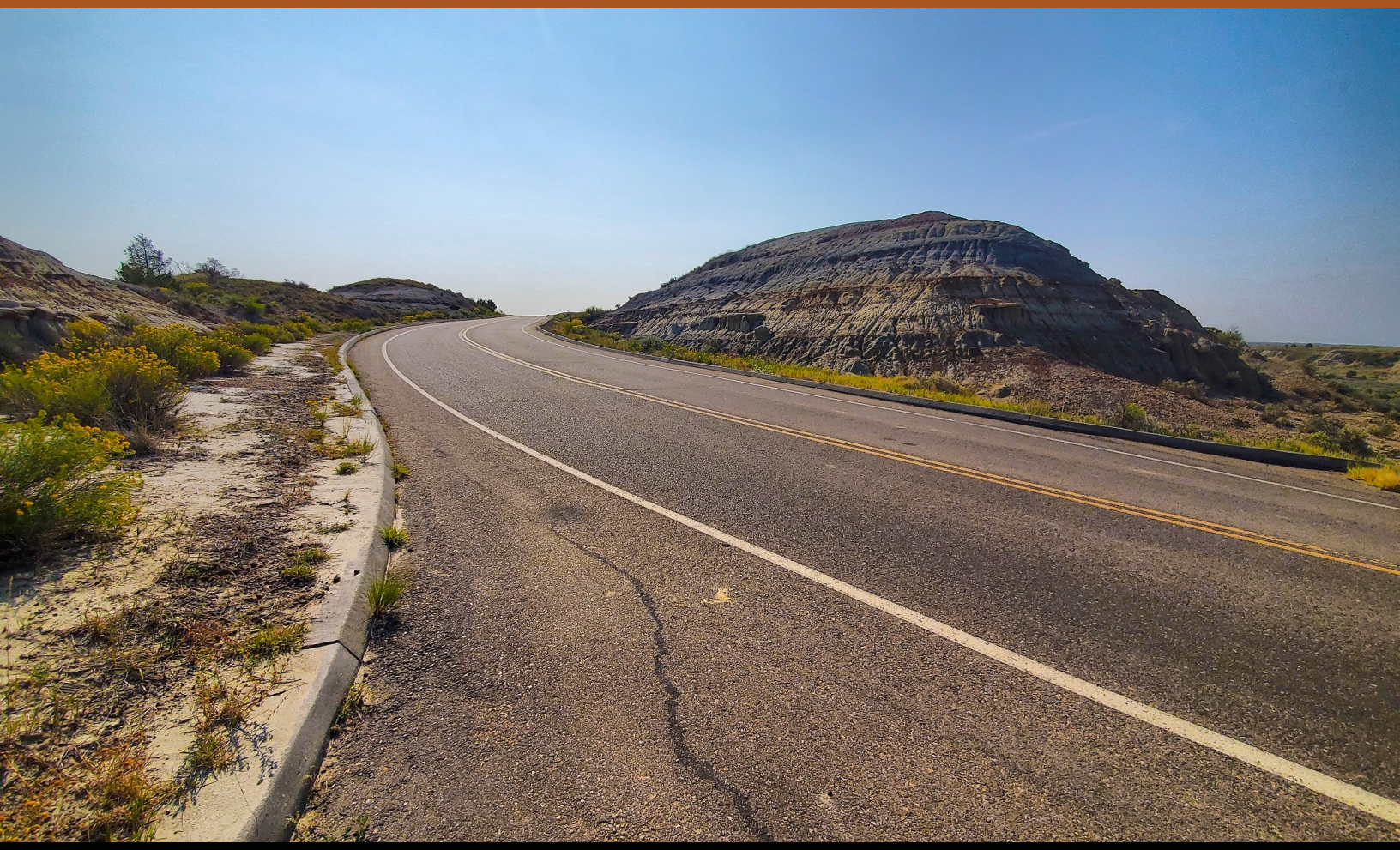
Theodore Roosevelt National Park
North Dakota

US Department of the Interior
National Park Service

Theodore Roosevelt National Park

South Unit Loop Road Reconstruction Project

Environmental Assessment



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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
historic district	Scenic Loop Drive Historic District
HRA	Historical Research Associates
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
FHWA-CFLHD	Federal Highway Administration, Central Federal Lands Highway Division
MWAC	(National Park Service) Midwest Archeological Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
North Dakota DEQ	North Dakota Department of Environmental Quality
North Dakota SHPO	North Dakota State Historic Preservation Office
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
Park	Theodore Roosevelt National Park
PFYC	(Bureau of Land Management) Potential Fossil Yield Classification System
TMDL	total maximum daily load
USEPA	US Environmental Protection Agency
USC	United States Code
USFWS	US Fish and Wildlife Service

SECTION 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The National Park Service (NPS) is proposing to reconstruct portions of Scenic Loop Drive (also known as Loop Road) in the South Unit of Theodore Roosevelt National Park (the park). The park is located near Medora, North Dakota, approximately 133 miles west of Bismarck, North Dakota, and 130 miles south of Williston, North Dakota. Scenic Loop Drive is one of the oldest sections of road in the South Unit; however, large-scale rehabilitation work has not been performed on the road in 20 years. During previous maintenance and repair efforts, subgrade and stormwater management issues were identified but were not fully addressed. As a result, areas of the road have succumbed to landslides and other damage over time. The proposed project would reconstruct approximately 6.15 miles of Scenic Loop Drive to provide long-term, sustainable access for future visitor use. The proposed project would also include improvements to pullouts and parking areas along the road.

This section of the environmental assessment (EA) describes the reasons NPS is proposing to reconstruct portions of Scenic Loop Drive. Specifically, this section includes the following:

- purpose of, and need for, action
- project background
- project area evaluated for impacts
- discussion of issues and impact topics retained for detailed analysis
- discussion of issues considered but dismissed from detailed analysis

1.2 PURPOSE OF THE ACTION

The purpose of the project is to restore access to park resources in the South Unit by providing a stable and more sustainable roadway that addresses visitor and staff safety, enhances the visitor's experience, improves efficiencies in park operations, and minimizes impacts on natural and cultural resources.

1.3 NEED FOR THE ACTION

The project is needed because the existing drainage system cannot convey stormwater runoff from the road surface effectively, resulting in unstable slopes that have damaged pavement along Scenic Loop Drive and caused partial or total closures. These road closures have adversely affected visitor enjoyment of the area and the park's ability to provide visitor services because portions of the road are currently unstable, inaccessible, and unsafe.

1.4 PROJECT BACKGROUND

The Federal Highway Administration, Central Federal Lands Highway Division (FHWA-CFLHD), in partnership with NPS, proposes to stabilize sections of failed roadway embankment along Scenic Loop Drive between mile marker 22 and mile marker 28. Landslides of various magnitudes and poor subgrade material within the park have affected the road for many years (**figure 1**). A 150-foot section of Scenic Loop Drive collapsed in spring 2019, requiring closure of the roadway. Subsequent sinkholes in the road required further closures. In fall 2019, the park found two other areas of potential roadway failure at Scoria Point and West Ridgeline, with other areas of concern identified. These areas of concern showed continued deterioration when reassessed in winter 2019-2020.

Geotechnical and pavement engineering studies along Scenic Loop Drive have recommended approximately 6.15 miles of roadway for reconstruction, including bank stability repairs, roadway deep patches, drainage improvements, and slope regrading (Shannon and Wilson 2020).

Pavement damage is prevalent in the form of depressions and cracking. This damage is likely due to unstable slopes, pumping of subgrade over impermeable clays, dissolution voids in embankment fill and the subsequent piping of fine fill material, and poor subgrade soils.

Additionally, evidence of embankment failures and slow downslope soil movement is found at several locations in the form of erosion, unstable slopes, and unstable trees. Historically, sections of Scenic Loop Drive have failed because of subsurface water conditions and existing culverts that were partially or fully filled with sediment. Several active seeps (i.e., wetlands where groundwater reaches the surface through an aquifer) have been observed, and it is assumed that most of the areas displaying embankment failure are experiencing a loss of strength because of high moisture content under the road surface.

FIGURE 1. A FAILED SECTION OF SCENIC LOOP DRIVE FROM A LANDSLIDE

1.5 PROJECT AREA

The project area is approximately 6.15 miles of Scenic Loop Drive located southeast of East River Road and approximately 6.5 miles from Medora, North Dakota (**figure 2**). The project area consists of a 400-foot-wide corridor (i.e., approximately 200 feet from the centerline on each side of the road). The project area may include several locations beyond the 400-foot-wide corridor to allow for adequate stormwater drainage based on hydraulics, erosion, geotechnical, and slope stability analysis.

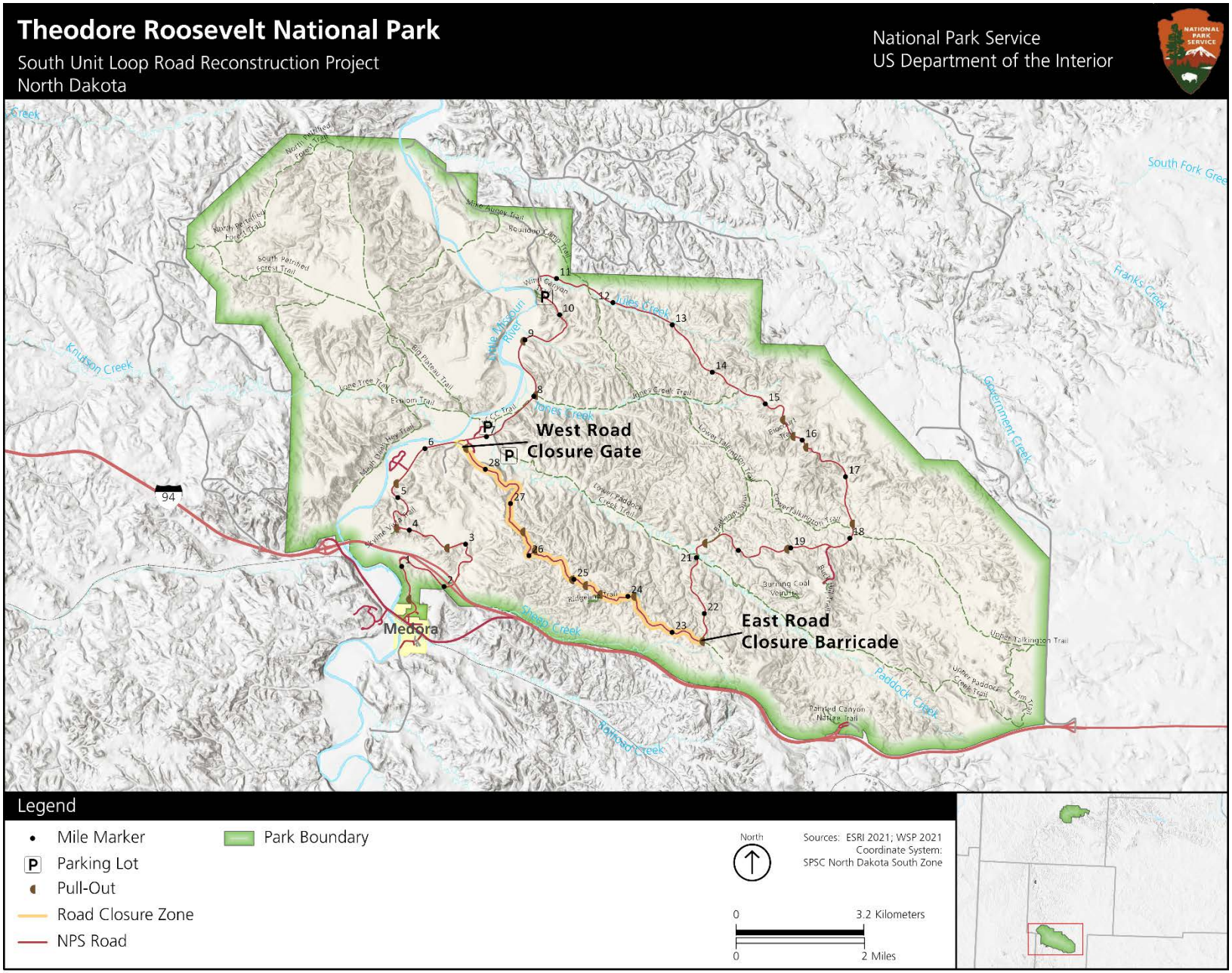

FIGURE 2. PROJECT AREA IN THE SOUTH UNIT

1.6 ISSUES AND IMPACT TOPICS

Through a series of internal meetings and site visits to the project area by an interdisciplinary team of park and regional staff, natural and cultural resource experts, and engineers familiar with the project area, NPS identified a range of issues and impact topics to evaluate. Issues are problems that the current situation has caused or that will continue to occur if they are not addressed. Impact topics are resources or values to be analyzed as part of the proposed action.

The 2015 NPS *National Environmental Policy Act* (NEPA) *Handbook* provides specific guidance for determining whether to retain issues for detailed analysis (NPS 2015a). Issues should be retained for consideration and discussed in detail if:

- the environmental impacts associated with the issue are central to the proposal or of critical importance,
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives,
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies, or
- there are potentially significant impacts to resources associated with the issue (NPS 2015a).

If none of the considerations described above apply to an issue, it was dismissed from this EA. Issues and impact topics that could be affected by this project include cultural resources; geology and soils; paleontological resources; visitor use and experience; and water resources. Issues and impact topics dismissed from detailed analysis, including the dismissal rationale, are provided below.

1.6.1 Impact Topics Retained for Detailed Analysis

Cultural Resources. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 United States Code [USC] 470 et seq.), and its implementing regulations under 36 Code of Federal Regulations (CFR) Part 800 require all federal agencies to consider effects of undertakings on historic properties, including historic structures eligible for or listed in the National Register of Historic Places (NRHP). The project area has been surveyed for archeological resources and historic structures within the built environment (NPS-MWAC 2021; Golder Associates, Inc. 2021a; WSP USA, Inc. 2021). Although NPS would avoid impacts on known archeological sites, road construction could affect historic structures and the cultural landscape. Therefore, this impact topic is carried forward for detailed analysis.

Geology and Soils. NPS *Management Policies 2006* state: the "Service will actively seek to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources" (NPS 2006). Activities to reconstruct Scenic Loop Drive in the project area could change the local topography, which may alter the park's geological landforms. Although the project would minimize areas contributing to surface runoff and erosion along Scenic Loop Drive in the project area, the potential for soil compaction from new impervious surfaces and the use of construction equipment would occur. Additionally, native soil would be removed along the road during implementation of the project. Therefore, geology and soils are carried forward as an impact topic.

Paleontological Resources. NPS *Management Policies 2006* state that paleontological resources (i.e., fossils), "including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research" (NPS 2006). Ground disturbance associated with the project may affect paleontological resources located near the roadway. The project area corridor is surrounded by moderately to highly fossiliferous strata

(i.e., layers of fossil-containing rock) and is mostly underlain by the Sentinel Butte Formation or Bullion Creek Formation, which are both fossiliferous and may contain important Paleocene vertebrate fauna (Paleo Solutions, Inc. 2021). Therefore, this impact topic is carried forward for detailed analysis.

Visitor Use and Experience. The mission of NPS is to preserve unimpaired natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. Reconstructing a portion of Scenic Loop Drive would improve visitor access to the area and enhance the visitor experience by improving vehicular circulation and access throughout the South Unit of the park and would eliminate unstable, inaccessible, and unsafe road conditions. However, visitor access to the area would remain closed during construction because the road would serve as a staging area during construction to reduce impacts on natural and cultural resources. Winter weather conditions in North Dakota could also limit construction activities. As a result, some construction activities would occur during peak park visitation periods in the spring, summer, and fall. Therefore, this impact topic is carried forward for detailed analysis.

Water Resources. The Clean Water Act was enacted to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 USC 1251 et seq.). Consideration of impacts on wetlands is also required under Executive Order 11990, "Protection of Wetlands," and NPS Director's Order 77-1: *Wetland Protection* (NPS 2002). Executive Order 11988, "Floodplain Management," requires an examination of impacts on floodplains and potential risk involved in placing facilities in floodplains. NPS *Management Policies 2006* and Director's Order 77-2: *Floodplain Management* (NPS 2003) provide guidelines for proposals in floodplains. Surface water features and intermittent streams occur in the project area that flow under Scenic Loop Drive through existing culverts. Bank stabilization, installation of upslope or downslope inlets and outlets, and potential culvert replacements under Scenic Loop Drive could affect these water resources. Therefore, this impact topic is carried forward for detailed analysis.

1.6.2 Impact Topics Considered but Dismissed from Detailed Analysis

NPS determines whether impact topics are evaluated in detail or dismissed from further evaluation to concentrate on the issues of concern. This section evaluates and explains why NPS dismissed the impact topics described below from further consideration. Impact topics are dismissed from further evaluation if they:

- do not exist in the project area,
- would not be affected by the alternatives or the likelihood of impacts are not reasonably expected,
- would result in impacts that, through the application of mitigation measures, would be minimal, and
- there is little controversy on the subject or few reasons to otherwise include the topic (NPS 2015a).

Air Quality. Section 118 of the Clean Air Act requires NPS to meet all federal, state, and local air pollution standards (42 USC 7401 et seq.). The park currently meets the National Ambient Air Quality Standards under the Clean Air Act (NPS 2009; USEPA 2021a). The project would increase vehicle trips to the park and result in localized emissions and fugitive dust in the area during construction activities. However, emissions and fugitive dust would occur only during the construction period and would dissipate quickly. No long-term impacts on air quality are expected. Therefore, the topic was dismissed from detailed analysis in this EA.

Ethnographic Resources. In 2016, the University of Arizona at Tucson completed an ethnographic overview and assessment of the entire park (Daughtrey et al. 2016). Key resources that characterize the cultural identity of the park include: the badlands landscape, with its unique landforms, fossils, and minerals; the bison herd; the elk herd; golden eagle (*Aquila chrysaetos*) and eagle trapping features; historic structures from various periods; and prairie dog towns. Actions taken in the project area would be designed to avoid disturbance to sensitive wildlife, and no eagle trapping features have been identified in the project area. Disturbances to the badlands landscape and associated landforms, fossils, minerals, and historic structures are further discussed under the impact analyses for cultural resources, geology and soils, and paleontological resources. Repairing and reopening the road will provide visitors and tribes traditionally associated with the park safe access to these resources within the project area.

All tribes that are traditionally associated with the park have been consulted regarding this project, including via letter, e-mail, phone call, teleconference, and field visits to discuss potential project actions and identify any concerns. To date, no properties of traditional religious and cultural significance have been identified in the project area. Therefore, this topic was dismissed from detailed analysis in this EA.

Indian Trust Resources. NPS must ensure that it explicitly addresses any anticipated effects on Indian trust resources in an environmental compliance document. If any effects are identified, NPS must consult with the affected tribe(s) on a government-to-government basis with respect to the impact from the project. However, if the project or action is expected to have either an insignificant impact or no impact on any Indian trust resources, the environmental compliance document must state the reason for dismissal. Since no Indian trust resources were identified in the project area during consultation, the topic was dismissed from detailed analysis in this EA (NPS, McCann, pers. comm. 2021a).

Indian Sacred Sites. In accordance with Executive Order 13007, NPS must accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Continued access to, and use of, these sites is often essential to the survival of family, community, or regional cultural systems, including patterns of belief and sociocultural and religious life. However, no Indian sacred sites were identified during consultation in the project area (NPS, McCann, pers. comm. 2021a). Therefore, the topic was dismissed from detailed analysis in this EA.

Soundscapes. In accordance with Director's Order 47: *Sound Preservation and Noise Management* and NPS *Management Policies 2006* (NPS 2000, 2006), an important component of the NPS mission is the preservation of the natural soundscape associated with national parks. The project would occur where sounds from vehicular traffic and other human activities are historically common. During construction, anthropogenic noise would increase because of construction activities, equipment, vehicular traffic, and the presence of crews. Any sounds generated from construction would be temporary, lasting only as long as the construction activity is generating the sound(s), and would have no long-term, measurable effect on visitors, employees, or natural soundscape conditions. Therefore, the topic was dismissed from detailed analysis in this EA.

Vegetation. NPS *Management Policies 2006* state that the agency will strive to maintain all components and processes of naturally evolving ecosystems, including the natural abundance, diversity, and ecological integrity of plants (NPS 2006). Unstable slopes and erosion along Scenic Loop Drive in the project area are currently affecting some vegetation. While many portions of road are atop steep slopes where disturbance to vegetation would be limited, areas disturbed by tree felling during construction activities would be revegetated with native plants that would enhance the adjacent roadway shoulders and embankments and improve the stabilization of the slope, where applicable. Additionally, fill material used during the project would meet FHWA-CFLHD

engineering requirements to avoid the introduction of nonnative invasive plants. No known rare plants occur in the project area. Therefore, this impact topic was dismissed from detailed analysis in this EA.

Visual Resources. NPS *Management Policies 2006* state that a park's scenery and scenic features are included among the resources and values to be protected and conserved unimpaired for enjoyment by current and future generations (NPS 2006). Visual impacts from construction activities would be temporary and localized. Repair treatments to the existing road in the project area would become permanent features on the landscape, potentially detracting from the scenic resources of the park and affecting visual quality. However, the project would occur in areas where the presence of the road has already altered the natural setting and would not represent a noticeable departure from historic visual conditions. Furthermore, new structures would resemble the existing landscape in color and geological form to minimize visual disturbances. Therefore, this topic was dismissed from detailed analysis in this EA.

Wildlife, including Threatened and Endangered Species. According to the NPS *Management Policies 2006*, NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of native animal populations (NPS 2006). Repairs to the existing road in the project area and reopening the road to vehicular traffic would have direct and indirect impacts on wildlife, including direct injury and mortality from vehicle collisions and equipment use, altered behavior and patterns of habitat use, and increased human use and disturbance of wildlife (Gerow et al. 2010). The reconstruction of the road would not introduce new impacts on most wildlife—these impacts already exist. However, the project may disturb existing prairie dog (*Cynomys ludovicianus*) habitat and individual animals in the project area. Increased noise levels during the construction phase of this project could result in temporary increases in localized disturbances to wildlife. While the project could result in minimal, temporary impacts, it would not affect the viability or population dynamics of wildlife in the park (Barnhart et al. 2017).

Although no federally threatened or endangered species are known to occur in the park, NPS has received concurrence from the US Fish and Wildlife Service (USFWS) that the project "may affect, but is not likely to adversely affect" northern long-eared bat (*Myotis septentrionalis*). To mitigate impacts to northern long-eared bat, no construction-related tree removal would occur during the roosting season between April 1 and October 31. The park also received concurrence that there would be "no effect" on the endangered whooping crane (*Grus americana*) and the candidate-for-listing monarch butterfly (*Danaus plexippus*) since there is no suitable habitat for either species within the project area. Upon the recommendation of USFWS, the park is planning to conduct surveys for golden eagle since the species has not been documented within the project area (NPS, McCann, pers. comm. 2021b; USFWS 2022). Therefore, the topic was dismissed from detailed analysis in this EA.

SECTION 2: ALTERNATIVES

2.1 INTRODUCTION

This section describes the alternatives developed for reconstructing portions of Scenic Loop Drive in the South Unit of the park. This section includes two alternatives: the no-action alternative and one action alternative. The action alternative presents a reasonable and feasible approach that meets the purpose of, and need for, action. This section also discusses alternatives that were initially considered but not carried forward for detailed analysis, identifies the NPS proposed action and preferred alternative, and lists stipulations and mitigation measures for the alternatives.

2.2 ALTERNATIVE 1: NO ACTION

Alternative 1, the no-action alternative, describes current management and the existing condition of Scenic Loop Drive (**figure 3**). Alternative 1 provides a basis for comparing the management direction and environmental consequences of alternative 2.

Under alternative 1, the approximately 6.15-mile section of Scenic Loop Drive would remain closed to visitors, erosion would continue to worsen the condition of the roadway, and structural and accessibility issues would remain (**figures 4 through 7**). This alternative would not relieve the risk of future roadway failures.

FIGURE 3. PROJECT AREA CONDITION UNDER THE NO-ACTION ALTERNATIVE

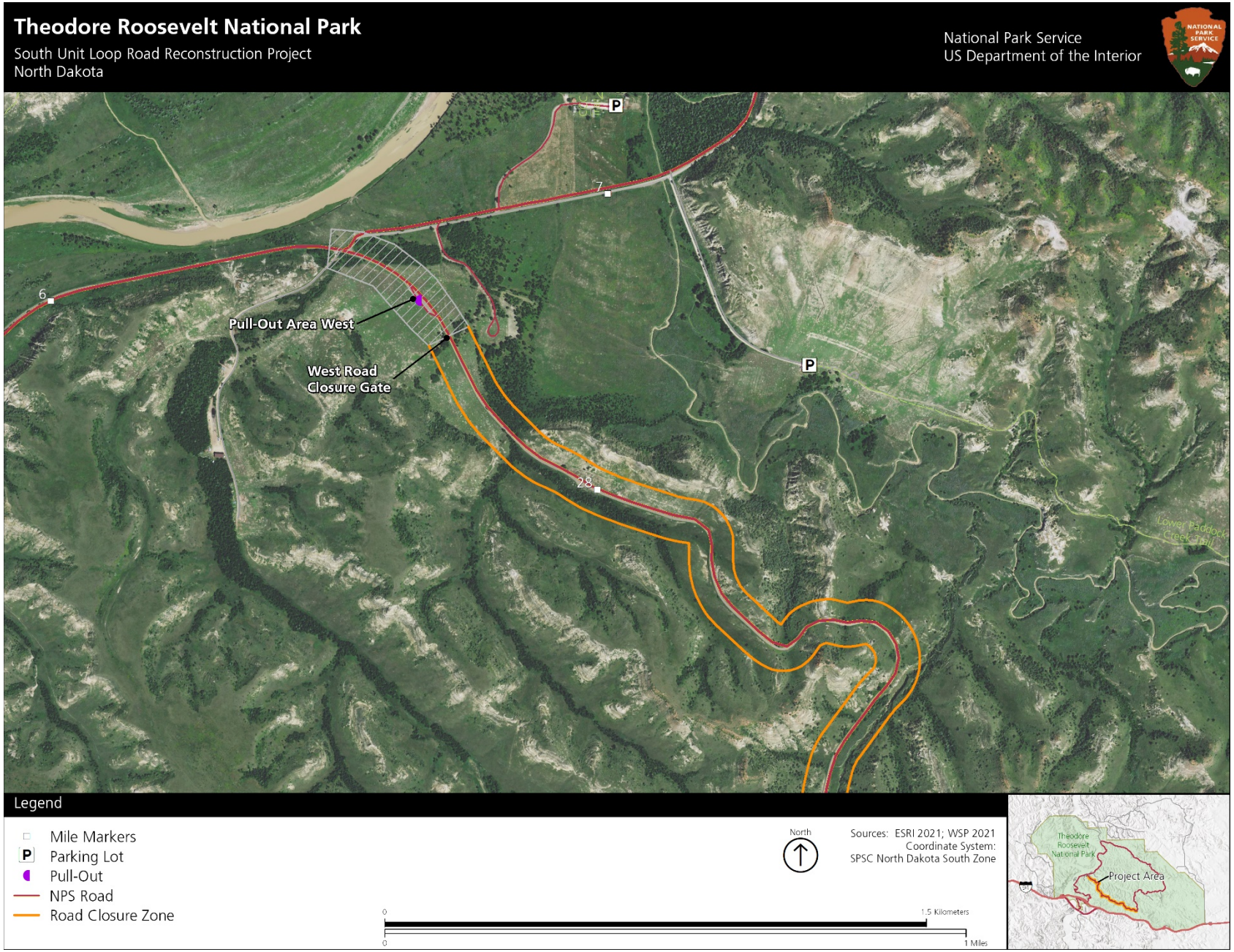

FIGURE 4. ROAD PROBLEM AREAS: WEST

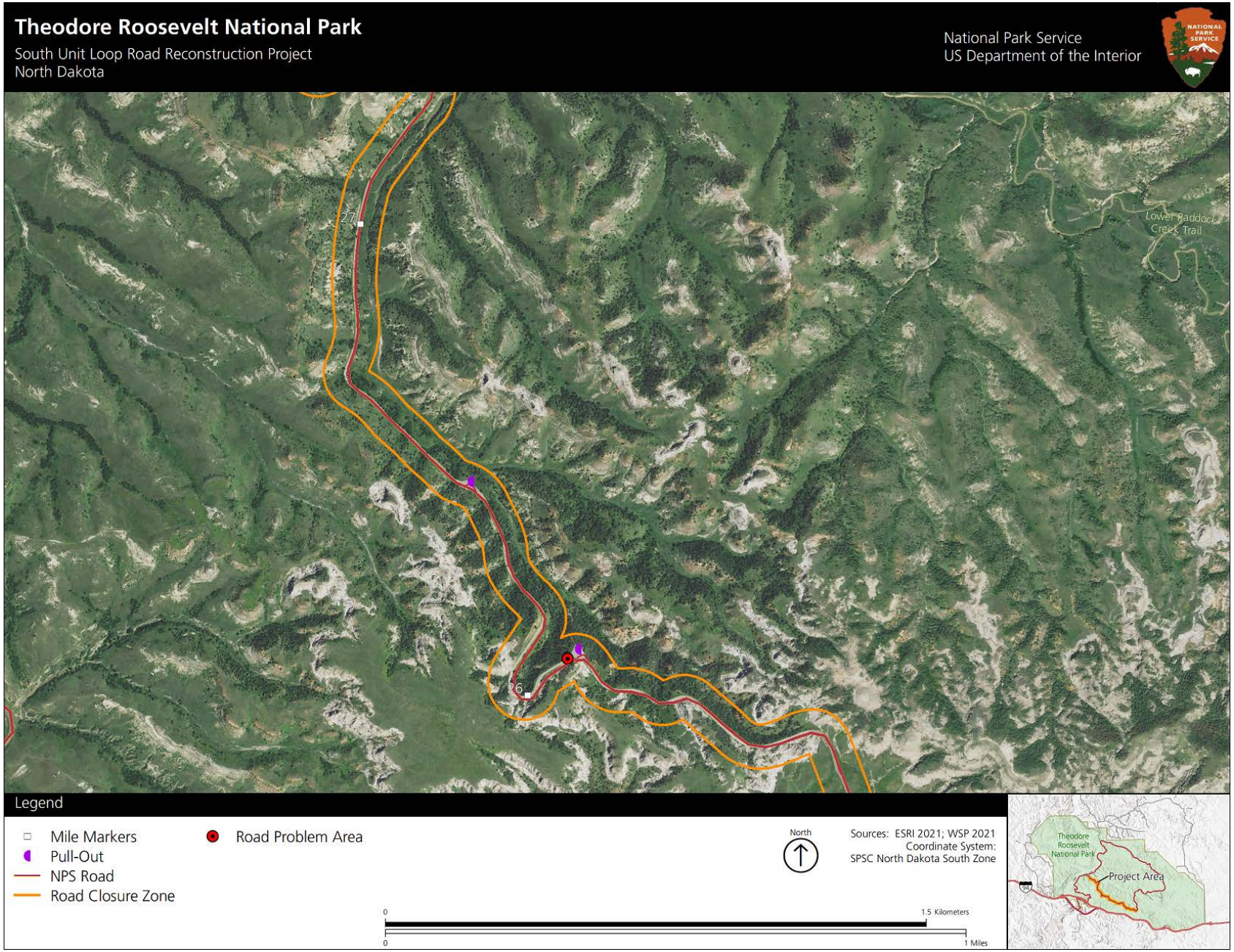

FIGURE 5. ROAD PROBLEM AREAS: WEST-CENTRAL

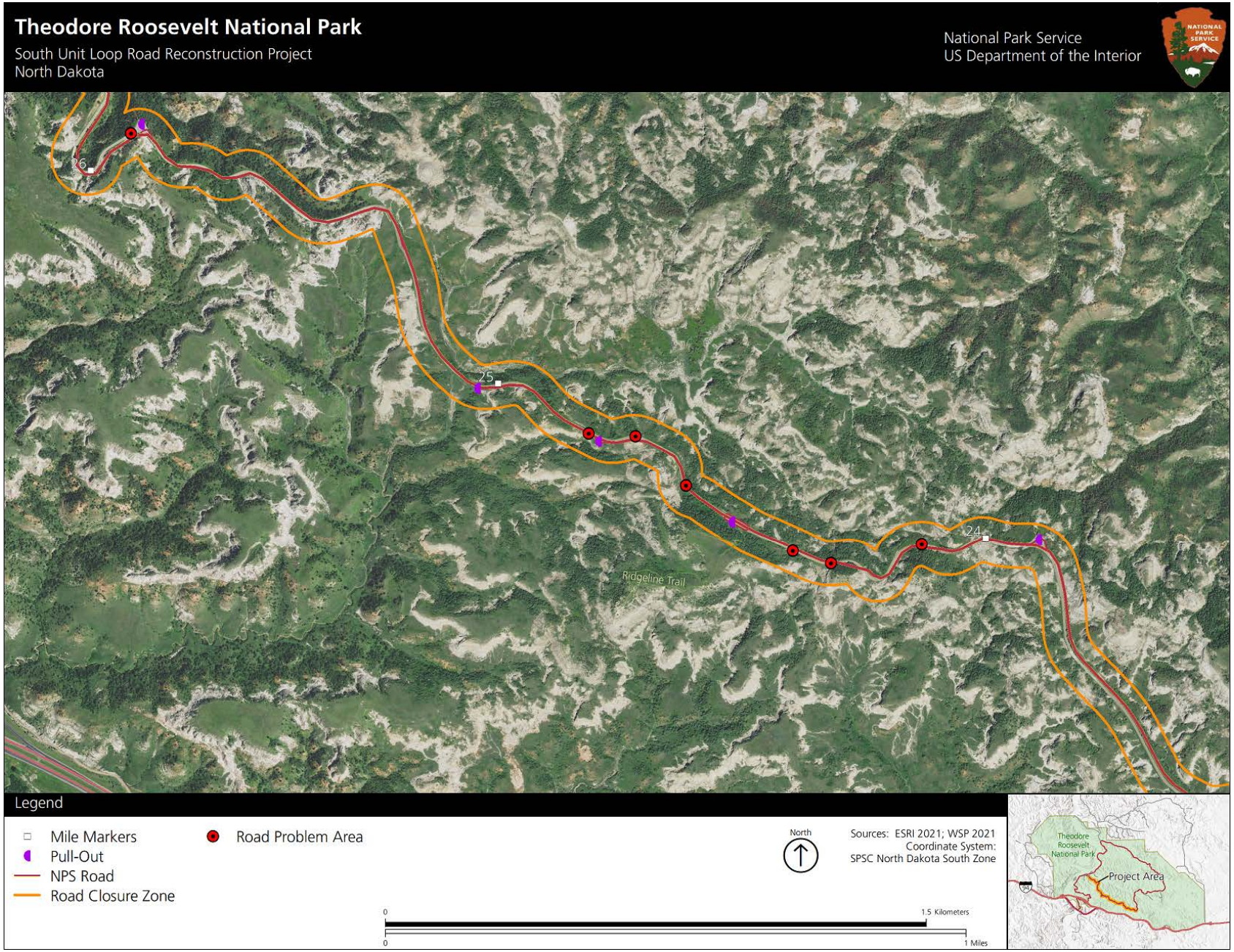

FIGURE 6. ROAD PROBLEM AREAS: CENTRAL-EAST

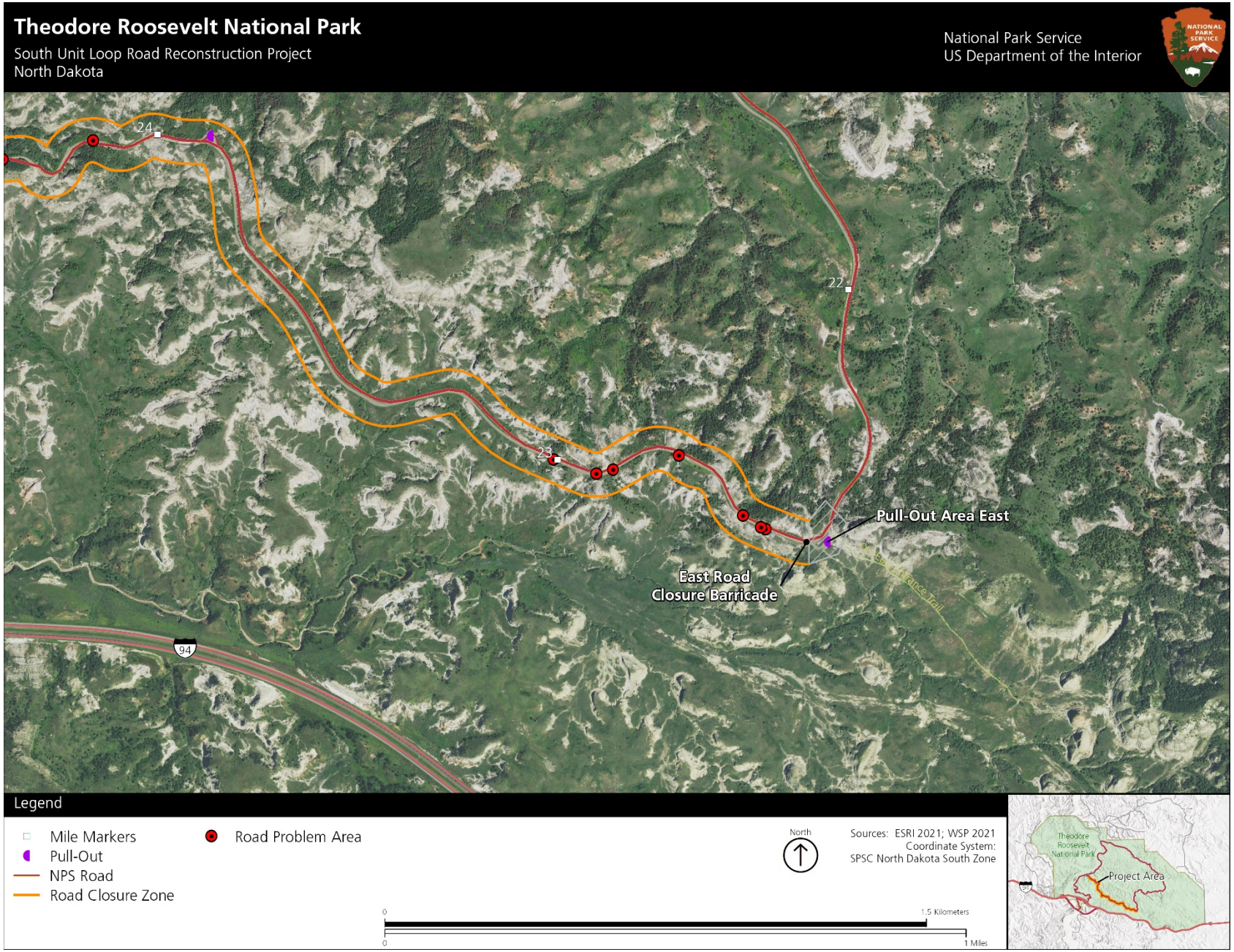

FIGURE 7. ROAD PROBLEM AREAS: EAST

2.3 ALTERNATIVE 2: RECONSTRUCTION OF SOUTH UNIT LOOP ROAD (PROPOSED ACTION AND PREFERRED ALTERNATIVE)

Alternative 2 is the proposed action and preferred alternative and would address multiple roadway problem areas along Scenic Loop Drive by reconstructing approximately 6.15 miles of road from mile marker 22 to mile marker 28 for longevity and resilience. Alternative 2 includes specific treatment options for repairing each section of the road to address existing problems. These treatment options are based on existing data, geological and soil studies, field exploration, survey and mapping of surface features, groundwater and hydraulics analyses, geotechnical back-analysis, and stability analyses. All proposed treatment options would occur within the project area, with possible exceptions for stormwater drainage requirements.

