Final Environmental Impact Statement Enbridge Sandpiper Pipeline and Line 3 Replacement Projects

Douglas County, Wisconsin

August 2016

Volume I Final EIS

WISCONSIN
DEPT. OF NATURAL RESOURCES

To the Reader

Enbridge, Inc. (the Applicant) is applying for waterway and wetland crossing permits, Broad Incidental Take Permit/Authorization, and a Construction Site Erosion Control permit for the proposed Sandpiper Pipeline and Line 3 Replacement Pipeline Projects (the Projects) from the Wisconsin Department of Natural Resources (DNR). The DNR has determined to follow the Environmental Impact Statement (EIS) process under Chapter NR 150, Wis. Adm. Code, for compliance with the Wisconsin Environmental Policy Act (WEPA). The DNR has prepared this Final EIS to inform agencies, tribes, local governments, and the public about the environmental effects of the proposed Projects in Wisconsin and the measures identified to minimize impacts. The EIS is an informational tool, not a decision document.

This Final EIS explains the Applicant's proposal to: construct 14 miles of a new 30-inch-diameter crude oil pipeline (the Sandpiper Pipeline); construct 14 miles of replacement 36-inch-diameter crude oil pipeline (Line 3 Replacement Pipeline); and abandon in place 13 miles of the existing 34-inch-diameter Line 3 Pipeline in Douglas County, Wisconsin. The Sandpiper Pipeline and Line 3 Replacement Pipeline are part of the Applicant's proposals for two larger projects—the entire Sandpiper Pipeline would extend from Tioga, North Dakota, to Enbridge's terminal in Superior, Wisconsin, and the Line 3 Replacement Pipeline would replace the existing Line 3 Pipeline in Wisconsin, Minnesota, and parts of Canada. This Final EIS analyzes the potential environmental impacts associated with the construction, operation, and decommissioning of both proposed pipelines, and alternatives, in Wisconsin.

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Appendix F Comments Received on Draft Environmental Impact Statement

Acronyms

°F	degrees Fahrenheit
µg	microgram(s)
µg/m^3	micrograms per cubic meter

–A–

ACHP	Advisory Council on Historic Preservation
AEO	Annual Energy Outlook
AI	Agricultural Inspector
AM	agricultural monitor
AOC	Area of Concern
APE	Area of Potential Effect
API	American Petroleum Institute
APP	Agricultural Protection Plan (Appendix A)
ASNRI	Area of Special Natural Resource Interest
ATV	all-terrain vehicle
ATWS	additional temporary workspace

–B–

BA	Biological Assessment
BACT	Best Available Control Technology
bbl	barrels
BGEPA	Bald and Golden Eagle Protection Act
BP	Before Present
bpd	barrels per day
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
BTEX	benzene, toluene, ethylbenzene, and xylenes
BWSR	Minnesota Board of Water and Soil Resources

–C–

CAPP	Canadian Association of Petroleum Producers
CCO	Control Center Operations
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEQ	Council on Environmental Quality

CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPM	Computational Pipeline Monitoring
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWA	Clean Water Act

–D–

dB	decibel
dBA	A-weighted decibel scale
dbh	diameter at breast height
DATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
dilbit	diluted bitumen
DNR	Department of Natural Resources
DO	dissolved oxygen
DOE	U.S. Department of Energy

–E–

EAS	Environmental Analysis and Sustainability
ECD	erosion control device
EI	environmental inspector
EIA	U.S. Energy Information Administration
EIS	Environmental Impact Statement
Enbridge	Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership
EO	Executive Order
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan (Appendix B)
ERAP	Emergency Response Action Plan
ERP	emergency response plan
ESA	Endangered Species Act

–F–

°F	degrees Fahrenheit
FCL	Forest Crop Law
FHWA	Federal Highway Administration

–G–

g	grams
GDP	Ground Disturbance Procedures
GHGs	greenhouse gases
GIS	geographic information system
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
GLWQA	Great Lakes Water Quality Agreement
GRP	Grassland Reserve Program

–H–

H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HCA	high-consequence area
HDD	horizontal directional drilling
HUC	hydrologic unit code

–I–

ICP	Integrated Contingency Plan
IEM	Independent Environmental Monitor
IVP	Intelligent Valve Placement

–J–

--

–K–

kg	kilogram

–L–

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–M–

MBTA	Migratory Bird Treaty Act
MFL	Managed Forest Law
MLRA	major land resource area
MNR	Midwest Natural Resources, Inc.

MP	milepost
MPUC	Minnesota Public Utilities Commission

–N–

N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDPC	North Dakota Pipeline Company, LLC
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NETL	National Energy Technology Laboratory
NGL	natural gas liquid
NHI	Natural Heritage Inventory
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOx	nitrogen dioxides
NPDES	National Pollutant Discharge Elimination System
NPMS	National Pipeline Mapping System
NPREP	National Preparedness for Response Exercise Program
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	National Response System
NRT	National Response Team
NTSB	National Transportation Safety Board

–O–

O_3	ozone
OECD	Organisation for Economic Co-operation and Development
OHWM	ordinary high water mark
OPEC	Organization of Petroleum Exporting Countries
OSHA	Occupational Safety and Health Administration

–P–

PADD	Petroleum Administration for Defense District
PAH	polycyclic aromatic hydrocarbon

Pb	lead
PEM	Palustrine Emergent
PFO	Palustrine Forested
PHMSA	Pipeline Hazardous Materials Safety Administration
PLM	Pipeline Maintenance
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
psi	pound(s) per square inch
PSS	Palustrine Scrub-scrub
PSCW	Public Service Commission of Wisconsin
PTC	Positive Train Control
PUB	Palustrine Unconsolidated Bottom

–Q–

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–R–

RFFA	reasonably foreseeable future actions
ROW	Right-of-way
RRT	Regional Response Team

–S–

SCADA	Supervisory Control and Data Acquisition
SCC	social cost of carbon
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SLRCAC	St. Louis River Citizens Action Committee
SNA	State Natural Area
SNA	State Natural Area
SO_2	sulfur dioxide
sp.	species
SSURGO	Soil Survey Geographic Database

–T–

TCP	Traditional Cultural Property

–U–

UDP	Unanticipated Discoveries Plan (Appendix D)
U.S.	United States
USA	Unusually Sensitive Areas
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOS	U.S. Department of State
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

–V–

VTF	Voigt Intertribal Task Force
VOC	volatile organic compounds

–W–

WCSB	Western Canadian Sedimentary Basin
WEPA	Wisconsin Environmental Policy Act
WHS	Wisconsin Historical Society
Wis. adm. code	Wisconsin Administrative Code
Wis. stat.	Wisconsin Statute
WisDOT	Wisconsin Department of Transportation
WPDES	Wisconsin Pollutant Discharge Elimination System
WRP	Wetland Reserve Program
WWAP	Wisconsin's Wildlife Action Plan
WWI	Wisconsin Wetland Inventory

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Glossary

Additional Temporary Workspace (ATWS). Construction areas that are temporarily needed outside and along the permanent construction right-of-way to stage equipment, stockpile spoil material, and conduct material fabrication and assembly.

Agricultural Inspector (AI). An individual responsible for ensuring that the measures identified in the Agricultural Protection Plan (APP) are implemented.

Agricultural Monitor. On-site, third party monitor who will be responsible for auditing the Applicants compliance under the APP.

API Gravity. A measure of how dense an oil is compared to water. An API gravity greater than 10 indicates a crude oil is lighter than water and will float, and an API gravity less than 10 indicates it will sink in water. Thus lighter crude oils have a higher API gravity and denser crude oils have a lower API gravity.

Booming. A method of deploying temporary floating barriers to contain oil spills, enhance recovery by skimmers or other collection methods, and reduce impacts to shorelines. Booms come in a range of materials, shapes, and sizes.

Bitumen. A viscous oil-based (hydrocarbon) substance that is found in tar sands in northern Alberta or that can be produced by removing the lighter fractions from heavy crude oil during the refining process.

Breakup. Also known as spring melt, breakup is the short transition period between winter and spring when thawing begins, ice thins and/or breaks up, and river flows increase substantively and quickly, often to flood stages.

Caliper Pig. A secondary inspection tool used to continuously measure interior pipeline diameter. They are constructed to travel through the entire pipeline, being able to pass through constrictions.

Candidate Species. Plant and animal species considered for possible addition to the list of endangered and threatened species. For these species, the USFWS has on file sufficient information on biological vulnerability and threats to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

Cathodic Coating. A coating that prevents corrosion of metal by providing a barrier against oxygen and water.

Cathodic Protection. A technique using a low-voltage electrical current to prevent external corrosion. A cathode (positive current) attracts electrons resulting in corrosion of the cathode rather than the metal it is protecting.

Class I Railroads. Freight railroads with a 2013 operating revenue of $467.0 million.

Cleaning Pig. A tool to clean the interior pipeline removing solid and semi-solid deposits.

Critical Habitat. Defined in the Endangered Species Act, it is a specific geographic area which contains essential features for the conservation of endangered or threatened species.

Cumulative Effects/Impacts. Additive or interactive effects that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions in a similar timeframe and geographical location.

Cultural Resources. The material remains of human activity, including sites, buildings, structures, objects, districts, and landscapes. Cultural resources include archeological resources, which may be prehistoric or historic, and historic resources, which consist of the built environment. Cultural resources also include properties of religious and cultural significance (including **Traditional Cultural Properties**).

Custody Transfer Metering. Raw or refined petroleum products transferred from one operator to another is custody transferring. Measurement of the amount of product transferred is done via metering. Due to the high level of accuracy needed at the time of product transfer all meters used must be approved by the American Petroleum Institute.

Densitometer/viscometer. An online device used to continuously measure the density of crude oil within a pipeline; it can determine the quantity of material passing through. Densitometers are used for pipeline leak detection where relatively small leaks can be identified by comparing pressures and flow rates at points along a pipeline.

Dilbit. Bitumen blended with a diluent, usually a natural gas liquid such as condensate (e.g., propane, butane), to create a somewhat “lighter” product and to reduce viscosity for transportation.

Direct Effects/Impacts. Impacts directly caused by a proposed action that occur at the same time and place as the action.

Dispersant. A chemical mixture of solvents and emulsifiers used in response to an inadvertent oil release event to break oil into smaller droplets which are easier to biodegrade by microbes.

Earthen Trench Plugs (Hard Plugs). Barriers used during construction to block off a trench or ditch and direct surface run-off to an interceptor dike or collection pond.

Emergency Response Action Plan. A region-specific, concentrated version of the Integrated Contingency Plan (ICP) focused on unique features of the region specifically designed to be used by first responders and Enbridge personnel in the field.

Endangered Species. Plant and animal species in danger of extinction throughout all or a significant portion of its range, as listed under the ESA.

Environmental Inspector. An individual that routinely investigates construction work sites to ensure that all environmental regulations are followed.

Environmental Justice. The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Erosion Control Devices. Physical barriers to control, reduce, or prevent wind and water erosion on construction sites, typically berms, silt fences, or mulch cover.

Farmland of Statewide Importance. Land other than **prime farmland** or unique farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops. Farmland of statewide importance is a soil classification, as opposed to a land use, that may or may not be utilized as agricultural land.

Federally Listed Species. Species listed as endangered, threatened, proposed, or candidates by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act.

Fish Entrainment. The entrapment of fish into water pumps used in waterbodies.

Forest Crop Law and **Managed Forest Law Programs.** Landowner incentive programs that encourage long-term, sustainable management of private woodlands by providing tax benefits.

Freeze-up. The transition time in the fall when lakes and rivers begin to freeze over.

Frost Heave. An upwards swelling of soil during freezing conditions caused by an increasing presence of ice as it grows toward the surface, which can sometimes push buried objects, including pipelines, upward. Frost heave typically occurs in very cold climates including Northern Canada and the northern Midwest United States and Alaska.

Fugitive Dust. Dust that is not emitted from a single location, typically occurring as a result of blasting or vehicle traffic.

Greenfield. Undeveloped and naturally vegetated land.

Greenhouse Gas. A chemical compound which absorbs and emits radiation within the thermal infrared range that traps and reflects the suns thermal energy back to the earth instead of it dissipating out into space.

Hand Broadcasting. Scattering seed by hand over an area during site restoration.

Heavy Crude Oil. Highly viscous oil that cannot easily flow. Its density or specific gravity is higher than that of light crude oil.

High-Consequence Areas. Areas along a pipeline where a release would result in a significant impact such as densely populated areas, drinking water sources, or ecologically sensitive areas.

Historic Properties. Any district, archeological site, building, structure, or object that is either listed, or eligible for listing, in the National Register of Historic Places.

Horizontal Directional Drilling (HDD). This technique involves drilling a pilot hole under a waterbody and banks and then enlarging the hole through successive ream borings with progressively larger bits until the hole is large enough to accommodate a pre-welded segment of pipe.

Hydrophytic Species. A plant that grows either partly or totally submerged in water or in waterlogged soils.

Hydroseeding. A slurry of mulch and seed hosed over a large area to establishing groundcover, typically used for erosion control and bank stabilization.

Hydrostatic Testing. Filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.

Indirect Effects/Impacts. Impacts caused by a proposed action that occur later in time or farther removed in distance from the action.

Integrated Contingency Plan. Enbridge's emergency response plan for their pipelines.

Integrity Management Program. A suite of actions taken to ensure the long-term maintenance of an existing pipeline including examining comprehensive and integrated integrity results, including internal inspection data, and projected future maintenance activities.

Invasive Species. Non-native plants or animals accidentally introduced/spread in areas that can displace native species and alter ecological systems.

Leak Detection System. Permanent monitors installed in crude oil handling systems (e.g., pipelines, storage tanks) to detect and alert inadvertent oil releases.

Light Crude Oil. Liquid petroleum with a low viscosity, low specific gravity, and a low density; light crude oil flows at room temperature.

Line Locates. The profession of locating buried utility lines.

Macrophytes. An aquatic plant that is large enough to be seen by the naked eye.

Manifold Tie-ins. The equipment used to connect the pipeline to a storage tank, the manifold connects several smaller pipelines into a larger pipeline which is then run to the storage tank.

Mat Decking. Matting put in place to increase stability and safety of work sites by creating a flat, rigid area for rigging and other equipment.

Meter Prover. A physical test which determines the accuracy of a meter used in transfer of raw or refined petroleum products.

Mitigation. Avoiding, minimizing, rectifying (repairing), reducing, eliminating, compensating for, or monitoring environmental impacts.

National Ambient Air Quality Standards (NAAQS). Standards established by the U.S. Environmental Protection Agency (EPA) under authority of the Clean Air Act that apply for outdoor air throughout the country. The EPA has established NAAQS for seven criteria pollutants: sulfur dioxide, nitrogen dioxide, particulate matter (10 micron diameter or less and 2.5 micron diameter or less), carbon monoxide, ozone, and lead.

National Land Cover Database. A database which provides spatial and descriptive data for a range of land use across the United States used to assess ecological health and biodiversity as well as develop land management policy.

National Response System. A network of cooperating response teams consisting of personnel from federal, state, and local agencies as well as organizations with specialized skills and knowledge that can be called on to respond to oil spill emergencies.

No Action Alternative. The alternative of not constructing or operating a proposed project.

Nominal Flow Rate. The volume of liquid passing through a system under specific pressure conditions.

Nonlisted Species. Species that do not receive protection under the Endangered Species Act.

Noxious Weeds. Largely non-native plant species that have been deemed harmful to crops, horticulture, and/or ecosystems by a local, state or federal agricultural authority.

Open Cut. The excavation of a trench to install individual pipe sections, after which the excavation is backfilled.

Palustrine Emergent (PEM) Wetlands. Nontidal, freshwater wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants.

Palustrine Forested (PFO) Wetlands. Wetlands dominated by woody vegetation 20 feet or taller.

Palustrine Scrub-Shrub (PSS) Wetlands. Wetlands dominated by woody vegetation, including true shrubs, young, trees, and trees/shrubs that are less than 20 feet tall.

Palustrine Unconsolidated Bottom (PUB) Wetlands. Areas of water with at least 25 percent cover of particles smaller than stones (less than 6 to 7 cm) and a vegetative cover less than 30 percent.

Pipeline Maintenance (PLM) Shops. Shops equipped with emergency response equipment including apparatus to contain and absorb oil released to water including various booms (e.g., river booms, sorbent booms, containment booms), pumps and portable dam systems, skimmers, sorbent pads and rolls; boats and response vessels to handle water-based activities; and specialized equipment for land-based activities including portable tanks, generators, and trailers.

Potholing Equipment. Equipment used for to excavate a small test hole to expose underground utilities or other subsurface features.

Pour Point. The temperature at which a liquid becomes semisolid and loses its flow characteristics. For crude oil, a high pour point is generally associated with a high paraffin content, typically found in crude deriving from a larger proportion of plant material.

Pressure Control Valves. A safety feature which keeps pressure below the upper limit in hydraulic systems.

Prime Farmland. Defined by the U.S. Department of Agriculture as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses.

Proposed Species. Species of plants of animals that have been proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act.

Public Scoping. Public participation in determining the scope and topics to be addressed in an Environmental Impact Statement.

Pump Station. Stations containing electric pumping units which are positioned along the pipeline route to increase pressure and ensure continued transfer of oil along the route within safe limits.

Receiving Traps. A receiving trap is the exit terminal for a caliper or cleaning pig where it will be removed from the pipeline.

Regional Response Teams. Teams with defined roles and responsibilities within the National Response System, consisting of a standing team of federal, state, and local government representatives and an incident-specific team that can be activated for a response to an oil spill.

Right-of-Way. The legal right to follow a specified route through another's property or grounds based on usage or grants.

Sampling Facility. A facility used to test environmental samples to ensure regulatory compliance.

SCADA System. The Supervisory Control and Data Acquisition (SCADA) system is used for remote monitoring and control over newly constructed pipelines and station systems.

Sediment Barriers. Barriers constructed to reduce/prevent sediment from entering waterways (e.g., silt fence, straw bales, bio-logs).

Seed drilling. The process of using a seed drilling machine to sow seeds in the soil at equal distances and depth and cover them.

Shale Oil. Light crude oil contained in petroleum-bearing formations of low permeability, often shale or tight sandstone.

Skimmers. Equipment used to remove/recover oil from water surfaces after an inadvertent oil release and come in a wide variety specific to the body of water and release type.

Slope Breakers. Barriers created from soil or hay to slow and redirect surface run-off away from the construction area. Typically these run diagonal across the pipeline right-of-way.

Special Status Species. Plants or animals listed as threatened or endangered by Federal or State authorities.

Species of Greatest Conservation Need. Defined in Wisconsin's Wildlife Action Plan as native wildlife species that have low or declining populations and that are most at risk of no longer being a viable part of Wisconsin's fauna.

Splash Pup. A device to help dissipate energy during dewatering activities, such as hydrostatic testing, thus reducing onsite erosion.

Spoil. Soil, rock, and other material excavated during the construction process.

State or Federal Undertaking. A project or activity that requires a state or federal permit, license, or approval.

Stringing. The process of moving pipe sections into position.

Submerged Oil Recovery Plan. A plan to recover spills submerged in water including methods to identify areas containing submerged oil after an oil spill and methods to recover submerged oil (e.g., raking, tilling, air injection, chain dragging).

Teratogens. An agent that can disturb the development of an embryo or fetus.

Threatened Species. Animal or plant species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, as listed under the ESA.

Tight Oil. Light crude oil contained in petroleum-bearing formations of low permeability, often shale or tight sandstone.

Topsoil. The thin, top layer of soil where the majority of nutrients for plants is found.

Traditional Cultural Property. A property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.

Treaty Ceded Territory. Areas in which the United State Supreme Court affirmed that, based on their sovereign rights, tribes are allowed hunt, gather, and fish off-reservation.

Trench Breakers. Temporary or permanently installed barriers along the pipeline during construction to reduce erosion along the trench from surface run-off, similar to **Earthen Trench Plugs**.

Viscosity. The thickness and fluidity of a liquid.

Volatile organic compounds (VOCs). Chemical compounds which are gaseous at room temperature that are regulated due to their toxic, carcinogenic nature.

Weathering. The alteration of crude oil when released into the environment by various chemical, physical, and biological processes (dispersion, evaporation, dissolution, emulsification, photo-oxidation, adsorption/sedimentation, and biodegradation).

Wetlands. An area of land which is saturated by water seasonally or permanently long enough to develop unique ecosystem characteristics in the soil, flora, and hydrology.

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EXECUTIVE SUMMARY

1 Overview of the Projects

Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership own and operate a pipeline system that transports crude oil to supply refineries in North America. Enbridge (U.S.) Inc. is proposing to construct and operate the Sandpiper Pipeline, a new 30-inch-diameter crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota. Additionally, Enbridge Energy, Limited Partnership is proposing to build a 36-inch-diameter Line 3 Replacement Pipeline to supplant its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. For convenience, Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership are collectively referred to as “Enbridge” or the “Applicant” in this Final Environmental Impact Statement (EIS), and the pipelines are collectively referred to as the “Projects.”

The Project area within Wisconsin would be approximately 14 miles long and constructed entirely within Douglas County, from the Minnesota/Wisconsin border to the terminus in Superior, Wisconsin (Figure ES-1). The proposed route of these two pipelines through Wisconsin would generally follow the existing pipeline corridor operated and maintained by Enbridge. The new Sandpiper Pipeline would transport 375,000 barrels per day (bpd) and the Line 3 Replacement Pipeline would transport 760,000 bpd of crude oil to the existing Enbridge terminal in Superior. The Projects in Wisconsin are part of larger Enbridge proposals for two multistate pipeline projects—the new Sandpiper Pipeline would extend from Tioga, North Dakota, to Wisconsin, and the Line 3 Replacement Pipeline would replace the existing Line 3 Pipeline in Wisconsin, Minnesota, and parts of Canada.

2 Purpose of this Environmental Impact Statement

Wisconsin Department of Natural Resources (DNR) determined to follow the EIS process under Chapter NR 150, Wis. Adm. Code, for compliance with the Wisconsin Environmental Policy Act (WEPA). This EIS evaluates the environmental impact of the Projects within Douglas County, Wisconsin. As the lead agency under the WEPA, the DNR has prepared this Final EIS to inform decision makers, agencies, tribes, local governments, and the public about the environmental effects associated with the construction, operation, and maintenance of the pipelines in Wisconsin. The EIS analyzes potential impacts on the human and natural environment that could result from the proposed Projects and the route variations considered. It also considers the risks of an inadvertent oil release, the potential impacts that could result, and emergency planning and response measures to reduce the risk of such incidents occurring. The Final EIS takes into account Enbridge’s proposed management, monitoring, and mitigation measures to avoid or minimize impacts in the analyses of impacts. The DNR has recommended additional mitigation measures beyond those proposed by the Applicant to further reduce environmental impacts to some resources. These are contained in Chapter 5 of the EIS. The Final EIS has incorporated comments received from the public, stakeholders, and other agencies.

3 Purpose of the Projects

The Applicant’s overall purpose and need for the Sandpiper Pipeline Project is to operate a new crude oil pipeline to transport domestic crude oil sourced from the Williston Basin in Montana and North Dakota (light crude oil) to an existing terminal at Superior, Wisconsin, to meet the demands of refineries and markets in the Midwest and on the East Coast of North America as well as the demands of other regions in the United States through interconnected existing pipeline systems and other methods of transportation.

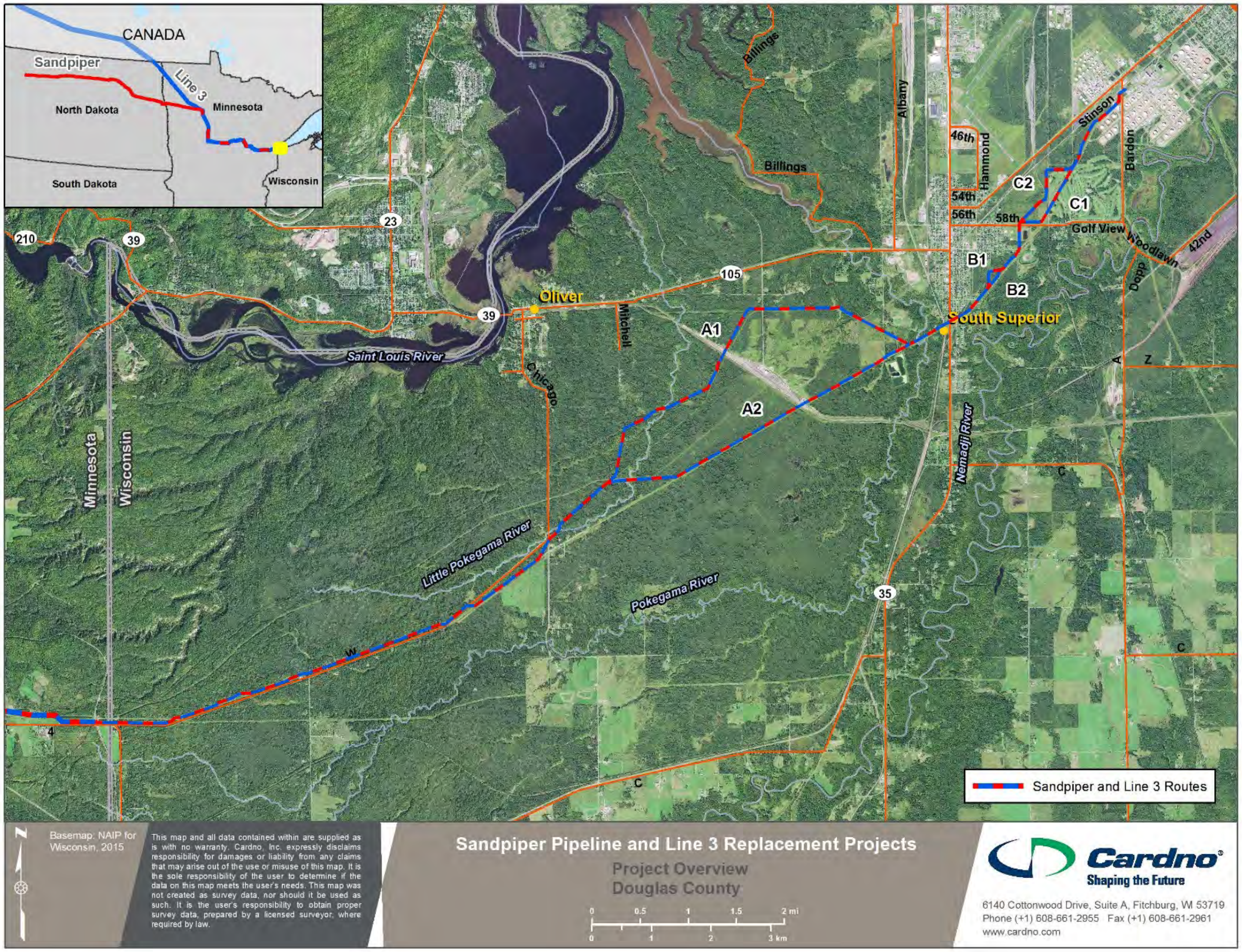


Figure ES-1 Overview of the Projects in Douglas County, Wisconsin

The Applicant's overall purpose and need for the Line 3 Replacement Pipeline Project is to replace the existing Line 3 Pipeline, which transports crude oil originating in the Western Canadian Sedimentary Basin to Enbridge terminals in the United States. The Applicant has proposed the Line 3 Replacement Pipeline Project to replace the original 34-inch-diameter pipeline installed in 1968 with a 36-inch-diameter pipeline. The replacement is necessary to increase the pipeline system's service life and reduce the frequency and magnitude of ongoing maintenance activities on the existing Line 3 Pipeline. The proposed Line 3 Replacement Pipeline Project would generally be expected to serve the same markets and transport the same product mix (light and heavy crude oil) as the existing Line 3 Pipeline.

4 Alternatives Considered

Alternatives to the proposed Projects were analyzed to determine whether any would be reasonable and environmentally preferable to the proposed Projects. These include expansion of existing pipeline systems; construction of other new pipeline systems; transporting oil via other methods including trucks, railroad, and barges; route variations; and alternative construction methods. Additionally, a "No Build" scenario was analyzed for the Projects.

Alternatives that could feasibly attain or approximate the proposals' objectives, but at a lower environmental cost or decreased level of environmental degradation, were carried forward for further analysis in the EIS. Alternatives that could not feasibly attain or approximate the proposals' objectives, and those that would result in a higher environmental cost or increased level of environmental degradation, were dropped from further consideration (Table ES-1).

Alternatives considered but not carried forward for further analysis in the EIS and the rationale for doing so are provided in Table ES-1.

Table ES-1 Alternatives Not Carried Forward

Alternative Description	Rationale for Rejection
Expansion of existing pipeline systems	**Sandpiper Pipeline Project Alternatives** Although the volume of oil transported by pipeline from North Dakota has risen since 2014 with the Plains Bakken North Pipeline, the Butte Expansion Pipeline, and the Kinder Morgan Double H Pipeline, the volume of crude oil being extracted from the Bakken region is still increasing. The Sandpiper Pipeline Project and other potential pipeline and rail projects would not be competing for the same production volumes, but rather, would help meet the demand for additional pipeline export capacity from the region, including to foreign markets now that the crude export ban has been lifted. Expansion projects for existing pipelines that would satisfy this increase in demand for export capacity from the Northern Great Plains region have not been identified. The alternative of expanding existing pipelines is not, therefore, considered to be a reasonable alternative to the Sandpiper Pipeline Project. **Line 3 Replacement Pipeline Alternatives** Three pipeline expansion projects have been proposed to transport crude oil originating in Canada to U.S. markets. 1. Trans Mountain Expansion Project would not serve the U.S. Midwest or East Coast markets. 2. Extensions to the Southern Access Pipeline would not serve to transport crude oil from Canada to U.S. markets. 3. The Alberta Clipper Pipeline would serve the same markets as the Line 3 Replacement Pipeline but would supply additional crude oil transmission capacity rather than displace oil that would otherwise be transported through the Line 3 Replacement Pipeline.

Table ES-1 Alternatives Not Carried Forward

Alternative Description	Rationale for Rejection
	Expansion of existing pipelines is therefore not considered to be a reasonable alternative to the Line 3 Replacement Pipeline.
Construction of other new pipeline systems	**Sandpiper Pipeline Project Alternatives** Two new pipelines have been proposed: 1. Energy Transfer Partners' pipeline from North Dakota's Bakken gathering facilities to Patoka, Illinois. 2. Enterprise Products Partners' pipeline from Stanley, North Dakota, to Cushing, Oklahoma. These new proposed pipelines would not reduce the need for additional capacity to transport the increased crude oil that will be produced in the region over the coming years and as such, these new pipelines are not considered to be reasonable alternatives to the Sandpiper Pipeline Project. **Line 3 Replacement Pipeline Alternatives** In Canada, three new pipeline projects have been proposed to transport crude oil originating in Canada to U.S. markets. 1. The Keystone XL Pipeline Project would have provided connections from Canada to U.S. Gulf Coast refineries, but will not be constructed since the required border crossing permit to Canada was denied by the Department of State on November 6, 2015. 2. The Northern Gateway Project would provide Canadian crude oil to the West Coast of Canada and the United States, although this pipeline would not serve the U.S. Midwest or East Coast. 3. The TransCanada Energy East Project would provide crude oil to East Coast markets in Canada and the United States, and may serve some customers who would otherwise receive oil from the Line 3 Replacement Pipeline; but Midwest markets would not be served. New pipelines within Wisconsin or elsewhere are not considered to be reasonable alternatives to the Line 3 Replacement Pipeline.
Transportation of crude oil by truck	The volume of oil that would otherwise be transported by the proposed pipelines would require approximately 1,875 tanker trucks for the proposed Sandpiper Pipeline and 3,800 tanker trucks for the Line 3 Replacement Pipeline. This would result in millions of highway miles driven by tank trucks per year, which could add congestion to highways and increase risks to public safety. The transportation of crude oil by truck alternative would likely result in a higher environmental risk, higher economic cost, and increased level of environmental degradation when compared to the movement of oil by pipeline. Further, because Enbridge would replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a feasible alternative to the Line 3 Replacement Project.
Transportation of crude oil by rail car	To move the same volume of crude oil that would be transported by the proposed Projects would require approximately 1,621 rail cars, or approximately 14 complete unit trains* per day. These trains would add traffic to congested systems and may affect moving other goods by rail to market (e.g., grain) and delays in passenger rail service. New offloading stations would be required adjacent to the Enbridge Terminal in Superior resulting in permanent wetland fill and new aboveground rail service lines, which would pose additional risk and impact to landowners and the public. Transportation of goods by rail can be affected by weather and conflicting rail traffic and mechanical/maintenance requirements. The transportation of crude oil by rail car alternative would likely result in a higher environmental cost or increased level of environmental degradation when compared to the movement of oil by pipeline. Further, because Enbridge would replace Line 3 and tie it into the existing infrastructure, a rail alternative is not a feasible

Table ES-1 Alternatives Not Carried Forward

Alternative Description	Rationale for Rejection
	alternative to the Line 3 Replacement Project.
Transportation of crude oil by barge	A barge alternative would first require crude oil to be transported by truck, rail car, or pipeline to an appropriate destination, which would be less economical than direct pipeline access. Barge transportation of crude oil would also come with additional risks and impacts including an increased risk of oil spills in waterways and barge accidents causing harm to the public. The transportation of crude oil by barge alternative would likely result in a higher environmental cost, higher economic cost, and increased level of environmental degradation when compared to the movement of oil by pipeline.

Note:

* A unit train is a train in which all rail cars carry the same commodity and are shipped from the same origin to the same destination, without being split up or stored en route. Unit trains carrying crude oil typically consist of 3 to 4 locomotives and approximately 120 rail cars.

4.1 Route Variations

The proposed route of these two pipelines through Wisconsin would generally follow the same route as that of six existing Enbridge pipelines within a 175-foot-wide permanently maintained easement. Enbridge identified small alternative pipeline routes (called route variations) for three segments of the proposed Projects: Segments A, B, and C. Route Variation A1 is proposed to avoid existing residences and the Pokegama Carnegie Wetlands State Natural Area (SNA); Route Variation B1 is proposed to avoid a land parcel that is involved in ongoing litigation; and Route Variation C1 is proposed to avoid a wetland conservation easement (Figure ES-1).

Table ES-2 provides a comparisons of these route variations based on impacts from co-construction of the Projects.

Table ES-2 General Features and Comparative Impacts of the Route Variations[a]

Pipeline Features	Route A Variations		Route B Variations		Route C Variations	
	A1	**A2**	**B1**	**B2**	**C1**	**C2**
Pipeline Segment Length (miles)	13.1	11.6	0.6	0.5	2.3	2.4
Co-located with Enbridge Existing Right-of-Way (miles)	1.7	7.3	0.0	0.5	0.3	0.3
Greenfield Route (miles)	1.8	0.5	0.6	0.0	1.3	1.2
Environmental Resources	Environmental Impacts					
	Route A Variations		Route B Variations		Route C Variations	
	A1	A2	B1	B2	C1	C2
Aesthetics	A larger amount of upland forest would be affected under A1, which would be more noticeable in the general landscape than for A2. A1 would also cross two more roads than A2, which would affect more viewers from the roadway		A slightly smaller amount of upland forest would be affected by B1 compared with B2, which would be less noticeable in the general landscape.		A smaller amount of upland forest would be affected by C1 compared with C2, which would be less noticeable in the general landscape.	

Table ES-2 General Features and Comparative Impacts of the Route Variations[a]

Pipeline Features	Route A Variations		Route B Variations		Route C Variations	
	A1	A2	B1	B2	C1	C2
	temporarily during construction.					
Air Quality	Since A1 is 1.5 miles longer than A2, slightly higher emissions would occur during construction.		Since B1 is 0.1 miles longer than B2, slightly greater emissions would occur during construction.		Since C2 is 0.1 miles longer than C1, slightly greater emissions would occur during construction.	
Agricultural Resources	No agricultural resources exist along A1 or A2: thus, there would be no impacts along either route.		No agricultural resources exist along B1 or B2: thus, there would be no impacts along either route.		No agricultural resources exist along C1 or C2: thus, there would be no impacts along either route.	
Cultural Resources	No resources of religious and cultural significance (including Traditional Cultural Properties [TCPs]) were found within the survey corridor. Therefore, there is no measurable difference in impacts on cultural resources between A1 and A2.		No resources of religious and cultural significance (including TCPs) were found within the survey corridor. Therefore, there is no measurable difference in impacts on cultural resources between B1 and B2.		No resources of religious and cultural significance (including TCPs) were found within the survey corridor. Therefore, there is no measurable difference in impacts on cultural resources between C1 and C2.	
Federally Listed Endangered and Threatened Species	Since A1 would impact an additional 8.5 acres of upland forest compared with A2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be greater for A1.		Since B1 would impact 0.3 fewer acres of upland forest than B2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be less than for B2.		Since C1 would impact 8.1 fewer acres of upland forest than C2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be less than for C2.	
Fish and Wildlife	One more Species of Greatest Conservation Need fish and one less state-listed threatened wildlife species occurs within 2 miles of the right-of-way (ROW) for A1 than A2.		The same number of Species of Greatest Conservation Need, state-listed species, and Species of Special Concern occur within 1 to 2 miles of both B1 and B2.		The same number of Species of Greatest Conservation Need, state-listed species, and Species of Special Concern occur within 1 to 2 miles of both C1 and C2.	
Forests and Other Woodland Resources	Approximately 8.5 additional acres of forest land would be impacted under A1 than A2.		Approximately 0.3 acre less forest land would be impacted under B1 than B2.		Approximately 8.1 fewer acres of forest land would be impacted under C1 than C2.	
Geological Hazards	No measurable difference between A1 and A2 with regard to geologic hazard impacts.		No measurable difference between B1 and B2 with regard to geologic hazard impacts.		No measurable difference between C1 and C2 with regard to geologic hazard impacts.	
Invasive Species	No measurable difference between A1 and A2 with regard to invasive species.		No measurable difference between B1 and B2 with regard to invasive species.		No measurable difference between C1 and C2 with regard to invasive species.	

Table ES-2 General Features and Comparative Impacts of the Route Variations[a]

Pipeline Features	Route A Variations		Route B Variations		Route C Variations	
	A1	A2	B1	B2	C1	C2
Noise	No measurable difference between A1 and A2 with regard to noise impacts.		No measurable difference between B1 and B2 with regard to noise impacts.		No measurable difference between C1 and C2 with regard to noise impacts.	
Public Utilities	A1 would cross 2 more roads than A2 but the same number of railroads.		Neither B1 nor B2 would cross any roads or railroads.		Both C1 and C2 would cross no roads and 2 railroads.	
Recreation Areas	The Pokegama Carnegie Wetlands SNA is avoided by A1 whereas 19.0 acres of the SNA would be impacted by construction of A2.		Neither B1 nor B2 would cross a recreation area.		C2 would not cross the Nemadji Golf Course, which would avoid disrupting golf course operations whereas C1 would cross the Nemadji Golf Course and the landowner has expressed concerns that normal business operations would be impacted during pipeline construction and restoration.	
Residential Areas	1 residence is located within 300 feet of the ROW for both A1 and A2.		B1 would avoid a land parcel that is involved in ongoing litigation, whereas B2 would not.		No residences are located within 300 feet of the ROW for both C1 and C2.	
Safety	No measurable difference between A1 and A2 with regard to safety.		No measurable difference between B1 and B2 with regard to safety.		No measurable difference between C1 and C2 with regard to safety.	
Socioeconomics	No measurable difference between A1 and A2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty rights.		No measurable difference between B1 and B2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty rights.		No measurable difference between C1 and C2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty rights.	
Soils and Topography	A1 would impact 15.8 fewer acres of compaction-prone soils and 4.9 more acres of highly water erodible soils than A2. A1 would impact 23.2 more acres of Farmland of Statewide Importance than A2.		B1 would impact 0.9 fewer acres of compaction-prone soils than B2. B1 would impact 2.3 more acres of Farmland of Statewide Importance than B2.		C1 would impact 3.9 fewer acres of compaction-prone soils than C2. C1 would impact 2.1 more acres of Farmland of Statewide Importance than C2.	
Transportation	A1 would cross two more roads compared with A2, which may affect road users temporarily during construction due to road closures or diversions.		Neither B1 nor B2 would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.		Neither C1 nor C2 would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.	
Vegetation (Plants)	One less state species of special concern occurs		The same number of state species of special concern,		The same number of state species of special concern,	

Table ES-2 General Features and Comparative Impacts of the Route Variations[a]

Pipeline Features	Route A Variations		Route B Variations		Route C Variations	
	A1	A2	B1	B2	C1	C2
	within 1 mile of the ROW for A1 than A2.		and threatened and endangered species occur within 1 mile of both B1 and B2.		and threatened and endangered species occur within 1 mile of both C1 and C2.	
Water Resources	A1 would have 14 more waterbody crossings than A2.		Neither B1 nor B2 would have any waterbody crossings.		C1 would have 5 fewer waterbody crossings than C2.	
Wetlands[b]	A1 would impact 1.6 more acres of wetlands during construction and 11.5 more acres during operations than A2. The Pokegama Carnegie Wetlands SNA is avoided by A1 whereas 19.0 acres of the SNA would be impacted by construction of A2.		B1 would impact 1.3 more acres of wetlands during construction and 1.2 more acres during operations than B2.		C1 would impact 4.8 fewer acres of wetlands during construction and 5.7 fewer acres during operations than C2. C2 would cross a wetland conservation easement.	

Source: Enbridge 2015; Enbridge and Merjent 2016

Notes:

[a] Comparisons between route variations are based on measurements/impacts of co-construction of Sandpiper and Line 3 Replacement Pipelines.

[b] Construction: Area of wetland impact within the construction workspace based on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas. Operations: Permanent conversion impacts include palustrine forested (PFO) wetland impacts within the construction workspace, and the area where palustrine scrub-shrub (PSS) wetlands occur within the new permanently maintained easement.

4.2 No Build Alternative

Under the No Build Alternative, the DNR would deny the permit application(s) and the Sandpiper Pipeline and Line 3 Replacement Pipeline Projects would not be constructed in Wisconsin. All impacts associated with construction and operation of new pipelines would not occur.

4.2.1 Sandpiper Pipeline No Build Alternative

Under the No Build Alternative, no new pipeline would be constructed to transport additional crude oil extracted from the Bakken to the existing crude oil terminal in Superior, Wisconsin. The additional crude oil would need to reach the terminal by other methods—most likely by rail car or tanker truck, with associated environmental impacts (Table ES-1). Over the longer term, other pipelines may be proposed to ship oil to refineries in the U.S. Midwest and East Coast to accommodate the increase in domestic supplies. An increase in refined or crude oil petroleum exports could occur since the export ban has been lifted and crude oil for export would need to be transported from the Bakken region to a coastal port for shipment overseas. The construction and use of such future pipelines could have similar, lesser, or greater impacts compared with those that would occur from the proposed Sandpiper Pipeline Project.

While the No Build Alternative would eliminate the environmental impacts directly associated with the Sandpiper Pipeline Project, it would not meet the purpose and need for the Proposed Action and it would not reduce the demand for oil in U.S. Midwest and East Coast markets.

4.2.2 Line 3 Replacement Pipeline No Build Alternative

Under the No Build Alternative, Enbridge could continue to operate and maintain the existing Line 3 Pipeline under its long-term integrity program. Maintenance costs for the pipeline system would be greater, and landowners would likely be impacted numerous times over subsequent years by ongoing and continuing maintenance activities. Since 2010, Enbridge has conducted 50 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles). Repairs typically involved the installation of welded full-encirclement around the existing pipeline and/or the cutting out and replacement of smaller sections of the existing pipeline (Enbridge 2014).

The integrity of a pipeline over its operational lifetime depends on how well protected it is against threats (e.g., corrosion) that can lead to defects in the pipeline over time. The Line 3 Pipeline was installed in the 1960s. Failure to replace the existing Line 3 would increase the ongoing costs of maintenance and would likely be associated with ongoing risks of pipeline leaks and releases in unrepaired or un-replaced sections of the aging existing Line 3 pipeline. Replacement of the Line 3 Pipeline would likely decrease pipeline leaks or releases in the future due to the installation of a new pipeline meeting current industry and regulatory standards and constructed using the most current technology. Replacement would reduce future maintenance activities that would otherwise be conducted to ensure safe operation of Line 3 under Enbridge's long-term integrity management program.

5 Construction and Operation Procedures

The Final EIS (Chapter 4) provides a detailed description of the construction, operation, and maintenance procedures that would occur for the Projects, and these are summarized here. The pipelines would be either a 30-inch (Sandpiper) or 36-inch (Line 3 Replacement) steel pipe. Associated facilities would be constructed within the fenced Superior Terminal (e.g., an electrical building, line and manifold tie-ins), and three mainline valves that can be closed to prevent oil from flowing would be installed along both pipelines.

To construct and operate the pipelines, Enbridge requires a right-of-way (ROW) agreement[1] (or easement) negotiated with landowners that grants Enbridge the right to construct, operate, and maintain a pipeline across a portion of property. The Projects' route would predominantly cross private lands located outside of municipal areas and also land owned by the City and Village of Superior and Douglas County Forest. Enbridge generally has existing blanket easement agreements that allow for expansion of the corridor for multiple pipeline ROWs.

Construction would begin with preparation of a 110-foot construction ROW, which would allow for temporary storage of topsoil and spoil as well as accommodate safe operation of construction equipment. For each proposed Project, construction activities would occur over a period of approximately 14 months, and would require 400 to 500 workers including an environmental monitor selected by DNR. At each construction location along the pipeline route, the Line 3 Replacement Pipeline would be constructed first, followed by the Sandpiper Pipeline (Figure ES-2). In general, construction would begin with crews clearing and grading the ROW for access; hauling and stringing pipe along the ROW to be accessible to construction personnel; and trenching to excavate the pipeline trench. In some areas trench dewatering may be necessary and require discharge of water. All applicable permits would be obtained for discharge activities, and dewatering would occur in compliance with DNR technical standards. After the trench has been excavated, conventional construction methods would be conducted in a sequential manner consisting

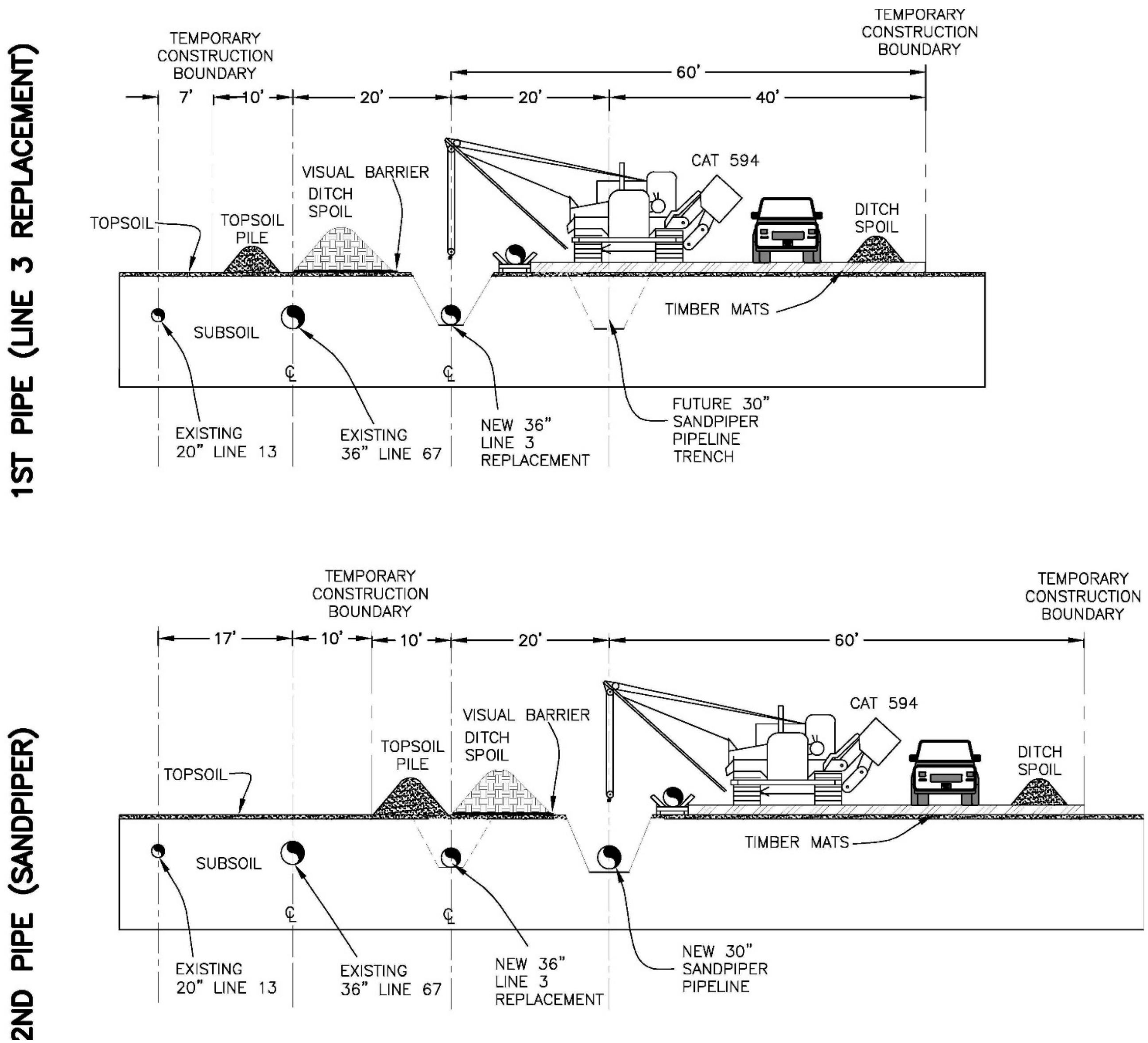
[1] Easements are also required for additional temporary workspace areas, access roads, and pipe storage and contractor yards on non-Enbridge property.

of pipe welding and coating; lowering in pipe to the proper depth; and backfilling. After the pipe is installed, the pipeline would be cleaned and tested[2] to ensure that the system could operate at the design pressure. Lastly, the site would undergo final cleanup and revegetation/restoration activities.

The pipelines would need to cross streams and rivers, roads, railroads and utilities. There are various methods used to cross streams, rivers and wetlands including the open cut/wet trench method, the dry crossing method, and the horizontal directional drilling (HDD) method. Utilities, and roadways are crossed using including the HDD method or the bore method. See Section 3.2.15 for descriptions of these crossing methods. In sensitive areas that would be crossed by the Projects, special construction methods would be implemented to avoid and/or minimize impact. Compensatory mitigation is proposed when impacts are unavoidable. Enbridge has developed an Environmental Protection Plan (see Appendix B) identifying best management practices (e.g., invasive species management plans and fugitive dust control measures) to avoid impacts to sensitive resources and an Agricultural Protection Plan (see Appendix A) identifying standards for construction activities occurring on agricultural land.

During active operation of the Projects, the movement of crude oil through the pipelines would be managed through an existing control center, which would be modified as appropriate to incorporate operation, maintenance, monitoring, and emergency response for the Sandpiper Pipeline and Line 3 Replacement Pipeline. Upon the completion of the Line 3 Replacement Project, including upstream portions outside of Wisconsin, Enbridge would decommission the existing Line 3 Pipeline. Decommissioning of the existing Line 3 Pipeline could be achieved by either abandoning the pipeline in place or by excavating and removing it. Section 4.3 provides a discussion of these alternatives. Enbridge proposes to decommission-in-place the existing Line 3 Pipeline. Decommissioning of the Sandpiper Pipeline and Line 3 Replacement Pipeline at the end of their useful lifespan would likely follow the same procedures as those described for the existing Line 3 Pipeline.

2 The "hydrostatic" testing process involves filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.



Source: Enbridge 2016

Figure ES-2 Typical Construction Workspace

6 Environmental Impacts of the Proposed Projects

The environmental resources analyzed in this Final EIS and the resulting impacts are provided in Table ES-3.

Table ES-3 Potential Environmental Impacts of the Proposed Projects

Environmental Resource	Environmental Impacts
Aesthetic Resources	• Short-term contrasts in visual scale, spatial characteristics, form, line, color, or texture experienced by recreationists, motorists, and local residents from vegetation removal and exposure of bare soil, fugitive dust, appearance of open trenches, use of construction vehicles/equipment, and storage of construction equipment and pipe. • Permanent changes to landscape from cleared vegetation on the permanent ROW. • Permanent changes to landscape from six to eight mainline valves and densitometer.
Air Quality	• Short-term increases in fugitive dust during construction. • Increases in particulate matter, polycyclic aromatic hydrocarbons (PAHs), and other compounds from burning of cleared wood. • Minor increases of combustion emissions from diesel- and gasoline-powered construction equipment. • Minimal releases of volatile organic compounds (VOCs) from temporary fuel storage tanks and refueling operations.
Agricultural Resources	• Prevention of crop production and grazing activities on 2.6 acres of agricultural land during construction, resulting in losses in production and economic activity. • Temporary soil erosion, soil compaction, increases in the proportion of large rocks in the topsoil, loss of soil productivity and fertility by mixing of topsoil and subsurface soil horizons, and damage to existing tile drainage systems during construction. • Short-term decreases in agricultural productivity during growing season following ROW restoration. • Slight increases in soil temperature during pipeline operations, which may cause early emergence of annual crops. • Potential emergence of the pipelines from the trench up to or near the surface of the land due to natural forces.
Cultural Resources	• No impacts to cultural resources since no properties of religious and cultural significance (including TCPs) were found within 1 mile of the Projects' corridor.
Federally Listed Endangered and Threatened Species	• Construction noise and activity may cause Canada lynx to move away from area; damage to Canada lynx dens possible if construction occurred during denning season. • Construction noise or presence of humans and equipment may cause migrating rufa red knots to startle and flush from wetlands or fields or to avoid the area. Temporary construction impacts to wetlands and cultivated fields could temporarily affect the foraging and sheltering behaviors of individual migrating rufa red knots. • Construction noise and activity would likely cause the gray wolf to move to other areas and possibly return after cessation of activities. • If clearing or construction occurs when the Northern long-eared bat is occupying summer roosts, bats may be disturbed due to noise or human presence causing abandonment of occupied tree cavities. Bats could be

Table ES-3 Potential Environmental Impacts of the Proposed Projects

Environmental Resource	Environmental Impacts
	killed or injured if occupied trees are felled, and impacts would be severe if trees containing maternity colonies are abandoned or destroyed.
Fish and Wildlife	• Injury or mortality to fish from construction, habitat loss and alteration including increased sedimentation and turbidity, barriers to movement, and entrainment in water intakes. • Injury or mortality to wildlife from construction, disturbance from noise and human activity and associated loss of breeding success, and habitat alteration and fragmentation. • If construction occurs in upland sandpiper breeding habitats during the breeding period, nests with eggs and young could be injured or killed by construction equipment or adults could abandon nests in the presence of noise and human activity, leading to reduced breeding success. • If wood turtles in the Pokegama River do not disperse due to construction equipment and noise, they may be injured or killed by construction equipment including stream diversion apparatus.
Forests and Other Woodland Resources	• Clearing of trees from within 86.2 to 103.1 acres of upland forests (depending on route variations chosen) would result in long-term forested landscape alteration given the long period of time needed for the community to mature to preconstruction conditions; maintenance mowing would prevent trees from reestablishing in 31.8 to 42.4 acres of the permanent ROW.
Geological Hazards	• Minor increased risk of landslides during construction due to vegetation clearing and surface drainage alterations.
Invasive Species	• Potential establishment of invasive plants (weeds) after disturbances of the soil. • Transportation of aquatic invasive species (plants and animals) to new locations in water or on construction equipment. • Clearing trees in the construction ROW may allow noxious weeds to become established and persist on the edges of undisturbed forested areas.
Noise	• Increased noise levels in residential, agricultural, recreational, and commercial areas near the proposed ROW from construction equipment and vehicles. Noise levels would vary depending on the construction phase, time of day, and equipment used. • Short-term increases in noise levels from vegetation clearing or maintenance activities during pipeline operations.
Public Utilities	• Temporary interruption of utilities possible but unlikely during construction of the proposed pipelines across existing utilities.
Recreation Areas	• Restricted access to recreation areas in the immediate area around the temporary ROW during construction. • Temporary restrictions of direct access to areas such as boat ramps, swimming access points, and fishing points due to increased traffic or road closures during construction possible.
Residential Areas	• Construction noise, visual effects, and potential access issues for residents of the 20 homes within 300 feet of the proposed pipeline routes. • Permanent easement of ROW on private properties would be a permanent impact to property owners.
Safety	• Possibility of fatal and nonfatal accidents and injuries for construction workers (occupational injuries) and the general population (non-

Table ES-3 Potential Environmental Impacts of the Proposed Projects

Environmental Resource	Environmental Impacts
	occupational injuries). • Potential exposure of workers or the public to contaminated materials from disturbance of unknown contaminated areas during construction.
Socioeconomics	• Temporary and minor increases in local population, demand for short-term housing, use of transportation systems, and expenditures in local economies for goods and services during construction. • Generation of tax revenues for the local and state governments from construction and operation of the proposed Projects. • Potential but unlikely minor impacts to one wild rice area used by tribes if sedimentation occurs in the Pokegama River and is carried downstream to the area.
Soils and Topography	• Soil erosion from vegetation clearing of the ROW. • Localized soil compaction in compaction-prone soils from construction equipment, which can lead to slower or less successful vegetation reestablishment following construction. • Topsoil/subsoil mixing and the introduction of rocks to the soil surface from deeper under the ground during excavation and backfilling. • Contamination of soils from releases of fuels, lubricants, and coolants from construction equipment and hazardous materials storage. • Minor increases in soil temperature during pipeline operations.
Transportation	• Traffic detours and short-term and partial, or brief full road closures during construction. • Temporary increases in traffic congestion from the movement of construction personnel, equipment, and materials from contractor and pipe storage yards to the construction work area. • Potential damage to roadway surfaces could occur as a result of the movement of heavy equipment and residual soils left behind from construction activities. • Increased workloads of local authorities to assist with traffic control.
Upland Plants	• Long-term impacts to vegetation communities within construction work areas from clearing trees and vegetation in upland communities. • Permanent loss of trees within the permanent ROW. • Loss of woody vegetation in grassland/meadows and open space habitats from clearing/removal activities. • Increased soil temperatures during pipeline operations may cause early germination and emergence in tall-grass prairie species. • Destruction or damage to state-listed endangered and threatened species and species of special concern through direct removal or trampling by construction equipment and vehicles.
Water Resources	• Temporary fluctuations of groundwater levels within shallow surficial aquifers in water sources used for hydrostatic testing. • Temporary reduced flow in streams during stream diversions and hydrostatic testing. • Temporary displacement of stream bottom sediments and increased erosion of soils adjacent to the waterbody. • Potential destabilization of stream banks and increased potential for additional erosion from the removal of vegetation, resulting in sedimentation and turbidity in waterbodies.

Table ES-3 Potential Environmental Impacts of the Proposed Projects

Environmental Resource	Environmental Impacts
	• Decreases in water quality from alteration of stream banks and removal of riparian vegetation.
Wetlands	• Loss of wetland vegetation from construction and maintenance activities. • Alteration of wetland communities from clearing trees in the construction ROW by exposing edge plant communities to elevated levels of sunlight and wind. • Changes in wetland species compositions, structure, and productivity from alterations in surface and subsurface hydrology from trenching, dewatering, and backfilling. • Wetland loss can lead to increased runoff from the landscape, resulting in flooding and streambank erosion. • Slower or less successful vegetation reestablishment following construction activities from localized soil compaction.

See Chapter 5 for complete discussions of these impacts to environmental resources from construction and operation of the proposed Projects.

7 Cumulative Impacts

Cumulative impacts are compounding effects resulting from repeated or other proximal actions, activities or projects, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a given period. The EIS identifies and describes cumulative impacts that could potentially result from implementation of the Projects in addition to other projects in the general area. Cumulative impacts identified for each environmental resource are addressed in Chapter 7 of the EIS. A discussion of greenhouse gases (GHGs) and climate change is also provided in this chapter. Past, present, and reasonable foreseeable future actions were identified within the cumulative impacts study area, including Enbridge pipeline construction/expansion projects, the Calumet Superior Refinery, and two road construction projects.

The proposed Projects in combination with other identified projects in the area would cumulatively impact: changes in land uses; loss and alteration of terrestrial vegetation and wildlife habitats; and increase in emissions associated with construction and operation of such projects. Forest and woodland resources, wetlands, and federally listed endangered and threatened species would be most vulnerable to cumulative impacts associated with the proposed Projects in combination with other past, present, and reasonable foreseeable future actions. Implementation of appropriate conservation and mitigation measures for these resources for the proposed Projects and future projects would reduce potential impacts. Such measures would be determined through consultations with federal, state, and local agencies. Both the Sandpiper Pipeline and Line 3 Replacement Pipeline in Wisconsin are extensions of much larger projects that intend to reach the Superior Terminal from different points of origin. If approved in Wisconsin and other jurisdictions outside of the state, cumulative impacts to environmental resources would also occur from the construction and operation of the entire Sandpiper Pipeline and the entire Line 3 Replacement Pipeline in Canada and the United States. Potential cumulative impacts would likely be similar to those discussed for environmental resources addressed in the EIS, and would include other effects specific to the areas crossed by the pipelines in those states.

Construction and operation of the proposed Projects would contribute to global GHG emissions, as would indirectly related activities including crude oil extraction, refining, and product end use (combustion). However, the extraction, refining, and combustion of crude oil would occur regardless of whether the proposed Projects are constructed and operated since there are other ways for crude oil to reach markets. The total life-cycle GHG emissions from activities directly and indirectly related to both the proposed Sandpiper and Line 3 Replacement Pipeline Project would approximate 2.77 percent of the U.S. total (or 3.15 percent of the reduced 2020 U.S. GHG emissions target) and 0.240 percent of the worldwide GHG emissions. GHG emissions increase the greenhouse effect and cause the Earth's surface temperature to rise, resulting in climate change. Natural ecosystems in the Midwest are being altered by the cumulative effects of climate change, land-use change, and an influx of invasive species, and risks to human health could increase with warmer temperatures, reduced air quality, and increased allergens caused by climate change (U.S. Environmental Protection Agency 2015). It is anticipated that the crude oil that would be transported through the proposed pipelines would replace existing supplies and thus not constitute an overall increase in global GHG emissions. However, crude oil originating from Canada could be exported overseas and now that the U.S. crude oil export ban has been lifted, it is possible that domestically-produced crude oil could be exported to foreign markets. In this event, GHG emissions associated with activities directly and indirectly related to the proposed Sandpiper and Line 3 Replacement Pipeline Project could constitute an incremental increase in global GHG emissions in the event that new refineries were built and operated overseas.

8 Potential Crude Oil Releases from the Proposed Projects

The EIS addresses the potential for impacts associated with accidentally release of hazardous materials, including crude oil and oil products during construction and operation of the proposed Projects. The safety requirements and standards, response contingency planning, types of releases, potential spill volumes, and potential environmental impacts are addressed in Chapter 8 of this Final EIS. For the proposed Projects, a crude oil release from either pipeline during operations of those pipelines represents the largest potential source of hazardous material environmental impact.

Preventing oil spills is the best strategy for avoiding potential damage to human health and the environment. The spill prevention plans that would be implemented by the Applicant during construction, operation, and maintenance of the proposed Projects are described in Sections 3.2.23 and 3.3.4 of this Final EIS.

If an accidental release of crude oil occurs from a pipeline, the best approach for containing and controlling the spill is to respond quickly in a well-organized manner. A response is most effective and organized if response measures have been planned ahead of time. The first level of response to a spill during operation of the Projects would generally be by Enbridge, followed by local government agencies, or state agencies when local capabilities are exceeded. If a spill from one of the proposed pipelines required additional response measures, the national and regional plans described in Section 8.2 could be implemented to contain and control an accidental release. The Region 5 Regional Response Team (RRT) has developed an Inland Response Tactics Manual to direct responders on appropriate response methods depending on the spill location, prevailing environmental factors, and response technique considerations and limitations. For example, the manual describes and diagrams containment methods on ice with trenches and sumps, different land barriers that can be constructed with available materials (e.g., earth, gravel, snow), and the purposes of different booming configurations in streams, rivers, and open water (Region 5 RRT 2013). In a large response effort, a Unified Command and an Incident Management Team made up of National Response System personnel would be created to address site/spill-specific concerns.

Crude oil released into the environment may affect natural resources, protected areas, and human uses and services to varying degrees, depending on the unique circumstances of the spill event, including:

- Quantity of oil released;

- Location of spill with respect to topography, infrastructure, and sensitive resources;
- Toxicity and other adverse effects of the oil to the resources;
- Seasonal and other environmental factors such as weather;
- Chemical composition and physical characteristics of the oil; and
- The effectiveness and speed of the response effort.

These factors are described in greater detail in Section 8.4 of the Final EIS. The volume of crude oil spilled and the receptor types (environmental resources) are key variables for estimating the magnitude of potential environmental impacts from a spill (Table ES-4). The magnitude of environmental impacts generally increases within an environmental resource as spill size increases.

Table ES-4 Spill Sizes and Potential Impacts

Spill Size	Crude Oil Spill Volume	Potential Impacts
Very small spills	less than 210 gallons (less than 5 barrels [bbl])	Negligible to minor detectable impacts on most resources, although there may be some visible presence of oil on land, vegetation, or water.
Small spills	210 to 2,100 gallons (5 to 49.9 bbl)	Negligible to medium impacts depending on the resource. Limited number of organisms may be killed or injured and impacts would likely be localized and short term.
Substantive spills	2,100 to 21,000 gallons (50 to 499.9 bbl)	Minor to medium impacts on most resources. Could cause local disruption of human uses and localized impacts to biological populations and communities.
Large spills	21,000 to 210,000 gallons (500 to 5,000 bbl)	Minor to substantial impacts depending on the resource. May include mostly continuous or nearly continuous presence of oil on all habitats in the vicinity and downgradient of the spill site.
Very large spills	greater than 210,000 gallons (greater than 5,000 bbl)	Minor to major impacts depending on the resource. Oil may persist in some environments for months to years, and could reach extensive sections of land or wetlands, and spread several to numerous miles on water surfaces. May cause regional disruption of human uses and regional impacts to biological populations and communities.

Wetlands, water resources and federally listed threatened and endangered species and habitats would be most sensitive to impacts of an accidental crude oil spill if they occur near the spill site. Spill response timing and effectiveness would have a large effect on the extent, severity, and persistence of impacts related to a spill. A well-executed response that quickly stopped the flow of oil, contained the spilled oil within a designated area away from sensitive resources, and removed the oil speedily and carefully would substantially lower impacts. National, regional, and Applicant spill response plans are (or would be) in place before construction and operation of the proposed Projects to aim for a rapid, effective response in the event of a spill (see Section 8.2 of the EIS for further details on spill prevention and response planning).

9 Public and Agency Involvement and Tribal Consultation

The scope of the environmental analysis in the EIS included public participation. The DNR sought public input on the topics that should be addressed in the EIS by providing a draft outline and asking the public to weigh in on topics that may be missing from the outline. The public was invited to review and comment on the EIS outline by email, by mail, or at a public meeting in which comments could be provided in either written or oral format. A public scoping meeting was held on August 25, 2014, at the Wisconsin Indianhead Technical College Superior Campus conference room in Superior, Wisconsin. DNR staff presented a brief overview of the EIS process and interested individuals then had the opportunity to identify topics they would like addressed in the EIS. The scoping process represented an important opportunity for citizens to provide constructive input on subjects ranging from specific ecological concerns to the potential for economic benefits from the proposed pipelines.

The Applicant has coordinated with several agencies in regard to the proposed Projects. Enbridge has applied for Section 404 Clean Water Act permits from the USACE for the discharge of dredge or fill material into waters of the United States, including in wetlands, for each Project. The Applicant has also coordinated with the Midwest Region Ecological Services Field Office (Region 3) and the Green Bay Field Office of the U.S. Fish and Wildlife Service (USFWS) to address concerns related to the following:

- Section 7 of the Endangered Species Act;
- Migratory Bird Treaty Act; and
- Bald and Golden Eagle Protection Act.

The DNR is consulting with The Voigt Intertribal Task Force (VITF) regarding tribal interests in the Project area. The VITF, a part of the Great Lakes Indian Fish and Wildlife Commission, recommends policy regarding inland harvest seasons and resource management issues. Tribal representatives provided comments during the scoping phase and are being updated on the EIS process with an opportunity to submit input through its conclusion. DNR is also consulting with numerous Indian tribes and the State Historic Preservation Officer, pursuant to Section 106 of the National Historic Preservation Act, on the identification of historic properties within the Project area and any potential impacts to these resources.

10 Public Review of Draft Environmental Impact Statement

The Draft EIS was made available for review and comment to all interested individuals, government agencies, and tribal members who had indicated an interest in the proposed Projects and was posted to the publicly accessible DNR website: http://dnr.wi.gov/topic/eia/enbridge.html. A total of 74 comment submittals (verbal comments, emails, letters, and attendance slips) were received from individuals, agencies, tribes, and organizations. Each comment submittal was logged upon receipt and placed in the administrative record.

Comments on the Draft EIS were provided verbally and in writing at a public hearing held on March 10, 2016, at the Superior Public Library, 1530 Tower Avenue, Superior, WI 54880. The meeting ran from 4:30 pm until about 7 pm. Approximately 66 people attended the public hearing and 15 people provided verbal comments at the public hearing. Chapter 9 provides further information on the comments received on the Draft EIS. All comments received on the Draft EIS, whether in written or verbal form, were considered equally.

This Final EIS has incorporated comments received on this Draft EIS from the public, agencies, tribes, and other stakeholders. Such comments required both minor editorial changes to the Draft EIS and additional analyses and discussion added to create this Final EIS.

In the event of denial of the permit(s), the Sandpiper Pipeline and Line 3 Replacement Pipeline Projects would not be constructed in Wisconsin. If permit(s) are granted, they would likely contain a final set of mitigation measures that must be carried out to reduce impacts as directed by the DNR.

11 Further Information About The Projects

DNR maintains a publicly accessible website for the proposed Projects: http://dnr.wi.gov/topic/eia/enbridge.html. The website includes a Project description for both pipelines with maps of their locations, information on required permits, consultations with other agencies and tribes, and information regarding the EIS process, and is regularly updated with such information.

12 References

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1. OVERVIEW OF PROJECTS AND REGULATORY REVIEW PROCESS

1.1 Introduction

This Final Environmental Impact Statement (EIS) evaluates the environmental impact of proposals to (1) install a new crude oil pipeline (Sandpiper Pipeline), (2) abandon-in-place an existing crude oil pipeline (Line 3 Pipeline), and (3) install a new crude oil pipeline to supplant the abandoned Line 3 Pipeline (Line 3 Replacement Pipeline) within Douglas County, Wisconsin.

Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership own and operate a pipeline system that transports crude oil to supply refineries in North America. Enbridge (U.S.) Inc. is proposing to construct and operate the Sandpiper Pipeline, a new crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota.

Additionally, Enbridge Energy, Limited Partnership is proposing to build the new Line 3 Replacement Pipeline that would replace its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. Sections of both pipelines would be constructed and operated in Wisconsin, and both pipelines would terminate at an existing Enbridge terminal in Superior, Wisconsin.

The route of these two pipelines through Wisconsin would generally follow an existing developed pipeline corridor operated and maintained by Enbridge (U.S.) Inc. that includes six other existing pipelines (Lines 1, 2, 3, 4, 13, and 67). The potential environmental impacts associated with the construction, operation, and decommissioning of both new pipelines, as well as the impacts associated with the decommissioning in place of the existing Line 3 Pipeline, are assessed in this Final EIS. For convenience, Enbridge Energy, Limited Partnership and Enbridge (U.S.) Inc. are collectively referred to as “Enbridge” or the “Applicant” in this EIS and the pipelines are each referred to as the “Project” or collectively, the “Projects.”

Enbridge has applied for waterway and wetland crossing permits, and will be applying for air pollutant discharge permits, Incidental Take Permit/Authorizations, and a Construction Site Erosion Control permit for its proposed Projects from the Wisconsin Department of Natural Resources (DNR). The DNR has determined that an EIS under the Wisconsin Environmental Policy Act (WEPA) review process is required for the Projects (ch. NR 150, Wis. adm. code). The DNR has prepared this Final EIS to inform agencies, tribes, local governments, and the public about the environmental effects of the proposed Projects in Wisconsin, and the measures identified to minimize those impacts.

1.2 Project Application

1.2.1 Overview of the Larger Projects

The proposed Sandpiper Pipeline would extend approximately 618 miles from Tioga, North Dakota, to Superior, Wisconsin. From the existing Beaver Lodge station south of Tioga to the Enbridge Clearbrook Terminal in Minnesota, the Sandpiper Pipeline would consist of a 24-inch-diameter crude oil pipeline and associated facilities. The proposed capacity to Berthold, North Dakota, would be 250,000 barrels per day (bpd), and the capacity of the segment to Clearbrook, Minnesota, would lessen to 225,000 bpd. From the Clearbrook Terminal, the Sandpiper Pipeline would consist of a 30-inch-diameter pipeline and associated facilities to transport 375,000 bpd to the Enbridge terminal in Superior, Wisconsin.

Enbridge also proposes to replace its existing 34-inch-diameter Line 3 with a new 36-inch-diameter pipeline as part of an ongoing maintenance program. Enbridge owns and operates Line 3, an existing 1,097-mile 34-inch pipeline, originally installed in 1968, that extends from Edmonton, Alberta, to Superior, Wisconsin. Enbridge conducted thorough internal inspections of Line 3 as part of its ongoing system-wide pipeline integrity program and has elected to replace all of Line 3 in Minnesota and Wisconsin as well as the Canadian portion of Line 3 between its existing Hardisty Terminal in east-central Alberta and Gretna, Manitoba. In Minnesota and Wisconsin, Enbridge proposes to abandon-in-place the existing Line 3 pipeline in accordance with 49 Code of Federal Regulations 195 and to construct a new Line 3 Replacement Pipeline along the same route.[1] The Line 3 Replacement Pipeline would transport 760,000 bpd of crude oil from Clearbrook, Minnesota, to Superior, Wisconsin. The span of the proposed Project outside the state of Wisconsin is referred to as the “Larger Project(s)” in this EIS. The proposed route for the Larger Projects is presented in Figure 1-1.

Although Enbridge is currently working to replace Line 3 in its entirety from Hardisty, Alberta, to Superior, Wisconsin, Enbridge identified the segment from the Wisconsin border to Superior as a priority to replace in advance of remaining portions within North Dakota and Minnesota based on the predicted frequency of maintenance activities. Therefore, the replacement of the portion of Line 3 in Wisconsin would proceed independently of the remaining upstream segments and is not contingent on regulatory, routing authority, or other authorizations in other states.

1.2.2 Overview of Wisconsin Projects

In Wisconsin the proposed Projects would cross the Wisconsin state border into Douglas County, and would be constructed along parallel alignments on approximately 14 miles of land within the town of Superior, the village of Superior, and the city of Superior, and would terminate at the existing Enbridge Superior Terminal (Figure 1-2). Permits and approvals for the Wisconsin portion of Sandpiper and Line 3 are discussed in Section 1.3.

1.2.3 Cost and Funding for the Projects

The Sandpiper Pipeline Project is privately funded and is expected to cost approximately $2.6 billion for the entire 618 miles of construction, 14 miles of which would be in Wisconsin. The Line 3 Replacement Project is privately funded and is expected to cost approximately $2.6 billion for the approximately 364 miles in the United States, 14 miles of which would be in Wisconsin.

[1] For the majority of its length in Wisconsin. See Chapter 3 for further details.

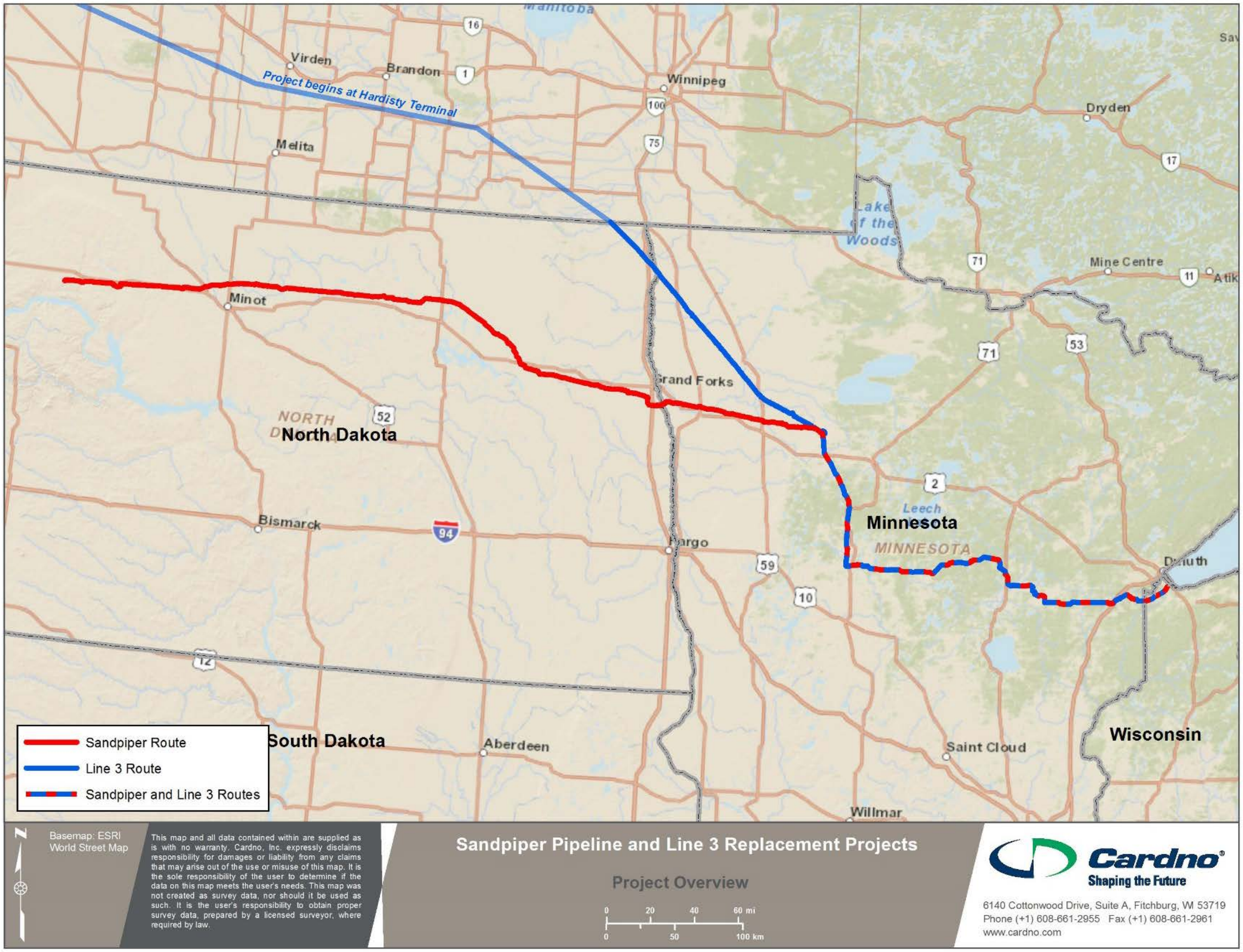

Figure 1-1 Overview of the Larger Projects

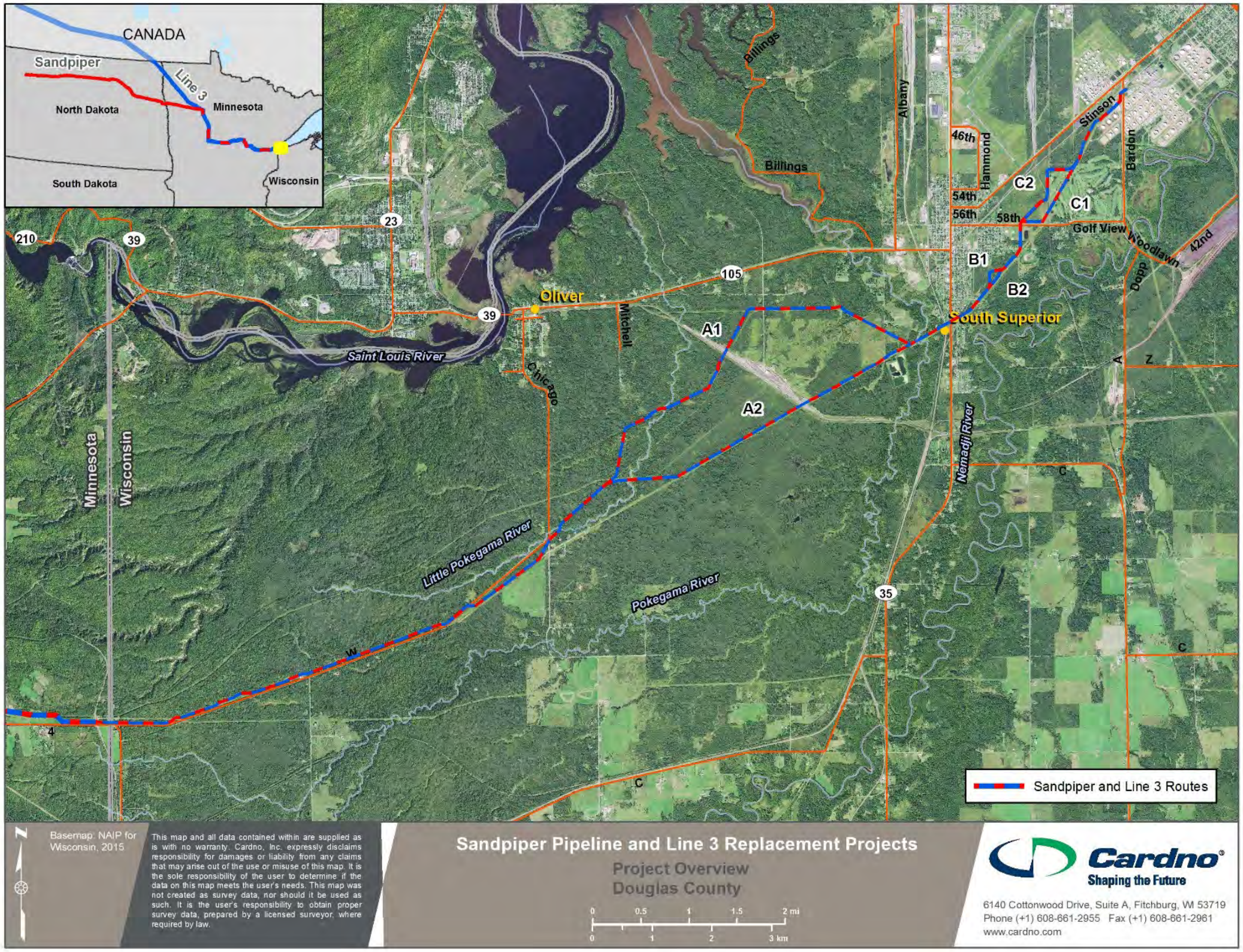

Figure 1-2 Overview of the Projects in Douglas County, Wisconsin

1.3 Authorities and Approvals for the Larger Projects

1.3.1 Federal Authorities and Approvals

The following federal permits and consultations are required for the Larger Projects:

- Section 404 Clean Water Act (CWA) / National Environmental Policy Act review;
- Section 106 National Historic Preservation Act (NHPA) consultation;
- Section 7 Endangered Species Act (ESA) consultation;
- Migratory Bird Treaty Act (MBTA) consultation; and
- Bald and Golden Eagle Protection Act (BGEPA) consultation.

These federal permits are described in the sections that follow.

1.3.1.1 Section 404 Clean Water Act

Enbridge applied for a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE) St. Paul District in February 2014 for construction of the Sandpiper Pipeline and in May 2015 for construction of the Line 3 Replacement Pipeline, including temporary bridges, grading, and utility crossings, in Wisconsin. A CWA Section 404 permit is required for the discharge of dredge or fill material into waters of the United States, including in wetlands. The USACE and DNR utilize a joint application process for projects involving impacts to waterways and wetlands, and coordinate impact assessment and project review. The U.S. Environmental Protection Agency (EPA) has responsibilities under Section 404 for reviewing the Sandpiper and Line 3 Replacement Projects and may provide additional comments regarding impacts to aquatic resources associated with Enbridge's proposed Projects during the USACE Section 404 permitting process.

1.3.1.2 Section 106 National Historic Preservation Act Consultation

Section 106 of the NHPA, as amended, requires the lead state or federal agency with jurisdiction over a state or federal undertaking (i.e., a project or activity that requires a state or federal permit, license, or approval) to consider effects on historic properties before that undertaking occurs. The intent of Section 106 is for state and federal agencies to take into account the effects of a proposed undertaking on any historic properties situated within the Area of Potential Effect (APE) and to consult with the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officer (SHPO), federally recognized Indian tribes, applicants for federal assistance, local governments, and any other interested parties regarding the proposed undertaking and its potential effects on historic properties. A "historic property" is defined as any district, archeological site, building, structure, or object that is either listed, or eligible for listing, in the National Register of Historic Places (NRHP). To be considered eligible for listing in the NRHP, a property generally must be greater than 50 years of age, although there are provisions for listing cultural resources of more recent origin if they are of "exceptional" importance. DNR is currently involved with Section 106 consultation with the Wisconsin State Historic Preservation Office and federally recognized Indian tribes as described in Section 1.3.2.

1.3.1.3 Section 7 Endangered Species Act Consultation

The U.S. Fish and Wildlife Service (USFWS) is responsible for ensuring compliance with the ESA. Section 7 of the ESA, as amended, states that any project authorized, funded, or conducted by any federal agencies should not "… jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined…to be critical….” The Applicant has coordinated with the Midwest Region Ecological Services Field Office (Region 3) and the Green Bay Field Office of the USFWS to identify federally endangered, threatened, and candidate species that may occur within the Project area. DNR coordination with the USFWS is ongoing as of early 2016 and will continue as needed through the end of the review process.

1.3.1.4 Migratory Bird Treaty Act Consultation

The Applicant has requested the USFWS to provide planning recommendations under the MBTA and Bald and Golden Eagle Protection Act (BGEPA) for the Projects (Enbridge 2014). Coordination with the USFWS is still ongoing.

1.3.2 Tribal Coordination

The Voigt Intertribal Task Force (VTF), a part of the Great Lakes Indian Fish and Wildlife Commission, recommends policy regarding inland harvest seasons and resource management issues. The VTF addresses matters that affect the treaty rights of the member tribes in the 1837 and 1842 treaty ceded territories. The VTF recommends harvest seasons and regulations for each inland season to the respective tribal councils for ratification prior to becoming an ordinance.

The DNR is continuing to coordinate with the VTF regarding tribal interests in the Projects. Tribal representatives provided comments during the scoping phase and are being updated on the EIS process with an opportunity to submit input through its conclusion.

1.3.3 State Authorities and Approvals

1.3.3.1 North Dakota Authorities and Approvals

The North Dakota Public Service Commission is responsible for siting pipelines in North Dakota. A siting permit application was submitted for the Sandpiper Pipeline Project in June 2014, and a siting permit application was submitted for the Line 3 Replacement Pipeline Project in May 2014.

1.3.3.2 Minnesota Authorities and Approvals

The Minnesota Public Utilities Commission (MPUC) is responsible for granting a Certificate of Need and Route Permit for the pipelines to be constructed and operated in Minnesota. The MPUC has accepted Enbridge’s applications for these permits and commenced its regulatory review processes for both pipelines. It authorized the Minnesota Department of Commerce, Energy Environmental Review and Analysis division to commence environmental reviews for both pipelines.

1.3.3.3 Wisconsin Authorities and Approvals

In addition to the federal permits and approvals described in Section 1.3.1, the Wisconsin portion of the Projects also requires permits and approvals from state agencies as provided in Table 1-1.

Table 1-1 Wisconsin Authorities and Approvals

Name of Agency	Title of Permit	Agency Action
Wisconsin Department of Natural Resources	Waterway and Wetland Individual Permits	In February 2014 Enbridge submitted a Water Resources Application for Project Permits for each Project to DNR for a waterway individual permit pursuant to ch. 30, Wis. stats, for approvals for temporary bridges, grading, and utility crossings. Enbridge also submitted a wetland individual permit pursuant to s. 281.36, Wis. stats, for each Project for approvals for temporary matting, trenching, and backfilling in wetlands during construction of the Projects. These permit applications are currently under review.
	Stormwater Permits	As of May 10, 2016, Enbridge has not yet submitted a Construction Site Erosion Control permit application with the DNR pursuant to s. NR 216.46, Wis. adm. code, which would document reduced sediment transport by stormwater through use of best management practices (BMPs) during construction of the Sandpiper Pipeline Project. Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Line 3 Replacement Project and received Notice of Coverage in December 2015. Enbridge has not yet requested authorization to discharge hydrostatic test waters under the Wisconsin Pollutant Discharge Elimination System (WPDES) permit program (Wis. stat. 283).
	Air Permits	Enbridge would need a Prevention of Significant Deterioration (PSD) Construction Permit for each Project from DNR pursuant to ch. NR 405, Wis. adm. code for alterations to its Superior Terminal that would occur as part of the Projects. In Wisconsin, this permit for new or existing major stationary air pollutant sources may be granted if best available control technology (BACT) standards are implemented (s. NR 405.08, Wis. adm. code) and modifications would not deteriorate air quality in the attainment area as outlined in a PSD Construction Permit. Enbridge submitted an Air Pollution Control Construction Permit application under ss. NR 400-499, Wis. adm. code, in July 2015 in fulfillment of both of these requirements for each Project. Wisconsin air quality standards outlined in ch. NR 404, Wis. adm. code, have been adopted from the EPA's National Ambient Air Quality Standards (NAAQS), and so monitoring and permitting of emissions will be largely regulated by the state. This permit application was withdrawn in June 2016, and will need to be resubmitted.
	Broad Incidental Take Permit/Authorization	Enbridge has been coordinating with staff in the DNR's Bureau of Natural Heritage Conservation regarding the proposed Projects since 2013. Enbridge officially applied for individual Incidental Take Permits in October 2015 for Line 3, Segment 18, and received their permit in April 2016. Incidental Take Permits for the Sandpiper Pipeline Project will be applied for when more Project details are known.
Public Service Commission of Wisconsin (PSCW)	Public Interest Determination	On March 14, 2014, Enbridge filed an application with the PSCW requesting that PSCW determine that the acquisition of permanent easements and additional temporary workspace for the Sandpiper and Line 3 Replacement Pipeline Project is in the public interest pursuant to s. 32.02(13), Wis. stats. In February 2016, Enbridge withdrew its application to the PSCW based on easement acquisition.
Wisconsin Department of Agriculture, Trade and Consumer Protection	Agricultural Protection Plan	In October 2013, Enbridge submitted an Agricultural Protection Plan identifying measures to avoid, mitigate, or provide compensation for possible negative agricultural impacts resulting from pipeline construction. This plan was developed in consultation with the Wisconsin Department of Agriculture, Trade and Consumer Protection and is included as Appendix A to this EIS.

Table 1-1 Wisconsin Authorities and Approvals

Name of Agency	Title of Permit	Agency Action
Wisconsin Department of Transportation	Road Crossing Permits	Any construction including grading, excavating, and/or boring along a federal, state, or local right-of-way (ROW) is required to obtain a permit from the Wisconsin Department of Transportation prior to start of work under s. 86.07(2), Wis. stats. Enbridge will submit road crossing permits for each Project for approval in the future.
Wisconsin State Historic Society	Cultural Resources Consultation	The DNR conducts a review of possible impacts to cultural resources resulting from the Projects' activities and coordinates with SHS as necessary.

1.3.4 Local Permits

In addition to the state permits, an erosion control/grading permit is required from the City of Superior before any land-disturbing activity occurs in the city. This permit is one component of the Construction Site Pollutant Control requirements, with the other being an Erosion Control Plan using best management practices (BMPs). Enbridge submitted an erosion control/grading permit to the city in January 2016 for the mainline construction activities associated with the Line 3 Replacement Project, and the permit is currently pending approval. Enbridge has not submitted an application for the Sandpiper Pipeline Project. The City of Superior also requires a Post-Construction Stormwater Permit for the Projects. Enbridge submitted the application in January 2016 for mainline construction activities associated with the Line 3 Replacement Project and received approval in February 2016. Enbridge has not submitted the application for the Sandpiper Pipeline Project.

1.4 Preparation of the Environmental Impact Statement

1.4.1 Public Scoping Process

The scope of the environmental analysis in the Draft EIS included public participation. On August 15, 2014, DNR issued a public notice seeking public input on the topics that should be addressed in the EIS by providing a draft outline and asking the public to weigh in on topics that may be missing from the outline. The public was invited to review and comment on the Draft EIS outline by email, by mail, or at a public meeting in which comments could be provided in either written or oral format. A public scoping meeting was held on August 25, 2014, from 3:30 to 8 pm at the Wisconsin Indianhead Technical College Superior Campus conference room, 600 North 21st St., in Superior. DNR staff presented a brief overview of the EIS process and interested individuals then had the opportunity to identify topics to be addressed in the EIS. The public scoping process represented an important opportunity for citizens to provide constructive input on subjects ranging from specific ecological concerns to the potential for economic benefit from the proposed Projects.

Key environmental issues identified during the public scoping process for the Projects included:

- The need for the pipelines and the need for oil in the United States generally.
- Alternative routes and methods of moving oil including pipelines in Canada, oil trains, trucks, and shipping across Lake Superior.
- Removing the Line 3 Pipeline instead of abandoning-in-place.
- Other energy sources and measures including energy conservation, electric cars, and renewable fuel production.

- Greenhouse gas (GHG) emissions from crude oils at all stages of use (extraction, transportation, processing, and end use).
- The impacts of carbon and other emissions on local and regional communities.
- Including the entire Lake Superior and all of the 1837, 1842, and 1854 Ceded Territory in the analyses of impacts.
- Landowner impacts and easement issues.
- The potential for spread of noxious weeds and measures to reduce such impacts.
- The effectiveness of restoration methods, the successes or failures of wetland mitigation projects, and the adequacy of compensatory mitigation to offset impacts.
- Disclosure of the chemical constituents of the crude oil and diluent mixtures of the products that would be shipped, including their health hazards.
- Providing the results of variable pressure stress, heat exposure, and corrosion tests.
- Enbridge's safety record and the reliability and efficacy of pipeline safety measures including shutoff valves.
- The impacts of spills of different oils in Lake Superior, including potential health and economic impacts, and consideration of the Great Lakes Water Quality Agreement between the United States and Canada.
- The use of cleanup methods in the event of an oil spill, including disallowing the use of dispersants.
- Requiring a performance bond to guarantee sufficient funds for complete cleanup operations.
- Cumulative impacts of potential spills from all pipelines in the region and of past oil spills on groundwater and surface water resources.
- Cumulative impacts on "downstream" pipeline projects and of the entire Enbridge pipeline network.
- Including the new Calumet Shipping proposal on Lake Superior in the analysis of impacts.
- Potential expansion of the Superior refinery and associated health impacts.
- The use of the proposed pipelines to export water from Lake Superior.
- Economic benefits of the Projects.

All issues raised during scoping were considered in the development of this EIS.

1.4.2 Scope of the Environmental Impact Statement

In determining the scope of the Draft EIS, the DNR considered the key environmental issues identified during public scoping and assessed information provided in the Applicant's Environmental Reports,[2] the Applicant's Supplemental Information,[3] the Applicant's Supporting Environmental Data,[4] and other publically available data in light of concerns identified during the scoping process. The environmental resources addressed in the Draft EIS were (in alphabetical order):

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2 Available at: http://dnr.wi.gov/topic/eia/documents/enbridge/spp_l3_eir.pdf and http://dnr.wi.gov/topic/EIA/documents/Enbridge/Encl3_SPP-L3R_WI_EIR_Master_Rev_2_2015-07-15.pdf.

3 Available at: http://dnr.wi.gov/topic/EIA/documents/Enbridge/SPP_L3_WDNR_Chap30_Supplemental_Info_2014-02-25.pdf.

4 Available at: http://dnr.wi.gov/topic/EIA/documents/Enbridge/SPP_L3_WDNR_Chap30_Supporting_Env_Data_2014-02-25.pdf.

- Aesthetics
- Air Quality
- Agricultural Resources
- Cultural Resources
- Federally Listed Endangered and Threatened Species
- Fish and Wildlife
- Forests and Other Woodland Resources
- Geological Hazards
- Invasive Species
- Noise
- Public Utilities
- Recreation Areas
- Residential Areas
- Safety
- Socioeconomics
- Soils and Topography
- Transportation
- Vegetation (Plants)
- Water Resources
- Wetlands

1.4.3 Public Review of the Draft EIS and Preparation of the Final EIS

The Draft EIS was made available for review and comment to all interested individuals, government agencies, and tribal members who had indicated an interest in the proposed Projects and was posted to the publicly accessible DNR website: http://dnr.wi.gov/topic/eia/enbridge.html. A total of 74 comment submittals (verbal comments, comment emails, letters, and attendance slips) were received from individuals, agencies, tribes, and organizations. Each comment submittal was logged upon receipt, placed in the administrative record, and is provided in Appendix F to this Final EIS.

Comments on the Draft EIS were provided verbally and in writing at a public hearing held on March 10, 2016, at the Superior Public Library, 1530 Tower Avenue, Superior, WI 54880. The meeting ran from 4:30 pm until about 7 pm. Approximately 66 people attended the public hearing and 15 people provided verbal comments at the public hearing. Chapter 9 provides further information on the comments received on the Draft EIS. All comments received on the Draft EIS, whether in written or verbal form, were considered equally.

This Final EIS has incorporated comments received on this Draft EIS from the public, agencies, tribes, and other stakeholders. Such comments required both minor editorial changes to the Draft EIS document and additional analyses and discussion added to create this Final EIS.

In the event of denial of the permit(s), the Sandpiper Pipeline and Line 3 Replacement Pipeline Projects would not be constructed in Wisconsin. If the permit(s) are granted, they would likely contain a final set of mitigation measures that must be carried out to reduce impacts as directed by the DNR.

1.4.4 Further Information about the Projects

DNR maintains a publicly accessible website for the proposed Projects: http://dnr.wi.gov/topic/eia/enbridge.html. The website includes a description of both pipelines with maps of their locations, information on required permits, consultations with other agencies and tribes, and information regarding the EIS process, and is regularly updated with such information.

1.5 References

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Enbridge. 2015. Sandpiper Pipeline and Segment 18 - Line 3 Replacement Projects, Wisconsin Department of Natural Resources Environmental Impact Report. July 2015.

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2. PURPOSE OF PROJECTS

This chapter describes the purpose of the Sandpiper Pipeline Project and the Line 3 Replacement Pipeline Project based on the Applicant's stated purpose and need, and within the context of pipeline infrastructure capacity and crude oil supply and market demand.

2.1 Purpose of Projects

The Applicant's overall purpose for the Sandpiper Pipeline Project is to operate a new crude oil pipeline for transporting domestic crude oil sourced from the Williston Basin in Montana and North Dakota (Bakken crude oil) to meet the demands of refineries and markets in the Midwest and on the East Coast of North America as well as to other regions in the United States through interconnected existing pipeline systems and other methods of transportation (Figure 2-1).

Bakken crude oil is a light, sweet crude oil with an American Petroleum Institute (API) gravity[1] generally between 40 and 43 degrees, and sulfur content less than 0.2 weight percent. It is similar to many other light, sweet crude oils produced and transported in the United States. The U.S. Energy Information Administration (EIA) categorizes crude oil that has an API gravity between 35 and 50 degrees and less than 0.3 weight percent sulfur as light sweet oil, and Bakken crude oil falls within the range for both properties (North Dakota Petroleum Council 2014). The Applicant has proposed an annual delivery capacity of 375,000 barrels per day (bpd) of Bakken crude oil to Superior, Wisconsin, via the proposed Sandpiper pipeline.

The Applicant's overall purpose for the Line 3 Replacement Pipeline Project is to replace the existing Line 3 Pipeline, which originates in Edmonton, Alberta, and transports crude oil originating in the Western Canadian Sedimentary Basin (WCSB) to Enbridge terminals in the United States (Figure 2-1). The Line 3 Replacement Project would serve demand that would have otherwise been served by the existing Line 3 Pipeline. The Applicant has proposed the Line 3 Replacement Pipeline Project to replace the original 34-inch-diameter pipeline installed in 1968 with a 36-inch-diameter pipeline, which is a more current industry standard size and more energy efficient. The replacement would increase the pipeline system's service life and reduce the frequency and magnitude of ongoing maintenance activities on the existing Line 3 Pipeline. The proposed Line 3 Replacement Pipeline Project is generally expected to serve the same markets and transport the same product mix (light and heavy crude oil) as the existing Line 3 Pipeline (Enbridge 2015).

The light crude oil carried by the Line 3 Replacement Pipeline would have very similar characteristics to those described above for the Sandpiper Pipeline Project. The heavy or extra-heavy bitumen from western Canada has an API gravity of about 8 degrees (meaning it is heavier than water) and a high sulfur content. To enable it to be transported by pipeline it is diluted with light oils to raise its API gravity as "diluted bitumen" to about 22.3. It can be further diluted to be classified as synthetic crude oil with an API gravity of 31 to 33 degrees. The design capacity of the existing Line 3 was 760,000 bpd, but for safety reasons the pumping pressure has been reduced and the line currently carries 390,000 bpd. Replacing the existing Line 3 Pipeline with a larger diameter pipeline (36 inches as opposed to the existing 34 inches) would restore Line 3 to its historical operating capabilities. The Applicant has proposed an annual delivery

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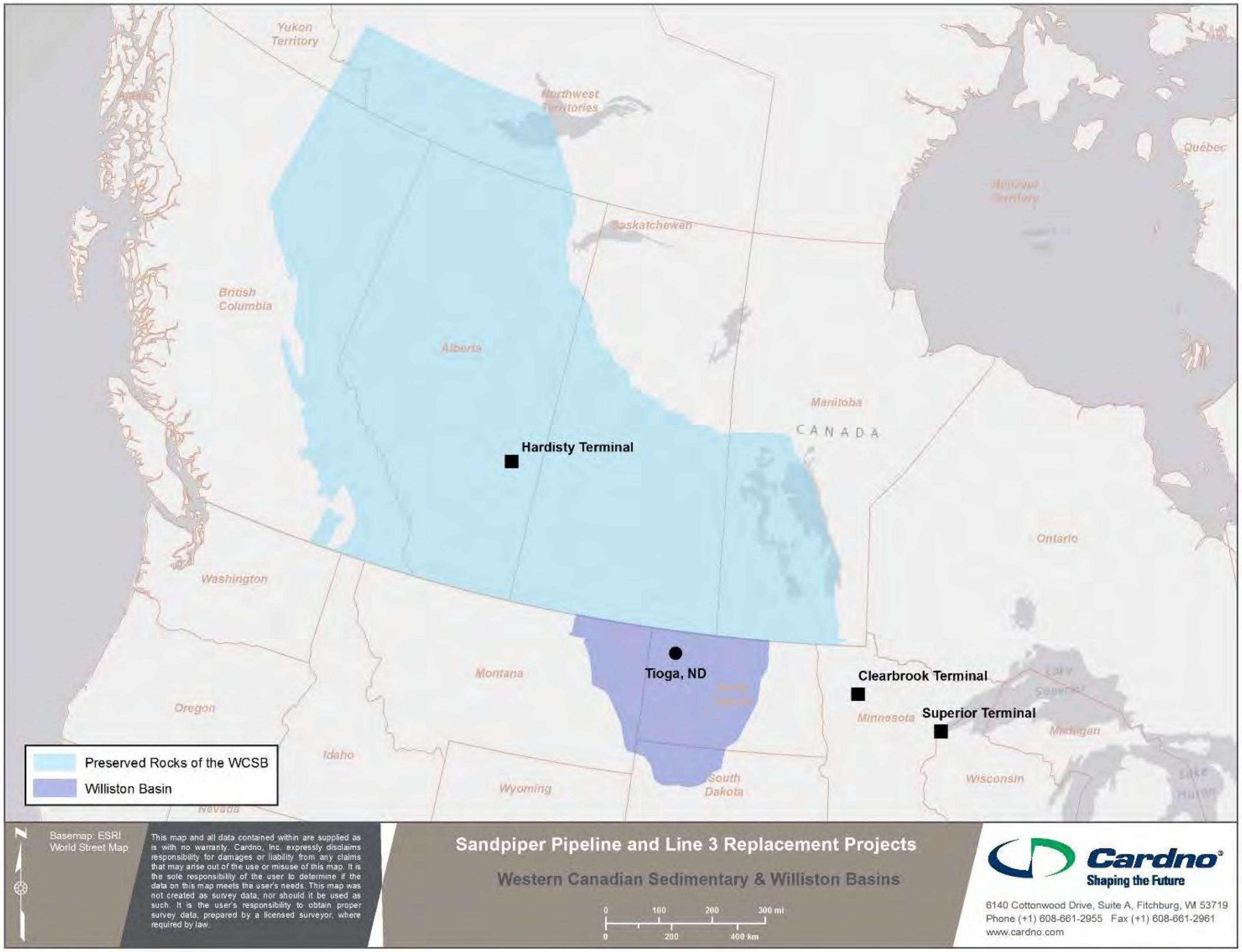
[1] API gravity is a measure of how dense an oil is compared to water. An API gravity greater than 10 indicates a crude oil is lighter than water and will float, and an API gravity less than 10 indicates it will sink in water. Thus lighter crude oils have a higher API gravity and denser crude oils have a lower API gravity.

capacity of 760,000 bpd of Bakken crude oil to Superior, Wisconsin, via the proposed Line 3 Replacement Pipeline.



Note: Both oil basins physically extend across the Canada/U.S. border but are displayed to show domestic versus Canadian oil sources.

Figure 2-1 Overview of Western Canadian Sedimentary Basin and Williston Basin

2.2 Existing Pipeline Capacity

There are approximately 55,000 miles of crude oil pipelines in the United States that connect points of supply and regional markets (Figure 2-2).

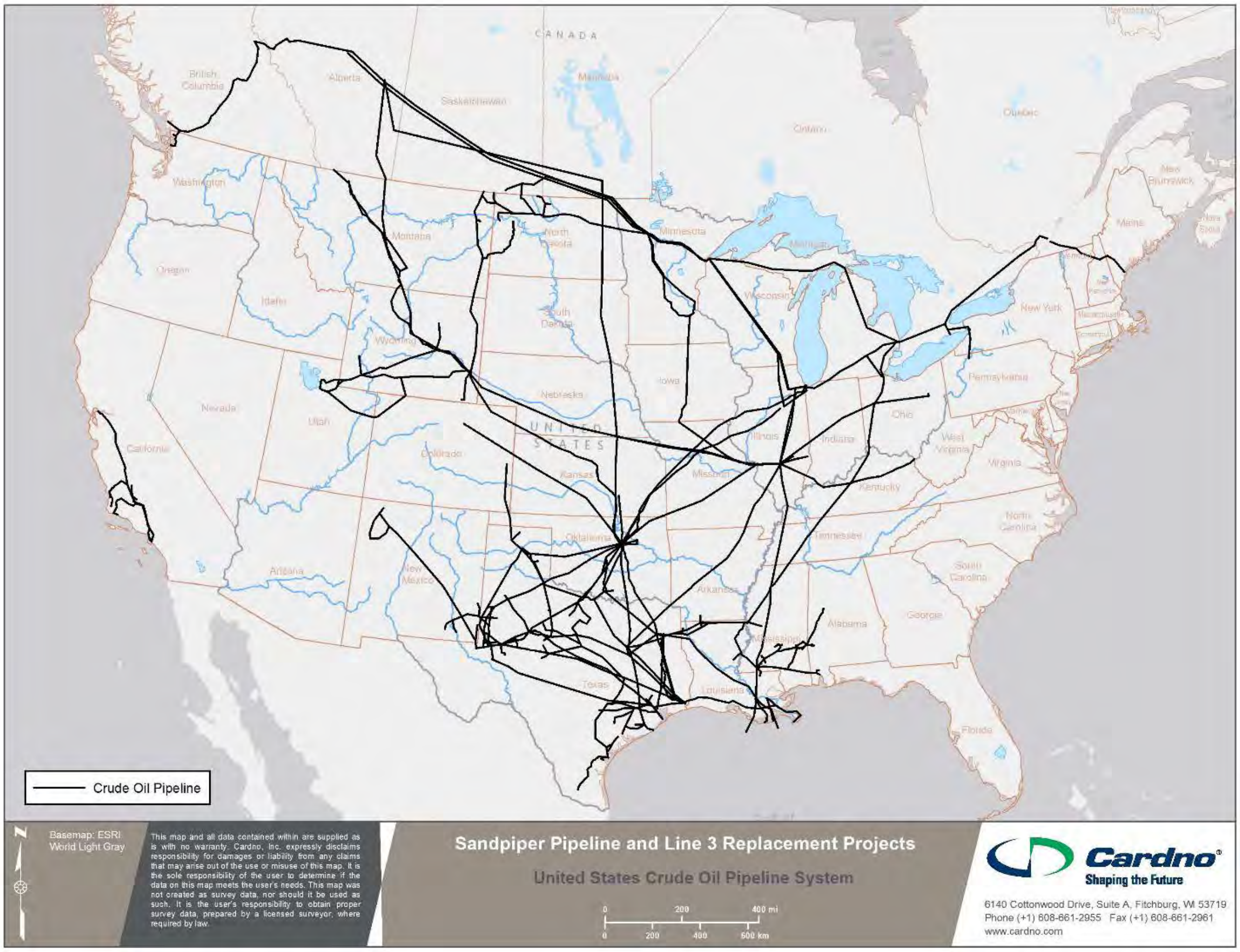


Figure 2-2 Overview of U.S. Crude Oil Pipeline System

The transportation of crude oil to regional refineries by pipeline is an integral component of the supply chain that delivers refined petroleum products to Midwestern consumers. Pipelines deliver almost all of the crude oil processed by Midwestern refineries. Relative to the need for the proposed Sandpiper Pipeline, pipelines are the primary means for transporting crude oil extracted from the Williston Basin; however, producers are increasingly transporting crude oil by rail because the rapid increase in oil production has outpaced pipeline capacity (EIA 2014a).

