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ENBRIDGE LINE 5
TUNNEL PROJECT

DRAFT
Line 5 Tunnel Project Supplemental Draft Environmental Impact Statement – Horizontal Directional Drill Installation Alternative

November 2025





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COVER SHEET

Line 5 Tunnel Project Supplemental Environmental Impact Statement
Mackinac and Emmet Counties - Horizontal Directional Drill Installation Alternative

LEAD AGENCY:	Department of the Army U.S. Army Corps of Engineers, Detroit District
COOPERATING AGENCIES:	USEPA Region 5 U.S. Coast Guard, Ninth District Michigan State Historic Preservation Office

ABSTRACT:

The United States Army Corps of Engineers, Detroit District (USACE) has prepared this Supplemental Draft Environmental Impact Statement (Supplemental Draft EIS) to the May 2025 Line 5 Tunnel Project Draft EIS as part of its review of Enbridge Energy, Limited Partnership's (the Applicant's) permit application under the authorities of Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, and in accordance with USACE General Regulatory Policies at Title 33 Code of Federal Regulations Parts 320-332. USACE is providing a 30-day public comment period on the Supplemental Draft EIS. USACE announced the public comment period through issuance of a Public Notice. Public announcements regarding the availability of the Supplemental Draft EIS were also posted on the Project website (www.Line5TunnelEIS.com), sent to the interested parties mailing list via e-mail and postal mail, made available to public news outlets and public libraries (similar to Appendix C.1 of the May 2025 Draft EIS). These communications outlined the various ways to participate and submit comments, including the option to submit comments online at the Project website. USACE will consider all comments received on the Supplemental Draft EIS when preparing the Final EIS.

The National Environmental Policy Act (NEPA) requires federal agencies to incorporate environmental considerations into their planning and decision-making through a systematic interdisciplinary approach. For proposed actions that could significantly affect the quality of the human environment, NEPA requires preparation of an EIS. The USACE prepared this Supplemental Draft EIS because it determined that an alternative to the Applicant's Preferred Alternative (proposed Tunnel Project) that was eliminated from detailed analysis in the May 2025 Draft EIS because it was considered infeasible, is now feasible due to advances in technology and meets the USACE's established screening criteria for alternatives, and therefore should be analyzed in detail in the EIS. This alternative includes installation of a replacement Line 5 pipeline via horizontal directional drilling (HDD) in bedrock underneath the lakebed of the Straits of Mackinac in Michigan (referred to as the HDD Installation Alternative). This document provides supplemental information for Chapters 1, 3 through 7 and Appendix F of the May 2025 Draft Line 5 Tunnel Project EIS with a focus on the HDD Installation Alternative.

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AADT	average annual daily traffic
APE	Area of Potential Effects
AQCR	Air Quality Control Region
BMP	best management practice
bpd	barrels per day
C.F.R.	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
dBA	A-weighted decibel
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EIS	Environmental Impact Statement
EMPS	excavated material placement site
EO	Executive Order
EPP	Environmental Protection Plan
ESA	Endangered Species Act
HAP	hazardous air pollutant
HDD	horizontal directional drilling
I-	Interstate
IK	Indigenous Knowledge
IPaC	Information for Planning and Consultation
LOS	Level of Service
MCMP	Michigan Coastal Management Program
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MSDS	Material Safety Data Sheets
MTBM	micro-tunnel boring machine
NEPA	National Environmental Policy Act
NGL	natural gas liquid
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NREPA	Michigan Natural Resources and Environmental Protection Act
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	ozone
PM	particulate matter
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PPV	peak particle velocity
PSD	Prevention of Significant Deterioration
RIDE	Remediation Information Data Exchange
ROW	right-of-way
SESC	Soil Erosion and Sedimentation Control
SO_2	sulfur dioxide
TBM	tunnel-boring machine
TCL	Traditional Cultural Landscape

Acronym	Definition
TCP	Traditional Cultural Place
U.S.	United States
US-	United States Highway
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound

1 CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

This Supplemental Draft Environmental Impact Statement (EIS) supplements the May 2025 Line 5 Tunnel Project Draft EIS (May 2025 Draft EIS) and considers the Horizontal Directional Drilling (HDD) Installation Alternative. The Purpose and Need statement remains the same as presented in the May 2025 Draft EIS.

1.2 BACKGROUND

An HDD Installation Alternative was considered in the May 2025 Draft EIS but was not carried forward for detailed analysis in the EIS based on a 2018 report, Alternatives for Replacing Enbridge's Dual Line 5 Pipelines Crossing the Straits of Mackinac (Enbridge 2018), which concluded that an HDD Installation Alternative was not technically feasible due to the length of the replacement pipeline, length of drill required, and the hard characteristics of the subsurface rock. Subsequent to the 2018 report and the May 2025 Draft EIS, the Applicant provided USACE with information indicating that the HDD Installation Alternative, using the intercept method as described in Appendix F of this Supplemental Draft EIS, is now technically feasible due to advances in technology (Enbridge 2025a). USACE considered the information provided and determined that the HDD Installation Alternative met the screening criteria defined in Chapter 2 of the May 2025 Draft EIS; therefore, the USACE carried forward the HDD Installation Alternative for detailed analysis in the EIS.

If the HDD Installation Alternative were to be implemented, the existing Dual Pipelines in the Straits would be decommissioned. Therefore, the HDD Installation Alternative would include consideration of the same decommissioning sub-alternatives described in Appendix F (Section F1.3.1) and analyzed in Chapter 4 for each resource area of the May 2025 Draft EIS. As the activities and anticipated impacts for decommissioning would be the same as described in the May 2025 Draft EIS, this Supplemental Draft EIS incorporates those discussions by reference.

USACE will incorporate information within this Supplemental Draft EIS into its Final EIS for the Line 5 Tunnel Project following a 30-day public comment period on this Supplemental Draft EIS.

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3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION TO AFFECTED ENVIRONMENT

Chapter 3, Affected Environment, provides the context for readers and agency decision-makers to understand the environmental consequences of the proposed Project and alternatives described in Chapter 4, Environmental Consequences, by describing existing resources in the area of analysis. Each Chapter 3 resource section describing the affected environment (Section 3.2 through Section 3.14) has a corresponding resource section in Chapter 4 (Section 4.2 through Section 4.14) that analyzes potential environmental impacts to that resource. This Supplemental Draft Environmental Impact Statement (Supplemental Draft EIS) supplements the May 2025 Draft Line 5 Tunnel Project EIS, focusing on the affected environment and potential environmental consequences associated with the Horizontal Directional Drilling (HDD) Installation Alternative (see Appendix F of the Supplemental Draft EIS for additional information). Information within this chapter will be incorporated into the Final EIS for the Line 5 Tunnel Project.

The United States Army Corps of Engineers (USACE) placed supporting information for the May 2025 Draft EIS into Appendix G (of the May 2025 Draft EIS). Appendix G comprises three attachments that contain relevant federal regulations and Executive Orders (EOs) that inform USACE's review of the proposed Project (Attachment 1), supplemental affected environment descriptions (Attachment 2), and supporting calculations and analyses (Attachment 3). Information in Appendix G is relevant to many resource sections included in this Supplemental Draft EIS and may be referenced throughout.

3.1.1 Area of Analysis by Resource Area

An area of analysis is specifically defined at the beginning of each resource section because the direct, indirect, and cumulative effects of the alternatives may extend different distances from the footprint of the alternatives based on the characteristics of the resource being discussed. The area of analysis for each resource area in this Supplemental Draft EIS includes the expected construction footprints for the two HDD Installation sub-alternatives under analysis: HDD Installation Sub-Alternative 1: Pipeline Assembly Area South and HDD Installation Sub-Alternative 2: Pipeline Assembly Area North. Figures F-1 through F-3 in Appendix F of this Supplemental Draft EIS depict the expected construction footprints of both HDD Installation sub-alternatives considered in this document.

The Supplemental Draft EIS analyses in Chapter 4 consider the scope of analysis outlined in USACE's 2023 Memorandum for Record, Subject: NEPA and Public Interest Review Scope of Analysis for Enbridge Line 5 Tunnel CELRE-ERW: LRE-2010-00463-56-A19 (1145).

3.1.2 Resource Interrelationships

Although the Supplemental Draft EIS discusses resources individually in Chapter 3 and resource impacts individually in Chapter 4, these resources are dynamic and interrelated. A change to one resource can have cascading or synergistic impacts to other resources. For instance, an increase in the noise environment or changes to water quality can detrimentally affect the local wildlife and aquatic resources, as well as socioeconomic and cultural uses of a site and surrounding areas. Therefore, impacts described in one resource section may depend on the analysis from another section.

3.1.3 Indigenous Knowledge/Traditional Ecological Knowledge

USACE's approach to incorporating Indigenous Knowledge (IK) and Traditional Ecological Knowledge into the EIS is detailed in Section 3.1.3 of the May 2025 Draft EIS.

3.1.4 Incomplete and Unavailable Information

To account for uncertainties caused by incomplete and unavailable information, USACE developed bounding conditions and assumptions based on the most current and available data in evaluating the range of potential impacts that could occur under implementation of the HDD Installation Alternative analyzed in this Supplemental Draft EIS. Chapter 4, Environmental Consequences, provides quantitative information based on the best existing and available information for the purpose of identifying the range of environmental effects that may occur.

In the absence of design data (e.g., construction layout information, etc.) or in some instances specific location data (e.g., site-specific natural and cultural resource surveys) USACE developed a range of potential impacts based on conceptual design data, siting criteria, other available plans and commitments, and available baseline data for each resource area. USACE's analysis was conducted in order to provide a range of potential impacts, including an upper bound, so as to provide decision-makers with information that would support a reasoned choice among the alternatives. USACE concluded that the impacts of these activities are appropriately described in this Supplemental Draft EIS. If the Applicant were to pursue the HDD Installation Alternative, it would be required to conduct the necessary natural and cultural studies within the construction footprint to further characterize the affected environment (e.g., location of protected species, wetlands, sensitive cultural sites, etc.).

3.2 LAND USE AND RECREATION

3.2.1 Area of Analysis

The area of analysis is defined in Section 3.2.1 of the May 2025 Draft EIS and includes general land use and recreational activities within Emmet, Cheboygan, and Mackinac counties and the Straits of Mackinac, with a focus on the expected footprints of all alternatives and sub-alternatives. This Supplemental Draft EIS includes affected environment information for the HDD Installation Alternative.

3.2.2 Land Ownership

Land ownership of the HDD and pipeline tie-in workspaces on both sides of the Straits (and the additional temporary workspace south of the Straits) is included in discussions provided in Section 3.2.2 of the May 2025 Draft EIS. Parcels south of the Straits are owned by multiple owners. A portion of the HDD workspace south of the Straits, as well as a portion of the pipeline assembly area expected under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), passes through the Headlands International Dark Sky Park, which is owned by Emmet County. The remainder of the pipeline assembly area alignment under HDD Installation Sub-Alternative 1 includes land held by public owners in addition to two small private parcels. Public owners include Emmet County, the Mackinaw Area Historical Society, Wawatam Township, and the Michigan Department of Natural Resources (MDNR). This pipeline assembly area is also flanked by MDNR land.

The pipeline assembly area expected under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) consists primarily of private property. At the southern extent of the pipeline assembly area alignment (close to where it meets the HDD workspace north of the Straits), some parcels are owned by the City of St. Ignace. Closer to its northern extent (near Freschette and Martin Lakes), land is owned by the federal government. Figures 3.2-1 and 3.2-2 present land ownership on both sides of the Straits. Land ownership of the excavated material placement sites (EMPSs) is discussed in Section 3.2.2 of the May 2025 Draft EIS.

3.2.3 Land Use

Land use information provided in Section 3.2.3 of the May 2025 Draft EIS includes Emmet, Cheboygan, and Mackinac counties. Workspaces associated with the HDD Installation Alternative would not extend beyond these three counties. As of July 2025, Moran Township is updating its master plan and has issued a Draft Land Use Map. The Supplemental Draft EIS utilizes this draft map[1] to characterize land use in this area. Land use within specific workspaces associated with the HDD Installation Alternative are presented in Table 3.2-1.

3.2.4 Recreation

Recreation information for Emmet, Cheboygan, and Mackinac counties is included in Section 3.2.4 of the May 2025 Draft EIS. Potential impacts to recreation associated with implementation of the HDD Installation Alternative would not extend beyond the limits of these three counties. The HDD workspace and a portion of the pipeline tie-in workspace south of the Straits under both of the HDD Installation sub-alternatives would intersect Headlands International Dark Sky Park, as would the pipeline assembly area under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). Information on the Headlands International Dark Sky Park is provided in Section 3.2.4.3.1 of the May 2025 Draft EIS.

[1] The May 2025 Moran Township Draft Land Use Map was released to the public on July 24, 2025, after publication of the May 2025 Draft EIS. The Final EIS will be updated with the most recent Land Use Map.

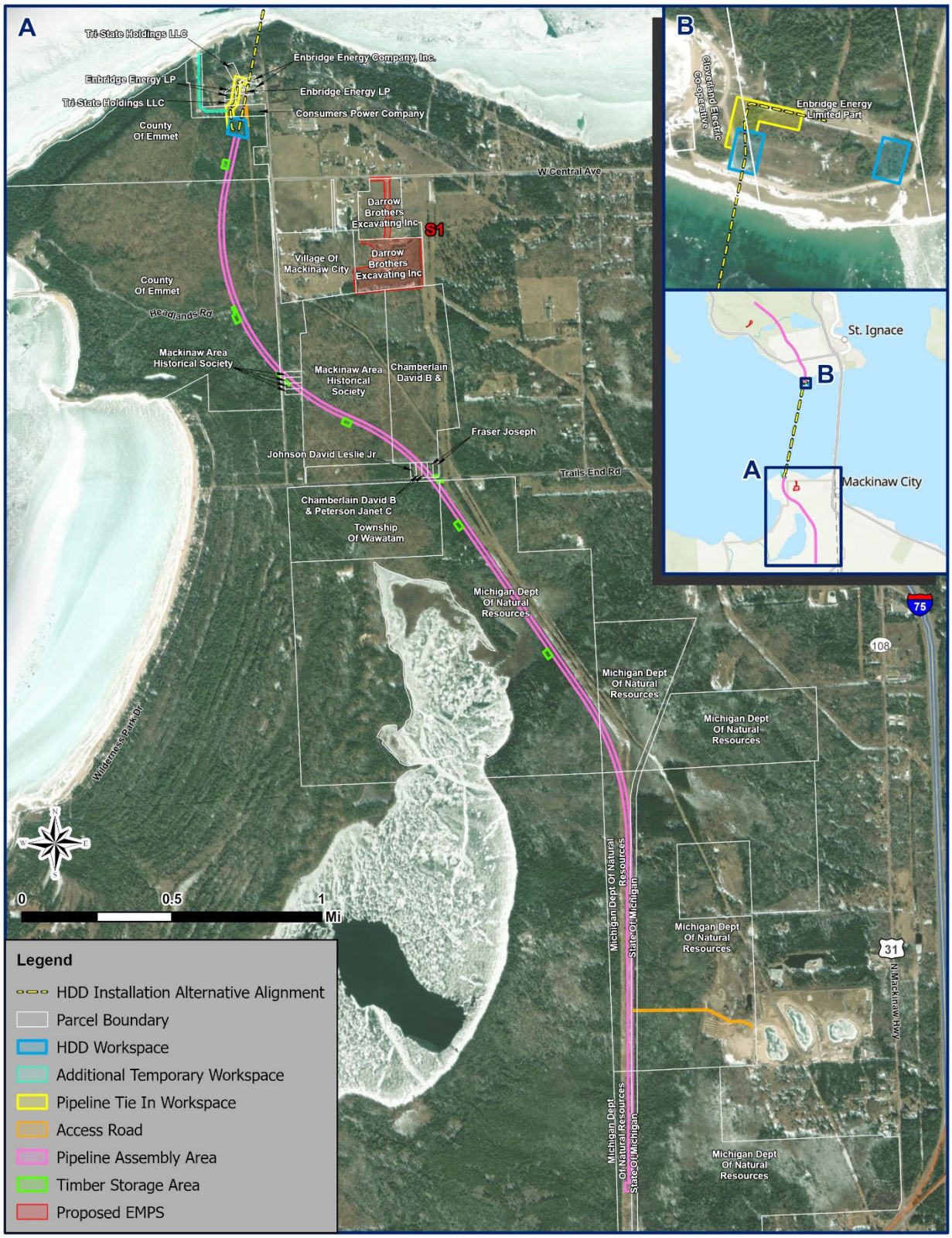

Figure 3.2-1. Parcel Data South of the Straits – HDD Installation Alternative

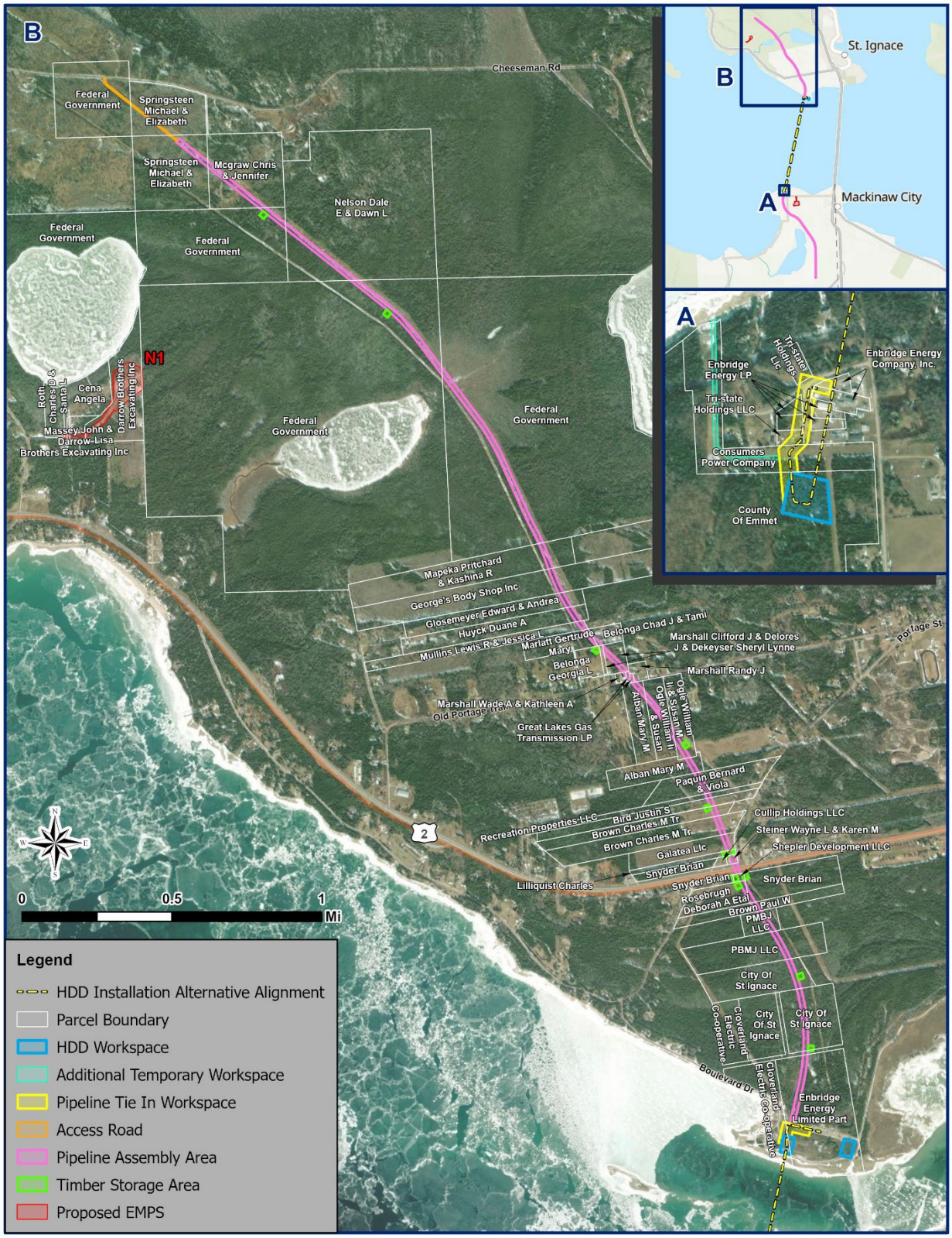

Figure 3.2-2. Parcel Data North of the Straits – HDD Installation Alternative

Table 3.2-1. Land use within HDD Installation Alternative Footprints

Location	Description of Land Use	Zoning
Workspaces Common to Both HDD Installation Sub-Alternatives		
HDD/Pipeline Tie-in Workspace – South of the Straits	Existing land use is Recreational Residential and General Business. Future use is identified as Medium Density Residential. Adjacent properties are identified for a future use of municipal lands and Medium Density Residential.	Recreational Residential and General Business
HDD/Pipeline Tie-in Workspace – North of the Straits	The 2025 Draft Land Use Map designates the workspace as non-forested field/rights-of-way and forest. Existing residential areas occur to the east with undeveloped land to the north and Lake Michigan to the south. Future land use is designated as Lakeshore Residential. This land is currently identified as being owned by utility companies.	Mixed Use
Additional Temporary Workspace – South of the Straits	Existing land use is right-of-way for Consumers right-of-way for Consumers Energy.	Recreational Residential and General Business
HDD Installation Sub-Alternative 1: Pipeline Assembly Area South		
Pipeline Assembly Area, including associated timber storage areas	Existing land uses are Recreational Residential, Agriculture, Residential, Farm and Forest, and Forest Recreation.	Recreational Residential, Agriculture, Residential, Farm and Forest, and Forest Recreation
HDD Installation Sub-Alternative 2: Pipeline Assembly Area North		
Pipeline Assembly Area, including associated timber storage areas	The 2025 Draft Land Use Map designates the area as Industrial/Utilities/Transportation, Forest, Commercial/Institutional, Agricultural, Residential, and Wetlands. Future land use is designated as Lakeshore Residential, Specialized Development Area, Mixed-Use Corridor, Urban Growth Center, Rural Open Space and Development, and Highway 2 Corridor/View Preservation.	Mixed Use, Medium Density Lakeshore Residential, Visual Corridor and Recreation Coastal District, Commercial, Primary Inland Growth, and Medium Density Residential

Source: Emmet County 2024, 2020; Mackinac County 2024, 2019; Moran Township 2025
HDD = horizontal directional drilling

The French Farm Lake Flooding State Wildlife Management Area (approximately 2,948 acres) also intersects the HDD Installation Sub-Alternative 1 pipeline assembly area. This management area, owned and managed by MDNR, is named for the shallow lake that lies within its bounds. Recreation at the management area includes experiencing wildlife habitat, wildlife viewing, and hunting. The pipeline assembly area under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) intersects the Hiawatha National Forest, which is discussed in Section 3.2.4.2 of the May 2025 Draft EIS.

3.3 AESTHETICS

3.3.1 Area of Analysis

The area of analysis is defined in Section 3.3.1 of the May 2025 Draft EIS and includes the footprint of all alternatives and sub-alternatives. This Supplemental Draft EIS includes additional information, where required, to further characterize the visual resources and olfactory environment for the HDD Installation Alternative.

3.3.2 Visual Resources

Visual resources that could be affected by activities in the HDD/pipeline tie-in workspaces both south and north of the Straits (as well as the additional temporary workspace identified south of the Straits) are included in the existing discussion in the May 2025 Draft EIS, Section 3.3.2. Visual resources in this area include the Straits of Mackinac, the Mackinac Bridge, rocky coastline and beaches, and inland forests. Section 3.3.2 of the May 2025 Draft EIS also describes the viewshed of the area that encompasses these workspaces, including nearby residences, existing cleared right-of-way (ROW), Applicant-owned property and facilities, and the Headlands International Dark Sky Park (see the May 2025 Draft EIS for additional detail).

Under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), much of the pipeline assembly area alignment (and associated timber storage areas) is forested, containing large, contiguous forested/shrub wetland communities, although much of the southern extent of the alignment (more than half) would follow a cleared ROW. The alignment would intersect residential areas (described in more detail in Section 3.3.2 of the May 2025 Draft EIS), the eastern portion of Headlands International Dark Sky Park, and the French Farm Lake Flooding State Wildlife Management Area, in addition to utilizing approximately 14 acres of existing cleared ROW.

Under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), the pipeline assembly area alignment (and associated timber storage areas) would intersect forest, residential areas, clearings, and large contiguous forested/shrub wetland areas. The majority of the alignment (approximately 25 acres) would follow existing cleared ROW, including in the area where forested/shrub wetlands are present.

3.3.3 Olfactory Environment

The olfactory environment for the HDD Installation Alternative would not be expected to differ from that described in Section 3.3.3 of the May 2025 Draft EIS.

3.4 WATER RESOURCES

3.4.1 Area of Analysis

The area of analysis for water resources is defined in Section 3.4.1 of the May 2025 Draft EIS, and includes the footprint of all alternatives and sub-alternatives, as well as consideration of water resources adjacent to those areas with potential to be impacted by implementation of Project alternatives/sub-alternatives. This Supplemental Draft EIS includes additional information, where required, to further characterize water resources within and adjacent to the expected footprints of HDD Installation Sub-Alternatives 1 and 2.

3.4.2 Groundwater

3.4.2.1 Groundwater and Aquifers

Section 3.4.2.1 of the May 2025 Draft EIS describes groundwater aquifers underlying this region, including in the area of the HDD Installation Alternative. Groundwater monitoring data collected by the Applicant south of the Straits (well locations shown in Figure 3.4-1 of the May 2025 Draft EIS) are applicable to groundwater resources underlying the footprint of all alternatives and sub-alternatives located in proximity to the south Straits shoreline, including those associated with the HDD Installation Alternative. As the pipeline assembly area (and associated timber storage areas) associated with HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) extends approximately 4 miles south of the Lake Michigan shoreline, data from the United States Geological Survey (USGS) National Water Information System were also reviewed. The closest USGS monitoring well is located on Stimpson Road South, approximately 4 miles from the HDD workspace south of the Straits, and approximately 2 miles from the southern extent of the pipeline assembly area associated with HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). In this location, groundwater levels between August 2024 and August 2025 ranged from 1.66 to 6.23 feet below land surface (USGS 2025a).

Groundwater monitoring data collected by the Applicant north of the Straits (well locations shown in Figure 3.4-2 of the May 2025 Draft EIS) are applicable to groundwater resources underlying the footprint of all alternatives and sub-alternatives located in proximity to the north Straits shoreline, including those associated with the HDD Installation Alternative. While USGS monitoring data were reviewed in consideration of the pipeline assembly area (and associated timber storage areas) under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), all USGS monitoring wells within 10 miles of this pipeline assembly area are inactive. The nearest active USGS well is located over 30 miles from the northern extent of the pipeline assembly area under HDD Installation Sub-Alternative 2, making Applicant-provided groundwater data (see Section 3.4.2.1 of the May 2025 Draft EIS) the most accurate and relevant data available for groundwater conditions in this area.

3.4.2.2 Groundwater Uses

Groundwater uses across the region are discussed in Section 3.4.2.2 of the May 2025 Draft EIS. Available data from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wellogic System indicate that three household wells are located in close proximity to the pipeline tie-in workspace south of the Straits; however, all three wells are located on property that has been acquired by the Applicant. Additionally, several household wells are located within 0.5-mile of the pipeline assembly area alignments (and associated timber storage areas) under both HDD Installation sub-alternatives, and the pipeline assembly area under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) intersects a Traditional Wellhead Protection Area Delineation associated with Mackinaw City (discussed in more detail in Section 3.4.2.3 of the May 2025 Draft EIS) (EGLE 2025a). Wells identified in proximity to the potential EMPS locations for

excavated material disposal/pipeline storage under the HDD Installation Alternative are discussed in Section 3.4.2.2 of the May 2025 Draft EIS.

3.4.2.3 Groundwater Quality

At the Stimpson Road South USGS monitoring well (referenced above), available monitoring data indicate that all measured parameters are within regulatory limits with one possible exception. Beryllium concentrations were most frequently measured at "less than" 0.01 milligrams/liter (USGS 2024). The U.S. Environmental Protection Agency's (USEPA's) maximum contaminant level for beryllium in drinking water is 0.004 milligrams/liter, due to the potential for intestinal lesions with long-term exposure. Sources of beryllium contamination in drinking water include discharge from metal refineries and coal-burning factories and discharge from electrical, aerospace, and defense industries (USEPA 2024a). Regional groundwater quality data are provided in Appendix G, Attachment 2, of the May 2025 Draft EIS, and Applicant-provided monitoring data for both the Mackinaw Station and the North Straits Facility are provided in Section 3.4.2.3 of the May 2025 Draft EIS.

3.4.3 Surface Water

3.4.3.1 Surface Waters

Information related to watersheds, Lake Michigan, and Lake Huron is provided in Section 3.4.3.1 of the May 2025 Draft EIS. Information related to Stream 01, which is located adjacent to the HDD workspace north of the Straits (and would be crossed by the pipeline assembly area under implementation of HDD Installation Sub-Alternative 2: Pipeline Assembly Area North), is also provided in Section 3.4.3.1 of the May 2025 Draft EIS. Stream 01 can be seen on Figure 3.4-1 in Section 3.4.4.1, below (labeled as S01). Portions of the expected footprints associated with the HDD Installation Alternative (specifically, the pipeline assembly areas) extend beyond the limits of the wetland delineation conducted for the proposed Tunnel Project. Information on surface waters with potential to be impacted by activities in these areas was taken from publicly available data sources and Applicant-provided information. North of the Straits, the Moran River (where it connects Chain Lake and Freschette Lake) occurs within the pipeline assembly area under HDD Installation Sub-Alternative 2 (USGS 2025b). South of the Straits, no additional surface waters were identified by the Applicant or within publicly available data sources.

3.4.3.2 Surface Water Uses

Surface water uses across the region are discussed in Section 3.4.3.2 of the May 2025 Draft EIS.

3.4.3.3 Surface Water Quality

Surface water quality across the region is discussed in Section 3.4.3.3 of the May 2025 Draft EIS. Section 3.4.3.3 of the May 2025 Draft EIS includes information on Lake Huron and Lake Michigan water quality, as well as information related to known impairments in close proximity to alternative/sub-alternative Project locations, and common impairments across the region. No additional impairments were identified within the expanded area of analysis. The expanded area of analysis is encompassed by the ecoregions discussed in Section 3.4.3.3 of the May 2025 Draft EIS.

3.4.4 Special Aquatic Sites

3.4.4.1 Wetlands

As the majority of the expected footprints under HDD Installation Sub-Alternatives 1 and 2 extend beyond wetland delineations conducted by the Applicant, the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) was reviewed to identify the potential for wetlands to occur in areas outside the wetland delineation. Figure 3.4-1 (below Section 3.5.6) displays delineated wetlands in the area of the HDD/pipeline tie-in workspaces north of the Straits. No wetlands have been identified, either by delineation or by NWI, in the area of the HDD/pipeline

tie-in/additional temporary workspaces south of the Straits. Figures 3.4-2 and 3.4-3 (below Section 3.5.6) display NWI data for the pipeline assembly areas under HDD Installation Sub-Alternatives 1 and 2, respectively, as well as NWI wetlands where they occur within other workspaces associated with the HDD Installation Alternative (in areas where both Applicant-delineated wetland data and mapped NWI wetlands are present, delineation date provided by the Applicant is considered to be more up-to-date and accurate).

3.4.4.2 Other Special Aquatic Sites

Sanctuaries and refuges that occur in this region that may be affected by Project alternatives and sub-alternatives, including the HDD Installation Alternative, are described in Section 3.4.4.2 of the May 2025 Draft EIS and Section G2.4.3 of Appendix G (of the May 2025 Draft EIS). Additionally, the pipeline assembly area (and associated timber storage areas) expected under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) intersects the French Farm Lake Flooding State Wildlife Management Area, which is introduced in Section 3.2.4 of this Supplemental Draft EIS.

Stream 01, described in greater detail in Section 3.4.4.2 of the May 2025 Draft EIS, meets the definition of a vegetated shallows, as defined in USACE regulations. As stated above, Stream 01 is located adjacent to the HDD workspace north of the Straits under both HDD Installation sub-alternatives and would be crossed by the pipeline assembly area under HDD Installation Sub-Alternative 2: Pipeline Assembly Area North.

3.4.5 Floodplains

Figures 3.4-4 and 3.4-5 (below Section 3.4.6) display floodplains that intersect the HDD Installation Alternative footprints south and north of the Straits, respectively. Portions of the footprint that are not shown on the figures are located outside the 100- and 500-year floodplains. The 100-year floodplain associated with Martin Lake borders EMPS N1, but does not intersect with areas that would be utilized by the Applicant under any of the alternatives/sub-alternatives under consideration, including the HDD Installation Alternative.

3.4.6 Shoreline and Protected Coastal Resources

Shoreline and protected coastal resources are described in Section 3.4.6 of the May 2025 Draft EIS. The limits of the coastal zone within the HDD Installation Alternative are shown on Figures 3.4-6 and 3.4-7. As stated in the May 2025 Draft EIS, the entirety of the Straits crossing is located within the coastal zone, although the below figures do not include the entire crossing (so that onshore workspaces within the coastal zone limits are visible).

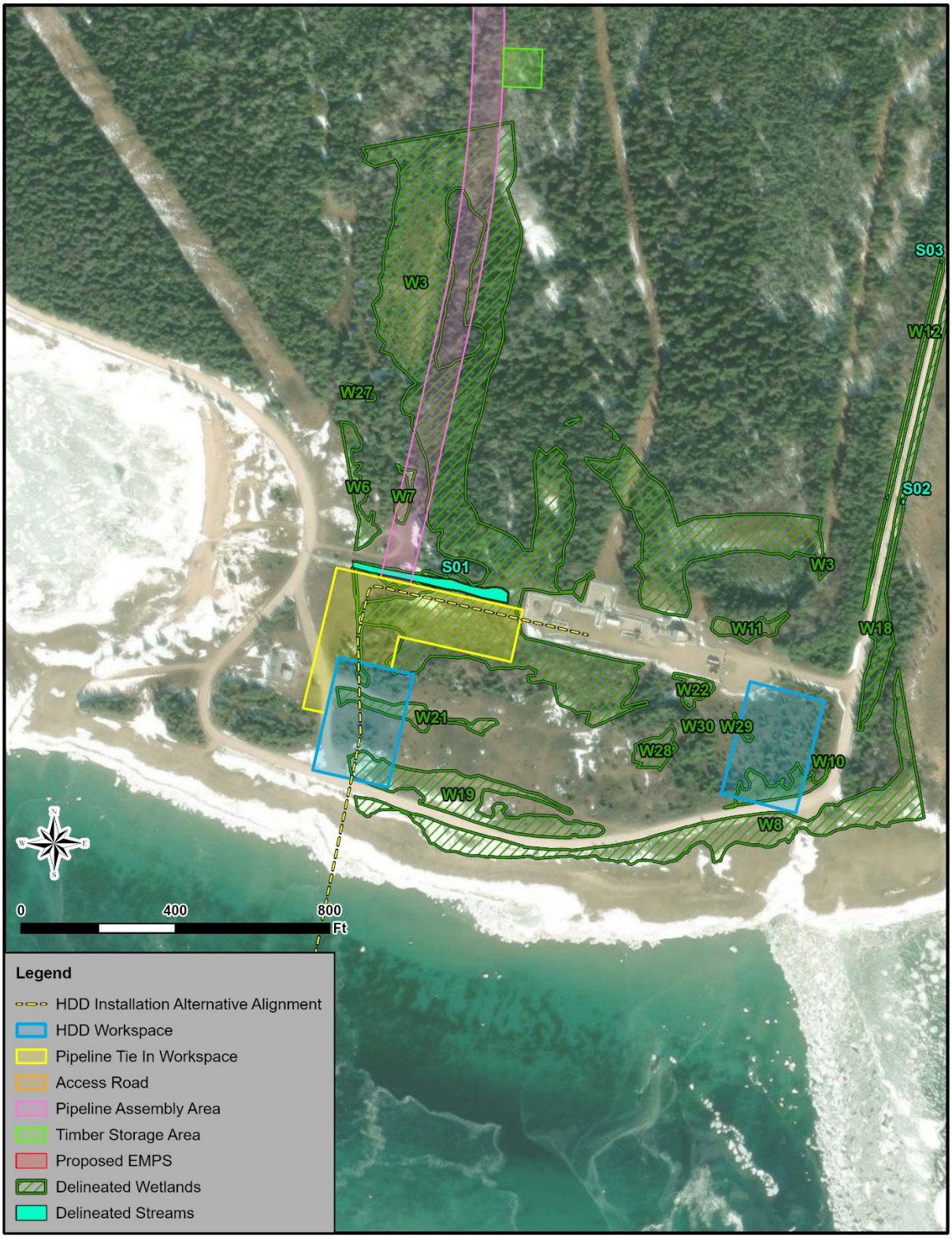

Figure 3.4-1. Delineated Surface Waters and Wetlands (North Side)