Alternative 2 also includes landslide mitigation and minimization measures, such as stabilization, that would protect natural aesthetics and reduce environmental impacts. Programmatic actions, or other means to address future maintenance and repair of the road in the project area, would be implemented. The Council on Environmental Quality (CEQ) defines "programmatic" as any broad or high-level analysis that assesses the environmental impacts of proposed policies, plans, programs, or projects implemented by subsequent actions (CEQ 2014). Programmatic actions proposed under alternative 2 would include, but would not be limited to, conducting roadway condition assessments, filling cracked pavement, repaving sections of road surface, repairing deteriorating culverts, removing eroded sediment from the road surface and culverts, restoring riprap and retaining walls, monitoring historic structures, and tracking the effectiveness of revegetation. General assumptions have been included below for the amount and type of disturbance anticipated.

Alternative 2 would reconstruct the road and reopen the project area, fulfilling the purpose of, and need for, action to resume park operations and allow visitors to enjoy the area. The proposed treatments under alternative 2 are summarized in the following subsections.

2.3.1 Roadway Reconstruction

In the project area, Scenic Loop Drive would be reconstructed to a typical cross-section containing one 10-foot travel lane in each direction and a 1-foot-wide shoulder. Construction widths could vary due to slopes, drainage, and geotechnical requirements for specific road sections. Alternative 2 would maintain the existing horizontal and vertical roadway alignment, except for a minor shift of the centerline of the road in a previously disturbed area.

2.3.2 Subgrade Excavation, Replacement, and Stabilization

Stabilization of the road in the project area would include excavation of the existing subgrade (i.e., material underneath the constructed road) at certain locations and full-depth reclamation. The existing pavement depth varies in thickness. Subgrade treatment would occur for the entire length of the project area by treating the top 6 to 12 inches of road subgrade with cement—via mixing or injection—to convert structurally unstable soils to stable soils, increasing the strength of the subgrade, and/or providing a barrier from surface water. In certain areas that are more unstable, a subexcavation treatment of approximately two feet in depth might be applied. This treatment would excavate the approximately two feet of unstable soils and replace it with imported stable backfill material. Once the subgrade is treated, the roadway would be paved with four inches of asphalt. Displaced materials would be removed from the park along structurally sound roadways. Approximately 35,000 cubic yards of soil would be excavated, and options to use or store this displaced soil are being examined.

2.3.3 Drainage Improvements

While stormwater runoff contributes to the current condition of the road, FHWA-CFLHD has determined the project area includes space to improve drainage and adequately carry stormwater away from the road. Based on a hydraulic analysis, drainage improvements may include:

- Directing stormwater on pavement to intakes or curbs at various locations along the road to drain stormwater off the roadway into drainageways and avoid eroding soils in the project area.
- Installing adequately sized culverts and drainageways. The design and material of the culverts and drainageways would be appropriate for the park's unique landscape and would accommodate the proposed hydraulic requirements, as determined by FHWA-CFLHD.
- Placing riprap (i.e., stone armoring) and/or vegetation in strategic locations to slow stormwater and reduce erosion.
- Constructing upslope and downslope intakes, underground piping, and outlets where needed. As previously stated, locations beyond the 400-foot-wide corridor may be used to allow for adequate stormwater drainage, as needed.

2.3.4 Structural Improvements

Structural improvements along the approximately 6.15 miles of Scenic Loop Drive would occur at specific locations throughout the project area to stabilize soils, reduce landslide hazards, and promote roadway resilience. Seven lagging walls—also known as retaining walls—are currently proposed for installation (**figure 8**). The length of each retaining wall could range from approximately 30 to 430 linear feet. The ultimate structural improvement recommendations under alternative 2 would be based on geotechnical and engineering analyses conducted during the design phase. Structural improvements in the project area may include:

- Deep Patch—the upper 1.5 to 6 feet of subsiding sections of the roadway are excavated and replaced with compacted backfill and reinforced with geosynthetic material, such as permeable fabrics. Deep patches reduce soil instability but do not eliminate all causes of instability. They confine the likelihood of road failure to the face of weak soil slopes and prevent failures from extending into the roadway bench.
- Reinforced Soil Slope—slopes are reinforced with geosynthetic materials as part of roadway design and backfilled with granular material.
- Tied Back Soldier Pile and Lagging Wall—retaining walls with soldier piles (i.e., H-piles vertically placed into the earth to hold horizontal lagging [planks or panels] in place) installed below the slope's highest elevation with ground anchors (also called tie backs; grouted anchors installed

FIGURE 8. EXAMPLE SOLDIER PILES AND LAGGING WALLS IN MESA VERDE NATIONAL PARK

at an angle to hold back soldier piles, walls, or other structures), as needed. Concrete could be applied at high velocity (e.g., shotcrete) to further strengthen the wall.

- Cantilever Soldier Pile and Lagging Wall—soldier pile and retaining wall without ground anchors.
- Coupled Shear Pile Wall, Tied Back (i.e., ground anchors)—two coupled large-diameter drilled shafts called coupled shear piles installed as a row to resist lateral force.

2.3.5 Pullout Area Improvements

The proposed project would also include improvements to pullout areas. These improvements may include delineating parking stalls to expand the footprint of available parking spaces, improving aesthetics to meet FHWA-CFLHD design standards, resolving social trailing, and improving accessibility. Improvements to pullouts in the project area are proposed at the following locations under alternative 2 (all mile markers indicated herein are approximate):

- Site 1 (Pullout Area West [Prairie Dog Town]): The pullout area would be slightly expanded from its existing width to accommodate peak volumes of visitors. Expansion would include new head-in parking and relocated parallel parking for oversized vehicles, an accessible pad with a ramp and sidewalks, additional trash bins, and benches.
- Site 2 (Pullout Area, Mile Marker 26.5): A linear stripe would be placed to delineate the pull-off edge of the road, and curbs and drainage would be modified. The width of the pullout would be reduced, and areas of removed pavement would be revegetated. A curb and gutter would also be installed along the roadway to direct stormwater.
- Site 3 (Scoria Point, Mile Marker 26): Scoria Point is a relatively new wayside and kiosk that requires accessibility improvements to comply with the Architectural Barriers Act of 1968. The existing island at the wayside would be removed and paved to accommodate parking, and tree limbing and revegetation would occur at the edges of the parking area. Head-in parking, an accessible concrete pad, and a seat wall overlook would also be added.
- Site 4 (Pullout Area, Mile Marker 25.5): A linear stripe would be placed to delineate the pull-off edge of the road, and curbs and drainage would be modified. The curbline would be articulated to define the pullout area and reduce plow damage.
- Site 5 (Pullout Area, Mile Marker 25): A linear stripe would be placed to delineate the pull-off edge of the road, and curbs and drainage would be added. The curbline would be articulated to define the pullout area and reduce plow damage.
- Site 6 (Ridgeline Trail Pullout and Trailhead, Mile Marker 24.5): A linear stripe would be placed to delineate the pull-off edge of the road, and curbs and drainage would be added. The curbline would be articulated to define parallel parking stalls and reduce plow damage. Parallel parking in the pullout area would be retained, and a ramp with a sidewalk would be added to connect to the trailhead.
- Site 7 (Badlands Overlook, Mile Marker 24): The existing center island would be removed and paved to accommodate parking. Head-in parking with an accessible concrete pad and limestone seat wall overlook would be added, and the area would be revegetated with plants native to the park.
- Site 8 (Pullout Area, Mile Marker 23.5): The curbline would be articulated to delineate the pull-off edge of the road.
- Site 9 (Pullout Area East [Old East Entrance]): The existing pullout area would be modified to create a formalized trailhead and accessible parking with interpretive signage for the historic park entrance road. The design would modify the existing center island; add an

accessible concrete pad, ramp, and head-in parking; accommodate pull-through parking; and add sidewalks, two benches, and a trash receptacle.

2.3.6 Staging Areas

Staging areas under alternative 2 would be located on the existing road in the project area where conditions are safe to host staging activities and where these activities would not affect archeological, cultural, or potential tribal resources. The project area would remain closed to vehicular and pedestrian traffic during construction to make the road available for staging throughout the construction period, with minimal need for traffic management. During construction, the volume of construction vehicle traffic to, from, and through the project area and staging areas would be higher because of the amount of subgrade, removal of pipe culverts and old road material (e.g., plastic pipes, asphalt, gravel, rock, plastic mesh, pipe liners), and trucking associated with transporting new materials for the project.

2.4 STIPULATIONS AND MITIGATION

NPS places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, NPS would implement the following measures as part of the action alternative.

2.4.1 General

- Clearly state all resource protection measures in the construction specifications and instruct workers to avoid conducting activities outside the project area. Limit disturbances to roadsides, culvert areas, and other areas inside the project area. Clearly indicate areas of concern on construction drawings, such as historic culverts.
- Hold a preconstruction meeting to inform contractors about sensitive areas, including natural and cultural resources, and provide procedures for identifying and addressing any unanticipated discoveries.
- Delineate construction zones outside existing disturbed areas with flagging and confine all surface disturbance to the construction zone.
- Site staging and storage areas for construction vehicles, equipment, materials, and soils in previously disturbed or paved areas approved by NPS. These areas would be outside high visitor use areas and clearly identified in advance of construction.
- Require contractors to properly maintain construction equipment to minimize noise and do not allow construction vehicle engines to idle for extended periods.
- Remove all tools, equipment, barricades, signs, and surplus materials from the project area upon completion of the project.
- Only remove trees between November 1 and March 31 to avoid potential impacts to any roosting northern long-eared bat. Review records for known eagle nests and conduct surveys for nests in the vicinity of the project area, if needed. Develop additional mitigation measures to prevent impacts if these species are present (e.g., no tree removal within a half mile or 1 mile).

2.4.2 Cultural Resources

- Identify and delineate archeological or structural resources near the project area prior to project work. An archeologist who meets the Secretary of the Interior's professional

qualification standards would monitor specific areas of ground disturbance indicated by NPS cultural resources staff. A tribal cultural specialist identified through consultation with tribal partners would also be present to monitor ground-disturbing activities, particularly in areas within or adjacent to known archeological sites.

- Continue to coordinate with the North Dakota State Historic Preservation Office (North Dakota SHPO) throughout the course of the project if unknown cultural resources are discovered as a result of the actions associated with alternative 2.
- Stop all work on the project and contact the park's archeologist immediately if human remains are discovered during construction activities. As required by law, notify the coroner. Follow all provisions outlined in the Native American Graves Protection and Repatriation Act (1990).
- Follow stipulations provided in the draft memorandum of agreement between NPS and concurring parties to resolve adverse effects to the Scenic Loop Drive Historic District (historic district) and protect other historic properties.

2.4.3 Geology and Soils

- Avoid or minimize disturbance to soils as much as possible.
- Evaluate new or locally sourced topsoil for nonnative invasive plant infestations.
- Wash and inspect construction equipment to remove potential nonnative invasive plant seeds.
- Implement erosion control measures that provide for soil stability and prevent movement of soils during rain events (i.e., silt fences and tarps).
- Aerate any ground surface temporarily disturbed during construction and revegetate with native plants to reduce compaction and prevent erosion.
- Develop and adhere to a stormwater pollution prevention plan and project specifications for dust control measures within construction areas, including active haul roads and staging areas, and engage a qualified stormwater practitioner to ensure compliance.

2.4.4 Paleontological Resources

- Incorporate paleontological monitoring during ground-disturbing actions in areas known to contain sensitive paleontological resources.
- Take all necessary steps and immediately notify NPS paleontologists if concealed paleontological resources are encountered during construction. Implement paleontological mitigation measures, such as specimen collection, and minimize ground disturbance, where possible, where associated resources of scientific significance are found.

2.4.5 Visitor Use and Experience

- Inform visitors in advance of construction activities via multiple methods, including the park's website, various signs, and the visitor center. Have park staff available to address visitor questions during construction and provide regular updates to the public about project progress and any associated delays.
- Coordinate with the City of Medora and North Dakota Department of Transportation on installing appropriate signage regarding construction routes for public safety.
- Develop provisions for emergency vehicle access through construction zones.

- Develop a cohesive aesthetic treatment plan throughout the project area corridor where treatments, like retaining walls, are visible.

2.4.6 Water Resources

- Comply with and meet all relevant requirements under the Clean Water Act, including management of stormwater-related nonpoint source pollutants under the National Pollutant Discharge Elimination System.
- Implement best management practices for drainage and sediment control to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. These practices may include, but are not limited to, silt fencing, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas to minimize sedimentation and turbidity impacts as a result of construction activities. As much as practicable, do not use plastic materials. Leave erosion control measures in place at the completion of construction to avoid adverse impacts on water resources, after which time NPS staff would be responsible for maintenance and removal.
- Use qualified NPS staff or certified wetland scientists to identify and clearly mark wetlands before construction work. Perform construction activities with caution to prevent damage caused by equipment, erosion, siltation, or pollutant discharges.

2.5 ALTERNATIVES DISMISSED FROM FURTHER CONSIDERATION

2.5.1 Reconstruct South Unit Loop Road on a New Alignment

This alternative would abandon the existing section of Scenic Loop Drive in the project area and construct a new road with a new alignment. This alternative was dismissed from further consideration because the topography along the road severely limits the feasibility of a new alignment, it would convert a large section of the park to transportation use, and it would have significant adverse impacts on natural and cultural resources.

2.5.2 Resurface South Unit Loop Road

This alternative would not reconstruct the entire section of road in the project area but would repave the surface of the existing roadway, employing patches or local structural improvements where roadway failures have occurred. This alternative was dismissed because resurfacing the road, without complete reconstruction, would not resolve the geotechnical and structural issues of the subgrade and soils and would continue the current cycle of roadway deterioration and failure. Previous resurfacing attempts on Scenic Loop Drive, particularly multiple applications of thick patching in damaged areas, added weight to the road that contributed to failures.

SECTION 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

In this section, the NPS presents the existing conditions of resources in the project area, along with reasonably foreseeable environmental trends and planned actions for those resources. It also includes the beneficial and adverse impacts that may occur under the two alternatives carried forward for detailed analysis. Each impact topic briefly describes the methods and assumptions used to adequately assess potential impacts on the resource.

3.2 CULTURAL RESOURCES

3.2.1 Affected Environment

3.2.1.1 Built Environment

In 2001, Historical Research Associates (HRA) recommended Scenic Loop Drive as eligible for listing as a historic district in the NRHP under criteria A and C for its association with the development of the South Unit as a Recreation Demonstration Area (HRA 2001). Civilian Conservation Corps and Emergency Relief Agency crews implemented the planning, design, and construction of the road and its associated structures. The period of significance for the historic district is from 1934 to 1941, which is when the road and its associated structures (i.e., retaining walls and culverts) were constructed. HRA determined that approximately a 7-mile segment of Scenic Loop Drive between the Peaceful Valley intersection and the old East Entrance Station at mile marker 23.5 has sufficient integrity to be eligible.

HRA identified 38 historic Civilian Conservation Corps- and Emergency Relief Agency-constructed stone culvert headwalls and retaining walls associated with Scenic Loop Drive, from Peaceful Valley to the old East Entrance. HRA did not include most of the small culverts and other features as resources because of their small scale. However, most of these features would contribute to the significance of the historic district if they were constructed within the period of significance and retained integrity. Of the 38 HRA-identified headwalls and retaining walls, 8 headwalls and 2 retaining walls were identified as contributing structures in the historic district (**table 1**).

TABLE 1. CONTRIBUTING STRUCTURES IN THE SCENIC LOOP DRIVE HISTORIC DISTRICT

Structure	Description	Location (Mile Marker)
Culvert 7.95 (LR 27)	48-inch stone arch culvert and headwall	28
Culvert 8 (LR 24)	18-inch steel culvert with stone headwalls	27
Retaining Wall 8	90-foot-long retaining wall adjacent to Culvert 8	27
Retaining Wall 8.7 (LR 17)	63-foot-long stone retaining wall	26.7
Culvert 8.85 (LR 18)	25-inch steel culvert and stone headwall	26.55
Culvert 8.95 (LR 19 and LR 20)	24-inch concrete culvert and stone headwall/drainage system	26.45

Structure	Description	Location (Mile Marker)
Culvert 9.85 (LR 8)	18-inch steel culvert with stone headwall	25.35
Culvert 10.2 (32BI00541)	120-inch-wide stone culvert and wing walls	25
Culvert 11.9 (32BI00540)	74-inch stone arch culvert and wing walls	23.3
Culvert 12.0 (LR 2)	72-inch stone arch culvert and wing walls	23.2

Source: HRA 2001

In September 2021, WSP USA, Inc., conducted a survey of the built environment along Scenic Loop Drive (appendix A). Ten previously surveyed individual resources, the road itself, and associated components such as pullouts and overlooks in the historic district, designated by the North Dakota SHPO as number 32BI1196, were identified. These resources were included in the 2001 NRHP nomination for Scenic Loop Drive (HRA 2001). An additional 18 structures were mentioned in the 2001 NRHP nomination; however, they were not included in the resource count or narrative description. These 18 structures are listed in **table 2**.

The Badlands Overlook was constructed in 1939 after most of the road was completed and is considered contributing to the historic district; however, the Scoria Point overlook and a pullout near mile marker 26.5 were constructed well after the main road was completed and are thus not associated with the historic roadway.

Several non-contributing resources within the district were constructed after the period of significance, including metal guardrails, signage, prairie dog exclusion mesh, Architectural Barrier Act-compliant components, repaving, and culverts replaced with modern metal or plastic pipes, including inlets and outlets. Between 1942 and 1971 is considered a potential or additional period of significance, although studies indicate modifications to the road during that time were minimal and limited to repaving and repairs of minor road features, with no new features constructed.

TABLE 2. IDENTIFIED RESOURCES IN THE SCENIC LOOP DRIVE HISTORIC DISTRICT

SITS/ Architectural Feature #	Field No.	Type	Year Built	NRHP Eligibility (Contributing/ Not Contributing)
1	N/A	Historic road	1935-1941	Contributing
2	THRO LR2	Stone arch culvert	1936	Contributing, Individually NRHP eligible
3/32BI000540	THRO LR2.5	Stone arch culvert	1936	Contributing, Individually NRHP eligible
29/32BI00541	THRO LR3.5	Stone arch culvert	1936	Contributing, Individually NRHP eligible
4	THRO LR3	Corrugated metal pipe culvert	1936	Contributing

SITS/ Architectural Feature #	Field No.	Type	Year Built	NRHP Eligibility (Contributing/ Not Contributing)
5	THRO LR4	Corrugated metal pipe culvert	1936	Contributing
6	THRO LR8	Corrugated metal pipe culvert	1936	Contributing
7	THRO LR5	Corrugated metal pipe culvert	1936	Non-contributing
8	THRO LR 6	Corrugated metal pipe culvert	1936	Contributing
9	THRO LR7	Corrugated metal pipe culvert	1936	Contributing
10	THRO LR14	Plastic pipe culvert	1936	Contributing
11	THRO LR13	Corrugated metal pipe culvert	1936	Contributing
12	THRO LR12	Corrugated metal pipe culvert	1936	Contributing
13	THRO LR11	Concrete pipe culvert	1939	Contributing
14	THRO LR10	Concrete pipe culvert	1939	Contributing
15	THRO LR9	Concrete pipe culvert	1939	Contributing
16	THRO LR23	Corrugated metal pipe culvert	1939	Contributing
17	THRO LR22	Plastic pipe culvert	1939	Contributing
18	THRO LR21	Corrugated metal pipe culvert	1939	Contributing
19	THRO LR20	Stone retaining wall	1939	Contributing
20	THRO LR19	Corrugated metal pipe culvert	1939	Non-contributing
21	THRO LR18	Corrugated metal pipe culvert	1939	Non-contributing
22	THRO LR17	Stone retaining wall	1939	Contributing
23	THRO LR16	Corrugated metal pipe culvert	1939	Contributing
24	THRO LR15	Triple corrugated metal pipe culvert	1939	Contributing
25	THRO LR24	Corrugated metal pipe culvert	1939	Contributing
26	THRO LR25	Corrugated metal pipe culvert	1939	Contributing
27	THRO LR26	Corrugated metal pipe culvert	1939	Contributing
28	THRO LR27	Stone arch culvert	1936	Contributing, Individually NRHP eligible

Note: SITS – Smithsonian Institution Trinomial System
Source: WSP USA, Inc. 2021

3.2.1.2 Archeology

In 1988, the University of North Dakota and NPS conducted an archeological survey of Scenic Loop Drive (Kuehn 1988). In July and September 2021, Golder Associates, Inc., conducted an archeological survey of portions of the road for this project. Three previously unrecorded resources were identified within the project area during the most recent surveys (**table 3**). They include one prehistoric lithic scatter site (32BI1195), one historical isolated find (32BIX1017), and one prehistoric isolated find (32BIX1018). Through consultation with tribal partners and the North Dakota SHPO, it was determined that evaluative testing of 32BI1195 was needed to assess the horizontal and vertical extent of cultural materials and to determine if construction design should be modified to avoid or minimize ground disturbance within the site boundaries.

TABLE 3. ARCHEOLOGICAL RESOURCES IN THE PROJECT AREA

SITS Number	Description	NRHP Eligibility	Recommendations
32BI1195	Prehistoric lithic scatter	Eligible; portion of site within area of potential effects does not contribute to eligibility	Monitoring during construction
32BIX1017	Historical isolated find (bottle base)	Not eligible	None
32BIX1018	Prehistoric isolated find (flake)	Not eligible	None

Notes: SITS – Smithsonian Institution Trinomial System. Note: The "X" in "32BIX1017" and "32BIX1018" indicates that the SITS Number is not yet considered final and is commonly used for isolated finds.
Source: Golder Associates, Inc. 2021a

In October 2021, Golder Associates, Inc., performed subsurface testing on 32BI1195 and recovered several dozen artifacts. In consultation with the North Dakota SHPO and tribal partners, the overall site was determined eligible for the NRHP under criterion D. However, intensive surface reconnaissance and subsurface testing only identified a single artifact within the project area, which has also been extensively disturbed by construction of the road and prairie dog activity. Therefore, the portion of the site where future construction may occur was determined not eligible for the NRHP. Because of the sensitive nature of archeological site information, detailed summaries regarding these resources are not provided in this EA. The cultural resources are protected by various federal regulations, including the NHPA and the Archeological Resources Protection Act of 1979.

3.2.1.3 Trends and Planned Actions

NPS's Cultural Resources Climate Change Strategy establishes goals to preserve and maintain cultural resources as the climate continues to warm. Rising temperatures expedite crystallization of efflorescent salts from increased evaporation rates, which could lead to higher rates of structural cracking and deterioration of the existing culverts and retaining walls in the project area (NPS 2016).

Moisture absorption in brick and porous stone structures from the potential increase of intense rainfall events may lead to frost damage, mold growth, and stress from the salt crystallization (NPS 2016; USEPA 2016). Surface cracking, flaking, and sugaring (i.e., surface disintegration) of these structures and spalling (i.e., peeling away) of stone could also occur as a result of worsening freeze-thaw cycles. If wildfires become more frequent in the park because of warming temperatures or human-caused activity, cracking and other physical damage to masonry components from thermal

stress and discoloration caused by smoke and/or extreme heat may occur. However, the potential impacts on masonry from wildfire could be mitigated through roadside vegetation management.

NPS actions that occur in the project area include updating databases for known cultural resources, conducting archeological surveys, and consulting regularly with tribal partners and academic institutions to better understand and monitor these resources in the park. The park also responds to climate change impacts on cultural resources by reducing fuel loading on sensitive resources and monitoring cultural resource locations during and after fires.

3.2.2 Environmental Consequences

3.2.2.1 Methods and Assumptions

Short-term impacts on historic properties within the historic district are analyzed quantitatively by calculating the number of contributing features that would be lost through actions such as reconstruction or replacement of culverts to improve stormwater drainage. The status of those resources that are affected to the extent that they no longer contribute to the significance of the historic district is changed to non-contributing. The number of contributing properties remaining in the historic district are compared to the original number to determine the overall impact to the historic district. The location of the non-contributing resources are also noted to determine whether the impact is widespread or localized. Long-term impacts from a lack of maintenance are analyzed in the same way.

The qualitative analysis assesses the level of integrity loss and its relation to the criterion under which the historic district is considered eligible. The historic district is eligible under criteria A and C for its association with development of the South Unit as a Recreation Demonstration Area between 1934 and 1941. Key aspects of integrity under criterion A are setting, feeling, and association and design; under criterion C, key aspects are workmanship and materials. Different aspects of integrity are critical to the eligibility of the resource depending on the significance of the historic district.

Section 106 of the NHPA and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on historic properties eligible for, or listed in, the NRHP. Any impact to contributing structures, buildings, objects, or sites within the historic district would be subject to review under section 106. An assessment of effects was completed separately under section 106 consultation, which determined the project would have an adverse effect to the historic district and no adverse effect to any other historic properties. Adverse impacts on historic properties would be avoided, minimized, or mitigated, per the draft memorandum of agreement (appendix B) among concurring parties.

3.2.2.2 Alternative 1 (No Action)

Built Environment

Under alternative 1, management of cultural resources would follow NPS *Management Policies 2006* and *Cultural Resource Management Guidelines* (NPS 2006, NPS 1998). Current management of the project area (i.e., approximately 6.15 miles of Scenic Loop Drive) would continue under alternative 1. Inadequate drainage would exacerbate erosion, further damaging the historic roadway and culverts that are partially or wholly silted-in. While the historic culverts would remain unchanged, continued erosion and sedimentation could damage those structures in areas with inadequate drainage. Erosion could also increase the risk of additional roadway failures. As a result of deterioration of the roadway and impacts on contributing properties, alternative 1 would have long-term, adverse impacts on the built environment.

Archeology

Current management of the road would have no impact on archeological resources because the roadway adjacent to where archeological resources are present would remain unchanged. In the long-term, it is foreseeable that natural forces would adversely affect known archeological sites, such as lithic scatter site 32BI1195.

3.2.2.3 Alternative 2 (Proposed Action and Preferred Alternative)

Built Environment

Alternative 2 would adversely affect the historic district, 32BI1196. The approximately 6.15 miles of historic roadway in the project area would be substantially reconstructed and stabilized with modern roadway features such as retaining walls, curbing, and drainage intakes that would adversely impact the historic district's design, workmanship, and feeling. Furthermore, the entire roadway would require excavation along the alignment of the existing pipes. The headwalls and associated mortar and stone would be removed along with the existing pipe, new inlets and outlets would be constructed, concrete pipe would be installed, the headwalls would be restored, and the roadway would be reconstructed as the last step in the construction process.

Twenty-three contributing culverts within the historic district would be impacted by alternative 2. Five contributing culverts (Feature Nos. 9, 16-18, and 26) would require upsizing of culvert pipes and reassembly of stone headwalls that would adversely affect the design, workmanship, and materials of these individual resources and the historic district as a whole. Feature Nos. 10, 24, and 25 would be adversely affected because each site would be redesigned with new pipes to provide proper drainage. Adverse impacts on 11 culverts (Feature Nos. 4-6, 8, 11-14, 15, 23 and 27) would be minimized by replacing culverts with the same size pipe, pipe alignment, and intakes/outlets as the original culvert pipe. Depending on their condition, the stone headwalls would be rehabilitated or repaired according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, which would also minimize adverse impacts.

Alternative 2 would have beneficial impacts on four stone arch culverts (Feature Nos. 2, 3, 28, and 29) because work would be conducted to reestablish the channel, clear sediment that has built up in the culverts, and repair headwalls where mortar has been damaged. Hydrological modeling and condition assessments for the project indicate that the surrounding topography, historical construction, and decades of subsequent use that these features are in locations where existing structures would accommodate anticipated precipitation, provided these structures receive maintenance to address siltation and remove vegetation. This work would improve water flow through the culverts and prevent further silting at each site, which would result in the long-term preservation of these structures.

The project would not affect two contributing retaining walls (Feature Nos. 19 and 22) because drainage improvements are not required at these locations. The park would coordinate with roadway construction personnel to avoid impacts on Architectural Feature No. 19, a stone retaining wall.

The historic roadway would continue to contribute to the historic district despite the proposed elements of alternative 2, because the main alignment of the road would not change, and repairs to the road and associated culverts would make the road functional again. Reconstruction of the existing road would not adversely affect the visual quality of the historic district. The historic intent of the road is to provide scenic vistas and views of the landscape, which would remain intact and alternative 2 would restore visitor access to these vistas and views. However, introduction of modern elements along the road such as drainage inlets, curbing, and retaining walls would adversely affect the design and setting of the resource. New structures installed during project implementation would resemble the existing landscape in color and geological form, with vegetation planted where

appropriate, to minimize disturbance to cultural resources, specifically reducing the potential visual intrusion to the historic district.

Archeology

Alternative 2 would not adversely impact the lithic scatter at site 32BI1195. The site was subjected to subsurface testing to determine the potential for further research and eligibility to the NRHP. The portion of the site within the project's area of potential effects was determined not eligible for listing in the NRHP because extensive surface reconnaissance and subsurface testing found a lack of cultural materials (limited to a single piece of flaked stone) and evidence of extensive disturbance associated with construction of the road, pullout area, and decades of prairie dogs mixing the soils. Therefore, alternative 2 would not have an adverse impact on the site. Other known archeological resources located near the western pullout area—which are limited to isolated finds and are not eligible for listing in the NRHP—are not within the limits of the project area.

3.3 GEOLOGY AND SOILS

3.3.1 Affected Environment

The badlands in the park are an intermittently barren landscape with juniper (*Juniperus spp.*) on the northern slopes, ash (*Fraxinus spp.*) in the valleys, and cottonwood (*Populus spp.*) stands along river corridors. The badlands were formed and continue to be re-formed by the ongoing water and wind erosion of sedimentary rocks (i.e., sandstone, siltstone, and claystone) formed from deposits of sand, silt, mud, and layers of volcanic ash (NPS 2015b). Seams of lignite coal are also present in many areas of these badlands, including along Scenic Loop Drive. These coal seams formed from dying and decaying trees and other plants in prehistoric swamps. When streams in the area changed course, they buried partially decomposed vegetation (i.e., peat) beneath layers of silt and clay. Over time, the weight of the overlying sediment compressed the peat to lignite coal (Bluemle 2014). Lignite coal is present in the Bullion Creek and Sentinel Butte Formations and in eroded sediments. This lignite has a high moisture content, is porous, and acts as a pathway for water to seep into soils, increasing soil moisture (NPS 2015b).

Sediments in or near the project area are deposited in a dynamic system containing rivers, streams, ponds, and swamps. According to the Natural Resources Conservation Service (NRCS), the project area comprises 13 different soil map units (**figure 9, table 4**). Most of this area consists of the Cabbart, Patent, Kirby, and Lonna soil series (NRCS 2021). These soils are calcareous (i.e., abundant in calcium) and are described briefly below.

- The Cabbart soil series consists of shallow, well-drained soils with moderate permeability. They were formed in material derived from semi-consolidated loamy sedimentary beds and are typically found on ridges and escarpments.
- The Patent soil series consists of very deep, well-drained soils with moderate permeability. They were formed in alluvium and are typically found across alluvial fans and swales.
- The Kirby soil series consists of very deep, excessively drained soils with rapid permeability. They were formed in alluvium, colluvium, or residuum derived from porcellanite. They are typically found on hills and ridges.
- The Lonna soil series consists of very deep, well-drained soils with moderate permeability. They were formed in alluvium derived from semi-consolidated loamy sedimentary beds, similar to the Cabbart series. They are typically found across alluvial fans and stream terraces (NRCS 2005).

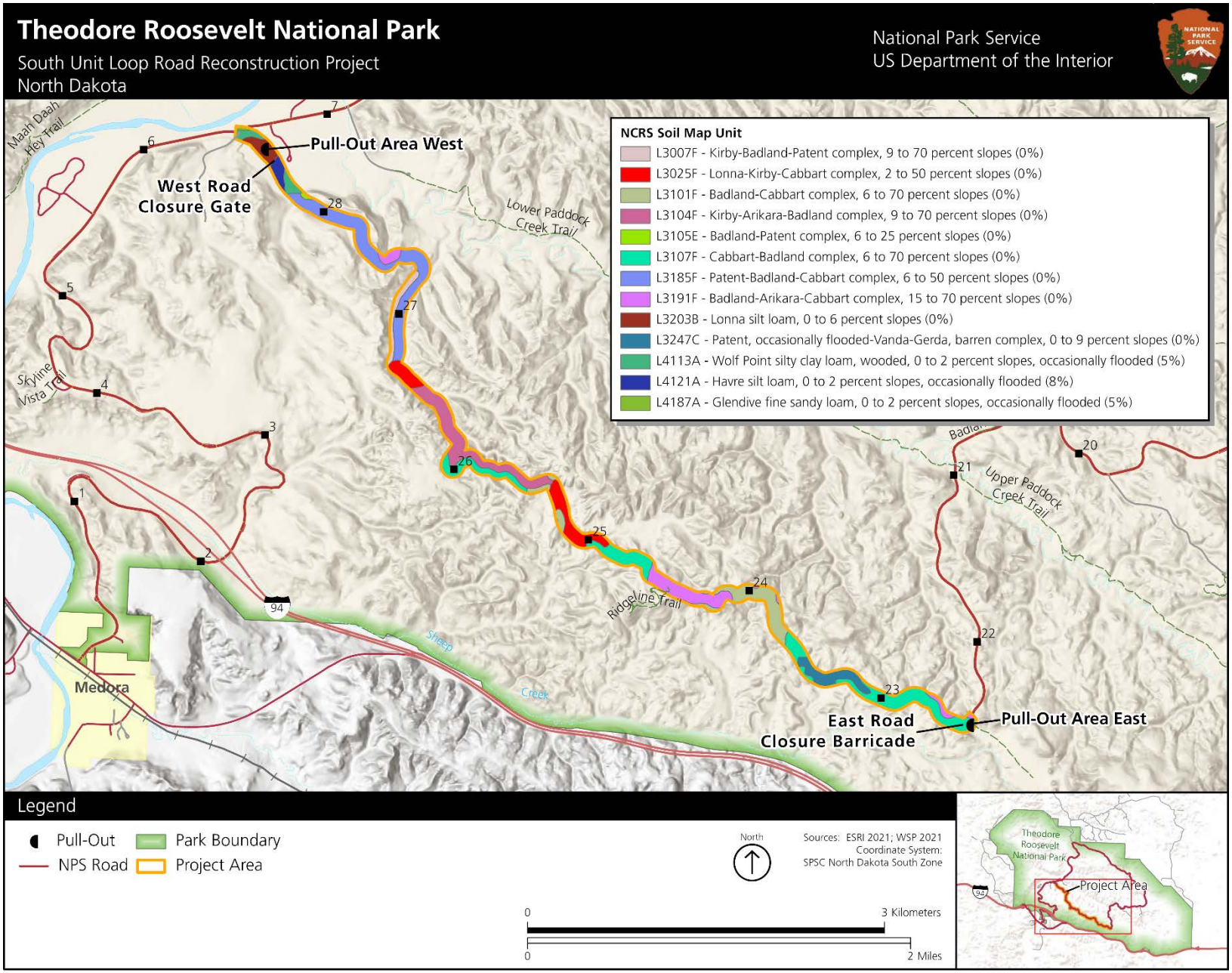

FIGURE 9. SOIL RESOURCES IN THE PROJECT AREA

TABLE 4. SOIL MAP UNITS IN THE PROJECT AREA

Map Unit Symbol	Map Unit Name	K-Factor	Acres of Project Area	Percent of Project Area
L3107F	Cabbart-Badland complex, 6 to 70 percent slopes	0.32	69.4	23.10%
L3185F	Patent-Badland-Cabbart complex, 6 to 50 percent slopes	0.37	55.4	18.40%
L3104F	Kirby-Arikara-Badland complex, 9 to 70 percent slopes	0.10	38.8	12.90%
L3101F	Badland-Cabbart complex, 6 to 70 percent slopes	0.55	31.2	10.40%
L3191F	Badland-Arikara-Cabbart complex, 15 to 70 percent slopes	N/A	29.6	9.80%
L3025F	Lonna-Kirby-Cabbart complex, 2 to 50 percent slopes	0.32	27.8	9.20%
L3247C	Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes	0.24	15.1	5.00%
L3007F	Kirby-Badland-Patent complex, 9 to 70 percent slopes	0.10	8.6	2.90%
L3203B	Lonna silt loam, 0 to 6 percent slopes	0.37	8.8	2.90%
L4113A	Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded	0.32	8.1	2.70%
L4121A	Havre silt loam, 0 to 2 percent slopes, occasionally flooded	0.43	5.6	1.90%
L3105E	Badland-Patent complex, 6 to 25 percent slopes	0.55	1.3	0.40%
L4187A	Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded	0.20	0.9	0.30%
	Totals or Average for Project Area	**0.32**	**300.6**	**100.00%**

Source: NRCS 2021

NRCS has identified K-factors, which describe soil susceptibility to erosion and the rate of runoff, for each soil type listed above. These factors can range from 0.02 (low) to 0.69 (high). Soils with a low K-factor are susceptible to erosion but have a low runoff rate. Soils with a median K-factor are moderately susceptible to erosion and have a moderate runoff rate. Soils with a high K-factor are the most erodible and have a high rate of runoff. The locations where road failures have occurred in the project area are found on the Badland-Arikara-Cabbart complex, a map unit for which NRCS does not have a K-factor established. However, these locations are less than 50 feet from the Badland-

Cabbart (L3101F) and Cabbart-Badland (L3107F) complexes, which have K-factors of 0.55 and 0.32, respectively, indicating moderate to high erosion and runoff rates.