Relative to the need for the proposed Line 3 Replacement Pipeline, rail shipments of crude oil from Canada into the United States have been increasing through 2014, when total shipments reached between 140,000 and 185,000 bpd, but shipment volume decreased in 2015 (Canadian Association of Petroleum Producers [CAPP] 2015b, EIA 2015a). The current capacity on the Enbridge Mainline System between Edmonton, Alberta, and Superior, Wisconsin, is approximately 2.6 million bpd (CAPP 2015b). Including the Enbridge Mainline System, there are currently four major pipelines that transport Canadian crude oil out of the WCSB, that together provide about 3.8 million bpd capacity out of western Canada (CAPP 2015b).

2.3 Crude Oil Supply and Demand

2.3.1 Current U.S. and Canadian Supply and Demand

In the past decade, crude oil reserves and production in the United States and Canada have been increasing. Proven reserves are the amount of technically and economically recoverable oil, and increases in reserves can occur when new oil plays are discovered and/or as improved technology make an existing source economically recoverable. For example, the combination of horizontal drilling and hydraulic fracturing has allowed for large-scale extraction of unconventional oil resources in the Williston Basin, and in-situ drilling technologies have increased proven reserves of oil sands in Canada (EIA 2015b; CAPP 2015a). The combined crude oil supply in the United States and Canada is estimated to have increased by 9 to 11 percent from 2012 to 2014 (National Energy Board [NEB] 2015). In 2013, the United States' proven reserves of crude oil and lease condensate exceeded 36 billion barrels (bbl) for the first time since 1975 (EIA 2015c).

As of December 2012, Canada has one of the largest proven reserves of crude oil in the world, with an estimated remaining potential of about 340 billion bbl. Of this, oil sands bitumen accounts for 90 percent and conventional crude oil makes up 10 percent (NEB 2013). Using currently available technology and under current economic conditions, there are approximately 167.2 billion recoverable barrels of heavy (bitumen) crude in the province of Alberta alone (Alberta Energy 2015). Growth in reserves is likely to continue as new technologies[2] make other crude oil supplies economically viable to extract. North Dakota led all states in increases of proven oil reserves (1.9 billion bbl) because of ongoing development of the Bakken/Three Forks oil plays in the Williston Basin (EIA 2014a). With the dramatic growth in proven reserves, U.S. production of crude oil has risen from 5.6 million bpd in 2011 and peaked in 2015 at around 9.4 million bpd (EIA 2015c). In the short-term, EIA expects crude oil production declines through late 2016, and then an upturn to an average production of 8.8 million bpd (EIA 2015c). Recently, nearly all of Canada's oil exports have been directed to the United States; Canada is the largest source of U.S. crude oil and refined products imports, accounting for about 37 percent in 2014 (EIA 2014b; NEB 2015). The top five sources of U.S. petroleum gross imports in 2014 are provided in Table 2-1. Approximately 80 percent of the gross petroleum imports listed in Table 2-1 were crude oil, and about 46 percent of the crude oil that was processed in U.S. refineries in 2014 was imported (EIA 2014b).

[2] New extraction technologies include:

1. Seismic methods, such as reflection seismology, seismic refraction, and seismic tomography.
2. Geodesy and gravity techniques, including gravity gradiometry.
3. Magnetic techniques, including aeromagnetic surveys.
4. Electrical techniques, including electrical resistivity tomography and induced polarization.
5. Electromagnetic methods, such as magnetotellurics, ground penetrating radar and transient/time-domain electromagnetics.
6. Borehole geophysics, also called well logging.
7. Remote sensing techniques, including hyperspectral imaging.

Many other techniques, or methods of integration of the above techniques, have been developed and are currently used. However these are not as common due to cost effectiveness, wide applicability, and/or uncertainty in the results produced.

Table 2-1 Top Five Sources and Amounts of U.S. Petroleum Imports (2014)

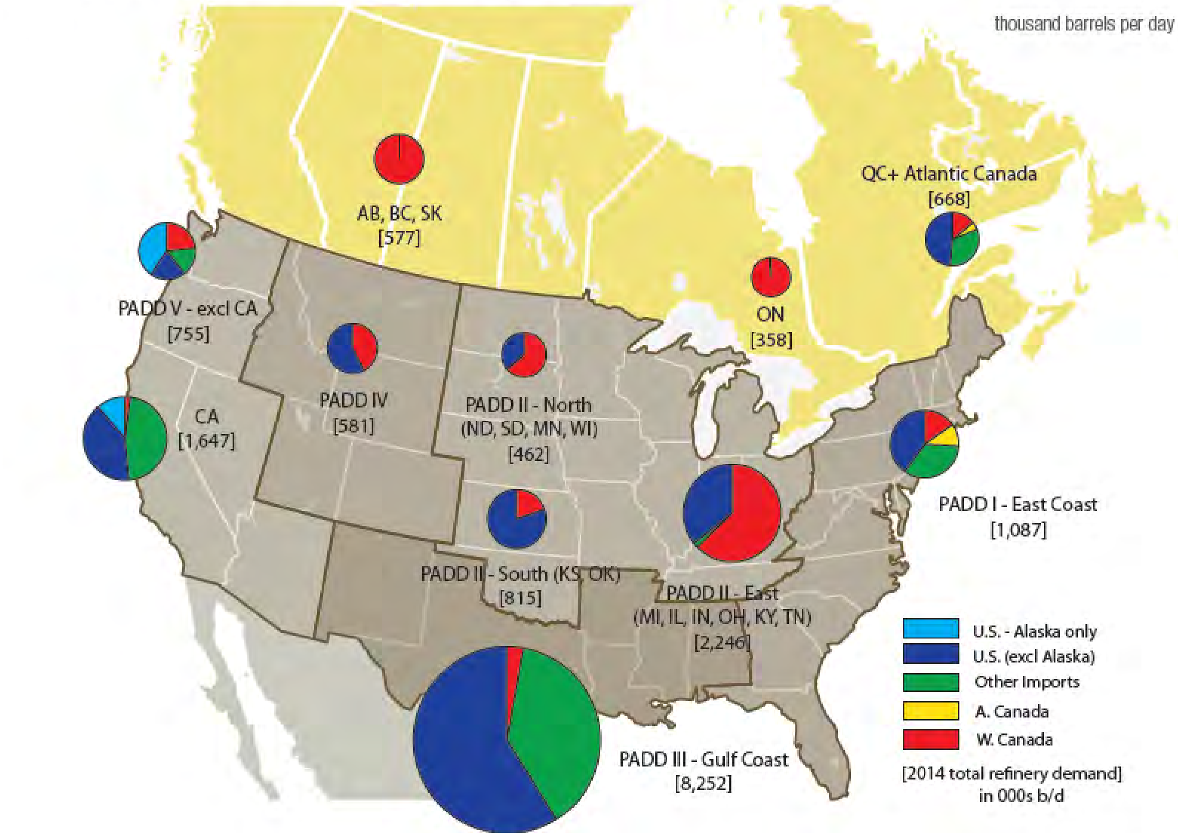
Country	Gross Petroleum Imports (million bpd)	Share of Gross Imports
Canada	3.39	37%
Saudi Arabia	1.17	13%
Mexico	0.84	9%
Venezuela	0.79	9%
Iraq	0.37	4%

Source: EIA 2014b

Crude oil is delivered to refineries throughout the United States, which is administratively divided into five Petroleum Administration for Defense Districts (PADDs). About 50 percent of U.S. refining capacity is located in the Gulf Coast, and another 21 percent is located in the Midwest. Total U.S. refining capacity reached 18 million bpd in 2014 (API 2014; EIA 2015d). Many U.S. refineries have been adjusting their capabilities to handle the lower-priced domestic and Canadian crude oils. In the Midwest (PADD 2) refiners have invested in complex refining units designed to refine heavy crude oils, such as the crude oil derived from the oil sands in Alberta, Canada, whereas U.S. East Coast (PADD 1) refiners are generally processing light, sweet crude oil such as Bakken crude oil sourced from the Williston Basin (API 2014).

U.S. and Canadian refinery demand for crude oil in 2014 by source and destination is illustrated in Figure 2-3. End-use consumption of refined petroleum products has been declining in the United States. National daily consumption has declined by roughly 2.5 million bpd since 2005, to 16.4 million bpd more recently (API 2014). This decrease in demand has resulted from numerous market factors, likely including slow recovery from the recent economic recession, the increased use of fuel-efficient vehicles, and new renewable fuel standards (API 2014).

Although the overall demand for crude oil is currently decreasing, there remains a very large demand for crude oil (and its end use commodities) in the United States and Canada. In late 2015, the EIA modeled the impacts of lifting the crude oil export ban, which has now occurred, using different domestic production and oil price scenarios. They projected that U.S. crude oil net exports would remained unchanged with the ban lifted if oil prices fell during 2015 and then increased by 2025 due to demand from non-Organization for Economic Cooperation and Development (OECD) countries (Reference scenario) and if there was lower demand for petroleum products, higher Organization of Petroleum Exporting Countries (OPEC) upstream investment, and lower non-OPEC exploration and development costs (Low Oil Price scenario). They projected that U.S. crude oil net exports would greatly increase if there was higher domestic production and thus lower crude oil prices in 2025 compared to the Reference scenario (High Oil and Gas Resource), and net exports would slightly increase if the combined assumptions of the High Oil and Gas Resource/Low Oil Price scenario were met (EIA 2015g). Regarding the petroleum market in Wisconsin, according to the Wisconsin Petroleum Council about 80 percent of Wisconsin's gasoline comes from Canadian tar sands (heavy) crude oil (Roth 2016).



Source: CAPP 2015b

Figure 2-3 Crude Oil Market Demand in the U.S. and Canada by Source and Destination (2014)

2.3.2 Future U.S. and Canadian Supply and Demand

The Annual Energy Outlook (AEO) 2015 report, prepared by the EIA, forecasts long-term U.S. energy trends to the year 2040 (EIA 2015e). The report considers a wide range of trends and issues that can influence energy markets, including economic trends, the future price of oil, and renewable energy usage. The AEO forecasts that U.S. energy consumption will grow at a modest rate through 2040. The projections show a slight decrease in transportation sector energy consumption, likely from the adoption of more energy-efficient technologies and policies; however, petroleum and other liquids are forecast to account for 33 percent of overall U.S. energy consumption in 2040 (EIA 2015e).

The future production of petroleum products at U.S. refineries depends largely on the cost of crude oil and domestic and global demand, but would likely be increasingly sourced from domestic and Canadian oil reserves (EIA 2015e). Demand for crude oil by PADD 1 and PADD 2 refineries is predicted to grow,[3] and U.S. net energy imports are forecast to decline and ultimately end by 2040, largely due to the increased domestic crude oil reserves and production (EIA 2015e).

[3] Except in the "High Oil and Gas Resource case," which estimates a market with very high levels of oil and gas production.

Canada's NEB prepared an annual report, Energy Future 2013, which projects Canadian energy supply and demand to the year 2035 using currently available information, and plausible trends, policies, and technologies. The report found that Canada's energy reserves will increase throughout the projection period, and that oil sands output will more than double by 2035 (NEB 2013).

It is possible, and perhaps likely, that future climate policy changes adopted within the United States and/or Canada would result in reductions in the demand for crude oil. For instance, Wisconsin currently has state energy efficiency and renewable resource programs and requires the Public Service Commission of Wisconsin (PSCW) to review state energy efficiency and renewable energy programs four times a year to "set or revise goals, priorities, and measurable targets" (Wisconsin Statute 196.374). Recent U.S. presidential actions have also focused on climate policy issues. In November 2015, the U.S. President rejected a presidential permit for the proposed Keystone XL Pipeline that would have facilitated the transportation of crude oil from Canada to the Gulf Coast, citing concerns about its impact on the climate (The White House 2015).

As of February 2016, a project similar to the proposed Sandpiper Pipeline is being proposed by Energy Transfer Partners to transport Bakken crude oil from North Dakota to a terminal at Patoka, Illinois. This Dakota Access line would cross South Dakota and Iowa to convey crude oil to the terminal, from where it can then be transported to refineries or export shipping terminals on the Gulf Coast. Advocates for energy conservation, climate protection, and landowner rights are questioning the need for this project on grounds similar to those used to question the need for the Keystone XL project (Morelli 2016).

2.3.3 Current and Future World Market Demand

The EIA estimates the global consumption of petroleum (and other liquids) grew by over 1 million bpd in 2014, and will continue to grow (EIA 2014c). The potential growth in demand for fossil fuels would likely occur from the needs of emerging economies such as China, India, and the Middle East, while demand in regions with well-established oil markets (e.g., Europe) seems to have peaked (EIA 2015f). China and India have potential as major markets since currently the two countries have the fastest growing demand for crude oil in the world with growing populations and transportation needs (CAPP 2015b).

Following the 1973 Arab oil embargo, Congress enacted a ban on the export of U.S.-sourced crude oil. However, on December 18, 2015, the crude oil export ban was lifted as part of an omnibus spending bill. Prior to this change in policy, exports of crude oil to Canada for use there, exports of crude oil from Alaska's North Slope, re-exports of foreign-sourced crude, and certain exports from California were exported under licensed exemptions from the ban. Since the crude oil export ban has been lifted, there is a potential that domestic crude oil transported through the proposed Sandpiper Pipeline could be exported to foreign markets. Shipment of U.S. crude oil overseas began in early 2016. In mid-April 2016, 175,000 bbl of North Dakota crude oil arrived in the Netherlands, marking the first export of North Dakotan crude oil to an international market since the export ban was lifted (MacPherson 2016). Western Canadian crude oil transported via the proposed Line 3 Replacement Pipeline could also ultimately be destined for the global market; however, its destination is not impacted by the recent export policy change because Canadian-sourced crude oil was not prohibited by the federal export ban. The Enbridge pipeline system encompasses pipelines that travel from Superior to Griffith and Flanagan, Illinois (near Chicago), to Cushing, Oklahoma, terminating at Freeport, Texas (near Houston). Thus, the infrastructure exists for exports to occur, but future exports would be based on market forces. Further, Enbridge is not the owner of the crude oil being shipped through its system, and thus does not determine the ultimate destination of the crude oil.

Recent global concern about the effects of climate change has led to international conferences aimed at adopting policies to reduce greenhouse gas emissions country-by-country, and this could have some impact on the global demand for crude oil. In December 2015 representatives from 196 countries met at a climate conference in Paris, France. An agreement was reached with an overriding goal of ensuring that average global temperatures increase by no more than 3.6 degrees Fahrenheit (°F) above pre-industrial levels. All 196 nations agreed to decrease the use of fossil fuels that generate heat-trapping greenhouse gas emissions like methane and carbon dioxide as soon as possible. The agreement also stipulates that by 2050, human-made emissions should be reduced to levels that can be absorbed by forests and oceans. The pact does not bind countries to a specific carbon emission level. Instead, it allows each nation to establish a comfortable reduction target and implementation strategy. Government officials are also urged to review the plan every 4 years to ensure they are meeting their goals and find ways to decrease emission rates further if possible (United Nations Framework Convention on Climate Change 2015).

While energy conservation and climate change policies may decrease the demand for crude oil in the future, widespread industry investment and adoption of more energy-efficient operations (e.g., vehicles, engines, and machinery), increased energy conservation practices by consumers, and national and regional energy policy changes will all be required to reduce the current demand for crude oil. In the short to medium term, the domestic and global supply and demand for crude oil will likely remain strong, and fossil fuels will continue to be extracted, shipped, and refined in the United States and Canada (EIA 2014c, 2015e; NEB 2013, 2015).

2.3.4 Crude Oil Transportation Demand

The proposed pipeline Projects would serve a current demand for transportation of crude oil from major production areas to markets for petroleum-based products. Due to pipeline constraints, Williston Basin producers have relied heavily on rail and trucks to move additional crude oil out of the region, putting oil transport in conflict with North Dakota’s agricultural industry, which is heavily dependent on efficient rail and truck transportation (Kub 2015). Since October 2015, crude-by-rail volumes have declined slightly as production has slowed, oil price spreads have narrowed, and more pipelines have come online (EIA 2016). According to data released by the North Dakota Pipeline Authority, about 52 percent of Williston Basin oil (approximately 645,000 bpd) was exported by pipeline in November 2015, while 41 percent was exported by rail (Scheid 2016). Continued pipeline expansion and interconnection would further reduce the need for rail transport of crude, freeing rail space for other products. The Sandpiper Pipeline Project would link crude oil production in the Williston Basin to Wisconsin and Minnesota refineries. Other refinery and marketing centers in the Midwest and East Coast, as well as export terminals, would also be connected to the Bakken supplies via the Enbridge Mainline System and other interconnecting third-party pipelines.

In Canada, according to the CAPP, the lack of infrastructure to transport crude oil to markets has been a continuing concern for the Canadian crude oil industry. Despite the recent decrease in crude oil prices, Canada’s crude oil production is still forecasted to increase from 3.7 million bpd in 2014 to 5.3 million bpd by 2030, with the vast majority of that production expected to come from the oil sands of Alberta (CAPP 2015b). Most oil from Alberta is currently transported via pipeline or rail. The United States imported 2.9 million bpd of Canadian crude oil in 2014, nearly all of which came from western Canada (EIA 2015h). Approximately 185,000 bpd of that was transported by rail, and the share of crude oil transported by rail from Canada has been growing (CAPP 2015b). Moreover, the transportation of crude oil by rail is expected to increase in future years, largely due to the simultaneous constraints of pipeline capacity out of the WCSB and the expected increase in transport to U.S. refineries (Berkow 2014). Currently, the existing pipelines out of the WCSB provide a capacity of 3.8 million bpd. The proposed Line 3 Replacement Project would enable Enbridge to better meet the petroleum usage of PADD 2, Eastern Canada, and the Gulf Coast by allowing Enbridge to transport crude oil.

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3. DETAILED DESCRIPTION OF THE PROPOSED PROJECTS AND GENERAL PIPELINE PRACTICES

3.1 Applicant's Proposed Projects

3.1.1 Sandpiper Pipeline

The proposed Sandpiper Pipeline Project comprises a new crude oil pipeline and associated facilities designed to transport domestic crude oil sourced from the Williston Basin in Montana and North Dakota to meet the demands of refineries and markets in the Midwest and on the East Coast of North America as well as to other regions in the United States through interconnected existing pipeline systems and other methods of transportation. The Sandpiper Pipeline Project in total is approximately 618 miles in length, with 14 miles of new 30-inch-diameter pipeline proposed to be constructed in Wisconsin (Figure 1-1). The pipeline within Wisconsin would have an initial annual capacity of 375,000 barrels per day (bpd) of crude oil, with the potential for this amount to increase through expansion using additional pumps. The maximum economic expansion capacity of the Sandpiper Pipeline is estimated to be 711,000 bpd with the installation of additional pumping horsepower over current design to meet this capacity (Enbridge 2015a).

3.1.2 Line 3 Replacement Pipeline

The proposed Line 3 Replacement Pipeline comprises a new 1,031-mile, 36-inch-diameter crude oil pipeline (Figure 1-1) to replace a section of the existing 1,097-mile-long, 34-inch-diameter Line 3 crude oil pipeline. The existing Line 3 Pipeline extends from Edmonton, Alberta, to Superior, Wisconsin. The Line 3 Replacement Project would replace that pipeline between Hardisty, Alberta, and Superior. In Canada, Enbridge has already replaced two sections of Line 3: (1) a 1.7-mile segment from Gretna, Manitoba, to the Canada/U.S. border and (2) a 12.5-mile segment downstream of Cromer, Manitoba. Enbridge also replaced a 15.3-mile segment of Line 3 with new 34-inch pipeline from the Canada/U.S. border to the Joliette Valve in Pembina, North Dakota, and will also replace an additional 13-mile segment with new 36-inch pipeline between the Joliette Valve and the North Dakota/Minnesota border in 2017 pending notification being sent to the regulator (Enbridge 2015a). The replacements within Minnesota and Wisconsin have not occurred and are under environmental and permitting review. The existing Line 3 crude oil pipeline was originally installed in 1968. Enbridge has evaluated the operation and condition of the existing Line 3 Pipeline through its integrity management program[1] and has determined that pipeline replacement is preferable to attempting to maintain the existing pipeline through repair activities. While the existing Line 3 could continue to be operated through the current management program, the original delivery capacity of Line 3 would not be able to be restored; in 2008, Enbridge opted to reduce the flow rate on Line 3 to maintain pipeline integrity, which decreased the delivery capacity from 760,000 bpd to 390,000 bpd (Enbridge 2015b). Enbridge proposes to replace Line 3 to restore historical operating capabilities, and to reduce impacts to landowners and the environment that could occur during the management program (Enbridge 2014). In Wisconsin, the Line 3 Replacement Pipeline Project consists of 14 miles of pipeline that would be constructed and operated within the same right-of-way (ROW) as that proposed for the Sandpiper Pipeline Project. The new 36-inch-diameter Line 3 Replacement Pipeline would have a throughput of 760,000 bpd. Throughput is a volume rate based on both the pumping flow rate and the diameter of the pipeline.

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[1] Actions involved in the program include examining comprehensive and integrated integrity results, including internal inspection data, and projected future maintenance activities.

3.1.3 Proposed Route of the Projects

The proposed pipeline route in Wisconsin (Figure 3-1) is within Douglas County, which is included in the Wisconsin Department of Natural Resources' (DNR's) Northern Region. The route is also within the Superior Coastal Plain Ecological Landscape (DNR 2012) and traverses the following sections of the Town of Superior:

- Sections: 2, 8, 9, 10, 11, 16, 17, 18, 19, 20 of T48N, R14W
- Sections: 24, 25, 26, 27, 31, 32, 33, 34 of T48N, R15W
- Sections: 35, 36 of T49N, R14W

The proposed route of the two adjacent pipelines would cross the western border of Wisconsin about 4 miles south of the St. Louis River and less than 1 mile north of the Pokegama River at Milepost (MP) 602.0 of the existing Line 3 Pipeline, where Carlton County Road 4 turns into Douglas County Road W. (Figure 3-2). Nearby linear features include the Burlington Northern railroad, a county highway (CTH W), and other pipelines including the Great Lakes Gas Pipeline and the Northern Natural Gas Pipeline.

The proposed route lies to the north of and roughly parallels the existing Enbridge corridor until MP 607.4, where it is proposed to move farther to the northeast to avoid a congested area that includes other pipeline facilities and existing road infrastructure. Approximately 2 miles after the deviation to the northeast, two potential route variations are under consideration to address potential impacts to the Pokegama Carnegie Wetlands State Natural Area (SNA) and to nearby residences (Figure 3-3). Route Variation A1 would extend farther to the north and would completely avoid the SNA. Route Variation A2 would extend due east until it reached the existing Enbridge pipeline corridor and it would then once again parallel that existing corridor. Route Variation A2 would cross approximately 1.5 miles of the southern section of the SNA, although a mile of that length is within the disturbance area of the existing Enbridge pipeline corridor. From MP 612.4 to MP 614.9 the proposed route would remain co-located with the existing Enbridge pipeline corridor. A very slight route variation (B1) is under consideration at MP 614.9 due to a legal issue with a landowner (Figure 3-4).

The route then traverses developed residential areas within the town of South Superior adjacent to Enbridge's existing corridor until MP 615.8. At this location, Enbridge prepared an evaluation of Route Variations C1 and C2 located between approximately MPs 615.8 and 616.8 due to an existing City of Superior stormwater pond, the Nemadji Golf Course, and a recently identified wetland conservation easement (Figure 3-5). The remainder of the route continues adjacent to and on the north side of Enbridge's existing corridor into the Superior Terminal.

3.1.4 Land Uses and Right-of-Way Acquisition

The Projects' route would predominantly cross private lands located outside of municipal areas and would not cross any federal lands or Indian reservations. The Projects would cross land owned by the City and Village of Superior and Douglas County Forest. The pipelines would cross approximately 0.2 mile of Douglas County Forest, as well as either an additional 1.6 or 2.6 miles depending on whether Route Variation A1 or A2 is selected. The woodlands crossed are used for recreation and domestic wood products harvesting and include residential properties. Approximately 0.3 mile of state DNR-managed land (the St. Louis and Red River Stream Bank Protection Area) would also be crossed by the pipelines. There are no conservation easement lands crossed by the proposed route.

Enbridge generally has existing blanket easement agreements that allow for expansion of the corridor for multiple pipeline ROWs. Landowners receive monetary compensation in return for temporary loss of use during construction, crop damages, and the restoration of unavoidable damage to property during construction.

3.1.5 Pipe Design

The pipelines would be constructed with either a 30-inch (Sandpiper) or 36-inch (Line 3 Replacement) outside diameter American Petroleum Institute (API) 5L PSL 2, Grade X70 steel pipe meeting the requirements of the U.S. Department of Transportation's (USDOT's) Pipeline and Hazardous Materials Safety Administration (PHMSA) (49 Code of Federal Regulations [CFR] Part 195).

The pipe would be manufactured and constructed in accordance with standards issued by the American Society of Mechanical Engineers, National Association for Corrosion Engineers, and API. All of the pipe would be manufactured with fusion-bond epoxy coating to protect against corrosion and would be inspected and integrity-tested at the factory. External cathodic protection systems would be installed to inhibit corrosion during the operating life of the pipelines.

Pipe wall thickness for each pipeline would depend on the location the pipes are underlying, with thicker walls being used where stresses are greatest, such as roads and river crossings. The wall thickness for the Sandpiper 30-inch pipeline would range from 0.469 to 0.625 inch and the wall thickness for the 36-inch Line 3 Replacement would range from 0.531 to 0.750 inch.

3.1.6 Associated Facilities

In addition to new 30- and 36-inch-diameter underground crude oil pipelines from the Minnesota/Wisconsin border to Enbridge's terminal in Superior, various associated facilities would be constructed within the existing fenced Superior Terminal (Figure 3-6). Each Project would require the following:

- Isolation valves
- Pressure control valves
- A static mixer
- A pig receiving trap
- Manifold connections and modifications including valves, piping, pressure transmitters, and temperature transmitters

The Line 3 Replacement Project would include installation of the following at the Superior Terminal:

- A batch detection and sampler with densitometer, viscometer, and fast loop pump
- Flow meter
- Emergency backup power generation with auto transfer switch
- Electrical building
- Piping tied to pressure relief systems
- Connectivity piping replacement for manifolds and tanks

The Sandpiper Project would require installation of the following:

- Mainline pressure relief system
- Custody transfer metering

- A meter prover
- Pressure control valves
- A sampling facility

In addition to these associated facilities within the Superior Terminal, mainline valves would be installed along both pipelines. Mainline valves are pipeline control devices that can be closed to prevent liquid from flowing. Enbridge's Operation and Risk Management Group conducted an Intelligent Valve Placement (IVP) study for the Sandpiper and Line 3 Replacement Pipeline Project to identify optimal valve locations in compliance with the requirements of 49 CFR Part 195. The study considered the placement of mainline valves to reduce the potential consequences in the event of a pipeline rupture and crude oil release, and addressed waterbody crossings greater than 100 feet wide, the presence of potential High-Consequence Areas (HCAs) as defined by PHMSA, proximity to densely populated areas, construction limitations, accessibility, operational considerations, and future pipeline expansion potential. As a result of the study, Enbridge proposes to install six mainline valves (three on each pipeline) at the locations provided in Table 3-1 within the construction ROW. In the event of the detection of release from either the Sandpiper or Line 3 Replacement Pipelines, these valves would be closed automatically from a remote control center, or by manual closure if necessary.

Additional valves can be placed at sensitive locations to limit the size of spills that could impact valuable natural resources. While the State of Wisconsin (through DNR or the Public Service Commission) does not have any authority to require additional valves, the State of Minnesota Public Utilities Commission does have the authority to require them for the portion of the pipelines in Minnesota.

Table 3-1 Mainline Valve Locations in Wisconsin

County	Valve Name	Physical Location	Coordinates	Pipeline Milepost
Douglas County	RSV19	East Military Road	46.59572 -92.28466	MP 1085.17
	RSV20	Irondale Road	46.62338 -92.19153	MP 1090.16
	RSV21	Cemetery Road	46.64924 -92.11945	MP 1093.99

Source: Enbridge 2015c

No pump stations would be installed in Wisconsin for either pipeline.

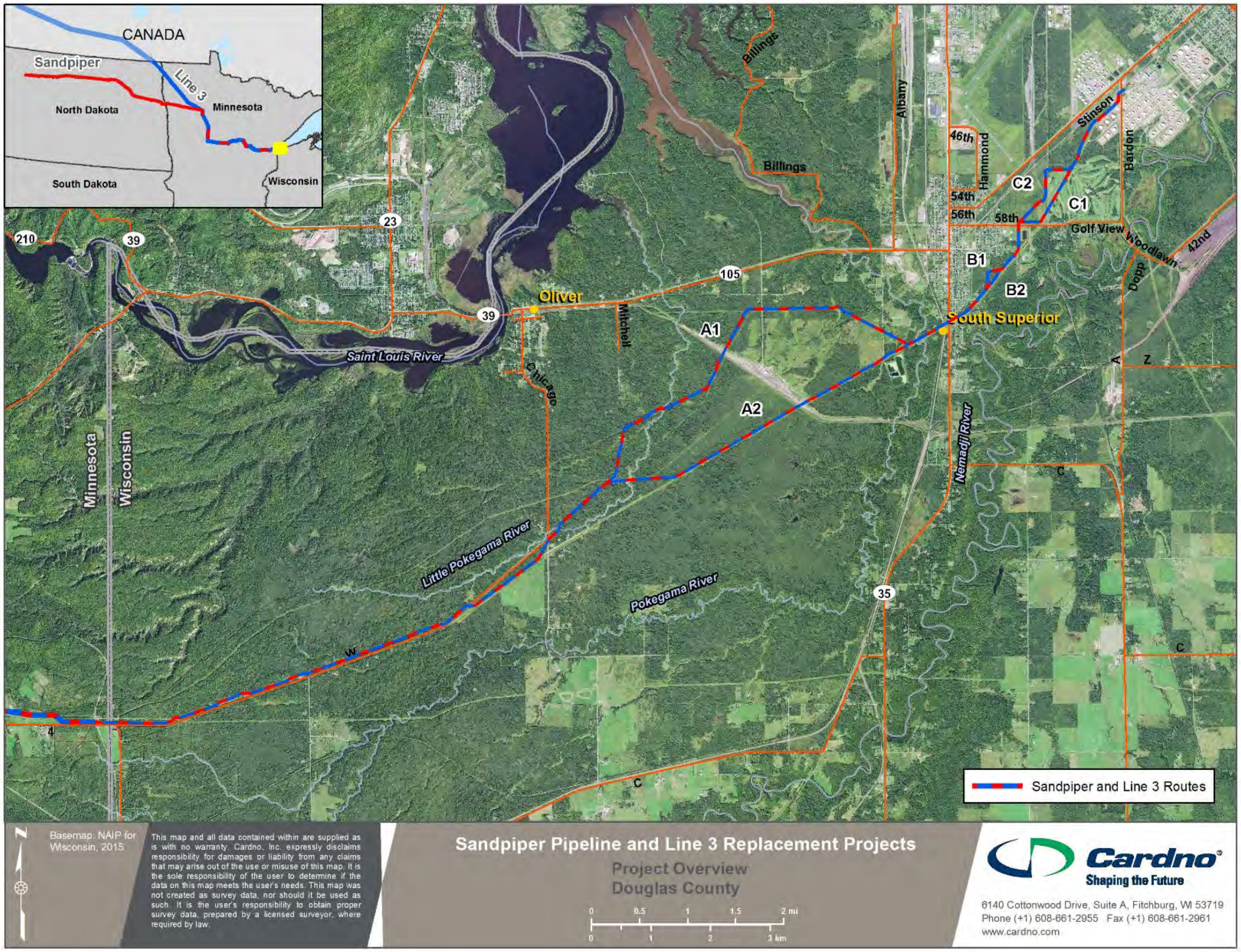


Figure 3-1 Overview of the Projects in Douglas County, Wisconsin

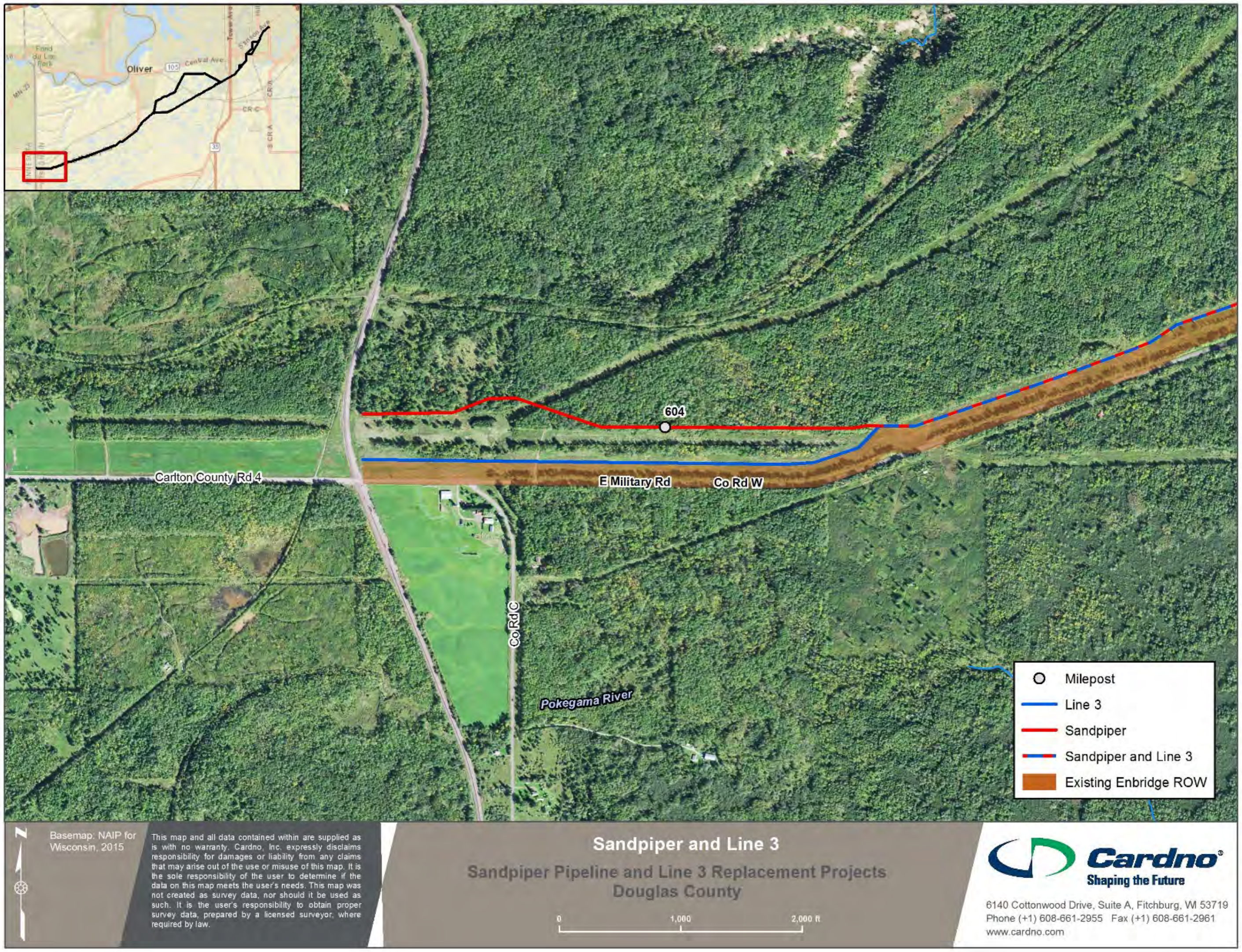


Figure 3-2 Pipeline Route Beginning Sections

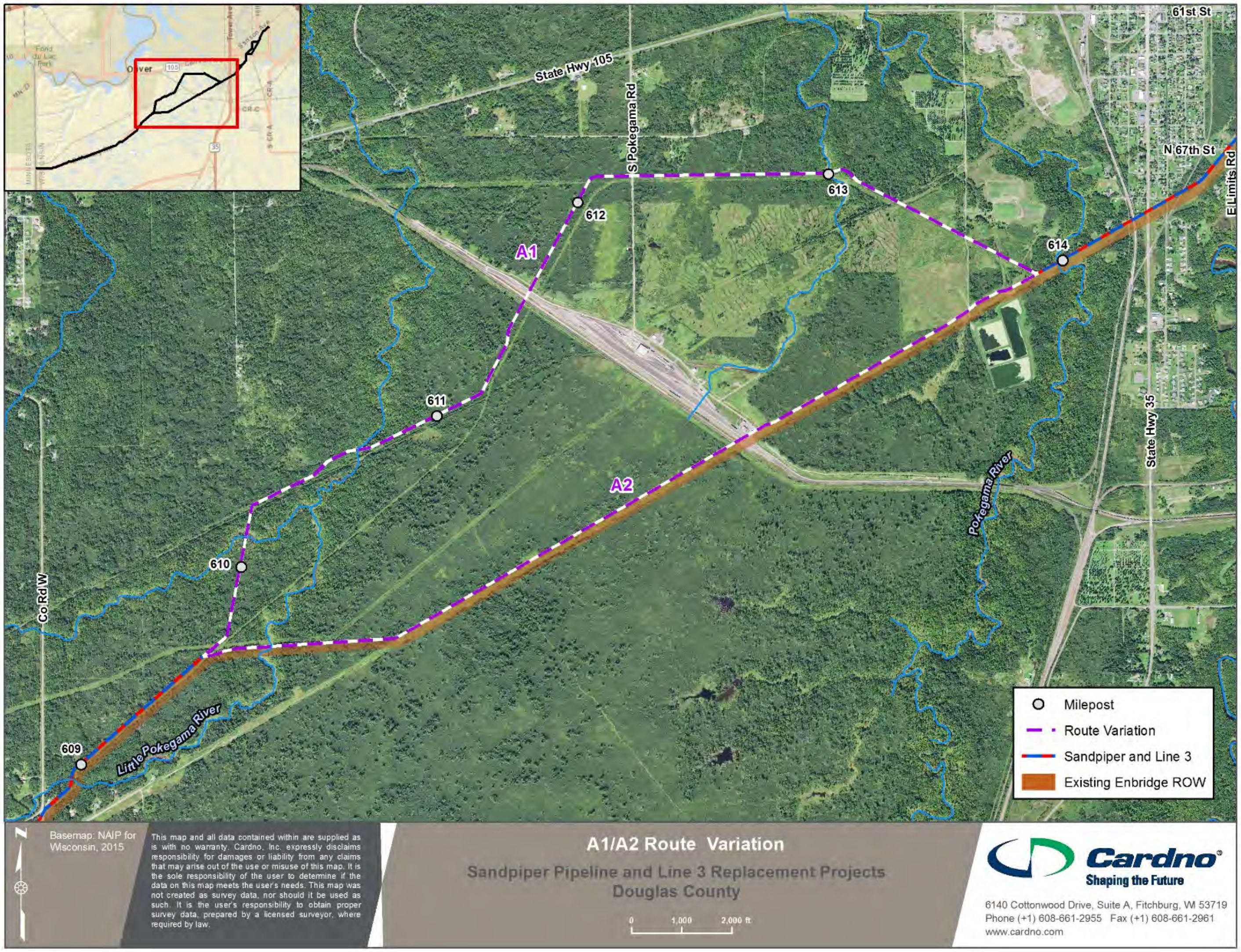


Figure 3-3 Pipeline Route Variations A1 and A2

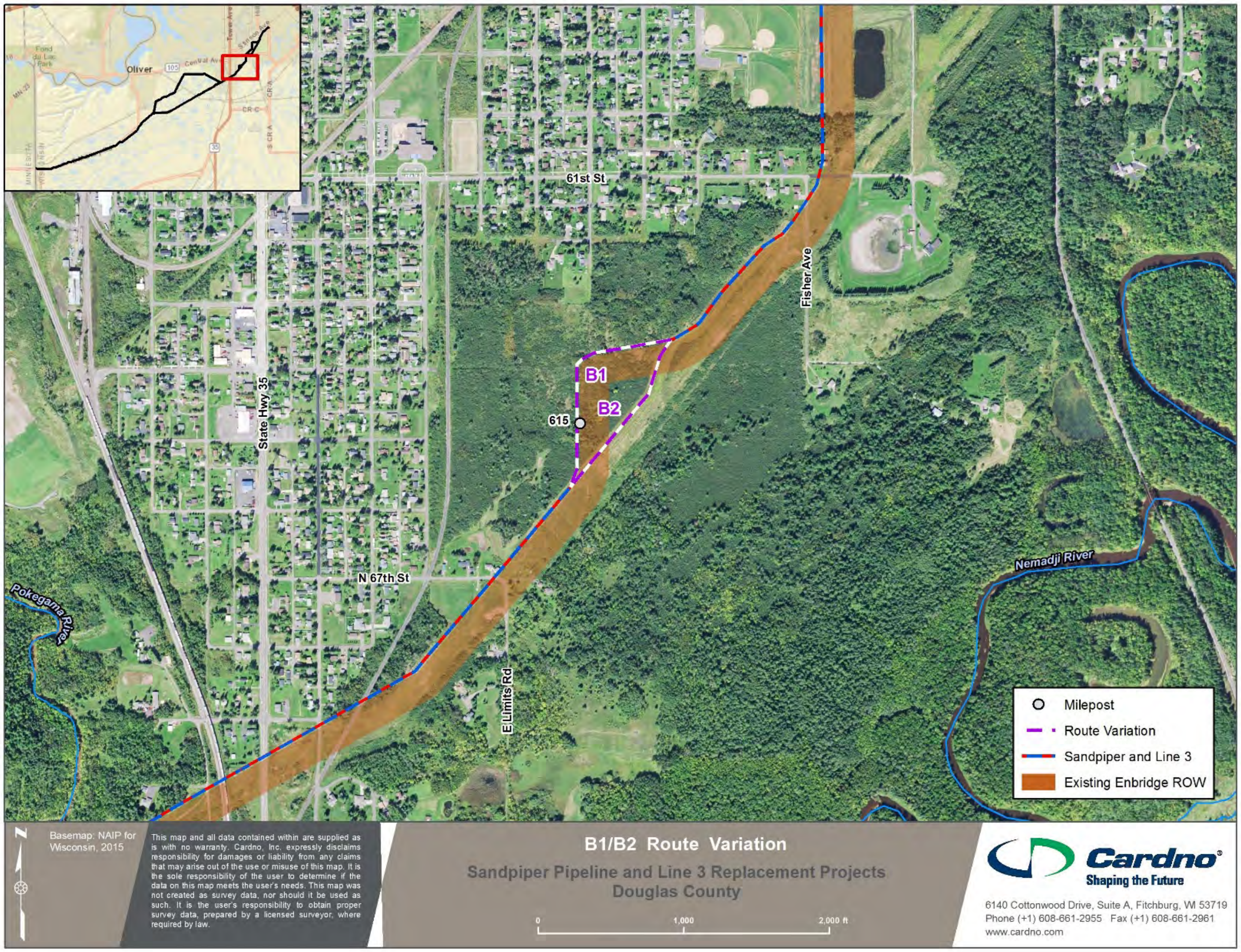


Figure 3-4 Pipeline Route Variations B1 and B2

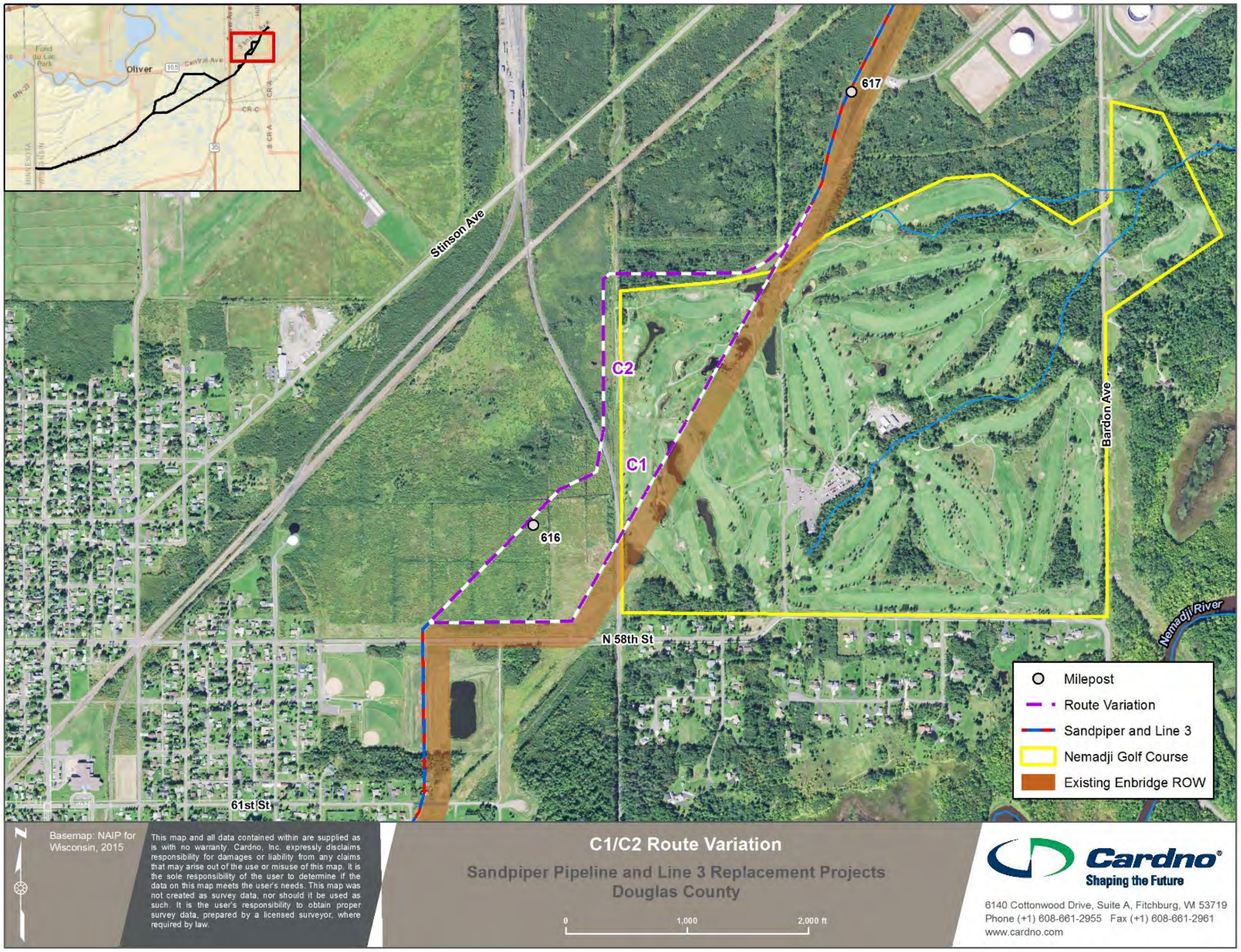


Figure 3-5 Pipeline Route Variations C1 and C2 to End

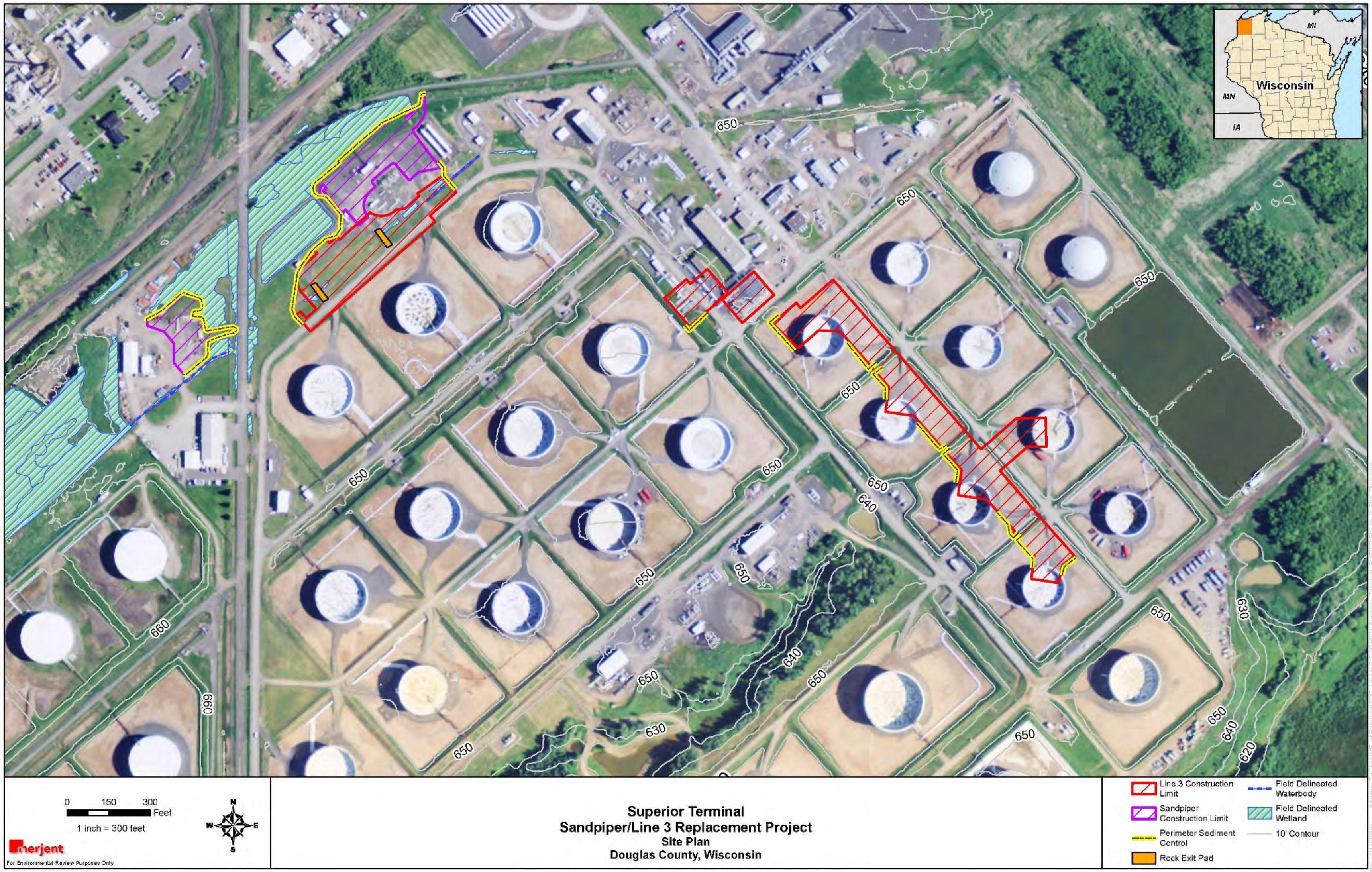


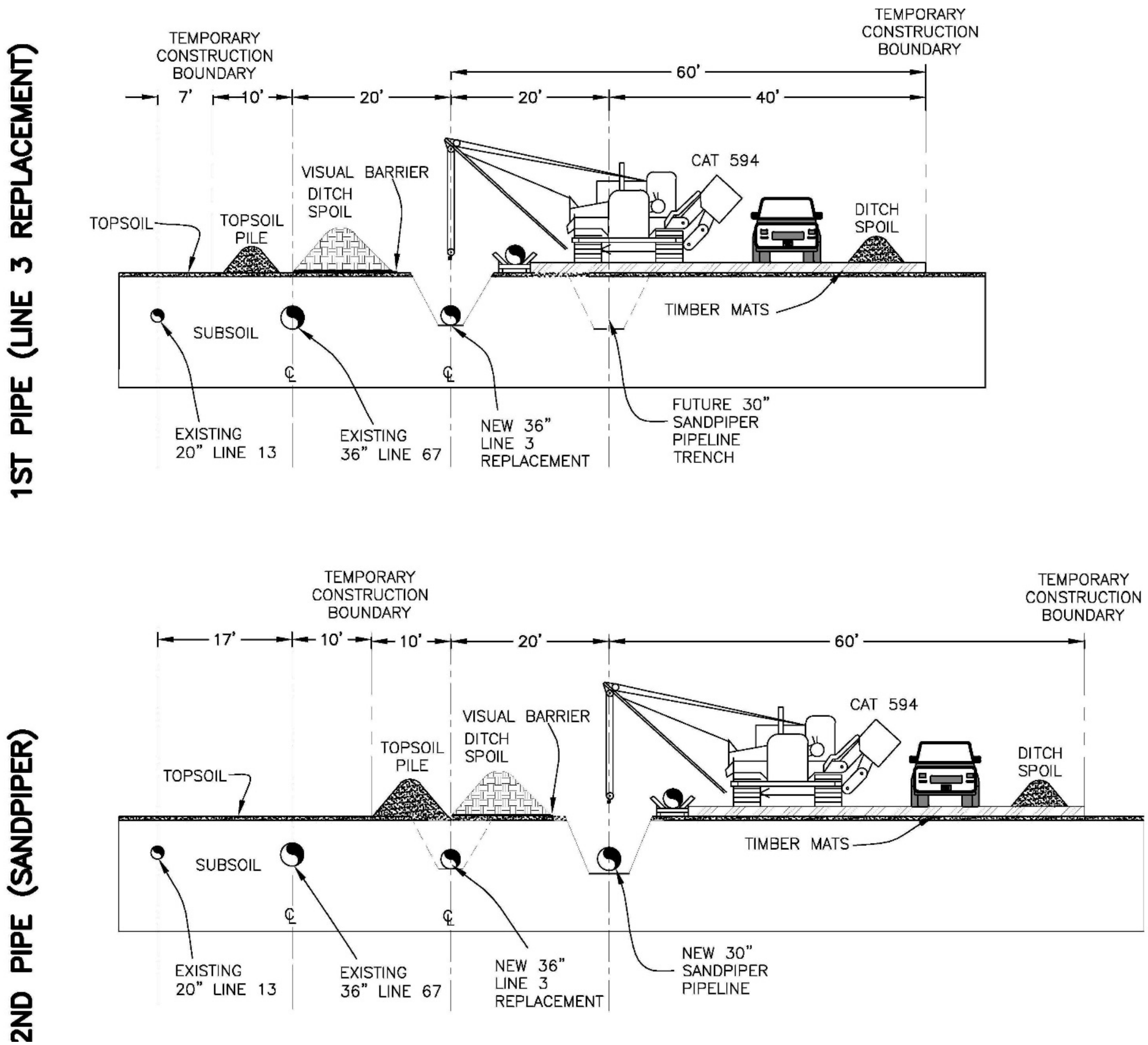
Figure 3-6 Locations of Associated Facilities at the Superior Terminal

3.1.7 Construction Right-of-Way

Enbridge proposes to generally use a combined 110-foot-wide construction ROW for the new 30- and 36-inch-diameter pipelines, which allows for temporary storage of topsoil and spoil and accommodates safe operation of construction equipment. The construction corridor generally consists of existing permanently maintained ROW and temporary workspaces (Figure 3-7). The construction ROW is divided between the spoil side (area used to store topsoil and excavated materials) and the working side (equipment work area and travel lane). Enbridge proposes to use approximately 10 feet of construction workspace for spoil storage over the existing Line 67 (Alberta Clipper Pipeline) to reduce the temporary workspace area requirements. This is possible since the Alberta Clipper Pipeline was recently installed and this part of the ROW is currently cleared. When co-located with Enbridge’s existing ROW, an additional 35 feet of temporary workspace would be required outside of the edge of the new permanent ROW (Figure 3-8). Construction of a new ROW (or greenfield ROW) and the required area is shown in Figure 3-9.

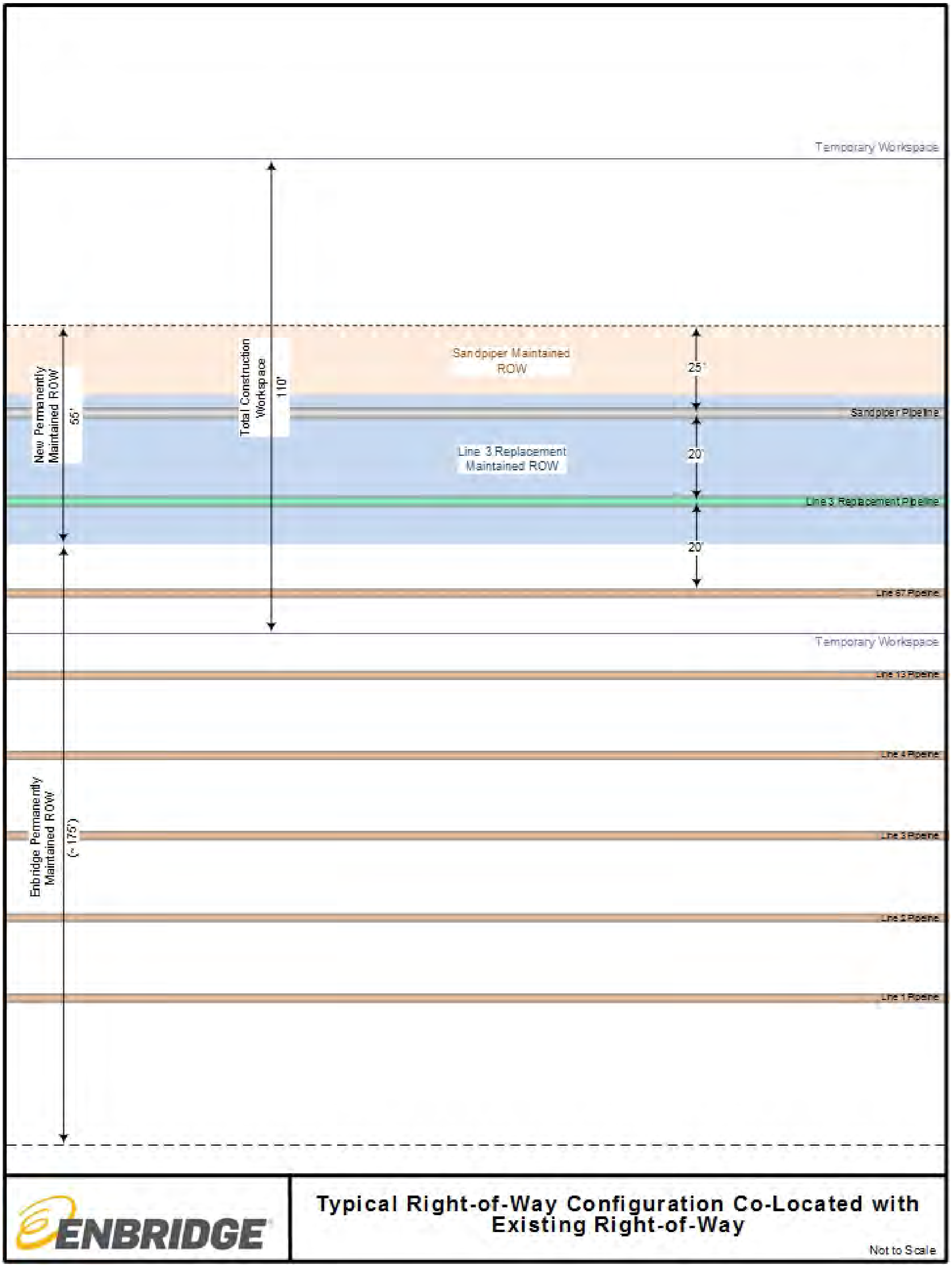
Enbridge proposes a 120-foot-wide construction ROW for the portions of Route Variations A1 and A2 between Irondale Road and the railroad tracks/facility. Regardless of the selected route in this location, no feasible access road exists to allow for construction traffic to exit the ROW at the railroad tracks/facility or to cross the tracks/railyard. Therefore, all traffic must turn around at this point and travel back. To facilitate efficient access in the event of an emergency during construction, Enbridge designed the additional 10 feet of workspace to include two lanes of traffic.

Safety policies and Ground Disturbance Procedures (GDP) would be implemented to protect existing active pipelines. Enbridge would map and physically identify all lines prior to ground-disturbance activities. Enbridge’s GDP would include a daily Process Hazard Analysis to ensure that potential hazards are identified and communicated and to ensure that safe work practices are implemented. The first step in determining the appropriate protection method for an active pipeline is identifying the location using the one-call system and line locates. Once the line is positively located, work crews would conduct hydro-excavation via potholing equipment to give an accurate depth to the top of the existing pipeline. The existing Enbridge lines in the proposed Projects’ corridor are buried at depths compliant with 49 CFR Part 195.248. Based on the location and depth of cover, detailed calculations would be performed using pipeline engineering specifications (e.g., diameter, wall thickness, grade, operating pressure, soil characteristics) following guidelines set forth in the American Society of Mechanical Engineers’ (ASME’s) B31.4 standards (Pipeline Transportation Systems for Liquids and Slurries) to determine allowable stresses. The engineering calculations would then be used to determine type of matting or additional cover that may be required to ensure the total combined stresses remain within established thresholds pursuant to applicable codes and standards. A minimum clearance of 12 inches between a pipeline and another underground structure is required by 49 CFR Part 195.250; Enbridge would space the pipelines approximately 20 feet from existing pipelines. Since conducting heavy construction inside and over a multiline pipeline corridor exposes the pipelines to risk that would otherwise not be present, Enbridge proposes to use mat decking or bridging, or to add additional spoil to increase cover for areas along the ROW that require additional protection during construction activities.



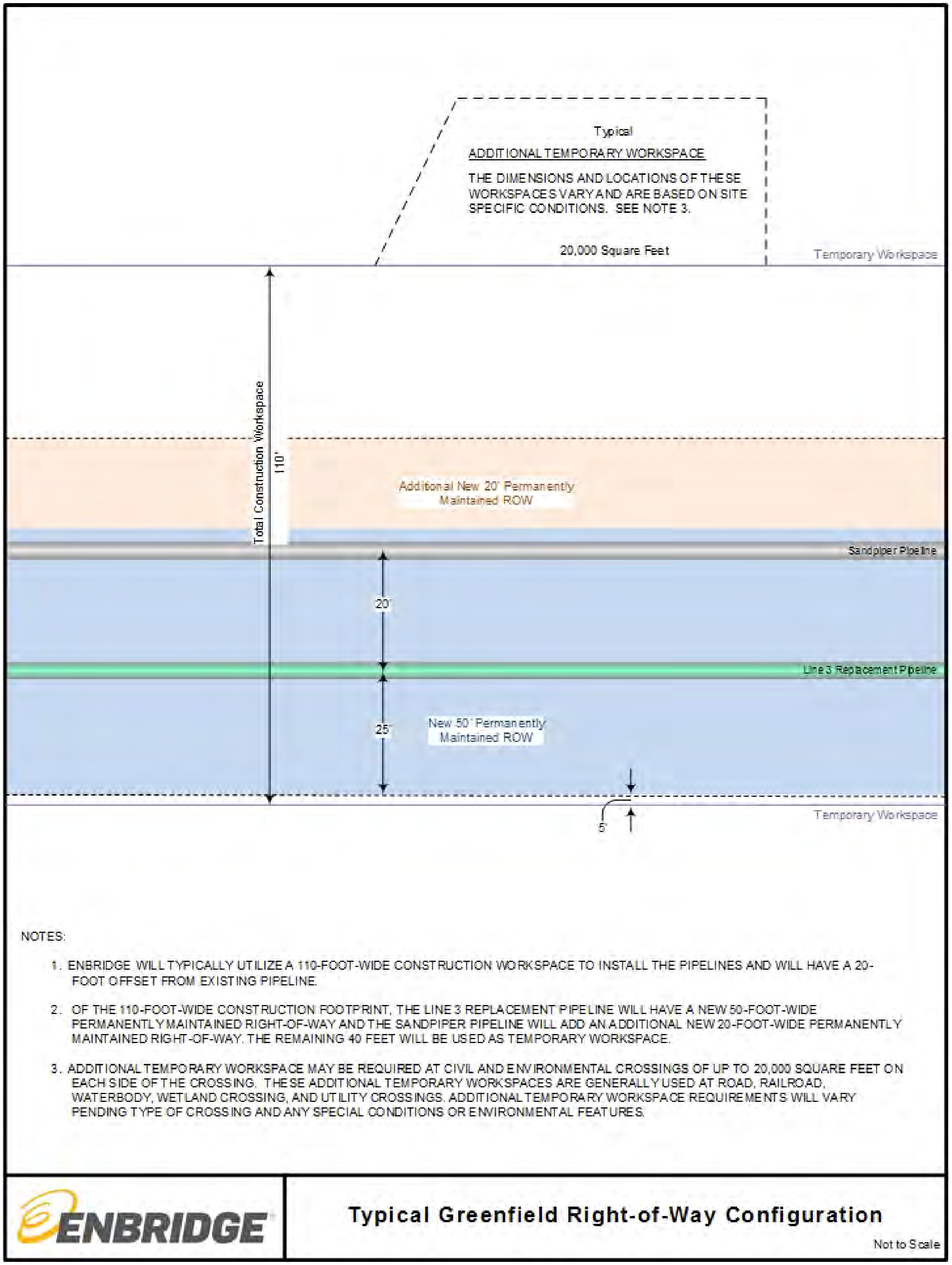
Source: Enbridge 2016

Figure 3-7 Typical Construction Workspace



Source: Enbridge 2016

Figure 3-8 Typical Co-located Pipeline Right-of-Way



Source: Enbridge 2016

Figure 3-9 Typical Greenfield Right-of-Way

3.1.8 Additional Temporary Workspace Areas

Additional temporary workspace (ATWS) areas are construction areas that are temporarily needed outside the typical construction ROW to stage equipment, stockpile spoil material, and conduct material fabrication and assembly (Figure 3-7 diagrams a typical ATWS). ATWS areas are generally necessary where the proposed route crosses features such as waterbodies, wetlands, roads, railroads, and existing pipelines and utilities. In some cases ATWS may be sited within wetland boundaries due to site-specific conditions. Table 3-2 below provides the typical dimensions used for ATWS.

Table 3-2 Typical Dimensions of Additional Temporary Workspaces

Feature	Dimensions On Each Side of Feature[a]
Open-cut Road Crossings	100 feet by 75 feet and 50 feet by 50 feet
Bored Road and Railroad Crossings	100 feet by 75 feet and 100 feet by 50 feet
Foreign Pipeline and Utility Crossings	100 feet by 75 feet and 100 feet by 50 feet
Pipeline Cross-Unders	100 feet by 75 feet
Horizontal Directional Drill	200 feet by 100 feet
Waterbody Crossings	100 feet by 75 feet
Wetland Crossings	100 feet by 75 feet

Source: Enbridge 2014

Notes:

[a] Areas are in addition to the typical 110-foot-wide construction ROW

3.1.9 Access Roads

Enbridge typically uses existing public and private roads to access the ROW and facilities to the extent practicable. However, Enbridge identified areas along the Projects where new temporary access roads are necessary to access the construction workspace. In these areas, Enbridge would obtain applicable regulatory approvals prior to using the new access. The only new permanent access roads would be those necessary to access the valve sites. Enbridge would coordinate the use of public roads with the appropriate county or state road authority and would coordinate the use of existing private roads with landowners. Table 3-3 contains a list of currently proposed access roads.

Table 3-3 Proposed Access Roads to be Used During Construction

Access Road ID	Approximate Milepost (Intersection with Pipeline)	Public or Private Road
AR456*	1085.1	Private
A-R457	1086.0	Private
AR458	1086.3	Private
AR458.1	1086.7	Private
AR460	1087.1	Private
A-R461	1087.4	Private
AR462	1087.6	Private
AR463	1088.6	Private

Table 3-3 Proposed Access Roads to be Used During Construction

Access Road ID	Approximate Milepost (Intersection with Pipeline)	Public or Private Road
AR466	1090.3	Private
AR466.1	1091.4	Private
AR466.2	1091.7	Private
AR466.3	1093.1	Private
AR468	1093.9	Public
AR469	1094.6	Private

Source: Enbridge 2015a
Notes:
* AR456 is associated with permanent access to a Sandpiper Pipeline Project valve site.

Some areas along the ROW would require construction of new temporary access roads in order to access the construction workspace. Approximately 2.24 acres of temporary access roads in wetlands are proposed. Some clearing and grading would occur, and timber mats would be laid down to surface access roads (Appendix B). All affected wetlands would be restored to preconstruction conditions after pipeline installation.

In the event that new temporary access roads are necessary in other areas, Enbridge would obtain applicable regulatory approvals and approval from the independent third-party environmental monitor (IEM; see Section 3.2.22 for additional details on the role of the IEM). Newly constructed temporary roads may be left intact through mutual agreement with the landowner unless otherwise restricted by federal, state, or local regulations. If temporary roads are to be removed, the land used for access would be restored to original conditions, as practicable, and seeded and stabilized pursuant to the Projects' Environmental Protection Plan (EPP) (Appendix B).

3.1.10 Pipe Storage Yards and Contractor Yards

During construction, areas off the ROW would temporarily be used to store pipe and materials, and construction contractors would require contractor yards to park equipment and stage construction activities. Up to 55 truckloads of 80-foot-long pipe segments or "joints" per mile of pipeline would be transported over area roads from the storage yard to the construction route. Enbridge currently does not intend to utilize pipe yards or contractor yards in Wisconsin; however, pipe storage yards and contractor yards may be identified as the planning and engineering for the Projects progresses. Sensitive environmental features are considered when planning the placement and use of pipe storage yards. The yards are leased sites and would be restored upon the completion of the Projects unless otherwise permitted or authorized by the landowner and applicable agencies.

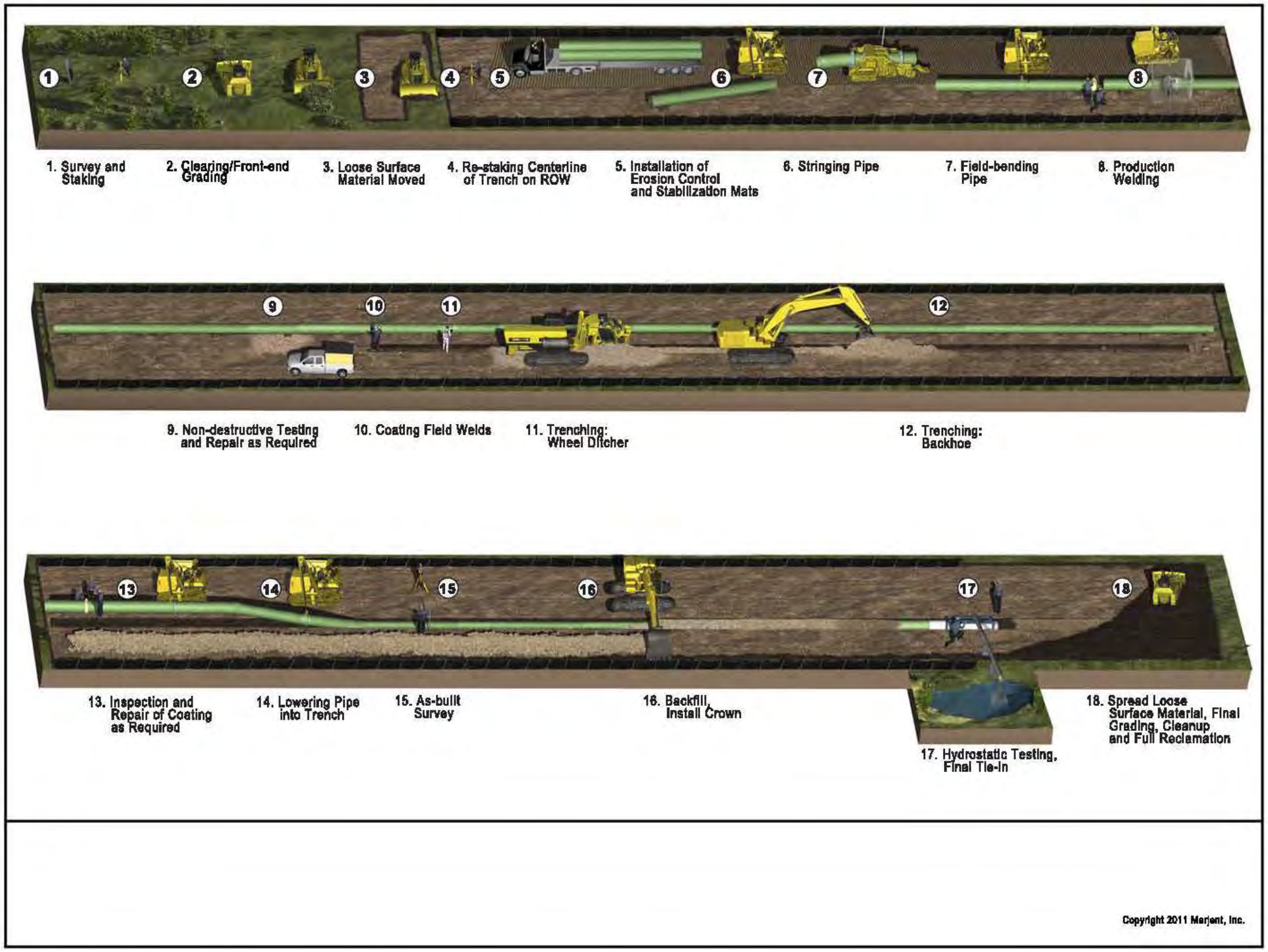
3.2 Construction Procedures

Pipeline construction activities would occur in the sequence presented below:

- Preparation of the ROW
- Clearing and grading
- Hauling and stringing pipe
- Trenching

- Trench dewatering (if necessary)
- Pipe joint field bending
- Pipe joint line-up, welding, and weld inspection
- Pipeline lowering into trench
- Trench backfilling
- Hydrostatic test water appropriation and pipeline hydrostatic testing
- Disposal of hydrostatic test water in accordance with National Pollutant Discharge Elimination System (NPDES) permit conditions
- Cleanup and ROW restoration
- Revegetation
- Post-construction monitoring

These procedures are described in the sections that follow. Figure 3-10 provides a schematic depicting the typical pipeline construction sequence. Descriptions of construction in waterbodies and in wetlands, which require specialized techniques and procedures to address stormwater and erosion, invasive species, and fugitive dust, are also provided. The EPP (Appendix B) outlines construction-related environmental policies, procedures, and mitigation measures developed to reduce construction impacts to the environment. The measures contained in the EPP are intended to meet or exceed applicable federal, state, and local environmental protection and erosion control specifications, technical standards, and practices.



Source: Enbridge 2014

Figure 3-10 Typical Construction Sequence

3.2.1 Preparation of the Right-of-Way

Civil survey crews would stake the construction ROW prior to clearing of vegetation or ground disturbance. Crews would modify or remove fences when encountered within the construction area or, if necessary, for ROW access.

3.2.2 Clearing and Grading

Clearing would be limited to the extent needed for access and construction of the pipelines. The contractor would clear the ROW in accordance with permits, would protect trees to the extent possible, and would remove stumps where necessary. The contractor would haul stumps and debris created from preparation of the construction area to an approved disposal site, mulch, or otherwise handle in accordance with the Projects' permits. Non-merchantable timber and slash would be disposed of by mowing, chipping, grinding, and/or hauling to an approved offsite disposal facility or used in stabilizing erodible slopes or construction entrances. In non-agricultural, non-wetland areas and with landowner approval, wood chips may be uniformly spread (at less than 1 inch thickness) across the construction ROW where they would ultimately be incorporated into the topsoil layer during grading activities.

The contractor would not be allowed to burn non-merchantable wood unless all applicable permits and approvals (e.g., agency and landowner) have been acquired and burning is carried out in accordance with all state and local regulations.

The construction area would be graded only to the extent needed to provide a safe work area. Graded areas and side hill cuts would be restored to original conditions to the extent possible upon completion of construction. Topsoil would be separated from subsoil to preserve the physical and chemical properties that are conducive to good plant growth in selected areas where soil productivity is an important consideration, such as in hayfields, pastures, residential areas, golf courses, unsaturated wetlands, and other areas as requested by the landowner or as specified in the Projects' plans, commitments, or permits. A visible separation between the topsoil and subsoil piles would be maintained to prevent mixing. Topsoil would not be used to construct trench breakers or to pad the pipe. Gaps would be left in stockpiled topsoil and spoil piles at water conveyances (i.e., ditches, swales, and waterways) to maintain natural drainage. Topsoil would be stripped to a maximum depth of 12 inches in cultivated lands, unless otherwise requested by the landowner. Additional space may be needed for spoil storage if more than 12 inches of topsoil are segregated. The contractor would also attempt to segregate and store topsoil layers less than 12 inches.

3.2.3 Hauling and Stringing Pipe

Coated pipe, valves, and fittings would be hauled by truck from material storage yards to various points along the proposed Projects' route. These materials would be offloaded along the construction route using side boom tractors, mobile cranes, or vacuum lifting equipment. Prior to trench excavation, pipe would be placed (strung) along the construction ROW and arranged to be accessible to construction personnel.

3.2.4 Trenching

At each construction location along the pipeline route, the Line 3 Replacement Pipeline is proposed to be constructed first, followed by the Sandpiper Pipeline. The amount of open trench would be restricted to approximately 3 days' welding production per pipeline at any one time, except in locations that require site-specific or "tie-in" crews to install valves or pipelines at select crossings such as roads, railroads, or waterbodies, for example. All construction equipment and vehicles would be confined to the approved construction ROW and ATWS areas. Precautions would be taken to adequately protect, repair, and/or replace damaged drainage systems such as ditches or drainage tiles. Enbridge proposes to coordinate with landowners to minimize disruption of access caused by the trench during construction. Enbridge also proposes to coordinate with landowners with concerns about ranging livestock to determine if exclusion fences or access bridges are necessary.

Trenching is typically conducted using a backhoe or crawler-mounted, wheel-type ditch-digging machine. Excavated material is stockpiled within the approved construction ROW separate from the topsoil (the EPP contains additional information; see Appendix B). The pipelines would be buried in accordance with USDOT regulations (49 CFR Part 195), which stipulate a minimum of 3 feet of top cover for normal excavations and 18 to 30 inches of cover for rock excavations (depending on the location) to prevent damage to the pipeline from normal use of the land. The Projects' depth of cover would vary from 36 to 48 inches, depending on permit requirements, landowner agreements, and site-specific conditions (e.g., depth of drain tile). Proposed depths of cover over the pipelines is provided in Table 3-4. Greater pipeline depths than those presented would result in greater amounts of ditch spoil that could require ATWS for storage of the spoil.

Table 3-4 Planned Depth of Cover for Pipelines

Land Type Crossed	Planned Depth of Cover (inches)	
	Normal Excavation	Rock Excavation
Industrial, commercial, and residential areas	36	30
Crossing of inland bodies of water with a width of at least 100 feet from high water mark to high water mark	48	18
Drainage ditches at roadways and railroads	36	36
Any other area	30	18

Source: Enbridge 2015a
Note: Rock excavation is any excavation that requires blasting or removal by equivalent means.

3.2.5 Trench Dewatering (if Necessary)

Groundwater or stormwater runoff may accumulate in the trench during construction activities and may require extraction and discharge. All applicable permits would be obtained for discharge activities, and dewatering would occur in compliance with DNR technical standards. A floating suction hose and elevated intake, or other similar measures, would be used to keep the intake hose of the dewatering system off the bottom of the trench to reduce the potential for capturing additional sediment in trench water. Discharged water would be pumped into a sediment filter bag or a straw bale dewatering structure to prevent heavily silt-laden water from flowing into streams or wetlands (see Section 5.0 of the EPP for further information; Appendix B). The specifications for filter bags vary depending on the materials being used. The use of filter bags with either a straw bale structure and/or geotextile lined straw bale dewatering structure generally increases efficiency of filtration of the discharge. Geotextile bags would be sized appropriately for the discharge flow and suspended sediment particle size according to DNR dewatering permit standards (Wisconsin Pollutant Discharge Elimination System [WPDES] Permit No. WI-0049344-4). The size of straw bale dewatering structures, if used, would depend on the maximum water discharge rate. Multiple filtering mechanisms (e.g., geotextile bag within a straw bale dewatering structure) may be used as necessary. Dewatering operation discharge sites that drain away from waterbodies or wetlands would be selected. Water would be discharged to well-vegetated upland areas at a rate that promotes filtering and soaking into the ground surface.

3.2.6 Bending

Within the limits of field pipe section bending parameters, individual sections of pipe would be bent within the temporary ROW next to the trench to conform to the contours of the trench and terrain where necessary. A track-mounted, hydraulic pipe-bending machine would be used for this purpose. Larger bends, if required, would be bent prior to arrival at the work site.

3.2.7 Welding

Following bending, sections of pipe would be lined up and welded together. Each individual weld is non-destructively inspected prior to coating. Non-destructive inspections do not alter the weld being examined (i.e., no samples need to be sent to a lab for inspection); common methods include x-rays or ultrasound tests.

3.2.8 Lowering In and Coating

The trench would be inspected for proper depth, and rocks or other obstructions would be removed prior to lowering in welded pipeline strings. Sideboom tractors, spread out along the pipeline segment, would simultaneously lift the welded pipeline sections and move them over the open trench. The sideboom tractors would then lower the pipeline segment into the trench. Cathodic coating[2] would be applied after the welded pipeline length is installed in the ditch to inhibit corrosion during pipeline operational life. The pipelines would be installed at a depth of 48 inches below the graded ROW surface, upon topsoil removal, which is below the maximum plow depth. The pipeline would be marked at all road, railroad, and stream crossings, and in sufficient number along the remainder of the line such that the location is known to the general public in accordance with CFR 49 Part 195.410.

3.2.9 Backfilling

The trench is backfilled with the spoil materials excavated from the trench after the lowering in of welded pipeline strings. The requirement for pipe protection would be determined during the trenching operation. The nature of the excavated native material may require the use of mechanical padding equipment to generate material that does not damage the pipe coating. In instances where insufficient native materials are available, the pipe may be wrapped with a polyvinyl chloride rock shield to protect the coating. Angle blade dozers, draglines, or backhoes would place the spoil on top of the pipeline. In areas where topsoil segregation occurred, subsoil would be replaced first, followed by topsoil.

3.2.10 Pipeline Cleaning and Hydrostatic Testing

After backfilling is complete, the pipeline would be prepared by removing accumulated construction debris, mill scale, dirt, and dust using a cleaning pig. The debris would be collected in a temporary receiver and disposed of at an appropriate offsite location. Upon completion of the cleaning operation, the pipeline would be sealed with test headers and rinsed. Rinse water would be treated and disposed of in accordance with applicable permit conditions. Then the pipeline would be hydrostatically tested in accordance with PHMSA regulations to ensure that the system would be capable of operating at the design pressure. The testing process would involve filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.

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[2] A coating that controls corrosion of metal by providing a barrier against oxygen and water.

For each pipe section to be hydrostatically tested, Enbridge would excavate around each end of the section and install a manifold to the end of the pipe. The manifolds would include valves to allow for the filling and draining of the test section and the release of displaced air, and to connect to testing equipment that would be used to measure and record the pressure within the test section. Once the hydrostatic testing is completed, the manifolds would be removed and the separate pipeline test sections would be welded together. The excavations at the ends of the test sections would remain open only during testing and would be backfilled when the test is completed.

The length of open trench required to install the manifolds is dependent on site-specific conditions but is typically less than 200 feet. To meet applicable safety standards for workers, the excavation would be slightly wider than the excavation width required to install the pipe. Temporary erosion and sediment control structures at the excavation sites would be installed and maintained in accordance with Enbridge's EPP. Dewatering of the open trench, if necessary, would also be completed in accordance with the EPP. Restoration of the sites after removal of the manifolds and backfilling would be accomplished in accordance with Enbridge's EPP.

The length of individual test segments would be determined by topography and water availability. All water for hydrostatic testing would be acquired in accordance with applicable permits, and hydrostatic testing would be carried out in accordance with USDOT specifications. The Pokegama River is identified as a potential source and discharge location for hydrostatic testing in Wisconsin. Enbridge would not add biocides or other chemicals to the test water. Test water would be discharged to the waterbody it was obtained from either directly with use of an energy dissipation device at the waterbody or through an energy dissipation device to ground surface that would allow the water to flow into the waterbody. Test water would be discharged in accordance with Enbridge's EPP, NPDES permit, and permits issued by federal, state, tribal, or local agencies. All landowners within 200 feet of each hydrostatic test area would be notified of the planned test and advised to stay a safe distance from the pipeline being tested.

Following hydrostatic testing, the test section would be depressurized and water would be discharged to a well-vegetated, upland area with an appropriate dewatering structure such as a geotextile filter bag and/or a hay bale structure lined with geotextile fabric. Direct discharges to surface waters, if allowed by permit, would be directed into an energy dissipation device such as a splash pup. Hydrostatic test water would be discharged at a rate specified in the DNR-issued hydrostatic testing and water supply permit (WPDES General Permit No. WI-0057681-4). If no maximum discharge rate is identified, discharges would be monitored and adjusted as necessary to avoid scouring, erosion, or the transportation of sediment from the discharge location. To minimize the potential for introduction or spread of invasive species due to hydrostatic testing activities, water would be discharged to the same location from which it was appropriated. If water is used to test multiple test sections, it would be relayed back to its source location through the pipeline for final discharge. Test water would not be discharged to a waterbody other than the appropriation source, unless coordinated and permitted through applicable agencies.

After completion of hydrostatic testing, Enbridge would conduct an internal inspection of the pipeline using a caliper pig, an electronic inspection tool. The caliper pig would travel inside the pipe, and its on-board computers would mechanically, ultrasonically, or magnetically examine the condition of the pipe. This technique would identify potential problems such as dents, gouges, or cracks. The results of the inspection would be analyzed; if potential problems are identified, that section of pipe would be repaired or replaced.

3.2.11 Cleanup and Right-of-Way Restoration

After the pipelines have been laid and tested, all construction debris (including excess rock and litter generated by construction crews) would be removed and ATWS would be restored. Disturbed areas would be re-graded and restored as closely as practicable to preconstruction conditions. Restoration includes placing topsoil, preparing a seedbed (where applicable) for permanent seeding, installing or repairing temporary erosion control measures, repairing or replacing fences, and installing permanent erosion controls. Cleanup and rough grading (including installation of temporary erosion control measures) would begin within 14 days after backfilling the trench. If seasonal or other weather conditions prevent compliance with this timeframe, temporary erosion controls will be maintained until conditions allow completion of cleanup.

In sloped areas, permanent berms (diversion dikes or slope breakers) would be installed according to the maximum spacing requirements specified in the EPP (see Appendix B) unless otherwise specified in permit conditions. Permanent berms of compacted earth would be constructed with a 2 to 4 percent out-slope. Stormwater deflected by berms would be directed toward appropriate energy-dissipating devices, and off the construction ROW if possible. Permanent berms would be inspected and repaired to maintain function and prevent erosion. Jute erosion control blankets would be placed on slopes over 30 percent or that connect directly with sensitive resource areas (e.g., wetland or waterway). Jute is made from high-strength coir yarn, which protects soil surfaces from water and wind erosion and provides partial shade and heat storage to accelerate vegetation growth.

3.2.12 Revegetation

Upland portions of the ROW would be reseeded in accordance with Section 7.0 of the EPP (see Appendix B). Wetlands would be reseeded in conformance with U.S. Army Corps of Engineers (USACE) and DNR specifications, and in accordance with the EPP, which was developed according to U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) guidelines. Seeding and restoration/stabilization would occur within 48 hours of final grading of the ROW and the restoration of wetland and waterways.

Temporary revegetation measures would be employed to quickly establish ground cover vegetation and minimize potential soil erosion. A temporary seed mix has been developed based on recommendations from the NRCS, which consists of equal amounts of oats (in summer) or winter wheat (in fall or spring), and annual ryegrass, annual alfalfa, or slender wheatgrass.

Unless specifically requested by landowners or land management agencies, temporary vegetation would not be established in actively cultivated land, standing water wetlands, and/or other standing water areas. Between April 1 and September 1, temporary revegetation would be established in construction work areas where 14 days or more would elapse between: the installation of the first pipeline (Line 3 Replacement) and the second pipeline (Sandpiper Pipeline); the completion of final grading at a site and the establishment of permanent vegetation; and/or, where there is a high risk of erosion due to site-specific soil conditions and topography. Temporary seeding may be required sooner than 14 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion. Straw mulch may be used to help stabilize areas during the establishment of temporary vegetation. Mulch would be free of noxious weeds as listed in applicable state laws and consistent with the EPP. Revegetation outside of this timeframe (i.e., from September 2 to March 31) would be assessed and approved by Enbridge on a site-specific basis.

Permanent vegetation would be established in areas disturbed within the construction workspace, except in actively cultivated areas, standing water wetlands, and forested wetlands. A standard upland seed mix has been developed for restoring disturbed areas affected by the Projects (Table 3-5). The mix includes species that would provide for effective erosion control and revegetation of disturbed areas and would be certified as “noxious weed free.” This seed mix would be used as the standard upland mix unless an alternate seed mix is specified by landowners or land management agencies. A different specialized seed mix consisting of American slough grass (*Beckmannia syzigachne*), annual rye grass (*Lolium perene*), and fowl bluegrass (*Poa palustris*) would be used in non-standing water wetlands (wetland construction methods are discussed further in Section 3.2.17).

Table 3-5 Standard Upland Seed Mix

Common Seed Name	Scientific Name	Pure Live Seed (pounds per acre)	Percentage of Seed
Perennial ryegrass	*Lolium perenne*	2	17
Canada wild-rye	*Elymus canadensis*	4	33
Switchgrass (unimproved native variety)	*Panicum virgatum*	4	33
Timothy	*Phleum pratense*	2	17
	Subtotal	**12**	**100**
Associated Companion Crop Mix			
Oats for summer seeding or winter wheat for seeding in late fall (dormant) or spring	Oats: *Avena sativa* Winter wheat: *Triticum aestivum*	16	80
Annual ryegrass or slender wheatgrass	Annual ryegrass: *Lolium italicum* Slender wheatgrass: *Elymus trachycaulus*	4	20
	Companion/Cover Crop Subtotal	**20**	**100**
	Total (pounds)	**32**	**NA**

Source: Enbridge 2014

Seed would be uniformly applied at specified rates across the prepared ROW by drilling, hand broadcasting, or hydroseeding. Seeding activities would be temporarily suspended in conditions that would cause rutting of the surface in designated seeding areas and would resume as site conditions improve and according to the general seeding timing restrictions. Seeding equipment would be capable of uniformly distributing and sowing seed at the required depth.

Enbridge consulted with NRCS representatives and reviewed county soil survey information to assess locations of soil amendment requirements, specifically the application of fertilizer or lime, to promote successful revegetation. Fertilizer or lime would not be added with native seed mixes. Rather, soil amendments would be applied to agricultural, pasture, and/or residential lands if requested by landowners and/or land management agencies. If soil amendments are required within 100 feet of a waterway, phosphate-free fertilizers would be applied to these areas.

Other methods of stabilization (e.g., mulch, erosion control matting) would be used if temporary seeding is not appropriate due to seasonal conditions. After construction and completion of final cleanup, Enbridge's land agents would contact landowners to address any remaining restoration concerns.

3.2.13 Stormwater and Erosion Control

Temporary erosion control measures are intended to slow the velocity of water to minimize erosion, stop the movement of sediments, and prevent the deposition of sediments into sensitive resources that may be on or adjacent to the ROW. Temporary erosion control measures would be installed after initial clearing and before disturbance of the soil at the base of sloped approaches to streams, wetlands, and roads. These temporary erosion control measures would be replaced by permanent erosion controls if required upon the completion of restoration. Temporary erosion and sediment controls include, but are not limited to, slope breakers, sediment barriers, stormwater diversions, trench breakers, mulch, and revegetation.

Erosion and sediment control structures would be maintained as required by all applicable permits. Any structures that are found to be no longer providing effective erosion and sediment control would be replaced with functional materials as soon as field conditions allow, but no later than 24 hours after discovery. Installation of temporary seeding, mulch, and erosion control mats may be necessary in certain locations if construction delays occur over14 days or longer. Temporary stabilization materials may be installed sooner based on site conditions, or due to other conditions that increase sediment transport potential.

The appropriate class of erosion control blanket would be installed on slopes greater than 5 percent that drain to surface waters and that would be exposed over the winter before snowfall to ensure maximum protection of exposed slopes prior to spring melt and prior to the frequent winter storms that occur in northern Wisconsin in March and April. Temporary slope breakers would be installed to minimize concentrated or sheet flow stormwater runoff in disturbed areas in accordance with the EPP unless otherwise specified in permit conditions. Temporary slope breakers may be constructed using earthen subsoil material, silt fence, hay bales, or rocked trenches (in upland, non-agricultural lands only).

During construction, certain activities may be suspended in wet soil conditions based on the:

- Extent of surface ponding
- Extent and depth of rutting and mixing of soil horizons
- Areal extent and location of potential rutting and compaction (i.e., can traffic be rerouted around wet areas?)
- Type of equipment and nature of the construction operations proposed for that day

The contractor would cease work in the wet soil area until the IEM and/or Enbridge environmental inspectors determine that site conditions are such that work may continue. Additional requirements for working in agricultural land during wet conditions are included in Enbridge's Agricultural Protection Plan (APP; Appendix A), which it developed in consultation with the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP).

Consistent with the requirements of state regulation (ch. NR 216 Wis. adm. code), Enbridge intends to request an authorization from DNR to discharge construction stormwater and will submit its Notice of Intent to discharge stormwater to the DNR for review and potential approval prior to initiation of construction activities of the Sandpiper Pipeline. Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Line 3 Replacement Project and received Notice of Coverage in December 2015.

3.2.14 Construction in Agricultural Land

Enbridge has developed an APP, which identifies measures that would be implemented to avoid, mitigate, or provide compensation for agricultural impacts that may result from pipeline construction. The construction standards described in the APP apply only to construction activities occurring partially or wholly on privately owned agricultural land, and the best management practices (BMPs) identified in the EPP may be used on agricultural land in conjunction with mitigation measures outlined in the APP. Appendix A of the APP provides additional mitigation measures that would be applied specifically to organic agricultural lands, such as organic certified farms or farms that are in active transition to organic-certified status.

3.2.15 Construction at Stream and River Crossings

When crossing streams and rivers, a 20-foot buffer of undisturbed herbaceous vegetation would be left on all waterbody banks as measured from the ordinary high water mark (OHWM) during initial clearing, except where grading is needed for bridge installation or where restricted by applicable regulations and/or permit conditions. Woody vegetation within this buffer may be cut and removed during clearing, leaving the stumps and root structure intact. Non-woody vegetation and the soil profile would be left intact until trenching of the stream crossing is ready to begin. Sediment control measures would be properly installed and maintained at the 20-foot buffer line adjacent to streams immediately after clearing and prior to initial ground disturbance. Use of this 20-foot buffer along with the Applicant's other BMPs outlined in the EPP (Appendix B) meets DNR's Construction Site Storm Water Runoff General Permit No. WI-S067831 requirement that the permittee stage land-disturbing construction activities to limit exposed soil areas subject to erosion.

ATWS areas would be located at least 50 feet away from the OHWM of a waterbody if topographic or other physical conditions such as stream channel meanders allow. In the event that safe work practices or site conditions do not allow for a 50-foot setback, ATWS areas would be located no closer than 20 feet from the OHWM, subject to site-specific approval by the IEM and/or Enbridge environmental inspectors.

Project activities at stream and river crossings include the installation of temporary bridge crossings to move construction equipment across the feature and the installation of the pipelines. Temporary bridge crossings would be designed to withstand the maximum foreseeable flow of the stream, would not restrict the flow of water while the bridge is in place, would be constructed with clean materials, and would be used only with agency approval (Figures 3-10 through 3-12). Temporary bridge crossings would be installed during clearing activities and would not be removed until restoration activities are complete.

There are various methods that are used to cross waterbodies including the open-cut/wet trench method, dry crossing methods, and the horizontal directional drilling (HDD) method. The type of crossing method chosen is determined by factors including the presence of water at the time of construction, soil types, and presence of sensitive species, among others. The two methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Projects are the open-cut/wet trench method and the dry trench crossing method as described below (Table 3-6 provides the crossing method to be used at each waterbody crossing).

3.2.15.1 Open-Cut/Wet Trench Method

The open-cut/wet trench method is used to cross streams and rivers that lack discernible flow at the time of construction. In-stream work including trenching and backfilling would typically be completed within 24 hours or less on minor waterbodies (less than 10 feet wide) and 48 hours or less on intermediate waterbodies (between 10 and 100 feet wide), or as directed by applicable permits. The Projects would not cross waterbodies greater than 100 feet in width in Wisconsin.

The following procedures would be used during wet trench crossings (Figure 3-11):

- Sediment control measures and erosion control devices (ECDs) would be installed before grading from the 20-foot vegetative buffer left on each stream bank.
- Spoil containment structures would be installed back from the stream bank so that spoil does not migrate into the stream.

- Grading would be directed away from the waterbody to minimize the potential for sediment to enter the stream. Grading of stream banks would be restricted to the trench line and areas necessary for safe bridge installation.
- After grading, backhoes or draglines would be used to excavate the trench. Where possible, excavating equipment would operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it would operate on clean construction mats (free of soil and plant material prior to being transported onto the construction ROW).
- Streambed material would be segregated (e.g., the upper 1 foot would be stored separately from the remaining trench spoil) and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream would only be allowed if expressly approved in applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench would be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs would be removed immediately prior to pipe placement, and then replaced when the pipe is in place.
- Trench water accumulated upslope of trench plugs would be dewatered appropriately prior to trench plug removal.
- Backfilling would begin after the pipe is positioned in the trench at the desired depth. Backfill material would consist of the spoil material excavated from the trench and streambed unless otherwise specified in state or federal permits. The in-stream trench would be backfilled so that the stream bottom is as near as practicable to its preconstruction condition, with no impediments to normal water flow.
- Stream banks would be restored as near as practicable to preconstruction conditions unless slopes are determined to be unstable. For unstable slopes, the banks would be reshaped to prevent slumping. Once the banks have been reshaped, ECDs[3] would be installed within 24 hours of backfilling the crossing.
- Temporary slope breakers would be installed on all sloped approaches to streams in accordance with spacing requirements.
- A temporary seed mix (e.g., annual rye or annual oats) and mulch and/or erosion control blankets would be spread within a 50-foot buffer on either side of the stream, except for within actively cultivated land.
- Silt fence or functional equivalent meeting DNR Technical Stormwater Standards[4] (DNR 2013) as selected in advance by Enbridge would be installed upslope of the temporary seeding area.

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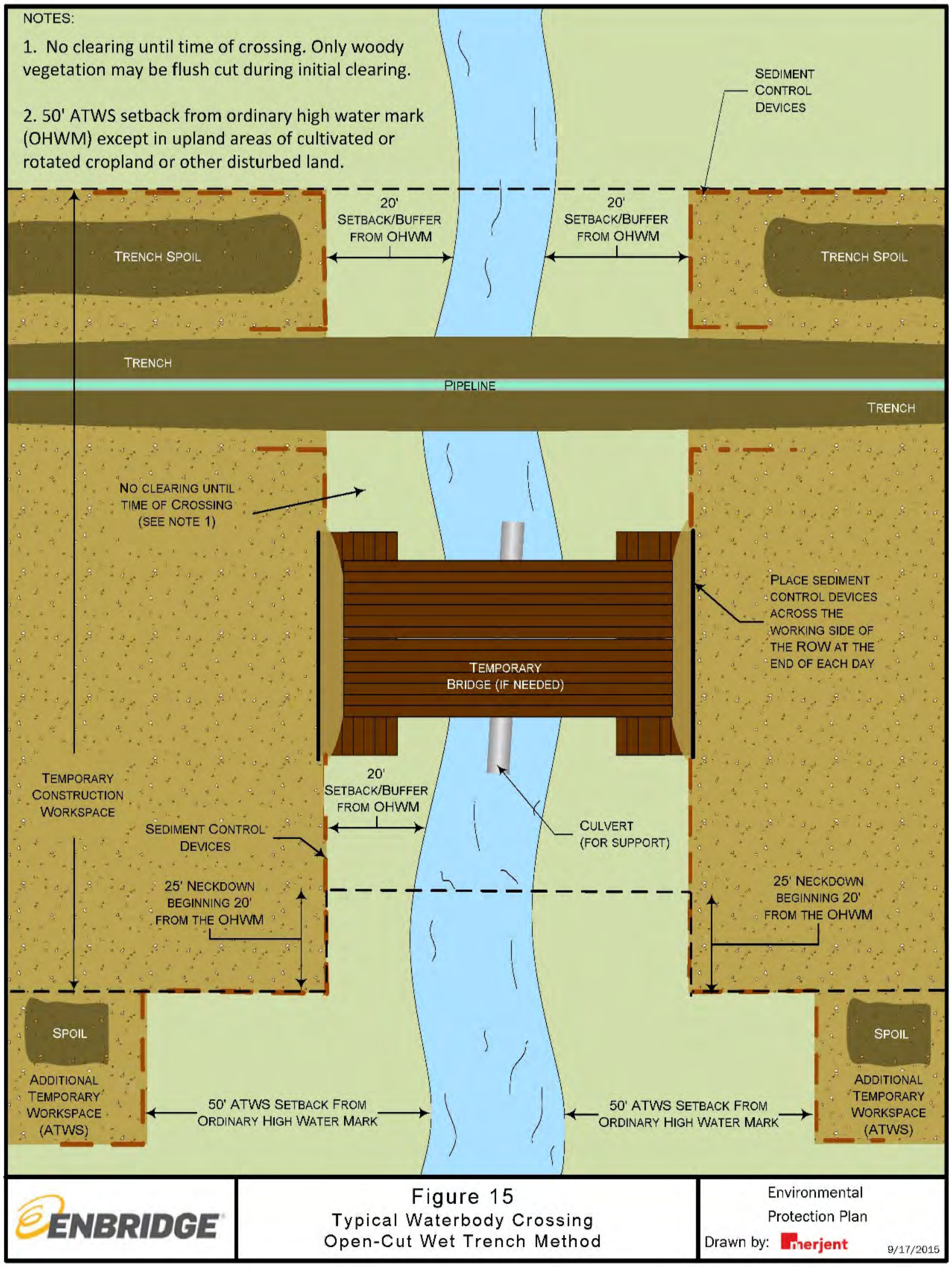
[3] Examples of ECDs that could be used include slope breakers, sediment barriers (i.e., silt fence, straw bales, bio-logs, etc.), stormwater diversions, trench breakers, mulch, and revegetation subsequent to seeding of exposed soils.

[4] Based on Wis. adm. code NR 216.



Source: Enbridge 2015d

Figure 3-11 Open-Cut/Wet Trench Method

3.2.15.2 Dry Trench Crossing Methods

Two dry trench crossing methods can be used to cross streams with flowing water: the dam and pump method and the flume method. The dam and pump method is suitable for low-flow streams and is generally preferred for crossing meandering channels, whereas the flume method is suitable for crossing relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at the point of crossing.

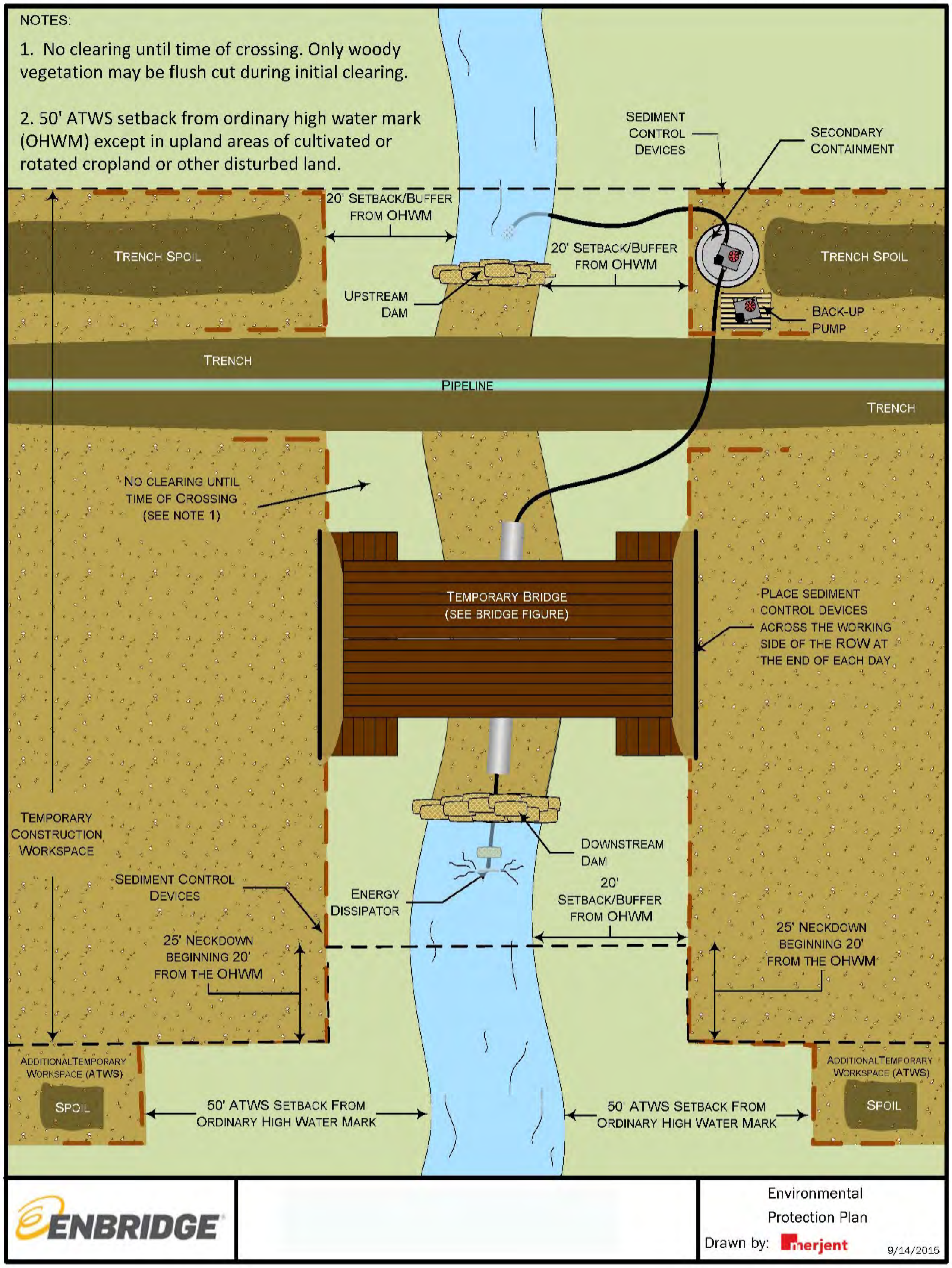
The dam and pump method involves damming of the stream upstream and downstream of the proposed trench before excavation and pumping water around the construction area (Figure 3-12). Duration of in-channel operations would be similar to those described for the wet trench method. The following procedures would be used for dam and pump crossings:

- Dams made of sandbags, inflatable dams, aqua-dams, sheet piling, and/or steel plates would be constructed to prevent the stream from flowing into the construction area. The dams would be continuously monitored for a proper seal and additional sandbags, plastic sheeting, steel plating, or similar materials would be used where necessary to seal seeping water.
- Stream water would be pumped across the construction area (commencing simultaneously with dam construction to prevent interruption of downstream flow) through a hose and would be discharged to an energy dissipation device, such as plywood boards, to prevent scouring of the streambed.
- The pump and fuel containers would be located on the upstream side of the crossing and would be placed in impermeable, sided structures that would act as containment units.
- The pump water intake would be suspended to prevent sediment from the bottom of the stream entering the intake. The pump water intake would also be equipped with a screen, or equivalent device, to prevent fish from entering.
- Pumps would have a capacity greater than the anticipated stream flow. The pumping operation would be staffed 24 hours a day, and pumping would be monitored and adjusted as necessary to maintain an even flow of water across the work area and near-normal water levels upstream and downstream from the crossing.
- Where possible, excavating equipment would operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it would operate on clean construction mats.
- Streambed material would be segregated and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream would only be allowed if expressly approved in applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench would be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody.
- Trench plugs would be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs would be dewatered appropriately prior to trench plug removal.
- Backfilling would begin after the pipe is positioned in the trench to the desired depth. Backfill material would consist of the spoil material and parent streambed excavated from the trench unless otherwise specified in state or federal permits. The in-stream trench would be backfilled so that the stream bottom is similar to its preconstruction condition, with no impediments to normal water flow.
- Restoration of the stream banks and the installation of temporary erosion controls would be similar to that described for the wet trench method above but would occur immediately following

installation of the pipeline. Once the stream banks have been stabilized, the dams and pump would be removed.

