lacking information for historic standing structures, and adequate descriptions and photographs. With the completed work and proposed resetting of the Entry Sign, the SHPO has concurred with a *No Adverse Effect* determination. Therefore, use of the Entry Sign would result in a *de minimis* impact. Please refer to **Appendix B. Agency Correspondence**, for SHPO concurrence and concurrence from the NPS with the *de minimis* impact determination.

Table 30, Summary of Anticipated Section 4(f) Properties Uses & Approval Options

Section 4(f) Property	Use	Approval Option
TRNP		
NPS-managed property within the Administrative Boundary	Temporary Occupancy—0.5 acres	Exception for Temporary Occupancy
TRNP—North Unit Entry Sign (32MZ154)	Relocation of Sign—*No Adverse Effect*	*De minimis*
LONG X BRIDGE (32MZ1807)		
Option LX-1	Permanent—*No Adverse Effect*	*De minimis*
Option LX-2	No Use	Not applicable, because the original location of the bridge, historic integrity, and value would be maintained
Option LX-3	Permanent—*Adverse Effect*	Nationwide Section 4(f) Programmatic Evaluation for Historic Bridges
HISTORIC SITE (32BI56)		
Dolyniuk Homestead	Permanent—*No Adverse Effect*	*De minimis*

6.8.3. Dolyniuk Homestead (32BI56)

Due to the nature and location of the Historic Building Remnants site, design of the project was not able to avoid impacting the site under either Alternative B or C. To mitigate the permanent impact, the NDDOT, in coordination with the SHPO, has developed a mitigation approach. This approach includes documentation of the Dolyniuk Homestead site as well as the Gregory Homestead (32BI1149). Currently, funding has only been identified for construction of the Long X Bridge and approximately 1 mile of approach roadways on each side. The Dolyniuk Homestead is located within the project segment of lowest priority from a construction sequencing standpoint; however, due to the continually deteriorating nature of the site, mitigation will be completed in 2018 in order to document the greatest amount of information possible. With this mitigation, the SHPO has concurred with a *No Adverse Effect* determination. Therefore, the use of the site would result in a *de minimis* impact. Please refer to **Appendix B. Agency Correspondence**, for SHPO concurrence.

6.9. *Would construction of the project result in a use of the Long X Bridge?*

Option LX-3 is part of the Preferred Alternative and includes replacing the existing Long X Bridge and constructing a new four-lane bridge east of the existing bridge. The bridge is *Eligible* for listing on the NRHP under Criterion C for its unique design. Removal of the Long X Bridge would be considered a permanent use and *Adverse Effect* by the SHPO. Please refer to **Appendix B. Agency Correspondence**, for SHPO concurrence.

6.9.1. Nationwide Section 4(f) Programmatic Evaluation for Use of Historic Bridges

This section contains the Nationwide Section 4(f) Programmatic Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges to satisfy the requirements of Section 4(f). The format of the evaluation is based on the FHWA-approved, NDDOT template for this programmatic evaluation. The historic bridges covered by this Nationwide Section 4(f) Programmatic Evaluation are unique because they are historic, yet are also part of either a federal-aid highway system or a state or local highway system that has continued to evolve over the years. Even though these structures are on or *Eligible* for inclusion on the NRHP, they must perform as an integral part of a modern transportation system. When they do not or cannot, they must be rehabilitated or replaced to ensure public safety while maintaining system continuity and integrity.

6.9.1.1. Applicability

The Nationwide Section 4(f) Programmatic Evaluation for the Use of Historic Bridges may be used if the project meets the following four criteria:

1. Will the bridge be replaced or rehabilitated with federal funds?
   All projects receiving federal funding through Title 23 U.S.C. or requiring an action by the FHWA must be included in the Statewide Transportation Improvement Program (STIP). State funding has been programmed in the STIP for the Long X Bridge portion of the project for construction in 2018. Federal funds for the project may be identified in the future.

2. Will the project require the use of a historic bridge structure that is on or is *Eligible* for listing on the NRHP?
   The Long X Bridge is *Eligible* for listing on the NRHP, and the removal of the existing bridge would be considered a permanent use and *Adverse Effect* by the SHPO. Therefore, the Nationwide Section 4(f) Programmatic Evaluation is applicable to the project.

3. Is the bridge a National Historic Landmark?
   No, because the Long X Bridge is not a National Historic Landmark, the Nationwide Section 4(f) Programmatic Evaluation is applicable to the project.

4. Has agreement among the FHWA, SHPO, or Tribal Historic Preservation Office (THPO) and the Advisory Council on Historic Preservation (ACHP) been reached through procedures pursuant to Section 106 of the *National Historic Preservation Act* (NHPA)?
   In August 2017, the NDDOT submitted a letter to the SHPO, which continues consultation on the project. The letter was intended to further and formally provide information on the project and how the NDDOT has proceeded to meet their responsibilities under Section 106 of the NHPA, and to consult on mitigation of the *Adverse Effect* resulting from Option LX-3. In addition, a Memorandum of Agreement (MOA) has been signed between the FHWA, NDDOT, and SHPO for the *Adverse Effect* on the Long X Bridge. The NDDOT and FHWA have also provided notification of the possible *Adverse Effect* to the ACHP. In a letter dated January 18, 2018, the ACHP formally declined participation in the consultation to resolve adverse effects. Therefore, the Nationwide Section 4(f) Programmatic Evaluation is applicable to the project. Please refer to **Appendix B. Agency Correspondence**, for the letter to the SHPO, letter from the ACHP, and MOA.

6.9.1.2. Alternatives and Findings

The three alternatives that need to be evaluated in the Nationwide Section 4(f) Programmatic Evaluation include the No Action Alternative, Rehabilitation of the Bridge Without Affecting the Historic Integrity of the Bridge, and Building on a New Location without Using the Old Bridge.

No Action Alternative (Alternative A)

Under Alternative A, the No Action Alternative, (i.e., the "Do Nothing Alternative") the existing infrastructure would remain as it is today and expansion of the roadway would not occur. There is a lack of roadways (paved or unpaved) that cross the Little Missouri River. The only two bridges that cross the Little Missouri River north of I-94 include the Long X Bridge, along US Highway 85, and the Lost Bridge, along North Dakota Highway 22 (ND-22). The Long X Bridge is a Warren through truss bridge with overhead cross members that place a vehicle height restriction on the bridge of 15 feet, 8 inches (actual bridge height clearance is 16 feet). Over-height vehicles traveling along US Highway 85 are currently forced to detour around the Long X Bridge via ND-22. Depending upon the final destination, this detour can result in an average of 50 additional highway miles traveled one-way. Between July 2013 and July 2015, 263 over-height permits were submitted to the NDDOT and denied due to the existing height restriction of the Long X Bridge. It is believed that this figure only accounts for a portion of the total over-height vehicles forced to detour around the Long X Bridge, as operators knowledgeable of the existing height restrictions apply for over-height permits utilizing alternate routes.

Existing height restrictions associated with the Long X Bridge indirectly affect more than just over-height vehicles. Since 2011, there have been seven major incidents of over-height vehicles hitting the Long X Bridge, resulting in one instance of full closure for five days for analysis and repair and three instances of overnight closures of approximately two weeks for repairs. The bridge was hit again in May 2017 and will need to be closed for additional repairs. When this occurs, all traffic along this stretch of US Highway 85 is forced to detour around and utilize alternate routes, resulting in social and economic impacts on all user groups. The frequency of these closures is such that the NDDOT has installed an over-height detection system on either side of the Badlands and a permanent bridge closed sign (which folds down when not in use) at the ND-200/US Highway 85 intersection. In order to address these issues, there is a need for a bridge capable of accommodating taller loads by either reducing or eliminating height restrictions.

This alternative would not meet the purpose and need for the project, as it fails to address social demands, system linkage/connectivity, safety, capacity, and transportation demand. Please refer to **Chapter 1** for further information. Therefore, Alternative A, the No Action Alternative, is not a feasible and prudent avoidance alternative to the use of the Section 4(f) property.

Rehabilitating the Bridge Without Affecting its Historic Integrity (Option LX-1)

Option LX-1 would include rehabilitating the existing Long X Bridge to increase the vertical clearance from 16 feet to 20 feet, 6 inches. To increase the vertical clearance, the horizontal braces (i.e., portals) spanning between the trusses would be raised in 20 locations along the length of the bridge. Please refer to **Figure 80, Option LX-1: Scope of Rehabilitation** and **Figure 81, Current Bridge View and Simulation of Raising the Portals (looking south)**, both on **page 121**. Raising the portals would require modification or replacement of the v-shaped diagonal braces connecting the portals to the top chords of the trusses.

In addition to rehabilitating the Long X Bridge, Option LX-1 would also include constructing a new two-lane bridge east of the existing bridge. The new bridge would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures. Please refer to **Figure 82** and **Figure 83** for Option LX-1 Simulations, both on **page 122**. Based on coordination with the SHPO, the scope of the Long X Bridge rehabilitation as defined, would have a *No Adverse Effect* determination. The SHPO has also concurred that the proximity of a new two-lane bridge would have *No Adverse Effect* on the bridge.

Option LX-1 would alter travel patterns and improve reliability by relieving and/or removing height restriction constraints in this location; however, it would only reduce, but not eliminate, the potential for over-height vehicles to strike the bridge. Under Option LX-1, southbound over-height vehicles could be detoured onto the northbound traffic lanes to cross the Little Missouri River via the new two-lane bridge. This scenario would require a temporary roadway closure and assistance from the NDHP. Thus, perpetuating the reliability issues and not providing a long-term solution for the goals of the High Priority Corridor that focuses on mobility, reliability, and ability to support economic activity.

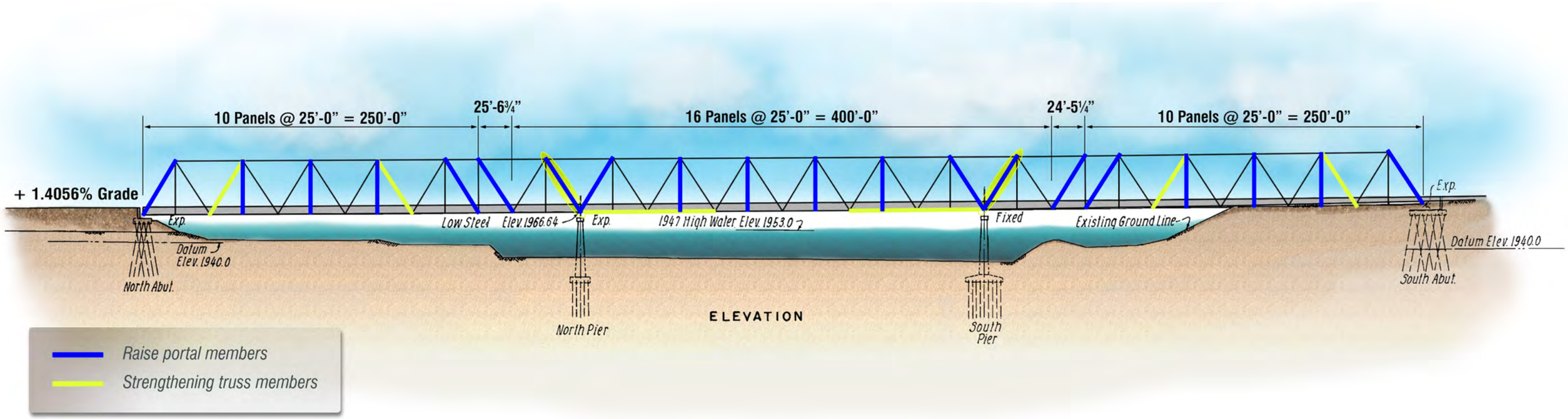


Figure 80, Option LX-1: Scope of Rehabilitation

Figure 81, Current Bridge View and Simulation of Raising the Portals (looking south)

Figure 82, Option LX-1 Simulation A (looking northeast)

Figure 83, Option LX-1 Simulation B (looking north)

The 2017 North Dakota Legislative Session increased the maximum gross vehicle weight from 105,500 pounds to 129,000 pounds on select designated permittable routes, one of which is US Highway 85. In order for the Long X Bridge to comply with the increased legal load, the deck would need to be replaced. According to the NDDOT Design Manual, bridge deck replacement is considered to be a reconstruction project. The NDDOT Design Standards applicable to reconstruction of an existing bridge require the clear roadway width to be a minimum of 32 feet, with a preferred width of 40 feet. Widening of the Long X Bridge is not included under Option LX-1 as the SHPO has previously concurred that widening the bridge would constitute an *Adverse Effect*. Widening of the Long X Bridge would alter the appearance of the bridge, require replacement of all members spanning across the bridge between the two main trusses, require significant modifications to the piers, and potentially result in replacement of main truss chord and diagonal members. By retaining a clear roadway width of 30 feet, Option LX-1 would not meet current NDDOT design standards.

The Long X Bridge is classified as fracture critical. A fracture critical bridge is defined by the FHWA as a steel member in tension, or with a tension element, whose failure would probably cause a portion of, or the entire bridge, to collapse. The Long X Bridge has 38 diagonal truss members on each side of the bridge, 16 of which are considered tension members, and are therefore fracture critical. These bridge components are vulnerable to damage due to strikes from over-width vehicles, as well as from vehicles striking traffic barriers of overhead members. Such collisions may cause part of the vehicle, or the load it is carrying, to impact a fracture critical truss member, resulting in the potential for a bridge collapse. Due to the relatively high truck traffic on the corridor, the potential for this type of collision and damage is likely elevated. Please refer to **Figure 84** and **Figure 85**, both on **page 123**.

In addition to the tension members, the Long X Bridge has eight fracture critical steel pins. There are two pins on each truss connecting the north and south spans to the center spans. These elements have similar vulnerability and potential consequences as was described for the truss tension members. If any of these pins were to fail, the bridge could potentially collapse.

Throughout the public and agency scoping process, 31 commenters expressed an opinion regarding the Long X Bridge. Of these, only one commenter explicitly stated they would like to see the Long X Bridge remain in place. Some commenters expressed a sense of indifference for the bridge; however, the majority of commenters indicated that they would like to see the bridge removed and replaced. The majority of the public expressed concerns regarding the height restrictions of the bridge and the ability to move oversized vehicles (including modern agricultural equipment) on the bridge, along with the overall reliability of the bridge. US Highway 85 plays a key economic role within the region. Two of the largest industries in western North Dakota include agriculture and oil and gas production. Both of these industries require the use of large equipment that is transferred to and from location using the state's highway network.

Other public comments received directly related to the Long X Bridge had to do with noise and visual appearance within the landscape. Several comments were received indicating that the Long X Bridge is noisier than other bridges due to the truss style design, particularly when trucks or large vehicles are crossing. This concern was also expressed by the NPS. In addition, tribal entities have indicated that the Long X Bridge presents a visual intrusion and detracts from the landscape that was once used by their ancestors.

The Long X Bridge sits in the Little Missouri River valley with the Badlands surrounding the bridge. The bridge is also within the administrative boundary of the TRNP – North Unit. A visual assessment, renderings, and simulations have been completed for the Long X Bridge and its associated options. The existing Long X Bridge is the dominant focal point of the Little Missouri River valley due to the size and height of the trusses. Removing the existing Long X Bridge and replacing it with a modern bridge structure that would better blend into the natural environment would result in the Badlands being the focal point of the viewshed .

Due to the aforementioned reasons, Option LX-1 is not considered a feasible and prudent avoidance alternative to the use of the Section 4(f) property.

Figure 84, Load shifted off trailer after collision with Long X Bridge overhead member

Figure 85, Example of Fracture Critical Bridge Failure caused by an oversized load striking portal members on the Skagit River Bridge on Interstate 5 in Washington

Building on a New Location without Using the Old Bridge (Option LX-2)

In 2013, the NDDOT prepared the Little Missouri River Crossing Feasibility Study Report (**appended by reference**). The objective of the study was to assess potential alternatives, alignments, and options to improve US Highway 85. The Long X Bridge is a critical component of the US Highway 85 corridor, and the through truss design results in vertical clearance issues and does not allow for the efficient movement of oversized loads. The alternatives developed for the study were to be used in future studies, such as this EIS. The findings of the study concluded that the alternatives that stayed on the existing alignment appear to be the most feasible. The alignments that deviated from the existing alignment had major geotechnical, ROW, and environmental issues.

During the alternatives development process for this EIS, this study was used in the alternatives methodology, specifically in *Phase I: Develop Full Range of Reasonable Alternatives, Step 2: Previous Reports and Studies.* The alternatives carried forward from *Step 1: Define Range of Reasonable Alternatives* were evaluated to determine whether or not they were consistent with the previous reports and studies. The three current options for the Long X Bridge were determined to be consistent and are carried forward in this EIS.

Option LX-2 would include retaining the existing Long X Bridge for an alternate use and constructing a new four-lane bridge east of the existing bridge. The new bridge would be located to provide approximately 25 feet of horizontal clearance between the existing and new structures. The existing Long X Bridge could remain in-place and serve as an example of a Warren through truss bridge as an alternate use. The existing bridge would need to be fenced/blocked at the ends to prevent access onto the bridge. Option LX-2 would retain the Long X Bridge's original location, historic integrity, and value; however, the historic integrity and the value would diminish because the bridge would be essentially an intact artifact (i.e., no functional value). The SHPO has concurred with the determination of *No Adverse Effect* for Option LX-2. The SHPO has also concurred that the proximity of a new four-lane bridge would have *No Adverse Effect* on the bridge. Please refer to **Figure 86** and **Figure 87**, both on **page 124,** for simulations of Option LX-2.

Original considerations for alternate use included use of the bridge as a pedestrian facility. As part of the scoping process for the project, McKenzie County requested that a trail (i.e., shared-use path), running along US Highway 85 from the Watford City trail system to the Long X Bridge be included in the overall project scope. Through coordination with resource agencies, it was determined that such use would conflict with proposed wildlife crossing measures, as detailed in **Chapter 3, Section 3.3.8**. Specifically, there was concern that use of the bridge as a pedestrian facility would increase the potential for disturbing bighorn sheep during the lambing season, as bighorn sheep are more likely to display a flight reaction in response to pedestrian traffic than vehicular traffic. In addition, the NPS expressed concerns that the trail, in combination with other project elements, would result in more impacts on NPS-managed lands than the NPS would be willing to permit. As a result, the trail was terminated prior to entering the badlands. Due to these reasons, alternate use of bridge as a pedestrian facility was eliminated from further consideration.

Had it been determined Long X Bridge would be used as a pedestrian facility, the likely scenario was that McKenzie County would have entered into a Memorandum of Agreement or Understanding with the NDDOT to take over the long-term maintenance of the bridge and be the responsible entity for maintaining its historic integrity. Due to the elimination of the pedestrian facility alternative use concept, the only remaining alternative use option is to maintain the bridge as an example of a Warren through truss. No pedestrians would be allowed on the bridge due to the conflict of pedestrians and wildlife and public safety. The bridge would be fenced or blocked at the ends to prevent access. The opportunity for interpretative panels or displays regarding its unique design would not be viable on or near the existing bridge due to the wildlife crossing and associated fencing.