NRCS has rated each of these soil map units as "very limited" for the construction of roads, which indicates that the soil has one or more features that are unfavorable for this use (appendix C). These limitations generally cannot be overcome without major soil reclamation, special design, or particular installation procedures for infrastructure. Poor performance and high maintenance are typically expected for roads constructed on these soil map units (NRCS 2021). Poor performance of soils in the project area is evident where landslides of various magnitudes have affected the roadway, and pavement is cracking and crumbling. Past road construction, road resurfacing, and development for pullouts have also disturbed native soils in the project area and decreased soil stability and increased erosion over time.

3.3.1.1 Trends and Planned Actions

As the impacts of climate change become more apparent, soil conditions could change. Higher intensity and more frequent rainfall may lead to more erosion on susceptible soils along Scenic Loop Drive and an increase in runoff when soils reach saturation levels (USEPA 2016). With rainfall amounts potentially increasing, erosion and runoff levels may increase at a greater rate (Nearing et al. 2004). NPS intermittently conducts research and sampling of soil resources in the project area, which is anticipated to continue in the future.

3.3.2 Environmental Consequences

3.3.2.1 Methods and Assumptions

This section describes the potential impacts on geology and soils from implementation of the alternatives developed for reconstructing portions of Scenic Loop Drive in the South Unit of the park, including the no-action alternative and the proposed action/preferred alternative. Impacts are quantitatively analyzed by calculating the amount of excavated soils within the project area. The analysis also qualitatively focuses on the likelihood of landslides, erosion, and sedimentation. The following discussion describes the impacts that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action/preferred alternative.

3.3.2.2 Alternative 1 (No Action)

Under alternative 1, geology and soils would not be altered from existing conditions. Geology and soils in the project area would continue to be subject to landslides of various magnitudes. Poor subgrade materials would continue to affect the structural integrity of the road, potentially leading to additional roadway failures along Scenic Loop Drive. Sedimentation and lack of adequate stormwater drainage would continue to adversely affect the visual quality of geology and soils in the project area because erosion and landslides would continue to expose soils and geologic formations. No attempt would be made to repair the existing roadway within the project area, so roadway equipment and tools would not be used. No mitigation measures would be implemented because vehicular and pedestrian access to the project area would remain closed, and the road would not be reconstructed.

3.3.2.3 Alternative 2 (Proposed Action and Preferred Alternative)

Alternative 2 would include implementation of structural improvements in the project area to stabilize soils, reduce landslide hazards, and promote roadway resilience. The current proposed design for alternative 2 includes the installation of approximately seven lagging/retaining walls that would stabilize soils where landslides are occurring or are anticipated to occur due to the erosion potential of underlain soils. Soils with moderate to high erosion and runoff rates exist where roadway failures have occurred in the project area.

During construction, increased disturbance, exposure, and excavation would adversely affect geology and soils in the project area in the short-term. Approximately 35,000 cubic yards of soil would be permanently excavated and replaced, and options to use or store this displaced soil are being examined. However, following the completion of construction, the stability of geological features and soils in the project area would be improved because soils would be reinforced with geosynthetic materials as part of the roadway design and backfilled with granular material, resulting in long-term, beneficial impacts.

New impervious surfaces (i.e., repaired roadways and pullouts) and the use of construction equipment could have a long-term, adverse impact on geology and soils from soil compaction. Construction may require benching for equipment, placement of riprap, and the installation of long pipe outfalls to divert stormwater. This disturbance may extend outside the roadway corridor in some areas. However, installing adequate stormwater drainage under alternative 2 would minimize areas contributing to surface runoff and erosion throughout the project area, which would stabilize geology and soils and have a long-term, beneficial impact.

The proposed reconstruction of the existing road would maintain a permanent feature on the landscape. Alternative 2 would be implemented in areas where the presence of the road has already altered geology and soils and would not represent a noticeable departure from historic visual conditions.

Mitigation measures for soils associated with alternative 2 would include erosion control techniques that provide for soil stability and prevent movement of soils during rain events (i.e., silt fences and tarps), dust control measures, and implementation of a stormwater pollution prevention plan. Furthermore, ground surfaces disturbed during construction would be aerated and revegetated with native plants to reduce compaction, prevent erosion, and increase soil stability through implementation of a revegetation plan.

3.4 PALEONTOLOGICAL RESOURCES

3.4.1 Affected Environment

Paleontological resources, or fossils, along with the sedimentary units in which they are preserved, provide evidence of the history of life in the North American western interior. The project area is in the Williston Basin in western North Dakota, which is a large structural basin that contains Cambrian through Quaternary-aged geologic units (Gerhard 1982). The Williston Basin has been the subject of extensive research because of the high oil and gas production from the strata contained within it. It occupies most of North Dakota, parts of South Dakota, Montana, and a portion of Saskatchewan, Canada.

3.4.1.1 Geologic Map and Literature Review

As mentioned above in the "Geology and Soils" section, the project area is underlain by two bedrock sedimentary geologic units, the Bullion Creek Formation and the Sentinel Butte Formation of the Fort Union Group. These geologic units are summarized in **table 5**. Additionally, six Holocene and Pleistocene-age surficial deposits occur within the project area, consisting of engineered artificial fill, modern alluvial deposits, alluvial fan deposits, mantled pediment deposits, older alluvial deposits, and landslide deposits.

The Bureau of Land Management's Potential Fossil Yield Classification System (PFYC) defines paleontological potential based on a numeric ranking system, from 1 (very low potential) to 5 (very high potential) (BLM 2016). The PFYC uses an assessment of rock type and records of fossil discovery to create a database for all lands, not just those managed by the Bureau of Land Management. These data are made available for all interested parties. According to this system, the

Bullion Creek and Sentinel Butte Formations have high paleontological potential (PFYC 4), and the Holocene to Pleistocene-age surficial deposits have low paleontological potential (PFYC 2).

TABLE 5. GEOLOGIC UNITS IN THE PROJECT AREA

Geologic Unit Name	Map Unit Abbreviation	Common Fossils	Age	PFYC	Acres (Half-Mile Area)
Engineered Fill	Qef	Too young to contain *in-situ* fossils	Holocene	PFYC 2	14.82
Modern Alluvial Deposits	Qal	Too young to contain *in-situ* fossils	Holocene	PFYC 2	234.74
Alluvial Fan Deposits	Qf2	Too young to contain *in-situ* fossils	Holocene	PFYC 2	10.81
Mantled Pediment Deposits	Qmp	Too young to contain *in-situ* fossils	Holocene	PFYC 2	92.05
Older Alluvial Deposits	Qoal	Too young to contain *in-situ* fossils	Holocene	PFYC 2	72.64
Landslide Deposits	Qls	Deposition of landslide deposits are not conducive to preserving fossils	Holocene and Pleistocene	PFYC 2	12.77
Sentinel Butte Formation including HT Butte Clinker, and Unnamed Clinker Beds	Tsb, Tsbc, Tsbck	Champsosaurs, turtles, crocodiles, fish, invertebrates, plants	Paleocene	PFYC 4	1172.96
Bullion Creek Formation	Tbc	Champsosaurs, alligator, turtles, invertebrates, plants, trace fossils	Paleocene	PFYC 4	707.3

Source: Gonzalez 2003

3.4.1.2 Record Search

Based on data provided by NPS, four fossil localities in the project area were previously documented—one from the Bullion Creek Formation consisting of non-significant invertebrates, and three from the Sentinel Butte Formation that are considered significant and were collected (**table 6**). Significance is determined by how well fossils are preserved to permit identification to a low taxonomic level (i.e., cellular structure or other features such as distinctive bark that is clearly visible). Additionally, 14 localities in the project area are from both the Bullion Creek and Sentinel Butte Formations, including significant fossils that were collected consisting of turtles, fish, crocodile, and champsosaur (an extinct crocodile-like reptile).

TABLE 6. PREVIOUSLY RECORDED FOSSIL LOCALITIES

Locality Number	Data Provided By	Fossils	Age	Formation	Collected?
TRS21_050	NPS	Bivalves and gastropods	Paleocene	Bullion Creek	N – not significant
TRS20-041	NPS	Reptile long bone	Paleocene	Sentinel Butte	Y – significant
TRS20-042	NPS	Fish vertebra	Paleocene	Sentinel Butte	Y – significant
TRS20-042b	NPS	Fish vertebra	Paleocene	Sentinel Butte	Y – significant

3.4.1.3 Field Assessment Summary

Two new significant fossil localities and five new non-significant fossil occurrences were discovered during a paleontological field survey in September 2021 (**table 7**). The two significant fossil localities, which consist of well-preserved plants from the Sentinel Butte Formation and crocodile and turtle fossils from the Sentinel Butte Formation, were collected (**table 8**). Non-significant fossils, such as petrified wood from this formation, were not collected because they are common and are already well represented in museum collections. Furthermore, the science of identifying a species of plant based on wood, for example, is not well developed, and only a few paleobotanists in the United States focus on fossil wood.

TABLE 7. SUMMARY OF SIGNIFICANT FOSSIL LOCALITIES AND NON-SIGNIFICANT FOSSIL OCCURRENCES DISCOVERED DURING THE SCENIC LOOP DRIVE SURVEY

ID	Significance	Collected?	Formation
Gastropoda undet. – 10+ shell fragments Bivalvia undet. – 100+ shell fragments	Non-Significant	No	Bullion Creek
Bivalvia undet. – 10 to 15+ shell fragments	Non-Significant	No	Bullion Creek
Plantae undet. – +50 plant impressions along bedding plane	Non-Significant	No	Sentinel Butte
Plantae undet. – petrified wood, hundreds of fragments from pebble size to boulder sized	Non-Significant	No	Sentinel Butte
Bivalvia undet. – 100+ shell fragments; Gastropoda undet. – 100+ shell fragments	Non-Significant	No	Sentinel Butte
Crocodilia undet. – 15 to 20 bone and scute fragments; Testudines undet. – shell fragments	Significant	Yes – Surface Collection	Sentinel Butte
Plantae undet. – 5 to 6 seed pods and 5 to 10 leaf impressions	Significant	Yes – Surface Collection	Sentinel Butte

TABLE 8. INVENTORY OF FOSSILS COLLECTED

NPS Catalogue Number	Taxon ID	Description
7912	*Nyssidium arcticum*	Fruit (contains small winged seeds)
7913	*Nyssidium arcticum*	Fruit (contains small winged seeds)
7911	*Porosia verrucose*	Seed or leaf of an aquatic angiosperm
7914	*Porosia verrucose*	Seed or leaf of an aquatic angiosperm
7915	*Porosia verrucose*	Seed or leaf of an aquatic angiosperm
7916	*Porosia verrucose*	Seed or leaf of an aquatic angiosperm
7917	*Porosia verrucose*	Seed or leaf of an aquatic angiosperm
No #	Angiospermopsida	Poorly preserved leaves and plant frags (4)
7904	cf. Trionychoidea	Claw (ungual)
7905	cf. Aves	Proximal ulna
7906	cf. Reptilia	Proximal phalanx
7907	cf. Reptilia	Phalanx fragment
7908	Testudines (mixed)	Approximately 98 shell fragments
7909	cf. Trionychoidea	Distal lateral hypoplastral processes (3)

Source: Paleo Solutions, Inc. 2021

3.4.1.4 Trends and Planned Actions

Climate change is projected to change the ecosystems in the park at rates that are unprecedented for millions of years. Robust climate data will be fundamental to interpreting the fossil record in the future. Developing a methodology for interpreting the extensive biotic datasets provided through paleontological records will also be key. It will be important to examine fossils with different ecologies to better understand the morphological changes and linkages to environmental drivers, and their sensitivities to these drivers (Schmidt 2018).

The park routinely processes categorical exclusions for paleontological resource collection in the park, including in the project area. The park also partners with paleontologists at the NPS Geological Resources Division to conduct field and laboratory studies, develop and address important research questions, curate collections, and provide important reporting and interpretive materials for long-term understanding of these important resources.

3.4.2 Environmental Consequences

3.4.2.1 Methods and Assumptions

The project area is surrounded by moderately to highly fossiliferous strata (i.e., layers of fossil-containing rock) and is mostly underlain by the Sentinel Butte Formation or Bullion Creek

Formation, which are both fossiliferous and contain important Paleocene vertebrate fauna. The analysis qualitatively considers potential changes and impacts to paleontological resources and these formations via changes to existing geological landforms, which could affect undiscovered fossils in the project area.

3.4.2.2 Alternative 1 (No Action)

Under alternative 1, continued erosion and landslides may lead to the exposure and instability of undiscovered paleontological resources in the project area; however, impacts would be minimal and unlikely to affect bedrock. Standing water, poor drainage, and sink holes also have the potential to impact undiscovered paleontological resources because of freeze-thaw cycles and the increased potential for fracturing. These impacts would be localized because the project area is approximately 300 acres in size compared to the 70,447 acres park-wide that support paleontological resources. Paleontological resources discovered within the project area to date have been collected and would not be affected under alternative 1. Newly discovered paleontological resources would continue to be collected, if found, under alternative 1.

3.4.2.3 Alternative 2 (Proposed Action and Preferred Alternative)

Road reconstruction, slope stabilization, and drainage improvements could disturb non-renewable paleontological resources in the project area, while excavation activities could lead to the disturbance or loss of fossils. If disturbance and/or loss occurs, there would be a long-term, adverse impact from the loss of individual fossils. Construction monitoring performed by a qualified paleontologist would reduce the potential for adverse impacts. To help protect the context and integrity of paleontological resources in the project area, FHWA-CFLHD approved engineering fill used for slope stabilization and roadway reconstruction would be obtained from an off-site source that has been determined to be free of fossils to prevent new fossils from being introduced that are not in context with the park.

To stabilize the banks along Scenic Loop Drive where continual erosion has been problematic, the roadway embankment would be graded to more gradual slopes that support vegetation. As noted above, structural engineering fill would be used, and options to use or store displaced soil are being examined. This grading and changes to the slope could impact existing geologic formations between the bottom of the slope and the roadway. These geologic landforms may contain paleontological resources and contribute to the park feeling and visual setting as visitors drive the road. Project engineers would seek to minimize impacts during detailed design by delineating landforms on the project plans and requiring contractors to avoid or minimize ground disturbance in areas likely to contain paleontological resources. Furthermore, a paleontologist would monitor the project area during construction and collect any specimens found. In the context of the landforms in the larger park setting of the South Unit, adverse impacts to existing paleontological resources are expected to be minimal.

3.5 VISITOR USE AND EXPERIENCE

3.5.1 Affected Environment

The mission of NPS is to preserve unimpaired natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. It is a fundamental purpose of all parks that NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks (NPS 2006).

The park is one of the top tourist destinations in the state, with approximately 97% of the park in natural or near-natural condition. Visitors to the park report wildlife viewing and the natural landscape as the two most important factors of their park visit (NPS 2020a). Scenic Loop Drive

provides visitors and recreationists, including those in motor vehicles, recreational vehicles, and on bicycles with access to several scenic overlooks and trails in the park's South Unit, as well as access to wildlife-viewing areas, ranger-led activities, and campgrounds (NPS 2021c). Scenic Loop Drive spans 35 miles and includes a portion of East River Road. Scenic Loop Drive is the most heavily used road in the park, with most visitation occurring between June and August (NPS 2020a, NPS 2021c). Traffic counts show a steady increase in use over time, with 2021 data showing the highest number of vehicles traveling Scenic Loop Drive to date (NPS 2021g).

Current visitor use in the park's South Unit is limited by the closure of Scenic Loop Drive between mile markers 22 and 28. Although most of the roadway is still open, visitors cannot experience the scenic route as a loop, as intended. Visitors now must backtrack and drive 22.5 miles from the park entrance and the same 22.5 miles out. This creates a longer drive time, higher risk of traffic congestion at vehicle pullouts, and increased likelihood of seeing other vehicles along the roadway. Visitors have reported that only seeing one to two vehicles during their visit significantly increases the quality of their experience (NPS 2020a). The poor roadway condition in the project area, which can cause visual impacts and less-comfortable driving conditions, also affect visitor experience. Despite the partial road closure, increases in visitation have intensified traffic. However, heavy equipment and construction-related traffic is limited within the park.

Ridgeline Nature Trail, the only out-and-back trail in the project area, is currently inaccessible to visitors because of the road closure. No other designated trailheads exist in the project area.

Because Scenic Loop Drive in the project area is currently unstable, inaccessible, and unsafe, the park has been unable to provide visitor services there since 2019. Safety concerns remain an issue for visitors and park staff because of the continued deterioration of the pavement and existing landslides. Emergency access has also been reduced as a result of the increased traffic throughout the open portion of the road and lack of access to the far end of the road.

3.5.1.1 Trends and Planned Actions

Since 1992, visitor use data show that Scenic Loop Drive has seen a steady increase in vehicular traffic of roughly 2,175 vehicles per year. Prior to the closure of Scenic Loop Drive between mile markers 22 and 28, the highest amount of traffic on the road to date occurred in 2018 (116,454 vehicles). There was a slight drop in overall traffic in 2019 (112,634 vehicles) and 2020 (100,646 vehicles), which can be explained by the closure of Scenic Loop Drive and the COVID-19 pandemic. As of August 2021, 87,736 vehicles traveled Scenic Loop Drive, which puts 2021 on track to receive the highest vehicle visitation to date (NPS 2021g). Despite 2019 and 2020 not following historic trends, an increase in traffic and visitation is anticipated to continue in future years, based on the 2021 statistics for vehicles entering the park.

Between 2016 and 2019, the park welcomed between 698,236 and 760,458 visitors each year. In 2020, the park had 551,303 visitors, despite being closed for several months due to the COVID-19 pandemic (NPS 2020b). These data show that recreational use of the park is consistently trending upward, with visitation expected to continue to increase. The 2020 Visitor Use and Associated Thresholds Study reports that visitors experienced slightly more crowding in 2017 compared to 2001, with key areas of crowding including roadside pullouts by prairie dog towns and along Scenic Loop Drive (NPS 2020a).

The NPS Social Science Program will continue to coordinate the collection of visitor statistics for the park in future years. Official statistics are traditionally reported during the first few months of a new year.

3.5.2 Environmental Consequences

3.5.2.1 Methods and Assumptions

This section describes the alternatives developed for reconstructing portions of Scenic Loop Drive in the South Unit of the park and their potential impact on visitor use and experience. The analysis qualitatively focuses on public access and safety, viewscapes, and soundscapes.

3.5.2.2 Alternative 1 (No Action)

Under alternative 1, visitor use and experience would remain unchanged. Vehicular and pedestrian access to the project area would remain closed because of the existing roadway failures and the potential for future failures that threaten the safety of park visitors. The poor physical condition of the project area along Scenic Loop Drive and the potential for landslides would continue to adversely affect the visitor experience. Visitors would still have access to nearly 22.5 miles of Scenic Loop Drive under alternative 1, as well as other roads in the park. However, visitor experience would continue to be adversely impacted because visitors would not be able to experience the scenic route as a loop, as intended. If visitation trends continue upward, as expected, congestion and traffic would also continue to adversely impact the visitor experience and be exacerbated by visitors having to backtrack to the park entrance via the same route they used to enter the park.

Under alternative 1, visitors would continue to be unable to enter the project area on foot to access Ridgeline Nature Trail, the only designated trail in the project area. No construction equipment or tools would be used under this alternative, creating no visual or auditory impacts for visitors to experience. Alternative 1 would continue to have an overall long-term, adverse impact on visitor use and experience.

3.5.2.3 Alternative 2 (Proposed Action and Preferred Alternative)

Alternative 2 would address multiple roadway problem areas along Scenic Loop Drive by reconstructing approximately 6.15 miles of road from mile marker 22 to mile marker 28 for longevity and resilience, allowing it to be reopened to visitors. Reconstructing a portion of Scenic Loop Drive would improve visitor access to the area and enhance the overall visitor experience by improving access throughout the South Unit of the park and returning the scenic route to a 35-mile loop, as intended. This alternative would also eliminate unstable, inaccessible, and unsafe road conditions, thus improving visitor safety and having a beneficial impact on the visitor experience. The pullout areas would be expanded slightly, which would give visitors increased and safer opportunities to view the landscape and rest. Parking stalls would be delineated at the pullouts, and some additional parking would be constructed, giving visitors improved access and reducing conflicts between vehicles. Accessibility would be improved, including parking for persons with disabilities and a reduced grade for ramps, which would improve access for all visitors to the park. Emergency access would also be improved because reopening the loop would allow emergency vehicles to access the far end of Scenic Loop Drive quickly, and improved pullout areas, would allow vehicles to pull-over for emergency response personnel.

Temporary adverse impacts on visitor use and experience would occur during construction of the project. Visitor access would remain closed throughout the duration of project implementation. The approximately 6.15-mile project area would serve as a staging area during construction to ensure park visitors remain safe. It is anticipated that construction activities would occur during the spring, summer, and fall, with required tree removal conducted in the winter, over the course of two years. During construction, pick-up trucks would arrive at the park with construction personnel, and construction equipment such as dump trucks hauling new or excavated materials would create additional traffic between the park entrance in Medora, North Dakota, and the intersection of East River Road and Scenic Loop Drive. Traffic would only increase between this 6.5-mile section of East River Road, because visitors would still have access to nearly 22.5 miles of Scenic Loop Drive, as well

as other roads in the park. The only designated trail within the project area, Ridgeline Nature Trail, would remain closed during construction for visitor safety and to avoid visitors experiencing visual and auditory disturbances from construction. These adverse impacts would be temporary and would not continue following the completion of construction activities.

Once construction is complete, the project area would reopen to visitors, including the pullout area at Ridgeline Nature Trail and scenic overlooks such as Scoria Point, Badlands Overlook, and the Prairie Dog Town in the western portion of the project area. Visitors would be able to enjoy the entirety of the 35-mile Scenic Loop Drive and would no longer have to backtrack to exit the park, reducing traffic congestion over the long-term.

Reconstruction of the existing road would maintain a permanent feature on the landscape, potentially detracting from the visual quality of the project area. However, alternative 2 would occur in areas where the presence of the road has already altered the landscape and would not represent a noticeable departure from historic visual conditions for visitors. The slight expansion of pullout areas through the removal of small vegetation islands, the delineation of parking stalls, increased parking capacity, and enhanced accessibility are not anticipated to adversely affect visitor use and experience of historic visual conditions.

To help alleviate potential traffic congestion, visitors would be informed in advance of construction activities via multiple outlets, including the park's website, various signs, and the visitor center. Park staff would be available to address visitor questions during construction and provide regular updates to the public about project progress and any associated delays. Furthermore, safety measures such as positioning flaggers or temporary stop lights at intersections (e.g., at East River Road and Fourth Street; East River Road and Scenic Loop Drive) would be taken. Provisions for emergency vehicle access through construction zones would be established, and a cohesive aesthetic treatment plan throughout the project area would be implemented.

3.6 WATER RESOURCES

3.6.1 Affected Environment

The project area is within the Middle Little Missouri River watershed, which is part of the hydrologic unit code 10110203 (1,345,900 acres) (NRCS 2007). Average annual precipitation in the project area is 13 to 15 inches. There are no surficial (i.e., shallow) aquifers underlying the Middle Little Missouri River sub-basin in the project area, but several active seeps and springs have been observed (NRCS 2007). The westernmost portion of the project area is within 250 feet of the Little Missouri River (figure 10). The Little Missouri River appears to be a Traditional Navigable Water (i.e., waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce).

Several unnamed stream channels are shown on the topographic maps located adjacent to Scenic Loop Drive in the central part of the project area. Most of these unnamed streams appear to flow into Paddock Creek, which is located north of the project area, with some unnamed streams, particularly near the east end of the project area flowing into Sheep Creek, south of the project area. Both Paddock Creek and Sheep Creek appear to be relatively permanent waterways that are tributaries to the Little Missouri River.

3.6.1.1 Wetlands and Streams

In October 2021, Golder Associates, Inc., delineated wetlands and streams adjacent to Scenic Loop Drive (appendix D). Surface water resources in the project area include 11 wetlands (**table 9**) totaling approximately 0.31 acres, and 39 streams (**table 10**), 35 of which were classified as ephemeral, 1 classified solely as intermittent, and 3 that contain both ephemeral and intermittent

reaches. Ephemeral streams exhibit flow for a brief period as a direct result of precipitation, while intermittent streams exhibit flow based on seasonal changes in runoff. The length of streams totaled approximately 17,740 linear feet (2.68 miles of ephemeral streams and 0.67 miles of intermittent streams). No part of the project area is mapped within a designated 100-year or more floodplain.

TABLE 9. SUMMARY OF DELINEATED WETLAND AREAS IN THE PROJECT AREA

Wetland ID	Wetland Classification		Area (Acres)	Likely Regulatory Status[2]
	FGDC[1]	Hydrogeomorphic		
W1	PEM1B	Riverine	0.01	Jurisdictional
W2	PEM1B	Riverine	0.08	Jurisdictional
W3	PEM1B	Slope	0.02	Non-jurisdictional (Isolated Wetland)
W4	PEM1B	Slope	<0.01[3]	Non-jurisdictional (Isolated Wetland)
W5	PEM1B	Riverine	0.06	Jurisdictional
W6	PEM1A	Riverine	<0.01[3]	Jurisdictional
W7	PEM1B	Depressional	0.03	Non-jurisdictional (Isolated Wetland)
W8	PEM1B	Depressional	0.01	Non-jurisdictional (Isolated Wetland)
W9	PEM1A	Riverine	0.03	Jurisdictional
W10	PEM1B	Depressional	0.01	Non-jurisdictional (Isolated Wetland)
W11	PEM1B	Depressional	0.04	Non-jurisdictional (Isolated Wetland)
Total			**0.31**	

1 Federal Geographic Data Committee/Cowardin Classification: PEM1A = palustrine emergent persistent temporarily flooded; PEM1B = palustrine emergent persistent seasonally saturated.
2 Final jurisdictional determination is made by the US Army Corps of Engineers.
3 Wetland area <0.01 calculated as 0.01 acres for calculating overall wetland acreage.
Source: Golder Associates, Inc. 2021b

TABLE 10. SUMMARY OF DELINEATED STREAMS IN THE PROJECT AREA

Stream Designation	Flow Regime	Length (Lineal Feet)	Average Width at OHWM (Feet)1	Area (Square Feet)	Likely Regulatory Status
S1	Ephemeral	1,381	2	2,765	Jurisdictional

Stream Designation	Flow Regime	Length (Lineal Feet)	Average Width at OHWM (Feet)1	Area (Square Feet)	Likely Regulatory Status
S2	Ephemeral	33	2	69	Jurisdictional
S3	Ephemeral	212	2	426	Jurisdictional
S4	Ephemeral	47	2	96	Jurisdictional
S5	Intermittent	81	5	424	Jurisdictional
S6	Ephemeral	309	4	1,246	Jurisdictional
	Intermittent	1,647	4	6,601	
S7	Ephemeral	117	2	236	Jurisdictional
S8	Ephemeral	2,324	2	4,650	Jurisdictional
S9	Ephemeral	1,019	2	2,040	Jurisdictional
S10	Ephemeral	293	1	294	Jurisdictional
S11	Ephemeral	191	2	385	Jurisdictional
S12	Ephemeral	157	2	318	Jurisdictional
S13	Ephemeral	30	1	31	Jurisdictional
S14	Ephemeral	152	2	307	Jurisdictional
S15	Ephemeral	206	2	416	Jurisdictional
S16	Ephemeral	311	2	625	Jurisdictional
S17	Ephemeral	351	3	1,059	Jurisdictional
	Intermittent	959	3	2,883	
S18	Ephemeral	47	1	47	Jurisdictional
S19	Ephemeral	60	1	61	Jurisdictional
S20	Ephemeral	200	1	201	Jurisdictional
S21	Ephemeral	23	2	49	Jurisdictional
S22	Ephemeral	219	1	220	Jurisdictional
S23	Ephemeral	840	1	840	Jurisdictional
S24	Ephemeral	905	2	1,813	Jurisdictional
S25	Ephemeral	351	3	1059	Jurisdictional

Stream Designation	Flow Regime	Length (Lineal Feet)	Average Width at OHWM (Feet)1	Area (Square Feet)	Likely Regulatory Status
S26	Ephemeral	342	2	687	Jurisdictional
S27	Ephemeral	522	1	522	Jurisdictional
S28	Ephemeral	106	1	106	Jurisdictional
S29	Ephemeral	194	2	392	Jurisdictional
S30	Ephemeral	472	2	945	Jurisdictional
S31	Ephemeral	102	2	206	Jurisdictional
S32	Ephemeral	1,082	3	3,250	Jurisdictional
	Intermittent	874	3	2,630	
S33	Ephemeral	79	1	80	Jurisdictional
S34	Ephemeral	76	1	77	Jurisdictional
S35	Ephemeral	234	1	235	Jurisdictional
S36	Ephemeral	109	1	110	Jurisdictional
S37	Ephemeral	852	2	1,707	Jurisdictional
S38	Ephemeral	109	1	110	Jurisdictional
S39	Ephemeral	123	3	376	Jurisdictional
Totals	**Ephemeral**	**14,179**	**-**	**28,055**	**-**
	Intermittent	**3,561**	**-**	**12,538**	**-**

[1] Ordinary High Water Mark
Source: Golder Associates, Inc. 2021b

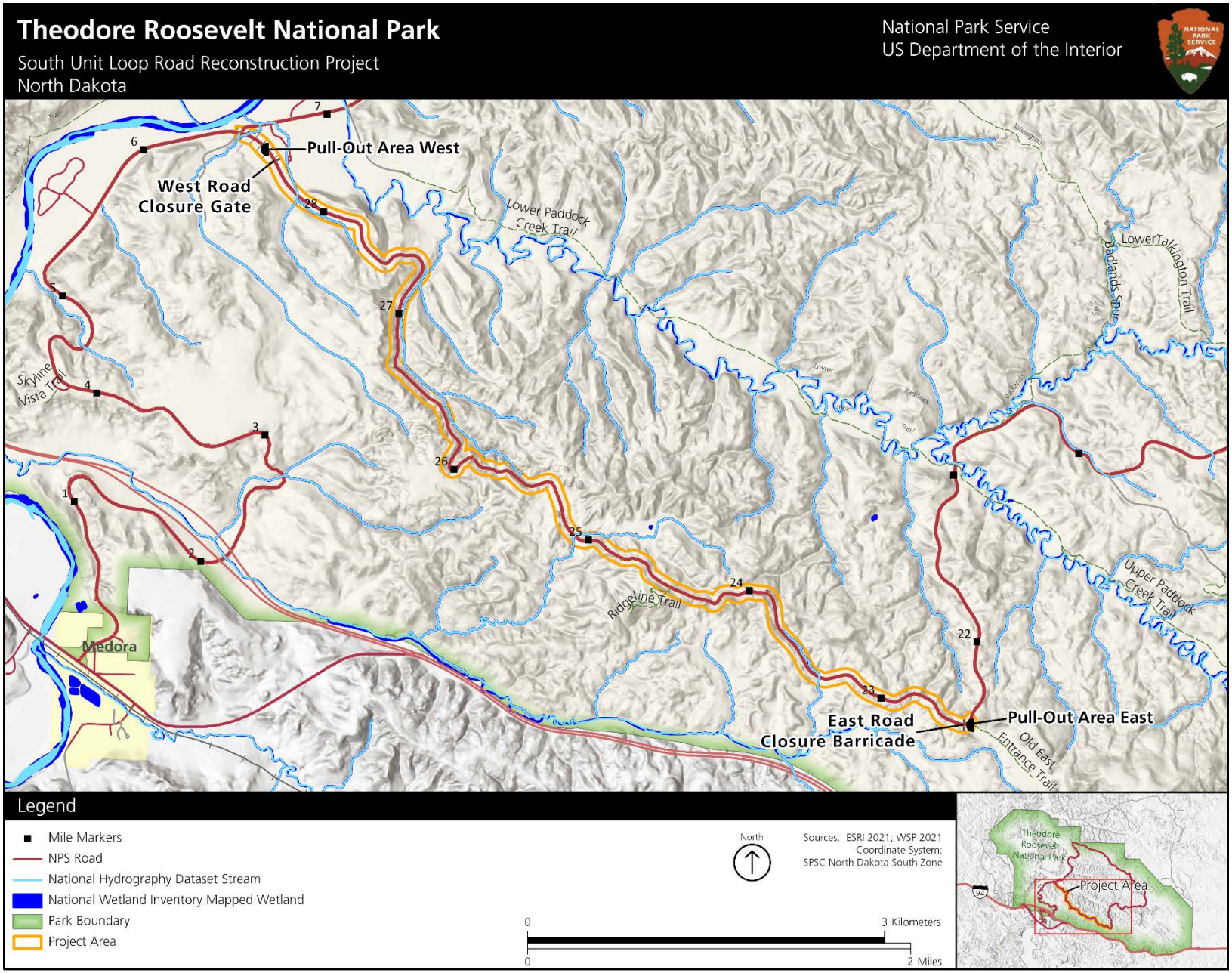

FIGURE 10. WATER RESOURCES NEAR THE PROJECT AREA

Wetlands and streams in the project area are potentially regulated under section 404 of the Clean Water Act of 1972. Consistent with the US District Court for the District of Arizona's August 30, 2021, order vacating and remanding the Navigable Waters Protection Rule, the US Army Corps of Engineers and US Environmental Protection Agency (USEPA) have halted implementation of the Navigable Waters Protection Rule and are interpreting "waters of the United States" consistent with the pre-2015 regulatory regime, which considers ephemeral and intermittent waters as jurisdictional if they have a significant effect on the chemical, physical, or biological integrity of a navigable water, interstate water, or territorial sea (USEPA 2021b).

3.6.1.2 Water Quality

As the lead water quality agency in the state of North Dakota, the North Dakota Department of Environmental Quality (North Dakota DEQ) has primary responsibility for the development, implementation, and delivery of several Clean Water Act programs, including water quality standards, total maximum daily loads (TMDLs), section 319 nonpoint source pollution management, and point source permitting. Designated use classifications for surface waters in North Dakota include municipal and domestic water supply, fish and aquatic life, recreation, agriculture uses, and industrial uses. Under the Clean Water Act, North Dakota DEQ is also responsible for lake, reservoir, river, stream, and wetland monitoring and assessment and for reporting the condition of its surface waters every two years in a report referred to as the Integrated Sections 305(b) Water Quality Assessment Report and Section 303(d) List of Impaired Waters Needing TMDLs; the most recent integrated report is from 2018 (USEPA 2021a).

Designated use classifications for the segment of Little Missouri River near the project area include recreation (North Dakota DEQ 2021). The 2018 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing TMDLs indicates the segment of the Little Missouri River just upstream of the project area was non-supporting of its designated use (i.e., recreation) because of pathogenic bacteria (i.e., *E. coli*) and is included on the 2018 303(d) list. The main source of water quality degradation is nonpoint sources associated with existing agriculture and stormwater runoff farther upstream in the watershed. Waters within the project area are classified as class II—or headwater streams but contain few, if any, fish. Sediment loading from erosion and degradation in the project area is associated with natural processes, land development and disturbance, and stormwater runoff (North Dakota DEQ 2021).

3.6.1.3 Trends and Planned Actions

In the last century, temperatures in North Dakota have warmed more than most of the United States, rising between 2.0 degrees Fahrenheit (°F) to 2.5°F (USEPA 2016). In 2016, there were many days when water temperatures and pH were above North Dakota standards in the Little Missouri River. Water temperatures exceedances were above 84.9°F multiple times during June and July (NPS 2020c).

As a result of warmer temperatures, USEPA indicates climate change is expected to exert additional impacts on water resources over time, as large precipitation events increase in frequency and size (USEPA 2016). Increases in rainfall could lead to more runoff and increase the potential for flooding events in the Middle Little Missouri River watershed. However, peak flows of the Little Missouri River were only 1,440 cubic feet per second in 2016 as result of receiving only 16 inches of rain over the course of the year. In contrast, the Little Missouri River's peak flow was over 8,000 cubic feet per second in 2013 (NPS 2020c). This variability in precipitation may drive moisture deficits in the project area if North Dakota continues to warm.

3.6.2 Environmental Consequences

3.6.2.1 Methods and Assumptions

This section describes the alternatives developed for reconstructing portions of Scenic Loop Drive in the South Unit of the park and their potential effects on water resources. Impacts on water resources are analyzed quantitatively through calculating the acreage (wetlands) or mileage (streams) of water resources lost through actions such as road reconstruction or replacement of culverts conducted to improve drainage. The impact analysis for the project describes what is likely to happen to water resources and water quality under each of the two alternatives. The locations of the affected water resources have been mapped to determine whether the impact is widespread or localized. The analysis focuses on the impacts that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action/preferred alternative.