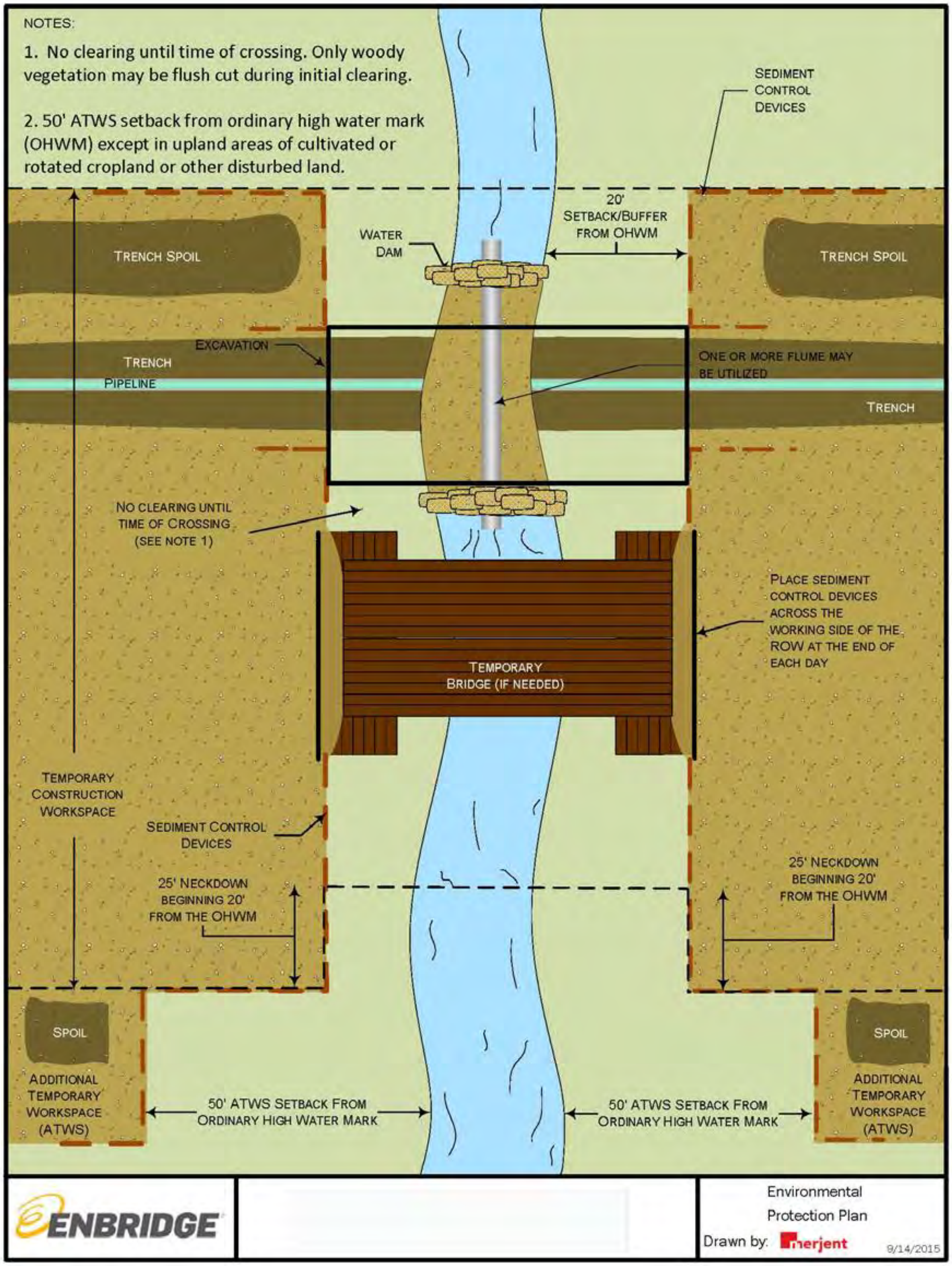
The flume method involves placing flume pipe(s) in the streambed to convey stream flow across the construction area without introducing sediment to the water (Figure 3-13). The following procedures would be used for flume crossings:

- Flume(s) of between typically 40 to 60 feet in length and of sufficient diameter to transport the maximum flows anticipated to be generated from the watershed would be placed in the stream before trenching begins. The flumes would be aligned so as not to impound water upstream of the flumes or cause downstream bank erosion.
- The upstream and downstream ends of the flumes would be incorporated into dams made of sandbags and plastic sheeting (or equivalent). The upstream dam would be constructed first and would funnel stream flow into the flumes. The downstream dam would prevent backwash of water into the trench and construction work area. The dams would be continuously monitored for a proper seal. Adjustments to the dams would be made where necessary to prevent large volumes of water from seeping around the dams and into the trench and construction work area.
- Where possible, excavating equipment would operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it would operate on clean construction mats. Flumes would be elevated in a manner that enables machinery to excavate a trench beneath them. Streambed material would be segregated and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream would only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench would be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs would be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs would be dewatered and treated appropriately prior to trench plug removal.
- Backfilling would begin after the pipe is positioned in the trench to the desired depth. Backfill material would consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench would be backfilled so that the stream bottom is similar to its preconstruction condition, with no impediments to normal water flow.
- Restoration of the ROW and the installation of temporary erosion controls would be similar to that described for the wet trench method above but would occur immediately following installation of the pipeline. After the stream banks have been stabilized, the dams and flume would be removed from the streambed, allowing water to resume its flow in the channel.



Source: Enbridge 2015d

Figure 3-12 Dam and Pump Method



Source: Enbridge 2015d

Figure 3-13 Flume Method

3.2.15.3 Horizontal Directional Drilling Method

The HDD or "guided bore" method involves drilling a pilot hole under the waterbody and banks, then enlarging the hole through successive ream borings with progressively larger bits until the hole is large enough to accommodate a pre-welded segment of pipe. Throughout the process of drilling and enlarging the hole, fluids are typically circulated to lubricate the drilling tools, remove drill cuttings, and provide stability to the drilled holes. During drilling operations, drilling mud and slurry is stored back from the waterbody in an earthen berm sediment control structure, in tanks, or by other methods so that it does not flow into a waterbody or adjacent wetlands. Pipe sections long enough to span the entire crossing are staged and welded along the construction work area on the opposite side of the waterbody and then pulled through the drilled hole. This method can be used for large river crossings where the flow of water cannot be readily managed, and in sensitive areas that require complete avoidance. The HDD/guided bore method does not typically result in the disturbance of the stream banks or riparian vegetation (with the exception of limited hand clearing of woody vegetation), which reduces the potential for erosion and sedimentation at the stream/wetland crossing. Consequently, temporary erosion control measures that are installed at open-cut crossings typically are not necessary for drilled/bored crossings.

3.2.16 Utility and Pipeline Crossings

The utility crossing methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Projects have been selected based upon specific site conditions and the type of utility at each site. The three methods that could be used are open-cut, bore, or HDD. The crossing method to be used at each utility or pipeline crossing is provided in Table 3-6. Additional workspaces for pipeline and utility crossings would be determined on a site-specific basis.

Table 3-6 Utility and Pipeline Crossing Method by Location

Crossing Type	Milepost (Existing Line 3 Pipeline)	Crossing Method	Route Variations Crossed*
Proposed Projects			
Electric Overhead	1085.0	Open-cut	-
Non-Enbridge Pipeline	1085.6	Open-cut	-
Non-Enbridge Pipeline	1085.6	Open-cut	-
Non-Enbridge Pipeline	1085.6	Open-cut	-
Electric Underground	1087.0	Open-cut	-
Electric Overhead	1087.4	Open-cut	-
Electric Underground	1087.4	Open-cut	-
Utility	1088.9	Bore	-
Utility	1088.9	Bore	-
Utility	1088.9	Bore	-
Non-Enbridge Pipeline	1089.0	Bore	-
Utility	1089.0	Bore	-
Electric Overhead	1090.1	Bore	-
Non-Enbridge Pipeline	1090.1	Bore	-
Non-Enbridge Pipeline	1090.1	Bore	-

Table 3-6 Utility and Pipeline Crossing Method by Location

Crossing Type	Milepost (Existing Line 3 Pipeline)	Crossing Method	Route Variations Crossed*
Non-Enbridge Pipeline	1091.0	Bore	A1
Electric Overhead	1093.3	Open-cut	A1
Electric Overhead	1093.3	Open-cut	A1
Electric Underground	1093.4	Open-cut	A1
Non-Enbridge Pipeline	1093.5	Open-cut	A1
Non-Enbridge Pipeline	1093.5	Open-cut	A1
Non-Enbridge Pipeline	1093.8	Open-cut	A1
Electric Underground	1093.9	Open-cut	A1
Utility	1094.6	Open-cut	-
Electric Overhead	1094.7	HDD	-
Electric Underground	1094.7	HDD	-
Utility	1094.8	HDD	-
Utility	1094.8	HDD	-
Electric Overhead	1094.9	HDD	-
Electric Underground	1095.1	Open-cut	-
Electric Underground	1095.2	Bore	-
Electric Overhead	1095.9	Bore	-
Utility	1095.9	Bore	-
Electric Overhead	1096.0	Open-cut	-
Utility	1096.0	Open-cut	-
Utility	1096.1	Open-cut	-
Utility	1096.2	Bore	-
Electric Overhead	1096.5	HDD	C1
Electric Overhead	1096.5	HDD	C1
Electric Overhead	1096.5	HDD	C1
Enbridge Existing Pipeline	1096.6	HDD	C1
Enbridge Existing Pipeline	1096.6	HDD	C1
Electric Overhead	1096.9	HDD	C1
Electric Overhead	1096.9	HDD	C1
Electric Overhead	1096.9	HDD	C1
Enbridge Existing Pipeline	1096.9	HDD	C1
Enbridge Existing Pipeline	1096.9	HDD	C1
Utility	1096.9	HDD	C1
Non-Enbridge Pipeline	1097.4	Bore	-
Non-Enbridge Pipeline	1097.4	Bore	-

Table 3-6 Utility and Pipeline Crossing Method by Location

Crossing Type	Milepost (Existing Line 3 Pipeline)	Crossing Method	Route Variations Crossed*
Electric Overhead	1097.5	Bore	-
Non-Enbridge Pipeline	1097.5	Bore	-
Non-Enbridge Pipeline	1097.5	Bore	-
Non-Enbridge Pipeline	1097.5	Bore	-
Electric Underground	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Enbridge Existing Pipeline	1097.6	Bore	-
Non-Enbridge Pipeline	1097.6	Bore	-
Non-Enbridge Pipeline	1097.6	Bore	-
Electric Overhead	1097.7	Bore	-
Electric Overhead	1097.7	Bore	-
Non-Enbridge Pipeline	1097.7	Bore	-
Route Variations			
Electric Overhead		HDD	A2
Electric Overhead		Open-cut	A2
Electric Overhead		Open-cut	A2
Electric Overhead		Open-cut	A2
Electric Overhead		Bore	C2
Electric Overhead		Bore	C2
Electric Overhead		Bore	C2
Electric Overhead		HDD	C2
Electric Overhead		HDD	C2
Electric Overhead		HDD	C2
Enbridge Existing Pipeline		HDD	C2
Non-Enbridge Pipeline		Open-cut	A2

Notes:
* Hyphen (-) denotes locations where no route variation is present.

3.2.17 Construction in Wetlands

Enbridge proposes to use conventional construction methods in wetlands similar to those implemented in uplands. Construction is conducted in a sequential manner and consists of clearing, stringing, trenching, dewatering, installation, backfilling, final cleanup, and revegetation activities, as described below:

- Wetlands would be accessed using only the construction ROW and approved access roads.
- The construction ROW would be cleared using low-ground-pressure equipment to limit disturbance to the wetland. Clearing of extra workspaces in forested wetlands would be minimized as much as practicable and would be conducted in accordance with applicable permits. Vegetation and trees within wetlands would be cut off at ground level, leaving existing root systems intact.
- Grading activities would be confined to the area of the trench and minimized to the extent practicable. Grading outside the trench would only be allowed where required to ensure safety and restore the construction ROW after backfilling the trench.
- ECDs would be installed after clearing activities across the entire construction ROW upslope of the wetland boundary.
- Construction mats (free of oil, soil, and plant material) would be used as needed to facilitate equipment access and pipeline installation.
- Excavation of the pipeline trench in wetlands typically would be accomplished using backhoe excavators.
- When constructing in wetland areas without standing water, up to 1 foot of topsoil (organic layer) would be stripped from the trench line and stockpiled separate from trench spoil to preserve the native seed stock. In wetlands with standing water, segregation of as much of the organic layer as possible would be carried out based on site/saturation conditions.
- Trench breakers would be used in areas where the pipeline trench has the potential to drain or partially drain a wetland, in order to maintain the current wetland hydrology.
- In large wetlands with standing water, the pipeline would be positioned using the “push-pull” or “float” techniques whereby a prefabricated section of pipeline is pushed-pulled into position or floated across a wetland. When the pipeline is in the correct place, floats are removed and the pipeline sinks into position.
- The trench would then be backfilled using a backhoe or similar equipment working from construction mats. Subsoil material would be replaced so that it is not mounded, and previously segregated topsoil would be placed on top. Excess subsoil would be disposed of in an upland area or at an approved disposal site.
- Backhoes or low-ground-pressure equipment would be used to restore the wetland. Wetlands would be restored as near as practicable to preconstruction conditions, and the contactor would make a reasonable attempt to return the subsoil to its preconstruction density.
- Cleanup and rough grading activities would likely take place simultaneously and would begin as soon as practicable after the trench is backfilled, weather permitting. Cleanup typically involves removing construction debris and replacing fences removed during construction. Rough grading includes restoring original conditions within the disturbed areas and installing or repairing temporary ECDs. Timber mats, construction debris, and larger woody vegetative debris would be removed during cleanup of wetlands.
- Wetlands without standing water would be seeded with an unsaturated wetland seed mix (listed in 3.2.12) to provide temporary cover (refer to Tables 25 and 26 in Appendix C, Seed Mixes, of Appendix B). Fertilizer, lime, and mulch would not be applied in wetlands.

The HDD construction method can also be used to cross wetlands because it does not typically result in the disturbance of riparian vegetation. However, Enbridge does not propose to use the HDD method to cross wetlands in Wisconsin (see Section 5.20.2 for further information). If approved, construction methods would be subject to the applicable state and federal permits for the Projects.

Enbridge originally proposed a compensatory mitigation plan in 2014 at the Crawford Creek mitigation site in the Town of Superior. Subsequently, the DNR implemented an in-lieu fee program and, as a result, in March 2015 Enbridge withdrew the compensatory mitigation plan and requested to utilize the in-lieu fee program to compensate for wetland impacts. The in-lieu fee program, regulated by the USACE and Wisconsin DNR, compensates for impacts to wetland resources through funds paid to a government or non-profit natural resources management entity to satisfy compensatory mitigation requirements for permits. An in-lieu fee program sells credits to permittees whose legal obligation to provide compensatory mitigation is then transferred to the sponsor of the in-lieu fee program upon receipt of an associated credit fee. Final determination of the appropriate mitigation sources and compensatory ratios will be made by USACE and Wisconsin DNR as part of the final wetland permit authorization.

3.2.18 Highway, Road, Driveway, and Rail Crossings

Typically, pipelines across paved roadways and railroads would be crossed using road-boring equipment. This equipment installs the pipelines beneath the road without closing it, thereby avoiding disruptions to vehicular or rail traffic and physical impacts on road/railroad beds. The method involves digging a pit on each side of the area to be crossed. Boring equipment is placed in the pits on the entry side, and the tunnel is bored to the exit pit. Tunneling may require several passes of boring equipment to create a hole with sufficient diameter to accommodate the pipe. When the bore is completed, a prefabricated segment of pipe is pulled through and welded to the adjoining sections of pipe.

Unpaved roadways would be crossed using road-boring equipment or through open-cut trenching as described previously. Open-cut trenching would temporarily disrupt road traffic as the pipe trench is excavated across the roadway. To minimize traffic delays at open-cut crossings, traffic detours would be established before excavating the roadbed. If no reasonable detours are feasible, at least one traffic lane of the roadway would be maintained, except for brief periods when road closure is unavoidable to complete pipeline installation. Road closures would be minimized to the extent practicable and in most cases would be completed in 1 day or less. Roads would not be closed during peak traffic hours to the extent practicable. Local residents would be notified prior to road closures.

Table 3-7 provides the crossing method to be used at each road or railway crossing. Additional workspaces for HDD road and railroad crossings and open-cut road crossings would be determined on a site-specific basis. These workspaces would be adjacent to the road or railroad and limited to the size needed to contain spoil from the crossing (see Table 3-2).

Table 3-7 Highway Road and Rail Crossing Method by Location

Crossing Type	Milepost (Existing Line 3 Pipeline)	Crossing Method	Route Variations Crossed*
Proposed Projects			
Driveway	1085.1	Open-cut	-
Driveway	1087.4	Open-cut	-
Driveway	1088.6	Open-cut	-
Road	1088.9	Bore	-

Table 3-7 Highway Road and Rail Crossing Method by Location

Crossing Type	Milepost (Existing Line 3 Pipeline)	Crossing Method	Route Variations Crossed*
Road	1090.1	Bore	-
Railroad	1092.0	Bore	A1
Railroad	1093.1	Bore	A1
Road	1093.4	Bore	A1
Road	1093.8	Open-cut	A1
Road	1093.9	Bore	A1
Railroad	1094.7	HDD	-
Railroad	1094.7	HDD	-
Road	1094.7	HDD	-
Road	1094.8	HDD	-
Road	1094.9	HDD	-
Railroad	1095.0	HDD	-
Road	1095.2	Bore	-
Road	1095.9	Bore	-
Road	1095.9	Bore	-
Trail	1096.1	Bore	-
-Road	1096.1	Bore	-
Railroad	1096.5	HDD	C1
Road	1097.7	Bore	-
		Route Variations	
Railroad		HDD	A2
Railroad		HDD	A2
Railroad		HDD	A2
Railroad		HDD	A2
Railroad		HDD	A2
Railroad		Bore	C2
Road		Open-cut	A2

Notes:
* Hyphen (-) denotes locations where no route variation is present.

Roadways that are crossed by pipeline construction equipment would be crossed such that tracking of mud onto the roadway is minimized. Additionally, rock tracking pads, constructed of stone as required by applicable permits, would be installed adjacent to paved public roads to further inhibit mud tracking. If a roadside ditch is part of a jurisdictional waterway, a permit would be obtained prior to installing a tracking pad or culvert. If permitted in wetlands, tracking pads would be limited in size to reduce impacts. Tracking pads installed in wetlands would be constructed with clean rock placed on geotextile fabric and with approval from applicable regulatory agencies. All rock and fabric would be removed from wetlands during cleanup.

3.2.19 Invasive Species Management

Vegetation communities are susceptible to infestations of invasive species after disturbances of the soil. Invasive (or noxious) species are plants (weeds) with a tendency to spread to a degree that causes damage to the environment, economy, or human health. Invasive species are most prevalent in areas of prior surface disturbance, such as agricultural areas, roadsides, existing utility corridors, and wildlife concentration areas. The prevention of the introduction or spread of noxious and invasive weeds is a high priority in Wisconsin.

Invasive species field surveys would be conducted along the entire route of the Projects in wetlands and upland areas to identify existing locations of noxious weeds and invasive species. These data would be used to develop specific plans to prevent the spread of known infestations pursuant to Wisconsin's invasive species rule (ch. NR 40 Wis. adm. code). The potential for establishment of invasive species would be reduced by minimizing the time duration between final grading and permanent seeding and by cleaning all construction equipment (e.g., timber mats, vehicles) prior to arrival at all construction sites, which in some situations is a permit requirement (Appendix B).

3.2.20 Fugitive Dust Control

Fugitive dust emissions can occur as a result of blasting or vehicle traffic. Enbridge does not anticipate the need for blasting due to the lack of bedrock. The amount of dust generated from vehicle traffic is dependent on moisture content and composition of soils, wind velocity, types of vehicles, and roadway characteristics. Dust emissions are generally greater during drier months and in fine-textured soils. Dust generated from construction activities would be minimized using control practices including wetting soils on the ROW, limiting working hours in residential areas, and/or additional measures as appropriate based on site-specific conditions (Appendix B).

3.2.21 Construction Schedule and Workforce

Construction activities for each Project would occur over a period of approximately 14 months and may not be concurrent. The construction schedule would be contingent on gaining all regulatory approvals and permits for the proposed Projects from federal, state, and local agencies (see Chapter 1). Following receipt of applicable permits, Enbridge proposes to begin and complete clearing activities associated with the Line 3 Replacement Project by May 31, 2016. Mainline construction activities would then proceed with an anticipated in-service date of November 2016. In the event Enbridge cannot complete the clearing by May 31, 2016, due to extenuating circumstances, it would occur in August 2016; however, the anticipated in-service date remains the same.

Construction of the Sandpiper Pipeline would begin upon receipt of the necessary Project permits. Limited construction on Sandpiper has started in North Dakota, and it is anticipated that the remaining construction and ROW restoration for the Sandpiper Pipeline would take place from 2016 to 2018.

Approximately 400 to 500 workers would be required to construct the pipelines. Enbridge would attempt to hire local workers where the local workforce possesses the required skills. Construction personnel hired from outside the Project area would augment the local workforce and consist of supervisors, environmental inspectors (EIs), and highly skilled mechanical, electrical, and instrumentation/control tradesmen. Non-local workers would relocate to the Project area for the duration of construction. Workers generally would be dispersed along the length of the construction route rather than concentrated at a single work site and would commute to Project work sites on a daily basis.

3.2.22 Construction Monitoring

The Projects would be inspected by an independent third-party environmental monitor (IEM), selected by DNR, who would work collaboratively with the Wisconsin DNR and Enbridge to observe construction mainline activities and supplement DNR field presence. The IEM would observe mainline construction activities until pipeline installation, excavation backfill, and temporary stabilization measures are complete. Enbridge environmental inspectors would continue to inspect any areas where the IEM monitoring is no longer necessary and would provide inspection reports to the DNR upon request. Further information on monitoring for spill prevention and response is provided below.

Conditions encountered during construction may necessitate revisions to environmental plans and/or permits. Most changes would likely be minor and routine in nature, but some may require formal DNR review. The IEM may approve certain modifications in the field where the variance meets the intent of the respective permit conditions, based on the following three levels of variances:

Level 1 variances are minor adjustments that involve interpretation of the requirements of a permit or related plan. The adjustments are of the type that would not affect land outside the temporary construction ROW and ATWS except minimally, where no additional impacts to environmental resources would occur, and that typically would not require formal modification or amendment of agency licenses or permits. Level 1 variances may include, but are not limited to, the following examples:

- Changing type and location of erosion controls shown on site-specific drawings to account for site conditions
- Extending the duration of waterbody crossings by no more than 24 hours
- Changing the type of stream crossing method if an emergency situation occurs during construction and immediate modification is necessary to avoid or minimize environmental damage
- Adjustments that will decrease environmental impacts at particular locations
- Other items identified in consultation with the DNR

Level 2 variances are modifications that require amendments to DNR permits, changes that involve land outside of the temporary construction ROW and ATWS, or that would result in additional incremental impacts to environmental resources. The IEM would explore means to mitigate any additional impacts, including consulting with, and receiving approval from, DNR staff. The IEM would then communicate DNR approval to the Enbridge EI for the variance or amendment. Level 2 variances may include, but are not limited to, the following examples:

- Adjusting the configuration of ATWS to accommodate spoil storage needs
- Extending ATWS into a wetland
- Changing the type of stream crossing method if a site-specific plan for the change was preapproved
- Changing the type of temporary bridge
- Other modifications identified in consultation with the DNR

Level 3 variances are major changes to requirements of permits or related plans or changes that are project-wide in nature. This type of modification would involve Enbridge preparing a formal submittal to the DNR for consideration. The IEM would provide information to the DNR during consideration of the variance or amendment request.

For level 1 variances, Enbridge staff would complete an Onsite Modification Request Form and submit to the IEM. The IEM would conduct any necessary field reviews or consultations with the DNR and either approve or deny the request. Enbridge staff would prepare and submit requests for Level 2 or Level 3 variances to applicable DNR staff using the Onsite Modification Request Form.

3.2.23 Construction Spill Prevention

Potential sources of construction-related spills include machinery and equipment failure, fuel handling, transfer (fueling) accidents, and storage tank leaks. Contractors would be required to implement proper planning and preventative measures to minimize the likelihood of spills and to quickly and successfully clean up a spill should one occur. In the event of a spill, all applicable federal, state, and local regulations with respect to cleaning up the spill would be adhered to. A description of operational pipeline spill response action is provided in Section 8.4.7.

The contractor would be responsible for implementing, at a minimum, the following spill prevention measures:

- Spills kits containing a sufficient quantity of absorbent and barrier materials to adequately contain and recover foreseeable spills would be located near fuel storage areas and other appropriate locations.
- Storage of petroleum products, refueling, lubricating, and maintenance operations would occur in upland areas that are more than 100 feet from wetlands, streams, waterbodies (including drainage ditches), and water supply wells.
- Overnight parking of equipment within 100 feet of a wetland or waterbody would not be allowed unless special containment provisions are implemented.
- All contaminated soils, absorbent materials, and other waste would be stored and disposed of in accordance with all applicable state and federal regulations.
- Hazardous waste, such as motor oil, would be recycled in areas with an established recycling program available.
- All hazardous or contaminated material stored on Enbridge property or the ROW would be appropriately labeled in accordance with state and U.S. Environmental Protection Agency (EPA) labeling requirements.

The EPP provides information on construction methods, BMPs, spill prevention, and other measures that would be used in construction of the Projects. The construction contractor would be responsible for implementing the requirements of the EPP. Enbridge would provide appropriate construction oversight to confirm and document compliance with the EPP and requirements of applicable federal, state, tribal, and local permits. Enbridge EIs would assist the contractor in interpreting and implementing the requirements of the EPP. The EI, in consultation with Enbridge environmental staff, would have the authority to stop activities and order corrective mitigation for actions that are not in compliance with the EPP, landowner agreements, or environmental permit requirements.[5] The EI would maintain appropriate records to document compliance with these and other applicable environmental permit conditions.

All employees handling fuels and other regulated substances would be trained to follow spill prevention procedures and to quickly and effectively contain and clean up spills that could occur using spill containment equipment located in the construction area. Each construction crew would maintain spill kits including adequate absorbent materials and containment booms on hand, to enable the rapid cleanup of

[5] The IEM overseen by DNR can request that activities contributing to resource degradation stop construction until the problem is remedied, but if that request is denied, then DNR would need to resort to requesting a court injunction to stop work.

any spill that may occur. Spill kits may include, but are not limited to, absorbent pads, straw bales, absorbent clay, sawdust, floor-drying agents, spill containment barriers, plastic sheeting, skimmer pumps, and holding tanks. This equipment would be located near fuel storage areas and other locations as necessary to be readily available to control foreseeable spills.

The storage of petroleum products, refueling, maintenance, and lubricating operations would take place in upland areas that are more than 100 feet from wetlands, streams, waterbodies (including drainage ditches), and water supply wells.[6] Fuels, lubricants, waste oil, and any other regulated substances would be stored in aboveground tanks at contractor yards. A suitable secondary containment structure would be used at each fuel storage site, lined with suitable plastic sheeting and providing a minimum containment volume equal to 150 percent of the volume of the largest storage vessel. All fueling and other service vehicles would carry materials adequate to control spills including absorbent pads, commercial absorbent material, plastic bags with ties, and shovels. Fuel trucks transporting fuel to onsite construction equipment would travel only on approved access roads and all fuel nozzles would be equipped with functional automatic shutoffs. Personnel would be stationed at both ends of a hose during fueling unless both ends are visible and are readily accessible by one person.

3.3 Operational Procedures

The Sandpiper Pipeline would deliver 375,000 bpd of crude oil and the Line 3 Replacement Pipeline would deliver 760,000 bpd of crude oil from Clearbrook, Minnesota, to Superior, Wisconsin.[7] The movement of oil would be managed through an existing control center, which would be modified as appropriate to incorporate operation, maintenance, monitoring, and emergency response for the Sandpiper and Line 3 Replacement Pipelines.

Enbridge routinely updates the existing control center to add any new infrastructure, such as pipelines and stations, so they are included in the Supervisory Control and Data Acquisition (SCADA) system to ensure full monitoring and control of the new assets. The SCADA system collects and displays a comprehensive set of pipeline operating data, including flows and pressures. A Pipeline Controller monitors this data, to identify unexpected operational changes, such as pressure drops, that may indicate a leak. Additional sensors monitored through SCADA, such as the detection of combustible gases, pump seal failures, equipment vibration levels, leak alarms and sump levels, can also be used by the Controller to identify potential leaks. SCADA operations include full-time monitoring and control of the assets, direct interaction with all maintenance activities that affect system control, and emergency response including a 1-800 emergency hotline. Since 2010, Enbridge has enhanced its control center operations (CCOs) by completing and implementing the following:

- Developed and implemented a Control Room Management Plan in accordance with applicable CFRs.
- Revised and enhanced all procedures pertaining to decision making, handling pipeline startups and shutdowns, leak detection system alarms, communication protocols, and suspected column separations.

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6 In certain instances, refueling or fuel storage may be unavoidable due to site-specific conditions or unique construction requirements (e.g., continuously operating pumps or equipment on barges). See Section 10.6.3 in Appendix B for precautions that would be taken under these circumstances.

7 During scoping concern was raised that the proposed pipelines could be used to transport water from Lake Superior. This would not occur. The Applicant is proposing to transport crude oil and not water; in addition the pipelines would not connect to Lake Superior, and would flow in the opposite direction than would be required to export water from the lake.

- Enhanced organizational structures to better support operators and to manage span of control and workloads.
- Augmented CCO staff, adding training, technical support, engineering, and operator positions.
- Designed and constructed a new control center in Edmonton, Alberta, that has been in operation since December 2011.
- Implemented CCO team training and Enhanced Operator Qualification for on-call administrative personnel.
- Implemented a Safety Culture Improvement Initiative including the formation of a Safety Leadership Committee tasked with promoting improved control center safety performance, effectiveness, and awareness.

The control center is staffed by pipeline operators 24 hours per day and includes a computerized pipeline control system that allows operators to monitor and remotely control the pipelines and related facilities. Telephone lines (landlines) and satellite communications are used to exchange computerized data for pipeline monitoring and control. Enbridge also maintains an ultra-high-frequency radio system, supplemented by cellular phones, to facilitate personnel communications during operation, maintenance, and emergency activities.

3.3.1 Operation Schedule and Workforce

Since Enbridge would add operation of the Projects to its existing pipeline operations program, operation of the Projects would not require a substantial number of new employees.

3.3.2 Post-construction Wetland Monitoring

A 10-year post-construction wetland monitoring plan has been proposed that involves maintenance of erosion and sediment control and related site-restoration structures, successful coverage of plant communities and compositions, and eradication of invasive species (Appendix B). The primary focus of initial monitoring would be on the continued development of plant communities in affected areas the restoration of topography to match preconstruction conditions within the tolerance specified in permits, and prevention of invasive species growth. Enbridge would meet with the DNR to discuss the result of monitoring held in Year 1 for the purpose of identifying additional restoration needs and identifying wetlands to be monitored for the following 2 years. Continued monitoring would be conducted in August through September of each respective monitoring year for approximately 10 years. A formal report of the monitoring results would be provided to the DNR by December 31 of each monitoring year.

3.3.2.1 Permanent Right-of-Way Maintenance

Enbridge maintains the ROW of its existing pipelines to provide access and to accommodate pipeline integrity surveys. The new permanent ROW for these Projects would be added to the existing ROW maintenance program. Vegetation along the permanent ROW easement would be maintained on a regular basis by removing brush and trees to prohibit the growth of woody vegetation over the pipelines for safety and pipeline integrity issues. Forest land located within temporary work areas would be restored to allow preconstruction land uses. Enbridge would continue to work with potentially affected landowners to determine if any impacts on Managed Forest Law lands would occur from construction of the Projects, and would compensate landowners accordingly if their status in the program is affected.

3.3.3 Pipeline Inspections and Monitoring

Inspection of the Projects would be incorporated into Enbridge's current inspection regime that is conducted for the pipelines in the existing corridor. Enbridge inspects the entire corridor periodically from the air and portions of the corridor on foot, as conditions permit, but no less frequently than the federal government requires in 49 CFR Part 195. The corridor is currently patrolled by air at least once every 2 weeks by an Enbridge-employed pilot who notes unusual activity in or near the ROW, or conditions that could indicate potential crude oil releases. If abnormal conditions are noted, ground crews are immediately dispatched for further investigation. If a release is suspected, the pilot notifies the control center by radio, and the affected pipeline may be shut down pending an onsite investigation. As a supplement to the aerial patrol, Enbridge employees visually inspect the ROW from the ground in selected locations on a periodic basis. These surveillance activities provide information on possible encroachments and nearby construction activities, erosion, exposed pipe, and other potential concerns that may affect the safety and operation of the pipelines.

Each calendar year, the cathodic protection systems of the existing pipelines are inspected by electronic measurements of the pipe/structure-to-soil and line currents (where possible). In addition, all elements of the cathodic protection system (e.g., rectifiers and anode groundbeds) are inspected to ensure proper operation. Repairs and adjustments to the cathodic protection system are made either during the annual survey or during later maintenance activities. At least six times per year, each rectifier and critical cathodic protection interference bond[8] to foreign structures is inspected and corrective measures are taken, if needed. In addition, Enbridge periodically conducts close-interval surveys[9] of the system. Although not required by regulation, this method allows Enbridge to assess the overall effectiveness of the system.

Isolating valves are checked at least twice per year to ensure proper operation. Other components of the pipeline, such as tanks and pump stations, also are routinely inspected. All overpressure safety devices capable of limiting, regulating, controlling, or relieving operating pressures are inspected and tested to ensure that the devices are in good mechanical condition and functioning properly.

Enbridge periodically inspects the pipelines internally with a smart pig to examine the condition of the pipe. This technique identifies potential problems such as dents, gouges, corrosion, or cracks. The results of the inspection are analyzed; if potential problems have been identified, the pipe is inspected to verify preliminary findings and is repaired as needed. See Section 3.3.4 for additional detail on inline inspections.

3.3.4 Operation Spill Prevention

Safety, inspection, and leak detection systems would be in place to minimize the possibility of a spill and to enhance the ability to locate spills that do occur, as quickly as possible. Pipeline inspections are required by PHMSA at 5-year intervals, not to exceed 68 months (49 CFR Part 195). Since there are multiple inline inspection technologies used to detect various types of possible pipeline features, inspections are typically carried out more frequently over a 5-year period to assess varying feature types.

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[8] Interference bonds protect cathodic protection systems by allowing the transfer of cathodic protection currents between pipelines.

[9] Closer-interval surveys are a measurement tool used to ensure that pipeline cathodic protection systems are operating according to standards. At regular intervals, measurements are taken of the voltage difference between the pipeline and a reference electrode in contact with the material or soil (electrolyte). The data collected during a close interval survey provides insight into the cathodic protection on a pipeline.

The Sandpiper and Line 3 Replacement Pipelines would be constructed to accommodate internal inspection instruments, such as smart pigs to identify areas of internal corrosion, dents, cracks, or other features that could compromise pipeline integrity. Section 8.4.7 of this EIS addresses spill response actions if a spill were to occur.

The existing Enbridge integrity management program would be implemented to evaluate risks associated with cracks, corrosion, and geometry-related issues for the two pipelines. Measures in that program include: inspecting the entire Enbridge mainline system using inline inspection tools; establishing rigorous monitoring programs for cracks using high-resolution ultrasonic inline inspection technology; analyzing data for indications of corrosion and using anti-corrosion coatings and cleaning tools; and monitoring to prevent third-party damage to the pipelines by having appropriate signage and organizing a public awareness campaign.

The Sandpiper and Line 3 Replacement Pipelines would have a corrosion-protection epoxy coating fusion-bonded to the pipe at the factory, where all pipe sections would be inspected by Enbridge and re-inspected in the field upon installation. During construction cathodic protection would be installed to protect the pipelines from corrosion during operation. During operation, pipeline internal corrosion susceptibility would be evaluated using data on pipeline characteristics, inline inspection data, operating conditions, pipeline cleanliness, crude and sludge sampling, and historical leak data. Any features discovered by inline inspection that meet specified criteria are identified for further examination through excavations to evaluate the inline inspection results, remediate or repair features, and examine the condition of the pipeline segment.

During operation, the two pipelines would be monitored 24 hours a day using four primary methods:

1. **Controller Monitoring** – The SCADA system (described in Section 3.3) monitors pipeline conditions. It identifies unexpected operational changes (such as pressure drops) outside normal variations that may indicate a release and uses additional sensors at pumping stations monitored through SCADA to identify potential leaks.

2. **Computational Pipeline Monitoring** – Computational Pipeline Monitoring (CPM) systems continuously monitor changes in the calculated volume of liquids and use measurements and pipeline data to detect abnormal operating conditions (such as pressure) that are above or below preestablished limits that could indicate possible releases. The primary CPM system for the Sandpiper and Line 3 Replacement Pipelines would be a Material Balance System, which is a real-time model that calculates material balance and displays alarms when imbalances exceed prespecified thresholds. A secondary, statistical-based CPM system would also be used that continuously calculates the statistical probability of a release based on fluid flow and pressure measured at remote valve locations and the inlets and outlets of a pipeline to detect the location of releases. It is estimated that the CPM system would alarm on leaks of 3 percent of nominal flow in a 2-hour alarm window; larger leaks would alarm in less time.

3. **Scheduled Line Balance Calculations** – These are calculations of oil inventory in operational pipelines to identify unexpected losses of pipeline contents during pipeline flow conditions that may indicate a possible release. The calculations are conducted at fixed intervals, typically every 2 hours, with a rolling 24-hour calculation conducted based on the 2-hour interval calculations.

4. **Visual Surveillance and Reports** – These are reports of oil or oil odors from scheduled aerial and ground line patrols or from third parties. Third-party reports are received through an emergency telephone line: the Emergency Pipeline Control Center, 1-800-858-5253. PHMSA

requires aerial line patrols every 2 weeks, and additional focused aerial and ground patrols may be carried out upon review of the status of a pipeline.

Enbridge is also pursuing the development and implementation of other leak detection technologies. For example, Enbridge recently partnered with TransCanada to research the potential use of fiber optics for purposes of leak detection. PHMSA regulations on the placement of valves near waterbodies and consideration of potential environmental impacts of a leak or spill were used to determine the locations for pipeline valves that can stop the flow of oil. Enbridge also has a public awareness program that facilitates communication with residents along pipeline routes, public officials, excavators, and emergency responders (Appendix C). Enbridge provides information to these parties on how to recognize, react, and report abnormal conditions or observations that could be the result of an oil release.

Additionally, as a result of the Sunday, July 25, 2010, crude oil spill from Enbridge Line 6B near Marshall, Michigan, the National Transportation Safety Board (NTSB) prepared a report with recommendations for Enbridge to reduce the risk of future oil spills from its pipeline system. Enbridge has implemented new measures in response to all of the NTSB recommendations as presented in Table 3-8 (Enbridge 2015c).

Table 3-8 Enbridge Actions Taken in Response to NTSB Report

Enbridge Action in Response to NTSB Report	Completion or Anticipated Completion Date
Pipeline Integrity	
The external tape coating applied to Line 6B, which was the root of the failure, will not be utilized on the proposed pipeline.	The decision has been made not to use external tape coating on the proposed pipeline. Action was completed in 2012.
Changes should be implemented to the integrity management program to ensure improvements to long-term monitoring and mitigation policies.	Numerous modifications were completed in 2011. Enhancements to the integrity program processes are part of Enbridge's continuous reassessment process and will continue year to year. In response to the recommendations made by the NTSB, an update of the comprehensive actions that have been taken to date by Enbridge was provided to NTSB. This update to NTSB was made on January 16, 2014, and the following response was received March 21, 2014: *"We are encouraged that, since then (July 2010), you have been improving your Integrity Management Program (IMP) and have implemented (1) a safety margin that more conservatively takes into account the uncertainties associated with the sizing of crack defects from in-line inspections and (2) procedures that apply a continuous reassessment approach to immediately incorporate any relevant new information as it becomes available, and that reevaluate the integrity of all pipelines within the IMP.* *We further understand that you are conducting a reliability engineering analysis of the effectiveness of hydrotesting in conjunction with in-line inspections using results from your recently hydrotested pipelines, expected to be completed in 2014. Pending the completion of this engineering analysis, Safety Recommendation P-12-11 is classified 'Open—Acceptable Response.'"* Enbridge has completed the reliability engineering analysis of the effectiveness of hydrotesting in conjunction with the inline inspections from recently hydrotested pipelines. This fulfills the requirements of recommendation P-12-11.

Table 3-8 Enbridge Actions Taken in Response to NTSB Report

Enbridge Action in Response to NTSB Report	Completion or Anticipated Completion Date
Changes should be implemented to inspection frequencies, repair methodologies, quality assurance programs, detailed procedure enhancements, additional technologies, and organizational restructuring.	Numerous modifications were completed by Enbridge in 2011. Enhancements to the integrity program processes are part of Enbridge's continuous reassessment process and will continue year to year. See comments above with respect to integrity management activities as assessed by the NTSB.
Increased integration of planning and issue resolution formalized through new committees and planning processes.	New committees and planning processes were activated in 2011 and continue to be used.
Reorganization of the functional areas responsible for pipeline and facility integrity resulting in a doubling of the number of positions dedicated to integrity.	The new organization was implemented in early 2011 and recruitment is complete. The organization will undergo periodic reviews to determine if further refinements are required.
An increase in pipeline integrity management spending in 2011 and 2012 resulting in an increase in the number of inline inspection programs and integrity digs (including excavation, examination, maintenance, and repair by welded sleeve or pipe segment replacements).	The intensive integrity management programs, inspections, and integrity digs were completed in 2011 and 2012 and have been formally analyzed. Those learnings have been integrated in the ongoing integrity plan.
Strengthened focus on the tools, technologies, and strategies to ensure pipeline networks perform safely, reliably, and in an environmentally responsible manner.	Numerous modifications were completed in 2011. Enhancements to the integrity program processes are part of Enbridge's continuous reassessment and improvement process and will continue year to year. See above comments with respect to integrity management activities as assessed by the NTSB.
Implementation of process and procedure enhancements to ensure that a feature similar to the one that led to the Line 6B Marshall incident will be identified and repaired.	Numerous modifications were completed in 2011. Enhancements to the integrity program processes are part of Enbridge's continuous reassessment and improvement process and will continue year to year. See above comments with respect to integrity management activities as assessed by the NTSB.
Leak Detection	
Implementation of additional leak detection analysis procedures.	Leak detection analysis and communication procedure was implemented in late 2011. Eighty-four additional leak detection procedures underwent final review and were implemented in the fourth quarter of 2012.
Establishment of a Pipeline Control Systems and Leak Detection department.	This was completed in October 2010.
Enhancement of the Leak Detection Analyst Training Program.	Training program enhancements to on-the-job training, training program layout, readiness assessment, and communications with CCO personnel were completed and implemented in the first quarter of 2012. Additionally, Enbridge has committed to team-based training twice annually, incorporating team members from both the control center and leak detection teams. The first team-based training sessions were held in 2013.
Implementation of a Leak Detection Instrumentation Improvement Program.	After a thorough analysis of the leak detection sensitivity across Enbridge's liquid pipeline assets in 2011, it was identified that there were opportunities for improved leak sensitivity in alignment with the mandate of providing industry-leading leak detection. The leak

Table 3-8 Enbridge Actions Taken in Response to NTSB Report

Enbridge Action in Response to NTSB Report	Completion or Anticipated Completion Date
	detection team sponsored an initiative known as the Leak Detection Instrumentation Improvement Program to add instrumentation allowing for increased leak sensitivity by Enbridge's CPM Tool (Material Balance System). The addition and replacement of instrumentation at planned locations in Enbridge's pipeline system is intended to improve leak detection sensitivity and reliability, reducing and mitigating the risks of undetected leaks in all locations including high-consequence areas across Enbridge's pipeline system. Instrumentation installation was prioritized based on a risk-based approach, with the most critical devices installed in the initial phases of the program. As of mid-2014, the program had installed 14 pressure transmitters, 3 temperature transmitters, and 38 flow meters on Enbridge liquid pipelines operating in the United States. In addition, Enbridge has successfully completed the Lakehead System Leak Detection Instrumentation Improvement Program. The completion of this project fully responds to Recommendation P-12-13.
Implementation of changes to the Pipeline Control Systems to improve controller decision support systems.	Enbridge has completed investigation of opportunities with alarm analysis and other operator decision support tools. A number of enhancements have been implemented; others are undergoing a phased rollout. Enbridge has since identified and introduced a number of additional planned initiatives that will further enhance operator decision support.
Control Center Operations	
Development and implementation of corporate and CCO-specific "Golden Rules" (safe operating, when in doubt—shutdown, emergency procedures)	Completed in March 2012.
Revision of and enhancement to all procedures pertaining to decision making, handling pipeline startups and shutdowns, leak detection system alarms, communication protocols, and suspected column separations.	Completed in January 2012.
Revisions to documents associated with the newly revised processes and procedures.	Completed in January 2012.
Augmentation to CCO staff, technical support, engineering and operator positions, and enhancement to the organizational structure to better support operators and to manage span of control and workloads.	Completed in May 2012.
Enhancement of training programs in all areas.	As part of ongoing and continued efforts, Enbridge recently completed spring training sessions for all CCO staff involved in pipeline control. These semi-annual sessions focus on lessons learned and communicate the importance of adhering to CO-specific Golden Rules. Mandatory simulator sessions are included as part of the program to provide operations staff with the opportunity to practice procedures while responding to abnormal and emergency operating conditions.
Consolidation, in November 2011, of the new CCO for operation of most Enbridge	Completed in November 2011.

Table 3-8 Enbridge Actions Taken in Response to NTSB Report

Enbridge Action in Response to NTSB Report	Completion or Anticipated Completion Date
liquid pipelines in North America to Edmonton, Alberta, Canada.	
Emphasis on Enbridge's clear message that it operates its pipelines safely and if, for any reason, the pipelines cannot be operated safely, they will be shut down and will not be restarted until Enbridge knows exactly what is going on.	Completed in August 2011.
Public Awareness/Emergency Response	
Development of an online and in-person training tool to provide Enbridge-specific information to emergency responders in its host communities.	The online Emergency Responder Education Program (www.mypipelinetraining.com) was rolled out in December 2012 to approximately 8,000 emergency responders in the United States and Canada. Enbridge rolled out an in-person outreach component of the program. A 911 dispatch module has been developed, working in partnership with the National Emergency Number Association. It was rolled out via email to 911 dispatch centers in Enbridge's areas of operations in the United States and Canada in early March 2014. Enbridge recently presented an educational session at the National Emergency Number Association annual conference in Nashville, Tennessee. Additionally, online public awareness training was rolled for all employees in the United States in 2013. Employees will receive this training once every 2 years. Online public awareness training is also being planned for employees in Canada. Enbridge Public Awareness brochures for the general public, excavators, emergency responders, and farmers is provided as Appendix C.
Addition of Community Relations positions in key locations along Enbridge liquid pipeline routes.	The addition of Community Relations positions in all U.S. liquid pipeline regions was completed in June 2013 with the hiring of employees in Cushing, Oklahoma, and Superior, Wisconsin.
Increased spending ($50 million) between 2012 and 2013 to improve equipment and capabilities, develop better tools to deal with particular waterborne spills, and improve training programs.	Dedicated emergency response equipment was identified and purchasing was completed in 2013.
Implementation of specialized training for a cross-business unit response team, to respond to large-scale events anywhere in North America that would require more resources than a single Enbridge liquid pipeline operating region or business unit could provide.	The company-wide Enbridge Enterprise Emergency Response Team was formed with representatives from three Enbridge business units that would fill roles within the Incident Command System in September 2012. The most recent exercise occurred in September 2014 at the Straights of Mackinaw.
Conducting an emergency response preparedness assessment to identify additional strategic equipment purchases to enhance capabilities to more rapidly respond and contain a significant release anywhere in the Enbridge system.	Assessment has been completed and will continue regarding equipment, training, exercises, and planning. This continues to be an ongoing development and improvement piece going forward. Emergency response tabletop exercises are being planned at selected locations along the ROW prior to the pipelines going into service. Enbridge has developed an Inland Spill Response Tactics Guide, which is a tool that can be used as a quick reference by Enbridge responders to select and implement containment and recovery tactics with Enbridge-owned oil spill response equipment.
Additional personnel in each Enbridge	Resourcing of regional emergency response coordinators is now

Table 3-8 Enbridge Actions Taken in Response to NTSB Report

Enbridge Action in Response to NTSB Report	Completion or Anticipated Completion Date
liquid-pipeline operating region to improve emergency preparedness planning and coordination.	complete.

Source: Enbridge 2015c.

3.4 Decommissioning Procedures

3.4.1 Decommissioning of the Existing Line 3 Pipeline

Upon completion of the Line 3 Replacement Project, Enbridge would place the existing Line 3 Pipeline into a state of temporary deactivation by purging the oil, treating with an internal inhibitor, physically isolating it from upstream and downstream oil movements, and filling it with nitrogen gas kept at approximately 20 pounds per square inch (psi). Enbridge would continue to apply cathodic protection to accommodate protection from external corrosion. Upon the future completion of the Line 3 Replacement Project upstream of Wisconsin, Enbridge would use this temporarily deactivated segment as a drainage path for oil within the remaining upstream to-be-deactivated Line 3 Pipeline. The temporary nature of the deactivation of the existing Line 3 in Wisconsin would render it as "active" per PHMSA regulations and would require active inclusion within the Enbridge Integrity Management System, as well as triggering the reporting requirements for an active pipeline as prescribed by PHMSA. This section of the existing Line 3 Pipeline would be in a temporarily deactivated state for approximately 1 year.

With the replacement of all remaining upstream portions complete, Enbridge would permanently deactivate the Wisconsin segment. Permanent deactivation is also referred to as "abandoned" by PHMSA per the requirements in Section 457, Abandoning a Piping System, of the ASME B31.4-2012, Pipeline Transportation Systems for Liquids and Slurries, standard, which requires:

- Facilities abandoned in place to be disconnected from all sources of transported liquid, such as other pipelines, meter stations, control lines, and other appurtenances.
- Facilities abandoned in place to be purged of the transported liquid and vapor with an inert material and the ends sealed.

The existing Line 3 Pipeline would be purged of crude oil, filled with nitrogen (an inert gas that makes up the majority of the earth's atmosphere), capped, cathodically protected, maintained, and rendered inactive in accordance with 49 CFR 195. After completing this process it would no longer be a PHMSA-regulated asset. However, Enbridge would bear any public safety, environment, or maintenance-related liabilities and responsibilities, and would retain ownership of the permanently deactivated pipeline and its associated easement.

3.4.2 Decommissioning of the Proposed Project

Decommissioning of the proposed pipelines at the end of their useful lifespan, which could be decades with regular monitoring and maintenance, would likely follow the same procedures as those that would be carried out on the existing Line 3 Pipeline upon completion of the proposed Project (Enbridge 2015c). The typical useful lifespan of a crude oil pipeline is variable—some pipelines in the United States have been functioning for over 60 years, and newer pipelines are expected to have greater longevity due to increased quality of materials and construction and monitoring practices.

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4. OVERVIEW OF PROPOSED PROJECTS AND ALTERNATIVES

As detailed in Chapter 3, Enbridge proposes to construct two crude oil pipelines in Wisconsin: 1) the Sandpiper Pipeline, which would be a new 30-inch-diameter pipeline; and 2) the Line 3 Replacement Pipeline, which would replace the existing 34-inch Line 3 Pipeline with a new 36-inch pipeline. Both pipelines and associated facilities would transport crude oil from Clearbrook, Minnesota, to the Superior Terminal in Superior, Wisconsin (Figure 4-1). Associated facilities for the pipelines proposed to be constructed in Wisconsin include:

- New 30- and 36-inch-diameter, underground crude oil pipelines from the Minnesota/Wisconsin border to Enbridge's terminal located in Superior, Wisconsin;
- Six mainline valves (three on each new pipeline);
- Receiving traps and pressure relief valves within the fenced property of the Superior Terminal;
- A densitometer for batch detection on Line 3; and
- Custody transfer metering, a meter prover, pressure control valves, and a sampling facility for the Sandpiper Pipeline Project within the fenced property of the Superior Terminal.

See Figure 4-1 for the locations of these associated facilities. Chapter 3 provides details on the two proposed pipelines and associated facilities including construction methods and safety features.

Both pipelines in Wisconsin are part of larger pipelines that span numerous states. The entire proposed Sandpiper Pipeline is approximately 618 miles long and consists of a 374-mile-long, 24-inch-diameter crude oil pipeline and associated infrastructure from the existing Beaver Lodge Station located south of Tioga, North Dakota, to a new Enbridge Terminal located near Clearbrook, Minnesota, as well as a 244-mile-long, 30-inch-diameter crude oil pipeline and associated facilities from Clearbrook, Minnesota, to the Superior Terminal located in Superior, Wisconsin (Figure 1-1). The new Sandpiper Pipeline would transport light crude oil extracted from the Bakken region to the North American refineries in the Midwest and along the East Coast (Enbridge 2015a).

The existing Line 3 Pipeline is a 1,097-mile crude oil pipeline originally installed in the 1960s that extends from Edmonton, Alberta (Canada), to Superior, Wisconsin (United States). The replacement pipeline would transport crude oil extracted from Canada into the United States and is generally expected to serve the same markets and transport the same product mix as the existing Line 3 Pipeline, which is physically equipped to transport all grades of crude oil (Enbridge 2015b).

Table 4-1 summarizes oil types and amounts associated with the existing Line 3 Pipeline, the proposed Sandpiper Pipeline, and the proposed Line 3 Replacement Pipeline.

Table 4-1 Existing and Proposed Pipeline Oil Types and Origins, and Amounts

Pipeline	Type of Crude Oil	Origin of Crude Oil	Pipeline Capacity
Existing Line 3 Pipeline	Light and heavy crude oils	Western Canada	760,000 bpd[a]
Proposed Sandpiper Pipeline	Light crude oil	Bakken region in North Dakota and Montana	375,000 bpd
Proposed Line 3 Replacement Pipeline	Light and heavy crude oils	Western Canada	760,000 bpd

Notes: bpd = barrels per day

[a] The pipeline was originally built to move 760,000 bpd of heavy crude, but currently moves approximately 390,000 bpd (MPR News 2015).

Alternatives to these proposed pipelines were analyzed to determine whether any would be reasonable and environmentally preferable to the proposed Projects (or “Proposed Actions”). Alternatives to the Proposed Actions include expansion of existing pipeline systems; construction of other new pipeline systems; transporting oil via other methods including trucks, railroad, and barges; route variations; and alternative construction methods. Additionally, a “No Build” scenario is provided for both pipelines. Each alternative is described along with an assessment of feasibility and comparison to the corresponding Proposed Action. Alternatives that could feasibly attain or approximate the proposals’ objectives, but at a lower environmental cost or decreased level of environmental degradation, were carried forward for further analysis in the Environmental Impact Statement (EIS). Alternatives that could not feasibly attain or approximate the proposals’ objectives, and those that would result in a higher environmental cost or increased level of environmental degradation, were dropped from further consideration.

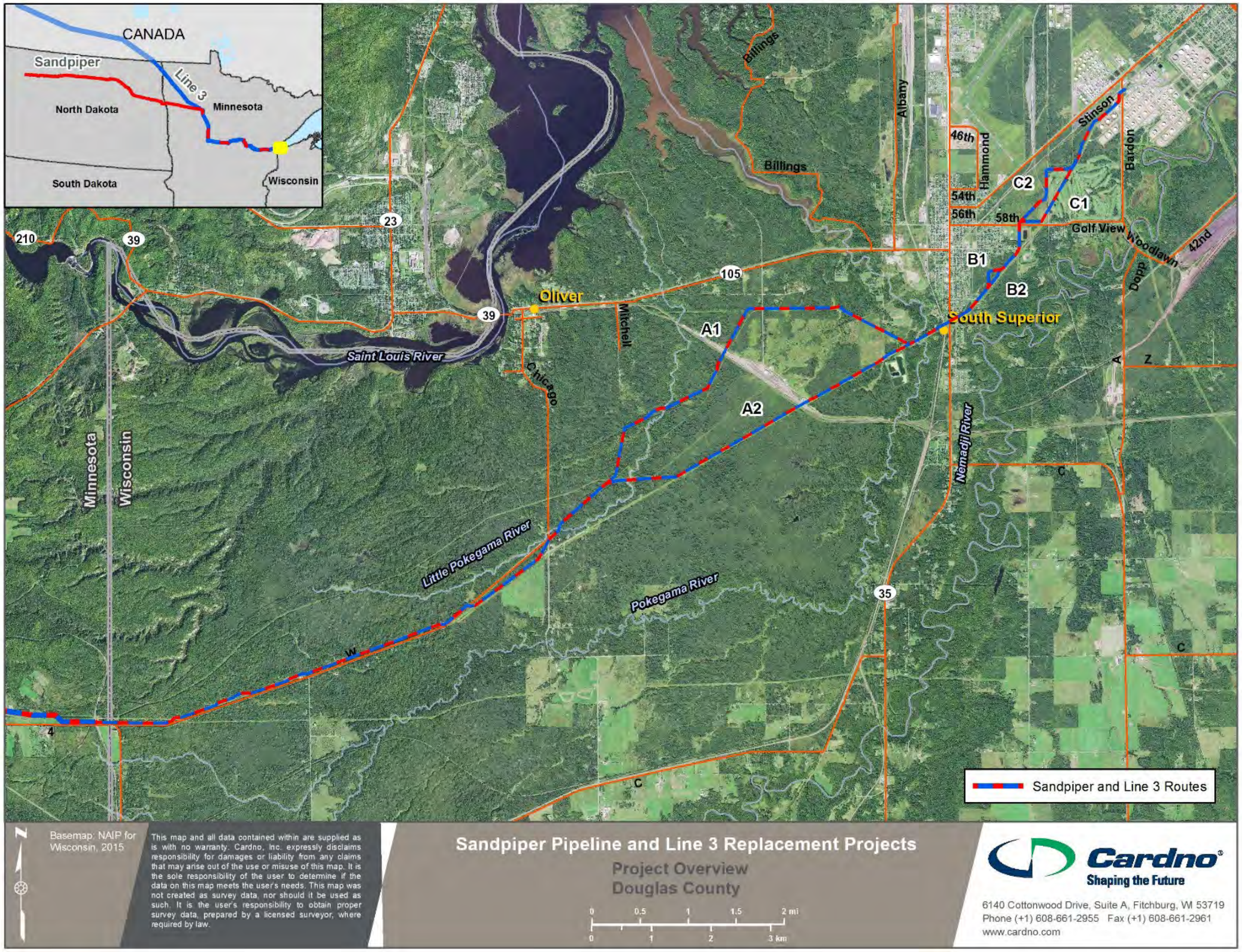


Figure 4-1 Location of the Sandpiper and Line 3 Replacement Pipeline Projects and Associated Features in Wisconsin

4.1 System Alternatives

System alternatives consider other methods for providing crude oil supplies to the Midwest and East Coast markets. A system alternative would make it unnecessary to construct all or part of the proposed Projects (the Sandpiper or Line 3 Replacement Pipelines), although some modifications or additions to other existing pipeline systems may be required to increase their capacities. These modifications or additions may result in environmental impacts that are less than, similar to, or greater than those associated with construction of the proposed Projects. The purpose of identifying and evaluating system alternatives is to determine whether potential environmental impacts associated with the construction and operation of the proposed pipelines and their associated facilities could be avoided or reduced by using another system, while still meeting the objective of the proposed Projects, which is to transport crude oil from western Canada and the Bakken region to Midwest and East Coast markets.

The system alternatives considered include:

- Expansion of existing pipeline systems;
- Construction of other new pipeline systems; and
- Alternative methods of transporting crude oil including trucks, railroads, or barges.

4.1.1 Expansion of Existing Pipeline Systems

Expansions of existing pipeline systems are considered as alternatives for both the Sandpiper and Line 3 Replacement Pipelines.

4.1.1.1 Sandpiper Pipeline

There has been a significant increase in the number of crude oil pipelines proposed or constructed in the Bakken region in recent years in response to the growing production of crude oil. Nearly 6,000 miles of crude oil pipeline was constructed in North Dakota between 2009 and 2012, and crude oil pipeline capacity has risen from approximately 286,000 barrels of oil per day (bpd) in 2009 to approximately 783,000 bpd by the end of 2014 (Bakken Breakout 2014). Even so, the amount of oil that was transported by pipeline in 2014 was significantly less than by railroad, with approximately 63 percent of crude oil extracted in the Bakken region of North Dakota transported by rail as opposed to 30 percent by pipeline (Bakken Breakout 2014). The volume of oil transported by pipeline from North Dakota has risen since 2014 with the Plains Bakken North Pipeline (40,000 bpd) and the Butte Expansion Pipeline (100,000 bpd), both of which came into service in 2014, and the Kinder Morgan Double H Pipeline (108,000 bpd), which came into service in 2015 (North Dakota Pipeline Authority 2015).

The largest regional crude oil production growth is expected to come from tight oil production[1] in the Northern Great Plains, primarily from the Bakken formation. Between 2011 and 2013, crude oil production in the Northern Great Plains region more than doubled, increasing from 495,000 bpd in 2011 to over 995,000 bpd in 2013. Northern Great Plains crude oil production in 2025 is projected to average between 1.9 million bpd and 1.7 million bpd (U.S. Energy Information Administration [EIA] 2015a). With this increase in supply, the Sandpiper Pipeline Project and other potential pipeline and rail projects would not be competing for the same production volumes, but rather, would help meet the demand for additional pipeline export capacity from the region, including to foreign markets now that the crude export ban has been lifted. Expansion projects for existing pipelines that would satisfy this increase in

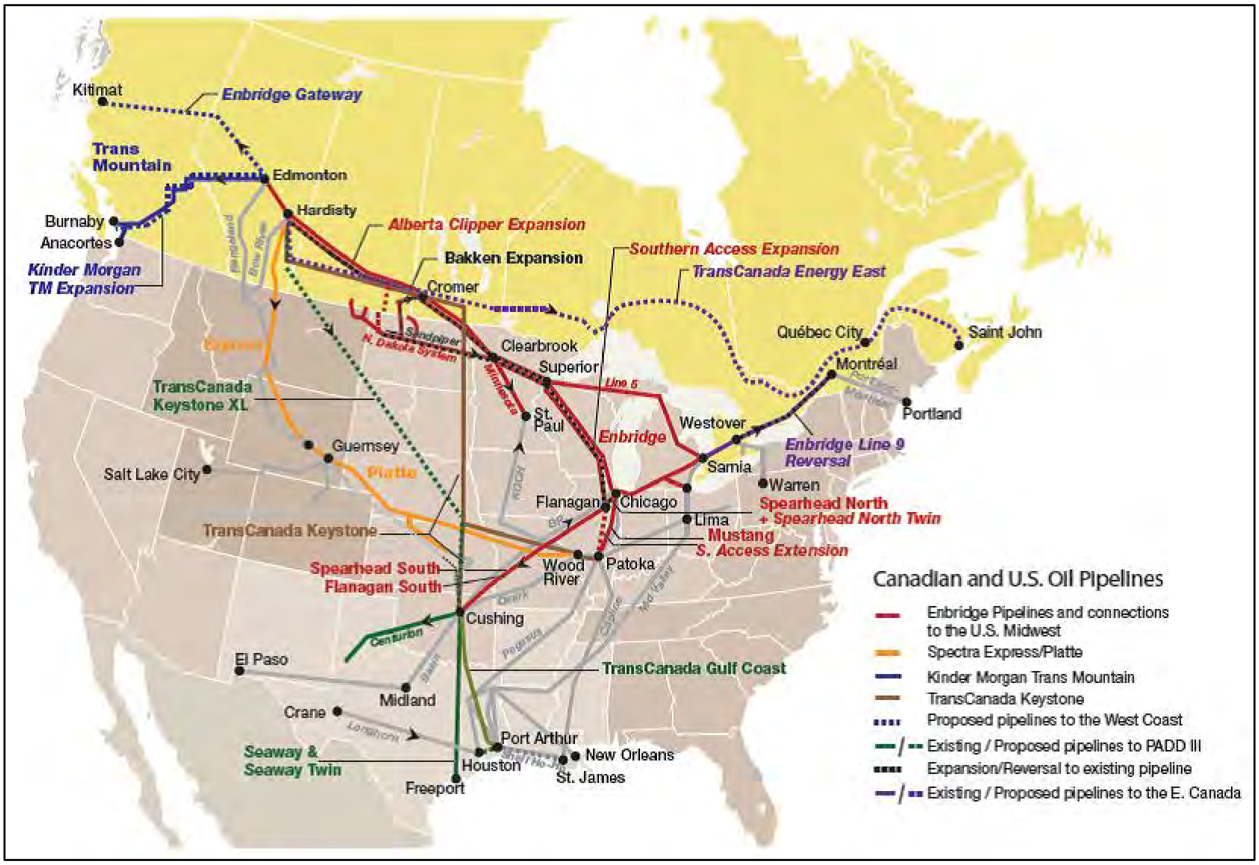
[1] Light crude derived via hydraulic fracturing.

demand for export capacity from the Northern Great Plains region have not been identified. The alternative of expanding existing pipelines is not, therefore, considered to be a reasonable alternative to the Sandpiper Pipeline Project.

4.1.1.2 Line 3 Replacement Pipeline

In Canada, total crude oil production continues to grow (albeit at a slower pace than previously anticipated) and market access is still required to the U.S. Gulf Coast and Midwest. The U.S. Midwest is Canada's largest export market and Canadian producers supplied 1.9 million bpd to this market in 2014. A number of refinery conversion projects for processing heavy crude oil (and dilbit) have been completed in the last 2 years and are anticipated to increase demand in the region by 190,000 bpd to reach a total of 2.1 million bpd by year 2020 (Canadian Association of Petroleum Producers [CAPP] 2015). CAPP reports indicate that the timely development of infrastructure to obtain market access is a continuing concern and that in-service dates for many of proposed pipeline projects have already been delayed and could be even further delayed due to extended regulatory processes (CAPP 2015). Notably, in November 2015, President Obama announced rejection of the Keystone XL Oil Pipeline, which would have transported 830,000 bpd of heavy crude oil (as dilbit) from Hardisty, Alberta (Canada), to U.S. Midwest markets.

Existing and proposed new pipelines and expansions to transport crude oil from Canada are shown in Figure 4-2.



Source: CAPP 2015

Figure 4-2 Canadian and U.S. Crude Oil Pipelines and Proposals

There are three pipeline expansion projects and three new pipeline projects that have been proposed to transport crude oil originating in Canada to U.S. markets. For pipeline expansions, the Trans Mountain Expansion project, if permitted and constructed, would provide Canadian crude oil (light and heavy crude oils) to the West Coast of Canada and the United States; however, this pipeline would not serve the U.S. Midwest or East Coast markets and is, therefore, not considered to be a viable alternative to the Line 3 Replacement Pipeline. Proposed pipeline expansions to U.S. Midwest markets include extensions to the Southern Access Pipeline and expansions to the existing Alberta Clipper Pipeline (a.k.a. Line 67). The existing Southern Access Pipeline runs from Superior, Wisconsin, to Flanagan, Illinois. The proposed extension would include a 168-mile-long, 24-inch-diameter pipeline to the south, to transport crude oil from Enbridge's Flanagan Terminal near Pontiac, Illinois, to an existing crude oil terminal near Patoka, Illinois. This pipeline expansion would not serve to transport crude oil from Canada to U.S. markets and is, therefore, not considered a viable alternative to the Line 3 Replacement Pipeline.

The Alberta Clipper (also known as Line 67) is a 36-inch-diameter pipeline that extends from Hardisty, Alberta, to Superior, Wisconsin. Enbridge completed the Phase 1 Expansion of this pipeline in the fall of 2014, which increased its capacity from 450,000 bpd to 570,000 bpd, and the Phase 2 Expansion (completed in July 2015) further increased its capacity to 800,000 bpd (Enbridge 2015c). While the Alberta Clipper (Line 67) Capacity Expansion would serve the same markets as the Line 3 Replacement Pipeline, it would not displace oil destined for refineries in the U.S. Midwest and East Coast that would be transmitted through the Line 3 Replacement Pipeline, but, rather, would supply additional crude oil transmission capacity. No other pipeline expansions have been proposed that would supply the same markets as the Line 3 Replacement Pipeline. As a result, expansion of existing pipelines is not considered to be a reasonable alternative to the Line 3 Replacement Pipeline and has not been carried forward for further analysis in the EIS.

4.1.2 Construction of Other New Pipeline Systems

4.1.2.1 Sandpiper Pipeline

Crude oil production in the Northern Great Plains (comprising northwest North Dakota, northeast Montana, and southeast Saskatchewan) is expected to significantly increase over the next 10 years, which will require additional transportation infrastructure. To accommodate this, two other pipelines have been proposed: Energy Transfer Partners proposed a 1,100-mile, 30-inch (320,000 bpd) pipeline from North Dakota's Bakken gathering facilities to Patoka, Illinois, and Enterprise Products Partners has had preliminary discussions of a 1,200-mile, 30-inch (340,000 bpd) pipeline tentatively stretching from Stanley, North Dakota, to Cushing, Oklahoma. Moving crude oil within and outside North Dakota has been a major challenge for producers due to lack of infrastructure (Bakken Breakout 2014). These new proposed pipelines, even if all permitted and constructed in a timely manner, would not reduce the need for additional capacity to transport the increased crude oil that will be produced in the region over the coming years. This oil could be shipped by new or existing rail (see Section 4.1.4). A new pipeline that has not been proposed could be developed to move crude oil from the Bakken region to serve markets in the U.S. Midwest and East Coast, but a new pipeline would likely be similar in length to the proposed Sandpiper Pipeline and may offer no significant environmental advantages over the proposed Project. A different pipeline route could potentially avoid Wisconsin and as such would avoid impacts in the state. However, impacts would occur elsewhere and in the absence of a new pipeline proposal, it is not possible to quantify and compare the relative environmental impacts. The alternative of construction of other new pipelines is, therefore, not considered to be a reasonable alternative to the Sandpiper Pipeline Project.

4.1.2.2 Line 3 Replacement Pipeline

In Canada, three new pipeline projects have been proposed to transport crude oil originating in Canada to U.S. markets. The Keystone XL Pipeline project would have provided connections from Canada to U.S. Gulf Coast refineries, but will not be constructed since the required border crossing permit to Canada was denied by the Department of State on November 6, 2015 (U.S. Department of State [DOS] 2015). The Northern Gateway project, if permitted and constructed, would provide Canadian crude oil to the West Coast of Canada and the United States, although this pipeline would not serve the U.S. Midwest or East Coast. The TransCanada Energy East project would provide crude oil to East Coast markets in Canada and the United States, and may serve some customers who would otherwise receive oil from the Line 3 Replacement Pipeline; however, Midwest markets would not have access to Canadian crude oil via the TransCanada Energy East project.

The Line 3 Replacement Pipeline in Wisconsin is proposed to occur within, or in close proximity to, the right-of-way (ROW) of the existing Line 3 Pipeline, an area that has already been disturbed. A new pipeline that required a new ROW would likely disturb greenfield sites and, as such, have greater environmental impacts. New pipelines within Wisconsin or elsewhere are not considered to be reasonable alternatives to the Line 3 Replacement Pipeline. As a result, the new pipeline construction alternative has not been carried forward for further analysis in the EIS.

4.1.3 Alternative Methods of Transportation: Trucking

Hauling crude oil from the Bakken region in North Dakota or from Canada to Midwest markets to Superior, Wisconsin (or refineries farther east), is a potential alternative to constructing the proposed Project. The volume of oil that would otherwise be transported by pipeline (375,000 bpd and 760,000 bpd for the proposed Sandpiper and Line 3 Replacement Pipelines, respectively), would require approximately 1,875 tanker trucks and 3,800 tanker trucks, respectively. This would result in millions of highway miles driven by tank trucks per year, which could add congestion to highways and increase risks to public safety. According to U.S. Department of Transportation safety statistics, pipeline transport of liquids is safer than vehicle transport. The Bureau of Transportation Statistics reported that the transport of hazardous liquids (including crude oil) on highways resulted in five times as many fatalities as transportation of hazardous liquids by pipeline between 1975 and 2007 (DOS 2011). Further, because Enbridge would replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a feasible alternative to the Line 3 Replacement Project.

The use of such a large fleet of tanker trucks would likely impact roadways and traffic patterns in the vicinity of the crude oil source locations and in the vicinity of the Superior Terminal in Wisconsin. Increased traffic impacts would likely include increases in noise levels and air emissions, although emission rates for new trucks will likely drop significantly in the coming years (Federal Highway Administration 2009). It is unknown if tanker truck availability is currently sufficient to support the delivery of 370,000 bpd from the Bakken region to the Midwest and East Coast. In 2011, about 1,000 tanker trucks were transporting approximately 200,000 barrels (bbl) of crude oil every day from the Bakken field (Oil and Gas Journal 2011). The use of heavy trucks would likely increase roadway maintenance requirements, and trucking would likely be subject to interruptions due to unfavorable weather and road conditions. Tanker trucks are predominantly used for local transportation of crude oil—usually from the extraction site to pipeline or rail loading stations, or in locations where the extraction site and the refineries are in close proximity, such as in Texas (Great Lakes Commission 2015).

Truck loading/unloading facilities would be required at suitable locations to allow receipt into the Enbridge Superior Terminal Facility, which would result in localized impacts in these areas of an unknown quantity.

Although trucks would be able to transport crude oil from their sources to U.S. Midwest and East Coast markets and would, therefore, attain or approximate the Project's objectives, trucking would likely result in a higher environmental risk, increased economic cost, and increased level of environmental degradation when compared to the movement of oil by pipeline. As such, the transportation of crude oil by truck alternative has not been carried forward for further analysis in the EIS.

4.1.4 Alternative Methods of Transportation: Rail Car

Rail transport of crude oil (crude-by-rail) has expanded greatly over the past 7 years as an alternative mode of transport to accommodate the rapid growth in crude oil production from new supply regions, and rail transport is expected to continue to rise once crude prices resume their upward trend. In 2008, U.S. Class I railroads[2] transported 9,500 carloads of crude oil and as of 2014 this number rose to 493,146 carloads—an increase of nearly 5,100 percent (Association of American Railroads 2015). The number of Canadian rail car loadings of crude oil and petroleum products in 2014 increased by 14 percent over 2013, with monthly loadings ranging between 13,745 carloads and 17,288 carloads throughout 2013 (CAPP 2015).

Multiple railroad routes spanning Canada and the United States transport crude oil via rail car, traveling from loading facilities at crude oil sources to destination markets (Figure 4-3). Rail lines are currently in place that could move crude oil from the Bakken region and western Canada to Superior, Wisconsin, but new loading and offloading stations would be required for this alternative. There are 20 existing and proposed crude oil unit train loading terminals in North Dakota and Montana that ship out an average of 638,000 bpd of Bakken crude oil (Burlington Northern Santa Fe [BNSF] 2015; North Dakota Pipeline Authority 2014; EIA 2015b) and two crude oil unit train loading terminals in Alberta, Canada (BNSF 2015; CAPP 2015). In Western Canada there are approximately 23 loading terminals with a current rail loading capacity of 776,000 bpd. Some new facilities and expansion projects that were originally proposed to be in service by the end of 2015 have been deferred due to the current (2015–2016) price and production slump, with uncertain startup dates (CAPP 2015). New loading facilities beyond those existing or planned would be required in both the Bakken region and in Canada under a rail alternative to accommodate capacity equivalent to that of the Sandpiper and Line 3 Replacement Pipelines, which would result in environmental impacts in construction areas. Impacts would depend on existing land uses, presence of sensitive resources (e.g., wetlands) and size and design of loading facilities.

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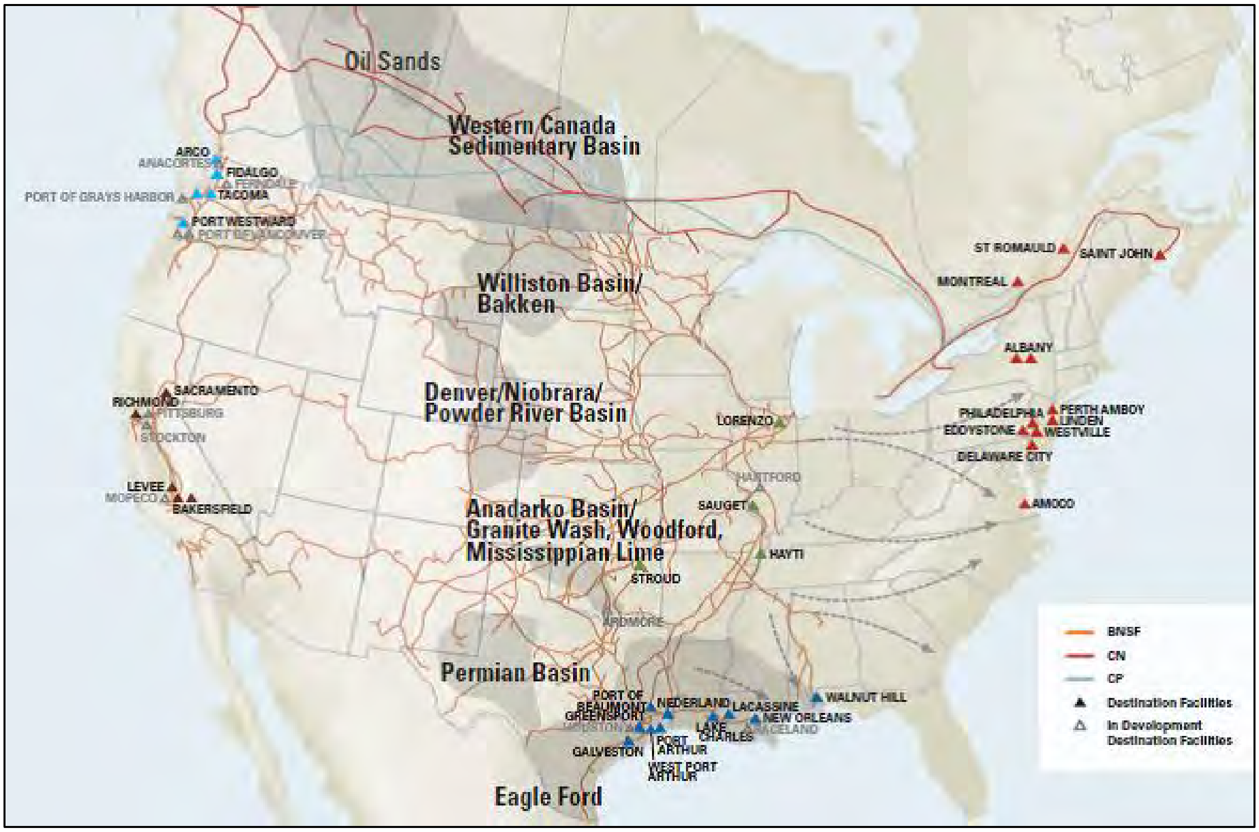
[2] Class I railroads are freight railroads with 2013 operating revenue of $467.0 million.



Source: BNSF 2015.

Figure 4-3 Crude-by-Rail Facilities in Canada and the United States

In Superior, there is currently one rail loading facility (situated across the street from the Calumet Superior LLC–owned refinery on the south edge of the City of Superior). This was constructed in 2012 and added 18,000 feet of new track to existing rail lines, but no offloading stations. However, although there are no existing facilities to offload crude oil transported by rail to Superior, the area has an existing Class I rail connection to the overall U.S. and Canadian rail network. An offloading station and associated extensions to rail lines could be constructed if adequate land were available. Using an average of 700 bbl of crude oil per rail car,[3] the 375,000 bpd and 760,000 bpd of crude oil that would be transported through the Sandpiper and Line 3 Replacement Pipelines, respectively, would require a total of approximately 1,621 rail cars, or approximately 14 complete unit trains[4] per day.

3 The capacity of a single rail tank car is assumed to be 700 bbl, though actual carloads are limited by cargo weight, tank car weight, and vapor space requirements. In actual practice, each tank car often holds from 650 to 690 bbl of crude oil (ERC 2015).

4 A unit train is a train in which all rail cars carry the same commodity and are shipped from the same origin to the same destination, without being split up or stored en route. Unit trains carrying crude oil typically consist of 3 to 4 locomotives and approximately 120 rail cars.

Considering an average offloading time of 12 hours, approximately 7 offloading stations would be required to accommodate 14 unit trains per day, which would require a substantial amount of land and likely new rail infrastructure (typically loop tracks are used to move trains through the offloading process). Enbridge reported that construction of rail car facilities adjacent to the Enbridge Terminal in Superior would likely require permanent wetland fill of an unknown quantity and that construction of new aboveground rail service lines would pose additional risk and impact to landowners and the public (Enbridge 2014).

The addition of 14 unit train loads of crude oil per day through the Canadian and U.S. rail systems may add to the rail congestion that has been documented over the past several years, which could impact other users of the rail system. This creates delays for Midwest grain farmers and other shippers, resulting in delays in moving their goods to market. It has also created substantial delays in Amtrak passenger rail (The Hill 2014). Increases in rail traffic would likely increase gate down times at locations where road crossings are at the same level as rail lines (known as at-grade crossings). Increased gate down times by at-grade crossings would cause delays for vehicles along these routes and could also delay emergency responders during medical, fire, or other emergencies.

Rail service would also result in increased greenhouse gas emissions from the engines needed to pull the 1,621 rail cars required to move the volume of crude per day equivalent to the capacity of the pipelines. Cumulative impacts of greenhouse gas emissions are discussed in Section 7.4.2.2.

The relative safety of transporting oil by rail versus pipeline depends on a range of factors, which generally are not easily compared. For example, the risks of a rail accident would depend on factors including the state of the tracks, the speed of the train, and the competence of the locomotive driver (or the installation of positive train control [PTC][5] technology). For pipelines, the risks of an accident would depend on a different set of factors that are not directly comparable to crude-by-rail. In the event of an accident, by rail or pipeline, the impacts would be dependent on factors unique to the event including volume and location of spilled oil, weather conditions, and response actions.

Twenty reported derailments have occurred in the United States and Canada from February 15, 2013, through July 23, 2015 (ERC 2015). In three of these derailments it is known that no spill occurred. In five of these derailments crude oil was spilled but there were no associated fires, explosions, or injuries reported. In the other 12 derailments fires were reported, and in three of these 12 fires there was also an explosion reported (Energy Facility Site Evaluation Council 2015). Crude-by-rail trains can also spill crude oil without derailing. For example, on February 3, 2014, approximately 12,000 gallons of crude oil leaked from a crude-by-rail train over 70 miles of track in Wisconsin and Minnesota (Oil Change International 2014).

The reliability of a railroad alternative in a northern climate would be compromised by periodic restrictions in truck traffic deliveries to rail loading facilities due to winter storms and spring road restrictions, and other weather-related or road capacity restrictions. This alternative would also be subject to delays caused by scheduling conflicting rail traffic and mechanical/maintenance requirements. (Enbridge 2014). Railroad transport reportedly costs between approximately $10 and $15 per barrel

[5] PTC refers to train control technology systems developed by railway carriers to prevent train-to-train collisions, overspeed derailments, incursions into established work zone limits, and the movement of a train through a mainline switch in the improper position.

compared with $5 per barrel for pipeline transportation, but is generally considered faster[6] (Frittelli et al. 2014).

While the transportation of crude oil by railroad is a possible alternative to the proposed Projects in that crude oil could physically be moved by rail cars from their sources to Superior, Wisconsin, this alternative would require the development of loading facilities in both the Bakken region and in Canada, and would require the construction of offloading stations and associated facilities (including rail line extensions), resulting in localized impacts at the site including wetland fill and additional risk and impacts to landowners and the public. The addition of 14 unit trains per day on the existing rail system could result in increased rail congestion, delays in the movement of other freight, as well as delays to vehicles and emergency responders at at-grade crossings along the routes. The transportation of crude oil by rail car alternative would likely result in a higher environmental cost or increased level of environmental degradation when compared to the movement of oil by pipeline. Further, because Enbridge would replace Line 3 and tie it into the existing infrastructure, a rail alternative is not a feasible alternative to the Line 3 Replacement Project. As a result, the transportation of crude oil by railroads alternative has not been carried forward for further analysis in the EIS.

4.1.5 Alternative Methods of Transportation: Barge

Since there is no large waterway system between crude oil sources in Canada and the Bakken region and Superior that would be capable of supporting barge traffic, for a barge alternative to be feasible, crude oil must first be moved via truck, unit train, or pipeline from its source(s) to ports with water connections to the Midwest and East Coast (e.g., via the Hudson River), and then loaded onto barges for shipment to refineries in the Midwest and East Coast with waterborne access. Most crude oil being moved from the Midwest by barge today comes from Canada by pipeline and is loaded onto barges in Illinois. Other ports (e.g., Albany, New York) receive unit trains of crude oil from Canada and the Bakken region where it is loaded onto barges for subsequent shipment to refineries in New Jersey (Professional Mariner 2014) (Figure 4-4).

A barge alternative would first require crude oil to be transported by truck, unit train, or pipeline to an appropriate destination. The use of trucks and rail cars is not preferable to pipelines for the reasons provided above (see Sections 4.1.3 and 4.1.4). The use of trucks, unit trains, or pipelines to first transport crude oil to a port location for subsequent transshipment would be less economical than direct pipeline access. Barge transportation of crude oil would also come with additional risks and impacts. Transporting crude oil over waterways would increase the risk of an oil spill into waterways, which could quickly spread and be carried by currents into sensitive shoreline habitats causing damage. Barge accidents can also be harmful to the public. For example, on April 3, 1983, four barges loaded with crude oil crashed into two bridges spanning the Mississippi River. Two of the vessels exploded, one man was treated for minor facial burns, and an oil slick stretched 7 miles down the river as one of the barges sank and continued to leak oil (Associated Press 1983).

A barge-reliant alternative would likely result in a higher environmental cost, higher economic cost, and increased level of environmental degradation when compared to the movement of crude oil by pipeline. As a result, the transportation of crude oil by barge alternative has not been carried forward for further analysis in the EIS.

[6] Moving oil by train from North Dakota to the Gulf Coast or Atlantic Coast requires about 5 to 7 days' transit, versus about 40 days for oil moving by pipeline (Frittelli et al. 2014).

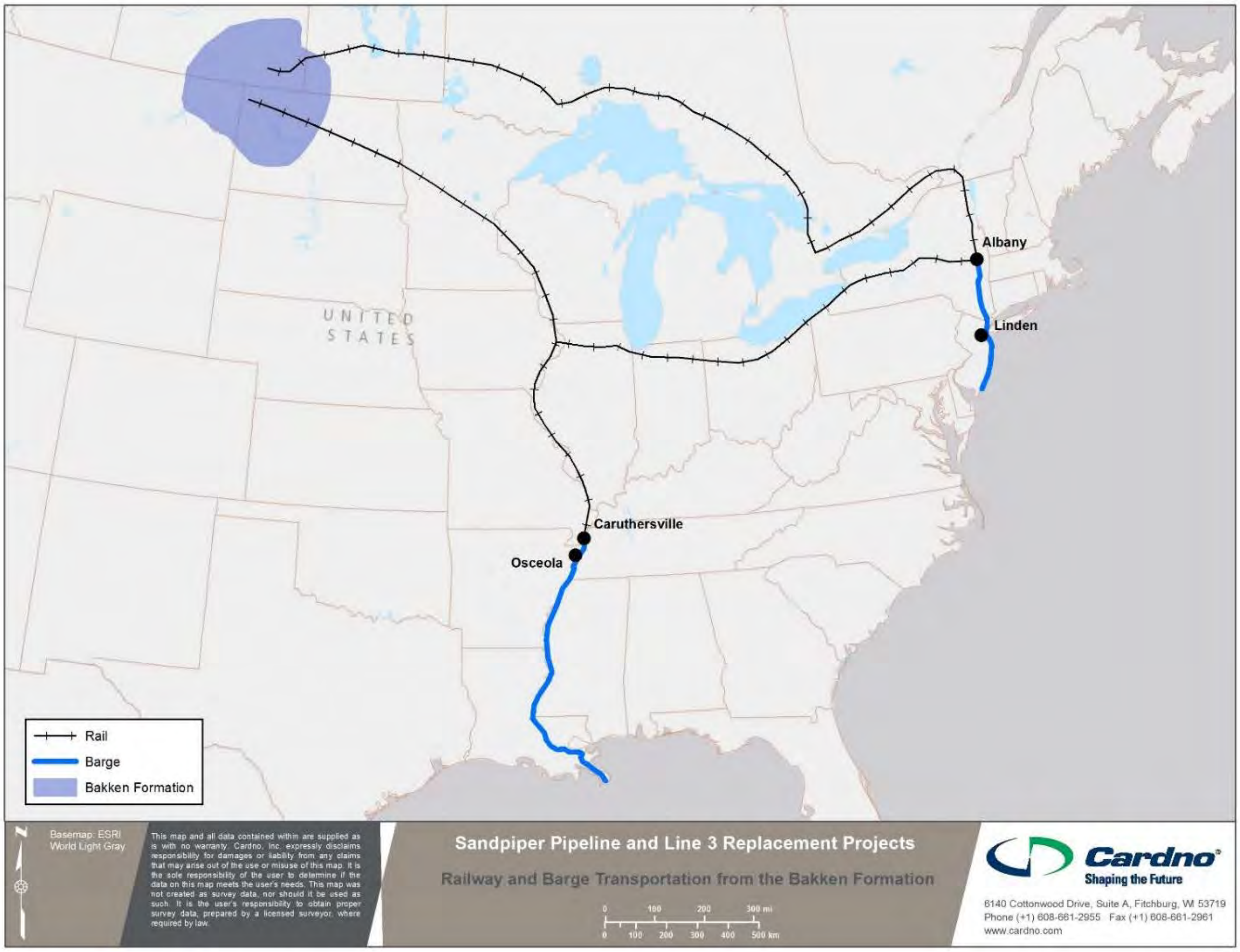


Figure 4-4 Shipments of Crude Oil by Barge

4.2 Pipeline Route Variations

Route variations are small segments of the proposed pipeline route that diverge from the overall proposed route. Enbridge considered the corridor for which it received authorization to construct its most recent projects (Alberta Clipper, Line 67, and Southern Lights Pipelines, Line 13) as the baseline for their analysis of potential route alternatives and conducted a quantitative analysis of environmental impacts for those areas that deviate from the previously permitted construction right-of-way. Enbridge identified variations for three sections of the proposed route: Segments A, B, and C.

Route Variation A1 (Figure 4-5) was proposed to avoid existing residences and the Pokegama Carnegie Wetlands State Natural Area (SNA). The Line 67 and Line 13 pipelines were installed via horizontal directional drilling (HDD)[7] in 2009 and 2010 in an attempt to avoid construction-related impacts on the wetlands and rare plants found within the Pokegama Carnegie Wetlands SNA. However, numerous inadvertent returns of drilling fluid occurred throughout the installations of both pipelines outside of the

[7] HDD refers to the technique of horizontal directional drilling, which involves drilling a pilot hole under a waterbody and banks, then enlarging the hole through successive ream borings with progressively larger bits until the hole is large enough to accommodate a pre-welded segment of pipe. The pipe is then threaded into the hole without the need for open cut or other methods that would impact surface areas such as wetlands.

existing, permanently maintained ROW. This resulted in the need to extend the timber mat road beyond the originally anticipated length to allow vacuum trucks to access inadvertent return sites and recover the drilling fluid.

Since the Sandpiper and Line 3 Replacement Pipelines would be equal to or of greater diameter than Lines 67 and 13 (36 and 20 inches, respectively) and would encounter similar subsurface soil conditions along the route, the inadvertent release of drilling fluid during HDD pipeline installation would likely occur. Therefore, Enbridge has proposed to avoid temporary construction impacts on wetlands and rare plants in the Pokegama Carnegie Wetlands SNA through route variations rather than through the use of HDD. Information provided by the Applicant in their Environmental Report (Enbridge 2014) does not indicate that either proposed route variation has a clear advantage over the other, so both were carried forward for further analysis in the EIS.

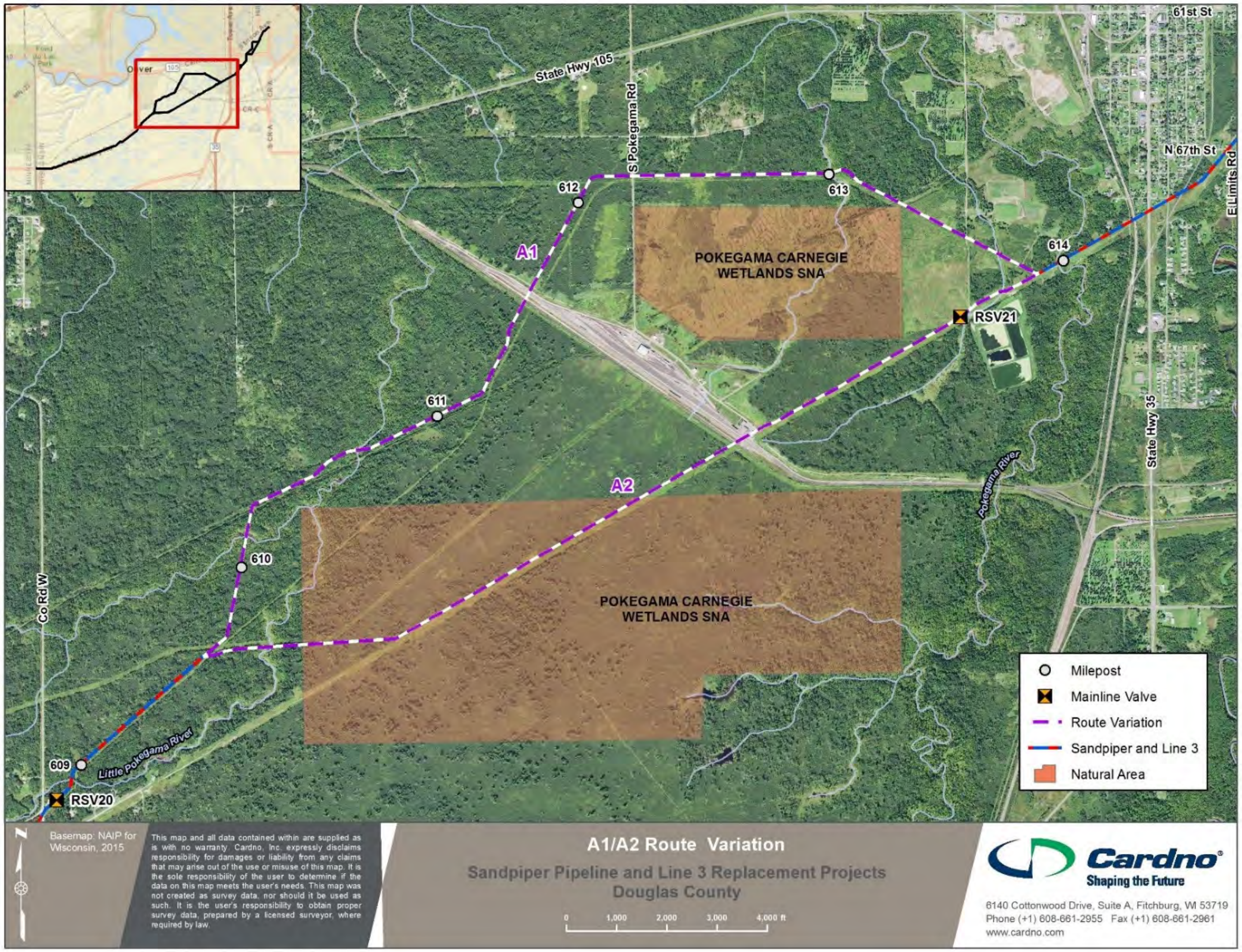


Figure 4-5 Proposed Pipeline Route Variations A1 and A2

Route Variation B1 is proposed to avoid a land parcel that is involved in ongoing litigation (Figure 4-6). Enbridge reported in 2014 that legal issues include the rights and interests involved in particular real property and have ascended to the Wisconsin State Supreme Court and are now on remand to the Circuit Court of Douglas County (Enbridge 2014). Route Variation B1 was developed because the final resolution of the legal issues was indeterminable at the time the permit applications were submitted. Although Route Variation B1 would require crossing additional greenfield areas, due to the legal issues surrounding Route Variation B2, both B1 and B2 were carried forward for further analysis in the EIS.

Route Variation C1 would cross the Nemadji Golf Course but would impact fewer greenfield sites, wetlands, and rare plant sites. Route Variation C2 was proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course (Figure 4-7). Although Route Variation C2 has the advantage of avoiding business operations at the golf course that would be impacted during construction and restoration and would also avoid some railroad tracks, existing pipelines, and a snowmobile trail, this variation would result in greater impacts to greenfield sites, wetlands, and rare plant sites. It also crosses a recently identified wetland conservation easement and therefore is not practicable. A more careful analysis of impacts from both Route Variations C1 and C2 was required before one could be considered more or less impactful to environmental resources overall. Therefore, both Route Variations C1 and C2 were carried forward for further analysis in the EIS.

Chapter 6 of the Final EIS provides a comparison of Route Variations A1 versus A2, B1 versus B2, and C1 versus C2.

4.3 Existing Line 3 Pipeline Decommissioning Alternatives

The decommissioning of the existing Line 3 Pipeline can be achieved by either abandoning the pipeline in place or by excavating and removing it. It is possible that a combination of both the abandonment-in-place and removal options could be used based on site-specific requirements.

Factors to consider when deciding whether to abandon in place or remove a pipeline include future land uses, structural integrity of the pipeline, long-term maintenance of a pipeline in place, disturbance to sensitive environments, potential for leaks of hazardous waste and associated liabilities, and the potential for future reuse of excavated steel pipe.

In sensitive environments such as waterbodies and wetlands, the risks associated with abandoning the pipeline in place should be weighed against the cost and environmental impact of removal. In many cases, abandonment-in-place is the preferred option because it is generally less impactful than removal.

Future land use is a consideration in the abandonment decision because an abandoned-in-place pipeline could become a physical obstruction to future development, including, installation of foundations, pilings, or sub-drains and deep ploughing. The existing Line 3 is located at the center of a 175-foot ROW for six other existing pipelines (Lines 1, 2, 3, 4, 13, and 67) as shown in Figure 4-8. Future use of this land would be very limited for the length of the ROW in Wisconsin since the area would remain within the existing Enbridge ROW and would be surrounded by other pipelines with the exception of a short 0.8-mile section at the border with Minnesota. This 0.8-mile section of existing pipeline ROW should be assessed to determine the best method of abandonment for this short section of pipeline.

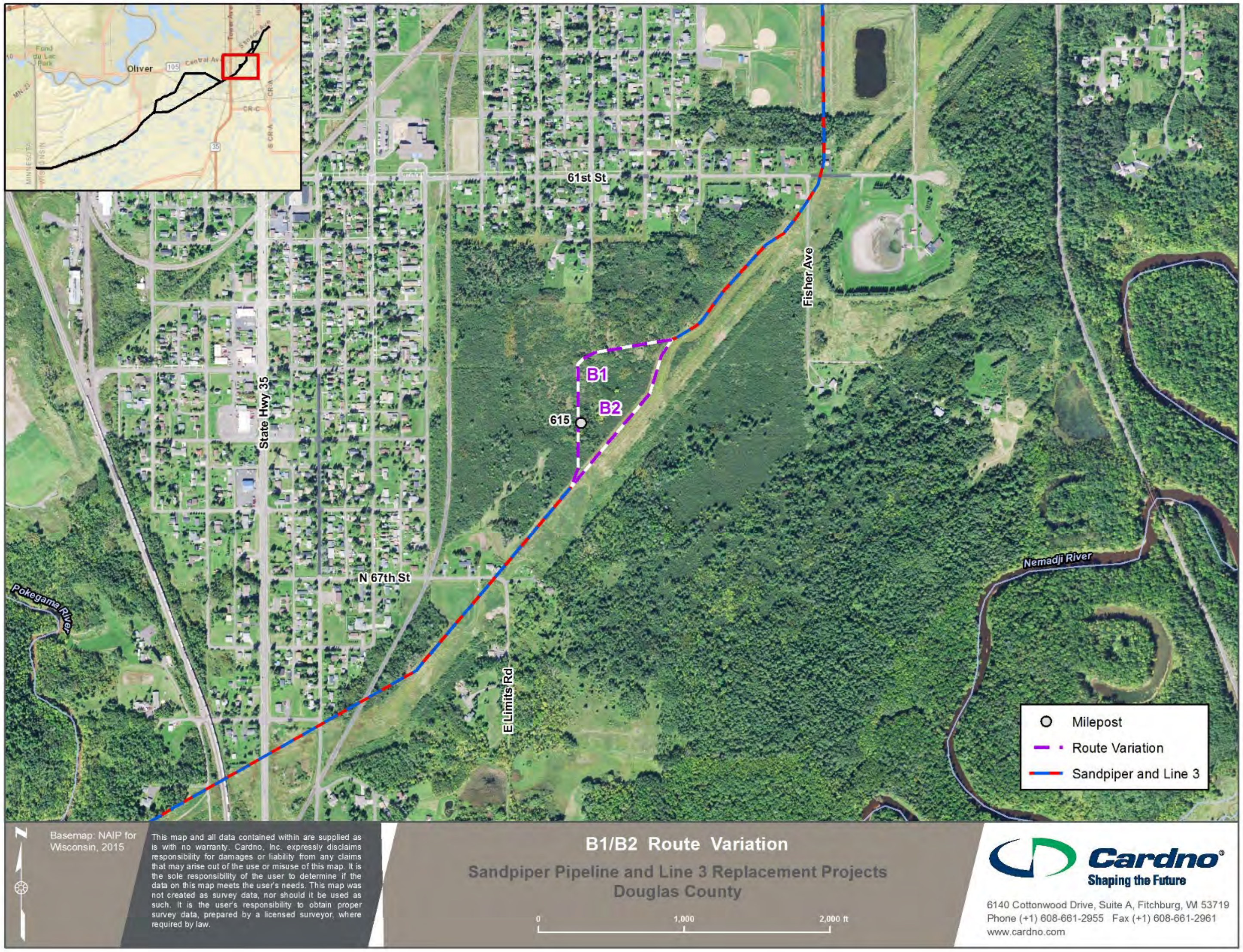


Figure 4-6 Proposed Pipeline Route Variations B1 and B2

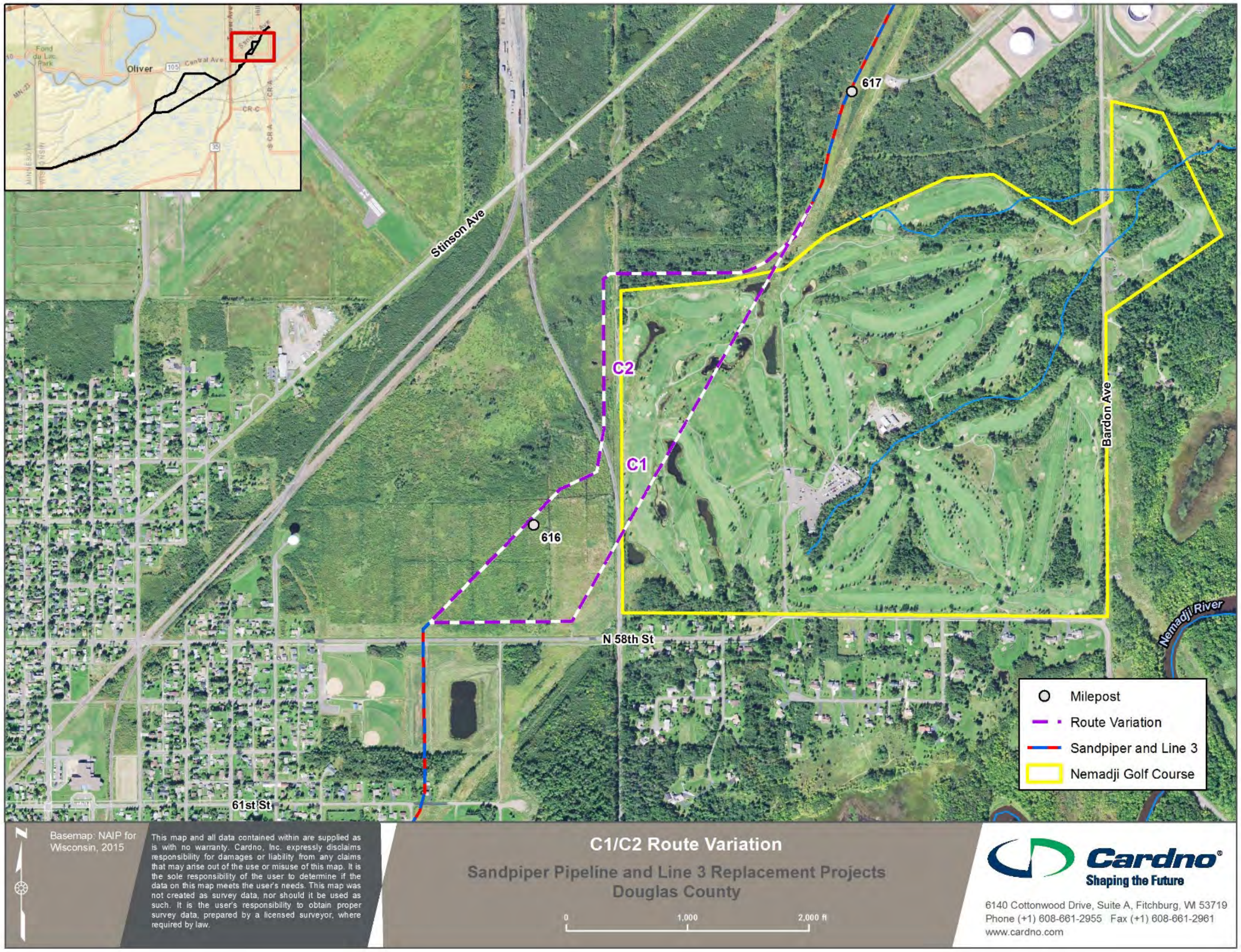


Figure 4-7 Proposed Pipeline Route Variations C1 and C2

4.3.1 Pipeline Abandonment-in-Place

Enbridge proposes to abandon the existing Line 3 Pipeline in place, which is the industry standard practice. Under this scenario, the existing pipeline would be purged of crude oil, filled with nitrogen, capped, cathodically protected, maintained, and rendered inactive in accordance with federal regulations (Enbridge 2014). Enbridge has safely deactivated approximately 425 miles of pipeline segments throughout the Midwest.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is responsible for setting and enforcing regulations and standards for pipeline abandonment, and prescribes certain steps for formal abandonment of crude oil pipelines including the disconnection, purging, and sealing of abandoned pipelines left in place (PHMSA 2015). The regulation of abandoned pipelines is defined in 49 Code of Federal Regulations (CFR) 195.59,[8] Abandonment or Deactivation of Facilities, which states that “For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through a commercially navigable waterway, the operator of that facility must file a report upon abandonment of that facility.” The preferred method to submit data on pipeline facility abandonment is to submit to the National Pipeline Mapping System (NPMS) the abandoned facility location, size, date, method of abandonment, and a certification that abandonment procedures comply with all applicable laws and regulations. The NPMS maintains the national database of abandoned pipeline locations to help ensure that they are maintained in the proper manner in accordance with pipeline safety regulations.

Upon completion of the Line 3 Replacement Project, Enbridge would place the existing pipeline into a state of temporary deactivation (for approximately 1 year) by purging the oil, treating with an internal inhibitor, physically isolating it from upstream and downstream oil movements, and filling it with nitrogen gas kept at approximately 20 pounds per square inch (psi). Enbridge would continue to apply cathodic protection to accommodate protection from external corrosion. As the Line 3 Replacement Project is completed upstream of Wisconsin, Enbridge would temporarily reactivate the existing Line 3 Pipeline and use it as a drainage path for oil during deactivation of the existing Line 3 Pipeline upstream. When deactivation of the existing Line 3 Pipeline is completed upstream, Enbridge would permanently deactivate, or abandon, the Wisconsin segment. After completing this process, the pipeline would be in a permanently deactivated state and no longer regulated by PHMSA. Enbridge would bear any public safety, environment, or maintenance-related liabilities and responsibilities. It would also retain ownership of the permanently deactivated pipeline and its associated easement.