The NDDOT would continue maintenance of the bridge to ensure that the bridge does not fall into neglect in order to maintain the historic integrity. Option LX-2 would move traffic to the new four-lane bridge, and as a result, the existing Long X Bridge would not be exposed to heavy truck loads or de-icing salts; however, maintenance costs of the bridge would continue, if retained as an example of a Warren through truss. Annual maintenance would include keeping the deck clear of dirt and debris to prevent deck deterioration, ensuring soundness and stability of steel connections (e.g., bolts), periodic touch-up painting, mowing, weed control, and potential repairs due to vandalism, such as graffiti. In addition, the presence of two bridges (existing and the new four-lane bridge) may result in greater potential for problems relating to stream flow, such as channel bottom erosion (scour), ice jams, and slope issues. Retaining the existing bridge at its current location could also be considered an attractive nuisance, creating safety and liability concerns for the NDDOT due to unauthorized use of the bridge, such as climbing the truss members.

Comments received during the public and stakeholder meetings indicated that leaving the bridge as an example of a Warren through truss was a waste of taxpayers' dollars and did not provide value to the public. In addition, if the bridge would be left in place there is no place near the bridge to add interpretive signage. Further, very few pedestrians would be near the bridge, making it harder to explain to the public why the bridge was left intact.

Due to the aforementioned reasons, although Option LX-2 is feasible (i.e., the bridge could be rehabilitated as a matter of matter of sound engineering judgment per 23 CFR 774.17), it is not considered prudent. Therefore, Option LX-2 is not considered a feasible and prudent avoidance alternative to the use of the Section 4(f) property.

Figure 86, Option LX-2 Simulation A (looking northeast)

Figure 87, Option LX-2 Simulation B (looking north)

6.9.1.3. Measures to Minimize Harm

Historic bridges covered under this Nationwide Section 4(f) Programmatic Evaluation are unique, because they are historic, yet also part of either a federal-aid highway system or a state or local highway system that has continued to evolve over the years. The US Highway 85 corridor is a perfect example of the evolution of a US Highway system, that over the last 10 years, has become a highly-traveled, economic freight corridor that is vital to the state of North Dakota, but also regionally and nationally by providing the movement of commerce. Even though the Long X Bridge is *Eligible* for inclusion on the NRHP, it has to perform as an integral part of a modern transportation system. When the existing bridge cannot, it must be replaced in order to maintain system continuity and integrity. The Nationwide Section 4(f) Programmatic Evaluation for the Use of Historic Bridges may be used if the project includes all possible planning to minimize harm as discussed in the subsections below.

1. Is this bridge being rehabilitated under this proposed project?
   Under Option LX-3 (part of the Preferred Alternative) the existing Long X Bridge would be removed (i.e., demolished or adopted) and a new four-lane bridge would be constructed. Please refer to **Figure 88** and **Figure 89**, both on **page 125,** for simulations of Option LX-3.

2. Is this bridge being rehabilitated or demolished to the point where historic integrity is affected under this proposed project?
   Under Option LX-3 (part of the Preferred Alternative), the existing Long X Bridge would be removed (i.e., demolished or adopted) resulting in an *Adverse Effect* determination.

3. Are adequate records being made of the existing structure?
   An MOA has been signed between the FHWA, NDDOT, and SHPO for the *Adverse Effect* on the Long X Bridge. The MOA contains two options: the Long X Bridge Adoption Option and the Alternative Mitigation Option. Please refer to **Appendix B. Agency Correspondence** for the MOA. The Alternative Mitigation Option would be followed if the Long X Bridge is not successfully adopted.

The FHWA would insure that the following measures are carried out:

Long X Bridge Adoption Option

As discussed further under Question #4, the Long X Bridge would be up for adoption under the Bridge Adoption Program. Prior to adoption, the existing Long X Bridge would be recorded using digital photography. Photographs will be taken of various aspects of the bridge. These will be transmitted along with prints to the archives of the State Historical Society of North Dakota (SHSND). The State Cultural Resource form (i.e., site form) would be updated to reflect the information gathered. In addition, the Long X Bridge would be added to the NDDOT's Historic Bridge Website.

Alternative Mitigation

If no successful adoption occurs following advertisement for adoption of the Long X Bridge, the following measures would be completed:

- The existing Long X Bridge would be recorded using digital photography. Photographs would be taken of various aspects of the bridge. These would be transmitted along with prints to the archives of the SHSND. The State Cultural Resource form (i.e., site form) would be updated to reflect current site information.

  A complete set of plans for the bridge exists at the NDDOT. A clean copy of these plans would be reproduced on mylar. This reproduction and any original blue line prints would be deposited at the archives of the SHSND.

- A professional report compiling the information on the Long X Bridge, placing it within the proper technical and historic contexts, would be completed. This report will discuss the history and context of Long X Bridge, as well as the Roosevelt Bridge, along with a discussion of other transportation (if applicable) used to cross the Little Missouri River. It would make use of existing information including, but not limited to, the statewide historic bridge inventory, the National Register files, historic photographs, documentation, and material at the SHSND, as well as the collections of local historical organizations such as the McKenzie County Historical Society.

Figure 88, Option LX-3 Simulation A (looking northeast)

Figure 89, Option LX-3 Simulation B (looking north)

- An interpretative panel would be designed and constructed for placement at the scenic overlook located along US Highway 85 at RP 127.5. The interpretive panel would be designed in coordination with the NDDOT, SHPO, and NPS and would incorporate technology to allow users to access digital media content specific to the Long X Bridge.
- The Long X Bridge would be added to the NDDOT's Historic Bridge Website.
- Laser scanning would be completed for the Long X Bridge to produce a 3-D image.
- The Warren through truss bridge type, which the Long X Bridge represents, is important in understanding the history of development within the state. The history and context of the Long X Bridge would be added, as appropriate, to the Bridge Send Trunk, produced by the NDDOT and the ND Heritage Center. The plan for updating this interpretation effort would be devised through consultation with the NDDOT and SHPO.

4. **Is the existing structure being made available for alternative use with a responsible party to maintain and preserve the bridge?**
   Under the Bridge Adoption Program (23 U.S.C. 144), the Long X Bridge would be up for adoption and advertised for 30 days. Due to the size of the structure, only one segment of the bridge would need to be adopted. In order to entice potential adoptees, the NDDOT would fund the disassembly, loading, and transport of one of the segments of the bridge within a 100-mile radius of its current location over the Little Missouri River. Preference would be given to public entities and the NDDOT would coordinate with SHPO regarding both the entity and the new location.
5. **If the bridge is being adversely affected, has agreement been reached through the Section 106 process of the NHPA on these Measures to Minimize Harm (which will be incorporated into the proposed project)?**
   An MOA has been signed between the FHWA, NDDOT, and SHPO. The MOA's stipulations are described under Question #3.

6.10. *What coordination efforts have been made regarding Section 4(f) properties?*

The officials with jurisdiction for the four Section 4(f) properties affected by this project are as follows:

- TRNP—North Unit: NPS
- TRNP—North Unit Entry Sign: NPS, SHPO
- Dolyniuk Homestead: SHPO
- Long X Bridge: NDDOT, SHPO

The NDDOT and FHWA have coordinated with the NPS as a cooperating agency and official with jurisdiction for the TRNP—North Unit and the TRNP—North Unit Entry Sign. The majority of the coordination took place during the working sessions with the lead and cooperating agencies throughout the life of the project.

The NDDOT and FHWA have also coordinated with the SHPO for the TRNP—North Unit Entry Sign, Dolyniuk Homestead, and the Long X Bridge. As a participating agency, the SHPO attended the agency scoping meeting and a lead, cooperating, and participating agency meeting. Several other meetings were held with SHPO to discuss the project, including the Long X Bridge options.

Several opportunities for public involvement have occurred since the project began. The purpose of public involvement is to help the public understand the project; define the project's purpose and need; develop alternatives; and gather comments about the project and EIS, including Section 4(f), prior to decision-making. Public coordination efforts for the project are as follows:

- Two public scoping meetings, with a 30-day comment period
- Two public alternatives workshops
- Fairfield community stakeholder meeting, with a 30-day public comment period
- Two stakeholder group meetings
- Three public hearings, with a 45-day public comment period

For further information regarding coordination efforts for the project, please refer to **Chapter 9. Public Involvement and Agency Coordination**.

Chapter 7. Summary of Impacts, Commitments, and Permits

This chapter provides a summary and comparison of potential direct and indirect impacts on environmental, cultural, socioeconomic, and human-made resources from the alternatives and their options. This chapter also summarizes the commitments and mitigation measures that would be incorporated into the alternatives and their options, as well as the permits and approvals that would be required.

Important topics in this chapter:

7.1. How do the impacts from the alternatives and their options compare?

Table 31, Summary of Impacts provides a summary and comparison of all the potential impacts from the alternatives and their options.

7.2. What are the environmental commitments and mitigation measures for the project?

Table 32, Environmental Commitments Summary on page 136 provides a summary of the environmental commitments (excluding many North Dakota Department of Transportation [NDDOT] Standard Specifications) that would be implemented to avoid, minimize, and compensate for environmental impacts resulting from the project.

7.3. What permits and approvals would be required for the project?

The following permits and approvals would be required for the project:

- North Dakota Pollutant Discharge Elimination System (NDPDES) Permit from the North Dakota Department of Health (NDDH)
- Section 401 of the *Clean Water Act* Certification (unless waived) from the NDDH
- Section 404 of the *Clean Water Act* Permit from the USACE
- Special-Use Permit from the National Park Service (NPS)
- Highway Easement Deed from the NPS
- Permanent Easement from the US Forest Service (USFS)
- Temporary Water Permit from the North Dakota State Water Commission (NDSWC)
- Section 106 of the *National Historic Preservation Act* (NHPA) concurrence from the North Dakota State Historic Preservation Office (SHPO)
- Section 7 of the *Endangered Species Act* (ESA) concurrence from the US Fish and Wildlife Service (USFWS)
- Section 4(f) of the *Department of Transportation Act of 1966* (United States Code [U.S.C.] § 303) concurrence from the NPS and approval/determination from the Federal Highway Administration (FHWA)
- Floodplain Development Permit from the Stark County Floodplain Administrator
- Haul permit(s) from counties, as necessary

Table 31, Summary of Impacts

Resource Area	Alternative A	Alternative B	Alternative C	Options
Land Use	Current land use trends and conditions would persist. May affect future development along US Highway 85 and would not comply with county or city planning documents to improve transportation.	Land use conversion would primarily affect agricultural pasture and cropland. Total temporary easements required from private landowners without options: 88.2 acres. Total temporary easement (i.e., Special-Use Permit) required from the NPS without options: 0.5 acres. Total permanent right-of-way (ROW) required from private landowners without options: 762.3 acres. Total permanent easement required from the USFS without options: 70.0 acres. New Highway Easement Deed from NPS for same area 9.2-acre area as existing Deed, plus 0.2 acres for unrelated landslide repair project. Would be consistent with goals identified in county comprehensive plans to improve transportation.	Impacts the same as Alternative B except the following: Total temporary easements required from private landowners without options: 107.1 acres. Total permanent ROW required from private landowners without options: 521.4 acres. Total permanent easement required from the USFS without options: 53.8 acres.	Total temporary easements required (with Alternatives B and C, respectively) from private landowners: » FF-1: 4.1 acres; 3.3 acres. » FF-2: 4.5 acres; 5.4 acres. » FF-3: 5.4 acres; 5.6 acres. » FF-4: 4.4 acres; 5.0 acres. » INT-1: 0.2 acres; 0.0 acres. » INT-2: 0.2 acres; 0.3 acres. » LX-1: 8.4 acres under Alternatives B and C. » LX-2: 9.6 acres under Alternatives B and C. » LX-3: 9.6 acres under Alternatives B and C. Total permanent ROW/easement required (with Alternatives B and C, respectively) from private landowners and, where noted, federal landowners: » FF-1: 20.6 acres; 20.4 acres. » FF-2: 97.1 acres; 79.1 acres. » FF-3: 105.2 acres; 86.9 acres. » FF-4: 111.9 acres; 96.0 acres. » INT-1: 2.1 acres; 1.0 acres. » INT-2: 2.6 acres; 2.6 acres. » LX-1: 5.4 acres (private) & 1.2 acres (USFS) under Alternatives B and C. » LX-2: 9.2 acres (private) & 3.0 acres (USFS) under Alternatives B and C. » LX-3: 9.2 acres (private) & 3.0 acres (USFS) under Alternatives B and C.
Prime and Unique Farmlands	No impacts.	Permanent conversion of 1.0 acre of prime farmland. Permanent conversion of 204.9 acres of farmland of statewide importance. Temporary impacts during construction: stormwater erosion or containments from waste material affecting adjacent prime farmland. Natural Resources Conservation Service (NRCS)-CPA-106 Form score of 93 out of 260. Potential indirect impacts due to some parcels becoming too small or inconvenient to farm. Potential temporary impacts during construction: stormwater erosion, contamination from waste materials.	Impacts the same as Alternative B except the following: Permanent conversion of 0.7 acre of prime farmland. Permanent conversion of 150.4 acres of farmland of statewide importance.	Permanent impacts on prime farmland (with Alternatives B and C, respectively): » FF-1: 3.8 acres under Alternatives B and C. » FF-2: 7.5 acres, 7.6 acres. » FF-3: 11.0 acres; 10.4 acres. » FF-4: 13.0 acres; 12.3 acres. » INT-1, INT-2, LX-1, LX-2, & LX-3: no impacts. Permanent impacts on farmland of statewide importance (with Alternatives B and C, respectively): » FF-1: 13.1 acres; 16.0 acres. » FF-2: 71.1 acres; 61.5 acres. » FF-3: 84.3 acres; 73.1 acres. » FF-4: 67.0 acres; 56.8 acres. » INT-1 & INT-2: no impacts. » LX-1, LX-2, & LX-3: 0.2 acres under Alternatives B and C.
Geology	Overall nature of the geological resources is not anticipated to change. Slope stability issues would continue along the project corridor. Potential mitigation of slope failure or erosion would continue, including impacts on traffic flow.	Permanent modification of terrain; however, overall nature of the geological resources is not anticipated to change. Increased impervious surfaces area would result in higher stormwater runoff velocity and volume, which could increase erosion and sedimentation. Potential increase in landslides on steep slopes. Slope stability issues would be addressed in landslide prone-areas through the Badlands. Temporary impacts during construction: potential paleontological investigations if significant paleontological resources are discovered.	Impacts the same as Alternative B except for the following: A paved center median would result in a greater increase of impervious surface area than Alternative B.	FF-2, FF-3, and FF-4 would result in a greater increase in impervious surface area than FF-1. INT-1 & INT-2 would result in similar increases in impervious surface.

… table continued on page 130…

Resource Area	Alternative A	Alternative B	Alternative C	Options
Paleontology	No impacts.	Ground-disturbing activities would have the potential to impact or uncover buried paleontological resources. Potential to impact or uncover paleontological resources would be the highest in the Sentinel Butte Formation and Quaternary landslide deposits (primarily in the Badlands area).	Impacts similar to Alternative B.	Impacts similar to Alternatives B and C.
Social	Continued high traffic volumes and a level of service (LOS) that is projected to be deficient by 2040. Reliability and capacity of the corridor would not be improved. Safety improvements (e.g., improved access, added turn lanes, widened shoulders) would not be constructed. Continued lack of pedestrian/bicyclist facilities along the corridor. Continued height restrictions on Long X Bridge and associated detours. Concerns regarding safety would not be addressed.	Reliability and capacity of the corridor would be improved. Safety improvements (e.g., improved access, added turn lanes, widened shoulders) would be constructed. Emergency response times and law enforcement operations would be improved. ROW and easement acquisition from private and public property, bringing roadway closer to homes, businesses, and community services; however, no relocations would occur. Consolidation of access points, with potential for some to become right-in/right-out. Relocation of mailboxes. Wider roadway would improve access for agricultural equipment; however, access consolidation and increased barrier to livestock rotation may negatively impact operations. Minor conversion of grazing and/or cropland. Minor social impacts and changes in community cohesion in Grassy Butte. Roadway would be brought closer to Community and Salem cemeteries. Negligible visual difference between existing and proposed roadway within the Theodore Roosevelt National Park (TRNP) – North Unit. Scenic overlooks would be slightly reduced in size and re-striped. Access to TRNP – North Unit would be improved with northbound and southbound turn lanes at entrance. Temporary impacts during construction: reduced speeds, minor detours for property access, construction noise, and visual intrusions (e.g., equipment, lighting, dust).	Impacts the same as Alternative B except for the following: Flush, center median would not provide as many safety benefits as depressed, center median. Less ROW and easement acquisition from private and public property. Roadway would be brought closer to more homes than Alternative B. Field drives would not be converted to right-in/right-out. Roadway would be brought closer to St. Demetrius Ukrainian Catholic Church, and the following cemeteries: St. Mary's, St. Boniface, Community, and Salem. Access points for St. Demetrius Ukrainian Catholic Church and St. Mary's Cemetery would be consolidated.	FF-1: Would require the acquisition of property within Fairfield; roadway would be brought closer to homes, businesses, and community services in Fairfield. FF-2, FF-3, & FF-4: Drivers would be required to turn off of mainline US Highway 85 to access Fairfield, which could result in fewer overall stops being made in Fairfield and impacts on local businesses. A reduction in traffic volumes in Fairfield would improve mobility within town, improve safety, and would result in a quieter overall atmosphere. Option FF-3 would offset the highway approximately 300 feet from Prairie Elementary, while FF-4 would offset the highway approximately 1,500 feet from the school. INT-1: Drivers making turns would be required to navigate additional lanes of traffic. INT-2: Drivers may experience uncertainty during initial use of the multi-lane roundabout. Added safety due to reduction in fatal and serious injury crashes associated with roundabouts. LX-1, LX-2, & LX-3: Would improve reliability; LX-1 would reduce, but not eliminate the potential for over-height vehicles to strike the bridge (LX-2 and LX-3 would eliminate potential for strikes). LX-3 would remove the historic Long X Bridge.
Environmental Justice	No impacts.	No impacts.	No impacts.	No impacts.
Public Lands	Visitors, employees, and other users of the TRNP – North Unit and Little Missouri National Grasslands (LMNG) would continue to experience high traffic volumes, as well as an LOS that is projected to be deficient by 2040. Continued lack of opportunities for passing and turn lanes. Access points would remain unconsolidated and offset. Safety and habitat connectivity would not be improved.	Transportation operational and safety improvements, including additional turn lanes at the TRNP – North Unit entrance, trail, and potential realignment of the access point to Summit Campground. Visual quality from public lands not anticipated to be diminished. Wildlife crossings with fencing would improve safety and terrestrial habitat connectivity. New Highway Easement Deed from NPS for same 9.4-acre area as existing Deed, plus 0.2 acres for unrelated landslide repair project. Acquisition of a Special-Use Permit from the NPS for temporary access to 0.5 acres to correct landslide at Horseshoe Bend and additional temporary impacts on NPS-managed lands for fencing replacement and jump-outs. » Management Area (MA) 3.65: 0.8 acres » MA 6.1: 67.3 acres Impacts on infrastructure that may service oil and gas well pads on USFS-managed lands. Temporary and permanent grazing allotment easement/ROW required, respectively: 4.5 acres; 128.7 acres. One stock pond on USFS-managed lands would be impacted, and one cattle pass on private land within a USFS grazing allotment would be impacted. Temporary impacts during construction: reduced access to Little Missouri River near the Long X Bridge, reduced speeds, construction noise, and visual intrusions (e.g., equipment, lighting, dust).	Impacts the same as Alternative B, except the following: Permanent USFS easement required: » MA 3.65: 0.8 acres » MA 6.1: 51.6 acres Temporary and permanent grazing allotment easement/ROW required, respectively: 9.5 acres; 101.9 acres.	Permanent USFS easement required: » LX-1 – MA 3.65: 1.2 acres » LX-2 – MA 3.65: 3.0 acres » LX-3 – MA 3.65: 3.0 acres Permanent grazing allotment easement/ROW required: » LX-1 – 0.5 acres » LX-2 – 2.1 acres » LX-3 – 2.1 acres