3.6.2.2 Alternative 1 (No Action)

Under alternative 1, erosion would continue to worsen the condition of the roadway, and structural and accessibility issues would remain. Water resources such as wetlands and streams that occur in the project area would remain intact under alternative 1. Several active seeps (i.e., wetlands where groundwater reaches the surface through an aquifer) have been observed, and it is assumed that most of the areas displaying roadway embankment failure are experiencing a loss of strength because of high moisture content under the road surface. As sections of roadway continue to deteriorate, water resources would likely experience long-term, adverse impacts related to erosion and sedimentation from landslides. Water resources would also continue to be subject to natural geological and hydrological processes of various magnitudes. Water quality in the project area would not change under alternative 1.

3.6.2.3 Alternative 2 (Proposed Action and Preferred Alternative)

Although alternative 2 would require excavation activities, construction impacts would be limited to the current footprint of the existing road and would not involve impacts on undisturbed water resources beyond the project area. Several wetlands (i.e., W1, W2, and W5) are in areas protected by the surrounding topography, such as within valleys or at the bottom of steep slopes, which would likely prevent impacts (e.g., erosion and sedimentation from exposed soils) from construction. Wetlands W3 (0.02 acres) and W4 (<0.01 acres) are the only wetlands directly adjacent to Scenic Loop Drive. Excavation activities and sedimentation could impact both wetlands because of their proximity to the roadway, but long-term, adverse impacts are not expected due to their small size and the implementation of proposed mitigation measures (see section 2.4.6). Any impacts from the erosion of exposed soil and ground subsidence resulting from alternative 2 would be short term because the surrounding geological contours would be restored upon completion of the project. Both of these wetlands are isolated and do not display any connections to other wetlands or waterbodies (i.e., streams).

Wetland W9 (0.03 acres) is situated downhill of a significant landslide that required closure of the road. This wetland may have been partially formed by sediment deposition from the landslide and blockage of surface water flow through stream S31. Construction associated with recontouring the hillside to stabilize the landslide would likely adversely affect this wetland. Because the soil uphill of the wetland is not stable, ground movement could occur during construction that would indirectly result in sediment and soil filling portions or all of the wetland. Following construction and grading associated with the road repairs, the ground surface/contours of the area within and adjacent to wetland W9 would be restored which may reduce the current wetland area but would restore the free flow of surface water through the stream. The total area of impacted wetlands would be 0.06 acres (appendix D).

The installation of new stormwater infrastructure or culverts under the road would temporarily affect stream segments in the project area. While several stream segments are located in the project area, short-term, adverse impacts (e.g., erosion, sedimentation, water quality) would likely be limited to the segments of 10 streams that cross the existing roadway. Impacts in these areas, including those near roadway embankment failures, are expected to be minimal based on the size, location, and type (ephemeral) of each stream segment. Long-term, adverse impacts on streams and water quality during construction are not expected. Affected streams would be restored to previously existing conditions to maintain the free flow of surface water along the streambeds, resulting in long-term, beneficial impacts (e.g., reduction of erosion and sedimentation) on water resources. No part of the project area is mapped within a designated 100-year or more floodplain.

As noted previously, impacts to water resources and water quality in the project area are associated with natural processes, land development and disturbance, and stormwater runoff. The expansion of pullout areas through the removal of small vegetation islands could increase the amount of impervious surface in the project area. However, alternative 2 would be contained within the footprint of the existing pullout areas and roadway, so the amount of additional impervious surface would be minimal and not result in additional impacts on water resources or water quality.

Under alternative 2, best management practices would be implemented for drainage and sediment control to prevent or reduce nonpoint source pollution that could affect water quality and minimize soil loss and sedimentation in drainage areas. These practices may include, but are not limited to, silt fencing, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas to minimize sedimentation and turbidity impacts as a result of construction activities. Furthermore, wetlands would be identified and clearly marked before construction work begins. Overall, alternative 2 would enhance the flow of stormwater and ensure hydrological connectivity and function throughout the project area, resulting in a long-term, beneficial impact on water resources.

SECTION 4: CONSULTATION AND COORDINATION

4.1 INTRODUCTION

This section describes the public involvement and agency consultation during the preparation of the EA. NPS places a high priority on public involvement in the NEPA process and on giving the public an opportunity to comment on the alternatives. Consultation and coordination with federal, state, and local agencies, as well as tribes, were conducted to identify issues and concerns related to park and tribal resources.

4.2 INTERNAL SCOPING AND PUBLIC INVOLVEMENT

4.2.1 Internal Scoping

Under NEPA regulations, scoping is an "early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). The scoping process is focused on determining the extent and nature of issues and alternatives that should be considered during a NEPA review. The internal scoping process for the project began on September 2, 2021. Internal scoping refers to the use of NPS staff to accomplish the outcomes described above. An interdisciplinary team that is familiar with the issues and affected resources is essential to a successful internal scoping process. Internal scoping associated with this EA has been extensive and has included dozens of internal interdisciplinary team meetings and reviews of the issues, alternatives, and impacts on park and tribal resources.

4.2.2 Public Involvement

Public involvement refers to the engagement of the interested and affected public on matters related to the project. Public involvement for the project began on February 14, 2022, with a public notice issued on NPS' Planning, Environment, and Public Comment website at https://parkplanning.nps.gov/parkHome.cfm?parkId=167. The notice highlights the availability of this EA for public review. The public review and comment period for the EA will be open for 15 calendar days and close on March 1, 2022. Interested individuals and organizations will also be notified of its availability.

4.3 FEDERAL AGENCIES

4.3.1 Federal Highway Administration, Central Federal Lands Highway Division

FHWA-CFLHD is a cooperating agency and developed the preliminary design for the project. They are continuing to work with NPS to revise the designs to limit the potential impacts on natural and cultural resources. On September 28-29, 2021, FHWA-CFLHD and NPS held a value analysis workshop to obtain an optimum value for each dollar required for the project and achieve the essential functions and benefits based on the materials, equipment, staffing, energy usage, facilities, professional services, and maintenance needed for the proposed action/preferred alternative.

Furthermore, cultural resource field surveys conducted during the preparation of this EA identified potential historic properties that would be adversely affected by the proposed action/preferred alternative. This required more intensive collaboration between FHWA-CFLHD, NPS, North Dakota SHPO, and tribes. Several meetings, teleconferences, and e-mail exchanges were held to discuss the findings from these field surveys, the potential implications for section 106 of the NHPA compliance, recommendations for design modifications to avoid impacts, and associated measures to preserve historic properties and incorporate findings into the design documents.

4.3.2 US Fish and Wildlife Service

Section 7 of the Endangered Species Act requires federal agencies to consult with USFWS to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. NPS initiated consultation with USFWS on December 16, 2021, requesting concurrence with the park's recommendation that the proposed action/preferred alternative "may affect, but is not likely to adversely affect" northern long-eared bat and describing the mitigation measures that would be implemented to avoid impacts to golden eagle. Furthermore, the park requested concurrence that there would be "no effect" on the endangered whooping crane and the candidate-for-listing monarch butterfly since there is no suitable habitat for either species within the project area. USFWS concurred with these recommendations and mitigation measures in a letter to the park superintendent, dated January 12, 2022 (USFWS 2022).

4.3.3 Advisory Council on Historic Preservation

The Advisory Council on Historic Preservation was notified using its e106 online system on December 22, 2021, of the determination of adverse impacts to historic properties under the proposed action/preferred alternative. The information shared included a summary of the proposed project, historic properties, assessment of effects, and consultation efforts with North Dakota SHPO and tribes, as described further below. The Advisory Council on Historic Preservation declined to participate further in consultation.

4.4 STATE AGENCIES

4.4.1 North Dakota State Historic Preservation Office

This EA evaluates impacts on cultural resources according to NPS *Management Policies 2006*. Section 106 of the NHPA also requires federal agencies to consider the effects of their undertakings on historic properties. Compliance with section 106 of the NHPA was carried out separately but concurrently with the planning process for the EA. NPS conducted a site visit to the project area on July 1, 2019, that included staff from the North Dakota SHPO. This meeting included a discussion of potential actions associated with the project and data needs to identify historic properties. NPS provided a letter to the North Dakota SHPO on July 2, 2021, summarizing the results of a preliminary cultural resources survey and the participation of a tribal cultural monitor during the fieldwork. On October 8, 2021, NPS held a teleconference with, and submitted a letter to, the North Dakota SHPO identifying the need for additional archeological work in the project area and further coordination with tribal partners, including participation of a tribal cultural monitor during the work. Personnel from the North Dakota SHPO were present during the survey and excavation work conducted between October 18-22, 2021. On November 2, 2021, NPS sent a letter to the North Dakota SHPO summarizing the results of archeological work, and a teleconference was held on November 9, 2021, to discuss next steps for evaluation of archeological sites and historic structures within the project area.

NPS sent another letter to the North Dakota SHPO on December 8, 2021, initiating consultation for the project, describing the area of potential effects, summarizing previous and ongoing tribal consultation efforts, providing archeological and historical built environment surveys of the project area, and requesting concurrence with the identification of historic properties within the area of potential effects. NPS recommended archeological site 32BI1195 (lithic scatter) and the portion of the historic district within the project area (32BI1196) as eligible for listing in the NRHP. NPS submitted a draft assessment of effect letter to the North Dakota SHPO for review on December 9, 2021, stating that the project would have an adverse effect on 32BI1196 but not on 32BI1195. The North Dakota SHPO replied on December 13, 2021, with the following:

> We have reviewed ND SHPO Ref.: 21-6285, NHPA H4217, South Unit Scenic Loop Road Repairs Project, Theodore Roosevelt National Park, Billings County, North Dakota. We concur that site 32BI1195 is eligible and that the portion of the site within the area of potential effects does not contribute to its significance. Therefore, the proposed undertaking would have "No Adverse Effect" to 32BI1195. We further concur that site 32BI1196 is eligible for listing and that the undertaking will have an "Adverse Effect" to 32BI1196.

On December 13, 2021, NPS began the process of minimizing the adverse effect on 32BI1196 by composing a draft memorandum of agreement (appendix B). NPS solicited the North Dakota SHPO's feedback on the draft memorandum of agreement on December 22, 2021, and a teleconference to review and apply edits to the document was conducted on January 20, 2022. The draft memorandum of agreement included in this EA incorporates information provided by the North Dakota SHPO, but the final agreement will include any information provided during public comment for this EA. NPS has been making efforts to avoid and minimize disturbance to 32BI1196 throughout the design process. This includes preserving contributing features of the historic district, where possible. However, efforts to resolve the adverse effect, including mitigation measures, are incorporated into the draft memorandum of agreement and it contains input from various experts on historic preservation within NPS and consultation with the North Dakota SHPO. The recommendations in the draft memorandum of agreement have been incorporated into design documents, and all measures would be conducted with funding for the project.

4.5 AMERICAN INDIAN TRIBES

The park consults with eight tribes traditionally associated with the park:

- Blackfeet Tribe
- Crow Tribe, Chippewa Cree Tribe
- Mandan, Hidatsa, and Arikara Nation (Three Affiliated Tribes)
- Fort Peck Assiniboine and Sioux Tribes
- Spirit Lake Sioux Tribe
- Standing Rock Sioux Tribe
- Turtle Mountain Band of Chippewa
- Rocky Boy's Reservation, Chippewa Cree Tribe

The tribes were first consulted about the proposed project via letter and e-mail on January 8, 2021. This correspondence discussed the damage to Scenic Loop Drive and its closure, asked tribal partners to identify if they had any concerns about resources along the road, if the project was not of further interest or concern, and invited all to participate in a teleconference held on February 4, 2021. Based on these discussions and in preparation of NPS-Midwest Archeological Center's (MWAC) pedestrian survey of the project area in July 2021, the Standing Rock Sioux Tribe provided a tribal resource monitor to help NPS assess potential impacts on tribal resources.

A second consultation period occurred between NPS and the eight tribes on September 14, 2021, via e-mail. NPS again requested participation from tribal partners, including the Standing Rock Sioux Tribe, during another archeological survey and a wetland delineation in October 2021. The archeological survey was conducted in locations proposed for modification of existing pullout areas, while the wetland delineation was conducted throughout the project area. On December 6, 2021, the final archeological report, which included review comments from NPS and North Dakota SHPO staff, was submitted to all tribes via letters and e-mail. To date, the only additional comments from

tribes on the proposed action/preferred alternative and associated impacts were from the Fort Peck Assiniboine and Sioux Tribes, indicating they had no further comments on the proposed project.

On December 14, 2021, all tribes were sent an e-mail and a letter identifying that the proposed action/preferred alternative would have an adverse effect on the 32BI1196 historic district, but no adverse effect to any other historic properties. Enclosures included the final archeological report and the form for the historic district. On December 15-16, 2021, NPS and the Fort Peck Assiniboine and Sioux Tribes exchanged e-mails clarifying the extent of the adverse effect and confirmed that there would be no adverse effect to archeological sites.

On December 22, 2021, all tribes were sent e-mails and letters notifying them of NPS' plan to draft a memorandum of agreement to resolve the adverse effect to 32BI1196. Included in the e-mail was a copy of the draft final historic architecture report for 32BI1196, a draft memorandum of agreement, and a request for the tribes to confirm their participation further as concurring parties and potential signatories on the agreement. On January 10, 2022, the Blackfeet Tribe contacted NPS and noted they had decided not to participate in development of the memorandum of agreement. All tribes are listed as concurring parties at the end of the memorandum of agreement, although to date none have indicated a preference to sign the document.

4.6 LIST OF PREPARERS

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SECTION 5: REFERENCES

Barnhart, P., and E. Gillam

2017 "Documentation of Overwintering Bat Species Presence and Hibernacula Use in the Badlands of North Dakota." *Northwestern Naturalist* 98(1):48–56.

Bluemle, J.P.

2014 *North Dakota Notes No. 12, North Dakota's Badlands*. October 2014. https://www.dmr.nd.gov/ndgs/ndnotes/ndn12.htm

Bureau of Land Management

2016 Potential Fossil Yield Classification System. https://www.blm.gov/sites/blm.gov/files/uploads/IM2016-124_att1.pdf

Council on Environmental Quality, Executive Office of the President (CEQ)

2014 Memorandum for Heads of Federal Departments and Agencies: Effective Use of Programmatic NEPA Reviews. Executive Office of the President Council on Environmental Quality. December 18, 2014.

Daughtrey, C.S., W.A. White, and M.N. Zedeño

2016 Ethnographic Overview and Assessment, Theodore Roosevelt National Park, ND: Integrated Report. Bureau of Applied Research in Anthropology, University of Arizona, Tucson. Submitted to US Department of the Interior, National Park Service, Theodore Roosevelt National Park, North Dakota.

Gerhard, L.C.

1982 "Geological Evolution and Resources of the Williston Basin." *UMR Journal --V. H. McNutt Colloquium Series*: Vol. 3, Article 8.

Gerow, K., N.C. Kline, D.E. Swann, and M. Pokorny

2010 "Estimating Annual Vertebrate Mortality on Roads at Saguaro National Park, Arizona." *Human-Wildlife Interactions* 4:283–292.

Golder Associates, Inc.

2021a South Unit Loop Road Reconstruction Project: A Class III Inventory and Formal Testing of 32BI1195 in Billings County, North Dakota. Theodore Roosevelt National Park. December 2021.

2021b Wetland Delineation Report for the South Unit Loop Road Reconstruction Project at Theodore Roosevelt National Park. November 2021.

Gonzalez, M.A.

2003 Surface geology - Fryburg NW quadrangle, North Dakota: North Dakota Geological Survey, 24K Series Fryburg NW-sg, scale 1:24,000.

Historical Research Associates, Inc. (HRA)

2001 South Unit Scenic Drive. Draft National Register of Historic Places on file at HRA in Billings, Montana.

Kuehn, D.

1998 Final Report on the 1987 Archeological Survey in Theodore Roosevelt National Park, North Dakota. Manuscript on file, State Historical Society of North Dakota. Bismarck.

National Park Service, US Department of the Interior (NPS)

1998 NPS-28: Cultural Resource Management Guideline.

2000 Director's Order 47: *Soundscape Preservation and Noise Management*. NPS Office of Policy.

2002 Director's Order 77-1: *Wetland Protection*. NPS Office of Policy.

2003 Director's Order 77-2: *Floodplain Management*. NPS Office of Policy.

2006 *Management Policies* 2006. https://www.nps.gov/policy/

2009 *Air Quality in National Parks: 2009 Annual Performance & Progress Report. Natural Resource Report*. NPS/NRPC/ARD/NRR—2010/266.

2015a *NEPA Handbook*. https://www.nps.gov/subjects/nepa/policy.htm

2015b *North Unit Visitor Center Replacement Environmental Assessment for Theodore Roosevelt National Park*. May 2015. https://parkplanning.nps.gov/document.cfm?parkID=167&projectID=48245&documentID=66118

2016 *Cultural Resources Climate Change Strategy*. https://www.nps.gov/subjects/climatechange/upload/NPS-2016_Cultural-Resoures-Climate-Change-Strategy.pdf

2020a Visitor Use and Associated Thresholds at Theodore Roosevelt National Park, 2016-2018, Research Report. Cooperative Ecosystem Studies Units (CESU), Agreement number P17AC00126.

2020b Theodore Roosevelt National Park, Annual Recreation Visits (1941 – 2020). Accessed September 22, 2021. https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=THRO

2020c *Water Quality Monitoring for Theodore Roosevelt National Park*. 2016 Data Report. Natural Resource Data Series NPS/THRO/NRDS—2020/1265

2021a Personal communication between B. McCann, Theodore Roosevelt National Park and D. Rosenbach, WSP USA, concerning dismissal of Indian trust resources and sacred sites.

2021b Personal communication between B. McCann, Theodore Roosevelt National Park and D. Rosenbach, WSP USA, concerning dismissal of threatened and endangered species.

2021c Visitor Statistics for Theodore Roosevelt National Park. Data obtained from the Integrated Resource Management Applications (IRMA) Portal. https://irma.nps.gov/STATS/Reports/Park/THRO2021g. Theodore Roosevelt National Park, Traffic Count by Location: Scenic Loop Drive, 1992–2021. Accessed September 22, 2021.

National Park Service, Midwest Archeological Center (NPS-MWAC)

2021 Trip Report: South Unit Loop Road Pedestrian Inventory, Theodore Roosevelt National Park, July 18-23, 2021.

Natural Resources Conservation Service (NRCS)

2005 Soil Survey of Billings County, North Dakota. https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/north_dakota/billingsND2005/Billings.pdf

2007 Middle Little Missouri 10110203 8-Digit Hydrologic Unit Profile. Accessed September 23, 2021. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_000793.pdf

2021 Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/

Nearing, M.A., F.F. Pruski, and M.R. O'Neal

2004 "Expected Climate Change Impacts on Soil Erosion Rates: A review." *Journal of Soil and Water Conservation* 59(1):43–50. https://www.tucson.ars.ag.gov/unit/publications/PDFfiles/1542.pdf

North Dakota Department of Environmental Quality (North Dakota DEQ)

2021 Watershed Management Program. Accessed September 23, 2021. https://deq.nd.gov/WQ/3_Watershed_Mgmt/default.aspx

Paleo Solutions, Inc.

2021 Paleontological Survey Report for Theodore Roosevelt National Park, Billings County, North Dakota. December 2021.

Schmidt, D.N.

2018 "Determining Climate Change Impacts on Ecosystems: The Role of Palaeontology." *Palaeontology*, 61(1):1–12.

Shannon and Wilson

2020 Geotechnical Design Report for South Unit Scenic Loop, Billings County, North Dakota. Submitted to HDR Engineering, Inc.

US Fish and Wildlife Service (USFWS)

2022 Informal Consultation Letter Concerning the Northern Long-Eared Bat, Golden Eagle, Whooping Crane, and Monarch Butterfly and Repairs to a Segment of Scenic Loop Road at Theodore Roosevelt National Park. Executed by Drew Becker, USFWS, on January 12, 2022.

US Environmental Protection Agency (USEPA)

2016 What Climate Changes Means for North Dakota. EPA 430-F-16-036. Accessed September 23, 2021. https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nd.pdf

2021a EPA Green Book National Area and County-Level Multi-Pollutant Information. Updated March 31, 2021. Accessed September 16, 2021. https://www.epa.gov/green-book/green-book-national-area-and-county-level-multi-pollutant-information

2021b Revising the Definition of "Waters of the United States." Revised Definition of WOTUS Notice of Proposed Rulemaking. Accessed January 25, 2022. https://www.epa.gov/wotus/revising-definition-waters-united-states

WSP USA, Inc.

2021 South Unit Loop Road Historic Context, Field Assessment, Evaluation of Associated Features, and Determination of Eligibility Report. Theodore Roosevelt National Park. December 2021.

APPENDIX A
PHOTO LOG OF HISTORIC FEATURES OF THE SCENIC LOOP DRIVE HISTORIC DISTRICT

Resource Name	Stone arch culvert	
Architectural Feature No.	2	
Field No./ NRHP Resource No.	THRO LR2; Culvert 12.0	
Location	MM 23.4	
Date(s) of Construction	1936	
Action	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions.	

Resource Name	Stone arch culvert	
Architectural Feature No. /SITS	3/ 32BI00540	
Field No./ NRHP Resource No.	THRO LR2.5; Culvert 11.9	
Location	MM 23.5	
Date(s) of Construction	1936	
Action	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No. /SITS	4	
Field No.	THRO LR3	
Location	MM 23.4	
Date(s) of Construction	1936	
Action	Replace with 24-inch concrete pipe. Rebuild headstone with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	5	
Field No.	THRO LR4	
Location	MM 25.2	
Date(s) of Construction	1936	
Action	Replace with 24-inch concrete pipe. Preserve wall as much as possible/repair as needed.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	6	
Field No./ NRHP Resource No.	THRO LR8; Culvert 9.85	
Location	MM 25.5	
Date(s) of Construction	1936	
Action	Replace with 18-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	7	
Field No.	THRO LR5	
Location	MM 25.5	
Date(s) of Construction	1936	
Action	Replace with 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	8	
Field No.	THRO LR6	
Location	MM 25.75	
Date(s) of Construction	1936	
Action	Replace with 36-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	9	
Field No.	THRO LR7	
Location	MM 25.9	
Date(s) of Construction	1936	
Action	Upsize with 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Plastic pipe culvert	
Architectural Feature No.	10	
Field No.	THRO LR14	
Location	MM 25.95	
Date(s) of Construction	1936	
Action	Heavily damaged surrounding slope, particularly erosion below outlet. Headwall will not be preserved. Install a pipe rundown in this location, out falling well below the existing rundown.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	11	
Field No.	THRO LR 13	
Location	MM 26	
Date(s) of Construction	1936	
Action	Replace pipe with 24-inch concrete pipe. Rebuild headwall with salvaged stone and install riprap on the outlet.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	12	
Field No.	THRO LR12	
Location	MM 26	
Date(s) of Construction	1936	
Action	Replace pipe with 24-inch concrete pipe. Rebuild headwall with salvaged stone and install riprap on downstream side and rundowns.	

Resource Name	Concrete pipe culvert	
Architectural Feature No.	13	
Field No.	THRO LR11	
Location	MM 26.2	
Date(s) of Construction	1939	
Action	Replace pipe with 36-inch concrete pipe, rebuild headwall with salvaged stone.	

Resource Name	Concrete pipe culvert	
Architectural Feature No.	14	
Field No.	THRO LR10	
Location	MM 26.25	
Date(s) of Construction	1939	
Action	Replace with 24-inch concrete pipe. Rebuild headwall on south side with salvaged stone.	

Resource Name	Concrete pipe culvert	
Architectural Feature No.	15	
Field No.	THRO LR9	
Location	MM 26.3	
Date(s) of Construction	1939	
Action	Replace with 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	16	
Field No.	THRO LR23	
Location	MM 26.4	
Date(s) of Construction	1939	
Action	Upsize to a 30-inch concrete pipe to convey flows. Rebuild headwall with salvaged stone - may need to install additional culverts if headwalls cannot be modified.	

Resource Name	Plastic pipe culvert	
Architectural Feature No.	17	
Field No.	THRO LR22	
Location	MM 26.45	
Date(s) of Construction	1939	
Action	Upsize to 30-inch concrete pipe. Rebuild headwall with salvaged stone, potentially install additional culverts	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	18	
Field No.	THRO LR 21	
Location	MM 26.5	
Date(s) of Construction	1939	
Action	Upsize to 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Stone Retaining Wall	
Architectural Feature No.	19	
Field No./ NRHP Resource No.	THRO LR 20; Culvert 8.95	
Location	MM 26.75	
Date(s) of Construction	1939	
Action	Repoint mortar and return any displaced rocks to their original positions.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	20	
Field No./ NRHP Resource No.	THRO LR19; Culvert 8.95	
Location	MM 26.75	
Date(s) of Construction	1939	
Action	Replace with 30-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	21	
Field No./ NRHP Resource No.	THRO LR18; Culvert 8.85	
Location	MM 26.8	
Date(s) of Construction	1939	
Action	Replace with 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Stone Retaining Wall	
Architectural Feature No.	22	
Field No./ NRHP Resource No.	THRO LR17; Retaining Wall 8.7	
Location	MM 26.8	
Date(s) of Construction	1939	
Action	Repoint mortar and return any displaced rocks to their original positions	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	23	
Field No.	THRO LR16	
Location	MM 27	
Date(s) of Construction	1939	
Action	Replace with a 24-inch concrete pipe. Rebuild headwall with salvaged stone.	

Resource Name	Triple corrugated metal pipe culvert	
Architectural Feature No.	24	
Field No.	THRO LR15	
Location	MM 27.1	
Date(s) of Construction	1939	
Action	Replace with 42-inch concrete pipe or 4-18-inch concrete pipes - rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	25	
Field No. Field No./ NRHP Resource No.	THRO LR 24; Culvert 8	
Location	MM 27.25	
Date(s) of Construction	1939	
Action	Remove culvert, rehabilitate stone wall, and redirect flows to a new 24-inch concrete pipe culvert outside of the limits of the stone wall.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	26	
Field No.	THRO LR 25	
Location	MM 27.3	
Date(s) of Construction	1939	
Action	Replace with 24-inch concrete pipe. rebuild headwall with salvaged stone.	

Resource Name	Corrugated metal pipe culvert	
Architectural Feature No.	27	
Field No.	THRO LR 26	
Location	MM 28	
Date(s) of Construction	1939	
Action	Replace with 18-inch concrete pipe. Rebuild headwall with salvaged stone. Install additional adjacent culvert.	

Resource Name	Stone arch culvert	
Architectural Feature No.	28	
Field No./ NRHP Resource No.	THRO LR27; Culvert 7.95	
Location	MM 28.25	
Date(s) of Construction	1936	
Action	Repoint mortar.	

Resource Name	Stone arch culvert	
Architectural Feature No./SITS	29 / 32BI00541	
Field No./ NRHP Resource No.	THRO LR3.5; Culvert 10.2	
Location	MM 25.1	
Date(s) of Construction	1936	
Action	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions.	

APPENDIX B
DRAFT MEMORANDUM OF AGREEMENT
BETWEEN THE NATIONAL PARK SERVICE AND THE
NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE

DRAFT MEMORANDUM OF AGREEMENT
BETWEEN THE NATIONAL PARK SERVICE AT THEODORE ROOSEVELT NATIONAL PARK AND THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICER REGARDING THE SOUTH UNIT SCENIC LOOP ROAD REPAIR PROJECT, BILLINGS COUNTY

WHEREAS, Theodore Roosevelt National Park (THRO) is a unit of the National Park Service (NPS) within Interior Region 5 in the state of North Dakota, and the NPS is charged to meet the directives of the NPS Organic Act of 1916 (PL 64-235, 39 Stat. 535) 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," as it applies to the park units; and

WHEREAS, NPS plans to repair and improve 6.15 miles of the South Unit Scenic Loop Road (Loop Road); and

WHEREAS, NPS initiated consultation with traditionally associated American Indian tribes and other groups (Tribes) on January 8, 2021 and continued consultations through December 22, 2021, and has involved the public through the public comment process of the National Environmental Quality Act, and NPS will maintain ongoing consultation with all parties as required, including the following Tribes: Blackfeet Nation, Crow Tribe, Chippewa Cree Tribe; Mandan, Hidatsa, and Arikara Nation (Three Affiliated Tribes), Fort Peck Assiniboine & Sioux Tribes, Spirit Lake Tribe, Standing Rock Sioux Tribe, and Turtle Mountain Band of Chippewa, and have invited the Tribes as concurring parties to this Memorandum of Agreement (Agreement) document; and

WHEREAS, NPS has developed the *Theodore Roosevelt National Park South Unit Loop Road Reconstruction Project Environmental Assessment* as part of compliance with the National Environmental Policy Act, and that this action constitutes an Undertaking as defined by the implementing regulations for Section 106 of the National Historic Preservation Act (NHPA), as amended, 54 USC 306108, and *Protection of Historic Properties*, found at 36 CFR 800 A herein referred to as Section 106 and a summary of the undertaking is provided as Appendix A to this Agreement; and

WHEREAS, the NPS has worked in collaboration with Federal Highway Administration (FHWA) to have the road designed and engineered to meet Park Road Standards; however, the NPS retains responsibility for compliance with Section 106; and

WHEREAS, FHWA, the project designer, agrees that the NPS is the lead federal agency, and FHWA is not an invited signatory to this Agreement; and

WHEREAS, the project is in the South Unit of THRO in Billings County and the NPS has defined the undertaking's Area of Potential Effect (APE) as a 6.15-mile-long corridor that covers areas within 200 feet of the center line of the road. The APE is illustrated in Appendix B and the APE encompasses all direct, indirect, and cumulative effects of the undertaking; and

WHEREAS, the NPS had a cultural resources survey conducted for the APE as described in *Addendum Report: Theodore Roosevelt South Unit Scenic Loop Drive Reconstruction Project: Class III Cultural Resource Inventory, Billings County, North Dakota)* (McDonald 2021), which recommended Loop Road (Site 32BI1196) was eligible for listing in the National Register under Criteria A and C; and

WHEREAS, the NPS has determined that the undertaking may adversely affect properties listed in, or eligible for listing in, the NRHP and the NPS has consulted with the North Dakota State Historic Preservation Officer (ND SHPO) pursuant to 36 CFR Part § 800.5(a); and

WHEREAS, the ND SHPO concurred on December 13, 2021 that the project constitutes an Undertaking and that APE encompasses all direct, indirect, and cumulative effects and concurred that 32BI1196 is eligible for listing on the National Register of Historic Places under Criteria A and C; and

WHEREAS, the NPS has determined that the undertaking will adversely affect 32BI1196 pursuant to 36 CFR Part § 800.5(a), and ND SHPO concurred with this assessment on December 13, 2021; and

WHEREAS, the NPS has determined that the undertaking will not adversely affect any other historic properties, and ND SHPO concurred with this assessment on December 13, 2021, though archeological site 32BI1195, which consists of a lithic scatter that overlaps the westernmost parking lot in the project area, is eligible for listing on the National Register of Historic Places under Criterion D but the portion of the site within the APE does not contribute to its significance and thus the undertaking will have no adverse effect to the site, and

WHEREAS, the SHPO is authorized to enter into this Agreement in order to fulfill its role of advising and assisting federal agencies in carrying out their responsibilities under Sections 101 and 106 of the NHPA (36 CFR §§ 800.2[c][1][i] and 800.6[b]), and SHPO is a signatory to this MOA; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), the NPS notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination December 22, 2021 with specified documentation, and on January 21, 2022, the ACHP informed the NPS that they chose not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

WHEREAS, pursuant to 36 CFR§800.2(d), the NPS will solicit and consider public comment throughout the Section 106 process, utilizing accepted practices; and

WHEREAS, the definitions in this MOA follow 36 CFR § 800.16; and

NOW, THEREFORE, the NPS and the ND SHPO agree that should NPS proceed with the undertaking, NPS will ensure that the following stipulations are implemented to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The NPS shall ensure that the following measures are carried out:

I. PROFESSIONAL QUALIFICATIONS

A. All work carried out pursuant to this MOA shall meet the *Secretary of the Interior's Standards for Archaeology and Historic Preservation*, as per Section 112(a)(1)(A) of the NHPA and § 800.2(a)(1) of the implementing regulations.

B. All archeological work shall be conducted by or under the direct supervision of an archeologist who meets the qualifications set forth therein. These include a graduate degree in archeology or anthropology; demonstrated ability to implement and carry archeological research to completion, and at least 36 months of full-time professional experience and/or specialized training including at least 12 months experience and/or specialized training in the kind of activity or skills the individual will perform.

C. All work to address historic structures will be conducted by or under the direct supervision of a Historical Architect or Historical Landscape Architect that meets the associated qualifications. These include a graduate degree in the associated discipline, demonstrated ability to implement and carry historical research to completion, and at least 36 months of full-time professional experience and/or specialized training including at least 12 months experience and/or specialized training in documentation and evaluation of historic structures.

D. All work conducted by a tribal cultural specialist will be performed by personnel that are experienced with monitoring of ground disturbing activities and identification of historic properties of traditional cultural significance. Appropriate personnel will be selected through consultation between the NPS and tribes that are traditionally associated with THRO.

II. ROLES AND RESPONSIBILITIES

The signatories and invited signatory agree that NPS is the lead agency for administering and implementing this MOA. These responsibilities include, but are not limited to, consulting and coordinating with the consulting parties, conducting Government-to-Government consultation with the consulting Tribes, overseeing all cultural resources work including any additional cultural resources inventory work, drafting and implementing the historic property treatment plan (HPTP); assembling all submissions to the consulting parties, including the additional cultural resources inventory reports (if needed), the HPTP, and the preliminary and final data recovery reports; and seeking SHPO concurrence with all agency compliance decisions.

III. RESOLUTION OF ADVERSE EFFECTS

A. Historic Properties Treatment Plan

Pursuant to Section 800.6(a) of the NHPA, the NPS has provided a Historic Property Treatment Plan (HPTP) within this document as Appendix C. This plan was developed in consultation with the ND SHPO and tribes that are traditionally associated with THRO. The HPTP focuses on treatment of the Loop Road site 32BI1196 to include a Historic American Landscapes Survey (HALS) for the portion of the Loop Road within the project area and will ensure it is consistent with Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation (68 FR No. 139, 44730-34). The HPTP will also include measures to repair contributing features in the district and an updated National Register of Historic Places nomination form. Additional measures to conduct construction monitoring and protection and documentation of any unanticipated discoveries are also provided. The HPTP, which will be implemented prior to and during road construction, specifies:

1. The contributing elements of the Loop Road that would be affected by the undertaking where HALS documentation would be carried out.

2. The results of previous research relevant to the undertaking.

3. The field and laboratory analysis methods to be used.

4. Specification of the level of effort, textually and on-site maps, to be expended on the treatment of the property, including treatment locations and methods of HALS documentation.

5. Follow guidelines for repair of contributing features of the historic district and placement of new masonry and riprap designed to minimize the effects to the historic character of contributing culverts, headwalls, rock retaining walls, and the overall historic setting of the district. This includes use of masonry techniques that replicate the aesthetics of existing significant features. Masonry shall utilize techniques that include matching mortar type, composition, color, and joint profile for each feature. Repairs to contributing features and construction of new culvert headwalls and riprap shall incorporate locally sourced sandstone (or stone with similar attributes), reuse historic fabric (e.g., stones, masonry) where possible, rebuild stone headwalls in the same alignment, and place riprap in consideration of visual compatibility with the historic setting. Any source of building materials will be assessed for potential disturbance to historic properties and fully comply with associated requirements of the National Historic Preservation Act.

6. Implement rehabilitation measures for stone culverts 32BI1196 Features 2, 3 (32BI540), 28, and 29 (32BI541), as these structures represent the most aesthetically and technologically impressive and best-preserved examples from the period of significance. This includes repointing mortar, replacing displaced rocks, removing accumulated sediment, and reducing accumulated hazard fuels in the immediate area.

7. Completion of a National Register of Historic Places nomination form for 32BI1196. This form will incorporate existing information in 2021 reporting on the district, including the North Dakota cultural resources survey form and the Class III inventory of the district. The form will include a summary of implemented project actions that altered contributing features of the district such as updated photographs, descriptions, location information, and associated narratives.

8. A discussion of permits and personnel qualifications for field crews.

9. The methods to be used in data management and dissemination to the professional community and public, including a proposed schedule for field implementation and a schedule for the submittal of draft and final reports to consulting parties for review and comment.

10. Procedures for monitoring, evaluating, and treating discoveries of unanticipated or newly identified cultural resources during construction associated with the Undertaking, including consultation with appropriate parties.

11. A protocol for the treatment of ancestral human remains, if such remains are encountered, describing methods and procedures for the recovery, inventory, treatment, and disposition of ancestral remains, associated and unassociated funerary objects, and objects of tribal patrimony.

12. A monitoring and discovery plan, for archeological and tribal monitoring of construction.

13. A schedule to implement the HPTP including proposed timelines for the report submittals and reviews.

B. Interpretation

As part of road construction, the NPS will, in consultation with ND SHPO and Tribes, develop and install a professionally designed interpretive panel to communicate the Loop Road's history and significance. The interpretive sign will be installed at the parking area at the west end of the project area near the junction of East River Road, or other appropriate location. The NPS will also update the Theodore Roosevelt National Park website to include a webpage detailing similar information, with associated pictures and links to more information. This may be correlated to similar construction present at other park units completed by the Civilian Conservation Corps in the 1930s-early 1940s. Materials should highlight the stone culverts 32BI540 and 32BI541, particularly for their workmanship and excellent preservation.

IV. REVIEW AND COMMENT

The NPS will submit all documentation related to the undertaking (e.g., HPTP, HALS reporting, etc.) to the consulting parties for review and comment, unless stipulated elsewhere in this MOA. Consulting parties shall have 30 days from receipt to provide written comments. If a party does not comment on a submittal during this period, the NPS will follow-up by telephone or e-mail with the party. If, after such reasonable and good faith efforts to reach an unresponsive consulting party, there has still been no response, the NPS will proceed to the next step.