Abandoning a pipeline in place can lead to long-term structural deterioration of the pipeline that could lead to some measure of ground subsidence. Abandoned pipeline sections can be filled with concrete to prevent subsidence from occurring and consideration is given to filling pipeline sections abandoned in place underneath railways and roadways to prevent potential ground subsidence impacts in these areas. However, the likelihood of ground subsidence from pipeline deterioration is low. Corrosion of a coated pipeline is normally restricted to those isolated areas where there are defects in the protective coating or where the coating has become disbonded from the pipe and can be expected to be almost negligible in areas where the coating integrity is intact (National Energy Board [NEB] 1996).

It is extremely rare for corrosion to cover large areas of pipeline, and given the non-uniform nature of the corrosion process and the Applicant’s proposed method of abandonment using cathodic protection, it is highly unlikely that significant lengths of an abandoned Line 3 Pipeline would collapse at any one time. However, over the course of many decades, with no monitoring or maintenance plan, some corrosion may

[8] Abandonment of pipelines is also addressed in 49 CFR 195.402(c)(10).

occur, and larger diameter pipelines such as the 34-inch existing Line 3 would be more susceptible to ground subsidence than smaller diameter pipelines. Over the course of a very long period of time, it can be assumed that as the coating adhesive degrades, or is consumed by soil organisms, pipeline coatings would eventually disbond and contribute to the corrosion process, although it is not known how long this process would take because limited information exists regarding such long-term decomposition of pipeline coatings (NEB 1996).

If a pipeline is not suitably cleaned, leaks of hazardous materials may occur after it is abandoned in place. The owner of an abandoned pipeline retains potential liability under common law for any nuisance or hazard that may be created by leaving pipe in the ground (Pipelinelaw.com 2015). Consequently, in the event that the required permits are granted, a thorough cleaning process is recommended as part of the abandonment process. Prior to abandonment-in-place at waterbody or wetland crossings, cleaning of the pipeline would occur to minimize potential future contamination. The strategic placement of caps and plugs would also help mitigate contaminant concerns by preventing the movement of potential contaminants through the abandoned pipe. If the Line 3 Pipeline is abandoned in place, it is recommended that plugs be strategically placed at waterbody and wetland crossings, at the boundaries of sensitive land uses (e.g., natural areas, parks), and at the top and bottom of steep slopes. Examples of suitable plug materials are concrete grout or polyurethane foam.

Since the existing Line 3 Pipeline is in close proximity to five other pipelines, the ROW would be maintained in its current state and the presence of abandoned pipe would not pose additional hazard beyond existing conditions.

4.3.2 Pipeline Removal

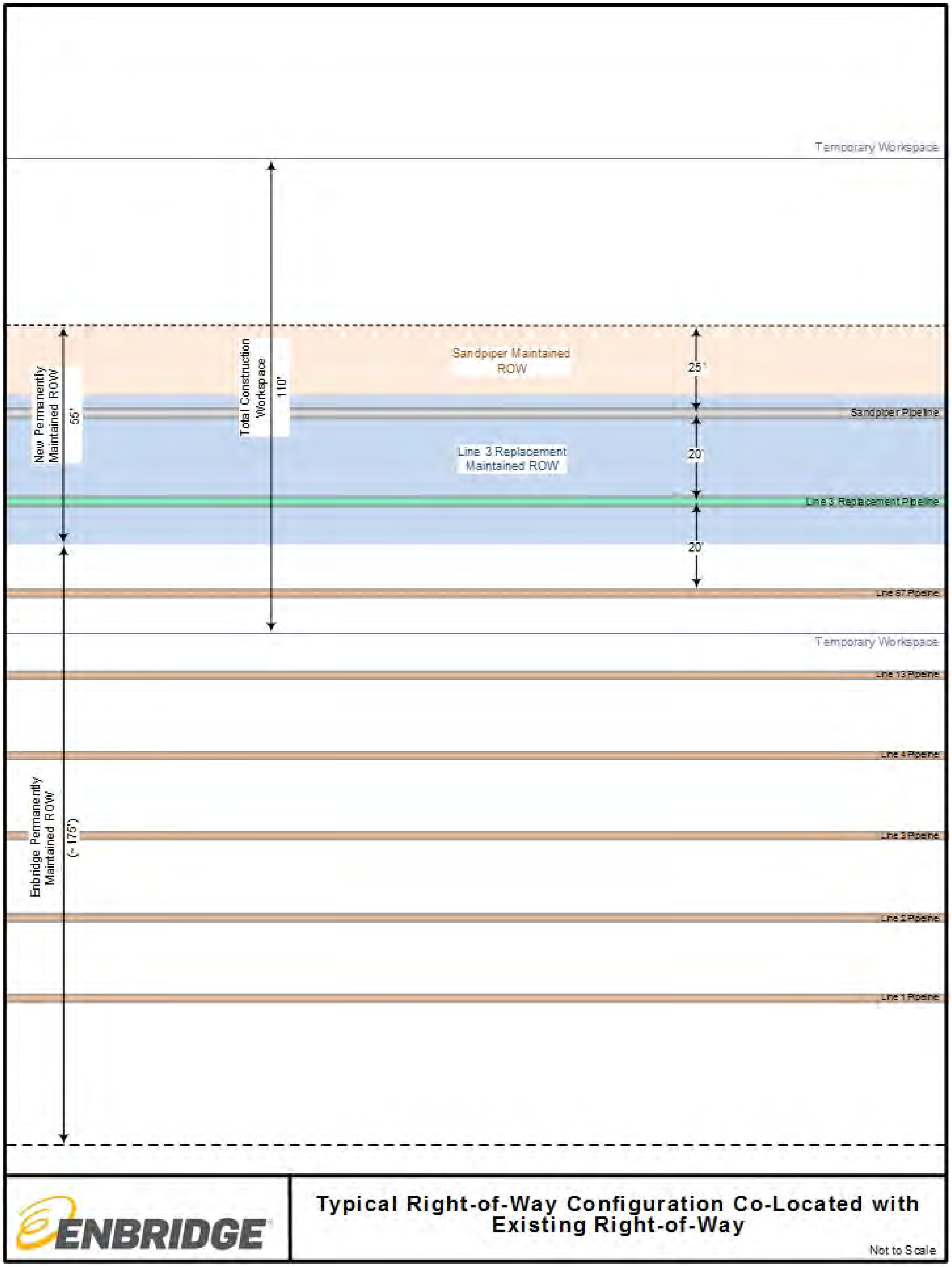
If the Line 3 Pipeline were to be removed in whole or in part, impacts to sensitive environments would be similar to those associated with construction. Removal of an existing pipeline is essentially the opposite of pipeline construction and involves topsoil removal, backhoe excavation of the subsoil to a depth at least even with the top of the pipe, pipe removal, backfilling and compaction of the trench, replacement of the topsoil, and revegetation measures. Many of the same construction techniques and environmental protection measures would apply to pipeline removal to reduce impacts including the use of work windows to avoid sensitive species lifecycles (e.g., breeding, nesting), vehicle and equipment crossing methods, sediment control measures, and bank restoration.

The potential for damage to existing bank stabilization structures or destabilization of previously stable banks could occur with pipeline removal. Erosion and slope stability concerns for pipeline removal would be similar to those for pipeline construction. For example, traffic, soil compaction, and wind and water erosion of disturbed soil could occur and the pipeline may have become a structural support to many slopes over time such that its removal could affect the integrity of the slope. In general, topsoil or soil materials required to fill the trench after pipe removal could be recovered from areas immediately adjacent to the pipeline ROW, although this would be difficult for the abandoned Line 3 Pipeline since the areas immediately adjacent to it are also ROWs for other pipelines. Additional topsoil or soil materials could be moved from the excavated area for the new Sandpiper Pipeline or would need to be obtained from local borrow sources.

In the event that the Line 3 Replacement Pipeline could be laid within the trench for the existing Line 3 Pipeline after pipe removal, ground subsidence would not occur. However, it may be difficult to excavate and lay new pipe in an area in close proximity to other pipelines due to construction area and construction access constraints. Temporary workspace areas are typically much larger than the permanent ROW to allow for temporary storage of topsoil and soil as well as to accommodate safe operation of construction equipment. Although Enbridge proposes to use a 10-foot construction workspace for soil storage over the existing Line 67 (Alberta Clipper) Pipeline (Figure 4-8) to reduce the amount of new clearing required for the construction workspace for the two pipelines, the remaining temporary construction area is easily accessible and relatively undisturbed. Using a temporary workspace over existing pipelines for the majority of construction needs poses safety issues such as potential damage to existing pipelines during construction.

Because the existing Line 3 is located within a shared corridor of five existing, operational pipelines, removing the existing pipeline could potentially damage the other pipelines and increase the risk of rupture/oil spills from these pipelines.

Since the existing Line 3 Pipeline is co-located in a ROW with five other pipelines in Wisconsin, the ROW would be maintained for the other pipelines which include inspections from vehicles and routine removal of brush and trees. Ground subsidence or other obvious issues with the existing ROW could be identified during maintenance for the entire ROW.



Source: Enbridge 2014

Figure 4-8 Proposed Pipe Right-of-Way Configuration Co-Located with Existing Right-of-Way

Contaminants that might be released from pipelines include substances produced in the hydrocarbon stream and deposited on the walls of the pipeline; treatment chemicals; the line pipe and associated facilities; pipeline coatings and their degradation products; and historical leaks and spills of product that were not cleaned to current standards (NEB 1996). Contamination of sensitive environments could occur if the pipe was not sufficiently cleaned before removal.

Pipe cleaning would be required if the pipe were to be removed to avoid contamination of soil and groundwater during the removal process. The removal of hazardous materials in a pipeline ready for abandonment can be carried out with a cleaning pig. NEB (1996) concluded that the small quantities of hydrocarbons left in an abandoned pipeline after a concerted pig cleaning effort will not result in any significant environmental concerns.

Pipe cleaning would reduce human health hazards including exposure to vapors and flammability hazards. Measures to prevent spills of the substances collected as a result of the cleaning process include the use of collection trays during the pipe cutting operation to catch any residual fluids. Pipe that would be used for another purpose after removal would also be cleaned of hazardous materials while in place and can include supplementary cleaning techniques after the pipe has been removed from the ground. For pipe that is targeted for disposal, existing disposal or landfilling guidelines would determine the required cleanliness of the pipe. Blind flanges are solid disks used to block off a pipeline or create a stop and can be used to prevent contamination of surrounding environments during removal.

Pipe exposure at waterbody or wetland crossings could occur from either erosion of soils overlying the existing pipeline or from flotation of an empty pipeline within a waterway. Filling the abandoned pipe with either concrete or other heavy material would prevent flotation in these areas. Since the existing Line 3 pipeline is within the ROW of five other pipelines as they cross waterbodies and wetlands, the maintenance activities for the permanent ROW would identify erosion issues from any pipeline in the ROW, including the Line 3 pipeline in the event that it is abandoned in place.

Pipeline removal at utility, road, and railway crossings could create short-term disruption to facility and traffic operations. Appropriate post-removal filling would be required in all cases to maintain structural integrity of the crossing. The Applicant should coordinate with affected utility and infrastructure agencies and companies to ensure that the abandonment plans are appropriate for each crossing location.

Once a pipeline has been abandoned, the owner/operator may retain a number of responsibilities regardless of whether the pipeline is removed or retained. The owner/operator may be responsible for ensuring that the ROW and any facilities left in place remain free of problems associated with the abandonment. For that reason, a ROW monitoring program is recommended to be included as part of a post-abandonment plan.

4.3.2.1 Summary

There are two feasible options for abandoning Line 3—removal or abandonment-in-place. Since the existing Line 3 Pipeline is located within the center of numerous other pipelines along most of its length within Wisconsin (with the exception of 0.8 mile near the border with Minnesota), removal (and potential relaying within the same trench) would not likely be practical given construction area and access constraints. Removal of the existing pipeline could also cause additional disturbance to sensitive environments including wetlands and natural areas, and could damage the other pipelines in the same ROW. Environmental impacts would appear to be generally lower if abandonment-in-place occurs.

4.4 No Build Alternative

Under the No Build Alternative, the DNR would deny the permit application(s) and the Sandpiper Pipeline and Line 3 Replacement Pipeline Projects would not be constructed in Wisconsin. All impacts associated with construction and operation of new pipelines would not occur.

4.4.1 Sandpiper Pipeline No Build Alternative

Under the No Build Alternative, no new pipeline would be constructed to transport additional crude oil extracted from the Bakken to the existing crude oil terminal in Superior, Wisconsin. All impacts associated with construction and operation of a new pipeline would not occur. Since the destination for the crude oil that would be shipped in the Sandpiper Pipeline is the existing crude oil terminal in Superior, Wisconsin, the additional crude oil would need to reach the terminal by other methods—most likely by rail car or tanker truck, with associated environmental impacts (see Section 4.1.3 through 4.1.5 above). Over the longer term, other pipelines may be proposed to ship oil to refineries in the U.S. Midwest and East Coast to accommodate the increase in domestic supplies or to ship crude oil to export terminals as a result of lifting of the crude oil export ban, and such pipelines could have similar, lesser, or greater impacts as those that would occur from the proposed Sandpiper Pipeline Project.

In the event that additional crude oil extracted in the Bakken region could not reach markets in the U.S. Midwest and East Coast, a reduction in production of petroleum-based products may occur. However, in response to a lack of pipeline infrastructure, producers have adopted alternative means to transport domestically produced crude oil to desired refining markets (U.S. Department of Energy 2014) including by rail and barge. Production of petroleum-based products and a shift in the current supply and demand model may occur if refineries decrease production because capacity is not available to meet shippers' demands.

While the No Build Alternative would eliminate the environmental impacts directly associated with the Sandpiper Pipeline Project, it would not meet the purpose and need for the Proposed Action and it would not reduce the demand for oil in U.S. Midwest and East Coast markets.

4.4.2 Line 3 Replacement Pipeline No Build Alternative

Under the No Build Alternative, Enbridge could continue to operate and maintain the existing Line 3 Pipeline under its long-term integrity program. Maintenance costs for the pipeline system would be greater, and landowners would likely be impacted numerous times over subsequent years by ongoing and continuing maintenance activities. Since 2010, Enbridge has conducted 50 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles). Repairs typically involved the installation of welded full-encirclement around the existing pipeline and/or the cutting out and replacement of smaller sections of the existing pipeline (Enbridge 2014).

The integrity of a pipeline over its operational lifetime depends on how well protected it is against threats (e.g., corrosion) that can lead to defects in the pipe over time. The Line 3 Pipeline was installed in the 1960s. Failure to replace the existing Line 3 would increase the ongoing costs of maintenance and increase the possibility of a significant pipeline failure and release of petroleum to the environment. Replacement of the Line 3 Pipeline would likely decrease the likelihood of pipeline incidents in the future as newer pipe segments are welded and inspected using the most current technology. Replacement would reduce future maintenance activities that would otherwise be conducted to ensure safe operation of Line 3 under Enbridge's long-term integrity management program.

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5. ENVIRONMENTAL IMPACTS OF CONSTRUCTION AND ROUTINE OPERATION OF THE PROPOSED PROJECTS

The impacts of construction and operation of the proposed pipelines would be very similar in that they would both be constructed along the same route in a similar timeframe[1] (with the Line 3 Replacement Pipeline laid before the Sandpiper Pipeline in the same construction areas), and it would be difficult to distinguish impacts of one from another. The impacts of both pipelines are generally addressed as one set of impacts in this chapter, although it is noted that in the event that the pipelines are laid at different times, temporary construction impacts would occur for each 14-month construction period.

The Project area used for the analysis of the existing environment and environmental impacts for each resource is the combined 110-foot-wide right-of-way (ROW) and additional temporary workspace (ATWS) areas (see Figures 1-1 and 3-6) for the majority of the pipeline route and the 120-foot-wide construction ROW for the portions of Route Variations A1 and A2 between Irondale Road and the railroad tracks/facility (Figure 3-7) unless otherwise specified.

The environmental resources analyzed in this Final Environmental Impact Statement (EIS) are:

- Aesthetics
- Air quality (greenhouses gases and climate change are addressed in Chapter 7)
- Agricultural resources
- Cultural resources
- Federally listed endangered and threatened species
- Fish and wildlife
- Forests and other woodland resources
- Geological hazards
- Invasive species
- Noise
- Public utilities
- Residential areas
- Recreation areas
- Safety
- Socioeconomics
- Soils and topography
- Transportation
- Vegetation (Plants)
- Water resources
- Wetlands

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[1] Enbridge noted in their comments on the Draft EIS that construction activities for each Project would occur over a period of approximately 14 months and may not be concurrent.

For each resource, a description of the current environmental setting is provided, followed by a discussion of environmental impacts from construction and normal operations. The likely impacts of the Projects' construction and operation were analyzed for each resource using data from the Applicant, including two Enbridge Environmental Impact Reports (Enbridge 2014a, 2015g), additional studies and analyses carried out by the Applicant and their consultants (referenced where used), information from the Wisconsin Department of Natural Resources (DNR), publicly available information including federal, state, and local government sources, and past environmental analyses performed for similar projects in the area, most notably the Alberta Clipper Pipeline Final EIS (a.k.a. Line 67; June 2009). The discussion of impacts for each resource is followed by suggested mitigation measures to reduce stated impacts for consideration. Mitigation measures committed to by the Applicant to reduce impacts to resources are provided along with measures proposed by DNR to further reduce potential impacts.

As part of the Draft EIS public hearing, the public was invited to review and comment on these measures and to suggest changes or additions to these measures for DNR consideration. In the event that a permit is granted, the DNR would impose a final list of permit conditions that the Applicant must adhere to for development of the proposed Projects.

Chapter 6 provides a comparison of the impacts from the route variations (A1, A2, B1, B2, C1, and C2), and Chapter 7 addresses potential cumulative impacts of the two pipelines in combination with compounding effects resulting from repeated or other proximal actions, activities or projects. Chapter 8 reviews the potential for accidental spills of crude oil to occur during construction and operation of the proposed pipelines and contains a discussion of potential impacts from such spills.

5.1 Aesthetic Resources

5.1.1 Current Environmental Setting

Aesthetic resources are the natural and manmade features of an area such as landforms, vegetation, water surfaces, and cultural modifications that give a particular landscape its character and aesthetic quality. The landscape types along the approximately 14-mile proposed pipelines route comprise the following general categories: wetlands, forests, agricultural lands, open spaces, and developed/urban lands of Superior, Wisconsin.

Impacts to aesthetic resources are described through viewer sensitivity. Viewers sensitive to visual change can include local residents, motorists, and recreational users. There are 20 residences within 300 feet of the proposed pipelines route, two of which are within 25 feet of the proposed route (see Section 5.12 for further information on residences in proximity to the proposed Projects). Main roads that would be crossed by the proposed pipeline route include State Route 35, N 58th Street, Bardon Avenue, and East Military Road in addition to many smaller developed roads and undeveloped rural roads. Recreation areas include forests, wetlands, rivers, trails, and the Nemadji Golf Course (see Section 5.13 for further information on recreation areas in proximity to the proposed Projects). It is assumed that viewers from residences, roads, and recreation areas would be sensitive to changes in the landscape.

5.1.2 Environmental Impacts

Aesthetic impacts include activities that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture, over both short-term and long-term scales. Most aesthetic impacts would be short term and result from clearing and removal of existing vegetation, exposure of bare soils and fugitive dust, earthwork and grading scars associated with heavy equipment tracks, the appearance of open trenches, the use of construction vehicles and equipment in ATWS, and the storage of construction equipment and pipe. Long-term impacts would arise from changed landscapes as a result of permanent removal of vegetation.

Viewers who are sensitive to visual change, including motorists, local residents, and recreational users, could be temporarily affected by construction activities. Short-term impacts from construction activities, including storage of equipment and removal of trees and other vegetation, would temporarily modify the visual landscape for residents, although there are relatively few residents in the majority of the Project area and the impacts are expected to be temporary and localized. Some residents within the 20 homes located within 300 feet of the proposed pipeline routes would experience aesthetic impacts during construction due to their proximity to the routes and ability to view the construction process.

Aesthetic impacts from the clearance of vegetation would be most pronounced in forested areas that are visible from residences or roads. The visual impact of vegetation removal would be reduced after grass and other vegetation becomes established. To reduce visual impacts from vegetation clearance, disturbed areas would be temporarily revegetated during construction activities, and permanently revegetated and restored following construction.

Motorists traveling on roads near the construction ROW (e.g., State Route 35, East Military Road) would be able to view some construction activities including the movement of vehicles and equipment, piles of topsoil and subsoil, and other construction materials and activities. These impacts would affect more people on larger roads because more motorists would travel these routes and observe the sites, and on East Military Road since the proposed pipeline route runs parallel to the road for approximately 5 miles. However, these aesthetic impacts would be short term and only affect viewsheds during the time it takes a motorist to pass the ROW during the construction period. These temporary impacts would occur for each pipeline if they are not constructed concurrently.

People engaged in recreation activities near the pipeline routes may be able to observe some construction activities temporarily while construction is ongoing, although some trails may be closed during the construction period. Most aesthetic impacts to hunters informally using the ROW for recreational purposes would also be short term, however the permanent loss of an estimated 31.8 to 42.4 acres of forest land that would not be re-established in the permanent ROW would be a long-term impact.

Permanent aboveground facilities would consist of six mainline valves (three for each pipeline) and a densitometer for batch detection for the Line 3 Replacement. These aboveground facilities would be permanent changes to the landscape. All other aboveground facilities would be within the existing Superior Terminal property and would not cause aesthetic impacts along the pipeline route.

5.1.3 Mitigation Measures

The following mitigation measures would reduce impacts to aesthetics during construction of the pipelines:

- Install temporary seeding, mulch (straw or hydromulch), and erosion control mats where 14 or more days will elapse between the installation of the Sandpiper Pipeline and the Line 3 Replacement; the completion of final grading at a site and the establishment of permanent vegetation; and/or, where there is a high risk of erosion due to site-specific soil conditions and topography.
- Revegetate permanently following construction activities.

5.2 Air Quality

5.2.1 Current Environmental Setting

Regional climate and meteorological conditions can influence the transport and dispersion of air pollutants that affect air quality. Douglas County has a typically continental climate with some modification due to its proximity to Lake Superior. Temperatures range from negative 40 degrees Fahrenheit (°F) in the winter to 90°F in the summer, with a long-term annual average of 39°F. Between 30 and 34 inches of precipitation are experienced annually, with an average of 30 thunderstorms occurring per year. Federal and state regulations protect ambient air quality. Table 5-1 provides climate data in the vicinity of the Projects in Wisconsin.

Table 5-1 Climate Data in Superior, Wisconsin

Measurement (monthly averages)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Maximum temperature (ºF)	20	26	35	47	57	68	75	73	65	53	37	25	48
Minimum temperature (ºF)	1	8	18	31	39	48	57	58	48	38	24	9	32
Total precipitation (inches)	0.95	0.53	1.37	1.58	2.26	3.71	3.73	3.69	3.71	1.89	1.39	0.79	25.60

Ambient air quality is regulated by federal, state, and local agencies. The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for seven criteria pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter, carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS were developed to protect human health (primary standards) and human welfare (secondary standards). Table 5-2 lists the NAAQS for the seven criteria pollutants. State air quality standards cannot be less stringent than the NAAQS. Wisconsin has adopted the NAAQS in ch. NR 404 Wis. adm. code, effective December 1, 2011, with the exceptions of the 1-hour NO_2 and 1-hour SO_2 standards, and other changes (which are expected shortly). Table 5-2 includes a summary of the NAAQS.

Table 5-2 National Ambient Air Quality Standards

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter (PM_{10})	Annual[a]	Revoked	Revoked
	24-hour[b]	150 µg/m^3	150 µg/m^3
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	Annual[c]	12 µg/m^3	15 µg/m^3
	24-hour[d]	35 µg/m^3	35 µg/m^3
Sulfur dioxide (SO_2)	3-hour[e]	N/A	0.5 ppm (1,300 µg/m^3)
	1-hour[f]	0.75 ppm	N/A
Carbon monoxide (CO)	8-hour[e]	9 ppm (10,000 µg/m^3)	N/A
	1-hour[e]	35 ppm (40,000 µg/m^3)	N/A
Nitrogen dioxide (NO_2)	1-hour[g]	0.1 ppm	N/A
	Annual	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)

Table 5-2 National Ambient Air Quality Standards

Pollutant	Time Frame	Primary	Secondary
Ozone (O_3)	8-hour[h]	0.070 ppm (147 μg/m^3)	0.070 ppm (147 μg/m^3)
Lead (Pb)	Rolling 3 month period	0.15 μg/m^3	0.15 μg/m^3

Source: EPA 2015.

Notes:

μg = microgram(s); m^3 = cubic meter(s); N/A = not applicable; ppm = part(s) per million.

[a] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the EPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

[b] Not to be exceeded more than once per year on average over 3 years.

[c] To attain this standard, the 3-year average of the annual arithmetic mean particulate matter less than 2.5 microns in diameter concentrations from single- or multiple community-oriented monitors must not exceed the standard.

[d] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μg/m^3 (effective December 17, 2006).

[e] Not to be exceeded more than once per year

[f] To attain this standard, the 3-year average of the 99th percentile of 1-hour daily maximum concentrations must not exceed the standard.

[g] To attain this standard, the 3-year average of the 98th percentile of 1-hour daily maximum concentrations must not exceed the standard.

[h] To attain this standard, the 3-year average of the annual fourth-highest daily maximum 8-hour ozone concentration must not exceed the standard. Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

A network of ambient air quality monitoring stations has been established by EPA and state and local agencies to measure and track the background concentrations of criteria pollutants across the United States and to assist in designation of nonattainment areas. To characterize the background air quality in the regions surrounding the proposed Project area, data from air quality monitoring stations were obtained. A summary of the available regional background air quality concentrations in the Project area is presented in Table 5-3.

Based on available regional background air quality concentrations, EPA has characterized all areas of the United States as attainment, unclassifiable, nonattainment, or maintenance. Areas where the ambient air concentration of a pollutant is less than the NAAQS are designated as attainment; areas where no ambient air quality data are available are designated as unclassifiable. Unclassifiable areas are treated as attainment areas for the purposes of permitting stationary sources. Areas are designated as nonattainment when a pollutant's ambient air concentration is greater than the NAAQS. If an area was designated as nonattainment and has since demonstrated compliance with the NAAQS, it is considered a maintenance area. While maintenance areas are treated as attainment areas for the purposes of permitting stationary sources, states may have specific provisions to ensure that the area will continue to comply with the NAAQS. The Projects would be located entirely within attainment areas (i.e., the pipelines would not pass through any nonattainment or maintenance areas).

Table 5-3 Regional Background Air Quality Concentrations in Douglas County (2008–2014 Data)

	PM_{10} (μg/m^3)	$PM_{2.5}$ [a] (μg/m^3)		SO_2 (ppm)			CO (ppm)		NO_2 (ppm)	O_3 [a] (ppm)	Lead (μg/m^3)
Location	24-Hr	Annual	24-Hr	Annual	24-Hr	3-Hr	8-Hr	1-Hr	Annual	8-Hr[b]	Quarterly
Douglas County, Wisconsin	29.4	19.8	7.3	11.8	11.2	5.4	904.7	950.5	8.0	NA	0.01

Table 5-3 Regional Background Air Quality Concentrations in Douglas County (2008–2014 Data)

	PM_{10} (µg/m³)	$PM_{2.5}$ [a] (µg/m³)		SO_2 (ppm)			CO (ppm)		NO_2 (ppm)	O_3 [a] (ppm)	Lead (µg/m³)
Location	24-Hr	Annual	24-Hr	Annual	24-Hr	3-Hr	8-Hr	1-Hr	Annual	8-Hr[b]	Quarterly
Superior, Douglas County, Wisconsin	47	23.6	9.4	43.2	30.5	8.6	1,362.7	1,192.2	24.1	NA	0.02

Sources: DNR 2014a; EPA 2008.

Notes:

µg = microgram(s); CO = Carbon monoxide; m³ = cubic meter(s); N/A = Not applicable; NO_2 = nitrogen dioxide; O_3 = ozone; ppm = part(s) per million; PM_{10} = Particulate matter less than 10 microns in diameter; $PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter; SO_2 = sulfur dioxide.

[a] PM2.5 and ozone are the 3-year average from 2011 to 2013. Other pollutants are for the highest year during 2005–2007.

[b] The 8-hour average ozone concentrations are the fourth-highest daily maximums.

5.2.2 Environmental Impacts

Two types of impacts on air quality were considered for this analysis: temporary impacts from construction-related emissions and long-term impacts associated with emissions generated from continued operation of a stationary source (e.g., valves, pumps, and storage tank emissions). Air quality impacts associated with construction of the proposed Projects would include emissions from fugitive dust and emissions from fossil-fueled construction equipment, open burning, and temporary fuel storage and refueling operations.

Fugitive dust is a source of respirable airborne particulate matter, including PM_{10} and $PM_{2.5}$ (particulate matter less than 10 and 2.5 microns in diameter, respectively), that could result from vehicle traffic on paved and unpaved roads. The amount of dust generated is a function of construction activities, silt, moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during drier months and in fine-textured soils. Emissions of particulate matter arising from fugitive dust are regulated by state and local agencies and Wisconsin has authority under NR 415.04, which requires measures to prevent fugitive dust from becoming airborne and leaving the property boundary. Enbridge proposes to address fugitive dust by using control practices including wetting soils on the ROW, limiting working hours in residential areas, and/or additional measures as appropriate based on site-specific conditions. Pipeline construction activity would pass by a specific location within a short period, thereby resulting in short-term impacts at any one location during construction.

Large earth-moving equipment, skip loaders, trucks, and other mobile sources may be powered by diesel or gasoline and are sources of combustion emissions, including NO_x, CO, volatile organic compounds (VOCs), SO_2, PM_{10}, $PM_{2.5}$, and small amounts of hazardous air pollutants (HAPs). Construction equipment also emits greenhouse gases (GHG). Gasoline and diesel engines must comply with the EPA mobile source regulations in 40 Code of Federal Regulations (CFR) Part 86 for on-road engines and 40 CFR Part 89 for non-road engines. These regulations are designed to minimize emissions. Furthermore, EPA has established rules to require that sulfur content in on-road and off-road diesel fuel be significantly reduced and these rules now require all on-road and off-road (non-road) diesel fuel to meet a limit of 15 parts per million (ppm) of sulfur. There are currently no federal regulations or guidelines for maximum GHG emissions (although such regulations may be developed in the future). Construction of the Projects is not expected to result in substantial amounts of combustion emissions or GHGs due to the short amount of time it would take to construct the pipelines.

Enbridge proposes to allow the burning of cleared materials in the event that all applicable permits and approvals (e.g., agency and landowner) have been acquired and burning is carried out in accordance with all state and local regulations. Open burning of cleared materials from construction activities has the potential to affect air quality, particularly with the large volume of trees that would be removed from the ROW (between approximately 86.2 and 103.1 acres of forest lands depending on the route variations chosen). Burning of wood material releases large volumes of particulate matter, as well as CO, carbon dioxide (CO_2), SO_2, hydrochloric acid, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), and dioxin (American Lung Association 2000), some of which are GHGs. If a large amount of burning occurred, impacts to air quality could be moderate but temporary, resulting in respiratory irritation and similar impacts to susceptible people.

Considering the large volume of wooded material that would be cleared from the ROW, DNR proposes to allow burning of small piles of brush only. Open burning and malodorous emissions have requirements under ch. NR 429, Wis. adm. code and general rule requirements to not create air pollution. Burning of wet wood can produce very smoky (high opacity) and poorly burning fires that can be a source of malodorous emissions as well as particulate matter and HAPs that can harm human health. The burning of mature trees (with a minimum diameter at breast height [dbh] of 6 inches) would not be allowed. Mature trees must instead be sold or chipped in place. Wood chips can be scattered along the permanent ROW in appropriate areas (not in wetlands) or removed. Temporary fuel storage tanks and refueling operations have the potential to release VOC emissions, although most construction equipment would use diesel fuel with a low vapor pressure (<0.01 pounds per square inch [psi]), resulting in minimal releases of VOCs.

Since pipeline construction moves through an area relatively quickly, air emissions typically would be localized, intermittent, and short term. These temporary impacts would occur twice if the pipelines are not constructed concurrently. Emissions from fugitive dust, construction equipment combustion, open burning, and temporary fuel storage and refueling operations would be controlled to the extent required by state and local agencies. Construction of the proposed Projects is not expected to significantly affect local or regional air quality.

For pipeline operations, electricity would be used to power the system's pumping stations and other infrastructure. No long-term emissions would result from operations associated with the proposed Projects, except for fugitive VOC emissions from valves, pumps, and connectors. The additional throughput from the new and replaced pipelines would result in additional long-term VOC increases at the Superior Terminal from the valves, pumps, connectors, and other fugitive piping components associated with the incoming pipeline manifolds as well as from the storage tanks used to hold the crude oil prior to its distribution to outgoing pipelines. Further discussion regarding cumulative air quality impacts from the proposed pipelines in addition to impacts from the Superior Terminal is provided in Section 7.4.2. There are no ambient air quality standards or increments for VOC, although there are ozone standards for which VOC is a precursor. Regardless, operation of the proposed Projects would not cause or contribute to a violation of any federal, state, or local air quality standards.

5.2.3 Mitigation Measures

DNR recommends the following measures to reduce impacts to air quality:

- Allow the burning of small brush piles only. The burning of mature trees (with a minimum dbh of 6 inches) would not be allowed. Mature trees must instead be sold or chipped in place. Wood chips can be scattered along the permanent ROW or removed.
- Adhere to federal and state requirements that prohibit engine tampering to increase horsepower.

- Where practical, operate equipment as far as possible from residential areas and sensitive receptors (schools, daycare centers, and hospitals).
- Limit engine idling to the extent practical.
- Adhere to federal requirements for the use of ultra-low sulfur diesel.

5.3 Agricultural Resources

Construction of the Projects has the potential to negatively impact agricultural lands and human uses that depend on that land. “Agricultural land” is described as cropland and grassland and could include activities such as crop harvesting, livestock grazing, and dairy production, including organic farming. A discussion of impacts to forest lands is provided in Section 5.7.

5.3.1 Current Environmental Setting

Agriculture is not a major component of the landscape or economy of any counties within the Superior Coastal Plain Ecological Landscape (DNR 2014b). Within the Superior Coastal Plain Ecological Landscape region, agriculture has been declining in recent decades. In 1970, there were about 327,000 acres of farmland. By 2002, farmland had reduced to 255,000 acres, a decrease of 22 percent. Within the same region, Douglas County contains a relatively higher percentage of agricultural land—about 10 percent of total land cover (DNR 2014b).

The National Land Cover Database 2006 (NLCD; Fry 2011) Classification System was used to obtain information on agricultural land in the Project area. Agricultural land consists of areas classified as cultivated crops and pasture. Table 5-4 shows the acreages of agricultural land that would be crossed by the proposed Projects.

Approximately 2.6 acres of agricultural land would be crossed by the proposed Projects’ temporary ROW with 1.0 acre crossed by the permanent ROW. The route variations would affect an equal amount of agricultural land regardless of the route chosen (Table 5-4). The agricultural land that would be affected by the Projects is predominately used for pasture and hay production, with small areas of cultivated crops.

A review of the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) website showed no certified organic farms in the vicinity of the Project area. However, organic farmers are not required to register with the DATCP, and data on farms exempt from the requirement to certify and farms in transition to organic were not available. Enbridge has stated that it will continue to work with affected landowners to identify organic farms.

Records[2] at the Natural Resources Conservation Service (NRCS) showed no conservation easement lands (such as Conservation Reserve Program [CRP], Conservation Reserve Enhancement Program [CREP], Grassland Reserve Program [GRP], or Wetland Reserve Program [WRP]).

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[2] As of April 2013.

Table 5-4 Land Use Classifications Affected by Construction and Operation of the Projects[a,b]

Land Use Type Impacts[c,d]	MP 1,084.8 – 1,090.9	MP 1,090.9 – 1094.2		MP 1,094.2 – 1,095.4	MP 1,095.4 – 1,095.6		MP 1,095.6 – 1,096.2	MP 1,096.2 – 1,097.0		MP 1,094.0 – 1,097.7	Totals (min–max)
		Route Variation A1	Route Variation A2		Route Variation B1	Route Variation B2		Route Variation C1	Route Variation C2		
Forest Land											
Construction (acres)	40.0	20.7	12.2	12.6	2.9	3.2	6.0	1.5	9.6	11.0	86.2 – 103.1
Operation (acres)	15.5	12.0	5.7	3.4	1.6	1.1	2.5	1.2	5.0	2.4	31.8 – 42.4
Wetlands											
Construction (acres)	46.6	40.6	39.0	7.7	4.5	3.2	4.7	8.3	13.1	14.8	124.3 – 132.0
Operation (acres)	12.6	23.8	12.3	2.3	2.0	0.8	0.8	1.3	7.0	2.5	32.6 – 51.1
Developed Land											
Construction (acres)	8.0	1.1	1.0	5.1	0.0	0.0	3.4	3.6	0.0	7.2	24.7 – 28.4
Operation (acres)	3.2	0.7	0.4	1.7	0.0	0.0	1.1	3.5	0.0	2.4	8.8 – 12.6
Shrubland											
Construction (acres)	5.0	4.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1 – 9.5
Operation (acres)	2.6	2.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8 – 5.3
Open Land											
Construction (acres)	0.8	0.3	0.3	0.2	0.0	0.0	0.0	1.2	1.2	0.0	2.5
Operation (acres)	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.6	0.8	0.0	1.1 – 1.4
Agricultural Land											
Construction (acres)	2.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.6
Operation (acres)	0.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.0

Source: Wetland data are based on field-delineated data from 2013–2015 surveys. Where 2013–2015 surveys were not complete, Enbridge used recent (2008/2009) wetland and waterbody field data from a previous project and Wisconsin Wetland Inventory data; all other impacts are from Enbridge 2015a and based on NLCD 2011 Classification System (Fry et al. 2011).

Notes:

[a] Construction calculations are based generally on the Projects' typical 110-foot-wide construction right-of-way and known additional temporary workspaces.

[b] Data represent acreage impacted by the Line 3 Replacement and Sandpiper Pipeline Projects.

[c] Forest Land includes deciduous forest, evergreen forest, and mixed forest; Wetlands include woody wetlands; Developed Land includes developed land classified as high intensity, medium intensity, low intensity, and open space; Shrubland includes land classified as shrub/scrub; Open Land includes herbaceous; and Agricultural Land includes hay/pasture.

[d] Con = Area of wetland impact within the construction workspace including temporary dredge and fill areas, travel lanes, and staging areas. Op = Impacts within the permanent right-of-way.

5.3.1.1 Prime Farmland and Farmland of Statewide Importance

The U.S. Department of Agriculture (USDA) defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. The Projects would not cross soils categorized as prime farmland.

Farmland of statewide importance is land other than prime or unique farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops. Farmland of statewide importance is a soil classification, as opposed to a land use, and may or may not be utilized as agricultural land. Generally, these areas would produce high yields of crops when treated and managed according to acceptable farming methods. In some states or localities, farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law or local ordinance. Table 5-5 shows the acreages of farmland of statewide importance that would be crossed by each segment of the proposed Projects. Depending on the route variations chosen, between 130.2 and 157.8 acres of farmland of statewide importance would be crossed by the proposed Projects.

Table 5-5 Acreages of Farmland of Statewide Importance Crossed by the Projects [a,b]

Farmland Type	MP 1,084.8 – 1,090.9	MP 1,090.9 – 1094.2		MP 1,094.2 – 1,095.4	MP 1,095.4 – 1,095.6		MP 1,095.6 – 1,096.2	MP 1,096.2 – 1,097.0		MP 1,094.0 – 1,097.7	Total (min–max)
		RV A1	RV A2		RV B1	RV B2		RV C1	RV C2		
Prime Farmland[c]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Farmland of Statewide Importance[d]	47.0	68.8	45.6	11.7	3.7	1.4	3.4	14.0	11.9	9.2	130.2 – 157.7

Source: Enbridge 2015g.

Notes:

RV = Route Variation

[a] Data represent acreage crossed by the Line 3 Replacement and Sandpiper Pipeline Projects.

[b] Acreage is based generally on a typical 110-foot-wide construction right-of-way and additional temporary workspace; it does not include access roads or open water.

[c] Includes land listed by the NRCS as potential prime farmland if a limiting factor is mitigated (e.g., artificial drainage).

[d] Farmland of Statewide Importance is land other than prime farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops.

5.3.2 Environmental Impacts

Approximately 2.6 acres of agricultural land including hayfields and pasture would be impacted by construction of the pipelines. Production of crops and grazing activities would be prevented during the construction period, resulting in losses to agricultural production and associated economic activity. Enbridge would compensate landowners for agriculture-related losses according to negotiated agreements. After the pipelines have been placed in agricultural lands and the construction ROW has been restored, landowners would be able to use the land again for crops or pasture.

Potential impacts to agricultural soils include temporary soil erosion, soil compaction, increases in the proportion of large rocks in the topsoil, loss of soil productivity and fertility by mixing of topsoil and subsurface soil horizons, and damage to existing tile drainage systems.

Clearing of the construction ROW would remove protective vegetative cover and could increase soil erosion and sediment transport to waterways. Mitigation measures contained in the Environmental Protection Plan (EPP; Appendix B) and Agricultural Protection Plan (APP; Appendix A) would be implemented to control erosion including installing sediment barriers, temporary slope breaks, and trench breakers as required. The Enbridge Environmental Inspector (EI) would have the authority to ensure the repair of any ineffective erosion control measures within 24 hours of detection and/or authorize a stop work order or order corrective action in the event that construction activities violate the provisions of the EPP or APP, landowner requirements, or any applicable permit.

Construction and maintenance activities may lead to localized soil compaction, which may lead to slower or less successful vegetation reestablishment following construction. To reduce soil compaction, Enbridge would use deep tillage operations during restoration activities to minimize this impact.

Construction may result in concentration of large pieces of rock near the surface in areas where rocky soil or near-surface bedrock is found. To prevent this, Enbridge proposes to remove rocks from the surface of the entire construction area so that the size, density, and distribution of rock on the ROW is similar to that on adjacent off-ROW areas.

Construction can result in the loss of soil productivity and fertility by mixing of topsoil and subsurface soil horizons. To prevent mixing, Enbridge would remove, segregate and stockpile topsoil, and replace it in the proper order during backfilling in cropland, hay fields, and pasture.

Construction of the proposed pipelines may necessitate disruption of existing drainage tiles (drainage systems and pipes). Enbridge would repair or replace drainage tiles that are damaged by pipeline construction to prevent long-term impacts to drain tile function. However, unavoidable temporary impacts would be experienced during construction. Enbridge would compensate landowners or tenants for demonstrated losses associated with flooding that could occur because of disruption of drain tile systems. These temporary impacts would occur twice if the pipelines are not constructed concurrently.

For agricultural areas that are used for livestock grazing, there is a potential for livestock to fall into open trenches. To prevent this, plugs of subsoil would be left in the excavated trench ditch or temporary access bridges would be constructed across the trench for landowners to move livestock. If additional measures are necessary, Enbridge would coordinate with landowners to install temporary exclusion fencing along the construction ROW.

After the pipelines have been placed in agricultural lands and the construction ROW has been restored, landowners would be able to use the land again for crops or pasture. Some short-term decreases in agricultural productivity are possible, even with the mitigation measures that have been identified to reduce impacts. During the next growing season, crop production could be reduced, but would not be expected to be completely lost, and long-term productivity is not expected to be impaired. As summarized in the APP (Appendix A), Enbridge would negotiate with landowners or tenants who assert claims for construction-related damages in accordance with the terms of the easement agreements; claims may include demonstrated losses from decreased productivity resulting from pipeline operations. Enbridge could elect to hire an independent third-party Agricultural Monitor (AM) to inspect construction work on agricultural lands and be responsible for auditing Enbridge’s compliance with the provisions of the APP. An AM would act as a liaison between landowners and the DATCP when necessary, and report landowner complaints to Enbridge. However, the Applicant has indicated that because the area involved is very small and consists primarily of hay land, the use of an AM is not warranted. If organic farms are found to be within the proposed ROW, Enbridge would work with affected landowners to negotiate appropriate mitigation measures and compensation for losses of productivity.

Pipeline operations would be expected to cause a slight increase in soil temperatures, mainly at soil depth of at least 6 inches (from 1°F to 5°F, with the most notable increase during spring), but also including the soil surface immediately above and surrounding the pipeline (from 1°F to 2°F, primarily during winter). However, a soil temperature analysis for the Keystone XL oil pipeline noted that soil temperatures near the surface were impacted mainly by climate with negligible effect attributable to the operating pipeline (U.S. Department of State 2014). Increased soil temperatures during early spring may cause early germination and emergence in annual crops, such as corn and soybeans, although the effects of temperature on crop yields for gas pipelines, which run hotter than oil pipelines, have not caused significant adverse impacts to crops (Dunn and Carlson 2007; Fisher et al. 2000).

Long-term impacts to agricultural land from pipelines can include emergence of the pipelines from the trench up to or near the surface of the land due to natural forces that can cause the pipelines to move upward. These forces include frost heave,[3] soil buoyancy, landslides, and earthquakes. Upward movement of the pipelines could also result from excavation damage. To reduce the possibility of such movement upward into the agricultural land, the pipelines would be installed with a depth of cover of 48 inches below the graded surface, which is below the average frost depth in northwest Wisconsin, so frost heave would not occur.

Historically, surfacing of pipelines has resulted from buoyancy effects on pipelines installed in saturated soils. To prevent this, buoyancy control measures such as set-on bag weights and/or concrete coating would be installed where necessary to overcome upward forces. The 48-inch depth of cover over the pipelines is below the maximum plow depth. To further reduce the potential for excavation damage, it is recommended that signage be used in all agricultural lands along the permanent ROW. See Section 5.8 for a discussion of potential impacts resulting from geological hazards such as landslides and earthquakes.

5.3.2.1 Prime Farmland and Farmland of Statewide Importance

Since no prime farmland would be affected by the proposed Projects, no impacts would occur to this soil category.

Between approximately 130.2 and 157.8 acres of farmland of statewide importance would be affected by construction of the proposed Projects. Impacts on farmland of statewide importance from construction of the Projects would be the same as those discussed for agricultural land generally, including temporary soil erosion, soil compaction, increases in the proportion of large rocks in the topsoil, loss of soil productivity and fertility by mixing of topsoil and subsurface soil horizons, and damage to existing tile drainage systems, as discussed above. The measures specified in the EPP and APP (Appendices B and A, respectively) would reduce or eliminate these impacts. As such, impacts on farmland of statewide importance would be temporary and would not likely result in a permanent decrease in productivity.

5.3.3 Mitigation Measures

The EPP and APP contain the measures proposed to reduce impacts to agricultural land, including organic farmland. Some of the most important mitigation measures proposed by Enbridge to reduce impacts to agricultural lands during construction of the pipeline are:

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[3] Frost heave is an upwards swelling of soil during freezing conditions caused by an increasing presence of ice as it grows toward the surface, which can sometimes push buried objects, including pipelines, upward. Frost heave typically occurs in very cold climates including Northern Canada and the northern Midwest United States and Alaska.

- Remove, segregate, and stockpile topsoil to prevent topsoil mixing with subsoil during construction in cropland, hay fields, and pasture. Topsoil would be replaced in the proper order during backfilling.
- Install sediment barriers, temporary slope breaks, and trench breakers as required to reduce soil erosion.
- Install permanent pipeline markers in accordance with Pipeline and Hazardous Materials Safety Administration (PHMSA) requirements to prevent excavation damage.
- Use deep tillage operations during restoration activities to minimize soil compaction.
- Remove rocks from the surface of the entire construction area so that the size, density, and distribution of rock on the ROW is similar to that on adjacent off-ROW areas.
- Apply soil amendments to agricultural or pasture lands if requested by landowners and/or land managing agencies.
- Restore or repair all drainage ditches, tiles, fences, and irrigation systems to their preconstruction contours with erosion controls as needed.

5.4 Cultural Resources

Cultural resources are the material remains of human activity, and can include sites, buildings, structures, objects, districts, and landscapes. Cultural resources include archeological resources, which comprise prehistoric or historic artifacts, and historic resources, which consist of the built environment. Cultural resources also include properties of religious and cultural significance (including traditional cultural properties [TCPs]). For a discussion of impacts to tribal and treaty resources, see Section 5.15, Socioeconomics.

Federal laws and regulations, including the National Historic Preservation Act (NHPA) of 1966, provide the standards for cultural resources identification, evaluation, and mitigation of impacts. If a cultural resource meets the criteria for listing in the National Register of Historic Places (NRHP), it is considered significant and termed a “historic property.” The criteria used to evaluate the significance of a historic resource are as follows:

- It is associated with events that have made a significant contribution to the broad patterns of American history; or
- It is associated with the lives of past significant persons; or
- It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
- It has yielded, or may be likely to yield, information important in history or prehistory.

Properties also need to exhibit integrity of location, materials, setting, design, association, workmanship, and feeling and must be at least 50 years old, although there are provisions for listing cultural resources of more recent origin if they are of exceptional importance (National Park Service 1990). A review of the properties listed on the NRHP in Douglas County, Wisconsin, did not identify any historic properties listed in the NRHP within 1 mile of the proposed Projects’ ROW, also referred to as the “environmental survey corridor.”

The Projects are subject to Wis. stat. 44.40 because the construction workspace crosses state land. Wis. stat. 44.40 requires agencies to review projects for effects to historic resources that are included on a list of locally designated historic places maintained by the Wisconsin Historical Society (WHS).

5.4.1 Current Environmental Setting

Early archaeology in northern Wisconsin is poorly understood as there are no large archaeological sites in the Superior Coastal Plain. Historically, a number of tribes settled temporarily in the region when the Iroquois wars of the seventeenth century forced a flood of eastern refugee tribes westward. Among those to settle on the Superior Coastal Plain were the Huron (Wyandot), the Ottawa, and the Ojibwe (Chippewa), of which, only the Chippewa remain there today (DNR 2014b).

Existing site file data maintained by the State Historic Preservation Office at the WHS was reviewed to identify previously recorded archaeological and historic resources within the environmental survey corridor (Watson et al. 2014). A review of the WHS list of sites did not identify any locally designated historic places within 1 mile of the environmental survey corridor, but the WHS database search did reveal one previously recorded archaeological site (47DG0116) within the environmental survey corridor. This site is a small dam that was determined not eligible for listing in the NRHP by the State Historic Preservation Office.

Enbridge conducted Phase I inventory surveys in August–November 2013, June–September 2014, and June–August 2015 within the environmental survey corridor to identify archaeological sites and historic resources and to evaluate these sites for NRHP eligibility. The August–November 2013 survey covered 982 acres, during which one archaeological site (47DG0180, a prehistoric lithic scatter) was recorded and one archaeological site (47DG0116, a dam/historic earthen site) was revisited (Lange Mueller et al. 2014). Site 47DG0116 has been determined not eligible for listing in the NRHP by the Wisconsin State Historic Preservation Office (U.S. Department of State 2009). Site 47DG0180 was recommended not eligible for the NRHP by the surveyors; however, State Historic Preservation Office determination has not been finalized. In addition to these sites, Commonwealth Cultural Resources Group, Inc. noted four cataloged cemetery/burial sites that extended into the environmental survey corridor (Lange Mueller et al. 2014).

The June–September 2014 survey covered a total of 117 acres, which were selected for survey based on field observations, results of prior surveys, and the results of the 2013 survey of the environmental survey corridor. In addition, Enbridge prepared a statistically-based geographic information system (GIS)–based predictive model to assist the design of the 2014 field survey for the Projects. The model predicted areas with high, moderate, and low potential for containing archaeological sites and historic structures that may be eligible for the NRHP. The resulting June–September 2014 survey did not identify any archaeological or historic resources in the environmental survey corridor.

The June–August 2015 survey covered 73 of the remaining 74 acres of the survey corridor (Enbridge 2015b). The remaining 1 acre was not surveyed in 2015 due to landowner restriction. This area is forested and will require shovel testing once survey permission is obtained. The June–August 2015 survey did not identify any archaeological or historic resources within the environmental survey corridor (Enbridge 2015b).

No properties of religious and cultural significance (including TCPs) were found within the environmental survey corridor. Two tribal monitors from the Fond du Lac Band of Lake Superior Chippewa accompanied the 2013 survey crew during survey activities (Lange Mueller et al. 2014). No additional tribal surveys have been conducted within the environmental survey corridor. See Section 5.15.1.2 for a discussion of tribal treaty resources.

5.4.2 Environmental Impacts

Since there are no historic properties within 1 mile of the Projects' corridor, no impacts to historic properties would occur from construction or operation of the proposed Projects. Likewise, there are no locally designated historic places within 1 mile of the Projects' corridor. As such, the Projects would not impact these types of resources. In addition, no NRHP-eligible archaeological or historic resources or properties of religious and cultural significance (including TCPs) were identified during Phase I inventory surveys, so no impacts would occur to such resources from construction or operation of the proposed Projects. However, the NRHP eligibility for one newly recorded resource is pending State Historic Preservation Office determination. Enbridge would avoid this unevaluated site. If engineering controls are unable to avoid impacts on the site, Enbridge would conduct site evaluations and determine if it meets the eligibility criteria for the NRHP. If the site does meet the criteria and the State Historic Preservation Office concurs, mitigation measures would be developed through agency and tribal consultation.

If an unrecorded cultural resource is uncovered during construction, Enbridge has developed an Unanticipated Discoveries Plan (Appendix D) for use during all Project construction activities. The plan describes the actions that would be taken if a previously unrecorded cultural resource or human remains are discovered during construction activities. The plan directs the construction contractor and the EI to stop activity and protect the find, and then contact the appropriate expert or authority. See Appendix D for further information.

5.4.3 Mitigation Measures

Since there are no historic properties present within the Projects' corridor, mitigation is not necessary at this time. However, in the event that an unrecorded cultural site is uncovered during construction, the Unanticipated Discoveries Plan (Appendix D) would be followed during all Project construction activities, which would aid in the minimization of impacts to cultural resources.

5.5 Federally Listed Endangered and Threatened Species

This section describes the species listed as endangered, threatened, proposed, or candidate by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA). *Endangered species* includes any species that is in danger of extinction throughout all or a significant portion of its range. *Threatened species* are any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. *Proposed species* are species that have been proposed in the Federal Register to be listed under Section 4 of the ESA. *Candidate species* are species considered for possible addition to the list of endangered and threatened species. For these species, the USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

A separate environmental review is being conducted as part of the overall environmental review of the proposed Projects including DNR conducting an endangered species review as part of the Natural Heritage Inventory (NHI) endangered resources review requirements for the proposed Projects in Wisconsin. This review primarily includes state-listed species documented in the NHI database (discussed further in Section 5.6), but would also include known records of federally listed species in the Project area and nearby vicinity.

Independently of this Wisconsin Environmental Policy Act EIS review, consultation under Section 7 of the ESA is required for these Projects because of the need for an Individual Permit authorization from the U.S. Army Corps of Engineers (USACE) to discharge dredged or fill material into waters of the United States (wetlands) under Section 404 of the Clean Water Act (CWA). The USACE is the federal action agency for Section 7 consultation for these Projects. In accordance with Section 7 of the ESA, the USACE as the federal action agency, in coordination with the USFWS, must ensure that any action authorized, funded, or carried out, in whole or in part, by the agency does not jeopardize the continued existence of a federally listed threatened or endangered species or result in the adverse modification of the designated critical habitat of a federally listed species. A federal action agency must prepare a Biological Assessment (BA) or similar document for actions involving major construction activities with the potential to affect listed species or designated critical habitat. If the impact analysis in the BA determines that the action is likely to adversely affect a listed species or designated critical habitat, the federal agency (USACE) must submit a request for formal consultation to comply with Section 7 of the ESA. The USFWS would then issue a Biological Opinion as to whether or not the federal action (filling of wetlands) would likely jeopardize the continued existence of a listed or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat.

This section addresses only federally listed species under the ESA. Section 5.6 addresses state-listed fish and wildlife species and Species of Conservation Concern, and Section 5.18 addresses state-listed plant species. The presence of federally listed species in Douglas County was determined, and the Project area for assessing the impacts from the proposed Projects includes habitat within 1 mile of the proposed route.

5.5.1 Current Environmental Setting

5.5.1.1 Endangered Species Act Species

Three federally listed endangered and four threatened species have been documented in Douglas County (Table 5-6). Designated critical habitat for the piping plover also occurs in Douglas County.

Table 5-6 Status of Federally Listed Species and Designated Critical Habitat in Douglas County

Species	Status	Habitat
Piping plover – Great Lakes population (*Charadrius melodus*)	Endangered Critical habitat	Sandy beaches, bare alluvial and dredge spoil islands
Kirtland's warbler (*Dendroica kirtlandii*)	Endangered	Young jack pine stands (5–25 years old)
Gray wolf – Western Great Lakes population (*Canis lupus*)	Endangered	Northern forest
Rufa red knot (*Calidris canutus rufa*)	Threatened	Along Lake Superior and inland wetlands and waterbodies
Canada lynx (*Lynx canadensis*)	Threatened	Northern forest
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	Cavities or crevices of both live and dead trees
Fassett's locoweed (*Oxytropis campestris* var. *chartacea*)	Threatened	Open sandy lakeshore

Source: DNR 2015a

The **piping plover** (*Charadrius melodus*) is listed as endangered under the ESA, with designated critical habitat occurring in Douglas County. It is a small, sand-colored shorebird that nests and feeds along coastal sand and gravel beaches in North America. The Great Lakes population of piping plovers use open, sandy beaches, barrier islands, and sand spits formed along the perimeter of the Great Lakes. They do not inhabit lakeshore areas where high bluffs formed by severe erosion have replaced beach habitat, but select sparsely vegetated open sand, gravel, or cobble for nesting sites. Many coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments. The habitat along the proposed Projects' route consists of an herbaceous utility corridor with mainly forestland adjacent in most locations, and the Projects are located within the interior of Douglas County over 1.5 miles from the shoreline of Superior Bay. No Wisconsin NHI occurrences of piping plover were identified within 1 mile of the Project area. The piping plover is therefore unlikely to be present in the Project area. Designated critical habitat for the piping plover is also outside of the Project area.

The **Kirtland's warbler** (*Dendroica kirtlandii*) is listed as endangered under the ESA. It is a small songbird that is also known as the jack pine warbler. It has bluish-gray upperparts, yellow underparts, dark streaks on its back, sides, and flanks, and indistinct white wing bars. It is primarily insectivorous and also feeds on seasonal fruits (DNR 2014c). It requires large areas (over 160 acres) of dense young jack pine interspersed with dense thickets and grassy openings as breeding habitat. Suitable breeding habitat conditions were created in pre-settlement times by repeated forest fires, but forest fragmentation and fire suppression have severely reduced the extent of wildfire-regenerated jack pine habitat in Wisconsin. Although wildfire-regenerated habitat provides optimal conditions for this species, most occupied habitat now occurs on plantations either managed specifically for this species or for timber. The nearest ecological landscape with Kirtland's warbler habitat (pine barrens and northern dry forest) is the Northwest Sands (DNR 2005). The nearest portion of the Northwest Sands Ecological Landscape occurs more than 12 miles southeast of the Projects. The Kirtland's warbler is therefore unlikely to be present in the Project area.

The **gray wolf – Western Great Lakes population** (*Canis lupus*) is listed as endangered under the ESA. The gray wolf is the largest of the wild dog species found in a variety of habitats throughout North America. Currently, the species is found in portions of the upper Midwest (Minnesota, Wisconsin, and Michigan including the Upper Peninsula), the Rocky Mountains (Montana, Idaho, and Wyoming), and Alaska. The Western Great Lakes population includes gray wolves in Minnesota, Wisconsin, and Michigan (USFWS 2013b). Gray wolves prey primarily on large ungulates and will occasionally take smaller prey, including beaver (*Castor canadensis*), insects, various small mammals, and domestic animals (USFWS 2013b). A habitat generalist, the gray wolf originally occupied most habitat types in North America. They show no preference for one cover type over another and successfully utilize alpine, forest, grassland, shrubland, and woodland habitats across their range (Enbridge 2015c). Recent range expansions have shown that wolves can tolerate higher rates of human development than previously thought. Given abundant prey and low rates of human-caused mortality, wolves can survive in proximity to human-dominated environments (Enbridge 2015c). The gray wolf is threatened by human-caused mortality (e.g., illegal shooting, competition with humans over livestock) and habitat loss (Mech and Boitani 2010). The gray wolf has the potential to occur in the Project area; however, there are no known Wisconsin NHI occurrences within 1 mile of the Project area.

The **rufa red knot** (*Calidris canutus rufa*) is a large sandpiper bird that measures 9 to 10 inches in length. Rufa red knots have a medium-length, straight, black bill, and their legs are typically black. During the breeding season, the rufa subspecies has a rusty-red plumage on its head, neck, and underside and dark brown, lightly fringed feathers on its upper parts (Enbridge 2015c). The rufa red knot is an aquatic prober/gleaner that forages in shallow water where vegetative cover is sparse or absent (Skagen et al. 1999). However, rufa red knot habitat preferences vary widely during the three main phases of their annual cycle. During breeding they nest on dry, sunny, elevated, wind-swept ridges or slopes in the Arctic tundra (Niles et al. 2008). While migrating, rufa red knots prefer sandy coastal habitats, shallow wetlands, and cultivated fields where they forage on a variety of invertebrates (Enbridge 2015c). Preferred wintering habitats in the southeastern United States include sandy beaches, peat banks, salt marshes, brackish lagoons, tidal mudflats, and mangroves (Niles et al. 2008). Key threats to the rufa red knot include habitat destruction, habitat modification, or curtailment of rufa red knot habitat and other natural and anthropogenic factors (USFWS 2013c). The rufa red knot has the potential to occur in the Project area; however, there are no known Wisconsin NHI occurrences within 1 mile of the Project area.

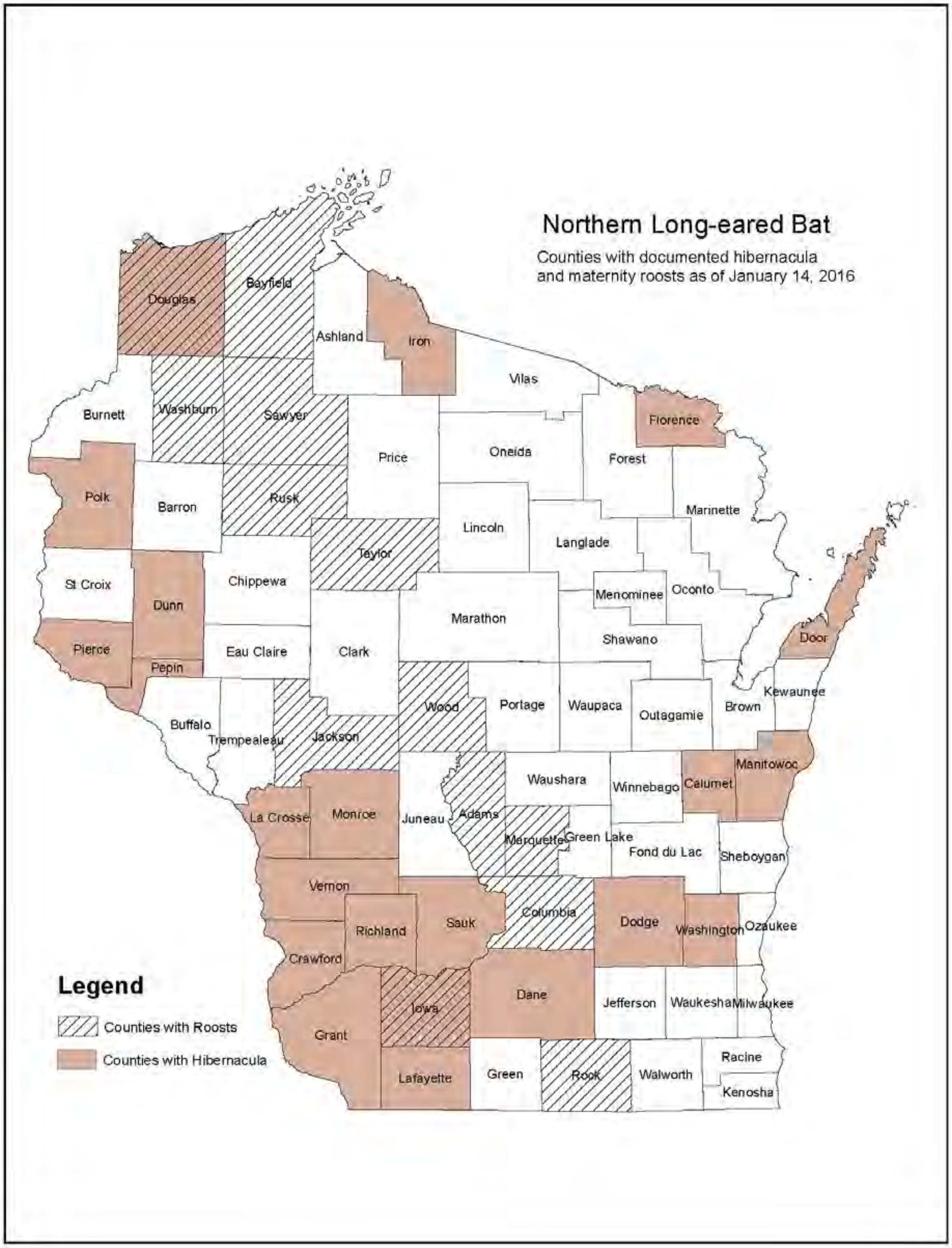
The **Canada lynx** (*Lynx canadensis*) is listed as threatened under the ESA. It is a medium-size cat that generally inhabits moist boreal forests that have cold, snowy winters and a high-density snowshoe hare prey base. The predominant vegetation of boreal forests is conifer trees, primarily species of spruce and fir. In the contiguous United States, the boreal forest type transitions to deciduous temperate forest in the Northeast and Great Lakes, and to subalpine forest in the West. Lynx also require habitats with deep powdery snow, which limits competition with other hare predators. Lynx typically breed in March and April, and kittens are born from late April to mid-June. Denning generally occurs from birth of kittens until the kittens are mobile (up until July if the kittens are born in June). Denning habitat includes log piles, windfall, or dense vegetation (USFWS 2013a). Individual lynx maintain large home ranges generally between 12 to 83 square miles. Lynx are fairly common in interior Canada and Alaska and much rarer at the southern edge of their range in the United States. Most lynx habitat in the United States occurs on public (National Forest, National Park, and Bureau of Land Management) lands and private timber lands (USFWS 2013a). The Canada lynx has the potential to occur in the Project area; however, there are no known Wisconsin NHI occurrences within 1 mile of the Project area.

The **Northern long-eared bat** (*Myotis septentrionalis*) occurs across much of the eastern United States. During the summer (June 1 to August 1), adult females form breeding or maternity colonies that range in size from a few individuals to 30 or 60 adults, whereas males typically roost alone (DNR 2013; Enbridge 2015c). Roost sites may include both live and dead trees and can occur under bark and in crevices or cavities, suggesting that Northern long-eared bats are habitat generalists. Northern long-eared bats typically hibernate in caves and mines in mixed species groups. In the vicinity of the Project area, hibernation occurs between October 1 and April 1. In April, the species emerges from its hibernacula and migrates to summer roosting habitat (DNR 2013; Enbridge 2015c). This species does not migrate great distances between its summer roosting habitat and winter hibernacula. Foraging habitat includes forested hillsides and ridges, and small ponds and streams within the forest interior and also along corridors and edge habitat. The Northern long-eared bat is threatened by roost habitat destruction and by the fungal disease white-nose syndrome (DNR 2013). The Project area is within the white-nose syndrome zone, which is defined as U.S. counties within 150 miles of positive counties or districts (USFWS 2016a).

The USFWS proposed to list the Northern long-eared bat as endangered under the ESA in October 2013. The USFWS determined that the species meets the definition of threatened under the ESA. On January 15, 2015, the USFWS published a proposed rule under Section 4(d) of the ESA for the Northern long-eared bat. The finalized rule under Section 4(d) will go into effect on February 16, 2016 (USFWS 2016b). The rule is designed to protect the bat while minimizing regulatory requirements for landowners, land managers, and others within the species' range and allows for exemptions of incidental take of the species under certain circumstances. In areas of the country impacted by white-nose syndrome, incidental take is prohibited if it occurs within a hibernation site for the Northern long-eared bat. It is also prohibited if it results from tree removal activities within 0.25 mile of a hibernaculum or from activities that cut down or destroy known occupied maternity roost trees, or any other trees within 150 feet of that maternity roost tree, during the pup-rearing season (June 1 through July 31). Occupied roost trees may be removed when necessary to address a direct threat to human life and property. In other cases, a permit for incidental take may be needed (USFWS 2016b).

The distribution of documented Northern long-eared bat hibernacula and maternity roosts in Wisconsin is shown on Figure 5-1. It shows that there is a potential for Northern long-eared bat hibernacula and maternity roosts to be present in the Project area. Enbridge conducted surveys for the Northern long-eared bat during summer 2014 per the USFWS 2014 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2015b) and Enbridge's 2014 Northern Long-eared Bat Survey Protocol. Enbridge documented three maternity roost trees and triangulated one additional maternity roost tree; all of these trees are located outside of the construction ROW (Enbridge 2015c). Enbridge also calculated acreages of Northern long-eared bat suitable habitat within the temporary construction workspace and permanent ROW using the definitions of a home range in the USFWS Northern Long-eared Bat Interim Conference and Planning Guidance (Enbridge 2015c). The total amount of suitable habitat cleared would vary with DNR-selected alternatives ranging from 144.9 to 161.2 acres (Enbridge 2015c). Although no maternity roosts were observed in the construction ROW or within 150 feet of the Project area during the 2014 Enbridge surveys, maternity roosts could potentially have been established within the ROW since the time of the surveys. The Northern long-eared bat has the potential to occur in the Project area.

The **Fassett's locoweed** (*Oxytropis campestris* var. *chartacea*) is listed as threatened under the ESA. It is a perennial in the pea family that grows on gentle slopes in sand-gravel shorelines around shallow lakes that are subject to water level fluctuations. The plant depends on a large seed bank and the open habitat (above the water line) provided when lake levels are low for long-term population maintenance. The habitat along the proposed Projects' route consists of an herbaceous utility corridor with forestland adjacent in most locations. No NHI occurrences of Fassett's locoweed were identified within 1 mile of the Project area. The Fassett's locoweed is therefore unlikely to be present in the Project area.



Source: DNR 2016

Figure 5-1 Documented Northern Long-eared Bat Hibernacula and Maternity Roosts in Wisconsin

5.5.1.2 Endangered Species Act Consultation – Initiation

Enbridge initiated informal consultation on the Sandpiper Pipeline Project with the Midwest Region Ecological Services Field Office (Region 3) in early 2013 and on the Line 3 Replacement Project with the USFWS Region 3 Green Bay Field Office in September 2013 regarding the Canada lynx, piping plover, Kirtland's warbler, and Fassett's locoweed, and piping plover designated critical habitat. The information provided to the USFWS included determinations of the Projects' impacts on these four federally listed species and one critical habitat. Since this correspondence, three additional species have been listed or re-listed under the ESA: the Northern long-eared bat, gray wolf (Western Great Lakes population), and rufa red knot. Enbridge subsequently submitted a BA of these three species (Enbridge 2015c) to the USACE. Consultation between the USFWS and USACE for both Projects is currently in progress.

5.5.2 Environmental Impacts

5.5.2.1 Endangered Species Act–Listed Species

Since the **Kirtland's warbler, piping plover**, and **Fassett's locoweed** are unlikely to be present in the Project area, no impacts would occur to these species.

The **Canada lynx** could occur in the Project area. Construction noise and activity would likely cause the lynx to move to other areas and possibly return after cessation of activities. The Projects' effects would be minor and temporary. Den sites used from April to June could most likely occur away from the existing cleared ROW. Den sites are likely to be located around downed logs and windfalls, away from the cleared pipeline corridor in the forest interior. Tree clearing that would be conducted as part of pipeline construction activities would occur adjacent to the already cleared corridor, which would not likely contain dens sites. However, there remains a potential for impacts during this sensitive life stage.

The **rufa red knot** could occur in the Project area. The rufa red knot may use wetlands, cultivated fields, or waterbodies in the Project area as migratory stopover habitat, but this species does not breed in the Project area. Construction activities have the potential to affect individual rufa red knots migrating through the Project area. Noise or presence of humans and equipment involved in construction activities may cause migrating rufa red knots to startle and flush from wetlands or fields or to avoid the area. The temporary impacts to wetlands and cultivated fields during construction could temporarily affect the foraging and sheltering behaviors of individual migrating rufa red knots. However, the abundance of wetlands in the vicinity of the Projects suggests that temporary impacts on a small number of these habitats in the Project area would not subtract from the overall availability of stopover habitat for rufa red knots and would not result in a detectable or measurable impact on an individual's survival or reproductive capacity. Enbridge proposes mitigation to further reduce potential impacts to the rufa red knot (see Section 5.5.3 below).

The **gray wolf** could occur in the Project area. Construction noise and activity would likely cause the gray wolf to move to other areas and possibly return after cessation of activities. Due to the highly mobile nature of this species, the transient nature of dispersers, the low number of gray wolves in the state, and the species' use of a variety of habitats, impacts on the gray wolf would be minor and temporary. Enbridge proposes mitigation to further reduce potential impacts to the gray wolf (see Section 5.5.3 below).

The **Northern long-eared bat** could occur in the Project area. Impacts on individual or colonies of bats may occur if clearing or construction occurs when the species is occupying summer roosts. Bats may be disturbed due to noise or human presence, causing them to abandon occupied tree cavities. Bats could be killed or injured if occupied trees are felled. Impacts would be severe if trees containing maternity colonies are abandoned or destroyed. Since the population of Northern long-eared bats is declining due to white-nose syndrome and destruction of habitat among other factors, the protection of these bats, and particularly of groups of bats in maternity colonies, is of paramount importance.

Any temporary impacts to threatened and endangered species would occur twice if the two pipelines are not constructed concurrently.

5.5.2.2 Endangered Species Act Consultation – Outcomes

5.5.2.3 Line 3 Replacement Project

The USFWS responded on October 18, 2013, with a letter of concurrence regarding the Canada lynx, piping plover, Kirtland’s warbler, and Fassett’s locoweed that no federally listed, proposed, or candidate species would be present in the Project area, and that there was no critical habitat in the Project area. Since this correspondence, three additional species have been listed or re-listed under the ESA, including the Northern long-eared bat, gray wolf (Western Great Lakes population), and rufa red knot. Enbridge has determined in its BA that the Project would be not likely to adversely affect the gray wolf and rufa red knot, but that since some clearing may take place within the Northern long-eared bat’s active season, the Project may be likely to adversely affect the Northern long-eared bat.

5.5.2.4 Sandpiper Pipeline Project

Enbridge has been communicating with the USFWS since April 2013 on the Sandpiper Pipeline Project. Similar to the Line 3 Replacement, Enbridge determined in its BA that the Project would be not likely to adversely affect the gray wolf and rufa red knot, but that since some clearing may take place within the Northern long-eared bat’s active season, the Project may be likely to adversely affect the Northern long-eared bat. The USFWS is currently reviewing the Draft BA submitted in December 2015. Enbridge will submit a Final BA in 2016.

5.5.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to the rufa red knot:

- Stop construction if Project proponents observe a rufa red knot within 1 mile and do not resume construction until the birds have left the area. As such, if an EI observes a rufa red knot within 1 mile of the construction corridor, or if the USFWS notifies Enbridge of a rufa red knot sighting within 1 mile, construction activities must stop until the birds have left the area.
- Report any sightings of rufa red knot within the construction corridor immediately to the USFWS. In order to be able to identify rufa red knots, Enbridge must provide EIs with preconstruction training in the identification of rufa red knots and have photos of the species onsite to aid in identification.
- Restore wetlands crossed by the proposed pipelines to preconstruction contours to avoid long-term impacts on the rufa red knot’s migratory stopover habitat.

The following mitigation measures are proposed by Enbridge to reduce impacts to the gray wolf:

- Stop construction activities if the contractor or EI observes a gray wolf or possible den site within the construction corridor, or if the USFWS notifies Enbridge of a gray wolf sighting within 1 mile of the construction ROW. Do not continue construction activities until the gray wolf individual(s) leave the area.
- Report any wolf sightings immediately to the USFWS, USACE, and DNR.

5.6 Fish and Wildlife

This section addresses potential impacts of the proposed Projects on general fish and wildlife species including state-listed species and Species of Greatest Conservation Need. Section 5.5 addresses potential impacts to the six federally listed animal species: Canada lynx, gray wolf, Kirtland's warbler, piping plover, rufa red knot, and Northern long-eared bat.

The Project area considered for analyzing impacts of the proposed Projects to fish and wildlife species includes terrestrial and wetland species within 1 mile and aquatic species within 2 miles of proposed routes (as indicated).

5.6.1 Current Environmental Setting

5.6.1.1 General Fish and Other Aquatic Species

The Projects would cross the Pokegama and Little Pokegama Rivers, unnamed tributaries of those rivers, and other intermittent, ephemeral streams, or ditches. The Pokegama River is an important spawning area for walleye (*Stizostedion vitreum*), northern pike (*Esox lucius*), longnose suckers (*Catostomus catostomus*), white suckers (*Catostomus commersoni*), burbot (*Lota lota*), and other fish species.

The Pokegama and Little Pokegama Rivers enter into the Pokegama and Little Pokegama Bays, respectively, which are part of the St. Louis River estuary and provide habitat for many species of native fish. The St. Louis River estuary encompasses over 12,000 acres, and the landscape supporting the adjacent estuary and its habitats covers some 260,000 acres in Minnesota and Wisconsin. The St. Louis River is the second-largest tributary to Lake Superior and supports a significant fishery. The upper estuary and river below the Fond du Lac dam provide spawning habitat for most of the walleye in the western arm of Lake Superior. Walleye is an important resource for local tribes. Lake sturgeon restoration efforts in the St. Louis estuary began in the 1980s and once this population reaches maturity, the upper estuary will also serve as sturgeon spawning habitat.

In 1987, concerns over environmental quality conditions prompted the designation of the lower St. Louis River as one of 43 Great Lakes Areas of Concern (AOCs). The majority of the beneficial use impairments for the St. Louis River AOC are related to habitat loss from extensive filling of wetlands, dredging of shallow aquatic habitat, and inputs of harmful chemicals that contaminated the sediments and water in the estuary. Priorities for delisting the AOC are continued remediation of contaminated sediments and restoration of aquatic and hydrologically connected habitat (DNR 2014d). Nevertheless, the combination of ecosystems within the St. Louis estuary is very unusual in Lake Superior and the Upper Midwest, which consist of estuarine wetland and aquatic habitats that are important to breeding and migratory birds, and to native fish (The Nature Conservancy 2015). In spite of human impacts, the Lower St. Louis River ecosystem is both regionally and globally significant. In 2002, the St. Louis River Citizens Action Committee published the Lower St. Louis River Habitat Plan, with support from The Nature Conservancy and others, which outlines specific steps to preserve and restore the critical habitats of the estuary. Table 5-7 is taken from that report, which lists native fish species found in the St. Louis River estuary in the mouths of clay-influenced tributaries, including the Pokegama River, by life stage (spawn, nursery, adult) and season. In addition to fish, other aquatic species that inhabit streams and rivers in the Project area include macroinvertebrates (such as crustaceans, insects, and worms), mussels, amphibians, and reptiles.

Table 5-7 Native Fish Species in the Pokegama River and Other Tributaries of the St. Louis River Estuary

Common Name	Scientific Name	Abundance	Spawn[a]	Nursery[a]	Adult[a]

			Sp	Su	Sp	Su	F	W	Sp	Su	F	W
Lake sturgeon	*Acipenser fulvescens*	Common			Y	Y	Y	Y				
Rockbass	*Ambloplites rupestris*	Common		Y	Y	Y	Y	Y	Y	Y	Y	Y
Longnose sucker	*Catostomus catostomus*	Present			Y	Y			Y			
White sucker	*Catostomus commersoni*	Common			Y	Y	Y	Y	Y	Y	Y	Y
Lake chub	*Couesius plumbeus*	Trace	Y	Y	Y	Y						
Northern pike	*Esox lucius*	Common	Y		Y	Y	Y	Y	Y	Y	Y	Y
Muskellunge	*Esox masquinongy*	Present	Y		Y	Y	Y	Y	Y	Y	Y	Y
Johnny darter	*Etheostoma nigrum*	Common	Y		Y	Y	Y	Y	Y	Y	Y	Y
Black bullhead	*Ictalurus melas*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Yellow bullhead	*Ictalurus natalis*	Trace		Y	Y	Y	Y	Y	Y	Y	Y	Y
Brown bullhead	*Ictalurus nebulosus*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Channel catfish	*Ictalurus punctatus*	Common	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pumpkinseed	*Lepomis gibbosus*	Trace		Y	Y	Y	Y	Y	Y	Y	Y	Y
Bluegill	*Lepomis macrochirus*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Burbot	*Lota lota*	Present			Y	Y	Y	Y	Y			Y
Smallmouth bass	*Micropterus dolomieui*	Common	Y		Y	Y	Y	Y	Y	Y	Y	Y
Largemouth bass	*Micropterus salmoides*	Trace		Y	Y	Y	Y	Y	Y	Y	Y	Y
Silver redhorse	*Moxostoma anisurum*	Common			Y	Y	Y	Y	Y	Y	Y	Y
Shorthead redhorse	*Moxostoma macrolepidotum*	Common			Y	Y	Y	Y	Y	Y	Y	Y
Golden shiner	*Notemigonus crysoleucas*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Emerald shiner	*Notropis atherinoides*	Common		Y	Y	Y	Y	Y	Y	Y	Y	Y
Common shiner	*Notropis cornutus*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Spottail shiner	*Notropis hudsonius*	Common		Y	Y	Y	Y	Y	Y	Y	Y	Y
Mimic shiner	*Notropis volucellus*	Present			Y	Y	Y	Y	Y	Y	Y	Y
Tadpole madtom	*Noturus gyrinus*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Yellow perch	*Perca flavescens*	Common	Y		Y	Y	Y	Y	Y	Y	Y	Y
Log perch	*Percina caprodes*	Common	Y		Y	Y	Y	Y	Y	Y	Y	Y
Trout perch	*Percopsis omiscomaycus*	Common		Y	Y	Y	Y	Y	Y	Y	Y	Y
Fathead minnow	*Pimephales promelas*	Present		Y	Y	Y	Y	Y	Y	Y	Y	Y
Black crappie	*Poxomis nigromaculatus*	Common	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Walleye	*Stizostedion vitreum*	Common			Y	Y	Y	Y	Y	Y	Y	Y

Source: St. Louis River Citizens Action Committee 2002
Notes:
[a] A "Y" indicates occurrence of species during different life stages in spring (Sp), summer (Su), fall (F), and winter (W), based on Appendix 6 of St. Louis River Citizens Action Committee 2002.

5.6.1.2 General Wildlife Species

The main land uses that occur along the proposed Projects' route are forest lands including deciduous and coniferous forests, agricultural lands including crop fields and grasslands, emergent wetlands and open water, and open space. These land uses constitute habitat types for different species of wildlife. The following wildlife-habitat relationships are based on the habitat descriptions and geographic distributions from DNR (1997). Mammalian species typical of Wisconsin's deciduous forests include Eastern chipmunks (*Tamias striatus*), Eastern gray squirrels (*Sciurus carolinensis*), porcupines (*Erethizon dorsatum*), and white-tailed deer (*Odocoileus virginianus*). Some of these species, as well as others such as red squirrels (*Tamiasciurus hudsonicus*), fishers (*Martes pennanti*), and black bears (*Ursus americanus*), also inhabit northern Wisconsin's coniferous forests. Other species, such as least chipmunks (*Neotamias minimus*) and snowshoe hares (*Lepus americanus*), are more unique to coniferous forests. The structural diversity of forests provides a variety of habitats that can support raptors such as Northern goshawks (*Accipiter gentilis*) and sharpshinned hawks (*Accipiter striatus*); migratory songbirds such as thrushes (Turdidae), vireos (Vireonidae), and warblers (Parulidae); and resident birds such as Northern cardinals (*Cardinalis cardinalis*), nuthatches (*Sitta* spp.), and woodpeckers (Picidae).

Emergent wetlands and open water in northern Wisconsin provide habitat for a variety of aquatic wildlife, including mammals such as muskrats (*Ondatra zibethicus*), beavers, and river otters (*Lontra canadensis*); birds such as herons and egrets (Ardeidae), swallows (Hirundinidae), dabbling ducks (Anatidae), and red-winged blackbirds (*Agelaius phoeniceus*); and reptiles and amphibians such as painted turtles (*Chrysemys picta*), snapping turtles (*Chelydra serpentina*), Eastern garter snakes (*Thamnophis sirtalis*), and mudpuppies (*Necturus maculosus*). Woody wetlands provide additional habitat for terrestrial mammals such as bobcats (*Lynx rufus*) and mink (*Neovison vison*); for birds such as barred owls (*Strix varia*), great horned owls (*Bubo virginianus*), wood ducks (*Aix sponsa*), and rose-breasted grosbeaks (*Pheucticus ludovicianus*); and amphibians such as red-backed salamanders (*Plethodon cinereus*), spring peepers (*Pseudacris crucifer crucifer*), and wood frogs (*Rana sylvatica*).

Mammals typical of northern Wisconsin's agricultural lands, shrub-scrub areas, grasslands, or areas of mixed habitats include moles (Talpidae), shrews (Soricidae), bats (Vespertilionidae), mice and voles (Cricetidae), jumping mice (Dipodidae), thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*), woodchucks (*Marmota monax*), Eastern cottontails (*Sylvilagus floridanus*), striped skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), weasels (*Mustela* spp.), badgers (*Taxidea taxus*), Virginia opossum (*Didelphis virginiana*), coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*). These areas also support numerous species of birds, such as Northern harriers (*Circus cyaneus*), red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), killdeer (*Charadrius vociferus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and Eastern bluebirds (*Sialia sialis*), as well as reptiles such as Northern brown snakes (*Storeria dekayi*).

Almost all birds, including their nests and eggs native to the United States are protected under the Migratory Bird Treaty Act (MBTA) (USFWS 2013d). Nonnative species such as European starlings, rock (feral) pigeons, house sparrows, and mute swans as well as upland gamebirds such as grouse, turkey, and quail are not protected under the MBTA. There are 284 native bird species for which Wisconsin provides important breeding, wintering, or migratory habitat (DNR 2005). In Wisconsin, birds protected under the MBTA include most of those listed in association with forests, wetlands, and agricultural land as described above. This portion of the state also overwinters species that are seen far less often in most other parts of Wisconsin. Notable species include gyrfalcon, great gray owl, Northern hawk owl, and boreal owl. Irruptive species such as bohemian waxwing (*Bombycilla garrulus*), pine grosbeak (*Pinicola enucleator*), evening grosbeak, red crossbill (*Loxia curvirostra*), white-winged crossbill (*Loxia leucoptera*), common redpoll (*Acanthis flammea*), and hoary redpoll (*Acanthis hornemanni*) are observed here in large numbers at times (DNR 2014b).

Bald eagles and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA). Bald eagles live near rivers, lakes, and marshes where they can find fish, their staple food. Habitats include estuaries, large lakes, reservoirs, rivers, and some seacoasts (USFWS 2015c). In winter, bald eagles congregate near open water in tall trees for spotting prey and night roosts for sheltering. In spring, they build large nests in large trees near rivers or coasts and will remain with young until they disperse. Bald eagles mate for life, choosing the tops of large trees to build nests, which they typically return to and enlarge each year. Generally egg-laying begins at the end February in the Midwest with clutch sizes ranging from one to three eggs. Eaglets make their first flights about 10 to 12 weeks after hatching, and fledge (leave their nests) within a few days after that first flight. The time between egg-laying and fledging is approximately 4 months, although young birds usually remain in the vicinity of the nest for several weeks after fledging since they are almost completely dependent on their parents for food until they disperse from the nesting territory approximately 6 weeks later (USFWS 2015d). The entire breeding cycle, from initial activity at a nest through the period of fledgling dependency, is about 6 months. In 2014, the DNR surveyed bald eagle nests in Wisconsin and documented 36 bald eagles nests in Douglas County (DNR 2015b). Bald eagles could be present in forested areas along the proposed Projects' routes year-round.

Golden eagles are found in northern Wisconsin in winter in remote areas (National Eagle Center 2015). Golden eagles generally live in mountainous areas, prairie coulees, and other places where rugged terrain creates abundant updrafts (American Bald Eagle Information 2015). Golden eagles are unlikely to be found along the proposed Projects' routes.

According to DNR online mapping, the Projects avoid all DNR Wildlife Areas in Douglas County.

5.6.1.3 Species of Greatest Conservation Need

Wisconsin's Wildlife Action Plan (WWAP) defines Species of Greatest Conservation Need (SGCN) as native wildlife species that have low or declining populations and that are most at risk of no longer being a viable part of Wisconsin's fauna (DNR 2005). The WWAP also identifies habitats with which SGCN are associated, locations where SGCN occur across the state, and conservation actions that can help keep SGCN from being listed as threatened or endangered in the future. It is noted that the 10-year revision of the WWAP is currently in draft form and, when finalized, will include an updated SGCN list.

Two SGCN and state-listed special concern fish are known to occur within 2 miles of the proposed pipelines. However, due to their habitat preferences, these two fish species are unlikely to be present in the Project area. The Projects avoid designated trout waters and the two DNR Fisheries Areas in Douglas County: the St. Louis/Red River Stream Bank Protection Area and Person Lake.

According to the WWAP Implementation Plan (DNR 2008a), the Pokegama-Nemadji wetland complex is a Conservation Opportunity Area in the Superior Coastal Plain. Table 5-8 lists the SGCN associated with this area and provides an ecological landscape association score whereby the SGCN's association with the Superior Coastal Plain is high (score = 3) or moderate (score = 2) (DNR 2005).

Table 5-8 Species of Greatest Conservation Need Associated with the Pokegama-Nemadji Wetlands Conservation Opportunity Area

Common Name	Scientific Name	Ecological Landscape Association Score[a]
Mammals		
Gray wolf	*Canis lupus*	3
Northern flying squirrel	*Glaucomys sabrinus*	3
Silver-haired bat	*Lasionycteris noctivagans*	2
Eastern red bat	*Lasiurus borealis*	2
Hoary bat	*Lasiurus cinereus*	2
American marten	*Martes americana*	2
Woodland jumping mouse	*Napaeozapus insignis*	3
Water shrew	*Sorex palustris*	3
Birds		
Veery	*Catharus fuscescens*	3
Olive-sided flycatcher	*Contopus cooperi*	2
Least flycatcher	*Empidonax minimus*	3
Rusty blackbird	*Euphagus carolinus*	2
Black-backed woodpecker	*Picoides arcticus*	2
Canada warbler	*Wilsonia canadensis*	3
Amphibians		
Four-toed salamander	*Hemidactylium scutatum*	3
Invertebrates		
Bay underwing moth	*Catocala badia coelebs*	n/a[b]

Notes:

[a] The ecological landscape association score indicates where the SGCN's association with the Superior Coastal Plain is high (score = 3) or moderate (score = 2) (DNR 2005).

[b] This species was listed in DNR (2008b) as an SGCN associated with the Pokegama-Nemadji Wetlands Conservation Opportunity Area, but an ecological landscape association score for this species is not included in the SGCN profiles at http://dnr.wi.gov/topic/WildlifeHabitat/profiles.asp as of February 19, 2014.

5.6.1.4 State-listed Fish and Wildlife Species

In addition to SGCN, there are two state-listed wildlife species identified in the DNR NHI with the potential to occur in the Project area: the upland sandpiper (*Bartramia longicauda*) and wood turtle (*Glyptemys insculpta*), which are both listed as state-threatened. In addition, five wildlife Species of Special Concern and one fish Species of Special Concern are known to occur within 1 mile of the Project area according to NHI data. Table 5-9 provides SGCN and state-listed wildlife species with the potential to occur in the Project area.

The **upland sandpiper** migrates from South America to northern areas of the United States in the late spring. This species spends only 4 months on its breeding grounds (including Wisconsin) where it typically requires three different but nearby grassland habitats: during courting, perches and low vegetation for visibility; during nesting, higher vegetation to hide its nest; and during supervision of young, lower vegetation (USFWS 2015e). The breeding period for this species in Wisconsin is April 25 to August 10.

The **wood turtle** resides in moderate- to fast-flowing clear streams or rivers associated with forested riparian corridors, which provide primary overwintering, courtship, basking, and foraging habitat. Typically inhabited waterways possess a sand, gravel, or cobble substrate with limited silt or muck. Nesting occurs in well-drained open or sparsely vegetated sandy soils, typically within 200 feet of suitable aquatic habitat (DNR 2013). Nesting habitat includes native dry prairies, moderately sloughing sand banks, sandbars, agricultural fields, or areas of disturbed sandy soils that support no or sparse ground layer vegetation. Females nest between May 30 and July 5, with peak nesting activity in mid- to late June.

Table 5-9 State-listed Endangered and Threatened Animal Species and Species of Special Concern with the Potential to Occur in the Project Area

Species	Scientific Name
Special Concern	
Birds	
Le Conte's sparrow	*Ammodramus leconteii*
Connecticut warbler	*Oporornis agilisa*
Fish	
Lake sturgeon	*Acipenser fulvescens*
American eel	*Anguilla rostrata*
Invertebrates	
Flat-headed mayfly	*Maccaffertium pulchellum*
Forcipate emerald dragonfly	*Somatochlora forcipata*
Small square-gilled mayfly	*Sparbarus maculates*
Threatened	
Birds	
Upland sandpiper	*Bartramia longicauda*
Reptiles	
Wood turtle	*Glyptemys insculpta*

Source: DNR 2015a

DNR requested habitat assessments for the two state-listed wildlife species to discover if suitable habitat was present along the proposed pipeline routes. For the **upland** sandpiper assessment, the NLCD and the U.S. Geological Survey (USGS) National Gap Analysis Program were used to identify grassland habitats through a desktop analysis. In 2013, 36 potentially suitable habitat sites identified through the desktop habitat assessment and in 2014, an additional eight potentially suitable habitat sites were identified. Midwest Natural Resources, Inc. (MNR) conducted field-based habitat assessments to determine if the grassland/herbaceous and pasture/hay areas identified in the desktop analysis would be suitable habitat for upland sandpipers. MNR ranked each site according to the quality of present habitat as compared to known habitat preference for this species using high, moderate, and low habitat quality rankings.

In 2013, MNR ranked 5 of the 33 potentially suitable habitat areas as high quality, 3 as moderate quality, and 25 as low quality. In 2014, MNR ranked two of the seven potentially suitable habitat areas as moderate quality and five as low quality. MNR did not survey 3 of the 36 areas identified as potentially suitable habitat in the 2013 desktop assessment or 1 of the 8 areas identified as potentially suitable habitat in the 2014 desktop assessment due to being denied access to the property.

In 2014, MNR conducted presence/absence surveys for breeding individuals to confirm presence/absence of the species in areas of suitable habitat within the Project area in Wisconsin. MNR did not observe upland sandpipers via visual or auditory survey methods at any of the surveyed sites. (Enbridge 2015d).

For the **wood turtle** assessments, MNR conducted waterbody field surveys to collect data on each waterbody that would be crossed by the proposed pipelines. The objective was to identify areas of potentially suitable aquatic habitat for the state-threatened wood turtle by collecting in-field data at each waterbody located within the environmental survey corridor. Based on consultation with DNR, the protocol included collecting and documenting the following characteristics to aid in determining potentially suitable habitat for the species:

- Estimated average ordinary high water mark (OHWM) width of the feature (in feet) within the environmental survey corridor in decimal format.
- Estimated average OHWM depth of the feature (in feet) within the environmental survey corridor in decimal format.
- Estimated flow rate of feature in meters per second in decimal format.
- Dominant streambed substrate material (i.e., sand, gravel, cobble, silt, muck).
- Photographic documentation of water clarity.

During field surveys, crews delineated and collected data for all waterbody features encountered in the environmental survey corridor, including intermittent, perennial, and ephemeral streams and ditches. The crews delineated all features, regardless of their regulatory status. Of the 94 waterbodies surveyed in Wisconsin in 2013, 14 met the width and flow characteristics for potentially suitable habitat. It was determined that 2 of the 14 waterbodies within the environmental survey corridor would provide suitable habitat, both locations at the Pokegama River.

No individual wood turtles were observed during the waterbody surveys. A field-based habitat assessment of the Pokegama River crossing area was carried out on May 21, 2014, including a visual meander survey of the waterbody crossing and adjacent terrestrial habitat. This segment of the Pokegama River provides suitable aquatic and foraging habitat for the wood turtle (Enbridge 2015e) and DNR concurs with this assessment.

5.6.2 Environmental Impacts

5.6.2.1 General Fish and Other Aquatic Species

Impacts to fish and other aquatic species during construction and operation of the pipelines may include direct mortality from construction, habitat loss and alteration including increased sedimentation and turbidity, barriers to movement, and entrainment in water intakes.

The physical disturbance of the streambed during excavation and use of temporary bridge crossings (to move construction equipment across the waterbody) may injure or temporarily displace adult fish and may dislodge other aquatic organisms. Some mortality of less mobile organisms, such as small fish and invertebrates, may occur within the construction areas. Temporary bridges would be constructed to not restrict flow or pool water. Temporary noise disturbances upstream and downstream of the sites would deter fish that may otherwise inhabit the area.

Construction of the pipelines would require clearing vegetation from the construction ROW, resulting in loss of bank features used by fish for cover, nesting, and feeding. Changes in light and temperature characteristics of some streams from vegetation removal at pipeline crossings may affect the behavioral patterns of aquatic species, including spawning, feeding, and predator avoidance, as well as retard growth (Spence et al. 1996). Removal of vegetation could also destabilize the banks and increase the potential for additional erosion, resulting in sedimentation and turbidity in the waterbody.

Sediment loads may temporarily increase downstream from pipeline open-cut stream crossings. These increased loads may temporarily affect the more sensitive fish eggs, fish fry, and invertebrates inhabiting the downstream area. Increases in instream sediment levels can alter a stream's substrate composition and fill inter-gravel spaces and pool habitats, thus reducing spawning habitat, available rearing habitat, and benthic invertebrate production. Fish populations can be directly affected by suffocation of eggs and newly hatched larvae living in gravels, and by abrasion of the sensitive gill membranes of both young and adult fish (Sutherland 2007). Loss of benthic organisms could occur within a fairly small, enclosed area that would last only a short time and losses of individuals would likely be replaced generally from upstream or downstream populations. To reduce the amount of sediment entering the waterbody, the erosion and sediment control measures specified in the EPP (see Appendix B) would be implemented and pipelines would be installed at stream crossings as quickly as possible to allow suspended sediment levels to return to preconstruction levels upon completion of instream work.

Installation of the pipelines across streams would prevent the movement of fish upstream and downstream of crossing sites during construction in these areas due to the open-cut crossing methods proposed to be used. However, an advantage of the open-cut method is that, in most circumstances, the length of time that in-channel disturbance occurs is less than in other methods. Depending on the width of the stream, minor waterbodies (less than 10 feet wide) would generally be crossed in less than 24 hours, and intermediate (10 to 99 feet wide) waterbodies would be crossed in less than 48 hours. The majority of the waterbodies that would be crossed by the proposed Projects are between 6 and 12 feet wide.

Fish entrainment into pump water intakes would be prevented with the use of screens, although some small fish, eggs, larvae, and macroinvertebrates could become entrained, leading to injury or mortality. This impact would be limited to the time it would take to complete the crossing and could be prevented by conducting construction activities outside of larval stages. Spawning periods for most (warm water) fish species in the Project area extend from April to June. To minimize impacts to fisheries resources during the sensitive spawning life stage, DNR proposes an instream timing window restriction of no instream work in Wisconsin waterbodies from April 1 to June 30. With the use of intake screens and timing windows to avoid instream work during spawning periods, impacts to fish (including larval and juvenile stages) during hydrostatic testing would be minimized.

If inter-basin transfers of water occur, there is also the potential to introduce and spread aquatic nuisance species; however, as stated in the EPP (Appendix B), hydrostatic test waters would be discharged through a filtering device back to the source waterbody.

5.6.2.2 General Wildlife Species

Impacts to wildlife during construction and operation of the pipelines may include direct mortality during construction and operation, disturbance from noise and human activity and associated loss of breeding success, and habitat alteration and fragmentation.

Initial clearing and grading activities could injure or kill smaller, less mobile animals such as amphibians, reptiles, and small mammals that cannot easily escape. Larger and more mobile animals would likely disperse from the Project area during construction due to construction noise and human activity.

Displaced individuals may temporarily occupy adjacent, undisturbed areas, possibly causing increased competition with other individuals in those areas. Some individuals may return to previously occupied areas after construction has been completed and habitat has become reestablished; however, this could not occur in forested areas where trees and woody vegetation would be periodically cleared for inspection purposes. In these areas, permanent habitat impacts would occur. The mitigation measures identified in Section 5.7.3 may offset these impacts by providing alternative forested areas in the future (after trees have matured) in nearby areas.

Initial clearing and grading activities could damage or destroy wildlife burrows, dens, and nests. The intensity of impact would depend on the species and the time of year that construction was carried out. Rabbit warrens and rodent burrows would likely be destroyed during construction, if they occur within the construction ROW, and construction may subsequently render these areas unsuitable for burrowing animals due to compaction. These animals would likely move to adjacent areas and reconstruct burrows in these areas, although competition for space may occur.

Under the MBTA, a federal depredation permit from the USFWS is required to destroy an active bird nest (one with eggs or chicks present). Depredation and control orders allow the take of specific species of birds protected under the MBTA for specific purposes without a depredation permit. However, the construction of an oil pipeline does not fall within any of these categories.

A permit is also required to disturb or destroy nests of bald eagles or golden eagles under the BGEPA and for federally threatened or endangered species protected under the ESA (see Section 5.5 for a discussion of ESA species). There is a potential for bald eagles to be present in the Project area year-round. Bald eagles may respond in a variety of ways when disturbed by human activities. For example, during the nest building period, eagles may inadequately construct or repair their nest, or may abandon the nest, both of which can lead to failed nesting attempts. During the incubation and hatching period, human activities may startle adults or cause them to flush from the nest, which can damage eggs or injure young when adults abruptly leave. Prolonged absences of adults from nests can jeopardize eggs or young since eggs may overheat or cool and fail to hatch or young nestlings may die from hypothermia or heat stress. Older nestlings may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves (USFWS 2015d).

Bald eagles are not as sensitive to human disturbance during migration and winter as they are while nesting. However, wintering eagles congregate at specific sites year-after-year for purposes of feeding and sheltering. Eagles rely on these established roost sites because of their proximity to sufficient food sources. Permanent landscape changes may destroy these important areas and displace bald eagles. Depending on the proximity of other suitable roost or foraging areas and the condition of the affected eagles, loss of these areas can harm eagles. In addition, construction noise and human activities near or within communal bald eagle roost sites may prevent bald eagles from feeding or taking shelter. These disturbances may violate the BGEPA prohibition against disturbing eagles and a permit may be needed. To reduce the potential for impacts to bald eagle nests and important winter foraging areas, the DNR recommends that bald eagle surveys be carried out in areas of suitable habitat within 1 mile of the proposed Projects' route prior to construction. In the event that bald eagle nests or important winter foraging areas are identified, the Applicant should consult with the USFWS for recommendations on how to avoid disturbance and whether a permit is necessary.

Construction noise and human activity would cause displacement of mobile wildlife species including birds and mammals along the pipeline route. These animals would likely return to nearby areas on completion of construction and cessation of noise and construction activities. However, habitats would be altered until they are reestablished (in the case of grasslands) or would be permanently lost (in the case of forest lands), resulting in temporary to permanent displacement. The permanent removal of trees would also result in loss of nesting sites, with greater losses resulting from the removal of older, more mature trees since these habitats take many years to establish and old-growth forests are ecologically important areas for wildlife. Mitigation is proposed in Section 5.7.3 to offset the loss of forested areas in greenfield sites. Restoration opportunities for small stands of old-growth forest occur in the City of Superior (DNR 2014b).

The proposed pipeline route would be co-located with other existing pipelines for the majority of the route, which would avoid habitat fragmentation and instead result in loss of some edge habitat as areas along the side of the existing ROW are cleared. Wildlife using these edge habitats would likely move into neighboring areas. The construction of access roads would also result in additional habitat loss or fragmentation.

Clearings of herbaceous and shrub communities in the temporary ROW, both in upland and wetland areas, would be allowed to recolonize, resulting in temporary impacts to habitat in these areas. Herbaceous seed mixes[4] would be used on disturbed areas following the completion of pipeline construction to reestablish vegetation quickly. Forested areas outside of the permanently maintained ROW would be allowed to revegetate naturally with tree and shrub species common to the area. Over time, natural growth and succession would restore the temporary portion of the construction ROW and ATWS areas to a forested community, and some wildlife species would return. The loss of herbaceous habitats would be short term, requiring from 1 to 3 years for establishment of cover lost to the construction ROW and ATWS areas. The loss of shrub and forest habitats would be long term, requiring from 5 to more than 50 years for establishment of shrubs and trees within reclaimed areas of the construction ROW. Within the new permanent ROW, mature forest stands containing relatively high wildlife habitat value would be converted into herbaceous cover dominated by grasses. The permanent removal of trees and large shrubs in greenfield areas (such as Route Variations A1, B1, and C2) would fragment this mostly forested habitat and create a break in canopy cover that could increase exposure of some wildlife species to ground-based predators (such as fox and coyotes) and aerial predators (such as hawks and eagles).

The proposed pipeline ROW would cross lands containing relatively high-value wildlife habitats and resources, including the Pokegama-Nemadji wetland complex Conservation Opportunity Area and Douglas County Forest. During construction, pipelines can be temporary barriers to wildlife movements (Hinkle et al. 2002), although this would be a temporary impact. Small mammals that attempt to cross the cleared ROW could fall into the pipeline trench and be stranded, and they may be predated upon by coyotes, foxes, or avian predators. DNR proposes to require trenches to be sloped where started and ended to allow ramps for wildlife to escape in important wildlife areas such as forested greenfield areas. Any temporary impacts to wildlife would occur twice if the two pipelines are not constructed concurrently.

After construction, maintained ROWs may be used as travel corridors by some big game animals and humans. Human access may be facilitated by vegetation clearing and the mistaken perception that the ROW is no longer private property. Increased human use could lead to increased wildlife disturbances and hunting pressure (Hinkle et al. 2002).

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4 Enbridge has developed seed mixes for residential areas, pasture areas, wildlife areas, native areas, and roadways. See Section 7.9 and Appendix C of the Environmental Report (Enbridge 2014).

During operation, pipeline monitoring would include low-level aerial over-flight and ground-based inspections, which could cause infrequent disturbance to wildlife within and near the ROW. Removal of woody vegetation and/or pipeline repair would cause impacts similar to those for construction, although the extent and duration of impact would likely be much shorter.

5.6.2.3 State-listed Fish and Wildlife Species

Suitable habitat for upland sandpipers in the Project area includes 5 locations of high-quality habitat, 5 locations of moderate-quality habitat, and 30 locations of low-quality habitat. The species could occur in these Project area locations around the breeding period from late April to late August. If construction occurs in these habitats during this period, upland sandpiper nests with eggs and young could be injured or killed by construction equipment or adults could abandon nests in the presence of noise and human activity, leading to reduced breeding success. If construction occurs outside of the nesting period, upland sandpiper would not be present so no impacts would occur. Adults returning to the area post-construction would likely find suitable habitat locations in proximity to the cleared ROW if suitable grassland cover has not yet established. If construction occurs in the high- and moderate-quality locations within the nesting period, DNR proposes to require Enbridge to survey for upland sandpiper nests if construction cannot be kept as close to the treeline as possible. If a nest is found, construction would cease until chicks have fledged.

The Pokegama River and its surrounding uplands are suitable habitat for the wood turtle. Wood turtles present in the area during construction may disperse in the presence of construction equipment and noise, although the level of activity of turtles would depend on the time of year and location. Wood turtles tend to spend more time in and near streams when air temperatures fall below 68°F and also inhabit terrestrial areas (DNR 2015c). In the event that any wood turtles present do not leave the area, they may be injured by construction equipment including stream diversion apparatus. The DNR requires Enbridge to consult with the DNR Endangered Resources Review Program before construction to discuss possible Projects-specific avoidance measures to protect wood turtles (DNR 2015c). Enbridge applied for an Incidental Take Permit for the Line 3 Replacement Project for the wood turtle. An Incidental Take Permit for the Sandpiper Pipeline Project will be applied for when more Project details are known.