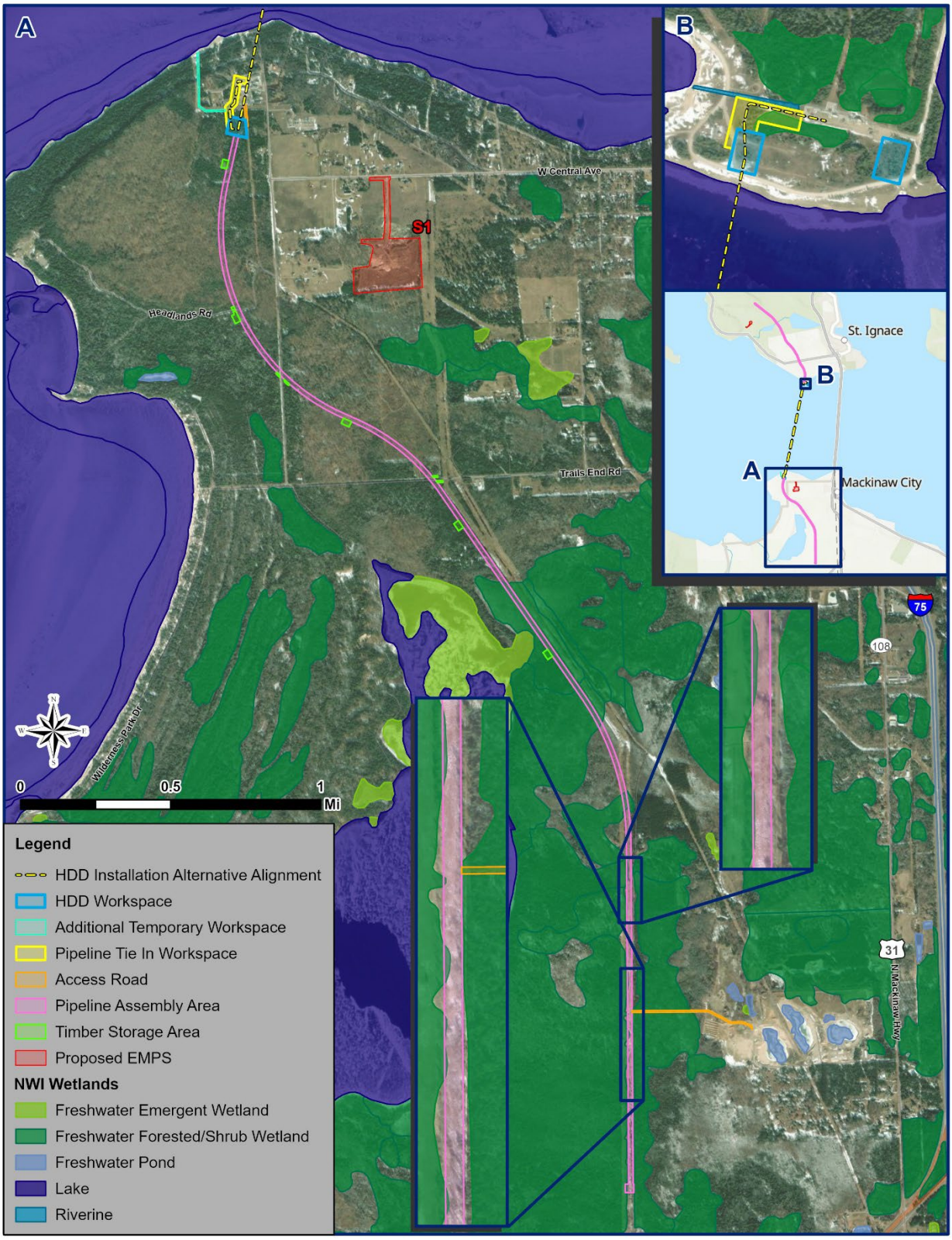

Figure 3.4-2. NWI Wetlands South of Straits

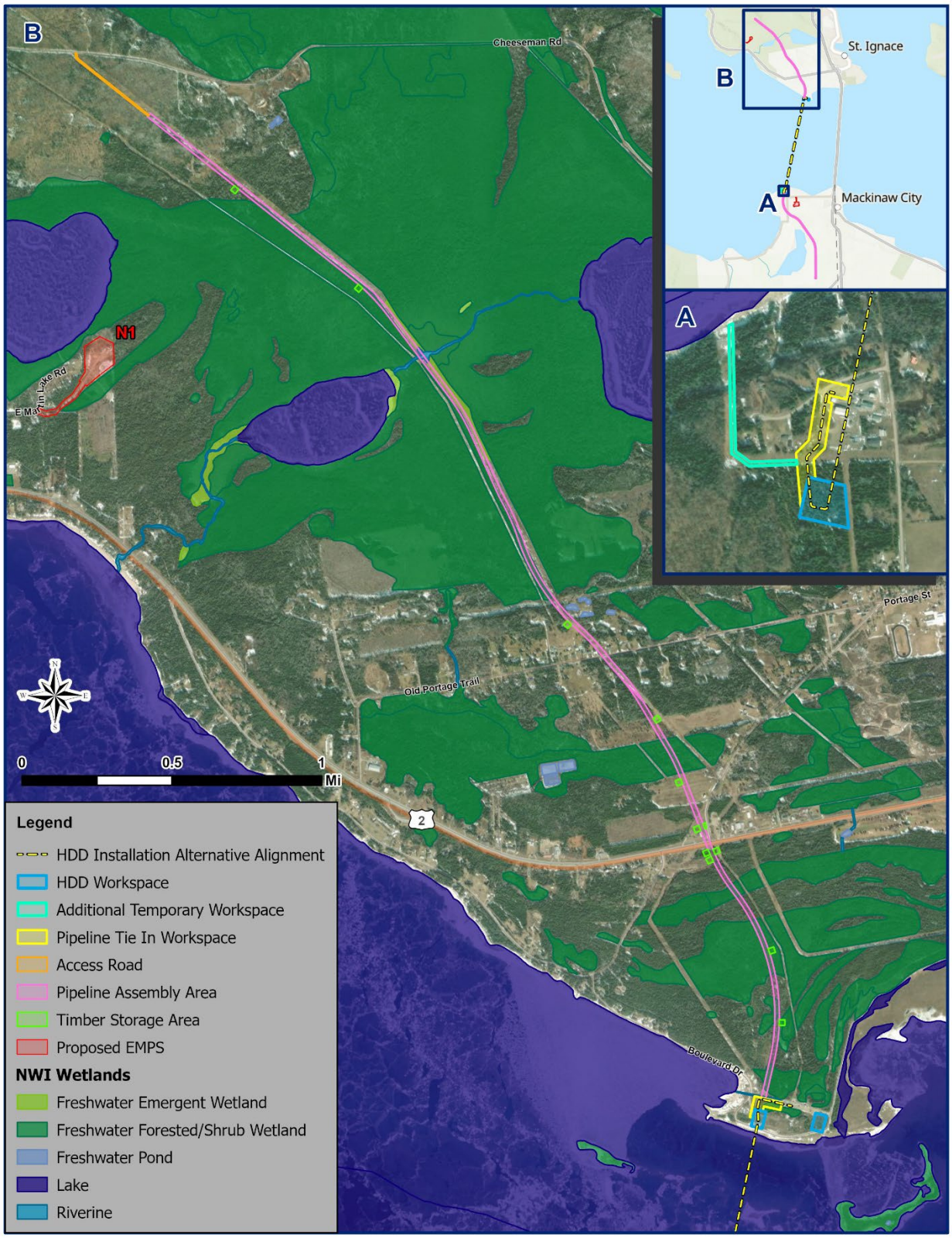

Figure 3.4-3. NWI Wetlands North of Straits

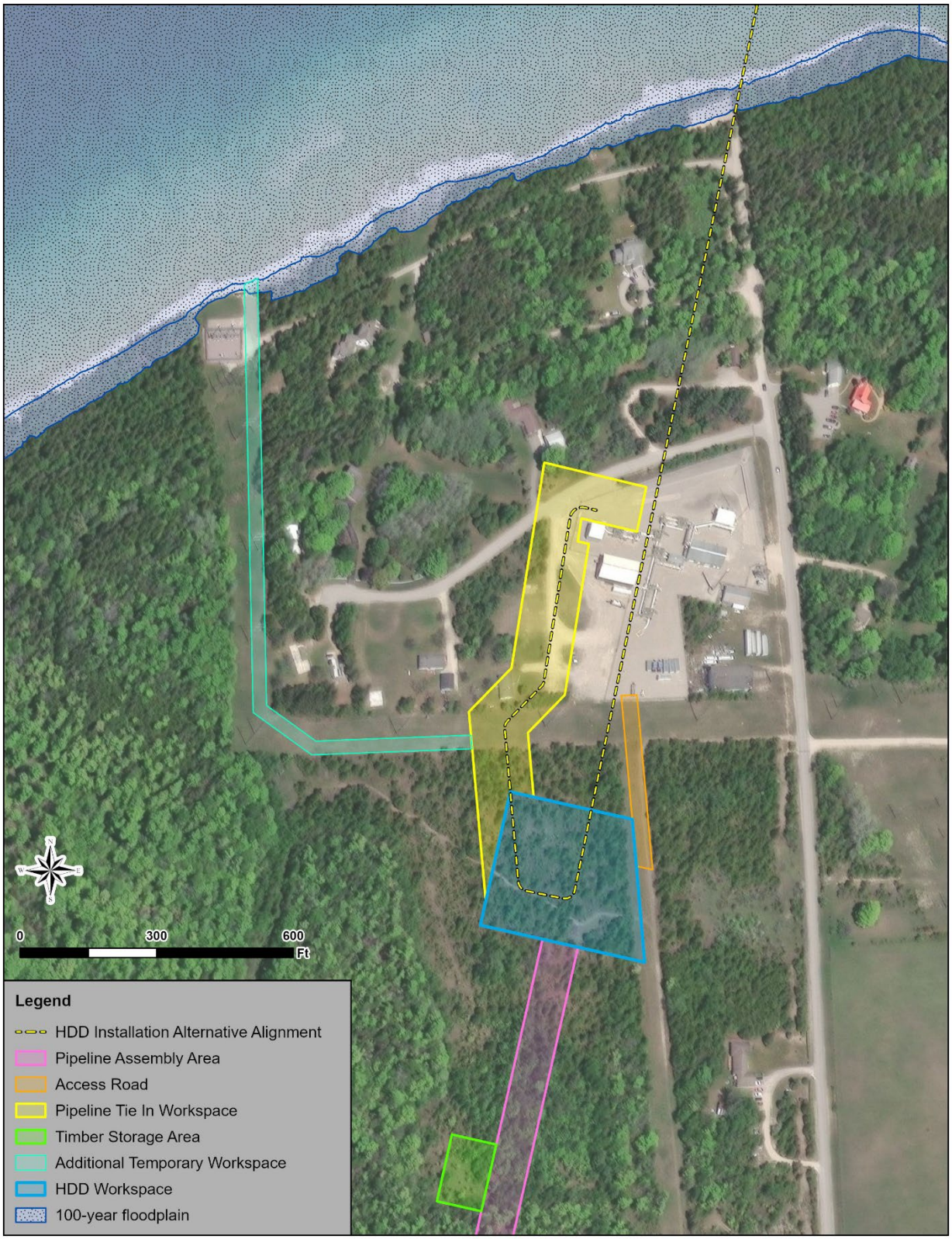

Figure 3.4-4. Floodplains within the Area of Analysis – South Side

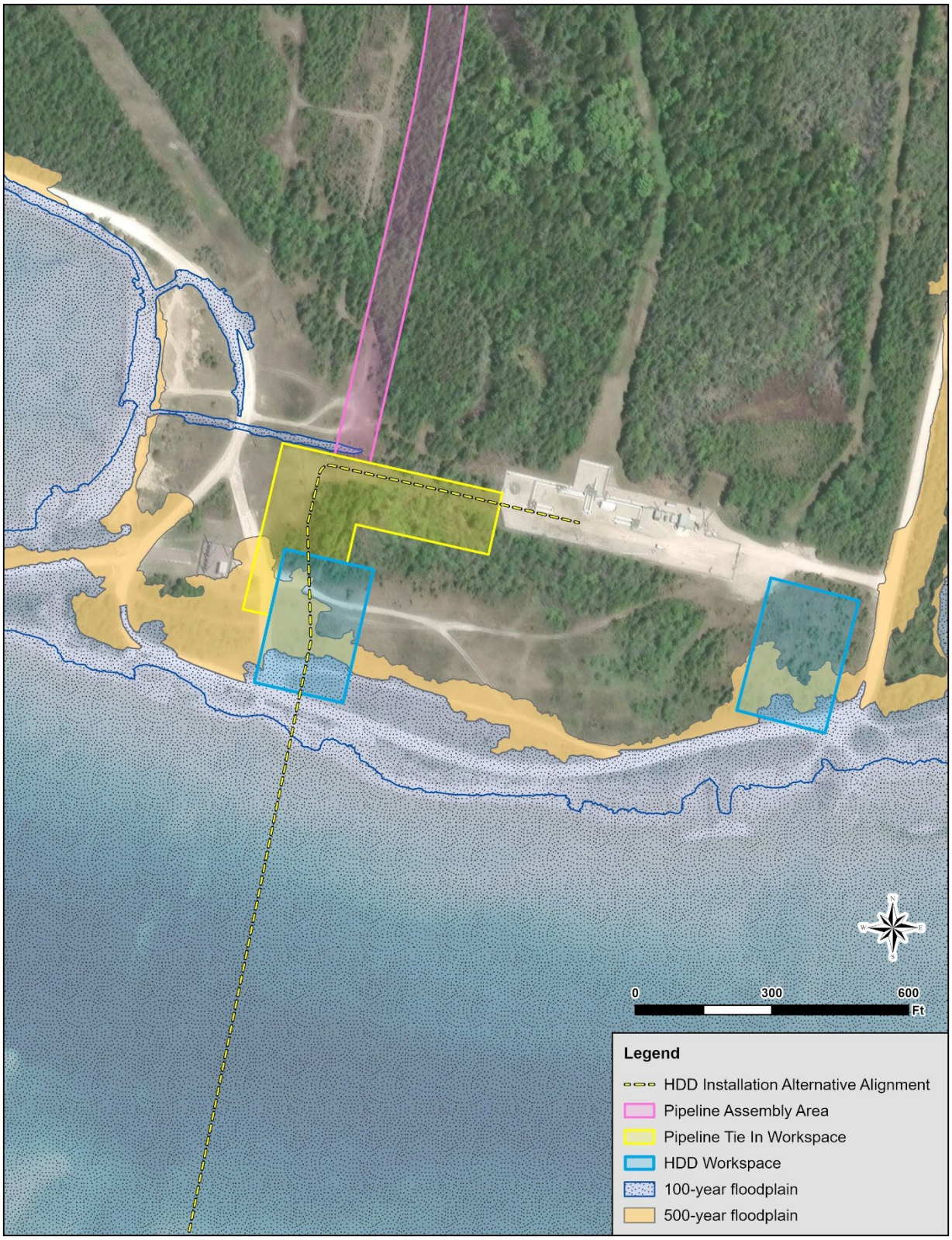

Figure 3.4-5. Floodplains within the Area of Analysis – North Side

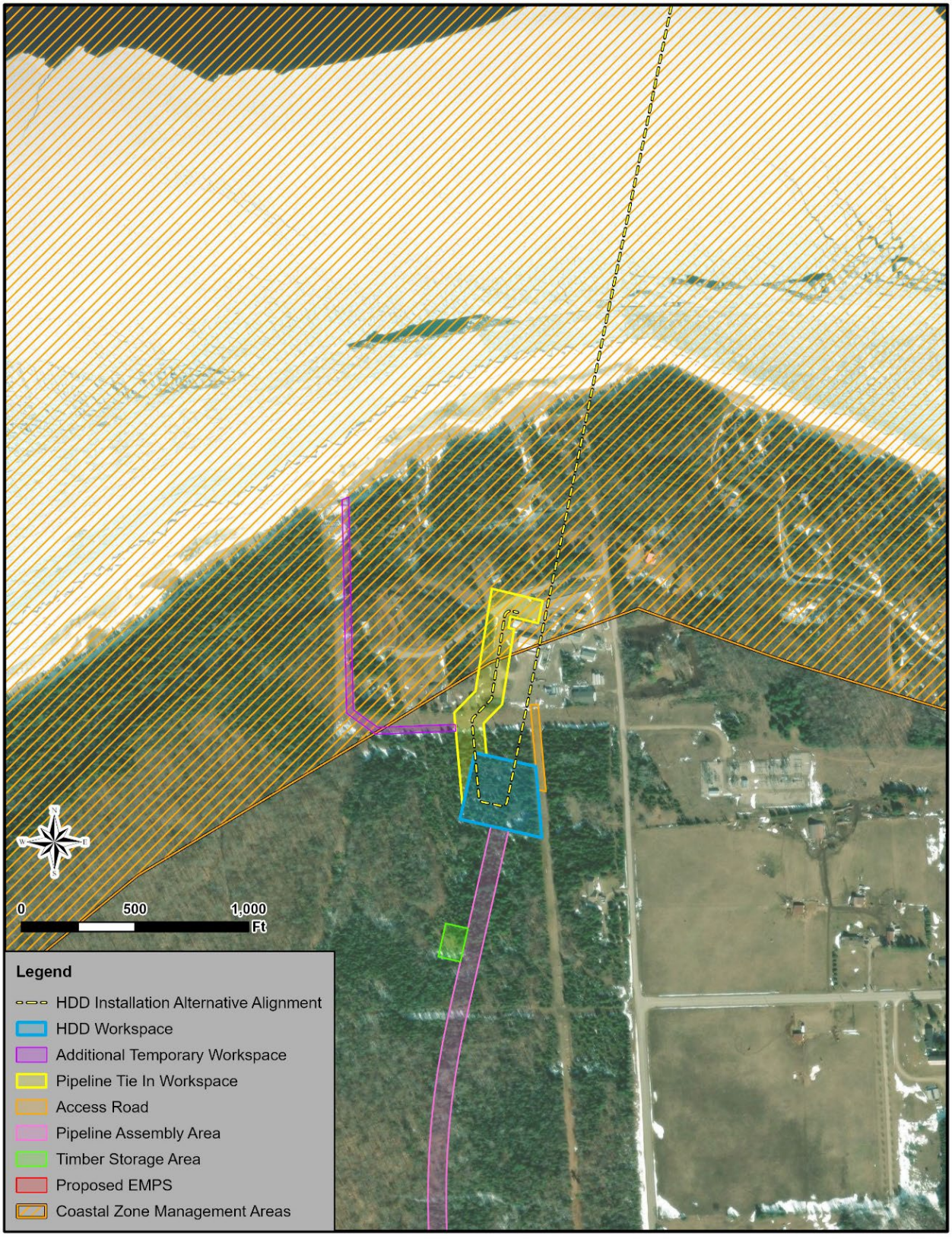

Figure 3.4-6. Coastal Zone Management Area Limits – South Side

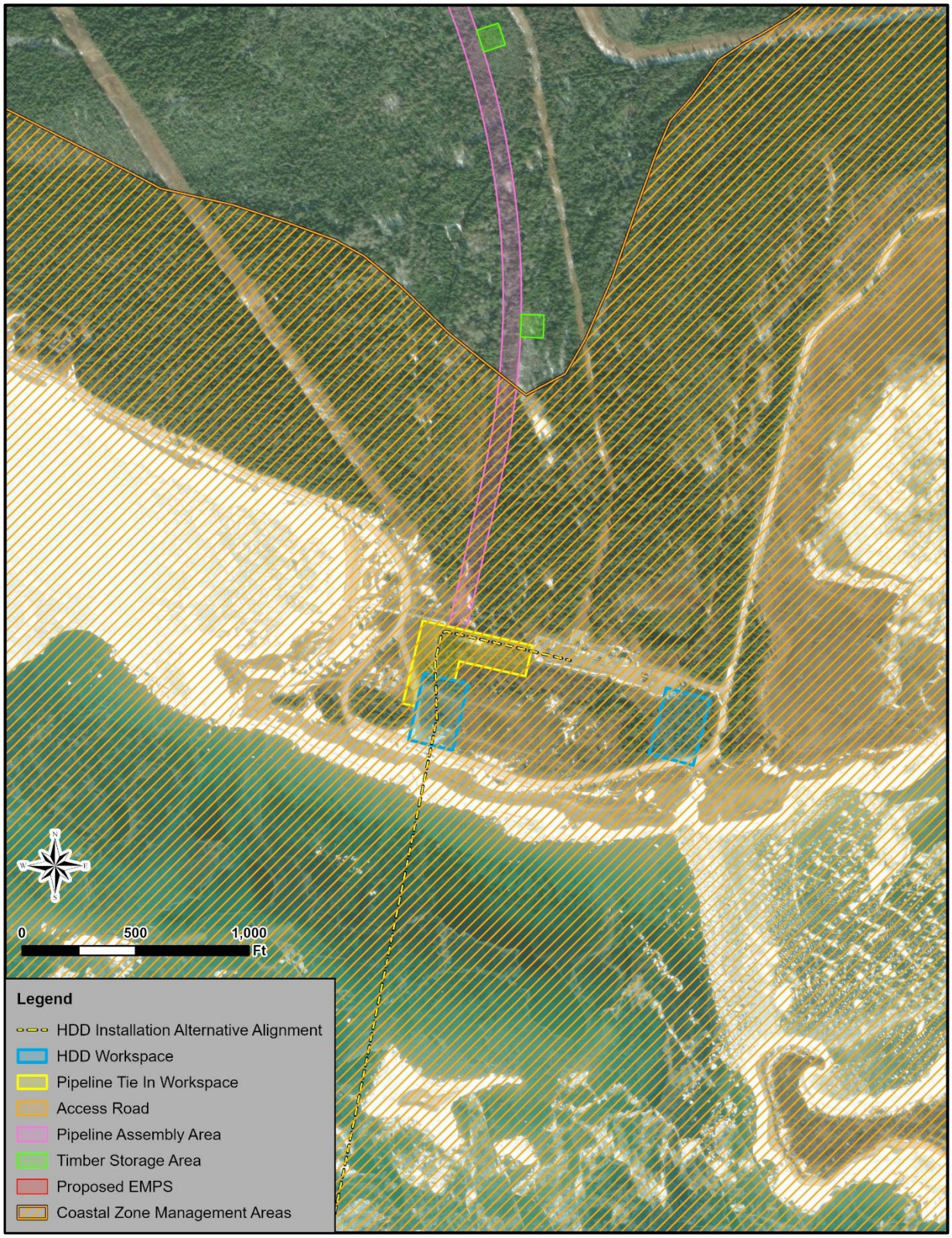

Figure 3.4-7. Coastal Zone Management Area Limits – North Side

3.5 BIOLOGICAL RESOURCES

3.5.1 Area of Analysis

The area of analysis is defined in Section 3.5.1 of the May 2025 Draft EIS, and includes the footprint of all alternatives and sub-alternatives, as well as consideration of biological resources adjacent to those areas. This Supplemental Draft EIS includes additional information, where required, to further characterize biological resources within and adjacent to the expected footprints of the HDD Installation Alternative.

3.5.2 Natural Communities

Table 3.5-1 presents the natural communities that are likely to occur within the expected footprints of HDD Installation Sub-Alternatives 1 and 2, based on a review of aerial imagery and Michigan Natural Features Inventory data.

Table 3.5-1. Natural Communities within the HDD Installation Alternative Footprints

Location	Description
Workspaces Common to Both Sub-Alternatives	
HDD Workspace – South of the Straits	Mesic Northern Forest; deciduous/mixed conifer-deciduous forest; approximately 3 percent previously disturbed ROW clearings.
HDD Workspace – North of the Straits	Boreal Forest; coniferous/mixed conifer-deciduous forest; approximately 80 percent previously disturbed ROW/utility clearings.
Pipeline Tie-In Workspace – South of the Straits	Mesic Northern Forest; deciduous/mixed conifer-deciduous forest; approximately 70 percent previously disturbed ROW clearings and development of the existing Mackinaw Station.
Pipeline Tie-In Workspace – North of the Straits	Boreal Forest; coniferous/mixed conifer-deciduous forest; approximately 50 percent previously disturbed ROW/utility clearings.
Additional Temporary Workspace – South of the Straits	Mesic Northern Forest; deciduous/mixed conifer-deciduous forest; approximately 90 percent previously disturbed ROW/utility clearings.
HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	
Pipeline Assembly Area, including associated timber storage areas	Mesic Northern Forest; deciduous/mixed conifer-deciduous forest; approximately 50 percent previously disturbed ROW clearings.
HDD Installation Sub-Alternative 1: Pipeline Assembly Area North	
Pipeline Assembly Area, including associated timber storage areas	Boreal Forest; coniferous/mixed conifer-deciduous forest; approximately 25 percent previously disturbed ROW clearings and residential development.

HDD = horizontal directional drilling; ROW = right-of-way

3.5.3 Wildlife

Development and presence of humans in the vicinity of the expected footprints associated with the HDD Installation Alternative likely influence the types of species that are likely to be found in this area. Species that may be encountered within the HDD/pipeline tie-in/additional temporary workspaces, which are at least in part located in close proximity to existing development, would likely be those more accustomed to human activity and associated noise, such as birds and small mammals. The HDD/pipeline tie-in workspaces north of the Straits and a portion of the pipeline assembly area (and associated timber storage areas) under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) are located on Point La Barbe, an important area for migrating

and breeding avian species (Sanders et al. 2005), as noted in Section 3.5.3 of the May 2025 Draft EIS.

As the pipeline assembly areas (and associated timber storage areas) under each HDD Installation sub-alternative traverse in part through heavily forested areas and are located further from human activity, there may be a higher likelihood of encountering wildlife in these areas. Throughout the Great Lakes region, species such as gray wolf, beaver, Canada lynx, little brown bat, river otter, and coyote may still be found in remaining native tracts of forest, grassland, and wetland habitats (NWF 2025). Species such as deer, migrating shorebirds, waterfowl, and songbirds are more likely to be present within the pipeline assembly areas than within expected workspaces closer to the Straits shoreline, which are also located closer to development associated with the Applicant's existing facilities. Notably, the pipeline assembly area south of the Straits (under HDD Installation Sub-Alternative 1: Pipeline Assembly Area South) is partially located within the French Farm Lake Flooding State Wildlife Management Area. Additionally, the pipeline assembly area north of the Straits (under HDD Installation Sub-Alternative 2: Pipeline Assembly Area North) is partially located within Hiawatha National Forest, in which wildlife such as deer, bears, wolves, rabbits and moose may be present (NWSRS 2025; USFWS 2025). Additionally, over 250 bird species have been reported in Hiawatha National Forest, including golden and bald eagles, hawks, and turkeys (UPTRA 2025).

3.5.4 Aquatic Organisms

Section 3.5.4 of the May 2025 Draft EIS describes baseline conditions for aquatic organisms in the Straits. While normal HDD operations during construction would not require in-water work, it is possible that a water intake structure would be required, prompting a small amount of in-water work while the structure is installed (see Section 4.4 for additional detail on the likelihood of a water intake structure being required under this alternative). The affected environment information provided in Section 3.5.4 of the May 2025 Draft EIS contains a description of aquatic organisms that would apply to the HDD Installation Alternative.

3.5.5 Protected Species

Table 3.5-2 provides information on documented federally protected species with the potential to occur within the footprints associated with the HDD Installation Alternative, based on data from the USFWS Information for Planning and Consultation (IPaC) database. Surveys were not conducted within the expected footprints of the HDD Installation Alternative (aside from in areas that may overlap with surveys conducted for the proposed Tunnel Project). If the HDD Installation Alternative were pursued, the Applicant would be required to conduct field surveys and coordinate with the USFWS. Appendix G, Attachment 2, of the May 2025 Draft EIS provides additional information on protected species within Emmet, Cheboygan, and Mackinac counties, which encompass the expected workspaces associated with the HDD Installation Alternative.

Table 3.5-2. Federal Special Status Species with Potential to Occur within the HDD Installation Alternative Area of Analysis

Species	Federal Status	Habitat	Likely to Occur in the Area of Analysis?
Mammals			
Northern long-eared bat (*Myotis septentrionalis*)	Endangered	Generally associated with old-growth forests and relies on intact interior forest habitat. Forages within forests and along forest edges. Hibernates in caves, mines, and tunnels in areas with temperatures above freezing and with low risk of disturbance. During the	Possibly. There is potential for this species to utilize nearby trees or structures as daytime roosting sites.

Species	Federal Status	Habitat	Likely to Occur in the Area of Analysis?
		daytime, may roost in crevices, under loose bark on trees, or in small spaces associated with buildings or under bridges.	
Gray wolf (*Canis lupus*)	Threatened	Require territories with minimal disturbance from humans and a sufficient mammal prey base. Territories may encompass 50 to 1,000 or more square miles. Prey species in Michigan primarily include beaver and white-tailed deer, but also snowshoe hare, red squirrel, voles, and ruffed grouse.	Possibly. While there is no critical habitat for this species in the area of analysis, it is possible that wolves may utilize forested areas within and adjacent to the pipeline assembly area. Therefore, individuals may travel through the action area.
Canada lynx (*Lynx canadensis*)	Threatened	Inhabit areas of coniferous and mixed coniferous/deciduous forests with sufficient populations of its primary prey, the snowshoe hare.	Possibly. While there is no critical habitat for this species in the area of analysis, lynx utilize a large range and could occasionally visit or pass through the area.
Tricolored bat (*Perimyotis subflavus*)	Proposed Endangered[1]	Hibernate in mines and caves. When not hibernating, this species primarily roosts in live or recently dead deciduous hardwood trees.	Possibly. While there is no critical habitat for this species in the area of analysis, there is potential for this species to utilize nearby trees or structures as daytime roosting sites.
Birds			
Piping plover (*Charadrius melodus*)	Endangered	In the Great Lakes, breeds on gravel shorelines with sparse vegetation or on sandy open flats above shells or cobble behind foredunes. Forages on open shorelines.	Possibly. While there is no critical habitat for this species in the area of analysis, limited areas of suitable habitat are likely within the area of analysis.
Rufa red knot (*Calidris canutus rufa*)	Threatened	In the Great Lakes region, the rufa red knot is considered a rare transient, and little is known about its use of stopover sites in the area. In general, stopover habitats must be rich in easily digested foods, such as juvenile clams, mussels, and horseshoe crab eggs.	Unlikely. Limited areas of suitable habitat likely within the area of analysis. Due to its status as a rare transient in the region and the limited availability of suitable habitat, this species is unlikely to occur in the area.

Species	Federal Status	Habitat	Likely to Occur in the Area of Analysis?
Reptiles			
Eastern massasauga rattlesnake (*Sistrurus catenatus*)	Threatened	Found in a variety of habitats but avoids heavily wooded areas. Winters in wetland areas and spends summers foraging in wetlands and upland or mesic grasslands.	Possibly. Some suitable habitat possible within or adjacent to the area of analysis near wetlands.
Insects			
Hine's emerald dragonfly (Somatochlora hineana)	Endangered	Slow-flowing marshes and sedge meadows. These are usually open and vegetated with nearby conifer swamps and forests.	Possibly. Some suitable habitat possible within or adjacent to the area of analysis near wetlands.
Hungerford's crawling water beetle (*Brychius hungerfordi*)	Endangered	Found in aerated riffles and plunge pools of cool, clean, moderate to fast flowing streams. These streams are typically alkaline and have inorganic substrates.	No. No suitable habitat likely within the area of analysis.
Monarch butterfly (*Danaus plexippus*)	Proposed threatened[2]	Suitable breeding habitat associated with presence of milkweed plants, which grow in sunny areas with soils ranging from well-drained to those occurring near water. Migrates south to overwinter in Mexico.	Possibly. Suitable habitat possible within the area of analysis.
Flowering Plants			
Dwarf lake iris (*Iris lacustris*)	Threatened	Well-drained soils along partially shaded forest edges. Associated with coniferous forest dominated by northern white cedar and balsam fir.	Yes. Suitable habitat likely within area of analysis.
Houghton's goldenrod (*Solidago houghtonii*)	Threatened	Potential habitats include damp, sparsely vegetated, sandy flats; low dunes; and beaches or cobbly shores.	Yes. Suitable habitat likely within area of analysis.
Pitcher's thistle (*Cirsium pitcheri*)	Threatened	Non-forested dune ecosystems of the Great Lakes.	Possibly. Suitable habitat possible within the area of analysis.
Lakeside daisy (*Tetraneuris herbacea*)	Threatened	In Michigan, this species is known to occur in a single location in Mackinac County at the edge of a white cedar forest.	No. No suitable habitat identified within the area of analysis.

Species	Federal Status	Habitat	Likely to Occur in the Area of Analysis?
Michigan monkey-flower (*Erythranthe michiganensis*)	Endangered	Cold springs, seeps, and streams, often in association with northern white cedar.	Possibly. Some suitable habitat within or adjacent to pipeline assembly areas near stream crossings.

Source: USFWS 2025

[1] A proposed endangered species is any species that USFWS has determined is in danger of extinction throughout all or a significant portion of its range and has proposed a draft rule to list as endangered. Proposed endangered species are not protected by the take prohibitions of Section 9 of the Endangered Species Act (ESA) until the rule is finalized. Under Section 7(a)(4) of the ESA, federal agencies must confer with USFWS if their action will jeopardize the continued existence of a proposed species. On September 13, 2022, the USFWS announced the proposal to list the tricolored bat as endangered.

[2] A proposed threatened species is any species that USFWS has determined is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and has proposed a draft rule to list as threatened. Proposed threatened species are not protected by the take prohibitions of Section 9 of the ESA until the rule to list is finalized. Under Section 7(a)(4) of the ESA, federal agencies must confer with USFWS if their action will jeopardize the continued existence of a proposed species. On March 19, 2025, USFWS reopened the comment period for 60 days on a proposed rule listing the monarch butterfly as a threatened species under the ESA. The original rule was proposed on December 12, 2024.

3.5.6 Invasive Species

While surveys for specific invasive species have not been conducted for the expected footprints associated with the HDD Installation Alternative, Table 3.5-6 of the May 2025 Draft EIS details common invasive species in Michigan and their known habitat.

3.6 CULTURAL RESOURCES

The Permit Area and Area of Potential Effects (APE) used in the cultural resources analysis in the May 2025 Draft EIS are described in Section 3.6.1 of the May 2025 Draft EIS. The footprints of the HDD Installation Alternative that are common to both sub-alternatives (the HDD/pipeline tie-in workspaces located near the Applicant's existing facilities on either side of the Straits and the additional temporary workspace identified south of the Straits) are included within the previously analyzed APE. Portions of those footprints are also included within the Permit Area (for the proposed Tunnel Project), for which detailed cultural resource surveys and IK were available for the analysis in this Supplemental Draft EIS. While some portions of the pipeline assembly area alignments (and associated timber storage areas) under each HDD Installation sub-alternative occur within the previously defined APE for the proposed Tunnel Project (approximately 70 percent of the alignment under HDD Installation Sub-Alternative 1 [Pipeline Assembly Area South] and approximately 50 percent of the alignment under HDD Installation Sub-Alternative 2 [Pipeline Assembly Area North]), other portions of the alignments extend beyond it. Particularly for these areas, but also for portions of the sub-alternative footprints that are located within the previously defined APE but outside the Permit Area for the proposed Tunnel Project, current knowledge on existing cultural resources is limited, due to a lack of identification and evaluation work and a lack of IK collected specific to these areas.

3.6.1 Archaeological Resources

For terrestrial and marine archaeological resources, there is some overlap of the HDD Installation sub-alternative footprints and areas that have received intensive inventory and evaluation efforts for the proposed Tunnel Project. No part of the HDD workspace or the additional temporary workspace south of the Straits has been previously surveyed, and approximately 10 percent of the pipeline assembly area under HDD Installation Alternative 1 (Pipeline Assembly Area South) has been surveyed. Approximately 80 percent of the pipeline tie-in workspace south of the Straits was included in previous survey and evaluation efforts. All HDD workspaces north of the Straits were included in previous inventory and evaluation, but only an estimated 10 percent of the pipeline assembly area under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) has been surveyed, and no part of the pipeline tie-in workspace north of the Straits has been surveyed. USACE defined its requirements for field surveys to identify historic properties based on the Applicant's proposed project (i.e., the Tunnel Project). Because the USACE does not require field surveys outside the Permit Area for the Applicant's proposed project, evaluation of cultural resource impacts associated with the HDD Installation Alternative is based on available information and consideration of where cultural resources may be impacted, if present. If the Applicant were to pursue the HDD Installation Alternative, additional archaeological surveys, site evaluations, and Section 106 consultation would be required.

3.6.1.1 Terrestrial Archaeological Resources

Based on available survey data within portions of the HDD/pipeline tie-in workspaces (no survey data is available for the additional temporary workspace south of the Straits), it is known that multiple archaeological sites eligible for listing in the National Register of Historic Places (NRHP) and an eligible archaeological district are located in the HDD/pipeline tie-in workspaces. As stated in the May 2025 Draft EIS, the nature and location of archaeological sites is sensitive and is not disclosed in this document. Surveys are not available for portions of the HDD Installation Alternative, including the pipeline assembly area/timber storage areas expected under either HDD Installation sub-alternative, to determine if terrestrial archaeological resources may be present. As stated, if this alternative were to be pursued by the Applicant, additional surveys, site evaluations, and consultation under Section 106 would be required.

3.6.1.2 Marine Archaeological Resources

The marine archaeological research completed for the proposed Tunnel Project did not identify marine archaeological sites in areas potentially affected by the HDD Installation Alternative. In-water work would not be expected under this alternative unless a water intake structure were to be required, in which case the method of installation and the location of the structure would be the same as proposed under the Applicant's Preferred Alternative, for which detailed surveys were completed to characterize the affected environment for marine archaeological resources. The potentially affected environment does not include the lakebed outside the potential water intake structure work area because the drilling depths expected under the HDD Installation Alternative are greater than 25 feet below the lakebed, and vibration levels would not exceed impact thresholds for any archaeological resources that may be present on the lakebed. Historic Buildings and Structures

As stated, much of the footprint associated with both HDD Installation sub-alternatives is included in the APE previously defined for the proposed Tunnel Project, throughout which known historic buildings and structures were inventoried. Table 3.6-2 in the May 2025 Draft EIS includes a summary of the NRHP-eligible/listed architectural resources inventoried in the APE. If the Applicant were to pursue the HDD Installation Alternative, additional inventories would be required to identify historic buildings and structures that could be affected by portions of the construction footprint located outside the previously inventoried APE for the proposed Tunnel Project, as well as consultation under Section 106.

3.6.2 Traditional Cultural Places

The footprints of HDD Installation Sub-Alternatives 1 and 2 would occur within the NRHP-eligible Straits of Mackinac Traditional Cultural Landscape (TCL) discussed in Section 3.6.5 of the May 2025 Draft EIS.

3.7 TREATY RIGHTS

Section 3.7 of the May 2025 Draft EIS outlines the context of Tribal treaty rights as well as the background of treaties in the State of Michigan, which would be applicable to consideration of the HDD Installation Alternative.

3.8 GEOLOGY

3.8.1 Area of Analysis

The area of analysis is defined in Section 3.8.1 of the May 2025 Draft EIS, and includes the footprint of all alternatives and sub-alternatives, as well as consideration of geological resources adjacent to these areas. This Supplemental Draft EIS includes additional information, where required, to further characterize geological resources within and adjacent to the expected footprints of the HDD Installation Alternative.

3.8.2 Geological Formations

Geological formations underlying the HDD Installation Alternative footprint are the same as those identified in Section 3.8.2 of the May 2025 Draft EIS. No borings or geotechnical surveys were performed for footprints associated with this alternative.

3.8.3 Geologic Hazards

The lack of geotechnical data available for this alternative raises the uncertainty of encountering unstable conditions such as pockets of gas, groundwater, or voids (see Sections 3.14 and 4.14 of the May 2025 Draft EIS and Section 4.14 of this Supplemental Draft EIS for further discussion of these hazards).

The area of analysis is not near any known active seismic fault lines (a weak point where an earthquake can occur). The Federal Emergency Management Agency prepares earthquake hazard maps with seismic design categories that reflect the likelihood of experiencing earthquake shaking of various intensities. The location of the Project alternatives, including the footprint associated with the HDD Installation Alternative, is within Seismic Design Category A, which denotes a very small probability of experiencing damaging earthquake effects (FEMA 2020).

3.8.4 Karst Conditions

As stated in Section 3.8.4 of the May 2025 Draft EIS, known areas of karst features occur in Emmet, Cheboygan, and Mackinac counties. Karst features are mapped in the area of analysis, and could potentially be encountered during drilling (see Section 3.8 of the May 2025 Draft EIS for further discussion of karst conditions). Figure 3.8-1 below shows the extent of known areas of karst conditions as well as the extent of the aquifer in relation to the area of analysis.

Source: USGS 1992

Figure 3.8-1. Karst Conditions Within the Area of Analysis

3.9 SOILS

3.9.1 Area of Analysis

The area of analysis is defined in Section 3.9.1 of the May 2025 Draft EIS, and includes the footprint of all alternatives and sub-alternatives. This Supplemental Draft EIS includes additional information, where required, to further characterize soils within the expected footprint of the HDD Installation Alternative.

3.9.2 Topography

In the area of the HDD/pipeline tie-in/additional temporary workspaces south of the Straits, elevations are approximately 665 feet above sea level in areas furthest from the Straits shoreline, and approximately 590 feet above sea level at the shoreline, according to USGS topographic maps. In the area of the HDD/pipeline tie-in workspaces north of the Straits, elevations are approximately 585 feet above sea level. Elevations along the pipeline assembly area alignment under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) range from approximately 625 to 675 feet above sea level, generally with gradual topographic changes, although there are isolated areas of steeper slopes. Elevations along the pipeline assembly area alignment under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) range from approximately 585 to 700 feet above sea level with some areas of steep slopes, including along United States Highway 2 (US-2), Old Portage Trail, and the northern extent of the alignment (USGS 2025c). Figures 3.9-1 and 3.9-2 show topographic contours south and north of the Straits, respectively. Topography of EMPS S1 and N1 is described in Section 3.9.2 of the May 2025 Draft EIS.

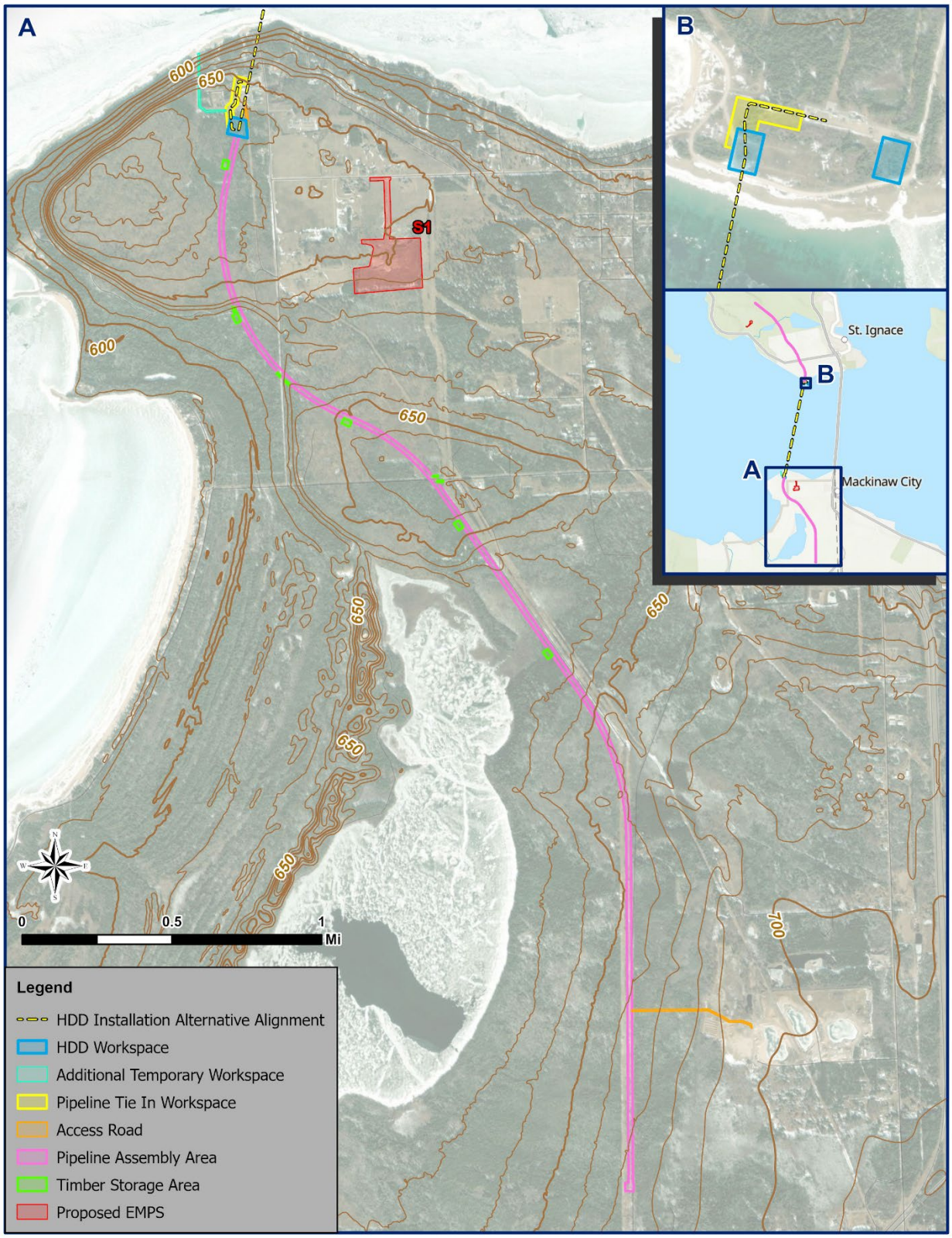

Figure 3.9-1. Topography South of the Straits, including HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

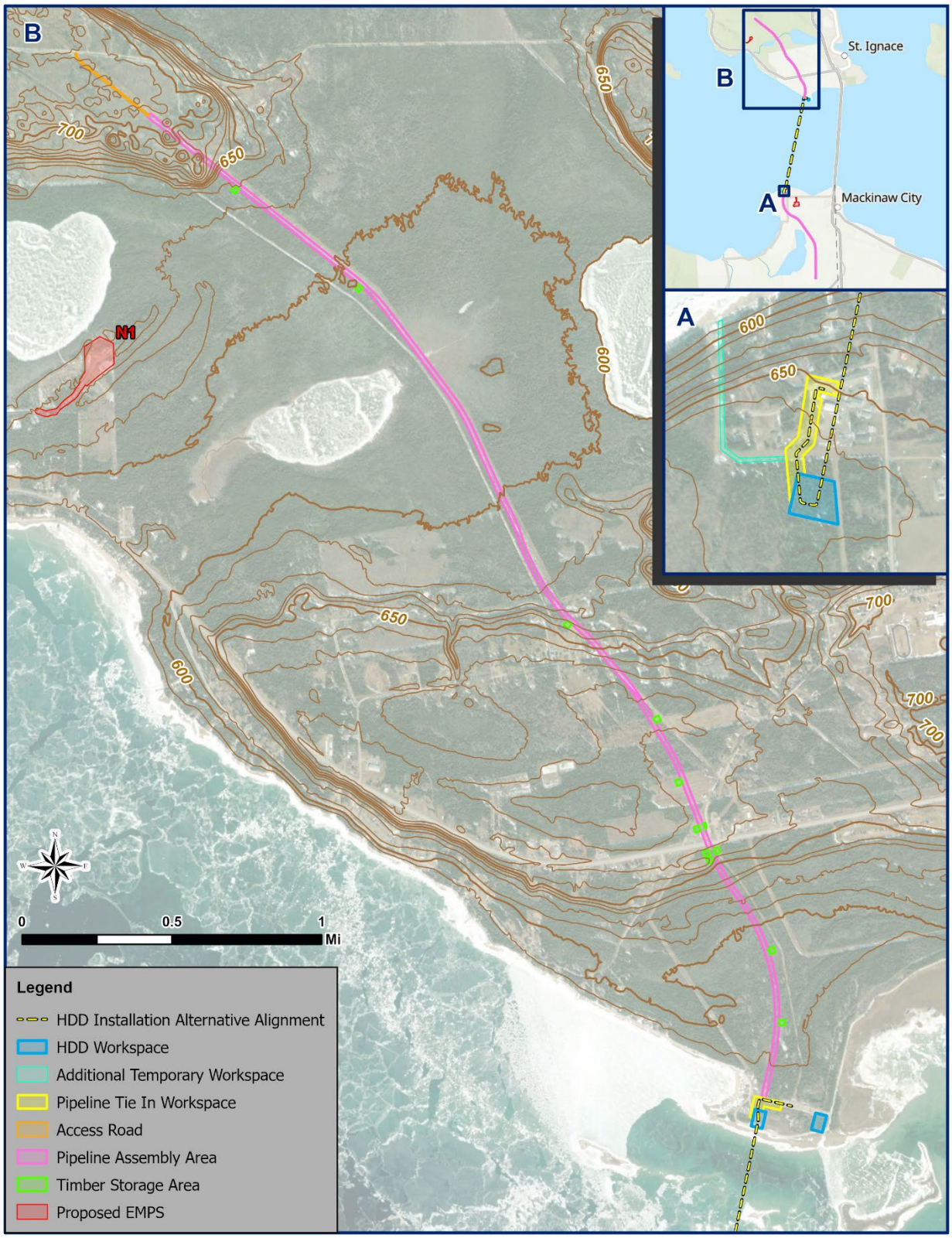

Figure 3.9-2. Topography North of the Straits, including HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

3.9.3 Soil Types within the Area of Analysis

Soil types identified and mapped by the U.S. Department of Agriculture Natural Resources Conservation Service are presented in Table 3.9-1 and Figures 3.9-3 and 3.9-4. Soil types within EMPS S1 and N1 are described in Section 3.9.3 of the May 2025 Draft EIS.

Table 3.9-1. Soil Types within the HDD Installation Sub-Alternative Footprints

Map Unit Symbol and Name	Drainage Class	Runoff Class	Erosion Hazard[1]	Erosion Hazard[2]
HDD/Tie-In Workspaces – South Side				
SaB – St. Ignace stony sandy loam, 2 to 6 percent slopes	Well drained	Low	Slight	Slight
HDD/Tie-In Workspaces – North Side				
116 – Udipsamments and Udorthents, nearly level	Excessively drained	Negligible	Slight	Slight
Additional Temporary Workspace – South Side				
AgB – Alpena gravelly loamy sand, sandy variant, 0 to 6 percent slopes	Excessively drained	Negligible	Slight	Slight
SaB – St. Ignace stony sandy loam, 2 to 6 percent slopes	Well drained	Low	Slight	Slight
So – Stony lake beaches	Not rated	Not provided	Not rated	Not rated
HDD Installation Sub-Alternative 1 Pipeline Assembly Area/Timber Storage Areas (South)[3]				
AvB – Au Gres loamy sand, gravelly subsoil variant, 0 to 6 percent slopes	Somewhat poorly drained	Very low	Slight	Slight
Ca – Carbondale muck	Very poorly drained	Very low	Slight	Slight
IIB – Iosco loamy fine sand, 0 to 6 percent slopes	Somewhat poorly drained	Low	Slight	Slight
KaB – Kalkaska sand, 0 to 6 percent slopes	Somewhat excessively drained	Very low	Slight	Slight
MnB – Menominee loamy sand, 0 to 6 percent slopes	Well drained	Low	Slight	Slight
MnC – Menominee loamy sand, 6 to 12 percent slopes	Well drained	Medium	Slight	Moderate
SaB – St. Ignace stony sandy loam, 2 to 6 percent slopes	Well drained	Low	Slight	Slight
Ta – Tawas muck	Very poorly drained	Very low	Slight	Slight
Wu – Wheatley loamy sand	Very poorly drained	Very low	Slight	Slight
HDD Installation Sub-Alternative 2 Pipeline Assembly Area/Timber Storage Areas (North)[3]				
29A – Solona loam, 0 to 3 percent slopes	Somewhat poorly drained	Low	Slight	Slight
43 – Angelica muck	Poorly drained	Medium	Slight	Slight

Map Unit Symbol and Name	Drainage Class	Runoff Class	Erosion Hazard[1]	Erosion Hazard[2]
62A – Iosco sand, 0 to 3 percent slopes	Somewhat poorly drained	Very low	Slight	Slight
70B – St. Ignace silt loam, 0 to 6 percent slopes	Well drained	Low	Slight	Moderate
70F – St. Ignace-Rock outcrop complex, 24 to 70 percent slopes	Well drained	High	Very severe	Severe
116 – Udipsamments and Udorthents, nearly level	Excessively drained	Negligible	Slight	Slight
124D – Alpena gravelly loam, 0 to 15 percent slopes	Excessively drained	Low	Slight	Moderate
151 – Beavertail muck	Poorly drained	Medium	Slight	Slight
163B – Esau-Zela complex, 0 to 3 percent slopes	Somewhat poorly drained	Very low	Slight	Slight
CbdaaA – Carbondale, Lupton, and Tawas mucks, 0 to 1 percent slopes	Very poorly drained	Not provided	Slight	Slight

Source: USDA NRCS 2024

[1] Erosion Hazard (Off-Road, Off-Trail) (MI): this rating indicates the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. “Slight” indicates that erosion is unlikely under ordinary climatic conditions; “moderate” indicates that some erosion is likely and that erosion control measures may be needed; “severe” indicates that erosion is very likely and that erosion control measures are advised; and “very severe” indicates that significant erosion is expected, loss of soil productivity and off-site damages are likely, and erosion control measures are costly and generally impractical.

[2] Erosion Hazard (Road, Trail): this rating indicates the hazard of soil loss from unsurfaced roads and trails. “Slight” indicates that little or no erosion is likely; “moderate” indicates that some erosion is likely, that roads/trails may require occasional maintenance, and that simple erosion control measures are needed; and “severe” indicates that significant erosion is expected, roads/trails require frequent maintenance, and costly erosion control measures are needed.

[3] Map unit types that occur within the boundaries of the pipeline assembly area but comprise less than 0.1 percent of the area were not included.

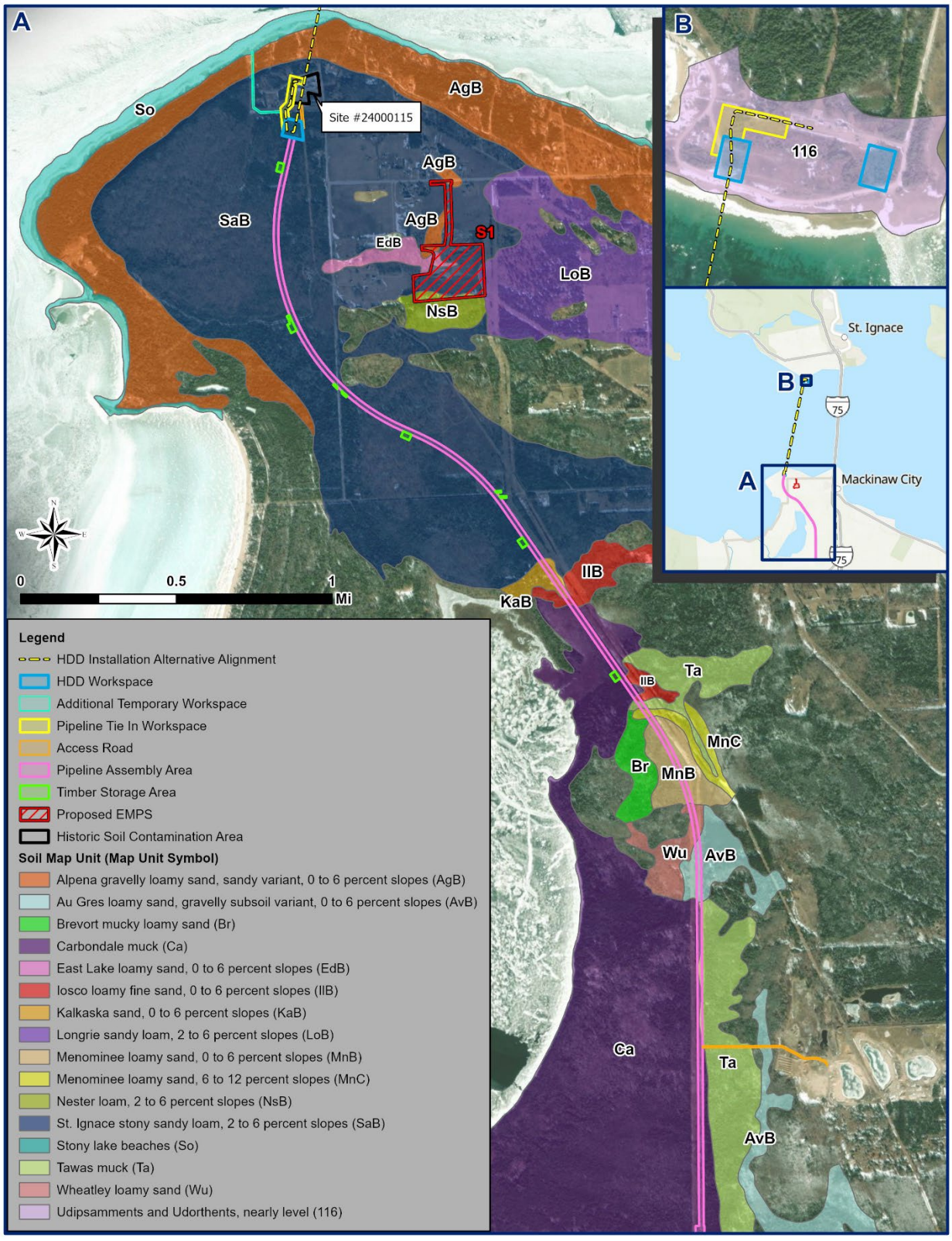

Figure 3.9-3. Mapped Soil Units South of Straits, including HDD Installation Sub-Alternative 1 Pipeline Assembly Area

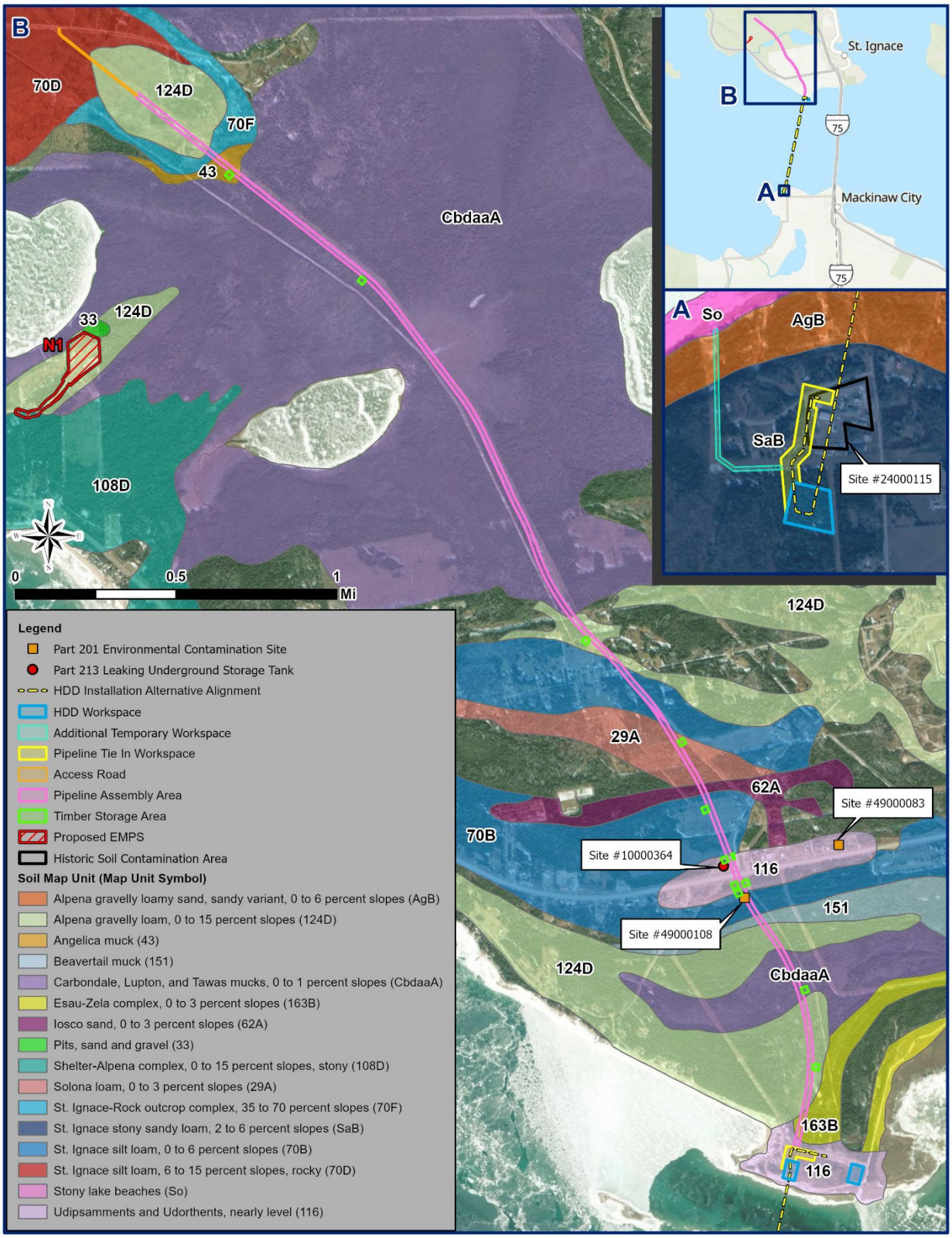

Figure 3.9-4. Mapped Soil Units North of Straits, including HDD Installation Sub-Alternative 2 Pipeline Assembly Area

3.9.4 Historical Soil Contamination in the Area of Analysis

A review of EGLE's online Remediation Information Data Exchange (RIDE) map application, which shows sites related to the work of the Remediation and Redevelopment Division, indicated that one Part 201 environmental contamination site occurs within the pipeline tie-in workspace south of the Straits (Site #24000115) (location shown on Figures 3.9-3 and 3.9-4). This site, which is related to historical petroleum releases at the Mackinaw Station, is described in detail in Section 3.9.4 of the May 2025 Draft EIS.

Additionally, one Part 201 environmental contamination site (Site #49000108) and one leaking underground storage tank (associated with Jerri's Pasties – Site # 10000364) occur within or directly adjacent to where the HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) pipeline assembly alignment would cross US-2 (the extent of the known contamination source is not identified). Additionally, a second Part 201 site (Site #49000083) is located east of the alignment (EGLE 2025b). The locations of these three sites are shown on Figure 3.9-4. Part 201 sites are regulated by EGLE under Part 201, Environmental Remediation, of Michigan Public Act 451 (Natural Resources and Environmental Protection Act), and indicate areas, places, or parcels/portions of parcels where a hazardous substance in excess of cleanup criteria concentrations for unrestricted residential use has been released, deposited, disposed of, or is otherwise located. Publicly available data from EGLE's RIDE application do not detail the type of contamination identified at the properties most likely to overlap with construction activities associated with HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), although it does identify contaminants associated with Site #49000083 (carcinogenic Polycyclic Aromatic Hydrocarbons, petroleum volatile organic compounds [VOCs] and semi volatile organic compounds).

3.10 TRANSPORTATION AND NAVIGATION

3.10.1 Area of Analysis

The area of analysis is defined in Section 3.10.1 of the May 2025 Draft EIS and for surface transportation, encompasses the regional public roadway network and the primary routes that would be used by construction vehicles to/from the expected construction footprints. This Supplemental Draft EIS includes, where required, additional information to further characterize surface transportation that may be affected by implementation of the HDD Installation Alternative. The area of analysis for navigation remains the same as described in Section 3.10.1 of the May 2025 Draft EIS.

3.10.2 Surface Transportation

Section 3.10.2 and Figures 3.10-1 through 3.10-4 of the May 2025 Draft EIS provide information on the local road network and key roadways within the area of analysis. The information below supplements that section with additional roads that may be affected by implementation of the HDD Installation Alternative.

3.10.2.1 Local Network South of the Straits

Headlands Road is a narrow, two-lane paved public road that primarily provides access to the Headlands International Dark Sky Park. The park's main entrance is located at the intersection of Headlands Road and Wilderness Park Drive, and the road connects visitors to various trails and facilities within the park. The entrance remains open year-round. Traffic count data for this road are not currently available.