V. CONSTRUCTION MONITORING AND DISCOVERIES

A. The NPS will ensure that road construction within or adjacent archeological site 32BI1195 is monitored by an archeologist or archeologists meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology (NPS Director's Order-28: Appendix C). These include an advanced degree in archeology, demonstrated ability to implement and carry archeological research to completion, and at least 36 months of full-time professional experience and/or specialized training including at least 12 months experience and/or specialized training in construction monitoring in lands within or adjacent to the Park. An archeological monitor will be on hand for a project kick-off meeting at the project area to identify the location and extent of this resource, provide an educational briefing describing the types of archeological materials that have been found and could be encountered during construction, and provide guidance for protecting and reporting any discoveries during construction. The portions of the site outside of the APE will be marked with flagging or fencing to ensure ground disturbance does not occur in these areas. The archeological monitoring will occur during ground disturbing activities within and adjacent to this site, and on an intermittent basis to respond to any inadvertent discoveries in other project locations. The monitor will be authorized to halt ground disturbing activities at a specific location while recovering materials and data.

B. In consultation with tribal partners, the NPS will ensure that road construction within or adjacent to archeological site 32BI1195 and adjacent to resources outside of the area of potential effects but identified by tribal partners as potential resources of traditional significance will include tribal cultural monitoring. These resources include five large sandstone rocks identified in field studies as "LR 4" and an isolated find consisting of a large sandstone rock with a bowl-shaped depression on one side. The tribal monitor shall be qualified and experienced with the work of tribal monitoring for ground disturbing activities in North Dakota, preferably with previous experience in the Park. The monitor will be identified through NPS consultation with tribes that are traditionally associated with the Park. Tribal governments will decide, in consultation with the Park, who will perform the work. The monitor will be present during the project kick-off meeting to identify the location and extent of these resources, provide a briefing on traditional use of the area and measures to protect associated resources, and describe the process for protecting and reporting any unanticipated resources. The monitor will be

authorized to halt ground disturbing activities at a specific location while recovering materials and data.

C. Archeological and tribal monitoring will occur in partnership with construction crews. The monitors can decide, in consultation with the NPS and tribal governments, if proposed work requires their presence in certain areas and not others. This decision will be based on the location of work, findings during previous surveys, excavation, and previous days of monitoring, the extent of ground disturbance, and the nature of proposed work. This will allow for flexibility during the months of implementation of the project and unanticipated challenges such as construction delays, shifts in schedule, and differences in the location, extent, and significance of findings during monitoring.

D. The NPS will include the expertise of a historical landscape architect as part of construction design teams and during implementation. This is to ensure requirements to avoid, minimize, and mitigate effects to the historic district 32BI1196 are implemented in the project. The historical landscape architect must meet the Secretary of Interior's Standards for Historic Preservation, Professional Historic Landscape Architect, Historian, or Historic Architect, who are able to demonstrate completion of previous similar research (Appendix C, DO-28, 1997). These include a graduate degree in the associated discipline, demonstrated ability to implement and carry historical research to completion, and at least 36 months of full-time professional experience and/or specialized training including at least 12 months experience and/or specialized training in documentation and evaluation of historic structures. The historical landscape architect will be included in the project kick-off meeting to identify contributing features of the district, discuss construction requirements associated with repair and rehabilitation of those features (e.g., masonry requirements to conduct in-kind replacement of stone headwalls), and address questions. The historical landscape architect will also be available for project update meetings and intermittent monitoring of implementation of masonry and similar measures on contributing elements of the district. Findings from these efforts will be incorporated into the regular quality control assessments during construction.

E. The NPS will ensure that the location of archeological sites, places of potential traditional significance, and contributing elements of the historic district within or adjacent to the project area are incorporated into construction design documents. This process will make sure to safeguard this information to not to identify sensitive resources to personnel not directly involved with the undertaking. These polygons will be labeled as "Cultural Monitoring Required" and incorporate a buffer of 100 feet. Having the extent of these resources in the designs will allow for more efficient communication and ensure that crew members coordinate with archeological and/or tribal monitors.

F. Construction crews will notify the NPS 14 calendar days before working within or adjacent to culturally sensitive areas, such as archeological sites, locations of

potential traditional significance, and contributing features of the historic district, and shall specify the estimated length of time and extent of ground-disturbing and structural actions (e.g., digging within the road prism or outside of it, estimated depth, removal and reconstruction of culvert headwalls, repairing stone culverts). This information will be shared with the associated archeological, tribal, and historical architecture monitors to determine if their presence is required during construction.

G. If previously unreported cultural resources are identified during the monitoring, the work shall be halted until the discovery is documented and evaluated for its significance and NRHP eligibility in coordination with the NPS archeologist. Consultation with ND SHPO and Tribes will follow, as appropriate. The NPS will notify SHPO and Tribes of the discovery following instructions in Stipulation VI of this MOA.

VI. POST REVIEW DISCOVERIES

The NPS shall ensure that all construction documents include the following provisions:

A. If previously unidentified historic properties or unanticipated effects to historic properties are discovered during construction activities, the contractor shall immediately halt all activity within a 100-foot radius of the discovery, notify the NPS of the discovery, and implement interim measures to protect the discovery from looting and vandalism.

B. Immediately upon receipt of the notification required in Stipulation VI.A of this document, the NPS shall:

1. Inspect the site to determine the extent of the discovery and ensure that construction activities have halted;

2. Clearly mark the area of the discovery;

3. Implement additional measures, as appropriate, to protect the discovery from looting and vandalism;

4. Have a qualified subject matter expert (archeologist, architect, etc. as appropriate) inspect the construction site to determine the extent of the discovery and provide recommendations regarding its NRHP eligibility and treatment; and

5. Depending on recommendations from the archeological and/or tribal monitor after discussion with NPS cultural resources personnel, for resources that could potentially be eligible for the NRHP notify ND SHPO. For new findings that are limited to new architectural features associated with the road, notification can be limited to ND SHPO. For any new findings of archeological or traditional cultural value that could be potentially eligible for the NRHP, notify ND SHPO and tribes traditionally associated with THRO. Notification will include a description of the

finding and the measures that have been implemented to comply with Stipulations VI.B.1-4 of this document.

C. Within 48 hours of receipt of the notification described in Stipulation VI.B.5 of this document, the NPS shall provide the ND SHPO and tribes traditionally associated with THRO with its assessment of the NRHP eligibility of the discovery and the measures it proposes to take to resolve adverse effects. In making its official evaluation, the NPS, in consultation with the ND SHPO and tribes may assume the discovery to be NRHP eligible for the purposes of Section 106 pursuant to 36 CFR Part § 800.13(c). The ND SHPO and tribes shall respond within 48 hours of receipt.

D. The NPS, which shall take into account the consulting parties' recommendations on eligibility and treatment of the discovery, shall ensure that appropriate actions are carried out and provide the ND SHPO and the other consulting parties with a report on these actions when they have been implemented.

E. Construction activities may proceed in the discovery area when the NPS has determined that implementation of the actions undertaken to address the discovery pursuant to Stipulation VI.A-D are complete.

VII. HUMAN REMAINS

To prepare for the unlikely event that human remains are encountered during the undertaking, the NPS will implement an Inadvertent Discovery Plan as part of construction documents, which is included in Appendix C. This includes treating all human remains in a manner consistent with the ACHP's "Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects" (February 23, 2007) or ACHP policy in effect at the time remains and funerary artifacts are handled.

A. If the remains found on federal lands are determined to be of Native American origin, the NPS shall comply with the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. Sec 3001 et seq.). If the remains are determined not to be of Native American origin, the NPS shall coordinate with North Dakota law enforcement to ensure compliance with the North Dakota Century Code 23-06: Care and Custody of the Dead.

B. The NPS shall use reasonable efforts to ensure that the general public is excluded from viewing any burial site or associated funerary artifacts. The consulting parties to this Agreement shall release no photographs of any burial site or associated funerary artifacts to the press or general public. The NPS shall notify the tribes when burials, human skeletal remains, or funerary artifacts are encountered on the project.

VIII. CURATION

Within 30 days of approval of the final technical report, the NPS shall submit the HALS documentation to the Washington office and the Library of Congress. This includes complying with the archival requirements of the Library of Congress. The NPS is

encouraged to contact HALS staff in the Washington office if questions arise. All such items shall be made available to educational institutions and individual scholars for appropriate exhibit and/or research under the operating policies of the NPS.

IX. ANNUAL REPORTING AND REVIEW

A. Each year following the execution of this Agreement until it expires or is terminated, the NPS will compose an annual letter report (Annual Report) to review the progress under this Agreement and under the approved HPTP. The Annual Report will include an update on project schedule, status, and any ongoing cultural resources monitoring or mitigation activities, discovery situations, proposed future actions, or outstanding tasks to be completed under this Agreement or the HPTP. Consulting parties will have 30 calendar days to review the Annual Report and provide comments to the NPS, who will then address the comments. The NPS will share the report with consulting parties to this Agreement and ask if parties are interested in attending a virtual annual meeting.

B. If an annual meeting is requested by consulting parties, the NPS will address the comments on the annual report to develop the meeting agenda. The meeting shall include a discussion of construction progress, any scheduling changes proposed, any problems encountered, associated findings for any disturbances or enhancements to historic properties, identification of any new discoveries, and any disputes and objections received in NPS's efforts to carry out the terms of this Agreement.

C. Within 14 days after the annual meeting, the NPS will summarize the meeting, including proposed action items and how they are to be addressed, in a letter to consulting parties. Consulting parties will have 20 days to review and comment on the meeting notes and, if necessary, provide the NPS with any edits to the meeting notes. If changes are needed, the NPS will produce revised meeting notes within 30 days of receipt of comments and will provide the final notes to the consulting parties.

X. DISPUTE RESOLUTION

Should any signatory to this Agreement object at any time to any actions proposed or the manner in which the terms of this Agreement are implemented, the NPS shall consult with such party to resolve the objection. If the NPS determines that such objection cannot be resolved, the NPS will:

A. Forward all documentation relevant to the dispute, including NPS's proposed resolution, to the ACHP. The ACHP shall provide the NPS with its advice on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the NPS shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. The NPS will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the 30-day period, the NPS may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the NPS shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the Agreement and provide them and the ACHP with a copy of such written response.

C. THRO's responsibility to carry out all other actions subject to the terms of this Agreement that are not the subject of the dispute remain unchanged.

XI. CONFIDENTIALITY

To the maximum extent allowed by federal and state law, the NPS will maintain confidentiality of sensitive information regarding historic properties that could be damaged through looting or disturbance, and/or to help protect a historic property to which a Tribe attaches religious or cultural significance. However, any documents or records the NPS has in its possession are subject to the Freedom of Information Act (FOIA) (5 USC 552 et seq.) and its exemptions, as applicable. The NPS shall evaluate whether a FOIA request for records or documents would involve a sensitive historic property, or a historic property to which a Tribe attaches religious or cultural significance, and if such documents contain information that the NPS is authorized to withhold from disclosure by other statutes including the Section 304 of the NHPA, as well as the Archeological Resources Protection Act. If this is the case, then the NPS will consult with the Keeper of the National Register of Historic Places and the ACHP regarding withholding the sensitive information. If a Tribally sensitive property is involved, the NPS will also consult with the relevant Tribe prior to making a determination in response to a FOIA request.

XII. AMENDMENTS

This Agreement may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XIII. TERMINATION

A. If any signatory to this Agreement determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VIII of this Agreement. If within 30 days an amendment cannot be reached, any signatory may terminate the Agreement upon written notification to the other signatories and concurring parties.

B. Once the Agreement is terminated, and prior to work continuing on the undertaking, the NPS must either (a) execute a Memorandum of Agreement pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. The NPS shall notify the signatories as to the course of action it will pursue.

XIV. DURATION

This Agreement will expire if its terms are not carried out within 5 years from the date of its execution. Prior to such time, the signatories may consult and agree in writing to an extension for carrying out the terms of the Agreement in accordance with Stipulation XII above.

XV. ANTI-DEFICIENCY ACT

The NPS's obligations under this Agreement are subject to the availability of appropriated funds, and the stipulations of this Agreement are subject to the provisions of the Anti-Deficiency Act. The NPS shall make reasonable and good faith efforts to secure the necessary funds to implement this Agreement in its entirety. If compliance with the Anti-Deficiency Act alters or impairs the NPS's ability to implement the stipulations of this agreement, the NPS shall consult in accordance with the amendment and termination procedures found at Stipulations XII and XIII of this agreement.

Execution of this Agreement by the NPS and the ND SHPO and implementation of its terms are evidence that the NPS has taken into account the effects of the Project on historic properties, and that the NPS has satisfied its Section 106 responsibilities for the undertaking covered by this Agreement.

MEMORANDUM OF AGREEMENT
BETWEEN THE NATIONAL PARK SERVICE AT THEODORE ROOSEVELT NATIONAL PARK AND THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICER REGARDING THE SOUTH UNIT SCENIC LOOP ROAD REPAIR PROJECT, BILLINGS COUNTY

SIGNATORIES:

National Park Service – Theodore Roosevelt National Park

_____ Date
Angela Richman, THRO Acting Superintendent

North Dakota Historic Preservation Officer

_____ Date
Bill Peterson, State Historic Preservation Officer

MEMORANDUM OF AGREEMENT
BETWEEN THE NATIONAL PARK SERVICE AT THEODORE ROOSEVELT NATIONAL PARK AND THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICER REGARDING THE SOUTH UNIT SCENIC LOOP ROAD REPAIR PROJECT, BILLINGS COUNTY

CONCURRING PARTIES:

Crow Tribe

_____ Date
Frank White Clay, Chairman

Chippewa Cree Tribe

_____ Date
Harlan Gopher Baker, Chairman

Fork Peck Assiniboine & Sioux Tribes

_____ Date
Floyd Azure, Chairman

Spirit Lake Tribe of Fort Totten

_____ Date
Douglas Yankton, Sr., Chairman

Standing Rock Sioux Tribe

_____ Date
Mike Faith, Chairman

Turtle Mountain Band of Chippewa

_____ Date
Jamie Azure, Chairman

MEMORANDUM OF AGREEMENT
BETWEEN THE NATIONAL PARK SERVICE AT THEODORE ROOSEVELT NATIONAL PARK AND THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICER REGARDING THE SOUTH UNIT SCENIC LOOP ROAD REPAIR PROJECT, BILLINGS COUNTY

ADDITIONAL CONSULTING PARTIES:

Blackfeet Nation

_____ Date
Timothy Davis, Chairman

Mandan, Hidatsa, and Arikara Nation (Three Affiliated Tribes)

_____ Date
Mark N. Fox, Chairman

Appendix A: Description of Undertaking

Introduction

The National Park Service (NPS) proposes to conduct repairs and improvements to the South Unit Scenic Loop Road (Loop Road) at Theodore Roosevelt National Park (Park). Roughly the southern half of the loop has been closed since spring 2019 due to various damages, including collapse of a 150-foot portion of the road. The project area covers the closed approximately 6.15 miles of the road between mile marker 22 and 28 from its junction with the East River Road to the Old East Entrance Station pull off. The road is one of the major attractions of the Park and provides access to the stunning Badlands ecosystem and exciting views present in the area. The project involves various proposed repairs to the road and associated drainage system and parking lots, including some improvements.

Background

The Loop Road was constructed in the 1930s largely through cut and fill in the steep Badlands topography and has been afflicted by recurring damages primarily associated with erosion. It includes a complex network of drainage culverts, rundown pipes, curbing, and small ditches. Multiple road repair projects have occurred in the historic and modern eras, with emphasis on fixing locations where the downslope shoulder, partial lane, or entire lane has been displaced. This includes efforts to repair damaged areas in 2001 and 2016. In April 2019, an approximately 150-foot-long section of the road slid. Multiple other areas with similar topography and hydrology were also found to have signs of analogous deterioration. This includes two locations of potential roadway failure at Scoria Point and West Ridgeline, which were identified in fall 2019 and shown to have worsened when reassessed in winter 2019-2020. Additional damages present throughout the project area include pavement cracking, downslope soil movement, embankment failures, unstable trees, and damaged drainage features. Subsequent geotechnical, pavement engineering, visitor use, and hydrological analyses have recommended various repairs and improvements. These include fixing failure points, reconstructing the road with stable subgrade and road base materials, repairing and upgrading drainage systems, constructing retaining walls, expanding parking areas to include accessibility improvements, and repaving to provide long-term solutions to recurring damages. This undertaking has been prioritized by the political leadership in North Dakota, as the road is one of the premier attractions in the state.

Project Undertaking and Area of Potential Effects

The construction extent includes 6.15-miles of road to consist of repairs within the prism, large-scale repair of a large road failure, construction of retaining walls below the road in unstable areas, modification of existing culverts and installation of new culverts, installation of drainage run down pipes below the road prism, and modification of parking areas. The planning and design for the undertaking has included a 400-foot-wide corridor (200 feet on each side of the road centerline) to assess potential effects to resources. However, the anticipated construction extent, and associated ground disturbance, varies widely between project actions and locations and is generally within 50 feet of the centerline. Proposed actions are best summarized in draft

schematic design documents that include areas of increased complexity designated as Sites A-D, F, I-M, and Parking Sites 1-9. Of all proposed actions, only erosion control planned for the large road failure (Site A) extends close to the edge of the 200-foot corridor. Guardrails are also proposed for locations where new walls are proposed. These would be composed of wood posts connected by metal rails that would be 3 feet tall located between the downslope shoulder and the top of the wall. The rails and hardware would be painted with a brown Natina finish.

In general, the minimum extent of disturbance involves removal of the asphalt layer, subbase (primarily scoria), and subgrade to a depth of approximately 1-2 feet below the asphalt, and rebuilding within the same extent with stable soil and subbase gravels and repaving. This is anticipated throughout the project area. The project also plans to install wire mesh exclusion fencing below the subbase in an approximately 0.4-mile-long portion of the road that passes through a prairie dog town at the west end of the project area, which includes a parking lot. The prairie dog town has been present in this location for decades and the animals cause recurring damages by creating holes in the asphalt. The mesh will prevent this process from occurring. The anticipated ground disturbance is 1 foot deep directly below the pavement, though the mesh may extend up to approximately 3 feet from the edge of pavement buried 1 foot deep.

Construction will include removal of vegetation in various locations along the road prism and adjacent areas, particularly for parking lot expansion, new culverts, run down pipes, and reconstruction of road failures. Revegetation and erosion control efforts will be conducted in these areas, with emphasis on replanting native herbaceous plants, shrubs, and trees. Additional measures include placing organic filter fabric, fiber rolls, wooden posts to keep fabric and rolls in place, small earth and rock berms, stone riprap, stone and soil benching, and placement of native slash. Ground disturbance for these actions is anticipated to be a maximum of 1-2 feet below surface.

The project includes nine existing parking areas, of which eight are proposed for improvements. Parking lots proposed for expansion (Sites 1, 3, 4, 6, 7, and 9) would include measures such as increasing the amount of parking spaces, adding pull-though parking for large recreation vehicles (Sites 1, 6, 7, and 9), adding accessible grades and sidewalks (Sites 1, 3, 7, 9), eliminating or reducing small vegetated islands surrounded by existing pavement (Sites 3, 7, and 9), improving trailhead access by paving the heavily eroded starting point (Site 6), ecologically restoring social trails and denuded areas, and constructing or rebuilding retaining walls. Proposed improvements also include six benches, likely composed of sandstone blocks similar to the materials present in the local area, and replacement bear-proof trash cans. New curbing will also be installed and a few parking areas (Sites 1, 2, 4) will have small portions removed and revegetated. The extent of ground disturbance in these areas is anticipated to be a maximum of 2 feet below ground surface. These modifications will only be visible from the local area, but are focal points for visitors.

The project includes installation of various new culverts, upsizing or combining existing culverts, and installing run down pipes. These modifications are proposed in various locations throughout the project area and approximately 64 culverts are already present, with an anticipated 10-15 additional culverts proposed. The necessity to add or upsize culverts or install run down piping was determined based on a hydrological modeling study that considered the

upslope watershed, anticipated average rainfall and storm events (including adjustments for climate change), and the condition of existing culverts and any associated upslope or downslope erosion. Installation of a culvert involves excavating an approximately 3-foot-wide trench across the road prism to a depth of approximately 3-5 feet. A concrete pipe is laid, and inlets and outlets are positioned. In some cases, drop inlets, positioned on the road shoulder, are used, while most culverts have inlets at the edge of the prism. Culvert pipes are anticipated to be 18-30 inches in diameter and existing corrugated metal pipes will be replaced with concrete. In one case, a triple-pipe culvert, consisting of three 18-inch metal corrugated metal pipes connected by an 8-foot-long headwall, will be consolidated into a single 42-inch concrete pipe and associated headwall. Some of the existing inlets and outlets have stacked rock riprap to reduce erosion. These structures will remain in place or be repaired, with associated ground disturbance to 2 feet below surface. In cases where culverts are replaced, if an existing headwall constructed in the historic period is present, it will be rebuilt using the same materials (e.g., sandstone rocks and blocks, mortar) and architectural style (e.g., same positioning and alignment of rocks) to the extent possible. Existing culverts that have structural damage (e.g., loose rock, broken or crushed pipe, damaged headwalls) or have filled with sediment will be repaired and cleaned out.

Run down pipes are longer than culverts and are placed in locations with significant erosion issues, usually on very steep slopes where the outlet flow has scoured a gully that either has already backed up to the fill slope of the road prism or will erode to that point if left untreated. Various existing run down pipes are present at the road, and consist of corrugated metal placed slightly above or on the ground surface. Proposed new pipes would be buried and surrounded by gravels, rock, and native plants designed to reduce erosion. These pipes may extend to approximately 150 feet from the road centerline. Construction in these very steep areas will require benching the slope to provide stable working conditions for heavy equipment. Access in most cases will be direct from the road in line with the pipe, while in others it may require a slightly displaced route that follows the slope contour more closely. Anticipated ground disturbance for these pipes is a maximum of 2-3 feet below ground surface, though benching may require excavation to 5 feet into the slope. As the heavy equipment is moved back up the slope, the benching will be filled and the grade adjusted to natural contour. Disturbed areas will be revegetated and erosion control measures will be installed.

At least six soldier pile retaining wall segments are planned for portions of the road with signs of displacement of the fill slope and heavy erosion. These areas are identified on the schematics as Sites A, B, C, and F, with a short additional wall proposed between road stations 235 and 245. The length of these walls varies, with the shortest section approximately 40 feet long between stations 235 and 245. The remaining walls include 325 feet at Site A (large road failure), 430 feet at Site B, 400 feet at Site C, and 200 feet at Site F (Scoria Point). These walls will be constructed using steel piles connected by wood lagging. In some cases, the wall will include tiebacks to increase stability. The walls will be a significant departure from the existing design of the road, as the few retaining walls currently present are generally short and composed of dry laid or mortared sandstone rock. The new walls will vary in height, generally 10-20 feet above the surrounding slope. In most cases only the tops of the walls will be visible from the road. However, the wall proposed at Site F will be visible while approaching on the road from the northwest, as here the road turns sharply back toward itself in a deep ravine. Construction of

these walls will require removing the road shoulder and some of the fill slope. The steel piles will be driven into the ground to a maximum of 15 feet below the surface and connected with the wood lagging. The fill slope and road would then be rebuilt behind the walls. Drainage measures such as weep holes and culverts will also be integrated into the design. Alternative wall options were considered as part of project planning, such as colored shotcrete, mortared stone, and concrete, but through the value analysis process were determined to be less desirable, particularly due to concerns about cost, visual impact, and longevity.

The most intensive proposed ground disturbance will be for repair of the portion of the road that has failed at Site A. Here the slope has broken and shifted and only a small portion of the upslope lane remains in its original position. Existing damaged culvert pipes, subbase, and paving will be removed, and the associated damaged areas of the road prism fully excavated to stable sediments or bedrock and rebuilt. The road prism will be supported by the soldier pile wall mentioned above and will include at least one drop inlet and associated culvert. The estimated ground disturbance for reconstruction of the road is 2 to 15 feet below surface. On the slope below, various erosion control measures are also proposed, which extend from the road to the bottom of a natural drainage. The proposed construction area is up to 100-170 feet north of the road centerline. Construction in this area will require benching to support heavy equipment, which will be used to install a culvert pipe that includes a protective rock apron on each end. This rockwork will be lined on the bottom with geotextile fabric. A series of existing gabion baskets at the bottom of the damaged culverts will be removed. The benching will be filled and the grade adjusted to natural contour. Erosion control efforts will include placement of fiber rolls and blanketing, planting, and recurring treatments to ensure vegetation growth and slope stability. Anticipated ground disturbance will be a maximum of 5 feet below surface along the slope for benching, while erosion control efforts will generally require 1-2 feet of disturbance below surface. The resulting site area, with its engineered slope and walls, will look significantly different from the original landscape, though will only be visible from adjacent areas on the road.

The project will involve a combination of heavy equipment and hand tools and will require importing thousands of cubic yards of subbase gravels from existing commercial quarries. Equipment and materials staging will occur along the road and associated parking areas. Thousands of cubic yards of removed asphalt, subbase, filter fabric, rock, vegetation, and culvert pipes will be hauled to an existing disposal facility. This work will include use of the currently closed and open portions of the Loop Road and East River Road, which connects to Medora.

Proposed Actions on Loop Road Historic District (32BI1196)

The significant components of the historic district 32BI1196 include the road itself, 24 contributing culverts and headwalls (including two previously documented stone arch culverts [32BI540 and 32BI541]), and two partially mortared stone retaining walls. The proposed undertaking involves various proposed modifications to the road and historically significant components, in addition to adding various modern features (Table 1). Please note that this table includes both the temporary field designation for the features and the architectural feature number assigned as part of the North Dakota cultural resource survey architectural form for the district. The adverse effect was determined particularly from addition of various retaining walls,

replacement of corrugated pipe culverts with concrete, upsizing some culverts, and combining the one triple-pipe culvert into a single large culvert. Notably, the proposed undertaking includes some repairs to historic structures, including 32BI1196 Features 2, 3 (32BI540), 28, and 29 (32BI541), which are the best preserved and largest examples from the period of significance. This includes repointing mortar, replacing displaced rocks, removing accumulated sediment, and reducing accumulated hazard fuels in the immediate area. Repair actions vary slightly between features.

Table 1. Contributing Features of 32BI1196 (Loop Road) Impacted by the Undertaking.

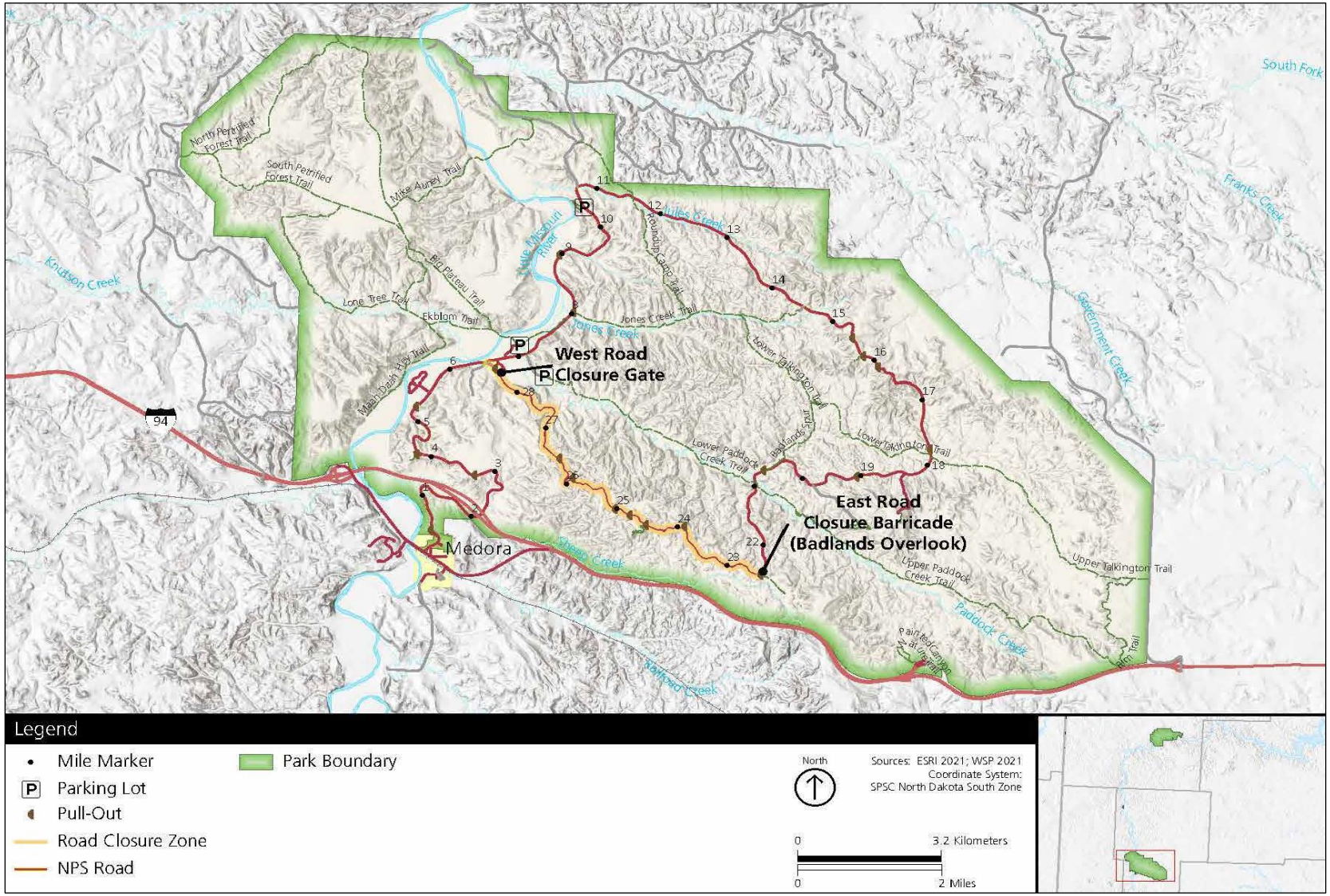
Feature Number	Field Designation	Type	Project Activity
2	THRO LR2	Stone arch culvert	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions
3	THRO LR2.5 (32BI540)	Stone arch culvert	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions
4	THRO LR3	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pipe, rebuild headstone with salvaged stone
5	THRO LR4	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pipe, preserve wall as much as possible/repair as needed
6	THRO LR8	Corrugated metal pipe culvert, 18-inch diameter	Replace with 18-inch concrete pipe, rebuild headwall with salvaged stone
7	THRO LR5	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch concrete pipe, rebuild headwall with salvaged stone
8	THRO LR6	Corrugated metal pipe culvert, 36-inch diameter	Replace with 36-inch diameter concrete pipe, rebuild headwall with salvaged stone
9	THRO LR7	Corrugated metal pipe culvert, 18-inch diameter	Upsize with 24-inch diameter concrete pipe, rebuild headwall with salvaged stone
10	THRO LR14	Plastic pipe culvert with stone headwall	Heavily damaged surrounding slope, particularly erosion below outlet. Headwall will not be preserved. A pipe run down will be installed in this location, out falling well below the existing outlet, and the existing culvert will be removed.
11	THRO LR13	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pipe, rebuild headwall, with salvaged stone, and install riprap on the outlet

Feature Number	Field Designation	Type	Project Activity
12	THRO LR12	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pipe, rebuild headwall with salvaged stone, install riprap on downstream side and rundowns
13	THRO LR11	Concrete pipe culvert, 36-inch diameter	Replace with 36-inch diameter concrete pipe, rebuild headwall with salvaged stone
14	THRO LR10	Concrete pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pip, rebuild headwall on south side with salvaged stone
15	THRO LR9	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch concrete pipe, rebuild headwall with salvaged stone
16	THRO LR23	Corrugated metal pipe culvert, unclear diameter (damaged)	Upsize to 30-inch diameter concrete pipe, rebuild headwall with salvaged stone, potentially install additional culverts
17	THRO LR22	Plastic pipe culvert with stone headwall, unclear diameter (damaged)	Upsize to 30-inch diameter concrete pipe, rebuild headwall with salvaged stone, potentially install additional culverts
18	THRO LR21	Corrugated metal pipe culvert, 18-inch diameter	Upsize to 24-inch diameter concrete pipe, rebuild headwall with salvaged stone
19	THRO LR20	Stone retaining wall	Repoint mortar and return any displaced rocks to their original positions
20	THRO LR19	Corrugated metal pipe culvert, 30-inch diameter	Replace with 30-inch concrete pipe, rebuild headwall with salvaged stone
21	THRO LR18	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch concrete pipe, rebuild headwall with salvaged stone
22	THRO LR17	Stone retaining wall	Repoint mortar and return any displaced rocks to their original positions
23	THRO LR16	Corrugated metal pipe culvert, 24-inch diameter	Replace with a 24-inch diameter concrete pipe, rebuild headwall with salvaged stone
24	THRO LR15	Triple corrugated metal pipe culvert, 18-inch diameter	Replace with single 42-inch diameter concrete pipe or four 18-inch diameter concrete pipes, rebuild headwall with salvaged stone
25	THRO LR24	Corrugated metal pipe culvert, 18-inch diameter, with large stone wall on outlet side	Remove culvert, rehabilitate stone wall, and redirect flows to new 24-inch diameter concrete pipe outside of the limits of the existing culvert and associated stone wall

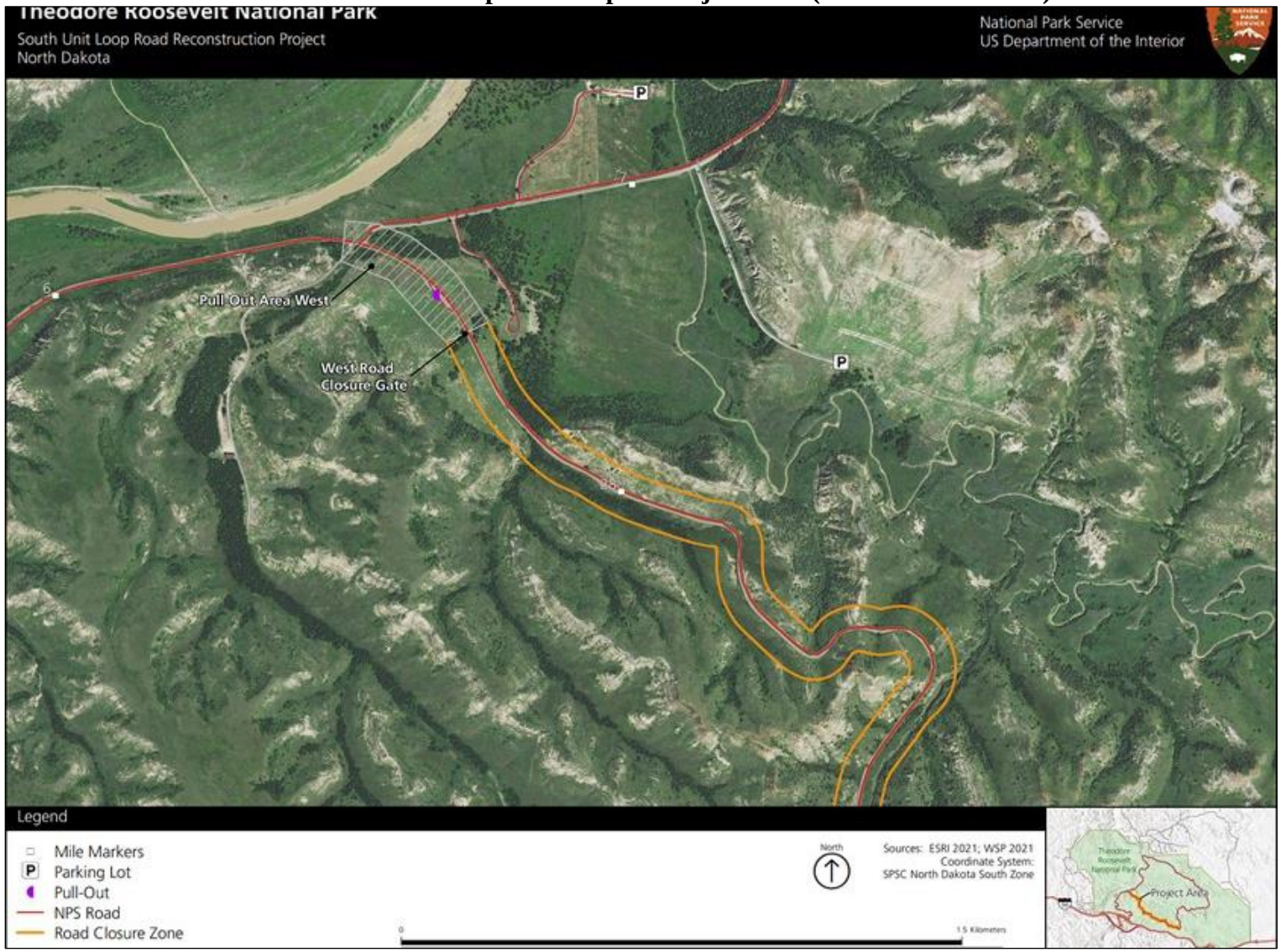
Feature Number	Field Designation	Type	Project Activity
26	THRO LR25	Corrugated metal pipe culvert, 24-inch diameter	Replace with 24-inch diameter concrete pipe, rebuild headwall with salvaged stone
27	THRO LR26	Corrugated metal pipe culvert, 18-inch diameter	Replace with 18-inch concrete pipe, rebuild headwall with salvaged stone, and install additional adjacent culvert
28	THRO LR27	Stone arch culvert	Repoint mortar
29	32BI541	Large stone arch culvert	Clean out accumulated sediment, repoint mortar, and return displaced rocks to their original positions
	Scenic Loop Drive Road	Road alignment and associated prism	Replace with new road along same alignment, additional culverts including some drop inlets, install six soldier pile walls with wood lagging, improve and expand Site 7 parking area, place riprap or vegetation in strategic locations to slow stormwater and reduce erosion, and place additional curbing.