… table continued on page 131 …

Resource Area	Alternative A	Alternative B	Alternative C	Options
Economics	The anticipated benefits of the Theodore Roosevelt Expressway (TRE) would not occur (i.e., stimulation of transportation opportunities and added opportunities for economic growth). Continuation of deficiencies (e.g., lack of passing opportunity, turn lanes, Long X Bridge height restriction) may increase cost of doing business based on travel time and damage to equipment. No expenditure of local, state, or federal funds for project construction; no increase in construction employment opportunities or subsequent increase in payroll taxes, sales receipts, and indirect purchases of goods and services.	The TRE would be closer to completion, which is anticipated to stimulate transportation opportunities and add opportunities for economic growth. Addressing deficiencies (e.g., lack of passing opportunity, turn lanes, Long X Bridge height restriction) may decrease cost of doing business based on travel time and damage to equipment. Minor economic impact on ranching businesses if the North Dakota Highway Patrol (NDHP) is unable to close the expanded roadway for the movement of cattle and for potential shared construction cost of cattle passes. Expenditure of approximately $419 million in local, state, and/or federal funds, plus $1 million for the trail, and $7 million for wildlife crossings and associated features. Temporary impacts during construction: increase in construction employment opportunities and subsequent increase in payroll taxes, sales receipts, and indirect purchases of goods and services; increased cost of business due to increased travel times.	Impacts the same as Alternative B, except the following: Expenditure of approximately $389 million in local, state, and/or federal funds.	LX-1, LX-2, and LX-3: Cost of doing business may decrease due to removal/reduction of over-height restrictions and detours. FF-2, FF-3, & FF-4: Potential reduction of payroll taxes, sales receipts, and the indirect purchase of goods and services at local businesses due to removal of mainline traffic through town; potential improvement of business environment by creating a “main street” with an overall quitter atmosphere and increased mobility in Fairfield. Fairfield options would cost $12 to $17 million, North Dakota Highway 200 (ND-200)/ US Highway 85 intersection options would cost $3 to $4 million, and Long-X Bridge options would cost $35 to $40 million.
Pedestrians and Bicyclists	Pedestrian and bicyclist facilities would not be added to the corridor	Additional opportunities for pedestrians and bicyclists would be provided Between McKenzie County Road 30 and McKenzie County Road 34. Temporary impacts during construction: reasonable access to roadways leading to trailheads in the vicinity of the project corridor would be maintained; however, users may experience delays when utilizing US Highway 85 to access trailheads.	Impacts the same as Alternative B.	No impacts.
Air Quality	Emissions of criteria pollutants would slightly increase as traffic volumes grow and passing and congestion increases. Traffic along the roadway would continue to contribute toward United States and North Dakota greenhouse gas (GHG) inventories.	Emissions of criteria pollutants from vehicles traveling along the project corridor would continue to occur; however, these emissions may be attenuated by eliminating the need for passing maneuvers and reducing roadway congestion. Traffic along the roadway would contribute toward United States and North Dakota GHG inventories. Temporary impacts during construction: emissions of criteria pollutants from construction equipment and the combustion of fuels from on-road haul trucks transporting materials and construction commuter vehicles; particulate matter emissions as fugitive dust from ground-disturbing activities.	Impacts the same as Alternative B, except the following: Temporary impacts during construction similar to, but less than, Alternative B, as the amount of disturbed ground would be less than Alternative B.	Impacts similar to Alternatives B and C.
Noise	No modeled receptors have noise levels that exceed their assigned FHWA Noise Abatement Criteria (NAC) and no receptors would have a substantial increase (15-A-weighted decibel [dBA] increase). No change in the current ambient noise environment.	No modeled receptors have noise levels that exceed their assigned FHWA NAC and no receptors would have a substantial increase (15-dBA increase). Frequencies with the furthest spread of sound from the point sound sources are predicted to spread between approximately 500 feet and 0.75 miles from the roadway, spreading farther near the Little Missouri River area, in flatter terrain. Higher noise levels (above 44.9 Z-weighted decibels [dBZ]) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway) and Little Missouri River area, in flatter terrain (i.e., approximately 0.25 miles from the roadway). Frequencies with the least spread of sound from point sound sources are predicted to spread between approximately 500 feet and 0.25 miles from the roadway, spreading farther near the Little Missouri River area, in flatter terrain. Higher noise levels (above 44.9 dBZ) would be constrained to the immediate roadway (i.e., approximately 500 feet from the roadway). For the wilderness area of the TRNP—North Unit, based on the worst-case scenario methodology, sound emitted from the point sound sources (at various frequencies) would only influence the far eastern border of the wilderness area. Temporary impacts during construction: increased noise.	Impacts the same as Alternative B.	Impacts similar to Alternatives B and C. Long X Bridge options: temporary pile driving noise during construction activities.

… table continued on page 132 …

Resource Area	Alternative A	Alternative B	Alternative C	Options
Water Resources	No impacts.	Impacts on the Little Missouri River due to construction of a new bridge, including placement of two bridge piers within the river channel and riprap associated with the piers; however, violations of the *Little Missouri State Scenic River Act* are not anticipated. Construction of the project would temporarily impact the outstandingly remarkable scenic value of the Little Missouri River; however, permanent impacts to the outstandingly remarkable scenic, cultural, and historic vales that qualify the river for listing on the Nationwide Rivers Inventory are not anticipated. Temporary and permanent impacts on wetlands, respectively: 21.82 acres; 26.85 acres. Temporary and permanent impacts on Other Waters, respectively: » South Branch of the Green River: 49 linear feet; 270 linear feet » Spring Creek: 248 linear feet; 182 linear feet » Unnamed Tributary: 2,639 linear feet; none Placement of fill in an area of mapped floodplain (Zone A). Elimination of portions of riverine floodplains and riparian corridors due to culvert construction/extension. New piers within the Little Missouri River could temporarily affect use of the corridor by wildlife until they acclimate to the new structure, and may temporarily alter stream velocities, flow patterns, and river morphology until the river adjusts to these changes. No impacts on groundwater. Potential impacts on eight stock ponds. Temporary impacts on riverine floodplains riparian corridors during construction: impaired ecological function of riparian corridors. Temporary impacts on water quality during construction: increased turbidity, sedimentation, soil erosion/deposition, and potential for spills/leaks.	Impacts the same as Alternative B, except the following: Temporary and permanent impacts on wetlands, respectively: 20.58 acres; 19.00 acres. Permanent impacts on Other Waters: » South Branch of the Green River: 92 linear feet; 212 linear feet » Spring Creek: 248 linear feet; 182 linear feet » Unnamed Tributary: 2,639 linear feet; none Elimination of shorter portions of riverine floodplains and riparian corridors. Potential impacts on six stock ponds.	Temporary and permanent impacts on wetlands, respectively: » FF-1: 0.06 acres; 0.75 acres » FF-2 with Alternative B: 0.03 acres; 0.79 acres » FF-2 with Alternative C: 0.01 acres; 0.81 acres » FF-3 with Alternative B: 0.05 acres; 0.11 acres » FF-3 with Alternative C: 0.04 acres; 0.09 acres » FF-4 with Alternative B: 0.06 acres; 0.06 acres » FF-4 with Alternative C: 0.14 acres; 0.12 acres » INT-1 with Alternatives B and C: 0.05 acres; 0.02 acres » INT-2 with Alternatives B and C: 0.04 acres; 0.03 acres » LX-1, LX-2, and LX-3: 1.13 acres; none Temporary and permanent impacts on Other Waters (Little Missouri River), respectively: » LX-1: 305 linear feet; 78 linear feet » LX-2 and LX-3: 305 linear feet; 121 linear feet LX-1 & LX-2: upstream water elevation would increase by approximately 0.13 feet (1.6 inches) during a 25-year flood event, 0.15 feet (1.8 inches) during a 50-year flood event, and 0.20 feet (2 inches) during a 100-year flood event. LX-3: not anticipated to affect upstream water elevations during flood events. LX-3 would require relocation of the streamgage located on the existing Long X Bridge. Temporary impacts on Little Missouri River during construction of Long X Bridge options: installation of a temporary bridge, causeway, or bypass; installation of cofferdams or earthen ring dikes at pier locations; excavation within cofferdams or ring dikes; dewatering of cofferdams or ring dikes; pile driving.

… table continued on page 133 …

Resource Area	Alternative A	Alternative B	Alternative C	Options
Wildlife	No impacts on migratory birds; general wildlife species; raptors; ESA-listed species or critical habitat; USFS-designated sensitive wildlife species; Management Indicator Species (MIS); or North Dakota Species of Conservation Priority. Wildlife mobility and habitat connectivity would not be improved by implementation of wildlife crossings and associated features.	Roadways can result in habitat loss, degradation, and fragmentation; barriers to wildlife movement; and mortality from wildlife-vehicle collisions. Divided highways would create incomplete habitat within the median and may cause wildlife to linger within the median. Additional lighting at intersections could interfere with migrating birds' navigation and may cause confusion leading to collisions, mortality, or injuries. Certain species of bats may benefit from the presence of streetlights due to increased prey availability, while other species may avoid illuminated habitat. Bats that forage near lighting may be more visible to predators, experience worsening vision, and/or experience interference with echolocation. Wildlife crossings and associated features would improve terrestrial habitat connectivity and reduce wildlife mortality due to collisions with vehicles. Construction would result in habitat loss where the roadway is expanded. Potential impacts on the burrowing owl and prairie falcon due to the disturbance of suitable habitat. Due to the potential for vehicle collisions, the project may affect, but is not likely to adversely affect, the Dakota skipper. Due to disturbance and conversion of potential habitat, the project may affect, but is not likely to adversely affect, the gray wolf, whooping crane, and northern long-eared bat. Potential impacts on the bighorn sheep, loggerhead shrike, Ottoe skipper, tawny crescent, and Sprague's pipit due to the disturbance of suitable habitat. Potential impacts on the sharp-tailed grouse due to the disturbance of suitable habitat. Sound and visual stimuli during construction and operation may result in the temporary avoidance of habitat and behavioral effects. Potential temporary impacts on fish species due to temporary altered stream velocities, flow patterns, and river morphology. Water quality degradation could cause the temporary avoidance of habitat by individuals or direct injury, mortality, or impairment of bodily functions of individuals.	Impacts the same as Alternative B, except for the following: Flush center median would not result in the creation of incomplete habitat within the median. Habitat loss would be less than Alternative B, as the amount of disturbed ground would be less than Alternative B.	FF-1 would have the least impacts on habitat, followed by Options FF-2, FF-3, and FF-4 in order of increasing construction footprint. LX-1 may have fewer impacts on habitat, as it would only require the construction of a new two-lane bridge and rehabilitation of the existing bridge, as opposed to construction of a new four-lane bridge under LX-2 and LX-3. Long X Bridge options: Temporary alteration of Little Missouri River stream velocities, flow patterns, and river morphology may impact fish habitat until the river adjusts
Historic and Archaeological Preservation/ Cultural Resources	Long X Bridge would continue to be maintained, such that its historic integrity would be preserved. Mitigation for *Eligible* sites would not occur.	*No Adverse Effect* determination for *Eligible* Dolynuik Homestead and TRNP – North Unit Entry Sign. Dolynuik Homestead and Gregory Homestead would be documented as part of the mitigation approach.	Impacts the same as Alternative B.	LX-1 & LX-2: *No Adverse Effect* determination for *Eligible* Long X Bridge. LX-3: *Adverse Effect* determination for *Eligible* Long X Bridge.
Hazardous Waste	No impacts.	Temporary impacts during construction: Potential for minor releases of hazardous materials; generation of minor amount of hazardous waste; disposal of asbestos-containing materials (ACMs) and lead-based paint during renovation or rehabilitation of the existing Long X Bridge.	Impacts the same as Alternative B.	Impacts similar to Alternatives B and C. Temporary impacts during construction of Long X Bridge options: disposal of ACMs and lead-based paint during renovation or rehabilitation.
Visual	No impacts on visual quality or protected visual resources. Fugitive dust and criteria pollutant emissions from vehicles and light pollution from vehicle headlights would continue. Any increases in fugitive dust, emissions of criteria pollutants, or light pollution from headlights associated with the annual increase in traffic are not anticipated to impact visual quality.	Fugitive dust and criteria pollutant emissions from vehicles and light pollution from vehicle headlights would continue. Any increases in fugitive dust, emissions of criteria pollutants, or light pollution from headlights associated with the annual increase in traffic are not anticipated to impact visual quality. Light pollution from headlights may decrease as traffic congestion decreases. Minor or negative impacts on visual quality of lightscape within the rolling prairie landscape unit due to addition/expansion of intersection lighting. Minor negative impacts on visual quality within the rolling prairie and Badlands landscape units. Minor impacts on scenic integrity for all six LMNG vantage points considered. No impact on the ability of the USFS to manage the affected vantage points for a "high" Scenic Integrity Objective. Negligible or minor impacts on the scenic quality of nine vantage points within the TRNP – North Unit. Overall, no significant reduction of the integrity of the landscape character, vividness, or visual harmony within the TRNP – North Unit. Temporary impacts during construction: negative impacts on visual quality.	Impacts the same as Alternative B, except for the following: Alternative C would result in fewer impacts on visual resources than Alternative B due to a narrower roadway footprint.	FF-1: not anticipated to result in negative impacts on visual quality FF-2, FF-3, & FF-4: visual quality for neighbors may be adversely impacted; visual quality for travelers may improve. LX-1, LX-2, & LX-3: positive or negative impacts on visual quality, depending on personal preference.

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Resource Area	Alternative A	Alternative B	Alternative C	Options
Energy	Demand for an improved highway system capable of addressing the social and economic needs of the region, which are tied to operation and maintenance of oil and gas development, would not be addressed. Fuel efficiency of vehicles would continue to be subject to sudden acceleration associated with passing, as well as congestion.	Demand for an improved highway system capable of addressing the social and economic needs of the region, which are tied to operation and maintenance of oil and gas development, would be addressed. Fuel efficiency of vehicles would be increased due to a reduction in sudden acceleration associated with passing, as well as reduced congestion. Relocation of 50,764 feet of energy infrastructure (i.e., electrical line and oil and gas pipeline). Temporary impacts during construction: consumption of energy.	Impacts the same as Alternative B except for the following: » Relocation of 95,450 feet of energy infrastructure.	FF-1 would have a slightly reduced vehicle energy efficiency than FF-2, FF-3, & FF-4 due to the reduction in posted speed limit within Fairfield; however, the reduction in efficiency may be offset by the shorter travel distance under FF-1. INT-2 may result in lower vehicle fuel efficiency than INT-1, as all vehicles would be required to slow down through the roundabout, whereas vehicles under INT-1 would only be required to slow down when making turns to or from ND-200. LX-1, LX-2, & LX-3 would have similar impacts on vehicle energy efficiency. Relocation of energy infrastructure: » FF-1: 1,540 linear feet with Alternative B; 1,690 linear feet with Alternative C » FF-2: 2,725 linear feet » FF-3: 1,565 linear feet » FF-4: 780 linear feet Temporary impacts during construction: FF-1 would result in less energy consumption during construction than FF-2, FF-3, & FF-4 due to the utilization of existing infrastructure.
Utilities	No impacts.	Relocation of utilities (including public lands): » 13,298 linear feet of oil/gas pipelines » 455,428 linear feet of communication lines » 37,466 linear feet of power lines » 114,400 linear feet of water pipelines Relocation of utilities on public lands only: » USFS: 61,253 linear feet » NPS: 9,300 linear feet	Relocation of utilities (including public lands): » 14,202 linear feet of oil/gas pipelines » 447,130 linear feet of communication lines » 81,248 linear feet of power lines » 37,680 linear feet of water pipeline Relocation of utilities on public lands: » USFS: 56,004 linear feet » NPS: 9,300 linear feet	Relocation of utilities: » FF-1: 15,690 linear feet » FF-2: 14,580 linear feet » FF-3: 16,495 linear feet » FF-4: 12,425 linear feet
Vegetation	Vegetation would remain similar to current conditions. No impacts on ESA-listed plant species, USFS-designated sensitive and watch list species, or species of concern.	Vehicles travelling along US Highway 85 would continue to have the potential to spread or introduce noxious weeds. Permanent conversion of vegetated areas into a transportation corridor. Impacts on approximately 6,700 urban or native trees. No impact on ESA-listed plant species, as no such resources occur within the project corridor. No impact on USFS watch list species anticipated, as no such resources have been identified within the project corridor. A population of Hooker's townsendia daisy would be impacted that was identified within the construction limits. No impact on the Missouri foxtail cactus populations identified, as they are outside of the construction limits and NDDOT ROW/easement; however, impacts on unidentified populations may occur due to the presence of suitable habitat. Potential impacts on ten additional sensitive species due to the disturbance of suitable habitat. Temporary impacts during construction: potential to spread or introduce noxious weeds.	Impacts the same as Alternative B except for the following: Alternative C would result in less vegetation impact than Alternative B due to a narrower roadway footprint. Impacts on approximately 6,400 urban or native trees. At least half of the population of Hooker's townsendia daisy identified would be impacted.	FF-1 would have the least impacts on vegetation, followed by Options FF-2, FF-3, and FF-4 in order of increasing construction footprint. LX-1 may have fewer impacts on vegetation, as it would only require the construction of a new two-lane bridge and rehabilitation of the existing bridge, as opposed to construction of a new four-lane bridge under Options LX-2 and LX-3.

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Resource Area	Alternative A	Alternative B	Alternative C	Options
Section 4(f) Properties	No impacts.	Temporary occupancy exception for NPS-managed lands within the TRNP–North Unit Administrative Boundary. *De minimis* impact determination (*No Adverse Effect* determination anticipated) for relocation of TRNP–North Unit Entry Sign. *De minimis* impact determination (*No Adverse Effect* determination anticipated) for permanent use of Dolyniuk Homestead.	Impacts the same as Alternative B.	LX-1: *De minimis* impact determination (*No Adverse Effect* determination) for permanent use of Long X Bridge. LX-2: No use. LX-3: Nationwide Section 4(f) Programmatic Evaluation for Historic Bridges for permanent use (*Adverse Effect* determination) of Long X Bridge.