3.10.2.2 Local Network North of the Straits

Cheeseman Road is a two-lane, paved roadway classified as a major collector. It runs east–west, connecting US-2 with the City of St. Ignace. The road primarily serves residential properties and also intersects a trail near its US-2 intersection that provides access to a golf course. With a 2024 average annual daily traffic (AADT) volume of 458 (MDOT 2025), Cheeseman Road experiences relatively low daily traffic volumes and operates at a Level of Service (LOS) A.

Portage Street is a two-lane paved road classified as a major collector that links US-2 with Old Portage Trail. It mainly serves residential properties and also provides access to some schools. At its intersection with Old Portage Trail there is an elementary, middle, and high school. With a 2024 AADT volume of 584 (MDOT 2025), Portage Street experiences relatively low daily traffic volumes and operates at a Level of Service (LOS) A.

Old Portage Trail is a two-lane, paved local road serving primarily residential areas and the St. Ignace public schools. It also provides access to US-2. Traffic count data for this road are not currently available.

3.11 AIR QUALITY

3.11.1 Area of Analysis

The area of analysis is defined in Section 3.11.1 of the May 2025 Draft EIS, and includes the airspace of Emmet, Cheboygan, and Mackinac counties, as well as the Upper Michigan Intrastate Air Quality Control Region (AQCR), which encompasses the footprints of HDD Installation Sub-Alternatives 1 and 2. Therefore, no additional information is required to further define baseline conditions within these areas.

3.12 NOISE AND VIBRATION

3.12.1 Area of Analysis

The area of analysis is defined in Section 3.12.1 of the May 2025 Draft EIS, and includes the footprints of all alternatives and sub-alternatives, as well as the area beyond the footprints from which noise and vibration levels could be detected by sensitive receptors during construction and operation. This Supplemental Draft EIS includes, where required, additional information to further characterize the noise environment that may be affected by implementation of the HDD Installation Alternative.

3.12.2 Ambient Noise Environment and Sensitive Receptors

The noise environment that could be impacted by construction activities at the HDD/pipeline tie-in/additional temporary workspaces south and north of the Straits and along the potential haul routes are included in discussions provided in Section 3.12.2 of the May 2025 Draft EIS. Table 3.12-1 of the May 2025 Draft EIS provides ambient noise measurements from a sampling of representative locations near these areas. The section also includes a discussion of sensitive receptors that could be impacted, which are presented in Figures 3.12-3 and 3.12-4 of the May 2025 Draft EIS.

There are no additional noise measurements available for the pipeline assembly area alignments under HDD Installation Sub-Alternatives 1 and 2. Much of the pipeline assembly area south of the Straits (under HDD Installation Sub-Alternative 1: Pipeline Assembly Area South) traverses heavily forested land, portions of which occur within the Headlands International Dark Sky Park and French Farm Lake Flooding State Wildlife Management Area. Therefore, it is assumed that the noise measurement taken at SML03 (Figure 3.12-1 and Table 3.12-1 of the May 2025 Draft EIS) is representative of most of the area within this alignment as SML03 is located within a heavily wooded area adjacent to the Headlands International Dark Sky Park. The daytime and nighttime noise levels at SML03 are 36 A-weighted decibel (dBA) and 31 dBA, respectively. Field notes taken at this location indicate that ambient sounds are dominated by natural bird sounds and nighttime noise is dominated by natural sounds, although there are also infrequent vehicles during both the daytime and nighttime hours (Stantec 2023).

Along the pipeline assembly area alignment north of the Straits (under HDD Installation Sub-Alternative 2: Pipeline Assembly Area North), most of the areas north of Old Portage Trail and south of US-2 are also dominated by forested land and likely have similar sound levels as described above for SML03. This alignment also comprises residential areas and a highway with numerous businesses and recreational areas catering to visitors, which peak in popularity during the summer months. It is assumed that residential areas have ambient noise levels ranging from 35 dBA to 45 dBA (based on SML05 and NML03 in Table 3.12-1 of the May 2025 Draft EIS, which are located near areas surrounded by trees along a rural road or near a residential area) and that areas near US-2 have ambient noise levels ranging from 45 dBA to 55 dBA (based on NML04, which is located adjacent to US-2). The workspace near US-2 likely experiences greater noise levels during the summer because of the higher levels of traffic noise from visitors.

3.13 SOCIOECONOMICS

3.13.1 Area of Analysis

The area of analysis is defined in Section 3.13.1 of the May 2025 Draft EIS, and includes the social and economic environment within Emmet, Cheboygan, and Mackinac counties, which encompasses the footprint of the HDD Installation Alternative. Therefore, no additional information is required to further define baseline conditions within these areas.

3.14 RELIABILITY AND SAFETY

Section 3.14 of the May 2025 Draft EIS describes the risks associated with construction and operation of pipelines and tunnels as well as the health and wellbeing of construction workers and members of the public in proximity to the proposed Line 5 Tunnel Project. This Supplemental Draft EIS expands that discussion to include consideration of the risks associated with construction and operation of pipelines installed under waterbodies via HDD.

3.14.1 HDD Industry Reliability and Safety

In a recent review conducted by the New Jersey Department of Environmental Protection Science Advisory Board, separate teams of researchers conducted surveys of the HDD industry to identify the primary risks of concern during construction projects using HDD. The review found that inadvertent returns, or drilling fluid losses through factures in the overlying soils or rock, could affect groundwater and surface waters, as well as the organisms that may inhabit these areas (see Sections 4.4 and 4.5 for additional detail on these risks specific to the HDD Installation Alternative analyzed in this Supplemental Draft EIS). While inadvertent returns may occur at any point during construction of an HDD project, the survey found that more than half of occurrences took place during drilling of the initial pilot hole. The boreholes created during construction of HDD projects may also allow migration of drill slurry between groundwater units (NJDEP Science Advisory Board 2021).

Krechowicz et al. surveyed 5,940 HDD projects in five countries to assess frequency of failures in HDD and the influence of failure occurrence[2] on the failure of the overall HDD project. The results were published in studies assessing the human and equipment risk factors (2021) and external risk factors (2022). Of 24 human and equipment risk factors and 14 external factors considered, the most critical risk factors (which caused up to 30 percent of the failure types analyzed) affecting construction of HDD projects included (Krechowicz et al. 2022, 2021):

- Human and equipment risk factors
    - Downtime in the HDD process
    - Mud motor failure
    - Drill rig operator lacking the required skills
    - Drill pipe failure due to repeated fluctuations in stress or strain (i.e., “fatigue”)
    - Inappropriate choice of external pipe coating
    - Drill rig failure
    - Mud cleaning system failure
- External risk factors
    - Borehole collapse
    - Drilling fluid runoff
    - Expected natural subsurface obstacles

Another study (Peters et al. 2014) examined three HDD projects in Sarasota County, Florida, and the types of failure they experienced in an effort to identify future prevention strategies. Failure in this study was defined as any part of the HDD that did not meet its intended objective during HDD

[2] The authors assigned a frequency of occurrence to each risk factor. For example, downtime in the HDD process had a frequency of occurrence of 17.55 percent and mud motor failure was 6.50 percent. The most critical failures, however, are not based just on frequency. Severity is also taken into account. The frequencies are based on survey results.

design or construction, whether on a grand scale or consisting of a minor incident. The study classified common HDD failures under three categories, with each containing their respective root causes:

- Geotechnical Exploration
    - Soil borings not deep enough
    - Soil borings not frequent enough
    - Soil borings located on top of pipe alignment
    - Insufficient soil information obtained
- Design
    - Utility/structure conflicts
    - Inadequate staging area
    - Staging too close to obstacle
    - 3D alignment
    - Drill calculations not completed
    - Drill angle of attack too shallow
    - Drill radius too small
    - Drill depth at mixed face soil conditions
    - Insufficient overburden/cover
    - Soft soils
    - Improper pipe specified
    - Flooded vs. unflooded installation
    - Lack of constructability review
- Construction
    - Equipment in disrepair
    - Wrong drill rig for the job
    - Wrong drill head for soil conditions
    - Drill change by contractor
    - Improper drilling fluid used
    - Hydro-fracture
    - Problematic soils causing the contractor to seek better soils

In addition to the industry-standard safety measures and construction BMPs discussed in Section 4.14.3 of the May 2025 Draft EIS, additional safety standards and industry BMPs such as those outlined in Section 4.14.3 of this Supplemental Draft EIS are used during HDD construction to mitigate the potential risks identified above. Michigan State University has developed a set of construction standards for directional drilling (Michigan State University 2009).

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4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 of the May 2025 Draft EIS describes the potential direct, indirect, and cumulative effects on the environmental resources identified in Chapter 3 that would occur under the proposed Project alternatives and sub-alternatives analyzed in detail. This Supplemental Draft EIS supplements the May 2025 Draft EIS, focusing on the environmental consequences associated with the HDD Installation Alternative (see Appendix F of this Supplemental Draft EIS for additional information). Information within this chapter will be incorporated into the Final EIS for the Line 5 Tunnel Project. The analysis of potential impacts assumed the implementation of design features and impact avoidance and minimization measures as described in Appendix F. Appendix H of the May 2025 Draft EIS contains information on the past, present, and reasonably foreseeable future actions within the area of analysis identified for the cumulative effects analysis.

As stated in Appendix F of this Supplemental Draft EIS, if the HDD Installation Alternative were to be implemented, the existing Dual Pipelines in the Straits would be decommissioned utilizing one of the decommissioning sub-alternatives analyzed in the May 2025 Draft EIS. Therefore, impacts associated with either HDD Installation sub-alternative would include the impacts described for the decommissioning sub-alternatives analyzed in the May 2025 Draft EIS. Since the anticipated impacts for decommissioning would be the same as described in Chapter 4 of the May 2025 Draft EIS, this Supplemental Draft EIS incorporates those resource impact discussions by reference, and does not reiterate them here.

4.1.1 Impact Characterization

Table 4.1-1 of the May 2025 Draft EIS provides definitions for impact terminology used for impact[3] characterization.

4.1.1.1 Scope of Analysis

Section 4.1.1.1 of the May 2025 Draft EIS describes the scope of analysis, which also applies to consideration of the HDD Installation Alternative.

4.1.2 Resource Interrelationships

See Section 4.1.2 of the May 2025 Draft EIS for information on resource interrelationships, which also applies to consideration of the HDD Installation Alternative.

4.1.3 Incomplete or Unavailable Information

Table 4.1-3 of the May 2025 Draft EIS details incomplete and unavailable information at the time of this document's development. Specifically related to consideration of the HDD Installation Alternative, baseline data provided in Chapter 3 rely on existing available information to understand the potential occurrence of resources, which informs the effects analysis in Chapter 4. This includes geographic information system mapping (e.g., NWI) and federal and state databases/records (e.g., USFWS IPaC, Michigan Natural Features Inventory, State Historic Preservation Office records). These resources can be less informative of the actual resources and condition of resources present than site-specific surveys, which are not available for the construction footprints for the HDD Installation Alternative. Completion of comprehensive surveys could result in shifts to the alignments of the pipeline assembly areas under each sub-alternative. Additionally, the footprint of the HDD Installation Alternative would occur, at least in part, outside of Applicant-owned property. Lack of property owner permission/easement for use during

[3] Note that in this document, the terms "effect" and "impact" have the same meaning and are used interchangeably.

construction could result in shifts to the pipeline assembly area alignments from those presented in this document. Unlike linear transportation projects pursued by government authorities, the Applicant as a private entity does not have authority to exercise eminent domain for property acquisition/entry rights. Shifts in the pipeline assembly area could impact more property owners than stated in this document, and could result in the need for additional access permits, including road crossing permits and water obstruction permits if additional streams or wetlands are temporarily impacted. Additional data that were lacking at the time of this document's development include projected daily truck traffic, ambient noise data, and projected noise modeling data for the HDD Installation Alternative.

4.1.4 Unavoidable Detrimental Effects

A detailed discussion of beneficial and/or detrimental effects as required by 33 Code of Federal Regulations (C.F.R.) 320.4(a)(2) is presented for each resource in Sections 4.2 through 4.14. A summary of key issues is presented at the beginning of each section. Additionally, both mitigation measures identified by the Applicant and those identified during the Supplemental Draft EIS impact assessment are summarized within each resource section, where applicable.

4.1.5 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be recovered or reversed. An irreversible commitment of a resource represents a loss of future options.

USACE has evaluated irreversible or irretrievable commitments of resources that would be involved for the HDD Installation Alternative should it be implemented. This term applies primarily to the use of non-renewable resources, such as minerals, fossil fuels, or cultural resources, and to factors that are renewable only over long periods of time, such as soil productivity. An irretrievable commitment of a resource represents opportunities that are foregone for the period of the expected activities. This term applies primarily to the use of renewable resources, such as timber or human effort, or other utilization opportunities that are foregone in favor of the expected activities. Table 4.1-1 describes resources that would be irreversibly and irretrievably committed to the HDD Installation Alternative analyzed in this Supplemental Draft EIS.

Table 4.1-1. Summary of Irreversible and Irretrievable Commitment of Resources

Resource	Summary of Irreversible and Irretrievable Commitment Impact
Cultural Resources and Historic Properties	Any disturbance to or destruction of cultural resources, historic properties, or TCPs could result in an irreversible commitment of resources.
Geology	Drilling beneath the Straits during construction would cause irreversible impacts, including permanent displacement of bedrock.
Resource Consumption	Irreversible consumption of renewable and non-renewable resources may be required, including metals, aggregate, cement, and other materials.
Resource Committal	Non-renewable resources (e.g., gasoline, diesel, natural gas, and electrical power generated from these fuels) would be irreversibly committed for construction and operations. Fuels would be required to operate motor vehicles, machinery, and HDD equipment.
Funds and Labor	Funds and labor would be irretrievably committed for permitting and development if this alternative were pursued.
Water	Water would be irretrievably committed for HDD machinery operation and excavated material removal.

HDD = horizontal direction drilling; TCP = Traditional Cultural Place

4.2 LAND USE AND RECREATION

This section presents the potential impacts to land use and recreation from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.2.

4.2.1 Summary of Key Issues

Table 4.2-1 presents a high-level summary of key issues for land use and recreation related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.2.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.2-1. Summary of Key Issues for Land Use and Recreation – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Land Ownership	No change in land ownership would occur within the expected construction footprints. Change of land ownership may occur at the EMPSs. The Applicant may purchase land within the sites or acquire temporary and/or permanent easements. Coordination would be required to utilize land managed by MDNR, Emmet County, and the State of Michigan.	No change in land ownership would occur within the expected construction footprints. Change of land ownership may occur at the EMPSs. The Applicant may purchase land within the sites or acquire temporary and/or permanent easements. Coordination would be required to utilize land managed by the U.S. Forest Service and the State of Michigan.
Land Use	Short- and long-term, detrimental impacts to land use due to changes from undeveloped land to developed construction land for the duration of construction. Impacts would be mitigated by revegetation post-construction. Areas requiring forest removal (approximately 31.9 acres of full logging expected) would experience long-term land use change from forested to open meadow due to the slow regeneration rate of trees. Permanent alterations to geology would occur due to removal of approximately 6,000 cubic yards of rock.	Short- and long-term, detrimental impacts to land use due to changes from undeveloped land to developed construction land for the duration of construction. Impacts would be mitigated by revegetation of some areas post-construction. Areas requiring forest removal (approximately 9.6 acres of full logging expected) would experience long-term land use change from forested to open meadow due to the slow regeneration rate of trees. Highway 2 Corridor/View Preservation by Moran Township would experience a short-term, detrimental impact due to construction noise/visual effects, including the presence of cranes. Impacts would end following construction. Permanent alterations to geology would occur due to removal of approximately 6,000 cubic yards of rock.
Water Recreation	Short-term, detrimental impacts due to changes to the recreational setting. If a water intake structure is required to be installed (not expected under normal HDD operation during construction), access to the Straits Area Blueway would be affected. During operations, there would be long-term, beneficial impacts as there	Short-term, detrimental impacts during construction and long-term, beneficial impacts during operations would be similar to those described for Sub-Alt 1.

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
	would be no need for future inspections or maintenance of the Dual Pipelines requiring localized closures in the Straits.	
Land Recreation	Short- and long-term, detrimental impacts to recreation activities resulting from presence of construction workers, construction noise from equipment use and tree clearing, and visual impacts, including from presence of cranes.	Short- and long-term, detrimental impacts to recreation activities would be similar to those described for Sub-Alt 1, although extent and location of impacts along the pipeline assembly area would differ.
Recreation at Parks, Monuments, and Preserves	Headlands International Dark Sky Park, French Farm Lake Flooding State Wildlife Management Area, McGulpin Lighthouse, Mackinaw Area Historic Society Heritage Village, Colonial Michilimackinac Historic State Park, and Hiawatha National Forest would experience short-term, detrimental impacts.	Headlands International Dark Sky Park, McGulpin Lighthouse, Mackinaw Area Historic Society Heritage Village, and Hiawatha National Forest would experience short-term, detrimental impacts.
Night Sky Recreation	Recreation activities relating to viewing of the night sky would not be impacted.	Recreation activities relating to viewing of the night sky would not be impacted.

EMPS = excavated material placement site; HDD = horizontal directional drilling; MDNR = Michigan Department of Natural Resources; Sub-Alt = Sub-Alternative

4.2.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.2.2.1 Construction

4.2.2.1.1 Land Ownership

There would be no impacts to land ownership as a result of construction. The potential EMPSs are privately owned, and the Applicant would either acquire ownership of appropriate areas within the sites or, if the current owners retain ownership, the Applicant would secure the rights to access the sites and place excavated materials and/or temporarily store materials during construction. Additionally, the Applicant would take the necessary steps to procure access rights along the pipeline assembly area alignment and within any other workspaces that are expected to be located outside of Applicant-owned property. The Applicant would coordinate with MDNR to conduct work within the French Farm Flooding State Wildlife Management Area and with Emmet County to conduct work within Headlands International Dark Sky Park. Authorization from the State of Michigan would be required to authorize the replacement pipeline easement below the Straits lakebed. All roads anticipated to be used are publicly-owned by the State or county so permission would not be required for use from private owners.

4.2.2.1.2 Land Use

There would be short- and long-term, detrimental impacts to land use within the expected workspaces associated with HDD Installation Sub-Alternative 1: Pipeline Assembly Area South. Land within the HDD/pipeline tie-in workspaces on both sides of the Straits would change from undeveloped land to developed construction land for the duration of construction (land within the additional temporary workspace south of the Straits already consists of existing, cleared ROW). Additionally, vegetation clearing would occur along the pipeline assembly area alignment.

Following construction, disturbed areas would be revegetated, as necessary. Areas requiring forest removal (approximately 31.9 acres of full logging expected under this sub-alternative) would experience long-term land use change from forested to open meadow due to the length of time required for tree growth and canopy reestablishment. Drilling and installation of a pipeline within bedrock under the Straits would permanently alter existing geology, removing approximately 6,000 acres of rock. Land use at the EMPSs would not change from baseline conditions, as the sites are currently used for material storage and quarry activities.

4.2.2.1.3 Recreation

4.2.2.1.3.1 Water Recreation

During construction there would be short-term, detrimental impacts to local water recreation in the Straits. All construction activities with potential to impact water recreation would occur on shorelines and underneath the Straits (within bedrock). Although HDD Installation Sub-Alternative 1 would not require vessel movement or blockages/closures that would impact water recreation, changes to the recreational setting due to a change in aesthetics (increased lighting, presence of construction equipment, changes to soundscape) would alter recreation experiences for visitors within view, including those utilizing Water Trails along the Straits. If a water intake structure is determined to be required (not expected during routine operation of HDD equipment during construction – see Section 4.4.2.1.1 for additional detail), access to the Straits Area Blueway Water Trail would be impacted. Impacts to water recreation would discourage some visitors from recreating in the area while construction is ongoing (Manning 2007). If visitors were discouraged from recreating in the area of analysis, they would likely recreate elsewhere, and impacts from increased recreation would be dispersed across the region.

4.2.2.1.3.2 Land Recreation

Construction activities would cause short- and long-term, detrimental impacts to recreation activities occurring nearby. Construction activities would include the presence of construction workers and equipment (including cranes up to 100 feet tall south of the Straits) and construction noise from equipment use and tree clearing. These activities would cause a disturbance to birding and other passive recreational activities that extend into currently undisturbed and more remote areas within the expected pipeline assembly area (and associated timber storage areas), and would disturb cultural/spiritual experiences along the Straits. Construction activities would be likely to displace birds and wildlife, particularly due to tree clearing, which would result in a long-term impact due to the slow regeneration rate of trees. Impacts to birds and wildlife are discussed in more detail in Section 4.5. Recreational access to the French Farm Lake Flooding State Wildlife Management Area may be impacted by construction activities within and adjacent to the management area.

4.2.2.1.3.3 Recreation at Parks, Monuments, and Preserves

Table 4.2-2 summarizes potential impacts to the historic and natural recreational features located within the area of analysis.

4.2.2.1.3.4 Night Sky Recreation

Recreation activities related to viewing the night sky would not be impacted. Construction lighting would not be expected to be concentrated enough to cause a detrimental impact on light pollution. Additionally, any light towers used along the pipeline assembly area alignment would be hooded and downward facing to prevent light intrusion.

Table 4.2-2. Potential Construction Impacts to Popular Historic and Natural Features from HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Recreational Resource	Impact
Headlands International Dark Sky Park	Recreationists at the Headlands International Dark Sky Park may experience detrimental impacts during construction. Headlands Dark Sky Park is directly next and within the construction footprint. Construction would occur within the bounds of the park and may impact visitors' experience by degrading recreational experience. Park users may experience increased traffic along Headlands Road/Wilderness Park Drive, which would be used to access the park and the expected workspaces. Cranes extending above the tree line may also be visible where viewers are not screened by trees or structures. Construction equipment and noise would impact recreationists. Portions of Headlands International Dark Sky Park would exceed the 57-dBA impact threshold for special parks. As such, detrimental noise effects are probable during the first few months of construction due to site development work and installation of temporary facilities but would be intermittent and limited to daytime work hours. Refer to Figure 4.12-1 for areas within Headlands where recreationists are expected to experience noise impacts.
French Farm Flooding State Wildlife Management Area	Recreationists at the French Farm Lake Flooding State Wildlife Management Area may experience detrimental impacts during construction. Construction equipment noise may impact recreationists. Cranes extending above the tree line may also be visible where viewers are not screened by trees or structures. Construction would occur within the bounds of the management area and may impact visitors' experience due to access changes. Recreationists most impacted would be those accessing the management area from the west side of French Farm Lake or through Trails End Road.
McGulpin Lighthouse	Recreationists at the McGulpin Lighthouse may experience detrimental impacts during construction. Visitors may experience detrimental impacts for the duration of construction, partially due to its location directly to the east of the construction footprint. Similar to Headlands International Dark Sky Park, the Lighthouse is accessed by Headlands Road/Wilderness Park Drive and recreationists may experience increased traffic. Cranes extending above the tree line may also be visible where viewers are not screened by trees or structures. Construction noise would impact recreationists. A projected noise level at McGulpin Point Lighthouse could exceed the 67-dBA for outdoor recreational areas. As such, detrimental noise effects are probable during the first few months of construction due to site development work and installation of temporary facilities but would be intermittent and limited to daytime work hours. Refer to Figure 4.12-1 for areas within McGulpin where recreationists are expected to experience noise impacts.
Mackinaw Area Historic Society Heritage Village	Recreationists at the Mackinaw Area Historic Society Heritage Village may experience detrimental impacts during construction. Construction would occur within lands that the Mackinaw Area Historic Society owns. Park users may experience traffic resulting from construction traffic and construction along Wilderness Park Drive, which would be used to access both the park and the expected workspaces. Cranes extending above the tree line may also be visible where viewers are not screened by trees or structures. Construction equipment noise may also impact recreationists. Refer to Figure 4.12-1 for areas within the village where recreationists are expected to experience noise impacts.

Recreational Resource	Impact
Colonial Michilimackinac Historic State Park	Visitors to the Colonial Michilimackinac Historic State Park may experience detrimental impacts for the duration of construction. Construction cranes would be visible from the park, which could detrimentally affect the user experience. The park is located approximately 2 miles from the south workspace and is not expected to be impacted by construction noise or other resources.
Wilderness State Park	Visitors to Wilderness State Park would not be expected to experience detrimental impacts during construction due to its distance from the construction activities. Wilderness State Park is approximately 8 miles from the closest point of construction activities.
Mackinac Island	Due to the distance (approximately 15 miles from nearest workspace) of Mackinac Island from construction activities, visitor experience is not expected to be detrimentally affected/altered.
Hiawatha National Forest	There would be no impacts to Hiawatha National Forest as excavated material placement at EMPS N1 would occur within private property, consistent with current industrial uses. Additionally, views of construction equipment and cranes would be obscured by vegetation.

EMPS = excavated material placement site

4.2.2.2 Operations

4.2.2.2.1 Land Ownership

Under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), there would be no land ownership changes and therefore no impacts are expected.

4.2.2.2.2 Land Use

No impacts to land use are anticipated during operations. Operation of the replacement pipeline would occur within existing facilities south and north of the Straits (Mackinaw Station and the North Straits Facility) and temporary structures used during construction would be demolished. Areas that are cleared of trees and vegetation during construction would be revegetated and restored to pre-construction grades.

4.2.2.2.3 Recreation

There would be a long-term, beneficial impact to water-based recreation as a result of operations, as inspection and maintenance of the Dual Pipelines would no longer be required, eliminating temporary and localized water closures. Due to the presence of other utilities along the Straits lakebed, the existing Regulated Navigation Area (RNA) would stay in place.

4.2.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.2.3.1 Construction

4.2.3.1.1 Land Ownership

Land ownership considerations under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). Where required, the Applicant would take the necessary steps to procure access rights along the pipeline assembly area alignment and any other applicable workspaces that are not owned by the Applicant. The Applicant would coordinate with the U.S. Forest Service to secure access rights to the Hiawatha National Forest and with the State of Michigan to seek authorization for an easement below the Straits.

4.2.3.1.2 Land Use

Under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), there would be short- and long-term, detrimental impacts to land use, similar to as described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). Land within the HDD/pipeline tie-in workspaces on both sides of the Straits would change from undeveloped land to developed construction land for the duration of construction (land within the additional temporary workspace south of the Straits already consists of existing, cleared ROW). Additionally, vegetation clearing would occur along the pipeline assembly area alignment. Following construction, disturbed areas would be revegetated, as necessary. Areas requiring forest removal (approximately 9.6 acres of full logging expected under this sub-alternative) would experience long-term land use change from forested to open meadow due to the length of time required for tree growth and canopy reestablishment. Land use within the pipeline assembly area (and associated timber storage areas) expected under this sub-alternative is designated as Highway 2 Corridor/View Preservation by Moran Township. Presence of construction cranes during pipeline installation would constitute a detrimental impact to the Highway 2 Corridor/View Preservation for the duration of construction, with impacts ending following construction. Drilling and installation of a pipeline within bedrock under the Straits would permanently alter geology, removing approximately 6,000 cubic yards of rock. As stated, land use at the EMPSs would not change from baseline conditions.

4.2.3.1.3 Recreation

4.2.3.1.3.1 Water Recreation

Impacts to water recreation would be similar to those described for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South (Section 4.2.2.1.3.1). Additionally, recreation access to Freschette and Martin Lakes within Hiawatha National Forest may be impacted by construction activities along the pipeline assembly area, which would intersect the national forest.

4.2.3.1.3.2 Land Recreation

Impacts to land recreation would include those impacts near the Straits shoreline described for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South (Section 4.2.2.1.3.2) (but would not include impacts to the French Farm Lake Flooding State Wildlife Management Area). Additionally, the pipeline assembly area alignment under this sub-alternative (and associated timber storage areas) would intersect the Hiawatha National Forest, which is discussed in more detail in Section 3.2.4.2 of the May 2025 Draft EIS. Recreation at other sites such as the St. Ignace Kampground of America may also be impacted during construction. Visitors could be less inclined to recreate in these areas due to construction noise and associated visual impacts. Recreational trails near the pipeline assembly area, including one located near Cheeseman Road, would also experience impacts due to traffic increases.

4.2.3.1.3.3 Recreation at Parks, Monuments, and Preserves

Table 4.2-3 summarizes potential impacts to the historic and natural recreational features located within the area of analysis.

Table 4.2-3. Potential Construction Impacts to Popular Historic and Natural Features from HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Recreational Resource	Impact
Headlands International Dark Sky Park	Recreationists at the Headlands International Dark Sky Park may experience detrimental impacts during construction. Park users may experience increased traffic along Headlands Road/Wilderness Park Drive, which would be used to access both the park and the expected workspaces. The park is located directly next to the south HDD workspace and would experience most impacts from construction at that footprint. Construction equipment and noise

Recreational Resource	Impact
	may impact recreationists. Construction activities would result in noise levels that exceed thresholds associated with lands where preservation of serenity and quiet are of great significance; visitors in the northern portion of the park may experience disturbances during construction. Refer to Figure 4.12-1 for areas within Headlands where recreationists may experience noise impacts.
French Farm Flooding State Wildlife Management Area	There is not expected to be impacts to recreationists under this alternative due to its distance of approximately 1 mile from construction workspaces.
McGulpin Lighthouse	Recreationists at the McGulpin Lighthouse may experience detrimental impacts during construction. Visitors may experience detrimental impacts for the duration of construction. Similar to Headlands International Dark Sky Park, the Lighthouse is accessed by Headlands Road/Wilderness Park Drive and recreationists may experience increased traffic. There would also be visual and noise impacts resulting from construction. Construction activities may also be visible from the raised viewing area of McGulpin Lighthouse, due to its proximity to the south HDD workspace and visibility of north construction workspace.
Mackinaw Area Historic Society Heritage Village	Recreationists at the Mackinaw Area Historic Society Heritage Village may experience detrimental impacts during construction. Construction equipment noise may impact recreationists as it is within the 55 dBA threshold. Lighting would not impact the village because the site is only open during daylight hours.
Colonial Michilimackinac Historic State Park	Due to the distance of Mackinac Island from construction activities (approximately 2 miles), visitor experience is not expected to be detrimentally affected/altered. Construction cranes could be visible from the park, but would be expected to be screened by trees or buildings.
Wilderness State Park	Visitors to Wilderness State Park would not be expected to experience detrimental impacts during construction due to its distance from the construction activities.
Mackinac Island	Due to the distance of Mackinac Island (approximately 15 miles) from construction activities, visitor experience is not expected to be detrimentallyaffected/altered.
Hiawatha National Forest	Recreationists at the Hiawatha National Forest may experience detrimental impacts during construction. Construction equipment noise may impact recreationists as construction activities would occur partially within the forest. Refer to Figure 4.12-2 for areas within Headlands where recreationists are expected to experience noise impacts. Cranes extending above the tree line may also be visible where viewers are not screened by trees or structures. Construction would occur within the bounds of the national forest and may impact visitors' experience due to access changes. Excavated material placement at EMPS N1 would occur within private property, consistent with current industrial use. Therefore, no recreation impacts are expected at EMPS N1. Additionally, Cheeseman Road would experience traffic impacts from vehicles accessing the pipeline assembly area and associated timber storage areas. These traffic impacts may deter recreationists.

EMPS = excavated material placement site

4.2.3.1.3.4 Night Sky Recreation

For the reasons described in Section 4.2.2.1.3.4, impacts to night sky recreation are not expected.

4.2.3.2 Operations

4.2.3.2.1 Land Ownership

As stated in Section 4.2.2.2.1, no land ownership changes would occur during operation of the HDD Installation Alternative.

4.2.3.2.2 Land Use

As stated in Section 4.2.2.2.2, no impacts to land use would occur during operation of the HDD Installation Alternative.

4.2.3.2.3 Recreation

Long-term, beneficial impacts to recreation would be the same as those described for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South (Section 4.2.2.2.3).

4.2.4 Summary of Impact Minimization Measures

To minimize impacts to land ownership, land use, and recreation, the Applicant would restore and revegetate all areas within the expected construction footprints. Additionally, hauling roads would be sited to avoid private lands, and to minimize impacts to environmentally sensitive areas, archaeological resources, and recreational areas.

4.2.5 Cumulative Impacts

The cumulative effects area of analysis for land use and recreation in the May 2025 Draft EIS was defined as general land use and recreational activities within Emmet, Cheboygan, and Mackinac counties, as well as the Straits of Mackinac between the northern and southern extents of the footprints of the alternatives/sub-alternatives analyzed. The area of analysis for cumulative effects in this Supplemental Draft EIS was expanded as necessary to include consideration of the HDD Installation Alternative. As Appendix H of the May 2025 Draft EIS considered past, present, and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, although the cumulative effects analysis for the HDD Installation Alternative may consider actions that were not considered in the cumulative effects analysis in the May 2025 Draft EIS due to the expanded area of analysis.

4.2.5.1 HDD Installation Alternative

No impacts to land ownership are anticipated under implementation of the HDD Installation Alternative. Changes in land use associated with tree clearing under both sub-alternatives would remain after construction ends, which would constitute a detrimental cumulative change in land use that would last until cleared trees regenerate.

No detrimental impacts to water recreation would remain after construction; therefore, there would be no detrimental cumulative effect. A beneficial cumulative effect could be realized due to elimination of inspection and maintenance activities associated with the existing Dual Pipelines, which currently require intermittent closures or restrictions in the Straits. Impacts to land recreation and recreation at parks, monuments, and preserves would primarily resolve after construction; therefore, cumulative impacts would not be expected. No impacts to night sky recreation are anticipated under implementation of the HDD Installation Alternative.

4.3 AESTHETICS

This section presents the potential impacts to aesthetics from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.3.

4.3.1 Summary of Key Issues

Table 4.3-1 presents a high-level summary of key issues for aesthetics related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.3.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.3-1. Summary of Key Issues for Aesthetics – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Visual Resources	Short-term, detrimental impacts associated with construction lighting, traffic increases, vegetation clearing (up to 51.4 acres), and use of temporary facilities and construction equipment (including cranes up to 100 feet tall). Tree clearing (up to 31.9 acres) would result in long-term detrimental impacts.	Impacts would be similar to those described for Sub-Alt 1, although the pipeline assembly area would intersect residential areas and businesses along Old Portage Trail and US-2, which may result in more acute aesthetic impacts for people living and working in these areas. Vegetation clearing under this sub-alternative would be up to 47.8 acres (of that, up to 9.6 acres tree clearing).
Soundscape	Detrimental impacts to the localized soundscape for the duration of construction.	Detrimental impacts to the localized soundscape for the duration of construction.

HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative

4.3.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.3.2.1 Construction

4.3.2.1.1 Visual Resources

Short-term, detrimental impacts to visual resources would be similar to those described for the Applicant's Preferred Alternative in the May 2025 Draft EIS (Section 4.3.3.1.1), but would occur for a shorter duration (ending when construction is complete) and across a larger area, due to the length of the pipeline assembly area (and associated timber storage areas). Impacts would include the presence of construction equipment, activity associated with the operation of HDD equipment, excavated material placement piles at the EMPSs, use of staging and laydown areas, storage of construction materials and timber (from vegetation removal along the pipeline assembly area), and staging/assembly of the pipeline string along the entire pipeline assembly area alignment (approximately 4 miles). Vegetation clearing could be up to 51.4 acres. Within the HDD workspaces on either side of the Straits, a temporary building would be constructed to house HDD equipment. South of the Straits, the temporary building, which would be industrial in nature, would contrast with the surrounding viewshed, which is primarily forested; however, the presence of large swaths of forest in this area would also provide screening, preventing onlookers from seeing the temporary building beyond the immediate vicinity of the workspace, depending on final height (which has not been determined). North of the Straits, HDD workspaces are partially located in forested/vegetated areas, but in close proximity to the Applicant's existing facilities and associated access roads. The presence of a temporary building would be unlikely to contrast greatly from the existing industrial development on this site. Cranes up to 100 feet tall would be

visible from the HDD workspace for the duration of pipeline installation (approximately 1 month) on the south shore of the Straits. Cranes would be especially visible in open areas that are not screened by trees or structures (as stated, the HDD workspace south of the Straits is surrounded by forest, which would provide some screening).

As the majority of the HDD equipment would be located within the temporary building constructed for that purpose, limited exterior lighting in the HDD workspace near the Straits shorelines and the Applicant's existing facilities would be required during construction. Additional lighting may be required at the HDD workspace south of the Straits when the preassembled pipeline is being installed into the final borehole. Some construction activities (drilling and pipeline pullback), would occur 24 hours per day, 7 days per week (see Figure F-4 in Appendix F). Along the pipeline assembly area alignment, light towers (also referred to as light plants), would be required for the duration of construction. Exact locations for the light towers have not yet been determined. If light towers were installed near residential areas or other areas along the alignment where people tend to congregate (e.g., for recreational activities), the construction lighting would cause detrimental impacts to the viewshed. It is expected that the light towers along this approximate 4-mile alignment would be used 24 hours per day, 7 days per week; however, light towers would be hooded and downward facing to prevent light intrusions. Headlands Road (which is located within the Headlands International Dark Sky Park), Wilderness Park Drive, and Trails End Road would be crossed by the pipe-string (within the pipeline assembly area alignment) utilizing support structures that would be installed on either side of the roadway to lift the pipe-string above traffic. The presence of support structures and the raised pipe-string would increase its visibility in this area and would contrast with the surrounding viewshed, particularly in the park.

Vehicle traffic may contribute to detrimental impacts during construction due to increased traffic movements and associated fugitive dust emissions. Vehicle traffic may be visible from Straits shorelines, residential areas close to the workspaces (including along the pipeline assembly area alignment), the Mackinac Bridge, haul routes, construction access roads, and recreational areas close to workspaces near Straits shorelines and along the pipeline assembly area alignment (see Sections 3.2 and 4.2 for information on recreation). Increased movement of vehicles would be more apparent during dark sky conditions, although it is expected that lighting associated with nighttime construction would not be concentrated enough to cause a detrimental impact on night sky conditions.

Generally, impacts to aesthetics would resolve post-construction; however, tree clearing within all footprints (including along the pipeline assembly area alignment) would represent a long-term impact, as trees would take many years to reestablish (full logging could occur for up to 31.9 acres). It is also possible that cleared forest in wetland areas may regenerate with emergent vegetation, representing a permanent change in wetland composition. Site restoration would include seeding with appropriate, native seed mixes based on pre-construction survey data, and it is possible that restoration of forested wetlands could include planting root stock tree species. Much of the pipeline assembly area alignment would utilize existing, cleared ROW (approximately 14 acres), which would minimize long-term impacts associated with forest clearing.

As stated throughout the May 2025 Draft EIS, the EMPSs expected for use under the HDD Installation Alternative are active quarries. Construction activities associated with this sub-alternative would not result in visual changes from baseline conditions at these sites. EMPS S1 is not screened by trees and is visible from the road; however, placement of approximately 10,200 cubic yards of excavated material would be expected to result in a pile less than 1 foot high[4], if

[4] This is a conservative estimate, as excavated material would be placed at both EMPS S1 and N1; therefore, the anticipated material pile would likely be less than this estimate, which assumes that all material would be placed at one site.

placed in the same location and across the same surface area as proposed for excavated material under the Applicant's Preferred Alternative. This would not be expected to alter the viewshed significantly in an area that is already used for material stockpile and mining. EMPS N1 is screened by trees 20 feet or taller.

4.3.2.1.2 Soundscape

Short-term, detrimental impacts would be similar to those described for the Applicant's Preferred Alternative in the May 2025 Draft EIS (Section 4.3.3.1.2), although intermittent noise increases would occur over a larger area due to the length of the pipeline assembly area alignment. Use of heavy equipment would generate increased noise levels along the pipeline assembly area alignment from activities associated with site preparation (clearing and grading, if required), pipeline assembly, and hydrotesting for approximately 15 months. Work would be limited to daylight hours (12-hour workday), Monday through Saturday. Subsequently, pullback of the pipeline (the process by which the preassembled pipeline is pulled/pushed through the prepared borehole) would occur on a continuous 24-hour, 7-days per week schedule for approximately 2 months. This would generate loud noises and affect numerous noise-sensitive receptors, including residential properties, outdoor recreational areas (e.g., Headlands International Dark Sky Park, French Farm Lake Flooding State Wildlife Management Area, Straits shoreline – see Sections 4.2 and 4.12 for additional detail), and wildlife. See Sections 4.5.2.1 and 4.12.2.1.1 for further details on noise effects on biological and human noise-sensitive receptors, respectively.

4.3.2.2 Operations

Implementation of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would not result in the addition of permanent onshore, visible structures, and operation/maintenance of the replacement pipeline would occur within existing facilities at the Mackinaw Station and North Straits Facility. Therefore, there would be no impacts to visual resources or the baseline soundscape during operations.

4.3.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.3.3.1 Construction

4.3.3.1.1 Visual Resources

Impacts to visual resources under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.3.2.1.1), although impacts associated with the pipeline assembly area alignment (and associated timber storage areas) would affect the viewshed north of the Straits rather than south of the Straits, and cranes used during pipeline installation (i.e., pipeline pullback) would be located within the north shore HDD workspace as opposed to the south shore. While much of this alignment would be screened by large swaths of forest, the pipe-string would be required to bore below US-2 and cross Old Portage Trail utilizing support structures (to lift the pipe-string above traffic) in the manner described in Section 4.3.2.1.1. The presence of this aerial crossing would constitute a detrimental impact to aesthetics as the structure would not be consistent with the existing rural and residential surroundings. Businesses and residences in this area would be impacted by increased traffic, construction lighting (depending on the location of light towers), and the presence of construction workers, equipment, and piping for the duration of construction.

As under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), much of the pipeline assembly area alignment north of the Straits would utilize existing, cleared ROW (approximately 25 acres), which would minimize potential long-term effects associated with tree clearing. As stated, site restoration would include seeding with appropriate seed mixes and may include planting root stock tree species. Total vegetation clearing under this sub-alternative could be up

to 47.8 acres, with 9.6 of those acres requiring full logging of trees (as opposed to minimal brushing/hand clearing, or vegetation disturbance associated with the presence of construction workers and equipment).

4.3.3.1.2 Soundscape

Impacts to the soundscape under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.3.2.1.2), although impacts associated with the pipeline assembly area would occur along an approximately 4-mile alignment north of the Straits rather than south of the Straits. Increased noise levels along this alignment would affect numerous noise-sensitive receptors, including residential properties, two motels, a campground, shorelines, and wildlife. See Sections 4.5.2.1 and 4.12.2.1.1 for further details on noise effects on biological and human noise-sensitive receptors, respectively.

4.3.3.2 Operations

4.3.3.2.1 Visual Resources

Operation of the replacement pipeline under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would not result in impacts to visual resources and the baseline soundscape for the reasons described in Section 4.3.2.2.

4.3.4 Summary of Impact Minimization Measures

Measures taken to minimize effects to aesthetics during construction of either HDD Installation sub-alternative would include erosion control measures to stabilize slopes and prevent aesthetic degradation (see Sections 4.4 and 4.9), placement of light towers along the pipeline assembly area alignment in locations that would be less likely to impact nearby residences and businesses, and revegetation efforts within the expected construction footprints, as described in Section 4.3.2.1.1. Section 4.12 discusses mitigation measures for noise impacts.

4.3.5 Cumulative Impacts

Impacts to aesthetics from the HDD Installation Alternative and from the alternatives/sub-alternatives analyzed in the May 2025 Draft EIS would include those related to changes in the baseline viewshed and soundscape present within the area of analysis. In consideration of the HDD Installation Alternative, the area of analysis defined in Section 3.3.1 of the May 2025 Draft EIS has been expanded to include the expected footprints associated with that alternative. As Appendix H of the May 2025 Draft EIS considered past, present, and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, as the footprints associated with the HDD Installation sub-alternatives do not extend beyond these three counties. The cumulative effects analysis for the HDD Installation Alternative (below) may consider actions that were not considered in the cumulative effects analysis in the May 2025 Draft EIS, due to the expanded area of analysis. Impacts to aesthetics from the HDD Installation Alternative would primarily include those related to construction noise and lighting; vegetation clearing; increased traffic; placement of excavated material; and the presence of construction equipment, construction workers, and temporary facilities.

4.3.5.1 HDD Installation Alternative

Past and present actions that have impacted aesthetics in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; ongoing quarry activities at the EMPSs; dredging within the Straits and other coastal maintenance activities; construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits; and recreation and maintenance/natural resource management within Hiawatha National Forest. As discussed in

Appendix H of the May 2025 Draft EIS, based on the analysis of past actions and review of historic aerial imagery, very little noticeable change has occurred in this area over the past 10 years.

No reasonably foreseeable future actions with the potential to impact aesthetics in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprints of the HDD Installation sub-alternatives to contribute cumulatively to the effects identified under either sub-alternative. Impacts associated with either sub-alternative would primarily be temporary, with long-term impacts occurring only in areas of tree clearing. The long-term visual effects of tree clearing would likely be shielded from viewers by adjacent, contiguous forest, and would decrease over time as trees regenerate. No cumulative effects are anticipated.

4.4 WATER RESOURCES

This section presents the potential impacts to water resources from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.4.

4.4.1 Summary of Key Issues

Table 4.4-1 presents a high-level summary of key issues for water resources related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.4.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.4-1. Summary of Key Issues for Water Resources – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Groundwater Contamination	Potential for exposure to HDD drilling fluids, which would not be expected to detrimentally impact water quality, and potential release of contaminants associated with onshore material storage and use of heavy equipment/vehicles. The construction contractor would adhere to the Spill Plan and monitoring of onsite and nearby wells would be conducted during construction and for 2 years after.	Impacts would be similar to those described for Sub-Alt 1.
Surface Water/ Wetland Disturbance	Disturbance to surface waters would only occur if a water intake structure is required (not anticipated during normal operation of HDD equipment). Disturbance associated with construction of a water intake structure would be approximately 800 square feet. Temporary wetland disturbance (including from ground disturbance and due to placement of matting within the pipeline assembly area) estimated to be approximately 11.27 acres. Wetlands would be restored post-construction.	Potential for disturbance to surface waters would be the same as Sub-Alt 1. Under Sub-Alt 2, Stream 01 and the Moran River would be crossed with clear span bridges (no disturbance to waterbody bed/banks). Temporary wetland disturbance (including from ground disturbance and due to placement of matting within the pipeline assembly area) estimated to be approximately 16.37 acres. Wetlands would be restored post-construction.
Erosion/Stormwater	Approximately 15.8 acres total ground disturbance, resulting in detrimental impacts to water resources within and immediately adjacent to construction footprints. Minor, isolated areas of grading may also be required within pipeline assembly area.	Impacts would be similar to those described for Sub-Alt 1, although the pipeline assembly area under Sub-Alt 2 would cross two waterbodies that may be susceptible to erosion and/or stormwater runoff occurring nearby.
Surface Water/ Wetland Contamination	Potential for detrimental impacts to surface water/wetland quality in and adjacent to construction footprints during construction, ending following construction. Impacts and impact minimization measures would be similar to as described for the Applicant's Preferred Alternative (see Section 4.4.3.1 of the May 2025 Draft EIS).	Impacts would be similar to those described for Sub-Alt 1.

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Turbidity	In-water work would only occur if a water intake structure is determined to be needed (not anticipated during normal operation of HDD equipment). If so, temporary, detrimental impacts would occur, localized to the area of the HDD associated with installation of the water intake pipe (approximately 2,000 square feet to be isolated by turbidity curtains) (same process/impacts as under Applicant's Preferred Alternative; see Section 4.4.3.1 of the May 2025 Draft EIS).	If a water intake structure is determined to be needed, impacts would be the same as Sub-Alt 1.

EIS = Environmental Impact Statement; HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative

4.4.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.4.2.1 Construction

4.4.2.1.1 Groundwater

Potential effects to groundwater resulting from construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would include minor potential for groundwater to interact with drilling muds/fluids (i.e., slurry). Although groundwater infiltration (into the borehole) could occur during HDD, it is unlikely due to several methods that would be in place to minimize or avoid infiltration (described in detail below), and impacts to existing hydrology would not be expected. Calculations were conducted for the proposed Tunnel Project that estimated the maximum volume of water infiltration into the Tunnel during excavation (not accounting for proposed measures to minimize infiltration identified in Section 4.4.3.1.1 of the May 2025 Draft EIS) and concluded that localized drawdown would recover within a few days of excavation in a specified area. Based on these calculations, it would not be expected that drawdown effects would occur during HDD, given the measures described below, as well as the smaller diameter of the borehole (in comparison to the proposed Tunnel). If measures to prevent groundwater inflow were to fail, any groundwater drawdown that would occur would be negligible (based on the assumption that drawdown effects would be less than those identified for the Applicant's Preferred Alternative worst-case scenario described in the May 2025 Draft EIS, given the smaller diameter of the HDD borehole) and would recover within a few days, based on indications of groundwater recharge from at least two different sources (one of which is likely the lake) (WSP 2020).

The primary groundwater concern related to the HDD process itself is the possibility of inadvertent drilling fluid losses (i.e., releases, or drilling fluid "returns"). While drilling is occurring, a drilling fluid slurry (consisting of water and bentonite) would circulate under pressure through the drilling tools to lubricate the drill bit, remove drill cuttings (excavated material), and promote stability of the borehole prior to installation of the pipeline. The slurry would be pumped through the inside of the drill pipe and back to the HDD entry point along an annular space between the outside of the drill pipe and the borehole, carrying excavated material back to the HDD entry point with it. Unintended releases of slurry/pressurized drilling fluid could occur if fluid escapes the borehole during drilling and travels through the surrounding substrate, potentially into adjacent groundwater resources. Conditions that make inadvertent fluid losses more likely include permeable soils or fractures/fissures in bedrock. Although geotechnical investigations have not been completed specific to the expected HDD alignment, geotechnical investigations conducted for the proposed Tunnel Project identified fractured and variable geologic conditions that would be expected to be

permeable in places. Variation in the geology through which the HDD drill bit would travel may require fluid pressure changes as the drill advances beneath the Straits, which would require continuous monitoring of drilling pressures during drilling operations. Monitoring for a potential fluid loss during drilling operations would primarily be conducted through instruments in the drill rig, which monitor fluid pressure and flow rates (a loss or spike in drilling fluid pressure would be indicative of a potential issue). A downhole annular pressure tool is commonly used within the HDD industry during the pilot hole drilling phase to assess the response to a loss or spike in drilling fluid pressure. It is possible that additional geotechnical investigations would be conducted prior to implementation of this alternative, if it were pursued by the Applicant, to better characterize existing geological conditions along the expected alignment.

Fluid losses are more likely to occur near the drill entry/exit points, where the alignment is shallower (i.e., has less rock and/or overburden cover). To isolate the adjacent geologic material/overburden (from drilling operations), casings would be installed at HDD entry/exit points on both sides of the Straits. Additionally, threaded casing may be installed over the HDD drill string and to the drill head, which would provide the aforementioned annulus for the drilling fluid and excavated material to return to the entry point, but would also provide support for the borehole and serve to separate the surrounding geologic material from the drilling process (Enbridge 2025a). As stated throughout the May 2025 Draft EIS, bentonite is considered to be an environmentally benign material, consisting primarily of clay with secondary minerals such as quartz, calcite, and micas (see Section 4.4.3.1.1 of the May 2025 Draft EIS, *Water Quality* subsection, for additional information). If drilling fluid additives are determined to be necessary, additives that meet requirements for potable well drilling and have been approved by the State of Michigan would be used. Material Safety Data Sheets (MSDS) for each additive would be maintained onsite, which include best practices to avoid potential releases into the environment, including proper handling, storage, and disposal procedures[5].