The Park and design team advocated for the minimum amount of disturbance to historical components of the district by clarifying the need for drainage improvements and road modifications, particularly installation of the soldier pile walls. This included not installing walls, or construction walls built with shotcrete textured and colored to look similar to the surrounding soils. These options were both determined to result in further deterioration of the road and could not be constructed to appear natural and consistent with the surrounding landscape. Each existing culvert was assessed in hydrological detail, and some culverts initially proposed for upsizing were left the same diameter if adjacent culverts could be used.

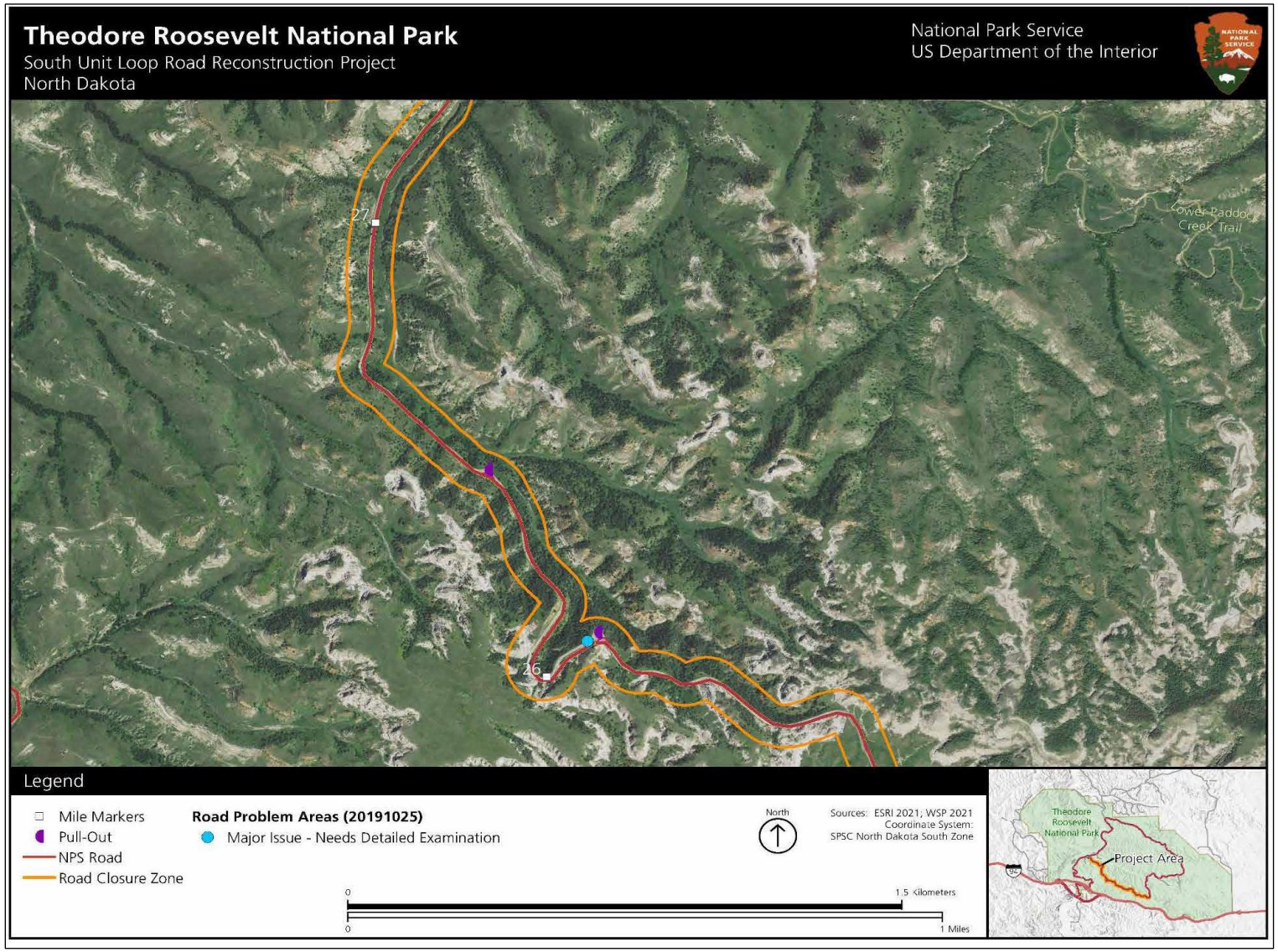
Appendix B: Area of Potential Effects



South Unit Scenic Loop Road Repair Project APE (Road Closure Zone)

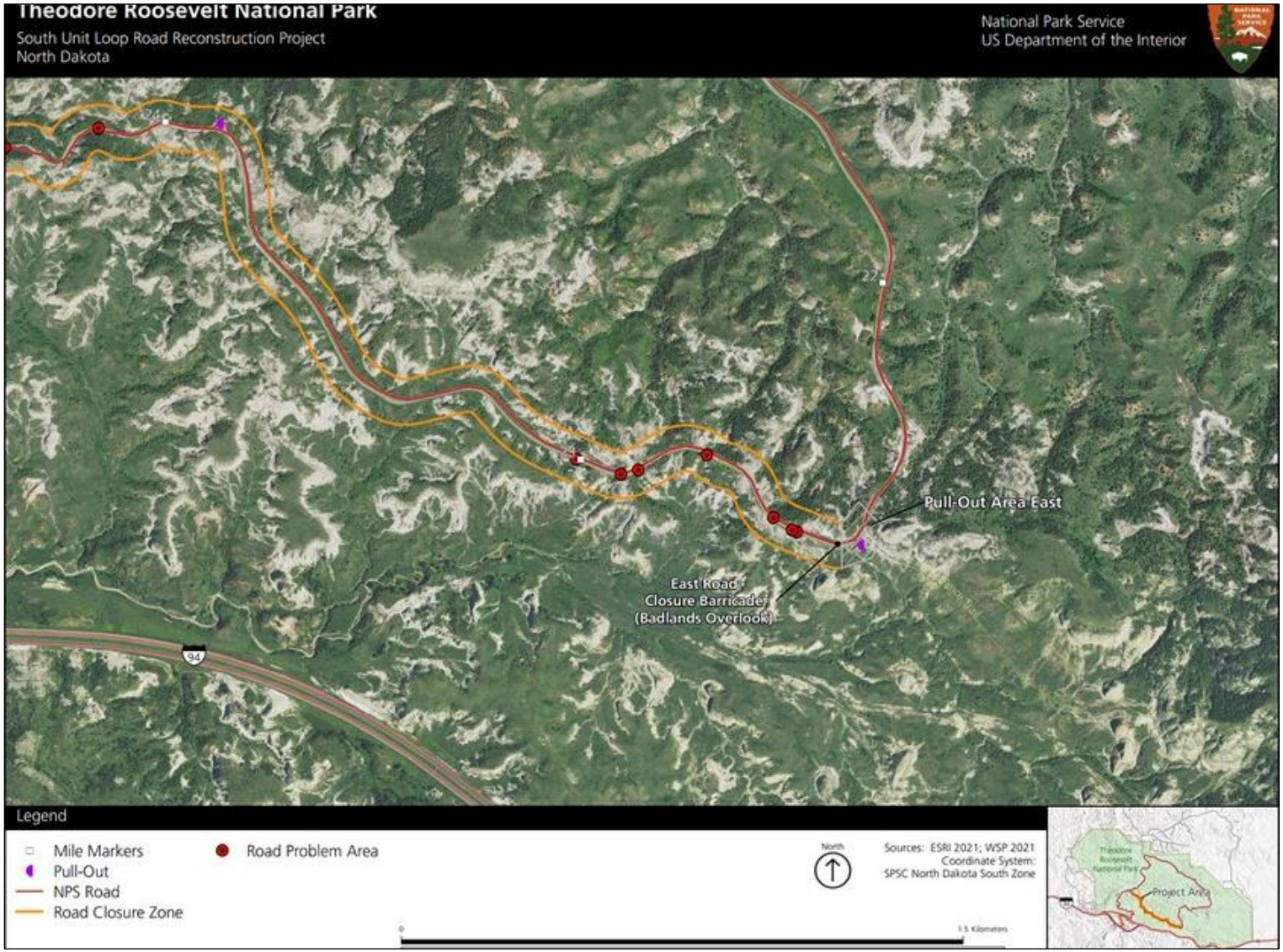


South Unit Scenic Loop Road Repair Project Area: Detail 1



South Unit Scenic Loop Road Repair Project Area: Detail 2

South Unit Scenic Loop Road Repair Project Area: Detail 3



South Unit Scenic Loop Road Repair Project Area: Detail 4

Appendix B: Historic Properties Treatment Plan

1. Historic Road District Treatment Measures
2. Archeological Construction Monitoring
3. Tribal Construction Monitoring
4. Inadvertent Discovery Plan

Please note the cultural resource information contained in these appendixes is protected from public disclosure under 16 U.S.C. Section 470w-3, of the National Historic Preservation Act of 1966, as amended, and 16 U.S.C. Section 470hh, of the Archaeological Resources Protection Act of 1979. As such, the associated details are not included in this public review copy of the environmental assessment.

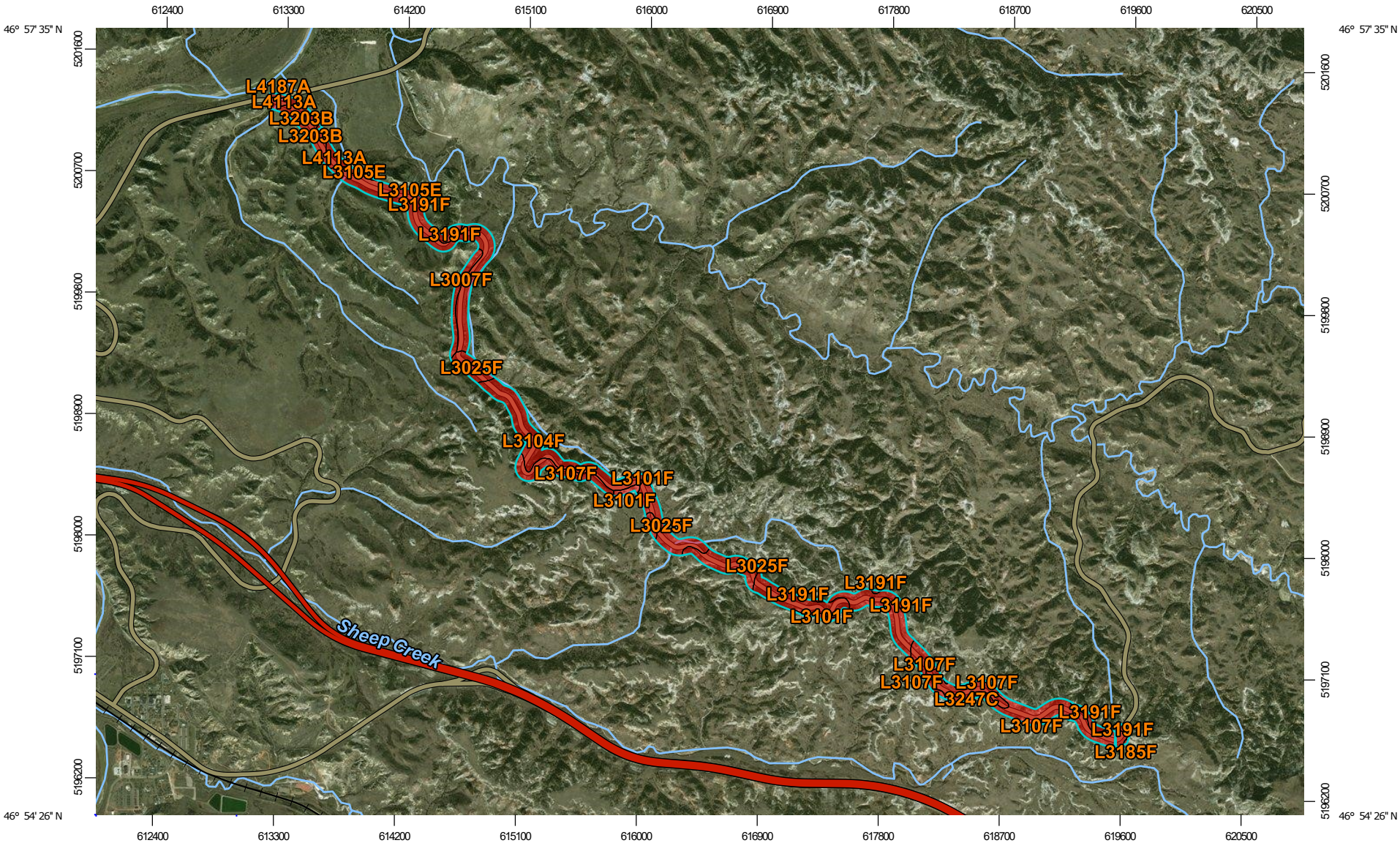
Inadvertent Discoveries

None of the investigations being proposed as a part of this project are intended or designed to excavate, uncover, disturb or remove Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony. In the event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are unintentionally exposed by some aspect of research in this study, procedures identified in "Guidance for National Park Service Compliance with the Native American Graves Protection and Repatriation Act (NAGPRA), NPS Cultural Resource Management Guideline, Appendix R will be followed.

If Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony are inadvertently discovered, the project archeologist or tribal monitor must stop work and immediately notify the superintendent by telephone and confirm in writing. The project archeologist or tribal monitor will immediately stop all ground disturbing activities in the area of the inadvertent discovery and make a reasonable effort to protect the remains and objects from further disturbance. As soon as possible, but not later than three working days after receipt of the written confirmation of notification, the superintendent must certify receipt of the written notification, further secure and protect the remains and/or items, and notify lineal descendants, and the appropriate Indian tribes about the inadvertent discovery. If appropriate, the cultural items may be stabilized or covered to ensure their protection and to protect them from public viewing. The superintendent will initiate consultation about the cultural affiliation and disposition of Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony. Ground disturbance in the area of the inadvertent discovery will not continue until a written agreement is executed between the NPS and the affiliated Indian tribe (s) that allows the Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony to remain safely *in situ* or that adopts a recovery plan for the excavation or removal of the remains and objects. The disposition of all Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony will be carried out according to the priority listing in the regulations [43 CFR 10.6].

APPENDIX C
NATURAL RESOURCES CONSERVATION SERVICE
SOIL DATA EXPLORER:
SUITABILITIES AND LIMITATIONS RATINGS

Local Roads and Streets—Billings County, North Dakota
(THRO SULR Project Area)



Map Scale: 1:41,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Lines

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Points

Very limited

Somewhat limited

Not limited

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Billings County, North Dakota
Survey Area Data: Version 23, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 9, 2015—Jul 1, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Local Roads and Streets

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
L3007F	Kirby-Badland-Patent complex, 9 to 70 percent slopes	Very limited	Kirby, channery loam (38%)	Slope (1.00)	8.6	2.9%
				Large stones (0.66)		
				Frost action (0.50)		
			Badland (25%)	Depth to soft bedrock (1.00)		
				Low strength (1.00)		
				Slope (1.00)		
			Patent, badland fan ESD (20%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Cabbart (10%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Lonna (4%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Maltese (3%)	Low strength (1.00)		
				Shrink-swell (0.99)		
				Slope (0.37)		
L3025F	Lonna-Kirby-Cabbart complex, 2 to 50 percent slopes	Very limited	Lonna (35%)	Slope (1.00)	27.8	9.2%
				Low strength (1.00)		
				Frost action (0.50)		
			Kirby, channery loam (34%)	Slope (1.00)		
				Large stones (0.61)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Frost action (0.50)		
			Cabbart (17%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Kremlin (8%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.04)		
			Maltese (4%)	Low strength (1.00)		
				Shrink-swell (1.00)		
			Rock outcrop, porcelanite (2%)	Large stones (1.00)		
				Slope (1.00)		
L3101F	Badland-Cabbart complex, 6 to 70 percent slopes	Very limited	Badland (60%)	Depth to soft bedrock (1.00)	31.2	10.4%
				Low strength (1.00)		
				Slope (1.00)		
			Cabbart (30%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Patent, badland fan ESD (3%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.04)		
			Arikara, low precipitation (3%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.03)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Boxwell (2%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Rock outcrop, porcelanite (2%)	Large stones (1.00)		
				Slope (1.00)		
L3104F	Kirby-Arikara-Badland complex, 9 to 70 percent slopes	Very limited	Kirby, channery loam (42%)	Slope (1.00)	38.8	12.9%
				Large stones (0.66)		
				Frost action (0.50)		
			Arikara, low precipitation (27%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.05)		
			Badland (16%)	Depth to soft bedrock (1.00)		
				Low strength (1.00)		
				Slope (1.00)		
			Patent, badland fan ESD (7%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.04)		
			Lonna (4%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.37)		
			Cabbart (4%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
L3105E	Badland-Patent complex, 6 to	Very limited	Badland (55%)	Depth to soft bedrock (1.00)	1.3	0.4%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
	25 percent slopes			Low strength (1.00)		
				Slope (1.00)		
			Patent, badland fan ESD (31%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Lonna (5%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Cabbart (5%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Rock outcrop, porcelanite (2%)	Large stones (1.00)		
				Slope (1.00)		
			Patent, frequently flooded, flat bottom draw ESD (2%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
L3107F	Cabbart-Badland complex, 6 to 70 percent slopes	Very limited	Cabbart (50%)	Depth to soft bedrock (1.00)	69.4	23.1%
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Badland (25%)	Depth to soft bedrock (1.00)		
				Low strength (1.00)		
				Slope (1.00)		
			Patent, badland fan ESD (10%)	Low strength (1.00)		
				Frost action (0.50)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Slope (0.04)		
			Boxwell (5%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Kirby, channery loam (4%)	Slope (1.00)		
				Large stones (0.61)		
				Frost action (0.50)		
			Kremlin (4%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.04)		
			Gerda (2%)	Low strength (1.00)		
				Shrink-swell (0.75)		
L3185F	Patent-Badland-Cabbart complex, 6 to 50 percent slopes	Very limited	Patent, badland fan ESD (35%)	Low strength (1.00)	55.4	18.4%
				Frost action (0.50)		
				Slope (0.37)		
			Cabbart (20%)	Depth to soft bedrock (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Badland (20%)	Depth to soft bedrock (1.00)		
				Low strength (1.00)		
				Slope (1.00)		
			Lonna (10%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Boxwell (4%)	Low strength (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Frost action (0.50)		
				Slope (0.37)		
			Gerda (4%)	Low strength (1.00)		
				Shrink-swell (0.75)		
			Patent, frequently flooded, flat bottom draw ESD (3%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Kirby, channery loam (2%)	Slope (1.00)		
				Large stones (0.61)		
				Frost action (0.50)		
			Arikara, low precipitation (2%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.03)		
L3191F	Badland-Arikara-Cabbart complex, 15 to 70 percent slopes	Very limited	Badland (30%)	Depth to soft bedrock (1.00)	29.6	9.8%
				Low strength (1.00)		
				Slope (1.00)		
			Arikara, low precipitation (27%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.06)		
			Cabbart (17%)	Slope (1.00)		
				Depth to soft bedrock (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Patent, badland fan ESD (10%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Lonna (6%)	Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Boxwell (5%)	Low strength (1.00)		
				Frost action (0.50)		
				Slope (0.37)		
			Patent, frequently flooded, flat bottom draw ESD (5%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.40)		
L3203B	Lonna silt loam, 0 to 6 percent slopes	Very limited	Lonna (85%)	Low strength (1.00)	8.8	2.9%
				Frost action (0.50)		
				Shrink-swell (0.50)		
			Patent, occasionally flooded (5%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.50)		
			Ethridge (5%)	Shrink-swell (1.00)		
				Low strength (1.00)		
			Lonna (3%)	Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.50)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Maltese (2%)	Shrink-swell (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
L3247C	Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes	Very limited	Patent, occasionally flooded (40%)	Flooding (1.00)	15.1	5.0%
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.50)		
			Vanda (25%)	Shrink-swell (1.00)		
				Low strength (1.00)		
			Gerda, severely eroded (15%)	Ponding (1.00)		
				Shrink-swell (1.00)		
				Low strength (1.00)		
			Patent, gullied, occasionally flooded (8%)	Flooding (1.00)		
				Slope (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.50)		
			Benz (5%)	Flooding (1.00)		
				Low strength (0.86)		
				Frost action (0.50)		
			Ethridge (3%)	Shrink-swell (1.00)		
				Low strength (1.00)		
			Sham, occasionally flooded (2%)	Flooding (1.00)		
				Frost action (0.50)		
L4113A	Wolf Point silty clay loam, wooded, 0 to 2 percent	Very limited	Wolf Point, wooded, occasionally flooded (78%)	Shrink-swell (1.00)	8.1	2.7%
				Flooding (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
	slopes, occasionally flooded			Low strength (1.00)		
			Havre, wooded, occasionally flooded (11%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
			Fluvaquents, channeled, frequently flooded (5%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Frost action (1.00)		
				Flooding (1.00)		
			Glendive, wooded, occasionally flooded (4%)	Flooding (1.00)		
				Frost action (0.50)		
			Ethridge (2%)	Shrink-swell (1.00)		
				Low strength (1.00)		
L4121A	Havre silt loam, 0 to 2 percent slopes, occasionally flooded	Very limited	Havre, occasionally flooded (82%)	Flooding (1.00)	5.6	1.9%
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.09)		
			Glendive, occasionally flooded (10%)	Flooding (1.00)		
				Frost action (0.50)		
			Fluvaquents, channeled, frequently flooded (5%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Flooding (1.00)		
				Frost action (0.50)		
			Lallie, occasionally flooded (3%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Shrink-swell (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Frost action (1.00)		
				Flooding (1.00)		
L4187A	Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Very limited	Glendive, occasionally flooded (75%)	Flooding (1.00)	0.9	0.3%
				Frost action (0.50)		
			Hanly, occasionally flooded, mwd (12%)	Flooding (1.00)		
			Havre, occasionally flooded, mwd (8%)	Flooding (1.00)		
				Low strength (1.00)		
				Frost action (0.50)		
				Shrink-swell (0.02)		
			Fluvaquents, channeled, frequently flooded (5%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Flooding (1.00)		
				Frost action (0.50)		
Totals for Area of Interest					**300.9**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Very limited	300.9	100.0%
Totals for Area of Interest	**300.9**	**100.0%**

Description

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Park Service

US Department of the Interior

Theodore Roosevelt National Park
North Dakota

EXECUTIVE ORDER 11990: WETLANDS PROTECTION
and
EXECUTIVE ORDER 11988: FLOODPLAIN MANAGEMENT

South Unit Loop Road Reconstruction Project
Wetlands and Floodplains Statement of Findings

Theodore Roosevelt National Park
Billings County, North Dakota

Recommended: Superintendent, Theodore Roosevelt National Park Date

Certification of Technical Adequacy and Service-wide Consistency

Concurred: Chief, Water Resources Division Date

Approved: Director, Midwest Region Date

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INTRODUCTION

The National Park Service (NPS) is proposing to reconstruct portions of Scenic Loop Drive (also known as Loop Road) in the South Unit of Theodore Roosevelt National Park (the park). The park is located near Medora, North Dakota, approximately 133 miles west of Bismarck, North Dakota, and 130 miles south of Williston, North Dakota. Scenic Loop Drive is one of the oldest sections of road in the South Unit; however, large-scale rehabilitation work has not been performed on the road in 20 years. During previous maintenance and repair efforts, subgrade and stormwater management issues were identified but were not fully addressed. As a result, areas of the road have succumbed to landslides and other damage over time. The proposed project would reconstruct 6.15 miles of Scenic Loop Drive to provide long-term, sustainable access for future visitor use. The project would also include improvements to pullouts along the road and improvements to parking areas.

PROJECT BACKGROUND

The Federal Highway Administration, Central Federal Lands Highway Division, in partnership with NPS, proposes to stabilize sections of failed roadway embankment along Scenic Loop Drive between mile marker 22 and mile marker 28. Landslides of various magnitudes and poor subgrade material within the park have affected the road for many years. A 150-foot section of Scenic Loop Drive collapsed in spring 2019, requiring closure of the roadway (figure 1). Subsequent sinkholes in the road required further closures. In fall 2019, the park found two areas of potential roadway failure at Scoria Point and West Ridgeline, with other areas of concern identified. These areas of concern showed continued deterioration when reassessed in winter 2019-2020. Geotechnical and pavement engineering studies along Scenic Loop Drive have recommended 6.15 miles of roadway for reconstruction, including bank stability repairs, roadway deep patches, drainage improvements, and slope regrading.

Historically, sections of Scenic Loop Drive have failed because of subsurface water conditions and existing culverts partially or fully filled with sediment. Several active seeps (i.e., wetlands where groundwater reaches the surface through an aquifer) have been observed, and it is assumed that most of the areas displaying embankment failure are experiencing a loss of strength because of high moisture content under the road surface.

FIGURE 1. A FAILED SECTION OF SCENIC LOOP DRIVE FROM A LANDSLIDE

APPENDIX D
WETLANDS AND FLOODPLAINS
STATEMENT OF FINDINGS

PURPOSE OF AND NEED FOR THE PROJECT

The purpose of the project is to restore access to park resources in the South Unit by providing a stable and more sustainable roadway that addresses visitor and staff safety, enhances the visitor's experience, improves efficiencies in park operations, and minimizes impacts on natural and cultural resources.

The project is needed because the existing drainage system cannot convey stormwater runoff from the road surface effectively, resulting in unstable slopes that have damaged pavement along Scenic Loop Drive causing partial or total closures. These road closures have adversely impacted visitor enjoyment of the area and the park's ability to provide visitor services because portions of the road are currently unstable, inaccessible, and unsafe (figures 2 through 5).

PROJECT AREA

The project area is 6.15 miles of Scenic Loop Drive located southeast of East River Road and approximately 6.5 miles from Medora, North Dakota (figure 6). The project area consists of a 400-foot-wide corridor (i.e., approximately 200 feet from the centerline on each side of the road). The project area also includes several locations beyond the 400-foot-wide corridor to allow for adequate stormwater drainage.