Table 32, Environmental Commitments Summary

NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
1	All areas temporarily disturbed by construction would be restored.	Completion of construction	Land Use, Prime and Unique Farmlands, Water Resources, Wildlife, Vegetation, Section 4(f)
2	Two lanes of traffic along US Highway 85 and reasonable construction access for all residences, businesses, and public lands would be maintained. Temporary signage pertaining to roads, businesses, and public facilities would be installed during construction as necessary.	Throughout construction	Land Use, Social, Public Lands, Economics, Pedestrians and Bicyclists
3	Borrow sites, waste sites, gravel source locations, and staging areas identified by the contractor (i.e., not included in this Environmental Impact Statement [EIS]) would be approved through the NDDOT Material Source Approval Process. This process is followed to obtain environmental clearance on these sites to comply with all federal and state laws and regulations that govern the protection of wetlands, threatened and endangered species, and cultural resources. Material sources include rock riprap and material from commercial sources, and any other area of planned ground-disturbing activities, such as staging area(s), plant site(s), stockpile area(s), waste site(s), and haul road(s). These sites would not be permitted on any federal or public lands or within the bighorn sheep lambing areas located adjacent to the project corridor.	Prior to and throughout construction	Land Use, Water Resources, Wildlife, Historic and Archaeological Preservation
4	If Alternative C or different option(s) are later determined to be the Preferred Alternative, an NRCS-CPA-106 Form would be completed and coordination with the NRCS would occur.	Prior to construction	Prime and Unique Farmlands
5	Waste material would be disposed of in accordance with state and federal laws, and in a manner that avoids impacts on water channels and riparian areas.	Throughout construction	Prime and Unique Farmlands, Water Resources, Wildlife
6	Paleontological monitoring would occur through the Badlands area, with paleontological monitors following earth-moving equipment and examining excavated sediments and road cuts for evidence of significant fossil resources. In the event that significant fossils are uncovered, work would be halted within 100 feet of the discovery site until the fossils are assessed and mitigation measures are discussed amongst the NDDOT, a qualified paleontologist, and an authorized agency representative for resources located on public land. If located on private land, the landowner would be included in the assessment and mitigation. Outside of the Badlands area, all other areas through the Sentinel Butte and Golden Valley formations and Coleharbor Group, where excavation and expansion of road cuts would occur, would be spot-check inspected (i.e., windshield survey for bedrock) once during excavation and once after excavation is completed. Where bedrock is identified, the area would be surveyed on-foot and visually inspected for fossils of any kind.	Prior to and throughout construction	Paleontology
7	Temporary mailboxes would be supplied during construction as necessary.	Throughout construction	Social
8	Landowner negotiations would occur regarding the extension of existing cattle passes or incorporation of new cattle passes. If additional cattle passes are requested by adjacent landowners, these requests would be considered utilizing the NDDOT Cattle Pass Consideration process (State Form Number 10155).	Prior to construction	Social, Public Lands, Economics
9	Temporary and/or permanent replacement fencing would be provided, as necessary, to maintain existing fencing connectivity. Apart from wildlife fencing associated with wildlife crossings, fencing installed on USFS-managed lands would meet or exceed specifications provided by the USFS in **Appendix B. Agency Correspondence**.	Throughout and completion of construction	Social, Public Lands, Economics
10	Roadway design plans pertaining to USFS-managed lands, including permanent erosion control measures, would be submitted to the USFS for review prior to construction and a preconstruction field review with the USFS would occur to review design plans and stipulations with the contractor and NDDOT.	Prior to construction	Public Lands
11	The contractor would remain apprised of fire danger conditions and follow applicable fire restrictions and safe fire practices, including fire stipulations for USFS-managed lands provided by the USFS in **Appendix B. Agency Correspondence**.	Throughout construction	Public Lands
12	The Medora and McKenzie Grazing Associations would be informed of respective impacted USFS grazing allotments prior to construction.	Prior to construction	Public Lands
13	Unless otherwise noted within this EIS, all range infrastructure (e.g., fences, gates, water developments) would remain functional during and upon completion of construction.	Throughout and completion of construction	Public Lands, Economics
14	Timing of construction activities would be limited in proximity to the TRNP–North Unit. Timing restrictions would extend from reference point (RP) 126 to RP 130. In this area, regular construction activities (i.e., all activities except pile driving) would be limited to 8 am to 10 pm central time (7 am to 9 pm mountain time). Pile driving activities in this area would be limited to 8 am to 7 pm central time (7 am to 6 pm mountain time). Certain construction activities may require work outside of these times. The contractor would be required to notify the NDDOT prior to working outside of the established times, and the NDDOT would notify the NPS. Should construction fall behind schedule, sustained 24-hour construction may be required. In the event that sustained 24-hour construction becomes necessary, the NDDOT would coordinate with NPS prior to commencing this schedule. Prior to developing the Special-Use Permit for temporary construction activities on NPS-managed lands, discussions would be had regarding extenuating circumstances that may necessitate 24-hour construction and additional conditions that may accompany 24-hour construction.	Throughout construction	Public Lands, Noise, Visual
15	Landowner negotiations would occur regarding impacts on existing stock ponds and necessary mitigation or compensation, including coordination with the USFS and the associated grazing permit holder for a stock pond located on USFS-managed lands near RP 110.33. Permitting may be required for mitigation actions depending upon the nature and location of the mitigation. Coordination with the USACE would be required if the proposed activity involves jurisdictional waterbodies. Additionally, if the proposed activity involves the diversion or impoundment of 12.5 acre-feet or more of water for livestock, a permit from the NDSWC would be required, and any industrial use of water would require a permit from the NDSWC.	Prior to and throughout construction	Public Lands, Water Resources
16	A noxious weed management plan would be implemented during construction and re-seeded areas would be maintained until such time that the vegetation is consistent with surrounding undisturbed areas and the site is free of noxious weeds. Any state- or county-listed noxious weeds identified on USFS-managed lands along the project corridor would be controlled in coordination with the USFS in compliance with the 2007 DPG Noxious Weed Management Project EIS.	Throughout and completion of construction	Public Lands, Wildlife, Vegetation
17	All construction equipment and vehicles to be used on USFS- or NPS-managed lands would be pressure washed and free of noxious weeds and plant propagules (i.e., seeds and vegetative parts that may sprout) prior to entrance onto the project site. This would include equipment and vehicles intended for off-road as well as on-road use, whether they are owned, leased, or borrowed by the contractor or any subcontractor. Cleaning of vehicles and equipment would occur off-site.	Prior to and throughout construction	Public Lands, Wildlife, Vegetation
18	The seed mixture for the Badlands area (i.e., RP 121.4 to RP 130.0) would be developed in coordination with the NDDOT, FHWA, USFS, NPS, and Tribal Consultation Committee (TCC). The seed mixture for USFS-managed lands outside of the Badlands area would be in accordance with USFS Seed Mixture #37-28A Scenario #13. The seed mixture for all other areas would follow the NDDOT Standard Specifications for Road and Bridge Construction, and may include a pollinator component.	Prior to construction	Public Lands, Wildlife, Vegetation
19	The TRNP–North Unit Entry Sign would be removed (intact) and reset in accordance with a Special Provision of the Construction Specifications that would be drafted for the sign.	Prior to and completion of construction	Public Lands, Historic and Archaeological Preservation, Section 4(f)

… table continued on page 137 …

NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
20	Long-term, fixed lighting associated with staging areas between RP 126 and 130 would consist of downcast, shielded lighting. Lighting would not be in use 24 hours per day unless NDDOT obtains permission from the NPS for limited duration 24-hour lighting. Short-term, fixed and/or mobile lighting would not consist of downcast, shielded lighting. This lighting would be limited to the duration of construction activities, as described above.	Throughout construction	Public Lands, Visual
21	Visual screening (e.g., slatted chain link fencing) would be installed prior to construction along the western- and northern-most sides of the Long X Bridge staging areas. Visual screening would be an earth-tone color.	Throughout construction	Public Lands, Visual
22	A grinding technique (similar to Next Generation Concrete Surface treatments) would be implemented on the new Long X Bridge to minimize noise.	Throughout construction	Noise
23	Prior to commencement of bridge removal activities under Option LX-3, a demolition plan would be submitted by the contractor to the NDDOT for review and approval. Removal activities would not commence until approval of the demolition plan has been received from the NDDOT. If the bridge is adopted, the State Historic Preservation Office (SHPO) would also review and approve the demolition plan. All portions of the existing bridge that extend above the river bottom would be removed and disposed of at an approved facility or salvaged. Debris and water used during concrete sawing would be prevented from falling into the river to the extent practicable. Debris and temporary fill material would be removed from the river channel to the extent practicable.	Prior to and throughout construction	Water Resources
24	The streamgage located on the Long X Bridge would continue to be operational during construction activities. Under Option LX-3, coordination with the US Geological Survey and NDSWC would occur during final design to incorporate necessary design features into the plan set and/or contract provisions for the relocation.	Prior to and throughout construction	Water Resources
25	During the use of any causeway or bypass, water flow would be maintained by installing temporary culverts or by leaving part of the channel open.	Throughout construction	Water Resources
26	Sandblasting and painting for Options LX-1 and LX-2 would include full containment of the bridge during sandblasting to facilitate collection, removal, and disposal of the existing paint and sandblasting materials. Containment would remain in-place during the application of the new paint system.	Throughout construction	Water Resources
27	Rock riprap and box culvert bottoms would be buried to minimize impacts on channels and riparian corridors.	Throughout construction	Water Resources
28	During final design, wetland and Other Waters impacts would be refined, and additional avoidance and minimization measures would be analyzed. Unavoidable permanent impacts would be mitigated for in accordance with Executive Order 11990 and Section 404 of the *Clean Water Act*. Wetland mitigation is anticipated to be accomplished through the creation of wetland mitigation site(s) and/or mitigated at a wetland mitigation bank. Mitigation would be determined during final design and permitting.	Prior to and completion of construction	Water Resources, Wildlife
29	The NDDOT would coordinate with the North Dakota Game and Fish Department (NDGF) during final design of the bighorn sheep wildlife underpass. The NDDOT would coordinate with the NDGF, USFS, and NPS during final design of the wildlife fencing and associated features.	Prior to construction	Wildlife
30	The NDDOT and NDGF have entered into a Memorandum of Agreement (MOA) to continue coordination with regard to pronghorn crossings, including reanalyzing the crossings during final design.	Prior to construction	Wildlife
31	The NDDOT Utility Engineer or consultant would request that utility companies install line markers (bird diverters) on overhead utility lines to be raised, lowered, and/or moved to reduce the risk of flight collisions for birds, including the whooping crane. The utility company would determine the type, number and placement/spacing of the line markers and may conclude that the placement of line markers is not feasible in certain situations.	Prior to construction	Wildlife
32	A field survey for raptor nests would be completed during the breeding and nesting season in North Dakota (February 1 to August 15) in accordance with the Eagle and Raptor Aerial Nest Survey Report and Biological Evaluation (BE) that were developed for the project. If any nests are found, appropriate minimization measures (such as timing restriction and avoidance buffers) would be implemented.	Prior to construction	Wildlife
33	If construction activities occur during the migratory bird nesting and breeding season in North Dakota (between February 1 and July 15), work areas would be mowed and/or grubbed prior to the nesting and breeding season. If mowing and/or grubbing is not completed prior to the nesting and breeding season, a qualified biologist would conduct pre-construction surveys to check the status of existing and historical nests and search for new nests, for migratory birds, including raptors, and their nests within the work areas. If active nests are identified, the NDDOT would coordinate with the USFWS prior to commencement of work to determine any measures necessary to minimize harm. In addition, the NDDOT Standard Special Provision for the *Migratory Bird Treaty Act* would be included with the Construction Specifications. This Special Provision includes stipulations pertaining to nests during construction activities involving bridges, box culverts, and structural plate culverts.	Prior to construction	Wildlife
34	To minimize potential impacts on sharp-tailed grouse breeding habitat, spring surveys of known leks (i.e., breeding sites) identified in the BE that was prepared for the project would be conducted prior to commencement of construction activities. If a lek site is determined to be active, all construction activity within 1 mile of the active lek site would be suspended for the first two hours of daylight beginning at sunrise for the time period of May 1 to June 15.	Prior to and throughout construction	Wildlife
35	Temporary fencing between construction activities and identified potential Dakota skipper habitat would be installed. A speed limit of 15 miles per hour would be maintained within a 0.6-mile radius of the identified Dakota skipper habitat (RP 121.5 to RP 122.9) for all construction vehicles traveling off of the existing roadway within the limits of construction from June 15 to July 15.	Prior to and throughout construction	Wildlife
36	Equipment that was last used outside of North Dakota or within a Class I infested waterbody would be inspected by the NDGF prior to being placed within waters of the state (as defined in North Dakota Century Code Chapter 60-01-01) to minimize the risk of spreading aquatic nuisance species.	Prior to and throughout construction	Wildlife
37	To minimize impacts on fish during the spawning period, work in the South Branch of the Green River, Little Missouri River, and Spring Creek would not occur between April 15 and June 1, except within coffer dams installed outside of this timeframe.	Throughout construction	Wildlife
38	In the event that any threatened or endangered species are identified within 1 mile of construction activities, the contractor would be required to notify the project engineer immediately. The project engineer would then cease all construction activities; establish a minimum 0.5-mile avoidance area; and immediately notify and coordinate with the USFWS, FHWA, and NDDOT. The contractor would not resume work within the avoidance area until the project engineer has confirmed with the agencies that work may proceed (i.e., either species have left the area or approved minimization measures have been implemented). A threatened and endangered species poster or pamphlet would be provided on all job sites.	Throughout construction	Wildlife
39	To minimize impacts on the bighorn sheep during lambing season, construction activities from approximately RP 124.1 to RP 126.4 would be limited to an area generally defined by ROW/easement or the surface of the roadway, inslopes, and ditches from April 1 to July 15.	Throughout construction	Wildlife
40	To minimize impacts on fish species, instream riverine water flow would be maintained at baseline depth during construction to allow fish passage.	Throughout construction	Wildlife
41	The NDGF and NDDOT would coordinate to monitor the effectiveness and manage the wildlife crossings. In addition, the NDDOT, NDGF, NPS and USFS would coordinate to maintain the wildlife fencing and associated features.	Completion of construction	Wildlife

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NO.	COMMITMENT	TIMING OF IMPLEMENTATION	ENVIRONMENTAL IMPACT CATEGORY
42	The area near the wildlife underpass at RP 126.1 within the NDDOT easement would be cleared of woody vegetation to improve sight lines for bighorn sheep as they approach the underpass.	Throughout construction	Wildlife, Vegetation
43	For each construction phase, impacts on woody vegetation would be assessed and recorded during construction. The NDDOT would coordinate with the NDGF to determine future mitigation needs and methods.	Throughout and completion of construction	Wildlife, Vegetation
44	An inadvertent discovery plan would be developed for the project prior to construction that would outline procedures and requirements in the event that cultural resources are discovered during construction.	Prior to construction	Historic and Archaeological Preservation
45	Under Option LX-2, to maintain the integrity of the historic Long X Bridge, a mechanism would be created in coordination with the NDDOT, FHWA, and SHPO to ensure continued maintenance so the bridge does not fall into neglect.	Prior to construction	Historic and Archaeological Preservation
46	Under Option LX-3, in accordance with the Bridge Adoption Program (23 U.S.C. 144), the Long X Bridge was made available for adoption and advertised for 30 days. If no successful adoption occurs, an MOA containing alternate mitigation measures has been signed between the FHWA, NDDOT, and SHPO. The MOA and related documentation, developed in consultation with the SHPO and consulting parties (i.e., TCC), would be filed with the Advisory Council on Historic Preservation (ACHP) at the conclusion of the consultation process.	Prior to construction	Historic and Archaeological Preservation, Section 4(f)
47	The mitigation approach for the permanent impact on the Dolyniuk Homestead includes documentation of the site, as well as the nearby Gregory Homestead, in 2018.	Prior to construction	Historic and Archaeological Preservation, Section 4(f)
48	State Form Number 17987 Asbestos Notification of Demolition and Renovation form would be submitted to the NDDH at least 10 working days prior to demolition of the South Branch of the Green River Bridge and Spring Creek Bridge, and renovation or removal of the Long X Bridge. In addition, all regulated "asbestos-containing materials (ACMs) identified at the Long X Bridge would be removed by properly certified and licensed individual(s), and an asbestos management/removal plan would be developed prior to renovation or removal. All waste ACMs would be properly disposed of in an approved landfill, in accordance with local, state, and federal regulations. Confirmation on whether or not the materials covering the communication box and conduit on the Long X Bridge are ACMs and proper removal of these materials prior to renovation or removal of bridge would be coordinated with the owner of the utilities prior to implementation of the project.	Prior to and throughout construction	Hazardous Waste
49	All hazardous wastes generated as a result of the project would be handled in accordance with the *Resource Conservation and Recovery Act* (RCRA) Subtitle C waste management program and the requirements and regulations of the NDDH.	Throughout construction	Hazardous Waste
50	If the contractor encounters abnormal conditions (e.g., presence of barrels, obnoxious odors, excessively hot earth, smoke) during construction that indicate the presence of hazardous materials or toxic wastes anywhere the contractor performs work, the contractor would immediately suspend the work and notify the project engineer. The contractor would continue construction in other areas of the project, but would not resume work in the area of the abnormal condition, unless directed to by the project engineer.	Throughout construction	Hazardous Waste
51	Lead-based paint associated with the Long X Bridge would be properly removed or stabilized prior to renovation or removal of the structure and disposed of at an off-site facility approved for lead waste.	Throughout construction	Hazardous Waste
52	Upon funding and the initiation of final design, the NDDOT would coordinate with utility companies to minimize impacts on utilities, avoid known sensitive resources (i.e., cultural resources, wetlands, USFS-designated sensitive plant populations), and coordinate ROW and easement acquisition activities.	Prior to construction	Energy, Utilities
53	Any utility relocations that occur outside of NDDOT ROW or USFS easements would be required to obtain individual state and federal approvals, as necessary. This would include obtaining a ROW permit from the NPS for any relocations occurring on NPS-managed lands.	Prior to construction	Energy, Utilities
54	Any USFS-designated sensitive plant species or USFS-designated watch plant species observed during construction would be reported to the USFS.	Throughout construction	Vegetation
55	Where avoidance is possible, fencing would be installed to minimize impacts on the population of Hooker's townsendia daisy identified in the BE that was prepared for the project to prevent disturbance to the maximum extent practicable.	Prior to construction	Vegetation
56	The NDDOT would be responsible for the control of noxious weeds within NDDOT ROW/easements after construction of the project.	Completion of construction	Vegetation

Chapter 8. Cumulative Effects

This chapter examines the potential impacts on environmental, socioeconomic, and human-made resources that would result from the incremental impacts of the alternatives in addition to other past, present, and reasonably foreseeable future actions. This analysis assesses the potential for an overlap of impacts with respect to project schedules or affected areas. This chapter presents a qualitative analysis of the cumulative effects, based on impacts anticipated for the alternatives and their options.

Important topics in this chapter:

8.1. What are cumulative effects, and why do we study them?

Federal regulations implementing the *National Environmental Policy Act* (NEPA) (Council on Environmental Quality [CEQ] 40 Code of Federal Regulations [CFR] § 1500–1508) require that the cumulative effects of a proposed action be assessed.

A cumulative effect could be additive (i.e., the net adverse, cumulative effects are strengthened by the sum of individual effects), countervailing (i.e., the net adverse, cumulative effect is less as a result of the interaction between beneficial and adverse individual effects), or synergistic (i.e., the net adverse, cumulative effect is greater than the sum of the individual effects). Cumulative effects could result from individually minor, but collectively significant actions that take place over time.

Accordingly, a cumulative effects analysis identifies and defines the scope of other actions and their interrelationship with the alternatives if there is an overlap in space and time. Cumulative effects are most likely to occur when there is an overlapping geographic location and a coincidental or sequential timing of events. Because the environmental analysis required under NEPA is forward-looking, the aggregate effect of past actions is analyzed to the extent relevant and useful in analyzing whether the reasonably foreseeable effects of a proposed action could have a continuing, additive, and significant relationship to those effects.