5.6.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to fish and wildlife during construction of the pipelines:

- Stabilize the streambed and stream banks after construction to minimize erosion and resulting sedimentation entering waterways within 24 hours of completing activities.
- Install intakes with screens to prevent entrainment of small fish, eggs, and larvae.
- Clean construction equipment prior to arriving at Project sites to prevent the spread of invasive species.
- Return all water diverted during construction to the source waterway to prevent the spread of invasive species.
- Reseed the construction ROW with an appropriate seed mix in a timely manner to minimize the duration of vegetative disturbance.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce impacts to fish and wildlife species:

- Restrict instream work in Wisconsin waterbodies from April 1 to June 30 to minimize impacts to fisheries resources during the sensitive spawning life stage.
- Slope trenches where started and ended to allow ramps for wildlife to escape in important wildlife areas such as forested greenfield areas to reduce the potential for wildlife entrapment.
- Survey for upland sandpiper nests if construction occurs in the high- and moderate-quality locations within the nesting period if construction cannot be kept as close to the treeline as possible. If a nest is found, construction would cease until chicks have fledged.
- Consult with the DNR Endangered Resources Review Program before construction to determine the necessary measures to protect wood turtles and to obtain an Incidental Take Permit.

5.7 Forests and Other Woodland Resources

5.7.1 Current Environmental Setting

The NLCD 2011 (Fry et al. 2011) Classification System was used to obtain information on forest land in the Project area. Forested land includes areas classified as deciduous forest, evergreen forest, and mixed forest. Forest in the “clay plain” region remain aspen-dominated and have been significantly fragmented by farm fields and pastures, roads, railroad, and utility ROWs, and other developments. The forests of today are the legacy of large-scale clearing, and subsequent fires of the late nineteenth and early twentieth centuries produced a second-growth forest with few conifers, virtually no large trees, and vast expanses of aspen, sometimes mixed with white birch (DNR 2014b).

The forest land that would be crossed by the proposed pipelines is currently owned by Douglas County or private landowners and is used primarily as residential property, as recreational property, or for the harvesting of wood products (i.e., firewood). Effective January 1, 2016, all tracts enrolled in the Managed Forest Law (MFL) programs have been withdrawn. There are no affected tracts within the Forest Crop Law (FCL) program.

5.7.2 Environmental Impacts

The Projects would result in the clearing of an estimated 86.2 to 103.1 acres of forest land during construction of the Projects, depending on the route variation chosen (Table 5-4). Of this acreage, an estimated 31.8 to 42.4 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW since it would be maintained clear of trees for operational purposes, such as facilitating aerial inspections, preserving pipeline integrity, and providing access for maintenance or emergency work. Clearing trees within upland forests would result in long-term impacts to these communities within the construction work areas, given the length of time needed for the community to mature to preconstruction conditions. This impact may be greater in areas away from the existing ROW since a cleared route through forest habitat would create additional edge habitat that would remain long-term. Over time (decades), natural growth and succession would restore the temporary portion of the construction ROW and extra workspaces to a forested community. Permanent impacts would occur within the permanent ROW, where trees would be removed and prevented from reestablishing through periodic mowing and brush clearing, which would convert forest lands to non-forest habitats permanently.

Enbridge would continue to work with the potentially affected landowners to determine if any impacts to FCL or MFL lands would occur as a result of construction activities and would compensate them accordingly if their status is affected.

Construction in most forested areas would be adjacent to existing pipeline or other linear ROWs, except in areas of greenfield construction such as within Route Variations A1, B1, and C2. In these greenfield areas, the landscape would be permanently altered. Permanent removal of trees and large shrubs creates a break in canopy cover that impacts wildlife species using these areas (see Section 5.6).

Clearing trees in the construction ROW would affect undisturbed forest vegetation growing alongside the ROW, exposing it to elevated levels of sunlight and wind. To prevent damage to adjacent trees, Enbridge would fell trees toward the cleared ROW. The increased sunlight would likely cause shade-intolerant species to grow, and the species composition of the newly created forest edge would likely change. The proposed clearing could also temporarily reduce local competition for available soil moisture and light and may allow some early successional species to become established and persist on the edges of the undisturbed areas adjacent to the site. Such species could include invasive noxious weeds. See Section 5.9 for a discussion of invasive species. In addition, construction activities through Douglas County forest land could temporarily disrupt recreational uses on and adjacent to the ROW. See Section 5.13 for a discussion of impacts to recreation.

An estimated 31.8 to 42.4 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW resulting in permanent loss of forest lands and alteration of landscapes, particularly in greenfield areas (Route Variations A1, B1, and C2). Forested lands provide wildlife habitat and high-quality water (in the form of runoff) and help regulate the natural carbon cycle (i.e., they absorb and store CO_2 from the atmosphere for use in photosynthesis and then release it back into the atmosphere through respiration, decomposition, and forest fires). Native woodlands have been lost due to land conversion to agricultural uses, levee construction, and urban development. The permanent loss of between 31.8 and 42.4 acres of forest land as a result of these Projects would further exacerbate this loss. There is no regulatory requirement for compensatory mitigation for loss of upland forest lands in Wisconsin.

5.7.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to forest land during construction of the pipelines:

- Fell trees toward the cleared ROW to prevent damage to adjacent trees.
- Revegetate disturbed areas in accordance with the EPP, unless otherwise directed by landowners or land managing agencies, upon completion of construction.
- Reseed the construction ROW with an appropriate seed mix[5] in a timely manner to minimize the duration of vegetative disturbance.
- If approved, a wetland permit would be conditioned to ensure appropriate wetland restoration criteria are met.

5.8 Geological Hazards

Geologic hazards including seismic hazards (earthquakes) and landslides and their potential to affect the structural integrity of the proposed pipelines are addressed in this section.

[5] Enbridge has developed seed mixes for residential areas, pasture areas, wildlife areas, native areas, and roadways. See Section 7.9 and Appendix C of the Environmental Report (Enbridge 2014a).

5.8.1 Current Environmental Setting

The area encompassing the Project area was glaciated most recently by the Superior lobe and the Chippewa sub-lobe of the Laurentide ice sheet between about 11,500 and 9,500 years before present (BP). The thickness of glacial deposits, including those from glacial lakes developed during the ice sheet retreat, is typically 100 to 200 feet over bedrock. Near Lake Superior and at some other scattered locations, deposits are thicker, ranging up to 600 feet. The well-known “red clay” soils are a dominant feature of the Superior Coastal Plain Ecological Landscape. These are soils that developed in the Miller Creek Formation, made up of reddish-brown, clayey glacial till and lake-deposited clay and silt. Miller Creek till is typically 3 to 65 feet thick. The clay comes from deep lake-bottom deposits in the Lake Superior basin and gets its color from the reddish Precambrian sandstones of the Keweenaw Supergroup (DNR 2014b). Sandy materials occur in strata within the Miller Creek Formation. The interface between sand and clay strata is particularly unstable in cut banks along rivers, where erosion of the sand strata leads to massive slumping of clay and sedimentation into rivers (DNR 2014b).

The proposed Project area is in a seismically stable area of the country with the lowest levels of seismic hazards (USGS 2015). The proposed route does not cross any active faults.

The proposed Project area has a moderate susceptibility to landslides with a low incidence (USGS 1997). Clay soils along the lakeshores and inland in Wisconsin are highly susceptible to earth flows and lateral spreading, but such incidences are generally low.

5.8.2 Environmental Impacts

As the Projects do not cross any active faults and are located in a seismically stable area, the pipelines would not likely be impacted by seismic hazards.

Vegetation clearing and alteration of surface drainage during construction have the potential to increase landslide risk. This potential risk would be reduced with the use of erosion control measures including revegetating disturbed areas as soon as possible following construction and restoring the contour of native slopes and drainage patterns.

5.8.3 Mitigation Measures

The following mitigation measure proposed by Enbridge would reduce potential risks to the structural integrity of the proposed pipelines from geologic hazards:

- Revegetate disturbed areas as soon as possible following construction.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce potential risks to the structural integrity of the proposed pipelines from geologic hazards:

- Use rock-free backfill to protect the pipelines in the event of minor earth movements.
- Restore the contour of native slopes and drainage patterns after construction.

5.9 Invasive Species

5.9.1 Current Environmental Setting

Invasive (or noxious) species are plants (weeds) or animals (fish and invertebrates) with a tendency to spread to a degree that causes damage to the environment, economy, or human health. Invasive species in

Wisconsin include the terrestrial weeds, wetland weeds, aquatic weeds, and aquatic fish and invertebrates shown in Table 5-10.

Due to high recreational use of the Superior Coastal Plain Ecological Landscape, the presence of several Great Lakes ports, numerous railroad lines, and several major highways, there is high potential for invasive species to become introduced. Human travel is a major vector for transport of a variety of invasive species. Tourism, recreation, and further development in the area create a high potential for initial introductions and further spread throughout the region (DNR 2014b).

Table 5-10 Noxious and Invasive Plant and Animal Species in Wisconsin as Classified by NR 40

Common Name	Scientific Name	Regulatory Classification
Terrestrial Weeds		
Amur honeysuckle	*Lonicera maackii*	Prohibited/Restricted
Autumn olive	*Elaeagnus umbellata*	Restricted
Bells honeysuckle	*Lonicera x bella*	Restricted
Black swallow-wort	*Vincetoxicum nigrum*	Prohibited/Restricted
Canada thistle	*Cirsium arvense*	Restricted
Cattail hybrid	*Typha x glauca*	Restricted
Celandine	*Chelidonium majus*	Prohibited/Restricted
Chinese yam	*Dioscorea oppositifolia*	Prohibited
Common buckthorn	*Rhamnus cathartica*	Restricted
Common teasel	*Dipsacus fullonum* subsp.	Restricted
Creeping bellflower	*Campanula rapunculoides*	Restricted
Cut-leaved teasel	*Dipsacus laciniatus*	Restricted
Cypress spurge	*Euphorbia cyparissias*	Restricted
European marsh thistle	*Cirsium palustre*	Prohibited/Restricted
Garlic mustard	*Alliaria petiolata*	Restricted
Giant hogweed	*Heracleum mantegazzianum*	Prohibited
Giant knotweed	*Polygonum sachalinense*	Prohibited
Glossy buckthorn	*Frangula alnus*	Restricted
Hairy willow herb	*Epilobium hirsutum*	Prohibited/Restricted
Helleborine orchid	*Epipactis helleborine*	Restricted
Hemp nettle, brittlestem hemp nettle	*Galeopsis tetrahit*	Restricted
Hill mustard	*Bunias orientalis*	Prohibited/Restricted
Hound’s tongue	*Cynoglossum officinale*	Restricted
Japanese hedge-parsley	*Torilis japonica*	Prohibited/Restricted
Japanese honeysuckle	*Lonicera japonica*	Prohibited
Japanese hops	*Humulus japonicus*	Prohibited/Restricted
Japanese knotweed	*Polygonum cuspidatum*	Restricted
Japanese stilt grass	*Microstegium vimineum*	Prohibited

Table 5-10 Noxious and Invasive Plant and Animal Species in Wisconsin as Classified by NR 40

Common Name	Scientific Name	Regulatory Classification
Kudzu	*Pueraria lobata*	Prohibited
Leafy spurge	*Euphorbia esula*	Restricted
Lyme grass or sand ryegrass	*Leymus arenarius*	Prohibited/Restricted
Mile-a-minute vine	*Polygonum perfoliatum*	Prohibited
Morrow's honeysuckle	*Lonicera morrowii*	Restricted
Multiflora rose	*Rosa multiflora*	Restricted
Musk thistle	*Carduus nutans*	Restricted
Narrow-leaf cattail	*Typha angustifolia*	Restricted
Oriental bittersweet	*Celastrus orbiculatus*	Restricted
Pale swallow-wort	*Vincetoxicum rossicum*	Prohibited
Perennial pepperweed	*Lepidium latifolium*	Prohibited
Phragmites, Common reed	*Phragmites australis*	Restricted
Plumeless thistle	*Carduus acanthoides*	Restricted
Poison hemlock	*Conium maculatum*	Prohibited/Restricted
Porcelain berry	*Ampelopsis brevipedunculata*	Prohibited
Princess tree	*Paulownia tomentosa*	Prohibited
Purple loosestrife	*Lythrum salicaria*	Restricted
Russian olive	*Elaeagnus angustifolia*	Restricted
Sawtooth oak	*Quercus acutissima*	Prohibited
Scotch broom	*Cytisus scoparius*	Prohibited
Sericea lespedeza	*Lespedeza cuneata*	Prohibited
Spotted knapweed	*Centaurea biebersteinii, c. stoebe*	Restricted
Spreading hedge parsley	*Torilis arvensis*	Prohibited
Tall or Reed manna grass	*Glyceria maxima*	Prohibited/Restricted
Tansy	*Tanacetum vulgare*	Restricted
Tartarian honeysuckle	*Lonicera tatarica*	Restricted
Tree-of-heaven	*Ailanthus altissima*	Restricted
Wild chervil	*Anthriscus sylvestris*	Prohibited/Restricted
Wild parsnip	*Pastinaca sativa*	Restricted
Wineberry	*Rubus phoenicolasius*	Prohibited
Yellow star thistle	*Centaurea solstitialis*	Prohibited
Wetland Weeds		
Dame's rocket	*Hesperis matronalis*	Restricted
European marsh thistle	*Cirsium palustre*	Prohibited/Restricted
Flowering rush	*Butomus umbellatus*	Restricted
Aquatic Weeds		

Table 5-10 Noxious and Invasive Plant and Animal Species in Wisconsin as Classified by NR 40

Common Name	Scientific Name	Regulatory Classification
Australian swamp crop	*Crassula helmsii*	Prohibited
Brazilian waterweed	*Egeria densa*	Prohibited
Brittle waternymph	*Najas minor*	Prohibited
Curly-leaf pondweed	*Potamogeton crispus*	Restricted
Eurasian water milfoil	*Myriophyllum spicatum*	Restricted
European frog-bit	*Hydrocharis morsus-ranae*	Prohibited
Fanwort, Carolina Fanwort	*Cabomba caroliniana*	Prohibited
Flowering rush	*Butomus umbellatus*	Restricted
Hydrilla	*Hydrilla verticillata*	Prohibited
Oxygen-weed, African elodea	*Lagarosiphon major*	Prohibited
Parrot feather	*Myriophyllum aquaticum*	Prohibited
Water chestnut	*Trapa natans*	Prohibited
Yellow floating heart	*Nymphoides peltata*	Prohibited
N/A	*Ulva (Enteromorpha)* spp.	Prohibited
Aquatic Fish and Invertebrate Species		
Asian clam	*Corbicula fluminea*	Prohibited
Bloody shrimp	*Hemimysis anomala*	Prohibited
Chinese mitten crab	*Eriocheir sinensi*	Prohibited
Chinese mystery snail	*Cipangopaludina chinensis*	Restricted
Cylindro (cyanobacteria)	*Cylindrospermopsis raciborskii*	Prohibited
Didymo or rock snot	*Didymoshpenia geminata*	Prohibited
Faucet snail	*Bithynia tentaculata*	Prohibited
Fishhook waterflea	*Cercopagis pengoi*	Prohibited
Golden alga	*Prymneisum parvum*	Prohibited
New Zealand mudsnail	*Potamopyrgus antipodarum*	Prohibited
Novel cyanobacterial epiphyte of order Stigonematales	*Stigonematales* spp.	Prohibited
Quagga mussel	*Dreissena bugensis*	Prohibited
Red swamp crayfish	*Procambarus clarkii*	Prohibited
Rusty crayfish	*Orconectes rusticus*	Restricted
Spiny waterflea	*Bythotrephes cederstroemi*	Prohibited
Starry stonewort (alga)	*Nitellopsis obtusa*	Prohibited
Water flea	*Daphnia lumholtzi*	Prohibited
Zebra mussel	*Dreissena polymorpha*	Restricted

Source: Enbridge 2014a

The prevention of the introduction or spread of noxious and invasive weeds is a high priority for nearby communities. Douglas County implements the following activities as part of its Aquatic Invasive Species Strategic Plan (2009):

- Watercraft inspection/monitoring program at all boat landings in the county.
- Invasive species education at boat landings, including providing information on which county waterways contain invasive species.
- Provide invasive species volunteer training using DNR protocols.
- Use of current research, best management practices, and best technology for minimizing invasive species infestations.
- Supporting biological and water quality surveys on county waterways.

The Douglas County Forestry Department uses surveillance of ROWs, stream banks, and internal forest roads and trails as the first line of defense against invasive species. It coordinates with DNR and uses integrated pest management, including a mixture of manual, mechanical, and biological control methods, to prevent and minimize the spread of noxious and invasive weeds. It does not currently use herbicides in the county forest.

Invasive species field surveys would be conducted along the entire route of the Projects in wetlands and in upland areas to identify existing locations of noxious weeds and invasive species. These data would be used to develop specific plans to prevent the spread of known infestations.

5.9.2 Environmental Impacts

Vegetation communities are susceptible to infestations of invasive species after disturbances of the soil. Invasive terrestrial weed species are most prevalent in areas of prior surface disturbance, such as agricultural areas, roadsides, existing utility corridors, and wildlife concentration areas. Major infestation areas identified during surveys or by Enbridge’s EIs may be treated with the recommended herbicides or their equivalents as identified through consultation with local authorities prior to clearing and grading of the construction ROW and pending landowner permission (see Appendix B for further details of herbicide use). The potential for establishment of invasive species would also be reduced by minimizing the time duration between final grading and permanent seeding and by cleaning all construction equipment (e.g., timber mats, vehicles) prior to arrival at all construction sites. The contractor(s) would keep logs documenting the cleaning history of each piece of equipment and make the logs available upon request.

Invasive species found in waterbodies and wetlands include wetland and aquatic weeds, and aquatic fish and invertebrates (Table 5-10). These organisms can be transported from existing infestation locations to new locations in water or on equipment that is transported from one area to another. To prevent the introduction of noxious weeds and invasive species into the Project area from other construction sites, construction equipment would be cleaned prior to arriving at the site of the Projects. This cleaning would consist of removing visible dirt from the equipment and blowing loose material from equipment using compressed air. Equipment designated for use within waterbodies would be washed and dried prior to use. Enbridge proposes to purge and clean all pumps that would be used in waterbodies and wetlands before proceeding from one location to the next if designated noxious weeds or invasive species (e.g., zebra mussels, Eurasian milfoil) are known to be present in the area. DNR recommends, as additional mitigation, that all pumps be purged and cleaned regardless of whether or not invasive species have been identified.

The use of hydrostatic test water could contribute to invasive species transfer if the water were discharged in a drainage basin other than the basin from which it originated. However, to minimize the potential for introduction and/or spread of invasive species due to hydrostatic testing activities, Enbridge would discharge water to the source location from which it originated. If water were used to test multiple sections, the test water would after the completion of all testing be transported back to the original water source through the pipeline and discharged at that location.

During reclamation activities, mulch used on the Projects would be composed of weed-free material to prevent the spread of noxious weeds and invasive species. Certified weed-free mulch may also be required at site-specific locations.

Clearing trees in the construction ROW would affect undisturbed forest vegetation growing alongside, potentially allowing some early successional species and noxious weeds to become established and persist on the edges of the undisturbed areas adjacent to the site. Enbridge would minimize the potential for the establishment of undesirable species by minimizing the time duration between final grading and permanent seeding. DNR recommends that Enbridge develop an Invasive Species Forest Management Plan to address the spread of noxious weeds in forested areas (see Section 5.9.3 below for details). Enbridge conducted field surveys along the entire route of the Projects in both wetlands and upland areas to identify existing locations of noxious weeds and invasive species. Enbridge is currently developing specific plans to prevent the spread of these known infestations. DNR recommends that Enbridge consult the Wisconsin Council on Forestry (2010) *Invasive Species Best Management Practices* in the development of invasive species management plans and that all such plans be submitted to the DNR for approval prior to the start of construction. The spread of invasive species could occur twice if the two pipelines are not constructed concurrently.

5.9.3 Mitigation Measures

The following mitigation measures are committed to by Enbridge to reduce the potential spread of invasive species during pipeline construction and any necessary maintenance of the permanent ROW during pipeline operation:

- Potentially treat major areas of noxious weed infestations with the recommended herbicides or their equivalents as identified through consultation with local authorities prior to clearing and grading of the construction ROW and pending landowner permission (see Appendix B for further details on herbicide use).
- Minimize the time duration between final grading and permanent seeding.
- Clean all construction equipment (e.g., timber mats, vehicles) prior to arrival at all construction sites. This cleaning would consist of removing visible dirt from the equipment and blowing loose material from equipment using compressed air.
- Wash and dry equipment designated for use within waterbodies prior to use.
- Discharge hydrostatic test water to the same source location from which it was appropriated. If water is used to test multiple sections, it would be relayed back to the source water through the pipeline for final discharge.
- Use weed-free mulch and timber mats.
- Develop site-specific plans to prevent the spread of known infestations.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to further reduce the potential spread of invasive species in Douglas County:

- Purge and clean all pumps before proceeding from one location to the next regardless of whether or not invasive species have been identified.

- Submit all specific plans to prevent the spread of known infestations to the DNR for approval prior to the start of construction.
- Develop an Invasive Species Forest Management Plan to address the spread of noxious weeds in forested areas. The plan should include measures for eradicating invasive weeds on forested lands, including mechanical, biological, and chemical control methods. Though herbicide use is currently prohibited on Douglas County Forest lands, the County Board of Supervisors has the authority to grant permission for their use, should the need arise (County Pesticide Ordinance 1.17). The plan should also include monitoring procedures and invasive species management goals for 3 years post-construction. The plan would be submitted to DNR prior to the start of construction and would require approval prior to implementation.

5.10 Noise

5.10.1 Current Environmental Setting

The proposed pipelines would be constructed through Douglas County Forest, wetlands, agricultural lands, and the urban area of Superior, Wisconsin. At any location, the magnitude and frequency of existing environmental noise may vary considerably throughout the day and week due to natural and human sources and factors. Existing ambient sound levels have not been measured in the Project area. There are 20 residences within 300 feet of the proposed pipeline routes, and two of these are within 25 feet of the routes. Residents of these homes may be considered sensitive receptors as they would likely be more susceptible to the effects of noise than the population at large because of their proximity to localized sources of noise.

Wisconsin and Douglas County do not have state- or county-level noise regulations, respectively. The Village of Superior, which borders the city of Superior to the south, prohibits noise-generating construction from 10 pm to 7 am on weekdays unless allowed by special permit. The city allows construction equipment to be used in residential, commercial, and all other zones as long as it does not exceed a maximum sound level of 80 decibels (db) measured at the property line of the location where the equipment is being used (Village of Superior Code Chapter 267-4).

5.10.2 Environmental Impacts

Noise impacts from the proposed Projects would be considered short term and related to construction activities. Long-term impacts would occur during operations.

Construction of the pipelines would increase noise levels in residential, agricultural, recreational, and commercial areas near the proposed Projects' ROW, and the noise levels would vary depending on the construction phase (noise impacts to wildlife receptors are discussed in Section 5.6). Table 5-11 shows estimated maximum noise levels of construction equipment commonly used during pipeline construction.

Table 5-11 Estimated Maximum Noise Levels for Construction Equipment (dBA)

Equipment	50 feet
Pickup truck	55
Welding torch	73
Dewatering pump	77
Backhoe	80
Ground compactor	80

Table 5-11 Estimated Maximum Noise Levels for Construction Equipment (dBA)

Air Compressor	80
Concrete pump truck	82
Generator	82
Hydraulic excavator	85
Dozer	85
Grader	85
Scraper	85
Concrete mixer truck	85
Crane	85
Jackhammer	85
Rock drill	85
Paver	85
Pile driver	95

Source: U.S. Department of Transportation, Federal Highway Administration 2006

Notes:

dBA = sound level from A-weighted decibel scale

There would be times when no large equipment is operating and noise would be at or near ambient levels. Construction-related noise levels would fluctuate depending on the number and type of equipment in use at any given time. Some of the equipment that would be used for construction (e.g., hydraulic excavator, grader) would exceed the maximum sound level of 80 db set by city of Superior for construction activities at the source, although this sound level would attenuate with distance from the source. Noise levels from some construction equipment could exceed the maximum sound level at some residences along the route. To reduce potential noise impacts while constructing near residences, Enbridge would limit the hours of construction activities with high-decibel noise levels and would manage construction quickly through residential and developed areas. Pipeline construction generally moves through an area relatively quickly so noise impacts would be localized, intermittent, and short term. Nighttime noise levels would not be impacted because construction activities would not occur at night (8 pm until 6 am). In addition, Enbridge's land agents are contacting affected landowners to discuss the Projects and document specific concerns they may have. Enbridge would maintain close contact with the landowners along the route before, during, and after construction. Any temporary increases in noise would occur twice if the pipelines are not constructed concurrently.

During operations, material traveling through the buried pipelines would not be expected to emit audible noise above the surface or a perceptible level of vibration. There would be no pump stations or any other aboveground facilities that would emit noise or vibrations along the proposed pipeline routes. Only short-term increases in noise levels would occur from vegetation clearing or maintenance activities during pipeline operations. There would not be any long-term noise impacts from the operation of the pipelines.

5.10.3 Mitigation Measures

DNR recommends the following measures to reduce noise impacts during construction and operation of the pipelines:

- Limiting the hours of construction activities with high-decibel noise levels (see Table 5-11) in residential areas.
- Ensuring that construction proceeds quickly through residential and developed areas.
- From mileposts (MPs) 1,090.9 to 1,094.2, Enbridge has proposed Route Variations A1 and A2 due to the proximity of their existing easement to existing residences.

5.11 Public Utilities

5.11.1 Current Environmental Setting

The proposed pipelines would cross existing utilities in Douglas County. Electricity, gas, and water are supplied to the City of Superior and the Village of Superior by the Superior Water, Light and Power Company. Wis. stat. 182.0175 requires every excavator and everyone who is responsible for planning non-emergency excavations to provide advance notice of at least 3 business days to a One-Call Diggers Hotline system to reduce the potential for third-party damage to utilities. Prior to construction of the pipelines, affected utilities would be notified of the proposed route of the Projects, and utility lines would be marked with stakes, flags, paint, or other suitable materials in varying combinations depending on the type of surface to be marked. After the markings have been made, excavators are required to maintain a minimum clearance of 18 inches between a marked and unexposed transmission facility and the cutting edge or point of any power-operated excavating or earth-moving equipment. If excavation is required within 18 inches of any marking, the excavation should be performed very carefully with hand tools (Wis. stat. 182.0175(2)(am)(3)).

5.11.2 Environmental Impacts

Temporary interruption of utilities may occur during construction of the proposed pipelines across existing utilities, which would cause short-term impacts. Enbridge would coordinate pipeline activities in advance to ensure the ongoing availability of utility services to the extent practical. Where disruptions of utility services cannot be avoided, Enbridge or its contractors would coordinate with landowners to minimize the period of interruption. Impacts to public utilities during construction would be minor and temporary and impacts during pipeline operations are not anticipated. Any temporary impacts to public utilities have the potential to occur twice if the pipelines are not constructed concurrently.

5.11.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to public utilities during pipeline construction:

- Continued coordination with landowners to ensure that utilities are not interrupted during construction. In the event of interruption of utilities, Enbridge would coordinate with landowners and utilities to immediately fix the problem.

5.12 Residential Areas

5.12.1 Current Environmental Setting

In general, the pipeline route avoids population centers and residential areas with exception of the southern portion of the City of Superior (population 26,862). There are 20 residences within 300 feet of the proposed pipeline routes, and two of these are within 25 feet of the routes (Figure 5-2). Route Variation B1 has been proposed to avoid outstanding legal issues with a landowner.

5.12.2 Environmental Impacts

Residents of the homes within 300 feet of the proposed pipeline route could be impacted by pipeline construction noise, visual effects, and potential access issues due to their proximity to the route (see also Section 5.1). Any temporary impacts to residential areas would occur twice if the two pipelines are not constructed concurrently. Enbridge would coordinate with landowners to minimize disruption of access caused by open trenches created during construction. Construction workers would not be allowed to use private driveways unless previously authorized by the landowner.

It is unlikely that the property value of land in the construction or permanent ROW would be significantly adversely impacted by the presence of the pipeline. A study conducted by Anstine (2003) showed that decreases in property taxes typically are associated with facilities that produce emissions that are easily noticeable by the surrounding community, such as odors, smoke or vapors, or noise. The proposed Projects may result in some noise impacts during construction; however, these impacts are expected to be temporary and would occur only during active construction (see Section 5.10 for noise-related impacts and Section 5.1 for aesthetic-related impacts). The proposed pipelines themselves would not emit any odors, vapors, or noise during operations and therefore are not expected to decrease property values.

Enbridge would provide updated information to landowners about the pipelines as they progress. Enbridge notified affected landowners of the Projects by mail and Enbridge’s land agents are contacting affected landowners to discuss the Projects and document specific concerns they may have. Enbridge would maintain close contact with the landowners along the route before, during, and after construction.

During operation of the pipeline, structures would not be permitted on the permanent ROW, and trees would not be allowed to regrow within the pipeline ROW. Minor noise disruptions to nearby residents could occur from maintenance mowing activities. The permanent easement on private properties would be a permanent impact to property owners.

See Sections 5.3 and 5.7 for discussions of potential impacts to agricultural and forest lands, respectively.

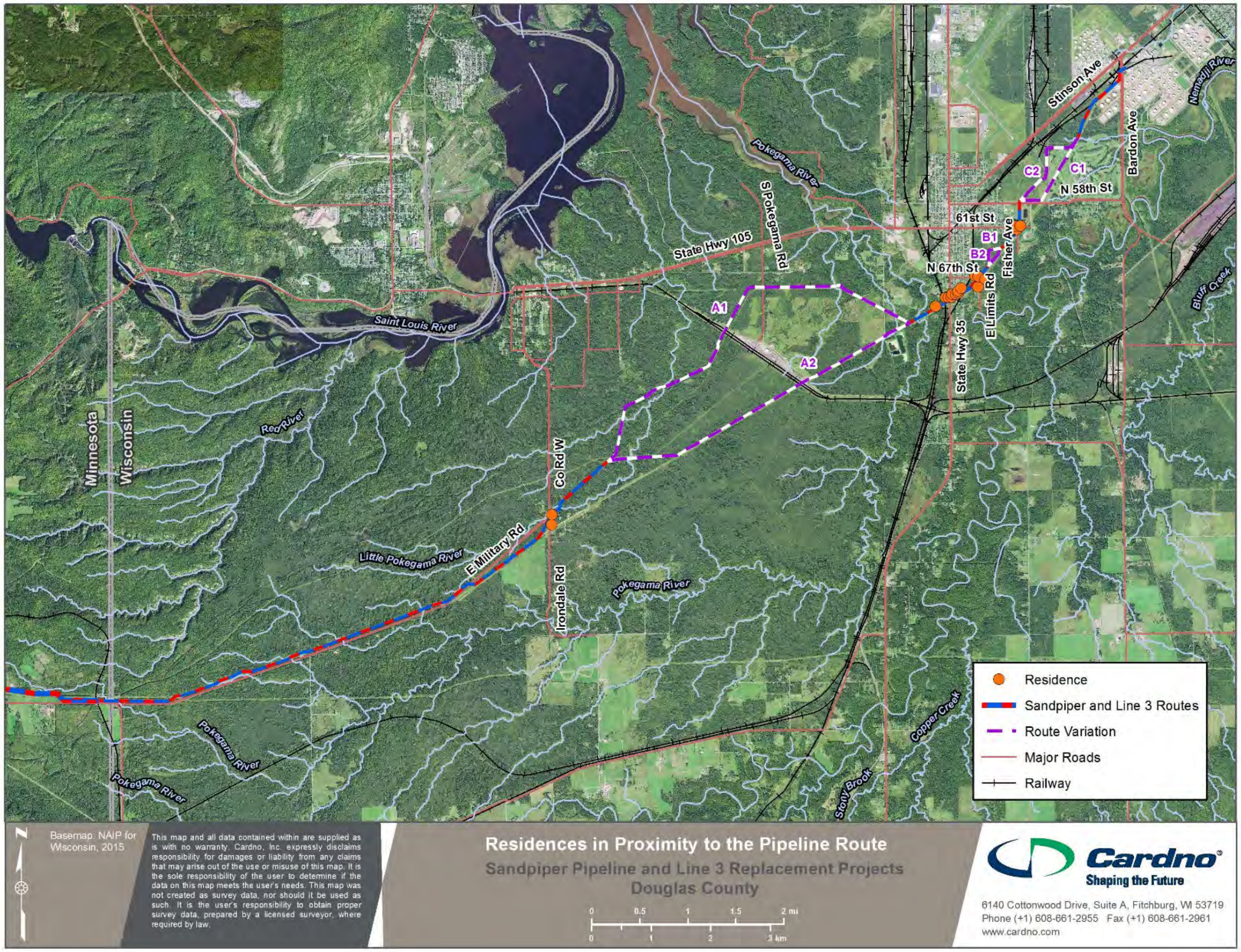

Figure 5-2 Residences in Proximity to the Proposed Pipelines' Route

5.12.3 Mitigation Measures

DNR recommends the following measures to reduce impacts to property owners during construction and operation of the pipelines:

- Notify landowners prior to the start of construction.
- Ensure that construction proceeds quickly through residential and developed areas.
- Mark the pipeline route at all road, railroad, and stream crossings, and in sufficient number along the remainder of the line such that the location is known to the general public in accordance with CFR 49 Part 195.410.
- Fence the edge of the construction work area adjacent to a residence.
- Fence or plate open ditches during non-construction activities.
- Clean up construction trash and debris daily.
- Restore all lawn areas, shrubs, specialized landscaping, fences, and other structures to their preconstruction appearance when construction has been completed.

5.13 Recreation Areas

5.13.1 Current Environmental Setting

The Superior Coastal Plain Ecological Landscape has the second-lowest acreage of lakes and reservoirs in the state. The density of campgrounds and multipurpose trails in this landscape is about average for the state as a whole, as is the number of visitors to state properties. State-owned lands and facilities are important to recreation in the Superior Coastal Plain Ecological Landscape. There are over 15,500 acres of state forest, over 4,800 acres in parks, and 1,350 acres of state trails. The Superior Coastal Plain Ecological Landscape also has about 27,900 acres of State Natural Areas (SNAs), all of which are publicly owned (including government and educational institutions). The largest SNAs include Bibon Swamp, Apostle Islands Maritime Forests, Dwight’s Point and Pokegama Wetlands, Apostle Islands Yew Forest, and Pokegama Carnegie Wetlands (DNR 2014b).

In 2004 there were an estimated 642,350 visitors to state recreation areas, parks, and forests in the Superior Coastal Plain counties (DNR 2014b). The majority, 84 percent, visited the state parks. Of all license sales, resident hunting licenses accounted for the most at 32 percent of total sales, followed by nonresident fishing licenses (23 percent of total sales) and resident fishing licenses (18 percent of total sales) (DNR 2014b).

The proposed pipeline routes would cross the following recreation areas (Figure 5-3):

- Douglas County Forest
- Pokegama Carnegie Wetlands SNA
- Pokegama River
- Superior Airport/Hill Avenue/South Superior Triangle Wetlands Area of Special Natural Resource Interest (ASNRI)
- Nemadji Golf Course
- Snowmobile/Winter all-terrain vehicle (ATV) trails

The Douglas County Forest is owned by Douglas County. Approximately 80 percent of the county forest is commercial forest while the remaining 20 percent is brush prairies, lakes, rivers, dams, and/or marsh wetlands. The forest is open to recreation including hiking, horseback riding, snowshoeing, cross-country skiing, use of ATVs and snowmobiles, camping, hunting, and trapping.

The Pokegama Carnegie Wetlands are a Wisconsin-designated SNA and ASNRI owned by Douglas County and DNR. The wetlands contain many rare plant species and a diversity of animal species. The site is open to hiking, fishing, cross country skiing, hunting, and trapping.

The Pokegama River is designated for recreation and fish and aquatic life according to ch. NR 104.22, Wis. adm. code.

Superior Airport/Hill Avenue/South Superior Triangle Wetlands ASNRI is located between the Pokegama and Little Pokegama Rivers. The site is composed of several discontinuous wetlands separated by roads, railroad tracks, and other urban developments. The wetlands contain many rare plant species and the land is owned by DNR.

The Nemadji Golf Course is privately owned and operates from approximately April through October. It is a 4-star Golf Digest–rated championship golf facility featuring 36 holes.

Two snowmobile/winter ATV trails would be crossed by the proposed pipeline route, one of which would be crossed twice. These trails are typically maintained by grooming and clearing of brush and signed.

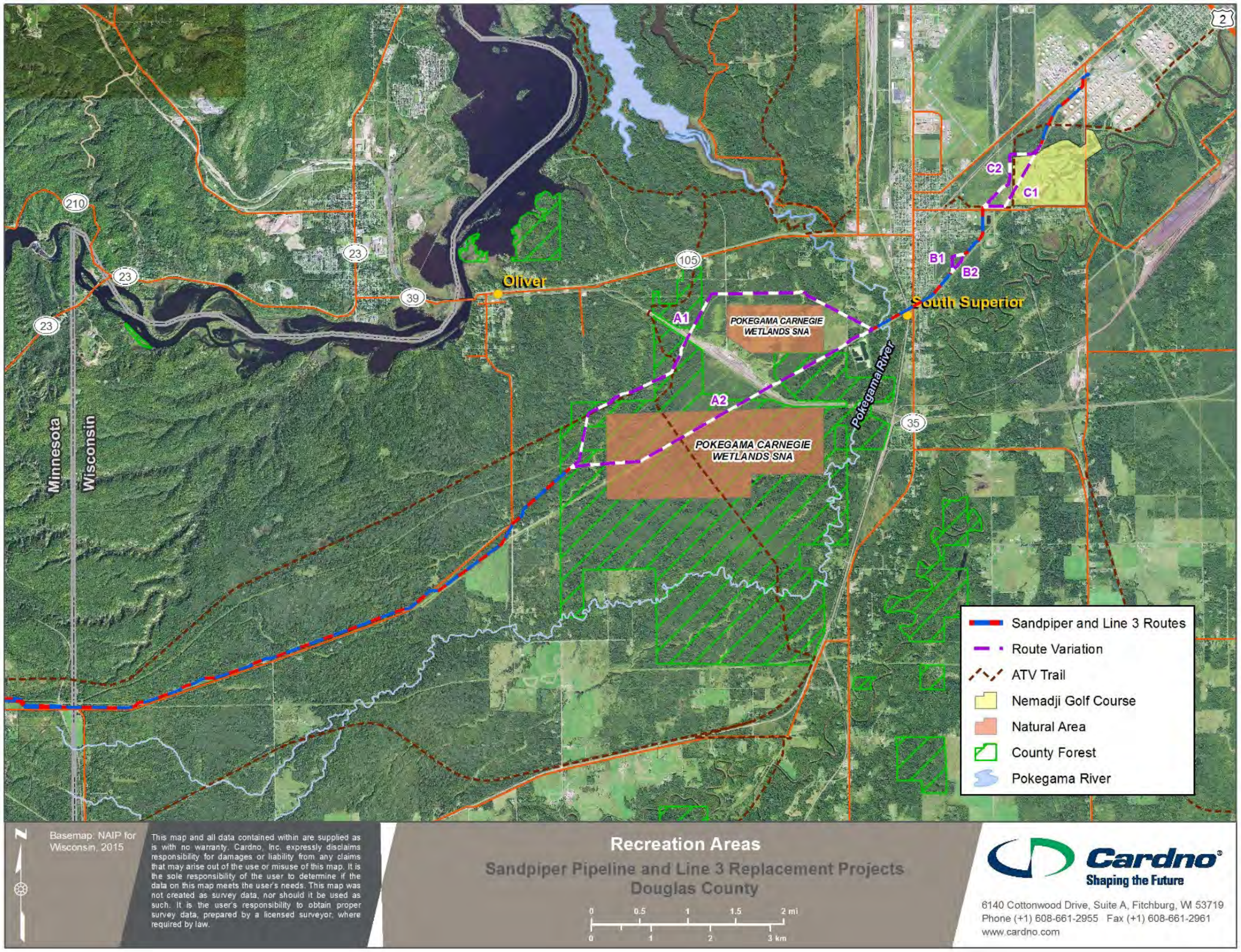

Figure 5-3 Recreation Areas in Proximity to the Proposed Pipelines' Route

5.13.2 Environmental Impacts

The proposed Projects would cause short-term impacts to recreation use areas during construction. The level of impact within recreation areas would depend on factors such as pipeline crossing methods, length of crossing, and proximity of the ROW to recreation activities. Clearing of trees, equipment noise, dust generation, and limited access would prevent recreationists such as hikers, bikers, hunters, and ATV operators from use of the immediate area around the temporary ROW during construction. Direct access to areas such as boat ramps, swimming access points, and fishing points may be temporarily restricted due to increased traffic or road closures during construction. Enbridge would work with local and state agencies to minimize potential impacts associated with construction across recreational lands.

Construction activities could temporarily disrupt recreational uses on and adjacent to the ROW on Douglas County forest land. No hunting would be allowed during construction along the ROW, and Enbridge would post signs to indicate no hunting zones. This impact to hunting would be short term, and the land would be re-opened for hunting when construction is completed. Construction activities also may result in converting wooded areas to open areas; however, impacts to hunting would likely be minor and short term. Temporary work spaces would be revegetated following construction: however, trees would not be replanted or allowed to regrow along the permanent pipeline ROW. Tree clearing that occurred along the ROW would result in long-term impacts to recreation activities as hunters and hikers would likely use other forested habitats.

Route variations have been designed to minimize impacts to certain recreation areas during construction. Route Variation A1 between approximate MPs 1,090.9 and 1,094.2 has been designed to minimize impacts to the Pokegama Carnegie Wetlands SNA (Figure 5-4). The SNA is within Enbridge's existing ROW corridor along Route Variation A2 but would be avoided by Route Variation A1. Construction of the proposed pipelines in the Pokegama Carnegie Wetlands SNA would be a short-term impact to the recreational use and aesthetic use of the wetlands crossed. Restoration of non-herbaceous wetland vegetation in the permanent ROW and of all wetland vegetation types in the temporary ROW would reduce these impacts in the long term.

Route Variation C1 would cross the Nemadji Golf Course, and the landowner has expressed concerns that normal business operations would be impacted during pipeline construction and restoration in this area. There is also congestion along Route Variation C1 where it crosses into the golf course, due to the railroad tracks, existing pipelines, and snowmobile trail. The use of Route Variation C2 would avoid disrupting golf course operations.

Access to certain trails, including ROW crossings of snowmobile/winter ATV trails, used by recreationists would be temporarily prohibited during construction and ROW restoration. The construction activities that would create a short-term impact on the use of the trails would be associated with the presence of construction equipment and trenching activities associated with installation of the pipelines. Enbridge would post appropriate warning signs prior to construction and would contact local clubs to inform them of construction schedules for each crossing and would assist in finding a safe path around construction impediments. As such, short-term impacts to users of these trails are expected to be temporary. Enbridge would restore all trails to preconstruction conditions. Any temporary impacts to recreational areas and users would occur twice if the two pipelines are not constructed concurrently.

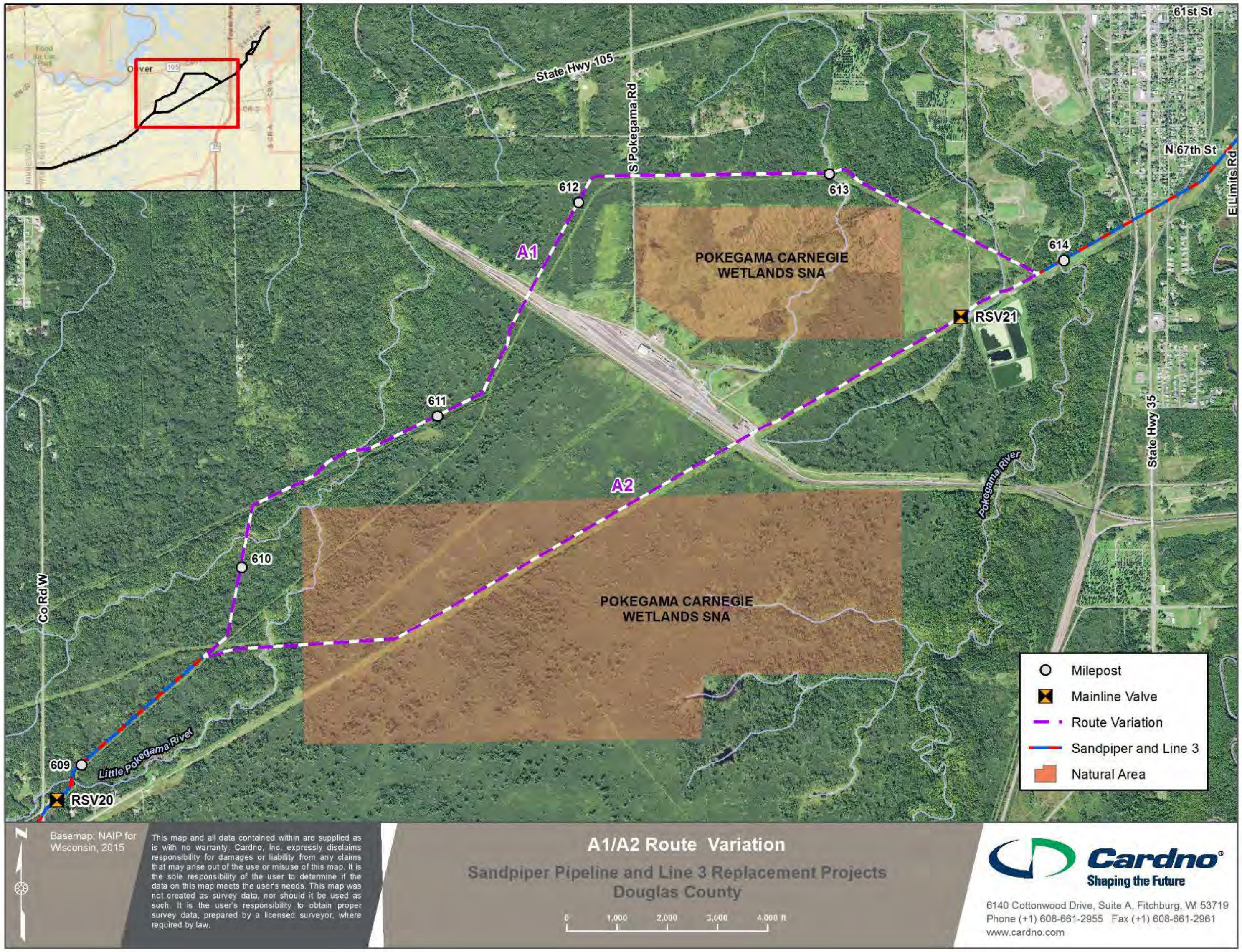

Figure 5-4 Location of the Pokegama Carnegie Wetlands SNA

5.13.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce recreation area impacts during construction and operation of the pipelines:

- Work with local and state agencies to minimize potential impacts associated with construction across local- and state-owned recreational lands.
- Post appropriate warning signs at trailheads prior to construction.
- Contact local clubs to inform them of construction schedules for each crossing and assist in finding a safe path around construction impediments.
- Restore all trails to preconstruction conditions.
- Revegetate forests following construction using native seed mixes.
- Reduce the construction ROW width to the extent practicable by reducing work crews, reducing extra workspaces, or adjusting construction techniques.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to further reduce recreation area impacts:

- Post signs to indicate no hunting zones during construction in hunting areas.
- Restore non-herbaceous wetland vegetation in the permanent ROW and all wetland vegetation types in the temporary ROW.
- Restore native wetland vegetation in the Pokegama Carnegie Wetlands SNA.
- Limit the hours of construction activities with high-decibel noise levels.

5.14 Safety

This section addresses safety issues associated with the construction of the proposed pipelines. Operational and maintenance risks from accidental oil spills and leaks are addressed in Chapter 8, including existing pipeline safety standards and regulations; spill prevention and response plans; potential spill types, volumes, and response actions; and potential impacts of oil spills to environmental resources.

5.14.1 Current Environmental Setting

Currently in most areas along the proposed pipeline corridors, with the exception of the potential route variations, existing pipelines are maintained and operated by Enbridge. Construction of the proposed Projects would include health and safety issues associated with that activity. Examples of environmental factors that can impact worker health and safety include unsafe equipment, inadequate site traffic controls, lack of training and awareness, and/or worker fatigue. Enbridge reported 0.94 recordable injuries per 200,000 employee hours worked and two construction worker fatalities in 2014 (200,000 hours represents the equivalent of 100 employees working 40 hours per week, 50 weeks per year; Enbridge 2016).

Hazardous materials used during construction would be typical of a construction site. Fuels such as gasoline and diesel would be used to power mobile construction equipment; maintenance of such equipment could require the use of lubricants, oils, and antifreeze. Hazardous materials onsite could include used oil, spent antifreeze, unused adhesives, discarded water treatment chemicals and residuals, and spent lead acid batteries.

Three sites located within 1,000 feet of the proposed pipeline routes are listed as contaminated by DNR and are currently undergoing environmental cleanup (DNR 2015d). The three sites, CP Rail Stinson Yard – Former Caboose Track, Murphy Oil – Loading Dock Area, and Enbridge Energy Superior Terminal Facility, are located in Superior, Wisconsin.

5.14.2 Environmental Impacts

Construction of the proposed pipelines would result in the possibility of fatal and nonfatal accidents and injuries in two populations: construction workers (occupational injuries) and the general population (non-occupational injuries). Occupational safety risks to pipeline construction workers would be managed through the implementation of safety and emergency plans. All construction activities would adhere to Enbridge's health and safety plans to ensure worker safety during all phases of construction. Enbridge implements various programs to protect worker safety including the following:

- Employees completed over 18 hours of environmental health and safety training in 2014 (quadruple the time spent in 2007).
- Establishment of Health and Safety Committees to promote safety engagement and decision-making communication.
- Maintenance of industrial hygiene programs that identify workplace stressors and that recommend steps to prevent injury and illness.

Employee training and the implementation of construction manuals and safety plans and procedures would reduce risks to construction workers, resulting in minor impacts during construction of the proposed pipelines. Although the potential for worker accident or injury during construction of the proposed pipelines is considered to be low to moderate, if an accident did occur, impacts would range from minor (in the event of a small injury) to major (in the event of a fatality).

The handling of hazardous materials could result in worker injury. The EPP (Appendix B) includes information on worker training and safety procedures to follow when handling hazardous materials, which would reduce the potential for accidents and resulting injuries. Measures include training of all employees to follow spill prevention procedures including following proper fuel storage practices, fuel dispensing operations, and other hazardous materials handling processes. In the event of a spill of hazardous material during construction, cleanup measures contained in the EPP (Appendix B) would reduce the extent of contamination. Such measures include immediate response actions (e.g., assessments and notifications), mobilization of response personnel, equipment, and materials for containment and/or cleanup, and storage and disposal of contaminated material. See Chapter 10 of Appendix B for further details on spill prevention and response.

Disturbance of contaminated areas during construction could lead to exposure of workers or the public to contaminated materials. Due to the distance of known contaminated sites from the proposed pipeline routes, it is unlikely that they would be impacted during construction and operation. However, there is a potential that unknown previously contaminated soils could be discovered during construction. In that event, work would stop immediately, and Enbridge would inform the appropriate agency and notify the landowner. In the event that heavily contaminated soils are discovered during construction, Enbridge may alter the route slightly to avoid the contaminated area.

With regard to public safety, warning signs would be posted during construction to inform the general public of construction area restrictions. Public access to the ROW would be restricted with the use of signs to prevent the general public from entering construction areas and to minimize the potential for accidents and injuries. Impacts to public safety during normal construction activities are expected to be minor.

5.14.3 Mitigation Measures

The following mitigation measures are proposed by DNR to increase safety during construction and operation of the pipelines:

- Post warning signs and prohibit public access to construction areas.
- Mark the pipeline at all road, railroad, and stream crossings such that the location is known to the general public in accordance with CFR 49 Part 195.410.

5.15 Socioeconomics

5.15.1 Current Environmental Setting

Counties in the Superior Coastal Plain region are characteristically sparsely populated, with the exception of the city of Superior in northern Douglas County. The population of these counties is largely white but includes a significant American Indian population due to the Bad River and Red Cliff Reservations. The Superior Coastal Plain counties have aging, shrinking populations but have attained slightly more education compared to many other northern Wisconsin regions (DNR 2014b).

The pipelines would be constructed and located entirely within Douglas County, Wisconsin, which would incur most of the direct socioeconomic impacts of the Projects, both positive and negative. Information on existing socioeconomic conditions in Douglas County was obtained from the U.S. Census Bureau data and estimates from 2010 and 2014. Table 5-12 presents information on current population levels and density, per capita income, workforce, unemployment rates, and employment industries.

Population density is an indicator of the extent of economic development. Superior Coastal Plain counties are among the least populated in the state (DNR 2014b). In Douglas County population density averages 33.5 people per square mile. The county-level population density is lower than the Wisconsin average of 105.4 people per square mile, reflecting the rural character of the Projects' route. The population of Douglas County in 2014 was approximately 43,689 people, which is an approximate 1 percent increase over the 2010 population.

Generally, per capita income is lower in rural counties with low population densities and high unemployment rates, and higher in urban counties with high population densities and low unemployment rates. Per capita income in Douglas County in 2014 was approximately $24,821, slightly below the state average of $27,907.

Table 5-12 Existing Socioeconomic Conditions in the Project Area

State/County	Population Estimate	Population Density (people per sq. mile)	Per Capita Income	Civilian Labor Force	Unemployment Rate (percent)	Major Employment Industries
Wisconsin	5,724,692	105.4	$27,907	3,073,680	4.9	Educational, health, and social services; Manufacturing; Retail trade
Douglas County	43,901	33.5	$24,821	23,161	5.3	Educational, health, and social services; Retail trade;

Table 5-12 Existing Socioeconomic Conditions in the Project Area

State/County	Population Estimate	Population Density (people per sq. mile)	Per Capita Income	Civilian Labor Force	Unemployment Rate (percent)	Major Employment Industries
						Arts, entertainment, recreation, and accommodation and food services.

Source: U.S. Census Bureau 2014a–e; Enbridge 2015g

The unemployment rates in the Project area are slightly higher than the statewide average. Douglas County's unemployment rate is 5.3 percent, as compared to a statewide average of 4.8 percent. Employment in the Project area is concentrated in the educational, health and social services, retail trade and arts, entertainment, recreation, and accommodation and food services industries.

5.15.1.1 Environmental Justice

Environmental justice refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA 2016). Information on race, ethnicity, income levels, and poverty rates within the Project area was used to determine if disproportionate effects of the proposed Projects would occur to minority or low-income populations. A disproportionate effect is an incidence (or prevalence) of an effect, a risk of an effect, or likely exposure to environmental hazards potentially causing such adverse health effects on a minority and or low-income population, or subpopulation, that significantly exceeds those experienced by a comparable reference population.

To assess potential environmental justice concerns related to the proposed Projects in accordance with Council on Environmental Quality guidance, two separate analyses were performed:

- A *50 percent criterion* population analysis to determine the census block groups in the Project area where minority and/or low-income individuals equaled or exceeded 50 percent of the population.
- A *meaningfully greater criterion* population analysis in which minority and/or low-income population percentages within the census block groups were compared to statewide reference populations. The meaningfully greater criterion for minority populations was assumed to be equal to or greater than 120 percent (1.2 times) the statewide reference population, in accordance with recommendations provided by the *National Guidance for Conducting Environmental Justice Analysis* (EPA 1998). The low-income criterion is defined as below twice the poverty threshold (EPA 1998). Low-income populations were identified using the U.S. Census Bureau's ratio of income to poverty level.

A census block group is the smallest geographic area for which the U.S. Census Bureau provides consistent sample data, and it generally contains a population between 600 and 3,000 individuals. A census tract (generally 1,200 to 8,000 people) is a group of block groups used for census purposes, the boundaries of which generally coincide with town and city limits. A county usually consists of multiple census tracts. Two census tract block groups are crossed by the proposed Projects: Block Group 3, Census Tract 208, and Block Group 1, Census Tract 302.

The demographics for the two block groups based on U.S. Census Bureau data from 2010 to 2014 are presented in Table 5-13. Block Group 3, Census Tract 208, has a meaningfully greater proportion of Asians, Native Americans, and persons reporting to be of two or more races than the state of Wisconsin's respective threshold percentages. Block Group 1, Census Tract 302, does not have any meaningfully greater proportions of minority populations. In both block groups, the percentage of persons of Hispanic or Latino origin is lower than the statewide threshold.

Block Group 3, Census Tract 208, has a meaningfully greater proportion of low-income residents compared to the state percentage (Table 5-13).

Table 5-13 Demographic Conditions in the Project Area

State/County	Race as a Percentage of Total Population[a]						Persons of Hispanic or Latino Origin[c] (percent)	Population Below Two Times the Poverty Level
	White	Black or African American	Asian	American Indian and Alaska Native	Native Hawaiian and Other Pacific Islander	Persons Reporting Other Race/2 or More Races		
Wisconsin	86.7	6.2	2.4	0.9	0.0	3.7	6.2	30.8
Wisconsin Threshold Criteria[b]	N/A	7.5	2.9	1.0	0.0	4.5	7.4	30.8
Block Group 3, Census Tract 208	84.9	1.7	8.2*	2.2*	0.0	5.9*	1.2	36.5*
Block Group 1, Census Tract 302	97.8	0.1	0.2	0.5	0.0	2.1	0.4	27.2

Source: U.S. Census Bureau 2014a–e: Table B02001, 2010–2014: Table C17002

Notes:

[a] Data are based on U.S. Census Bureau figures that, due to rounding, may total slightly more or less than 100 percent.

[b] Statewide exceedance criteria percentages are 1.2 times the actual environmental justice group population percentages for each state.

[c] People who identify their origin as Hispanic or Latino may be of any race. Thus, the percent Hispanic or Latino should not be added to the race as percentage of population categories.

* Denotes minority or low-income populations that are meaningfully greater than the corresponding minority or low-income population at the state level in the relevant racial/ethnic or low-income category.

5.15.1.2 Tribal Treaty Resources

Tribal treaty rights include the collective right of Indian tribal members of access to hunt, fish, trap, gather, and collect traditional materials and natural resources. These resources include off-reservation rights and are exercised in a limited fashion, subject to quotas, seasons, and tribally adopted regulations (Great Lakes Indian Fish and Wildlife Commission [GLIFWC] 2014). The DNR authors of this EIS recognize that there are spiritual and cultural values associated with many natural resources within the Ceded Territory. Many of these values are described in periodicals and other publications of the GLIFWC (see: http://www.glifwc.org/publications/mazinaigan/Mazinaigan.html). The DNR believes that issues arising from any impacts to such resources as a result of the proposed Projects may be resolved via the existing Voight Task Force channels.

Wisconsin is home to 11 sovereign nations as well as the GLIFWC. The proposed Projects would not cross any Indian reservation lands but is entirely within Ceded Territory (Figure 5-5). In total, the Ceded Territory encompasses 22,400 square miles of northern Wisconsin that was ceded to the United States by the Lake Superior Chippewa Tribes in 1837 and 1842. The proposed Projects lie within the lands ceded in the Treaty of 1842 (GLIFWC 2014). The Ceded Territory comprises lands ceded by Wisconsin's six Chippewa (Ojibwe) Tribes in the Treaties of 1837 and 1842, but in which members reserved their right to hunt, fish, trap, and gather on lands open to the public. The six tribes include the Bad River Band, Lac Courte Oreilles Band, Lac du Flambeau Band, Red Cliff Band, St. Croix Band, and Sokaogon/Mole Lake Band.

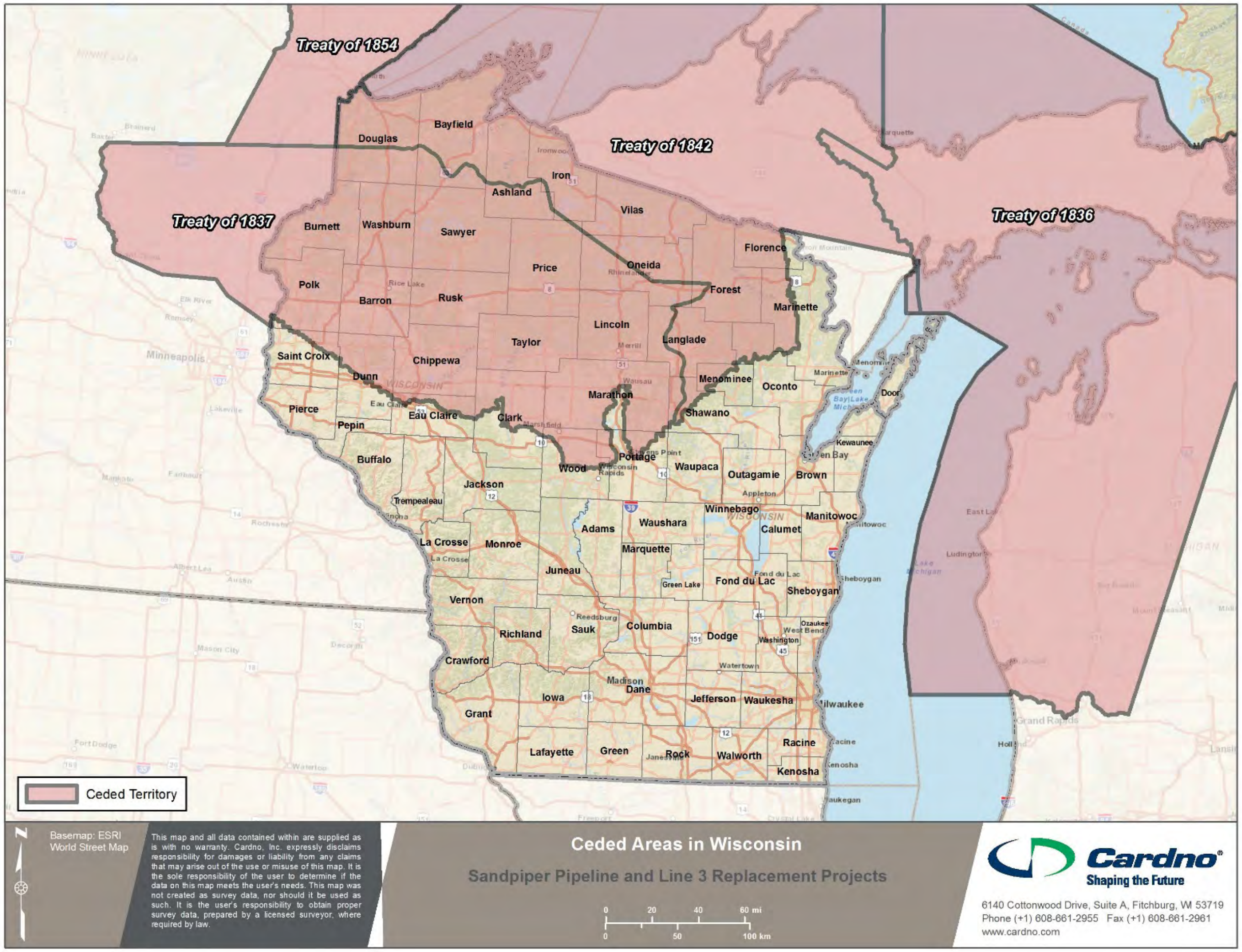

Figure 5-5 Ceded Territory Areas in Wisconsin

The reserved rights have been confirmed in court cases including the 1972 Gurnoe decision, Wisconsin State Court (affirmed rights to fish in areas of the Great Lakes), and the 1983 Lac Courte Oreilles v. State of Wisconsin (LCO) decision (affirmed rights to fish, hunt, and gather inland), which is also known as the Voigt case (GLIFWC 2014). The DNR works closely with the Chippewa Tribes and the GIFWC when treaty reserved resources are likely to be impacted by proposed projects that require DNR oversight. A consultation process exists that allows for questions and/or comments that the Chippewa would like to share with the DNR.

When the DNR receives applications that have the potential to directly or indirectly impact tribal interests, the DNR works with the associated tribe(s) to allow for review and input prior to finalizing permits and/or approvals. Any comments received by the DNR submitted by a sovereign nation are taken into consideration prior to a decision being made. The DNR strives to allow for early and open conversation between the state and tribes, and a formal consultation policy exists to assist with tribal involvement.

The Chippewa Tribes of Wisconsin harvest walleyes and muskellunge using a variety of high-efficiency methods, including spearing and gillnetting on many lakes within the Ceded Territory (DNR 2015e). Since 1985, tribal harvest of walleyes has occurred in 271 of 903 walleye lakes in the Ceded Territory. The number of lakes with tribal harvest in a given year has been between 144 and 171 every year since 1991. Total yearly tribal harvest has ranged from 18,500 to 30,558 fish for the past 13 years (DNR 2015e).

Tribes also gather edible food such as wild rice, nuts, berries, and fruits within the Ceded Territory (Indian Country 2016). Of particular importance are wetland areas that contain wild rice that the tribes harvest. The Pokegama River contains wild rice; however, there are no occurrences near the pipeline crossing. A fairly extensive rice bed exists where the Pokegama River widens to join the St. Louis River estuary but wild rice is not known to exist further upstream (DNR 2008b). The nearest wild rice area is approximately 0.5 mile from Route Variation A1 (Figure 5-6). See Section 8.5.16.2 for a discussion of potential impacts to tribal treaty resources from a crude oil spill.

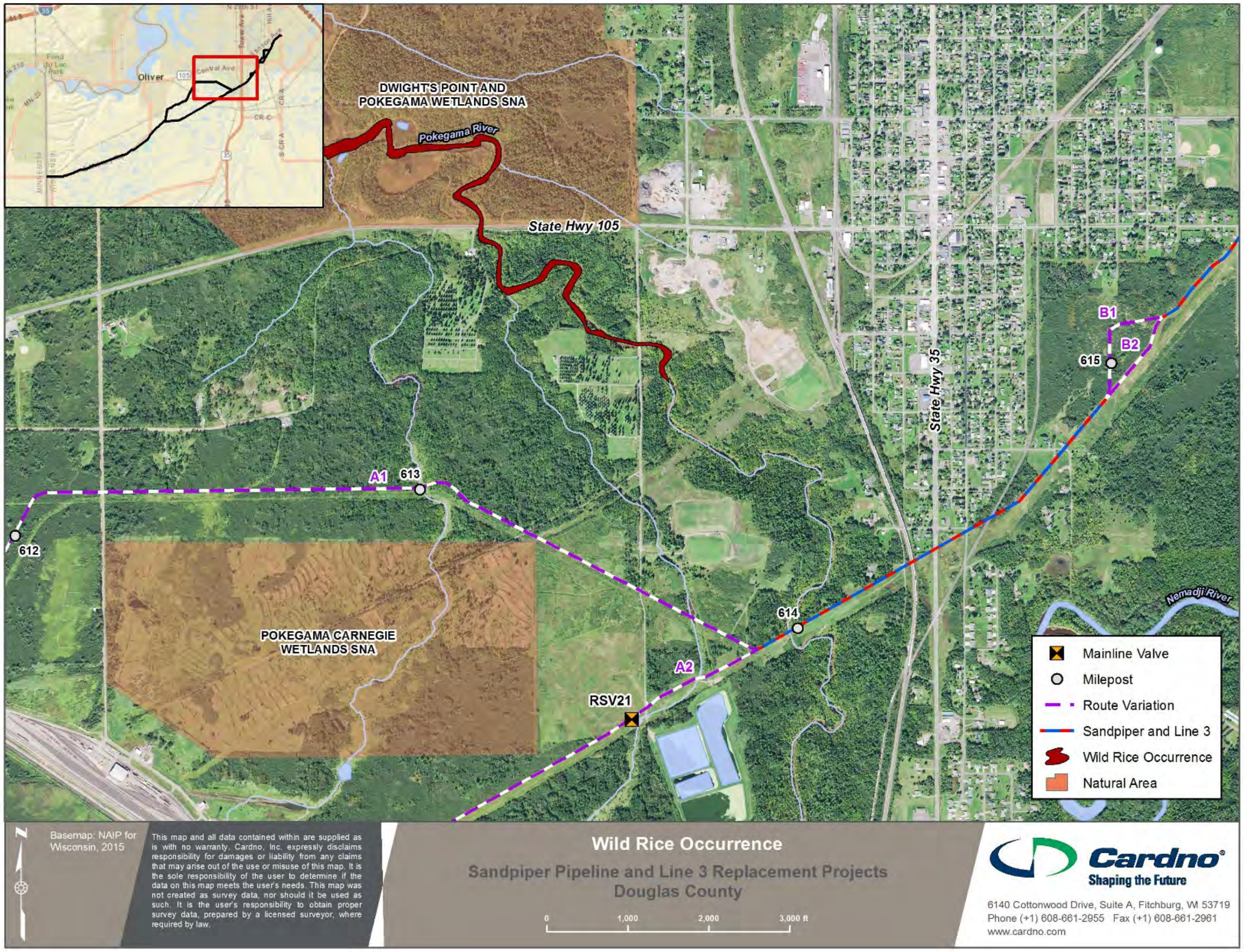

Figure 5-6 Wild Rice Areas in Proximity to the Proposed Pipelines' Route

5.15.2 Environmental Impacts

Construction and operation of the Projects would result in both short-term and long-term socioeconomic impacts in Douglas County. During construction, there would be temporary increases in local population, demand for short-term housing, use of transportation systems, and expenditures in local economies for goods and services. Construction activities for each pipeline would occur over an approximate 14-month period, with employment opportunities provided to local workers where the local workforce possesses the required skills. Approximately 400 to 500 workers would be required to construct the pipelines. Construction personnel hired from outside the Project area would augment the local workforce and consist of supervisors, EIs, and highly skilled mechanical, electrical, and instrumentation/control tradesmen. Non-local workers would relocate to the Project area for the duration of construction and would be dispersed along the length of the construction route rather than concentrated at a single work site. Non-local workers would reside in the vicinity of the Projects for short periods and would require temporary housing such as hotels, motels, and apartments or would stay at local campgrounds. Demands for temporary housing within local communities is expected to be minimal because workers would be dispersed along the length of the pipeline route for short periods of time.

Local workers would commute from their residences to Project work sites on a daily basis. The movement of construction personnel, equipment, and materials from contractor and pipe storage yards to the construction work area would result in additional short-term impacts on the local transportation system. Several construction-related trips would be made each day to and from the job site. Traffic would remain fairly consistent throughout the construction period, and would typically peak during early morning and evening hours as workers commute to Project sites, although most workers would commute during off-peak hours (i.e., early morning and evening) since pipeline construction is generally scheduled to take full advantage of daylight hours. In addition, construction workers typically would leave personal vehicles at contractor yards and participate in ride shares to work sites with other workers; this would help reduce road congestion in the vicinity of work sites. Enbridge is also considering busing contractors from yards and other central locations to minimize the number of personal vehicles accessing the ROW. Road congestion may increase but would not likely disrupt the normal flow of traffic in the Project area.

The presence of non-local workers within the local area could increase the demand for public services, although the additional non-local workers would not result in a large increase in the general population in Douglas County. It is not anticipated that workers would be accompanied by their families due to the short duration of the work. Potential impacts to public services would therefore be short term and minor.

Local communities would benefit from income paid to construction workers, both local and non-local, throughout the construction period since workers would spend a portion of their earnings locally. Both local and non-local workers would use hospitality services such as restaurants, grocery stores, and gasoline stations. Additionally, construction contractors and subcontractors may purchase some materials from local vendors, and lease land and equipment for temporary field offices and material storage areas, resulting in beneficial economic impacts locally. Operation of the Projects would likely require additional local or non-local full-time permanent employees. Communities would benefit from local spending by operations and maintenance workers. Any temporary socioeconomics impacts would occur twice if the two pipelines are not constructed concurrently.

Tax revenues would be generated for the affected local governments from construction and operation of the proposed Projects. At the state and local level, the primary source of tax revenue would be property taxes paid by Enbridge. These taxes would be based on the assessed value of the property and the varying state and local tax rates. Enbridge estimates that taxes during the first year of construction would be approximately $67,500 and that peak taxes during the life of the Projects would be $3.7 million in Wisconsin.

Overall, construction of the Projects would result in a short-term positive impact to the local economy. Some economic benefits would result due to the hiring of a non-local labor force and importing materials and services. The monetary benefits of the Projects to the state government would include short-term tax revenues from construction. Most of the construction-related economic impacts would occur over the 14–month construction period and would be temporary.

5.15.2.1 Environmental Justice

The creation of jobs and increased local spending would benefit minority populations in the event that the populations are employed as temporary or permanent workers for the Projects. Impacts to minority and low-income populations from construction of the proposed Projects could include changes to air quality, noise, and visual effects, and disruption to traffic patterns. However, the mitigation measures discussed in the respective resource sections would reduce these potential impacts for minority and low-income residents as well as the entire local population. Douglas County health officials have indicated there seems to be anecdotal evidence of higher than expected rates of certain diseases that can be correlated to pollutant exposure. However, more detailed information is not available.

5.15.2.2 Tribal Treaty Resources

The proposed Projects would cross Ceded Territory that contains wetlands used for gathering edible foods including berries and wild rice. The nearest known wild rice location is approximately 0.5 miles from the proposed pipeline Route Variation A1 (Figure 5-6). The proposed pipeline (co-located segment, not a route variation) would cross the Pokegama River approximately 1.02 river miles upstream from the wild rice location at milepost 614 (Figure 5-6). There is a potential for sedimentation to enter the river and be carried downstream that would potentially affect the wild rice area. However, erosion and sediment control measures described in the EPP (Appendix B) would reduce this potential impact and impacts to this wild rice area would be minimal. Temporary erosion and sediment controls include including slope breakers, sediment barriers (e.g., silt fence, straw bales, bio-logs), stormwater diversions, trench breakers, mulch, and revegetation activities.

If other previously unknown wild rice production areas that could be affected by the Projects' construction are discovered along the Projects' route, Enbridge would work with the landowner and/or DNR to determine appropriate measures to be implemented to minimize or avoid Projects-related impacts to wild rice production areas. Such measures may include installing erosion controls to direct sediment away from waterbodies supporting wild rice, making minor adjustments in the route, compensating for lost production during construction of the Projects, and/or reestablishing wild rice populations in affected areas.

5.15.3 Mitigation Measures

Enbridge, through its construction contractors and subcontractors, would attempt to hire local workers where the local workforce possesses the required skills which would both provide local employment benefits and reduce the number of non-local workers that may be required to relocate to the area for the construction period.

In the event that previously unknown wild rice populations are encountered along the pipeline route, additional consultation with the tribes may be necessary.

5.16 Soils and Topography

5.16.1 Current Environmental Setting

The proposed Projects' route crosses through the Superior Lake Plain major land resource area (MLRA), a geographic area characterized by a particular pattern of soils, climate, and water resources. The MLRA is characterized by a till plain mixed with lake plains, lake terraces, beaches, flood plains, swamps, and marshes. The lake plain is nearly level with some rocky knobs, hills, and low mountains. Dominant soils in the MLRA have an active layer that freezes in the winter and thaws in the spring. The major soil resource management concerns in the MLRA are water erosion, wetness, soil fertility, and soil tilth.

Enbridge identified and assessed detailed soil characteristics along the route and route variations using the Soil Survey Geographic Database (SSURGO) for Douglas County. Soil characteristics analyzed include highly erodible soils, prime farmland compaction-prone soils, presence of stones and shallow bedrock, droughty soils, depth of topsoil, and percent slope. Table 5-14 provides the soil types found in the Project area.

Table 5-14 Soil Types that would be Crossed by Proposed Pipeline Segments (acres) [a, b]

Soil Characteristic	MP 1,084.8 – 1,090.9	MP 1,090.9 – 1094.2		MP 1,094.2 – 1,095.4	MP 1,095.4 – 1,095.6		MP 1,095.6 – 1,096.2	MP 1,096.2 – 1,097.0		MP 1,094.0 – 1,097.7
		RV A1	RV A2		RV B1	RV B2		RV C1	RV C2	
Prime Farmland[c]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Farmland of Statewide Importance[d]	47.0	68.8	45.6	11.7	3.7	1.4	3.4	14.0	11.9	9.2
Compaction Prone	1.7	17.7	33.5	1.4	0.9	1.8	0.9	4.4	8.3	8.9
Highly Wind Erodible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Highly Water Erodible	16.6	10.4	5.5	4.3	0.0	0.0	0.0	0.6	0.6	0.8
Droughty	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stony/Rocky	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shallow Bedrock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Enbridge 2014a

Notes:

RV = route variation

[a] Data represent acreage crossed by the Line 3 Replacement and Sandpiper Pipeline Projects.

[b] Acreage is based generally on a typical 110-foot-wide construction right-of-way and additional temporary workspace; it does not include access roads or open water.

[c] Includes land listed by the NRCS as potential prime farmland if a limiting factor is mitigated (e.g., artificial drainage).

[d] Farmland of Statewide Importance is land other than prime farmland that is of statewide or local importance for the production of food, feed, fiber, forage or oilseed crops.

Depending on the route chosen, soils along the proposed pipeline route consist of between 35.9 and 56.5 acres of the compaction-prone soils, and between 27.8 and 32.3 acres of soils highly erodible by water.

There are no highly wind erodible or stony/rocky soils, or shallow bedrock in the Project area. See Section 5.3 for a discussion of prime farmland and farmland of statewide significance. Much of the topsoil thickness in the Project area is 6 inches or less along the proposed route.

Elevation along the Projects ranges from 618 to 900 feet above mean sea level. Depth to bedrock in the vicinity of the Projects ranges from 100 to 325 feet below the ground surface, and is typically greater than 200 feet. The route generally follows relatively level ground (less than 5-percent slope).

Three sites located within 1,000 feet of the proposed pipeline routes are listed as contaminated by DNR and are currently undergoing environmental cleanup (DNR 2015d). The three sites, CP Rail Stinson Yard – Former Caboose Track, Murphy Oil – Loading Dock Area, and Enbridge Energy Superior Terminal Facility, are located in Superior, Wisconsin.

5.16.2 Environmental Impacts

Pipeline construction and operations, including clearing, grading, trenching, backfilling, and equipment movement, can impact soil resources. Potential impacts include soil erosion, soil compaction, permanent increases in the proportion of large rocks in the topsoil from topsoil/subsoil mixing, and soil contamination from the use of hazardous materials.

The clearing of brush, trees, and tall herbaceous vegetation for ROW construction removes the protective vegetative layer and could lead to soil erosion, particularly in wetter months. The areas with highly erodible soils (between 27.8 and 32.3 acres depending on the route chosen) would be particularly susceptible to erosion. Temporary erosion and sediment controls, including slope breakers, sediment barriers (e.g., silt fence, straw bales, bio-logs), stormwater diversions, trench breakers, mulch, and revegetation activities would reduce the potential for erosion during construction. In areas with slopes greater than 5 percent, erosion control blankets would be placed across the entire construction ROW where the base of the slope is less than 50 feet from tile line inlets, drainage ways, wetlands, and/or waterbodies until the area is revegetated and there is no potential scouring or sediment transport to surface waters. In addition, on highly erodible slopes, earthen berm slope breakers would be used whenever possible. After construction is complete, permanent erosion controls would be used during site restoration.

Construction activities may cause localized soil compaction in compaction-prone soils, which can lead to slower or less successful vegetation reestablishment following construction. Grading activities and construction and operations equipment traveling over wet soils could also disrupt the soil structure, reduce pore space and percolation rates, increase runoff potential, and cause rutting. These impacts would be reduced by temporarily stopping certain construction activities on susceptible soils during wet conditions, and by using timber mats and/or low-ground-pressure equipment[6] in wetlands. Deep tillage operations would be used during restoration activities on agricultural land to promote growth and alleviate compaction impacts.

Topsoil/subsoil mixing and the introduction of rocks to the soil surface from deeper under the ground may occur during pipeline construction (excavation and backfilling). To prevent this, topsoil would be segregated in areas where soil productivity is an important consideration such as in cropland, hay fields, pasture, residential areas, and other areas as requested by the landowner. Enbridge has not proposed to

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6 Low ground-pressure equipment spreads a machine’s weight over a larger area using wide tires and other features.

segregate topsoil from subsoil in forested areas, standing water wetlands, and nonagricultural open upland areas except in areas of steep side slopes adjacent to wetlands and waterbodies where subsoil would be excavated to create a level workspace. An EI would perform audits of the topsoil/subsoil removal and segregation. Temporary impacts to soil resources would occur twice if the two pipelines are not constructed concurrently.

Contamination from release of fuels, lubricants, and coolants from construction equipment could impact soils during fuel storage, equipment refueling, and equipment maintenance. The potential for spills would be reduced by training of all employees to follow spill prevention procedures as described in the EPP (Appendix B). Such measures include following proper fuel storage practices, fuel dispensing operations, and other hazardous materials handling processes. In the event of a spill of hazardous material during construction, cleanup measures contained in the EPP (Appendix B) would reduce the extent of soil contamination. Such measures include immediate response actions (e.g., assessments and notifications), mobilization of response personnel, equipment, and materials for containment and/or cleanup, and storage and disposal of contaminated material. See Chapter 10 of Appendix B for further details on spill prevention and response. Chapter 8 addresses potential impacts from accidental spills of crude oil during operation of the Projects.

Due to the distance of known contaminated sites from the proposed pipeline routes, it is unlikely that they would be impacted during construction and operation. However, there is a potential that unknown previously contaminated soils could be discovered during construction. In that event, work would stop immediately, and Enbridge would inform the appropriate agency and notify the landowner. In the event that heavily contaminated soils are discovered during construction, Enbridge may alter the route slightly to avoid the contaminated area.

Pipeline operations would be expected to cause a slight increase in soil temperatures at the soil surface (from 1°F to 2°F, primarily during winter) and at depths of 6 inches (from 1°F to 5°F, with the most notable increase during spring). Increased soil temperatures during early spring may cause impacts on crops, as discussed in Section 5.3.2.

5.16.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce soil impacts during construction and operation of the pipelines:

- Install erosion control measures including slope breakers, sediment barriers (e.g., silt fence, straw bales, bio-logs), stormwater diversions, trench breakers, mulch, and revegetation activities to reduce the potential for soil erosion during construction.
- Place erosion control blankets across the entire construction ROW where the base of slopes greater than 5 percent are less than 50 feet from tile line inlets, drainage ways, wetlands, and/or waterbodies until the area is revegetated and there is no potential scouring or sediment transport to surface waters.
- Install earthen berm slope breakers on highly erodible slopes to reduce erosion.
- Halt certain construction activities on susceptible soils during wet conditions.
- Use timber mats and/or low-ground-pressure equipment in wetlands.
- Use deep tillage operations during restoration activities on agricultural land to promote growth and alleviate compaction impacts.
- Remove, segregate, stockpile, and replace topsoils and subsoils in in areas where soil productivity is an important consideration.

- Follow spill prevention procedures as described in the EPP (Appendix B) to reduce the potential for spills of hazardous materials.
- Follow cleanup measures contained in the EPP (Appendix B) to reduce the extent of soil contamination in the event of a spill.

5.17 Transportation

5.17.1 Current Environmental Setting

The proposed Projects would intersect federal, state, and local roadways as shown in Figure 5-7. Main roads that would be crossed by the proposed pipeline route include State Route 35, N 58th Street, Bardon Avenue, and East Military Road in addition to many smaller developed roads and undeveloped rural roads.

The proposed Projects would cross railroads in Douglas County operated by Burlington Northern Santa Fe Railway. In addition, the Canadian Pacific Railway and Wisconsin Central Railway would each be crossed once.

5.17.2 Environmental Impacts

Construction of the proposed pipelines would result in short-term, temporary road closures, increased traffic volume on roadways near the activities due to the construction equipment that would be used to move material to work areas and from daily commuting of the construction workforce to work sites, damage to existing roads, and increased demands on local transportation authority personnel.

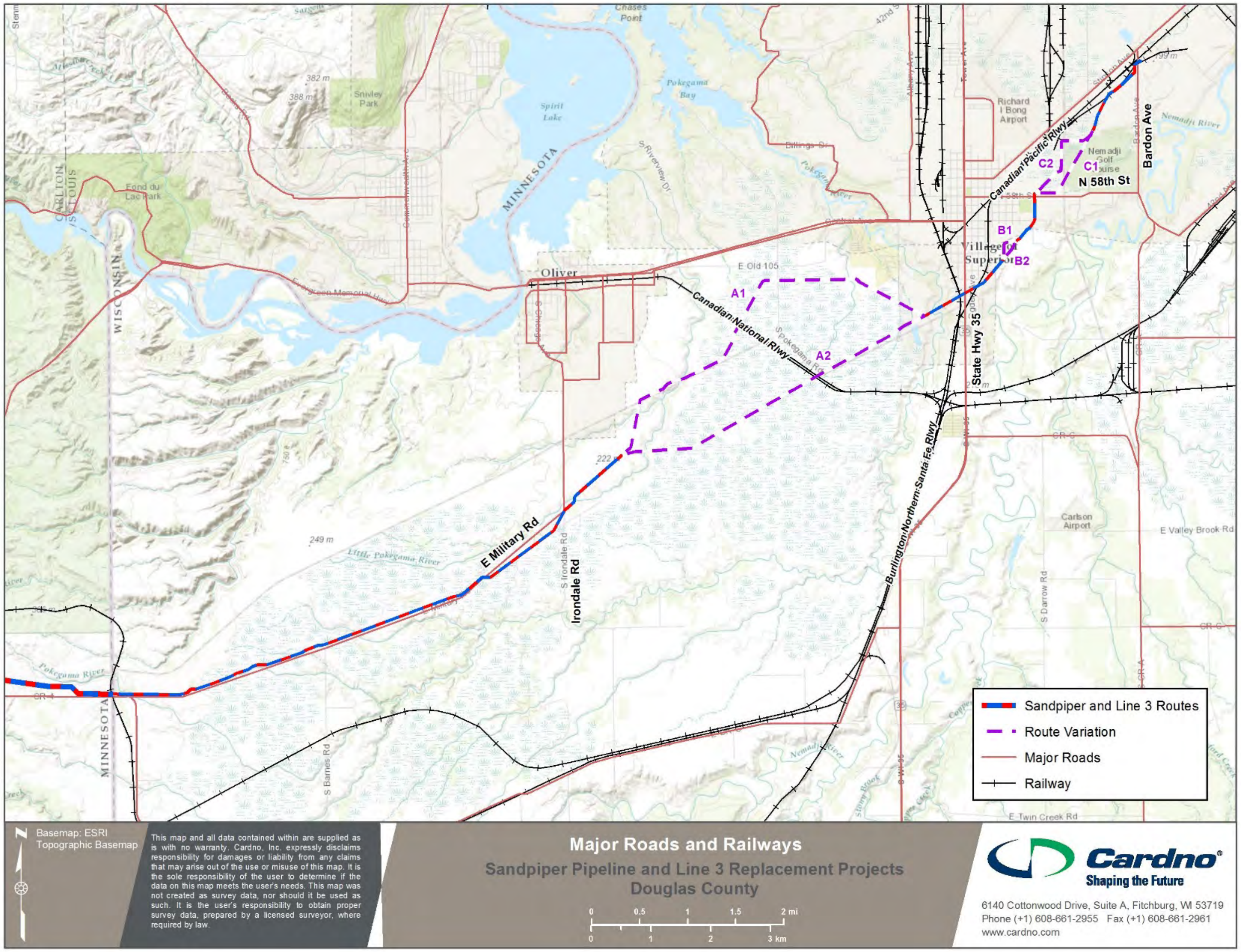

Figure 5-7 Roads and Railroads Crossed by the Proposed Pipelines' Route

Road-boring equipment would be used to construct the pipelines across paved roadways and railroads thereby avoiding traffic-related disruptions and damage to road and railroad surfaces. However, disruption of traffic flow patterns would still occur along other roadways (not being crossed) that run parallel to the pipeline from impacts to nearby roads. Pipelines would be installed across unpaved roads by boring or the open-cut construction method. Open-cut activities would disrupt traffic during the pipe trench excavation across the roadway. To minimize such traffic delays at open-cut crossings, traffic detours would be established before excavating the roadbed. If no reasonable detours are feasible, at least one traffic lane of the road would remain open, except for brief periods when road closure is essential to install the pipeline. These closure periods would attempt to avoid peak traffic hours. The duration of open-cut crossings would be minimized and in most cases these road crossings would be completed in one day or less. Enbridge would inform local residents of road closures prior to construction.

Local workers would commute from their residences to Project work sites on a daily basis. The movement of construction personnel, equipment, and materials from contractor and pipe storage yards to the construction work area would result in temporary impacts on the local transportation system. Several construction-related trips would be made each day to and from the job site. Traffic would remain fairly consistent throughout the construction period, and would typically peak during early morning and evening hours as workers commute to Project sites, although most workers would commute during off-peak hours (i.e., early morning and evening) since pipeline construction is generally scheduled to take full advantage of daylight hours. Construction workers typically would leave personal vehicles at contractor yards and participate in ride shares to work sites with other workers which would help reduce road congestion in the vicinity of work sites. Enbridge is considering transporting contractors from yards and other central locations by bus to minimize the number of personal vehicles accessing the ROW. Road congestion from workers commuting to work sites may increase but would not likely disrupt the normal flow of traffic in the Project area.

Potential damage to roadway surfaces could occur as a result of the movement of heavy equipment and residual soils left behind from construction activities. To maintain safe conditions, construction crews would be required to adhere to local weight restrictions and limitations for construction vehicles, and to remove soil that is left on the road surface by the crossing of construction equipment. When it is necessary for construction equipment to move across paved roads, mats or other appropriate measures to prevent damage to the road surface would be used. Enbridge would repair any damage to roadways and railroads as a result of construction-related activities.

Enbridge anticipates deliveries of up to 55 truckloads of 80-foot-long pipe segments or “joints” per mile of pipeline over area roads from the storage yard to the construction route. Truck traffic associated with transporting this pipe as well as other construction-related travel associated with the Projects may increase the workload of local authorities to assist with traffic control. In addition, local authorities may need to assist with short-term detours at pipeline road crossings or delays in traffic flow from large, slow-moving vehicles. As a mitigation measure, Enbridge would work with the local unit of government to ensure safety of transportation on roads during construction of the proposed pipelines. Enbridge would also work with the Wisconsin Department of Transportation (WisDOT) to obtain the necessary road crossing permits prior to pipeline construction activities. Any temporary impacts to transportation would occur twice if the two pipelines are not constructed concurrently.

During operations, work would be limited to maintenance of the ROW by a limited number of employees and equipment which would not disrupt traffic on roads in the vicinity of the ROW.

5.17.3 Mitigation Measures

The following mitigation measures would reduce impacts to transportation systems during construction of the pipelines:

- Consult with the WisDOT prior to and during construction to establish temporary road closures, the use of alternate routes, and staff required to assist with directing traffic.
- Use road-boring equipment to construct the pipelines across paved roadways and railroads to avoid traffic-related disruptions and damage to road and railroad surfaces.
- Establish traffic detours before excavating the roadbed during open cut installations. If no reasonable detours are feasible, leave at least one traffic lane of the road would open, except for brief periods when road closure is essential to install the pipeline.
- Avoid peak traffic hours during closure periods.
- Minimize the duration of open-cut crossings and in most cases complete road crossings in one day or less
- Inform local residents of road closures prior to construction.
- Request that construction workers leave personal vehicles at contractor yards and participate in ride shares to work sites with other workers.
- Use a bus to transport contractors from yards and other central locations to the ROW on a daily basis.
- Adhere to local road weight restrictions and limitations for construction vehicles.
- Remove soil that is left on the road surface by the crossing of construction equipment.
- Use mats or other appropriate measures to prevent damage to the road surface when it is necessary for construction equipment to move across paved roads.
- Repair any damage to roadways and railroads as a result of construction-related activities.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce overall impacts to transportation systems that would be affected by the proposed Projects:

- Request that Enbridge pay for the cost of flaggers and other personnel required to ensure safety of transportation on roads during construction of the proposed pipelines.

5.18 Vegetation (Plants)

This section addresses potential impacts of the proposed Projects on general vegetation and on state-listed plant species and Species of Conservation Concern. Section 5.6 addresses potential impacts to one federally listed plant species, the Fassett's locoweed.

The Project area for analyzing impacts of the proposed Projects to plant species includes habitats within 1 mile of the proposed routes.

5.18.1 Current Environmental Setting

5.18.1.1 Natural Communities

Most of the area within the construction ROW consists of wetlands (84.7 to 90.2 acres depending on the route variations chosen), forest land (86.2 to 103.1 acres), developed land (24.7 to 28.4 acres), agricultural land (2.6 acres), and open land (2.5 acres) (Table 5-4).

The Projects are located in the Superior Coastal Plain Ecological Landscape (DNR 2014b), which is a nearly level plain of lacustrine clay that slopes gently northward toward Lake Superior (Figure 5-8). For an in-depth description of the region's natural communities and their change over time, see the Superior Coastal Plain Ecological Landscape description (DNR 2014b).

Source: DNR 2014b

Figure 5-8 Ecological Landscapes of Wisconsin

The Superior Coastal Plain was originally dominated by white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), and white pine (*Pinus strobus*), and currently forests of aspen (*Populus* spp.) and birch (*Betula* spp.) occupy about 40 percent of the Superior Coastal Plain, having increased in prominence over the boreal conifers. Approximately 30 percent of the Superior Coastal Plain is currently non-forested; most of the open land is grassland, having been cleared and then pastured or plowed (DNR 2005). Important land uses in the Superior Coastal Plain today include forestry, tourism, and agriculture, including specialty crops such as apples and cherries (DNR 2014b). Within the Superior Coastal Plain, the proposed pipelines would pass through a land type association known as the Douglas Lake-Modified Till Plain, which is characterized by undulating modified lacustrine moraines with deep v-shaped ravines and clay soils. Common habitat types in the Douglas Lake-Modified Till Plain include associations of balsam fir, red maple (*Acer rubrum*), and black snakeroot (*Sanicula marilandica*); associations of balsam fir, maple (*Acer* spp.), black snakeroot, and partridgeberry (*Mitchella repens*); and forested lowlands (DNR 2014b).

Natural communities included in Wisconsin's NHI are communities the DNR deems significant for reasons such as undisturbed condition or community extent. The NHI shows three natural communities present within 1 mile of the Project area. The NHI also shows two aquatic natural communities present within 2 miles of the Project area. Table 5-15 presents the occurrences of natural communities within 1 and 2 miles of the proposed Projects.

5.18.1.2 State-listed Plant Species

Plants listed as endangered or threatened in Wisconsin are protected by Wisconsin's Endangered Species Law on public lands. Eight state-listed plant species have been identified in the DNR NHI with the potential to occur in the Project area. DNR requested field surveys for these state-listed plant species to discover if any were present along the proposed pipeline route. In addition, 9 special concern plant species are known to occur within 1 mile of the Project area according to NHI data.

Table 5-15 Occurrences of Natural Communities Within 1 or 2 Miles of the Projects (NHI)

Natural Community	MP 1,084.8 – 1,090.9	MP 1,090.9 – 1094.2		MP 1,094.2 – 1,095.4	MP 1,095.4 – 1,095.6		MP 1,095.6 – 1,096.2	MP 1,096.2 – 1,097.0		MP 1,094.0 – 1,097.7
		Route Variation A1	Route Variation A2		Route Variation B1	Route Variation B2		Route Variation C1	Route Variation C2	
Terrestrial or Wetland Natural Communities within 1 mile of the Projects		X								
Terrestrial or Wetland Natural Communities within 1 mile of the Projects		X								X
Terrestrial or Wetland Natural Communities within 1 mile of the Projects		X	X							X
Aquatic Natural Communities within 2 miles of the Projects	X	X	X							

Source: DNR 2015a

MNR conducted surveys for state-listed plant species in Douglas County, Wisconsin, in 2013, 2014, and 2015 to document the occurrence of threatened and endangered plants within an environmental survey corridor. They identified target locations for the field surveys through a desktop habitat assessment that incorporated Element Occurrences from Wisconsin's NHI and interpretation of aerial photography. MNR botanists conducted intuitive meander surveys to search for suitable habitat and microhabitat for target plant species between June 27 and September 30, 2013, and between July 15 and September 11, 2014. MNR documented all threatened and endangered species, as well as species of special concern, at survey sites when observed. Table 5-16 provides the results of the NHI data and field surveys.

MNR documented 1,154 occurrences of 8 species within the Project area during the botanical surveys carried out in 2013. Biologists observed (at one or more sites) all but one of the state-listed endangered and threatened plant species with the potential to occur in the Project area (Enbridge 2015f).

5.18.2 Environmental Impacts

5.18.2.1 Natural Communities

The total miles crossed and acres of terrestrial vegetation affected during construction and operation of the Projects are presented in Table 5-4. The primary impacts to vegetation from construction and operation of the Projects would be cutting, clearing, and removing existing vegetation within the construction ROW. The degree of impact would depend on the type and amount of vegetation affected, the rate at which vegetation would regenerate after construction, and the frequency and type of vegetation maintenance conducted on the ROW during pipeline operation.

Clearing trees within upland forest communities would result in long-term impacts to these communities within the construction work areas, given the length of time needed for the community to mature to preconstruction conditions. Permanent impacts would occur within the permanent ROW, where trees would be removed and prevented from reestablishing through the periodic mowing and brush clearing required for pipeline operation and inspections. See Section 5.7 for further discussion of impacts to forest lands. Forest habitats could also be affected by the spread of noxious and invasive weed species. Additional mitigation measures proposed by DNR to reduce such impacts in forest areas has been identified in Section 5.7.3.

Impacts to grassland/meadow and open space habitats would generally be shorter term than those to forest and woodland communities, with grasses and herbaceous vegetation becoming reestablished relatively rapidly, particularly with the proposed revegetation measures and through colonization by annual and perennial herbaceous species. As a result, impacts to grasslands/meadow and open space habitats communities would be minimal. During operations, these areas would be cleared of woody vegetation but would otherwise be left undisturbed. Grassland habitats could be affected by the spread of noxious and invasive weed species, as discussed in Section 5.9. Measures proposed in the EPP (Appendix B) to reduce the spread of invasive weed species, including treating major areas of noxious weed infestations with recommended herbicides prior to construction and cleaning all construction equipment (e.g., timber mats, vehicles) prior to arrival at all construction sites, would limit such impacts. Any temporary impacts to vegetation would occur twice if the two pipelines are not constructed concurrently. Pipeline operations would be expected to cause a slight increase in soil temperatures at the soil surface (from 1°F to 2°F primarily during winter) and at depths of 6 inches (from 1° to 5°F with the most notable increase during spring). Increased soil temperatures may cause early germination and emergence in tall-grass prairie species.

Table 5-16 Presence of State-listed Endangered and Threatened Plant Species and Species of Special Concern within 1 mile of the Projects

Wisconsin Status	Number of 2013 Occurrences	Number of 2014 Occurrences	Total Number of Occurrences
Endangered Plant	5	0	5
Endangered Plant	44	13	57
Threatened Plant	53	6	59
Threatened Plant	356	194	550
Threatened Plant	468	192	660
Threatened Plant	7	0	7
Threatened Plant	6	0	6
Plant Species of Special Concern	0	1	1
Plant Species of Special Concern	215	309	524
Total	**1,154**	**715**	**1,869**

Source: Enbridge 2015f

Impacts to marsh and wetland vegetation include removal of wetland plant species, which can lead to erosion and habitat alteration. Invasive species can become established in areas cleared of native species, which can cause changes in habitat structure and function. Enbridge has developed a wetland seed mix that would be used to reestablish vegetation in unsaturated wetlands. See Section 5.20 for more details on wetland habitat impacts.

5.18.2.2 State-listed Plant Species

Since almost all state-listed endangered and threatened plant species with the potential to occur in the Project area were observed at one or more sites along the ROW, impacts to state-listed endangered, threatened, and special concern species would occur from construction of the proposed Projects. Impacts to these plant species include destruction or damage through direct removal or trampling by construction equipment and vehicles. Since many of these species are found within wetland habitats, the mitigation measures proposed for wetlands would reduce impacts to these species. See Section 5.20.3 for details on wetland mitigation. However, such mitigation measures would not eliminate impacts and as such, Enbridge will be applying for an Incidental Take Permit for all state-listed plants on public property.

5.18.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to natural plant communities during construction and operation of the pipelines:

- Revegetate disturbed areas in accordance with the EPP, unless otherwise directed by landowners or land managing agencies, upon completion of construction.
- Reseed the construction ROW with an appropriate seed mix[7] in a timely manner to minimize the duration of vegetative disturbance.
- Monitor wetland habitats for a 10-year post-construction period to ensure the continued development of appropriate plant communities in affected areas.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce impacts to state-listed plant species:

- Consult with the DNR Endangered Resources Review Program before construction to determine the necessary measures to protect state-listed plants and to obtain an Incidental Take Permit.

5.19 Water Resources

5.19.1 Current Environmental Setting

5.19.1.1 Groundwater Resources

Groundwater is an important source of water for private, public, commercial, and industrial uses in rural northern Wisconsin. Productive glacial drift aquifers are generally not expected to occur in the vicinity of the Projects with the exception of sand and gravel stringers that are occasionally encountered within the clay sediments. The underlying Keweenawan sandstone is a productive aquifer, although it is typically

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[7] Enbridge has developed seed mixes for residential areas, pasture areas, wildlife areas, native areas, and roadways. See Section 7.9 and Appendix C of the Environmental Report (Enbridge 2014).

200 to 300 feet below the ground surface in the vicinity of the Projects. The pipeline route would not cross any EPA-designated sole-source aquifers, since none occur in the State of Wisconsin (EPA 2014).

The DNR maintains a database that contains basic information for public wells within the state of Wisconsin (DNR 2014e). Enbridge used this database to identify public water supply wells located within 0.5 mile of the pipeline route. Out of a total of 191 wells for Douglas County, only 102 had sufficient information to locate them. Of these remaining 102 wells, three public water supply wells were identified in the vicinity of the Projects, one at a minimum approximate distance of 289 feet from the Projects and the other two at a distance of over 2,100 feet.

The DNR maintains two databases that contain information on private water wells. DATCP (2014) contains records of wells constructed from 1936 to 1989, and DNR (2014b) contains records for wells constructed for private home owners since 1987. These databases were reviewed to locate private water supply wells in proximity to the proposed pipeline routes.

For private water wells, 25 well locations with 31 well logs (two logs for six of the locations) were located within 0.5 mile of the centerline of all corridor options (DATCP 2014). All except two well locations are located at a distance of at least 270 feet from all segment options of the Projects. Logs for two wells (172 and 218 feet deep) were found for the well location closest to the Projects at a distance of 7 feet. Additionally, using data from DNR (2014d), 16 private water wells were determined to lie within 0.5 mile of the Projects, the closest being 154 feet.

The DNR—Remediation & Redevelopment Sites (RR) database (DNR 2015d) was consulted to identify contaminated sites within 0.5 mile of the Projects. This database includes completed and ongoing investigations and cleanups of contaminated soil and/or groundwater; public registry of sites with residual soil or groundwater contamination, or where continuing obligations have been put in place; cleanup of sites under the federal Superfund statute; liability exemptions and clarifications at contaminated properties (i.e., brownfields); and DNR funding assistance. Closed sites with completed cleanup were excluded from the analysis. A total of 13 open sites were identified, all with a minimum distance of 736 feet from the proposed Projects' route.

5.19.1.2 Surface Water Resources

Overall within the Project area, water drains to the Pokegama and St. Louis Rivers, which then discharge into Lake Superior. Lake Superior is the largest freshwater body in the world, covering an area of 31,700 square miles, and is third largest by volume. Lake Superior is the coldest (average temperature is 40°F) and deepest (maximum depth of 1,332 feet) of all the Great Lakes. Much of the land within the Lake Superior Major Basin is forested, with very little agriculture due to the cool climate and poor soils. Streams within the basin flow to Lake Superior, which discharges into Lake Huron and ultimately flows into the St. Lawrence Seaway via Lakes Erie and Ontario.

Many streams in the Lake Superior basin have "flashy" flow regimes, meaning that water levels rise rapidly in response to precipitation because of the impermeable soils in the watershed. Sand layers within the soils of the clay plain can create unstable bluffs along stream banks and roadsides. The power from high and rapidly changing flows erodes stream banks and leads to deposition of sand and clay into the stream. Streams in the Lake Superior clay plain are often turbid with suspended clay particles that remain in suspension and often form plumes into Lake Superior. The Nemadji River is particularly noted for carrying clay plumes into Lake Superior.

The Lake Superior Major Basin is further partitioned into numerous local watersheds. Within the Lake Superior Major Basin, wetland and waterbody crossings are located within the Superior Coastal Plain

Ecological Landscape of the St. Louis River (HUC 8 – 04010201) and Beartrap-Nemadji Rivers (HUC 8 – 04010301) Watersheds. The St. Louis River System drains an area of 3,634 square miles in northern Minnesota and Wisconsin, forming a large fresh water estuary at its mouth. The estuary and its tributaries are unusual in having such a variety of habitat types supporting a large and diverse assemblage of native fish species. The 12,000 acre St. Louis estuary supports an important complex of coastal wetlands on Lake Superior and was nominated in 2008 by the State of Wisconsin as a National Estuarine Research Reserve (NERR) under the National Oceanic and Atmospheric Administration (NOAA).

The proposed pipeline routes would cross the Pokegama River at MP 1,094.3, approximately 3.4 miles from the Projects' terminus at the Superior Terminal. The Pokegama River enters the Upper St. Louis estuary which supports extensive wetlands and undeveloped shoreline. The proposed route would also cross a number of smaller waterbodies including unnamed ditches, streams, and tributaries, and the Little Pokegama River as shown in Table 5-17. There are no natural lakes found in the area crossed by the proposed Projects.

The proposed route of the pipelines would cross multiple perennial, intermittent, and ephemeral streams, and waterbodies designated as ASNRI, the number of which would depend on the route chosen (Table 5-17). ASNRI includes trout streams, outstanding or exceptional resource waters, waters inhabited by endangered or threatened species or species of concern, or wild and scenic rivers. The Projects would have either eight or four crossings of ASNRI-designated waterbodies depending on whether Route Variation A1 or A2 is selected. The Projects would cause between 156 and 242.5 linear feet of stream impacts depending on which route variations are selected. The specific waterbody crossing methods proposed for each waterbody are also provided in Table 5-17, with additional details provided in the EPP (Appendix B).