Groundwater entering the borehole prior to pipeline installation would be prevented or minimized by the use of the aforementioned casings and pressurized slurry/drilling fluid. In most cases, the slurry would be sufficient to seal small fissures in the substrate ahead of the drill (to prevent groundwater inflow as the drill excavates the surface) and to seal the borehole behind the drill. In areas where additional sealing material is required to promote borehole stability and prevent groundwater inflow, mud additives could be added to the drilling fluid slurry, or a grout could be injected into a fractured and/or permeable formation ahead of the drill. These methods could also be utilized to stabilize materials such as gravel and cobbles that are prone to collapse due to lack of consolidation (Enbridge 2025b).

As described in the May 2025 Draft EIS (Section 4.4.3.1.1), when drilling through bedrock either with a tunnel-boring machine (TBM) (as would be the case for the Tunnel Project) or with HDD, there is potential for the equipment to encounter, breach, and potentially impact groundwater aquifers, including artesian (confined) aquifers. Breaching an artesian aquifer can result in the mixing of previously confined groundwater, causing long-term changes to groundwater quality and characteristics in that aquifer. Although geotechnical investigations have not been completed specific to the HDD alignment, geotechnical investigations conducted for the proposed Tunnel Project identified possible artesian flow in only one location; overall, aquifer testing determined that the aquifers most likely to be encountered by the TBM (in the case of the proposed Tunnel Project) are unconfined (i.e., not artesian). As geotechnical investigations have not been

[5] The Occupational Safety and Health Administration regulates the use of potentially hazardous materials on construction sites by requiring employers to provide appropriate training to workers and MSDS, which stipulate the safe storage, use, and handling of the material, including proper disposal. As this is a project that requires a federal approval, it is also required that the public may have access to applicable MSDS, upon request under Right to Know laws.

conducted for the HDD Installation Alternative and because geologic conditions can vary greatly over small distances, it is not practicable to identify every geologic feature along an alignment and therefore, it is possible that the HDD would encounter an artesian aquifer. While the HDD would not be equipped with probing capabilities such as those described for the TBM proposed under the Tunnel Project, drill bit location and pressures would be continuously monitored, as stated above, and drilling could be slowed or stopped if pressure changes indicate encounters with groundwater. As stated throughout this Supplemental Draft EIS, it is possible that additional surveys, including geotechnical investigations, would be conducted if the Applicant were to pursue this alternative, to better characterize existing geological conditions along the alignment.

Contamination concerns related to onshore work (e.g., material storage and increased use of heavy equipment/vehicles) would be similar to those described for the Applicant's Preferred Alternative (Section 4.4.3.1.1 of the May 2025 Draft EIS, *Water Quality* subsection). Under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), the area of ground disturbance (approximately 15.8 acres) is smaller than that proposed for the Applicant's Preferred Alternative; however, shallow groundwater resources could be impacted by leaks or spills of equipment along the pipeline assembly area alignment as well (where ground disturbance would occur only as needed in upland areas where existing topographical variations are more severe), which extends multiple miles beyond the limits of the construction footprints analyzed for the Applicant's Preferred Alternative. Aboveground construction equipment and associated contaminants would be the same as identified in Section 4.14 of the May 2025 Draft EIS. As proposed for the Applicant's Preferred Alternative, monitoring of groundwater wells within a 0.5-mile radius of the construction footprint (with landowner permission) would occur throughout construction of the HDD Installation Alternative and for 2 years following construction for constituents in the EGLE Oil, Gas, and Minerals Division Tier 2 parameters list (with the exception of E. coli and total coliform bacteria).

Under normal HDD operating conditions during construction, the Applicant anticipates that water needs for the project (approximately 60,000 gallons per day) would be provided by a municipal source; however, the Applicant has also indicated that conditions could be encountered that would result in a loss of drilling fluid returns, which could prompt the need for contingency actions and the subsequent need for additional water of an unknown quantity. If needed, a water intake structure would be constructed in the Straits in the manner described for the Applicant's Preferred Alternative in the May 2025 Draft EIS. If a water intake structure were required in the Straits, potential impacts to groundwater associated with the HDD installation of a water intake structure would be the same as those described in Section 4.4.3.1.1 of the May 2025 Draft EIS (i.e., the potential for small amounts of drilling muds/fluids to interact with groundwater). As stated in the May 2025 Draft EIS, installation of a water intake structure in the Straits would take approximately 4 weeks, with in-water work occurring over approximately 1 week.

4.4.2.1.2 Surface Water

Detrimental impacts to surface waters resulting from construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would include effects associated with increased risk of contamination and increased erosion potential and sedimentation caused by onshore ground disturbing activities adjacent to surface waters. HDD is a trenchless crossing method that typically avoids impacts to surface water quality by avoiding disturbance of the waterbody bed and banks; however, inadvertent releases of drilling fluid beneath the lakebed would need to be avoided or minimized (utilizing the methods identified in Section 4.4.2.1.1, above) to prevent potential impacts to surface waters not associated with onshore activities. Inadvertent releases of drilling fluid are discussed in more detail above, in Section 4.4.5.1.1. As stated, drilling fluid pressure would be continuously monitored during drilling operations and operations would be stopped immediately if a drilling fluid loss is identified. The quantity of drilling fluid that would be utilized

during HDD activities would be relatively small, especially in comparison to the overall volume of water in the overlying lake. The likelihood of a release of fluid traveling through overlying bedrock and overburden materials to enter surface waters in the lake would be extremely low (considered to be negligible), particularly with the aforementioned monitoring efforts. In the unlikely event that drilling fluid reaches the lakebed, response and cleanup efforts would begin immediately, including notification to the appropriate regulatory authorities. As stated, drilling fluid would consist of water and bentonite, which is considered to be an environmentally benign material. If drilling additives are determined to be required, additives that meet requirements for potable well drilling and have been approved by the State of Michigan would be used.

Regarding potential contamination associated with onshore work, aboveground construction equipment and associated contaminants would be the same as identified in Section 4.14 of the May 2025 Draft EIS. Stream 01 is located adjacent to the northern edge of the pipeline tie-in workspace north of the Straits. Potential effects to Stream 01 resulting from increased erosion potential within the adjacent workspace (as well as associated impact minimization and mitigation measures) would be the same as those described for the Applicant's Preferred Alternative in Section 4.4.3.1.2 of the May 2025 Draft EIS (see also Section 4.9 of the May 2025 Draft EIS). The Applicant would be required to acquire Soil Erosion and Sedimentation Control (SESC) permits from both Emmet and Mackinac counties, and a National Pollutant Discharge Elimination System (NPDES) permit from EGLE prior to the start of ground disturbing activities (see Section 4.9 of the May 2025 Draft EIS for information on SESC permitting and Section 4.4.3.1.2 [of the May 2025 Draft EIS] for information on NPDES). Conditions of these permits would be expected to include best management practices (BMPs) to prevent or minimize the effects of erosion and subsequent sedimentation in Stream 01. Disturbance to Stream 01 is not currently expected under this alternative.

Based on publicly available data sources, no additional surface waters are located within or immediately adjacent to the expected workspaces south of the Straits and the pipeline assembly area. If the Applicant were to pursue this alternative, it is possible that additional surveys (i.e., wetland delineations) would be required to confirm the lack of surface water resources in this area.

The HDD drilling process would require water for use during drilling operations. Water used during drilling would be recycled to the extent possible. Under normal HDD operating conditions, the Applicant anticipates that water needs for construction (approximately 60,000 gallons per day) would be provided by a municipal source. As stated in Section 4.4.2.1.1, it is possible that a water intake structure would be required, which would be constructed in the Straits in the manner described for the Applicant's Preferred Alternative in the May 2025 Draft EIS. If a water intake structure were required in the Straits, potential impacts to surface waters would be the same as those described in Section 4.4.3.1.2 of the May 2025 Draft EIS (i.e., disturbance to Straits sediments [approximately 800 square feet], release of drilling fluid at the interface of the HDD and the lakebed [approximately 20,000 gallons], and increased turbidity within the HDD work area, which would be isolated by turbidity curtains [area of approximately 2,000 square feet]).

Hydrostatic tests of the assembled pipe-string would occur twice, once prior to being pulled through the borehole, and a second time once the entire pipeline string is in place beneath the lakebed. The hydrostatic tests would result in approximately 2 million gallons of water that would be discharged to the Straits in accordance with a NPDES General Permit for Discharge of Hydrostatic Test Water, which would need to be acquired from EGLE. In accordance with the General Permit, all hydrostatic test water would be sent through a filter system prior to discharge. NPDES permits for all discharges would include effluent limitations and monitoring requirements developed to be protective of state water quality standards, as described in Section 4.4.3.1.2 of the May 2025 Draft EIS (*Water Quality* subsection).

4.4.2.1.3 Special Aquatic Sites

Detrimental impacts to wetlands resulting from construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would include disturbance within multiple wetlands and effects associated with increases in erosion and sedimentation. Post-construction, affected wetlands would be restored; therefore, impacts would be expected to be temporary, although vegetation clearing within forested wetlands would be likely to result in the long-term conversion of forested wetlands into emergent wetlands, representing a long-term or permanent impact (depending on if trees regenerated).

Table 4.4-2 presents the acreage of wetlands occurring within the construction footprint. As wetland delineations have not been conducted specifically for this alternative, USFWS NWI data were utilized to identify the potential for wetland impacts in areas not included in the delineation conducted for the proposed Tunnel Project (e.g., the pipeline assembly area as well as workspaces south of the Straits located off Applicant-owned property). Therefore, Table 4.4-2 may not be indicative of total wetland impacts. Based on NWI data and Applicant-provided wetland delineations, no wetlands are located within or immediately adjacent to the HDD/pipeline tie-in/additional temporary workspaces south of the Straits, or within EMPS S1. As a result, these areas are not included in Table 4.4-2. According to NWI data, approximately half of the pipeline assembly area alignment intersects freshwater forested/shrub wetland communities (see Figure 3.4-2); however, much of the alignment (in the vicinity of wetlands) would utilize an existing ROW. If the Applicant were to pursue this alternative, it is possible that additional surveys (i.e., wetland delineations) would be required to confirm the presence of additional wetlands in this area, particularly within the pipeline assembly area alignment.

Table 4.4-2. Estimated Wetland Impacts – HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Wetland ID	Estimated Temporary Impact Acreage
HDD Workspace – North	
W10	0.20
W29	0.02
W19	0.16
W21	0.13
Pipeline Tie-In Workspace – North	
W3	1.18
EMPS N1	
Non-jurisdictional wetland (not regulated by USACE or EGLE)	2.65
Pipeline Assembly Area and Associated Timber Storage	
Additional freshwater forested/shrub wetlands	6.93

EGLE = Michigan Department of Environment, Great Lakes, and Energy; EMPS = excavated material placement site; HDD = horizontal directional drilling; USACE = United States Army Corps of Engineers

Note: Wetland acreages provided for the HDD/pipeline tie-in workspaces are based on Applicant-provided delineation data, which included delineations in these areas. Wetland acreage within the pipeline assembly area was estimated from publicly available NWI data.

Wetlands within the HDD/pipeline tie-in workspaces would likely experience disturbance. Specific locations of ground disturbance would depend on the exact location of the HDD entry/exit points and extent of disturbance required for pipeline tie-in to existing facilities at the Mackinaw Station and North Straits Facility. Disturbance within some wetland areas may be able to be avoided; however, this Supplemental Draft EIS conservatively assumes that all wetlands within the HDD/pipeline tie-in workspaces would be disturbed.

Within the pipeline assembly area, ground disturbance within wetlands is not expected, but wetlands may be adversely affected by pipeline assembly, equipment storage, and woody vegetation clearing, which would be required throughout the pipeline assembly area to accommodate pipeline storage and assembly. Matting would be placed along the entire alignment to protect wetland soils and other environmentally sensitive features. Placement and removal of mats typically does not impact the root structure of existing vegetation, and grasses and woody species would likely regenerate, although tree removal in forested wetland areas would represent a long-term impact due to the slow regeneration rate of trees. It is possible that cleared forested wetlands would regenerate as emergent wetland areas post-construction, representing a permanent impact. As shown in Table 4.4-2, approximately 6.93 acres of forested/shrub wetlands are mapped by the NWI within the pipeline assembly area/timber storage areas for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South.

Detrimental impacts to wetlands within and/or adjacent to the EMPSs (including impact minimization measures) would be similar to those described for the Applicant's Preferred Alternative in Section 4.4.3.1.3 of the May 2025 Draft EIS, although excavated material quantities would be less, and the duration of construction activities occurring in these areas would also be less. Additionally, impacts associated with increased erosion and sedimentation and potential impacts to wetlands along haul routes would be similar to those described in Section 4.4.3.1.3 of the May 2025 Draft EIS, although use of haul routes would occur for a shorter duration. Restoration of wetland areas within all workspaces, including the pipeline assembly area, would include seeding with wetland seed mixes according to preexisting wetland survey data. Restoration of forested wetland areas could include planting root stock tree species in lieu of or in addition to wetland mitigation, as required by USACE.

Stream 01, located directly adjacent to the pipeline tie-in workspace north of the Straits, fits the definition of a vegetated shallow (a type of special aquatic site defined in USACE regulations). Potential impacts to Stream 01 under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) are described in Section 4.4.5.1.2. The pipeline assembly area (and associated timber storage areas) would intersect the French Farm Lake Flooding State Wildlife Management Area. Anticipated impacts in this area would include vegetation clearing, potential habitat fragmentation, and wildlife disturbance (see Section 4.5 for additional detail).

4.4.2.1.4 Floodplains

Approximately 0.5 acre of 100-year floodplain and 0.9 acre of 500-year floodplain occur within the HDD workspace north of the Straits, and 0.2 acre of 500-year floodplain occurs within the pipeline tie-in workspace north of the Straits. Additionally, approximately 0.02 acre of 100-year floodplain occurs within the additional temporary workspace located south of the Straits. Floodplains do not occur elsewhere within the construction footprint associated with HDD Installation Sub-Alternative 1: Pipeline Assembly Area South (see Figure 3.4-5). Ground disturbing activities in floodplain areas under this sub-alternative would include the use of heavy equipment, vegetation removal, potential grading, and excavation of the borehole. During construction, temporary losses of ecological functions (e.g., flood and erosion/accretion control, surface water quality maintenance, etc.) may occur; however, the area would be restored post-construction and impacts would be temporary. No addition of permanent structures or new impervious surfaces is expected.

Floodplains do not occur within the EMPSs that would be utilized under the HDD Installation Alternative.

4.4.2.1.5 Shoreline and Protected Coastal Resources

Some amount of erosion would be expected to occur during construction of HDD Installation Sub-Alternative 1: Pipeline Assembly Area South; however, the HDD/pipeline tie-in workspaces (where ground disturbing activities would primarily occur) would be located approximately 700 feet from the south Straits shoreline and approximately 120 feet from the north Straits shoreline, although it should be noted that the additional temporary workspace located south of the Straits would abut the shoreline at its northern extent (the exact nature of work expected in this area has not been identified by the Applicant, but this Supplemental Draft EIS conservatively assumes that some amount of ground disturbance could occur in this area). As detailed in Section 3.9 of this document and in the May 2025 Draft EIS, the soil types that occur within the HDD/pipeline tie-in workspaces (where the majority of ground disturbing activities would occur), as well as those occurring along shorelines outside the workspace (and within the additional temporary workspace abutting the south shore), are considered to have only a slight erosion hazard (indicating that little or no erosion is likely) (USDA NRCS 2024). Additionally, protocols outlined in the Applicant's Environmental Protection Plan (EPP), the Michigan Nonpoint Source BMP Manual, as well as conditions of required permits (SESC and NPDES) would be expected to minimize the potential for erosion during construction. Impacts to nearby shorelines would not be expected.

While the HDD workspace south of the Straits as well as the pipeline assembly area occur outside of any protected coastal resources, the HDD/pipeline tie-in workspaces north of the Straits as well as the pipeline tie-in/additional temporary workspaces south of the Straits occur at least partially within the coastal zone (see Figures 3.4-6 and 3.4-7). As stated in Section 4.4.3.1.5 of the May 2025 Draft EIS, several state statutes and rules are considered in the management of coastal zone resources. Table 4.4-3 includes the state statutes and associated administrative rules that may be applicable to the HDD Installation Alternative (coastal zone consistency would apply to both sub-alternatives)[6]. If the Applicant were to pursue this alternative, review by EGLE may be required to ensure the proposal would be consistent with regulations pertaining to coastal zone resources. Shoreline and/or coastal resources do not occur within any of the EMPSs that would be utilized for the HDD Installation Alternative.

Table 4.4-3. Coastal Zone Consistency – HDD Installation Alternative

MCMP Statutes and Rules	Applicable to Project?	Consistency Statement
NREPA Part 31, Water Resources Protection	Yes	See Section 4.4, Water Resources.
NREPA Part 35, Use of Water in Mining Low-Grade Iron Ore	No	N/A
NREPA Part 41, Sewerage Systems	Yes[1]	See Section 4.4, Water Resources, and Section 4.9, Soils.
NREPA Part 55, Air Pollution Control	Yes	See Section 4.11, Air Quality.
NREPA Part 91, Soil Erosion and Sedimentation Control	Yes	See Section 4.9, Soils.
NREPA Part 95, Watercraft Pollution Control	No	N/A

[6] Table 4.4-3 would apply to either HDD Installation sub-alternative and will be incorporated into Appendix G, Attachment 3, of the Final EIS.

MCMP Statutes and Rules	Applicable to Project?	Consistency Statement
NREPA Part 115, Solid Waste Management	Yes	Solid waste would be transported off-site and disposed of in accordance with NREPA Part 115. Materials would be reused to the extent practicable.
NREPA Part 117, Septage Waste Servicers	No	N/A
NREPA Part 121, Liquid Industrial By-Products	Yes	Liquid industrial by-products would be handled and disposed of off-site in accordance with NREPA Part 121.
NREPA Part 301, Inland Lakes and Streams	Yes	See Section 4.4, Water Resources.
NREPA Part 303, Wetlands Protection	Yes	See Section 4.4, Water Resources.
NREPA Part 305, Natural Rivers	Yes	See Section 4.4, Water Resources.
NREPA Part 309, Inland Lake Improvements	No	N/A
NREPA Part 323, Shorelands Protections and Management	Yes	See Section 4.4, Water Resources.
NREPA Part 325, Great Lakes Submerged Lands	Yes	See Section 4.4, Water Resources.
NREPA Part 339, Control of Certain State Lands	No	N/A
NREPA Part 351, Wilderness and Natural Areas	Yes	See Section 4.2, Land Use and Recreation, for information on Wilderness State Park.
NREPA Part 353, Sand Dunes Protection and Management	Yes	See Section 4.5, Biological Resources.
NREPA Part 365, Endangered Species Protection	Yes	See Section 4.5, Biological Resources.
NREPA Part 615, Supervisor of Wells	No	N/A
NREPA Part 625, Mineral Wells	No	N/A
NREPA Part 631, Ferrous Mineral Mining	No	N/A
NREPA Part 637, Sand Dune Mining	No	N/A
NREPA Part 761, Aboriginal Records and Antiquities	Yes	See Section 4.6, Cultural Resources.
NREPA Part 793, Harbors, Channels, and Other Navigational Facilities	No	N/A
NREPA Part 811, Off-Road Recreation Vehicles	No	N/A
Trailer Coach Parks Act, Public Act 243 of 1959, as amended	No	N/A

MCMP Statutes and Rules	Applicable to Project?	Consistency Statement
Land Division Act, Public Act 288 of 1967, as amended	No	N/A
Local Historic Districts Act, Public Act 169 of 1970, as amended	Yes	See Section 4.6, Cultural Resources.
Condominium Act, Public Act 59 of 1978, as amended	No	N/A
Part 125, Campgrounds, Swimming Areas, and Swimmers' Itch, of the Public Health Code, Public Act 368 of 1978, as amended	No	N/A
Michigan Zoning Enabling Act, Public Act 110 of 2006, as amended	Yes	See Section 4.2, Land Use and Recreation.

[1] Part 41, along with Part 31, provides the basis for Michigan's National Pollutant Discharge Elimination System program.

NREPA = Michigan Natural Resources and Environmental Protection Act; MCMP = Michigan Coastal Management Program

4.4.2.2 Operations

Implementation of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would not result in the addition of permanent onshore structures or new impervious surfaces. As the replacement pipeline would be connected to existing infrastructure at the Mackinaw Station and North Straits Facility, any maintenance or operations activities would occur within existing facilities. Therefore, impacts to water resources would not be expected during operations.

4.4.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.4.3.1 Construction

4.4.3.1.1 Groundwater

Impacts to groundwater from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.4.5.1.1).

4.4.3.1.2 Surface Water

Impacts to surface waters from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.4.5.1.2), although placement of the pipeline assembly area north of the Straits would require the pipe-string to cross both Stream 01 and Moran River. To achieve this, the Applicant proposes to utilize clear span bridges that would extend from top of bank to top of bank. Bridges would be placed on abutments set back a minimum of 3 feet from the top of bank. Equipment would cross the waterbodies via the bridge, and the pipeline string, once welded, would be suspended on cribbing. Therefore, no disturbance would occur within the waterbodies. Surface waters crossed by the pipeline assembly area may be susceptible to the effects of erosion and sedimentation due to the increased activity and use of construction equipment adjacent to their banks (particularly Stream 01, which is located directly adjacent to the pipeline tie-in workspace north of the Straits, as stated in Section 4.4.2.1.2). The effects of erosion and sedimentation are discussed throughout the May 2025 Draft EIS, beginning in Section 4.4.3.1.2, in the *Water Quality* subsection (see also Section 4.9 of the May 2025 Draft EIS). As stated, additional surveys may be required if the Applicant were to pursue this alternative, to confirm the lack of other surface water resources.

4.4.3.1.3 Special Aquatic Sites

Impacts to special aquatic sites within the HDD/pipeline tie-in workspaces north of the Straits as well as at EMPS N1 would be the same as those described for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South, as these workspaces are common to both sub-alternatives (see Section 4.4.5.1.3). These temporary impact acreages are reiterated in Table 4.4-4.

According to publicly available NWI data, approximately half of the pipeline assembly area under this sub-alternative (north of the Straits) intersects large, contiguous freshwater forested/shrub wetlands (see Figure 3.4-3), although much of the alignment in the area of large wetland communities follows an existing, cleared ROW. Some areas of freshwater emergent wetland are mapped along the edges of the existing ROW. Additionally, the alignment would cross Stream 01 and Moran River, which are mapped by NWI as riverine wetland communities. As stated, Stream 01 and Moran River would be crossed with clear span bridges to avoid impacts to the waterbody bed/banks. Wetland impact acreages for HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) are provided in Table 4.4-4. As noted in Section 4.4.2.1.3, acreages provided may not be representative of total wetland impacts, as NWI data were used to estimate wetland impacts in areas where wetland delineations have not been completed. If the Applicant were to pursue this alternative, it is likely that additional wetland delineations would be required to confirm the presence or absence of wetlands in these areas. As stated, wetlands would be restored post-construction, and all impacts would be temporary, although vegetation clearing within forested/shrub wetlands would result in long-term impacts due to the slow regeneration rate of trees, and permanent impacts may result in previously forested wetlands, if they regenerate with emergent vegetation only. As shown in Table 4.4-4, approximately 9.50 acres of forested/shrub wetlands are mapped by the NWI within the pipeline assembly area/timber storage areas.

Table 4.4-4. Estimated Wetland Impacts – HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Wetland ID	Estimated Temporary Impact Acreage
HDD Workspace – North	
W10	0.20
W29	0.02
W19	0.16
W21	0.13
Pipeline Tie-In Workspace – North	
W3	1.18
Pipeline Assembly Area and Associated Timber Storage	
W3	1.06
W7	0.07
Additional freshwater forested/shrub wetlands	9.50
Additional freshwater emergent wetlands	1.07
Riverine wetlands	0.33

Wetland ID	Estimated Temporary Impact Acreage
EMPS	
Non-jurisdictional wetland (not regulated by USACE or EGLE)	2.65

EGLE = Michigan Department of Environment, Great Lakes, and Energy; EMPS = excavated material placement site; HDD = horizontal directional drilling; USACE = United States Army Corps of Engineers

Note: Wetland acreages provided for the HDD/pipeline tie-in workspaces are based on Applicant-provided delineation data, which included delineations in these areas. Wetland acreage within the pipeline assembly area were primarily estimated from publicly available NWI data (the southernmost portion of the alignment occurs within an area that has been previously delineated and includes known wetlands W3 and W7).

Potential impacts to Stream 01 (which fits the definition of a vegetated shallow) under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) are described in Section 4.4.3.1.2. No other special aquatic sites would be impacted.

4.4.3.1.4 Floodplains

Impacts to floodplains from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would include those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.4.5.1.4). Additionally, approximately 0.02 acre of 100-year floodplain associated with Stream 01 intersects the pipeline assembly area alignment under this sub-alternative. As no addition of permanent structures or new impervious surfaces is expected and any required ground disturbance along the pipeline assembly area alignment would be minimal, no long-term impacts to floodplains would occur.

4.4.3.1.5 Shoreline and Protected Coastal Resources

Impacts to shoreline and protected coastal resources from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) (as well as impact minimization measures and required permits) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.4.5.1.5), although siting of the pipeline assembly area north of the Straits would increase temporary impacts within the coastal zone along approximately 0.25 mile of the alignment (see Figure 3.4-7 for limits of coastal zone in this area). If the Applicant were to pursue this alternative, review by EGLE may be required to ensure the proposal would be consistent with regulations pertaining to coastal zone resources (see Table 4.4-3 in Section 4.4.2.1.5). As stated, shoreline and/or coastal resources do not occur within any of the EMPSs that would be utilized for the HDD Installation Alternative.

4.4.3.2 Operations

Operation of the replacement pipeline under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would not result in impacts to water resources for the reasons described in Section 4.4.2.2.

4.4.4 Summary of Impact Minimization Measures

4.4.4.1 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Measures to reduce construction impacts on water resources resulting from the HDD Installation Alternative would be included in design plans and permits that would be required, if issued.

HDD technology advancements in recent years that mitigate the potential loss/release of drilling fluids to fractured zones within bedrock (and potential subsequent releases to groundwater resources and/or the Straits) include the following, which are discussed in greater detail in Section 4.4.2.1.1.

- Annular pressure monitoring
- Step change improvements in mud and grouting design and placement to control fluid losses, fluid gains (infiltration of groundwater), and to the support the borehole wall
- Advancements in threaded casing pipe to mitigate against fluid losses and to provide borehole wall support
- Micro-tunnel advancement for installing casing at the drill entry points to mitigate against soil/fracturing risks

While no in-water work is expected under normal HDD operating conditions during construction, if additional water sources are required, a water intake structure may be constructed in the Straits (see Section 4.4.2.1.1 for information on when a water intake may be required). If a water intake structure in the Straits were to be required, impacts to Straits waters would be reduced utilizing turbidity curtains to create a uniform barrier around the workspace. Release of drilling fluids/muds would be minimized to the extent practicable by stopping forward operation the moment the pipe emerges above the lakebed.

To reduce impacts to water resources related to soil erosion, sedimentation, and stormwater runoff, design plans and required permits (i.e., SESC and NPDES permits) would stipulate the use of BMPs (e.g., perimeter controls such as silt fence and perimeter soil berms; erosion control blankets, straw bales, and other erosion-control devices; sediment traps; slope breakers or swales to manage stormwater; wetting construction ROW and access roads; reestablishing vegetation in temporarily disturbed areas, etc.). Sections 4.4.6 and 4.9.6 of the May 2025 Draft EIS provide additional information related to erosion and sediment control BMPs.

Post-construction, HDD workspaces, pipeline tie-in workspaces, the additional temporary workspace located south of the Straits, and the pipeline assembly area alignment would be returned to pre-construction contours and reseeded with appropriate native seed mixes, which would restore soil stability, reduce erosion susceptibility, and allow wetland hydrology and vegetation to return to temporarily disturbed wetlands. Excavated material at the EMPS would also be revegetated and maintained permanently.

Regarding the potential for leaks or spills of fuels and other contaminants, the contractor would be required to implement proper planning and preventative measures to minimize the likelihood of spills, and to quickly clean up a spill should one occur. The contractor would be required to designate a Spill Coordinator, whose responsibilities would include reporting spills to the appropriate federal, state, and local agencies and mobilizing onsite personnel, equipment, and materials for spill containment and/or cleanup. Spill kits would be maintained onsite at all times, and spill prevention and response training would be provided to construction personnel. Additional information related to the Applicant's Spill Prevention, Containment, and Control Plan (Spill Plan) is included in Section 4.9.6 of the May 2025 Draft EIS. The Applicant would conduct twice yearly monitoring of onsite wells and wells within a 0.5-mile radius of the construction footprints (with landowner permission) throughout construction and for 2 years following construction. Adherence to effluent limitations, monitoring requirements, and other conditions included in required permits (e.g., NPDES) would be expected to be sufficiently protective of surface water quality standards.

Along the pipeline assembly area alignment, temporary matting would be placed to minimize impacts to wetlands and other environmentally sensitive features that would be subject to pipeline placement and equipment movement. Surface waterbodies, if identified within the pipeline assembly area alignment, would be crossed using clear span bridges to avoid disturbance to waterbody bed/banks.

4.4.4.2 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Impact minimization and mitigation measures expected for HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those identified for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). Under this sub-alternative, the pipeline assembly area alignment would cross at least two waterbodies (wetland delineations and other surveys may be required if this sub-alternative were pursued, to identify additional water resources that may be present). Clear span bridges would be constructed, as described in Section 4.4.3.1.2, to allow equipment, construction workers, and the assembled pipe-string to cross the waterbodies (Stream 01 and Moran River) without disturbance to the waterbodies' bed and banks.

4.4.5 Cumulative Impacts

The cumulative effects area of analysis for water resources in the May 2025 Draft EIS was defined by the footprint of the Applicant's Preferred Alternative, the waters of the Straits, all EMPSs, all required onshore workspace associated with all decommissioning sub-alternatives, and resources adjacent to all aforementioned onshore areas, as stated in Section 3.4.1 of the May 2025 Draft EIS. In consideration of the HDD Installation Alternative, the area of analysis for water resources has been expanded to include the footprints associated with that alternative. As Appendix H of the May 2025 Draft EIS considered past, present, and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, as the footprints associated with the HDD Installation sub-alternatives do not extend beyond these three counties. The cumulative effects analysis for the HDD Installation sub-alternatives (below) may consider actions that were not considered in the cumulative effects analysis in the May 2025 Draft EIS, due to the expanded area of analysis. Impacts to water resources from the sub-alternatives analyzed in this Supplemental Draft EIS would primarily include those related to disturbance to wetlands, potential surface and groundwater contamination, and effects associated with increases in erosion and sedimentation.

4.4.5.1 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Past and present actions that have impacted water resources in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; ongoing quarry activities at the EMPSs; dredging within the Straits and other coastal maintenance activities; construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits; and vessel use in the waters of the Straits (see Appendix H of the May 2025 Draft EIS for additional detail). Based on the analysis of past actions through review of historic aerials, very little noticeable change has occurred in this area over the past 10 years, including along the pipeline assembly area alignment.

No reasonably foreseeable future actions with the potential to impact water resources in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprint of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) to contribute cumulatively to the effects identified for this sub-alternative. Impacts associated with this sub-alternative would primarily be temporary, with no permanent wetland losses expected and no proposal to place new, permanent facilities in the Straits, floodplain, coastal zone, or any other water resources considered in this EIS. As impacts associated with this sub-alternative would end when construction is complete, no cumulative effects are anticipated.

4.4.5.2 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Past and present actions that have impacted water resources in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; ongoing quarry activities at the EMPSs; dredging within the Straits and other coastal maintenance activities; construction work associated with roadways

that intersect the area of analysis and/or utilities that cross the Straits; vessel use in the waters of the Straits; and recreation and maintenance/natural resource management within Hiawatha National Forest. Based on the analysis of past actions through review of historic aerials, very little noticeable change has occurred in this area over the past 10 years, including along the pipeline assembly area alignment.

No reasonably foreseeable future actions with the potential to impact water resources in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprint of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) to contribute cumulatively to the effects identified for this sub-alternative. Impacts associated with this sub-alternative would primarily be temporary, with no permanent wetland losses expected and no proposal to place new, permanent facilities in the Straits, floodplain, coastal zone, or any other water resources considered in this EIS. As impacts associated with this sub-alternative would end when construction is complete, no cumulative effects are anticipated.

4.5 BIOLOGICAL RESOURCES

This section presents the potential impacts to biological resources from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.5.

4.5.1 Summary of Key Issues

Table 4.5-1 presents a high-level summary of key issues for biological resources related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.5.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.5-1. Summary of Key Issues for Biological Resources – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Natural Communities	Short- and long-term, detrimental impacts associated with vegetation clearing/disturbance of up to 51.4 acres. Potential detrimental effects would vary depending on the natural communities present and the specific activities that may occur.	Short- and long-term, detrimental impacts associated with vegetation clearing/disturbance of up to 47.8 acres. Potential detrimental effects would vary depending on the natural communities present and the specific activities that may occur.
Wildlife	Detrimental impacts similar to those described for the Applicant's Preferred Alternative (Section 4.5.3.1.2 of the May 2025 Draft EIS). Clearing of vegetation would detrimentally affect habitat for wildlife inhabiting the construction footprints and adjacent areas. Additionally, noise and construction lighting may impact wildlife behavior.	Impacts would be similar to those described for Sub-Alt 1.
Aquatic Organisms	If a water intake structure were to be required (not anticipated during normal operation of HDD equipment), impacts to aquatic organisms would be the same as described for the Applicant's Preferred Alternative (Section 4.5.3.1.3 of the May 2025 Draft EIS).	Impacts would be the same as described for Sub-Alt 1.
Protected Species	Short- and long-term, detrimental impacts associated with vegetation clearing, noise, construction lighting, and human activity. Table 4.5-3 summarizes potential impacts to each identified species.	Impacts would be similar to those described for Sub-Alt 1.
Invasive Species	Disturbance of native plant communities and increased human and vehicle traffic increase the potential for introduction or spread of invasive species.	Impacts would be similar to those described for Sub-Alt 1.

EIS = Environmental Impact Statement; HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative

4.5.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.5.2.1 Construction

4.5.2.1.1 Natural Communities

Construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would have short- and long-term, detrimental impacts on vegetation and natural communities within the expected construction footprints. Construction would require vegetation clearing/vegetation disturbance (disturbance primarily related to placement of mats and equipment use on top of the matting) of up to 51.4 acres. Table 4.5-2 summarizes the acres of each natural community that may be affected during construction. Potential detrimental effects would vary depending on the natural community present and the specific activities that may occur. The extent of impacts would be reduced as much as practicable by prioritizing the use of previously disturbed areas for pipeline assembly/timber storage (e.g., previously cleared ROW). As disturbed/cleared areas would be revegetated post-construction, the majority of impacts would be short-term; however, due to the slow regeneration rate of trees, tree clearing would represent a long-term change in natural community. Additionally, it is possible that forested wetland areas may regenerate as emergent wetland communities, representing a permanent impact. Additional effects to vegetation and natural communities could arise from the air emissions generated by construction activities and operation of heavy equipment. These emissions are discussed in Section 4.11.2.1.1.

Table 4.5-2. Acreage of Natural Communities within the HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) Construction Footprint to be Impacted

Impact Type	Previously Disturbed	Cedar Swamp	Beech-Sugar Maple – Hemlock Forest	Mixed Conifer Swamp	Total
No clearing/grading	5.7	0.0	0.0	0.0	5.7
Minimal brushing/hand clearing	13.8	0.0	0.0	0.0	13.8
Full logging	0.0	0.0	16.6	15.3	31.9
Total HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	19.5	0.0	16.6	15.3	51.4

Source: Enbridge 2025c
HDD = horizontal directional drilling

4.5.2.1.2 Wildlife

Construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) could have detrimental effects on local wildlife. Impacts to wildlife would be similar to those described in Section 4.5.3.1.2 of the May 2025 Draft EIS, in that clearing vegetation during the site preparation phase would detrimentally affect habitat for local wildlife inhabiting the construction areas and adjacent areas. Additionally, there is potential for detrimental impacts to wildlife due to construction noise and lighting, particularly within the pipeline assembly area, where human activity is likely less frequent under baseline conditions. Wildlife may leave the area temporarily due to noise from construction equipment and presence of workers for the duration of construction. For those species or individuals that do not leave the area during construction, construction noise impacts and increased lighting could affect behavior. See Section 4.5.3.1.2 of the May 2025 Draft EIS for further discussion of noise impacts to wildlife.

Changes in vegetation associated with construction activities within the HDD/pipeline tie-in workspaces (the additional temporary workspace south of the Straits consists of previously cleared ROW) and along the pipeline assembly area alignment (and associated timber storage

areas) may contribute to fragmentation of natural communities, breaking contiguous forest tracts into smaller, isolated patches, reducing core habitat areas essential for interior forest species such as deer, moose, bats, and migrating and breeding songbirds. These species depend on large, undisturbed tracts of forest for nesting, foraging, and protection from threats. Fragmentation introduces more forest edges, which can increase exposure to sunlight, wind, and invasive plant species, altering microhabitats and reducing biodiversity. Moreover, the proliferation of edges benefits certain predators, which thrive in transitional zones and often prey on interior species. Approximately 31.9 acres of forest would be fully logged under this sub-alternative (see Table 4.5-1), increasing the amount of fragmentation along the pipeline assembly area alignment and the HDD/pipeline tie-in workspaces, especially where they intersect with the Headlands International Dark Sky Park. As a result, while some adaptable predators may flourish, the ecological integrity of the forest and the viability of sensitive species could be compromised (Manley 2024; Schulte et al. 2007).

4.5.2.1.3 Aquatic Organisms

The HDD Installation Alternative would not require in-water work during normal operation of HDD equipment, as construction activities would not occur within the Straits. Conditions can be encountered during HDD that result in a loss of drilling fluids that may prompt the need for contingency actions requiring additional water than the quantity that would be acquired from a municipal source (see Section 4.4.2.1.1 for more information). Such a scenario might result in the need to install a water intake structure in the Straits to supply additional water to the construction site. If a water intake structure were to be installed under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), impacts to aquatic organisms associated with construction and operation of the structure would be the same as those described for the Applicant's Preferred Alternative in Section 4.5.3.1.3 of the May 2025 Draft EIS (e.g., increased turbidity within the work area, which would be isolated by turbidity curtains [area of approximately 2,000 square feet] and exposure to released drilling muds/fluids on the lakebed [approximately 20,000 gallons]).

As shown in Figure F-5 in Appendix F, drilling into the bedrock would occur at substantially greater depths compared to the proposed TBM under the Applicant's Preferred Alternative (described in the May 2025 Draft EIS) as the bore path traverses the Straits. Due to the smaller drill bit diameter and depth underneath the lakebed, it is expected that vibration levels from the HDD would be substantially smaller than those projected for the TBM (discussed in Section 4.12.3.1.2 in the May 2025 Draft EIS). As discussed in Section 4.12.2.1.2, it is projected that vibration levels on the lakebed at the minimum depth of 150 feet near the north shoreline would be less than 0.02 inches/second and, therefore, vibration effects to aquatic species are anticipated to be minimal.

Detrimental effects from an inadvertent release of HDD drilling fluid are considered to be extremely unlikely, due to the small volume potentially released and the distance it would need to travel through the overlying bedrock and overburden material to reach the lake. If a release did occur, the effects are anticipated to be negligible as the comparative volume of drilling fluid within the lake would not be sufficient to measurably reduce oxygen levels, increase turbidity, or affect breathing by physically clogging gills. The drilling fluid that would be used during construction would consist of water and bentonite (an environmentally benign material) and would not have toxic effects on aquatic organisms. As stated, in the unlikely event that drilling fluid were to reach the lakebed, response and cleanup efforts would begin immediately, including notification to the appropriate regulatory authorities.

4.5.2.1.4 Protected Species

Table 3.5-2 identifies the documented federally protected species with potential to occur within the footprints associated with the HDD Installation Alternative. Table 4.5-3 summarizes potential impacts to each of these identified species. Additional surveys would be required to further

quantify impacts to protected species and Section 7 consultation with the USFWS would be required, if the HDD Installation Alternative were to be pursued by the Applicant.

Table 4.5-3. Federal Special Status Species Impacts under the HDD Installation Alternative

Species	Federal Status	Potential Impacts
Mammals		
Northern long-eared bat (*Myotis septentrionalis*)	Endangered	The loss of suitable summer habitat within the area of analysis is anticipated. The HDD Installation Alternative may affect the northern long-eared bat if tree clearing occurs during the species' active season. Trees would be cleared outside the pup season (June/July), and clearing/grading would be completed during winter months, to the extent possible, to minimize potential impacts to roosting bats. If tree clearing is avoided during the bats' active season, the alternative may affect but is not likely to adversely affect the Northern long-eared bat because any effects, should they occur, would be insignificant or discountable. Up to 31.9 acres of full logging is possible under HDD Installation Sub-Alternative 1, and 9.6 acres of full logging is possible under HDD Installation Sub-Alternative 2.
Gray wolf (*Canus lupus*)	Threatened	Wolves may travel through the action area, but the species' general wariness would mean wolves would tend to avoid areas of human activity, including roads. The HDD Installation Alternative may affect but is not likely to adversely affect the gray wolf because any effects, should they occur, would be insignificant or discountable.
Canada Lynx *(Lynx canadensis)*	Threatened	Lynx may travel through the action area, but the species' general wariness would mean lynx would tend to avoid areas of human activity, including roads. The HDD Installation Alternative may affect but is not likely to adversely affect the Canada lynx because any effects, should they occur, would be insignificant or discountable.
Tricolored bat (*Perimyotis subflavus*)	Proposed Endangered	The loss of suitable summer habitat within the area of analysis is possible. The HDD Installation Alternative may affect the tricolored bat if tree clearing occurs during the species' active season. Trees would be cleared outside the pup season (June/July), and clearing/grading would be completed during winter months, to the extent possible, to minimize potential impacts to roosting bats. If tree clearing is avoided during the bats' active season, the alternative may affect but is not likely to adversely affect the Tricolored bat because any effects, should they occur, would be insignificant or discountable. Up to 31.9 acres of full logging is possible under HDD Installation Sub-Alternative 1, and 9.6 acres of full logging is possible under HDD Installation Sub-Alternative 2.
Birds		
Piping plover (*Charadrius melodus*)	Endangered	The loss of suitable habitat within the area of analysis is possible. Individuals may avoid the area due to construction and increased human activity. While there is potential for mortality due to collision with construction equipment, such an occurrence is unlikely due to the limited extent of available suitable habitat within the action area. The HDD Installation Alternative may affect but is not likely to adversely affect the piping plover because any effects, should they occur, would be insignificant or discountable.

Species	Federal Status	Potential Impacts
Rufa red knot (*Calidris canutus rufa*)	Threatened	The loss of some suitable habitat within the area of analysis is possible. Individuals may avoid the area due to construction and increased human activity. While there is potential for mortality due to collision with construction equipment, such an occurrence is unlikely due to the limited extent of available suitable habitat within the action area. The HDD Installation Alternative may affect but is not likely to adversely affect the rufa red knot because any effects, should they occur, would be insignificant or discountable.
Reptiles		
Eastern massasauga rattlesnake (*Sistrurus catenatus)*	Threatened	This species may be encountered along haul roads. The HDD Installation Alternative may affect but is not likely to adversely affect the eastern massasauga rattlesnake.
Insects		
Hine's emerald dragonfly *(Somatochlora hineana)*	Endangered	Suitable habitat for larvae may exist within wetlands adjacent to the pipeline assembly area alignment and HDD/pipeline tie-in workspace north of the Straits. If suitable habitat for this species is present along haul routes, potential for road mortality exists. The HDD Installation Alternative may affect but is not likely to adversely affect Hine's emerald dragonfly.
Monarch butterfly (*Danaus plexippus*)	Proposed threatened	Construction activities may result in loss of breeding and foraging habitat. The HDD Installation Alternative may put monarch butterflies at risk. Additional coordination with the USFWS may be needed if the species becomes listed as a federally threatened or endangered species.
Flowering Plants		
Dwarf lake iris (*Iris lacustris*)	Threatened	The loss of suitable habitat within the area of analysis is anticipated. Dwarf lake iris would be cleared where present within the expected workspaces, and would be adversely affected.
Houghton's goldenrod (*Solidago houghtonii)*	Threatened	The loss of suitable habitat within the area of analysis is anticipated. Houghton's goldenrod would be cleared where present within the expected workspaces, and would be adversely affected.
Pitcher's thistle (*Cirsium pitcheri*)	Threatened	The loss of suitable habitat within the area of analysis is possible. However, if this species is present at the time of construction, it would be isolated from the area and left undisturbed. As such, the HDD Installation Alternative is not likely to adversely affect the pitcher's thistle.
Michigan monkey-flower (*Erythranthe michiganensis*)	Endangered	The loss of suitable habitat within the area of analysis is possible.

Source: Stantec 2025; USFWS 2025
HDD = horizontal directional drilling; USFWS = United States Fish and Wildlife Service

4.5.2.1.5 Invasive Species

As stated in Section 3.5.6 of the May 2025 Draft EIS, several species of invasive plants have been identified within undeveloped areas north of the Straits, including common buckthorn, glossy buckthorn, wild parsnip, common tansy, spotted knapweed, purple loosestrife, bull thistle, common reed, and reed canary grass. South of the Straits, invasive species observations have included scattered individuals of wild parsnip and spotted knapweed (Stantec 2025). Disturbance of native plant communities and increased human and vehicle traffic increase the potential for introduction or spread of invasive species. Impacts associated with invasive plant species include crowding out of native species, increased fire risk, and production of toxins harmful to human health, among others. The Applicant would employ the mitigation measures summarized in Section 4.5.4 to reduce or avoid potential detrimental impacts from invasive species to the extent practicable.

4.5.2.2 Operations

No long-term impacts to biological resources are anticipated to occur during operation of HDD Installation Sub-Alternative 1: Pipeline Assembly Area South. No additional land disturbance or in-water activities would occur during normal pipeline operations, and maintenance/operations activities would occur within the Applicant's existing facilities (Mackinaw Station and North Straits Facility).

4.5.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.5.3.1 Construction

4.5.3.1.1 Natural Communities

Impacts to natural communities from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.5.2.1.1). Construction would require vegetation clearing/vegetation disturbance (disturbance primarily related to placement of mats and equipment use on top of the matting) of up to 47.8 acres. Table 4.5-4 summarizes the acres of each natural community that may be affected during construction. As stated for HDD Installation Sub-Alternative 1, impacts would primarily be temporary, although tree clearing would represent a long-term impact, and permanent impacts would occur if forested wetland areas regenerated as emergent wetlands.

Table 4.5-4. Acreage of Natural Communities within the HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) Construction Footprint to be Impacted

Impact Type	Previously Disturbed	Cedar Swamp	Beech-Sugar Maple – Hemlock Forest	Mixed Conifer Swamp	Total
No clearing/grading	2.5	0.0	0.0	0.0	42.5
Minimal brushing/hand clearing	32.4	3.4	0.0	0.0	35.8
Full logging	0.0	5.6	4.0	0.0	9.6
Total HDD Installation Sub-Alternative 2: Pipeline Assembly Area North	34.9	8.9	4.0	0.0	47.8

Source: Enbridge 2025c
HDD = horizontal directional drilling

4.5.3.1.2 Wildlife

Impacts to wildlife from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.5.2.1.2), although impacts associated with pipeline assembly/timber storage would occur in habitats located north of the Straits rather than south of the Straits. Expected logging under HDD Installation Sub-Alternative 2 would be less than under HDD Installation Sub-Alternative 1 (9.6 acres, compared to 31.9 acres under HDD Installation Sub-Alternative 1).

4.5.3.1.3 Aquatic Organisms

Impacts to aquatic organisms from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be the same as those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.5.2.1.3).

4.5.3.1.4 Protected Species

Impacts to protected species from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.5.2.1.4). Additional surveys would be required to further quantify impacts to protected species if HDD Installation Sub-Alternative 2 were to be pursued by the Applicant.

4.5.3.1.5 Invasive Species

Impacts related to invasive species from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.5.2.1.5).

4.5.3.2 Operations

Operation of the replacement pipeline under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would not result in impacts to biological resources for the reasons described in Section 4.5.2.2.

4.5.4 Summary of Impact Minimization Measures

Measures to reduce construction impacts on biological resources resulting from the HDD Installation Alternative would be included in design plans and permits that would be required, if issued. If this alternative were to be pursued, additional surveys would be required to better characterize existing natural communities, wildlife, and protected species, and consultation with USFWS in accordance with Section 7 of the ESA would be required.

The Applicant would consider and employ the following measures to reduce or avoid potential detrimental impacts associated with constructing and operating the HDD Installation Alternative:

- Siting workspaces north of the Straits (where wetlands have been delineated) to minimize impacts to wetlands and protected plant species
- Clearing trees and performing grading during the winter months (October 1 to April 14), as practicable, when bats are hibernating. Trees would be cleared outside the pup season (June/July), and clearing/grading would be completed during winter months, to the extent possible, to minimize potential impacts to roosting bats. If tree clearing is avoided during the bats' active season, the alternative may affect but is not likely to affect the Northern long-eared bat and the Tricolored bat because any effects, should they occur, would be insignificant or discountable
- Reseeding disturbed areas with native seed mixes

- Providing long-term conservation benefits such as off-site land preservation, endowment, and research funding for impacted protected plant species
- Clearly staking construction area boundaries to prevent disturbance to unauthorized areas
- Utilizing quieter construction machinery and avoiding artificial lighting in natural areas
- Using turbidity curtains to contain sediment disturbed during water intake structure installation, if a water intake structure is determined to be required
- Timing construction to avoid sensitive breeding or hibernation periods
- Washing construction equipment before arriving onsite to reduce spread of invasive plants
- Using mulch and straw or hay bales that are free of noxious weeds for temporary erosion and sediment control
- Cleaning all construction equipment, including timber mats, with air or high-pressure washing equipment prior to moving equipment to the next job site; cleaning the tracks, tires and blades of equipment by hand or compressed air to remove excess soil prior to movement of equipment out of weed infested areas; or using cleaning stations to remove vegetative materials with high pressure washing equipment
- Imposing a vehicle speed limit of 20 miles per hour within the construction footprints to minimize risk of vehicle collisions and damage to habitat
- Conducting initial vegetation clearing activities outside the time when monarch butterflies would be present (between September 15 to May 10) to the extent practicable, and avoiding vegetation removal during the time when monarchs are congregating for fall staging, when feasible
- If a water intake structure in the Straits is required, conducting associated HDD activities outside the whitefish spawning and hatching season (mid-October through April) to the extent practicable

Post-construction, all workspaces would be returned to pre-construction contours and reseeded with appropriate native seed mixes. Excavated material at the EMPSs would also be revegetated and maintained permanently.