8.2. How were cumulative effects evaluated?

The resources considered in this cumulative effects analysis were determined by analyzing the following criteria (AASHTO 2016):

1. What types of environmental resources are present in the vicinity of the project?
2. Which resources are most prevalent, sensitive, and/or threatened by other actions?
3. Which resources are likely to be most substantially affected by the project (taking into account both direct and indirect effects of the project)?

For each resource considered in this cumulative effects analysis, the following steps were taken to analyze cumulative effects (AASHTO 2016):

1. Describe resource conditions and trends,
2. Summarize the direct and indirect impacts of the proposed action on that resource,
3. Describe other actions and their effects on the resource,
4. Estimate the combined effects of the proposed action and other actions on the resource, and
5. Consider minimization and mitigation for those effects.

> Cumulative effects are defined as the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7).

8.3. What environmental resources were considered in the cumulative effects analysis?

The project corridor is located in western North Dakota and intersects the Little Missouri River, Little Missouri National Grasslands (LMNG), and Theodore Roosevelt National Park (TRNP)—North Unit Administrative Boundary. The corridor traverses a diverse landscape characterized by grasslands, cultivated fields, Badlands, buttes, and plateaus accented by wooded draws. The landscape supports a diversity of vegetation, wildlife, and land uses including grazing, agriculture, recreation, and energy development. Numerous public comments were received in regard to potential impacts on the scenic quality and serenity of the Badlands, TRNP, and/or LMNG. Based on the project setting and public comments, the cumulative effects analysis considers the following resources:

- Land Use
- Social
- Public Lands
- Noise
- Water Resources
- Wildlife
- Historic and Archaeological Preservation/Cultural Resources
- Visual
- Vegetation

The temporal span of this cumulative effects analysis begins when past projects and actions began modifying the respective resource, and ends in 2040, the year for which forecasted traffic data is available (i.e., accounting for the typical 20- to 30-year design life of roadways). The spatial areas of consideration for potential cumulative effects on the respective resources were defined by considering the extent of the resource and the area that the project in combination with other past, present, and reasonably foreseeable future projects and actions might affect the resource. Resource conditions and trends were considered within the context of the state, with a focus on western North Dakota. Cumulative effects were analyzed at the spatial intersection of the oil and gas industry in western North Dakota, LMNG, TRNP, Little Missouri River Badlands, and project corridor.

8.4. What other past, present, and reasonably foreseeable future projects and actions were considered for potential cumulative effects?

8.4.1. Oil and Gas Developments

The first oil boom in western North Dakota began in the early 1950s and peaked in the 1960s. The second oil boom began in the 1970s and peaked in the 1980s. The third oil boom began in the early 2000s. From 2009 to 2015, annual crude oil production in North Dakota increased approximately 442.2 percent (from 79.7 to 432.3 million barrels) (NDIC 2015B).

The price per barrel of oil began falling in 2015 due to a worldwide surplus in the crude oil supply. From 2013 to 2014, there was an approximate 21 percent annual increase in oil production, but from 2014 to 2015, there was only an approximate 8.9 percent annual increase in oil production. By 2015 to 2016, there was an approximate 12 percent annual decrease in oil production.

In 2017 and 2018, oil production began to recover and increase as the price per barrel of oil increased. Annual crude oil production in North Dakota increased approximately 3.8 percent from 2016 to 2017 (from 380.4 to 394.8 million barrels). Between January and April 2018, there was a total of approximately 142.3 million barrels of oil produced in North Dakota, which is 15.9 percent more than what was produced between January and April 2017 (approximately 122.8 million barrels) (EIA 2017C, EIA 2018, NDIC 2017, NDIC 2018A).

The US Energy Information Administration (EIA) forecasts total United States crude oil production to average 10.8 million barrels per day in 2018 and 11.8 million barrels per day in 2019. If realized, both of these forecasted levels would surpass the previous record of 9.6 million barrels per day in 1970 (EIA 2018).

Oil and gas production involves several components, including oil and gas well pads (with access roads and utilities), pipelines, oil refineries, natural gas processing plants, saltwater disposal wells, and treatment facilities. Known past, present, and reasonably foreseeable oil and gas developments are as follows:

- As of January 8, 2018, there were 31,121 oil and gas wells located on single- or multi-well pads in North Dakota. Of these, 1,086 wells are located within 5 miles of the project corridor and 89 are located within 0.5 miles of the corridor. These values include abandoned, producing and drilling wells, and wells that are permitted to be drilled in the future (NDIC 2018B).
- As of June 30, 2017, there were 17 crude oil, nine natural gas, four refined oil and gas product, and one carbon dioxide transmission pipelines operating in North Dakota. Of these, two crude oil pipelines intersect the alternatives. Since June 30, 2017, Public Service Commission siting applications have been filed for nine pipeline projects in western North Dakota. In addition, there are currently numerous oil and gas gathering pipelines connecting well pads to transmission lines, for which existing and proposed locations are generally confidential. The active wells in the vicinity of the alternatives currently utilize trucks and gathering pipelines to transport crude oil (Public Service Commission 2018, NDPA 2017).
- There are currently two operating oil refineries in North Dakota. Of these, the nearest refinery is located approximately 13 miles east of the project corridor in Dickinson. Pending the acquisition of required state permits, construction of a third refinery located approximately 3 miles west of the project corridor near Belfield is expected to begin in 2018 and become operational in 2019. The refinery has been situated near existing transportation infrastructure, including US Highway 85, I-94, pipelines, and a railroad. As such, construction of the refinery is not contingent upon the US Highway 85 Project (McGurty 2017, Wernette 2015).

- As of June 30, 2017, there were 28 natural gas plants operating in North Dakota (NDPA 2017). Of these, four plants are located within 5 miles of the project corridor and none are located within 0.5 miles of the corridor (NDIC 2018B). Since June 30, 2017, Public Service Commission (2018) siting applications have been filed for a plant expansion in Dunn County and a new plant in McKenzie County.

- As of January 8, 2018, there were a total of 790 saltwater disposal wells in North Dakota. Of these, 29 are located within 5 miles of the project corridor and 7 are located within 0.5 miles of the project corridor. These values include abandoned, drilling wells, and wells that are permitted to be drilled in the future (NDIC 2018B).

- As of February 15, 2018, there were 72 mobile and stationary oil and gas waste treatment facilities in North Dakota. Of these, two are located within 5 miles of the project corridor and none are located within 0.5 miles of the project corridor. These values include abandoned, active, and treatment facilities that are permitted for the future (KIRBY 2018).

8.4.2. Recreation/Tourism

The precursor to the North Dakota Tourism Division (NDTD), the Tourism Promotion Bureau, was established in 1965 to promote tourism in the state (SHSND UNDATED(C)). According to the North Dakota Tourism Annual Report (2015) produced by the NDTD, tourism has shown consistent growth since 1990 and is North Dakota's third-largest industry with nonresident visitors spending $3.1 billion in 2015. A total of 21.9 million people visited North Dakota in 2015, and all 53 counties experienced visitor spending increases. Tourism makes up 13.2 percent of gross state product, and generates 5.8 percent of state and local taxes. From 2015 to 2016, the number of tourists visiting state parks increased 4 percent, tourists visiting national parks increased 30 percent, tourists visiting major attractions increased 1 percent, and tourists visiting visitor centers decreased 9 percent (NDTD 2015).

Major tourist and recreation areas along the project corridor include the TRNP, LMNG, Little Missouri River (State Scenic River) and the Maah Daah Hey Trail. While western North Dakota has a relatively low population, these recreation/tourist sites draw birdwatchers, campers, hunters, hikers, history enthusiasts, canoeists, equestrians, and mountain bikers from around the world to the area. This influx of people can create additional demands on area resources and the local entities that maintain them.

8.4.3. Little Missouri National Grasslands

The LMNG is one of four National Grasslands that make up the Dakota Prairie Grasslands (DPG) (USFS UNDATED(B)). The DPG was established in 1998 when it was split from the Custer National Forest. The DPG Land and Resource Management Plan (LRMP) provides guidance for all resource management activities on the DPG (e.g., noxious weed control); identifies management standards and guidelines; and describes resource management practices, levels of resource use and protection, and the availability and suitability of lands for resource management (USFS 2001). The LMNG makes up much of the DPG, spanning over 1 million acres in western North Dakota. The grassland is divided into two ranger districts: Medora and McKenzie. Recreational opportunities on the LMNG include hiking, camping, horseback riding, photography, canoeing, wildlife viewing, fishing, and hunting (USFS UNDATED(D)). In addition to recreation, the other human uses of the LMNG include oil and gas development and livestock grazing.

As of March 7, 2018, there were 11 recent US Forest Service (USFS) projects that have been analyzed under NEPA pertaining to the LMNG in addition to many more archived projects that have been analyzed (USFS UNDATED(G)). Of the recent projects, two are in or applicable to the vicinity of the US Highway 85 Project corridor:

- In 2016, the USFS replaced Chapter 4 of the DPG LRMP, which brought the Plan's monitoring program into compliance with the 2012 National Forest System Land Management Planning Rule (36 CFR 219.12) (O'DONNELL 2016). Monitoring allows USFS to conduct adaptive management, make informed decisions, and assess the effectiveness of the Plan (USFS 2016).

- In 2018, the USFS approved a proposal to reroute a portion of the Maah Daah Hey Trail by constructing 2,970 feet of new trail and abandoning an existing segment of the trail that was damaged by a landslide (VERES 2018).

As of March 7, 2018, there were eight future USFS projects that are being analyzed under NEPA pertaining to the LMNG (USFS UNDATED(G)). Of these, two are in or applicable to the vicinity of the US Highway 85 Project corridor:

- The Dakota Prairie Grasslands Plan Oil and Gas Development Supplemental Environmental Impact Statement (EIS) would reevaluate the oil and gas development pattern on the DPG as a supplement to the 2001 Northern Great Plains Management Plans Revision Final EIS. The project would reconsider impacts of oil and gas activities on the DPG to determine if changes to the DPG LRMP are adequate to mitigate the effects of future oil and gas development (NEITZKE 2015).

- The Little Missouri National Grassland Prairie Dog Management Project would implement the DPG LRMP direction to manage the black-tailed prairie dog. Management would include monitoring prairie dog colonies entirely within USFS-managed lands, directing colonies approaching the edge of USFS-managed lands away from private lands, and/or working with landowners to find solutions (e.g., easement, elimination, relocation) for colonies that are encroaching onto private lands and/or causing harm to infrastructure or safety (BOEHM 2015).

8.4.4. Theodore Roosevelt National Park – North Unit

The Theodore Roosevelt National Memorial Park was established in 1947, which was redesignated by Congress in 1978 as Theodore Roosevelt National Park. The North Unit was added to the park in 1948. The National Park Service (NPS) Management Policies 2006 and TRNP Foundation Document provide guidance for resource management activities in the TRNP, including policies and directives for park management, and guidance for making planning and management decisions. The TRNP is one of the largest tourism draws in North Dakota. From 2012 to 2017, the TRNP – North Unit averaged nearly 99,000 visitors annually, the majority of whom accessed the park via the US Highway 85 project corridor. The number of annual visitors to the TRNP – North Unit has increased since 2008, peaking in 2012 and 2016 when it experienced nearly 130,000 and 120,000 visitors, respectively. The TRNP – North Unit offers camping, hiking, horseback riding, biking, cross-country skiing, snowshoeing, fishing, boating, canoeing, and kayaking. Approximately 92 percent of park visitors place 'scenery viewing' as an important factor in visiting the park, and approximately 97 percent of the park is in a natural or near-natural condition (NPS 2006, NPS 2014, NPS 2015A, NPS 2017A).

As of March 7, 2018, there were four NPS projects that have been or are being analyzed under NEPA pertaining to the TNRP (NPS UNDATED(E)). Of these, three pertain to the TRNP – North Unit:

- In 2007, the NPS prepared a draft Environmental Assessment (EA) for the repair and rehabilitation of the scenic drive in the TRNP – North Unit. The EA contained one build alternative to rehabilitate and repave the 14-mile roadway through the TRNP – North Unit (NPS 2007).

- In 2015, the NPS completed an EA for the replacement of the TRNP – North Unit visitor center (NPS 2015A). The visitor center (abandoned in 2013) is located approximately 1,200 feet west of the park entrance off of US Highway 85. This area of the park is designated as 'Development Zone', where development of facilities to support the park's mission is compatible with park purposes. The NPS proposed to replace the abandoned visitor center because the force of groundwater, expansive clays, water-bearing coal seams, and soil slumping pushed on the basement walls of the abandoned visitor center, causing them to crack and move. In the signed Finding of No Significant Impact for the EA, Alternative Site Number 1 was selected as the Preferred Alternative, which included construction of a new visitor center approximately 120 feet southeast of the center of the abandoned visitor center (NPS 2015A).

- In 2016, the NPS completed an EA for the issuance of a permit for the replacement of a communication tower and installation of a shed adjacent to the tower (NPS 2016A). The communication tower is located approximately 1 mile north of the park entrance off of US Highway 85 (approximately 600 feet northeast of US Highway 85). This area is currently the site of a communication tower and shed. The NPS proposed to issue the permit for tower replacement because the new tower would reduce impacts on the park resources by installing a shorter tower without lighting, while maintaining communication infrastructure for the park. In the Finding of No Significant Impact for the EA, the alternative to issue the permit was selected as the Preferred Alternative.

8.4.5. Agriculture

In 1925, there were approximately 3,495 farms and ranches (with the majority averaging 260 to 1,000 acres each) in Stark, Billings, and McKenzie counties (USDA 1927). However, during the Great Depression in the 1930s, many farms and ranches were abandoned. Land purchases made by the United States government under the Land Utilization Program also contributed to the abandonment of farms and ranches during that time. The Land Utilization Program was implemented in an attempt to manage the agricultural problems (e.g., drought, soil erosion, and crop failure) plaguing the United States (CUNFER 2001). Between 1945 and 1972 North Dakota farmers and farms went through notable changes including diversification, electrification, mechanization, and organization. Nothing revolutionized life on the farm more than electrification. In 1935, the New Deal legislation provided for the organization of rural electric cooperatives. By the mid-1960s, it was rare to find a farm without electric power. Improved and new machinery allowed farmers to be more efficient and produce more on larger farms (TWETON UNDATED). Record prices for American grain in the early 1970s led many farmers to expand their operations and others to go deeply in debt to enter the agricultural arena (SHSND UNDATED(A)).

Over the years, the number of farms and ranches in Stark, Billings, and McKenzie counties has decreased, while the size of the farms and ranches has increased. According to the Census, Stark County contained 837 farms (approximately 829,547 acres), Billings County contained 197 farms (approximately 722,275 acres), and McKenzie County contained 574 farms (approximately 1,064,191 acres) in 2012. Crops produced at these farms varied from small grains to native grass; much of which was used for cattle grazing. In addition to grazing on private land, a large amount of grazing occurs on federal lands (USDA 2012A).

8.4.6. Transportation

In 1940, the state highway system consisted of a total of 7,350 miles of roadway, of which approximately 4,500 miles were unpaved, gravel roadways. The first highway map was developed in 1924, which depicts North Dakota Highway 25, a portion of present-day US Highway 85, running from Watford City to Grassy Butte. In 1959, US Highway 85 was constructed, which provided north-south directional travel east of the Little Missouri River (NDDOT UNDATED).

With the increase in oil and gas activity starting in the early 2000's and the third oil boom, many road improvements have been made in western North Dakota. The following are some of the major roadway improvements that have occurred (NDDOT UNDATED):

- 2008: North Dakota Department of Transportation (NDDOT) completed the expansion of US Highway 2 between Williston and Minot to four lanes, with a total of 97 miles of four-lane highway added to the system when the project was completed.
- 2011: Construction of the US Highway 85 Super 2 Project began, with intermittent passing and turning lanes added between Watford City and Williston.
- 2012: First roundabout on a state highway (i.e., North Dakota Highway 22 [ND-22]) near Killdeer was completed.
- 2014: NDDOT worked on the expansion of US Highway 85 between Watford City and Williston to four lanes and constructed several truck bypasses and truck reliever routes around the communities of Alexander, Dickinson, New Town, Watford City, Killdeer, and Williston.

Currently, there are more than 107,000 miles of roadway in North Dakota (NDDOT UNDATED). Roadways along the project corridor include county roads, North Dakota Highway 200 [ND-200], Interstate 94 [I-94]), and numerous secondary rural residential and industrial roadways, primitive roadways, and trails. Access roads for oil and gas developments are reclaimed upon completion of oil production; however, oil production is not anticipated to be completed in the near future.

The project corridor occurs within the NDDOT Dickinson and Williston districts, whereby there are 999.7 and 1,057.1 total miles of NDDOT-managed roadways (i.e., interstate, interregional, state corridor, district corridor, district collector), respectively. Roadway projects programmed for fiscal years 2018–2021 in the Dickinson District consist of 19 rural projects, two urban projects, 13 bridge projects, three transportation alternatives projects, one county project, and four safety projects. Roadway projects programmed for the same timeframe in the Williston District consist of 19 rural projects (including replacement of the Long X Bridge), four urban projects, two bridge projects, one transportation alternatives project, and six safety projects (NDDOT 2017B).

8.5. *What cumulative effects are anticipated?*

8.5.1. Land Use

Land use in North Dakota began with Native American hunters around 10,000 Before Common Era (BCE), with use by agricultural and hunter-gatherer civilizations since 2000 BCE. In the late 19th century, Scandinavian, German, and English immigrant farmers and ranchers began settling in North Dakota. Farming transformed from primarily wheat that pioneers produced on small farms or bonanza farms to larger farms producing sugar beets, sunflowers, and other row crops. Ranching also took hold, primarily in the Badlands and Little Missouri River Valley of western North Dakota. In the mid-20th century, coal mining and oil production became important land uses in North Dakota in the western portion of the state (NDTD UNDATED).

Recent land use trends in North Dakota include an increase in developed areas and pastureland, and a decrease in cropland. From 1982 to 2012, Federal land area in North Dakota increased 3.4 percent, water area increased by 17.8 percent, developed area increased by 11.6 percent, rural area decreased by 1 percent. In the same time period, cropland in North Dakota decreased by 9.2 percent, pasture land increased by 30.6 percent, and rangeland decreased by 6.6 percent (USDA 2015).

The objectives of future land use in Stark County (including the City of Belfield) include retaining agricultural integrity in rural areas and orderly energy development (STARK COUNTY 2010, CITY OF BELFIELD 2013). The objectives of future land use in Billings County include promoting the agricultural economy, conserving natural resources, and promoting sustainable oil and gas industry growth (BILLINGS COUNTY 1998). Much of the future land use along the project corridor in McKenzie County is agricultural, with growth focus areas located at the ND-200/US Highway 85 intersection and Grassy Butte, and development increasing to the north near Watford City (MCKENZIE COUNTY 2016). Land use objectives for areas of Stark, Billings, and McKenzie counties under the jurisdiction of the USFS include ensuring sustainable ecosystems and allowing multiple benefits to people (e.g., recreation, grazing, mineral and energy development) (USFS 2001). Land use objectives for areas of Stark, Billings, and McKenzie counties under the jurisdiction of the NPS are aimed at preserving TNRP's fundamental resources and values for public use (NPS 2006, NPS 2014).