Table 5-17 Waterbodies Crossed by Proposed Pipeline Routes

Waterbody ID Number	Project Name [a]	Approx. Milepost	Waterbody Name	Flow Regime	Project Route Variation Crossed [b]	ASNRI Water	Proposed Crossing Method [c, d]	Alternate Crossing Method [c, d]	Bridge Type [c, e]	Linear Feet of Impacts [f] (OHWM Width) [g]
St. Louis River Watershed (HUC 8)										
DO002aWB	SPP / S18	1,085.0	Unnamed stream	P	-		DC	OC	Span	6
DO002bWB	SPP / S18	1,085.0	Unnamed stream	P	-		DC	OC	Span	2
DO007aWB	SPP	1,085.9	Unnamed Stream	E	-		OC	DC	Span	3
DO007bWB	SPP / S18	1,086.0	Unnamed Stream	E	-		OC	DC	Span	2
DO007bWB	SPP	1,086.1	Unnamed Stream	E	-		OC	DC	Span	2
DO008aWB	SPP / S18	1,086.4	Unnamed Stream	E	-		OC	DC	Span	2
DO020aWB	SPP / S18	1,087.5	Unnamed Stream	P	-		DC	OC	Span	25
DO025aWB	SPP / S18	1,088.4	Unnamed Stream	I			OC	DC	Span	4
DO034_500b WB	SPP / S18	1,090.2	Unnamed Stream	E	-		OC	DC	Span	1
DO034_500a WB	SPP / S18	1,090.3	Little Pokegama River	P	-	X	DC	OC	Span	12
DO041_001b WB	SPP / S18	1,091.3	Unnamed Stream	E	A1	X	OC	DC	Span	0.5
DO041_500a WB	SPP / S18	1,091.3	Unnamed Stream	P	A1	X	DC	OC	Span	40
DO041_506a WB	SPP / S18	1,091.4	Unnamed Stream	E	A1		OC	DC	Span	4

Table 5-17 Waterbodies Crossed by Proposed Pipeline Routes

Waterbody ID Number	Project Name [a]	Approx. Milepost	Waterbody Name	Flow Regime	Project Route Variation Crossed [b]	ASNRI Water	Proposed Crossing Method [c, d]	Alternate Crossing Method [c, d]	Bridge Type [c, e]	Linear Feet of Impacts [f] (OHWM Width) [g]
DO041_506c WB	S18	1,091.5	Unnamed Stream	E	A1		OC	DC	Span	2
DO041_200c WB	S18	1,091.6	Unnamed Stream	E	A1		OC	DC		2
DO041_508f WB	SPP / S18	1,091.6	Unnamed Stream	I	A1		OC	DC		2
DO041_508e WB	SPP / S18	1,091.7	Little Pokegama River	P	A1	X	DC	OC		20
DO041_508c WB	SPP / S18	1,091.8	Unnamed Stream	E	A1		OC	DC		1
DO041_534a WB	SPP / S18	1,093.4	Unnamed Stream	E	A1		OC	DC	Span	3
DO041_534_ 200aWB	SPP / S18	1,093.5	Unnamed Tributary: Pokegama River	P	A1	X	DC	OC	Span	6
DO057aWB	SPP / S18	1,094.3	Pokegama River	P	-	X	DC	OC	Span	30
Beartrap-Nemadji Watershed (HUC 8)										
DO065_900R DcWB	SPP / S18	1,094.9	Unnamed	I	-		OC	DC	Span	1.5
DO071_001_ 900StaWB	SPP	1,095.2	Unnamed	I	-		OC	DC	Span	1
DO074aWB	SPP / S18	1,095.2	Unnamed Ditch	I	-		OC	DC	Span	3.5
DO074aWB	SPP / S18	1,095.2	Unnamed Ditch	I	-		OC	DC	Span	3.5
DO074aWB	S18	1,095.2	Unnamed	I	-		OC	DC	Span	3.5

Table 5-17 Waterbodies Crossed by Proposed Pipeline Routes

Waterbody ID Number	Project Name [a]	Approx. Milepost	Waterbody Name	Flow Regime	Project Route Variation Crossed [b]	ASNRI Water	Proposed Crossing Method [c, d]	Alternate Crossing Method [c, d]	Bridge Type [c, e]	Linear Feet of Impacts [f] (OHWM Width) [g]
			Ditch							
DO075aWB	SPP / S18	1,095.2	Unnamed Stream	E	-		OC	DC	Span	1.5
DO094_001a WB	SPP / S18	1,096.0	Unnamed Stream	P	-		DC	OC	Span	6
DO100_510a WB	SPP / S18	1,096.2	Unnamed Ditch	I	-		OC	DC	Span	2
DO106_200b WB	SPP / S18	1,096.2	Unnamed Ditch	I	C1		OC	DC	Span	5
DO106aWB	SPP / S18	1,096.3	Unnamed Ditch	I	C1		OC	DC	Span	5.5
DO109bWB	SPP / S18	1,096.5	Unnamed Ditch	I	C1		HDD	OC	Span	8
DO110_001a WB	SPP / S18	1,096.9	Unnamed Ditch	I	C1		HDD	OC	Span	4.0
DO122aWB	S18	1,097.6	Unnamed Ditch	I	-		OC	DC	Span	6.0
DO041eWB	SPP / S18	N/A	Little Pokegama River	P	A2	X	DC	OC	Span	10
DO055aWB	SPP / S18	N/A	Unnamed Stream	P	A2	X	DC	OC	Span	6
DO100_510a WB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	2
DO106_200b WB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	5
DO106aWB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	5.5

Table 5-17 Waterbodies Crossed by Proposed Pipeline Routes

Waterbody ID Number	Project Name [a]	Approx. Milepost	Waterbody Name	Flow Regime	Project Route Variation Crossed [b]	ASNRI Water	Proposed Crossing Method [c, d]	Alternate Crossing Method [c, d]	Bridge Type [c, e]	Linear Feet of Impacts [f] (OHWM Width) [g]
DO106_200a WB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	4
DO106bWB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	8
DO106bWB	SPP	N/A	Unnamed Ditch	I	C2		OC	DC	Span	8
DO106bWB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	8
DO110_001a WB	SPP / S18	N/A	Unnamed Ditch	I	C2		OC	DC	Span	4

Notes:

[a] SPP = Sandpiper Pipeline Project crossing; S18 = Segment 18 – Line 3 Replacement Project crossing

[b] Hyphen (-) denotes locations where no route variation is present.

[c] Crossing method and bridge type apply to both Sandpiper and Line 3 Replacement Pipelines.

[d] OC: Open trench method used in conditions of no flow, sometimes referred to as the “wet open-cut” method. DC: Open trench method used in conditions where a discernible water flow is present in the waterbody; referred to as the “dry trench” method, water is routed around the excavation area using either a dam and pump or flume pipe. HDD = horizontal directional drilling.

[e] Span Bridge: Timber Mat or Rail Car. All bridges may require instream support.

[f] Impacts presented would occur during pipeline construction. In the event that the pipelines are constructed at different times, these impacts would occur twice – once for each construction period.

[g] Width of the channel in feet between the ordinary high water mark on both channel banks.

5.19.2 Environmental Impacts

5.19.2.1 Groundwater Resources

Construction activities are not expected to have impacts on the quality or availability of groundwater resources. Subsurface disturbance or excavation during trenching would occur above the water table of the majority of the regional surficial aquifers, resulting in little to no water quality impacts. Water used for hydrostatic testing may result in temporary fluctuations of groundwater levels within shallow surficial aquifers. Groundwater levels typically would recover in a short period following completion of construction activities and shallow groundwater aquifers generally recharge quickly because they are receptive to recharge from precipitation and surface water flow. Impacts to public or private water supply wells are not anticipated.

With regard to contaminated groundwater, all identified contaminated groundwater sites are more than 500 feet from the Projects and are not anticipated to impact or be impacted by the Projects. However, inaccuracies in the database require field-evaluation on a site-by-site basis to verify this observation. Prior to the Projects' construction, Enbridge would assess the potential for encountering contaminated groundwater if any sites are actually located within 500 feet of the pipeline route. Enbridge would consult with the appropriate regulatory agencies to confirm that the Projects would not encounter contamination from the site. If necessary, appropriate avoidance or mitigation measures would be developed and implemented in accordance with applicable state and federal regulations. A discussion of the potential impacts of a crude oil spill to groundwater resources is addressed in Section 8.5.20.1.

5.19.2.2 Surface Water Resources

Impacts to surface water resources during construction activities include temporary increases in total suspended solids concentrations and increased sedimentation from removal of substrates and from vegetation clearing activities, changes in channel morphology and stability caused by channel and bank modifications, changes in water quality from alteration of stream banks and removal of riparian vegetation, and temporary reduced flow in streams during stream diversions and hydrostatic testing.

Installation of a pipeline across a stream or river can temporarily displace stream bottom sediments and increase erosion of soils adjacent to the waterbody. The magnitude and duration of these effects depends on the soils and topography of the site, and the proposed crossing method (see Table 5-17). For open-cut wet crossings, construction activities involve excavation of the channel and banks in the wetted channel and excavated soils would be in direct contact with surface water flow, resulting in sediment entering the water. For dry crossing methods, however, work areas would be relatively dry by creating a temporary dam upstream and downstream of the work area, resulting in relatively less turbidity and sedimentation than wet crossing techniques since most construction activities would not occur in contact with surface waters. For waterbody crossings where boring or horizontal directional drilling (HDD) would be used, no instream mitigation would typically be necessary because boring or HDD does not involve direct contact with the surface waterbody, stream channel, or stream banks. However, Enbridge does not propose to use the HDD method to cross the Pokegama River in Wisconsin because previous use of this method during construction of Lines 67 and 13 in 2009 and 2010 resulted in inadvertent returns of drilling fluids during the processes, resulting in impacts to the river. Three large inadvertent returns of drilling fluid (ranging from approximately 100 to 6,500 gallons) occurred during installation of Line 67, two of which entered the river. In response to the 6,500-gallon event, the flow of the river was diverted to isolate the inadvertent return and recover the drilling fluid by vacuum while pulling the 36-inch pipeline through the reamed pilot hole. While pulling the pipeline through the reamed pilot hole, drilling fluid caused the riverbed to shift several feet. Prior to removing the dam, excess clay soils were excavated to return the riverbed to its original, preconstruction contours. Construction of the Sandpiper and Line 3 Replacement

Pipelines using HDD in the same area would likely result in inadvertent returns of drilling fluid with additional unanticipated impacts.

Depending on the geomorphic characteristics of a particular stream and pipeline crossing location, pipeline exposure can become an issue over the lifetime of their operation. The potential for pipeline exposure is dependent on a variety of factors that influence erosion along streams. These concerns become more significant when associated with sensitive resources like rivers and wetlands. Planning, design, and construction measures can be implemented to reduce this risk (see Castro et al. 2014). Construction could also change the stream bottom profile, resulting in increased siltation or erosion at the site or further downstream; however this would be a temporary impact and may mimic to some degree the “flashy” flow regimes of streams in the Lake Superior clay plain. Maintenance of forest cover and wetlands within the watershed generally help to ameliorate rapid runoff from the watershed and reduce stream flashiness that leads to stream bank erosion and subsequent aquatic habitat degradation.

Removal of vegetation could destabilize the stream banks and increase the potential for additional erosion, resulting in sedimentation and turbidity in the waterbody. This impact would be reduced by implementing the measures identified in the EPP including stabilizing the streambed and stream banks after construction to minimize erosion and resulting sedimentation entering waterways shortly after completing activities and reseeding stream banks with appropriate seed mixes (e.g., wetland seed mix) to reestablish vegetation quickly post-construction. Temporary erosion and sediment controls also include installing slope breakers, sediment barriers, stormwater diversions, and trench breakers.

Impacts on water quality could result from alteration of stream banks and removal of riparian vegetation. Removal of riparian vegetation in areas adjacent to streams reduces shade, allows light to enter and can increase water temperatures in these areas. Although disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation, it would take time for vegetation to become reestablished such that it creates shade. Woody vegetation and trees would be permanently removed and maintained, resulting in no shading in these areas. Changes in light and temperature characteristics of some streams from vegetation removal at pipeline crossings may affect the behavioral patterns of aquatic species, including spawning, feeding, and predator avoidance, as well as retard growth (Spence et al. 1996).

Water used for hydrostatic testing would be obtained from nearby surface water resources. Enbridge identified the Pokegama River as a potential source and discharge location for the hydrostatic testing of the test segment in Wisconsin. All waterbodies utilized for hydrostatic testing would be approved by the appropriate federal, state, and tribal agencies prior to initiation of any testing activities. Planned withdrawal rates for each water resource would be approved by these agencies prior to testing. After testing is complete, water would be returned to the waterbody from which it was taken to minimize the potential for introduction and/or spread of invasive species. Water would be discharged to a well vegetated, upland area with an appropriate dewatering structure to prevent erosion of the discharge area. Direct discharges to surface waters, if allowed by permit, would be directed into an energy dissipation device such as a splash pup to avoid erosion.

Stormwater that has entered the trench during construction would be collected and discharged to an upland location to prevent potential erosion from fast moving water and to prevent silt-laden water from entering waterbodies. Enbridge intends to request authorization to discharge construction stormwater under NR 151 and NR 216.

Temporary impacts to ground and surface water resources would occur twice if the two pipelines are not constructed concurrently. A discussion of the potential impacts of a crude oil spill to surface water resources is addressed in Section 8.5.20.2.

5.19.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to groundwater resources and surface waterbodies during construction of the pipelines:

- Assess the potential for encountering contaminated groundwater if any contaminated sites are actually located within 500 feet of the pipeline route and consult with the appropriate regulatory agencies to confirm the Projects would not encounter contamination from the site. If necessary, appropriate avoidance or mitigation measures would be developed and implemented in accordance with applicable state and federal regulations.
- Stabilize the streambed and stream banks after construction to minimize erosion and resulting sedimentation entering waterways as soon as practicable after completing activities.
- Reseed the construction ROW with an appropriate seed mix in a timely manner to minimize the duration of vegetative disturbance.
- Discharge hydrostatic test water to the same source location from which it was appropriated to minimize the potential for introduction and/or spread of invasive species.
- Direct hydrostatic test water or dewatered trench water to well-vegetated upland areas using an appropriate dewatering structure such as a geotextile filter bag and/or a hay bale structure lined with geotextile fabric in a manner that drains away from waterbodies or wetlands and discharge at a rate to promote filtering and soaking into the ground surface. Direct discharges to surface waters, if allowed by permit, would be directed into an energy dissipation device such as a splash pup.
- Install temporary erosion control measures such as slope breakers, sediment barriers, stormwater diversions, and trench breakers after initial clearing and before disturbance of the soil at the base of sloped approaches to streams, wetlands, and roads to slow the velocity of water off-site to minimize erosion, stop the movement of sediments off the construction ROW, and prevent the deposition of sediments into nearby waterways.
- Install the appropriate class of erosion control blanket on slopes greater than 5 percent that will be exposed over the winter and drain to surface waters, before snowfall to ensure maximum protection of exposed slopes prior to spring melt off and the frequent winter storms that occur in northern Wisconsin in March and April.

In addition to these measures committed to by Enbridge, DNR recommends the following measures to address impacts to water resources in Douglas County that would be affected by the proposed Projects:

- Coordinate with DNR to determine the least impactful method of pipeline construction specific to each waterbody crossed by the Projects.

5.20 Wetlands

Wetlands provide various important environmental functions including flood control, shoreline stabilization, streamflow maintenance, groundwater recharge, sediment removal, nutrient cycling, production of trees, production of herbaceous growth, plant and wildlife habitat, and recreational uses.

5.20.1 Current Environmental Setting

Great Lakes wetland systems are unique from a global perspective, and the St. Louis River wetlands are the largest such complex on the Lake Superior shore, representing a significant source of productivity for the entire Lake Superior ecosystem. The estuary and its tributaries are unusual in having such a variety of habitat types supporting a large and diverse assemblage of native fish species.

Approximately 23 percent of Douglas County is categorized as wetlands by the Wisconsin Wetland Inventory (WWI; 194,169 acres of wetlands out of 837,924 total acres) (DNR 2015f). The northern third of the county is in the Lake Superior clay plain. The clay plain is rich in wetlands, in part due to the impermeable clay soils and relatively flat topography. Although wetlands are locally abundant, they are often of types that are nationally rare. In the area proposed to be crossed by the Projects and up to the Superior Terminal, shrub swamps and wet meadows are commonly interspersed with agricultural, residential, and industrial land uses.

Unlike many other Great Lakes freshwater estuaries, many of these coastal wetlands are still in good biological condition and are valuable repositories of regional biodiversity. Even though many of the wetlands on these lacustrine clays have been disturbed by hydrological disruption, agriculture, and past logging, they support unusual assemblages of species, some of which are unique in Wisconsin. In and around the City of Superior especially, the red clay wetlands support many rare plants, some rare animals, and remnants of an unusual and geographically restricted variant of Boreal (spruce-fir) Forest. The lower Nemadji and Pokegama river corridors (and their drainages into the St. Louis River estuary) contain ecologically significant wetlands that act as important fish spawning and nursery areas, plus quality habitat for waterfowl and other birds, mammals, herptiles, and invertebrates. (DNR 2014b).

The wetlands survey corridor for the proposed pipelines consists of approximately 1,177 acres, covers approximately 22 miles, and has an average width of 300 feet (Enbridge 2014b). Wetland surveys were conducted in 2013 and 2014 on approximately 1,028 acres of the total wetlands survey corridor. These surveys identified 190 wetlands within 448 wetland communities comprised of Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested vegetative (PFO), and Palustrine Unconsolidated Bottom (PUB) communities (characterized according to Cowardin et al. 1979) (Table 5-18).

PEM wetlands are nontidal, freshwater[8] wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants. They also include wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2m at low water; and (4) salinity due to ocean-derived salts less than 0.5 parts per thousand (‰). Vegetation is present in PEM wetlands for most of the growing season in most years. PEM wetlands include marshes, meadows, and fens. Characteristic herbaceous species in these PEM wetlands along the proposed pipeline routes include sedges, Canada bluejoint grass, orange jewelweed, asters, boneset, rough bedstraw, marsh fern, arrow-leaved tearthumb, and sensitive fern. Much of the emergent wetlands are along existing utility ROWs, which are maintained free of woody vegetation.

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[8] <0.5 parts per thousand (‰) salinity.

Table 5-18 Wetland Types that would be Crossed by Proposed Pipeline Segments (acres) [a]

Wetland Type[b]	MP 1,084.8 – 1,090.9	MP 1,090.9 – 1094.2		MP 1,094.2 – 1,095.4	MP 1,095.4 – 1,095.6		MP 1,095.6 – 1,096.2	MP 1,096.2 – 1,097.0		MP 1,094.0 – 1,097.7
		Route Variation A1	Route Variation A2		Route Variation B1	Route Variation B2		Route Variation C1	Route Variation C2	
Wetland Impacts – Construction [c, d]										
PEM	26.4	4.7	11.1	5.1	1.1	1.1	3.0	5.3	1.3	10.9
PSS	13.0	29.3	26.4	0.8	2.7	2.0	1.0	2.3	11.1	1.6
PFO	7.0	6.6	1.5	1.8	0.7	-	0.7	<0.1	0.6	2.3
PUB	0.1	-	-	-	-	-	-	0.6	-	-
Total	46.6	40.6	39.0	7.7	4.5	3.2	4.7	8.3	13.1	14.8
Wetland Impacts – Permanent [c, e]										
PEM	-	-	-	-	-	-	-	-	-	-
PSS	5.6	17.1	10.7	0.4	1.4	0.8	0.1	1.3	6.4	0.2
PFO	7.0	6.6	1.5	1.8	0.7	-	0.7	<0.1	0.6	2.3
PUB	-	-	-	-	-	-	-	-	-	-
Total	12.6	23.8	12.3	2.3	2.0	0.8	0.8	1.3	7.0	2.5

Source: Enbridge and Merjent 2016.

Notes:

[a] The comparisons of route variations presented in this table identify a combined representation of the Line 3 Replacement and Sandpiper Pipeline Projects' impacts.

[b] PEM = Palustrine Emergent; PSS = Palustrine Scrub Shrub; PFO = Palustrine Forested; PUB = Palustrine Unconsolidated Bottom (Cowardin et al. 1979).

[c] Based on field delineated data from 2013–2015 surveys. Where 2013–2015 survey is not complete, Enbridge used recent (2008/2009) wetland and waterbody field data from a previous project and WWI data.

[d] Area of wetland impact within the construction workspace is based typically on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas.

[e] Permanent conversion impacts include PFO wetland impacts within the construction workspace, and the area where PSS wetlands occur within the new permanently maintained easement.

PSS wetlands are dominated by woody vegetation, including true shrubs, young, trees, and trees/shrubs that are less than 20 feet tall. They include shrub swamp and bogs. These PSS wetlands along the proposed pipeline routes are dominated by alder thickets, particularly speckled alder, and include red-osier dogwood, willows, sedges, cattails, or other hydrophytic species.

PFO wetlands are dominated by woody vegetation 20 feet or taller. They generally include an overstory of trees, an understory of young trees and shrubs, and an herbaceous layer. These PFO vegetative wetlands along the proposed pipeline routes contain primarily black ash (*Fraxinus nigra*) dominated depressions within the hardwood uplands along the route; discrete aspen groves within shrub-carr; and isolated hardwoods and conifers in better drained areas adjacent to incised drainageways.

PUB wetlands are areas of water with at least 25 percent cover of particles smaller than stones (less than 6 to 7 cm) and a vegetative cover less than 30 percent.

Two wetland complexes are located between the Pokegama and Little Pokegama rivers: The Pokegama Carnegie Wetlands and Superior Airport/Hill Avenue/South Superior Triangle Wetlands. The Pokegama Carnegie Wetlands are a Wisconsin-designated SNA and ASNRI owned by Douglas County and DNR. The Pokegama Carnegie Wetlands SNA (designated in 2006) and ASNRI is managed by DNR as a reserve for tamarack (poor) swamp, alder thicket, and northern sedge meadow; boreal forest and wetland restoration site; aquatic reserve; and rare plant habitat site. The Superior Airport/Hill Avenue/South Superior Triangle Wetlands ASNRI is composed of several discontinuous wetlands separated by roads, railroad tracks, and other urban developments. Both of these wetland complexes are notable for their concentrations of rare plants, some of which occur nowhere else in the drainage basin or state.

5.20.2 Environmental Impacts

Pipeline construction in wetlands crossed by the proposed pipeline route would consist of clearing, trenching, dewatering, installation, backfilling, cleanup, and revegetation. Such activities would lead to wetland habitat alteration, permanent changes in wetland types, and changes in wetland species compositions, structure, productivity, and function. As described in Section 5.19.2, Enbridge does not propose to use the HDD method to cross waterbodies (including wetlands) in Wisconsin because previous use of this method during construction resulted in inadvertent returns of drilling fluids during the processes, resulting in impacts to areas outside the ROW. As a result, timber mat roads were extended beyond the areas originally anticipated to allow vacuum trucks to access inadvertent return sites to recover drilling fluid. In one instance, 4,000 to 6,000 gallons of drilling fluid discharged within a rare plant population. Construction of the Sandpiper and Line 3 Replacement Pipelines using HDD in these same areas may result in inadvertent returns of drilling fluid.

The removal of wetland vegetation during construction and maintenance activities during operations would constitute the greatest impact to wetlands. In PEM wetlands, herbaceous vegetation would regenerate within one or two seasons, resulting in short-term construction impacts. During operations, periodic mowing during maintenance of the ROW would permanently maintain these wetlands as PEM wetlands, resulting in no long-term impacts to existing PEM wetlands.

In PFO and PSS wetlands, clearing impacts would be long-term due to the long recovery period of these vegetation types (5 to 10 years for PSS species and 50 years or more for willow, ash, tamarack and spruce). To preserve the native seed stock and aid in regeneration of wetland species, up to one foot of topsoil (organic layer) would be stripped from the trench line, stockpiled separately from trench spoil, and replaced. Unsaturated wetlands would be revegetated with a temporary crop cover but would be allowed to naturally revegetate with the seeds and rhizomes that occur in the topsoil. Seeding would not be conducted in saturated wetlands. Areas within the temporary ROW would regenerate and could eventually recover as PFO and PSS wetlands. However, some vegetation in these wetlands may not be able to regenerate due to the altered conditions of the area post-construction or the competition with invasive species. In the permanent ROW, periodic mowing during maintenance of the ROW would likely maintain these PFO and PSS wetlands in an emergent state as PEM wetlands, which constitutes a permanent landscape change.

Wetland communities could be altered from the clearing of trees in the construction ROW by exposing edge trees to elevated levels of sunlight and wind. Shade-intolerant species and some early successional species could become established and persist on the newly created edge, altering the species composition of the area. Clearing of trees and vegetation could cause the spread of invasive plant and animal species along the pipeline ROW during construction. To prevent the spread of noxious and invasive plant species, timber mats would be kept free of soil and plant material prior to being transported onto the construction ROW and/or moved from one area of the construction ROW to another area. All construction equipment (e.g., timber mats, vehicles) would be cleaned prior to arrival at all construction sites. See Section 3.2.19 for descriptions of additional measures to reduce the spread of invasive species during construction.

Wetland species compositions, structure, and productivity could be impacted by alterations in surface and subsurface hydrology due to trenching, dewatering, and backfilling. To reduce this impact, construction work areas would be restored as practicable to the original preconstruction contours. Wetland hydrology would be maintained by using trench breakers in any area where the potential to drain, or partially drain, a wetland exists, sufficiently compacting the pipeline trench, and placing the pipeline on native material as opposed to gravel.

Wetlands provide an important flood protection function by holding water on the landscape, which slows the rate of water runoff to the streams. Wetland loss can lead to increased runoff from the landscape, resulting in flooding and stream bank erosion. For streams in the clay plain, the stream bank erosion caused by excess water runoff leads to habitat degradation from sedimentation. Trenching, dewatering, and stockpiling could lead to temporary increases in sedimentation and the potential for increased erosion during construction. The erosion and sediment control measures contained in the EPP (see Appendix B and Section 5.16.3) would reduce this impact during construction.

Construction activities may cause localized soil compaction which can lead to slower or less successful vegetation reestablishment following construction. Grading activities and construction and operations equipment traveling over wet soils could also disrupt the soil structure, reduce pore space and percolation rates, increase runoff potential, and cause rutting. These impacts would be reduced by using timber mats and/or low-ground-pressure equipment[9] in wetlands. Any impacts to wetlands would occur twice if the two pipelines are not constructed concurrently.

Overall, between approximately 84.7 and 90.2 acres of wetlands would be affected by construction and between 31.5 and 41.0 acres of wetlands would be permanently affected during operations. To offset these impacts, Enbridge originally proposed a compensatory mitigation plan in 2014 at the Crawford Creek mitigation site located in the Town of Superior. Subsequently, the DNR implemented an in-lieu fee program and as a result, in March 2015 Enbridge withdrew the compensatory mitigation plan and requested to utilize the in-lieu fee program to compensate for wetland impacts. The in-lieu fee program, regulated by the USACE and DNR, compensates for impacts to wetland resources through funds paid to a government or non-profit natural resources management entity to satisfy compensatory mitigation

[9] Low ground-pressure equipment spreads a machine's weight over a larger area using wide tires and other features.

requirements for permits. An in-lieu fee program sells credits to permittees whose legal obligation to provide compensatory mitigation is then transferred to the sponsor of the in-lieu fee program upon receipt of an associated credit fee.

5.20.3 Mitigation Measures

The following mitigation measures are proposed by Enbridge to reduce impacts to wetlands during construction of the pipelines:

- Strip, segregate and replace up to one foot of topsoil (organic layer) from the trench line to preserve the native seed stock and aid in regeneration of wetland species.
- Revegetate unsaturated wetlands with a temporary crop cover and allow to naturally revegetate with the seeds and rhizomes that occur in the topsoil.
- Restore construction work areas to the original preconstruction contours to the extent practicable.
- Keep timber mats free of soil and plant material prior to being transported onto the construction ROW and clean all construction equipment (e.g., timber mats, vehicles) prior to arrival at all construction sites to prevent the spread of noxious and invasive plant species.
- Maintain wetland hydrology using trench breakers in any area where the potential to drain, or partially drain, a wetland exists, sufficiently compacting the pipeline trench, and placing the pipeline on native material as opposed to gravel.
- Install temporary erosion control devices prior to trenching activities (described in Section 5.16.3 and the EPP).
- Use timber mats and/or low-ground-pressure equipment[10] in wetlands to reduce soil compaction impacts.
- Locate ATWS outside of wetlands to the extent practicable but if necessary, do not perform vegetation clearing or earthwork between the ATWS and wetland and limit the size of ATWS to the minimum necessary to construct the wetland crossing.

In addition to these measures committed to by Enbridge, DNR recommends the following measure to address impacts to water resources in Douglas County that would be affected by the proposed Projects:

- Coordinate with DNR to determine the least impactful method of pipeline construction specific to each wetland crossed by the Projects.

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[10] Low ground-pressure equipment spreads a machine's weight over a larger area using wide tires and other features.

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6. ENVIRONMENTAL ANALYSIS OF THE ROUTE VARIATIONS

6.1 Description of the Potential Route Variations

The route for the proposed pipelines generally follows the same route as that of six existing Enbridge pipelines within a 175-foot-wide permanently maintained easement. Enbridge identified small alternative pipeline routes (called route variations) for three sections of the proposed route: Sections A, B, and C (Figure 6-1). Route Variations A1 and A2 are proposed to avoid existing residences and the Pokegama Carnegie Wetlands State Natural Area (SNA); Route Variation B1 is proposed to avoid a land parcel that is involved in ongoing litigation; and Route Variation C2 was proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course. Section 4.2 provides further detail on the route variations.

Enbridge proposes to use a combined 110-foot-wide construction right-of-way (ROW) for the proposed pipelines with additional temporary workspaces (ATWS) at “feature crossings” (e.g., roads, waterbodies). The construction ROW is divided between the spoil side (area used to store topsoil and excavated materials) and the working side (area used to accommodate safe operation of construction equipment and travel lane). By using their existing cleared ROW along much of the proposed pipelines, Enbridge would use a ratio of 1.67 feet of construction workspace per diameter inch for the proposed pipelines, an approximately 14 percent decrease from previous pipeline projects. Enbridge proposes approximately 75 feet of new clearing impacts.

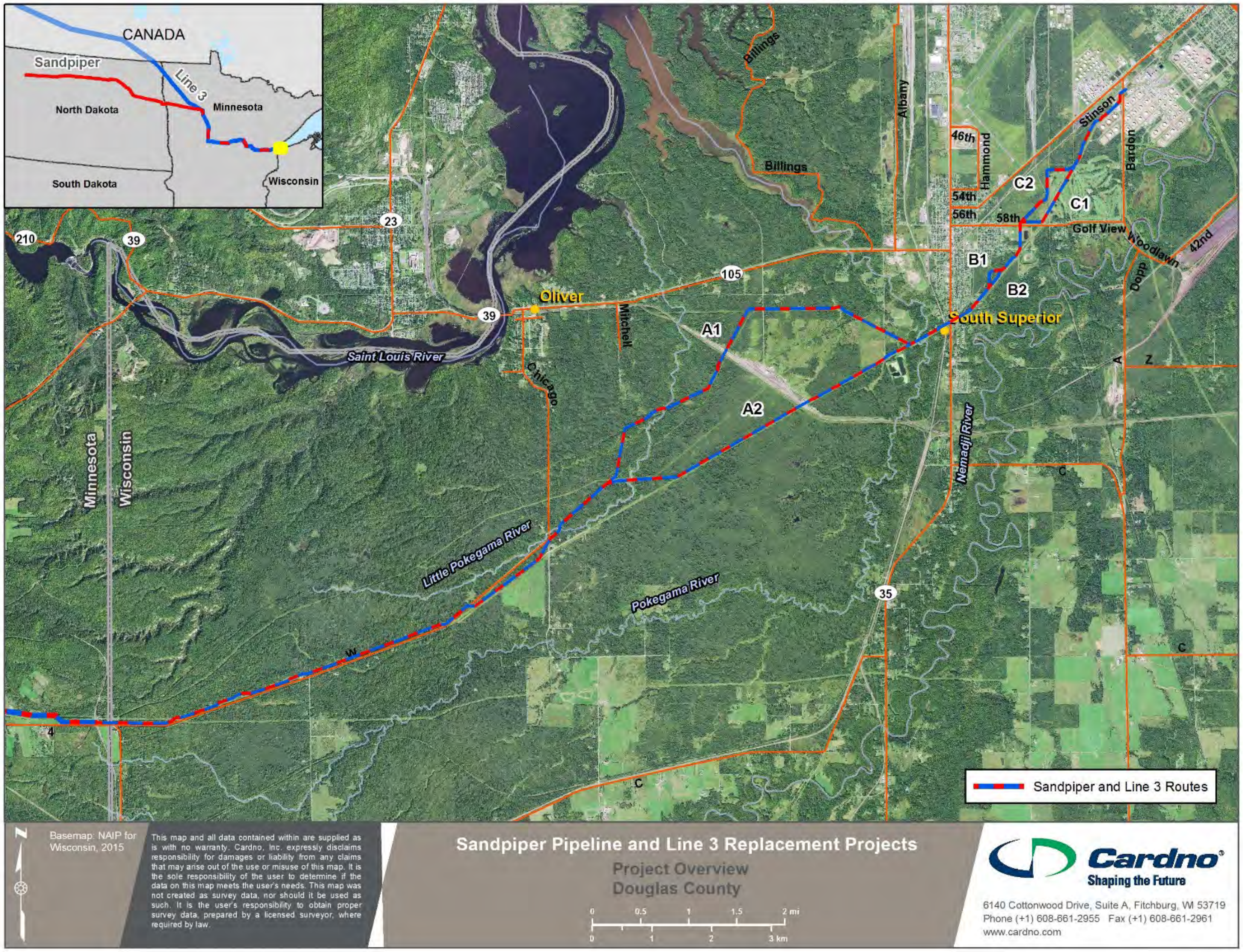

Figure 6-1 Proposed Pipeline Route Variations A1, A2, B1, B2, C1, and C2

6.2 Impacts of Route Variations

The following subsections provide comparisons of the environmental impacts of the co-located Sandpiper and Line 3 Replacement Pipelines for each proposed route variation: A1 versus A2, B1 versus B2, and C1 versus C2. To facilitate comparison, the impacts of each route variation on the environmental resources discussed in Chapter 5 are provided in tables below. The least impactful route variation for each environmental resource is shown in bold font within each table. A figure showing the route variations is provided following each comparison table.

6.2.1 Comparison of Route Variations A1 and A2

Route Variation A1 (a combined 13.1 miles) would be 1.5 miles longer than Route Variation A2 (11.6 miles), and it would affect 1 additional mile of greenfield area compared with Route Variation A2 (1.8 miles for Route Variation A1 versus 0.5 mile for Route Variation A2) (Figure 6-2). In addition, Route Variation A1 would be co-located with Enbridge's existing ROW for a shorter distance (1.7 mile for Route Variation A1 versus 7.3 miles for Route Variation A2). The environmental impacts of Route Variations A1 and A2 are provided in Table 6-1, and impacts are representative of co-location of the Projects. The least impactful route variation for each environmental resource factor considered is shown in **bold** font.

Table 6-1 Comparison of Impacts[a] for Route Variations A1 and A2

Environmental Resource	Route Variation A1	Route Variation A2
Aesthetics	A greater amount of upland forest would be affected compared with Route Variation A2, which would be more noticeable in the general landscape. Route Variation A1 would also cross two more roads than Route Variation A2, which would affect viewers from the roadway temporarily during construction.	**A smaller amount of upland forest would be affected compared with Route Variation A1, which would be less noticeable in the general landscape. Route Variation A2 would also cross two fewer roads than would Route Variation A1, which would affect fewer viewers from the roadway temporarily during construction.**
Air Quality	Since Route Variation A1 is 1.4 miles longer than Route Variation A2, slightly greater emissions would occur during construction.	**Since Route Variation A2 is 1.4 miles shorter than Route Variation A1, slightly lower emissions would occur during construction.**
Agricultural Resources	Agricultural Land Affected: 0.0 acres Farmland of Statewide Importance: 65.3 acres impacted during construction.	Agricultural Land Affected: 0.0 acres **Farmland of Statewide Importance: 45.0 acres impacted during construction.**
Cultural Resources	No resources of religious and cultural significance (including Traditional Cultural Properties [TCPs]) were found within the survey corridor. Therefore, there is no measurable difference in impacts on cultural resources between Route Variations A1 and A2.	No resources of religious and cultural significance (including TCPs) were found within the survey corridor. Therefore, there is no measurable difference in impacts on cultural resources between Route Variations A1 and A2.
Federally Listed Endangered and Threatened Species	Since Route Variation A1 would impact 8.5 additional acres of upland forest compared with Route Variation A2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-	**Since Route Variation A2 would impact 8.5 fewer acres of upland forest than Route Variation A1, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx,**

Table 6-1 Comparison of Impacts[a] for Route Variations A1 and A2

Environmental Resource	Route Variation A1	Route Variation A2
	eared bat, and gray wolf) would be greater.	**Northern long-eared bat, and gray wolf) would be less.**
Fish and Wildlife	There are two fish Species of Greatest Conservation Need within 2 miles of Route Variation A1. **There is one state-listed threatened wildlife species within 2 miles of the route variation.** Four Species of Special Concern are present within 2 miles of the route variation.	**There is one fish Species of Greatest Conservation Need within 2 miles of the Route Variation A2.** There are two state-listed threatened wildlife species within 2 miles of the route variation. Four Species of Special Concern are present within 2 miles of the route.
Forests and Other Woodland Resources	Upland Forest Affected: 20.7 acres	**Upland Forest Affected: 12.2 acres**
Geological Hazards	No measurable difference between Route Variations A1 and A2 with regard to geologic hazard impacts.	No measurable difference between Route Variations A1 and A2 with regard to geologic hazard impacts.
Invasive Species	No measurable difference between Route Variations A1 and A2 with regard to invasive species.	No measurable difference between Route Variations A1 and A2 with regard to invasive species.
Noise	No measurable difference between Route Variations A1 and A2 with regard to noise impacts.	No measurable difference between Route Variations A1 and A2 with regard to noise impacts.
Public Utilities	Railroad Crossings: 2 Roads Crossings: 8	Railroad Crossings: 2 **Roads Crossings: 6**
Recreation Areas	**The Pokegama Carnegie Wetlands SNA is avoided by Route Variation A1.**	The Pokegama Carnegie Wetlands SNA is within Enbridge's existing ROW corridor along Route Variation A2. A total of 19.0 acres of the Pokegama Carnegie Wetlands SNA would be impacted by construction of Route Variation A2.
Residential Areas	Residences within 300 feet: 1	Residences within 300 feet: 1
Safety	No measurable difference between Route Variations A1 and A2 with regard to safety.	No measurable difference between Route Variations A1 and A2 with regard to safety.
Socioeconomics	No measurable difference between Route Variations A1 and A2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.	No measurable difference between Route Variations A1 and A2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.
Soils and Topography	**Compaction Prone Soils: 17.7 acres** Highly Water Erodible Soils: 10.4 acres	Compaction Prone Soils: 33.5 acres **Highly Water Erodible Soils: 5.5 acres**
Transportation	Route Variation A1 would cross two additional roads compared with Route Variation A2, which may affect road users temporarily during construction due to road closures or diversions.	**Route Variation A2 would cross two fewer roads than would Route Variation A1, resulting in slightly less disruption to road users during construction from road closures or diversions.**
Vegetation (Plants)	**Four state-listed species of special**	Five state-listed species of special concern

Table 6-1 Comparison of Impacts[a] for Route Variations A1 and A2

Environmental Resource	Route Variation A1	Route Variation A2
	concern are within 1 mile of the route variation. Five state-listed threatened species are within 1 mile of the route variation. Three state-listed endangered species are within 1 mile of the route variation.	are within 1 mile of the route variation. Five state-listed threatened species are within 1 mile of the route variation. Three state-listed endangered species are within 1 mile of the route variation.
Water Resources	Intermittent Waterbody Crossings: 2 Ephemeral Waterbody Crossings: 10 Perennial Waterbody Crossings: 6	**Intermittent Waterbody Crossings: 0** **Ephemeral Waterbody Crossings: 0** **Perennial Waterbody Crossings: 4**
Wetlands	Wetland Crossing Length: 5.6 miles Temporary Wetland Impacts (Construction): 40.6 acres **PEM: 4.7 acres** PSS: 29.3 acres PFO: 6.6 acres Permanent Wetland Impacts (Operations): 23.8 acres PEM: 0.0 acres PSS: 17.1 acres PFO: 6.6 acres **Priority Wetlands: 0.0 miles**	**Wetland Crossing Length: 5.4 miles** **Temporary Wetland Impacts (Construction): 39.0 acres** PEM: 11.1 acres **PSS: 26.4 acres** **PFO: 1.5 acres** **Permanent Wetland Impacts (Operations): 12.3 acres** PEM: 0.0 acres **PSS: 10.7 acres** **PFO: 1.5 acres** Priority Wetlands: 3.0 miles

Source: Enbridge 2015; Enbridge and Merjent 2016.

Notes:

[a] Comparisons between route variations are based on measurements/impacts of co-construction of Sandpiper and Line 3 Replacement Pipelines.
PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub

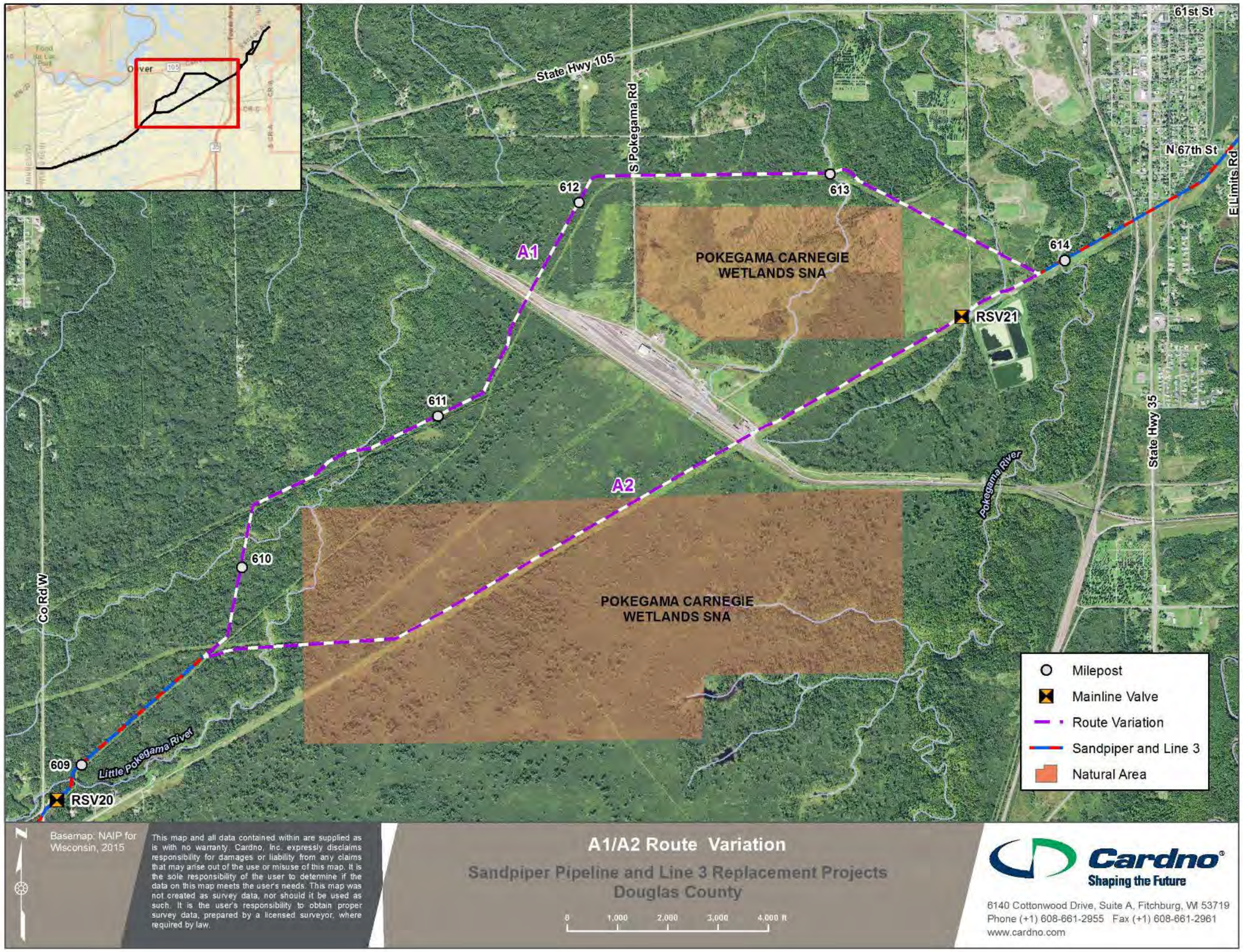

Figure 6-2 Proposed Pipeline Route Variations A1 and A2

6.2.2 Comparison of Route Variations B1 and B2

Route Variation B1 (0.6 mile) would be 0.1 mile longer than Route Variation B2 (0.5 mile) and would affect 0.6 mile more of greenfield area than would Route Variation B2 (0.6 mile for Route Variation B1 versus 0.0 mile for Route Variation B2) (Figure 6-3). Route Variation B1 would not be co-located with Enbridge's existing ROW, unlike Route Variation B2 (0.0 mile of co-location for Route Variation B1 versus 0.5 mile of co-location for Route Variation B2). The environmental impacts of Route Variations B1 and B2 are provided in Table 6-2, and impacts are representative of co-location of the Projects. The least impactful route variation for each environmental resource factor considered is shown in **bold** font.

Table 6-2 Comparison of Impacts[a] for Route Variations B1 and B2

Environmental Resource	Route Variation B1	Route Variation B2
Aesthetics	**A slightly smaller amount of upland forest would be affected compared with Route Variation B2, which would be less noticeable in the general landscape.**	A slightly greater amount of upland forest would be affected compared with Route Variation B1, which would be more noticeable in the general landscape.
Air Quality	Since Route Variation B1 is 0.1 mile longer than Route Variation B2, slightly greater emissions would occur during construction.	**Since Route Variation B2 is 0.1 mile shorter than Route Variation B1, slightly lower emissions would occur during construction.**
Agricultural Resources	Agricultural Land Affected: 0.0 acres Farmland of Statewide Importance: 3.7 acres	Agricultural Land Affected: 0.0 acres **Farmland of Statewide Importance: 1.4 acres**
Cultural Resources	No resources of religious and cultural significance (including TCPs) were found within the survey corridor; therefore, there is no measurable difference in impacts on cultural resources between Route Variations B1 and B2.	No resources of religious and cultural significance (including TCPs) were found within the survey corridor; therefore, there is no measurable difference in impacts on cultural resources between Route Variations B1 and B2.
Federally Listed Endangered and Threatened Species	**Since Route Variation B1 would impact 0.3 fewer acres of upland forest than Route Variation B2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be less.**	Since Route Variation B2 would impact 0.3 more acres of upland forest than Route Variation B1, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be greater.
Fish and Wildlife	There is one fish Species of Greatest Conservation Need within 2 miles of route Variation B1. There is one state-listed threatened wildlife species within 2 miles of the route variation. Two Species of Special Concern are present within 2 miles of the	There is one fish Species of Greatest Conservation Need within 2 miles of Route Variation B2. There is one state-listed threatened wildlife species within 2 miles of the route variation. Two species of Special Concern are present within 2 miles of the

Table 6-2 Comparison of Impacts[a] for Route Variations B1 and B2

Environmental Resource	Route Variation B1	Route Variation B2
	route variation.	route variation.
Forests and Other Woodland Resources	**Upland Forest Affected: 2.9 acres**	Upland Forest Affected: 3.2 acres
Geological Hazards	No measurable difference between Route Variations B1 and B2 with regard to geologic hazard impacts.	No measurable difference between Route Variations B1 and B2 with regard to geologic hazard impacts.
Invasive Species	No measurable difference between Route Variations B1 and B2 with regard to impacts on invasive species.	No measurable difference between Route Variations B1 and B2 with regard to impacts on invasive species.
Noise	No measurable difference between Route Variations B1 and B2 with regard to noise impacts.	No measurable difference between Route Variations B1 and B2 with regard to noise impacts.
Public Utilities	Railroad Crossings: 0 Roads Crossings: 0	Railroad Crossings: 0 Roads Crossings: 0
Recreation Areas	Neither route variation would cross a recreation area.	Neither route variation would cross a recreation area.
Residential Areas	**Route Variation B1 would avoid a land parcel that is involved in ongoing litigation.**	Route Variation B2 would cross a land parcel that is involved in ongoing litigation.
Safety	No measurable difference between Route Variations B1 and B2 with regard to safety.	No measurable difference between Route Variations B1 and B2 with regard to safety.
Socioeconomics	No measurable difference between Route Variations B1 and B2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.	No measurable difference between Route Variations B1 and B2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.
Soils and Topography	**Compaction Prone Soils: 0.9 acre** Highly Water Erodible Soils: 0 acres	Compaction Prone Soils: 1.8 acres Highly Water Erodible Soils: 0 acres
Transportation	Neither route variation would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.	Neither route variation would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.
Vegetation (Plants)	One state-listed species of special concern is within 1 mile of the route variation. Four state-listed threatened species are within 1 mile of the route variation. Two state-listed endangered species are within 1 mile of the route variation.	One state-listed species of special concern is within 1 mile of the route variation. Four state-listed threatened species are within 1 mile of the route variation. Two state-listed endangered species are within 1 mile of the route variation.
Water Resources	Intermittent Waterbody Crossings: 0	Intermittent Waterbody Crossings: 0

Table 6-2 Comparison of Impacts[a] for Route Variations B1 and B2

Environmental Resource	Route Variation B1	Route Variation B2
	Ephemeral Waterbody Crossings: 0 Perennial Waterbody Crossings: 0	Ephemeral Waterbody Crossings: 0 Perennial Waterbody Crossings: 0
Wetlands	Wetland Crossing Length: 0.6 mile Temporary Wetland Impacts (Construction): 4.5 acres PEM: 1.1 acres PSS: 2.7 acres PFO: 0.7 acre Permanent Wetland Impacts (Operations): 2.0 acres PEM: 0.0 acres PSS: 1.4 acres PFO: 0.7 acre Priority Wetlands: 0.0 miles	**Wetland Crossing Length: 0.5 mile** **Temporary Wetland Impacts (Construction): 3.2 acres** PEM: 1.1 acres **PSS: 2.0 acres** **PFO: 0.0 acres** **Permanent Wetland Impacts (Operations):** **0.8 acre** PEM: 0.0 acres **PSS: 0.8 acre** **PFO: 0.0 acres** Priority Wetlands: 0.0 miles

Source: Enbridge 2015; Enbridge and Merjent 2016.

Notes:

[a] Comparisons between route variations are based on measurements/impacts of co-construction of Sandpiper and Line 3 Replacement Pipelines.

PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub

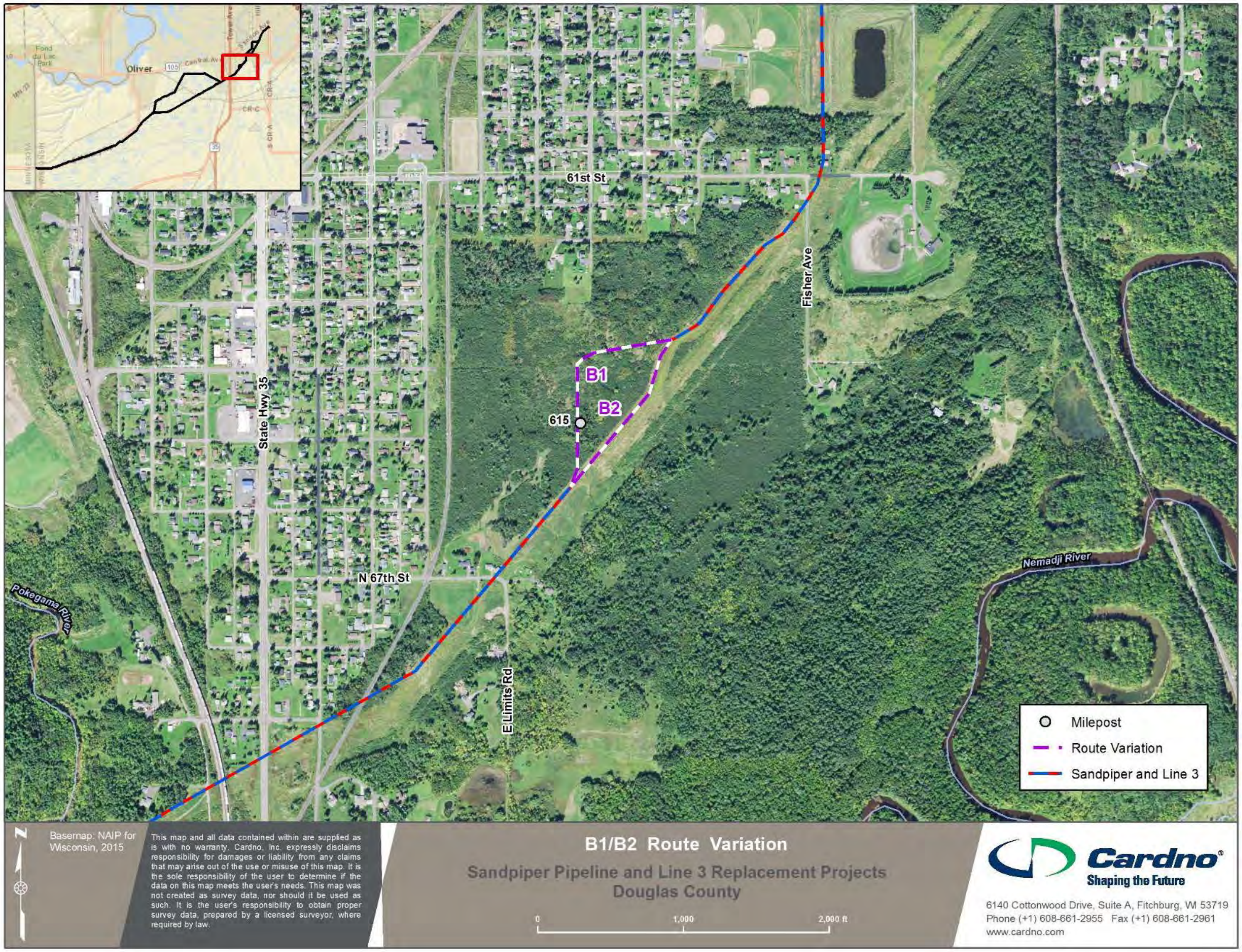

Figure 6-3 Proposed Pipeline Route Variations B1 and B2

6.2.3 Comparison of Route Variations C1 and C2

Route Variation C1 (2.3 miles) would be 0.1 mile shorter than Route Variation C2 (2.4 miles) and would affect an additional 0.1 mile of greenfield area compared with Route Variation C2 (1.3 miles for Route Variation C1 versus 1.2 miles for Route Variation C2) (Figure 6-4). The variations would be co-located with Enbridge's existing ROW for the same distance (running 0.4 mile north from milepost 614). The environmental impacts of Route Variations C1 and C2 are provided in Table 6-3, and impacts are representative of co-location of the Projects. The least impactful route variation for each environmental resource factor considered is shown in **bold** font.

Table 6-3 Comparison of Impacts[a] for Route Variations C1 and C2

Environmental Resource	Route Variation C1	Route Variation C2
Aesthetics	**A smaller amount of upland forest would be affected compared with Route Variation C2, which would be less noticeable in the general landscape.**	A greater amount of upland forest would be affected compared with Route Variation C1, which would be more noticeable in the general landscape.
Air Quality	**Since Route Variation C1 is 0.1 mile shorter than Route Variation C2, slightly lower emissions would occur during construction.**	Since Route Variation C2 is 0.1 mile longer than Route Variation C1, slightly greater emissions would occur during construction.
Agricultural Resources	Agricultural Land Affected: 0.0 acres Farmland of Statewide Importance: 14.0 acres	Agricultural Land Affected: 0.0 acres **Farmland of Statewide Importance: 11.9 acres**
Cultural Resources	No resources of religious and cultural significance (including TCPs) were found within the survey corridor; therefore, there is no measurable difference in impacts on cultural resources between Route Variations C1 and C2.	No resources of religious and cultural significance (including TCPs) were found within the survey corridor; therefore, there is no measurable difference in impacts on cultural resources between Route Variations C1 and C2.
Federally Listed Endangered and Threatened Species	**Since Route Variation C1 would impact 8.1 fewer acres of upland forest than Route Variation C2, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be less.**	Since Route Variation C2 would impact an additional 8.1 acres of upland forest compared with Route Variation C1, potential impacts to federally listed endangered and threatened species that have the potential to occur in these habitats (Canada lynx, Northern long-eared bat, and gray wolf) would be greater.
Fish and Wildlife	There is one fish Species of Greatest Conservation Need within 2 miles of Route Variation C1. There is one state-listed threatened wildlife species within 2 miles of the route variation. One Species of Special Concern is present within 2 miles of the route variation.	There is one fish Species of Greatest Conservation Need within 2 miles of Route Variation C2. There is one state-listed threatened wildlife species within 2 miles of the route variation. One Species of Special Concern is present within 2 miles of the route.
Forests and Other Woodland Resources	**Upland Forest Affected: 1.5 acres**	Upland Forest Affected: 9.6 acres
Geological Hazards	No measurable difference between Route Variations C1 and C2 with regard	No measurable difference between Route Variations C1 and C2 with regard

Table 6-3 Comparison of Impacts[a] for Route Variations C1 and C2

Environmental Resource	Route Variation C1	Route Variation C2
	to geologic hazard impacts.	to geologic hazard impacts.
Invasive Species	No measurable difference between Route Variations C1 and C2 with regard to impacts on invasive species.	No measurable difference between Route Variations C1 and C2 with regard to impacts on invasive species.
Noise	No measurable difference between Route Variations C1 and C2 with regard to noise impacts.	No measurable difference between Route Variations C1 and C2 with regard to noise impacts.
Public Utilities	Railroad Crossings: 2 Roads Crossings: 0	Railroad Crossings: 2 Roads Crossings: 0
Recreation	Route Variation C1 crosses the Nemadji Golf Course, and the landowner has expressed concerns that normal business operations would be impacted during pipeline construction and restoration. There is also congestion along Route Variation C1 where it crosses into the golf course, due to the railroad tracks, existing pipelines, and snowmobile trail.	**Route Variation C2 would not cross the Nemadji Golf Course. This route would avoid disrupting golf course operations.**
Residential Areas	Residences within 300 feet: 0	Residences within 300 feet: 0
Safety	No measurable difference between Route Variations C1 and C2 with regard to safety.	No measurable difference between Route Variations C1 and C2 with regard to safety.
Socioeconomics	No measurable difference between Route Variations C1 and C2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.	No measurable difference between Route Variations C1 and C2 with regard to job creation, commuting, demands for public services, tax revenues, environmental justice, and tribal treaty resources.
Soils and Topography	**Compaction Prone Soils: 4.4 acres** Highly Water Erodible Soils: 0.6 acre	Compaction Prone Soils: 8.3 acres Highly Water Erodible Soils: 0.6 acre
Transportation	Neither route variation would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.	Neither route variation would cross a road; therefore, no disruptions to road users during construction from road closures or diversions would occur.
Vegetation (Plants)	Two state species of special concern are within 1 mile of the route variation. Four state threatened species are within 1 mile of the route variation. Two state-listed endangered species are within 1 mile of the route variation.	Two state-listed species of special concern are within 1 mile of the route variation. Four state-listed threatened species are within 1 mile of the route variation. Two state-listed endangered species are within 1 mile of the route variation.
Water Resources	**Intermittent Waterbody Crossings: 4** Ephemeral Waterbody Crossings: 0 Perennial Waterbody Crossings: 0	Intermittent Waterbody Crossings: 8 Ephemeral Waterbody Crossings: 0 Perennial Waterbody Crossings: 0
Wetlands	**Wetland Crossing Length: 1.0 mile** **Temporary Wetland Impacts (Construction): 8.3 acres**	Wetland Crossing Length: 1.9 miles Temporary Wetland Impacts (Construction): 13.1 acres

Table 6-3 Comparison of Impacts[a] for Route Variations C1 and C2

Environmental Resource	Route Variation C1	Route Variation C2
	PEM: 5.3 acres	**PEM: 1.3 acres**
	PUB: 0.6 acre	**PUB: 0.0 acres**
	PSS: 2.3 acres	PSS: 11.1 acres
	PFO: <0.1 acres	PFO: 0.6 acres
	Permanent Wetland Impacts (Operations):	Permanent Wetland Impacts (Operations):
	1.3 acres	7.0 acres
	PEM: 0.0 acres	PEM: 0.0 acres
	PSS: 1.3 acres	PSS: 6.4 acres
	PFO: <0.1 acres	PFO: 0.6 acre
	PUB: 0.0 acres	PUB: 0.0 acres
	Priority Wetlands: 0.2 mile	**Priority Wetlands: 0.0 miles**

Source: Enbridge 2015; Enbridge and Merjent 2016.

Notes:

[a] Comparisons between route variations are based on measurements/impacts of co-construction of Sandpiper and Line 3 Replacement Pipelines.

PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub; PUB = Palustrine Unconsolidated Bottom

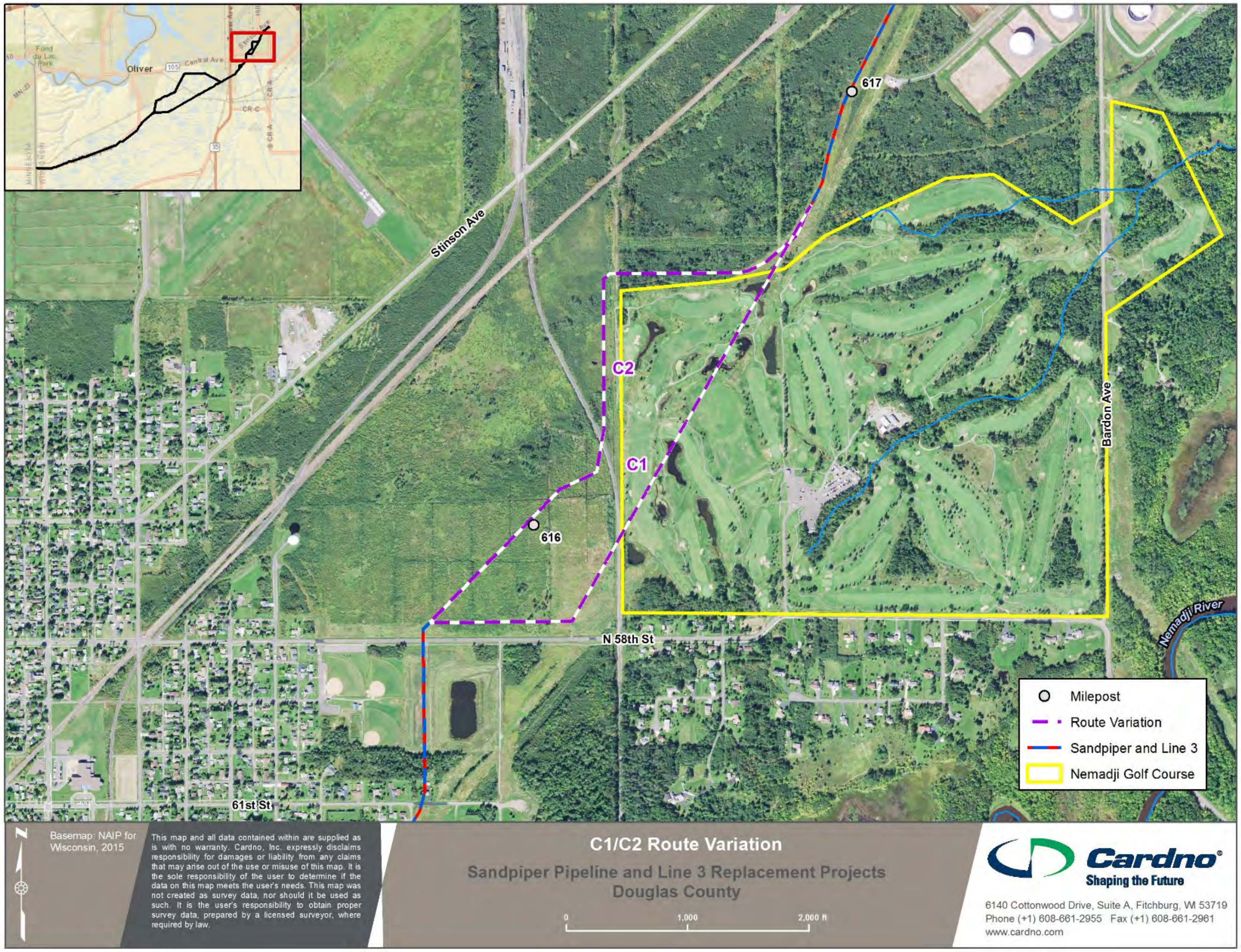

Figure 6-4 Proposed Pipeline Route Variations C1 and C2

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7. CUMULATIVE IMPACTS

Cumulative impacts are compounding effects resulting from repeated or other proximal actions, activities or projects, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a given period. The purpose of this analysis is to identify and describe cumulative impacts that would potentially result from implementation of the proposed Sandpiper and Line 3 Replacement Pipelines Projects in addition to other projects in the general area. This includes a discussion of the cumulative impacts regarding greenhouse gases (GHGs) and climate change.

7.1 Scope and Methods of Analysis

As part of the Wisconsin Department of Natural Resources' (DNR's) responsibility to consider the environmental effects of their policies and actions outlined in Chapter NR 150 (Environmental Analysis and Review Procedures), the agency must complete an evaluation of the probable positive and negative direct, secondary, and cumulative effects of a proposed project and its alternatives on the human environment. This cumulative impacts analysis uses an approach consistent with the methodology set forth in relevant guidance (Council on Environmental Quality [CEQ] 1997a, 2005; U.S. Environmental Protection Agency [EPA] 1999). This cumulative impacts analysis has been conducted by DNR and its Environmental Impact Statement (EIS) consultant as part of the overall impact analysis of the proposed Projects in accordance with the Wisconsin Environmental Policy Act (WEPA).

The temporal boundaries of this analysis assume 50 years of operations for the proposed Projects, although the proposed Projects could be operational beyond that. RFFAs were considered if available information suggested that they could be implemented by 2020. While projects beyond that timeframe could be implemented, information on such projects is not available at this time. The expanded crude oil infrastructure resulting from operation of the proposed Projects could prompt other proposals similar to the Calumet/Elkhorn Superior Terminal Project in the future if market drivers create a sufficient need for delivery of crude oil to Great Lakes terminals or refineries by vessel. However, there are currently no known proposals to ship crude oil by vessel from the Superior Terminal (the Calumet/Elkhorn Superior Terminal Project was canceled due to lack of refinery interest), and crude oil is not currently transported on the Great Lakes (Great Lakes Commission 2015).

The study area for the cumulative impacts analysis is consistent with the different study areas for environmental resources that could reasonably be affected by the proposed Projects. For example, the geographic area over which impacts to air resources (related to the airshed) are considered is different than the geographic area considered for transportation (the local road system). In general the cumulative impacts study area for environmental resources encompasses the construction and operation of the proposed Projects within 1 mile of the right-of-way (ROW) and other past, present, and RFFA projects or actions identified within Douglas County, Wisconsin, unless otherwise stated.

7.2 Past, Present, and Reasonably Foreseeable Future Actions

Table 7-1 includes past, current, proposed, or reasonably foreseeable future actions (RFFAs) in the study area that have the potential to cumulatively impact resources during the construction and operation of the Projects. The locations of these projects are shown on Figure 7-1.

Table 7-1 Current, Proposed, or RFFA Projects

Project or Action	Project Description	Details	Type	Status
1. **Superior Terminal Expansion Project** (Enbridge Energy)	Various upgrades increasing the Superior Terminal's storage capacity by 1.2 million barrels (bbl) to 8.5 million bbl due to expansion of the mainline pipeline system. Construction of a new electrical substation to increase the electrical capacity at the Superior Terminal, requiring permanent fill of 2.8 acres of wetlands (Enbridge 2013; U.S. Army Corps of Engineers 2015).	• 42 existing crude oil tanks of varying size and capacity • Added three 24.5–million-gallon crude oil storage tanks • Constructed and modified fugitive piping components • Constructed new diesel generator • Applying to construct new electrical substation	Oil Storage Facility	In-service 2016. Substation proposal is under review.
2. **Calumet Superior Refinery** (Calumet Specialty Products Partners LP)	The existing refinery in Superior has a crude oil throughput capacity of approximately 45,000 barrels per day (bpd).	• Produces gasoline, diesel, asphalt, and fuel oils • Crude oil supplied by Enbridge pipelines and rail cars • Distributes refined product by pipeline, tank truck, and rail car (crude oil by rail car)[a]	Oil Refinery	In-service
3. **Calumet/Elkhorn Superior Terminal Project** (Calumet Specialty Products Partners LP/Elkhorn Industries, Inc.)	Upgrade existing pier at the Superior Terminal and construct infrastructure to load crude oil onto vessels for distribution across the Great Lakes.	• Would have conducted dredging, constructed dock, pipeline, and storage. • Would have loaded one oil tanker (77,000 bbl) or barge (110,000 bbl) every 4 days (Council of Canadians 2013).	Oil Distribution Terminal	Canceled, application withdrawn[b] (Myers 2015).
4. **Original Line 67 (Alberta Clipper Pipeline) and Line 67 Capacity Expansion Project** (Enbridge Energy)	Construction and operation of original Line 67 to transport 450,000 bpd to Enbridge's Superior Terminal. Recent project to increase throughput to 800,000 bpd arriving at Superior Terminal by adding and modifying pump stations (Enbridge 2015a). No construction or modifications occurred in Wisconsin from expansion.	• Approximately 326.9 miles of new 36-inch-diameter pipeline and associated facilities from the U.S./Canada border to Superior. • Pipeline primarily constructed within or adjacent to existing Enbridge pipeline corridors. • Expansion included construction and modification of 10 pump stations in Minnesota along the existing pipeline.	Oil Pipeline	Pipeline in-service 2010; upgrades in service 2015.[c]

Table 7-1 Current, Proposed, or RFFA Projects

Project or Action	Project Description	Details	Type	Status
5. Line 61 (Southern Access Pipeline) Capacity Expansion Project (Enbridge Energy)	Recent upgrade to expand capacity of existing 400,00 bpd pipeline to handle 560,000 bpd by adding 9 new pump stations and upgrading 3 existing stations (including one new pump station at the Superior Terminal) (Enbridge 2006).	• Install new pumping units and related equipment at existing Superior Terminal and Vesper pump stations. • Construct a new pump station adjacent to Enbridge's pump station near Sheldon, Wisconsin. • Modifications and upgrades within Enbridge's pump station near Delavan, Wisconsin, and Enbridge's Flanagan Terminal, Indiana.	Oil Pipeline	Under construction, expected in-service 2016.
6. Line 61 Twin Project (Enbridge Energy)	Construct new pipeline to twin current Line 61 (Southern Access Pipeline) (Enbridge 2015b:27)	• Construct a new pipeline (up to 42-inch-diameter) and associated facilities from Superior Terminal, Wisconsin, to Flanagan Terminal, Illinois. • Expected capacity of 800,000 bpd.	Oil Pipeline	Not formally announced but surveying for potential routes is underway, according to news reports.[d]
7. Sandpiper Pipeline Expansion (North Dakota Pipeline Company, LLC)	Increase capacity from 375,000 to 640,000 bpd (Enbridge 2014).	• Modify and/or construct additional pump stations.	Oil Pipeline	Not currently proposed.
8. US 2 Belknap Street Project (Wisconsin Department of Transportation)	Replacing 1.4 miles of roadway and storm sewer system in City of Superior (Wisconsin Department of Transportation 2015a).	• Two years of construction on oversize/overweight truck route connecting US 2 and US 53.	Road Construction	Construction expected in spring 2017.
9. US 53 Spooner/Minong, Washburn and Douglas Counties Project (Wisconsin Department of Transportation)	Asphalt paving and concrete pavement repair along southbound US 53 between Minong and Spooner (Wisconsin Department of Transportation 2015b).	• One year of construction. • US 53, WIS 77, and other side roads will remain open during construction. • Single lane closures will be used throughout the project.	Road Construction	Under construction in 2016.

Notes:

[a] Calumet Superior has shipped crude oil out of the facility by rail car. While this is not currently occurring, this capability still exists.

[b] The Wisconsin DNR denied a permit application to rebuild the waterfront area at the location of this proposed project because of details regarding harbor fill.

[c] The application for a Presidential Permit to increase operational capacity at the international border is undergoing review by the Department of State (2012).

[d] Source: Seitz 2015

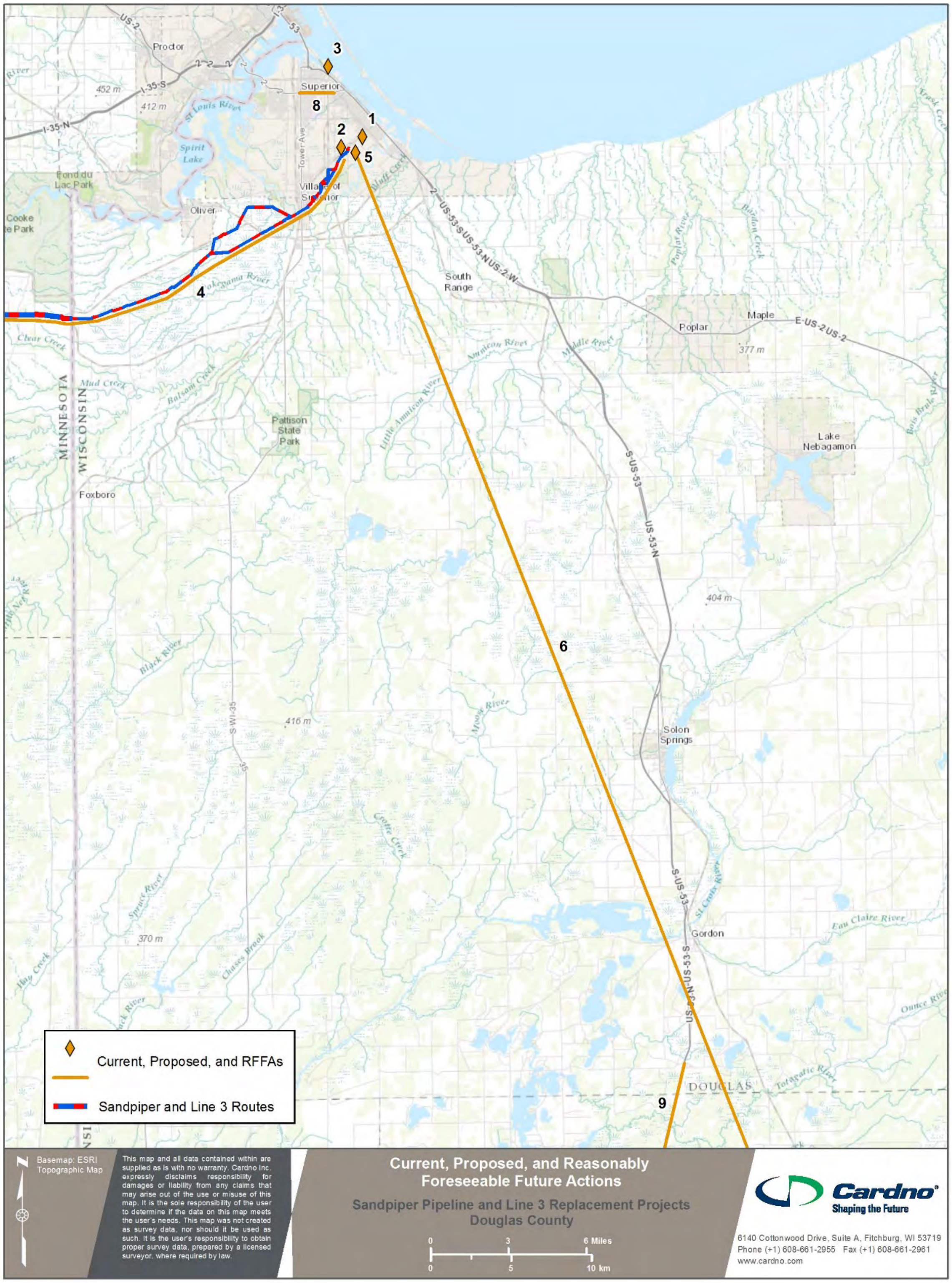

Figure 7-1 Map of Current, Proposed, and RFFAs

7.3 Cumulative Impacts by Project

The past, present, and RFFA projects listed in Table 7-1 in combination with the proposed pipelines could combine to create cumulative impacts, as addressed in Table 7-2. Discussions of impacts specific to the environmental resources analyzed in this Final EIS are provided in Section 7.4 below.

Table 7-2 Cumulative Impacts of Current, Proposed, or RFFA Projects in Combination with the Proposed Projects

Project or Action	Potential Cumulative Impacts	Resources Potentially Affected
1. **Superior Terminal Expansion Project** (Enbridge Energy)	Cumulative contribution to an intensified industrial character. Construction of a new substation would result in a loss of 2.8 acres of wetland habitat in addition to the acreage lost from the proposed Projects, resulting in a reduction in available stopover habitat for rufa red knots. Potential increase in the spread of invasive species. Potential impacts to local residents near Superior.	• Aesthetic resources • Federally listed endangered and threatened species and habitats • Fish and wildlife • Residential areas • Wetlands
2. **Calumet Superior Refinery** (Calumet Specialty Products Partners LP)	Cumulative contribution to an intensified industrial character from past construction and cumulative alterations to land uses, and reductions in acreage of some habitat types. Potential increase in the spread of invasive species.	• Aesthetic resources • Federally listed endangered and threatened species and habitats • Fish and wildlife • Invasive species • Recreation areas • Wetlands
3. **Calumet/Elkhorn Superior Terminal Project** (Calumet Specialty Products Partners LP/Elkhorn Industries, Inc.)	None. The project has been canceled and the application withdrawn. The expanded crude oil infrastructure resulting from operation of the proposed Projects could prompt other proposals similar to the Calumet/Elkhorn Superior Terminal Project in the future if market drivers create a sufficient need for delivery of crude oil to Great Lakes terminals or refineries by vessel.	• None
4. **Original Line 67 (Alberta Clipper Pipeline) and Line 67 Capacity Expansion Project** (Enbridge Energy)	Cumulative increases in the width of the existing ROW in this area to accommodate the proposed Projects, leading to cumulative alterations to land uses, and reductions in acreage of upland plants, forested lands, agricultural lands, fish and wildlife habitats, and wetlands with potential associated impacts to recreation areas. Potential increase in the spread of invasive species.	• Aesthetic resources • Agricultural land • Federally listed endangered and threatened species and habitats • Fish and wildlife • Forests and other woodland resources • Invasive species • Recreation areas • Wetlands

Table 7-2 Cumulative Impacts of Current, Proposed, or RFFA Projects in Combination with the Proposed Projects

Project or Action	Potential Cumulative Impacts	Resources Potentially Affected
5. Line 61 (Southern Access Pipeline) Capacity Expansion Project (Enbridge Energy)	Minor regional cumulative impacts to air quality and noise from construction emissions possible in areas close to Superior. Cumulative additions of air pollutant emissions from stationary sources (e.g., valves, storage tanks) and fossil-fueled equipment for ongoing inspection and maintenance activities. Cumulative loss of forested habitats with associated potential impacts to gray wolf, Canada lynx, and/or Northern long-eared bat, which could also be disturbed by construction noise and activity in multiple areas and become temporarily displaced. If construction occurred during the migration period, cumulative noise and construction activity could occur to rufa red knots migrating through the project area. Potential impacts to recreation resources from concurrent hunting restrictions in forested lands and an increase in the spread of invasive species.	• Air quality • Federally listed endangered and threatened species and habitats • Fish and wildlife • Forests and other woodland resources • Invasive species • Noise • Recreation areas • Wetlands
6. Line 61 Twin Project (Enbridge Energy)	Potential localized increase in air emissions from concurrent construction in areas close to Superior, and increased air pollutant emissions along the route from operations equipment. Cumulative loss of agricultural and/or forested habitats with associated potential impacts to gray wolf and Canada lynx, which could be disturbed by construction noise and activity in multiple areas and become temporarily displaced. Potential impacts to recreation resources from concurrent hunting restrictions in forested lands and an increase in the spread of invasive species.	• Air quality • Agricultural land • Federally listed endangered and threatened species and habitats • Fish and wildlife • Forests and other woodland resources • Invasive species • Noise • Recreation areas • Wetlands
7. Sandpiper Pipeline Expansion (North Dakota Pipeline Company, LLC)	The addition of pump stations to increase capacity of the Sandpiper Pipeline once constructed would have few cumulative impacts. Depending on the areas chosen to site pump stations, cumulative alterations to land uses, and reductions in acreage of upland plants, forested lands, agricultural lands, and wildlife habitats with associated impacts to recreation areas. Cumulative contribution to an intensified industrial character and increased air pollutant emissions from new facilities.	• Aesthetic resources • Agricultural land • Federally listed endangered and threatened species and habitats • Fish and wildlife • Forests and other woodland resources • Invasive species • Recreation areas • Wetlands

Table 7-2 Cumulative Impacts of Current, Proposed, or RFFA Projects in Combination with the Proposed Projects

Project or Action	Potential Cumulative Impacts	Resources Potentially Affected
8. US 2 Belknap Street Project (Wisconsin Department of Transportation)	Potential localized increase in air emissions from concurrent construction in areas close to Superior.	• Air quality

7.4 Cumulative Impacts by Resource

7.4.1 Aesthetic Resources

Short- to long-term cumulative impacts to aesthetic resources could result from construction of the proposed Projects in combination with other nearby projects (see Figure 7-1). Cumulative impacts to aesthetic resources could result from clearing and removal of existing vegetation; exposure of bare soils and fugitive dust; earthwork and grading scars associated with heavy equipment tracks; the use of construction vehicles and equipment; and the storage of construction equipment and materials. Other projects with the potential to contribute to cumulative impacts for aesthetic resources include the recently expanded Superior Terminal Expansion Project, Phase 2 of the ongoing Line 61 Capacity Expansion Project (installation of a pump station at the Superior Terminal), and the potential Sandpiper Pipeline Expansion Project requiring new pump stations in the study area. In combination, the proposed Projects and other past, present, and RFFAs could collectively contribute to an intensified industrial character.

7.4.2 Air Quality

7.4.2.1 Regulated Air Pollutants

The cumulative impacts study area for air quality is Douglas County, which is an air quality attainment area. Minor contributions to cumulative air quality impacts would result from construction of the proposed Projects and other RFFAs constructed at the same time that generate fugitive dust (e.g., excavation and materials handling) and air emissions (e.g., operation of construction equipment or open burning). The ongoing Line 61 Capacity Expansion Project would require a new pump station at the Superior Terminal and together with the potential Line 61 Twin Project and the US 2 Belknap Street Project, would likely have a construction schedule that at least partially overlaps the construction schedule for the proposed pipeline Projects. If construction of any of the RFFAs overlapped with the 14-month construction period of each proposed Project, minor regional cumulative impacts to air quality from construction activities could occur. Long-term cumulative air quality impacts could occur at the Superior Terminal during operation of the proposed Projects and other RFFAs from incremental additions of stationary sources emitting air pollutants (e.g., fugitive volatile organic compounds [VOCs] from valves, pumps, and connectors, and future increased emissions from additional terminal crude oil storage tanks) and increasing requirements for fossil-fueled equipment for ongoing inspection and maintenance activities. All projects would be required to obtain and abide by individual air quality permits that are designed to maintain air quality.

7.4.2.2 Greenhouse Gases and Climate Change

Construction and operation of the proposed Projects would contribute to global GHG emissions. In addition, activities indirectly related to the proposed Projects (e.g., crude oil extraction, refining, and product end use combustion) would also contribute to global GHG emissions. Although it is likely that the crude oil that would be transported through the proposed pipelines would replace existing supplies and thus not constitute an *increase* in global GHG emissions, the amount of GHGs that would be emitted from the full life-cycle of crude oil use has been quantified for the amount and types of crude oil that would be transported through the proposed pipelines. It is noted that the GHG emissions from activities indirectly related to the proposed Projects would occur regardless of whether or not the proposed Sandpiper and Line 3 Replacement Projects are permitted, constructed, and operated. Furthermore, it is noted that the emissions estimates from the pipelines are for the entire pipelines and not just for the portions of the pipelines in Wisconsin.

As discussed in Section 2.1, the proposed Sandpiper Pipeline would transport light Bakken crude oil, and the proposed Line 3 Replacement Pipeline would transport both light crude and heavier crude oil (including “diluted bitumen” or “dilbit”) from western Canada. It is noted that for the purposes of this cumulative effects analysis, all oil transported through the Line 3 Replacement Pipeline is assumed to be heavy crude oil, which likely results in a somewhat conservative assessment of the actual life-cycle contribution to global GHGs resulting from the proposed Projects.

Life-Cycle Greenhouse Gas Analysis

This section of the Final EIS provides information on the amount of GHGs that would be emitted at various stages in the life-cycle use of crude oil—from extraction to end use. It is noted that there are various methods to extract, transport, and process crude oil. Information on some of these methods that are used in the Canadian oil sands can be found at http://www.pembina.org/.

A life-cycle analysis for GHG can be referred to as a “cradle-to-grave” analysis. The cradle refers to the extraction of raw materials from the earth and the grave represents the combustion of the fuel in a vehicle, aircraft, or other engine. The U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) developed a baseline for life-cycle GHG emissions using the following five stages (NETL 2008):

- Life-Cycle Stage #1: Raw Material Acquisition
  - Boundary includes extraction of raw feedstocks (e.g., crude oil) from the earth and any partial processing of the raw materials that may occur
  - Feedstocks include foreign and domestic crude oil, natural gas liquids, unfinished oils, and unconventional hydrocarbons (e.g., oil sands)
- Life-Cycle Stage #2: Raw Material Transport
  - Boundary begins at the end of extraction/processing of the raw materials and ends at the entrance to the petroleum refineries
  - Feedstocks are transported from both domestic and foreign sources to U.S. and foreign refineries
- Life-Cycle Stage #3: Liquid Fuels Production/Refining
  - Boundary starts at the entrance of the petroleum refinery with the receipt of crude oil (and other feedstock inputs) and ends at the entrance to the petroleum pipeline used to transport the liquid fuels to the bulk fuel storage depot
  - Petroleum refinery operations are both foreign and domestic
  - Emissions associated with acquisition and production of indirect fuel inputs such as purchased power and steam, purchased fuels such as natural gas and coal, and fuels produced in the refinery and subsequently consumed therein are included in this stage
  - Emissions associated with onsite and offsite hydrogen production are included in this stage, including emissions associated with raw material acquisition for hydrogen plant feedstock and fuel

  - Production of oxygenates is excluded from the analysis
- Life-Cycle Stage #4: Product Transportation and Refueling
  - Boundary starts at the exit of the petroleum refinery and ends with dispensing the fuel into the vehicle/aircraft
  - Boundary includes the operation of the bulk fuel storage depot for gasoline and diesel and the airport fuel storage tanks
  - Boundary includes the operation of liquid fuel tanker trucks used to transfer the gasoline/diesel from the depot to the vehicle fueling stations and the transport of jet fuel from the airport fuel storage tanks to the aircraft by a refueling truck
- Life-Cycle Stage #5: Vehicle/Aircraft Operation
  - Boundary starts at the vehicle/aircraft fuel tank and ends with the combustion of the liquid fuel

The DOE NETL study (2008) determined life-cycle GHG emissions from conventional petroleum-based fuels (gasoline, diesel, kerosene-based jet fuel) sold or distributed in the United States in the year 2005. The study was based on a weighted average of fuels produced in the United States plus fuels imported into the United States and minus fuels produced in the United States but exported to other countries for use. The crude oil mix fed to American refineries included in the study is identified in Table 7-3. This mix was used to represent the type of oil that would be used at refineries receiving crude oil from the proposed Sandpiper and Line 3 Replacement Pipeline Projects, and accounted for over 90 percent of the total American crude input in 2005.

Table 7-3 Sources of Crude Oil Used at U.S. Petroleum Refineries in 2005

U.S. Crude Oil Source	Percent of Refinery Crude
U.S. Crude Oil	33.8%
Canada Crude Oil	10.7%
Canada Oil Sands	
Mexico Crude Oil	10.2%
Saudi Arabia Crude Oil	9.4%
Venezuela Crude Oil	8.1%
Nigeria Crude Oil	7.1%
Iraq Crude Oil	3.4%
Angola Crude Oil	3.0%
Ecuador Crude Oil	1.8%
Algeria Crude Oil	1.5%
Kuwait Crude Oil	1.5%
Total	**90.5%**

Source: National Energy Technology Laboratory 2008

The resulting GHG emissions for the five life-cycle stages for gasoline, diesel, and kerosene-based jet fuel are presented in Table 7-4. GHG emissions are presented in units of kilograms (kg) of carbon dioxide equivalent (CO_2e) per barrel (bbl) consumed. Because carbon dioxide (CO_2) is the reference gas for climate change, measures of non-CO_2 GHGs are converted into CO_2e. CO_2e refers to the number of metric tons of CO_2 emissions with the same global warming potential as 1 metric ton of another GHG.

Global warming potential is calculated as a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years) compared to CO_2 (EPA 2013). As an example, methane (CH_4), which is a common GHG, is widely represented as having a 100-year global warming potential of 25 (i.e., for the same weight, the comparative impact of CH_4 on climate change is 25 times greater than CO_2 over a 100-year period).

As indicated by the study results, combustion of fuel in vehicles (life-cycle stage #5) accounts for 80 percent of the total GHG emissions of gasoline and diesel (NETL 2008).

Table 7-4 Life-Cycle GHG Emissions for Liquid Fuels Production of U.S. Crude Oil Average (kg CO_2e/bbl consumed)

	Life-Cycle Stage #1: Raw Material Extraction	Life-Cycle Stage #2: Raw Material Transport	Life-Cycle Stage #3: Liquid Fuels Production/ Refining	Life-Cycle Stage #4: Product Transportation and Refueling	Life-Cycle Stage #5: Vehicle/ Aircraft Operation	Life-Cycle Total
Gasoline						
Total	35.8	7.0	47.9	5.3	375	471
CO_2	23.9	6.9	46.2	5.2	367	449
CH_4 (CO_2e)	11.7	0.1	1.4	0.1	0.6	13.9
N_2O (CO_2e)	0.2	0.0	0.2	0.0	7.3	7.8
Diesel						
Total	36.6	7.3	52.6	4.8	422	524
CO_2	24.6	7.1	50.8	4.7	422	509
CH_4 (CO_2e)	11.8	0.1	1.6	0.1	0.0	13.6
N_2O (CO_2e)	0.2	0.0	0.2	0.0	0.3	0.8
Jet Fuel						
Total	35.3	7.0	31.6	5.2	407	486
CO_2	23.8	6.9	30.5	5.1	403	470
CH_4 (CO_2e)	11.4	0.1	0.9	0.1	0.1	12.6
N_2O (CO_2e)	0.2	0.0	0.1	0.0	3.3	3.7

Source: National Energy Technology Laboratory 2008

Notes:

bbl = barrels, CO_2 = carbon dioxide, CO_2e = carbon dioxide equivalent, CH_4 = methane, GHG = greenhouse gas, N_2O = nitrous oxide

According to the U.S. Energy Information Administration (EIA), 1 bbl of crude oil (42 gallons) yielded 44.9 gallons of refined products in 2013, including 18.9 gallons of gasoline, 12.4 gallons of diesel, and 4.0 gallons of jet fuel (EIA 2015). Although refinery yields of individual products vary from month to month as refiners focus operations to meet demand for different products and to maximize profits, this average breakout was used to quantify potential production and consumption of gasoline, diesel, and kerosene-based jet fuel for refineries that would receive crude oil from the proposed Sandpiper Pipeline. Consequently, the proposed 375,000 bbl per day of crude oil would equate to 168,750 bbl of gasoline, 110,625 bbl of diesel, and 35,625 bbl of jet fuel.

Table 7-5 converts the GHG emissions for the five life-cycle stages into units of metric tons per year based on the three main petroleum products produced by 375,000 bbl per day of crude oil.

Table 7-5 Life-Cycle GHG Emissions for Liquid Fuels Production of 375,000 bbl Per Day Crude Oil (metric-ton CO_2e/year)

Fuel Type	Life-Cycle Stage #1: Raw Material Extraction	Life-Cycle Stage #2: Raw Material Transport	Life-Cycle Stage #3: Liquid Fuels Production	Life-Cycle Stage #4: Product Transportation and Refueling	Life-Cycle Stage #5: Vehicle/Aircraft Operation	Life-Cycle Total
Gasoline	2,205,056	431,156	2,950,341	326,447	23,097,656	29,010,565
Diesel	1,477,839	294,760	2,123,889	193,815	17,039,569	21,129,873
Jet Fuel	459,010	91,022	410,899	67,616	5,292,272	6,320,819
Total	4,141,906	816,938	5,485,129	587,878	45,429,497	56,461,348

Sources: National Energy Technology Laboratory 2008, U.S. Energy Information Administration 2015

Results indicate that the total life-cycle GHG emissions from activities directly and indirectly related to the proposed Sandpiper Pipeline are approximately 56 million metric tons per year of CO_2e, which is equivalent to providing electricity to 7,766,348 homes in one year (see https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator).

In 2013, U.S. GHG emissions totaled 6,673 million metric tons of CO_2e (EPA 2014). In 2010, estimated worldwide GHG emissions from human activities totaled nearly 46 billion metric tons of CO_2e (EPA 2014). Consequently, the direct and indirect GHG emissions related to the proposed Sandpiper Pipeline would represent approximately 0.84 percent of the U.S. total and 0.12 percent of the worldwide GHG emissions. This does not mean, however, that there would be a 0.84 percent increase in U.S. or 0.12 percent increase in worldwide GHG emissions, since some portion or potentially all of the crude oil transported through the proposed pipeline would replace existing supplies.

U.S. GHGs emissions in 2013 were 9 percent below the 2005 level of 7,350 million metric tons of CO_2e (EPA 2014). In 2009, President Obama made a commitment to reducing U.S. GHG emissions to approximately 17 percent below 2005 levels by 2020 by implementing the following (Executive Office of the President 2013):

- "Deploying Clean Energy (Cutting carbon pollution from power plants; Promoting American leadership in renewable energy; Unlocking long-term investment in clean energy innovation)
- Building a 21st Century Transportation Sector (Increasing fuel economy standards; Developing and deploying advanced transportation technologies)
- Cutting Energy Waste in Homes, Businesses, and Factories (Reducing energy bills for American families and businesses)
- Reducing Other GHG Emissions (Curbing emissions of hydrofluorocarbons; Reducing methane emissions; Preserving the role of forests in mitigating climate change)
- Leading at the Federal Level (Leading in clean energy; Federal government leadership in energy efficiency)"

Taking into account the reduced U.S. GHG emission target, the direct and indirect GHG emissions related to the proposed Sandpiper Project would represent approximately 0.95 percent of the U.S. total GHG emissions.

The Line 3 Replacement Pipeline would transport crude oil from Canada. Some of this crude oil would be light crude similar to oils derived from the Bakken region and some would be heavier crude oil derived from the Canadian tar sands. The in-place crude oil within the oil sands is in the form of bitumen, a semisolid, highly viscous form of naturally occurring petroleum. Dilbit is bitumen blended with a diluent, usually a natural gas liquid such as condensate (e.g., propane, butane), to create a somewhat “lighter” product and to reduce viscosity for transportation. The most commonly used diluent is natural gas condensate, a liquid byproduct of natural gas processing. Typically the mixture of diluent and bitumen consists of 30 percent diluent and 70 percent bitumen (Crosby et al. 2013).

The life-cycle GHG emissions associated with Canadian oil sands (i.e., bitumen) is approximately 17 percent greater than the 2005 U.S. crude oil blend for gasoline production, 7 percent greater than for diesel production, and 9 percent greater than for jet fuel production, as indicated in Table 7-6 (NETL 2008, 2009). Note that the GHG emissions do not account for the fact that condensate is blended with bitumen to form dilbit. Since condensate has a lower GHG intensity than bitumen, the per-bbl GHG emissions from dilbit would be less than the per-bbl emissions from bitumen (NETL 2008, 2009).

Table 7-6 Comparison of Life-Cycle GHG Emissions for Liquid Fuels Production of U.S. Crude Oil Average and Canadian Oil Sands (kg CO_2e/bbl consumed)

Fuel Type	Life-Cycle Stage #1: Raw Material Extraction	Life-Cycle Stage #2: Raw Material Transport	Life-Cycle Stage #3: Liquid Fuels Production	Life-Cycle Stage #4: Product Transportation and Refueling	Life-Cycle Stage #5: Vehicle/ Aircraft Operation	Life-Cycle Total	Difference from 2005 U.S. Average
Gasoline							
2005 U.S. Average	35.8	7.0	47.9	5.3	375	471	0%
Canadian Oil Sands	105.2	4.9	59.2	4.9	375	549	16.6%
Diesel							
2005 U.S. Average	36.6	7.3	52.6	4.8	422	524	0%
Canadian Oil Sands	104.7	5.0	72.8	4.4	375	562	7.2%
Jet Fuel							
2005 U.S. Average	35.3	7.0	31.6	5.2	407	486	0%
Canadian Oil Sands	105.1	4.7	41.3	4.7	375	531	9.2%

Sources: National Energy Technology Laboratory 2008, 2009

Notes:

kg CO_2e/bbl = kilograms carbon dioxide equivalent per barrel

Table 7-7 calculates the GHG emissions for the five life-cycle stages in units of metric tons per year for dilbit based on the three main petroleum products that would ultimately be refined from the 760,000 bbl per day that would be transported through the Line 3 Replacement Pipeline.

Table 7-7 Life-Cycle GHG Emissions for Liquid Fuels Production of 760,000 bbl per Day Canadian Oil Sands (metric-ton CO_2e/year)

Fuel Type	Life-Cycle Stage #1: Raw Material Extraction	Life-Cycle Stage #2: Raw Material Transport	Life-Cycle Stage #3: Liquid Fuels Production	Life-Cycle Stage #4: Product Transportation and Refueling	Life-Cycle Stage #5: Vehicle/Aircraft Operation	Life-Cycle Total
Gasoline	13,129,370	610,668	7,389,087	610,668	46,811,250	68,551,044
Diesel	8,570,206	405,957	5,954,038	360,851	30,687,375	45,978,428
Jet Fuel	2,770,306	124,044	1,088,827	124,044	9,882,375	13,989,595
Total	24,469,883	1,140,669	14,431,952	1,095,563	87,381,000	128,519,067

Sources: National Energy Technology Laboratory 2008, 2009, U.S. Energy Information Administration 2015

Results indicate that the total life-cycle GHG emissions from activities directly and indirectly related to the proposed Line 3 Replacement Pipeline, assuming that all crude oil transported would be heavy crude oil, would be approximately 129 million metric tons per year of CO_2e, which is equivalent to providing electricity to 17,678,001 homes in one year (see https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator). Consequently, the direct and indirect GHG emissions related to the proposed Line 3 Replacement Pipeline would represent approximately 1.93 percent of the U.S. total (or 2.19 percent of the reduced 2020 U.S. GHG emissions target) and 0.28 percent of the worldwide GHG emissions. Again, this does not indicate that there would be a 1.93 percent increase in U.S. or 0.28 percent increase in worldwide GHG emissions since some or all of the crude oil transported through the proposed Line 3 Replacement Pipeline would replace existing supplies. It is also important to note that GHG emissions during the transportation phase from only the Wisconsin portions of the proposed pipeline Projects would be substantially lower than the total amount for the transportation phase, since Wisconsin represents 14 miles of much larger pipelines that would be located in other states.

Executive Order 12866 requires agencies, as permitted by law, to incorporate the social benefits of reducing CO_2 emissions into cost-benefit analyses of regulatory actions that impact cumulative global emissions. The social cost of carbon (SCC) is an estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year (Interagency Working Group on Social Cost of Carbon 2013). An SCC analysis has not been performed for these Projects.

While the construction and operations of the two pipelines do not include construction, retrofit, or operation of any refineries that could receive crude oil, refinery operations could contribute to increased cumulative impacts to GHGs and associated climate change if changes in the type or quantity of refinery emissions occurred in the future as a result of refining the crude oil transported through the proposed pipelines. Such changes could occur if the proposed pipelines generated construction of a new refinery, caused expansions of capacity in existing refineries, induced existing refineries to add new downstream processing units (such as cokers or fluid catalytic converters), or induced refineries to process a different crude oil (e.g., crude oils with different sulfur contents or American Petroleum Institute [API] gravities).[1] In this cumulative impacts study this scenario is not considered to be reasonably foreseeable since no plans to expand or change downstream processing units at any receiving refinery have been identified. Any future proposal to expand refinery capacity would prompt a state and/or federal environmental review process and require new operating permits, including new air quality permits with associated conditions.

1 API gravity is a measure of how dense an oil is compared to water. An API gravity >10 indicates a crude oil is lighter than water and will float, and an API gravity <10 indicates it will sink in water.

In the event that the Projects do not proceed to construction (No Action Alternative), crude oil would likely continue to be transported by existing pipelines, trains, and/or trucks. Each of the three modes of transport (i.e., pipelines, trains, and trucks) result in GHG emissions throughout their life-cycles. Probable life-cycle GHG emissions of these three modes of transport can be compared by calculating the mass (grams [g]) of CO_2e produced per functional unit of freight shipment, in this case ton-kilometers (t-km).

On a per-unit basis, truck transport results in significantly greater emissions (138 g CO_2e) than either rail (25 g CO_2e) or pipeline transport (14 g CO_2e) (Strogen 2012; Strogen et al. 2013). These emission values support the understanding that trucks contribute more to GHG emissions than trains, and that both trucks and trains contribute more to GHG emissions than pipelines. It is important to note that comparing these modes of transport by emission factor alone is simplistic. Even when one mode appears to be more efficient for a particular route based on emission factor, variations in transit time; topography; reliability; accident risk; contribution to congestion; number of trucks, rail cars, or pipeline pumping stations required; and cost may contribute to lesser or greater emissions than initially predicted. Additionally, use of alternative fuels or renewable sources of electricity may reduce overall emissions for a given mode, making direct comparisons difficult and imprecise.

Strogen (2012) compiled life-cycle GHG emission factors for long-distance pipelines (5 to 20 g CO_2e/t-km), fuel-carrying unit trains (25 g/t-km), and tanker trucks (140 to 180 g/t-km). These estimates considered GHG contributions from construction of the infrastructure through production and transport of product. Construction of pipeline infrastructure accounts for the majority of overall GHG emissions during the service lifetime of the pipeline. During operation, pipelines typically run on electricity, which results in less release of GHGs (the amounts depending on the source of electricity) compared to fuel burned by heavy machinery during construction. In contrast, both rail and truck transport produce the majority of their lifetime GHG emissions during transportation of products, with relatively lower emissions generated during pre-production or assembly. This is because both trains and trucks burn diesel fuel during operations and transport of products. Additionally, unlike pipelines, trains and trucks must backhaul (return) to their supplier to reload.

Climate Change Impacts

The total life-cycle GHG emissions from activities directly and indirectly related to both the proposed Sandpiper and Line 3 Replacement Pipelines would be approximately 185 million metric tons per year of CO2*e*, which is equivalent to providing electricity to 25,444,349 homes for one year (see https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator). This would represent approximately 2.77 percent of the U.S. total (or 3.15 percent of the reduced 2020 U.S. GHG emissions target) and 0.240 percent of the worldwide GHG emissions. It is noted, however, that the emissions from only the Wisconsin portions of the proposed Projects would be substantially less than this amount, since the majority of the transportation of crude oil from source to refineries would occur in other states.

GHG emissions increase the greenhouse effect and cause the Earth's surface temperature to rise. According to the EPA (2015) the consequences of climate change in the Midwest would be associated with increasing air temperatures, particularly at nighttime and during the winter months. Climate change is expected to intensify storms and lead to greater precipitation across the Midwest. Natural ecosystems in the Midwest are being altered by the cumulative effects of climate change, land-use change, and an influx of invasive species (EPA 2015). Climate change is anticipated to affect the distribution of culturally important tribal resources including walleye and wild rice but some of the Native American tribes who rely on these resources may not be able to follow shifts in ranges because reservation boundaries and off-reservation treaty rights are geographically fixed (Wisconsin Initiative on Climate Change Impacts 2011). Risks to human health could increase with warmer temperatures, reduced air quality, and increased allergens caused by climate change. There may be higher short-term yields of agricultural crops but increasingly warmer temperatures and other stressors are expected to decrease yields in the long-term (EPA 2015).

Wisconsin's climate is becoming warmer and wetter with climate change (Katt-Reinders and Pomplun 2011). By mid-century, seasonal temperature increases are projected to be greatest in winter, followed by spring and fall, and then by summer. Winter temperatures are likely to increase by about 8 degrees Fahrenheit (°F) and summers are likely to rise by 5 to 6°F. Large storm events are likely to increase during spring and fall. Although more precipitation may occur, evapotranspiration rates would increase, possibly leading to water shortages, particularly in the northern part of the state. These same factors could result in substantial increases in harmful algal blooms in lakes and loss of biodiversity in wetlands (Katt-Reinders and Pomplun 2011). Increased temperatures and altered precipitation patterns will have considerable impacts on growing season, crop yields, and dairy productivity. The economic impacts of these changes are difficult to forecast.

Wisconsin's urban areas, such as Madison, Milwaukee, and Green Bay could be challenged by increased precipitation leading to flooding and exaggerated heat waves. Stormwater conveyance systems in Wisconsin may not be adequate if storms become more frequent and intense. Urban areas also tend to have higher concentrations of vulnerable populations, who could be disproportionately affected by climate change conditions. Climate change can also pose indirect threats to human health in Wisconsin by leading to an expansion of the range of Lyme disease and other pathogens.

Climate change will also impact the Ceded Territories in the northern part of the state and present challenges to tribes who rely on natural resources to meet spiritual, cultural, medicinal, subsistence, and economic needs. The increasingly mild winters could impair the growth of wild rice and foster an increase in rice worm infestation (Great Lakes Indian Fish and Wildlife Commission n.d.a). Warmer temperatures could lead to a decline of cold-water fisheries (e.g., walleye, trout) and extirpation of moose and other heat-intolerant species that currently provide subsistence to tribes.

Researchers have developed models to estimate the dollar costs and benefits of climate change on a global scale. These models predict a range of costs to the global economy and vary depending on the degree of uncertainty surrounding all the factors that may influence the changes to global climate. Estimates for the costs to the global economy in the near term (by the year 2020) range from median values of $37 (U.S. government agencies) to $43 (Intergovernmental Panel on Climate Change estimate) per metric ton. A longer-term estimate by Stanford University estimates the costs to be approximately $220 per metric ton, based on the assumption that a changing climate can suppress basis economic growth rates (Moore and Diaz 2015; Tan 2015).

7.4.3 Agricultural Resources

Approximately 2.6 acres of agricultural land used for pasture and hay production and small areas of cultivated crops would be temporarily affected by construction of the proposed Projects, but no land would be permanently taken out of production. As such, moderate short-term cumulative impacts could occur if construction of the proposed Projects is concurrent with construction or expansion of other ROWs in the study area such as the potential Sandpiper Pipeline Expansion Project, which requires new pump stations in the study area and would affect small acreages of land (of an unknown type at this time). Unsuccessful restoration of agricultural land used for the proposed Projects' ROWs in combination with land used for other RFFAs could contribute to longer-term cumulative impacts to agricultural resources in the study area until areas are restored. Other short-term cumulative impacts to agricultural resources could result from concurrent construction that affect the productivity, fertility, or drainage of additional pastures, hayfields, or cultivated crop land. These cumulative impacts to agricultural resources would likely be short term and minor since landowners would be able to use the land again for crops or pasture after the construction ROW has been restored.

7.4.4 Cultural Resources

There are no known historic properties within 1 mile of the Projects' corridors, no National Register of Historic Places (NRHP)–eligible archaeological or historic resources or properties of religious and cultural significance (including Traditional Cultural Properties) identified during Phase I inventory surveys, and only one unevaluated resource that has been recommended not eligible within the survey corridor; therefore, construction or operation of the proposed Projects would not contribute to cumulative impacts to cultural resources. If cultural resources are found to be within the affected areas for other projects, impacts to cultural resources could occur, but these would not be cumulative to effects from the proposed pipeline Projects.

7.4.5 Federally Listed Endangered and Threatened Species

The cumulative impacts study area for federally listed Endangered Species Act (ESA) species extends 1 mile from either side of the proposed Projects' ROWs. Within Douglas County, there are three species listed as endangered and four listed as threatened, and critical habitat has been designated for piping plover (Table 7-8). Since the Kirtland's warbler, piping plover, and Fassett's locoweed are unlikely to be present in the Project areas, and critical habitat for piping plover occurs outside of the study area, these species and critical habitat would not be cumulatively affected by the proposed Projects in conjunction with other past, present, or RFFAs. However, suitable habitat exists for Canada lynx, rufa red knot, gray wolf, and Northern long-eared bat. Cumulative impacts could occur to these species in the event that other past, present, and RFFA impacted these species or habitats as described below.

Table 7-8 Status of Federally Listed Species and Designated Critical Habitat in Douglas County and Potential for Occurrence in the Cumulative Effects Study Area*

Species	Status	Habitat	Potential for Occurrence in the Study Area*
Piping plover – Great Lakes population (*Charadrius melodus*)	Endangered Critical habitat	Sandy beaches, bare alluvial and dredge spoil islands	No
Kirtland's warbler (*Dendroica kirtlandii)*	Endangered	Young jack pine stands (5–25 years old)	No
Gray wolf – Western Great Lakes population (*Canis lupus*)	Endangered	Northern forest	Yes
Rufa red knot (*Calidris canutus rufa*)	Threatened	Along Lake Superior and inland wetlands and waterbodies	Yes
Canada lynx (*Lynx canadensis*)	Threatened	Northern forest	Yes
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	Cavities or crevices of both live and dead trees	Yes
Fassett's locoweed (*Oxytropis campestris* var. *chartacea*)	Threatened	Open sandy lakeshore	No

Source: DNR 2015

Notes:

* Study area extends 1 mile from either side of the proposed Projects' ROWs.

The **gray wolf** and **Canada lynx** use forested habitats that occur in the study area. Forested habitat within the study area would be affected by the proposed Projects and RFFAs. Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between 86.2 and 103.1 acres for the proposed Projects, of which an estimated 31.8 to 42.4 acres of forest lands would not reestablish within the permanently maintained ROWs. The Projects in combination with RFFAs would result in the permanent loss of forest lands and alteration of landscapes, which may impact gray wolf and Canada lynx. In the event that some pump stations are constructed in areas close to the proposed Projects at the same time as the Line 61 Capacity Expansion Project, gray wolf and Canada lynx could be disturbed by construction noise and activity in multiple areas and become temporarily displaced. However, it is likely that these animals would find suitable habitat during the construction periods in other areas, resulting in minor and temporary disturbance impacts to these species. The measures identified in Section 5.5.3 would reduce these potential impacts.