4.5.5 Cumulative Impacts

Long-term impacts to biological resources from the alternatives analyzed in the May 2025 Draft EIS would primarily include those related to loss of habitat. The cumulative effects area of analysis for biological resources in the May 2025 Draft EIS was defined by the footprint of the Applicant's Preferred Alternative, the waters of the Straits, all EMPSs, all required onshore workspace associated with all decommissioning sub-alternatives, and resources adjacent to all aforementioned onshore areas, as stated in Section 3.5.1 of the May 2025 Draft EIS. In consideration of the HDD Installation Alternative, the area of analysis for biological resources has been expanded to include the expected footprints associated with that alternative. As Appendix H of the May 2025 Draft EIS considered past, present, and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, as the footprints associated with the HDD Installation Alternative do not extend beyond these three counties. The cumulative effects analysis for HDD Installation Sub-Alternatives 1 and 2 (below) may consider actions that were not considered in the cumulative effects analysis for biological resources in the May 2025 Draft EIS, due to the expanded area of analysis.

4.5.5.1 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Past and present actions that have impacted biological resources in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual

Pipelines and along Straits shorelines; ongoing quarry activities; dredging within the Straits and other coastal maintenance activities; and construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits. Although specific impacts from past actions are not reasonably available, HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would contribute to the cumulative loss of vegetation, including forested area, within the area of analysis. Impacts associated with this sub-alternative would result in removal or disturbance to approximately 51.4 acres of vegetation, although vegetation would be expected to regenerate post-construction (with the exception of some forested wetland areas, that may regenerate as emergent wetlands).

No reasonably foreseeable future actions with the potential to impact biological resources in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprint of HDD Installation Sub-Alternative 1 to contribute cumulatively to the effects identified for this sub-alternative. As most impacts to biological resources associated with this sub-alternative would end when construction is complete, any cumulative effects associated with vegetation removal would be limited.

4.5.5.2 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Past and present actions that have impacted biological resources in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; ongoing quarry activities; dredging within the Straits and other coastal maintenance activities; construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits; and maintenance/natural resource management in Hiawatha National Forest. Although specific impacts from past actions are not reasonably available, HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would contribute to the cumulative loss of vegetation, including forested area, within the area of analysis. Impacts associated with this sub-alternative would result in removal or disturbance to approximately 47.8 acres of vegetation (impacts would primarily be temporary).

No reasonably foreseeable future actions with the potential to impact water resources in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprint of HDD Installation Sub-Alternative 2 to contribute cumulatively to the effects identified for this sub-alternative. As most impacts to biological resources associated with this sub-alternative would end when construction is complete, any cumulative effects associated with vegetation removal would be limited.

4.6 CULTURAL RESOURCES

This section presents the potential impacts to cultural resources from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.6. This section presents high-level summary information on effects to cultural resources due to the resource sensitivity. Additionally, as stated in Section 3.6, much of the expected footprint for the HDD Installation Alternative has not been surveyed or inventoried for cultural resources; therefore, the extent of impacts is not fully known.

4.6.1 Summary of Key Issues

Either HDD Installation sub-alternative would likely cause adverse effects to NRHP-eligible terrestrial archaeological sites, an archaeological district, and the Straits of Mackinac TCL. Activities such as site grading, excavation, fill, and the use of construction equipment during the duration of construction activities would remove or destroy archaeological resources within the construction footprints, including at HDD/pipeline tie-in/additional temporary workspaces. Within the pipeline assembly area and associated timber storage areas, potential disturbance to archaeological and natural cultural resources may occur due to the flush-cutting of trees and the placement/removal of matting. Matting would limit potential effects to archeological sites, but matting may not effectively protect sites with above-grade features. Additionally, minor areas of grading may be required in the pipeline assembly area in upland areas with greater topographical variations, which would result in ground-disturbing activities that could adversely affect archaeological resources, where present. Vegetation clearing and ground disturbance within the HDD/pipeline tie-in/additional temporary workspaces and the pipeline assembly area would result in loss of culturally important plants, wildlife, and habitats.

Figure 4.12-1 shows the areas where construction noise levels from the HDD/pipeline tie-in/additional temporary workspaces and the pipeline assembly area are projected to exceed 55 dBA. Noise at this level could affect the atmosphere and setting of cultural resources within the affected areas, including the TCL and its contributing elements (note, 55 dBA is typically the nighttime threshold for residential properties, and 57 dBA is a threshold for special parks, such as the Headlands International Dark Sky Park). The presence of construction equipment, workers, and noise may temporarily lessen the suitability of lands and waters in the vicinity for the exercise of ceremonial practices and other Tribal traditional cultural activities associated with the TCL. Detrimental noise effects would be limited to the construction period and would diminish with distance from the construction areas. The construction activities, equipment, and noise may affect nearby architectural resources, but effects would generally be temporary, limited to the construction period, and not adverse.

Using the vibration impact threshold of 0.1 inches/second, the vibration analysis discussed in Section 4.12.2.1.2 notes that this threshold would only be exceeded within 25 feet of the source of the vibration. The HDD's main bore path would have a minimum depth below the lakebed of approximately 150 feet near the north shoreline (see Figure F-5 of Appendix F) and projected vibration levels on the lakebed are estimated to be less than 0.02 inches/second at this depth, well below the impact threshold. An additional HDD workspace would be located north of the Straits, separate from the HDD entry point on that side (see Figures F-1 and F-2). This workspace would serve as the exit location for the drill bit and pilot string originating from the south side. Surveys identified no marine archaeological resources in the area that may be affected by potential water intake structure installation. If any drilling would occur less than 25 feet below the lakebed, additional surveys may be needed to identify marine archaeological sites in the potentially affected areas.

As stated, data are currently lacking to adequately characterize marine archaeological resources that may be present along the lakebed, and portions of the expected footprints under either sub-

alternative have not been surveyed for terrestrial archaeological resources or inventoried for known architectural resources. If the Applicant were to pursue either sub-alternative, it is likely that extensive survey efforts would be required to characterize existing resources and determine potential impacts and impact avoidance, minimization, and mitigation efforts.

If the Applicant were to pursue the HDD Installation Alternative, site-specific surveys would likely be required, and identification of architectural resources, archaeological sites and other cultural resources could result in development of site-specific avoidance, minimization, and mitigation measures through Section 106 consultation.

4.6.2 Cumulative Impacts

Any of the construction activities expected under the HDD Installation Alternative, considered together with the projects identified in Appendix H of the May 2025 Draft EIS that would occur within the TCL, could contribute to cumulative impacts to the TCL, particularly through impacts to the natural environment. While many of these projects pose little risk to the TCL, such as routine maintenance and upkeep of existing infrastructure and non-invasive scientific studies within the Straits and surrounding areas, others, such as continued resource extraction/use, tourism, and additional infrastructure construction, could negatively impact the Straits. The majority of the projects identified in Appendix H would occur far enough from the expected footprints of the HDD Installation Alternative that cumulative impacts would not be expected. Cumulative impacts to architectural and archaeological resources may occur if impacts accrue at specific resource locations.

4.7 TREATY RIGHTS

This section discusses USACE's treaty rights analysis, which is being conducted separate from the National Environmental Policy Act (NEPA) process.

4.7.1 Summary of Key Issues

In accordance with the United States' federal trust responsibility, the USACE is conducting a review to evaluate the Project's potential impacts on treaty rights. The USACE does not have authority to issue a permit for an activity that would impinge upon or abrogate a treaty right. The treaty rights review is separate and distinct from NEPA and is therefore not included in the EIS. The USACE is consulting on a government-to-government basis with federally recognized Tribes to determine if the Project would impinge upon or abrogate treaty rights. This consultation is ongoing, and the USACE is committed to including its final finding in the Record of Decision.

4.8 GEOLOGY

This section presents the potential impacts to geology from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.8.

4.8.1 Summary of Key Issues

Table 4.8-1 presents a high-level summary of key issues for geology related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.8.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.8-1. Summary of Key Issues for Geological Resources – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Rock Removal	An estimated 6,000 cubic yards of excavated bedrock would be removed from underneath the lakebed. Removal of these geological resources, if not managed and mitigated properly, could lead to deformation along the alignment.	Potential impacts on geology would be the same as those described for Sub-Alt 1, as the alignment and HDD process would be the same under both sub-alternatives.
Karst Conditions	There is potential for karst features to be encountered within the area of analysis. Potential groundwater inflows would be prevented and/or minimized utilizing the methods described in Section 4.4.2.1.1, which would support borehole stability during construction.	Potential impacts would be the same as those described for Sub-Alt 1, as the alignment and HDD process would be the same under both sub-alternatives.
HDD Vibrations and Seismic Activity	Vibrations from drilling could cause shifts in the geology around the alignment horizon. The location of the Project alternatives is within Seismic Design Category A, which denotes a very small probability of experiencing damaging earthquake effects (FEMA 2020). The area of analysis is not near any known active seismic fault.	Potential impacts would be the same as those described for Sub-Alt 1, as the alignment and HDD process would be the same under both sub-alternatives.
Inadvertent Returns	Inadvertent drilling fluid losses (i.e., drilling fluid "returns") could lead to drilling fluid traveling through factures in bedrock and interacting with groundwater resources. There is a higher risk of inadvertent returns near HDD entry/exit points where there is less rock/overburden cover, as well as in poor quality or porous bedrock such as limestone, or in the presence of karst conditions (See Section 4.4.2.1.1 for additional detail).	Potential impacts would be the same as those described for Sub-Alt 1, as the alignment and HDD process would be the same under both sub-alternatives.

HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative

4.8.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.8.2.1 Construction

HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would result in permanent changes to geological resources. The alignment would be bored through bedrock, altering existing geology and permanently removing rock from the area. During construction, an estimated 6,000 cubic yards of excavated material would be removed from beneath the lakebed. Excavated material would be placed at EMPS S1 and N1 and managed and maintained as described for the Applicant's Preferred Alternative in the May 2025 Draft EIS. Removal of these geological resources, if not managed and mitigated properly, has the potential to cause localized deformation along the expected HDD alignment. Due to the anticipated depth of the alignment below the lakebed and because vibrations from the HDD would only be expected to reach impact thresholds within 25 feet of the HDD alignment (and no part of the alignment is within 25 feet of the lakebed), any localized deformation effects would not impact the lakebed (see Section 4.12 for additional information on vibration impact thresholds). Localized shifts in the geology surrounding the alignment caused by drilling vibrations could make drilling activities more difficult for the operators and may contribute to the possibility of inadvertent returns of drilling fluid (see Section 4.4.2.1.2 and 4.14 for additional detail related to inadvertent returns). Borehole stability is maintained by consistent pressure of drilling fluid; therefore, issues during the drilling process associated with geologic conditions could increase the risk of borehole collapse during construction. While potential deformation or geological shifts would likely be less than those described for the proposed Tunnel Project (see Section 4.8.3.1 of the May 2025 Draft EIS) due to excavation of a lesser amount of bedrock, a thorough understanding of existing geology, through geotechnical exploration, would improve the identification of potential impacts.

As stated in Section 3.8.4, there is potential to encounter karst features within the area of analysis. Potential groundwater inflows would be prevented and/or minimized utilizing the methods described in Section 4.4.3.1.1, which would support borehole stability during construction. As stated, HDD construction poses the risk of drilling fluid losses (i.e., inadvertent returns), in which slurry/pressurized drilling fluid escapes the borehole during drilling and travels through factures in overlying soils or rock, potentially interacting with nearby groundwater resources or reaching the lake above, although the latter is considered to be a highly unlikely occurrence (see Section 4.4.2.1.2). The risk of inadvertent returns is heightened in weak or cohesive soils, poor quality bedrock, or porous bedrock such as limestone, as well as in the presence of karst conditions (Alfonso and Gomez 2023). This risk is also higher near HDD entry/exit points where there is less rock/overburden cover (Willoughby n.d.).

The Mariner East 2 pipeline, constructed by Sunoco Pipeline (a subsidiary of Energy Transfer), provides an example of karst conditions contributing to the likelihood of inadvertent returns during HDD. In August 2020, near Marsh Creek Lake in Chester County, Pennsylvania, HDD operations associated with the Mariner East pipeline caused between 21,000 and 28,000 gallons of drilling fluid to spill into Marsh Creek Lake and surrounding wetlands. The area is underlain by karstic limestone, which contributed to sinkhole formation and unpredictable fluid migration (Phillips 2024; FracTracker Alliance 2018). The Sabal Trail Transmission pipeline, a 517-mile interstate natural gas pipeline, experienced several HDD inadvertent return incidents during its construction through Georgia. Notably, pressurized drilling fluid escaped into the Withlacoochee River in October 2016 from beneath the riverbed through a crevice in fractured bedrock. Multiple sinkholes later developed near the HDD exit point, indicating subsurface instability exacerbated by pressurized drilling. The project was conducted through karstic and fractured limestone (WWALS 2025, IEN 2016). It should be noted (as stated elsewhere in this Supplemental Draft EIS) that the likelihood of drilling fluid reaching the Straits lakebed in the event of an inadvertent release is considered to be extremely low due to the depth of the expected borehole; however, groundwater

resources have the potential to be exposed to drilling fluids in the event of inadvertent returns (see Section 4.4.2.1.1 for additional detail). Both examples discussed here conducted boring along much shallower alignments than expected under the HDD Installation Alternative.

The above cases demonstrate the importance of thorough geotechnical investigations, conservative pressure modeling, real-time monitoring during HDD activities, and rapid response protocols for containment. Section 4.4.2.1.1 discusses inadvertent releases in detail, including information on HDD industry advancements and mitigation measures that would prevent or minimize this risk (see also Section 4.14).

4.8.2.2 Operations

Routine operations would not impact surficial geology. Operations activities would utilize the Applicant's existing facilities at the Mackinaw Station and the North Straits Facility. It should be noted that as the pipeline would be encased by bedrock, maintenance or repairs along the line itself would likely be infeasible.

4.8.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Potential impacts on geology from construction and operation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be the same as those discussed for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.8.2), as the HDD alignment and process would be the same under both sub-alternatives.

4.8.4 Summary of Impact Minimization Measures

Mitigation measures for the HDD Installation Alternative include following BMPs and permit requirements regarding sedimentation and erosion control (see Section 4.9), as well as requirements for building, mechanical, and demolition permits. Additionally, temporarily disturbed sites would be restored to original grades. Prior to the use of any EMPS, an experienced geotechnical engineer or engineering geologist would inspect quarry faces to identify areas susceptible to future instabilities. See Section 4.9 for the discussion of impacts on soils.

The risk of encountering challenges due to karst areas, such as environmental damage and/or economic losses due to halted construction, can be reduced through early identification and characterization of geological conditions through the use of mechanical and geophysical site investigations (seismic, electrical tomography, georadar). While no known karst features are mapped in the area of the alignment, the presence of the Silurian-Devonian aquifer and underlying bedrock geology indicates there is potential for karst features to be encountered (see Section 3.8.4), which should be taken into account during design and construction. Construction approaches such as monitoring of the drill bit and pressures to allow for adjustments in drilling speed and fluid pressures are effective to help prevent borehole deformation.

Mitigation strategies to prevent drilling fluid losses include geotechnical analysis, comprehensive pressure modeling, and implementation of BMPs to monitor and respond to fluid releases (Trenchless Technology 2024) (see Sections 4.4.2.1.1, 4.4.4, and 4.14 for additional detail).

4.8.5 Cumulative Impacts

Impacts to geology from the alternatives analyzed in the May 2025 Draft EIS would include those related to geologic formations, seismicity, and karst conditions. As stated in Section 3.8.1 of the May 2025 Draft EIS, the cumulative effects area of analysis for geological resources was defined by the footprint of the Applicant's Preferred Alternative, all EMPSs, all required onshore workspace associated with all decommissioning sub-alternatives, and resources adjacent to all aforementioned onshore areas. In consideration of the HDD Installation Alternative, the area of analysis for geological resources has been expanded to include the expected footprints associated with that alternative. Appendix H of the May 2025 Draft EIS considered past, present,

and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, which include the footprints associated with the HDD Installation Alternative. The cumulative effects analysis for the HDD Installation Alternative (below) may consider actions that were not considered in the cumulative effects analysis for geological resources in the May 2025 Draft EIS, due to the expanded area of analysis.

4.8.5.1 HDD Installation Alternative

Past and present actions that have impacted geological resources in the area of analysis include ongoing quarry activities at the EMPSs and construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits (see Appendix H of the May 2025 Draft EIS for additional detail). Based on the analysis of past actions through review of historic aerials, very little noticeable change has occurred in this area over the past 10 years, including along the pipeline assembly area alignments under both sub-alternatives. The HDD Installation Alternative would result in the removal of approximately 6,000 cubic yards of bedrock, representing a long-term impact on local geology. No reasonably foreseeable future projects within the area of analysis have been identified that would contribute cumulatively to this effect.

4.9 SOILS

This section presents the potential impacts to soils from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.9.

4.9.1 Summary of Key Issues

Table 4.9-1 presents a high-level summary of key issues for soils related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.9.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.9-1. Summary of Key Issues for Soil Resources – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Ground Disturbance	Approximately 15.8 acres total within HDD/pipeline tie-in/additional temporary workspaces. Ground disturbance at EMPS/pipeline assembly area would only be required in localized upland areas where existing topographical variations are more severe, in order to create a level working surface. Straits sediments would not be disturbed during normal operation of HDD equipment; if additional water needs are identified and a water intake structure is required, approximately 800 square feet of disturbance to Straits sediments would occur (see Section 4.4.2.1.1 for information on when a water intake structure may be required).	Approximately 15.8 acres total within HDD/pipeline tie-in/additional temporary workspaces. Ground disturbance at EMPS/pipeline assembly area would only be required in localized upland areas where existing topographical variations are more severe, in order to create a level working surface. If a water intake is required, disturbance of Straits sediments would be the same as described for Sub-Alt 1.
Erosion and Accretion	Impacts would vary and would be mitigated by implementing the approved SESC plan, complying with issued permits, and following industry standard BMPs. Impacts would not be long-term.	Impacts would be similar to those described for Sub-Alt 1, although location of impacts associated with pipeline assembly area activities/timber storage would differ.
Soil Quality	Impacts to soil quality would vary and could result from ground disturbing activities and spills/leaks from construction equipment.	Impacts would be similar to those described for Sub-Alt 1, although location of impacts associated with pipeline assembly area activities/timber storage would differ.

BMP = best management practice; EMPS = excavated material placement site; HDD = horizontal directional drilling; SESC = Soil Erosion and Sedimentation Control; Sub-Alt = Sub-Alternative

4.9.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.9.2.1 Construction

Construction of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would disturb approximately 7.6 acres within the HDD/pipeline tie-in workspaces south of the Straits, 7.2 acres within the HDD/pipeline tie-in workspaces north of the Straits, and 1.0 acre within the additional temporary workspace identified south of the Straits. While the HDD workspace south of the Straits occurs within undeveloped forest belonging to Emmet County (associated with Headlands International Dark Sky Park), the rest of these areas have been previously disturbed and/or occur within existing ROWs, and it is unlikely that natural soil horizons exist.

It is possible that limited areas of grading would be required in upland areas along the pipeline assembly area (and associated timber storage areas) and within the EMPSs to create a relatively flat working surface; however, impacts along the pipeline assembly alignment would primarily consist of brush, shrub, and tree removal (accomplished by flush cutting the trees at ground surface to accomplish a level working surface) and underlying soils would not be disturbed. To the extent practicable, the pipeline assembly area would be aligned with existing, previously disturbed ROW. Matting would be placed along the entire alignment to minimize environmental impacts; however, some amount of soil compaction would occur due to the use of heavy equipment and timber storage (Kunickaya et al. 2024). The effectiveness of mats for soil protection is dependent on factors such as soil composition, quantity, moisture, intensity of equipment use, terrain, and thickness of the soil layer. Any soil compaction that occurs would result in a reduction in soil porosity that may limit the oxygen and water supply for soil microorganisms and plants, which would have temporary, detrimental impacts on soil ecology and forest productivity (in areas of forest clearing). Compaction may also contribute to erosion of topsoil and impede forest regeneration after construction (Cambi et al. 2014). Impacts to topography would not be expected other than minor grading where required to achieve a level working surface. All disturbed areas along the pipeline assembly alignment (and associated timber storage areas) as well as within the HDD/pipeline tie-in/additional temporary workspaces would be restored to pre-construction elevations to the extent practicable post-construction. As stated in the May 2025 Draft EIS, the EMPSs have been previously disturbed and are currently utilized for mining operations. Impacts to soils associated with material storage and placement of excavated material would be similar to ongoing impacts associated with existing quarry operations.

Temporary impacts associated with ground disturbance under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would be similar to those described for the Applicant's Preferred Alternative in Section 4.9.3.1 of the May 2025 Draft EIS (e.g., increases in erosion and increased potential for soil contamination), although the expected area of ground disturbance would be smaller than proposed under the Applicant's Preferred Alternative. Soil types occurring within the HDD/pipeline tie-in/additional temporary workspaces both south and north of the Straits, where the majority of ground disturbing activities would occur, are considered to have only a slight erosion hazard (indicating that little or no erosion is likely) with negligible to low potential for runoff (USDA NRCS 2024). Likewise, the majority of soil types identified in the pipeline assembly area (and associated timber storage areas) under HDD Installation Sub-Alternative 1 have only a slight erosion hazard, with the exception of one soil map unit (MnC) that has a moderate erosion hazard from unsurfaced roads and trails (see Section 3.9.3, Table 3.9-1 for more detail). As under other action alternatives and sub-alternatives described in the May 2025 Draft EIS, the Applicant would be required to obtain SESC permits from Emmet and Mackinac counties and a NPDES permit from EGLE prior to the start of any land disturbing activities (see Section 4.9 of the May 2025 Draft EIS for information on SESC permitting and Section 4.4.3.1.2 [of the May 2025 Draft EIS] for information on NPDES). It is anticipated that permit conditions would dictate BMPs and other measures that would minimize or eliminate the potential for disturbed soils to leave the site. Expected measures to avoid or minimize impacts associated with soil erosion are presented in Section 4.9.4. Post-construction, all disturbed areas would be revegetated as needed[7].

The risk of soil contamination would be highest in areas of ground disturbance due to increased exposure of soils to construction activities; however, the presence of construction equipment along the pipeline assembly area/timber storage areas would allow for the possibility of soil

[7] Placement and removal of matting typically does not impact the existing, underlying root structure and it would be expected that grasses and woody plant species would regenerate once construction is complete; however, restoration efforts would also include additional seeding with appropriate seed mixes.

contamination along this alignment as well, in the event of unanticipated leaks or spills of construction-related contaminants. The Applicant has indicated that aboveground construction equipment and associated contaminants would be the same as identified in Section 4.14 of the May 2025 Draft EIS. Brush and scrub that is cleared along the alignment may be mulched and spread onsite and matting would be placed, which may provide additional protection to underlying soils from minor leaks or spills of contaminants, including those from equipment fuels/oils. As under all action alternatives/sub-alternatives discussed in the May 2025 Draft EIS, the construction contractor would be expected to implement protocols outlined in the Applicant's EPP to minimize the potential for accidental spills/leaks and to minimize impacts should one occur. Section 4.9.6 of the May 2025 Draft EIS provides a high-level summary of measures included in the EPP Spill Plan.

Under the HDD Installation Alternative, approximately 10,200 cubic yards of excavated material would be placed at EMPS S1 and N1[8]. Potential impacts to soils in this area would occur primarily from the frequent use of heavy equipment (which may compact, loosen, and/or destroy the structure and function of soils) and compaction of soils associated with placement of excavated material. Potential impacts to soils associated with use of previously disturbed EMPSs is described in more detail in Section 4.9.3.1.3 of the May 2025 Draft EIS (Applicant's Preferred Alternative).

No disturbance to Straits sediments would occur under this sub-alternative, unless a water intake structure is determined to be needed (see Section 4.4.2.1.1 – not expected under normal HDD drilling operations). If a water intake structure were to be required, it would be constructed and operated in the same manner as described for the Applicant's Preferred Alternative in the May 2025 Draft EIS (impacts to Straits sediments during construction of a water intake structure described in Section 4.9.3.1.2 of the May 2025 Draft EIS). Total disturbance to Straits sediments associated with construction of a water intake structure would be approximately 800 square feet. Potential impacts to the geology underlying the Straits are discussed in Section 4.8.

4.9.2.2 Operations

Implementation of HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would not result in the addition of permanent onshore structures or new impervious surfaces. As the replacement pipeline would be connected to existing infrastructure at the existing Mackinaw Station and North Straits Facility, any maintenance or operations activities would occur within existing facilities. Therefore, impacts to soils would not be expected during operations.

4.9.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.9.3.1 Construction

Construction-related impacts under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) (including required permits and anticipated impact minimization/mitigation measures) would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). The only exception would be that temporary soils impacts associated with pipeline assembly and associated timber storage would occur along the alignment north of the Straits rather than along the alignment south of the Straits. While the majority of soils underlying this alignment have only a slight erosion hazard, three soil map units (70B, 70F, and 124D) have moderate to very severe erosion hazard classifications. These three soil map units comprise approximately 18 percent of soils underlying the pipeline assembly area

[8] Approximately 6,000 cubic yards of soil would be excavated during construction; however, not all drilling mud/fluids would be removed from the excavated soils, and an inert drying agent would be added prior to placement at the EMPSs. Therefore, the final volume of excavated material is estimated to be approximately 10,200 cubic yards.

alignment (USDA NRCS 2024). SESC measures/BMPs (including those specified in SESC and NPDES permits that would be required for the project) would be expected to avoid and/or minimize effects associated with erosion and sedimentation, particularly in areas where mapped soil types indicate erosion is most likely. BMPs could include perimeter controls such as silt fence and perimeter soil berms; erosion control blankets, straw bales, and other erosion-control devices; sediment traps; slope breakers, etc.

As stated for HDD Installation Sub-Alternative 1, disturbance to Straits sediments would occur only if a water intake structure is determined to be required, in which case impacts would be the similar to those summarized for HDD Installation Sub-Alternative 1, and detailed for the Applicant's Preferred Alternative in Section 4.9.3.1.2 of the May 2025 Draft EIS. Potential impacts to the geology underlying the Straits are discussed in Section 4.8.

As stated in Section 3.9.4, one Part 201 environmental contamination site and one leaking underground storage tank have been identified by EGLE in close proximity, or possibly within, the pipeline assembly area (and associated timber storage areas) for HDD Installation Sub-Alternative 2. The precise location/extent of known contamination is not identified within publicly available data. It is likely that if this sub-alternative were pursued, the Applicant would need to coordinate with EGLE to ensure any existing contamination cleanup efforts would not be compromised by any ground disturbance that might occur to support pipeline boring under US-2 in this area. While grading is generally not expected along the pipeline assembly area alignment, some degree of ground disturbance would be required in the vicinity of US-2 to allow the pre-assembled pipeline to bore beneath the roadway and avoid impacts to US-2. Therefore, it is possible that siting the pipeline assembly area north of the Straits (as expected under this sub-alternative) could result in disturbance to known sites of environmental contamination. At least one of the identified sites is associated with private property and it is unlikely that ground disturbance would occur in this area; however, publicly available data do not confirm that contamination at this site is confined to the property boundaries.

4.9.3.2 Operations

Operation of the replacement pipeline under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would not result in impacts to soils for the reasons described in Section 4.9.2.2.

4.9.4 Summary of Impact Minimization Measures

Under both HDD Installation sub-alternatives, impacts to soils resulting from erosion, sedimentation, and the potential for contamination would be mitigated with measures described in Section 4.9.6.1 of the May 2025 Draft EIS, as applicable. Section 4.9.6.1 of the May 2025 Draft EIS provides examples of erosion and sediment control measures/BMPs and provides a high-level summary of the Applicant's Spill Plan. Required permits (e.g., SESC and NPDES permits) would include additional measures to minimize potential impacts associated with soil erosion, if issued. Matting along the entire pipeline assembly area alignment would provide additional protection to soils, minimizing inadvertent disturbance and potential exposure to construction contaminants.

4.9.5 Cumulative Impacts

Impacts to soil resources from the alternatives analyzed in the May 2025 Draft EIS would include those related to soil disturbance and erosion. The cumulative effects area of analysis for soils in the May 2025 Draft EIS was defined by the footprint of all alternatives and sub-alternatives analyzed in the May 2025 Draft EIS, as stated in Section 3.9.1 (of the May 2025 Draft EIS). In consideration of the HDD Installation Alternative, the area of analysis for soils has been expanded to include the expected footprints associated with that alternative. As Appendix H considered

past, present, and reasonably foreseeable future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, as the footprints associated with the HDD Installation sub-alternatives do not extend beyond these three counties. The cumulative effects analysis for the HDD Installation Alternative (below) may consider actions that were not considered in the cumulative effects analysis for soils in the May 2025 Draft EIS, due to the expanded area of analysis. Impacts to soils from the sub-alternatives analyzed in this Supplemental Draft EIS include those related to soil disturbance and erosion.

4.9.5.1 HDD Installation Alternative

Past and present actions that have impacted soils in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and Straits shorelines; ongoing quarry activities at the EMPSs; dredging within the Straits and other coastal maintenance activities; construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits; and recreation and maintenance/natural resource management within Hiawatha National Forest.

No reasonably foreseeable future actions with the potential to impact soils in the area of analysis were identified (see Appendix H of the May 2025 Draft EIS). Multiple future actions were noted; however, none are close enough to the footprints of the HDD Installation sub-alternatives to contribute cumulatively to the effects identified for the HDD Installation Alternative. Impacts to soils under implementation of this alternative would be temporary, as no permanent structures are expected and disturbed areas would be restored and revegetated post-construction. As impacts to soils associated with the HDD Installation Alternative would end when construction is complete, no cumulative effects are anticipated.

4.10 TRANSPORTATION AND NAVIGATION

This section presents the potential impacts to transportation and navigation from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.10.

4.10.1 Summary of Key Issues

Table 4.10-1 presents a high-level summary of key issues for transportation and navigation related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.10.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.10-1. Summary of Key Issues for Transportation and Navigation – Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Truck transport of equipment and material	Approximately 75 (south of Straits) and 25 (north of Straits) daily truck roundtrips would increase traffic safety risks, delays, and rate of road surface deterioration on public roadways. Short-term and local detrimental effects are probable and would be similar to or less detrimental than the Applicant's Preferred Alternative (see May 2025 Draft EIS), occurring over a shorter duration (approximately 1.5 years for transport of excavated materials; and 2.5 years for miscellaneous trucks) and having a greater extent south of Straits. Temporary, detrimental effects are possible from traffic disruption from full or partial road closures at aerial crossings during initial setup: Headlands Road, Wilderness Park Drive, and Trails End Road.	Approximately 25 (south of Straits) and 75 (north of Straits) daily truck roundtrips would increase traffic safety risks, delays, and rate of road surface deterioration on public roadways. Detrimental effects probable and would be similar to or less detrimental than Applicant's Preferred Alternative, but occurring over shorter timeframe (approximately 1.5 years for transport of excavated materials; and 2.5 years for miscellaneous trucks) and have greater extent north of Straits. Temporary, detrimental effects are possible from traffic disruption from full or partial road closures partial road closures at aerial crossing during initial setup at Old Portage Trail; underground pipeline crossing at US-2 could result in limited traffic delays during initial setup.
Commuting construction workers	Approximately 125 (south of Straits) and 100 (north of Straits) workers would increase traffic safety risks and degrade LOS on public roadways, especially during the peak a.m. and p.m. commuting hours and peak recreational seasons and holidays. Short-term and local detrimental effects are probable but would be similar to or less detrimental than the Applicant's Preferred Alternative (see May 2025 Draft EIS), occurring over a shorter duration (approximately 2.5 years).	Approximately 100 (south of Straits) and 125 (north of Straits) workers would increase traffic safety risks and degrade LOS on public roadways, especially during the peak a.m. and p.m. commuting hours and peak recreational seasons and holidays. Detrimental effects are probable but would be less detrimental than the Applicant's Preferred Alternative, occurring over shorter construction period (approximately 2.5 years).

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Construction activities or structures in the Straits	Detrimental effects on navigable capacity from construction and use of a water intake structure/pipe (if required – see Section 4.4.2.1.1) unlikely as obstruction to navigation would be limited to area adjacent to the shoreline, away from the main navigation channel.	Impacts would be similar to those described for Sub-Alt 1.
Barge transport of aggregate material	N/A	N/A
Risk and Impacts of an Oil Spill on Navigation	Accidental release of product from existing Dual Pipelines) during drilling considered unlikely (see Section 4.12.3.1.2), therefore, detrimental effects on navigation unlikely.	Impacts would be similar to those described for Sub-Alt 1.
Structural Obstacles to Navigation (Operations)	Dual Pipelines would be decommissioned either in-place or removed. Therefore, effects on navigation would be dependent on the decommissioning sub-alternative chosen (see Table 4.10-2 of the May 2025 Draft EIS). Long-term, beneficial effects on navigation probable as limited intermittent maintenance closures and inspection activities associated with the existing Dual Pipelines would no longer be required. RNA would remain in place.	Impacts would be the same as described for Sub-Alt 1. RNA would remain in place.

EIS = Environmental Impact Statement; HDD = horizontal directional drilling; I- = interstate-; LOS = Level of Service; N/A = not applicable; RNA = Regulated Navigation Area; Sub-Alt = Sub-Alternative

4.10.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.10.2.1 Construction

4.10.2.1.1 Surface Transportation

Short-term and local detrimental effects on public roadways would result from increased vehicles due to commuting workers and heavy trucks accessing the HDD/pipeline tie-in workspaces, pipeline assembly area (and associated timber storage areas), and potential EMPSs. The types of detrimental effects would be the same as those identified for the Applicant's Preferred Alternative in Section 4.10.3.1.1 of the May 2025 Draft EIS. These include increased traffic delays and degradation of LOS, increased traffic safety risks, and higher rates of road surface deterioration from heavy trucks. Although similar in type, the extent and magnitude of effects under this sub-alternative when compared to the Applicant's Preferred Alternative would be different due to the variations in workspace locations and nature of activities.

The south and north HDD/pipeline-tie in workspaces and potential EMPSs (S1 and N1) would be accessed by the same haul routes as presented in Figures 3.10-1 through 3.10-4 of the May 2025 Draft EIS. To access the pipeline assembly area under this sub-alternative (south of the Straits),

new access roads would be constructed at the north and south ends of the alignment. The northern access road would be located adjacent to the HDD workspace (south of the Straits), while the southern access road would extend west from an area within an existing quarry site (referred to as EMPS S2 in the May 2025 Draft EIS) to the pipeline assembly area.

Truck traffic would result from hauling excavated material, as well as from transporting equipment, materials, and wastes to the various project sites. In addition, commuting workers would generate daily vehicle trips to/from these sites. Because the Applicant is not currently pursuing the HDD Installation Alternative and no detailed work plan has been developed, vehicle projections were based on existing data from the Applicant's Preferred Alternative and from comparable past projects, with conservative assumptions applied where data were unavailable.

Excavated material would be treated and then transported via truck from the HDD workspaces both south and north of the Straits to one of the EMPSs identified under the Applicant's Preferred Alternative (S1 and N1) or permitted landfills within approximately 70 miles of the Straits. Projected truck volumes were based on 10,200 cubic yards of excavated material as noted in Section F1.5.1.2.4 in Appendix F and elsewhere in this Supplemental Draft EIS. Additionally, S1 could also be used for pipeline storage under this sub-alternative. Estimates for miscellaneous trucks to/from the HDD/pipeline tie-in workspaces (south and north) and the pipeline assembly area were based on a review of Table F-7 of the May 2025 Draft EIS and past projects. New vehicle traffic would also be generated by commuting workers, which are expected to range from 15 to 150 workers (Enbridge 2025c).

Based on the estimated construction schedule, the greatest number of vehicles at any given time would likely occur during the overlap of drilling activities at the HDD workspaces and during site preparation and pipe-string activities in the pipeline assembly area (and associated timber storage areas). This overlap would occur over approximately 15 to 18 months (see Figure F-4 in Appendix F). Projected daily vehicle volumes during this overlap are presented in Table 4.10-2. The table also identifies whether the expected volumes would occur along key roadways south or north of the Straits, or both. Under Sub-Alternative 1 (Pipeline Assembly Area South), approximately 75 and 25 daily trucks would occur south and north of the Straits, respectively; while,125 and 100 workers commuting daily would occur south and north of the Straits, respectively.

Table 4.10-2. Projected Daily Volume of Vehicles During Construction

Traffic Component	Projected Daily Vehicles	Area Impacted
Trucks hauling excavated material (to S1 and N1 or other existing landfills)	5 trucks/day per HDD site[1]	Haul routes south and north of the Straits
Truck transport of equipment, materials, and waste (to HDD workspaces)	20 trucks/day per HDD site[2]	Haul routes south and north of the Straits
Trucks for pipeline assembly area/timber storage areas	50 trucks/day[3]	Haul routes south or north of the Straits, depending on sub-alternative[4]
Commuting workers to HDD/pipeline tie-in workspaces	100 cars/day per HDD site[5]	Key roadways south and north of the Straits
Commuting workers to pipeline assembly area/timber storage areas	25 cars/day[6]	Key roadways south or north of the Straits, depending on sub-alternative[4]

[1] Approximately 1,800 trucks, based on 10,200 cubic feet of excavated material (Enbridge 2025c) and the following assumptions: density of material is 3,0000 pounds/cubic yard (FHWA 2024), standard truck capacity has maximum allowable weight of 20,000 pounds (Cowtown Logistics 2025); schedule is 10-hour workday, 6 days/week over 8 months as worst-case; truck volumes are split 50/50 between south and north sites; and a 20-percent safety margin

to account for a few-days period of increased trucks due to a storm event, road blockage preventing truck access, or other unforeseen event.

[2] Based on Tables F-7 and F-8 in Appendix F of the May 2025 Draft EIS.

[3] Based on a review of past projects with similar characteristics.

[4] Under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), trucks and commuting workers operating within the pipeline assembly area would utilize key roadways south of the Straits; under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), daily vehicle volume estimates would occur along key roadways north of the Straits.

[5] HDD work sites would require 15 to 150 workers (Enbridge 2025c). For purposes of the traffic analysis, conservatively assumed 100 workers could work at either HDD site.

[6] Based on a review of past projects with similar characteristics.

HDD = horizontal directional drilling

Based on the projected daily vehicle volumes in Table 4.10-2, hourly vehicle volumes for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) were estimated to consider traffic impacts during a peak traffic hour, which is presented in Table 4.10-3.

Table 4.10-3. Projected Traffic Volumes During Peak Hour for HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

Traffic Component	On Key Roads South of the Straits (vehicle trip/hour)	On Key Roads North of the Straits (vehicle trip/hour)
Trucks hauling excavated material (to EMPSs)[1]	2	2
Truck transport of equipment, materials, and waste (to HDD workspaces)[2]	4	4
Trucks for pipeline assembly area/timber storage areas[3]	10	N/A
Commuting workers to HDD/pipeline tie-in workspaces[4]	100	100
Commuting workers to pipeline assembly area/timber storage areas[4]	25	NA
Total Vehicles per Hour	141	106

[1] Assuming a 10-hour workday, 5 trucks/day x 2 vehicle trips/truck / 10 hours = Approximately 2 vehicle trips/hour, based on a single truck making two vehicle trips during the peak traffic hour.

[2] Assuming a 10-hour workday, 20 trucks/day x 2 vehicle trips/truck / 10 hours = 4 vehicle trips/hour.

[3] Assuming a 10-hour workday, 50 trucks/day x 2 vehicle trips/truck / 10 hours = 10 vehicle trips/hour.

[4] Assuming a single vehicle trip per commuter during a peak traffic hour.

EMPS = excavated material placement site; HDD = horizontal directional drilling; N/A = not applicable

Compared to the Applicant's Preferred Alternative, the projected vehicle volumes under this sub-alternative are lower. For the Applicant's Preferred Alternative, Table 4.10-3 of the May 2025 Draft EIS notes a total of 232 vehicles/hour south of the Straits and 179 vehicles/hour north of the Straits. As such, the impact on roadway capacity on most of the roads would be similar to or less than the results shown for the Applicant's Preferred Alternative, as presented in Table 4.10-3 of the May 2025 Draft EIS. Because of the pipeline assembly area alignment, the distribution of trucks could result in higher levels of trucks on Mackinaw Highway, Trails End Road, and Wilderness Park Drive compared to the Applicant's Preferred Alternative, but these roads would remain well under capacity, operating at an LOS of A or B during the off- and on-peak traffic seasons, respectively. Similar to the Applicant's Preferred Alternative, projected truck traffic on US-2 would result in increased traffic safety risks and exacerbated delays for left-turn movements at its intersections with smaller roads and entrances to commercial businesses and recreational

areas, especially during the summer months. Delays at the Interstate-75 (I-75) toll north of the Mackinac Bridge could also be exacerbated during the summer.

The pipeline assembly area alignment under this sub-alternative would intersect the following public roadways (see Figure F-1 in Appendix F):

- Headlands Road – This is the main access road serving as the public entrance for Headlands International Dark Sky Park and is open year-round
- Wilderness Park Drive – As noted in Table 3.10-1 of the May 2025 Draft EIS, this road is a two-lane, paved road. The AADT was 921 in 2024 (MDOT 2025)
- Trails End Road - As noted in Table 3.10-1 of the May 2025 Draft EIS, this road is a two-lane, paved road. The AADT was 1,064 in 2024 (MDOT 2025)

The pipe-string would cross these roads using an aerial crossing, with the pipe lifted and supported on both sides of the roadway at a height that does not interfere with traffic. Although details about traffic management plans associated with pipeline assembly are unavailable at this time, it is assumed that the aerial crossings could require temporary partial or full roadway closures during initial installation when support structures are erected at the road crossings. A temporary full road closure could be used to stop traffic upstream of the crossing during initial setup at an aerial crossing. Full roadblocks are typically used for work that can be completed within a few hours and are usually scheduled during off-peak traffic hours when traffic volumes are lowest to minimize disruption (MDOT 2024; TDOT 2025). Full or partial road closures would require signage to warn and/or redirect motorists. Required approvals for temporary road closures, utility crossing permits and/or highway occupancy permits, would be obtained from the appropriate agency (e.g., MDOT, county road commissions). Any temporary disruption on Headlands Road would require coordination with Headlands International Dark Sky Park as it is the main access road for the park. It is assumed that the crossing structure would remain within the pipeline assembly area footprint. Temporary detrimental effects resulting from temporary traffic disruptions at the aerial roadway crossings are possible but are expected to occur over two days or less.

4.10.2.1.2 Navigation

General construction within the Straits of Mackinac

Potential effects to navigation from the construction (and removal) of a temporary water intake structure within the Straits, if required (see Section 4.4.2.1.1 for information on when a water intake structure would be required), would be similar to those described for the Applicant's Preferred Alternative in Section 4.10.3.1.2 of the May 2025 Draft EIS. It is assumed that a water intake structure would be located near the shoreline, would be constructed in the same manner described for the Applicant's Preferred Alternative, and that detrimental effects to the navigable capacity of the Straits would be unlikely as the structure would be located well outside the main navigation channel. As stated for the Applicant's Preferred Alternative in the May 2025 Draft EIS, the Applicant's construction contractor performing the in-water work would be required to request the safety zone from the U.S. Coast Guard per 33 C.F.R. 165.944 (Regulated Navigation Area; Straits of Mackinac). Additionally, the same sediment and erosion control measures described for the Applicant's Preferred Alternative would be implemented if a water intake structure is determined to be required (see additional detail in Sections 4.4 and 4.9 of the May 2025 Draft EIS and this Supplemental Draft EIS); therefore, detrimental effects on the condition of Straits waters that could impact navigation would be unlikely.

HDD underneath the Straits of Mackinac

As discussed in Section F1.5.1.2.2 of Appendix F, HDDs on both sides of the Straits would be used to drill a borehole for the replacement pipeline under the lakebed. Casings would be installed a few hundred feet in depth from the HDD entry points and over 1,000 feet and 100 feet from the south and north ordinary high water marks of the Straits, respectively. Both casings would be constructed entirely on land and into bedrock. Therefore, the entirety of the borehole would be bored through rock and would run substantially deeper underneath the lakebed than the proposed Tunnel alignment of the Applicant's Preferred Alternative (see Figure F-5 in Appendix F for the vertical profile of the expected borehole alignment). At no point would the borehole contact the wetted perimeter of the navigable channel (i.e., the length of the lakebed in direct contact with the flowing water) during excavation. Because of the depth of rock and natural protection, there would be no effects on the navigable capacity of the Straits from the borehole's excavation.

The shortest distance between the existing Dual Pipelines and expected drilling activities would occur at the HDD casing for the north HDD workspace, located over 50 feet from the existing western pipeline. As discussed in more detail Section 4.12, the micro-tunnel boring machine (MTBM) vibration impacts from the casing installation would be below the impact threshold for buried pipelines and, therefore, an accidental release of product from the existing Dual Pipelines due to construction activities is not reasonably foreseeable[9]. As such, navigational impacts from an oil spill during construction of the pipeline alignment would not be expected.

4.10.2.2 Operations

Staff and maintenance associated with the replacement pipeline would be similar to existing conditions. No effects to surface transportation are expected during operations.

Long-term, beneficial effects on navigation would occur as limited maintenance closures and inspection activities associated with the existing Dual Pipelines would no longer be required. Additional effects on navigation (rather detrimental or beneficial) would be dependent on which decommissioning sub-alternative is selected (whether they are decommissioned in place or removed in part or in their entirety). See Section 4.10.6 of the May 2025 Draft EIS for information on additional impacts associated with each decommissioning sub-alternative. No change to the RNA would occur under the HDD Installation Alternative as other existing, active utilities on the Straits lakebed would remain in place, thereby maintaining the applicability of the RNA (see Figures 3.10-6 and 3.10-9 in the May 2025 Draft EIS). Existing anchoring restrictions outlined in 33 C.F.R. Part 165.944 would still apply and anchoring within the RNA would continue to be prohibited without authorization of the U.S. Coast Guard (see Section 3.10.3.2 of the May 2025 Draft EIS).

[9] In a memorandum dated January 7, 2025, the Acting Assistant Secretary of the Army for Civil Works directed USACE to analyze the potential risk and impacts of an oil spill on Tribal treaty rights and on overall navigation in the crossing area. Consistent with USACE authority and the direction cited above, this section of the May 2025 Draft EIS analyzes the potential impact on navigation of an oil spill resulting from construction activities under the Applicant's Preferred Alternative and the Engineered Gravel/Rock Protective Cover Alternative. As stated in Section 1.5 of the May 2025 Draft EIS, USACE does not consider oil spill risks or impacts associated with operation of the pipeline within its scope of analysis. See Section 4.14 of the May 2025 Draft EIS and also Section 4.14 of this Supplemental Draft EIS for a discussion of spill risk. Impacts to Tribal treaty rights will be analyzed in the USACE's treaty rights analysis, separate from the EIS.

4.10.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.10.3.1 Construction

4.10.3.1.1 Surface Transportation

The type of detrimental effects on public roadways under this sub-alternative would be similar to those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South); however, because the pipeline assembly area (and associated timber storage areas) would be located north of the Straits (as opposed to south of the Straits, as expected under HDD Installation Sub-Alternative 1), the extent and magnitude of traffic impacts would differ. The location of the south and north HDD/pipeline tie-in workspaces and potential EMPSs (S1 and N1) for excavated material would be the same as for HDD Installation Sub-Alternative 1. Additionally, N1 could also be used for pipeline storage under this sub-alternative. The pipeline assembly area would be sited north of the Straits, with the northern extent of the alignment requiring construction of a new access road off Cheeseman Road, which directly connects to US-2 in the west. As noted in Table 4.10-2, under Sub-Alternative 2 (Pipeline Assembly Area North), approximately 25 and 75 daily trucks would occur south and north of the Straits, respectively; while, 100 and 125 workers commuting daily would occur south and north of the Straits, respectively.

An auger bore machine would be used to drill a bore path beneath US-2 to allow the pipe-string to be fully preassembled within the pipeline assembly area alignment without disrupting highway traffic. This drilling activity is expected to be relatively minor, lasting about 1 week, and would not increase vehicle trips much beyond those shown in Table 4.10-2 (for HDD Installation Sub-Alternative 1). While differences in vegetation/landscape within the pipeline assembly area under this sub-alternative (in comparison to HDD Installation Sub-Alternative 1) and the need to drill under US-2 may cause some variation in sub-alternative vehicle projections, the estimates in Table 4.10-2 are considered conservative enough to account for additional vehicles that may result from implementation of HDD Installation Sub-Alternative 2. As such, the daily traffic volumes presented in Table 4.10-2 are also considered applicable to this sub-alternative. Based on the projected daily vehicle volumes, hourly vehicle volumes were estimated, which are presented in Table 4.10-4.

Table 4.10-4. Projected Traffic Volumes During Peak Hour for HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

Traffic Component	On Key Roads South of the Straits (vehicle trip/hour)	On Key Roads North of the Straits (vehicle trip/hour)
Trucks hauling excavated material (to EMPSs)[1]	2	2
Truck transport of equipment, materials, and waste (to HDD workspaces)[2]	4	4
Trucks for pipeline assembly area/timber storage areas[3]	NA	10
Commuting workers to HDD/pipeline tie-in workspaces[4]	100	100
Commuting workers to pipeline assembly area/timber storage areas[4]	N/A	25
Total Vehicles per Hour	106	141

[1] Assuming a 10-hour workday, 5 trucks/day x 2 vehicle trips/truck / 10 hours = Approximately 2 vehicle trips/hour, based on a single truck making two vehicle trips during the peak traffic hour.
[2] Assuming a 10-hour workday, 20 trucks/day x 2 vehicle trips/truck / 10 hours = 4 vehicle trips/hour.
[3] Assuming a 10-hour workday, 50 trucks/day x 2 vehicle trips/truck / 10 hours = 10 vehicle trips/hour.
[4] Assuming a single vehicle trip per commuter during a peak traffic hour.
EMPS = excavated material placement site; HDD = horizontal directional drilling; N/A = not applicable

As with HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), projected traffic volumes for HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) are lower than those estimated for the Applicant's Preferred Alternative; therefore, overall traffic impacts on roadway capacities for key roads are expected to be similar to or less than the results shown in Table 4.10-3 of the May 2025 Draft EIS. However, detrimental effects on traffic safety and left-turn delays onto US-2 from intersecting roads and from access points to commercial businesses and recreational areas would be greater for this sub-alternative than under HDD Installation Sub-Alternative 1 due to the additional trucks generated by the pipeline assembly area being located north of the Straits.