The alternatives and their options would result in the permanent conversion of land into a transportation corridor (primarily agricultural pasture and cropland). Past, present, and reasonably foreseeable future projects and actions (e.g., oil and gas developments, agriculture,

transportation) could also result in land use conversion. Therefore, a minor adverse cumulative effect is anticipated. Any project resulting in land use changes, including the US Highway 85 Project, would typically undergo landowner negotiations to arrive at an amicable land transfer, including adherence to applicable public lands policies.

Because the alternatives would be in accordance with USFS and NPS land use planning objectives, as well as comprehensive plans for Stark, Billings, and McKenzie counties, cumulative effects on land use planning are not anticipated.

8.5.2. Social

The first communities in North Dakota were founded by Native Americans. Upon the creation of Dakota Territory in 1861 and statehood in 1889, formal government and community services, such as justice of the peace, road and school districts, were established. Many pioneer communities, including Belfield (established 1883) and Watford City (established 1914), were founded along railroads that could transport agricultural and ranching products. Modern technology, such as electricity, telephones, and gas-powered vehicles arrived in North Dakota during World War I. During the 1920s, the Great Depression, and World War II, farm commodity prices fell and many people moved from rural areas to cities. President Franklin Roosevelt established the Civilian Conservation Corps in 1933 in an effort to spur economic recovery, whereby public lands improvement projects in western North Dakota, including trails, campsites, visitor centers, dams, and roads, improved tourism opportunities. After World War II, the coal and oil industries took hold, the Missouri River was dammed for electricity and irrigation, and urban population centers arose (SHSND Undated(b)).

Western North Dakota has experienced oil boom/bust cycles that communities have endured, and is currently navigating a recent downturn of oil prices that has created a sense of uncertainty regarding western North Dakota's future. However, the scope and magnitude of the current boom have far exceeded the past events, leading to a high level of development and population growth. As such, oilfield activity is not anticipated to return to pre-2009 activity levels in the near future. In addition to the oil and gas industry, agriculture, ranching, and tourism in western North Dakota are anticipated to continue into the future.

Travel patterns in North Dakota began with Native American hunters following bison herds and later trading. Most transportation was overland by foot, with some use of canoes and other vessels, until horses became widespread by the late 1700s. Bison trails later gave way to cattle trails and unimproved stagecoach roads. Europeans brought larger boats to the Missouri River system, culminating with the short-lived steamboat. By 1913, most towns in North Dakota were within 50 miles of a railway, which transformed transportation patterns by allowing the efficient movement of goods and people. By 1925, there was an extensive, largely unpaved roadway network in North Dakota. In the same year, the Joint Board on Interstate Highways designated and numbered transcontinental highways, including US Highway 85 and US Highway 10 (now I-94). With the completion of Interstate highways in North Dakota, the NDDOT shifted from a "new construction" to a "maintenance" philosophy. Apart from the project corridor, there is currently a four-lane paved highway system across southern and northern North Dakota, which is connected from north to south in the east, west, and central regions of the state (University of Nebraska–Lincoln Undated, NDDOT Undated, SHSND Undated(b)).

The alternatives and their options would improve the roadway network by reducing congestion, providing passing and turning opportunities, and improving reliability for travelers along the project corridor. These improvements would benefit the communities along the project corridor (i.e., Belfield, Fairfield, Grassy Butte, Watford City) by allowing for more efficient movement of goods and services. Past, present, and reasonably foreseeable future projects and actions (e.g., transportation) would also improve the roadway network. Therefore, beneficial cumulative effects are anticipated.

The alternatives and their options are not anticipated to increase traffic volumes, as traffic along the project corridor is projected to grow approximately 2.5 percent each year with or without implementation of the project. As such, the alternatives and their options are not anticipated to result in increased development. While past, present, and reasonably foreseeable oil and gas development has increased traffic volumes and development in western North Dakota, the US Highway 85 Project is not anticipated to be a driver of such growth. Therefore, cumulative effects on traffic volumes and development, including rural areas and the communities of Belfield, Fairfield, Grassy Butte, and Watford City, are not anticipated.

The Fairfield bypass options could result in positive or negative impacts on the Fairfield community. Option FF-1 would result in additional lanes of traffic through the community; however, impacts on local businesses that depend on traffic through Fairfield are not anticipated. To the contrary, Options FF-2, FF-3, and FF-4 would divert traffic around the community, which may result in fewer stops being made at local businesses; however, a reduction of traffic volumes within Fairfield may be beneficial to the overall atmosphere of the community. Past, present, and reasonably foreseeable future projects and actions (e.g., oil and gas developments) could affect the number of stops made at local businesses in Fairfield and traffic volumes in Fairfield in proportion with the rate of oil and gas development. Therefore, beneficial or adverse cumulative effects are possible. No minimization or mitigation measures for potential adverse cumulative effects are anticipated.

The alternatives and their options would result in positive and negative impacts on agriculture operations. The wider roadway would facilitate movement of large equipment and the improved roadway network would benefit day-to-day operations; however, access to agricultural areas/fields would be consolidated and barriers to livestock rotation could be increased. Past, present, and reasonably foreseeable future projects and actions (e.g., transportation) would improve the roadway network and could result in access changes. Therefore, beneficial or adverse cumulative effects are possible. Transportation projects requiring right-of-way (ROW) acquisition and/or access modifications, including the US Highway 85 Widening Project, typically undergo landowner negotiations to arrive at an amicable solution with regard to access changes and other concerns.

The Long X Bridge options would alter travel patterns by relieving and/or removing height restriction constraints that necessitate detours for over-height vehicles. Past, present, and reasonably foreseeable projects and actions (e.g., transportation) would also alter travel patterns. Because the aim of transportation projects are to improve the transportation network, beneficial cumulative effects are anticipated.

The alternatives and their options would result in temporary social impacts during construction activities consisting of speed limit reductions, congestion, visual intrusions, and noise and fugitive dust emissions. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation, TRNP – North Unit, and LMNG) would also result in temporary social impacts during construction activities. Therefore, a minor adverse cumulative effect is anticipated. Most projects, including the US Highway 85 Project, would maintain reasonable construction access for travelers and would be required to obtain an NDPDES permit (or would opt to obtain a permit voluntarily, as with many oil and gas developments) in accordance with the *Clean Water Act*, which necessitates development of BMPs to minimize fugitive dust.

8.5.3. Public Lands

Federal public lands in western North Dakota include the National Grasslands (LMNG), National Parks (TRNP), US Army Corps of Engineers lands (Missouri River), National Wildlife Refuges, Waterfowl Production Areas, and Bureau of Land Management lands. State public lands in western North Dakota include Wildlife Management Areas, State Parks, and Trust lands. Of these public lands, the LMNG, managed by the USFS, and the TRNP – North Unit, managed by the NPS, occur along the project corridor. Between 1990 and 2015, there was a 0.6 percent increase in federal public lands in North Dakota (Vincent et al. 2017). It is anticipated that change in federal public lands would continue to be small in the future and that they would continue to be managed according to applicable agency prescriptions.

The alternatives and their options would result in the permanent conversion of small portions of the LMNG into a transportation corridor and the temporary use of a small portion of the TRNP – North Unit for construction activities. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation, TRNP – North Unit, and LMNG) could also convert portions of public lands to other uses. Therefore, a minor adverse cumulative effect is anticipated. Any project resulting in conversion of public lands, including the US Highway 85 Project, would include coordination with applicable land management agencies, including adherence to applicable public lands policies.

The alternatives and their options would result temporary impacts on visitor experience during construction activities consisting of speed limit reductions, congestion, visual intrusions, and noise and fugitive dust emissions. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation, TRNP – North Unit, and LMNG) may also result in temporary impacts on visitor experience during construction activities. Therefore, a minor adverse cumulative effect is anticipated. Most projects, including the US Highway 85 Project, would maintain reasonable construction access for travelers and would be required to obtain an NDPDES permit (or would opt to obtain a permit voluntarily, as with many oil and gas developments) in accordance with the *Clean Water Act*, which necessitates development of BMPs to minimize fugitive dust. Any projects occurring on public lands would be required to coordinate with the applicable land management agency to avoid, minimize, and obtain approval for temporary construction impacts.

Please refer to **Section 8.5.8** for cumulative effects on the TRNP – North Unit and LMNG as protected visual resources.

The beneficial cumulative effects resulting from an improved roadway network and temporary adverse cumulative effects resulting from construction activities discussed in **Section 8.5.2** would extend to the TRNP – North Unit, LMNG, and their users.

8.5.4. Noise

Prior to human arrival, sounds were limited to natural occurrences, such as blowing wind, flowing water, and animal vocalizations. In western North Dakota, naturally occurring median ambient noise levels are approximately 30 to 35 A-weighted decibels (dBA) L50 SPL. Human activity, such as traffic, aircraft, and agricultural and industrial (e.g., oil and gas) operations, has increased median ambient noise levels in this area to approximately 45 dBA across large swaths and up to 50 dBA in populated areas (NPS Undated(d)). It is anticipated that ambient noise levels in western North Dakota may continue to increase and/or the area impacted by anthropogenic noise will increase into the future in proportion with the amount of development.

The alternatives and their options are not anticipated to increase traffic volumes, as traffic along the project corridor is projected to grow approximately 2.5 percent each year with or without implementation of the project. As such, the project is not anticipated to increase traffic noise levels. While past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, agriculture, transportation) have increased noise in western North Dakota, the US Highway 85 Project is not anticipated to contribute to such increases. Therefore, cumulative effects on the ambient noise environment are not anticipated.

The alternatives and their options would result in temporary increases in noise during construction activities. Past, present, and reasonably foreseeable future projects and actions (e.g., oil and gas developments, transportation, TRNP – North Unit, and LMNG) would also result in such temporary impacts during construction activities. Therefore, a minor adverse cumulative effect is anticipated. Individual projects, including the US Highway 85 Project, may include measures to minimize construction noise impacts (e.g., timing restrictions) developed in coordination with applicable parties.

8.5.5. Water Resources

Most of western North Dakota is in the Missouri River Basin, whereby several drainages, creeks, and rivers flow into the Missouri River or its tributaries. Implementation of irrigation, wells, drains, levees, and dams and reservoirs have altered natural water systems across North Dakota. Current surface water quality in the state varies depending on weather, land use, ground water, and erosion. Groundwater quality also varies, but meets standards in all communities that utilize groundwater for municipal purposes. Most water used in the state is used for irrigation (54 percent), followed by industrial (including fracking oil and gas wells) (21 percent), municipal (20 percent), and rural (4 percent) uses. By 1980, 45 percent of the pre-settlement wetland area in North Dakota was drained, with much of this loss occurring in the eastern portion of the state where there is a higher density of wetlands. From 1982 to 2012, wetland area in the state on non-federal land decreased by 3.0 percent and other aquatic habitat area increased by 18.0 percent (USDA 2015, NDSWC 2014, University of Nebraska–Lincoln Undated, USGS 1996). It is anticipated that alterations of water systems, variable water quality, and the slow loss of wetlands will continue into the future.

Because the alternatives and their options would be in accordance with the *Little Missouri State Scenic River Act*, cumulative effects on the free-flowing natural condition of the Little Missouri River are not anticipated. In addition, based on formal consultation completed with the NPS, the alternatives are not anticipated to permanently impact the outstandingly remarkable scenic, cultural, and historic vales that qualify the river for listing on the Nationwide Rivers Inventory (NRI); therefore, cumulative effects on rivers listed on the NRI are not anticipated.

The alternatives and their options would result in temporary and permanent impacts on wetlands and Other Waters as a result of placement of fill material utilized for roadway and bridge construction. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation) would also result in placement of fill material within wetlands and Other Waters. Therefore, a minor adverse cumulative effect is anticipated. Any projects with federal involvement, including the US Highway 85 Project, are required to avoid impacting wetlands to the extent practicable in accordance with Executive Order (EO) 11990. Any projects impacting wetlands or Other Waters under the jurisdiction of the USACE are required to avoid, minimize, and mitigate for impacts on jurisdictional waters in accordance with Section 404 of the *Clean Water Act*.

Because the alternatives and their options would be in accordance with the National Flood Insurance Program, cumulative effects on floodplains identified in Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) are not anticipated.

The alternatives and their options would eliminate small portions of riverine floodplains and riparian corridors due to bridge and culvert construction/extension. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation) would also eliminate small portions of riverine floodplains and riparian corridors. Therefore, a minor adverse cumulative effect is anticipated. Any stream crossing project, including the US Highway 85 Project, would be required to comply with North Dakota Administrative Code 89-14, which outlines design flood frequency, floodplain regulations and regulatory floodway requirements, and allowable headwater.

The alternatives and their options would result in temporary impacts on water resources during construction activities consisting of increases in sedimentation of surface waters; potential fluid spills; impairment of the ecological function of the riverine corridors; and modification of stream velocities, flow patterns, and river morphology. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, LMNG, TRNP – North Unit, transportation) would also result in temporary impacts on water resources during construction activities. Therefore, a minor adverse cumulative effect is anticipated. Most projects, including the US Highway 85 Project, would restore areas temporarily disturbed during construction activities and would be required to obtain an North Dakota Pollutant Discharge Elimination System (NDPDES) permit (or would opt to obtain a permit voluntarily, as with many oil and gas developments) in accordance with the *Clean Water Act*, which necessitates development of a Stormwater Pollution Prevention Plan (SWPPP) and best management practices (BMPs) to minimize erosion, sedimentation, and stormwater runoff.

Because the alternatives and their options are not anticipated to impact groundwater wells or groundwater, cumulative effects on groundwater wells and groundwater are not anticipated.

The alternatives would result in impacts on stock ponds. Alternative B would have greater impacts than Alternative C. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, agriculture, transportation, LMNG) could also result in impacts on stock ponds. Therefore, a minor adverse cumulative effect is anticipated. Any project impacting stock ponds, including the US Highway 85 Project, would typically undergo landowner negotiations to arrive at an amicable solution, and would be subject to regulation for impacts on stock ponds under USACE jurisdiction and/or diversions or impoundments greater than 12.5 acre-feet of water.

8.5.6. Wildlife

Native Americans began hunting big game in North Dakota thousands of years ago. By the mid-1800's, many game species populations had declined due to unrestricted hunting by European settlers. Elk and moose were extirpated; bison, pronghorn, and mule deer populations were nearly decimated; and whitetail deer populations suffered major losses (SHSND Undated(b)). Efforts to conserve game and fish began shortly thereafter (SHSND Undated(c)), which led to the establishment of hunting seasons, limits, and rules that allowed for the recovery of many game species. Currently, the US Fish and Wildlife Service (USFWS), USFS, and the North Dakota Game and Fish Department (NDGF) are leading efforts to manage and recover several species and their habitats, including threatened and endangered species, migratory birds and raptors, USFS-designated sensitive species and Management Indicator Species, species of conservation priority, and species targeted for hunting, trapping, or fishing. While harvesting of wildlife is well-regulated, it is anticipated that wildlife habitat loss, degradation, and fragmentation caused by human development and activity will persist into the future.

The alternatives would result in minor temporary and permanent habitat loss and degradation due to new roadway areas, traffic, and construction activities, which may disturb and/or displace wildlife. These impacts pertain to:

- Migratory birds and general wildlife species;
- Two raptor species (burrowing owl and prairie falcon) given special consideration by the USFS;
- Four threatened or endangered species (Dakota skipper, gray wolf, whooping crane, and northern long-eared bat);
- Five USFS-designated sensitive wildlife species (bighorn sheep, loggerhead shrike, Ottoe skipper, tawny crescent, and Sprague's pipit); and
- One USFS-designated Management Indicator Species (MIS) (sharp-tailed grouse).

Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, recreation/tourism, LMNG, TRNP – North Unit, agriculture, transportation) would also result in habitat loss and degradation, which may disturb and/or displace wildlife listed above.

Therefore, a minor adverse cumulative effect is anticipated. Any projects occurring on USFS-managed lands, including the US Highway 85 Project, are required to coordinate with the USFS to avoid, minimize, and obtain approval for impacts on raptor species given special consideration by the USFS, threatened or endangered species, USFS-designated sensitive wildlife species, USFS-designated MIS, and wildlife species of concern. Any project, including the US Highway 85 Project, are required to coordinate with the USFWS if threatened or endangered species, or migratory birds would be adversely affected. Other mitigation measures applicable to cumulative effects on wildlife habitat include:

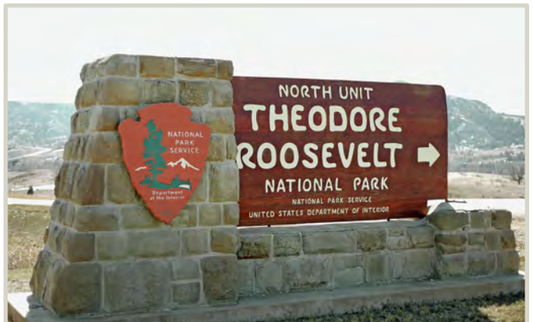
- Any projects and actions with federal involvement, including the US Highway 85 Project, are required to avoid impacting wetlands to the extent practicable in accordance with EO 11990.
- Any projects and actions impacting wetlands or Other Waters under the jurisdiction of the USACE, including the US Highway 85 Project, are required to avoid, minimize, and mitigate for impacts on jurisdictional waters in accordance with Section 404 of the *Clean Water Act*.
- Most projects and actions, including the US Highway 85 Project, would restore areas temporarily disturbed during construction activities. Restoration seed mixes for impacts occurring on federally-managed lands would be in accordance with applicable resource agency direction.
- Most projects and actions, including the US Highway 85 Project, would be required to obtain an NDPDES permit (or would opt to obtain a permit voluntarily, as with many oil and gas projects) in accordance with the *Clean Water Act*, which necessitates development of a SWPPP and BMPs to minimize erosion, sedimentation, and stormwater runoff.
- All projects and actions, including the US Highway 85 Project, are required to control the spread of noxious weeds and aquatic invasive species in accordance with NDCC Chapters 4.1-47-02 and 20.1-17, respectively.
- Typically, projects and actions occurring on federally managed lands, including the US Highway 85 Project, include equipment cleaning and inspection prior to use on federally-managed lands to prevent the introduction and spread of noxious and invasive species.
- Any projects and actions occurring on USFS-managed lands, including the US Highway 85 Project, are required to coordinate with the USFS to avoid, minimize, and obtain approval for impacts on USFS-designated sensitive plant species.

8.5.7. Historic and Archaeological Preservation

Archaeological evidence indicates that big game hunting Native Americans were present in North Dakota approximately 10,000 years ago, with hunter-gatherer and agricultural settlements beginning around 2000 BCE. European explorers and fur traders reached North Dakota in the mid-1700's. With the arrival of settlers and an increase in military interventions in the mid 1800's, traditional Native American ways of life were lost by the end of the century. Settlers established railroads, towns, homesteads, and other developments. The Great Depression of the 1930's forced many farmers to abandon their farms for cities or other states. Recovery after World War II saw development of dams and reservoirs, oil and coal mining, and communication and transportation systems (Remele Undated). The State Historical Society of North Dakota (SHSND) is responsible for identifying, recording, and preserving prehistoric cultural resources as well as historic structures and sites. It is anticipated that the SHSND will continue these activities into the future.