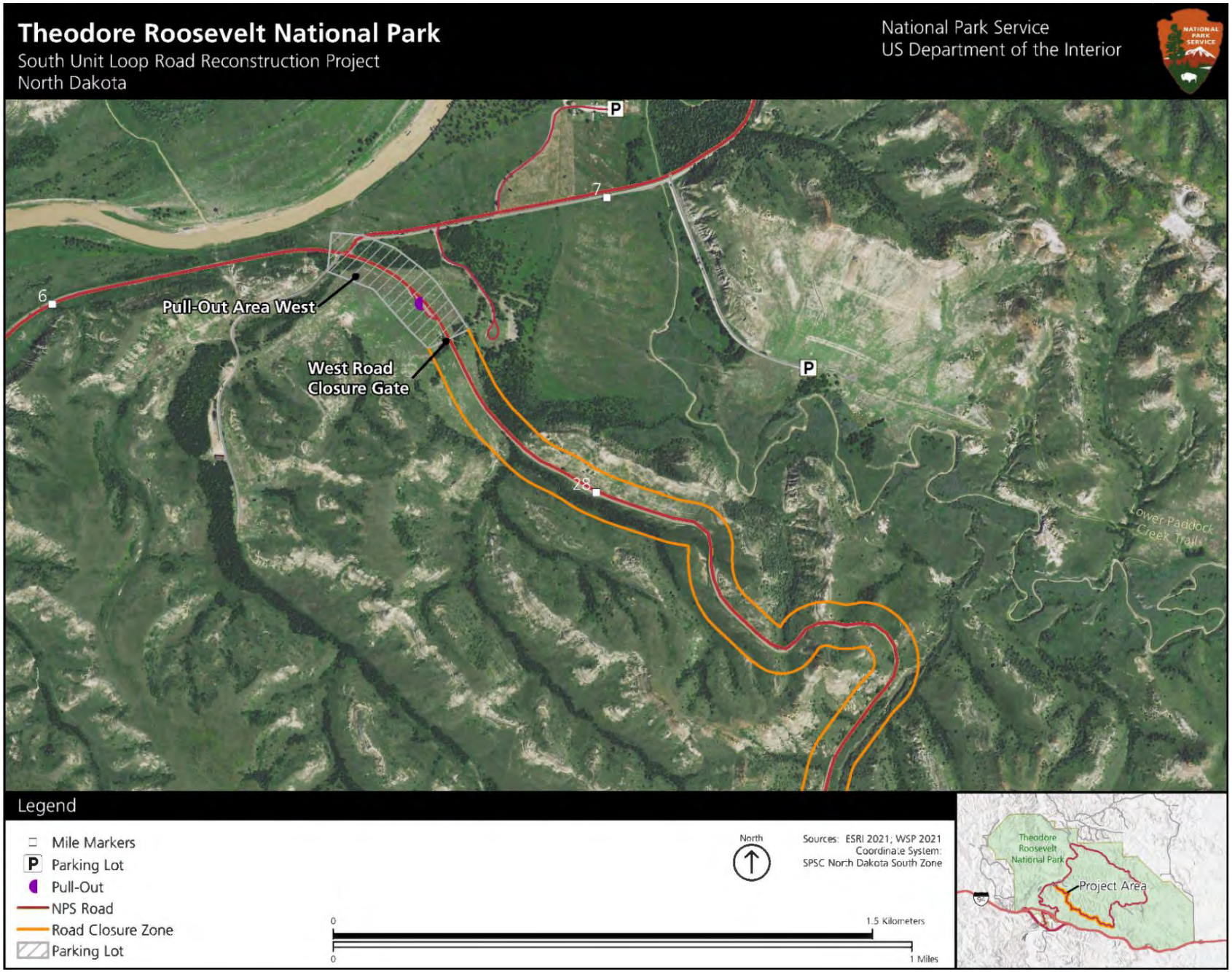

FIGURE 2. ROAD PROBLEM AREAS: WEST

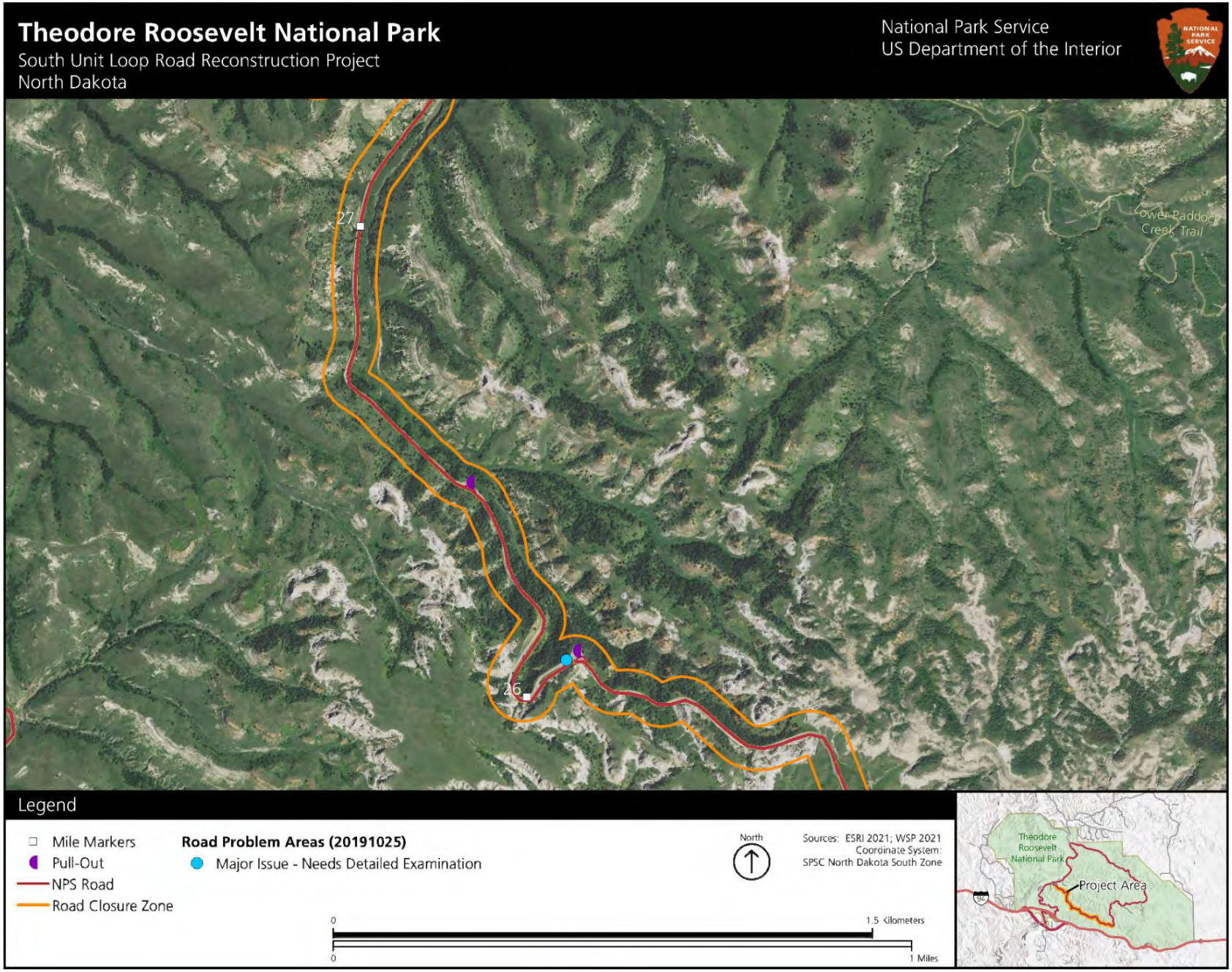

FIGURE 3. ROAD PROBLEM AREAS: WEST-CENTRAL

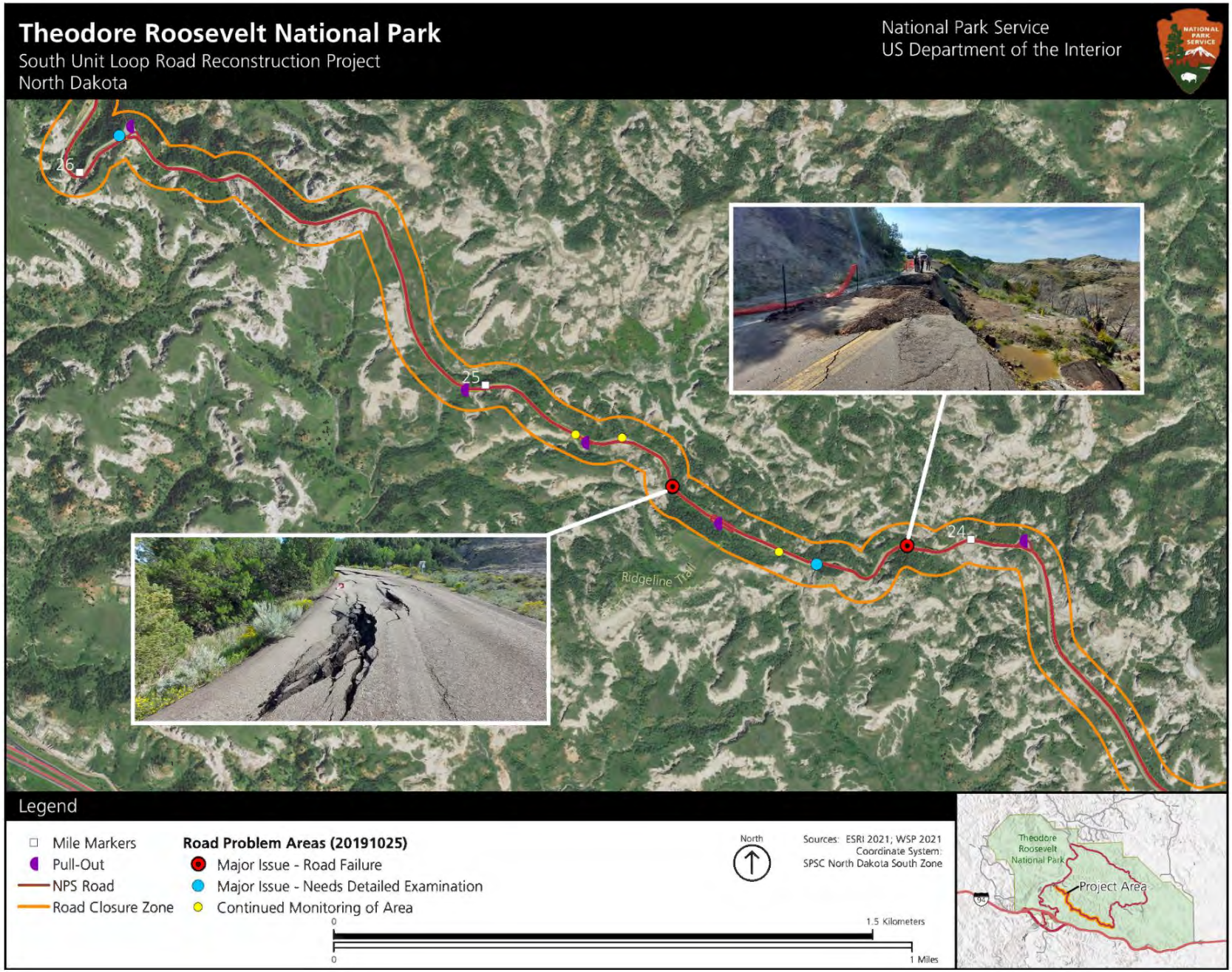

FIGURE 4. ROAD PROBLEM AREAS CENTRAL-EAST

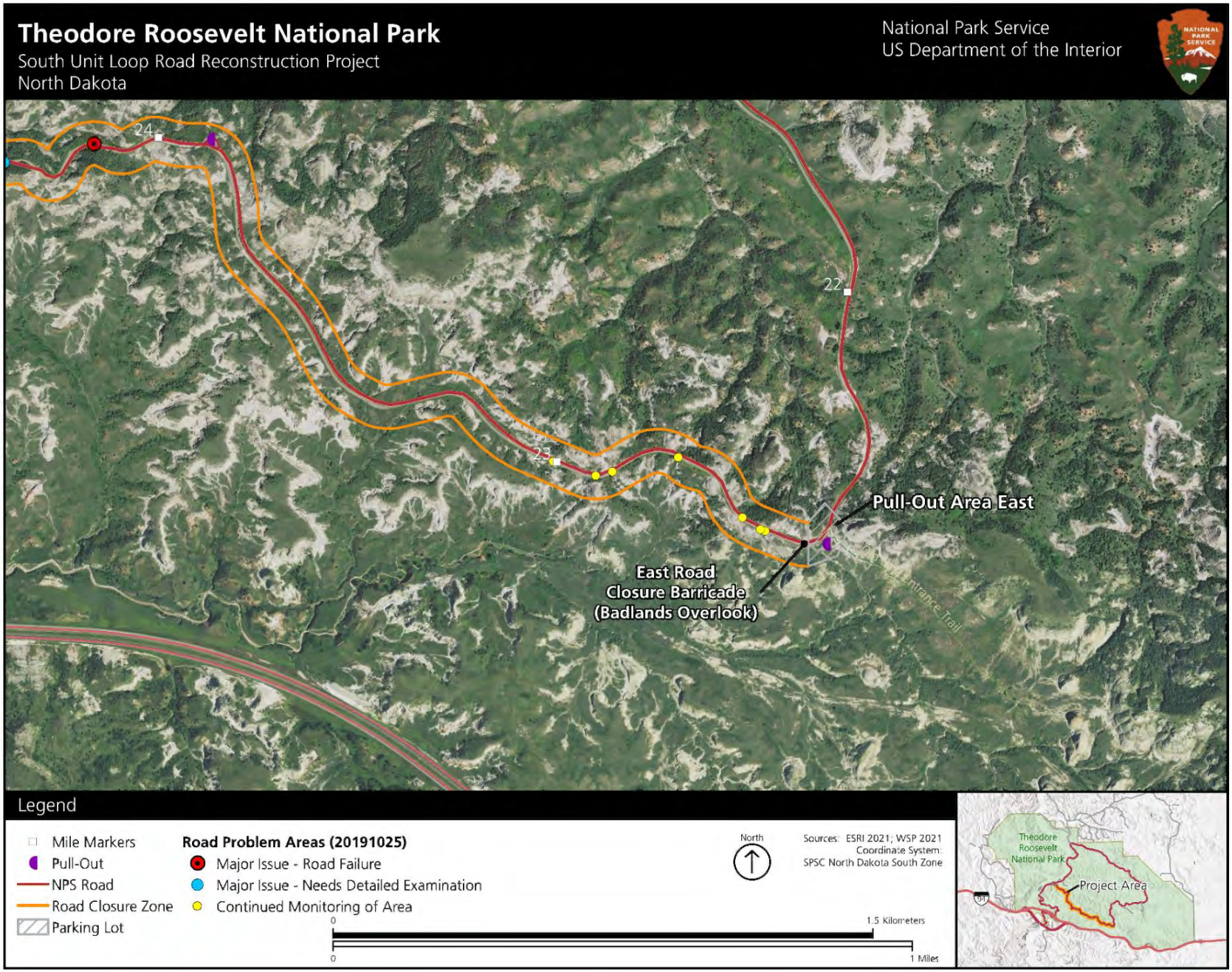

FIGURE 5. ROAD PROBLEM AREAS: EAST

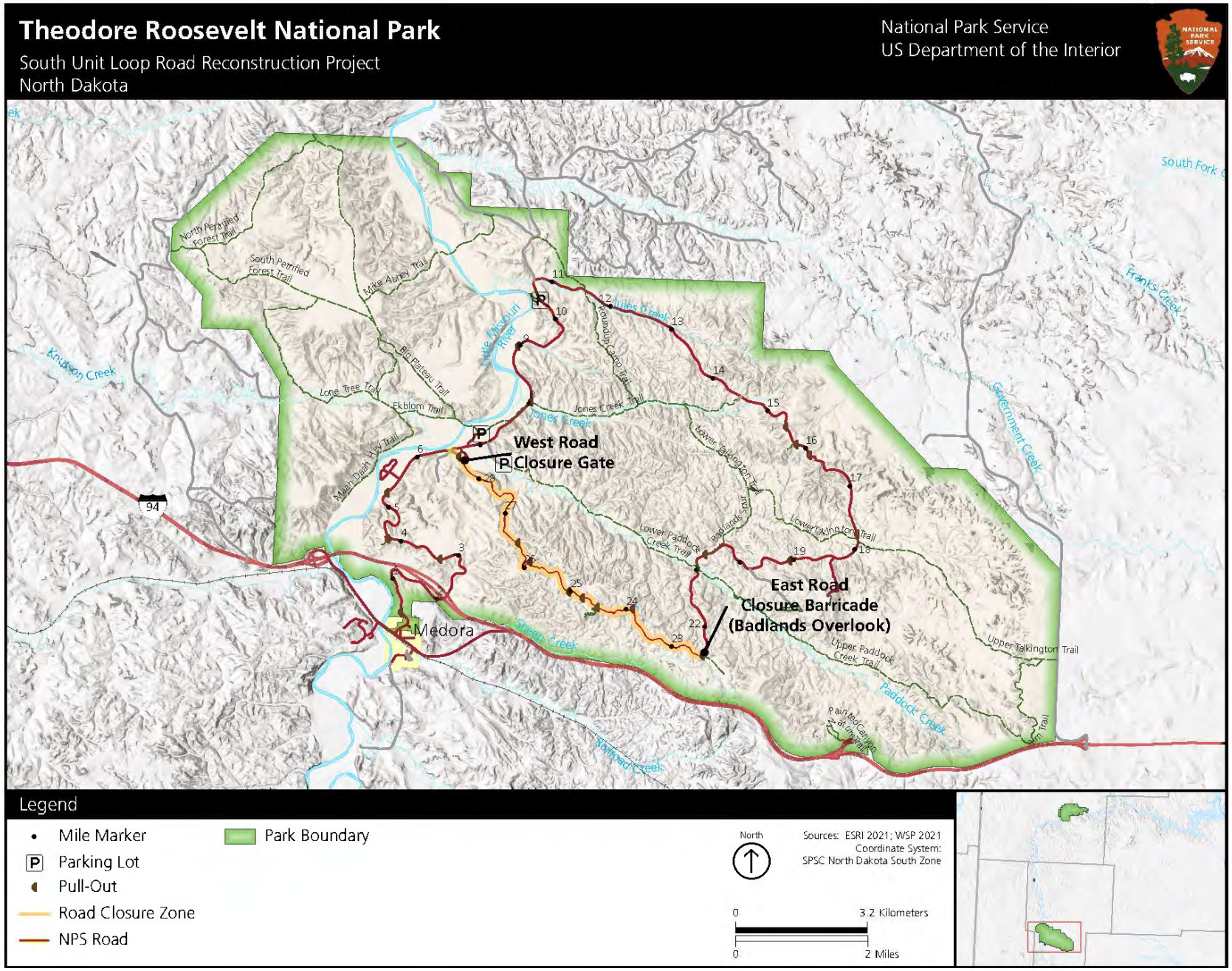

FIGURE 6. PROJECT AREA IN THE SOUTH UNIT

Wetlands

A certified wetland delineator delineated wetland and stream boundaries in September 2021 to identify these resources within the project area. Prior to the delineation, the delineator completed a desktop review to identify the potential wetlands that may be present near the project. He reviewed existing maps and databases, including aerial imagery, US Geological Survey (USGS) 7.5-minute quadrangle maps, the Billings County soil survey (online using the US Department of Agriculture-Natural Resources Conservation Service Web Soil Survey [USDA-NRCS n.d.]), the National Wetlands Inventory (USFWS 2020), and the National Hydrography Dataset (USGS n.d.). Delineation procedures followed the protocols of NPS Director's Order #77-1: *Wetland Protection*.

The classification of all waters, wetlands, and uplands were based on field observations and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). As part of the wetland delineation, the delineation team recorded vegetative community types, inventoried dominant plant species, described the wetlands, and noted open waters. Additionally, they documented soil profiles and hydrologic indicators.

The wetland delineation identified 11 palustrine emergent (PEM) wetlands within the project area, totaling approximately 0.31 acres. These wetlands are listed in table 1 along with supplemental information collected during the delineation. Figures 7a through 7f show the locations and classifications of the wetlands throughout the project area.

TABLE 1. WETLANDS WITHIN THE PROJECT AREA

Wetland ID	Cowardin Classification[1]	Acres
W1	PEM1A	0.01
W2	PEM1A	0.08
W3	PEM1A	0.02
W4	PEM1A	<0.01
W5	PEM1A	0.06
W6	PEM1A	<0.01
W7	PEM1A	0.03
W8	PEM1A	0.01
W9	PEM1A	0.03
W10	PEM1A	0.01
W11	PEM1A	0.04
Total Wetland Acres		0.31[2]

[1] Federal Geographic Data Committee (2013) / Cowardin Classification: PEM1A = palustrine emergent persistent temporarily flooded; PEM1B palustrine emergent persistent seasonally saturated.

[2] Wetland area <0.01 calculated as 0.01 acres for calculating overall wetland acreage.

Data regarding the functions and values were collected for each wetland. Descriptions and data on each wetland are provided below. The scientific names and wetland indicator status of vegetation noted during the delineation follow the common name the first time each plant species is referenced. The wetland indicator status is a measure of the relative tendency of a particular species to occur in

wetlands under normal conditions. The following is a summary of the indicator categories and the probability the species is located in a wetland:

- Obligate (OBL) Probability >99%
- Facultative Wetland (FACW) Probability 67–99%
- Facultative (FAC) Probability 34–66%
- Facultative Upland (FACU) Probability 1–33%
- Upland (UPL) Probability <1%

Wetland W1 consisted of seasonally saturated emergent habitat formed in a valley with a relatively flat bottom. Vegetation in the wetland was characterized by common three-square (*Schoenoplectus pungens*; OBL) and prairie cordgrass (*Spartina pectinata*; FACW). Soils in the wetland consisted of 18 or more inches of dark gray to dark grayish brown sandy clay with common (more than 2 and less than 20%) to many (more than 20%), prominent redox concentrations. Soils within most of the wetland were saturated at a depth of 6 inches and exhibited signs of a salt crust on the surface. Based on observed conditions, it appeared that wetland W1 receives surface water runoff from adjacent uplands and periodically from wetland W2. The area between the two wetlands exhibited hydric soil conditions but did not exhibit wetland hydrology, vegetation, or indications of concentrated flow (i.e., channel). Excess surface water from wetland W1 flowed into an intermittent stream (stream S5) located at the east side of the wetland, which subsequently flowed into Paddock Creek.

The wetland was determined to provide sediment retention and stabilization, as well as nutrient production and export into stream S5. The primary hydrologic function provided by the wetland is groundwater recharge. The wetland offers habitat for small terrestrial species but is not capable of retaining surface water for long durations to accommodate aquatic organisms. The wetland is not visible from Scenic Loop Drive but provides a unique and rare habitat for the surrounding landscape.

Wetland W2 consisted of seasonally saturated emergent habitat formed along an intermittent stream (stream S6). The wetland is located within a valley at the terminus of stream S6, upgradient of wetland W1. Vegetation in the wetland was characterized by common three-square with some curly-cup gumweed (*Grindelia squarrosa*; UPL). Soils within the wetland consisted of 18 or more inches of dark grayish brown sandy clay with common, prominent redox concentrations. Soil was not inundated or saturated within 18 inches of the surface. A salt crust was observed on the soil surface throughout the extent of the wetland. Based on observed conditions, wetland W2 appeared to receive surface water runoff from adjacent uplands and stream S6, and excess surface water from the wetland flowed into wetland W1 via overland sheet flow.

This wetland provides sediment retention and soil stabilization to the area and protects stream S6 from scouring during periods of flow. Hydrologic functions performed by this wetland include groundwater recharge and floodwater attenuation. The wetland provides habitat for small terrestrial species but is not capable of retaining surface water for long durations to accommodate aquatic organisms. The wetland is not viewable from Scenic Loop Drive but provides a unique and rare habitat for the surrounding landscape.

Wetland W3 consisted of seasonally saturated emergent habitat associated with a groundwater seep located on a hillside adjacent to Scenic Loop Drive. Vegetation in the wetland was characterized by narrowleaf cattail (*Typha angustifolia*; OBL), common three-square, and common spikerush (*Eleocharis palustris*; OBL). Soils within the wetland consisted of approximately 1 to 2 inches of reddish brown to strong brown sandy clay with few (less than 2%) dark gray mottles underlain by 16 or more inches of dark gray sandy clay with common, prominent redox concentrations with fragments of organic material. Soils were typically saturated within 8 inches with a water table at approximately 12 inches, with some areas of standing water perched in tracks left by bison (*Bison*

bison). A salt crust was also observed on the soil surface throughout the wetland. Based on observed conditions, wetland W3 appeared to receive surface water runoff from adjacent uplands and Scenic Loop Drive and groundwater seepage from the hillside. There was no readily apparent outlet for surface water flow from wetland W3 (it appeared isolated).

Wetland W3 provides sediment retention and stabilization along a steep hillside and groundwater filtration as it flowed from the wetland downhill. Habitat provided to small terrestrial species is minimal, and no habitat is provided for aquatic species. The wetland is directly adjacent to the road and offers a visual aesthetic and educational opportunity for visitors.

Wetland W4 consisted of seasonally saturated emergent habitat associated with a groundwater seep located on a hillside along Scenic Loop Drive. Vegetation in the wetland was characterized by sparse patches of alkali cordgrass (*Spartina gracilis*; FACW), with most parts of the wetland characterized by bare soil. Soils within the wetland consisted of approximately 4 to 6 inches of dark grayish brown clay with common, prominent redox concentrations underlain by 6 or more inches of gray clay with common, prominent redox concentrations. Soils were not inundated or saturated within 18 inches. A salt crust was observed on the soil surface throughout the wetland. Based on observed conditions, wetland W4 appeared to receive surface water runoff from adjacent uplands and groundwater seepage from the hillside. There was no readily apparent outlet for surface water flow from wetland W4 (it appeared isolated).

Because of its small size, wetland W4 provides very little in terms of functional value. It provides a small amount of sediment retention along the hillside, along with some groundwater discharge. Habitat for terrestrial species is minimal—no surface water was documented within its boundaries, and vegetation was sparse throughout the wetland. Wetland W4 provides educational opportunities to the public because it is in direct view of Scenic Loop Drive.

Wetland W5 consisted of seasonally saturated emergent habitat formed along an ephemeral stream (stream S8) situated along the toeslope of a forested hillside. Vegetation in the wetland was characterized by foxtail barley (*Hordeum jubatum*; FACW), Nuttall's alkali grass (*Puccinellia nuttalliana*; OBL), curly-cup gumweed, prairie rose (*Rosa arkansana*; FACU), Canada thistle (*Cirsium arvense*; FACU), and green ash (*Fraxinus pennsylvanica*; FAC). Soils within the wetland consisted of 18 or more inches of dark grayish brown clay with common to many, prominent redox concentrations. Soils were not inundated or saturated within 18 inches. Visible indications of wetland hydrology included surface soil cracks and the FAC-Neutral test. Based on observed conditions, wetland W5 appeared to receive surface water runoff from adjacent uplands, and excess surface water from the wetland flowed into an ephemeral stream (stream S8) located at the southeast end of the wetland that subsequently flowed into Paddock Creek.

Wetland W5 provides sediment and retention to stormwater flow received from stream S8, along with groundwater recharge because no outflow location was observed within the wetland boundaries. Hoofprints from bison were observed throughout the wetland, which indicates the wetland may serve as a source of drinking water for surrounding animals following precipitation events. The wetland is not easily identifiable from the road because the view is blocked by trees. The wetland provides a unique habitat and heritage to the park due to its rarity.

Wetland W6 consisted of seasonally flooded emergent habitat formed in a concave portion of a hillside at the terminus of an ephemeral stream (stream S25). Vegetation in the wetland was characterized by narrowleaf cattail. Soils within the wetland consisted of approximately 4 to 8 inches of dark grayish brown silt underlain by 6 or more inches of dark grayish brown clay with common distinct to prominent redox concentrations. The upper silt layer appeared to have been the result of sediment deposition from upgradient erosion. Soils inundated with shallow water (1 to 2 inches) were perched in small depressions within the wetland. Other visible indications of wetland hydrology included surface soil cracks and the FAC-Neutral test. Based on observed conditions,

wetland W6 appeared to receive surface water runoff from adjacent uplands and stream S25, and excess surface water from the wetland flowed downgradient via sheet flow into an ephemeral stream located south of the project area limits and subsequently into Sheep Creek.

Wetland W6 is another small riverine PEM wetland that provides sediment retention for the area and helps prevent sediment from stream S25 from flowing farther downhill. The hydrologic benefits include stormwater flow attenuation and groundwater recharge. The wetland may provide habitat for small terrestrial creatures, but because of its size, it does not likely provide a significant source of usable habitat for larger animals in the area. The wetland is not visible from Scenic Loop Drive but provides a unique and rare habitat type for the surrounding area.

Wetland W7 consisted of seasonally saturated emergent habitat situated in a depressional part of a valley. Vegetation in the wetland was characterized by narrowleaf cattail, Canada thistle, and coastal salt grass (*Distichlis spicata*; FACW). Soils in the wetland consisted of 18 or more inches of dark gray sandy loam with common prominent redox concentrations. The upper silt layer appeared to have been the result of sediment deposition from upgradient erosion. Soils inundated with shallow water (1 to 2 inches) were perched in small depressions within the wetland. Soils were not inundated or saturated within 18 inches. An algal crust was observed covering the soil surface of the wetland. Based on observed conditions, wetland W7 appeared to receive surface water runoff from adjacent uplands, and excess surface water from the wetland flowed downgradient via sheet flow into an ephemeral stream located north of the project area limits and subsequently into Paddock Creek.

This wetland is isolated and does not contain a direct connection to any other surface waterbody. It serves as a sediment retention source and groundwater recharge area. The wetland provides habitat diversity for the surrounding area and may serve as suitable habitat for smaller terrestrial species. Its uniqueness and heritage provide value to the surrounding landscape because of its rarity; however, the wetland is not directly visible to park visitors from Scenic Loop Drive.

Wetland W8 consisted of seasonally saturated emergent habitat situated in a depression. Vegetation in the wetland was characterized by salt grass, foxtail barley, and common spikerush. Soils in the wetland consisted of approximately 3 to 5 inches of very dark brown clay with distinct redox concentrations underlain by 12 or more inches of dark gray clay with common prominent redox concentrations. Soils were not inundated or saturated within 18 inches. Visible indications of wetland hydrology included surface soil cracks and the FAC-Neutral test. Based on observed conditions, wetland W8 appeared to receive surface water runoff from adjacent uplands, and excess surface water from the wetland flowed downgradient via sheet flow into an ephemeral stream located north of the project area limits and subsequently into Paddock Creek.

This wetland is isolated and does not contain a direct connection to any other surface waterbody. It serves as a sediment retention source and groundwater recharge area. The wetland provides habitat diversity for the surrounding area and may serve as suitable habitat for smaller terrestrial species. Its uniqueness and heritage provide value to the surrounding landscape because of its rarity; however, the wetland is not directly visible to park visitors from Scenic Loop Drive.

Wetland W9 consisted of seasonally flooded emergent habitat situated in a depressional area in a valley downgradient of a significant slope failure along the north side of Scenic Loop Drive. The hillside showed evidence of instability (large cracks and soil movement), and sediment from the slope had been discharged into the wetland. Sediment deposition appeared to block an ephemeral stream (stream S31), preventing water from flowing west. There was no significant vegetation in the wetland. Soils in the wetland consisted of recently deposited sediment (dark grayish brown silt, sand, and fine gravel) from the slope failure. Soils were inundated with shallow (approximately 1 to 3 inches) water. Based on observed conditions, it appeared that wetland W9 receives surface water runoff from adjacent uplands and stream S31. At the time of the visit, there was no readily apparent outlet for surface water runoff from the wetland. However, under normal/pre-slope failure

circumstances, excess surface water from wetland W9 appears to flow into an ephemeral stream (stream S30) located to the west and subsequently into Paddock Creek. Delineation of wetland W9 was based on observation of conditions present at the time of the visit and applying best professional judgement to assess the disturbed conditions. It is possible and likely that the characteristics and/or limits of wetland W9 will change over time depending on the nature and extent of disturbance.

Wetland W9 provides sediment and retention to stormwater flow received from stream S31 and groundwater recharge, since no outflow location was observed within the wetland boundaries. The wetland contained a large amount of sediment as a result of the landslide from the road failure uphill. The wetland appears to have prevented the sediment from entering the ravine below, and possibly reaching stream S30. The wetland provides a unique habitat and heritage to the park because of its rarity. The wetland may be visible from Scenic Loop Drive upon completion of the reconstruction work and would provide an educational opportunity to park visitors.

Wetland W10 consisted of seasonally saturated emergent habitat situated in a depressional part of a valley. Vegetation in the wetland was sparse and characterized by narrowleaf cattail and a single cottonwood (*Populus deltoides*; FAC). Soils within the wetland consisted of approximately 4 to 8 inches of dark grayish brown silt with common prominent redox concentrations underlain by 6 or more inches of black peat. The upper silt layer appeared to have been the result of sediment deposition from upgradient erosion. Soils were inundated with shallow (approximately 1 to 3 inches) water. Other visible indications of wetland hydrology included surface soil cracks, sparsely vegetated concave surface, and the FAC-Neutral test. Based on observed conditions, it appeared that wetland W10 receives surface water runoff from adjacent uplands and Scenic Loop Drive, and excess surface water from the wetland flowed downgradient via sheet flow into an ephemeral stream located north of the project area limits and subsequently into Paddock Creek.

This wetland is isolated and does not contain a direct connection to any other surface waterbody. The wetland serves as a sediment retention source and groundwater recharge area. The wetland provides habitat diversity for the surrounding area and may serve as suitable habitat for smaller terrestrial species. Its uniqueness and heritage provide value to the surrounding landscape because of its rarity; however, the wetland is not directly visible to park visitors from Scenic Loop Drive.

Wetland W11 consisted of seasonally saturated emergent habitat situated in a depressional part of a valley with relatively flat topography. Vegetation in the wetland was characterized by salt grass, rough cocklebur (*Xanthium strumarium*; FAC), and Nuttall's alkali grass. Soils in the wetland consisted of 18 or more inches of dark gray sandy clay with common to many, prominent redox concentrations. Soils were not inundated or saturated within 18 inches. Visible indications of wetland hydrology included surface soil cracks and the FAC-Neutral test. Based on observed conditions, it appeared that wetland W11 receives surface water runoff from adjacent uplands and Scenic Loop Drive, and excess surface water from the wetland flowed downgradient via sheet flow into an ephemeral stream located south of the project limits and subsequently into Sheep Creek.

Wetland W11 provides sediment and retention to stormwater flow from a roadside stormwater drain, along with groundwater recharge since no outflow location was observed within the wetland boundaries. The wetland may serve as a source of habitat for small animals, although no evidence was recorded that indicated the presence of standing water in the wetland. The wetland is not easily identifiable from the road because trees block the view. The wetland provides a unique habitat and heritage to the park because of its rarity.