Additionally, Cheeseman Road would experience traffic impacts from vehicles accessing the pipeline assembly area and associated timber storage areas. While the road would remain well below capacity and operate at an LOS A, increased truck access would accelerate deterioration of the roadway surface. Furthermore, at the intersection of Cheeseman Road and US-2, traffic safety risks and left-turn delays would increase, as movements are stop-controlled on Cheeseman Road and a recreational trail is located nearby. These effects are expected to be greater during the summer months, when recreational traffic is higher. The boring underneath US-2 for the pipe-string crossing would also result in increased traffic safety risks and delays from potential conflicts with construction trucks at Portage Street, which is adjacent to this crossing; however, impacts associated with this boring are not expected to last longer than 1 week.

The pipeline assembly area alignment under this sub-alternative would intersect the following public roadways (see Figure F-5 in Appendix F):

- US-2 – This is a fairly busy roadway during the peak season as it provides access to various recreational areas, restaurants, and accommodations and is connected to I-75 to the east. As stated, an auger bore machine would be used to drill a path underneath this highway to provide continuation of the pipe-string without disrupting traffic flow
- Old Portage Trail – This is a two-lane paved road. No traffic volume data are available for this road

The pipe-string would cross Old Portage Trail utilizing an aerial crossing and temporary traffic disruption due to a potential partial or full road closure during initial setup, as described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), could occur. The pipeline crossing underneath US-2 could result in temporary traffic delays on US-2 and Portage Street during initial setup at the crossing due to equipment mobilization. As such, temporary detrimental effects resulting from temporary traffic disruptions at these crossings are possible. Similar to Sub-Alternative 1 (Pipeline Assembly Area South), the required approvals for temporary road closures, utility crossing permits, and/or highway occupancy permits, would be obtained from the appropriate agency.

4.10.3.1.2 Navigation

Impacts to navigation from construction of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be the same as those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.10.2.1.2).

4.10.3.2 Operations

Operation of the replacement pipeline under implementation of HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would not result in impacts to surface transportation for the reasons described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.10.2.2). Effects to navigation during operations would be the same as those described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) (Section 4.10.2.2).

4.10.4 Summary of Impact Minimization Measures

Impact minimization and mitigation measures for surface transportation during construction of the HDD Installation Alternative would generally be similar to those identified for the Applicant's Preferred Alternative, including:

- Implement a traffic accommodation plan and logistics plan that would specify haul routes, roadway restrictions and limits, and miscellaneous traffic mitigation measures
- Post pedestrian signage in accordance with Michigan Department of Transportation (MDOT) standards
- Advise construction workers of preferred commuter routes, especially during peak recreational seasons and holidays
- Non-essential deliveries would generally occur outside peak commuting traffic hours, especially during the summer season
- Restrict truck traffic between construction footprints and EMPSs to avoid certain hours (e.g., peak traffic hours during the summer travel season), as appropriate
- Regarding Boulevard Drive (unpaved segment), the Applicant would enter into a road maintenance agreement with the local authorities to maintain the roads during construction, including snow removal and maintenance necessary for safe operation of the road

During construction of a water intake structure, if required, the Applicant would implement the following measures to minimize detrimental effects on navigation:

- The water intake structure would have a buoy to identify its location during the navigable season (no ice on lake, when it will be removed). Also, the coordinates of the water intake structure would be provided to the U.S. Coast Guard, and the location may be charted for mariners
- For periods when divers are present during in-water work, a diver flag would be flown from the dive boat, or a temporary floating diver marker would be used while divers are in the water

4.10.5 Cumulative Impacts

Impacts to transportation resources from the alternatives analyzed in this Supplemental Draft EIS would primarily include those related to land-based transportation, although water-based (navigation) transportation could be affected if a water intake structure is determined to be required (not expected during normal operation of HDD equipment). The cumulative effects area of analysis for surface transportation was defined in the May 2025 Draft EIS as the regional public roadway network and the primary routes that would be used by construction vehicles to/from the expected footprints, EMPSs, and off-site laydown areas. Regarding the HDD Installation Alternative, the area of analysis has been slightly expanded to include additional roads due to the locations of the pipeline assembly areas and associated timber storage under each sub-alternative. For navigation, the area of analysis remains the same and includes the expanse of the Straits of Mackinac where the new pipeline and the existing Dual Pipelines cross the Straits.

4.10.5.1 HDD Installation Alternative

Past and present actions that have impacted surface transportation in the area of analysis include truck transport by the extraction industry; increases in vehicular traffic during peak travel periods from the expansion of tourist-related attractions and businesses; and construction work and ongoing maintenance associated with the roadways, including the Mackinac Bridge. Detrimental impacts on transportation under both HDD Installation sub-alternatives would be short-term and

intermittent in nature. Traffic conditions would return to pre-construction levels once construction is completed and, as such, neither sub-alternative would contribute to cumulative traffic or transportation impacts. Likewise, cumulative detrimental impacts to navigation would not result under the HDD Installation Alternative as any construction-related impacts would resolve after the completion of construction and none would occur during operations.

4.11 AIR QUALITY

This section presents the potential impacts to air quality from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.11.

4.11.1 Summary of Key Issues

Table 4.11-1 presents a high-level summary of key issues for air quality related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.11.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.11-1. Summary of Key Issues for Air Quality – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Air Quality	Construction equipment, generator sets, employee commuting, tree clearing equipment, and deliveries would cause short-term, detrimental impacts to air quality within the AQCR.	Impacts would be similar to those described for Sub-Alt 1.

AQCR = Air Quality Control Region; HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative

4.11.2 HDD Installation Alternative – HDD Installation Sub-Alternative 1 and HDD Installation Sub-Alternative 2

Location of the pipeline assembly area/timber storage areas is the distinguishing factor between the two HDD Installation sub-alternatives analyzed in this Supplemental Draft EIS. As construction and operations activities would be the same or similar under both sub-alternatives, emissions calculations presented in Tables 4.11-2 through 4.11-4 (below) are applicable to both.

4.11.2.1 Construction

4.11.2.1.1 Air Quality – Criteria and Hazardous Pollutants

Construction equipment, generator sets, employee commuting, tree clearing equipment, and deliveries would cause short-term, detrimental impacts to air quality within the AQCR. Site preparation and motor vehicle movement would cause fugitive dust emissions (represented by particulate matter [PM] less than 10 micrometers in diameter [PM_{10}] and PM less than 2.5 micrometers in diameter [$PM_{2.5}$]). PM and ozone (O_3) (represented by nitrogen oxides [NO_x]) and VOCs emissions would detrimentally impact aesthetics, recreation, and biological resources. PM emissions reduce visibility and contribute to haze, a reduction of clarity of color of visual resources. O_3 can affect sensitive vegetation and ecosystems, particularly during the growing season. Calculations assumed that employees would commute 40 miles round-trip. The exact amount of required ground disturbance during site preparation is not known; to provide a conservative analysis, the entirety of the HDD/pipeline tie-in workspaces are assumed to be graded. For analysis purposes, construction is assumed to begin in 2027. Table 4.11-2 presents direct construction emissions by construction phase. Table 4.11-3 presents indirect construction emissions by construction phase. Since the HDD Installation Alternative would be constructed within an attainment area, conformity requirements do not apply. Therefore, to provide a point of reference, Table 4.11-2 compares annual emissions from the HDD Installation Alternative to the Prevention of Significant Deterioration (PSD) threshold for criteria pollutants. Table 4.11-4 presents indirect and direct construction emissions by source.

Table 4.11-2. HDD Installation Alternative Direct Construction Air Quality Emissions

Emissions by Year	Emissions (tons)					
	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC
Year 1	6.04	17.98	0.02	18.78	10.44	1.17
Year 2	24.22	68.26	0.07	3.40	3.30	5.08
Total	**30.25**	**86.24**	**0.10**	**22.18**	**13.73**	**6.25**
PSD Threshold (tons/yr)	250	250	250	250	250	250

Source: Enbridge 2025c; Argonne National Laboratory 2021, 2013; USEPA 2024b, 1995
CO = carbon monoxide; NO_x = nitrogen oxides; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 micrometers; $PM_{2.5}$ = particulate matter less than 2.5 micrometers; PSD = Prevention of Significant Deterioration; VOC = volatile organic compound

Table 4.11-3. HDD Installation Alternative Indirect Construction Air Quality Emissions

Emissions by Year	Emissions (tons)					
	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC
Year 1	2.21	0.07	0.01	0.05	0.01	0.21
Year 2	2.21	0.07	0.01	0.05	0.01	0.21
Total	**4.43**	**0.13**	**0.01**	**0.11**	**0.03**	**0.42**
PSD Threshold (tons/yr)	250	250	250	250	250	250

Source: Enbridge 2025c; Argonne National Laboratory 2021, 2013; USEPA 2024b, 1995
CO = carbon monoxide; NO_x = nitrogen oxides; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 micrometers; $PM_{2.5}$ = particulate matter less than 2.5 micrometers; PSD = Prevention of Significant Deterioration; VOC = volatile organic compound

Table 4.11-4. HDD Installation Alternative Total Construction Air Quality Emissions by Source

Emissions Source	Emissions (tons)					
	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC
Direct						
Construction Equipment	28.61	85.12	0.09	4.24	4.11	6.05
Delivery and Hauling Trucks	1.65	1.12	0.01	0.02	0.02	0.20
Site Grading	--	--	--	17.92	9.60	--
Indirect						
Employee Commuting	4.43	0.13	0.01	0.11	0.03	0.42
Totals	**34.68**	**86.37**	**0.11**	**22.29**	**13.76**	**6.66**
PSD Threshold (tons/yr)	250	250	250	250	250	250

Source: Enbridge 2025c; Argonne National Laboratory 2021, 2013; USEPA 2024b, 1995
CO = carbon monoxide; NO_x = nitrogen oxides; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 micrometers; $PM_{2.5}$ = particulate matter less than 2.5 micrometers; PSD = Prevention of Significant Deterioration; VOC = volatile organic compound

Some hazardous air pollutants (HAPs) would be emitted as a result of the HDD Installation Alternative. There would be short-term, localized, detrimental impacts to local air quality due to HAPs emitted as a result of gasoline or diesel equipment and vehicles. Impacts would be limited to the construction period and, depending on weather conditions, would likely be limited to the

immediate vicinity of the emissions source. Quantitative impacts to VOCs are shown in Table 4.11-2 through 4.11-4.

4.11.2.2 Operations

4.11.2.2.1 Air Quality– Criteria and Hazardous Pollutants

During operations, no impacts to local air quality as a result of criteria pollutant or HAP emissions would occur. Operational activities would use existing facilities, and no modifications that could impact emissions would be made to existing facilities. Employee commuting is not expected to increase significantly as a result of operations; therefore, no increases in emissions as a result of motor vehicles are expected.

4.11.3 Summary of Impact Minimization Measures

The Applicant would adhere to the following measures:

- Grading would be designed in a way to prevent fugitive dust emissions
- Per the EPP, the contractor must take reasonable steps to control construction-related noise and dust near residential areas and other areas as directed by the Applicant. Control practices may include wetting the construction ROW and access roads, limiting working hours in residential areas, reestablishment of vegetation and/or additional measures as appropriate based on site-specific conditions
- When hauling material and operating non-earthmoving equipment, speeds could be limited to 15 miles per hour. Earth-moving equipment could be limited to 10 miles per hour. The faster a truck is moving the more fugitive dust is emitted (MPCA 2025)
- Unnecessary idling of equipment would be reduced or avoided, where possible
- Contractors would be required to use equipment, where applicable, that would meet or exceed the USEPA Tier 456 exhaust emissions standards for heavy-duty nonroad compression-ignition engines
- The Applicant would coordinate with local authorities to ensure that appropriate dust control measures, such as watering the roads, are employed during construction to minimize potential impacts to fugitive dust emissions
- Posted speed limits would be adhered to and excavated materials would be covered with tarps when materials are being transported

4.11.4 Cumulative Impacts

Impacts to air quality from the alternatives analyzed in the May 2025 Draft EIS would include those related to construction and operational activities such as emissions from construction equipment, employee commuter vehicles, soil disturbance, generators, vessel traffic, and operations activities. The cumulative effects area of analysis for air quality is defined as the airspace of Emmet, Cheboygan, and Mackinac counties, as well as the Upper Michigan Intrastate AQCR, as stated in Section 3.11.1. Appendix H of the May 2025 Draft EIS details the past, present, and reasonably foreseeable future actions considered for evaluation, as applicable.

4.11.4.1 HDD Installation Alternative

Past and present actions that have impacted air quality in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; ongoing quarry activities at the EMPSs; dredging within the Straits and other coastal maintenance activities; and construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits. In addition, other regional air quality emissions in the area of analysis have resulted from multiple construction projects,

operational activities, and commuter and commercial vehicles. Emmet, Mackinac, and Cheboygan counties are located within the Upper Michigan Intrastate AQCR and have been designated as being in attainment for all criteria pollutants. Past and present actions within the area of analysis have not contributed to air quality emissions that could change the attainment status within the Upper Michigan Intrastate AQCR.

Reasonably foreseeable future actions with the potential to impact air quality in the area of analysis include harbor dredging and other coastal maintenance activities, as well as infrastructure improvements with potential to intersect the area of analysis. No reasonably foreseeable future projects were identified that would be anticipated to cause a long-term air quality impact (e.g., new industrial sites, power plants, etc.). Identified future transportation projects would be subjected to and part of the state's air quality conformity analysis and would therefore not be expected to have any long-term air quality impacts.

As shown in Tables 4.11-2 and 4.11-3, emissions from the HDD Installation Alternative would be dispersed over the approximate 2-year construction period and would result in short-term, local, and detrimental impacts. There would not be long-term impacts during operation of the replacement pipeline. Emissions expected from the HDD Installation Alternative would be well below the PSD threshold of 250 tons per year. Even in the event that the HDD Installation Alternative is constructed concurrently with all reasonably foreseeable future actions identified in Appendix H of the May 2025 Draft EIS, construction emissions would be short-term and would dissipate once construction is completed and no long-term, cumulative impacts on air quality would be anticipated. In addition, emissions from the HDD Installation Alternative combined with all foreseeable future actions are not anticipated to impact the air quality attainment status within the Upper Michigan Intrastate AQCR.

4.12 NOISE AND VIBRATION

This section presents the potential impacts to noise- and vibration-sensitive receptors from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.12.

4.12.1 Summary of Key Issues

Table 4.12-1 presents a high-level summary of key issues related to noise and vibration for HDD Installation Sub-Alternatives 1 and 2. See Section 4.12.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.12-1. Summary of Key Issues for Noise and Vibration – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Construction noise from point sources (non-blasting)	HDD/pipeline tie-in workspaces. Short-term and local detrimental effects are probable south of the Straits as sensitive receptors could experience increases in noise levels ranging from 10 to 25 dBA during site preparation. Noise during site preparation could exceed 60-dBA (daytime threshold) at approximately 16 residences. Additionally, noise levels at the Headlands International Dark Sky Park and McGulpin Point Lighthouse would exceed impact thresholds. Short-term and local detrimental effects are possible during drilling/pullback south of the Straits as one residence as well as visitors at Headlands International Dark Sky Park could experience nighttime impact exceedances. Pipeline assembly area (and timber storage areas). Short-term and local detrimental effects are probable during pipeline pullback as the 55-dBA nighttime threshold could be exceeded at approximately 70 residences during overnight work over approximately two months. Outdoor recreational areas that would experience exceedances of impact thresholds include Headlands International Dark Sky Park, French Farm Lake Flooding State Wildlife Management Area, and Lake Michigan shoreline. EMPS. Increase in noise expected to occur at level of threshold detection (3 dBA); therefore, detrimental noise effects unlikely.	HDD/pipeline tie-in workspaces. Impacts would be similar to those described for Sub-Alt 1, although pipeline pullback would occur north of the Straits rather than south of the Straits under Sub-Alt 2. Pipeline assembly area (and timber storage areas). Short-term and local detrimental effects are probable as the 55-dBA nighttime threshold could be exceeded at approximately 80 residences and two motels during overnight work over approximately two months. Outdoor recreational areas that would experience exceedances of impact thresholds include a campground and Lake Michigan shoreline. EMPS. Impacts would be similar to those described for Sub-Alt 1.

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Construction noise from point sources (blasting)	N/A	N/A
Construction traffic noise	Short-term and local detrimental effects probable as projected noise levels on Headlands Road, Densmore Avenue, Boulevard Drive, and East Martin Lake Road would exceed impact thresholds and impact sensitive receptors located along these roads.	Short-term and local detrimental effects probable along the same roads as discussed for Sub-Alt 1. Additionally, projected noise level would exceed impact threshold on Cheeseman Road and impact sensitive receptors located along this road.
Construction vibration from point sources	HDD/pipeline tie-in workspaces. Detrimental vibration effect unlikely to human receptors or structures from general construction or drilling at HDD workspaces (north and south). Pipeline assembly area (and timber storage areas). Detrimental vibration effect unlikely as no vibration sensitive receptors are located within 25 feet of workspace boundary. EMPS. Detrimental vibration effect unlikely as levels would not exceed impact thresholds.	HDD/pipeline tie-in workspaces. Impacts would be the same as described for Sub-Alt 1. Pipeline assembly area (and timber storage areas). Short-term and local detrimental effects possible as four residential properties and one building are located inside or within 25 feet of the workspace boundary. Risk of damage to US-2 from auger bore. State and local requirements would minimize risk. EMPS. Impacts would be similar to those described for Sub-Alt 1.
Blasting vibration	N/A	N/A
Vibration from drilling underneath the Straits	Detrimental vibration effect unlikely as impact threshold of existing Dual Pipelines would not be exceeded.	Impacts would be the same as described for Sub-Alt 1.
Construction traffic vibration	Detrimental vibration effect unlikely as levels would not exceed impact thresholds.	Impacts would be similar to those described for Sub-Alt 1.
Addition of new noise source	No new sources of noise or vibration; therefore, no detrimental effects.	Impacts would be the same as described for Sub-Alt 1.

dBA = A-weighted decibel; HDD = horizontal directional drilling; N/A = not applicable; Sub-Alt = Sub-Alternative

4.12.2 HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

4.12.2.1 Construction

4.12.2.1.1 Noise

The same noise thresholds described in Section 4.12.3.1.1 of the May 2025 Draft EIS would apply to the HDD Installation Alternative. A potential noise effect would occur if one of the following would result during construction activities:

- A 10-dBA increase over the existing ambient noise level
- For residential properties: an outdoor noise level greater than 60 dBA during the daytime and greater than 55 dBA during the nighttime (assuming a standard 10-dBA reduction from exterior to interior noise levels with windows open [FHWA 2018], the indoor noise

levels of these residences could exceed 45 dBA, the threshold associated with sleep disturbance)

- For lands that serve a public need and where preservation of certain qualities, such as serenity and quiet, are of great significance (e.g., Headlands International Dark Sky Park): an outdoor noise level greater than 57 dBA
- For areas that support miscellaneous active outdoor recreational activities, such as beaches and cultural attractions: an outdoor noise level greater than 67 dBA

Short-term and local detrimental effects from construction noise under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South) would generally result from site preparation activities at project locations (HDD/pipeline tie-in workspaces and pipeline assembly area alignment), drilling at the HDD workspaces, pipe-string assembly and pullback activities at the HDD workspace and pipeline assembly area, and truck traffic along the designated haul routes as discussed below.

HDD/Pipeline Tie-In Workspaces (South Side and North Side). Site preparation (clearing and grading), installation of temporary facilities, and construction of a water intake structure[10] would generate elevated sound levels during the first few months of construction that would be limited to daylight hours (12-hour workday), Monday through Saturday (see Figure F-4). Since the HDD workspaces under both sub-alternatives are located in areas similar to the South Side and North Side construction footprints under the Applicant's Preferred Alternative (described in the May 2025 Draft EIS), it is assumed that the projected noise contours and sensitive receptors as shown in Figures 4.12-1 (South Side) and 4.12-3 (North Side) of the May 2025 Draft EIS are generally applicable to construction noise at the HDD workspaces during site preparation and temporary building installation. Note, however, that the footprint of the HDD workspace south of the Straits extends 500 feet south of the footprint of the Applicant's Preferred Alternative. It does not shift in the east-west direction. Therefore, one residential property located approximately 200 feet southeast of this HDD workspace would experience higher construction noise levels under both HDD sub-alternatives compared to the Applicant's Preferred Alternative.

It is assumed that residences and general outdoor recreational areas located near the construction footprints typically experience a low ambient sound level of approximately 45 dBA. As such, receptors within or near the projected 55-dBA in Figures 4.12-1 and 4.12-3 in May 2025 Draft EIS could experience intermittent increases in noise ranging from 10 dBA to 25 dBA, resulting in exceedances of the 10-dBA change in noise impact threshold. Additionally, as indicated in the figures, approximately 16 residences could exceed the daytime threshold of 60-dBA at the south HDD workspace, while no residences are expected to exceed this threshold at the north HDD workspace. Portions of Headlands International Dark Sky Park would exceed the 57-dBA impact threshold for special parks and a projected noise level at McGulpin Point Lighthouse could exceed the 67-dBA for outdoor recreational areas. As such, detrimental noise effects are probable during the first few months of construction due to site development work and installation of temporary facilities but would be intermittent and limited to daytime work hours.

After site preparation is complete and the HDD workspaces are finalized, drilling activities on both sides of the Straits would begin on a continuous 24-hour, 7-days-a-week schedule for approximately 17 months (see Figure F-4 in Appendix F). HDD activities during this phase include pilot drilling, reaming to final size, and pullback. The HDD drill rig, drill fluid processing unit, MTBMs, mud recovery/skid pump, pipe thruster, and boring/drilling operations units would be

[10] Under normal HDD operating conditions during construction, a water intake structure would not be required; however, certain conditions may arise that would require the use of additional water, and therefore, the construction of a water intake structure. See Section 4.4.2.1.1 for greater detail.

located inside a temporary enclosed building on the HDD drill pad site. Because of this enclosure, noise levels during drilling and pullback are not expected to exceed thresholds at most sensitive receptors. The only potential impacts would occur at one residence southeast of the south HDD workspace and for visitors at the Headlands International Dark Sky Park. Based on an assumed HDD drilling noise level of 85 dBA at 50 feet (see Section G3.1.12 in Appendix G of the May 2025 Draft EIS), the closest residence could experience nighttime noise of approximately 61 dBA. This estimate is conservative, as it assumes the enclosure provides only a 10-dBA reduction. In practice, typical barriers such as sound walls can reduce noise by 15 to 22 dBA or more (ENC 2025). Detrimental noise effects are possible at the HDD workspace south of the Straits over the span of approximately 17 months due to overnight construction activities associated with drilling and pipeline pullback. While similar activities and noise levels would be anticipated at the HDD workspace north of the Straits, detrimental impacts would not be expected, due to the greater distance to any identified sensitive receptors.

Pipeline Assembly Area (and associated Timber Storage Areas). Site preparation (clearing and grading, if grading is required in isolated upland areas where existing topographic variations are severe and a level working surface must be achieved for pipe assembly) and pipeline assembly and hydrotesting would occur over approximately 15 months but would be limited to daylight hours (12-hour workday), Monday through Saturday. Typical equipment that would generate the loudest noise include tree clearers and trucks, as well as excavators, forwarders, dozers, pipe movers, generators, and welders (see Section F1.5.1.2.5 in Appendix F for a more detailed list of equipment).

Following assembly and hydrotesting of the pipeline, use of heavy equipment during pullback of the pipeline would also generate increases in noise levels within the pipeline assembly area. These activities would occur on a continuous 24-hour, 7-days-a-week schedule for approximately 2 months. Typical equipment would include trucks, rollers, sidebooms, and cranes.

For all activities within the pipeline assembly/timber storage areas, a combined noise level was estimated assuming simultaneous operation of the four loudest equipment types, resulting in an overall noise reference level of 91-dBA (at 50 feet). Based on this reference level and using a basic sound propagation equation, a 55-dBA noise level (nighttime impact threshold for residential properties) could occur at 3,000 feet and 67-dBA (impact threshold for outdoor recreational areas) at 800 feet from the workspace boundary. The boundaries representing the noise impact threshold levels and sensitive receptors within these affected areas under HDD Installation Sub-Alternative 1 are presented in Figure 4.12-1.

Approximately 70 residential properties could experience nighttime noise levels of 55 dBA or greater due to overnight construction activities associated with the pullback of the pipeline within the pipeline assembly area under this sub-alternative, for about 2 months. To reduce these effects, the Applicant would implement mitigation measures as identified in Section 4.12.4, including setting up noise barriers to reduce nighttime noise levels to 55 dBA at nearest residential properties.

Although there are a few cultural attractions located near the assembly area (McGulpin Point Lighthouse, McGulpin Rock, Mackinaw Area Historical Society Heritage Village), these would be located beyond the 67-dBA impact threshold for outdoor recreational areas. Other outdoor recreational spaces include the Lake Michigan shoreline and areas within the Headlands International Dark Sky Park and the French Farm Lake Flooding State Wildlife Management Area, which would exceed the 57-dBA and 67-dBA impact thresholds associated with special parks and outdoor recreational areas, respectively. Therefore, the activities within the pipeline assembly area could cause temporary disturbances to visitors within these recreational spaces.

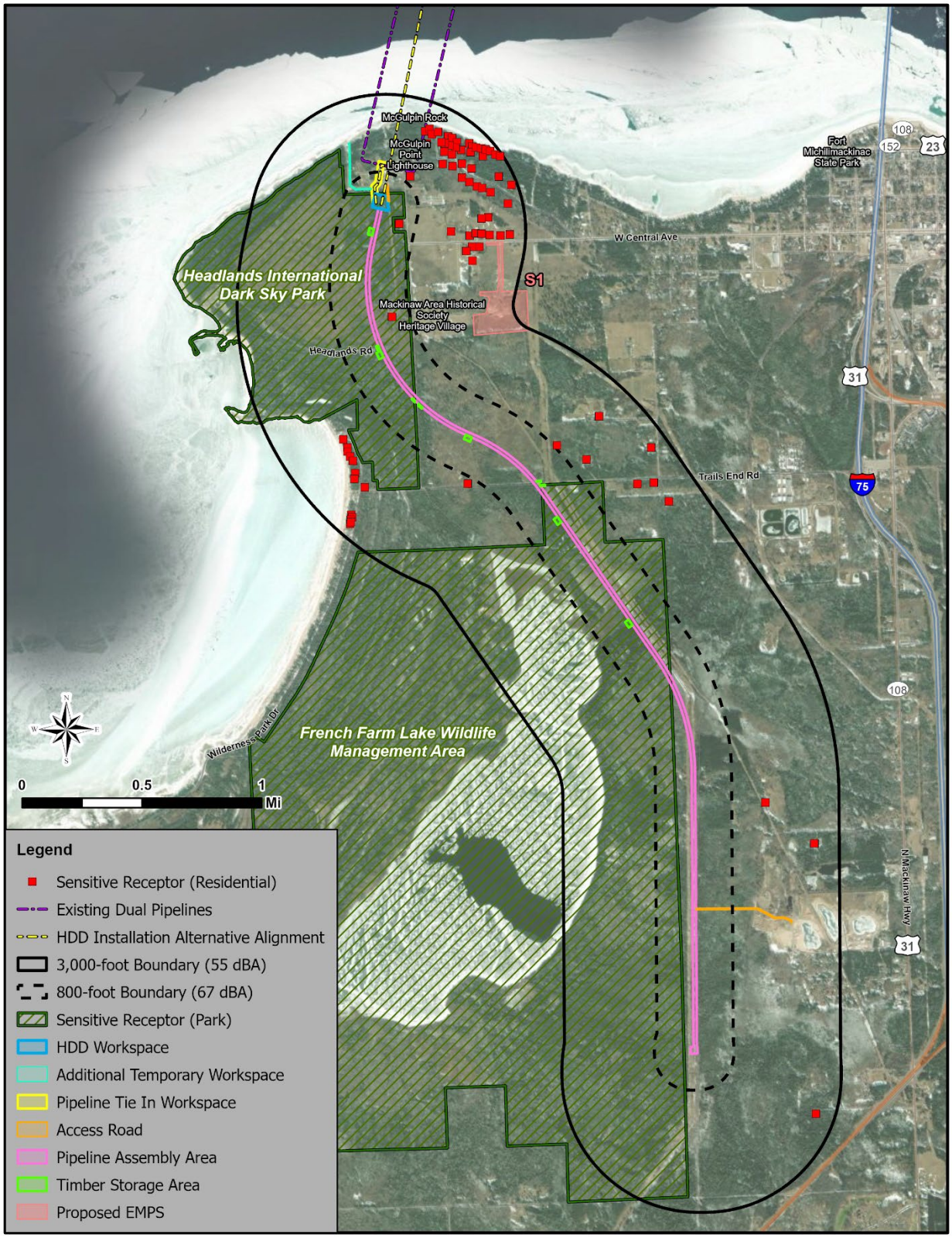

Figure 4.12-1. Noise Buffers for South Pipeline Assembly Area

EMPS. Excavated material during HDD drilling may be transported to EMPS S1 and N1. Noise levels of activities within S1 and N1 are expected to be similar to those discussed under the Applicant's Preferred Alternative in Section 4.12.3.1.1 of the May 2025 Draft EIS. The potential increase in noise would be at the threshold of detection (approximately 3 dBA) and, therefore, no detrimental effects from noise are expected. The greatest potential for noise impacts would be from trucks intermittently entering and exiting the sites. Noise impacts from traffic noise are discussed below.

Traffic Noise. Increased truck traffic along public roadways would result from the transport of construction equipment, materials, and wastes and, therefore, would increase noise levels along key travel corridors. The south and north construction footprints and potential EMPS sites (S1 and N1, if used) would be accessed by the same haul routes as presented in Figures 3.10-1 through 3.10-4 of the May 2025 Draft EIS. To access the pipeline assembly area/timber storage areas under this sub-alternative (south of the Straits), new access roads would be constructed at the north and south ends of the alignment. The access road at the north extent of the alignment would be located adjacent to the HDD workspace south of the Straits, while the access road at the south extent of the alignment would extend west from an area within an existing quarry site (referred to as EMPS S2 in the May 2025 Draft EIS) to the pipeline assembly area.

Compared to the Applicant's Preferred Alternative described in the May 2025 Draft EIS, the projected vehicle volumes on key road segments under this sub-alternative are lower, as discussed in Section 4.10.2.1.1. Therefore, the projected noise levels and changes in ambient noise levels would be similar to or less than those presented in Table 4.12-4 of the May 2025 Draft EIS for the key roadways listed in the table except for Mackinaw Highway, Trails End Road, and Wilderness Park Drive (see below). The table notes that projected traffic noise levels of the key roads listed would only be exceeded on Boulevard Drive.

Compared to the Applicant's Preferred Alternative (and in comparison to HDD Installation Sub-Alternative 2 [Pipeline Assembly Area North], which is discussed in Section 4.12.3), Mackinaw Highway, Trails End Road, and Wilderness Park Drive could experience greater volumes of project trucks because of the location of the pipeline assembly area south of the Straits. However, the impact thresholds (new noise level greater than 60 dBA or a 10-dBA increase over ambient noise level) would not be exceeded. Estimates for the projected noise levels and changes in ambient noise expected along these roadways are as follows:

- Mackinaw Highway – 55 dBA (4 dBA change)
- Trails End Road – 46 dBA (5 dBA change)
- Wilderness Park Drive – 48 dBA (7 dBA change)

As noted in Section 4.12.3.1.1 of the May 2025 Draft EIS, no traffic data are available for Headlands Road, Densmore Avenue, Martin Lake Road, and East Martin Lake Road. However, because these roadways would provide direct access to the HDD/pipeline tie-in workspaces on both sides of the Straits and to EMPS N1, it is assumed that the impact threshold of a 10-dBA increase could be exceeded as these roads currently experience relatively low traffic volumes. Similar to the Applicant's Preferred Alternative, noise-sensitive receptors located on these roadways would experience detrimental noise effects from intermittent traffic noise over the duration of construction. As discussed in Section 4.12.3.1.1 of the May 2025 Draft EIS, the following sensitive receptors are located on the affected roadways: two residences and McGulpin Point Lighthouse on Headlands Road; a hotel and three residences on Boulevard Drive; approximately 12 residences on Densmore Avenue; and approximately four residences on East Martin Lake Road.

4.12.2.1.2 Vibration

The same vibration thresholds as discussed in Section 4.12.3.1.2 of the May 2025 Draft EIS would apply to the HDD Installation Alternative. A potential vibration effect would occur if one of the following criteria would result during construction activities:

- A peak particle velocity (PPV) of 0.1 inches/second for aboveground fragile structures and a PPV of 0.2 inches/second for aboveground non-fragile structures
- A PPV of 0.2 inches/second for human receptors at residential and outdoor recreational areas
- A PPV of 1.6 inches/second for buried/underground pipelines

Under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), detrimental effects from construction vibration are not expected at any of the project locations, as discussed in more detail below.

HDD/Pipeline Tie-In Workspaces (South Side and North Side). Vibrations generated during the initial phases of construction would result from site preparation activities (excavating, grading) and installation of casings at the drill sites (within the HDD workspaces). Typical equipment used for site preparation would include excavators, trucks, and dozers, while drilling activities would require drill rigs, pipe thrusters, and pumps. See Section F1.5.1.2.2 of Appendix F for a more detailed list of equipment.

Vibration levels of typical construction equipment and reference vibration levels at various distances are presented in Table 4.12-5 of the May 2025 Draft EIS. The bolded estimates in the table indicate levels that exceed the 0.1 inches/second impact threshold for fragile structures. Pile drivers would not be used for any of the construction activities under this sub-alternative, and therefore, vibrations from expected equipment in these areas would not be expected to reach the highest levels shown in the table for a pile driver. As such, the shortest distance to result in vibration levels less than 0.1 inches/second is 50 feet from the source. There are no fragile aboveground structures located within this distance to the boundaries of the south or north HDD workspaces and, therefore, no detrimental effects to residential property or fragile structures would occur.

Drilling for the casings would occur on land, with installation occurring a few hundred feet in depth from the HDD entry points via an MTBM. Because vibration data for MTBMs are not readily available, estimates were derived from Table 4.12-5 and Figure 4.12-7 of the May 2025 Draft EIS. Vibration levels from an MTBM are assumed to be comparable to those produced by caisson drilling, which, according to Table 4.12-5 (in the May 2025 Draft EIS), would generate vibrations below 0.1 inches/second at 25 feet. Similarly, Figure 4.12-7 (in the May 2025 Draft EIS) shows that TBMs with diameters smaller than 16 feet generate vibration levels below 0.1 inch/second at 25 feet. Because the MTBM would be smaller and less powerful than a 16-foot diameter TBM, the MTBM vibration levels are assumed to remain at or below 0.1 inch/second at 25 feet. At the north and south HDD workspaces, use of MTBMs would be located more than 50 feet from the existing Dual Pipelines and, therefore, are not expected to reach the vibration impact threshold of 1.6 inches/second for buried pipelines.

HDD Underneath the Straits. As shown in Figure F-5 of Appendix F, drilling through the bedrock underneath the lakebed would occur at substantially greater depths than those of the proposed TBM under the Applicant's Preferred Alternative (described in the May 2025 Draft EIS). The majority of the HDD's main bore path would traverse the Straits at depths exceeding 400 feet below the lakebed, with a minimum depth below the lakebed of approximately 150 feet near the north shoreline. Due to the HDD's smaller drill bit diameter (approximately 4 feet or less), it is expected that vibration levels would be substantially smaller than those of the TBMs shown in

Figure 4.12-7 of the May 2025 Draft EIS. Based on this figure, projected vibration levels from the HDD are conservatively assumed to be 0.1 inches/second at approximately 25 feet and, therefore, it is anticipated that vibration levels on the lakebed would not reach this threshold as the minimum depth below the lakebed is 150 feet. Vibration levels are estimated to be less than 0.02 inches/second at the minimum depth of 150 feet. Additionally, the HDD bore path would be located more than 50 feet from the existing Dual Pipelines and, therefore, would not reach the vibration impact threshold of 1.6 inches/second for buried pipelines.

As shown in all figures that display the shoreline north of the Straits, two separate HDD workspaces are anticipated in this location (see Figures F-1 and F-2). This additional HDD workspace (located to the east and separate from the HDD entry point) would serve as the exit location for the drill bit and pilot string originating from the south shore. Removal of this drill string through this separate workspace is necessary to avoid damaging the casing and drill set-up on the north shore. At this time, the specific path the drill would take to access its exit point within the easternmost HDD workspace north of the Straits is unknown. It is assumed that the path would drill through the upper layers of the bedrock and overburden to its exit point and that the minimum depth below the lakebed would remain at 150 feet, as described above. Therefore, it is anticipated that vibrations on the lakebed from drilling in this area would not exceed 0.1 inches/second.

Pipeline Assembly Area (and associated Timber Storage Areas). Site preparation (clearing and grading, if grading is required in isolated upland areas where existing topographic variations are severe) would generate the greatest vibration levels due to the use of excavators, dozers, and forwarders (see Section F1.5.1.2.5 in Appendix F for a more detailed list of equipment).

Based on the vibration levels presented in Table 4.12-5 of the May 2025 Draft EIS, it is estimated that a vibration level for fragile aboveground structures of 0.1 inches/second would occur within 25 feet of the vibration source. There are no such structures within 25 feet of the pipeline assembly area and therefore, no detrimental effects from construction vibrations are expected.

EMPS. Vibration effects from activities at EMPS S1 and N1 would be similar to those described under the Applicant's Preferred Alternative in Section 4.12.3.1.2 in the May 2025 Draft EIS. It is expected that vibration levels at nearby receptors would be lower than the PPV threshold considered damaging for fragile structures (0.1 inches/second) or anticipated to cause annoyance to human receptors (0.2 inches/second), as the closest receptors are residences located over 50 feet from the closest boundary of the access roads. Except for the higher frequency of trucks, any vibration levels associated with EMPS activities are not expected to be different from current activities at these sites, and would not extend beyond the property boundary.

Truck Traffic. Vibration effects from trucks would be similar to those described for the Applicant's Preferred Alternative in Section 4.12.3.1.2 of the May 2025 Draft EIS. An increase in traffic volumes would result in localized, intermittent vibration increases that could affect receptors located adjacent to public roadways along the potential haul routes (see Section 4.10 for projected truck volumes), particularly along the potential truck haul routes to EMPS S1 and N1; however, the vibration level of a loaded truck is approximately 0.08 inches/second at 25 feet (see Table 4.12-5 in May 2025 Draft EIS), which is below the 0.2 inches/second threshold associated with human receptor disturbance and below the 0.1 inches/second threshold associated with fragile structures. The majority of vibration-sensitive receptors adjacent to the haul routes would be located over 25 feet from the trucks and therefore, detrimental effects from traffic vibration during construction would be unlikely.

4.12.2.2 Operations

There would be no new sources of noise or vibration after construction and therefore, no detrimental noise or vibration effects would occur. Any maintenance or operations activities would occur within the Applicant's existing facilities at the Mackinaw Station and North Straits Facility.

4.12.3 HDD Installation Sub-Alternative 2: Pipeline Assembly Area North

4.12.3.1 Construction

4.12.3.1.1 Noise

Short-term and local detrimental effects from construction noise under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North) would be similar to those identified for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), with the exception of noise associated with the pipeline assembly area (and associated timber storage areas) and potential haul routes, which would be sited north of the Straits under this sub-alternative. The characteristics of construction noise and scheduling would be similar to HDD Installation Sub-Alternative 1, as the expected activities and equipment would be the same; however, the extent and magnitude would differ due to the different workspace locations.

HDD/Pipeline Tie-In Workspaces (South Side and North Side). Noise impacts would be similar to those described for Sub-Alternative 1 (Pipeline Assembly Area South) in Section 4.12.2.1.1.

Pipeline Assembly Area (and associated Timber Storage Areas). Site preparation and pipeline assembly and hydrotesting would be similar as described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), although activities would occur along the pipeline assembly area alignment north of the Straits. Activities would occur during 12-hour workdays, Monday through Saturday, over a 15-month period. Subsequently, pullback of the pipeline would occur on a 24-hour, 7-days-a-week schedule over a 2-month period. A 55-dBA noise level (nighttime impact threshold for residential properties) could occur at 3,000 feet from the workspace boundary, and a 67-dBA noise level (impact threshold for outdoor recreational areas) could occur at 800 feet from the workspace boundary. The boundaries representing these noise impact threshold levels and sensitive receptors within the affected areas are presented in Figure 4.12-2.

Approximately 80 residential properties and two motels could experience nighttime noise levels of 55 dBA or greater due to overnight activities within the pipeline assembly area/timber storage areas expected under this sub-alternative. Outdoor recreational spaces that could be affected include the St. Ignace Kampground of America, which is located approximately 2,500 feet west of the pipeline assembly area boundary. To reduce these effects, the Applicant would implement the mitigation measures identified in Section 4.12.4, including using noise barriers to reduce nighttime noise levels to 55 dBA to the extent possible at the closest sensitive receptors.

Drilling activities using an auger bore drill at the pipe-string crossing at US-2 would generate temporary noise increases that would be within the noise threshold boundary shown in Figure 4.12-2. Drilling of a borehole underneath US-2 is expected to last less than 1 week.

EMPS. Noise impacts would be similar to those described for Sub-Alternative 1 (Pipeline Assembly Area South) in Section 4.12.2.1.1.

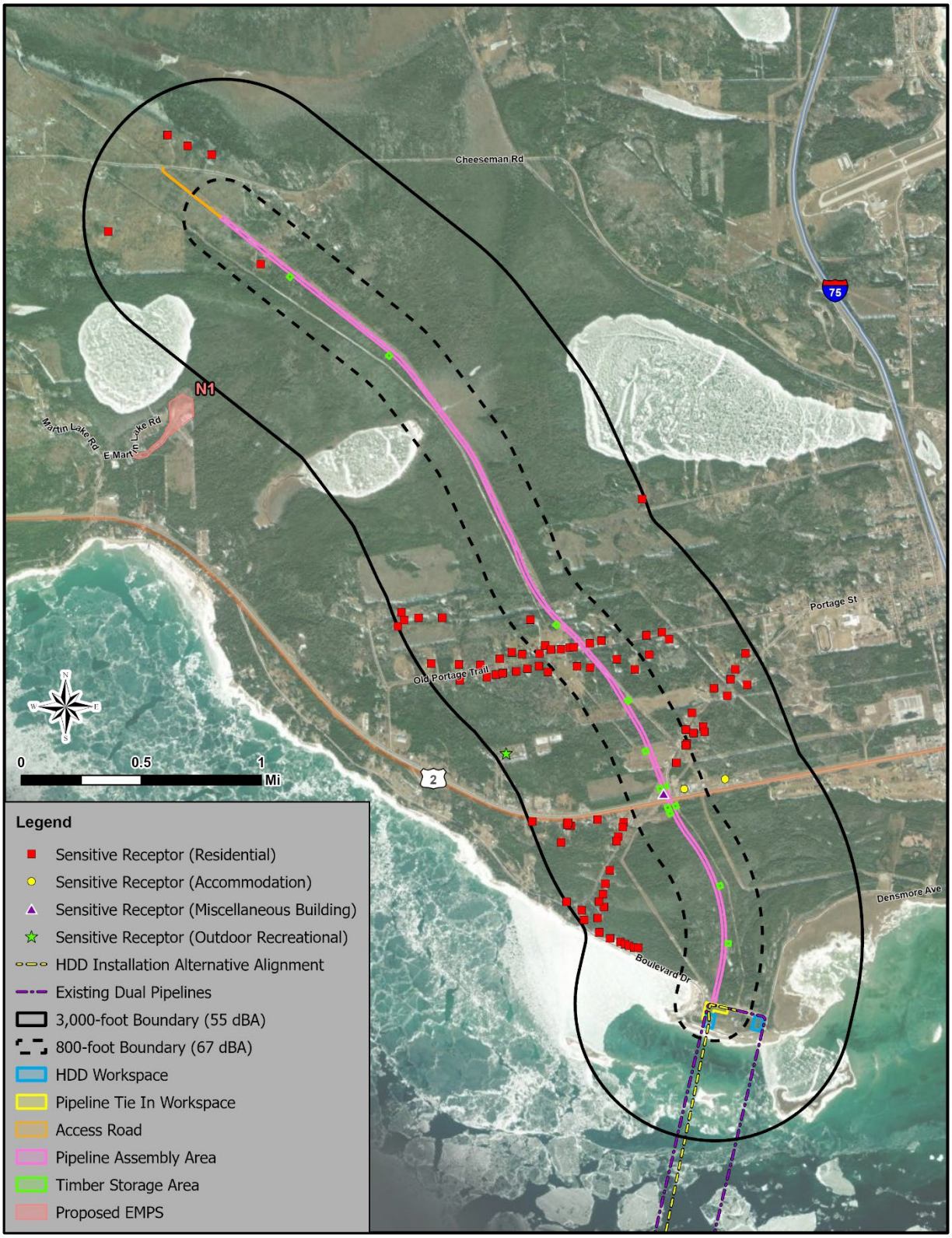

Figure 4.12-2. Noise Buffers for North Pipeline Assembly Area

Traffic Noise. The haul routes identified for the HDD/pipeline tie-in workspaces and the EMPSs would be the same as under HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South). The projected vehicle volumes on key road segments under this sub-alternative are lower than those for the Applicant's Preferred Alternative, as discussed in Section 4.10.2.1.1. Therefore, the projected noise levels and changes in ambient noise levels on key roadways would be similar to or less than those presented in Table 4.12-4 of the May 2025 Draft EIS. Regarding the pipeline assembly area, Cheeseman Road would experience increased traffic and could experience a projected noise level of 50 dBA, which is a 10-dBA increase above the ambient noise level. Although this is the level at which a traffic noise impact threshold is reached, the projected noise level would be less than the 55-dBA nighttime impact threshold for residential properties.

4.12.3.1.2 Vibration

Under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), short-term and local detrimental effects from construction vibration would be possible along the pipeline assembly area north of the Straits due to proximity of sensitive receptors along the pipeline assembly area (and associated timber storage areas) north of the Straits.

HDD/Pipeline Tie-In Workspaces (South Side and North Side). Vibration impacts would be similar to those described for Sub-Alternative 1 (Pipeline Assembly Area South) in Section 4.12.2.1.2.

HDD Underneath the Straits. Vibration impacts would be similar to those described for Sub-Alternative 1 (Pipeline Assembly Area South) in Section 4.12.2.1.2.

Pipeline Assembly Area (and associated Timber Storage Areas). As discussed in Section 4.12.2.1.2 for Sub-Alternative 1 (Pipeline Assembly Area South), site preparation would generate the greatest vibration levels due to the use of excavators, dozers, and forwarders (see Section F1.5.1.2.5 in Appendix F for a more detailed list of equipment). Similarly, it is estimated that a vibration level for fragile aboveground structures of 0.1 inches/second would occur within 25 feet of the vibration source. There are four residential properties located within 25 feet of the pipeline assembly area boundary expected under this sub-alternative: one property is located near the northern portion of the alignment, and three properties are located near its crossing with Old Portage Trail. Additionally, there is an industrial building and electric poles within the pipeline assembly area near the US-2 crossing. Depending on the type of construction activity that would be required near these properties, vibration levels could exceed 0.1 inch/second (impact threshold for aboveground fragile structures) and/or 0.2 inch/second (impact threshold for aboveground non-fragile structures). Vibration levels could be reduced by maintaining a certain distance between heavy equipment and existing structures to avoid potential damage.

Auger bore drilling underneath US-2 would be required for continuation of the pipe-string in this area. Risk of damage to the structural integrity of the roadway is possible if the process is not managed properly. Drilling underneath US-2 would require coordination with and authorization from MDOT and the Mackinac County Road Commission. MDOT establishes specific minimum depth requirements for horizontal auger boring beneath public roads through their Special Conditions document 3703B (MDOT 2006). Adhering to state and local requirements would minimize potential vibration effects and therefore, no detrimental effects from vibration would be expected.

EMPS. Vibration impacts would be similar to those described for Sub-Alternative 1 (Pipeline Assembly Area South) in Section 4.12.2.1.2.

Truck Traffic. Vibration impacts from truck traffic would be similar to those described for Sub-Alternative 1 (Pipeline Assembly South) in Section 4.12.1.2 as the haul routes identified for the HDD/pipeline tie-in workspaces and the EMPSs would be the same. Regarding the pipeline

assembly area, Cheeseman Road would experience increased truck traffic; however, residential properties located on this road are located over 25 feet from the roadway. Therefore, vibration levels at these receptors would be below the 0.2 inches/second threshold associated with human receptor disturbance and below the 0.1 inches/second threshold associated with fragile structures and detrimental effects from traffic vibration during construction would be unlikely.

4.12.3.2 Operations

As described for HDD Installation Sub-Alternative 1 (Pipeline Assembly Area South), there would be no new sources of noise or vibration after construction and therefore, no detrimental noise or vibration effects would occur. Any maintenance or operations activities would occur within the Applicant's existing facilities at the Mackinaw Station and North Straits Facility.

4.12.4 Summary of Impact Minimization Measures

Noise effects would be minimized to the extent possible through various measures, including:

- Implementation of noise control measures, such as project scheduling and using noise controls on equipment (e.g., mufflers)
- Maintaining equipment in good working order to minimize noise levels
- To extent possible, limiting loudest construction activities to daytime
- Communicating with nearest sensitive receptors (e.g., residential properties, campground, and motels) when loudest equipment and activities would be occurring on a 24-hour, 7-days-a-week schedule
- During overnight construction activities, implementing noise barriers to reduce nighttime noise levels to 55 dBA to the extent possible at closest sensitive receptors
- Recommend commuter travel routes that avoid high densities of residential properties
- Limit truck deliveries to daytime to the extent possible
- Implement the following administrative controls:
    - Enforce a no idling policy for equipment within the construction footprints
    - To the extent possible, operate equipment at a lower throttle setting
    - Ensure that equipment used by contractors are well maintained and fitted with engine mufflers

At the pipeline assembly area under HDD Installation Sub-Alternative 2 (Pipeline Assembly Area North), vibration effects would be minimized to the extent possible through various measures, including:

- Coordinating with owners regarding structures that are located within or adjacent to the pipeline assembly area to evaluate sensitivity of structures
- Maintaining a certain distance between heavy equipment and existing structures to minimize risk of damage

4.12.5 Cumulative Impacts

Effects from increased noise and vibration levels from the alternatives analyzed in the May 2025 Draft EIS would include those related to changes in the ambient noise environment and impacts on sensitive receptors present in the area of analysis, as defined in Section 3.12.1 of the May 2025 Draft EIS. In consideration of the HDD Installation Alternative, the area of analysis has been expanded to include the pipeline assembly areas under each sub-alternative (south and north of the Straits), Headlands Road, Wilderness Park Drive, Trails End Road, and Cheeseman Road. As Appendix H of the May 2025 Draft EIS considered past, present, and reasonably foreseeable

future actions within Emmet, Cheboygan, and Mackinac counties, no changes to Appendix H were made, as the footprints associated with the HDD Installation sub-alternatives do not extend beyond these three counties. The cumulative effects analysis for the HDD Installation sub-alternatives (below) may consider actions that were not considered in the cumulative effects analysis in the May 2025 Draft EIS, due to the expanded area of analysis. Effects from the sub-alternatives analyzed in this Supplemental Draft EIS are similar to those identified in the May 2025 Draft EIS, although extent and magnitude may differ.