The **rufa red knot** uses shallow wetlands habitat in the study area during their migration. Wetland habitat within the study area would be affected by the proposed Projects and RFFAs. Construction of a substation as part of the Superior Terminal Expansion Project would result in a loss of 2.8 acres of wetland habitat in addition to the acreage lost from the proposed Projects during construction (between 124.3 and 132.0 acres depending on the route variations chosen) and operation (between 32.6 and 51.1 acres). The impacts of the proposed Projects on wetlands would be offset through a compensatory mitigation plan for the preservation, enhancement, and restoration of 48.4 acres of wetlands. It is unknown at this time whether compensatory wetland mitigation would be required for the Superior Terminal Expansion Project since the substation proposal is under review. However, the abundance of wetlands in the vicinity of the Projects suggests that temporary impacts on a small acreage of wetland habitat in the Project areas in addition to those from the proposed Projects would not subtract from the overall availability of stopover habitat for rufa red knots and would not result in a detectable or measurable impact on an individual's survival or reproductive capacity.

If construction of the proposed Projects occurred during the migration period at the same time as other RFFAs (e.g., pump stations for the Line 61 Capacity Expansion Project), construction activities could cumulatively impact rufa red knots migrating through the Project areas. Noise or presence of humans and equipment involved in construction activities may cause migrating rufa red knots to startle and flush from wetlands or fields or to avoid construction areas. The measures identified in Section 5.5.3 would reduce these potential impacts.

The **Northern long-eared bat** uses forested habitats in the study area for roosting and forage. Impacts caused by clearing trees for construction and operation of the proposed Projects combined with clearing associated with construction of RFFAs (e.g., pump stations as part of the Line 61 Capacity Expansion Project) could cause moderate cumulative impacts if the bats are disturbed in multiple areas due to noise or human presence, and severe impacts would occur if projects incrementally result in large numbers of trees containing maternity colonies to be abandoned or destroyed. The measures identified in Section 5.5.3 would reduce these potential impacts.

The cumulative impacts to federally protected threatened, endangered, or candidate species would be reduced by strict adherence to conservation guidelines by the Sandpiper and Line 3 Replacement Pipeline Projects and all ongoing and future projects. Implementation of appropriate conservation measures for listed species to reduce impacts from the proposed Projects and future projects would be determined through consultations with federal, state, and local agencies and can include habitat restoration, impact avoidance, and impact minimization to reduce the magnitude of long-term cumulative impacts. Agencies permitting individual projects may also require mitigation measures beyond those required by fish and wildlife regulatory agencies such as those required by DNR for the proposed Projects (see Section 5.5.3 of this EIS).

7.4.6 Fish and Wildlife

7.4.6.1 General Fish and Other Aquatic Species

Disturbance to streams and rivers would occur from the proposed Projects, but no other projects have been identified that would be constructed at the same time within streams and rivers crossed by the proposed pipelines. As such, cumulative impacts would not occur to fish and other aquatic species.

7.4.6.2 General Wildlife Species

Disturbance to and loss of wildlife habitats including forest land and wetlands would occur from the proposed Projects and from RFFAs, which would impact wildlife in the general area. Approximately 2.8 acres of wetland habitat would be affected by the Superior Terminal Expansion Project, and forest lands may be required to construct pump stations as part of the Line 61 Capacity Expansion Project. The permanent loss of wetland and forest lands would constitute a cumulative impact to wildlife inhabiting these areas, which include high-value wildlife resources. Cumulative impacts to wildlife would be greater in areas where high-value wildlife habitat would be altered by future project construction. In the event that construction occurred during the same time period as for the proposed Projects, cumulative impacts could occur to wildlife including direct mortality, disturbance from noise and human activity, and associated loss of breeding success. Mitigation measures identified in Section 5.6.3 would reduce these potential impacts.

7.4.6.3 State-listed Fish and Wildlife Species

Disturbance to streams and rivers would occur from the proposed Projects, but no other projects have been identified that would be constructed at the same time within streams and rivers crossed by the proposed pipelines. As such, cumulative impacts would not occur to the two Species of Greatest Conservation Need (SGCN) (i.e., American eel and lake sturgeon) with the potential to be present in the Project areas (but which are also unlikely to be present in the vicinity of the proposed Projects).

Suitable habitat for a rare bird species occurs in the Project areas, and these birds may be present during the breeding period and beyond from late April to September. Grassland habitats would be temporarily affected by the proposed Projects and RFFAs during construction but would be reestablished following construction, which would likely take 1 to 2 years. If construction occurred for RFFAs in grassland habitats during the same year (e.g., land required to construct pump stations as part of the Line 61 Capacity Expansion Project) temporary impacts to suitable habitats would occur.

In the event that construction of the proposed Projects and RFFAs occurs in suitable habitats for a rare bird species during the breeding period (from late April to late August) within a few years of each other, reduced breeding success could occur from the combined effects of injury or mortality of eggs and young or adult abandonment of nests in the presence of noise and human activity. DNR proposes mitigation to reduce potential impacts to the rare bird if construction occurs during the breeding period (see Section 5.6.3), which would also contribute to a reduction in cumulative impacts.

One waterbody crossing location (at the Pokegama River) provides suitable aquatic and foraging habitat for a rare reptile. However, since no other projects have been identified that would be constructed at the same time at this crossing location, no cumulative impacts would occur to the rare reptile.

7.4.7 Forests and Other Woodland Resources

Forested habitat within the study area would be affected by the proposed Projects and RFFAs. Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between 86.2 and 103.1 acres for the proposed Projects, of which an estimated 31.8 to 42.4 acres of forest lands would not reestablish within the permanently maintained ROWs. The Projects in combination with RFFAs would result in the permanent loss of forest lands. The mitigation measures identified in Section 5.7.3 including the planting of between 31.8 and 42.4 acres of trees to compensate for the loss of the same amount of forest land as a result of pipeline maintenance for the proposed Projects would reduce this cumulative impact.

7.4.8 Geological Hazards

The proposed Projects and the projects listed in Table 7-1 do not lie within areas of high seismic or fault hazard risks and as such would not be impacted by geologic hazards in the area. While vegetation clearing and alteration of surface drainage during construction of the proposed Projects could lead to some minor localized risk of land sliding or soil movement, construction of RFFAs would not occur in these localized areas and would not contribute to cumulative impacts.

7.4.9 Invasive Species

Invasive species are transported and spread from existing infestation locations to new locations on equipment and materials that are transported from one area to another. Past human activity has already led to the introduction of and spread of invasive species in the cumulative impacts study area. The spread of invasive species is typically a localized effect, although water-borne invasive species can invade larger areas (rivers and watersheds) by being transported in water. Cumulative impacts could occur in the event that invasive species were spread during construction or operation of the proposed Projects to areas of other RFFAs, which could spread the invasive species farther. However, Enbridge is currently developing specific plans to prevent the spread of known infestations in the areas of the proposed ROWs to minimize the potential introduction of or spread of invasive species due to the Projects. It is reasonable to assume that RFFAs would also develop and implement similar plans to inhibit the introduction of new invasive species or the spread of existing invasive species as a result of each project’s construction and operation. Depending on the success of ongoing and future invasive species management plans, cumulative impacts are expected to be constrained to localized areas.

7.4.10 Noise

Construction of the proposed Projects is expected to occur within a relatively short period of time, with localized, intermittent, and short-term noise impacts. Most of the projects in Table 7-1 would not occur in the same location as the proposed Projects and therefore would not contribute to cumulative noise impacts. However, construction of pump stations as part of the Line 61 Capacity Expansion Project or construction of a new electrical substation at the Superior Terminal (as part of the Superior Terminal Expansion Project) could occur in similar locations and may contribute temporary noise impacts. Long-term cumulative noise impacts would not occur since pipeline operations tend to generate little to no noise except during occasional maintenance activities.

7.4.11 Public Utilities

Cumulative impacts to public utilities could occur in the event that the proposed Projects accidentally damaged utilities during construction activities at the same time that another RFFA also damaged the same utility, although this scenario is unlikely. Wisconsin Statute 182.0175 requiring advance notice of at least 3 business days to a One-Call Diggers Hotline system would reduce the potential for third-party damage to utilities from all projects.

7.4.12 Residential Areas

In general, the pipeline routes avoid population centers and residential areas with the exception of the southern portion of the city of Superior (population 26,862). If other RFFAs are constructed during the same time period in areas close to residences, such as the construction of a new electrical substation at the Superior Terminal (as part of the Superior Terminal Expansion Project), local residents may be affected by construction noise, aesthetic impacts, and access issues. Many property owners within the proposed ROWs have existing agreements with Enbridge concerning the potential effects of construction, maintenance, and operations activities. These existing agreements would reduce impacts from the proposed Projects and would thus reduce overall cumulative impacts of all projects as experienced by these landowners.

7.4.13 Recreation Areas

The proposed Projects in combination with other RFFAs could cause cumulative impacts to recreation areas. The clearing of trees, equipment noise, dust generation, and access restrictions would prevent recreationists such as hikers, bikers, hunters, and all-terrain vehicle operators from use of areas around construction sites. Direct access to areas such as boat ramps, swimming access points, and fishing points may be temporarily restricted due to increased traffic or road closures during construction. If construction of multiple projects occurred within a similar timeframe, choice of recreation areas to use may be limited. For example, construction activities from the proposed Projects could temporarily disrupt recreational uses on and adjacent to Douglas County forest land and no hunting would be allowed during construction. If construction of pump stations as part of the Line 61 Capacity Expansion Project occurred in Douglas County forest land, hunting sites would be temporarily limited to areas outside of these construction zones.

Construction of the proposed Projects and other RFFAs also may result in the permanent conversion of wooded areas to open areas, resulting in long-term impacts to recreation activities as hunters and hikers would be required use other forested habitats.

7.4.14 Safety

Cumulative impacts to worker and public safety during construction of the proposed Projects and other RFFAs is unlikely since each project would involve a different set of workers and the public would be prevented from accessing the individual sites. The greatest potential impact to public safety during pipeline operations would be from an oil spill. The likelihood of multiple concurrent pipeline failures resulting in oil spills is low. However, the proposed Projects would be constructed in an existing ROW with several other pipelines, and it is possible that an unprecedented event could impact multiple pipelines at the same time. In the event of oil spills from multiple pipelines in the ROW, a large amount of oil could be released, resulting in cumulative impacts to public and worker safety. Since Enbridge owns the pipelines in the ROW, the main control center would be responsible for detecting and responding to such an event. Please refer to Chapter 8 for a detailed discussion of oil spill risk and associated environmental impacts.

7.4.15 Socioeconomics

If construction of any of the RFFAs overlapped with the 14-month construction period of either Project, potential short-term cumulative socioeconomic impacts could occur in the region. However, the projects in the vicinity of the proposed Projects, such as construction of a new electrical substation as part of the Superior Terminal Expansion Project, would not involve a large labor force, and the other RFFAs are not in the general vicinity of the proposed Projects. As such, many cumulative impacts for socioeconomics would not occur such as increases in local population, demand for short-term housing, and use of transportation systems (commuting effects).

Positive socioeconomic benefits from increased employment opportunities and related labor income benefits, increased government revenues associated with sales and payroll taxes, and increased expenditures for goods and services would contribute cumulative impacts for Douglas County and the state of Wisconsin. The increased tax revenue paid to the state and local governments over the life of the spectrum of projects in the proposed Projects' vicinity would result in beneficial long-term cumulative economic impacts.

In Canada, the intensive and growing development of bitumen is causing significant concerns over several economic factors. First, while more than 16,000 good-paying jobs have been created from 2001 to 2011 in Canada's tar sands region, 520,000 manufacturing jobs were lost, which is attributed in part to the fact that bitumen development siphons off large amounts of investment capital from other enterprises. Second, because a portion of this energy sector investment originates in countries outside Canada, the profits from those investments are often not reinvested in the Canadian economy. Third, the "boom town" impact of soaring housing and other costs in its energy-producing areas has meant that Alberta has seen the lowest growth in real wages of any province in Canada. Finally, in international trade, Canada has seen a drop in non-petroleum export income that is over eight times greater than the increase in petroleum export income. The Line 3 Replacement Pipeline would most likely contribute to these economic concerns in Canada (Clarke et al. 2013).

7.4.15.1 Environmental Justice

For minority populations, Douglas County has a meaningfully greater (72 percent higher) proportion of Native Americans than the population of Wisconsin. In the short term, the creation of jobs and increased local spending would benefit minority populations in the event that Native Americans are employed as temporary or permanent workers for the proposed Projects and other RFFAs. Noise and visual impacts from construction activities for the proposed Projects and RFFAs are anticipated to be temporary as construction is completed, with no disproportionate impacts to minority populations. Over the long term, cumulative impacts to minority and low-income populations related to past, present, and RFFAs could occur if future projects indirectly create additional demands on medical services from combined impacts to air quality, or if minority and low-income population are disproportionally impacted by the effects of climate change (see Section 7.4.2).

In Block Group 3, Census Tract 208, near the Superior Terminal, 15 percent of the population is under the age of 5. Children are more susceptible than adults to health and safety risks from environmental contaminants due to their physiology, behavior, and opportunity for increased exposure (World Health Organization 2016). As noted in Section 7.4.2.1, long-term cumulative air quality impacts could occur at the Superior Terminal during operation of the proposed Projects and other RFFAs from incremental additions of stationary sources emitting air pollutants and increasing requirements for fossil-fueled equipment for ongoing inspection and maintenance activities. These increases in emissions could have a disproportionate impact on children. However, all projects would be required to obtain and abide by individual air quality permits that are designed to maintain air quality for the protection of the entire population.

7.4.15.2 Tribal Treaty Resources

Past projects such as damming rivers leading to water level changes, barriers to fish passage, and the introduction of invasive species have historically led to a decline in wild rice populations and declines in fish species such as sturgeon. Dams, pollution, habitat degradation and overharvest have dramatically reduced lake sturgeon populations in many Wisconsin boundary waters over the past 100 years (Great Lakes Indian Fish and Wildlife Commission n.d.b).; Wisconsin Natural Resources Magazine 2001). Construction and normal operation of the proposed Projects is not expected to impact wild rice areas, although an accidental oil spill in the Pokegama River upriver from identified wild rice locations could impact wild rice and affect tribal harvests in impacted areas. Damage to treaty resources or restrictions in access to tribal treaty areas from other RFFAs may constitute a cumulative impact to tribal treaty resources if these incidents occurred during the same timeframe as impacts from the proposed Projects (e.g., during an oil spill). If the proposed Projects and RFFAs affect wild rice populations this could create long-term moderate to major impacts to harvesting and cultural traditions depending on the severity of the impacts and success of management and restoration plans. Impacts from spills are discussed in Chapter 8. Climate change is anticipated to affect the distribution of culturally important tribal resources including walleye and wild rice (Wisconsin Initiative on Climate Change Impacts 2011), which would also contribute to cumulative impacts, and in the event of an oil spill in the future when such climate change impacts would be more pronounced, could have major effects to Native American tribes.

7.4.16 Soils and Topography

The proposed ROWs for the proposed Projects have already experienced soils and topography impacts through clearing, grading, trench excavation, backfilling, heavy equipment traffic, and restoration. Impacts to soils and topography from the proposed Projects would be in addition to these past effects, resulting in localized and temporary cumulative impacts including reduced productivity in disturbed areas until soil reclamation efforts are successful. Other RFFAs are not proposed to occur in the same ROWs and as such would not contribute cumulative impacts to soils and topography.

The increase of hydraulic fracturing (“fracking”) for Bakken crude oil extraction has led to an increase in mining of quartz-rich sand in Wisconsin. This sand, known as “frack sand,” is added to the chemical slurry used for oil extraction. Continued Bakken oil extraction may lead to increased frack sand mining in Wisconsin (Younger 2013). A study by DNR on frack sand mining is currently pending.

7.4.17 Transportation

Construction activities of the proposed Projects in combination with construction of RFFAs could result in cumulative impacts to transportation systems in the event that the same roads are used during the same time period. Cumulative impacts to transportation may include traffic delays from reroutes at roads crossed by the proposed Projects and additional worker and construction vehicles using affected roads.

7.4.18 Vegetation (Plants)

7.4.18.1 Upland Communities

The total amount of vegetation that may be affected by all RFFAs (Table 7-1) in addition to the proposed Projects is relatively small compared to the abundance of similar vegetation in the region generally. The proposed Projects and RFFAs would result in localized effects but would not likely affect regional populations of upland plants. For example, construction of the Line 61 Twin Project would require expansion of an existing ROW but not in close proximity to the proposed Projects (Figure 7-1). However, clearing trees within upland forest communities would result in long-term to permanent impacts to these communities.

7.4.18.2 State-listed Plant Species

State-listed plant species have been identified in proximity to the proposed Projects and throughout Douglas County (see Section 5.11). Construction of the proposed Projects and other RFFAs could contribute to cumulative impacts on state-listed plant species by incrementally increasing destruction or damage to these plants. Examples of destruction or damage include through direct removal or trampling by construction equipment and vehicles. Since many of these species are found within wetland habitats, the mitigation measures proposed for wetlands would reduce impacts to these species (see Section 5.11.3). Future projects would likely implement similar mitigation measures designed to reduce impacts to special status plants and their habitats. In addition, other mitigation measures may include strategically placing timber matting to avoid known locations of rare plants or plant relocations.

7.4.19 Water Resources

7.4.19.1 Groundwater Resources

Since construction, normal operation, and maintenance of the proposed Projects is not expected to have impacts on the quality or availability of groundwater resources, cumulative impacts to these resources would not occur. However, in the event of an oil spill, public and private water wells could be closed to use for the duration of the spill and response and for some period afterward. Well closures would inconvenience users who would need to use other water sources. Cumulative impacts to water users would occur in the event of a regional water shortage, although this is unlikely.

7.4.19.2 Surface Water Resources

Lake Superior is a dominant feature in this region. It holds a vast amount of clean, fresh water and offers diverse aquatic and terrestrial Great Lakes habitats, from rocky beaches and clay-dominated wetlands to deep-water reefs and deeper pelagic waters (DNR 2014). Despite this quality, the St. Louis River estuary area near Superior and Duluth maintains a legacy of contamination from its industrial past. Toxic contamination has impaired several uses including fish consumption advisories and restrictions on dredging.

Disturbance to streams and rivers would occur from the proposed Projects, but no other projects have been identified that would be constructed at the same time within streams and rivers crossed by the proposed pipelines. As such, cumulative impacts to surface water from the proposed Projects and RFFAs would not occur. However, a very large crude oil spill from the proposed Projects in combination with past actions could exacerbate water quality impacts in the St. Louis River estuary in the event that spilled oil reached that far downstream. An oil spill from the proposed pipelines in Minnesota has the potential to impact water quality in Minnesota-Wisconsin boundary waters (not to be confused with the Minnesota-Canada Boundary Waters Canoe Area). On a regional scale, if the construction of other RFFAs occurred concurrently with the proposed Projects in the same hydrologic basin, additional short-term contributions to water quality impacts within the hydrologic basin could occur, resulting in minor cumulative impacts at a regional scale. In case of an oil spill from the proposed Projects, cumulative impacts would be of a greater magnitude (see Section 8.5.20).

7.4.20 Wetlands

Past and current wetland disturbances in the vicinity of the proposed Projects includes wetland drainage and disruptions associated with agricultural activities, previous pipeline ROW construction, and ongoing ROW maintenance. Previously installed pipeline projects (e.g., original Line 67/Alberta Clipper Pipeline and Line 67 Capacity Expansion Project) have permanently converted forested wetland vegetation (palustrine forested [PFO] wetland) to emergent (palustrine emergent [PEM] wetland) types from construction and periodic maintenance mowing. Remaining wetland habitats would be affected by the proposed Projects and RFFAs. Construction of a substation as part of the Superior Terminal Expansion Project would result in a loss of 2.8 acres of wetland habitat in addition to the acreage lost from the proposed Projects during construction (between 124.3 and 132.0 acres depending on the route variations chosen) and operation (between 32.6 and 51.1 acres). Cumulative impacts would be reduced with implementation of the in-lieu fee program for the preservation, enhancement, and restoration of 48.4 acres of wetlands as part of the proposed Projects.

7.5 Cumulative Impacts Outside of Wisconsin

In accordance with CEQ guidance (1997b), this EIS, including the cumulative impacts analysis, evaluates only impacts of the Projects in the United States and focuses on environmental impacts that could occur in the United States. Executive Order [EO] 12114 identifies conditions or exceptions where an agency may incorporate environmental review of projects outside of U.S. jurisdiction—primarily including major federal actions significantly affecting the environment outside of the jurisdiction of any nation, or in a foreign nation not otherwise involved in the project. The Line 3 Replacement Pipeline Project would not satisfy the exceptions identified in EO 12114 since the portion outside the United States is located in a recognized nation (Canada), and Canada's National Energy Board is conducting its own environmental review of the portion of the Line 3 Replacement Project in Canada.[2] The National Energy Board is expected to report its final decision by May 2016. Since Canada is conducting its own environmental review of the portion of the Line 3 Replacement Project in Canada and the entirety of the proposed Sandpiper Pipeline would be in the United States, transboundary impacts are not included in this cumulative impacts analysis. In addition, an environmental review of the Minnesota portion of the proposed Projects is being undertaken by the Minnesota Department of Commerce, Energy Environmental Review and Analysis division,[3] and the North Dakota Public Service Commission conducted an environmental review of the Sandpiper Pipeline for the North Dakota portion.[4] Since Minnesota and North Dakota have already conducted, or are in the process of conducting, environmental reviews of the proposed pipelines, an in-depth cumulative impacts analysis in these states has not been conducted as part of this EIS.

Each of the two proposed pipelines (Sandpiper Pipeline and Line 3 Replacement Pipeline) in Wisconsin are extensions of much larger projects that intend to reach the Superior Terminal from different points of origin. If approved in Wisconsin and other jurisdictions outside of the state, the proposed Sandpiper Pipeline would extend approximately 618 miles from Tioga, North Dakota, to the Superior Terminal and the Line 3 Replacement Pipeline would approximate the length of the existing 1,097-mile Line 3 Pipeline corridor from Alberta, Canada, to the Superior Terminal (see Chapter 1, Figure 1-1). The actual length and route of each pipeline proposal would ultimately depend on which alternative routes are approved in each state that is proposed to be crossed by the Projects. Cumulative impacts to environmental resources

[2] Additional information available from Canada's National Energy Board: Major Applications and Projects
[3] Additional information available from the Minnesota Department of Commerce, Docket PPL-15-137 and Docket PPL6668/PPL-13-474
[4] Additional information available from the North Dakota Public Service Commission Docket PU-13-848

would occur from the construction and operation of the entire 618-mile-long Sandpiper Pipeline and 1,097-mile-long Line 3 Replacement Pipeline in Minnesota and North Dakota. Potential cumulative impacts would be somewhat similar to those discussed for environmental resources in this chapter, and would include other effects specific to the areas crossed by the pipelines in those states.

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8. POTENTIAL RELEASES AND ENVIRONMENTAL IMPACTS

This chapter addresses the potential for, and impacts of, accidentally released hazardous materials, including oil products and crude oil, which could occur during construction and operation of the proposed Projects. The safety requirements and standards, response contingency planning, types of releases, potential spill volumes, and potential environmental impacts are also addressed.

8.1 Pipeline Safety Standards and Regulations

The U.S. Department of Transportation (USDOT) is mandated to regulate pipeline safety under Title 49, U.S. Code [USC] Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), housed under USDOT, is responsible for protecting the public and the environment by ensuring the safe and secure movement of hazardous materials (e.g., crude oil) to industry and consumers by all transportation modes, including by interstate pipeline. PHMSA sets regulations and performance standards that address safety in the design, construction, testing, operation, maintenance, and emergency response preparedness for crude oil pipelines and related facilities. The regulations governing pipeline safety are included in 49 Code of Federal Regulations [CFR] Parts 190 through 199. The regulations at 49 CFR 195 (Transportation of Hazardous Liquids by Pipeline) include the design, construction, operation, and maintenance safety standards and reporting requirements for pipelines that transport hazardous liquids, including crude oil.

PHMSA’s Office of Pipeline Safety and the State of Wisconsin share pipeline safety regulatory responsibilities in Wisconsin (PHMSA 2014a). Wisconsin Statute [Wis. Stat.] 196.745 requires pipeline operators to maintain and operate their pipelines in a safe manner, and allows the Public Service Commission to “order any alteration in construction, maintenance or operation required in the interest of public safety.” Operator compliance with state and federal pipeline safety regulations is monitored through PHMSA’s inspection and enforcement program (PHMSA 2014b). The program consists of field inspections of operations, maintenance, and construction activities; programmatic inspections of operator procedures, processes, and records; and incident investigations and corrective actions (PHMSA 2014b). The Wisconsin Public Service Commission works in partnership with PHMSA to ensure pipeline operators are meeting requirements for safe and environmentally sound operation of their facilities (PHMSA 2014b).

The proposed design for the Sandpiper Pipeline and Line 3 Replacement Pipeline would comply with pertinent industry standards incorporated by reference in 49 CFR 195.3. These standards have been developed by the Pipeline Research Council International, Inc., American Petroleum Institute (API), American Society of Mechanical Engineers, American National Standards Institute, Manufacturers Standardization Society of the Valve and Fittings Industry, Inc., American Society for Testing and Materials, National Fire Protection Association, and the National Association of Corrosion Engineers. PHMSA continually reviews industry recommendations and adopts updated versions of industry-recommended standards. Associated facilities would also be designed and constructed in accordance with relevant standards listed in 49 CFR 195.

8.2 Spill Prevention and Response Planning

Preventing oil spills is the best strategy for avoiding potential damage to human health and the environment. The spill prevention plans that would be implemented by the Applicant during construction, operation, and maintenance of the proposed Projects are described in Section 3.2.23 and 3.3.4 of this Final Environmental Impact Statement (EIS). If an accidental release occurs, the best approach for containing and controlling a spill is to respond quickly in a well-organized manner. A response is most effective and organized if response measures have been planned ahead of time. This section describes the national, regional, and Applicant spill response plans that are (or would need to be) in place before construction and operation of the proposed Projects in order to carry out an effective response in the event of a spill.

8.2.1 National Plans

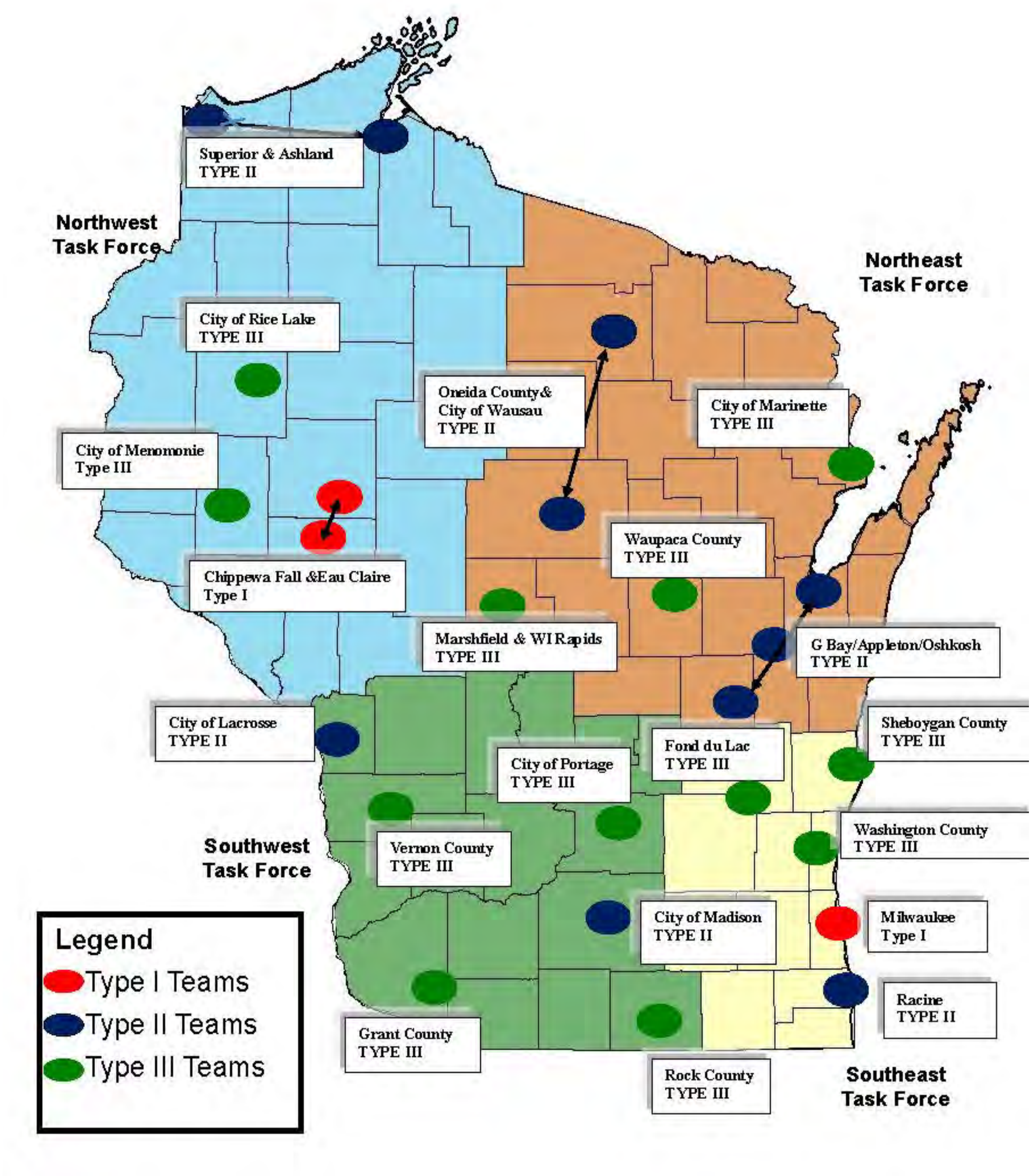
Provisions of the Clean Water Act of 1972 and the Comprehensive Environmental Response, Compensation and Liability Act of 1980, commonly called CERCLA, mandated development of a National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the NCP, to be the federally established blueprint for responding to oil spills and other hazardous substance releases in the United States. The NCP, developed by the U.S. Environmental Protection Agency (EPA), established the federal National Response System (NRS), which can be activated to organize and support response activities. The NRS is made up of a network of cooperating response teams consisting of personnel from federal, state, and local agencies as well as organizations with specialized skills and knowledge that can be called on to respond to spill emergencies. To facilitate a rapid and effective response, NRS teams ensure that technical, financial, and operational information on responding to oil spills is available; the roles of different agencies on the NRS teams are clearly outlined; regional plans to respond to spills are maintained; oversight and consistency reviews for response plans are undertaken; and appropriate technical advice, equipment, or manpower are available to assist with a response.

8.2.2 Regional Plans

The NCP also established Regional Response Teams (RRTs) with defined roles and responsibilities within the NRS. Each RRT consists of a standing team made up of federal, state, and local government representatives and an incident-specific team that can be activated for a response. Wisconsin is included within Region 5 of the NCP, and the Region 5 RRT has developed and maintains a Regional Contingency Plan/Area Contingency Plan. This plan is designed to coordinate a rapid and effective response among local, tribal, state, and federal officials; private industry; and other organizations to minimize damage resulting from releases of oil or hazardous substances, pollutants, or contaminants (Region 5 RRT 2015). This plan is updated every 5 years, and was most recently updated in March 2015. In addition, the governor of each state in Region 5 is requested to designate a lead agency that can direct state-led response operations (Region 5 RRT 2015). The primary agency representative to Region 5 RRT for Wisconsin is the Wisconsin Department of Natural Resources (DNR) with alternative representation from Wisconsin Emergency Management. These agencies are primarily responsible for developing and updating a State Contingency Plan that can be implemented in coordination with the Regional Contingency Plan/Area Contingency Plan and follows the requirements of the Emergency Planning and Community Right-to-Know Act established under Title III of the Superfund Amendments and Reauthorization Act.

To provide a high level of hazardous materials response capabilities to local communities, Wisconsin Emergency Management contracts and manages 22 Regional Hazardous Materials Response Teams. The teams are divided into task forces: Northeast Task Force, Northwest Task Force, Southeast Task Force, and the Southwest Task Force (Figure 8-1). These task forces are then divided into Type I, Type II, and Type III teams, all with complementary capabilities and training requirements.

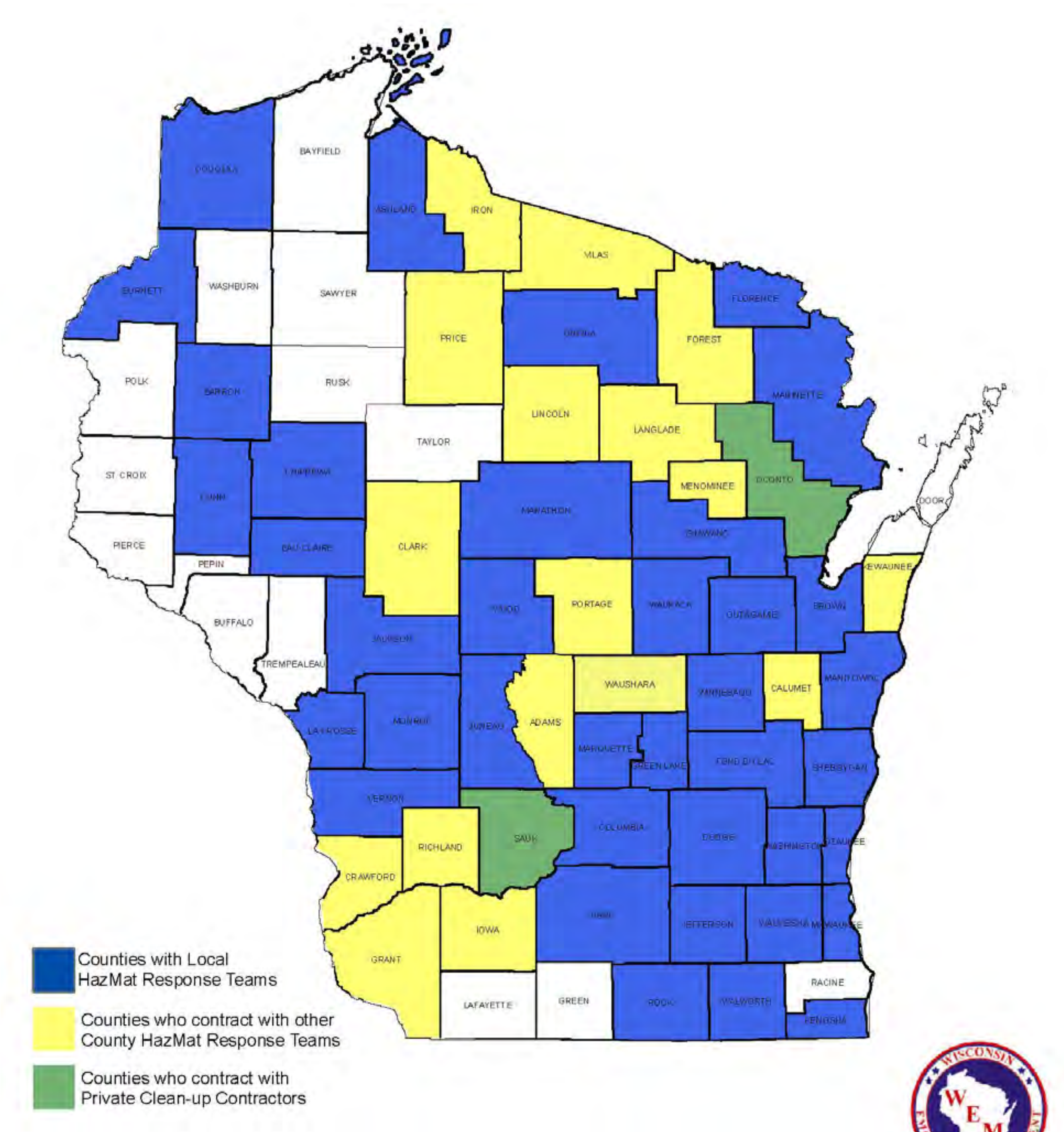
The Wisconsin Hazardous Materials Response System may be activated for an incident involving a hazardous materials spill, leak, explosion, or injury, or the potential of immediate threat to life, the environment, or property. The Wisconsin Hazardous Materials Response System responds to the most serious of spills and releases requiring the highest level of skin and respiratory protective gear. This includes all chemical, biological, or radiological emergencies.



Source: Wisconsin Division of Emergency Management n.d.

Figure 8-1 Map of Wisconsin Regional Hazardous Materials Response Teams

Local (County) Hazardous Materials Response Teams respond to chemical incidents that require a lower level of protective gear but still exceed the capabilities of standard fire departments. Forty counties currently have Level 4 Hazardous Materials Response Teams (Figure 8-2). Those teams may provide assistance to surrounding counties and are approved by the Local Emergency Planning Committees.



Source: Wisconsin Division of Emergency Management n.d.

Figure 8-2 Map of Wisconsin's County Hazardous Materials Response Teams

8.2.3 Applicant Spill Response Plans and Measures

In addition to the construction and operation spill prevention measures described in Chapter 3 of this EIS, contingency response plans for the proposed Projects would require approval by appropriate federal agencies prior to construction and operation. PHMSA regulations require the preparation of emergency response plans, which must be submitted to PHMSA for review and approval (49 CFR Part 194).

Following the July 2010 rupture of Enbridge’s Line 6B and subsequent oil release into wetlands and the Kalamazoo River in Marshall, Michigan, Enbridge has developed a new Integrated Contingency Plan (ICP) that serves as the emergency response plan for Enbridge’s pipelines. Input on the ICP was provided by the EPA, U.S. Coast Guard (USCG), the Occupational Safety and Health Administration (OSHA), and other agencies. Enbridge’s ICP was approved by PHMSA on July 11, 2013, for other Enbridge pipelines, and Enbridge would require approval of the ICP from PHMSA in order for the plan to apply to the Sandpiper and Line 3 Replacement Pipelines (Enbridge 2014). At EPA’s direction, Enbridge has also developed a Submerged Oil Recovery Plan (Appendix E) to describe tactical methods that could be employed to recover spills submerged in water. The plan includes methods that would be employed to identify areas containing submerged oil after an oil spill, including geomorphologic assessment, poling surveys, and sediment sampling and core logging. The plan also provides methods that would be used to recover submerged oil, including raking, tilling, air injection, chain dragging, and other procedures.

Each of the four U.S. regional annexes to the ICP contains an Emergency Response Action Plan (ERAP), which is a region-specific, concentrated version of the ICP focused on the unique features of the region. Each ERAP is a region-specific plan that is specifically designed to be used by first responders and Enbridge personnel in the field. The ERAPs include materials designed to provide first responders and others with the important information they need to allow them to work with the Enbridge response system in the event of an emergency. The ERAPs contain notification lists and protocols, and detailed lists of response equipment maintained by Enbridge along the pipeline routes, organization charts, decision-making flowcharts, evacuation information, mitigation and recovery efforts, specific response and recovery techniques, material safety data sheets for the products transported by Enbridge, and important forms. Enbridge’s ICP and ERAPs are intended to satisfy the requirements of local, state, and federal regulatory agencies mandating written procedures to address planning and response to emergencies, including PHMSA’s pipeline safety regulations specified in 49 CFR Parts 194 and 195, and applicable OSHA, USCG, and API national technical standards (Enbridge 2015a).

Enbridge owns and maintains spill response equipment stored in locations across the United States. Enbridge has established Pipeline Maintenance (PLM) Shops in many locations, the nearest being in Superior, Wisconsin. PLM shops are equipped with emergency response equipment. Equipment includes apparatus to contain and absorb oil released to water including various booms (e.g., river booms, sorbent booms, containment booms), pumps and portable dam systems, skimmers, sorbent pads and rolls; boats and response vessels to handle water-based activities; and specialized equipment for land-based activities including portable tanks, generators, and trailers.

Portable emergency response trailers contain hard boom, sorbent boom, skimmers, and porta-tanks as well as various tools for initial emergency response to both land and water releases. Response equipment also involves personal protective equipment (PPE) for responders, which includes respiratory equipment, hard hats, gloves, safety glasses, safety boots, and impervious clothing. The ICP contains guidance on PPE requirements, use, maintenance, storage, and disposal. Periodic inspection and maintenance is performed on each piece of equipment in accordance with recommendations from the manufacturer. After an equipment deployment exercise or actual response, each piece of deployed equipment is inspected to assess the condition and determine if any repairs need to be made. Equipment periodically inspected and found to be defective is repaired or replaced (Enbridge 2015a).

Enbridge employees in the United States and Canada participate in regular emergency-response drills and simulations to test and improve preparedness procedures. Employees are trained through workshops, tabletop and full-scale exercises, and procedural drills, often in partnership with local response agencies, regulators and external observers. The National Transportation Safety Board (NTSB) identified deficiencies in training of first responders and emergency response resources as one of the inadequacies of the oil spill response following the 2010 Line 6B rupture (NTSB 2012). To improve safety training, the Enbridge Enterprise Emergency Response Team was created in 2011 as a cross-company team with specialized training. The team regularly conducts major training exercises involving emergency response contractors and consultants, as well as emergency response agencies at the local, state/provincial, and federal levels.

The Enbridge Enterprise Emergency Response Team is trained to respond to large-scale events in Enbridge operational locations in North America. Enbridge reports that in 2014, its employees participated in 371 drills, exercises, and equipment deployments, working alongside first response agencies to test and practice emergency response plans (Enbridge 2015b). On September 17, 2014, Enbridge coordinated a multi-agency emergency response exercise along the Indian River in Cheboygan County, Michigan. This full-scale emergency exercise involved more than 300 Enbridge representatives, the USCG, EPA, the Michigan Department of Environmental Management, the Great Lakes Commission, and local emergency responders. The exercise tested the ability of Enbridge to carry out equipment deployment on water, public notification, and protection of water intakes and public parks, and educated first responders on pipeline emergencies.

Enbridge states that its training programs meet the National Preparedness for Response Exercise Program (NPREP) standards, which were developed by PHMSA, the USCG, the EPA and the U.S. Department of the Interior to establish a minimum preparedness exercise program for federally regulated companies. The NPREP standards require a minimum number of different exercise types over a 3-year period, including at least one spill response tabletop exercise and one equipment deployment exercise annually. Enbridge employees participate in regular emergency response drills and simulations to provide training, and to test and improve upon Enbridge's preparedness procedures (Enbridge 2015a).

The NTSB noted insufficient public awareness and education as deficiencies in Enbridge's spill response following the 2010 Line 6B rupture and spill (NTSB 2012). Enbridge currently operates Pipeline Public Awareness and Emergency Response Programs to address the problems noted by NTSB (Enbridge 2014). In 2014, Enbridge sent out 816,000 brochures to key stakeholders near Enbridge pipelines in the United States, providing recipients with information about pipeline safety, recognizing and responding to a pipeline emergency, and providing necessary contact information (Enbridge 2015b; Appendix C). Enbridge states that it is developing an online and in-person training tool to provide Enbridge-specific information to emergency responders in host communities, and community relations personnel are being added in key locations along Enbridge pipeline routes (Enbridge 2014). Emergency response preparedness assessments was completed and will continue regularly to identify additional strategic equipment requirements and specialized training for a response team to respond to large-scale events (Enbridge 2014).

The NTSB identified the failure of control center staff to appropriately respond to leak detection alarms as a cause for the duration and extent of the Line 6B rupture and spill (NSTB 2012). Since the 2010 incident, Enbridge has implemented the following actions to improve its control center operations (Enbridge 2015a):

- Augmented CCO (Control Center Operations) staff, adding training, technical support, engineering, and operator positions.
- Developed and implemented a Control Room Management plan in accordance with CFR.

- Revised and enhanced all procedures pertaining to decision making, handling pipeline startups and shutdowns, leak detection system alarms, communication protocols, and suspected column separations.
- Enhanced the organizational structures to better support our operators and to manage span of control and workloads.
- Opened a new control center in Edmonton, Alberta, in 2011. The center significantly enhances the work environment for operators and allows greater interaction and support for 24/7 operations.
- Implemented CCO team training and Enhanced Operator Qualification for on-call administrative personnel.
- Executed a Safety Culture Improvement Initiative including the formation of a Safety Leadership Committee tasked with promoting improved control center safety performance, effectiveness, and awareness.

8.3 Spill Volumes, Types of Spills, and Response Actions

Concerns were raised during scoping about potential oil spills related to construction and operation of the proposed Projects. This section addresses historical spill volumes from Enbridge's existing national and Wisconsin pipeline system; potential volumes and types of spills that could occur during construction, operation, and maintenance of the proposed pipelines; and the actions that would be implemented to respond to any accidental releases.

8.3.1 Potential Spill Volumes for Impact Analysis

To assess the impacts of potential spills from the proposed Projects in this Final EIS, the following categories of spill volumes are used:

- Very small spills: less than 210 gallons (less than 5 barrels [bbl]);
- Small spills: 210 to 2,100 gallons (5 to 49.9 bbl);
- Substantive spills: 2,100 to 21,000 gallons (50 to 499.9 bbl);
- Large spills: 21,000 to 210,000 gallons (500 to 5,000 bbl); and
- Very large spills: greater than 210,000 gallons (greater than 5,000 bbl).

These spill size classifications were used by the U.S. Department of State (USDOS) in the Alberta Clipper Pipeline Final EIS and are generally similar to the unofficial categories used by PHMSA for spill reporting (USDOS 2009).[1]

[1] The Minnesota Department of Commerce, Energy Environmental Review and Analysis division is currently undertaking EIS preparation under Minnesota state regulations to compare the environmental effects of the proposed Project in Minnesota and alternative pipeline routes. As part of this analysis Energy Environmental Review and Analysis has commissioned spill size and site-specific spill trajectory modeling to estimate the potential size and spread of crude oil in the event of an accidental release. Information from this spill modeling could be applicable to this (Wisconsin) analysis of potential spills; however, modeling results are not yet available and so could not be incorporated in this EIS. Once modeling results are available, they will be reviewed and analyzed for applicability to the proposed pipeline ROW in Wisconsin, and may be incorporated into the Final EIS to inform decision makers.

8.3.1.1 Very Small and Small Spills

The most common spill scenarios according to available data are the very small (less than 210 gallons [5 bbl]) and small (210 to 2,100 gallons [5 to 49.9 bbl]) spills of material—usually diesel, hydraulic fluid, transmission oil, or antifreeze—on work pads, roads, and facility parking or work areas. Some of these small spills may result from slow and small (pinhole) leaks of crude oil from the proposed pipelines or from maintenance activities on the pipelines and their facilities (e.g., pump station valves).

8.3.1.2 Substantive and Large Spills

Substantive (2,100 to 21,000 gallons [50 to 499.9 bbl]) and large (21,000 to 210,000 gallons [500 to 5,000 bbl]) spills would be much less likely to occur than smaller sized spills. Large spills would likely be crude oil releases from the proposed pipelines and would likely occur in the Enbridge mainline right-of way (ROW). Both substantive and large spills could result from tanker truck accidents (during construction), major failure of the fuel storage tanks at construction sites, outside forces such as excavators and major earth movement damaging the pipelines, or pipe failure resulting from corrosion (USDOS 2011).

8.3.1.3 Very Large Spills

A very large spill (greater than 210,000 gallons [5,000 bbl]) could occur during operation and could result from a major rupture or a complete break in either proposed pipeline. Pipeline rupture can result from a number of causes, including corrosion fatigue or pipeline shearing related to major earth movements, excavation accidents, or intentional acts (e.g., vandalism, sabotage, and terrorism).

8.3.2 Historical Pipeline Spill Volumes

8.3.2.1 Historical Pipeline Spills

PHMSA's Office of Pipeline Safety provides publicly available raw data, yearly summaries, and multiyear trends of safety performance metrics on all federally and state regulated pipelines, including information on historically reported incidents.[2] From 2005 through late 2015, pipeline companies reported 1,981 crude oil spills in the United States and 91 crude oil spills in Wisconsin (PHMSA 2015a, 2015b). Twenty of these incidents resulted in a substantive spill size; however, 11 incidents had recovery rates greater than 90 percent, and 16 had recovery rates greater than 50 percent (PHMSA 2015a, 2015b).

8.3.2.2 Historical Enbridge Spills

Out of the 66,649 miles of crude oil pipelines in the United States (as of 2014), Enbridge and its affiliated companies operates approximately 4,600 miles of pipeline (Association of Oil Pipeline Operators and API 2015; Enbridge 2015c). According to the Polaris Institute, Enbridge records document 804 total spills across its entire system from 1999 to 2010 (Enbridge 2015d). From 2005 through late 2015, Enbridge reported 178 crude oil release incidents in the United States from various system components including pipelines, storage tanks, and pump stations (PHMSA 2015a; PHMSA 2015b). The majority of these spill volumes were very small or small (less than 50 bbl). However, in 2010, there were two very large spills reported by Enbridge—one in Marshall, Michigan, that discharged over 20,000 bbl of crude oil into the Kalamazoo River system, and one in Romeoville, Illinois, that discharged over 7,000 bbl of crude oil into sewers and a retention pond (EPA 2011, 2015a; PHMSA 2015a). The NTSB determined that the probable cause of the pipeline rupture in Marshall was corrosion fatigue cracks that grew and coalesced, producing

[2] PHMSA Office of Pipeline Safety data and statistics are available online at http://phmsa.dot.gov/pipeline/library/data-stats.

a substantial crude oil release that was misdiagnosed by the control center for over 17 hours (NTSB 2012). The NTSB released a report and associated recommendations for Enbridge following the incident. Enbridge acted to incorporate all recommendations in the NTSB report (Enbridge 2015a). These measures have been included in the discussion of Applicant spill prevention and response measures in Section 8.2.3.

In the past decade, Enbridge reported 85 crude oil spills in Wisconsin (out of the 178 reported in the United States). This represents a large majority of overall crude oil pipeline spills reported in Wisconsin because Enbridge is the only crude oil pipeline operator in the state (the other six spills were reported by CCPS Transportation, LLC, which is now a subsidiary of Enbridge Inc.). Of these reported spills, 74 were very small to small, six were substantive (50 to 499.9 bbl), five were large (500 bbl or 5,000 bbl), and none were very large (PHMSA 2015a, 2015b). Ninety-five to 100 percent of the crude oil was recovered during the response to three of the large spill incidents and more than half of the oil was recovered from the other two large spills (PHMSA 2015a, 2015b).

8.3.3 Potential Types of Spills and Response Actions

Accidental releases of very small to small volumes of hazardous materials (e.g., paint cleanup solvents, waste paints, etc.) could occur during pipeline and appurtenant facility construction and during system operation and maintenance. Accidental releases of refined oil products (e.g., gasoline, diesel, and lubricating and hydraulic fluids) could also occur during construction or operation of the proposed Projects and would typically release very small to small volumes, although larger release volumes are possible.

Accidental crude oil releases ranging from very small to very large volumes of crude oil could occur during operation and maintenance of the proposed Projects. The characteristics of the crude oils (e.g., chemical composition, viscosity, and volatility) that would be transported by the proposed Sandpiper Pipeline and the proposed Line 3 Replacement Pipeline are described in Section 8.4.6.

8.3.3.1 Potential Project Construction Incidents

Construction-related spills could include releases of small quantities of refined products (e.g., gasoline, diesel, and lubricating and hydraulic fluids). These releases would be subject to the reporting requirements of 40 CFR Part 110, and would typically result from vehicle and construction equipment fueling and maintenance. Refined product releases could also result from accidents (e.g., tank truck rollover); excess fuel or lubricants accidentally released during vehicle, equipment, and machinery maintenance; and incorrect operation of equipment or fueling procedures. Hydrostatic testing of the pipelines prior to operation would not result in release of oil to the environment as the water used in the testing does not contain oil. Also, the discharged hydrostatic test water would be required to meet National Pollutant Discharge Elimination System (NPDES) discharge permit conditions (see Section 3.2.10) and conditions of Wisconsin’s Pollutant Discharge Elimination System (WPDES) General Permit for Hydrostatic Test Water or Water Supply System Water under (Permit No. WI-0057681-4) or an Individual Permit.

During construction, the potential also exists for damage to existing pipelines resulting in the release of potentially large volumes of crude oil, or for undetected leaks from other pipelines in the existing ROW to become exposed during construction. In the event that an existing and operating pipeline is damaged during construction, or that undetected leaks are discovered, response actions would likely be similar to those described below for operations accidents (see Section 8.3.3.2).

In the event of a spill of refined product or crude oil during construction, the Applicant's pre-designated Spill Coordinator would be responsible for reporting the spill, mobilizing containment and cleanup measures, and coordinating with emergency response contractors to ensure that actions are consistent with the Environmental Protection Plan (EPP; see Appendix B). The Spill Coordinator would mobilize onsite personnel, equipment, and materials for containment and/or cleanup commensurate with the extent of the spill, request additional assistance if needed, and assist the emergency response contractor and monitor containment procedures to ensure that the actions are consistent with the procedures defined in the EPP. Construction spills would likely be relatively small and contained with onsite equipment and personnel. In the event of a larger spill, the onsite response equipment and personnel would be supplemented, as required, by equipment and response assistance from an emergency response contractor. The Applicant would report spills to appropriate federal, state, and local agencies as soon as possible and consistent with applicable regulatory requirements, and initiate cleanup measures according to all federal, state, and local regulations (Enbridge 2014).

Potential treatment and disposal facilities for contaminated materials, petroleum products, and other construction-related wastes is provided in Appendix E to Appendix B. In Wisconsin, facilities that treat, store, or dispose of hazardous waste must be licensed by DNR. Recyclable wastes, such as motor oil, could be recycled where an established program is available. Grease or oily rags would be disposed of in accordance with state requirements. All contaminated soils, absorbent materials, and other wastes would be disposed of in accordance with all applicable state and federal regulations, and only licensed carriers would be used to transport contaminated material from the site to a disposal facility. If it is necessary to temporarily store excavated soils onsite, these materials would be placed on and covered by plastic sheeting (Appendix B).

8.3.3.2 Potential Project Maintenance and Operations Incidents

Operational spills from the proposed Projects could originate from the pipelines (no pump stations or surge tanks are included in the Wisconsin portions of the proposed Projects). Additionally, spills similar to those described above for construction could occur as a result of ongoing maintenance activities. A pipeline release could result from the effects of corrosion (external or internal) and corrosion fatigue, excavation or other subsurface equipment disturbance damage, defects in materials or defects related to the proposed Projects' construction, hydraulic over-pressuring related to incorrect operating procedures, or geologic hazards (e.g., ground movement, washouts, and flooding).

In the event of a pipeline release, leak detection systems would be in place to alert the control center (see Section 3.3.4 for details on leak detection systems). The amount of time required to identify a leak depends on the nature of the release. Full-line ruptures result in multiple leak triggers and alarms that notify the controller almost instantaneously. Small leaks are typically detected by the Computational Pipeline Monitoring (CPM) systems and the line balance calculation process, both of which are tuned to detect large and small leaks. The smaller the leak, the more time it takes for an alarm to be triggered by these systems. The highest sensitivity leak threshold requires 24 hours to trigger an alarm (Enbridge 2015a).

Although leak detection systems would be in place, some leaks might not be detected by the system for an extended period of time. A pinhole leak, for example, could be undetected for days or a few weeks if the release volume rate were small and below detectable levels. Although the total volume of a release from a pinhole leak could be relatively large (e.g., up to a substantive spill size), in most cases the oil would likely remain within or near the pipeline trench where it could be contained and cleaned up after discovery. Detection would likely occur through visual or olfactory identification, either by regular pipeline aerial inspections, ground patrols, or landowner or citizen observation, in most cases before the release of a substantive volume of oil to environmental features on the land surface.

In the event of a release of oil from a pipeline during operations, the control center shuts down the pumps and closes the valves in the area of the release. Additional valves can be placed at sensitive locations to limit the size of spills that could impact valuable natural resources. While the State of Wisconsin (through DNR or the Public Service Commission) does not have any authority to require additional valves, the State of Minnesota Public Utilities Commission does have the authority to require them for the portion of the pipelines that are in Minnesota.

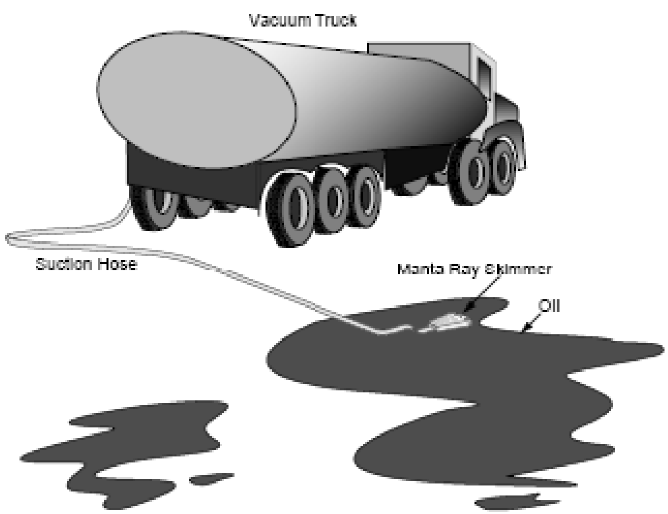
Following pump shut-down and valve closure, on-call operations personnel and managers are notified internally by the control center. Notifications occur for both internal and external parties, including the National Response Center (NRC), the state, and local police. Enbridge first responders work to confirm the nature and location of the incident as notifications occur. The ERAP provides specific response steps and tactics to be used within each region, considering the unique topography and features along a pipeline route within the region. First responders would arrive on the scene within minutes of being alerted to an incident and secure the scene, undertake evacuations when necessary, and deploy the ERAP procedures (Enbridge 2015a).

Enbridge's emergency response plans include predetermined steps to take in the event of an incident. Maps and tables based on information in established regional response plans are included to identify high-consequence areas (HCAs) along pipeline routes for each region. The maps and tables allow responders to know where to direct response resources in advance of a release, so that emergency responders can get to work immediately upon deployment. For example, they contain information on the location of sensitive resources, such as aquatic vegetation, sensitive shoreline areas, important habitats, and other features. Emergency responders use the maps and tables to begin placing booms and taking any other necessary response measures to protect resources and limit the scope of an incident (Figure 8-3).[3] These maps and tables are reviewed annually and updated in accordance with Enbridge policy and in concurrence with National Pipeline Mapping data available from PHMSA for use by first responders and state and county officials.

[3] Booms are floating, physical barriers to oil, made of plastic, metal, or other materials, which slow the spread of oil and keep it contained. Skimmers are similar to booms and are used by boats or others devices to collect oil for removal by skimming the water surface.

Source: NOAA 2014

Figure 8-3 Example of Booming in a River



Source: Region 5 RRT 2015.

Figure 8-4 Oil Removal by Tank Truck

The primary effort to contain and clean up a large spill on land would involve pumping the released material into tank trucks and excavating any contaminated soils for appropriate disposal in accordance with all applicable federal, state, and local agency requirements (Figure 8-4; Enbridge 2014). Enbridge emergency response staff would inform the appropriate public agencies, who would determine if evacuation is necessary to safeguard human health. Evacuation parameters would include consideration of the potential for fire, explosion, and hazardous gases. Containment and absorbent materials would be applied to any inland flowing spills with the potential to reach surface waters or wetlands. If a spill did reach a waterbody, sorbent booms and pads would be applied to initiate containment and recovery of released materials in standing water. If necessary, for large spills in waterbodies, the Enbridge emergency response staff would secure an emergency response contractor to further contain and clean up the spill.

Except on federal lands, response actions are generally monitored and/or implemented by the most immediate level of government with authority and capability to conduct such activities (Region 5 RRT 2015). The first level of response to a spill during the Projects' operations would generally be onsite Enbridge personnel followed by local government agencies, or state agencies if local capabilities are exceeded (Region 5 RRT 2015). When incident response is beyond the capability of the state response, EPA is authorized to take response measures deemed necessary to protect the public health or welfare or the environment from discharges of oil or releases of hazardous substances, pollutants, or contaminants.

If a spill from one of the proposed pipelines required additional response measures, the national and regional plans described in Section 8.2.2 could be implemented to contain and control an accidental release. In a large response effort, a Unified Command and an Incident Management Team made up of NRS personnel would be created to address site/spill-specific concerns. In the event of a pipeline spill on land or in inland waters, EPA would be the lead federal agency in charge of the response (EPA 2015b).

The actions that could be taken with the resources outlined in the Regional Contingency Plan/Area Contingency Plan include, but are not limited to, the following:

- Placing containment and recovery booms and pads,
- Sampling runoff and rivers,
- Excavating soil,
- Performing hydrogeological investigations,
- Conducting wildlife rescue and rehabilitation,
- Closing drinking water intakes, and
- Providing an alternate water supply (Region 5 RRT 2015).

The Regional Contingency Plan/Area Contingency Plan identifies environmentally and economically sensitive areas in an atlas series and a set of geographic information system (GIS) products intended to provide contingency planners and spill responders in Region 5 with the most accurate and relevant information possible for spill preparedness and response (Region 5 RRT 2015). Information mapped includes:

- Species data including federal and state-listed threatened and endangered species,
- Federal, state, regional, and privately owned and managed natural resource areas,
- Tribal lands,
- Federal, state, regional, and private designations of natural resource areas (no ownership),
- Drinking water intakes,
- Industrial water intakes,
- Locks and dams,
- Marinas and boat accesses,
- Oil storage above 42,000 gallons and oil pipelines, and
- Federal, state, and tribal trustees (Region 5 RRT 2015).

The Region 5 RRT has developed an Inland Response Tactics Manual to direct responders on appropriate response methods depending on the spill location, prevailing environmental factors, and response technique considerations and limitations (Region 5 RRT 2013). For example, the manual describes and diagrams containment methods on ice with trenches and sumps, different land barriers that can be constructed with available materials (e.g., earth, gravel, snow), and the purposes of different booming configurations in streams, rivers, and open water (Region 5 RRT 2013). EPA Region 5 does not recommend the use of dispersants or other oil emulsifiers in fresh water because it is ineffective, so this cleanup method would not be used within Wisconsin freshwater systems (Region 5 RRT 2015). In addition, the use of burning on surface waters in Region 5, particularly near sensitive wetland or water supplies, must be approved by state and/or federal agencies (Region 5 RRT 2015).

8.4 Factors Affecting Oil Spill Impacts

When oil is released into the environment, it is altered by various chemical, physical, and biological processes that are collectively referred to as “weathering” and include dispersion, evaporation, dissolution, emulsification, photo-oxidation, adsorption/sedimentation, and biodegradation. Weathering rates are highest immediately following release of crude oil into the environment and decrease over time. The degree to which an oil undergoes weathering depends on the oil characteristics and the environment into which it is released. A description of the different weathering processes is provided below:

- **Dispersion**—the distribution of spilled oil into the upper layers of the water column by natural wave action or application of chemical dispersants;
- **Evaporation**—the process whereby any substance is converted from a liquid state to become part of the surrounding atmosphere in the form of a vapor;
- **Dissolution**—the act or process of dissolving one substance in another;
- **Emulsification**—the process whereby one liquid is dispersed into another liquid in the form of small droplets;
- **Photo-oxidation**—the sunlight-promoted chemical reaction of oxygen in the air and oil;
- **Adsorption/sedimentation**—the process by which one substance is attracted to and adheres to the surface of another substance without actually penetrating its internal structure; and
- **Biodegradation**—the degradation of substances resulting from their use as food energy sources by certain micro-organisms including bacteria, fungi, and yeasts (National Oceanic and Atmospheric Administration [NOAA] 2015).

In addition, the spreading and thinning of spilled oil increases the surface area of a slick, enhancing surface-dependent weathering processes such as evaporation, biodegradation, photo-oxidation, and dissolution.

Crude oil released from the proposed pipelines during maintenance and operations or refined oil products released during construction or operations into the environment may affect natural resources, protected areas, human uses and services, and aesthetics to varying degrees, depending on the spill event. When an oil spill occurs, the resulting environmental impact depends on a number of factors, including:

- Quantity of oil released;
- Location of spill with respect to topography, infrastructure, and sensitive resources;
- Toxicity and other adverse effects of the oil to the resources;
- Season and other environmental factors such as weather;
- Chemical composition and physical characteristics of the oil; and

- The effectiveness and speed of the response effort.

These factors are described in greater detail in the following sections.

8.4.1 Quantity of Oil Released

The duration and speed of release would affect the amount of oil released to the environment. Generally, smaller oil spills would have lesser impacts than larger oil spills, although spills of smaller quantities in sensitive environments could be more damaging than larger spills in developed (impervious and contained) environments since cleanup options or access restrictions in sensitive environments such as wetlands may hinder containment and/or cleanup.

8.4.2 Location of Spilled Material

The specific impacts of an oil spill in the St. Louis estuary and Duluth harbor are difficult to predict given the large number of variables that play a role in the transport, dispersion, and fate of spilled oil. Each oil spill is unique. Most models for oil dispersion, transformation, and fate have been developed for marine (saltwater) systems rather than freshwater ones, so they have limited applicability in such freshwater systems. The Large Lakes Observatory at the University of Minnesota-Duluth is currently developing a high-resolution circulation model to track constituents in the harbor subjected to realistic meteorological forcing. This model or a variant of it may eventually be useful for addressing spill impacts in the future.

Very small to small spills would most likely be contained within or in close association with the Enbridge mainline ROW or associated infrastructure, including construction and maintenance yards. These smaller spills would be promptly cleaned up as required by federal, state, and local regulations and in accordance with Enbridge spill planning documents. Large to very large spills could extend beyond these areas and require a more significant response effort to achieve control and containment.

The extent of spill dispersal would partially depend on the size and rate of release, topography and geology of the release site, vegetative cover, and speed and success of emergency spill containment and cleanup measures. Light crude oils would penetrate quickly through most soil matrices. Diluted bitumen (dilbit) and other heavier crude oils would disperse more slowly than Bakken crude oil.

Oil released to inland areas is typically more easily contained than oil released to water. The rapid installation of containment features (e.g., dikes, impoundments, and physical barriers) around a spill area can deter spreading. Oil spill dispersal in freshwater habitats varies according to water flow and the habitat’s specific characteristics. Spills would tend to pool in standing or slow-moving water, such as wetlands and marshes. Spills into waterbodies with high turbidity and/or high concentrations of suspended particulates can lead to greater oil adsorption, resulting in oil becoming suspended in the water column or sinking to the bottom.

The locations of greatest concern for potential oil spills would be those that are upgradient of HCAs, such as water intakes for public drinking water, and Unusually Sensitive Areas (USAs) such as wetlands, flowing streams and rivers, and critical habitats. The region-specific ERAPs would aid in protecting these sensitive areas from oil spills in such locations.

8.4.3 Environmental Receptors

The impact of an oil spill is heavily influenced by the types of environmental resources (e.g., aquatic invertebrates or plants, sometimes referred to as environmental receptors) that might be exposed to the oil. The potential toxicity of different oil types to humans and other living species depends on chemical composition, amount and duration of organism exposure, and receptor sensitivity. Exposure to spilled substances can be either acute or chronic. Both refined fuel and crude oil exposure can result in sublethal effects such as reproductive impairments, reduced survival, or immunotoxicity. Potential effects to environmental resources are dependent on the amount and method of exposure and the sensitivity of a habitat or organism to the toxic effects of crude oils.

8.4.4 Season

The season in which a spill occurs could dramatically influence spill behavior, fate, impacts, and cleanup response actions. Seasonal variations in potential spill behavior are addressed in this section.

8.4.4.1 Spring, Summer, and Fall

The length and timing of the spring to fall season depends on the dominant annual weather patterns. For this EIS, this time period is generally defined as the period when the ground is mostly free of snow and access to the proposed pipeline ROWs is not restricted by snow and ice. During spring to fall, most of the rivers and creeks are flowing; ponds and lakes exhibit open water; land is mostly snow-free; and biological use of land and waterbodies is high. Currents, winds, and passive spreading forces would disperse spills that reach waterbodies, and heavier crude oil could adhere to sediments and become fully or partially submerged in water. Spills on land would directly affect vegetation, although dispersal of the spilled material is likely to be impeded by vegetation. Spills at wetlands may float on the water or be dispersed over a larger area than would spills on dry land or on ice and/or snow-covered land and waterbodies associated with the wetlands.

8.4.4.2 Winter

Winter is defined in this EIS as the period when waterbodies may be covered with ice and possibly snow, and the land surface may be partially or completely covered with snow. As oil evaporation is temperature-dependent, evaporation rates in winter would be slower than they are in warmer months. Oil is also more viscous at cooler temperatures, and therefore, spreading and dispersal of oil would also be slower in winter months (NRC 2003). Dispersal of oil spilled on land generally would also be slowed, although not necessarily stopped, by the snow cover. Depending on the depth of snow cover and the temperature and volume of spilled material, the spill may reach the underlying dormant vegetation or wetlands, ponds, and lakes. Similarly, spills at flowing rivers and creeks generally would be restricted in area by the snow and ice covering the waterbody, compared to seasons with little or no snow and ice cover. Spills under the ice at creeks, rivers, and ponds/lakes might disperse slowly as currents are generally slow to nonexistent in winter. However, recent warmer and more variable winter temperatures causing mid-winter rains and snow/ice melt would cause increased oil dispersion and evaporation if a spill occurred at the same time as the rain/melting event. In addition, because of snow and ice, winter spills may be harder to detect.

8.4.4.3 Freeze-up and Breakup in Aquatic Environments

Freeze-up is the transition time in the fall when lakes and rivers begin to freeze over. Breakup or spring melt is the short transition period between winter and spring when thawing begins, ice thins and/or breaks up, and river flows increase substantively and quickly, often to flood stages. Major floods may cause bank erosion and ultimately pipeline failure, with the oil entering the river and likely being widely dispersed and difficult to contain or clean up. An oil spill that results in oil reaching waterbodies during either freeze-up or breakup may be difficult to contain, remove, and clean up. The ice may not be strong enough to support people or equipment. In rivers, the oil may be transported several miles under the ice or in broken ice before it can be contained. Once the ice is strong enough to support people and equipment, it may be more difficult to detect the oil under the ice and to implement measures to effect rapid containment/cleanup at and near the spill site.

8.4.5 Weather

Weather, especially rapid warming periods and heavy rainfall, may cause rapid ice melt in rivers, snowmelt, and runoff. These could result in major flood flows that erode riverbanks, alter channels, and expose the proposed pipelines to forces that may break or rupture them. This scenario, although unlikely, could occur at stream or river crossings not spanned by horizontal directional drilling (HDD). If spilled oil were released to the flooded area, especially to flowing waters, oil could be distributed to adjacent terrestrial, wetland, and aquatic habitats that normally would not be exposed. These habitats and natural resources, as well as human uses of the habitats and resources, may be exposed to the spilled material. Major flooding or adverse weather conditions (e.g., high winds, blizzards, and extreme cold) could limit the Applicant's ability to detect small releases and/or hinder the spill response contractors from implementing timely and effective oil spill containment and cleanup operations.

8.4.6 Oil Type

During operation, different types of crude oil would be transported in the proposed pipelines. The proposed Sandpiper Pipeline would carry a light, sweet (meaning that it has a low sulfur content, generally 0.1 to 0.2 percent) crude oil sourced from the Bakken formation. Bakken crude oil is a low-viscosity oil, with an average API gravity[4] in the low 40s. It contains benzene, toluene, ethylbenzene, and xylenes (BTEX) at levels comparable to other light crude oils, and is made up of approximately 5 percent natural gas liquids (NGL), including ethane, propane, butane, and pentane. It is similar to other light crude oils (e.g., West Texas Intermediate) with a low sulfur content, low density, and low persistence in the environment. Bakken crude oil contains high quantities of volatile hydrocarbons and has a high vapor pressure; thus, it volatilizes quickly and is flammable (North Dakota Petroleum Council 2014). A recent EPA-led pilot study to evaluate the fate and behavior of Bakken crude oil spilled into water found that exposure and weathering caused a significant loss of the lighter compounds after 24 hours, including a complete loss of benzene, and that approximately 30 percent of the spilled oil had been lost mostly through evaporation (National Response Team 2015).

The proposed Line 3 Replacement Pipeline would transport dilbit, derived from bitumen sourced from the Canadian oil sands, and could also transport lighter crudes. Bitumen is a heavy, sour (generally 3 to 5 percent sulfur), naturally occurring semisolid hydrocarbon with high concentrations of polycyclic aromatic hydrocarbons (PAHs), resins, and asphaltenes (Environment Canada 2013). This chemical composition causes bitumen to be highly viscous and dense so it is mixed with diluents, such as NGL, to become transportable by pipeline, thus becoming a diluted bitumen. The composition of dilbit that would be transported by the proposed Line 3 Replacement Pipeline would likely be around 30 percent diluent and 70 percent bitumen; the exact ratio would depend on the viscosity of the bitumen and the density of the diluent (PHMSA 2012). Dilbit has an API gravity of approximately 20 degrees (PHMSA 2012). The viscosity of dilbit is comparable to that of conventional heavy crude oil, and it has similar corrosivity to other heavy crude oils (API 2013). Dilbit is similar to other denser and less volatile, potentially persistent heavier crude oils, and immediately following a spill, remains similar to other heavy crude oils (National Academies of Sciences, Engineering, Medicine [NASEM] 2015). It is also common for corrosion-inhibiting chemical additives to be injected into the oil in pipelines to minimize the potential for corrosion. Drag-reducing agents are also used to decrease turbulence in pipelines and allow oil to be pumped at lower pressures.

[4] API gravity is a measure of a petroleum liquid's density relative to water. Lighter crude oils have a higher API gravity and denser crude oils have a lower API gravity.

However, if dilbit reached a waterbody, weathering would cause the lighter, volatile diluents to rapidly evaporate, leaving behind a dense, viscous material more like the original bitumen with a strong tendency to adhere to surfaces and form a residue (NASEM 2015). In some cases, the residue can submerge or sink to the bottom of a waterbody even before it exceeds the density of the surrounding water, as the residue combines with particles present in the water column causing it to sink or become suspended and persist in the water column (NASEM 2015). Oil sinking and sedimentation are dependent upon the density of the oil and water currents and tidal and wave energy; it is not known if these processes are influenced by temperature (NRC 2003). Responding to spills of dilbit into a waterbody can require uncommon response tactics to recover the spilled oil persisting below the water surface. As described in Section 8.2, the Applicant has developed a Submerged Oil Recovery Plan to address this concern (Appendix E).

8.4.7 Spill Response

The spill response timing and effectiveness would have a large effect on the extent, severity, and persistence of impacts related to an accidental release of hazardous materials. A well-executed spill response that quickly stopped the flow of oil, contained the spilled oil within a designated area away from sensitive resources, and removed the oil speedily and carefully would have substantially lower impacts than a poorly executed and uncoordinated response. Existing access roads that would be used for construction of the pipelines would likely be used to access a spill that occurred along the pipeline routes. In the event that no access road was available, temporary access roads may be constructed.

For a suspected oil spill from the proposed Projects, first responders could arrive on the scene within minutes of being alerted to an incident and secure the scene, undertake evacuations when necessary, and deploy the ERAP procedures. Enbridge personnel would arrive at the site of an incident within, at most, 6 hours after receiving notice of the incident (Enbridge 2015a). See Section 8.2 for information on national, regional, and Applicant spill response plans.

8.5 Potential Environmental Impacts

The pipeline safety standards and regulations, industry standards described above, and the spill prevention plans described in Chapter 4 are all designed to reduce the frequency of spill incidents. Nonetheless, accidents can occur and the risk of an oil spill cannot be totally eliminated. This section addresses the potential environmental consequences to specific resources as a result of a spill. The range of impacts considered for each resource includes the effects of the initial event and the effects of the likely response to that event.

8.5.1 Overview of Potential Impacts

For the proposed Projects, the crude oil transported through the pipelines represents the most likely source of an oil release that could produce substantial environmental impacts. The size of a spill and the receptor types (environmental resources) are key variables for estimating the magnitude of potential environmental impacts from a spill (Table 8-1). The magnitude of environmental impacts generally increases within an environmental resource as spill size increases (from left to right in the table). Within a spill size, the magnitude of impact increases with increasing sensitivity of the resources (from top to bottom in the table). Combining size and sensitivity, the magnitude of impacts generally increases from top left to bottom right in the table. Figure 8-5 provides an overview of the proposed pipeline routes.

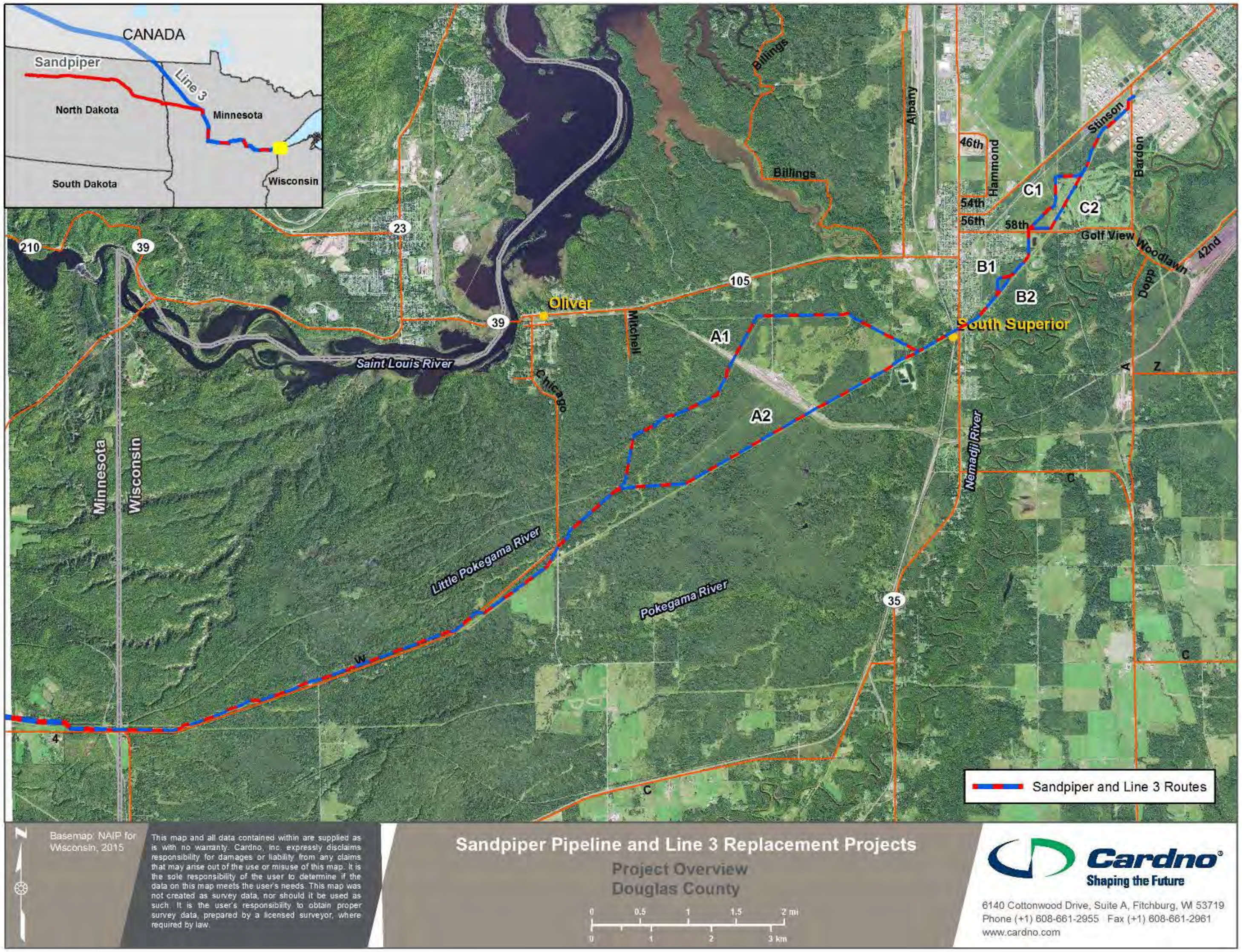


Figure 8-5 Overview of Project Area

Table 8-1 Magnitude of Environmental Impacts of Crude Oil Spills by Spill Size and Environmental Resource

Environmental Resource [a]	Magnitude of Impact by Size of Spill [b]				
	Very Small (<5 bbl)	Small (5–49.9 bbl)	Substantive (50–499.9 bbl)	Large (500–5,000 bbl)	Very Large (>5,000 bbl)
Noise	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Aesthetic Resources	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Transportation	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Public Utilities	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Socioeconomics	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Soils and Topography	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Air Quality	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Invasive Species	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Vegetation (Plants)	Negligible	Negligible to minor	Minor	Minor to medium	Medium
Residential Areas	Negligible	Negligible to minor	Minor	Medium	Medium to substantial
Agricultural Resources	Negligible	Negligible to minor	Minor to medium	Medium	Medium to substantial
Recreation Resources	Negligible to minor	Minor	Minor to medium	Medium	Medium to substantial
Forests and Other Woodland Habitats	Negligible to minor	Minor	Minor to medium	Medium to substantial	Substantial
Fish and Wildlife	Negligible to minor	Minor	Minor to medium	Medium to substantial	Substantial
Safety	Negligible to minor	Minor	Medium	Medium to substantial	Substantial
Wetlands	Minor	Minor to medium	Medium	Medium to substantial	Substantial to major
Cultural Resources	Minor	Minor to medium	Medium	Medium to substantial	Substantial to major

Table 8-1 Magnitude of Environmental Impacts of Crude Oil Spills by Spill Size and Environmental Resource

Environmental Resource [a]	Magnitude of Impact by Size of Spill [b]				
	Very Small (<5 bbl)	Small (5–49.9 bbl)	Substantive (50–499.9 bbl)	Large (500–5,000 bbl)	Very Large (>5,000 bbl)
Water Resources	Minor	Minor to medium	Medium	Substantial	Substantial to major
Federally Listed Threatened and Endangered Species and Habitats	Minor to medium	Minor to medium	Medium	Substantial	Substantial to major

Notes:

[a] In increasing order of sensitivity from top to bottom. For some resources, such as noise, sensitivity includes relative importance of the resource.

[b] Negligible impact: little to no detectable impact on most resources; there may be some visible presence of oil on land, vegetation, or water. No to very few organisms apparently killed or injured. Temporary (days) and very local to spill site.

Minor impact: measurable presence of oil and limited impacts on local habitats and organisms. Temporary (days to weeks) and local (acres). Some organisms (likely birds, fish, and aquatic macroinvertebrates) may be killed or injured in the immediate area.

Medium impact: patchy to continuous presence of oil on terrestrial and aquatic habitats near the spill site. Impacts may be present for weeks to a few months and may affect tens of acres or a few miles of stream/river habitat. Local community- and population-level effects on organisms and human uses of the area.

Substantial impact: patchy to continuous and heavy presence of oil on terrestrial and aquatic habitats near the spill site and for substantial distances downgradient of the spill site. Impacts may be present for weeks to months and potentially for a year or more. Area may include many acres to sections of land or wetlands and several miles of riverine habitat. Local community- and population-level impacts on organisms and habitats, and disruption of human uses of local oiled areas.

Major impact: mostly continuous or nearly continuous presence of oil on all habitats near and for substantial distances downgradient of the spill site. Impacts may be present for months to years. Area may include many acres to sections of land or wetlands, and several to numerous miles of river or other aquatic habitat. May cause local and regional disruption of human uses. May cause local and regional impacts to biological populations and communities.

8.5.2 Aesthetic Resources

Most spills in upland areas would typically be confined to construction and maintenance areas, roads, facility sites, or the pipeline ROW and adjacent areas. However, if a substantive to very large spill extended beyond the Projects' ROW, oiled vegetation and slicks or sheens on water surfaces would be visible.

Impacts could also result from response and cleanup actions. Vehicles, equipment, and personnel present during spill cleanup and recovery operations (e.g., temporary containment berms and response vessels in the water) could alter the visual environment of the affected area. Glare from equipment and the presence of emergency crew vehicles and operations would be visible at times from nearby residences and would most likely cause short-term impacts (hours to days) depending on volume of oil spilled and response effort required.

8.5.3 Air Quality

The level and location of air quality impacts would depend on wind speed and direction in relation to proximate receptors (e.g., populated areas). Impacts to air quality from a larger spill would be higher due to the potential volume of air pollutants released to the atmosphere but would still be localized and transient. Once crude oil is exposed to the environment during a spill, the lighter volatile organic compounds (VOCs) within the oil separate from the heavier fractions and evaporate into the atmosphere. As described in Section 8.4.6, Bakken crude oil has a higher volatile content and higher vapor pressure than dilbit, so more of it would evaporate. Dilbit, like other heavy crude oils, contains more high-molecular-weight hydrocarbons and is less prone to evaporation. VOCs exacerbate the formation of ground-level photochemical ozone in the presence of nitrogen oxides in strong sunlight, light winds, and low-altitude temperature inversions. The ROW for the proposed Projects in Wisconsin is currently in attainment with the ozone National Ambient Air Quality Standard (NAAQS) and is expected to remain so for the foreseeable future. It is therefore not anticipated that ozone formation from an oil spill from either pipeline would cause a violation of the NAAQS. However, since ozone is a greenhouse gas (GHG), a crude oil spill would indirectly present a minor contribution to GHG emissions.

BTEX and PAHs are classified as hazardous air pollutants (HAPs), which cause serious health effects or adverse environmental and ecological effects (EPA 2013). Since HAP exposure times from a crude oil spill from the proposed Projects would be relatively short (days or weeks), the chronic public health risk would be negligible to minor. However, depending on atmospheric conditions, short-term impacts from larger crude oil spills may become apparent, such as acute olfactory, respiratory, neurological, and gastrointestinal irritation (predominantly headache and nausea). If the spilled oil contained sulfur compounds (e.g., hydrogen sulfide [H_2S], mercaptans) a heightened odor impact would occur. The impact would increase as a function of the spill size. Impacts of the very large spill in the vicinity of Marshall, Michigan, in 2010 were documented in a report by the Michigan Department of Community Health (2010).

During emergency spill cleanup and recovery operations, fuel-burning equipment (e.g., vehicles, pumps, boats) would create minor impacts from the release of air pollutants, as would in situ burning operations (if approved).

8.5.4 Agricultural Resources

The agricultural land in the Project area is predominately used for pasture and hay production, with small areas of cultivated crops. Agricultural production and crop yields within the spill area could be reduced until remediation of affected soils and impacted irrigation water supplies were completed. Contaminated pasture land could negatively affect livestock if sufficient unaffected pasture areas were not available.

Crude oil spilled in croplands would render them unsuitable for consumption, and direct contact with crops would likely kill the plants. Crude oil spilled in pasture lands would require removal of any livestock present to prevent injury. If a spill occurred in agricultural environments, the highest response priorities would be to prevent oil from leaching into groundwater or entering waterways as runoff, and returning the soil to productive use as quickly as possible (API 2015). Production of crops and grazing activities could also be prevented during a spill response effort, resulting in losses to agricultural production and associated economic activity.

Cleanup operations in agricultural lands would likely involve removing the upper soil and vegetation layer with earth-moving equipment. Impacts to soils from such activities can be long term since the formation of new soils generally takes longer in colder climates. Crops or grasslands could be reestablished relatively quickly in appropriate soils after 1 to 2 years. Natural sorbent materials such as straw or mulch could contain noxious or invasive weed seeds, which could spread throughout the area. This impact would be greater in organic farms where herbicides are not used, although no organic farms have been identified in the proposed Projects' ROW.

8.5.5 Cultural Resources

Oil spills can directly impact archaeological and historical resources, or properties of religious and cultural significance (including Traditional Cultural Properties [TCPs]) that are listed on or eligible for the National Register of Historic Places (NRHP). However, no NRHP-eligible resources exist within 1 mile of the proposed ROWs, so no impacts would occur. If a crude oil spill were to reach a historic property, potential changes to its integrity and setting through alterations to its chemical and physical composition may vary depending on the type of historic property (archaeological, TCP, or historic resource) and the location of the resource (e.g., terrestrial or river shoreline). One unevaluated archaeological site (47DG0180) is located within the environmental survey corridor (see Section 5.4) and should be avoided. The Wisconsin State Historic Preservation Office (SHPO) is currently being consulted regarding the determination of eligibility of this site for NRHP registration.

Response actions could result in increased noise or changes in the visual setting of cultural resources from the presence of equipment, vehicles, and personnel associated with cleanup response. In the event of an inadvertent discovery of previously unknown archaeological resources during spill response (e.g., contaminated soil removal), an Unanticipated Discovery Plan (see Appendix D) developed for the Projects would be followed (Enbridge 2013). The UDP is currently in draft form and requires review by the DNR Tribal Liaison and affected tribal historical preservation officers prior to a DNR permit determination. In addition, the Regional Contingency Plan/Area Contingency Plan outlines the role of federally recognized tribal governments' involvement in response efforts, including Tribal Historic Preservation Officers who would be available to advise responders if actions may impact known historic properties that are of concern to the tribes (Region 5 RRT 2015). If impacts to historic properties are identified, the response would be adjusted to protect those historic properties where feasible and if time is available (Region 5 RRT 2015).

8.5.6 Federally Listed Endangered and Threatened Species

Three federally listed endangered and four threatened species have been documented in Douglas County, and designated critical habitat for the piping plover (*Charadrius melodus*) also occurs in Douglas County. The federally listed endangered species are Kirtland's warbler (*Dendroica kirtlandii*), the piping plover, and the western Great Lakes gray wolf (*Canis lupus*); the threatened species are Fassett's locoweed

(*Oxytropis campestris* var. *chartacea*), rufa red knot (*Calidris canuta rufa*), Canada lynx (*Lynx canadensis*), and the Northern long-eared bat (*Myotis septentrionalis*). If a spill were to occur, it would be unlikely to impact the Kirtland's warbler, piping plover, or Fassett's locoweed since they are unlikely to be present in the Project area. However the gray wolf, Canada lynx, rufa red knot, and Northern long-eared bat could occur in the Project area. Impacts from an oil spill to listed species may include direct exposure to oil itself (for those species with the potential to occur in proximity to the pipelines) or damage to habitats.

Canada lynx den sites used in late April to July would most likely occur away from the existing cleared ROWs. However, in greenfield forested areas including the proposed Route Variations A1, B1, and C1, Canada lynx den sites may occur. In the event of an oil spill, toxicity to lynx could be caused by contact, inhalation of fumes, or ingestion (EPA 1999). Nonlethal effects of exposure to oil may include both physiological and ecological effects. Chronic exposure to PAHs can lead to physiological responses such as immunosuppression and mutagenic effects (Burns et al. 2014). Oil spills could also affect lynx through habitat degradation, changes in prey or forage availability, and contamination of prey or forage resources (Burns et al. 2014). They may also be disturbed by noise and activity caused by the spill response effort. Onsite burning to remove oil, if allowed, could create smoke plumes and particulates that could affect lynx through inhalation.

Oil spills could affect **Northern long-eared bats** through changes in prey or forage availability and contamination of prey or forage resources (Burns et al. 2014). Direct toxicity could result through contact, inhalation of fumes, or ingestion (EPA 1999). Chronic exposure to PAHs can lead to physiological responses such as immunosuppression and mutagenic effects (Burns et al. 2014). Northern long-eared bat females form maternity roosting colonies from June 1 to August 1 annually. These summer maternity roosting colonies could occur in the Project area. The noise and activity generated during a spill response effort could impact individuals or colonies of Northern long-eared bat occupying summer roosts by causing them to abandon occupied tree cavities. Impacts could be severe if a maternal colony were abandoned or destroyed as result of a spill or spill response effort. Since the population of Northern long-eared bats is declining due to white-nose syndrome and destruction of habitat among other factors, the protection of these bats, and particularly of groups of bats in maternal colonies, is of high importance.

Gray wolves could occur in the Project area as either transients or residents. Toxicity could be caused by contact, inhalation of fumes, or ingestion, and chronic exposure to PAHs can lead to immunosuppression and mutagenic effects. Oil spills could also affect gray wolves through habitat degradation, changes in prey or forage availability, and contamination of prey or forage resources (Burns et al. 2014). Noise and activity caused by the spill response effort may cause gray wolves present at the time of a spill to move out of the spill area temporarily. Onsite burning to remove oil, if allowed, could create smoke plumes and particulates that could affect wolves through inhalation.

Rufa red knots may use wetlands, cultivated fields, or waterbodies in the Project area as migratory stopover habitat, but this species does not breed in the Project area. In the event of an oil spill this species would be susceptible to toxic effects of oil through preening and ingesting contaminated prey. Ingestion of PAHs can cause teratogenic changes (embryo deformities) and changes in egg size and shell thickness and can reduce future reproductive success (Vidal et al. 2011). Spill response and cleanup activities could result in damage to wetland habitat if booms were deployed near sensitive resources. Onsite burning to remove oil (if permitted) could create smoke plumes and particulates that could affect rufa red knots through inhalation. This species would also be temporarily disturbed and displaced by cleanup activities.

8.5.7 Wisconsin Fish and Wildlife

8.5.7.1 Fish and Other Aquatic Species

If spilled oil reached the Pokegama River or other waterways along the Project area, it could affect fish present (see Chapter 5, Table 5.6-1 for a list of native fish species in the Pokegama River and other tributaries of the St. Louis River estuary). Oil reaching other smaller tributaries containing fish species would also be affected. The sensitivity of fish to the lethal effects of oil and its constituents depends on fish species and life stage. Lethal effects from acute exposure to crude oil and its constituents have been demonstrated for an array of fish species at various life stages. Embryos and larvae can be particularly susceptible to acute exposure (Billiard et al. 2008), and vertebrates tend to be more sensitive than invertebrates. Mortality occurs over a range of concentrations and is highly dependent on duration of exposure. It is difficult to predict how different species are affected by chronic exposure to hydrocarbon compounds, but mortality resulting from chronic exposure often occurs at levels an order of magnitude or more lower than those induced by acute toxicity (McGrath and Di Toro 2009). Increased mortality of larval fish occurs because they are relatively immobile and are often at the water's surface, where contact with oil is more likely. Adult fish may be able to avoid contact with oiled waters during a spill, but survival would be expected to decrease if oil concentrations in the water column were to reach an isolated pool, especially if it were ice covered.

An oil spill reaching streams and rivers in the Project area could affect macroinvertebrates (such as crustaceans, insects, and worms), mussels, amphibians, and reptiles. The effects of oil spills on macroinvertebrates, amphibians, and reptiles depend on the concentration of petroleum present, the length of exposure, and the stage of development involved (larvae and juveniles are generally most sensitive [McKim 1977]). Sublethal effects to aquatic species are more likely than lethal effects from spills that enter large waterbodies where oil would be dispersed and diluted during and after the spill event. Sublethal effects may include changes in growth, feeding, prey availability, fecundity, survival rates, and temporary displacement. Sedentary organisms (e.g., mussels) and those with a limited geographic distribution would encounter greater impacts than more motile and widespread species.

If a large to very large spill reached a slow-flowing, small- to moderate-size river in summer, the impacts due to toxic exposure may be greater than at other times in the same river when flows are higher and water temperatures are cooler. During a high-water event (such as spring floods), oil dispersed into adjacent wetlands or lakes with connections to rivers and large creeks could produce additional impacts.

Methods of cleanup that can affect fish include the use of booms, skimming, manual or mechanical removal, application of dispersants, cutting or removal of vegetation, and in-situ burning. Cleanup operations may involve a large number of vessels and aircraft in water habitats, with the potential to disturb fish and possibly displace them from important feeding or reproductive grounds or other important habitat. Fish could be indirectly affected by a reduction or contamination of prey, or shifts in prey distribution. The use of dispersants (if permitted) introduces oil into the water column. When chemicals are used for dispersion, the chemical along with dispersed oil can sink to the bottom and come into contact with fish and eggs that are stuck to surfaces or buried in the sediment, resulting in increased toxicity to these organisms. Dispersed oil can kills eggs before they hatch or lead to damage or deformities in juvenile fish.

The duration of freshwater ecosystem impacts from an oil spill depends on various factors such as oil type and volume spilled into the waterbody, time of year and weather conditions, hydrology of the waterbody, response/cleanup time and methodology, and the sensitivity of environmental receptors present in the ecosystem (e.g., species, lifestage). Direct mortality of aquatic vegetation, fish, and invertebrates would occur immediately following a spill, when oil concentrations are highest. Sublethal impacts, such as decreased reproductive success, or delayed mortality of embryos and juveniles, may not be apparent until months or years following a spill, if they were to occur in a large enough subset of a population.

Open waters, such as Lake Superior, are considered to have low to medium sensitivity to oil spill impacts because physical removal rates are high, concentrations of oil can be rapidly diluted, and most organisms are mobile enough to move out of the area affected by the spill (NOAA and API 1994). Large rivers have medium sensitivity to oil spill impacts because they have high natural removal rates but also have extensive biological and human use. Small lakes and ponds have medium to high sensitivity to oil spill impacts because of low physical removal rates, limited dilution and flushing of oil mixed into the water column, and high biological and human use. Small rivers and streams have medium to high sensitivity to oil spill impact because they have lower flow conditions, lower dilution rates, lower overall energy, and greater range of natural habitats than do large rivers. (NOAA and API 1994).

8.5.7.2 Amphibians and Reptiles

In the event of an oil spill, an external oil coating of skin or scales in amphibians and reptiles can lead to reduced thermoregulatory capacity and suffocation in amphibians. Amphibians may absorb toxins from oil through their skin. Exposure to toxins that occurs during egg formation in reptiles and amphibians can lead to reduced productivity and teratogenic effects;[5] longer-lived animals, such as turtles, may be more susceptible to carcinogenic effects of PAHs compared to shorter-lived animals (Burns et al. 2014).

Spill response and cleanup activities could result in damage to wetland habitat if booms were deployed near sensitive resources. Onsite burning to remove oil, if allowed, could injure or kill amphibians and reptiles. Cleanup operations would decrease the likelihood that wildlife would come into contact with oil or oiled forage or prey, and they would also temporarily disturb and displace some wildlife.

8.5.7.3 Birds

Impacts of oil spills to birds can include injury or mortality from direct exposure through oiling of body and feathers, ingesting oil, inhaling VOCs, and eating contaminated food. Direct contact with oil can coat feathers, causing them to mat and separate, impairing waterproofing and insulating qualities, and exposing the skin to extremes in temperature that can result in hypothermia. Birds attempting to remove the oil preen, which results in the animal ingesting the oil and causing damage to internal organs (International Bird Rescue 2016). Oiled feathers would add weight to the bird, hindering natural movement and balance. Direct oiling can impact adult and fledged birds. Eggs can be exposed to oil from brooding adults, which can cause mortality of the eggs. Oil ingestion can cause suppression to the immune system, organ damage, skin irritation and ulceration, and behavioral changes (Nomack 2010). Secondary health problems to birds from oil exposure include severe weight loss, anemia, and dehydration. Lethal or sublethal effects can occur from direct ingestion of oil or ingestion of contaminated foods (such as insect larvae, mollusks, other invertebrates, or fish). Predatory and scavenging birds present in the spill vicinity, could become secondarily oiled by foraging on carcasses of oiled birds and small mammals.

If the spilled oil entered local or interconnected wetlands, streams, or rivers, water-dependent birds could be exposed including several waterfowl species that breed or stop at local wetlands, adjacent riparian habitats, or Lake Superior. Waterfowl and shorebirds would be more abundant in wetlands, streams, or small rivers during the spring and fall migrations. If a spill were to reach those habitats, losses could be higher for local resident species than for migrating species with large geographic distributions. Potential

[5] Teratogens are any agent that can disturb the development of an embryo or fetus.

mortality of breeding raptors would likely represent a loss for the local population but would not likely affect the regional population. Threatened and endangered species are discussed separately in Section 8.5.6.

The number of birds impacted by an oil spill would depend primarily on the habitat and season, the volume and type of oil released, the specific weather and site conditions influencing dispersal and dilution of the spill, and effectiveness of response actions.

Spill response and cleanup activities could result in damage to wetland habitat if booms were deployed near sensitive resources. Damage to forested habitats could occur through the use of heavy equipment and vehicles. Onsite burning to remove oil could create smoke plumes and particulates that could affect birds through inhalation. Birds would be temporarily disturbed and displaced by cleanup activities.

8.5.7.4 Mammals

Impacts of oil spills to mammals can include injury or mortality from direct exposure through oiling of body and fur, ingesting oil, inhaling VOCs, and eating contaminated food. Oil stuck to fur can reduce its function and lead to hypothermia. Ingestion of oil or dispersants may result in gastrointestinal inflammation, ulcers, bleeding, diarrhea, and maldigestion (Nomack 2010). Herbivores would be expected to avoid ingesting oiled vegetation as many are selective grazers and are particular about the plants they consume (e.g., deer). Vegetation affected by spilled oil would reduce its availability as a food source for several years. Small mammals and furbearers could be affected by spills due to oiling or ingestion of contaminated forage or prey items. Carnivores, particularly scavengers, could ingest oiled carcasses and could also become secondarily oiled. Inhalation of VOCs from oil or dispersants can result in respiratory irritation, inflammation, emphysema, or pneumonia (Nomack 2010). Mammals that spend time in or near contaminated sediments such as rodents or raccoons may inhale hydrocarbon vapors, which can result in lung and nerve damage and may contribute to behavioral abnormalities (EPA 1999). Absorption of inhaled and ingested chemicals may damage organs such as the liver or kidney, result in anemia and immune suppression, or lead to reproductive failure or death (Nomack 2010).

Noise and activity from response and cleanup operations (e.g., ground traffic, air traffic, and personnel) at a spill site would frighten many mammals away from the spill and reduce the potential for exposure. Onsite burning to remove oil (if an approved) could create smoke plumes and particulates that could affect mammals through inhalation.

Mammals displaced from contaminated habitats may experience increased competition in new habitats. Changes in preferred prey or forage may lead to use of lower quality prey or forage, which can reduce survival and reduce reproductive fitness. These sublethal physiological and ecological effects of oil can persist long after cleanup activities have concluded and can have important consequences on individual and population fitness (Burns et al. 2014).

8.5.7.5 State-listed Fish and Wildlife Species

Two state Species of Greatest Conservation Need (SGCN), American eel (*Anguilla rostrata*) and lake sturgeon (*Acipenser fulvescens*), have the potential to be present in the Project area, and although they are unlikely to be present in the vicinity of the Projects, an oil spill could travel downstream into habitats occupied by these species. Impacts to these two SGCN fish species exposed to crude oil spills may include changes in heart and respiratory rate, enlarged livers, reduced growth, fin erosion, deformities, and a variety of effects at biochemical and cellular levels (U.S. Fish and Wildlife Service [USFWS] 2010). Larval/juvenile fish are generally more sensitive to toxicity than adults (Hose et al. 1996). Increased mortality of larval/juvenile fish would be expected because they are often found at the water's surface, where contact with oil is most likely, and because they are relatively immobile, whereas adult fish would be able to swim away from the spill. Oil also may affect the reproductive capacity of fish and may result in deformed fry (United Nations Environment Programme 2011).

Suitable habitat for the upland sandpiper occurs in the Project area, and these birds are known to occur in Wisconsin from April to September. In the event that an oil spill occurred in suitable habitats during the breeding period from late April to late August, adult upland sandpipers could be oiled while finding food and could secondarily oil nests with eggs and young, leading to injury or mortality. Adults could abandon nests in the presence of noise and human activity during response, leading to reduced breeding success. If an oil spill occurred when the upland sandpiper is not present (October to March) no impacts would occur.

One waterbody crossing location (at the Pokegama River) provides suitable aquatic and foraging habitat for the wood turtle. Wood turtles present in the area during an oil spill could come into contact with oil leading to reduced thermoregularity capacity. Turtles may be more susceptible to carcinogenic effects of PAHs compared to shorter-lived animals (Burns et al. 2014). Spill response and cleanup activities could result in damage to wetland habitat if booms were deployed near sensitive resources. Onsite burning to remove oil, if allowed, could injure or kill reptiles. Wood turtles that remain in affected areas during cleanup operations may be injured by equipment and vehicles.

8.5.8 Forests and Other Woodland Resources

Forest lands that would be crossed by the proposed pipelines are currently owned by Douglas County or private landowners and are used primarily as residential property, for recreation, or for domestic heating (i.e., firewood). If a large crude oil spill spread beyond the Projects' ROW, the impacts to surrounding forests and woodland resources would depend on the extent and persistence of oiling and the effectiveness of the response effort. Oil reaching tree roots could lead to tree mortality over time (Bay 1997; Collins et al. 1994; Holt 1987; Hutchinson and Freedman 1978; Walker et al. 1978).

Response activities could damage forests and woodlands more than an actual spill. Ground disturbance, removal of oiled vegetation, and soil compaction from vehicle and foot traffic could cause short-term damage to parts of forests and woodlands. More long-term localized impacts could occur if activities hinder regrowth of vegetation or forest trees that have longer re-growth period are removed during the response operations.

8.5.9 Geological Hazards

As the Projects do not cross any active faults and are located in a seismically stable area, the pipelines would not likely be impacted by seismic hazards in the area. During response actions, vegetation clearing and alteration of surface drainages could lead to some minor localized risk of land sliding or soil movement.

8.5.10 Invasive Species

Terrestrial and aquatic invasive species could be introduced and spread to currently unaffected vegetation communities from response and cleanup operations (see Section 5.9.1 for a list of invasive species found in Wisconsin). Natural sorbent materials such as straw or mulch could contain noxious or invasive weed seeds. Diligence in the use of weed-free material and in the cleaning of response equipment between infected areas would reduce these impacts.

8.5.11 Noise

Noise resulting from an oil spill during pipeline operations would only be associated with emergency response efforts and equipment (e.g., trucks, helicopters, response vessels) required to contain and clean up a substantive to very large spill. Noise levels from these efforts would be short term and would depend on receptor sensitivity and distance from the noise source. The presence of equipment and personnel from emergency response crew activities would not likely result in a major impact to nearby receptors because of the similarity of the equipment to what would be used on a regular basis to maintain the Projects' ROW.

8.5.12 Public Utilities

Disruption of public utilities is unlikely to occur for an oil spill along the ROWs because utilities are typically buried and protected from aboveground events or are located overhead as wires. Earth-moving equipment could potentially harm these resources during cleanup operations, although the location of buried utilities would likely be known and avoided prior to such activity. If response to an oil spill required excavation activities or temporary shutdown of electric power, temporary impacts to public utilities could occur.

8.5.13 Recreation Resources

Impacts from spills on recreational uses and wilderness-type values of scenic quality, solitude, and naturalness would depend on the overall extent of spill migration. Visible oil would reduce the natural/scenic value of recreational areas. Impacts to fishing, boating, kayaking, tubing, scenic values, and other recreational pursuits could occur if spilled crude oil reached rivers, including the Pokegama River or the St. Louis River estuary, which are used by recreationists. Recreational fishing could be suspended following an oil spill that reached fishing areas to prevent the ingestion of contaminated fish species. Spills in forested areas including Douglas County Forest could restrict access to hunters.

Enbridge's existing easement and Route Variation C1 bisect the Nemadji Golf Club in Superior. Daily operation of the golf course during a spill or spill response could be restricted or prohibited. The Projects also intersect two snowmobile/winter all-terrain vehicle trails, one of which is crossed twice. In the event of an oil spill during the winter, trail use could be prohibited for an extended period of time.

Response activities would likely cause moderate, short-term impacts to recreational activities in the affected area for the duration of the response activities. Based on previous spills, impacts to recreational use would be expected to diminish as visible oil and active cleanup efforts decreased.

8.5.14 Residential Areas

In general, the pipeline routes avoid population centers and residential areas with the exception of the southern portion of the city of Superior (population 26,862). Residents of affected areas may be evacuated to reduce the likelihood of public safety issues from direct exposure to crude oil and VOCs (see Section 8.5.15 for a discussion of potential public health effects from crude oil spills). During past oil spill events where residents of affected areas have not been evacuated, people have complained of headaches, nausea, and respiratory problems (Inside Climate News 2013). Enbridge's ICP contains evacuation procedures for large oil spill events.

Residents of the homes within 300 feet of the proposed pipeline routes could be impacted by response operations including noise, visual effects, and potential access issues if a spill occurred in these areas. These impacts would be temporary, lasting until cleanup operations are complete.

8.5.15 Safety

Human health hazards from crude oil can result from exposure to VOCs, monocyclic aromatic hydrocarbons (e.g., BTEX), PAHs, and H_2S. Acute inhalation hazard is primarily from H_2S (API 2011). H_2S gas could be emitted in small amounts, causing a wide range of health effects, primarily through inhalation and dependent upon the amount of H_2S inhaled (Centers for Disease Control 2015). Skin and/or eye contact with H_2S can also affect human health. Symptoms of H_2S gas inhalation or skin/eye contact include irritation of the eyes and/or respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, abnormal visual intolerance to light; dizziness, headache, weakness, exhaustion, irritability, insomnia; and gastrointestinal disturbance (Centers for Disease Control 2015). In an assessment of risk to first responders at crude oil spill sites, Thayer and Tell (1999) modeled atmospheric emissions of H_2S from crude oil spills and found that H_2S levels in the immediate aftermath of a crude oil spill at the two higher levels of H_2S modeled (20 parts per million [ppm] and 350 ppm) could pose short-term health risks (respiratory paralysis) only in the first 4 minutes following a spill. After 4 minutes, modeled exposures drop to nontoxic levels. As it is unlikely that first responders would arrive at a spill within 4 minutes, H_2S exposure would not be expected to create substantive health hazards to first responders.