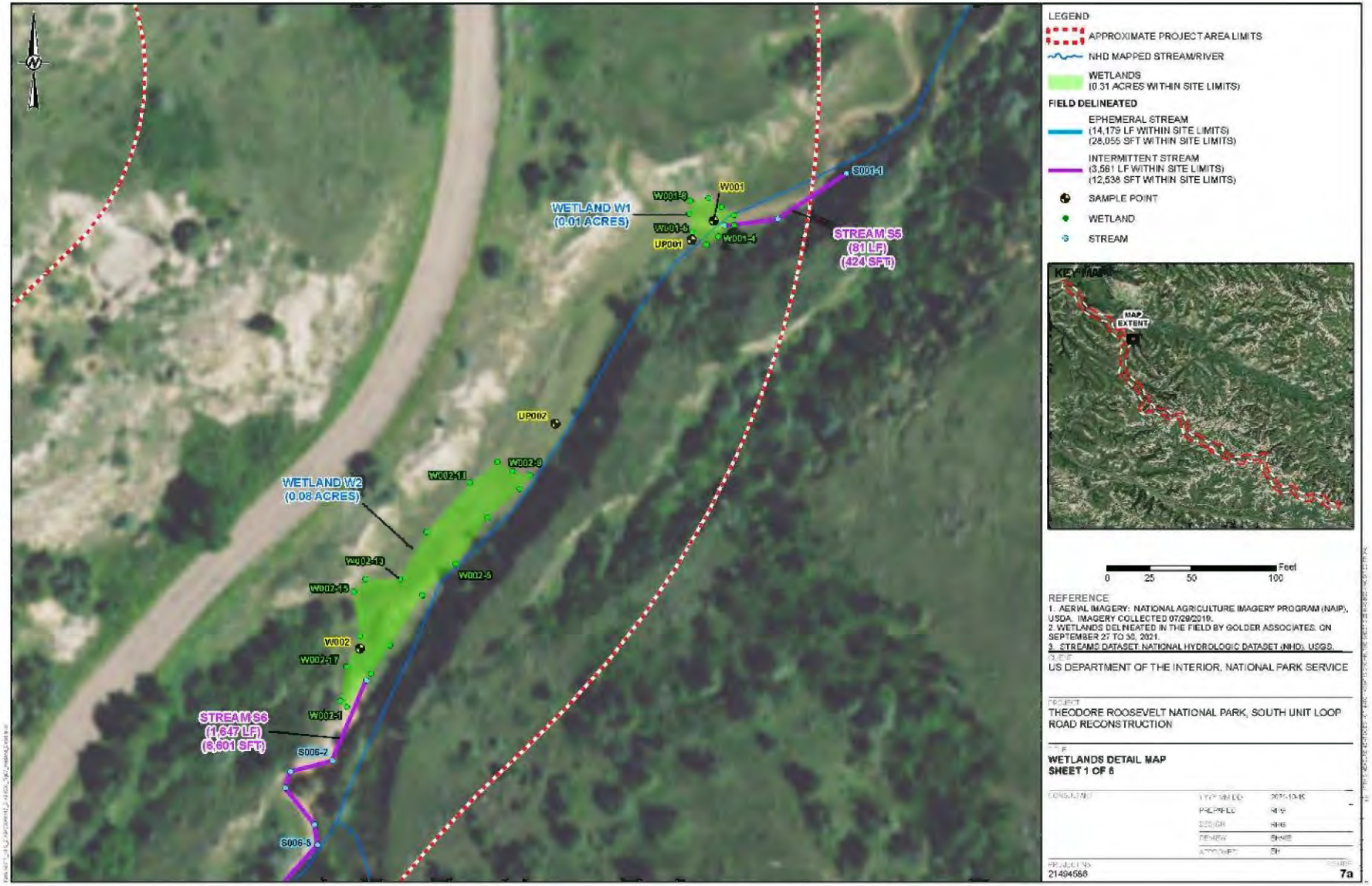

FIGURE 7A. WETLANDS DETAIL MAP

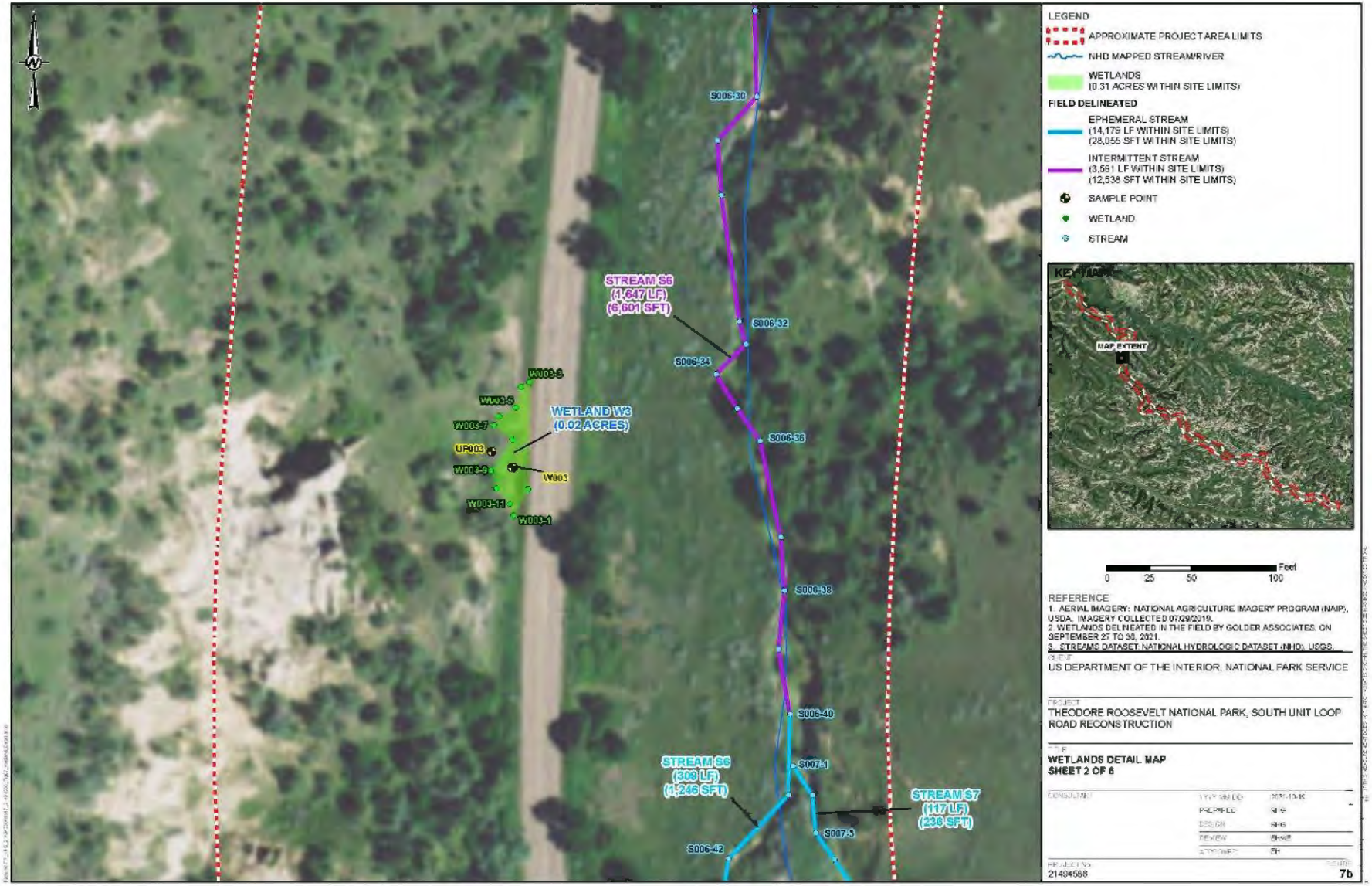

FIGURE 7B. WETLANDS DETAIL MAP

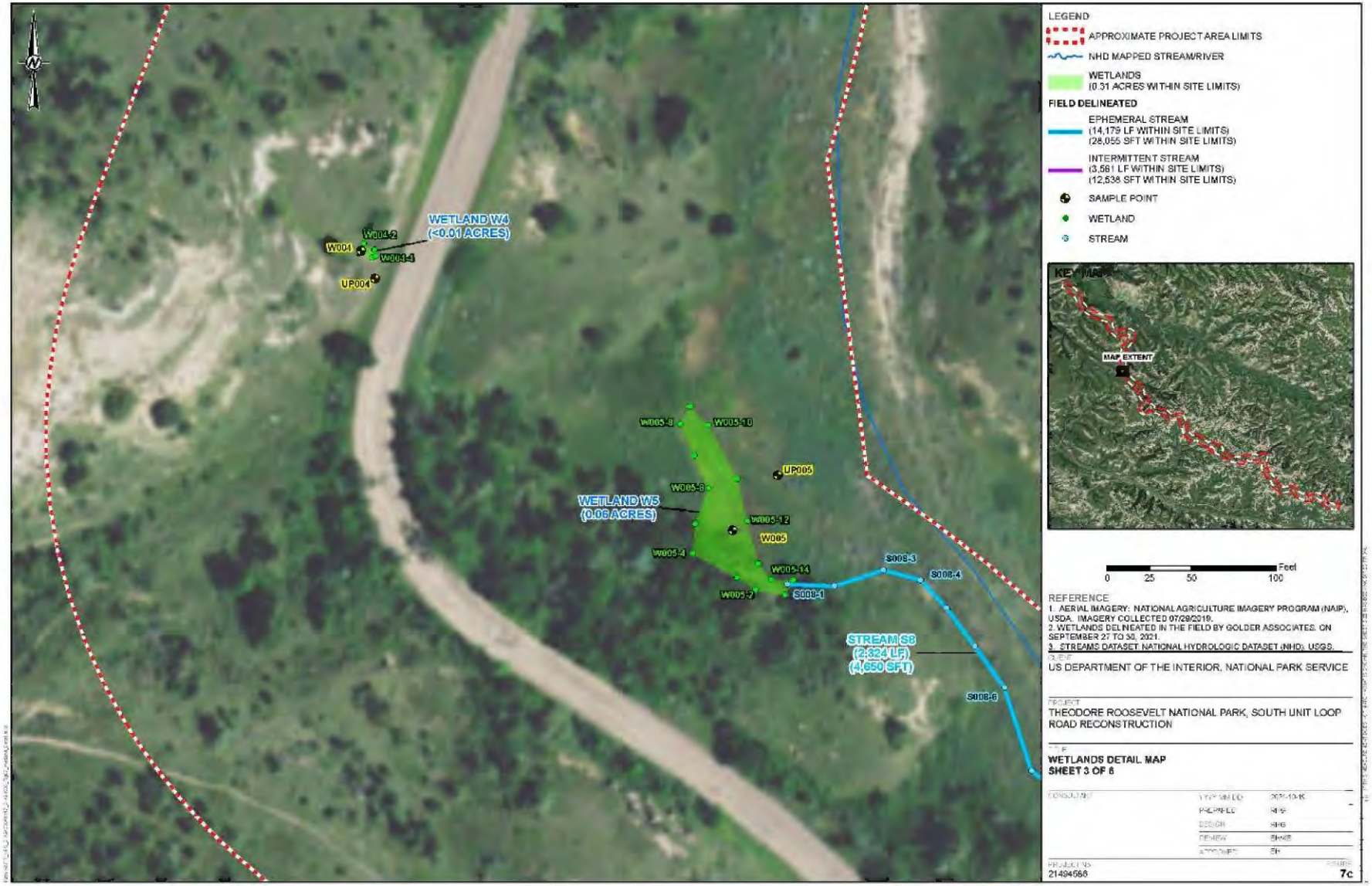

FIGURE 7C. WETLANDS DETAIL MAP

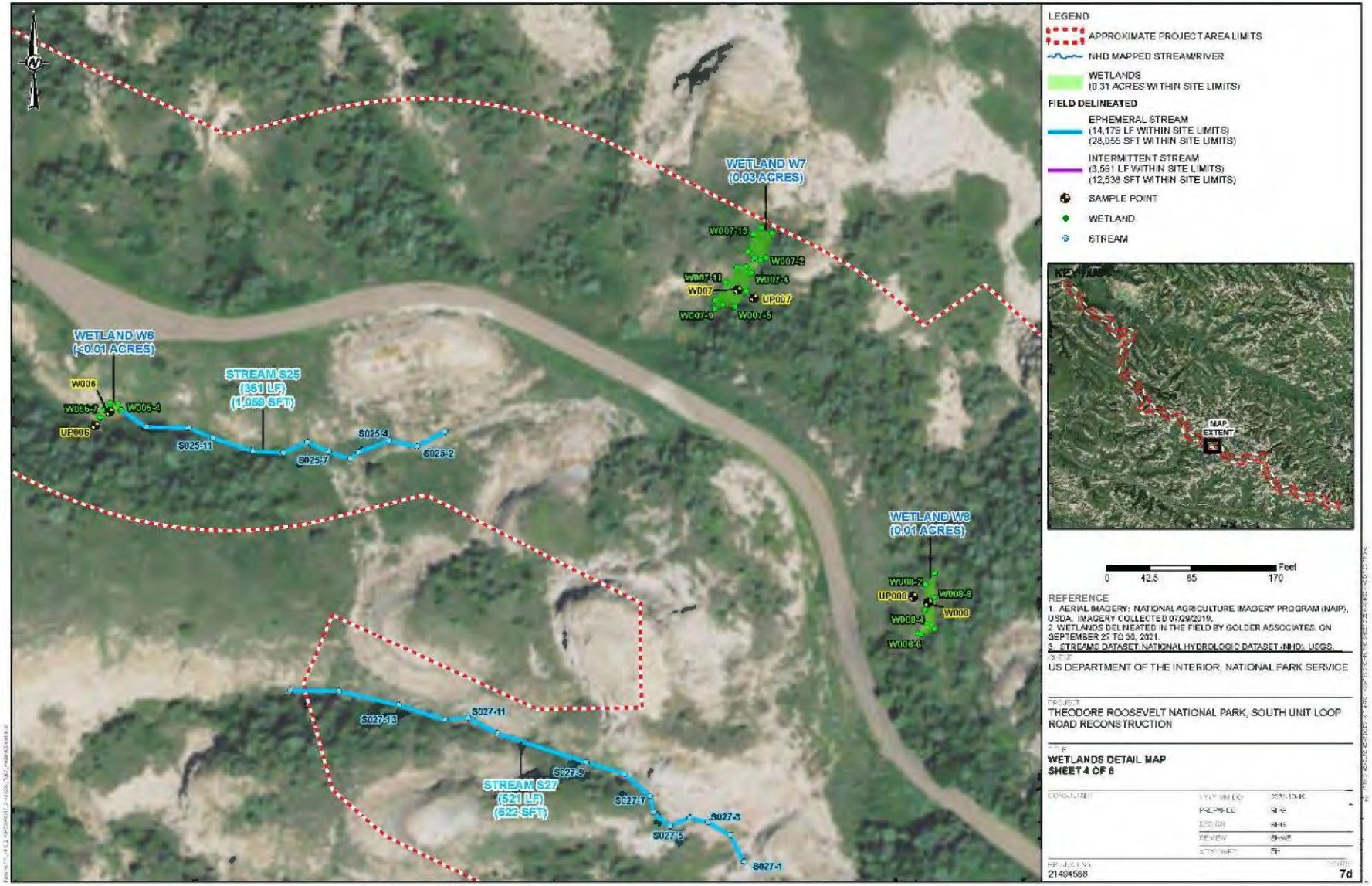

FIGURE 7D. WETLANDS DETAIL MAP

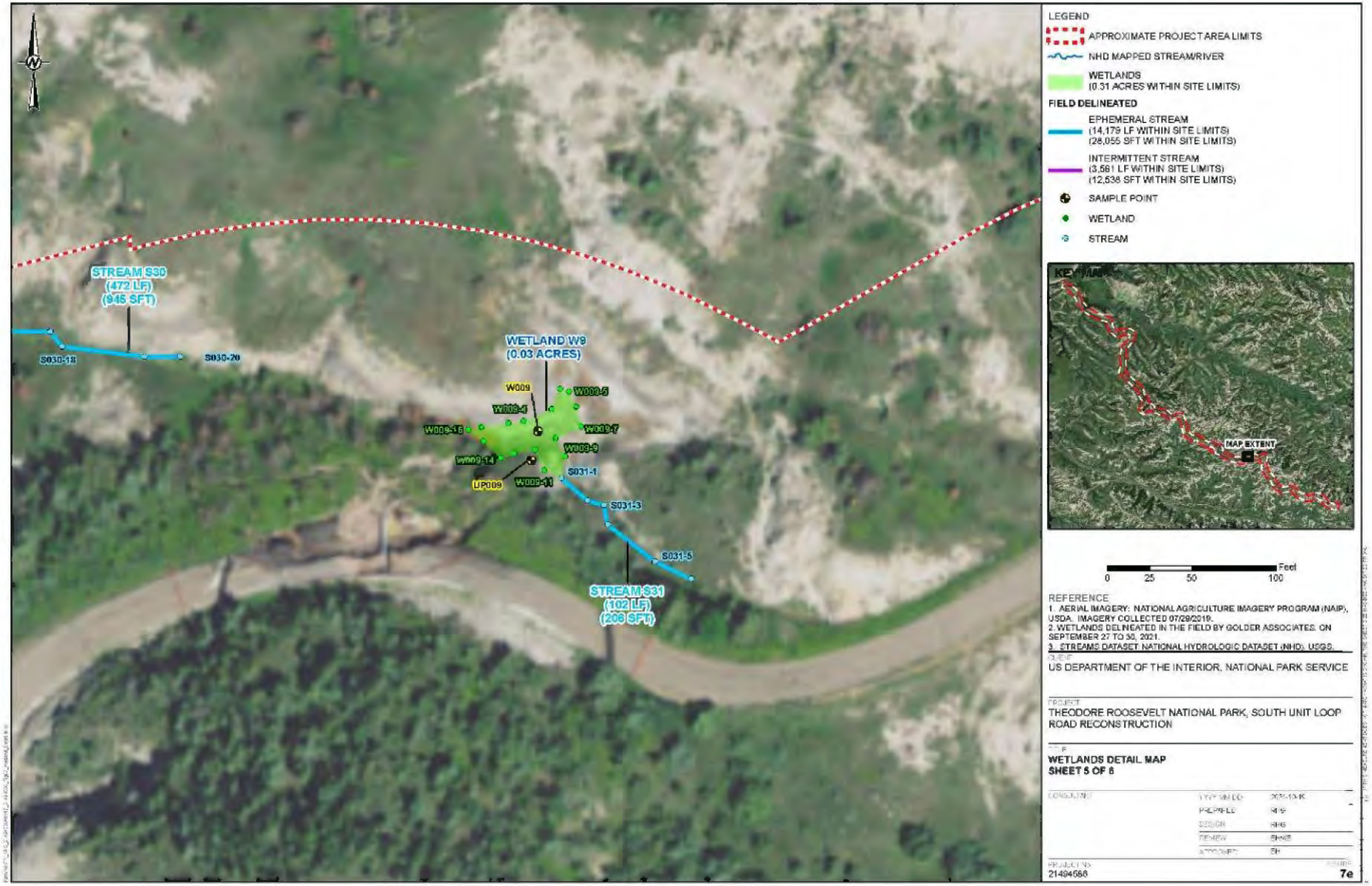

FIGURE 7E. WETLANDS DETAIL MAP

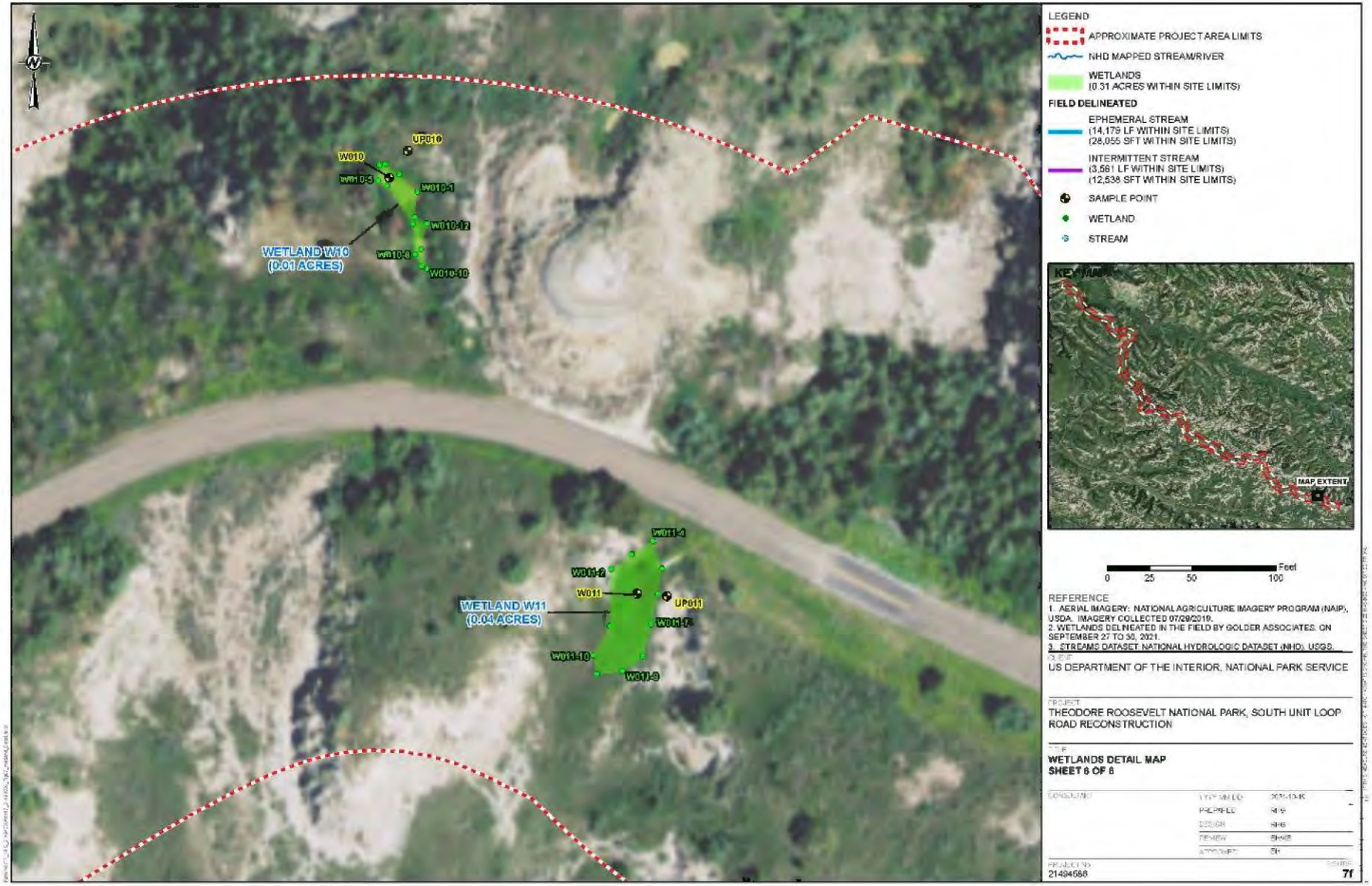

FIGURE 7F. WETLANDS DETAIL MAP

Waterbodies (Streams)

The certified wetland delineator identified 39 streams in the project area, of which, 35 were classified as ephemeral, 3 streams contained ephemeral and intermittent reaches, and 1 was classified solely as intermittent. The length of streams totaled approximately 17,740 linear feet. These streams are listed in table 2 along with supplemental information collected during the delineation. Figures 8a–8e show the locations and classifications of the streams throughout the project area.

TABLE 2. STREAMS WITHIN THE PROJECT AREA

Stream ID	Flow Regime	Linear Feet
S1	Ephemeral	1,381
S2	Ephemeral	33
S3	Ephemeral	212
S4	Ephemeral	47
S5	Intermittent	81
S6	Ephemeral	309
	Intermittent	1,647
S7	Ephemeral	117
S8	Ephemeral	2,324
S9	Ephemeral	1,019
S10	Ephemeral	293
S11	Ephemeral	191
S12	Ephemeral	157
S13	Ephemeral	30
S14	Ephemeral	152
S15	Ephemeral	206
S16	Ephemeral	311
S17	Ephemeral	351
	Intermittent	959
S18	Ephemeral	47
S19	Ephemeral	60
S20	Ephemeral	200
S21	Ephemeral	23
S22	Ephemeral	219
S23	Ephemeral	840
S24	Ephemeral	905
S25	Ephemeral	351

Stream ID	Flow Regime	Linear Feet
S26	Ephemeral	342
S27	Ephemeral	521
S28	Ephemeral	106
S29	Ephemeral	194
S30	Ephemeral	472
S31	Ephemeral	102
S32	Ephemeral	1,082
	Intermittent	874
S33	Ephemeral	79
S34	Ephemeral	76
S35	Ephemeral	234
S36	Ephemeral	109
S37	Ephemeral	852
S38	Ephemeral	109
S39	Ephemeral	123
Ephemeral		14,179
Intermittent		3,561

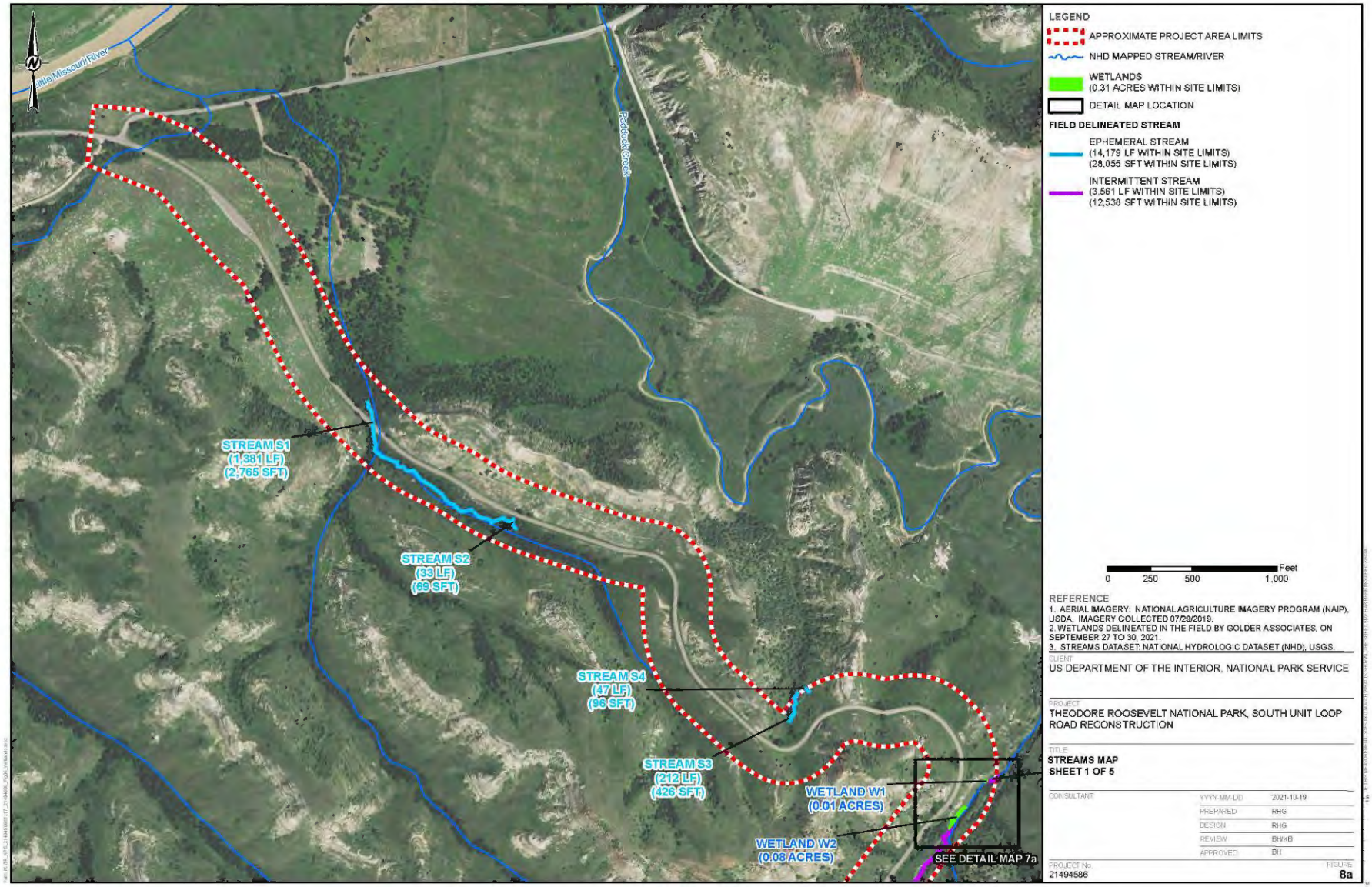

FIGURE 8A. STREAM MAP

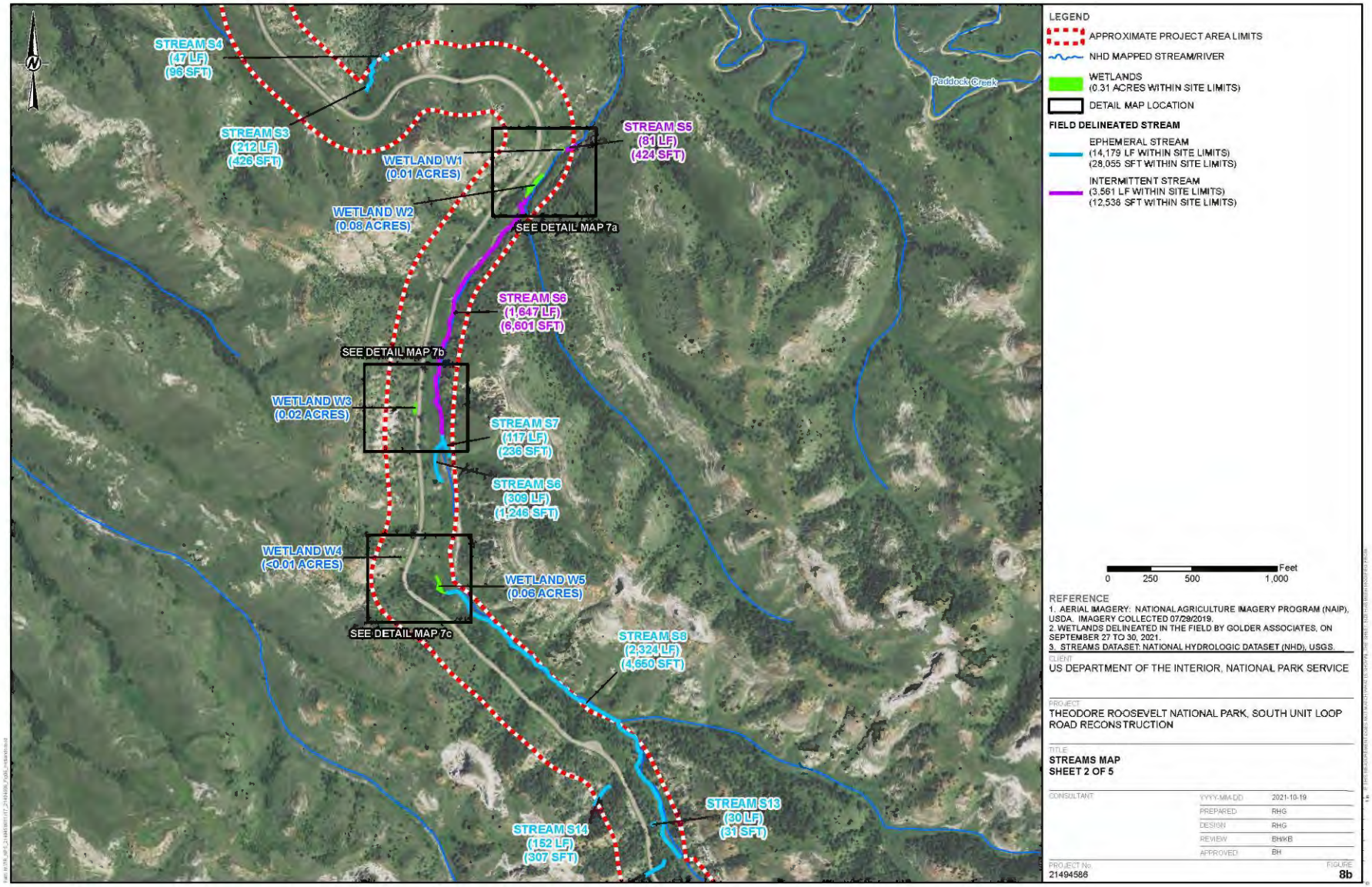

FIGURE 8B. STREAMS MAP

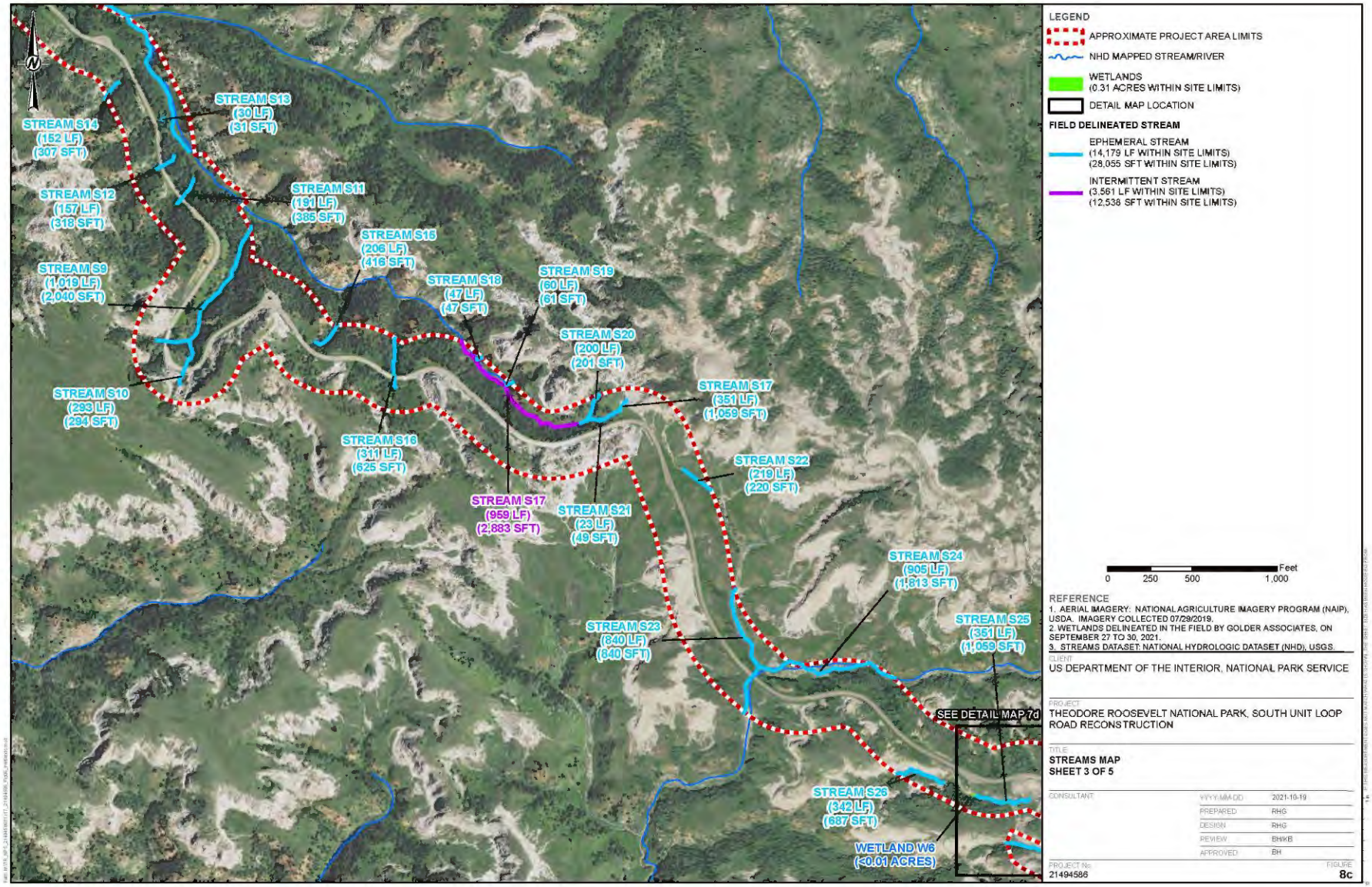

FIGURE 8C. STREAMS MAP

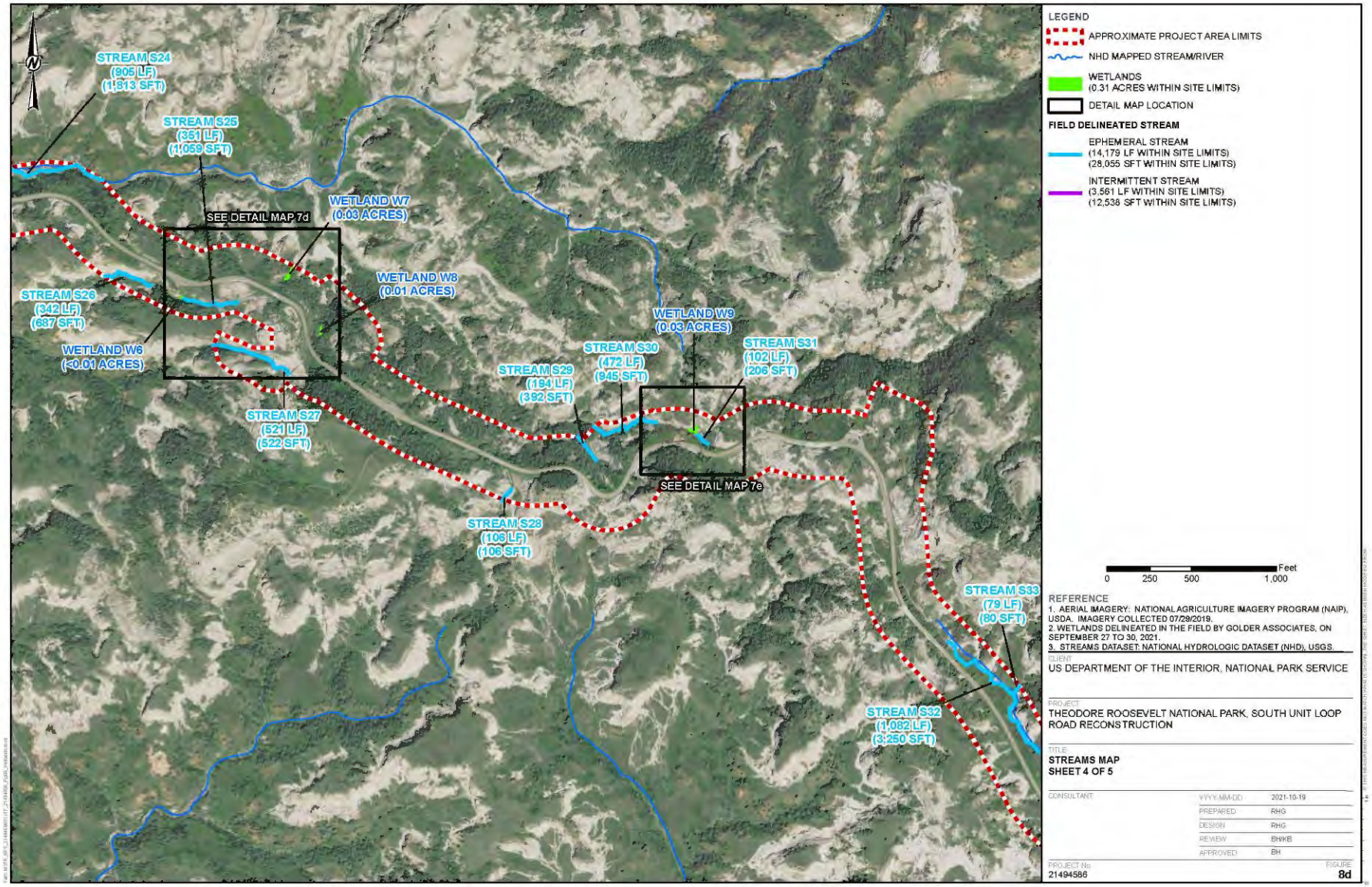

FIGURE 8D. STREAMS MAP

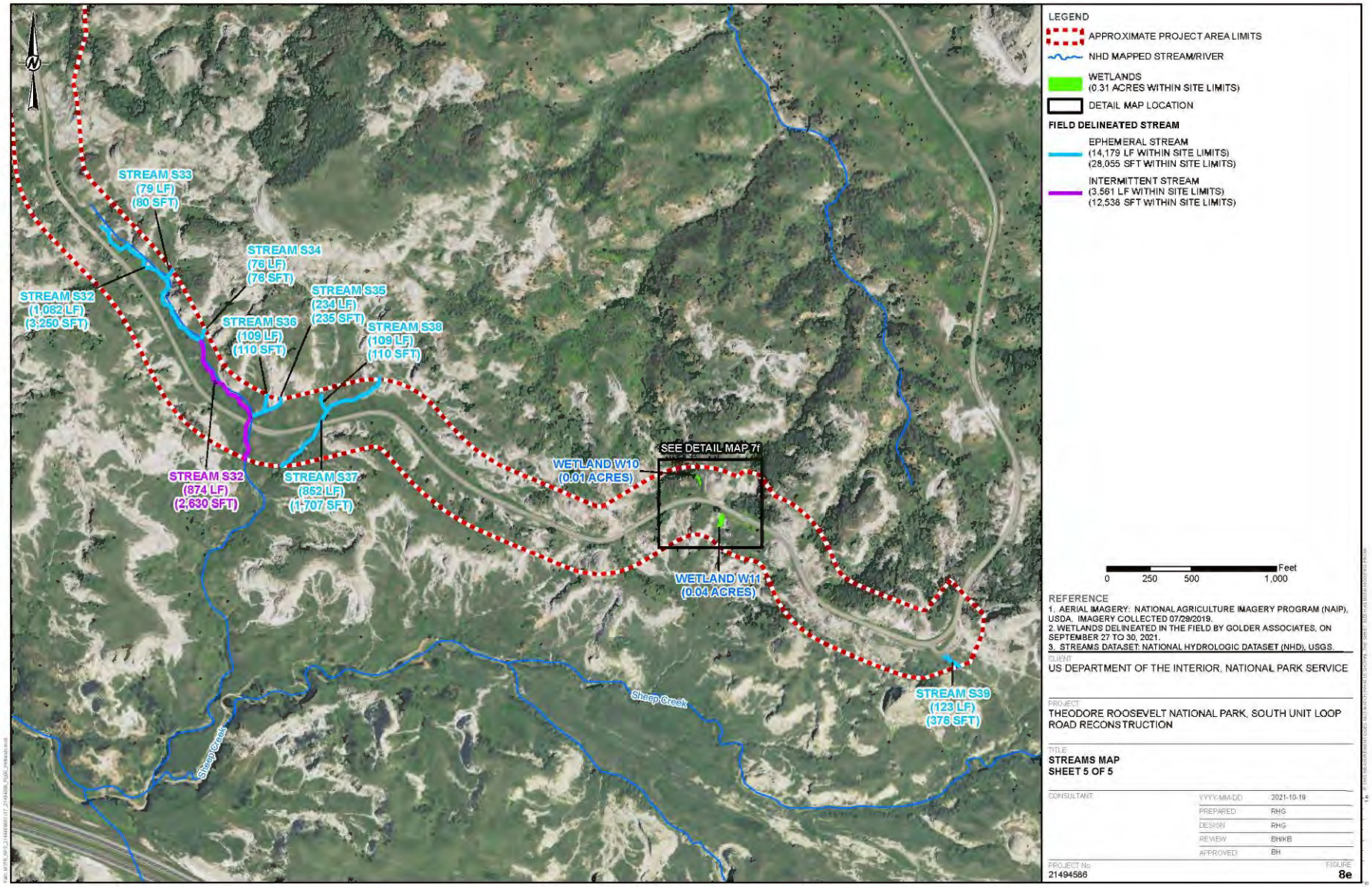

FIGURE 8E. STREAMS MAP

Floodplains

Executive Order 11988, "Floodplain Management," requires federal agencies to evaluate the likely impacts of actions in floodplains, avoid "adverse impacts associated with the occupancy and modification of floodplains, and avoid direct and indirect support of floodplain development wherever there is a practicable alternative."

Floodplains are defined in NPS Director's Order #77-2 as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood" (NPS 2002).

The Federal Emergency Management Agency (FEMA) is the federal agency tasked with mapping and cataloging the nation's floodplains; these data are available to the public in the National Flood Hazard Layer data. Billings County, North Dakota, is not a county that is currently mapped by FEMA. No part of the project area is mapped within a designated 100-year or more floodplain.

ALTERNATIVES

This section describes the preliminary alternatives developed for reconstructing portions of Scenic Loop Drive in the South Unit of the park. Two alternatives are discussed: the no-action alternative and one action alternative. The action alternative presents a reasonable and feasible approach that meets the purpose of, and need for, action.

Alternative 1: No Action

Alternative 1, the no-action alternative, describes current management and the existing condition of Scenic Loop Drive in the South Unit of the park (figure 9).

Under alternative 1, the 6.15-mile section of Scenic Loop Drive would remain closed to visitors, erosion would continue to worsen the condition of the roadway, and structural and accessibility issues would remain. Current management (i.e., road closure) would continue under this alternative; however, it would not relieve the risk of future roadway failures.

FIGURE 9. PROJECT AREA CONDITION UNDER THE NO-ACTION ALTERNATIVE

Alternative 2: Reconstruction of South Unit Loop Road (Proposed Action)

Alternative 2 is the proposed action and would address multiple roadway problem areas along Scenic Loop Drive by reconstructing 6.15 miles of road from mile marker 22 to 28 for longevity and resilience. This alternative would include subgrade excavation, installation of a subgrade geotextile rodent barrier, the replacement of pavement, roadway stabilization, drainage improvements (i.e., stormwater infrastructure), structural improvements (i.e., retaining walls), pull-out area improvements, and replacing currently undersized or damaged stone culverts. These treatment options are based on existing data, geological and soils studies, field exploration, survey and mapping of surface features, groundwater and hydraulics analyses, geotechnical back-analysis, and stability analyses.

Alternative 2 would reconstruct the road and reopen the project area, fulfilling the purpose of, and need for, action to resume park operations and allow visitors to enjoy the area.

PROJECT IMPACTS

Most of the impacts resulting from the project would be temporary because the surrounding geological contours would be restored upon completion of the project. Permanent impacts resulting from the project are expected to be minimal and fall under all mitigation and reporting thresholds stated below and in applicable permits and regulations.

Wetlands

Alternative 2, the proposed action, would largely replace the current footprint of the road and would not involve impacts on undisturbed habitat beyond the project area. Several wetlands (W1, W2, and W5) are located in areas protected by the surrounding topography that are likely to prevent impacts from construction (e.g., within valleys or at the bottom of steep slopes,). Wetlands W3 and W4 are the only wetlands directly adjacent to Scenic Loop Drive. Both of these wetlands are isolated and do not display any connections to other wetlands or waterbodies (i.e., streams) that would classify them as waters of the United States. According to Section 404 of the Clean Water Act, because these wetlands do not fall under the jurisdiction of the US Army Corps of Engineers (USACE), no mitigation would be required to offset permanent impacts on these wetlands.

Wetland W9 is situated downhill of a significant landslide that required the closure of the road. This wetland may have been partially formed by sediment deposition from the landslide and blockage of surface water flow through stream S31. Construction associated with recontouring the hillside to stabilize the landslide would likely affect this wetland. Because the soil uphill of the wetland is not stable, ground movement could occur during construction that would result in sediment and soil filling portions or all of the wetland. Following construction and grading associated with the road repairs, the ground surface/contours of the area within, and adjacent to, wetland W9 would be restored to previously existing conditions, which may reduce the current wetland area but restore the free flow of surface water through the stream. At most, the total area of permanently impacted wetland (wetland W9) would be 0.03-acres.

Due to the small area of permanent impact and presumption that most or all parts of wetland W9 are the result of relatively recent sediment deposition and surface water blockage, no mitigation is proposed or deemed necessary per typical guidance for wetland impacts authorized under one or more USACE nationwide permits (NWPs). Based on a preliminary assessment of potential wetland and stream impacts, the proposed project could be authorized under the provisions of NWP 18 – Minor Discharges and/or NWP 33 – Temporary Construction, Access, and Dewatering.

Waterbodies (Streams)

The installation of new stormwater infrastructure or culverts under the road would temporarily affect several streams in the project area. These temporary impacts are expected to be minimal and would not cause long-term degradation to the streams. All impacts would be localized and temporary during construction of the project. Following construction and grading associated with the road repairs, the ground surface/contours of the areas within, and adjacent to, affected streams would be restored to previously existing conditions to maintain the free flow of surface water along the streambeds. Because no permanent impacts would occur and the area of temporary impacts would be small, no mitigation is proposed or deemed necessary per typical guidance for stream impacts authorized under one or more USACE NWPs.

Based on preliminary assessment of potential wetland and stream impacts, it appears the proposed project can be authorized under the provisions of NWP 18 – Minor Discharges and/or NWP 33 – Temporary Construction, Access, and Dewatering.

Floodplains

No part of the project area is mapped within a designated 100-year or more floodplain. NPS Director's Order #77-2 states that if precise floodplain information is unavailable, NPS should assume the project area is within a regulatory floodplain unless the site can be determined beyond reasonable doubt to be outside the floodplain. Therefore, the proposed stormwater infrastructure for the project has been designed to pass the 10-year storm event without significant surface water impoundment and maintain stability during 100-year storm events (HDR 2020). The project has also been designed to stabilize the road and restore surface water flow, including stream segments that may have been affected by sediment deposition from uphill road/slope failures. No specific federal, state, or local permits or approvals are required for activities affecting floodplains in the project area.

MITIGATION

NPS Director's Order #77-1 and the USACE NWPs noted above state that any impacts on wetlands within the project area totaling 0.1 acres or more require compensatory mitigation (NPS 2016). Because the project would not exceed these permanent impact thresholds to require wetland or stream mitigation, no mitigation is proposed to offset project-related impacts.

Most of the wetlands and streams in the project area would be avoided during construction. Temporary impacts are expected to occur during construction, but the surrounding contours would be restored, and disturbed areas would be revegetated upon completion of the project. Impacts on wetlands and streams would be minimized by the implementation of appropriate soil erosion and sedimentation control measures during construction. Should changes in construction techniques or project design occur, impacts would be reevaluated to determine if mitigation is required.

Mitigation for regulatory floodplains may consist of any combination of seasonal closure, structural flood protection measures, and specific actions to minimize impacts to floodplain natural resource values.

CONCLUSION

Temporary impacts on wetlands and streams are likely to occur during construction. A small area (up to 0.03-acres) of permanent impacts on wetlands may occur. Neither temporary nor permanent wetland or stream impacts would exceed reporting and mitigation thresholds stated in applicable regulations. The project will not affect areas that meet the definition of a 100-year floodplain, although detailed analysis of this conclusion is restricted because of the lack of FEMA floodplain data for the county.

REFERENCES

Council on Environmental Quality, Executive Office of the President (CEQ)

2014 Memorandum for Heads of Federal Departments and Agencies: Effective Use of Programmatic NEPA Reviews. Executive Office of the President Council on Environmental Quality. December 18, 2014.

Cowardin, L. M., V. Carter V., F. C. Golet, and E. T. LaRoe

1979 *Classification of Wetlands and Deepwater Habitats of the United States*. US Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

Federal Geographic Data Committee

2013 *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and US Fish and Wildlife Service, Washington, DC.

HDR Inc.

2020 *Memorandum Concerning the Preliminary Hydrology and Hydraulics Design for the South Unit Loop Road Reconstruction Project at Theodore Roosevelt National Park.*

National Park Service (NPS)

2002 *National Park Service Procedural Manual #77-2: Floodplain Management.*

2016 *National Park Service Procedural Manual #77-1: Wetland Protection.*

US Department of Agriculture-Natural Resources Conservation Service (NRCS-USDA)

No date Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database. https://sdmdataaccess.sc.egov.usda.gov

US Fish and Wildlife Service (USFWS)

2020 Publication date (08/1983). National Wetlands Inventory website. US Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

US Geological Survey (USGS)

No date National Hydrography Dataset. https://www.usgs.gov/core-science-systems/ngp/national-hydrography/national-hydrography-dataset?qt-science_support_page_related_con=0#qt-science_support_page_related_con

WSP USA

2021 "Wetland Delineation Report." October 2021. Report prepared for the NPS under contract. On file at NPS Denver Service Center.