4.12.5.1 HDD Installation Alternative

Past and present actions that have resulted in increased noise and vibration levels on roadways in the area of analysis include truck transport by the extraction industry, increases in vehicular traffic during peak travel periods from the expansion of tourist-related attractions and businesses, and roadway maintenance projects. Additionally, construction traffic noise under both HDD Installation sub-alternatives could overlap with reasonably foreseeable future actions, including roadway improvements and the Cheboygan Commons Project, which would temporarily increase noise levels for sensitive receptors on regional public roadways. The increase in visitors at McGulpin Rock, McGulpin Point Lighthouse, and Headlands International Dark Sky Park would add to intermittent increases in noise surrounding the HDD/pipeline tie-in workspaces south of the Straits and on local roads leading to these areas (Headlands Road, Wilderness Park Drive, and Trails End Road). Any increase in visitors at businesses and recreational areas located on US-2 would overlap with construction activities north of the Straits and add to intermittent increases in noise and vibration on this highway. The overlap of local noise and vibration increases would cease after completion of construction, and no long-term impacts are expected. Therefore, either HDD Installation sub-alternative would not contribute to cumulative noise or vibrations impacts.

4.13 SOCIOECONOMICS

This section presents the potential impacts on socioeconomics from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.13.1 of the May 2025 Draft EIS, which includes Emmet, Mackinac and Cheboygan counties.

4.13.1 Summary of Key Issues

Table 4.13-1 presents a high-level summary of key issues for socioeconomics related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.13.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.13-1. Summary of Key Issues for Socioeconomic Resources – Action Alternatives

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Population, Housing, Community Services, Unemployment, Income, Taxes, and Tourism	Up to 150 workers could be required for construction and may relocate to the area of analysis. This would have detrimental impacts on population, housing, community services, and tourism, as the increase in population would reduce the availability of housing for residents and tourists and may strain police, fire, health, and emergency medical services. As the region is accustomed to large increases in population and has amenities that can readily absorb an influx of temporary workers due to the nature of the area as a tourist destination, construction is not expected to affect population growth or demographic patterns in ways that alter the overall character of the area of analysis; affect the ability of individuals living on a fixed income to pay rent; or detrimentally affect the ability to provide funding for social services, health services, or schools. There would also be beneficial impacts on unemployment, income, and taxes for the duration of construction, as construction would increase employment opportunities, wage spending, and tax revenues in the area. Short-term, detrimental impacts to housing values and tourism may occur during construction due to construction noise and anticipated visual effects. The extent of these impacts would depend on how disruptive construction noise and visual effects are and the individual's tolerance of these effects. The pipeline assembly area would pass through areas utilized for housing, tourism and hunting, resulting in detrimental impacts to related activities. Impacts would end following construction.	Impacts would be the same as Sub-Alt 1.
Supply Chain and Economy	The percentage of materials that would be sourced from regional and state-sourced supply chains is unknown. Any materials sourced from these supply chains would provide a beneficial impact to the regional and state economy, along with beneficial job creation by the construction firm making purchases from local vendors.	Impacts would be the same as Sub-Alt 1.

Resource Impact	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Energy Demand	Annual energy requirements for construction is unknown. If current utilities need to be relocated or if additional utilities are required, the Applicant would coordinate with the appropriate utility provider to meet the energy demands. Impacts on the local energy grid are not expected. While the amount of fuel required for commuting construction workers, truck hauling, and operation of construction equipment is unknown, it would likely be less than that anticipated for the Applicant's Preferred Alternative (see Section 4.13.3.1.6 of the May 2025 Draft EIS), as construction would take place within a shorter timeframe and involve fewer workers. There would be no impact to commodities transported by Line 5, as the annual average capacity of the pipeline would not change from the existing 540,000 bpd of NGLs and light crude oil. Annual energy demand from operation of the replacement pipeline would be similar to operation of the Applicant's Preferred Alternative, although energy needs associated with the Tunnel and new onshore facilities proposed under that alternative would not be required.	Impacts would be the same as Sub-Alt 1.

bpd = barrels per day; EIS = Environmental Impact Statement; HDD = horizontal directional drilling; NGL = natural gas liquid; Sub-Alt = Sub-Alternative

4.13.2 HDD Installation Alternative – HDD Installation Sub-Alternative 1 and HDD Installation Sub-Alternative 2

4.13.2.1 Construction

4.13.2.1.1 Population and Community Services

Short-term, detrimental impacts on population are anticipated during construction of the HDD Installation Alternative due to an influx of construction workers that would result in a temporary increase in population. Under both HDD Installation sub-alternatives, construction would occur over a period of approximately 24 months. A typical HDD workforce requires approximately 15 to 150 workers during periods of construction. While the percentage of workers expected to come from outside of Michigan is unknown, the potential maximum of 150 is lower than that anticipated for construction of the Applicant's Preferred Alternative (see Section 4.13 of the May 2025 Draft EIS); therefore, the presence of these workers would result in temporary socioeconomic impacts similar to those described in the May 2025 Draft EIS, although impacts would be less and would occur over a shorter duration. Impacts would end following construction; therefore, construction would not be expected to affect population growth or demographic patterns in ways that would alter the overall character of the area of analysis; affect the ability of individuals living on a fixed income to pay rent; or detrimentally affect the ability to provide funding for social services, health services, or schools. Temporary increases in population could result in temporary increases in demand for police, fire, and emergency medical services, although the extent of the impact would depend on the distribution of temporary worker housing and proximity to services. The response time of ambulances, fire trucks, and police may increase slightly if they need to access areas surrounding the expected construction footprint associated with each HDD Installation sub-alternative, due to potential traffic delays (see Section 4.10).

In the event of an emergency, hospitals within the area of analysis are expected to have the capacity to treat workers injured during a construction accident. As discussed in Section 4.14.2.1, an estimated 2.25 recordable injuries or illnesses may occur during construction of the HDD Installation Alternative. Per the May 2025 Draft EIS, the two hospitals closest to the construction footprints north and south of the Straits have a combined hospital bed capacity of 138. Based on the range of average hospital occupancy (72 to 79 percent), an estimated 29 to 39 of these hospital beds would be available at a given moment if an accident were to occur.

4.13.2.1.2 Tribal Populations

Short-term, detrimental impacts on Tribal populations similar to those described for construction of the Applicant's Preferred Alternative (see Section 4.13.3.1.2 of the May 2025 Draft EIS) could occur throughout construction.

4.13.2.1.3 Economy

Detrimental impacts on tourism are anticipated for the duration of construction, the majority of which would end following construction. Tourists visiting the McGulpin Point Lighthouse area, the Headlands International Dark Sky Park, Hiawatha National Forest, and shorelines adjacent to expected construction sites would experience detrimental impacts similar to those described for the Applicant's Preferred Alternative in the May 2025 Draft EIS, but potentially at a greater intensity, as portions of the expected construction footprints under each sub-alternative would intersect some of these areas (e.g., under both sub-alternatives, the HDD workspace south of the Straits would be located within Headlands Internation Dark Sky Park) (see Section 4.2 for additional information on recreation impacts). The construction process would involve the removal of trees, which would constitute a long-term impact that would persist until trees naturally reestablish in the area. The visual presence of construction equipment such as cranes and construction noise (see Sections 4.2, 4.3, and 4.12) within the Headlands International Dark Sky Park may result in a decline in visitor attendance, which in turn would result in a loss of potential revenue for the park that would typically be acquired from its gift shop. Furthermore, construction may discourage visitors from renting the park's event center, guest house, and stargazing house, which are used for weddings, overnight stays, and other special events, resulting in a further loss of revenue. The extent of these impacts would depend on how disruptive the noise and visual effects from construction activities are to the tourist activities taking place and the overlap between the time of day that these activities occur.

Under HDD Installation Sub-Alternative 2, the pipeline assembly area would be located partially within the Hiawatha National Forest. The construction process would result in the removal of trees in this area, resulting in a long-term, detrimental impact on the national forest. The presence of construction workers and activities may result in a decline in visitor attendance, as the area would experience greater levels of disturbance (e.g., noise, increased activity, etc.). Visitor attendance at other nearby recreational sites such as the St. Ignace Kampground of America may also decline due to construction activities. The extent of these impacts would depend on how disruptive the noise and visual effects from construction activities are to the tourist activities taking place and the overlap between the time of day that these activities occur. Impacts to other recreational activities in the area of analysis are discussed in Sections 4.2.2.1.3 and 4.2.3.1.3. A portion of the pipeline assembly area under HDD Installation Sub-Alternative 2 would also be located approximately 250 feet away from the Four Star Motel and 1,200 feet from the Sunset Motel. Construction occurring in such close proximity to these businesses may discourage visitors from staying at these locations, which would have a detrimental impact on the revenue of the motels. As discussed in Section 4.10, traffic associated with construction under the HDD Installation Alternative, such as commuting workers and transport trucks, would exacerbate existing congestion issues during the summer tourism season. This could make travel more difficult for tourists by increasing the travel time required for visitors to move around the area.

There would be short-term, beneficial impacts on taxes in the area of analysis for the duration of construction, similar to those described for the Applicant's Preferred Alternative (see Section 4.13.3.1.3 of the May 2025 Draft EIS). The estimated cost and tax value associated with this alternative is currently unknown, as a detailed HDD project plan has not been prepared by the Applicant.

4.13.2.1.4 Employment

There would be short-term, beneficial impacts on unemployment and income in St. Ignace, Mackinaw City, and any other communities where construction workers temporarily relocate, similar to those described for construction of the Applicant's Preferred Alternative (see Section 4.13.3.1.4 of the May 2025 Draft EIS), although beneficial impacts would be less (due to the smaller anticipated workforce) and last for a shorter duration. It is unknown approximately what percentage of materials needed to construct the HDD Installation Alternative would contribute to regional and state-sourced supply chains. Materials sourced from these supply chains would provide a beneficial impact to the regional and state economy, with beneficial job creation by the construction firm making purchases from local vendors.

4.13.2.1.5 Food Production and Harvesting

Short- and long-term, detrimental and beneficial impacts to hunting could occur. Under HDD Installation Sub-Alternative 1, the pipeline assembly area alignment (and associated timber storage areas) would pass through land that lies within the boundaries of the French Farm Flooding State Wildlife Management Area, which is open to the public for hunting. Under HDD Installation Sub-Alternative 2, the pipeline assembly area alignment would pass through the Hiawatha National Forest, which is also open to the public for hunting. Increased activity in these areas due to construction activities under either sub-alternative may disturb wildlife, which could alter their typical behavior and temporarily make hunting more difficult. These impacts would be felt throughout the duration of construction, as activities would be consistently occurring along this alignment for most of the construction period. In places where forest removal occurs, a long-term change in the natural community would result due to the slow rate of forest regeneration, which would have impacts on the composition of plants and wildlife game species found in the area. The removal of trees and other vegetation could have beneficial or detrimental impacts depending on which species reestablish after construction ends. Cleared land may provide habitat for early succession plant species that benefit important wildlife game species such as white-tailed deer and turkey, and thus benefit hunting conditions; however, the disturbance of native plant communities and increased human and vehicle traffic would increase the potential for invasive plant species to become established in the area, which would have detrimental impacts on hunting by reducing the presence of native plant species and their associated wildlife game species.

Tribal Nations have asserted that construction activities in the Straits region would make areas surrounding the construction sites unsuitable for hunting, gathering, and fishing, including the cultural practices associated with these activities. Species of plants identified by Tribal Nations as important for subsistence and medicinal purposes such as wild leek, reeds, cedar, red pine, white pine, and wild berries have been observed in plant surveys conducted south of the Straits (for the proposed Tunnel Project), which would be impacted by construction of the HDD Installation Alternative if the species are located within the expected construction footprint (Stantec 2020). Impacts to these resources would likely be similar to those described for the Applicant's Preferred Alternative, although potential impacts could occur over a larger area due to the extent of the pipeline assembly area alignments expected under each sub-alternative. Because field surveys have not been conducted specifically for this alternative, field survey level composition of plant and animal species within the expected workspaces both south and north of

the Straits is unknown. If the HDD Installation Alternative were to be pursued, additional field surveys would likely be required to better characterize baseline conditions.

There would be short-term, detrimental impacts on farm production under implementation of HDD Installation Sub-Alternative 2. The pipeline assembly area alignment under this sub-alternative would pass through agricultural areas located north of the Straits. As a result, affected farmlands would either experience a reduction in the amount of agricultural products that they can produce or would have to halt operations altogether while the pipeline is being assembled. This would cause a temporary reduction in the total market value of farms in Mackinac County, the extent of which would be dependent on the type and quantity of commodities affected. The amount of farmland affected by construction would represent only a small portion of total farmland in Mackinac County, meaning that production agriculture, food processing, and other related businesses as a whole would not be compromised and would continue to function.

4.13.2.1.6 Energy

The amount of energy required annually for construction activities under implementation of the HDD Installation Alternative is unknown. If current utilities need to be relocated or if additional utilities are required, the Applicant would coordinate with the appropriate utility provider to meet the energy demands of the project; therefore, impacts to energy demand would not be anticipated. The amount of fuel required for commuting construction workers, truck hauling, and operation of construction equipment over the course of approximately 2 years is unknown, but would likely be less than that of the Applicant's Preferred Alternative (see Section 4.13.3.1.6 of the May 2025 Draft EIS), as construction would take place under a shorter timeframe and involve fewer workers. Much of this fuel would likely be acquired from one of the four nearby gas stations in St. Ignace or three nearby gas stations in Mackinaw City.

4.13.2.1.7 Housing

Short-term, detrimental impacts to housing are anticipated during construction of the HDD Installation Alternative due to an influx of construction workers requiring temporary housing. Impacts would be similar but less than those described for the Applicant's Preferred Alternative (see Section 4.13.3.1.7 of the May 2025 Draft EIS), due to a smaller anticipated workforce. Construction of the HDD Installation Alternative would be expected to occur over a period of approximately 2 years. During this time, the potential maximum number of construction workers requiring housing would be 150 workers.

Short-term, detrimental impacts to housing values may occur during construction due to construction noise and the visual effects of construction (see Sections 4.12 and 4.3, respectively). These impacts would be similar to those described for the Applicant's Preferred Alternative (see Section 4.13.3.1.7 of the May 2025 Draft EIS) but would affect a greater number of homes due to the extent of the pipeline assembly area alignments expected under each sub-alternative. The extent of impacts on housing values would depend on how disruptive construction noise and visual effects are to everyday life at housing locations and the individual homeowner's (or buyer's) tolerance of these effects. The closer a house is to the expected alignment, the greater impact it would experience. The presence of the pipeline segments as they are stored and assembled along this alignment and associated equipment and workers would likely be more disruptive than typical construction areas, as the pipeline assembly area would pass directly through the property of some homeowners. Under HDD Installation Sub-Alternative 1, approximately 70 residential properties along the south pipeline assembly area could exceed the impact threshold of 55 dBA for nighttime noise resulting from pipeline pullback activities. For HDD Installation Sub-Alternative 2, approximately 80 residential properties along the north pipeline assembly area could exceed 55 dBA during pipeline pullback. Additionally, four homes are located within 25 feet of the pipeline assembly area expected under HDD Installation Sub-Alternative 2, which could experience

detrimental effects from vibration. Because pullback activities would occur on a continuous 24-hour, 7-days-a-week schedule for approximately 2 months, these residences would experience daily detrimental impacts to their quality of life, particularly at night when construction activities could impact sleep (see Sections 4.12.2.1.1 and 4.12.3.1.1 for additional details regarding noise impacts). These impacts would end after construction, as operation of the pipeline would be comparable to current conditions. As residences would not be displaced during construction, long-term, detrimental impacts to housing values are not expected.

Construction activities that would occur outside Applicant-owned property (e.g., work within the HDD workspace south of the Straits and the pipeline assembly area, as well as work that would extend into existing utility ROWs) would require the Applicant to obtain access to and permission to conduct construction activities on multiple private properties, including residential areas and parklands, which would require obtaining easements from landowners. These easements would be temporary, granting the Applicant and its construction contractor the use of the land during construction.

4.13.2.2 Operations

The annual energy demand required for operation of the replacement pipeline is anticipated to be similar to energy demands for operation of the Applicant's Preferred Alternative, although this alternative would not require energy for a tunnel or new onshore facilities, as these are not expected under the HDD Installation Alternative. As a result, the pipeline's energy usage is not expected to have an impact on the ability of counties in the area of analysis to supply energy, as usage would be comparable to current levels of consumption. As discussed in Section 3.13.3.10 of the May 2025 Draft EIS, there is an ongoing and future demand for the commodities transported across the Straits of Mackinac through Line 5. Under the HDD Installation Alternative, the annual average capacity of the pipeline would not change from the existing 540,000 bpd of natural gas liquids (NGLs) and light crude oil. Because of this, operation of the new pipeline would not impact the market demand for light crude oil and NGLs, as these products would continue to be transported across the Straits at a rate comparable to current conditions.

4.13.3 Summary of Impact Minimization Measures

During construction, the following measures would be implemented to minimize detrimental impacts on socioeconomics:

- The construction contractor would engage with local communities to establish a list of available accommodations that may be utilized by construction personnel. If construction workforce-related housing needs could impact tourist accommodation availability, this engagement may need to include measures to mitigate impacts to tourists and businesses that rely on tourism
- The Applicant would prepare and implement a Missing and Murdered Indigenous Women Plan to prevent or reduce the occurrence of construction-related impacts to Tribal populations (i.e., human trafficking, abuse, missing and murdered Indigenous women and children)
- The Applicant would implement mitigation measures as identified in Section 4.12.4, including implementing noise barriers, to reduce nighttime noise levels to 55 dBA or below at the nearest residential properties

Measures to reduce impacts to aesthetics, traffic, and noise from construction activities are discussed in Sections 4.3, 4.10, and 4.12, respectively. Measures described in Section 4.2 may also benefit socioeconomic conditions and community services.

4.13.4 Cumulative Impacts

Impacts to socioeconomic resources from the HDD Installation Alternative would include those related to the social and economic environment. The cumulative effects area of analysis for socioeconomics includes the tri-counties (Mackinac, Emmet, and Cheboygan), Beaver Island, and activities occurring within the Straits of Mackinac. Appendix H of the May 2025 Draft EIS details the past, present, and reasonably foreseeable future actions considered for evaluation, as applicable.

4.13.4.1 HDD Installation Alternative

Past and present actions that have impacted socioeconomics in the area of analysis include the resource extraction industry, commercial fishing, and the establishment of the Straits and surrounding areas as a tourist destination for outdoor recreation. As socioeconomics impacts anticipated under implementation of the HDD Installation Alternative would resolve after construction (during operations, conditions in the area of analysis would be expected to return to baseline), no cumulative impacts are anticipated.

4.14 RELIABILITY AND SAFETY

This section presents the potential impacts related to reliability and safety from construction and operation of the HDD Installation Alternative based on information regarding the affected environment presented in Section 3.14.

4.14.1 Summary of Key Issues

Table 4.14-1 presents a high-level summary of key issues for reliability and safety related to HDD Installation Sub-Alternatives 1 and 2. See Section 4.14.1 of the May 2025 Draft EIS for a high-level summary of key issues identified for other alternatives and sub-alternatives.

Table 4.14-1. Summary of Key Issues for Reliability and Safety – HDD Installation Alternative

Factor	HDD Installation Sub-Alternative 1: Pipeline Assembly Area South	HDD Installation Sub-Alternative 2: Pipeline Assembly Area North
Construction Activities	Approximately 2.25 recordable injuries or illnesses may be expected during pipeline construction.	Impacts would be the same as Sub-Alt 1.
Exposure to Hazardous Gases	If pockets of hazardous gas (e.g., methane) exist along the HDD alignment, the potential to encounter those pockets is greater for the HDD Installation Alternative than for the Applicant's Preferred Alternative, because the TBM proposed for the Tunnel Project would have sensors on the drilling head. This technology is not available for HDD. The potential human health effects associated with exposure to hazardous gases would be reduced, however, because no workers would be present within the borehole during construction. There remains a risk of exposure to workers at the surface if hazardous methane is encountered and comes out the hole being drilled.	Impacts would be the same as Sub-Alt 1.
Secondary Containment	This alternative would not provide secondary containment.	This alternative would not provide secondary containment.
Anchor Strike	The replacement of the Dual Pipelines with a pipeline below the lakebed would eliminate the risks currently associated with an anchor strike, as the existing pipelines would be decommissioned (either left in place or partially or fully removed, depending on decommissioning sub-alternative).	Impacts would be the same as Sub-Alt 1.

HDD = horizontal directional drilling; Sub-Alt = Sub-Alternative; TBM = tunnel-boring machine

4.14.2 HDD Installation Alternative – HDD Installation Sub-Alternative 1 and HDD Installation Sub-Alternative 2

4.14.2.1 Construction

Current and future employees would be subject to the risk of injury and fatality from occupational hazards encountered during construction of the pipeline and related structures. Per the information presented in Table 3.14-1 of the May 2025 Draft EIS, an annual average of 0.75 recordable injury or illness occurred per 100 workers in the pipeline construction industry between 2014 and 2023. Under implementation of the HDD Installation Alternative, construction would occur over a period of approximately 24 months. A typical HDD workforce requires approximately 15 to 150 workers during periods of construction. Therefore, approximately 2.25 recordable injuries or illnesses may occur during construction.

As stated in Sections 3.14.1 and 4.4.2.1.1 of this Supplemental Draft EIS, there is the potential for drilling fluid losses/releases (i.e., inadvertent returns) through factures in overlying soils or rock during drilling, which could allow slurry/pressurized drilling fluid to enter nearby groundwater resources. The drill slurry expected for use is comprised of water and bentonite, which is an environmentally benign material (see Section 4.4 in both this Supplemental Draft EIS and the May 2025 Draft EIS for additional detail). Sections 4.4.2.1.1 and 4.14.3 (below) discuss technological advancements in the HDD industry in recent years that mitigate this risk.

Detrimental effects could arise if pockets of hazardous gas, such as methane, are encountered during construction. As no individuals would be present within the borehole, any potential effects would occur at the surface, if the hazardous gas escaped out of the borehole at the point of construction. The gas would be expected to disperse quickly in the air upon escaping the borehole. As such, hazardous gases would not concentrate to their lower explosive limit and would not present an explosion and/or asphyxiation hazard.

Potential Accidental Release from the Existing Dual Pipelines Due to Construction Activities

HDD construction would not impact the existing Dual Pipelines. As detailed in Section 4.12.2.1.2 of this Supplemental Draft EIS, vibrations resulting from HDD below the lakebed would be substantially below specified minimum yield strength limits anticipated for the Dual Pipelines. The shortest distance between the existing Dual Pipelines and expected drilling activities would occur at the HDD casing for the north HDD workspace, located over 50 feet from the existing western pipeline. As MTBM vibrations at this distance would be below the impact threshold for buried pipelines and no additional construction activities are expected directly above or adjacent to the Dual Pipelines, an accidental release of product resulting from construction of the HDD Installation Alternative is not considered to be a reasonably foreseeable event.

Potential Accidental Release from Construction Equipment

During onshore work, spill risk could come from multiple sets of equipment, ranging from light-duty equipment (i.e., cars, pick-up trucks, etc.) to heavy equipment (i.e., cranes, back hoes, excavators, etc.). Each piece of equipment contains fuel and coolant, which could leak or spill under certain circumstances. The Applicant has indicated that aboveground construction equipment and associated contaminants would be the same as identified in Section 4.14 of the May 2025 Draft EIS (see Table 4.14-3 of the May 2025 Draft EIS). Section F1.5.1.2.2 of Appendix F also provides a more detailed list of equipment that would be anticipated under implementation of the HDD Installation Alternative. The impact minimization measures described in Section 4.14.6 of the May 2025 Draft EIS, including adherence to the Applicant's Spill Plan, would remain effective to capture or otherwise reduce potential impacts from released contaminants.

4.14.2.2 Operation

The replacement pipeline would be operated in a similar manner as the replacement pipeline described under the Applicant's Preferred Alternative. Section 4.14.3.2.2 of the May 2025 Draft EIS discusses the potential effects of normal pipeline operations on reliability and safety.

The HDD Installation Alternative would place the operational pipeline below the lakebed, where it would not be susceptible to an anchor strike or similar physical impact. The replacement pipeline would not include manmade secondary containment, and any potential failure of the pipeline (e.g., a leak or spill) would result in product entering the surrounding bedrock and potentially nearby groundwater resources. The replacement pipeline would be bored entirely through bedrock, several hundred feet below the depth of the lakebed (much deeper than the proposed Tunnel under the Applicant's Preferred Alternative), which would provide some degree of secondary containment. USACE acknowledges these potential safety improvements as they relate to the project purpose but does not evaluate risk of an oil spill during operation.

4.14.3 Summary of Impact Minimization Measures

Downtime in the HDD process, or a delay in the project timeline, was identified as one of the most critical risk factors affecting a project that could arise from human and equipment in a survey of HDD failures. Downtime reportedly had a frequency of occurrence of 17.55 percent in a survey of 5,940 HDD installations (Krechowicz et al. 2021). In order to minimize downtime, the Applicant would hydrotest the pipeline before it is pulled into the final borehole to ensure welding has been properly completed. Stringing the pipeline together and installing in one pullback string would minimize the time that the borehole needs to maintain shape prior to installation and reduce the potential for collapse or debris within the borehole causing the pipeline to become stuck. Once the preassembled pipe-string enters the borehole, it would move continuously, as stopping and starting the pipeline would allow time for the drilling slurry to fall out of suspension, thereby reducing lubrication within the borehole, increasing friction on the pipeline, and increasing potential for the pipeline to become stuck. Decreasing downtime during construction would reduce the risk of borehole collapse or the pipeline becoming stuck.

HDD technology advancements in recent years that mitigate the potential loss of drilling fluids to fractured zones within bedrock (and potential subsequent releases to groundwater) include the following, which are discussed in greater detail in Section 4.4.2.1.1:

- Annular pressure monitoring
- Step change improvements in mud and grouting design and placement to control fluid losses, fluid gains (infiltration of groundwater), and to the support the borehole wall
- Advancements in threaded casing pipe to mitigate against fluid losses and to provide borehole wall support
- Micro-tunnel advancement for installing casing at the drill entry points to mitigate against soil/fracturing risks

The impact minimization measures described in Section 4.14.6 of the May 2025 Draft EIS would be expected to effectively capture or otherwise reduce the potential impacts from construction contaminants being released into the environment (see also Section 4.4.4.1 of this Supplemental Draft EIS).

4.14.4 Cumulative Impacts

Potential impacts related to reliability and safety analyzed for the HDD Installation Alternative include risks to workers related to construction activities and the potential for inadvertent returns. The cumulative effects area of analysis for reliability and safety is defined by the construction footprint. Appendix H of the May 2025 Draft EIS details the past, present, and reasonably foreseeable future actions considered for evaluation, as applicable.

4.14.4.1 HDD Installation Alternative

Past and present actions that have impacted reliability and safety in the area of analysis include operations and maintenance activities conducted by the Applicant in the area of the existing Dual Pipelines and along Straits shorelines; dredging within the Straits and other coastal maintenance activities; and construction work associated with roadways that intersect the area of analysis and/or utilities that cross the Straits.

No specific reasonably foreseeable future actions were identified that would be likely to contribute to cumulative effects when considered in combination with the HDD Installation Alternative (see Appendix H of the May 2025 Draft EIS for a list of reasonably foreseeable future actions identified in the area of analysis). Under the HDD Installation Alternative, reliability and safety impacts that occur during construction would resolve upon completion of construction and there would be no cumulative effect.

5 MITIGATION

This Supplemental Draft EIS serves in part to inform the public and review agencies of mitigation measures, project elements, or other environmental protections that are expected to reduce or avoid impacts. This chapter provides an overview of impact minimization and mitigation measures for the HDD Installation Alternative, which are also summarized for each resource in the appropriate section of Chapter 4, and discusses compensatory mitigation under the Clean Water Act (CWA) and the ESA.

5.1 SUMMARY OF MITIGATION MEASURES

Table 5-1 describes measures that would be taken to minimize or mitigate impacts under implementation of either HDD Installation sub-alternative. In addition to specific actions included in the table, the Applicant would adhere to conditions of all permits and authorizations required to implement the HDD Installation Alternative. Additionally, the construction contractor would be expected to implement protocols outlined in the Applicant's EPP. Where appropriate in the following tables, specific measures from the Applicant's EPP may be referenced; however, please refer to the EPP for additional measures and protocols that may be implemented. The EPP Spill Plan details the protocols for avoiding leaks and spills and managing a spill event should one occur. As adherence to the Spill Plan would be expected to minimize/mitigate impacts to several resources considered in this EIS, measures included in that plan are summarized below rather than included in the table that follows this section. The following summarizes measures included in the Spill Plan, but does not include the full list of requirements:

- The construction contractor would designate a Spill Coordinator, responsible for reporting spills to appropriate federal, state, and local agencies and mobilizing onsite personnel, equipment, and materials for containment and cleanup
- All employees handling fuels and other regulated substances would receive spill prevention training
- Adequate materials for rapid cleanup (i.e., spill kits) would be kept on hand at all times. Likewise, all fueling vehicles would carry adequate material to control foreseeable spills
- Equipment (e.g., hoses, pipes, valves, and tanks) would be regularly inspected to ensure equipment is free of leaks
- Proper fuel storage practices would be followed, as detailed in the Spill Plan. For example, storage tanks and containers would adhere to all applicable industry codes, and secondary containment structures would be used at fuel storage sites

As stated in the May 225 Draft EIS, the EPP would be updated prior to Project implementation to include conditions from required permits and authorizations, once received.

Table 5-1. Mitigation Measures Summary – HDD Installation Alternative

Resource Area	Mitigation Measures
Land Use and Recreation	The Applicant would restore and revegetate all areas within construction footprints.
	Haul roads would be sited to avoid private lands, and to minimize impacts to environmentally sensitive areas, archaeological resources, and recreational areas.
Aesthetics	Erosion control measures would be implemented to stabilize slopes, which would prevent aesthetic degradation (see Water Resources and Soils rows for additional information).
	Lighting would be faced downwards and inwards and would include hooded lights to minimize lighting effects outside of the immediate construction areas.
	Site restoration would include seeding with appropriate, native seed mixes; it is possible that restoration of forested wetlands could include planting root stock tree species.
	To the extent possible, the pipeline assembly area would utilize existing, cleared ROW.
Water Resources	Project plans and required permits, if issued (e.g., NPDES, SESC), would stipulate BMPs to prevent stormwater runoff and minimize impacts to downstream waters. Anticipated measures could include (but are not limited to): • silt fence and perimeter soil berms • erosion control blankets • straw bales • sediment traps • slope breakers or swales to manage stormwater • wetting construction ROW and access roads • reestablishing vegetation in temporarily disturbed areas
	Sediment control measures would be installed prior to the start of any ground-disturbing activities occurring onsite. Additionally, all sediment and erosion control measures would be inspected once a week and within 24 hours of a precipitation event that results in stormwater discharge from the site.
	Twice yearly monitoring would occur of onsite wells and wells within a 0.5-mile radius of the construction footprints (with landowner permission) throughout construction and for 2 years following construction.
	Posted speed limits would be adhered to, excavated materials would be covered with tarps when materials are being transported, and appropriate dust control measures would be on haul routes to minimize impacts to adjacent wetlands, if present.

Resource Area	Mitigation Measures
	If a water intake structure were to be required, turbidity curtains would be used during construction of the structure to create a uniform barrier around the workspace. Release of drilling fluids/muds would be minimized to the extent practicable by stopping forward operation when the pipe emerges above the lakebed.
	The Applicant would be required to adhere to all U.S. Coast Guard requirements related to spill prevention, management, and reporting. Additionally, the Applicant has stated that its construction contractor would adhere to the Spill Plan detailed in its EPP.
	The Applicant would adhere to all effluent limitations and other requirements of the Project's NPDES permit, if issued.
	Potential loss of drilling fluids to fractured zones within bedrock would be mitigated through annular pressure monitoring, step change improvements in mud and grouting design and placement to control fluid losses/gains and to support the borehole wall, advancements in threaded casing pipe, and micro-tunnel advancement for installing casing at the drill entry points to mitigate against soil/fracturing risks.
	Along the pipeline assembly area alignment, temporary matting would be placed to minimize impacts to wetlands and other environmentally sensitive features.
	Any surface waters along the pipeline assembly area alignment would be crossed via clear span bridges to avoid impacts to the waterbodies' bed/banks.
	Post-construction, all workspaces would be returned to pre-construction contours and reseeded as appropriate. Excavated material at the EMPS would also be revegetated and maintained permanently.
Biological Resources	Post-construction, HDD workspaces, pipeline tie-in workspaces, and the pipeline assembly area alignment would be returned to pre-construction contours and reseeded with appropriate native seed mixes. Excavated material at the EMPS would also be revegetated and maintained permanently.
	Siting workspaces north of the Straits to minimize impacts to wetlands and protected plant species, as practicable.
	Tree clearing and site grading north of the Straits would be performed during the winter months (October 1 to April 14) when bats are hibernating. Trees would be cleared outside the pup season (June/July), and clearing/grading would be completed during winter months, to the extent possible, to minimize potential impacts to roosting bats. If tree clearing is avoided during the bats' active season, the alternative may affect but is not likely to affect the Northern long-eared bat because any effects, should they occur, would be insignificant or discountable.
	Disturbed areas would be reseeded with native seed mixes after topsoil replacement.

Resource Area	Mitigation Measures
	Construction area boundaries would be clearly staked to prevent disturbance to unauthorized areas.
	Quieter construction machinery would be utilized and artificial lighting would be avoided in natural areas, as practicable.
	Turbidity curtains would be used to contain sediment disturbed during water intake structure installation, if a water intake is determined to be required.
	Timing construction to avoid sensitive breeding or hibernation periods.
	Construction equipment would be washed before arriving onsite to reduce spread of invasive plants.
	Mulch and straw or hay bales would be used that are free of noxious weeds for temporary erosion and sediment control.
	All construction equipment, including timber mats, would be cleaned with air or high-pressure washing equipment prior to moving equipment to the next job site; cleaning the tracks, tires and blades of equipment by hand or compressed air to remove excess soil prior to movement of equipment out of weed infested areas; or use cleaning stations to remove vegetative materials with high pressure washing equipment.
	A vehicle speed limit of 20 miles per hour would be imposed within the construction footprints to minimize risk of vehicle collisions and damage to habitat.
	Conducting initial vegetation clearing activities outside the time when monarch butterflies would be present (between September 15 to May 10) to the extent practicable, and avoiding vegetation removal during the time when monarchs are congregating for fall staging, when feasible.
	If a water intake structure in the Straits is required, conducting associated HDD activities outside the whitefish spawning and hatching season (mid-October through April) to the extent practicable.
Geology	Per the Applicant's EPP, and as required by state and local construction and disturbance permits, the Applicant would adhere to BMPs and permit requirements regarding sedimentation and erosion control.
	Per the Applicant's EPP, the Applicant would restore temporarily disturbed sites to original grades.
	Prior to the use of any EMPS, an experienced geotechnical engineer or engineering geologist would inspect quarry faces to identify areas susceptible to future instabilities.
	Potential loss of drilling fluids to fractured zones within bedrock would be mitigated through annular pressure monitoring, step change improvements in mud and grouting design and placement to control fluid losses/gains and to support the borehole wall, advancements in threaded casing pipe, and micro-tunnel advancement for installing casing at the drill entry points to mitigate against soil/fracturing risks.

Resource Area	Mitigation Measures
	Construction approaches such as monitoring of the drill bit and pressures to allow for adjustments in drilling speed and fluid pressures are effective to help prevent borehole deformation.
Soils	The Applicant's EPP states that, to control dust and prevent deposition in nearby surface waters, construction ROW and access roads would be wetted. The Applicant would coordinate with local authorities to ensure appropriate dust control measures are employed along haul routes.
	The Applicant has stated that it would place protective matting along the entire pipeline assembly area alignment to minimize environmental impacts.
	The Applicant has stated that its construction contractor would adhere to the Spill Plan detailed in its EPP (see Section 5.1 for additional information).
	The Applicant's EPP states that vehicle tracking of soil from construction areas would be minimized with BMPs such as the installation of stone pads and/or timber mats and reducing equipment/vehicle access to the construction footprint where practicable.
	The Applicant's EPP states that temporary erosion and sediment control devices would be installed prior to grubbing and grading activities at the base of sloped approaches to waterways, wetlands, and roads; at the base of slopes greater than 5 percent where the slope is located within 50 feet of tile line inlets, drainage ways, wetlands, and waterbodies until final stabilization occurs; and along the edge of the construction footprint, as necessary.
	Excavated material placed at EMPSs would be vegetated to prevent soil erosion. Seed mixes and any necessary soil amendments would be selected based on a soil analysis. Once seeded, BMPs for erosion and sediment control and stormwater would be implemented and inspection and stabilization would be completed in accordance with the SESC permit.
Transportation and Navigation	Implement a traffic accommodation plan and logistics plan that would specify haul routes, roadway restrictions and limits, and miscellaneous traffic mitigation measures.
	Post pedestrian signage in accordance with MDOT standards.
	Recommend construction workers of preferred commuter routes, especially during peak recreational seasons and holidays.
	Non-essential deliveries would generally occur outside peak commuting traffic hours, especially during the summer season.
	Restrict truck traffic between construction footprints and EMPS to avoid certain hours (e.g., peak traffic hours during the summer travel season), as appropriate.

Resource Area	Mitigation Measures
	Regarding Boulevard Drive (unpaved segment), the Applicant would enter into a road maintenance agreement with the local authorities to maintain the roads during construction, including snow removal and maintenance necessary for safe operation of the road.
	If a water intake structure were determined to be required, the structure would have a buoy to identify its location during the navigable season (no ice on lake, when it will be removed). The coordinates of the water intake structure would be provided to the U.S. Coast Guard, and the location may be charted for mariners. For periods when divers are present during in-water work, a diver flag would be flown from the dive boat, or a temporary floating diver marker would be used while divers are in the water.
Air Quality	Grading would be designed in a way to prevent fugitive dust emissions.
	Per the EPP, the contractor must take reasonable steps to control construction-related noise and dust near residential areas and other areas as directed by the Applicant. Control practices may include wetting the construction ROW and access roads, limiting working hours in residential areas, reestablishment of vegetation and/or additional measures as appropriate based on site-specific conditions.
	When hauling material and operating non-earthmoving equipment, speeds could be limited to 15 miles per hour. Earth-moving equipment could be limited to 10 miles per hour.
	Unnecessary idling of equipment would be reduced or avoided, where possible.
	Contractors would be required to use equipment, where applicable, that would meet or exceed the USEPA Tier 456 exhaust emissions standards for heavy-duty nonroad compression-ignition engines.
	The Applicant would coordinate with local authorities to ensure that appropriate dust control measures, such as watering the roads, are employed during construction to minimize potential impacts to fugitive dust emissions.
	Posted speed limits would be adhered to and excavated materials would be covered with tarps when materials are being transported.
Noise and Vibration	Implementation of noise control measures, such as project scheduling and using noise controls on equipment (e.g., mufflers).
	Maintaining equipment in good working order to minimize noise levels.
	Limiting loudest construction activities to daytime construction.
	Communicating with nearest residential properties and overnight accommodation when heaviest/loudest equipment would be operating 24 hours per day, 7 days per week.

Resource Area	Mitigation Measures
	During 24-hour workdays, implementing noise barriers to reduce nighttime noise levels to 55 dBA to extent possible at nearest residential properties.
	Recommend commuter travel routes that avoid high densities of residential properties.
	Limit truck deliveries to daytime use to the extent possible.
	Implementation of the following administrative controls: enforce a no idling policy for equipment within the construction footprints; to the extent possible, operate equipment at a lower throttle setting; and ensure that equipment used by contractors are well maintained and fitted with engine mufflers.
Socioeconomics	The construction contractor would engage with local communities to establish a list of available accommodations that may be utilized by construction personnel. If construction workforce-related housing needs could impact tourist accommodation availability, this engagement may need to include measures to mitigate impacts to tourists and businesses that rely on tourism.
	The Applicant would prepare and implement a Missing and Murdered Indigenous Women Plan to prevent or reduce the occurrence of construction-related impacts to Tribal populations (i.e., human trafficking, abuse, missing and murdered Indigenous women and children).
Reliability and Safety	In order to minimize downtime, the Applicant would hydrotest the pipeline before it is pulled into the final borehole, to assure welding has been properly completed prior to insertion into the borehole.
	Stringing the pipeline together and installing in one pullback string would minimize the time that the borehole needs to maintain shape prior to installation and reduce the potential for collapse or debris within the borehole causing the pipeline to become stuck.
	Potential loss of drilling fluids to fractured zones within bedrock would be mitigated through annular pressure monitoring, step change improvements in mud and grouting design and placement to control fluid losses/gains and to support the borehole wall, advancements in threaded casing pipe, and micro-tunnel advancement for installing casing at the drill entry points to mitigate against soil/fracturing risks.
	BMPs listed for the Applicant's Preferred Alternative (Section 4.14.6.1 and Table 5-1 of the May 2025 Draft EIS) would minimize or prevent construction equipment/storage-related spills during construction.

BMP = best management practice; EMPS = excavated material placement site; EPP = Environmental Protection Plan; HDD = horizontal directional drilling; MDOT = Michigan Department of Transportation; NPDES = National Pollutant Discharge Elimination System; SESC = Soil Erosion and Sedimentation Control; ROW = right-of-way; U.S. = United States; USEPA = United States Environmental Protection Agency; USFWS = United States Fish and Wildlife Service

5.2 COMPENSATORY MITIGATION UNDER THE CLEAN WATER ACT

Regulatory standards and criteria for mitigating impacts to aquatic resources that result from work authorized by permit under the USACE Regulatory Program were established on April 10, 2008 by the USACE and the USEPA in a rule titled "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule" (33 C.F.R. Part 332 [USACE] and 40 C.F.R. Part 230 [USEPA]) (referred to herein as the 2008 mitigation rule). The rule emphasizes the sequence to be followed for mitigating impacts to aquatic resources. All practicable steps to avoid and/or minimize impacts to aquatic resources must be taken before proposing compensatory mitigation to offset project impacts. Once all efforts to avoid and minimize impacts have occurred, remaining impacts may be offset by compensatory mitigation, which is the restoration (reestablishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances, preservation of aquatic resources to offset unavoidable detrimental impacts.

Compensatory mitigation is a critical tool to ensure that project impacts are offset by compensation to meet the long-standing national goal of "no net loss" of wetland functions and values, identified in EO 11990, Protection of Wetlands. Compensatory mitigation requirements must be commensurate with the amount and type of impact that is associated with a particular CWA Section 404 permit and may be achieved by purchasing credits through mitigation banks or in-lieu fee programs, by permittee-responsible mitigation, or by a combination of the three. Construction of the HDD Installation Alternative may require compensatory mitigation to offset expected impacts to regulated wetlands.

5.3 ENDANGERED SPECIES ACT

Section 7 of the ESA requires federal agencies, in consultation with the USFWS, to ensure that actions funded, authorized, or carried out by federal agencies do not jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. If the HDD Installation Alternative were pursued by the Applicant and USACE determined that the alternative may have potential to impact threatened or endangered species protected under the ESA, USACE would engage the USFWS in dialogue prior to initiating formal consultation.

7 REFERENCES

Alfonso, Arnelio and Julian Gomez. 2023. Horizontal Directional Drilling: Minimizing Impacts, Maximizing Benefits. Cha Consulting, Inc. Accessed September 2025, at https://www.chasolutions.com/news/changemakers/horizontal-directional-drilling-minimizing-impacts-maximizing-benefits/.

Argonne National Laboratory. 2021. MOVES3 Vehicle Operation Emission Factors. Accessed April 8, 2025, at https://greet.anl.gov/files/update_moves3.

Argonne National Laboratory. 2013. Updated Emission Factors of Air Pollutants from Vehicle Operations in GREET Using MOVES. Accessed March 21, 2025, at https://greet.anl.gov/files/vehicles-13.

Cambi, Martina, Giacomo Certini, Francesco Neri, and Enrico Marchi. 2014. The impact of heavy traffic on forest soils: A review. Forest Ecology and Management, 338, 124–138. December 10, 2024. Accessed September 24, 2025, at https://doi.org/10.1016/j.foreco.2014.11.022.

Cowtown Logistics (Cowtown Logistics Freight Management). 2025. Legal Axle Weight Limits for Trucks: Heavy Haul Weight Limits by State. Accessed October 1, 2025, at https://www.cowtownexpress.com/blog/legal-axle-weight-limits-for-trucks-heavy-haul-weight-limits-by-state.

EGLE (Michigan Department of Environment, Great Lakes, and Energy). 2025a. Water Well Viewer. Accessed September 16, 2025, at https://experience.arcgis.com/experience/4af1cf3544b34411b1da781d756956e2.

EGLE. 2025b. RIDE Mapper. Layers: Environmental Management – Part 201 Environmental Contamination Sites and Environmental Management – Part 213 Leaking Underground Storage Tanks. Accessed August 18, 2025, at https://experience.arcgis.com/experience/caac24695429449bbf6cc6d89c111d3b.

Emmet County. 2024. Emmet County Equalization/GIS Department. Accessed November 2024, at https://emmetcounty.maps.arcgis.com/apps/webappviewer/index.html?id=7426312e77a04530920120153c5a1fef.

Emmet County. 2020. Emmet County Master Plan 2021-2025. Accessed November 14, 2024, at https://cms2.revize.com/revize/emmetcountynew/Documents/Departments/Planning%20And%20Zoning/QUICK%20LINKS/PZCR_2021-2025_emmet-county-master-plan-adopted.pdf.

Enbridge Energy, Limited Partnership (Enbridge). 2025a. HDD Construction Footprint and Secondary Containment – Data Need/Request No. 49. August 6, 2025.

Enbridge. 2025b. HDD Feasibility – Data Need/Request No. 47. July 30, 2025.

Enbridge. 2025c. HDD Alternative – Data Need/Request No. 52. September 12, 2025.

Enbridge. 2018. Alternatives for Replacing Enbridge's Dual Line 5 Pipelines Crossing the Straits of Mackinac June 25, 2018.

ENC (Environmental Noise Control). 2025. Temporary Perimeter Sound Walls. Accessed October 3, 2025, at https://www.drillingnoisecontrol.com/drilling-rig-sound-control-systems/temporary-perimeter-sound-walls/.

FEMA (Federal Emergency Management Agency). 2020. Earthquake Hazard Maps. Accessed October 11, 2024, at https://www.fema.gov/emergency-managers/risk-management/earthquake/hazard-maps.

FHWA (Federal Highway Administration). 2024. Earthwork Design. Last updated March 13, 2024. Accessed October 3, 2025, at https://highways.dot.gov/federal-lands/pddm/dpg/earthwork-design.

FHWA. 2018. Noise Measurement Handbook. June, 01, 2018. Accessed March 19, 2025, at https://www.fhwa.dot.gov/environment/noise/measurement/handbook.cfm.

FracTracker Alliance. 2018. Mariner East 2: More Spills & Sinkholes Too? FracTracker Alliance Accessed October 3, 2025, at https://www.fractracker.org/2018/03/me2-spills-sinkholes/.

IEN (Indigenous Environmental Network). 2016. Sabal Trail spill, protests across U.S. spur debate over natural gas pipeline in Florida. IEN Earth. Accessed October 3, 2025, at https://www.ienearth.org/sabal-trail-spill-protests-across-u-s-spur-debate-over-natural-gas-pipeline-in-florida/.

Krechowicz, Maria, Waclaw Gierulsi, Stephen Loneragan, and Henk Kruse. 2021. Human and equipment risk factors evaluation in horizontal directional drilling technology using failure mode and effect analysis. *Management and Production Engineering Review*. Volume 12, Number 2, June 2021, pp. 45-56.

Krechowicz, Maria, Waclaw Gierulski, Stephen Loneragan, and Henk Kruse. 2022. External risk factors evaluation in horizontal directional drilling technology using failure mode and effect analysis. *Management and Production Engineering Review*. Volume 13, Number 1, March 2022, pp. 76-88.

Kunickaya, Ol'ga, Dulus Novgorodov, Varvara Druzyanova, Dmitry Levushkin, Evgeniy Tikhonov, Pavel Perfiliev, and Vladimir Kleveko. 2024. Protective role of mats in maintaining soil integrity on temporary forest roads: An in-depth analysis of their application. Forest Science and Technology, 20(2), 105–113. January 24, 2024. Accessed September 24, 2025, at https://doi.org/10.1080/21580103.2024.2307008.

Mackinac County. 2024. Geographic Information Systems (GIS). Accessed August 2024, at https://app.fetchgis.com/?currentMap=eup.

Mackinac County. 2019. Mackinac County Master Plan 2019. Amended December 20, 2019. Accessed January 7, 2025, at https://www.mackinaccounty.net/wp-content/media/2019-Mackinac-County-Master-Plan.pd.

Manley, Kyle. 2024. Habitat Fragmentation and its Effects on Biodiversity: Case Studies and Solutions. Journal of Biodiversity and Endangered Species. Accessed September 2025, at https://www.hilarispublisher.com/open-access/habitat-fragmentation-and-its-effects-on-biodiversity-case-studies-and-solutions.pdf.

Manning, Robert. 2007. Parks and Carrying Capacity: Commons Without Tragedy. Accessed August 2025, at https://archive.org/details/parkscarryingcap0000mann/mode/2up.

MDOT (Michigan Department of Transportation). 2025. Michigan Department of Transportation Traffic Count (TCDS). Accessed September 15, 2025, at https://mdot.public.ms2soft.com/tcds/tsearch.asp?mod=tcds.

MDOT. 2024. Work Zone Safety and Mobility Manual. Last updated February 20, 2024. Accessed October 2025, at https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Business/Work-Zone-Mobility/Work-Zone-Safety-Mobility-Manual.pdf.

MDOT. 2006. Special Conditions for Horizontal Auger Boring (HA). October 2006. Accessed October 2025, at https://mdotjboss.state.mi.us/webforms/GetDocument.htm?fileName=3703B.pdf.