The alternatives and their options would impact three sites that are Eligible for listing under the National Register of Historic Places (NRHP): the Dolyniuk Homestead, TRNP—North Unit Entry Sign, and Long X Bridge. A *No Adverse Effect* determination has been made for all of the impacted sites except for the Long X Bridge under Option LX-3. An *Adverse Effect* determination has been made for the Long X Bridge under Option LX-3, as it would include removal (i.e., demolished or adopted) of the existing bridge. Removal of the Long X Bridge would result in a net reduction in the number of Warren through truss bridges in North Dakota from four to three. Past, present, and reasonably foreseeable future projects and actions (e.g., oil and gas developments, agriculture, transportation, TRNP—North Unit, and LMNG) also have the potential to result in *Adverse Effect* determinations for sites that are *Eligible* for listing on the NRHP. Therefore, an adverse cumulative effect is anticipated. Any projects with federal involvement, including the US Highway 85 Project, would be required to coordinate with the North Dakota State Historic Preservation Office (SHPO), Tribal Historic Preservation Office (THPO), Tribal Consultation Committee (TCC), and/or Advisory Council on Historic Preservation (ACHP), as appropriate, to avoid, minimize, and/or mitigate impacts on sites *Eligible* for listing on the NRHP.

Dolyniuk Homestead (32BI56)



TRNP—North Unit Entry Sign (32MZ154)

Long X Bridge (32MZ1807)

8.5.8. Visual

Naturally-occurring visual resources that contribute to the visual character of western North Dakota include rolling hills, grasslands, buttes, Badlands, wooded draws, drainages and rivers, and wildlife. Since their arrival, humans have introduced cultural visual resources and altered the visual character with features such as buildings, railroads, roadways, bridges, fences, utilities, and industrial developments. Impacts depend on the existing visual character of the viewshed and the perspective of the viewer. Visual quality associated with USFS- and NPS-managed lands in the Badlands is afforded protection against changes in visual character. While it is anticipated that human development and activities will continue to slowly alter visual resources in western North Dakota, the overall visual quality of the rural setting is anticipated to persist into the future.

The alternatives and their options would result in the continuation of fugitive dust and criteria pollutant emissions from traveling vehicles, and light pollution from headlights within the rolling prairie and Badlands landscape units (including protected visual resources). The alternatives would also result in the alteration of visual resources within the rolling prairie landscape unit. However, these impacts are anticipated to be compatible with the existing visual character and are not anticipated to impact visual quality. Therefore, cumulative effects are not anticipated.

The Fairfield bypass options would result in the alteration of visual resources within the rolling prairie landscape due to construction of a new roadway in a natural setting. These impacts may be perceived by neighbors as incompatible with the existing visual character that detract from visual quality. To the contrary, these impacts may be perceived as an improvement on visual quality for travelers along the highway that prefer driving through a natural rather than developed area. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation) would also result in alteration of visual resources that could reduce visual quality for neighbors and travelers alike. Therefore, adverse cumulative effects are possible. No minimization or mitigation measures for potential adverse cumulative effects are anticipated.

The alternatives and their options would result in the alteration of lightscapes within the rolling prairie landscape unit due to proposed roadway lighting. These impacts may be perceived as incompatible with the existing lightscape that detract from visual quality. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, transportation) would also result in alteration of lightscapes that could reduce visual quality. Therefore, minor adverse cumulative effects are anticipated. No minimization or mitigation measures for the adverse cumulative effects are anticipated.

The alternatives and their options would result in the alteration of visual resources within the Badlands landscape due to construction of a

new roadway in a natural setting, including the introduction of new features (e.g., modification or removal of the Long X Bridge, a new bridge, retaining walls, wildlife fencing). These impacts may be perceived by neighbors and travelers as incompatible with the existing visual character that detract from visual quality. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, TRNP—North Unit, transportation) could also result in alteration of visual resources that could reduce visual quality in the Badlands landscape unit. Therefore, adverse cumulative effects are possible. No minimization or mitigation measures for potential adverse cumulative effects are anticipated.

The alternatives and their options would result in the alteration of visual resources that would be visible from some vantage points located within the TRNP—North Unit and LMNG. These impacts are not anticipated to appreciably limit the viewsheds and would result in minor impacts on scenic integrity. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, TRNP—North Unit, transportation) could also result in alteration of visual resources that could impact the scenic integrity of viewsheds from the TRNP—North Unit and LMNG. Therefore, adverse cumulative effects are possible. Typically, projects with local, state and/or federal involvement, including the US Highway 85 Project, would include coordination with applicable agencies regarding protected visual resources.

8.5.9. Vegetation

Historically, tallgrass prairie dominated much of the Great Plains; however, native tallgrass prairie has been largely plowed and is currently limited to the Red River valley in North Dakota. Much of North Dakota is currently dominated by mixed-grass prairie, with shortgrass prairie dominating in the far west. Agricultural and other introduced species have replaced much of the native prairie vegetation in the state, whereby 39.1 million acres of land are farmed. Since 2008, noxious weeds have been reported in 1.36 to 2.88 million acres across North Dakota. Forest vegetation in western North Dakota includes riparian areas and the pine/juniper forests of the Badlands (NDGF 2016, USDA 2018, NDDA 2017c). It is anticipated that vegetation across North Dakota will remain relatively unchanged into the future.

The alternatives and their options would result in permanent and temporary removal of vegetation, which can indirectly lead to erosion and sedimentation. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, LMNG, TRNP—North Unit, agriculture, transportation) would also result in vegetation removal and potential erosion and sedimentation. Therefore, a minor adverse cumulative effect is anticipated. Most projects, including the US Highway 85 Project, would restore areas temporarily disturbed during construction activities. Restoration seed mixes and tree replanting for impacts occurring on federally managed lands would be in accordance with applicable resource agency direction. Most projects, including the US Highway 85 Project, would be required to obtain an NDPDES permit (or would opt to obtain a permit voluntarily, as with many oil and gas projects) in accordance with the *Clean Water Act*, which necessitates development of a SWPPP and BMPs to minimize erosion, sedimentation, and stormwater runoff.

The alternatives and their options may result in the introduction of noxious weeds and/or invasive species as a result of construction activities. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, recreation/tourism, LMNG, TRNP—North Unit, agriculture, transportation) may also result in the introduction of noxious weeds and/or invasive species. Therefore, a minor adverse cumulative effect is anticipated. All projects and actions, including the US Highway 85 Project, are required to control the spread of noxious weeds and aquatic invasive species in accordance with NDCC Chapters 4.1-47-02 and 20.1-17, respectively. Typically, projects occurring on federally managed lands, including the US Highway 85 Project, include equipment cleaning and inspection prior to use on federally managed lands to prevent the introduction and spread of noxious and invasive species.

The alternatives would impact one population of Hooker's townsendia daisy, a USFS-designated sensitive plant species, and may impact unknown populations of 11 additional sensitive species as a result of construction activities. Past, present, and reasonably foreseeable projects and actions (e.g., oil and gas developments, LMNG, TRNP—North Unit, agriculture, transportation) may also result in impacts on sensitive species. Therefore, a minor adverse cumulative effect is anticipated. Any projects occurring on USFS-managed lands are required to coordinate with the USFS to avoid, minimize, and obtain approval for impacts on USFS-designated sensitive plant species.

Chapter 9. Public Involvement and Agency Coordination

This chapter includes a detailed description of the public involvement and agency coordination efforts conducted for the project. This chapter also includes a description of the lead, cooperating, and participating agencies, as well as other consulting agencies.

Important topics in this chapter:

List of documents appended by reference in this chapter:

- Coordination Plan (2016)
- Draft EIS Public and Agency Involvement Report (2019)
- Public Alternatives Workshop Report (2017)
- Scoping Report (2016)

9.1. *Why is there public involvement and agency coordination?*

The *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) includes guidance on linking planning and the *National Environmental Policy Act* (NEPA) such that transportation decision-making considers environmental, community, and economic goals early in the project planning stage, throughout project development and design, and ultimately for construction. This process encourages greater public involvement and agency coordination on a broad and comprehensive basis.

A coordination plan (**appended by reference**) was prepared to satisfy the requirements of *Fixing America's Surface Transportation Act* (FAST), *Moving Ahead for Progress in the 21st Century Act* (MAP-21), and SAFETEA-LU 6002. The intent of the coordination plan was to define the process in which the Federal Highway Administration (FHWA) and North Dakota Department of Transportation (NDDOT) communicate information about the project to the cooperating and participating agencies and public.

Public involvement and agency coordination begins in the planning phase and ends after construction. It is intended to assist in understanding the transportation facility and the proposed project, as well as any potential social, economic, and environmental effects that could be caused by the proposed project. It is also a tool to encourage input and provides the decision-makers valuable information to be considered in the process.

The FHWA invites public participation throughout the Environmental Impact Statement (EIS) process. Consideration of the views and information of all interested parties promotes open communication and enables effective decision-making. All federal, state, and local agencies; special interest groups, committees, and associations; and members of the public with interest in the project are encouraged to participate in the decision-making process.

9.2. *Lead, Cooperating, and Participating Agencies*

9.2.1. What is the role of the lead agencies?

The lead agencies (i.e., FHWA and NDDOT) are responsible for the development of the EIS to meet the requirements of NEPA and for the overall management of the SAFETEA-LU 6002 process. These responsibilities include identifying the cooperating and participating agencies through formal invitations; developing the Coordination Plan; and collaborating with the cooperating and participating agencies in development of the project's purpose and need, methodologies for the alternatives analysis, and range of reasonable alternatives. The lead agencies also provide final approval of the project's purpose and need, methodologies for the alternatives analysis, range of reasonable alternatives, and the Preferred Alternative. The FHWA provides final approval of the Draft EIS, Final EIS, and Record of Decision (ROD).

9.2.2. What is the role of the cooperating agencies?

The cooperating agencies (i.e., US Army Corps of Engineers [USACE], National Park Service [NPS]–Theodore Roosevelt National Park [TRNP], and US Forest Service [USFS]–Dakota Prairie Grasslands [DPG]) participate in the NEPA process at numerous points throughout project development. The role of the cooperating agencies includes the following:

- Participating in the scoping process, development of the project's purpose and need, refinement of the methodologies for the alternatives analysis, and the determination of the range of reasonable alternatives and level of design detail for the Preferred Alternative.
- Reviewing the Draft EIS.
- Adopting the Final EIS without recirculating the document, if appropriate.
- Developing information and preparing a portion of the EIS for which the agency has special expertise, if appropriate.

Scoping is a term used by CEQ in their regulations implementing NEPA to define the early and open process for determining the extent or 'scope' of issues to be addressed in an EIS.

9.2.3. What is the role of the participating agencies?

The participating agencies do not provide any project approvals; however, they participate in the NEPA process at several points throughout project development. The role of the participating agencies includes the following:

- Participating in the scoping process, development of the project's purpose and need, refinement of the methodologies for the alternatives analysis, and the determination of the range of reasonable alternatives and level of design detail for the Preferred Alternative.
- Reviewing the Draft EIS.
- Identifying issues of concern regarding potential impacts on environmental, socioeconomic, and human-made resources.
- Participating in the issue-resolution process.
- Providing input on unresolved issues.

When project milestones are reached, meeting(s) may be held with the participating agencies (lead and cooperating agencies are also encouraged to attend) to fulfill the requirements of SAFETEA-LU 6002. Additionally, participating agencies are invited to attend all public workshop(s) and public hearing(s).

The participating agencies for the project are as follows:

Bureau of Indian Affairs (BIA)	North Dakota Department of Mineral Resources (NDDMR)	City of Belfield
Bureau of Land Management (BLM)	North Dakota Game and Fish Department (NDGF)	City of Watford City
US Environmental Protection Agency (USEPA)	North Dakota Highway Patrol (NDHP)	Billings County
US Fish and Wildlife Service (USFWS)	North Dakota State Water Commission (NDSWC)	McKenzie County
Western Area Power Administration (WAPA)	State Historic Preservation Office (SHPO)	Stark County
North Dakota Department of Health (NDDH)	Tribal Consultation Committee (TCC)	

9.3. *Public and Agency Coordination Efforts*

This section provides information on the public and agency involvement efforts required for the project. Since the project began, information regarding the project has been provided on the project Website (https://www.dot.nd.gov/projects/williston/US85I94/). The Website contains project information, maps, contact information, and dates and times for public involvement events.

9.3.1. Scoping Letters

9.3.1.1. What was the purpose of the scoping letters?

The scoping letters ensure that the scope of the project is made known to other jurisdictions and government agencies. It provides them an opportunity to comment on the project's potential impacts on the human, natural, and physical environment.

The purpose of the scoping letters for this project was to obtain information regarding the resources the entities manage and/or the properties the entities may own or have interest in that would be adjacent to the project. In addition, the scoping letters letters requested information regarding future developments proposed by the entities that could be in the areas under consideration for the project.

9.3.1.2. How was the scoping letter process conducted for the project?

The lead agencies provided early notification to, and solicited the view and comments of, several federal, state, and local agencies; special interest groups; committees; associations; utilities; and advocacy groups on November 2, 2015.

The scoping letters included a description of the project and project requirements, request for information and comments, and information regarding anticipated public meetings to be held for the project. The solicitation of views package is provided in the Scoping Report (**appended by reference**).

9.3.2. Lead and Cooperating Agencies Working Sessions

Since the project began there have been numerous working sessions held between the lead and cooperating agencies.

9.3.2.1. When and why were the lead and cooperating agencies working sessions held?

- **Working Session #1: October 28, 2015.** Meeting objectives included discussing roles, communication, schedule, and an overview of concerns, issues, benefits, and agency and public scoping meetings.
- **Working Session #2: January 29, 2016.** Meeting objectives included a review and discussion of agency and public scoping comments, the project purpose and need, the alternatives methodology, and the coordination plan.
- **Working Session #3: March 24, 2016.** Meeting objectives included discussing and finalizing the purpose and need comments and reviewing and discussing the Phase I alternatives screening.
- **Working Session #4: June 29, 2016.** Meeting objectives included a review and discussion of the wildlife crossings/accommodations; Phase II alternatives screening; geotechnical investigation; public alternatives workshops; lead, cooperating, and participating agencies meeting; and tree mitigation.

- **Working Session #5: December 9, 2016.** Meeting objectives included a discussion of the comments from the public alternatives workshops and Fairfield community stakeholder meeting, Stakeholder Group/Engagement Plan, Wildlife Habitat Assessment Report, trail from Watford City to the Long X Bridge, and Badlands section of the project corridor.

- **Working Session #6: April 3, 2017.** Meeting objectives included a discussion of stakeholder group meeting #1, utility conflict memorandum, Section 4(f) memorandum, wildlife crossing drawings, alternatives/options for the project, and trail.

- **Working Session #7: June 16, 2017.** Meeting objectives included a recap of the wildlife crossing field review and a discussion of Volume II of the Wildlife Habitat Assessment Report, Chapters 2 and 3 of the EIS, Biological Assessment (BA) and Biological Evaluation (BE) for the project, design implications at Horseshoe Bend, floodplain impacts at the Long X Bridge, and findings of cultural resources testing.

- **Working Session #8: August 30, 2017.** Meeting objectives included a discussion of the Preliminary Draft EIS, next steps in the EIS process, trail terminus, Section 106 process, impacts on NPS- and USFS-managed lands, Preferred Alternative, determinations of the Section 4(f) properties, and stakeholder group meeting #2, as well as a recap of the wildlife crossings and Value Engineering session.

- **Working Session #9: October 26, 2017.** Meeting objectives included a recap of the Little Missouri River Commission meeting (held October 11, 2017); cultural updates; and discussion of the stakeholder group meeting #2, Preliminary Draft EIS, project schedule, and next steps.

- **Working Session #10: December 13, 2017.** Meeting objectives included a discussion of comments on the Preliminary Draft EIS, Long X Bridge Section 106 and Section 4(f) updates, and next steps.

- **Working Session #11: May 9, 2018.** Meeting objectives included a discussion of the Draft EIS, previewing the public hearing presentation, and a discussion of design details for the TRNP—North Unit Entry Sign.

- **Working Session #12: September 10, 2018.** Meeting objectives included discussion of the Final EIS/ROD, Draft EIS comments and responses, administrative record, and Long X Bridge adoption and replacement.

9.3.3. Scoping Meetings

9.3.3.1. What was the purpose of the scoping process?

Public scoping is a requirement of NEPA, as amended (40 Code of Federal Regulations [CFR] 1501.7), and SAFETEA-LU 6002, which requires that lead agencies establish a plan for coordinating public and agency participation and comment during the environmental review process.

The purpose of the scoping process is to initiate early communication, inform the public and agencies about the project, help develop the project's purpose and need, and gather feedback regarding the overall project. The scoping process for the project included efforts to engage both members of the public (e.g., citizens, elected officials, key stakeholders), as well as federal, state, and local agencies during the early stages of the EIS development.

The scoping process for the project was initiated with publication of the Notice of Intent (NOI) in the *Federal Register* on October 6, 2015 (Volume 80, Number 193), announcing initiation of the EIS process. The NOI is provided in **Appendix A. Notice of Intent**. A Scoping Report (2016) (**appended by reference**) was developed to outline the purpose, materials used, and comments received during the public and agency scoping meetings.

9.3.3.2. When and where were the scoping meetings?

One agency and two public scoping meetings were held for the project in 2015 and are summarized as follows. In addition, a 30-day comment period was held from November 9 to December 9, 2015.

Agency Scoping Meeting

- **November 9, 2015:** from 10:00 a.m. to 12:00 p.m. in the Brynhild Haugland Room at the North Dakota State Capitol Building (600 E Boulevard Avenue, Bismarck).
  - » Attendees: FHWA, NDDOT, KLJ, NPS-TRNP, USACE, USFS-DPG, WAPA, USFWS, NDGF, NDHP, SHPO, NDSWC, and Billings County.

The agency scoping meeting was held to achieve the following:
- Discuss the EIS process.
- Identify the roles of the lead, cooperating, and participating agencies.
- Define the goals for the project and its purpose and need.
- Identify issues, concerns, and benefits of the project.

Public Scoping Meetings

- **November 9, 2015:** from 5:00 p.m. to 7:30 p.m. at the Belfield City Hall (107 2nd Avenue NE, Belfield) and **November 10, 2015:** from 5:00 p.m. to 7:30 p.m. at the Watford City City Hall (213 2nd Street NE, Watford City).
  - » Advertisements announcing why, when, and where the public meetings would be held were published on the project Website and in local newspapers: *The Dickinson Press* (October 21, 2015), *McKenzie County Farmer* (October 21, 2015), and *Billings County Pioneer* (October 22, 2015).
  - » There were 66 attendees at the public scoping meeting in Belfield and 101 attendees at the public scoping meeting in Watford City.

The public scoping meetings were held to achieve the following:
- Help the public obtain an understanding of the project.
- For the public to help define the project's purpose and need.

The public scoping meetings included open houses, at which members of the public could directly ask questions and discuss the project with the project team. In addition, map boards showing the project location were displayed; information on the project, public scoping meetings, and public participation were provided; and written comment forms were made available.

The agency and public meeting materials, newspaper affidavits, meeting transcripts, and comments received are provided in the Scoping Report (**appended by reference**).

9.3.4. Alternatives Workshops

9.3.4.1. What was the purpose of the alternatives workshops?

Alternatives workshops are conducted in accordance with SAFETEA-LU 6002, which requires that lead agencies establish a plan for coordinating public and agency participation and comment during the environmental review process and provide early opportunities for public input on alternatives and concepts to be considered. The purpose of the alternatives workshops for this project was to inform agencies and the public about the project, including the purpose and need and current status of the project; discuss the alternatives methodology and screening process; describe potential alternatives and options being considered; and obtain input from agencies and the public. A Public Alternatives Workshop Report (2017) (**appended by reference**) was developed to outline the purpose, materials used, and comments received during the public alternatives workshops and lead, cooperating, and participating agencies meeting.