Michigan State University. 2009. Construction Standards Section 330524 – Directional Drilling. Revised January 1, 2009. Accessed October 21, 2025, at https://ipf.msu.edu/sites/default/files/2018-08/CS_TEC_2004_330524_DIRECTIONAL_DRILLING.PDF.

MPCA (Minnesota Pollution Control Agency). 2025. Fugitive Dust Emissions Management and Best Practices. Accessed March 2025, at https://www.pca.state.mn.us/sites/default/files/p-sbap5-45.pdf.

Moran Township. 2025. Master Plan Update: Draft May 28, 2025. Accessed September 25, 2025, at https://www.morantownship.com/go.php?id=1336&table=page_uploads.

NWF (National Wildlife Federation). 2025. The Great Lakes. Wildlife Guide. Accessed September 2025, at https://www.nwf.org/Educational-Resources/Wildlife-Guide/Wild-Places/Great-Lakes.

NWSRS (National Wild and Scenic Rivers System). 2025. Sturgeon River (Hiawatha National Forest). Accessed September 2025, at https://rivers.gov/river/sturgeon-hiawatha.

Peters, B., Jeffrey S. Lowe, and Seton Katz. 2014. Can You See It Coming? Examining and Mitigating the Common Causes of HDD Failures. *North American Society for Trenchless Technology (NASTT) NASTT's 2014 No-Dig Show*. April 2014. Accessed October 1, 2025, at https://www.mckimcreed.com/wp-content/uploads/2014/11/2014-No-Dig-HDD-Failures-Blake_Lowe_Katz.pdf.

Phillips, Susan. 2024. Marsh Creek State Park once again the site of cleanup due to Mariner East pipeline construction. State Impact Pennsylvania. Accessed October 2025, at https://stateimpact.npr.org/pennsylvania/2024/02/23/marsh-creek-state-park-once-again-the-site-of-cleanup-due-to-mariner-east-pipeline-construction/.

Sanders, Michael, David Cuthrell, and Helen Enander. 2005. Identification of Critical Nesting Habitat for Wetland Birds in Michigan: Eastern Upper Peninsula – Year Two Progress Report. Report Number 2005-006. March 31, 2005.

Schulte, Lisa A., David J. Mladenoff, Thomas R. Crow, Laura C. Merick, and David T. Cleland. 2007. Homogenization of northern U.S. Great Lakes forests due to land use. Landscape Ecol 22, 1089–1103. https://doi.org/10.1007/s10980-007-9095-5.

Stantec (Stantec Consulting Services Inc.). 2025. Biological Assessment. Great Lakes Tunnel Project. July 9, 2025. Prepared for Enbridge.

Stantec. 2023. Ambient Sound Survey and Area of Potential Impact Assessment – Great Lakes Tunnel Project, Emmet and Mackinac Counties, Michigan. October 18, 2023. Prepared for Enbridge.

Stantec. 2020. Enbridge Great Lakes Tunnel Project, Rare Plants and Natural Communities Report, 2020 Survey Area. June 15, 2020. Prepared for Enbridge.

TDOT (Tennessee Department of Transportation). Middle Tennessee Scheduled Lane Closures Oct. 23 - 29, 2025. October 23, 2025. Accessed October 2025, at https://www.tn.gov/tdot/news/2025/10/23/middle-tennessee-scheduled-lane-closures-oct--23---29--2025.html.

Trenchless Technology. 2024. How to Evaluate Hydraulic Fracture Risk in HDD Design. Accessed October 2025, at https://trenchlesstechnology.com/how-to-evaluate-hydraulic-fracture-risk-in-hdd-design/.

USDA NRCS (United States Department of Agriculture Natural Resources Conservation Service). 2024. Emmet County, Michigan (MI047) Version 21, August 27, 2024 and Mackinac County, Michigan (MI097) Version 17, August 27, 2024. Accessed September 17, 2025, at https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

UPTRA (Upper Peninsula Travel and Recreation Association). 2025. Explore Hiawatha National Forest. Accessed September 2025, at https://www.uptravel.com/outdoors-recreation/national-forests/hiawatha-national-forest/.

USEPA (United States Environmental Protection Agency). 2024a. National Primary Drinking Water Regulations. Last updated December 12, 2024. Accessed September 23, 2025, at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.

USEPA. 2024b. Motor Vehicle Emission Simulator: MOVES5. Office of Transportation and Air Quality. U.S. Environmental Protection Agency. Ann Arbor, MI. November 2024.

USEPA. 1995. AP-42 - Heavy Construction Operations. Accessed March 21, 2025, at https://www3.epa.gov/ttnchie1/ap42/ch13/final/c13s02-3.pdf.

USFWS (United States Fish and Wildlife Service). 2025. Information for Planning and Consultation. Accessed September 16, 2025, at https://ipac.ecosphere.fws.gov/.

USGS (United States Geological Survey). 2025a. Monitoring location 39N 03W 29CBCB02 Cheboygan CO (Stimpson Road S) – USGS-454427084424002. August 18, 2024- August 18, 2025. Depth to water level, feet below land surface. Accessed August 18, 2025, at https://waterdata.usgs.gov/monitoring-location/USGS-454427084424002/#period=P365D&showMedian=true&dataTypeId=continuous-72019-0.

USGS. 2025b. The National Map – Data Layer: National Hydrography Dataset. Accessed August 18, 2025, at https://apps.nationalmap.gov/viewer/.

USGS. 2025c. 7.5-Minute Topo Quadrangle, Michigan – Custom Extent. Scale 1:24,000. Accessed September 22, 2025, at https://topobuilder.nationalmap.gov/.

USGS. 2024. Water Quality Samples for the Nation. USGS 454427084424002 39N 03W 29CBCB02 Cheboygan Co (Stimpson Road S). Accessed September 9, 2024, at https://nwis.waterdata.usgs.gov/usa/nwis/qwdata/?site_no=454427084424002&agency_

cd=USGS&inventory_output=retrieval&rdb_inventory_output=file&TZoutput=0&pm_cd_compare=Greater%20than&radio_parm_cds=all_parm_cds&format=html_table&qw_attributes=0&qw_sample_wide=wide&rdb_qw_attributes=0&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=brief_list.

USGS. 1992. Ground Water Atlas of the United States – Iowa, Michigan, Minnesota, Wisconsin. HA 730-J. Accessed August 29, 2024, at https://pubs.usgs.gov/ha/ha730/ch_j/index.html.

Willoughby, David. n.d. Mitigating Hydro Fracture in HDD: Understanding Risks, Prevention, and the Role of HDDPT. Technical Toolboxes. Accessed September 2025, at https://technicaltoolboxes.com/mitigating-hydro-fracture-in-hdd-understanding-risks-prevention-and-the-role-of-hddpt/.

WWALS (Withlacoochee, Willacoochee, Alapaha, Little, and Suwannee River Watershed Coalition). 2025. Sabal Trail fracked methane pipeline. WWALS. Accessed October 2025, at https://wwals.net/issues/stt/.

WSP. 2020. Line 5 Replacement and Tunnel Project Geotechnical Data Report. March 9, 2020. Prepared for Enbridge.

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ENBRIDGE LINE 5 TUNNEL PROJECT

DRAFT
Line 5 Tunnel Project Supplemental Draft Environmental Impact Statement – Horizontal Directional Drilling Installation Alternative

Appendix F. Alternative to the Applicant's Preferred Alternative – HDD Installation

November 2025





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Appendix F. Alternative to the Applicant's Preferred Alternative – HDD Installation

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F1.5 INTRODUCTION

This Appendix supplements Appendix F of the May 2025 Line 5 Tunnel Project Draft Environmental Impact Statement (EIS) (May 2025 Draft EIS) and describes the Horizontal Directional Drilling (HDD) Installation Alternative, which is analyzed in detail in this Supplemental Draft EIS.

An HDD Installation Alternative was considered in the May 2025 Draft EIS but was not carried forward for detailed analysis in the EIS based on a 2018 report, Alternatives for Replacing Enbridge's Dual Line 5 Pipelines Crossing the Straits of Mackinac (Enbridge 2018), which concluded that an HDD Installation Alternative was not technically feasible due to the length of the replacement pipeline, length of drill required, and the hard characteristics of the subsurface rock. Subsequent to the 2018 report and the May 2025 Draft EIS, the Applicant provided USACE with information indicating that the HDD Installation Alternative, using the intercept method as described in this appendix, is now technically feasible due to advances in technology (Enbridge 2025c). USACE considered the information provided and determined that the HDD Installation Alternative met the screening criteria defined in Chapter 2 of the May 2025 Draft EIS; therefore, the USACE carried forward the HDD Installation Alternative for detailed analysis in the EIS. This appendix describes the HDD Installation Alternative based on information provided by the Applicant regarding likely construction methods and work areas. As the HDD Installation Alternative is not proposed by the Applicant, detailed work plans and supporting investigations have not been prepared.

If the HDD Installation Alternative were to be implemented, the existing Dual Pipelines in the Straits would be decommissioned. Therefore, the HDD Installation Alternative would include consideration of the same decommissioning sub-alternatives described in Appendix F (Section F1.3.1) and analyzed in Chapter 4 for each resource area of the May 2025 Draft EIS. As the activities and anticipated impacts for decommissioning would be the same as described in the May 2025 Draft EIS, this Supplemental Draft EIS incorporates those discussions by reference.

F1.5.1 Alternative to the Applicant's Preferred Alternative – HDD Installation

F1.5.1.1 Overview

The Applicant provided descriptions for two HDD Installation sub-alternatives. The location of the proposed pipeline assembly area (and associated timber storage areas) is the distinguishing factor between the two sub-alternatives (under HDD Installation Sub-Alternative 1, the replacement pipeline would be assembled south of the Straits; under HDD Installation Sub-Alternative 2, the replacement pipeline would be assembled north of the Straits). As the overall construction process and operation of the pipeline post-construction would be the same regardless of where the pipeline assembly area is sited, the description provided below would apply to either sub-alternative, if implemented.

The HDD Installation Alternative would involve the use of HDD to install the 30-inch diameter Line 5 replacement pipeline segment below the lakebed of the Straits. Figures F-1 and F-2 show the two HDD Installation sub-alternatives under consideration in the Supplemental Draft EIS, one involving a pipeline assembly area[1] and associated timber storage areas south of the Straits (HDD Installation Sub-Alternative 1: Pipeline Assembly Area South), and the other involving a pipeline assembly area and associated timber storage areas north of the Straits (HDD Installation Sub-Alternative 2: Pipeline Assembly Area North). Figure F-3 shows the HDD alignment below the Straits, which would be the same under both HDD Installation sub-alternatives.

Construction footprints (workspaces) common to both sub-alternatives include HDD entry/exit workspaces on both sides of the Straits (referred to collectively in this document as HDD workspace) and additional workspace for pipeline tie-in on both sides of the Straits. All workspaces, including the pipeline assembly area alignments (which differ by sub-alternative), are displayed on Figures F-1 and F-2. Ground disturbance in the HDD entry/exit and pipeline tie-in workspaces would depend on trenching associated with pipeline tie-in (to existing facilities at the Mackinaw Station and North Straits Facility) and the exact location of HDD entrance and exit boreholes; however, this Supplemental Draft EIS conservatively assumes that ground disturbance would occur within the entirety of any expected HDD entry/exit and pipeline tie-in workspaces. By comparison, ground disturbance within the pipeline assembly area (and associated timber storage areas), if required, would be limited and localized to upland areas containing topographical variations that require minor grading to achieve a level working surface for pipeline assembly. Otherwise, activities within the pipeline assembly area would not require ground disturbance (additional detail provided in Section F1.5.1.2.5, below).

Additional off-site staging areas would consist of pipe storage areas and drilling mud/excavated material disposal areas. Under both HDD Installation sub-alternatives, excavated material would be placed at excavated material placement site (EMPS) S1 and N1, as HDD entry points would be located on both sides of the Straits (EMPS S1 and N1 are also expected for use under the Applicant's Preferred Alternative). Depending on the location of the pipeline assembly area alignment (south of the straits under HDD Installation Sub-Alternative 1: Pipeline Assembly Area South or north of the Straits under HDD Installation Sub-Alternative 2: Pipeline Assembly Area North), either EMPS S1 or N1 could also be used for temporary pipe storage. As stated in the

[1] The HDD Installation Alternative requires a single, approximately 4-mile-long and 80-foot wide pipeline assembly area (and associated timber storage areas) that could be sited either south or north of the Straits (not required on both sides of the Straits); therefore, this Supplemental Draft EIS analyzes two sub-alternatives that consider the potential impacts of siting this pipeline assembly area on either side of the Straits. This area would be used for pipe assembly and welding prior to installation within the final borehole, during which the assembled/welded pipeline would be pulled through the borehole. This pre-assembled pipeline is also referred to as a pullback pipe-string. Preassembling the pipe-string allows the construction contractor to minimize the time between final preparation of the borehole and pulling the pipe-string into the borehole and to minimize starts and stops during this process, in keeping with best practices in the HDD industry. The pipeline assembly area alignment has specific requirements based on the curvature of radius (10,000-foot radius) of the pullback pipe-string. Unlike a mainline pipe installed by excavation that allows for routing around sensitive features or land tracts, the pullback pipe-string cannot be bent. Therefore, moving one section of the pullback pipe-string would cause the entire pipe-string to move, potentially requiring the drill rig locations to move as well (Enbridge 2025a). Comprehensive information on the limits of disturbance and construction footprint, including extent and types of impacts, would be dependent on field surveys. Necessary permits and land rights would need to be obtained to authorize the HDD activities within the construction footprint (Enbridge 2025c).

May 2025 Draft EIS, both S1 and N1 are previously-disturbed, excavated areas used for mining activities (Enbridge 2025c).

Figure F-4 details the expected construction sequencing. Additional details regarding the HDD Installation Alternative are provided in the subsections that follow. A typical HDD workforce could range from approximately 15 to 150 workers during periods of construction (Enbridge 2025a).

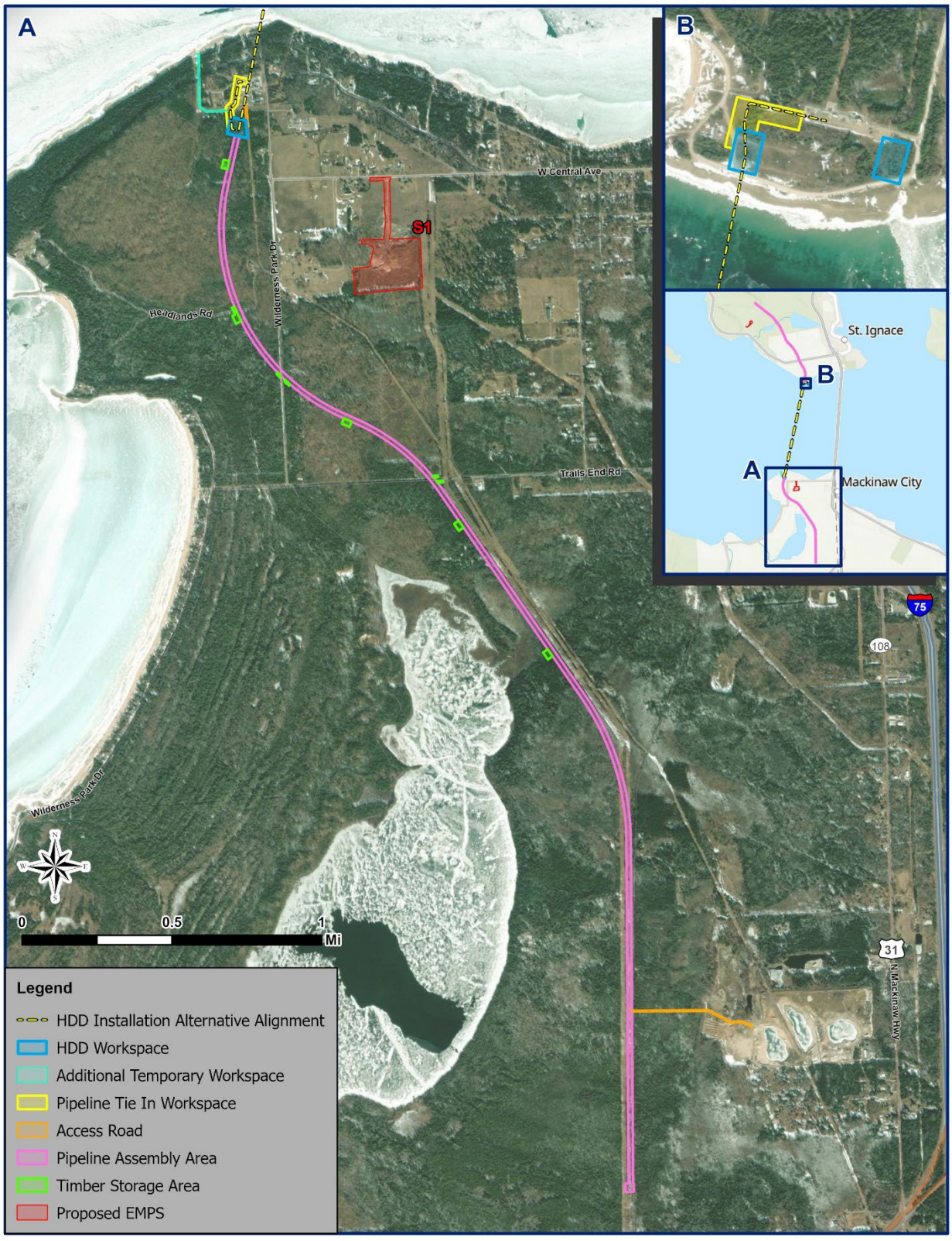

Figure F-1. HDD Installation Sub-Alternative 1: Pipeline Assembly Area South

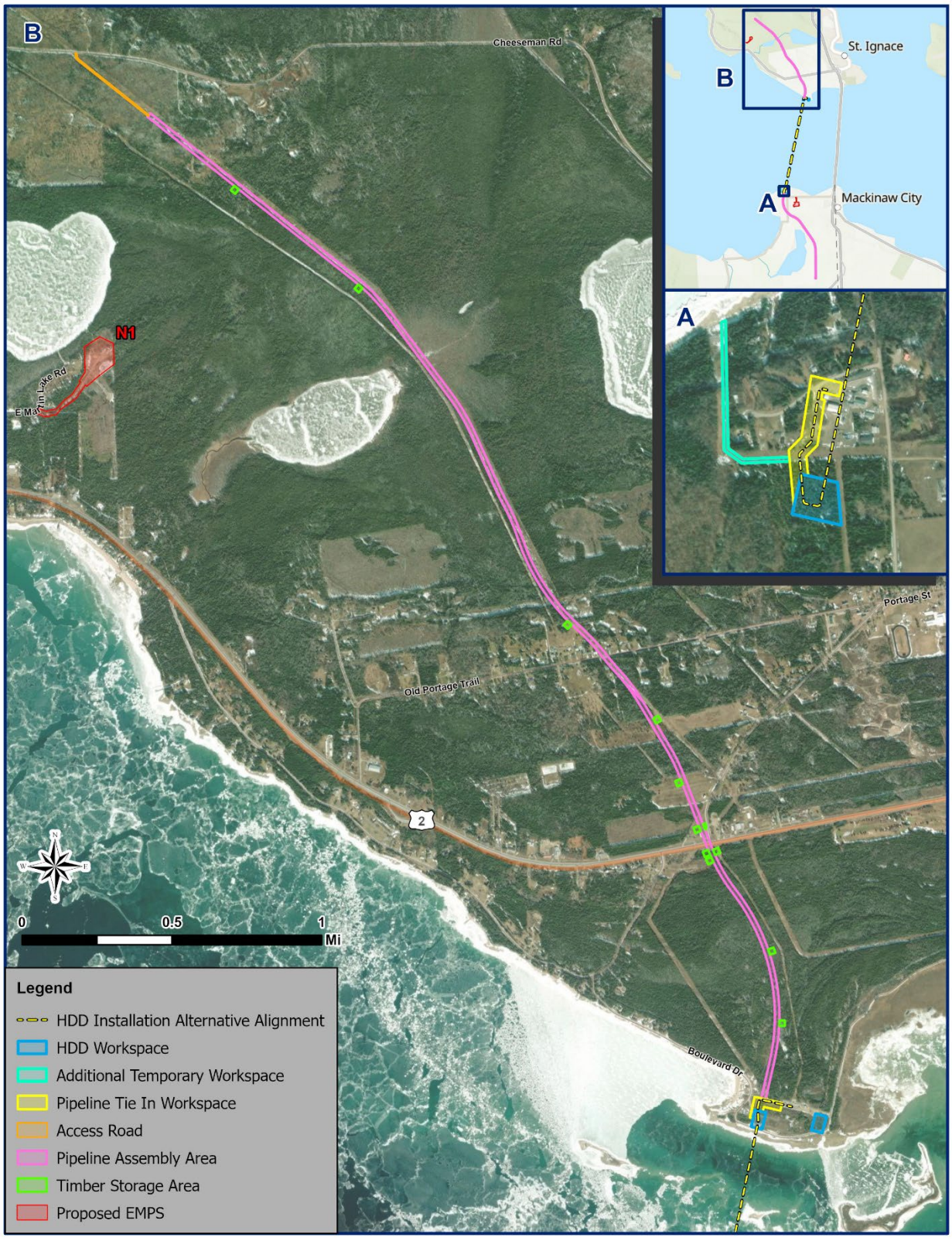

Figure F-2. HDD Installation Sub-Alternative 2 Pipeline Assembly Area North

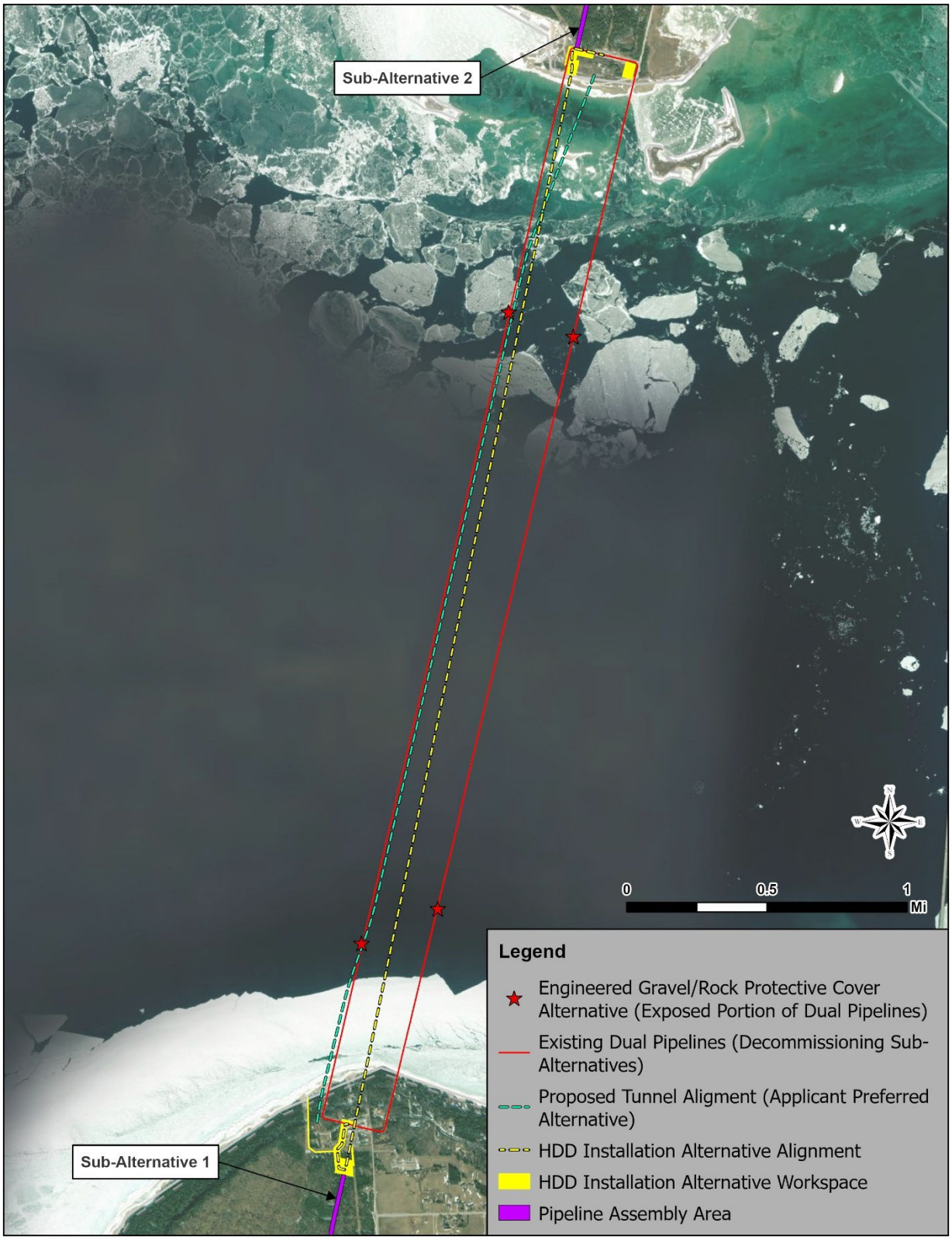

Figure F-3. HDD Installation Alternative Alignment Underneath the Straits

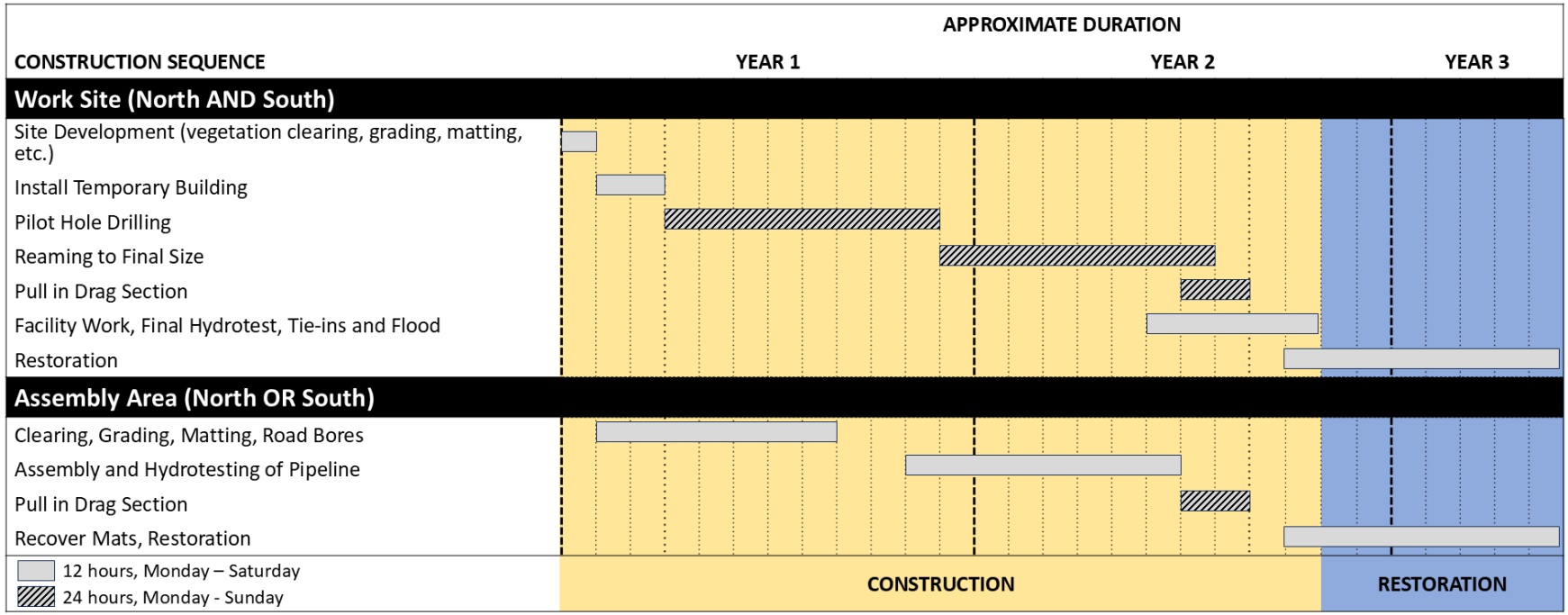

Figure F-4. HDD Installation Alternative Construction Sequence

F1.5.1.2 Construction Method

F1.5.1.2.1 Site Preparation Activities Described by the Applicant

The use of HDD under either sub-alternative would utilize an intersect drill method, requiring HDD entry/exit and pipeline tie-in connection workspaces to the Applicant's existing facilities, the Mackinaw Station to the south and the North Straits Facility to the north. Figures F-1 and F-2 depict these workspaces (see the blue HDD workspaces and yellow pipeline tie-in workspaces). Table F-1 provides workspace acreages illustrated in Figures F-1 and F-2.

Table F-1. Workspace Area for the HDD Installation Alternative

Workspace	Disturbance Activities	Acres
Workspaces Common to Both Sub-Alternatives		
HDD Workspace – South	• vegetation clearing • stump removal • grading/ground disturbance • HDD boring/excavation	5.0
HDD Workspaces - North	• vegetation clearing • stump removal • grading/ground disturbance • HDD boring/excavation	5.0
Pipeline Tie In Workspace - South	• vegetation clearing • stump removal • grading/ground disturbance	2.6
Pipeline Tie In Workspace - North	• vegetation clearing • stump removal • grading/ground disturbance	2.2
Additional Temporary Workspace (linear area extending to Lake Michigan) – South	• Site clearing/grading	1.0
Off-site Staging Area/Excavated Material Placement (EMPS S1 and N1)	• materials storage • placement of excavated material	34.4
HDD Segment Below the Lakebed	• HDD boring/excavation	6,000 cubic yards
Pipeline Assembly Area and Associated Workspaces[1] – Sub-Alternative 1: Pipeline Assembly Area South		
Pipeline Assembly Area	• brush, shrub, and tree removal • placement of protective matting • assembly of pipe-string	39.4
Timber Storage Areas	• materials storage	2.1
Access Road	• vegetation clearing • stump removal • grading/ground disturbance • placement of gravel	1.8

Workspace	Disturbance Activities	Acres
Pipeline Assembly Area and Associated Workspaces[1] – Sub-Alternative 2: Pipeline Assembly Area North		
Pipeline Assembly Area	• brush, shrub, and tree removal • placement of protective matting • assembly of pipe-string	39.1
Timber Storage Areas	• materials storage • placement of excavated material	2.6
Access Road	• vegetation clearing • stump removal • grading/ground disturbance • placement of gravel	1.5
HDD Installation Alternative Sub-Alternative 1 Total		**93.1**
HDD Installation Alternative Sub-Alternative 2 Total		**93.0**

[1] Analysis assumes all work associated with boring and aerial crossings of roadways and spanning of streams would be conducted within the 80-foot-wide pipeline assembly area.

HDD drill pad site preparation would require the use of excavators, skid steers, concrete trucks, dozers and Ponsee tree harvesters. While stumps would be removed during site preparation at HDD/pipeline tie-in workspaces, vegetation clearing within the pipeline assembly area would be accomplished by flush cutting the trees at ground surface to accomplish a level site required for pipe-stringing. Stump grinding, removal, or pushing stumps into the ground may occur in limited areas. Merchantable trees would be salvaged and placed in the timber storage areas for reuse. Brush and scrub would be mulched and spread onsite or disposed of in upland areas. The cleared assembly area would be matted to minimize environmental impacts to the extent possible, while maintaining the maximum curvature allowed for the pipe-string (Enbridge 2025c). It is possible that limited areas of grading would be required along the pipeline assembly area alignment to accommodate the pipe-stringing. If grading were to occur, it would be limited to upland areas with larger topographic changes. Placement of mat stringers would be used in areas to level the mat construction surface in areas, as needed, to take up small ground topography changes (Enbridge 2025b).

Streams would be crossed by clear span bridges to avoid direct disturbance to stream bed and banks. Bridges would be placed on abutments set back a minimum of 3 feet from the top of bank and be utilized by equipment to cross the stream. The pipeline would be suspended on cribbing across the stream once welded. Wetland fill is not anticipated to occur, other than the temporary placement of the mats in wetlands to accommodate pipeline assembly (Enbridge 2025b). Road crossings of the pipeline assembly area would be accomplished by aerial pipe-string crossings[2] with the exception of US-2 under implementation of HDD Installation Sub-Alternative 2 (Pipeline

[2] Similar to an aboveground utility crossing where telephone or electric lines cross above a roadway on utility poles or other structures, an aerial pipe-string crossing would consist of support structures on each side of the roadway that lift the pipe-string above the roadway. The height would prevent the pipe-string from interfering with traffic and the structure would provide sufficient support to prevent sagging of the pipe-string. Appropriate approvals including utility crossing permits and/or highway occupancy permits would be required for the crossing and placement of the support structures. It is assumed that this crossing structure would be contained within the 80 feet right-of-way for the pipe-string.

Assembly Area North). Under this sub-alternative, a path for the pipe-string would be bored beneath the roadway.

All site clearing and grading activities within the construction footprints would commence upon receiving all permits and authorizations (see Section F1.5.1.4).

F1.5.1.2.2 HDD Drilling Described by the Applicant

HDD installation under either sub-alternative would require the placement and operation of a drill rig, pipe thrusters, mud mixing system and mud recovery, screening, and recycling system on both sides of the Straits (see HDD workspaces indicated in blue on Figures F-1 and F-2). HDD operations would require the use of the following types of equipment: drill rig, drill fluid processing unit, micro-tunnel boring machine (MTBM), mud recovery/skid pump, pipe thruster, MTBM and HDD operations unit, generator, skid steer, fork lift, excavator, dump truck, loader, air compressor, grout pump, pickup truck, and semi tractors.

The HDD drilling process would begin with drilling of a 12.25-inch pilot hole along the expected alignment (see Figure F-3). This would be accomplished with two drill bits (requiring an HDD workspace and placement of a drill rig on both sides of the Straits), one beginning excavation on south of the Straits and one beginning excavation north of the Straits. The drill bits would be connected to their associated drill rigs (located within their respective HDD workspace) via a pilot string, and would meet (intersect) in the middle of the expected alignment. Following this intersection, both drill bits and pilot strings would travel back to the north shore of the Straits (i.e., the drill bit/pilot string that started north of the Straits would reverse its path, and the drill bit/pilot string that started south of the Straits would continue and exit north of the Straits ensuring one continuous pilot hole). An additional HDD workspace would be located on the north shore, separate from the HDD entry point on that side (see Figures F-1 and F-2) to accommodate the exit of the drill bit/pilot string traveling from the south side. The drill bit that started on the north side would be removed from the same hole that it drilled. Removing one of the drill bits from a separate workspace is necessary to avoid damaging the casing and drill set-up on the north side.

While drilling is occurring, a drilling fluid slurry (consisting of approximately 95 percent water and 5 percent bentonite clay) would circulate under pressure through the drilling tools to lubricate the drill bit, remove drill cuttings (excavated material), and promote stability of the borehole. The slurry would be pumped through the inside of the drill pipe and back to the HDD entry point along an annular space between the outside of the drill pipe and the borehole, carrying excavated material back to the HDD entry point with it. During this process, mud design modification and/or grouting would be used to manage drilling fluid loss or gain. Drilling fluid additives may be used to adjust pH and drilling fluid viscosity and to reduce drag on the assembled pipeline as it is pulled through the completed borehole, etc. If drilling fluid additives are determined to be necessary, additives that meet requirements for potable well drilling and have been approved by the State of Michigan would be used. Following completion of the pilot hole, ream passes are conducted along the alignment to increase the borehole size to a minimum of 42 inches. Approximately 6,000 cubic yards of material would be excavated during the HDD drilling process (Enbridge 2025a, 2025c).

Casings of an appropriate width would be installed at the north and the south HDD entry points to separate the surrounding geologic material from the drilling process and provide support for the borehole as it is drilled through the overburden into the more stable rock formations below. Based on the known geology of the Straits, these casings would be installed a few hundred feet in depth from the HDD entry points via a micro-tunnel and pipe thruster process. This method would allow for accurate casing installation on the required HDD alignment to isolate the subsurface formation from the drilling process (Enbridge 2025c).

As stated, best practices in HDD execution include minimizing the time between final preparation of the borehole and pulling the pipeline into the borehole as well as minimizing starts and stops

during this process. Once the pipe-string enters the borehole, continuously moving the string (without starting and stopping) maintains the slurry in suspension and provides lubrication to the pipeline as it advances, which prevents the pipeline from potentially getting stuck. Preassembling the pipeline prior to installation (rather than installing the pipeline segment by segment, which would eliminate the need for an approximate 4-mile-long pipeline assembly area) also minimizes the time that the borehole wall and diameter are required to maintain shape and stability. If the borehole is prone to collapse due to ground squeezing, installing the pipeline quickly prevents the borehole wall and diameter from losing shape, thereby preventing debris from damaging the coating of the pipeline or the possibility of the pipeline getting stuck (Enbridge 2025b).

HDD construction would take approximately 24 months. Welding the pipe, pressure testing (hydrotest), and inserting it into the final borehole would take less than 1 month (Enbridge 2025c).

Figure F-5 shows the cross-section of the HDD Installation Alternative beneath the Straits.

F1.5.1.2.3 Stormwater and Process Water Described by the Applicant

The HDD drilling process would require water for use during drilling operations. Water would be trucked in from a municipal source, pulled from the Straits, or a combination of the two sources. Under normal drilling operations, approximately 60,000 gallons of water per day would be required (resulting in approximately 3 million gallons of water used over the course of the HDD drilling process), which could be accommodated by a municipal source (Enbridge 2025a, 2025c). Water used for the drilling fluid for the HDD process would be recycled. Upon completion of the HDD and takedown of the HDD drill rig, there would be some water remaining in the recycling system, which would be hauled off-site and disposed of at a permitted facility (Enbridge 2025a).

During HDD, conditions could be encountered that could result in a loss of drilling fluid returns that would prompt the need for contingency actions, which could require additional water of an unknown quantity. In such a scenario, a water intake structure may be required along with an associated Part 325 permit (see Section F1.5.1.4), which would be constructed and operated in the same manner as the water intake structure described for the Applicant's Preferred Alternative (Enbridge 2025a, 2025c).

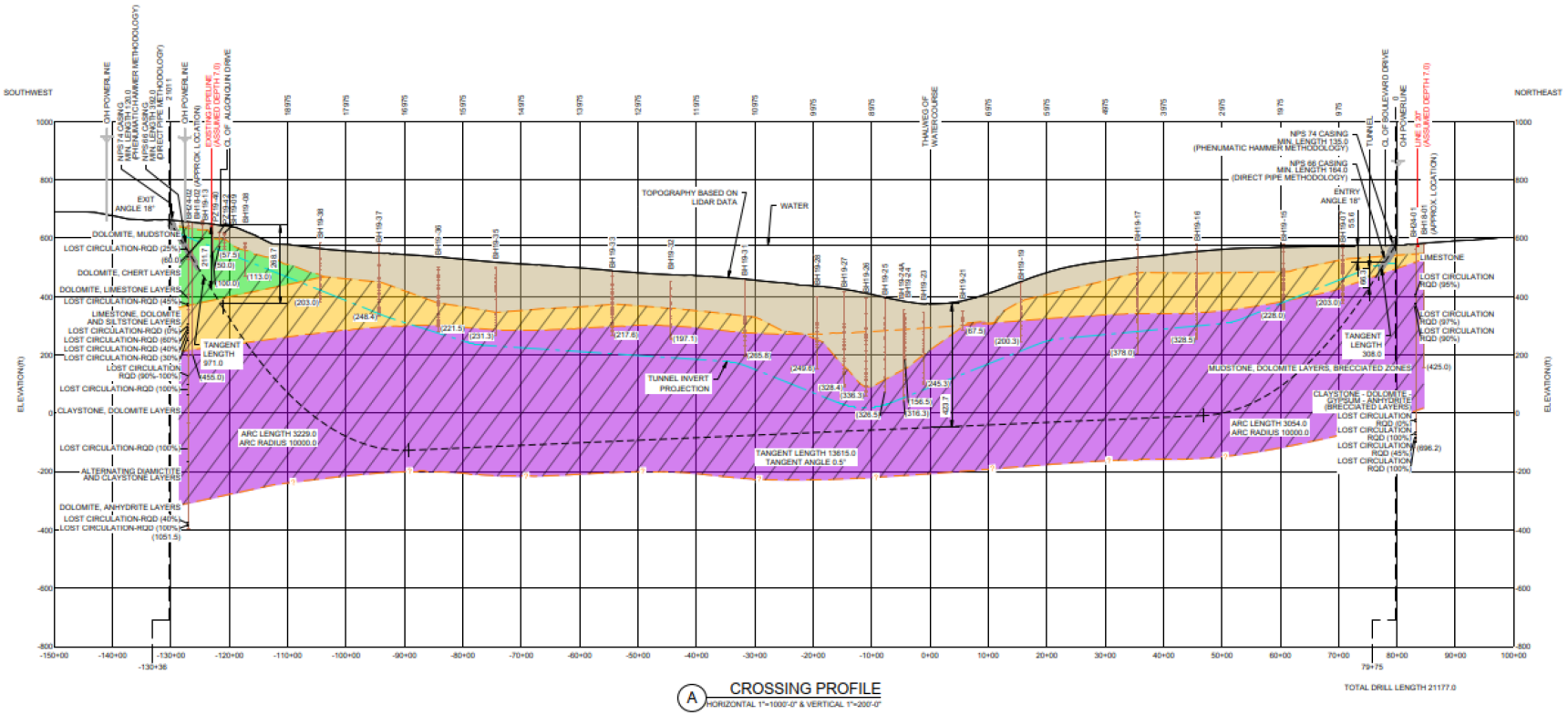

Figure F-5 HDD Installation Alternative Crossing Profile

The HDD Installation Alternative would require two hydrotests, one prior to pulling the pre-assembled pipeline (i.e., pipe-string) into the final borehole, and a second test once the pipeline is in place below the lakebed. The hydrotests would result in approximately 2 million gallons of water that would need to be discharged in accordance with a NPDES General Permit for Discharge of Hydrostatic Test Water, which would be required by the Michigan Department of Environment, Great Lakes, and Energy. The water would be run through a filter system prior to discharge in compliance with the General Permit (Enbridge 2025a, 2025c).

F1.5.1.2.4 Excavated Material Described by the Applicant

Excavated material would be treated and then disposed of off-site at EMPS S1 and N1 or permitted landfills within approximately 70 miles of the Straits. Total excavated material would be approximately 10,200 cubic yards; 6,000 cubic yards of material removed from beneath the lakebed plus an additional estimated 4,200 cubic yards consisting of remnant drilling muds/fluids as well as an inert drying agent.

Transportation would be by truck to the disposal location (Enbridge 2025c); however, truck estimates are not known at this time (Enbridge 2025a) but would be less than the Applicant's Preferred Alternative due to anticipated cubic yards of disposal.

F1.5.1.2.5Pipeline Assembly Described by the Applicant

The pipeline would be preassembled on matted areas within the pipeline assembly area. Equipment within the pipeline assembly area would include: excavator, forwarder, dozer, pipe mover, side booms, tree clearer, skid steer, crane for pullback, rollers, hydrotest, tree skidder, generator, tracked pipe pusher, light plant, pickup truck, welder, utility terrain vehicle, and semi tractor. As previously stated, this area would be approximately 4 miles long and 80 feet wide, and would differ in location between the two sub-alternatives. Activities associated with pipe-string assembly would include delivery of 80-foot pipe sections, welding of the pipe sections, non-destruction testing of the welds, field coating of the joints and welds, and hydrotesting of the pipe-string (Enbridge 2025c). Hydrotesting the entire pipe-string in one section provides another layer of assurance by having all welds hydrotested prior to insertion into the HDD boring (Enbridge 2025b).

F1.5.1.2.6Pipeline Installation Described by the Applicant

When the HDD borehole is completed, the borehole would be conditioned by swab passes to prepare for pulling the pipe-string into the borehole. Cranes would be utilized to lift the assembled pipeline into the prepped borehole. The cranes would be approximately 100 feet in height to lift the pipe-string to the height required to pull it into the prepped borehole. The assembled pipeline would be assisted along the drill string by a pipe thruster and pipeline tracked pushers, which would be placed on the matted pipeline assembly area (Enbridge 2025c).

The ends of the pipe-string would be connected (tied-in) to the existing Line 5 pipeline by trenching from the end of the HDD to the existing pipeline locations at the North Straits Facility and Mackinaw Station (Enbridge 2025c). The trench would be approximately 7 feet deep, 4 to 5 feet wide at the bottom, and depending on soil types, approximately 12 to 19 feet wide at the top (Enbridge 2025c). The trenches would be excavated within the pipeline tie-in workspaces identified in Figures F-1 and F-2. At a minimum, these areas would be topsoil stripped over the trench line and travel lane. The subsoil excavated from the trench would be stockpiled separately from the topsoil piles. Once the pipeline is installed in the trench, the subsoil would be used to backfill the trench and then the topsoil would be replaced across the area from which it was stripped. The topsoil would then be prepped, seeded with appropriate seed mix, and mulched (Enbridge 2025a). A second hydrotest would occur after the pipe is installed in the borehole and tied into the existing Line 5 piping (Enbridge 2025c).

F1.5.1.2.7 Construction Lighting Described by the Applicant

The HDD drill rig, drill fluid processing unit, MTBMs, mud recovery/skid pump, pipe thruster, and boring/drilling operations units would be enclosed within temporary buildings installed within each HDD workspace (south and north of the Straits). Limited exterior lighting would be required. Light plants[3] would be used along the pipeline assembly area (and associated timber storage areas, as needed) (Enbridge 2025a). All temporary buildings and light structures would be removed post-construction.

F1.5.1.2.8 Site Restoration Described by the Applicant

Following construction, the Applicant would restore, to the extent possible, all impacted workspaces to pre-construction conditions, including restoring vegetation in matted areas of the pipeline assembly area. Within the HDD entry/exit workspaces and pipeline tie-in workspaces (where ground disturbance would primarily occur), pre-construction grades would be restored, disturbed subsoil and topsoil would be returned, and appropriate seed mixes would be applied. In matted areas (such as within the pipeline assembly area), restoration would consist of restoring the area to original grade as practicable in the limited areas where grading occurred, and revegetation, as needed. Placement and removal of mats typically does not impact the root structure of existing vegetation, and grasses and woody species would likely regenerate; however, restoration of these areas would also include over seeding with upland and wetland seed mixes according to preexisting wetland survey data. Upland areas that were graded would also be mulched and the mulch crimped for erosion control and to assist with revegetation. Forested wetland areas that are cleared would be expected to regenerate; however, supplementing the native regrowth by planting root stock tree species could be an option if beneficial in lieu of or in addition to wetland mitigation as required by the USACE Detroit District (Enbridge 2025b).

Restoration would occur at the waterbody crossings similar to the matted areas previously described. Bridges installed during construction would be removed (Enbridge 2025b). Additionally, all aerial crossing of roadways would be removed and any borings beneath roadways would be backfilled and restored.

F1.5.1.3 Operations

The operational and monitoring programs for the pipeline replacement segment would be similar to other buried pipeline segments utilizing HDD crossings within the Applicant's Mainline System. Accordingly, the same leak detections systems, pipeline integrity program, and maintenance procedures applicable to the Line 5 mainline pipe would apply to the pipe installed via HDD under the Straits (see Section 3.14.3 and Appendix F, Section F1.1, of the May 2025 Draft EIS) (Enbridge 2025a).

Additional new buildings or above-grade accessories are not required for the HDD Installation Alternative; therefore, no changes to existing structures or operational lighting would occur beyond what currently exists at the North Straits Facility and Mackinaw Station (Enbridge 2025a). As a result, all impacts associated with ground disturbance during construction would be temporary, with the exception of tree clearing, which would constitute a long-term impact due to the slow regeneration rate of trees.

[3] Light plants, also known as light towers or portable light plants, provide illumination in construction and other industrial settings where electricity is unavailable. They consist of a trailer, a tall mast with lamps mounted to it, and a diesel generator. These systems are designed to be portable, generating their own power, and can be moved around to meet job site needs.

F1.5.1.4 Permits and Approvals

Table F-2 provides a list of required permits and approvals indicated by the Applicant (Enbridge 2025a).

Table F-2. Required Permits and Approvals

Agency, Authority	Jurisdiction	Permit, Authorization, Survey or Consultation
Environmental Permits		
USACE	Federal	Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act, including consultation under Section 106 of the National Historic Preservation Act
USFWS	Federal	Consultation under Section 7 Endangered Species Act
USFS	Federal	Special Use Authorization for work within Hiawatha National Forest (for Sub-Alternative 2: Pipeline Assembly Area North)
EGLE	State	State Individual Permit – Natural Resources and Environmental Protection Act (NREPA), Part 303 Wetlands Protection
EGLE	State	Permits required for impacts to Great Lakes Submerged Lands – NEPA Part 325
EGLE	State	Part 91 – Soil Erosion Control Notice of Coverage
EGLE	State	NPDES General Permit for Discharge of Hydrostatic Test Water
MDNR	State	Coordination – Part 365 Endangered Species Protection
MDNR	State	Coordination for work within the French Farm Flooding State Wildlife Management Area (for Sub-Alternative 1: Pipeline Assembly Area South)
USACE in coordination with SHPO and THPO	Federal	Consultation – Section 106 National Historic Preservation Act
EGLE	State	Hydrostatic Discharge of Water – Certificate of Coverage
MPSC	State	Line 5 Replacement Segment via HDD
Mackinac County	Local	Part 91 – Soil Erosion Control
Emmet County	Local	Part 91 – Soil Erosion Control
Emmet County	Local	Coordination for work within the Headlands International Dark Sky Park (for Sub-Alternative 1: Pipeline Assembly Area South)

EGLE = Michigan Department of Environment, Great Lakes, and Energy; HDD = horizontal directional drilling; MDNR = Michigan Department of Natural Resources; MPSC = Michigan Public Service Commission; NPDES = National Pollution Discharge Elimination System; SHPO = State Historic Preservation Office; THPO = Tribal Historic Preservation Office; U.S. = United States; USACE = United States Army Corps of Engineers; USFS = U.S. Forest Service; USFWS = United States Fish and Wildlife Service.

F1.5.2 References

Enbridge Energy, Limited Partnership (Enbridge). 2025a. HDD Alternative. Data Need/Request No. 52. September 12, 2025.

Enbridge. 2025b. HDD Alternative – Temporary Pullback Assembly (pipe-stringing) Construction Area. Data Need/Request No. 51. August 8, 2025.

Enbridge 2025c. HDD Construction Footprint and Secondary Containment. Data Need/Request No. 49. August 6, 2025.

Enbridge. 2018. Alternatives for Replacing Enbridge's Dual Line 5 Pipelines Crossing the Straits of Mackinac June 25, 2018.