Presentation during the November 9, 2015 public scoping meeting

9.3.4.2. When and where were the alternatives workshops?

The potential alternatives and options were presented to cooperating and participating agencies at a lead, cooperating, and participating agencies meeting and the public at two public alternatives workshops, which were held for the project in 2016 and are summarized as follows. In addition, a 30-day comment period was held from July 25 to August 26, 2016.

Lead, Cooperating, and Participating Agencies Meeting

- July 21, 2016: from 1:00 p.m. to 4:00 p.m. in the Pioneer Room at the North Dakota State Capitol Building (600 E Boulevard Avenue, Bismarck).
  - » Attendees: FHWA, NDDOT, KLJ, USFS-DPG, NPS-TRNP, USACE, WAPA, NDGF, USFWS, NDDMR, Billings County, NDDH, SHPO, NDHP, USEPA, and NDSWC.

The lead, cooperating, and participating agencies meeting was held to achieve the following:

- Provide a project status update.
- Discuss the alternatives methodology/screening and potential alternatives/options.
- Provide direction for submitting comments.

Public Alternatives Workshops

- July 25, 2016: from 5:00 p.m. to 7:30 p.m. at Belfield City Hall (107 2nd Avenue NE, Belfield) and July 26, 2016: from 5:00 p.m. to 7:30 p.m. at Watford City City Hall (213 2nd Street NE, Watford City).
  - » Invitations to participate in the public alternatives workshops were provided via newspaper advertisement and press release. Newspaper advertisements were published in the *Golden Valley News*, *Billings County Pioneer*, and *The Dickinson Press* on July 7, 2016.
  - » There were 73 attendees at the public alternatives workshop in Belfield and 61 attendees at the public alternatives workshop in Watford City.

The public alternatives workshops were held to achieve the following:

- Discuss the alternatives methodology/screening, potential alternatives/options, and estimated cost for the project.
- Provide the public with visual exhibits of the alternatives and options.
- Provide information and direction for additional opportunities for public involvement.

The public alternatives workshops included open houses, at which members of the public could directly ask questions and discuss the project with the project team. In addition, a presentation was given to update the public on the project's current status, recap the public scoping meetings, review the purpose and need, and provide directions for submitting comments. The meeting materials, newspaper affidavits, meeting transcripts, and comments received are provided in the Public Alternatives Workshop Report (**appended by reference**).

9.3.5. Stakeholder Meetings

Following the alternatives workshops, it was determined, through coordination with Billings County, that a Fairfield community stakeholder meeting needed to be held in Fairfield to inform and directly engage the local community about the potential roadway expansion alternatives for Fairfield. In addition, a 30-day comment period for the Fairfield area (December 1 to 31, 2016) was provided to agencies and the public. After receiving agency and public comments from both the scoping meetings and alternatives workshops, it was determined that a stakeholder group needed to be created to inform and directly engage concerned stakeholders (e.g., groups, individuals, business owners, landowners) that have an interest in the project. Numerous stakeholders have been identified throughout the 62-mile project corridor. The following are the members of the stakeholder group:

The Fairfield community stakeholder meeting was held in effort to receive more feedback regarding the roadway expansion alternatives for Fairfield.

The stakeholder group acts as an advice-giving role to the NDDOT by providing informed and thoughtful input. It also acts as a liaison to other groups, individuals, business owners, and landowners throughout the EIS process.

- Lead Agencies (FHWA and NDDOT)
- Cooperating Agencies (USACE, NPS-TRNP, and USFS-DPG)
- Representatives from the TCC
- County Representatives (Stark, Billings, and McKenzie Counties)
- City/Community Representatives (Belfield, Fairfield, Grassy Butte, and Watford City)
- Special Interest Groups
- Landowners
- Utilities

9.3.5.1. When and where were the stakeholder meetings?

Fairfield Community Stakeholder Meeting

- December 1, 2016: from 5:00 p.m. to 7:30 p.m. at the Billings County Rural Fire Hall (12811 20th Street SW, Fairfield).
  - » Flyers announcing the Fairfield community stakeholder meeting were hung at various businesses two weeks prior to the meeting, and post cards were mailed to landowners, local business owners, and interested parties in the local community.
  - » There were 27 attendees at the stakeholder meeting.

The Fairfield community stakeholder meeting was held to achieve the following:

- Discuss the roadway expansion alternatives for Fairfield and estimated cost for the project.
- Provide the public with visual exhibits of the alternatives and options.
- Provide information and direction for additional opportunities for public involvement.

The Fairfield community stakeholder meeting included an open house, at which members of the public could directly ask questions and discuss the project with the project team. In addition, a presentation was given to update the public on the project's current status, recap the public alternatives workshops, review the alternatives and options for Fairfield, and provide directions for submitting comments. After the presentation, discussions between members of the public and the project team took place, whereby the public provided verbal comments and the project team provided responses and answered questions in an open forum. The meeting materials, flyers, post cards, and a summary of the discussions at the meeting are provided in the Public Alternatives Workshop Report (**appended by reference**).

Stakeholder Group Meeting #1

- February 8, 2017: at 5:00 p.m. at the Billings County Rural Fire Hall (12811 20th Street SW, Fairfield).
  - » Notification of the meeting was provided via telephone and email to the stakeholder group.
  - » There were 28 attendees at the stakeholder group meeting.

Stakeholder group meeting #1 included the following:

- Discussion of the purpose, goals, and roles of the stakeholder group.
- Review of the US Highway 85 project and corridor.
- Identification of issues of concern, potential solutions, and action items.

After introductions and a brief overview of the stakeholder group, discussions took place, whereby verbal comments were provided and the project team responded and answered questions in an open forum. Meeting minutes that summarize the discussions held during stakeholder group meeting #1 are provided in the Public Alternatives Workshop Report (**appended by reference**).

Stakeholder Group Meeting #2

- October 30, 2017: at 5:00 p.m. at the Billings County Rural Fire Hall (12811 20th Street SW, Fairfield).
  - » Notification of the meeting was provided via postcard to the stakeholder group.
  - » There were 52 attendees at the stakeholder group meeting.

Stakeholder group meeting #2 included the following:

- Review of the stakeholder group goals, purpose, and roles/responsibilities; status of the project; and project corridor.
- Discussion of issues of concern and potential solutions and/or action items.

After introductions and a brief overview of the stakeholder group, discussions took place, whereby verbal comments were provided and the project team responded and answered questions in an open forum. Meeting minutes that summarize the discussions held during stakeholder group meeting #2 have been included in the Draft EIS Public and Agency Involvement Report (2019) (**appended by reference**).

9.3.6. Public Hearings

9.3.6.1. What was the purpose of the public hearings?

Public hearings are held to present and discuss the project; the project's purpose and need; alternatives being considered for the project; and potential social, economic, and environmental impacts from implementing the alternatives.

9.3.6.2. When and where were the public hearings?

The Notification of Availability (NOA) of the Draft EIS for review and comment was published in the *Federal Register* on May 11, 2018 and local newspapers. Following publication of the NOA, three public hearings were held in Belfield, Fairfield, and Watford City. In addition, a 45-day comment period (May 11 to June 25, 2018) was provided to allow agencies and the public to review and comment on the Draft EIS. A Draft EIS Public and Agency Involvement Report (2019) (**appended by reference**) was developed to outline the purpose, materials used, and comments received during the public hearings and lead, cooperating, and participating agencies meeting. All comments received during the Draft EIS comment period have been addressed in the Draft EIS Public and Agency Involvement Report, and comments warranting a revision have been incorporated into the Final EIS.

Lead, Cooperating, and Participating Agencies Meeting

- May 21, 2018: from 1:00 p.m. to 4:00 p.m. in Rooms 310–312 at the NDDOT Central Office (608 E Boulevard Avenue, Bismarck).
  - » Attendees: FHWA, NDDOT, KLJ, USFS-DPG, NDGS, NPS-TRNP, Mandan-Hidatsa-Arikara Nation, USACE, WAPA, NDGF, NDPR, USFWS, NDDH, SHPO, NDHP, and NDSWC.

The lead, cooperating, and participating agencies meeting was held to achieve the following:

- Discuss and provide overview of Draft EIS.
- Discuss upcoming public hearing.
- Receive comments and provide direction for submitting comments.

Public Hearings

- May 29, 2018: from 5:00 p.m. to 7:30 p.m. at Belfield City Hall (107 2nd Avenue NE, Belfield); May 30, 2018: from 5:00 p.m. to 7:30 p.m. at Billings County Rural Fire Hall (12811 20th Street SW) in Fairfield, North Dakota; and May 31, 2018: from 5:00 p.m. to 7:30 p.m. at Watford City City Hall (213 2nd Street NE, Watford City).
  - » Invitations to participate in the public hearing were provided via newspaper advertisement and press release. Newspaper advertisements announcing the public hearings were published in the McKenzie County Farmer on May 9, 2018, and Dickinson Press and Billings County Pioneer on May 10, 2018; press releases were published on May 7 and 22, 2018; and post cards were mailed to interested parties and landowners.
  - » A total of 136 people attended the public hearings: 31 in Belfield, 47 in Fairfield, and 58 in Watford City.

The public hearings were held to achieve the following:

- Discuss and provide overview of Draft EIS, including discussion on the Preferred Alternative and options.
- Receive questions and comments and provide direction for submitting comments.

The public hearings began with an open house, whereby members of the public could view exhibits of various aspects of the Preferred Alternative, discuss questions with the project team, and provide comments and input. All attendees were provided with a handout, comment form, and public participation survey. The handout contained details on the project, purpose and need, alternatives and options being studied (specifically the recommended Preferred Alternative), right-of-way (ROW) acquisition, potential impacts from the project, cost and construction schedule, adoption of the Long X Bridge, next steps, and directions for submitting comments. Following the open house, a formal presentation was shown, which described the purpose and need, Preferred Alternative and options, potential impacts associated with the Preferred Alternative and options, environmental commitments, schedule, and next steps. The public hearings ended with a questions and answers/comment gathering session. The meeting materials, newspaper affidavits, meeting transcripts, and comments received are provided in the Draft EIS Public and Agency Involvement Report (2019) (**appended by reference**).

9.3.7. Other Miscellaneous Meetings

The lead agencies, NDDOT and FHWA, have had several meetings with other agencies and organizations (e.g., NPS, NDGF, USFWS, SHPO, NDSWC, USGS, McKenzie County, Little Missouri River Commission) since the environmental review process began in 2014. Some of these meetings are summarized below.

9.3.7.1. What was the purpose of the Little Missouri River Commission meetings?

The *Little Missouri State Scenic River Act* (North Dakota Century Code [NDCC] 61-29) is administered by a Little Missouri River Commission composed of the director of the NDPRD, state health officer of the NDDH, and chief engineer of the NDSWC (or their designated representatives) and one member from each of the following counties: McKenzie, Billings, Slope, Golden Valley, Dunn, and Bowman. The county representatives appointed must be resident landowners who live adjacent to the Little Missouri River, with exception to the Golden Valley County representative.

The Little Missouri River Commission may advise local or other units of government to afford the protection adequate to maintain the scenic, historic, and recreational qualities of the Little Missouri River and its tributary systems (NDCC 61-29).

August 9, 2017 meeting with the Little Missouri River Commission

On August 9, 2017, the Little Missouri River Commission held a meeting in Dickinson. During the meeting, the NDDOT gave a presentation on the project. The presentation included a description of the project; overview of the EIS process; discussion of the Long X Bridge and rehabilitation and replacement alternatives currently being considered (i.e., Options LX-1, LX-2, and LX-3); overview of the methods for constructing the new bridge, rehabilitating the existing bridge, and removing the existing bridge; and discussion and depiction of the staging areas.

On October 11, 2017, the Little Missouri River Commission held a meeting in Dickinson. During the meeting, the NDDOT gave a presentation on the project. The presentation included a description of the project, discussion of the Long X Bridge and rehabilitation and replacement alternatives currently being considered (i.e., Options LX-1, LX-2, and LX-3), overview of the staging areas, and summary of the next steps.

On June 5, 2018, the Little Missouri River Commission held a meeting in Dickinson. During the meeting, the NDDOT gave a presentation discussing the Preferred Alternative for the project, including Option LX-3, staging areas, and environmental impacts and commitments. At the conclusion of the presentation and corresponding discussion, Chair Schettler asked the commissioners if they wanted to provide any comments regarding the bridge. Secretary Baker indicated the direction would be for the commission to provide a motion to provide a comment if so desired. No motion or comment was made.

June 1, 2017 wildlife crossing/accommodation field review

9.3.7.2. What was the purpose of the wildlife crossing/accommodation field reviews?

Two wildlife crossing/accommodation field reviews were held for the project, one on September 15, 2016, and one on June 1, 2017.

- Wildlife Crossing/Accommodation Field Review: September 15, 2016. The objectives of the field review were to visit wildlife crossing/accommodation locations; discuss wildlife crossing/accommodation types, fencing, and items of concern; and reach a consensus regarding the wildlife crossing/accommodations.

- Wildlife Crossing/Accommodation Field Review: June 1, 2017. The objectives of the field review were to visit wildlife crossing/accommodation locations; and discuss a proposed cattle pass, suitable Dakota skipper habitat along the project corridor, and the wildlife crossing/accommodation design, fencing, and items of concern. Items of concern included the proposed trail; South Branch of the Green River and Spring Creek bridge/box culvert configurations; use of existing NPS fencing; and the design and feasibility of a wildlife overpass.

9.3.7.3. What was the purpose of the SHPO meetings?

As a participating agency, the SHPO attended the agency scoping meeting on November 9, 2015, and the lead, cooperating, and participating agency meeting on July 21, 2016. Several other meetings have been held with the SHPO, whose objectives were to introduce the project; facilitate the Section 106 of the *National Historic Preservation Act* and Section 4(f) of the *Department of Transportation Act* processes; and discuss the Long X Bridge, Dolynuik Homestead, TRNP—North Unit Entry Sign, mitigation, and field surveys. These meetings were held on:

- September 25, 2015
- March 11, 2016
- May 19, 2016
- January 26, 2017
- December 12, 2017
- February 2, 2018
- March 29, 2018

Chapter 10. Preparers and Contributors

In accordance with the regulations of the CEQ (40 CFR § 1502.6), the efforts of an interdisciplinary team comprising technicians and experts in various fields were required to accomplish this EIS. This chapter includes the names, titles, and roles of the principal individuals contributing information to this EIS.

Important topics in this chapter:

This Environmental Impact Statement (EIS) was prepared by KLJ under a contractual agreement with the North Dakota Department of Transportation (NDDOT). Please refer to **Table 33, Preparers and Contributors** for a list of individuals with the primary responsibility of contributing to this EIS, preparing the documentation, and providing technical reviews.

Table 33, Preparers and Contributors

Affiliation	Name	Title	Project Role
Federal Highway Administration (FHWA)	Kevin Brodie, PE	Transportation Engineer	FHWA Project Liaison
	Richard Duran	Environmental & Planning Specialist	*National Environmental Policy Act* (NEPA) Compliance
	Stephanie Stoermer	Environment Program Specialist/Archaeologist	EIS Review, Section 4(f) Review
NDDOT	Valerie Barbie	Cultural Resources Support, Environmental & Transportation Services (ETS) Division	Cultural Resources Coordination & Review, Tribal Coordination
	Jeani Borchert	Cultural Resources Manager, ETS Division	Cultural Resources Coordination & Review, Tribal Coordination
	Jeff Jirava, PE	Geotechnical Section Leader, Materials, & Research Division	Geotechnical Review
	Matt Kurle, PE	Geotechnical Engineer, Materials & Research Division	Geotechnical Review
	Cory Lawson	Environmental Planner, ETS	EIS Review, Section 4(f) Review
	Matt Linneman, PE	Materials and Research Engineer	Project Manager
	Paul Moch	Environmental Scientist, ETS	Wetland Delineation Report, Noise Analysis & SPreAD Analysis
	Jeff Rensch, PE	Transportation Engineer, Design Division	Roadway Design Review
	Greg Schonert	Biologist, ETS	Programmatic Biological Assessment, Biological Evaluation, Wildlife Habitat Assessment
	Tim Schwagler, PE	Bridge Design Section Leader, Bridge Division	Bridge Design & Concept Review
	Kristen Sperry	Environmental Liason, ETS	Noise Analysis & SPreAD
	Stacy Wilz	Right of Way Realty Officer, ETS	Right-of-Way
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	Mark Anderson, PE	Principal Engineer	QC/QA Review
	Nick Anderson	Environmental Planner	EIS Review
	Becky Baker	Environmental Planner	Senior Advisor
	Nute Bishop	Environmental Planner	Asbestos Inspection
	Mikayla Boche	Environmental Planner	Wildlife Crossing/Accommodation, EIS Author, Administrative Record
	Stacie Cornett	Graphic Designer	EIS Layout, Exhibit Creation, Public & Agency Meeting Materials
	Corie Ereth	Environmental Planner	Biological Inventory
	Wade Frank, PE	Project Engineer	Bridge Design, EIS Author
	Patrick Gallagher, PE	Project Engineer	Roadway Design
	Jordan Gerber, PE	Project Engineer	Bridge Design
	Chris Harris	Visual Designer	Visual Simulations, Exhibit Creation
	Mike Huffington	Environmental Planner	Agency & Public Involvement, EIS Author
	Duane Kaul	GIS Analyst	Noise Analysis, SPreAD, Viewshed Analysis
	Duane Klinner	Archaeologist	Cultural Resources Surveys, Reports, & Agency Coordination
	Tom Naas	Environmental Planner	Wetland Delineation
	Jeff Price	GIS Analyst	Impact Assessment, Exhibit Creation
	Elizabeth Ricciardi	Environmental Planner	EIS Author, Agency & Public Involvement, Noise Analysis, SPreAD, Phase I Environmental Site Assessment (ESA), Administrative Record
	Troy Ripplinger, PE	Project Engineer	Roadway Design, EIS Author, Agency & Public Involvement
	Andrew Robinson	Archaeologist	Cultural Resources Surveys
	Ashley Ross	Environmental Planner	EIS Review

… table continued on page 160 …

Affiliation	Name	Title	Project Role
	Allen Shaw	Paleontologist	Paleontology Survey & Report
	Skip Skattum (past)	GIS Analyst	Noise Analysis, SPreAD
	Jen Turnbow	Project Manager	Project Development & Management, Agency & Public Involvement, EIS Author, Senior Review
	Amanda Vetter	Project Engineer	Roadway Design
	Nicole Wallenta	Environmental Planner	Phase I ESA
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Brosz Engineering, Inc.	Billy Doerr, PE	Project Engineer	Roadway Design
Houston Engineering, Inc.	Rick Gunderson, PE	Project Engineer	Roadway Design
	Adam Nies, PE	Civil Engineer	Long X Bridge Hydraulics
Shannon & Wilson, Inc.	Gregory Fischer, PhD, PE	Senior Geotechnical Engineer	Geotechnical
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Utility Mapping Services	Rodney Kent, PE	Project Engineer	Utility Coordination
Metcalf Archaeological Consultants	Emily Sakariassen	Architectural Historian	Cultural Resources Surveys
	Damita Engel	Regional Manager	Cultural Resources Surveys

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