Potential exposure to PAHs represents the highest worker dermal exposure risk, but the dermal hazard from a single exposure to crude oil is minor (API 2011). Further, first responders would be trained in the use of OSHA and Project-specific PPE to prevent harmful vapor inhalation or dermal contact with spilled oil. The likelihood of general public exposure would depend on the location and size of the spill. Because most of the proposed pipeline routes avoid population centers, impacts to human health and public safety from a very small to a very large spill would likely be low The rapid atmospheric dissipation of H_2S levels indicated by the model results discussed above suggests that risks to the general public would also be low in the event of an oil spill. However, if a spill occurred near one of the residences located in close proximity to the proposed pipelines, impacts to residents could include nausea, headaches, and respiratory issues and short-term dermal exposure. Enbridge's ICP contains evacuation procedures for large oil spill events, which would reduce these potential impacts.

8.5.16 Socioeconomics

Oil spills, especially large or very large spills, could affect components of the socioeconomic environment, including:

- Populated areas, especially residential areas;
- Agricultural activities;
- Forest resources;
- Recreational resources;
- Water intakes and water supplies (e.g., drinking water and agricultural irrigation water); and
- Property sales and value.

In general, the pipeline routes avoid population centers and residential areas with the exception of the southern portion of the city of Superior (population 26,862). Short-term disruption in local agricultural production could result from a spill that reached agricultural lands. The agricultural land in the Project area is predominately used for pasture and hay production, with small areas of cultivated crops. The extent of the economic impact would depend on the number of productive acres affected. Production of crops and grazing activities could be prevented during a spill response effort, resulting in losses to agricultural production and associated economic activity. Agricultural losses likely would be reimbursed by Enbridge, resulting in short-term and minor economic impacts.

The forest land that would be crossed by the proposed pipelines is currently owned by Douglas County or private landowners and is used primarily as residential property, for recreation, or for domestic wood products harvest (i.e., firewood). Forest resource losses likely would be reimbursed by Enbridge; therefore, the short-term economic impact would be minor.

If a spill affected recreational lands, businesses relying on fishing and other recreational activities could experience a short-term negative impact due to avoidance of the area by recreational users. Based on previous spills, any impacts to recreational use would be expected to diminish as visible oil and active cleanup efforts decreased.

Three public water supply wells were identified in the vicinity of the Projects, one at an approximate distance of 289 feet from the Projects and the other two at a distance of over 2,100 feet. As the proposed pipelines would be located well above the water table, impacts to these water sources are not anticipated. However, in the event of an oil spill, water supplies for residential, agricultural, commercial, or public uses could be affected, potentially resulting in economic losses for businesses that rely on such supplies if alternative sources were not provided in a timely manner.

Economic impacts to property values in areas affected by oil spills could occur. Economists evaluating the impacts of past oil spills to nearby property values have found that significant reductions in mean sale price occurred following a spill, with the greatest mean sale price reductions occurring for properties nearest to the spill (Hansen et al. 2006; Simons et al. 2001). However, the reduction in mean sale price also decreased over time. These data suggest that the economic consequences of an oil spill could include a short-term reduction in housing prices, particularly if a spill occurred near the residences located within 300 feet of the pipelines, but that these impacts would likely decrease over time.

Response to oil spills could generate local economic activity for the duration of the spill response activity due to response personnel using local services including lodging, food, and transportation.

8.5.16.1 Environmental Justice Considerations

Analysis of oil spill impacts on residents in Douglas County includes a focus on potential impacts to Native Americans for environmental justice purposes because Block Group 3, Census Tract 208, Douglas County has a meaningfully greater proportion of Native Americans than the population of Wisconsin. The same block group has a meaningfully greater proportion of Asians, persons reporting other or two or more races, and low-income individuals (see Table 5-14).

Minority and low-income populations could be more vulnerable to health impacts associated with a crude oil spill if access to health care is less available in the release area. However, evacuation procedures would affect residences in closest proximity to the pipeline ROWs rather than communities of specific demographics.

8.5.16.2 Tribal Treaty Resources

An oil spill in the Pokegama River upriver from identified wild rice locations could impact wild rice and affect tribal harvests in impacted areas. A crude oil spill reaching a waterbody could also contaminate fish species that are harvested including walleye and muskellunge. Fishing grounds may be closed to prevent public health effects from consumption of contaminated fish and other edible foods in treaty areas.

Closures and restrictions of tribal treaty areas during a response effort could negatively affect tribal harvests of fish, wildlife, and plants, including wild rice, within Ceded Territories.

8.5.17 Soils and Topography

The impact of oil spills on soil is a function of several variables, including the type of oil, permeability of the soil, type and amount of vegetation and other surface cover, and oil release point (at the surface or belowground). Once oil reaches the soil surface, the depth of penetration into soil depends on the volume released, viscosity of the spilled oil, porosity of the soil, and extent to which the soil is frozen or, during warmer seasons, saturated with water. Porous soils (such as sand and gravel) are generally more permeable than clays and silts. Oil that adsorbs to or is retained between soil grains may weather only slowly over one to several years. Crude oil spilled into soils would likely be removed by mechanical means. Such activities may lead to erosion and sedimentation issues similar to those described for construction activities.

For large crude oil releases, Enbridge may be required by federal and state agencies to prepare a soil and groundwater monitoring plan for approval, with particular attention given to specific soil types, groundwater flows, drinking water sources, and environmental receptors. Soil productivity could be negatively impacted by oil contamination and if long-term remediation is required, beneficial uses of the soil could be restricted for the length of the remediation period or longer.

8.5.18 Transportation

A large to very large oil spill would impact nearby roadways and railroads in close proximity to the proposed pipeline routes including State Route 35, N 58th Street, Bardon Avenue, and East Military Road and railroads owned by Burlington Northern Santa Fe, the Canadian Pacific Railway, and Wisconsin Central Railway. Roads would be closed until response actions were completed. Numerous smaller developed and undeveloped roads may also be affected. It may be necessary to temporarily detour and/or delay vehicular and rail traffic, which would result in increased congestion on the roadway and rail networks. Impacts to State Route 35 would be most pronounced during peak commuting hours.

Response efforts to clean up the spill could temporarily limit or close access to some roads in close proximity to the spill area. The duration of transportation disruptions would depend on the time necessary to clean up the spill, repair infrastructure, and reopen the transportation corridor(s).

8.5.19 Vegetation (Plants)

Impacts to upland plants would largely depend on the season, the extent of the spill, effectiveness of the response effort, and presence or absence of special status plant species. There are 22 state-designated threatened, endangered, or special status plant species known to occur within 1 mile of the Projects (Section 5.18.2; Tables 5-17 and 5-18). Vegetation can be affected by oil spills through direct oil contact or through removal or damage from cleanup operations. Crude oil acts as a contact herbicide that damages cells and tissues of plants that come into contact with it (McKendrick 1999; Walker et al. 1978). Crude oil can coat the surface of plant leaves and stems, preventing normal gas exchange and leading to injury or death of the plant, and contact with plant stems may be sufficient to kill the whole plant (Walker et al. 1978). When oil penetrates soil, roots are damaged on contact and hydrophobic soils are created that limit water availability to plants. Microbial actions can imbalance carbon-to-nutrient ratios as microbes increase to consume the hydrocarbons using soil nutrients in the process. This increased microbial activity can deprive vascular and nonvascular plants of vital nutrients (McKendrick 1999). Lighter crude oils are generally more toxic to plants and mosses than heavier crude oils although damage may be reduced by wetter soil conditions that prevent the oil from reaching plant roots. Heavier oils can present the highest risk to vegetation because of higher persistence and mechanical injury from coating and fouling.

During winter, sufficient snow cover or sufficiently low temperatures may slow the flow of spilled oil and allow spill cleanup efforts to occur before oil spreads substantial distances from the release source. In warmer temperatures and with little to no snow cover, spilled oil trajectory distances may increase, resulting in more impacts to vegetation. One of the rare plant species is only known to be found in Wisconsin within 5 miles of the Projects and could be heavily impacted by an oil spill of substantial size. In addition, three different rare plant species have their largest known populations along the Projects and an oil spill could jeopardize their statewide viability. Response and cleanup activities could result in damage to existing vegetation through trampling and compaction by vehicles and equipment, or from mechanical removal of affected plants. Removal of oiled vegetation is often a response tactic to prevent secondary impacts to wildlife; however, effective removal operations minimize root destruction so vegetation can regrow (Region 5 RRT 2013). Natural sorbent materials such as straw or mulch could contain noxious or invasive weed seeds that could outcompete native upland plants. In some cases, in situ burning could be used as a response measure and could destroy or damage vegetation. Cleanup operations could adversely affect vegetation and habitat if activities are not implemented carefully and with regard for minimal disturbance of the surface soils and vegetation. Impacts to plants would be greatest if a spill and/or ensuing response activities resulted in permanent damage to listed and special status plant species habitat or extirpated Wisconsin populations.

8.5.20 Water Resources

8.5.20.1 Groundwater

The proposed pipeline route would not cross any EPA-designated sole-source aquifers, since none occur in the state of Wisconsin (EPA 2014). The three public water supply wells in the vicinity of the Projects (one at a minimum approximate distance of 289 feet from the Projects and the other two at a distance of over 2,100 feet) and private water wells located within 0.5 mile of the centerline of all corridor options could be impacted by an oil spill. While the majority of these wells are at a distance of over 200 feet from the pipeline ROW, these wells may be closed as a safety measure. The two wells (172 and 218 feet deep) closest to the Projects at a distance of 7 feet could be affected directly by oil contamination and would be closed to use for the duration of the spill and response, and for some period afterward. Well closures would inconvenience users who would need to use other water sources.

8.5.20.2 Surface Water

Spills could affect surface freshwater quality if spilled material reached waterbodies directly or from flow of the spill material over land. The proposed Projects’ ROW crosses the Pokegama River and Little Pokegama River, unnamed tributaries of those rivers, and other intermittent, ephemeral streams or ditches. Crude oil released to surface water could disperse, become suspended in the water column, or sink and adhere to bottom sediments. An oil spill in these areas would temporarily impair water quality within a relatively short upstream and longer downstream distance. While the proposed pipeline ROW does not directly cross the St. Louis River estuary or Lake Superior, the Pokegama and Little Pokegama Rivers enter into the Pokegama and Little Pokegama Bays, respectively, which are only several miles downstream and are part of the St. Louis River estuary. The lower estuary culminates in the Duluth–Superior Harbor at the shore of Lake Superior.

While it may be possible for spilled oil to reach Lake Superior, it is unlikely that a large volume of oil would reach this area since much would become trapped in sediments and vegetation at the river bottom and along stream and river banks and in wetlands before reaching this far downstream. However, if an oil spill reached Lake Superior, lighter crude oil would likely readily disperse in the large volume of water within the lake, and heavier crude oils would not spread extensively, particularly in cold water conditions, and would be more likely to coat rather than penetrate shorelines (NOAA and API 1994). Decreases in dissolved oxygen (DO) levels could occur if the oil covered much of the water surface for a day or more. Direct toxicity would likely be short term because of the high dilution volume in the lake and the rapid evaporation of most of the potentially toxic lighter hydrocarbons. Spreading of a spill over a lake surface could result in minor to major impacts to water aesthetics and recreational use. The duration of impairment would vary based on the size of the spill, location of residual and sunken crude oil mixtures, the characteristics of the impacted waterbody, and the timing and effectiveness of response and cleanup.

For spills entering the Pokegama River or the Little Pokegama River, water quality would be impacted on a short-term or long-term basis depending on the location of the spill, the type and volume of crude oil released, and the length of time that crude oil remains in the environment.

The most immediate impact on water quality from crude oil spills is increased concentration of toxic chemicals in the water column. The water-soluble fraction of crude oil and petroleum derivatives contains a toxic mixture of PAHs (Rodrigues et al. 2010) and other chemicals. Crude oil released to surface water could disperse, become suspended in the water column, or sink and adhere to bottom sediments. An oil spill that reached a freshwater body could cause reduced DO concentrations and increased toxicity to aquatic organisms, particularly from dissolved phase hydrocarbons (e.g., BTEX).

Because oil slicks are less permeable to oxygen than water, spilled material that reached wetlands, ponds, or small lakes could lower DO concentrations due to a decreased influx of atmospheric oxygen and the relatively high rate of natural sediment respiration in many shallow waterbodies. In small, shallow waterbodies with limited water movement and high organic loading (e.g., small lakes, farm reservoirs, and stock ponds), increased biodegradation resulting from the addition of oil to the water column may further reduce oxygen levels. However, biodegradation rates are temperature-dependent: in cooler waters, such as Lake Superior and the rivers of Wisconsin, rates would be slower than in warmer waters, such as the Gulf of Mexico (Atlas 1975). In smaller flowing streams, an oil spill could create direct aquatic toxicity in the water column because of the lower relative volume and rate of water flow, and thus with less dilution there would be a higher likelihood of direct contact between the biota and the dispersed oil.

Some toxicity might persist in these streams for a few weeks to months, until toxic compounds trapped in the sediment were washed out or until oiled sediment was covered by cleaner sediment. Some of the crude oil may sink, become incorporated into the sediments, and remain there for years, depending on response actions and the amount of biodegradation and chemical or physical weathering that takes place.

A larger spill could also affect potable surface water sources and irrigation water supplies. Scoping comments requested the EIS to consider the impacts of oil spills in Lake Superior and the Great Lakes Water Quality Agreement (GLWQA) between the United States and Canada. The GLWQA is a commitment between the United States and Canada to restore and protect the waters of the Great Lakes. First signed in 1972, the GLWQA was amended in 1983 and 1987, and then in 2012, it was updated to enhance water quality programs that ensure the “chemical, physical, and biological integrity” of the Great Lakes. The 2012 agreement will facilitate U.S. and Canadian action on threats to Great Lakes water quality and includes strengthened measures to anticipate and prevent ecological harm (EPA 2016).

With regard to potential oil spills affecting Lake Superior, the proposed Projects do not terminate near the shore of Lake Superior (they would terminate approximately 1.5 miles inland) nor do the pipeline routes parallel the lake shore. Spills on to land can be contained using berms and trenches (Oil Spill Prevention and Response 2016) to prevent spills from entering waterways. A crude oil spill that reached the lake would likely result from a release that entered a river or estuary upstream from the location where the river or estuary enters Lake Superior. Impacts to Lake Superior would likely be localized and could include surface sheens or slicks and some localized water contamination. Given the volume of Lake Superior, it is unlikely that a release into a river or estuary would result in significant long-term impacts to its water quality and its aquatic resources. For spills in water colder than the oil's pour point, the oil quickly becomes viscous or tar-like (NOAA and API 1994). Even lighter, refined products can lose the ability to disperse and become non-coalescing, semi-solid, smooth, spherical particles that are difficult to recover. Weathering and loss by evaporation are slowed by low temperature and thickness of the slick (NOAA and API 1994).

During cleanup activities, the use of dispersants (unlikely to be permitted) would transfer oil and its associated toxic hydrocarbons into the water column, which would temporarily degrade water quality until toxins were diluted to sufficiently low concentrations to reduce their accumulation in fish tissue. Other cleanup methods that may be used, including booming, skimming, and mechanical removal, would not affect water quality. In-situ burning (if permitted) could result in sinking of heavier pyrogenic products as a consequence of the high temperatures. These heavier components are left behind after the lighter components are consumed by the fire and can linger in sediments, occasionally re-suspending in the water column. For some portion of the winter months each year, spill responders could remove spilled material from frozen ground or ice-covered waterbodies prior to snowmelt. During the rest of the year, spills could reach and affect wetlands, ponds, and lakes, as well as creeks and rivers before spill response is initiated or completed.

Since the St. Louis River estuary is valued for its variety of habitats and diverse assemblage of native fish species and is a National Estuarine Research Reserve, it is likely that this area (including tributaries to the estuary) would be a high priority for protection, and response actions would focus on preventing oil from entering such habitats. Similarly, the pipelines cross either 14 or 4 Areas of Special Natural Resource Interest (ASNRI)–designated waterbodies (depending on whether Route Variation A1 or A2 is selected), and this important habitat area would also be high priorities for protection in the event of an oil spill along the proposed pipeline routes.

8.5.21 Wetlands

Potential impacts of spills to wetlands such as the Pokegama-Nemadji wetland complex, including the Pokegama Carnegie Wetlands State Natural Area, are influenced primarily by the type of oil spilled, the amount and proportion of water surface area covered, the type of vegetation present in the wetland, the duration of oil wetland cover, and cleanup response actions. Spilled oil would cover the water surface, coat plants and animals, and restrict oxygen exchange between air and water. Dense stands of emergent vegetation tend to act as oil booms and collect oil at the edges of the stand as oil adheres to vegetation. If a spill occurred in winter, wetlands may be covered in ice or snow, which could contain the oil above the wetland and potentially allow it to be recovered before it directly affected the wetland habitat and associated vegetation or animals. For spills occurring during the rest of the year, most of the oil spilled would float on the water or wet soil surface—although some of the volatile fraction may dissolve or disperse in the water.

Nearly all types of active cleanup would cause habitat damage or disturbance due to the equipment used, the way it is used, or the mere presence of the cleanup workers in the wetland. Aggressive and intrusive cleanup methods tend to mix oil into the water column and into sediments (which are often anoxic below the surface layer) where the oil may have long-lasting effects. Passive cleanup methods, including natural attenuation and biodegradation processes, generally result in much lower impact to wetland resources, particularly if the impact area is small, the spill is of a light oil that will rapidly evaporate and weather, or the oil is mostly on vegetation (NOAA and API 2013).

8.6 Insurance and Liability

While existing local government response teams are publicly funded to respond to natural disasters and industrial and other spills, fires, and so on, the party responsible for a spill is required to repay the costs of response and mitigation, under s 292.11, Wis. stats. Enbridge has substantial financial resources for funding responses to oil spill events, including third-party claims. Enbridge maintains comprehensive insurance of types and in amounts for its subsidiaries and affiliates that are considered customary for the industry. Coverage includes commercial general liability insurance that applies to Enbridge's legal liability for third-party property damage and injuries arising from operational activities, including an oil spill. Since the July 2010 rupture of Enbridge's Line 6B and subsequent oil release into wetlands and the Kalamazoo River in Marshall, Michigan, Enbridge has paid over $1.2 billion in response, cleanup, and restoration costs as well as fines from state and federal agencies (U.S. Securities and Exchange Commission 2014). Enbridge currently maintains a general liability insurance program with a total limit of $860 million for the policy period. The retention (deductible) for sudden and accidental pollution events is $30 million per event, and the program is renewed annually (Enbridge 2015a). In 2015, the Dane County Board passed a resolution to amend its conditional use permit for a pumping station, adding a requirement that Enbridge buy a $25 million Environmental Impairment Liability Policy to help ensure funds would be available to pay for any cleanup or damages should a spill occur from the Enbridge-owned pipelines in that county. The Wisconsin legislature passed a law with the 2016–2017 budget preventing county enforcement of any such requirement. As of January 2016, Enbridge had elected to file suit to remove this currently non-enforceable provision. Dane County is advocating the provision remain in place in the event of a future lifting of this local ordinance preemption in state law. The suit is pending.

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9. DRAFT EIS COMMENTS AND RESPONSES

9.1 Introduction

The Wisconsin Department of Natural Resources (DNR) sought comments on the Draft Environmental Impact Statement (EIS) for the Sandpiper and Line 3 Replacement Projects (Projects) from members of the public, regulatory agencies, tribes, and other stakeholders. The Draft EIS was made available for review and comment to all interested parties and was posted to the publically accessible DNR website: http://dnr.wi.gov/topic/eia/enbridge.html. The official comment period for the Draft EIS was 30 days: from February 23, 2016, through March 23, 2016. The public was invited to review and comment on the Draft EIS by email, by mail, or at a public meeting in which comments could be provided in either written or oral format. A public hearing was held on March 10, 2016, at the Superior Public Library, Superior. All comments received on the Draft EIS, whether in written or verbal form, were considered equally by the DNR in preparing this Final EIS (FEIS).

This chapter of the FEIS describes the process by which comments were reviewed, categorized, evaluated, and responded to. The Draft EIS was revised in response to the comments received to create this FEIS. This chapter includes a set of consolidated responses that address key issues that were raised during the comment period as well as responses to individual comments received.

9.2 Public Participation

One public hearing was held on March 10, 2016, at the Superior Public Library, Superior. The event was attended by members of the public, representatives of governmental agencies, members of the Fond Du Lac Band, nongovernmental organizations, private individuals, and the Applicant. All attendees were given the opportunity to comment throughout the event. Approximately 66 people attended the public hearing and 15 people provided verbal comments at the public hearing. These comments were transcribed by a court reporter.

9.3 Comments Received

The DNR accepted comments on the Draft EIS in three ways:

- Orally and in writing at the public hearing;
- By email to DNR staff; and
- By mail to the DNR

A total of 74 comment submittals were received from individuals, agencies, tribes, and organizations. Each comment submittal was logged upon receipt and placed in the administrative record. Appendix F includes a list of the people and organizations that commented on the Draft EIS (see Table F-1).

Each comment submittal was read and substantive comments extracted. A substantive comment was one that:

- Questioned the accuracy of information in the Draft EIS;
- Questioned the adequacy of, methodology for, or assumptions used for the environmental analysis;
- Ask questions about the Projects, the regulatory process, the DNR, or the Applicant;

- Presented new information relevant to the analysis;
- Presented reasonable alternatives other than those analyzed in the Draft EIS;
- Recommended changes or revisions in one or more of the alternatives;
- Suggested use of alternative documents, studies, and methods of analyses;
- Suggested additional analyses of topics/issues not covered in the Draft EIS; or
- Instructed the DNR or the Applicant to undertake something.

Comments were summarized and assigned to a category so similar comments could be grouped together and addressed by the appropriate resource specialists and agency staff for development of responses. Comment-response tables (Table 9-1 through 9-3) were developed to include a summary of extracted comments, the assigned category, and associated responses. The Applicant also provided comments on the Draft EIS, and the responses to their comments are provided in Table 9-4. The Draft EIS was revised as necessary in response to comments, as indicated in the individual responses to comments within the comment-response tables below.

Table 9-1 Summary of Public Draft EIS Comments and Responses

Comment ID	Comment	Response
EIS Process		
1	There is a lack of interstate coordination on these studies and the analyses are fragmented. There should be an integrated regional EIS (ND, MN, and WI) with tribes at the table and it should have the federal agencies at the table, with the Army Corps of Engineers and the EPA. That study should look at the whole pipeline without ignoring all of the other alternatives that would make much more regional sense.	Comment noted. The U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), and U.S. Fish and Wildlife Service (USFWS) are all participating in the review and analysis of these Projects in the states that would be crossed.
2	By studying just these 14 miles of the pipeline it ignores all of the environmental impacts of the other 1,050 miles of the pipeline.	The Wisconsin DNR is responsible for carrying out an environmental review of the proposed Projects in Wisconsin. As part of this analysis, the DNR has assessed cumulative impacts of the proposed Projects in combination with other past, present, or reasonably foreseeable actions that may occur along the entirety of these Projects that could combine to create additive impacts. In addition, Section 7.4.19.2 of the EIS has been revised to include potential impacts to Minnesota-Wisconsin boundary waters in the event of a spill in Minnesota.
3	Suspend the DNR permitting process until the other states are further along in their permitting processes at the state and federal levels so that other alternative routes (that may not even pass through Wisconsin) can be identified.	One purpose of an EIS is to inform Wisconsin DNR permit decisions. The Wisconsin DNR has no authority to suspend review and evaluation of a proposed project once an application is deemed complete. The application for the Line 3 Replacement Project is complete, so a suspension on the permit application for that Project is not possible. The application for the Sandpiper Pipeline Project is not complete at this time. In the event that new information becomes available as part of the environmental reviews being carried out by other agencies that would affect the impact analysis conclusions in this EIS, the document could be amended to incorporate that information.
4	Interstate and state/federal collaboration and cooperation in properly scoped and joint environmental review of these large projects is essential to assure the requirements of both NEPA and WEPA are met and the most reasonable prudent alternatives to the proposed project are evaluated. WDNR and Minnesota state officials should approach the Corps of Engineers and the applicant and encourage them to best facilitate the intent of the National Environmental Policy Act, the Wisconsin Environmental Policy Act and the Minnesota Environmental Policy Act, all of which say that the best job of serving the public and protecting the resources is conducted when those processes are well coordinated and collaborated and to allow the applicant to suspend the	Wisconsin DNR has coordinated with other state and federal agencies in development of this EIS in accordance with ch. NR 150.40, Wis. Adm. Code. Wisconsin DNR will continue to coordinate with these agencies in their own related review processes. In the event that new information becomes available as part of the environmental reviews being carried out by other agencies that would affect the impact analysis conclusions in this EIS, the document could be amended to incorporate that information.

Table 9-1 Summary of Public Draft EIS Comments and Responses

Comment ID	Comment	Response
	federal review by simple request. Given Enbridge's proposed expansion plans perhaps it is far more important that Wisconsin step back and look at these projects from a regional perspective, not just local.	
5	Minnesota and Wisconsin should act jointly on the issue of new pipelines and to not let Enbridge divide its overall pipeline expansion plan into segments acted upon separately by the individual states. If these projects are only the first leg of a much larger future project to run through Wisconsin, Enbridge should be required to apply for permits for the entire project. The overall impact of the larger project should be considered, as it might give a more realistic view of the potential environmental damage this pipeline will cause to the state's natural resources. These pipelines do not end at Minnesota's border with Wisconsin nor do they start at Wisconsin's border with Minnesota. They are small portions of a much larger integrated network of pipelines Enbridge is building upon throughout Canada and the U.S. It is time the involved states start looking at these developments with a regional outlook. Perhaps it's time to think the EIS currently ordered for Minnesota be expanded to the level of a joint multi-state and federal EIS.	The Wisconsin DNR is responsible for carrying out an environmental review of the proposed Projects in Wisconsin and does not have the authority to impose permit decisions in other states. The Wisconsin DNR and Minnesota Department of Commerce (DOC) Energy Environmental Review and Analysis intend to share information and knowledge on these Projects. Each state agency is considering the potential impacts from the entire pipeline in other states as part of each analysis.
General		
6	There is a need to examine the harm the project poses to the stakeholders of our region. These stakeholders are the: local, regional, State, national, and global citizens that are all directly affected by the new extreme energy development represented here by a foreign corporations desire to hasten the exploitation of fracking oil and Tar sands.	The EIS provides analyses on the direct, indirect, and cumulative impacts, both negative and positive, from construction, operation, and decommissioning of the proposed Projects. The analyses include impacts to the following resources: • Aesthetics • Air quality, GHGs, and climate change • Agricultural resources • Cultural resources • Federally listed endangered and threatened species • Fish and wildlife • Forests and other woodland resources • Geological hazards • Invasive species • Noise

Table 9-1 Summary of Public Draft EIS Comments and Responses

Comment ID	Comment	Response
		• Public utilities • Residential areas • Recreation areas • Safety • Socioeconomics • Soils and topography • Transportation • Vegetation (Plants) • Water resources • Wetlands
7	The FEIS should also acknowledge that this proposed project is effectively an end-run around President Obama's decision to block the Keystone XL (KXL) pipeline. The FEIS needs to discuss the whole appalling process that the oil industry is engaged in in the Northern Alberta tar sand, from ripping up the beautiful boreal forest; to heating up the semi-frozen, congealed, bitumen in some places; to ripping it out of the ground in gigantic strip mines and then heating it up in others; to combining the reluctant-to-flow bitumen with less viscous toxic diluent substances to actually get it to flow through a pipeline.	Comment noted.
8	The FEIS needs to tell us what benefits we will derive from facilitating this in Wisconsin other than a destroyed planet and another decade or more of political corruption.	The EIS provides a discussion of the potential positive and negative impacts from these Projects including socioeconomic benefits (see Section 5.15) and GHGs and their contribution to climate change (Section 7.4.2.2).
9	Section 2.3.2 Future U.S. and Canadian Oil Supply and Demand addresses the question of future markets, but only gives one paragraph of attention to the scenario that U.S. and Canadian market demands could drastically shift away from fossil fuel consumption in the near future.	In the event of a decline in fossil fuel use in the future, the Applicant would need to develop a business strategy to adapt to changes in fossil energy use.
10	As Wisconsin's authority on natural resources protection, the DNR should be demonstrating leadership in the transition away from fossil fuel use. If it is the DNR's mission to protect and enhance natural resources while carrying out the public will, then the focus and language used in the discussion of future markets should reflect a commitment to natural resources protection and the public good.	The DNR is committed to our mission while carrying out the legal processes established by statute. The Wisconsin DNR is a state executive agency and its authority to act is limited to those actions authorized in the statutes and administrative rules approved by the state legislature and governor.

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11	I am writing in support of the proposed Sandpiper and Line 3 replacement in Douglas County. We need these pipelines to transport these products across the country, as it's the safest and most economical way to do so. Pipelines like these are good for the economy, putting people to work and good for the public safety so this product isn't transported by rail or tanker truck. Pipelines are the safest, the most economical way of transporting crude oil and natural gas and any other petroleum through the pipelines. I support said pipeline because of the lower cost and in the end product cheaper for the consumer.	Comment noted.
12	Enbridge has proven to be an excellent steward of environmental responsibility and business discipline in delivering a vital energy commodity from the oil fields to storage, refining and final destinations. I believe they will follow the rules of a modern and evolving environmentally concerned society. Replacement of Line #3 is further evidence of the investment in modernization and safety. The environmental and economic benefits far outweigh any risk. The people that build these pipelines depend largely on the continued support of Enbridge towards organized labor. The men and women in the building and construction trades here are in support of this project. The continued safety that Enbridge is committed to in their pipelines and to their clean ups of right-of-ways, into the partnership and the due diligence that they present to anybody and everybody that they deal with is a very important part of what I do for a living.	Comment noted.
13	The DNR is tasked with protecting the land and water of the State of Wisconsin for the benefit of the citizens of the state, NOT the businesses and corporations. The cost of sanctioning the dangerous possibilities to the environment and the people of the region is too great. Enbridge has a terrible environmental track record. The company's pipeline has ruptured in many locations. Laying more pipes or expanding pipes to carry toxic oil products are not good for the citizens of America. The potential high risk of more environmental damage to the hunting, fishing, farms, and water table outweigh the benefit.	Comment noted. The Wisconsin DNR is following applicable statutes and administrative codes related to certain construction activities required for the proposed projects.
14	I am here as a Fond de lac band member. I am here to talk for the water, I am here to talk for the otters, the turtles, the fish, the four legged, the swimmers and the flyers, who can't be here today to talk about it for themselves. I am here for the 1837 Treaty. I am here for the	Comment noted. Chapter 5 of the EIS presents the potential impacts to water resources, fish, wildlife, and vegetation among others, from construction and operation of the proposed pipeline Projects.

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	1842 Treaty. I am here for the 1854 Treaty. And we oppose this pipeline.	
Project Purpose		
15	The need for the pipeline has easily been shown by the demand for fuels used in transportation. The American economy is still very dependent on fossil fuels and until that changes and we have a real alternative that can be used by all we will have to transport these fossil fuels by one means or another.	Comment noted. A discussion of the crude oil transportation demand has been added to the EIS (see Section 2.3.4). Also, there are many ways to define and evaluate exactly what constitutes “need” for certain activities or products, based on either commerce, science, sociology, and other points of view.
16	The environmental review should further explore the fundamental motivations behind Enbridge's desire to replace Line 3. The upgrades to safety and environmental protections and the doubling of daily shipping volumes should be offered equal and separate scrutiny here and throughout the EIS. The Line 3 Replacement Project will not increase the capacity of crude oil pipeline transported from Canada. Instead, it will replace the existing, aging pipeline with a new, safer means of transportation of crude oil to PADD II refineries. The Sandpiper Pipeline will ensure that Bakken crude oil has a reliable means to reach PADD II refineries. The U.S. economy, as a whole, and Wisconsin economy, specifically, are benefitted by the Projects.	Comment noted. Enbridge has provided evidence of repetitive maintenance actions along Line 3 required by the aging of the pipeline in order to minimize the probability of disastrous spills. The company has made a business decision that it is now in their best interests to replace the pipeline altogether.
Project Description		
17	As proposed the Line 3 project is the placement of a larger pipeline mostly into a new location other than the existing Line 3 corridor. Therefore it is a new pipeline, not a "replacement".	The starting point and end point of the existing Line 3 Pipeline and proposed Line 3 Replacement Pipeline are the same, and much of the route for both pipelines would be immediately adjacent to the existing pipeline right-of-way (ROW). If approved, upon completion of a replacement Line 3, the original Line 3 would be decommissioned. The only differences in the two pipelines would be potential route variations (A1, B1, and/or C1), which have been proposed to avoid sensitive resources or landowner issues.
18	The DEIS should be re-drafted with re-scoping of the geographic area of the project as required by NEPA policy for connected actions. The current geographic study area of the DEIS is described is very limited. Scoping provisions of NEPA in Section 1508.25 clearly require an EIS to consider “connected actions”. The short 14 mile long segment of these two pipelines described in the geographic scope of the DEIS could not function independently nor could they proceed to construction unless the remainder of the pipeline system that lies upstream or downstream	The Wisconsin DNR is responsible for carrying out an environmental review of the proposed Projects in Wisconsin. As part of this analysis, the DNR has assessed cumulative impacts of the proposed Projects in combination with other past, present, or reasonably foreseeable actions that may occur along the entirety of these Projects that could combine to create additive impacts. It is not the responsibility of Wisconsin DNR to determine the need for a federal EIS under the National Environmental

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	from this segment were also constructed. Thus the impacts of the overall project and the broader scope of regional alternative routes available in this region must be included in the revisions of the DEIS.	Policy Act (NEPA).
19	Enbridge has used pipe from inferior quality sources in the past. Pipe manufactured in China and elsewhere outside the US, is notorious for being of poor quality and strength under pressure. I have talked to pipe-fitters doing the actual welding of the pipe seams and they said that the welds do pinhole making an inferior weld. At the hearing at Superior on 25 August 2014, the pipefitters union said in testimony that they wanted Enbridge to use pipe made in the USA.	The pipe for the Projects would be American Petroleum Institute (API) 5L PSL 2, Grade X70 steel pipe with a 30- and 36-inch outside diameter, which will meet the U.S. Department of Transportation (DOT) Pipeline Hazardous Materials Safety Administration's (PHMSA's) requirements under 49 Code of Federal Regulations [CFR] Part 195. Pipeline manufacturing and construction would occur in accordance with the American Society of Mechanical Engineers, National Association for Corrosion Engineers, and API standards. All of the pipe would include fusion-bond epoxy coating to protect against corrosion. Wisconsin DNR does not have the authority to regulate pipe and material purchasing requirements for the project.
20	When the Environmental Assessment was performed for the Line 61 project (Southern Access), the maximum capacity of the pipeline was not revealed to the public. In the draft EIS for the Sandpiper and Line 3 Replacement, the maximum capacity of the pipelines and the psi has not been disclosed. This does not allow for an informed response by the public.	The joint Environmental Analysis prepared in 2006 for the Southern Access project included information on the maximum operating specifications for the pipeline. Additionally, information on the capacity of Line 61 (Southern Access Pipeline) Capacity Expansion Project is provided in Section 7.2 of the EIS. The Line 61 Capacity Expansion Project expands the existing capacity of 560,000 barrels per day (bpd) to 1,2000,000 bpd by adding 9 new pump stations and upgrading 3 existing stations in Wisconsin.
21	The Project Overview in the Executive Summary fails to mention that Line 3's operational capacity will double from 390,000 bpd to 760,000 bpd. This increase in operational capacity is central to public concerns over the project. As is, the drastic changes to operational capacity of Line 3 go largely overlooked and should be highlighted.	As described in Section 2.1 of the EIS, the design capacity of the existing Line 3 was 760,000 bpd, but for safety reasons the pumping pressure has been reduced and the line currently carries 390,000 bpd. Replacing the existing Line 3 Pipeline with a larger-diameter pipeline (36 inches as opposed to the existing 34 inches) would restore Line 3 to its historical operating capabilities.
Alternatives		
22	Evaluate the corridor that is being examined for the planned Energy Transfer Pipeline Company pipeline (from the Bakken shale fields to a very similar destination point in Illinois as Line 3 and Sandpiper oil would end up) or the Enterprise Products Partners (EPP) pipeline (from Stanley, ND to Cushing, OK) as alternative routes for both pipelines. Gather available information from other state or federal regulatory agencies reviewing these alternative pipeline routes. No reason is	Section 4.1.2.1 of the EIS discusses the construction of new pipeline systems as an alternative to the proposed Projects. This discussion includes Energy Transfer Partners' proposed 1,100-mile, 30-inch (320,000 bpd) pipeline from North Dakota's Bakken gathering facilities to Patoka, Illinois, and Enterprise Products Partners' preliminary discussions regarding a 1,200-mile, 30-inch (340,000 bpd) pipeline tentatively stretching from Stanley, North Dakota, to Cushing, Oklahoma. These new

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	offered for exclusion of these alternative routes from consideration.	proposed pipelines, even if permitted and constructed in a timely manner, would not reduce the need for additional capacity to transport the increased crude oil that is anticipated to be produced in the region over the coming years. Some of the anticipated demand for additional crude oil may arise from the recent lifting of the prohibition of crude oil exports. See Section 4.1.2.1 for further information.
23	Enbridge has not provided information in its CN and Route Permit applications to determine whether alternative end points and routes might be in the public interest, be beneficial to users or refineries, and eliminate or reduce apportionment.	The Certificate of Need (CN) and Route Permit applications refer to permit applications in Minnesota.
24	Analyze in detail other possible more direct routes from the Bakken oil field to the destination for this oil as alternatives to the Sandpiper pipeline that would not pass through the more sensitive areas of Minnesota and a highly sensitive area of Wisconsin.	The Wisconsin DNR is responsible for reviewing and making decisions on permit applications for projects in Wisconsin. The DNR is reviewing the permit applications for 14 miles of pipeline for the proposed Sandpiper and Line 3 Replacement Projects in Wisconsin. As part of the EIS, the DNR looked at system alternatives to the proposed Projects including alternative pipelines (see Section 4.1.2 of the EIS). The Wisconsin DNR could not propose an alternative pipeline route in Minnesota since it does not have permit authority in that state. The Minnesota DOC will be looking at alternative routes as part of the environmental reviews for the two proposed pipelines in that state.
25	No individual state should act in and of itself thus pre-empting the possibility of alternatives for a neighboring state. The several levels of environmental review that are going on by the individual states and the federal government should be sufficiently coordinated so as to have as wide as possible a range of alternatives considered.	The Wisconsin DNR is responsible for carrying out an environmental review of the proposed Projects in Wisconsin and does not have the authority to impose permit decisions in other states. The Wisconsin DNR and Minnesota DOC intend to share information and knowledge on these Projects to allow consistent and more accurate analyses. Each state agency is considering the potential impacts from the entire pipeline in other states as part of each analysis. In the event that actions in Minnesota require a new route through Wisconsin, the Applicant would need to submit revised permit applications or withdraw its applications in Wisconsin.
26	Consider entirely different routes for these pipelines. Nowhere in NEPA, CEQ guidance or WEPA must an alternative pipeline route actually be proposed as an actual pipeline project before it can be considered a “reasonable alternative” to the proposed project. Alternative routes for projects under environmental review are almost always “imagined” yet feasible routes used to make comparisons of impacts between the proposed route and these “imagined” alternative routes. Potential route	The DNR does not have routing or siting authority for new petroleum pipeline projects in Wisconsin. The EIS describes the existence of potential alternative routes or modes.

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	alternatives for these projects have been presented which will greatly reduce the risk of North Dakota Bakken and Alberta tar sands crude oils spilling into Minnesota's and Wisconsin's iconic waters. Alternate Route A (This is designated as SA-04 in the Sandpiper docket) Alliance pipeline corridor from Alberta, Canada to Illinois Alternate; Route B Viking and Alliance pipeline corridors with short link of new corridor; Alternate Route C Keystone 1 and Alliance pipeline corridors.	
27	As stated in the EIS, trucking crude oil from the Bakken region and/or Canada is not an alternative for the Projects. A recent study released by the U.S. Department of Transportation found that 71% of Wisconsin’s roads are in poor or mediocre condition, and 14% of Wisconsin’s bridges are structurally deficient or functionally obsolete.	Comment noted.
28	The project's purpose and its subsequent alternatives analysis must focus on the source and end points of the products the pipelines carry. The vast majority of product goes to the Chicago area; then east and south. Therefore the end point(s) of most of the product carried by the project are not in Superior but are much farther south. Consider the multiple alternative routes between these beginning and end points that would achieve the project's purpose. A more comprehensive approach is needed for Line 3 with objective examination of other endpoints besides Superior.	The intent of the proposed pipelines is to deliver Bakken crude oil and Canadian crude oil to the existing Superior Terminal. While much of the petroleum in the proposed pipelines will not be refined in Superior, pipelines to other end points besides Superior may not meet the purpose of the proposed Projects as stated by the Applicant.
29	The project purpose as stated by Enbridge requires the need for a much more broadly defined alternatives analysis including a thorough, independent review of Enbridge's product apportionment, commitments to refiners, and alternative physical routes and physical structures to meet these commitments. Such a review would result in identification of other alternatives to meet the project purpose.	A review of Enbridge’s product apportionment and commitments to refiners is beyond the scope of the environmental analysis for these Projects.
30	No new pipelines should be constructed through Minnesota's northern water landscape. Rather this new energy corridor should be placed in a location that has the lowest risk environmentally for the state and is the easiest to mitigate should a spill occur.	This consideration of alternative routes to avoid construction through Minnesota’s northern water landscape is under the authority of the State of Minnesota, and not the Wisconsin DNR. The Minnesota DOC is reviewing alternative routes as part of the environmental analysis of the proposed Projects in Minnesota. If actions in Minnesota require a new route through Wisconsin, the applicant would need to submit revised permit application(s) or withdraw its application(s) in Wisconsin.
31	Enbridge's stated reasons for replacing Line 3 are its numerous integrity anomalies along the line due to its age (50 years old). There are two	Opting to replace multiple pipelines is a business decision for the owners of the existing pipeline. In the event that the Applicant submits a permit

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	older pipelines, over 60 years old, also sharing the Enbridge Mainline northern corridor with Line 3. Is this a situation wherein it is advisable to replace all three old pipelines with one large pipeline with the equivalent capacity of the three old lines? Enbridge will be coming back to the state in the near future with an application to replace one of those 60 year old pipes. Do the Minnesota government, the Company and the public want to expend the time, money and resources to re-fight, re-litigate, and potentially incur long and expensive delays again?	application to replace another existing pipeline in Wisconsin, the DNR will carry out an environmental review as part of that permit application.
32	Minnesota is just embarking on a full EIS for these same pipelines yet no mention is made in the DEIS of this opportunity for Wisconsin to join with Minnesota agencies in broadening the range of feasible alternative routes through cooperative and concurrent environmental review efforts. The current scoping process for the Minnesota EIS for the pipelines is likely to consider a far larger array of potential routes that should be included in the Wisconsin DEIS. Several of the possible alternatives in the Minnesota DEIS would avoid Wisconsin altogether or could possibly enter Wisconsin at an entirely different location than described in the DEIS. The DEIS is incomplete and inadequate if it fails to consider these alternatives. The re-drafting of the Wisconsin DEIS would benefit significantly from rescheduling its completion such that the new information generated by the Minnesota EIS or any other Federal environmental assessments performed on these projects.	One purpose of an EIS is to inform Wisconsin DNR permit decisions. The Wisconsin DNR has no authority to suspend review and evaluation of a proposed project once an application is deemed complete. The application for the Line 3 Replacement Project is complete, so a suspension on the permit application for that Project is not possible. The application for the Sandpiper Pipeline Project is not complete at this time. In the event that new information becomes available as part of the environmental reviews being carried out by other agencies that would affect the impact analysis conclusions in this EIS, the document could be amended to incorporate that information.
33	Do not leave any old decommissioned pipe in the ground where it can disintegrate and leave toxins to leech into the soil and thus the ground water. Leaving it would save Enbridge/Koch Brothers a lot of money. Why shouldn't Enbridge dig it up and get the salvage money? The line that is being replaced should be removed from the ground and disposed of properly. The line is wrapped/coated with asbestos (according to the wind socks and hazmat signs during recent a recent repair) and would simply rust creating a problem to be solved by future generations similar to the taconite tailings dumping in Lake Superior or any of the other polluted sites that have been and keep popping up.	Section 4.3 of the EIS provides discussions of the potential environmental impacts of abandoning the existing Line 3 Pipeline in place (Section 4.3.1) as well as removing it (Section 4.3.2). The EIS notes the potential risks of removing the abandoned line due to its placement between two active pipelines. Also, Koch Industries, which does own other pipeline routes, is not a partner in the proposed project according to the Applicant.
34	I believe that a pipeline would be the safest means of oil transportation. After prior tanker car spills in the state of Wisconsin, it proves that rail is dangerous. Not only will a pipeline be a boost in the economy, it will pose the least threat to the environment. Both the Sandpiper Pipeline and Line 3 Replacement Projects are better for the local environment than the alternatives of transporting crude oil from Alberta and North	Comment noted. Analyses of the relative environmental risks, economic costs, and levels of environmental degradation of alternative methods of transportation were performed. Sections 4.1.3, 4.1.4, and 4.1.5 describe alternative methods of transportation of crude oil by trucks, trains, and barges, respectively.

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	Dakota to Superior by either truck or rail.	
35	The need for another pipeline is apparent. The current means of moving crude is not sustainable. Too few volume can be transported in existing pipeline infrastructure. Transporting crude by rail is not an appropriate means of transporting crude. Pipelines are the best method.	Comment noted. Section 2.3.4 of the FEIS describes the demand for crude oil transportation from the Bakken region and from Canada. Section 4.1 provides a discussion of the relative environmental risks, economic costs, and levels of environmental degradation of alternative methods of transportation as compared to the movement of oil by pipeline.
36	The limiting parameter of having the pipeline to pass through Superior in order to transport crude oil from the oil fields to the refineries and markets in the Midwest should be eliminated from the purpose & need. By defining the purpose of a project in the DEIS in narrow terms which actually prescribe a certain route as necessary to meet the project purpose (as done in the Executive Summary) inappropriately prejudices the selection of alternative routes for the project that do not pass through these predetermined points. While the project purpose is described differently in later sections of the DEIS, this purpose statement should be reconsidered and made consistent throughout the DEIS.	The Applicant has stated the purpose from its business perspective. The EIS can describe current market and other conditions that may seem to contradict the stated purpose, but for a pipeline in an existing ROW, the permit process provides no state agency with authority to require a different route, only to evaluate the impacts of a proposal and reasonable alternatives. The intent of the proposed pipelines is to deliver Bakken crude oil and Canadian crude oil to the existing Superior Terminal. Pipelines to other end points besides Superior may not meet the purpose and need of the proposed Projects as stated by the Applicant.
Air Quality		
37	As the transfer from pipeline to tanks is done there is a diluent that gets aerosolized and I believe that the permit that Enbridge asked for didn't include that. I am afraid for the health of the workers who work on this line and may or may not know of the health effects.	Air emissions associated with the operation of the Superior Terminal are regulated by the Wisconsin DNR consistent with state and federal air quality regulations.
Cultural Resources		
38	The EIS section on tribal consultation spells out how you have worked with an inter-tribal Fish and Wildlife Commission that came out of the Voight decision, but no mention of actual tribal consultation with tribal governments.	The Ojibwe communities in the Ceded Territory were notified of these Projects and of the EIS process via the DNR Tribal Liaison process. The public hearing announcement and Draft EIS were provided to the tribal community contact in conformance with existing mutually agreed-upon practices. The Ojibwe community (as represented by the Great Lakes Indian Fish and Wildlife Commission, or GLIFWC) has submitted comments on the Draft EIS pursuant to the April 5, 2016, meeting of the Voight Task Force. All comments from tribal representatives have been considered in the development of this FEIS.
39	Section 8.5.16.2 Tribal Treaty Resources is simply insufficient. We need to protect ceded territory and medicines. What happens when a	The Draft EIS provided an analysis of potential impacts to tribal treaty areas from construction and normal operations as well as from a spill

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	traditional staple food crop or harvesting or gathering or hunting or spiritual site gets destroyed? The loss carries into our identity. Potential impacts of a spill are examined only so far as their most immediate effects as seen from an Anglo and economically-centered perspective. In its revision, tribal members should be given a space to share their interpretations of what the impacts of a spill would mean to treaty resources.	from the proposed Projects. The Draft EIS was provided to the Ojibwe communities in the Ceded Territory for review and comment. Comments were received from the Fond du Lac Band, the Red Cliff Band of Lake Superior, and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), which is an intertribal agency exercising delegated authority from 11 federally recognized Ojibwe (or Chippewa) tribes in Wisconsin, Michigan, and Minnesota. All comments from tribal representatives have been considered in the development of this FEIS. Section 5.15.1.2 of the FEIS was changed to recognize the existence of spiritually significant resources.
40	The EIS defines cultural resources to include, "objects, districts, and landscapes," but fails to define "religious or cultural significance." Although cultural significance is left undefined, an inventory of the project produced a determination that "No resources of religious and cultural significance (including Traditional Cultural Properties [TCPs]) were found within the survey corridor." The Red Cliff Band finds the entire corridor of significant cultural importance. Within the Wisconsin section of the corridor, the objects, districts, and landscape all fall within Ceded Territory. How will these pipelines affect our culture moving into the future? The EIS needs to offer a more comprehensive appraisal of what is culturally significant and why and be representative of the people, our past, and our future.	The information in the EIS has been developed from repositories with publicly available information as well as published reports and studies. To gain information on properties of religious and cultural significance, including Traditional Cultural Properties (TCPs), the Wisconsin DNR would need more specific information from the Red Cliff Band that can be gained through correspondence or a meeting. Once the DNR has specific information related to the Projects, the information would be reviewed to identify any additional historic properties, project impacts, and the potential development of mitigation measures. Any information that is sensitive to the Red Cliff Band would not be shared with the public. This information would be reviewed by DNR, but not be included in the FEIS. (See also Response 53.)
41	An oil spill would affect Lake Superior, a place of distinct cultural significance. DNR, the agency charged with protecting natural resources, does not acknowledge the significance of those resources to the people who depend upon them. Certainly it is hard to quantify what would happen if a spill contaminated our fishery from which we harvest over a million pounds of dressed fish a year. It is hard to quantify how an expanded corridor will affect our hunting and fishing rights.	As discussed in Section 8.5.20 of the EIS, while it may be possible for spilled oil to reach Lake Superior, it is unlikely that a large volume of oil would reach this area since much would become trapped in sediments and vegetation at the river bottom and along stream and river banks and in wetlands before reaching this far downstream. However, if an oil spill reached Lake Superior, lighter crude oil would likely readily disperse in the large volume of water within the lake, and heavier crude oils would not spread extensively, particularly in cold water conditions, and would be more likely under calm conditions to coat rather than penetrate shorelines (National Oceanic and Atmospheric Administration [NOAA] and API 1994). However, according to a Canadian government study, under stormy conditions bitumen can mix with suspended sediment and sink to the bottom of a waterbody (Environment Canada et al. 2013). (See also Response 53.)
42	Because the proposed pipeline corridors pass through Minnesota and Wisconsin lands ceded to the Ojibwe for hunting, fishing and gathering,	The Ojibwe communities in the Ceded Territory were notified of these Projects and of the EIS process via the DNR Tribal Liaison process. The

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	they should have a seat on this advisory panel.	public hearing announcement and Draft EIS were provided to the tribal community contact in conformance with existing mutually agreed-upon practices. The Ojibwe community (as represented by the GLIFWC) have submitted comments on the Draft EIS pursuant to the April 5, 2016, meeting of the Voight Task Force. All comments from tribal members have been considered in the development of this FEIS.
43	The DEIS does not consider historical wetlands or wild rice areas that are no longer present. That history is important; just because it is not a wild rice bed anymore doesn't mean it's not there. Wild rice is a unique resource for the Anishinaabe people and they have constitutional protections on that.	Potential impacts to wild rice areas are addressed in Sections 5.15.5.2 and 8.5.16.2. The information in the EIS has been developed from repositories with publicly available information as well as published reports and studies. To gain information on areas of historic rice harvesting areas for the Anishinaabe (Ojibwe) people, the Wisconsin DNR would need more specific information that can be gained through correspondence or a meeting.
Residential Areas		
44	Enbridge has been found guilty of trespassing on our land in South Superior with each of the last three pipelines since 2002. Enbridge does not have an easement on our land for these last three pipelines to be installed where they were installed. Granting EIS approval to Enbridge for constructing pipelines outside of the current easement gives the appearance that Enbridge can install those pipelines outside of their easement. That is simply not the case and the DNR cannot approve a pipeline route or boundaries that could be interpreted to expand an existing easement. Enbridge does not have landowner or court permission to install any new pipelines on our property outside of the 50 foot easement (reference Enbridge v Engelking, et al). If you allow Enbridge to submit our property as an "alternate route", then you must confine their approved route to the existing 50 foot easement on our land and not over additional land that we own. Some of the terminology in the EIS says that they are negotiating with landowners for the right to go across their property or they are attempting to obtain easements on private property and gives an impression that they do have an easement when in fact according to this last lawsuit, they do not have an easement on our land. Please revise the language in the EIS accordingly.	The DNR decision does not supersede local, state, or federal trespass laws. The DNR considers potential impacts to regulated areas in the route alternatives and permit decisions. Section 4.1 of the EIS states that Route Variation B1 is proposed to avoid a land parcel that is involved in ongoing litigation, which is presumably the land parcel under discussion here. For other areas, Enbridge would require a ROW agreement (or easement) negotiated with each landowner that grants Enbridge the right to construct, operate, and maintain a pipeline across a portion of property.
45	We don't think Enbridge should have the right of eminent domain to take people's land. They are not providing a public service, they are moving a	The proposed Enbridge routes are primarily co-located with other Enbridge pipelines and other existing ROWs, which would reduce the

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	private good for private profit.	need for additional easements. Enbridge would require a ROW agreement (or easement) negotiated with landowners that grants Enbridge the right to construct, operate, and maintain a pipeline across a portion of property. Section 32.02, Wis. stat., states: "The following departments, municipalities, boards, commissions, public officers, and business entities may acquire by condemnation any real estate and personal property appurtenant thereto or interest therein which they have power to acquire and hold or transfer to the state, for the purposes specified, in case such property cannot be acquired by gift or purchase at an agreed price: (9) Any Wisconsin corporation transmitting gas, oil or related products in pipelines for sale to the public directly or for sale to one or more other corporations furnishing such gas, oil or related products to the public."
46	Citizens along the route and residing at the source will have local land exposed to construction damage and spill damage.	Potential impacts to residential areas and to public safety from construction, operation, and accidents are addressed in Sections 5.12, 5.14, 8.5.14, and 8.5.15 of the EIS.
Socioeconomics		
47	Enbridge is a vital link for North American oil independence and makes a tremendous economic impact in communities like Superior. Their support enables so many other businesses in the area to prosper. Please recognize that permitting industrial growth of this nature with private investment from a company like Enbridge done in concert with best practices toward the environment create the greatest quality of life for the current and future generations.	Economic benefits of the Projects are addressed in Section 5.15.2 of the EIS.
48	I support and believe that a pipeline would be more cost effective and safer way to transport material. It would free up space for the railroad to haul many other materials. It will also provide a lot of jobs for the locals in our area. Better jobs means better local economy. It will provide a large number of jobs for many union workers as well as provide a safer means for transporting material.	Comment noted.
49	I think that the environmental impact would be great at first but if we don't pipe it we have to truck it and running the pipeline would create so many jobs.	Comment noted.
50	I fear for the health of the citizens of Superior and I know they are poor. Who gave this international corporation the agreement that will cut through our city and will decimate and has decimated the health of our	Environmental justice is discussed in Section 5.15 of the EIS.

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	citizens who are economically disadvantaged?	
51	We have the highest energy prices of any states in the country so I want to know for whose benefit is this being done -- it is not being done for our benefit.	The DNR must grant or deny the permit applications for the two Projects based on the environmental reviews performed under the environmental permit applications. Costs and benefits of the proposed Projects to the local community are part of the WEPA evaluation, intended to inform citizens and their elected decision makers.
52	A properly scoped EIS must consider socio-economic issues. Since Enbridge and its subsidiaries made their initial applications for these pipelines, the world oil market has changed dramatically. Are the company's economic arguments and its contractual agreements with shippers for needing these pipelines still relevant in today's oil marketplace? An independent panel of advisors should include an oil market economist to compile and analyze that data.	Socioeconomic issues are addressed in Sections 5.15 and 8.5.16 of the EIS. The Applicant’s response to changing energy price structures and global markets is a business decision not regulated by the State of Wisconsin.
53	How will the compatibility of construction workers be with tourists, residents and local businesses (e.g., lodging needs)? How trustworthy and reliable will these workers be with respect to property and paying for services? Some resort owners will not provide lodging for pipeline workers due to previous negative experiences. Will Enbridge be financially responsible for covering damages or lost income from disreputable and irresponsible workers?	Socioeconomic issues, including demands for local services by construction workers, are discussed in Section 5.15 of the EIS. This specific issue would need to be resolved among accommodations providers, construction contractors, and their employees.
54	Enbridge's economic impact is felt beyond the borders of Douglas County. Each year, Enbridge pays the State of Wisconsin over $20 million in "terminal taxes". Enbridge construction, replacement and improvement projects along its pipeline assets in Wisconsin create jobs and generate commerce in counties from Douglas to Walworth.	Socioeconomic issues including potential economic benefits from the proposed Projects are discussed in Section 5.15.2 of the EIS.
55	In addition to providing a large number of family-supporting permanent positions, expansion projects at the Superior terminal and along Enbridge's pipelines have created hundreds of construction related jobs. As we have seen with previous Enbridge pipeline projects, the creation of these construction jobs will provide an immediate boost to the local and regional economies both with the injection of direct wages and salaries and in the subsequent increase in demand for housing, transportation and expenditures for goods and services. Local sales tax revenues will increase the coffers of both Douglas County and the State of Wisconsin. Wisconsin will also benefit from an increase in personal income tax collections. Once the projects are completed, the State of	Comment noted. The analysis of socioeconomic impacts is discussed in Section 5.15.2 of the EIS.

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Comment ID	Comment	Response
	Wisconsin will realize an increase in terminal tax revenues paid to it by Enbridge.	
56	The Sandpiper Pipeline and Line 3 Replacement projects will have long-term socio economic benefits also. Enbridge's multi-billion dollar investment in these projects will help ensure the company's future in Douglas County as one of the county's largest and most socially and environmentally responsible employers. The projects will also ensure that the Calumet Superior Refinery and other regional refineries that serve our community have a safe, reliable and cost competitive supply of crude oil.	Comment noted. The analysis of socioeconomic impacts is discussed in Section 5.15.2 of the EIS.
57	The proposal violates the treaty rights of the Anishinaabe people and everybody that lives on the corridor. You are concentrating impacts on people who have already had impacts concentrated on them for centuries.	An analysis of potential impacts to tribal treaty resources from the two Projects is described in Sections 5.15.2.2 and 8.5.16.2 of the EIS.
58	Environmental Justice Considerations follows the assumption that monetary income is the truest indicator of what might make a population deserving of environmental justice considerations. The EIS needs to reflect the reality that environmental justice relates to much more than a population's monetary capacity to mitigate problems imposed upon it by outside entities. Treaty rights, the right to thrive in an uncompromised landscape, the right to have a voice as a Native Sovereign Nation that is making strides towards fossil fuel independence; these are only a few of the considerations overlooked within the EIS's review of environmental justice.	Environmental Justice is discussed in Section 5.15 of the EIS. According to the U.S. EPA, “Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”
59	What are the economic consequences of summer construction and congestion issues with roads and traffic?	Section 5.15.2 of the EIS describes potential socioeconomic impacts of construction of the proposed Projects including potential impacts on the local transportation system.
60	This pipeline will not be productive financially. It is short lived. It is not where our economy is going and needs to go. Profit from this pipeline is short-lived and when it is done, we will not have invested this money towards fossil free sources.	The analysis of economic impacts is discussed in Section 5.15.2 of the EIS. The degree of profitability of the proposed project is a business decision to be made by the Applicant.
61	Many will say that fossil fuels are not the way of the future but they are certainly here to stay for a while. I think that supporting this project sends a clear message that these jobs are important to the region, they produce substantial income and they can increase prosperity here.	Comment noted. The analysis of socioeconomic impacts is discussed in Section 5.15.2 of the EIS.

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Comment ID	Comment	Response
Wetlands and Water Quality		
62	Using 2005-2015 spill information presented in the EIS, Enbridge has spilled potentially 600,000 gallons of oil in Wisconsin in 10 years. A precise recounting of the size of each spill and effectiveness of the consequent cleanup should be provided. Although most of these spills were "small", even "small" spills were predicted to have minor to medium impacts on listed species and wetlands. Because the proposed pipeline runs through state wetlands and across tributaries to a major river and Lake Superior, this project seems to have an extremely high probability of major deleterious consequences on these aquatic resources.	Section 8.3.2.2 provides a historical record of spills from Enbridge pipelines, and Section 8.3.1 of the EIS provides a range of spill volumes that were used in the analysis of potential impacts. The EIS also notes that most construction and operational safety regulations are the purview of federal, not state, agencies.
63	The threat to water quality is heightened when a spill occurs on karst aquifer. The National Academy of Sciences reports that bitumen can spread quickly to the aquifer and have a significant effect on water quality. Although Enbridge's application does not cover an area with this type of aquifer, the truth is that the bitumen does not remain in Superior, but is shipped further through the state where there are communities that get their drinking water from karst aquifers.	Comment noted. The proposed pipeline Projects would not cross any karst areas in Wisconsin. Potential impacts of shipment of petroleum from Superior to the Illinois border and beyond could include impacts to karst areas in southern Wisconsin and would be covered in an analysis of any future pipeline in that area, as applicable.
64	Mitigation/restoration of wetlands has proven in the past to be particularly difficult, as many functions that are lost cannot be restored. Preservation and prevention are far more effective methods for maintaining the ecological services of these systems. The success rate of wetland restorations should also be noted in the mitigation sections, so that people understand the difficulty of this process.	The mitigation measures described in Section 5.20.3 are designed to prevent or reduce impacts to wetlands to the extent practicable, but Section 5.20.2 discusses the long-term (>50 years) recovery of certain wetland types post-construction as well as likely permanent operational impacts.
65	These two Enbridge oil pipeline projects would be situated in Douglas County on the edge of 18% of the world supply of water and 90% of the U.S. supply. The Great Lakes are the largest surface of freshwater in the world.	Comment noted. Response preparedness measures noted in the EIS recognize the need to protect Lake Superior and note improvements made in response readiness over the past several years.
Energy		
66	This fracking oil boom is unnecessary. We should be conserving oil and using alternative energy methods that do not pollute Earth. The Wisconsin DNR should be encouraging citizens to engage in energy saving, not providing imprimatur to corporations to build, expand, take advantage of, and ultimately destroy the people's right to a clean and safe environment. There should be no debate about the size of pipes.	The DNR is not responsible for forming the energy policy of the United States or Wisconsin. The DNR is undertaking environmental reviews of both proposed pipeline Projects as required by the WEPA and is responsible for granting or denying the permit applications.

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	There should be no expansion. The DNR cannot ignore the fact that this oil belongs in the ground if we are to halt or slow the disastrous path of catastrophic climate change.	
67	This project does not support the President's promise and resolutions he made at the 2015 United Nations Climate Change Conference, in Paris France. The President wants us to go forward supporting alternative energy resources. He knows we have to switch to fossil free resources. Laying pipe for oil is not the direction we need to go. Oil is limited but wind and solar energy is forever.	The DNR has no authority to formulate the energy policy of the United States or Wisconsin. The DNR is undertaking environmental reviews of both proposed pipeline Projects as required by the WEPA and is responsible for granting or denying the permit applications.
68	I understand this oil product will be sold to foreign countries. The promise of cheap oil energy to other nations promotes its use and delays expansion of fossil free energy. If other countries continue using fossil fuel while we use fossil free energy they will offset any positive effort we have done. We need to look at this as a planet's need, not just our need for profit.	The DNR has no authority to formulate the energy policy of the United States or Wisconsin. The DNR is undertaking environmental reviews of both proposed pipeline Projects as required by the WEPA and is responsible for granting or denying the permit applications.
Oil Spills and Response		
69	Enbridge has been choosing repairs on these lines for years, and they have had good success but it is time to put new pipe in. One of the pipes that leaked into the river in Wisconsin had been slated for repair, but the people opposed to the Projects halted the repair and 4 weeks later the line broke. Pipelines are way safer than rail look at all of the rail spills that have happened in the Dakotas in the last 2 years.	The purpose for the proposed Projects are addressed in Section 2.1 of the EIS. The EIS notes the risks involved with continued use of the existing Line 3.
70	As WI taxpayers, we wish to strongly oppose the pipeline going to Superior, just as we are opposing pipelines going through the headwaters of Minnesota. Many spills have occurred with these pipelines in the past and there is no guarantee that more won't happen. The high potential for polluting these pristine waters in both states is huge. Enbridge and companies like it, are known for pipeline leaks; they almost seem inevitable, and for not having adequate measures in place for monitoring and for clean-up. These probable leaks and spills could literally ruin the water we all depend on, for decades to come.	Comment noted. Section 8.3.2.2 of the EIS provides historical records of Enbridge spills. The EIS notes that, according to the applicant, the applicant has improved its response measures over the past several years, although DNR has no ability to verify the extent to which they may be adequate for responding to the most serious of potential spills. In a legal filing May 4, 2016, the National Wildlife Federation requested that the U.S. District Court for the Eastern District of Michigan for a quick decision in a 2015 lawsuit that accuses the Department of Transportation of failing to oversee "worst case scenario" spill response plans for oil pipelines that cross rivers and lakes. However, there is no indication whether such a suit would result in stronger regulations, or when they would take effect.
71	There is a high risk of the possibility equaling or surpassing the BP Macondo catastrophe and jeopardizing the largest body of fresh potable	The BP Macondo spill was a sub-sea release from an exploration well and failed blowout preventer. It did not involve pipeline transport of crude

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	water on Earth. The cities of Superior, WI and Duluth, MN derive their drinking water from Lake Superior. If an oil spill occurred at the port terminal owned by whomever, or whatever entity possibly Calumet Specialty Products), thousands of people would immediately be affected.	oil. The proposal to upgrade the existing pier at the Superior Terminal and construct infrastructure to load crude oil onto vessels for distribution across the Great Lakes has been withdrawn and as such is not a reasonably foreseeable future action. In the event that a similar proposal is made in the future, a separate environmental review would be carried out as part of the permitting process for such a proposal.
72	Corexit or similar toxic dispersants would be used for future oil spills, even for an oil spill in the greatest and largest body of freshwater on the planet. If not Corexit, what would be used for the cleanup? The Canadian Tar Sands oil sinks to the bottom and the highly flammable Bakken oil remains on the top, what other methods exist to clean up such a catastrophic spill? According to Michael Robichaux, a doctor in Louisiana, people were still getting sick in the Gulf States affected areas from the dispersant Corexit three years later, as reported in "The Washington Spectator, 1 July 2013." (washingtonspectator.org) The Gulf Coast citizen's livelihoods (shrimping, etc.) are in deep decline because of the Corexit dispersal. The same scenario could very well play out in Lake Superior or any of the Great Lakes.	The potential for oil to affect Lake Superior is discussed in Section 8.5.20 of the EIS. As discussed in Section 8.3.3 of the EIS, EPA Region 5 does not recommend the use of dispersants such as Corexit or other oil emulsifiers in fresh water (Region 5 RRT 2015).
73	Citizens along the route and residing at the source will have to pay for the costs of developing emergency response teams to prepare for the inevitable toxic spills.	Enbridge would be financially responsible for oil spill response and cleanup, as discussed in Section 8.6 of the EIS.
74	How do the company and clean-up agencies access wetlands In non-winter seasons if a leak/spill/rupture occurs?	Section 8.4.7 of the EIS has been revised to include access for oil spill response.
75	A congressionally mandated study by the National Academy of Sciences, points out our unpreparedness to address a bitumen oil spill in the United States. It is imperative that the WDNR and US Army Corps of Engineers use the information from the study to deny any future pipeline expansions until oil spill cleanup plans can be determined acceptable. The study reports that the emergency plans provided by Enbridge have not been approved as effective. The study further reports that plans by states and local governments are far from adequate to address the needs of the public and the environment when an oil spill happens. The NAS report says that emergency response plans do not plan for the effective cleanup of a spill in water. Enbridge's application for new pipelines runs through several important wetlands and the St Louis River, which is the second largest tributary to Lake Superior. Current plans require that Enbridge only clean up waterways until oil is	As discussed in Section 8.2.3 of the EIS, Enbridge developed an Integrated Contingency Plan (ICP) that serves as the emergency response plan for Enbridge's pipelines. Input on the ICP was provided by the EPA, U.S. Coast Guard (USCG), the Occupational Safety and Health Administration (OSHA), and other agencies. Enbridge's ICP was approved by PHMSA on July 11, 2013, for other Enbridge pipelines, and Enbridge would require approval of the ICP from PHMSA in order for the plan to apply to the Sandpiper and Line 3 Replacement Pipelines. Enbridge has also developed a Submerged Oil Recovery Plan (see Appendix E to the EIS) to describe tactical methods that could be employed to recover spills submerged in water, which would apply to diluted bitumen spills.

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	no longer seen on the surface. Current water clean-up plans may actually be more dangerous to the environment. The report says that bitumen spills pose a significant risk to wetlands because we cannot plan on an effective clean up. The NAS report says that because most of the effective spill response methods are based on the premise that spilled oil floats, submerged oil moving downstream in rivers or following wind or tidally driven currents may not be recoverable thus resulting in protracted periods of exposure". Regarding response to which Enbridge is supplement to the Draft EIS characterizes a very different clean-up scenario. None of the tactics Enbridge has proposed to respond to sunken oil have been documented as effective.	
76	The NAS report finds that necessary information on bitumen/diluent blends and toxicity is lacking from Material Safety Data Sheets regarding the different blends that can run through the pipelines so first responders don't have adequate information to respond to spills. Specific response plans must address the different blends. The current generic response plan does not provide enough details. Enbridge is currently not required to divulge the actual contents of a pipeline before and during its shipping. Therefore a significant delay will occur between a spill detection and knowledge of what actually spilled. The NAS recommends that PHMSA establish a rule that this information be made available within 6 hours of a spill; possibly too late for anyone near a release of flammable gases.	OSHA is responsible for changes to Material Safety Data Sheets and not the DNR. PHMSA is responsible for developing regulations relative to the safety of hazardous liquid pipelines.
77	The Wisconsin Division of Emergency Management says that there is a Local Emergency Planning Committee at the county level that addresses chemical hazards. The Douglas County Hazard Mitigation Plan addresses "natural hazards". Enbridge, pipelines, and the Superior terminal are not mentioned in its plan. The City of Superior used to be home to the highest level Hazmat response team available. Since the last Enbridge pipeline was built, Wisconsin has decreased its top tiered Hazmat teams from 8 to only 2 across the entire state. The top response team has since been moved to Eau Claire. I did not see any mention of the potential ramifications from that in the EIS.	Section 8.2 of the EIS describes the national, regional, and applicant spill response plans that would be in place to address an oil spill from the proposed Projects. In the event of a release of oil from a pipeline during operations, the control center would shut down the pumps and close the valves in the area of the release and would notify internal and external parties, including the National Response Center (NRC), the state, and local police. Enbridge and/or Regional Hazardous Materials Response Team first responders would work to confirm the nature and location of the incident as notifications occur. First responders would be dispatched to the scene within minutes of being alerted to an incident. Upon their arrival, the timing of which would depend on remoteness and other factors, they would secure the scene, undertake evacuations when necessary, and deploy spill response procedures (see Section 8.3.3 of the EIS).

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78	During one training exercise in Wisconsin it was noted that there were not enough resources/foam available for handling one tank car. A pipeline oil spill could be much larger than one train car. The Wisconsin DNR should determine the amount of resources/foam necessary for a worst case spill and demand that they be available before any approval of the project. Additionally, the rule of thumb for an oil tank spill is 1/2 mile evacuation. I do not see a similar evacuation plan for pipeline incidents.	These issues are addressed in Section 8.2.3 of the EIS.
79	When all risks are considered systematically, there must be a greater level of concern associated with spills of diluted bitumen compared to spills of commonly transported crude oils. Commenters were concerned with the ability to respond and clean up bitumen crude oils due to their density and volatility. The presence of diluted bitumen in particularly in its weathered residues of large quantities of resins and asphalt teams heightens the level of concern about long-term persistence in the environment. In light of the committee's findings regarding the differences between dilbit and commonly transported crude oils, modifications to the current regulatory framework are needed to better account for the unique characteristics of dilbit. Spill response plans should demonstrate that responders fully understand the unique properties and potential environmental impacts of dilbit. Enhanced plans describing in detail the areas most sensitive to the effects of the dilbit spill and response strategies and resources necessary to mitigate the impacts a dilbit spill are needed.	The properties of Dilbit are discussed in Section 8.4.6 of the EIS. See also Response 98.
80	Based on existing Enbridge spill data, is there a way to estimate the probability or frequency of spills of different sizes over the next decade, several decades, or life of the project? It seems like small spills have an extremely high likelihood of happening almost annually, while substantial or even large spills are likely to occur within 10-20 years of pipeline construction. Quantifying the risk using probabilities would better outline the potential problems these projects could (will) cause going into the future.	Section 8.3.2.2 provides a historical record of spills from Enbridge pipelines, and Section 8.3.1 of the EIS provides a range of spill volumes that were used in the analysis of potential impacts.
Safety and Liability		
81	Having worked on pipeline construction, I first hand know the amount of effort and quality of construction that goes into building a safe and effective means of transporting fuel/crude. In additions, the land is reclaimed, able to be used again and pipeline testing and safety is	Comment noted. See Sections 4.1.3 and 4.1.4 for discussions of the relative safety of transporting crude oil by truck and rail car, respectively. Chapter 3 of the EIS provides discussions of construction procedures and techniques that incorporate safety considerations for workers and the

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	ongoing. Much more than with rail or road transport. I agree with putting the pipeline through because if you truck it or put it on railcars all that stuff cause more safety problems going through towns. The pipeline does an outstanding job on safety with all the testing of the pipes, so I personally have seen which way is better for the communities and the environment.	public.
82	Enbridge contractors perform weekly and rainfall inspections to ensure compliance with the storm water permits and alike. I have been involved in inspecting several sites in Minnesota and Wisconsin throughout my tenure. Whether that's checking their sites on a holiday due to rain events or if it rains on a Sunday, people are there making sure their erosion control devices are functioning properly. I fully support this project. Enbridge has honestly been great to work with. They enforce any push back regarding safety, the environment, and workmanship. The amount of checks and balances provided within their company assures me that they are trustworthy and will do anything to protect the environment.	Comment noted. Chapter 3 and the Enbridge Environmental Protection Plan (Appendix B of the EIS) discuss safety procedures that would be carried out during construction and operation of the pipelines.
83	If the projections show that there will be 100% risk of a breach in the line through Wisconsin, the only questions are where and when? If this corporation now has a Wisconsin legislation permission to not have any funds in a contingency for clean- up who will pay? Will our property taxes go down? Will the shareholders benefit? Who will assume the risk?	Section 8.3.3 provides a discussion of potential types of spills and response actions for both pipeline Projects, and Section 8.6 addresses liability in the event of an accidental spill. Enbridge would be financially responsible for oil spill response and cleanup, as discussed in section 8.6 of the EIS.
Cumulative Impacts		
84	The DEIS does not address the potential environmental impacts from a proposal to upgrade the existing pier at the Superior Terminal and construct infrastructure to load crude oil onto vessels for distribution across the Great Lakes that has since been withdrawn. DNR should address the consequences associated with inevitable additional projects. Calumet Specialty Products may seek permits to use a Lake Superior port terminal on Lake Superior in the City of Superior, WI and then allow Enbridge to use a privately owned terminal port to ship the Bakken Oil, Canadian Tar Sands Oil and crude oil and refined products worldwide via Lake Superior.	The proposal to upgrade the existing pier at the Superior Terminal and construct infrastructure to load crude oil onto vessels for distribution across the Great Lakes has been withdrawn and as such is not a reasonably foreseeable future action. In the event that a similar proposal is made in the future, a separate environmental review would be carried out as part of the permitting process for such a proposal.
85	The impact areas in the cumulative effects analysis are too small. In general, the area that is analyzed for cumulative impact is Douglas	A discussion of potential cumulative impacts that could occur outside the State of Wisconsin are addressed in Section 7.5 of the EIS.

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	County. The DEIS acknowledges that impacts will occur in Minnesota, North Dakota, and Canada but the analysis of all of those impacts is not presented in the DEIS. The impact areas in the cumulative effects analysis should be larger than Wisconsin.	
Greenhouse Gases and Climate Change		
86	The analysis minimizes the adverse climate change related impacts caused by the pipeline's facilitation of increased production and consumption of fossil fuels. Developments such as construction of a new refinery or expanding existing refineries seem so foreseeable as to be virtually inevitable, and the absence of this analysis from the DEIS renders it incomplete and inadequate.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS.
87	It is unclear whether increased refining activities are included in the calculation of GHGs from the projects. We believe the scope of the DEIS must be broadened to provide more than a perfunctory analysis of the probable climate change consequences.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS.
88	The argument can be made that the Sandpiper Pipeline project will actually have a positive impact on the environment and will lead to a net decrease in GHG once a more efficient and environmentally friendly pipeline transportation alternative is provided for Williston (ND) Basin crude oil that is currently transported to Superior and other destinations by truck and rail car.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS.
89	The development of these new extreme energy sources result in 3 to 5 times more greenhouse gasses than conventional petroleum use.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS.
90	The DEIS fails to acknowledge that the SL3 project is a commitment to greatly expand fracked oil production in the Bakken Shale and Tar Sands oil (bitumen) production in the Western Canadian Sedimentary Basin (WCSB). Expanding production in either area cannot be done without violating the Paris Climate Agreement of December 2015. The fact that the consensus target of limiting earth's temperature rise to 1.5 C was agreed to by essentially all responsible governments on earth suggests that it should have been given greater weight in your DEIS. The Sandpiper line serves no useful purpose unless Bakken Shale fracking produces more crude. Likewise, the "Line 3 Replacement" increases effective WCSB export capacity to the U.S. by 370,000 bbl per day, and that expansion serves no useful purpose unless the WCSB produces more crude (bitumen).Your FEIS needs to acknowledge and	A discussion of potential cumulative impacts that could occur outside the State of Wisconsin are addressed in Section 7.5 of the EIS.

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Comment ID	Comment	Response
	discuss the environmental consequences—the unacceptable global warming—associated with the greatly increased production from the Bakken Shale and the Tar Sands that this proposed Enbridge project is designed to facilitate.	
91	The FEIS needs to discuss the methane emissions from oil production in the Bakken Shale since the Sandpiper pipeline will transport Bakken oil. Methane is a potent GHG. The FEIS needs to fully disclose the increased methane emissions from the Bakken Shale and their climate consequences.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS. With current technology and under current regulations in North Dakota, methane emissions may indeed increase. However, there have been ongoing efforts in North Dakota to require that methane emissions be reduced. Therefore, it is very difficult to speculate on what changes to emissions rates may result.

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
1	EPA has responsibilities under Section 404 for reviewing the Sandpiper and Line 3 Replacement Projects. We reserve our right to provide additional comments regarding impacts to aquatic resources associated with Enbridge's proposed Projects during the U.S. Army Corps of Engineers (COE) Section 404 permitting process. The EIS should acknowledge EPA's authorities under Section 404 of the CWA.	Comment noted. Change made to section 1.3.1.1 to reflect EPA authority under Section 404 CWA.
2	The FEIS should include the USFWS Biological Opinion and correspondence between the project proponents, WDNR and COE.	The USACE, USFWS, and EPA are reviewing the Projects pursuant to federal permit requirements. The DNR is coordinating with the USACE and other agencies as part of their environmental review, including assessing compensatory mitigation for wetlands and waters of the United States.
3	The existing right-of-way should be labeled on all EIS Figures. Describe existing pipelines within the right-of-way; Identify when all six existing pipelines will need to be replaced. Identify the "typical useful life" span of existing and proposed pipelines.	Figures in the EIS have been updated to include the right-of-way for the existing pipelines, which are described in Sections 1.1 and 4.3 of the EIS. Enbridge evaluates the operation and condition of existing pipelines through its integrity management program, which involves performing internal inspections and projecting future maintenance activities (see Section 3.3 of the EIS for further information on inspection and maintenance activities that are carried out for the existing pipelines). The typical useful lifespan of a crude oil pipeline is variable—some pipelines in the United States have been functioning for over 60 years, and newer pipelines are expected to have greater longevity due to increased quality of materials and construction and monitoring practices.
4	Address whether the Sandpiper pipeline could also be used to transport heavy crude/"oil (tar) sands crude" (diluted bitumen) from Canada. Identify the amount of each product mix (light crude, heavy crude) of the existing 390,000 bpd of Line 3 and their origins and market destinations. Explain why Enbridge proposes to install larger diameter pipe (36-inch) than the existing Line 3 (34-inch).	As discussed in Section 2.1 of the EIS, the proposed Sandpiper Pipeline is intended to transport a light, sweet crude oil sourced from the Bakken formation and the proposed Line 3 Replacement Pipeline would transport dilbit, derived from bitumen sourced from the WCSB, and could also transport lighter crudes. The existing Line 3 Pipeline generally serves the refining industry in PADD 2, Eastern Canada, and the Gulf Coast. The proposed larger-diameter replacement pipeline (36 inches as opposed to the existing 34 inches) would provide power conservation at all flow rates and restore Line 3 to its historical operating capabilities. In the event market or other conditions change, it would be physically possible to connect the Sandpiper line to a source of dilbit, if a connecting pipeline were permitted in the future. Many existing petroleum pipelines do carry a variety of products.
5	Include a figure in the FEIS that shows the locations of the above "associated facilities" within the Superior Terminal and the resources that would be impacted by these facilities.	Figure 3-6 has been added to Section 3.1.6 of the EIS that shows locations of the associated facilities at the Superior Terminal. The associated facilities for each pipeline are discussed in Section 3.1.6.

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
	Briefly describe the purpose of each associated facility and include representative photos.	
6	The FEIS should show the locations of temporary work areas, access roads, pipe storage yards, and contractor yards. Disclose the temporary and permanent impacts associated with each of these. Explain why 2.5 acres of wetlands need to be impacted by temporary access roads. Identify mitigations measures.	There are no pipe storage or contractor yards currently proposed for the Projects in Wisconsin. Enbridge typically uses existing public and private roads to access the right-of-way and facilities to the extent practicable to limit impacts on waters of the U.S. However, Enbridge identified areas along the Projects where new temporary access roads would likely be necessary to access the construction workspace, which would result in additional temporary wetland impacts. The temporary and permanent impacts associated with access roads and temporary work areas are discussed in Chapter 5. As discussed in Section 5.20.3, the Applicant has proposed to use a wetland in–lieu fee mitigation program sponsored and administered by the DNR to mitigate for wetland impacts.
7	Figure 3-2: Provide additional information about the St. Louis River Stream Bank Area and Fish Management, to address the following question: What work is proposed? For how long? What are the anticipated benefits? How does this related to proposed impacts? Is this area formally proposed as compensatory mitigation for Clean Water Act Section 404 impacts?	The St. Louis River is not proposed to be crossed by the pipelines, so there would be no construction impact. Protection against and response to spills is addressed in Chapter 8 of the EIS. The St. Louis River Stream Bank Area and Fish Management is not proposed as compensatory mitigation for wetland and stream impacts. Rather, Enbridge has requested to use the in-lieu fee program to compensate for wetland impacts.
8	The DEIS states that when crossing streams and rivers, a 20-foot buffer of undisturbed herbaceous vegetation would be left on all waterbody bank as measured from the ordinary high water mark (OHWM) during initial clearing, except where grading is needed/or bridge installation or where restricted by applicable regulations and/or permit conditions. Identify if this 20-foot buffer is a requirement, and if so, under what statute or program guidance? Explain Ecological significance and benefit of 20-foot buffer and why it is sufficient.	The 20-foot buffer is not an explicit requirement under state or federal regulations. However, incorporating a 20-foot buffer adjacent to waterways, along with other BMPs outlined in the EPP (Appendix B) meets DNR's Construction Site Storm Water Runoff General Permit No. WI-S067831 requirement that the permittee stage land disturbing construction activities to limit exposed soil areas subject to erosion.
9	Assess and substantiate the need to deviate from the existing right-of-way for Route Variations A2 and C2.	The Pokegama-Carnegie wetland complex falls within Enbridge's existing ROW corridor along Route Variation A2. The applicant has proposed Route Variation A1 to avoid the wetland complex, although this Variation also contains high quality wetlands and habitat. Route Variation C2 in the Draft EIS was proposed to avoid disruptions to the Nemadji Golf Course. However, there are wetland mitigation conservation easements on portions of the route around the golf course that would prohibit pipeline installation. As a result, Enbridge's preferred route variation is to be co-located with the existing ROW through the Nemadji Golf Course (which is now

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
		labeled Route Variation C1 in the FEIS).
10	Bitumen and Bakken oil spills will have an effect on the air quality for the public and first responders, most at the early stages of a spill. The response plans by Enbridge, Wisconsin and/or local governments do not have the necessary plans to keep people safe during exposure to the toxins released into the air. Discuss costs associated with providing well-staffed and equipped local emergency responders, including funding courses.	Section 8.2 of the EIS describes spill prevention and response actions that would be taken in the event of an oil spill from the Projects. Enbridge's Integrated Contingency Plan (ICP) serves as the emergency response plan for Enbridge's pipelines and would need to be updated and approved to include the proposed Projects prior to operation of the pipelines. Each of the four U.S. regional annexes to the ICP contains an Emergency Response Action Plan (ERAP), which is a region-specific, concentrated version of the ICP focused on the unique features of the region. Each ERAP is a region-specific plan that is specifically designed to be used by first responders and Enbridge personnel in the field. As described in Section 8.5.3, the extent of air quality impacts would depend on wind speed and direction in relation to proximate receptors (e.g., populated areas) and would be localized and transient. The ERAPs include materials designed to provide first responders and others with the important information they need to allow them to work with the Enbridge response system in the event of an emergency.
11	Include discussion of potential measures to reduce emissions associated with the production, transport, and refining of the crude oil to be transported.	The Wisconsin DNR is responsible for carrying out an environmental review of the proposed Projects in Wisconsin, and it does not have the authority to oversee crude oil production or refining. A comparison of GHG emissions between pipeline, rail, and truck transport has been included in the EIS in Section 7.4.2.2. Air emissions associated with the operation of the Superior Terminal are regulated by the Wisconsin DNR consistent with state and federal air quality regulations.
12	Specific construction mitigation measures listed in Section 5.15.3 for currently unknown wild rice populations should also be applied to wildlife and fishing resources (currently known or unknown) that might be impacted by an oil spill event. The State should consult directly with affected and interested tribes to seek more specific information about potential impacts to all of these resources, including appropriate measures to minimize impacts, in the event of a spill or other adverse impact to tribal treaty-protected rights to natural or to tribal cultural resources.	The information in the EIS (see Section 5.15) has been developed from repositories with publically available information as well as published reports and studies. To gain information on tribal wildlife and fishing resources (currently known or unknown), the Wisconsin DNR would need more specific information that can be gained through correspondence or a meeting.
13	The environmental justice analysis relies on county-wide data to assess potential impacts to low-income and minority populations. When available and where appropriate, Census block group-level data should be used to inform the analysis	The requested revisions have been made to the EIS. Demographic data for the census block groups through which the pipelines would be constructed is presented in Section 5.15.1.1, and impacts analyzed based on these data are discussed in 5.15.2.1.

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
	and conclusion.	
14	There are a high number of children under the age of 5 in one of the Census block groups near the existing Superior Terminal for which a capacity expansion has been proposed as detailed in Section 7.3 (Cumulative Impacts). Include information on potentially adverse impacts to children as a result of the proposed project, particularly in locations where there are high numbers of children under the age of five near the Superior Terminal.	The discussion in Section 7.4.15.1 has been expanded to address census block data near the Superior Terminal. Air quality permits would be obtained by all projects and are designed to maintain air quality for the whole population. Interested persons may wish to compare local air quality with that of know problems areas: http://www.arb.ca.gov/fuels/carefinery/carefinery.htm http://earthjustice.org/sites/default/files/files/Refineries-Fact-Sheet_04-08.pdf http://www.cbecal.org/wp-content/uploads/2012/05/wilmington_refineries_report.pdf.
15	Provide discussion on the HDD method and whether the inadvertent returns could be prevented in future construction. How much higher are the construction costs of multiple bores under rivers and streams? What are the contingency plans and costs for controlling "frackouts" in stream beds during a bore?	As described in Section 5.19.2, Enbridge does not propose to use the horizontal directional drilling method to cross waterbodies or wetlands in Wisconsin. Thus, the costs of multiple bores have not been evaluated, and there are no contingency plans or calculated costs for this construction method.
16	What are the costs and issues for winter construction of wetlands along the route? Discuss whether conducting work in wetlands in the winter would minimize impacts in any way.	Because of the challenges associated with wetland restoration in areas with shallow topsoil, the applicant is not proposing to construct the Projects in the winter; therefore, costs and related issues have not been evaluated.
17	Clarify whether wetland mitigation provided would be in-kind (i.e., of the same wetland type). Also provide more discussion on amount of wetland and stream impacts (debits) and the proposed mitigation (credits) to demonstrate whether proposed mitigation is consistent with the CWA Section 404(b)(1).	As discussed in Section 5.20.2, Enbridge originally proposed a compensatory mitigation plan in 2014 at the Crawford Creek mitigation site in the Town of Superior. Subsequently, the DNR implemented an in-lieu fee program and as a result, in March 2015 Enbridge withdrew their permittee-responsible compensatory mitigation plan and requested to utilize the in-lieu fee program to compensate for wetland impacts. If the project is approved, final compensatory mitigation must be approved by the WDNR and USACE. The in-lieu fee program, implemented by the WDNR and overseen by the USACE, requires an applicant to purchase credits used for the creation of in-kind wetlands impacted by a project.
18	Table 5-19 should identify: (1) linear footage of stream impacts for each stream, (2) whether each stream is impaired and if so why. Discuss summation of the anticipated linear feet of stream impacts. Include habitat quality assessment of streams impacted and anticipated quantification of habitat quality loss to determine if compensatory mitigation proposed	Table 5-19 has been updated with linear feet of streams impacted. The proposed Projects would not cross any impaired waters. Additional text has been added to Section 5.19.2.2 to address linear feet of stream impacts. The WDNR does not have authority to require compensatory mitigation for impacts to navigable waters.

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
	is adequate, if required.	
19	Justify statement that Project construction would not impact general temperature and light conditions of streams as a majority of the waterbodies are narrow. Address how change in temperature and light might disturb aquatic communities. Temporal loss of aquatic resources should be quantified and mitigated. Address temporal loss of affected aquatic resources and discuss compensatory mitigation for loss.	The text in Section 5.6.2.1 addressing temperature and light changes on aquatic species and temporal loss of aquatic species has been revised. Potential impacts to streams are minimized by isolating the workzone from the waterway by bypassing normal stream flows, limiting disruption during sensitive lifecycle timeframes, and restoring the system to pre-existing conditions. The WDNR does not have authority to require compensatory mitigation for impacts to navigable waters.
20	Include a wetland quality assessment report. Compare the quality of the wetlands that would be impacted by C1 to the quality of the wetlands that would be impacted by following the existing right-of-way through the golf course. Fully discuss resources in the area of this variation.	DNR received clarification from Enbridge after receipt of these comments that the route identified as C1 in the July 2014 Environmental Impact Report (EIR) is not Enbridge's preferred route due to the presence of wetland conservation easements on portions of the route around the golf course that would prohibit pipeline installation. Enbridge has switched the naming of the routes presented in the 2014 EIR so that C1 now represents the route through the Nemadji Golf Course. These changes are reflected in the FEIS.
21	The state regulatory agency must establish robust inspection and reporting requirements in order to ensure that Enbridge operates the Line 3 in a responsible manner. Identify specific measures Enbridge has and will take in Douglas County for their Sandpiper and Line 3 Replacement Projects with regard to spill prevention and response.	Section 8.1 discusses pipeline safety standards and regulations. PHMSA's Office of Pipeline Safety and the Public Service Commission of the State of Wisconsin share pipeline safety regulatory responsibilities in Wisconsin. Wis. Stat. 196.745 requires pipeline operators to maintain and operate their pipelines in a safe manner, and allows the Public Service Commission to "order any alteration in construction, maintenance or operation required in the interest of public safety." Operator compliance with state and federal pipeline safety regulations is monitored through PHMSA's inspection and enforcement program. The applicant's spill response plans and measures are discussed in Section 8.2.3.
22	Provide most recent date that Enbridge conducted a major training exercise involving emergency response contractors and consultants, as well as emergency response agencies for the Enbridge pipelines in Douglas County at the local, state, and federal levels. Provide proposed future date for this type of training in Douglas County.	Enbridge routinely performs drill exercises for employees, as discussed in Section 8.2.3 of the EIS. Enbridge reports that in 2014, its employees participated in 371 drills, exercises, and equipment deployments, working alongside first response agencies to test and practice emergency response plans. On May 6, 2015, Enbridge conducted a full-scale training exercise in Minot, North Dakota, that included employees from other states.
23	Has Enbridge sent Public Awareness brochures (page 8-4, Appendix C) to the residents that live and/or own property that could potentially be affected by an Enbridge pipeline leak and/or accident at Enbridge's Superior Terminal in Douglas County? When did this occur/when is it proposed to occur?	Pipeline operators in the U.S. are required by federal law to carry out a continuing education program for excavators, affected public (people who live and work near pipelines and related facilities), and emergency officials and public officials. The most recent mailing in Douglas County occurred in April 2015. 2016 mailings will occur mid-May through mid-June.

Table 9-2 Summary of EPA Draft EIS Comments and Responses

Comment ID	EPA Comment	Response
24	Where Minnesota's modeling results are inapplicable, WDNR should commission or conduct spill size and site-specific trajectory modeling to estimate the potential size and spread of crude oil in the event of an accidental release, and include this information.	The Minnesota oil spill modeling results are not available to DNR at this time. Chapter 8 of the EIS addresses oil spills and response actions.
25	Explain why a leak from the pipelines would remain near the pipeline trench and discuss whether such a leak could be explosive.	Section 8.3.3.2 of the EIS address leak detection and response actions in the event of a rupture. The distance that spilled oil would travel from the pipeline would depend on factors including spill volume, topography, and season. Crude oil does not spontaneously ignite when released, but rather requires an ignition source. Enbridge would be required to comply with federal, state, and local regulations regarding pipeline safety, leak detection, and spill response.
26	WDNR and Enbridge should consider adding additional shut-off valves where sensitive areas (residences, rivers/streams, wetlands, drinking water wells) are crossed or near the proposed pipeline.	As described in Section 3.1.6, Enbridge's Operation and Risk Management Group conducted an Intelligent Valve Placement (IVP) study for the Sandpiper and Line 3 Replacement Pipeline Projects to identify optimal valve locations in compliance with the requirements of 49 CFR Part 195. The study considered the placement of mainline valves to reduce the potential consequences in the event of a pipeline rupture and crude oil release, and addressed waterbody crossings greater than 100 feet wide, the presence of potential High-Consequence Areas (HCAs) as defined by PHMSA, proximity to densely populated areas, construction limitations, accessibility, operational considerations, and future pipeline expansion potential. As a result of the study, Enbridge proposes to install six mainline valves (three on each pipeline) at the locations provided in Table 3-1 within the construction ROW. Additional valves can be placed at sensitive locations to limit the size of spills that could impact valuable natural resources; however, the State of Wisconsin (through DNR or the Public Service Commission) does not have any authority to require additional valves.

Table 9-3 Summary of GLIFWC Draft EIS Comments and Responses

Comment ID	GLIFWC Comment	Response
1	The Final EIS should acknowledge that the need for oil transported by the Sandpiper line and Line 3 is speculative and that this oil may not be needed nor desired, given the commitments the United States has made on climate change mitigation.	The current U.S. crude oil demand is discussed in Section 2.3.1, which notes that demand has decreased by 2.5 million barrels per day since 2005, but is still currently about 16.4 million barrels per day (bpd). Future demand for crude oil is discussed in Section 2.3.2 and is expected to grow according to the U.S. Energy Information Administration (EIA). If federal climate policy requires, the Applicant and its customers would need to make a business decision on how to adapt to demand changes.
2	There is no information in the DEIS on chemical additives that may be used in the pipeline. Different chemical mixtures are often added to the oil to ease the movement through the pipeline. These chemical may present serious environmental threats if released. The DEIS should include information on chemical additives that may be used in the pipeline.	Bitumen derived from the Western Canada Sedimentary Basin (WCSB) (also referred to as Canadian oil sands) tends to be highly viscous and dense so it is mixed with diluents, such as natural gas liquid (NGL), to become transportable by pipeline, thus becoming a diluted bitumen (a.k.a. dilbit). In addition, it is common for corrosion-inhibiting chemical additives to be injected into the oil in pipelines to minimize the potential for corrosion, and drag-reducing agents are also used to decrease turbulence in pipelines and allow oil to be pumped at lower pressures. In the event of an oil spill, these chemicals would be mixed with the crude oil, which itself is hazardous and would be treated as such. See Section 8.2 of the EIS for further discussion on oil spill prevention and response actions.
3	The DEIS presents two unacceptable choices. Use the old pipeline and risk a spill, versus replace the pipeline and perpetuate climate change emissions. A third alternative should be fully analyzed in the DEIS for Line 3: Decommission Line 3 and determine the amount of climate change mitigation that would be achieved. The amount of carbon mitigation that would be achieved by rejecting the Sandpiper line should be quantified.	The extraction, transportation, refining, and end use of crude oil in the Bakken and WCSB regions may very well occur whether or not the Sandpiper and Line 3 Replacement Pipelines are constructed and operated. Crude oil is currently distributed from these areas through existing pipelines, by rail cars, and by trucks. These proposed alternatives are the equivalent of the No Action alternative (i.e. no new or replacement pipeline), which is discussed in Section 4.4 of the EIS. Section 7.4.2.2 of the EIS provides a discussion on the amount of GHGs that would be emitted from a life-cycle analysis of crude oil use.
4	The DEIS essentially assumes that the increased volumes of oil transported by the upgraded/expanded pipeline will go no farther than Superior. The oil transported by the proposed pipeline will go somewhere, somehow, and to pretend otherwise does a great disservice to the public and the environment. Quantities and characteristics of oil and oil based products that leave Superior for other destinations should be included, along with a description and impact analysis of this secondary transportation.	Other refinery and marketing centers in the Midwest and East Coast would be connected to deliveries of crude oil through the proposed Sandpiper Pipeline and Line 3 Replacement Pipeline Projects via the Enbridge Mainline System and other interconnecting third-party pipelines, as discussed in Section 2.3.4 of the EIS.
5	Line 3 has already contributed to climate change and the oil transported by the Sandpiper line would increase carbon emission into the atmosphere. Given these impacts, the	Projected impacts of climate change specific to Wisconsin have been added to Section 7.4.2.2 of the EIS.

Table 9-3 Summary of GLIFWC Draft EIS Comments and Responses

Comment ID	GLIFWC Comment	Response
	discussion on the predicted changes to Wisconsin's climate is inadequate. The Final EIS must disclose the Wisconsin Initiative on Climate Change Impacts (WICCI) information in greater detail, including maps of predicted temperature, precipitation, and seasonality changes as presented in WICCI's first adaptive report.	
6	Cumulative impacts to the Ceded Territories and threats posed by climate changes are not adequately characterized. Ultimately, the oil that would be transported by the new Sandpiper pipeline and the replacement for the Line 3 pipeline only perpetuate human induced climate change and the ongoing degradation of the Ceded Territories. Climate change is likely to severely impact the ability of tribes to continue harvesting many culturally important resources within boundaries that are fixed by treaty. Tribal leaders and GLIFWC staff are concerned about any proposals that would expand or increase the amount of fossil fuel available for burning. Climate change concerns are especially serious for tribes. Because of their reliance on natural resources to meet spiritual, cultural, medicinal, subsistence, and economic needs, they are disproportionately affected by climate change impacts.	Section 7.4.2.2 has been revised to include additional potential impacts to Ceded Territory and tribal treaty resources from climate change.
7	Page 7-13 of the DEIS states that the oil transported by the Sandpiper and Line 3 replacement pipelines would account for 2.77% of the carbon emitted by the United States. This is a significant amount in light of the large percentage of global emissions that the U.S. generates and the international agreements the United States has made to curb the effects of climate change. The Draft EIS minimizes this concern by stating that the oil would still be extracted and transported by other means. That assumption is not justified given the efforts of the United States and Canada to combat climate change.	A cradle-to-grave GHG analysis is presented in Section 7.4.2.2 of the EIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
Appendix A	NA	Appendix A includes the 2013 version of the Agricultural Protection Plan. The current version is April 2015.	Replace with 2015 version (attached)	Appendix A to the Final Environmental Impact Statement (FEIS) has been updated.
Appendix B	NA	Appendix B includes the 2013 version of the Environmental Protection Plan. The current version is September 2015.	Replace with 2015 version (attached)	Appendix B to the FEIS has been updated.
Appendix D	NA	Appendix D includes the 2013 version of the Unanticipated Discoveries Plan. The current version is April 2015	Replace with 2015 version (attached)	Appendix D to the FEIS has been updated.
Global	The document refers to the Sandpiper Pipeline and Line 3 Replacement Projects collectively as "the Project."	This is not an accurate representation because they are two distinct projects, with different purpose and need, each requiring its own permits, and should be referenced as such. Enbridge did not comment every instance of the use of "Project" that should be "Projects;" therefore, the DNR will need to identify all instances and correct accordingly for the Final EIS.	Replace "the Project" with "the Projects" throughout the document when discussing them collectively verses individually. Individual project references should include the official project name for clarity.	The requested revision was made to the FEIS.
Executive Summary, ES-1	Enbridge (U.S.) Inc. owns and operates a pipeline system that transports crude oil to supply refineries in North America. The North Dakota Pipeline Company LLC (NDPC), a joint venture between Enbridge Energy Partners, L.P. and the Williston	The Enbridge entities listed in this paragraph as the applicants are not correct per the application materials originally submitted February 24, 2014.	Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership own~~s~~ and operate~~s~~ a pipeline system that transports crude oil to supply refineries in North America. ~~The North Dakota Pipeline Company LLC (NDPC), a joint venture between Enbridge Energy Partners, L.P. and the Williston Basin Pipeline LLC,~~ ~~In Wisconsin,~~ Enbridge (U.S.)	The requested revision was made to the FEIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	Basin Pipeline LLC, is proposing to construct and operate the Sandpiper Pipeline, a new 30-inch-diameter crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota. Additionally, Enbridge (U.S.) Inc. is proposing to build a 36-inch-diameter Line 3 Replacement Pipeline to supplant its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. For convenience, the NDPC and Enbridge (U.S.) Inc. are collectively referred to as "Enbridge" or the "Applicant" in this Draft Environmental Impact Statement (EIS), and the pipelines are collectively referred to as the "Project."		Inc. is proposing to construct and operate the Sandpiper Pipeline, a new 30-inch-diameter crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota. Additionally, ~~Enbridge (U.S.) Inc.~~ Enbridge Energy, Limited Partnership is proposing to build a 36-inch-diameter Line 3 Replacement Pipeline to supplant its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. For convenience, ~~the NDPC~~ Enbridge Energy, Limited Partnership and Enbridge (U.S.) Inc. are collectively referred to as "Enbridge" or the "Applicant" in this Draft Environmental Impact Statement (EIS), and the pipelines are collectively referred to as the "Projects."	
Executive Summary, Table ES-1	Transportation of crude oil by truck: "The volume of oil that would otherwise be transported by the proposed pipelines would require approximately 1,875 tanker trucks for the proposed Sandpiper Pipeline and 3,800 tanker trucks for the Line 3 Replacement Pipeline."	The number of tanker trucks for Sandpiper is incorrect per the application materials submitted in July 2015. Furthermore, Enbridge's alternative analysis for Line 3 concluded that it is not a relevant or feasible alternative, since Enbridge will replace Line 3 tie it into the existing infrastructure.	The volume of oil that would otherwise be transported by the proposed Sandpiper Pipeline Project ~~pipelines~~ would require approximately ~~1,875~~ 4,354 tanker trucks ~~for the proposed Sandpiper Pipeline and 3,800 tanker trucks for the Line 3 Replacement Pipeline~~. Since Enbridge will replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a relevant or feasible alternative to the Line 3 Replacement Project.	The proposed final sentence has been added to the text in the FEIS. The number of tanker trucks was not altered because the Applicant's reasoning for using 86 barrels per tanker (bbl/tanker) truck, rather than 200 bbl used in the Draft EIS, was not provided.
Executive Summary, Table ES-1	Transportation of crude oil by rail car: "To move the same volume of crude oil that would be transported by the Project would require approximately 1,614 rail cars, or	The number of rail cars is incorrect per the application materials submitted in July 2015. Furthermore, it is not clear for which project the	To move the same volume of crude oil that would be transported by the Sandpiper Pipeline Project would require approximately ~~1,614~~ 2,052 rail cars, or approximately ~~14~~ 17 complete unit trains* per day. Since	The proposed final sentence has been added to the text in the FEIS. The number of rail cars was not

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	approximately 14 complete unit trains* per day."	statement refers.	Enbridge will replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a relevant or feasible alternative to the Line 3 Replacement Project.	altered because the Applicant's reasoning for this recalculation was not provided.
Executive Summary, 4.1	"...and Route Variation C1 is proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course (Figure ES-2)."	Route Variation C2 avoids impacts to the City of Superior stormwater ponds and the Nemadji Golf Course.	"...and Route Variation ~~C1~~ C2 is proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course (Figure ES-2)."	The requested revision was made to the FEIS based on updated information.
Executive Summary, Figure ES-2	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The February 2014 figure was used which illustrates old versions of the centerlines.	The C1 and C2 identifications are incorrect. In addition, it depicts previous iterations of the pipeline routes.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. In addition, the current proposed routes should be depicted. Use the centerline shapefile data provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
Executive Summary, Table ES-2	NA	The calculations represented appear to be from the co-construct scenario in updated Environmental Impact Report tables submitted December 14, 2015; however, this is not clear to the reader. In the December 14, 2015 submittal where Enbridge utilized miles as unit of measure it represents the pipeline centerline; therefore, under the co-construct scenario the information is the sum of the Sandpiper and Line 3 Replacement pipelines. Therefore, the total number of features on the landscape such as roads or railroads does not change but the total number of individual times a pipeline will cross it does. Furthermore, it is not clear to	Utilize a format similar to the tables provided on December 14, 2015 to make clear the distinction between the two projects, where the data assumes the a co-construct scenario, and the units of measure for each data point presented. Alternatively, insert footnotes to explain the data more clearly.	The requested footnote was added to Table ES-2.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		the reader the units of measure for each of the data points represented.		
Executive Summary, Table ES-2	NA	The calculations for Pipeline Segment Length, Co-located with Enbridge Existing Right-of-Way, and Greenfield Route for Route C variations are incorrect based on the inaccurate depiction of C1 and C2.	The calculations represented currently for Pipeline Segment Length, Co-located with Enbridge Existing Right-of-Way, and Greenfield Route for the Route C variations should be switched.	DNR received clarification from Enbridge after receipt of these comments that the route variation identified as C1 in the July 2014 Environmental Impact Report (EIR) is not Enbridge's preferred route due to the presence of wetland mitigation conservation easements on portions of the route around the golf course that would prohibit pipeline installation. Enbridge has switched the naming of the routes presented in the 2014 EIR so that C1 now represents the route through the Nemadji Golf Course. These changes are reflected in the FEIS.
Executive Summary, Table ES-2	Agricultural Resources: "A1 would impact 20.3 more acres of Farmland of Statewide Importance than A2"… and so on for the other two alternatives.	Farmlands of Statewide Importance are a soils category, not an agricultural land use. Agricultural resources impact information should match the agricultural section of the land use impact tables.	"No agricultural resources exist along A1 and A2." "No agricultural resources exist along B1 and B2." "No agricultural resources exist along C1 and C2."	Comparisons of farmlands of statewide importance have been moved from Section 5.3, Agricultural Resources, to Section 5.16, Soils and Topography, and

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
				replaced with requested language.
Executive Summary, Table ES-2	Public Utilities, Route C Variations: "Both C1 and C2 would cross 2 roads and no railroads."	The data for road and railroad crossings is switched. Refer to the updated Environmental Impact Tables (3.1.6-3) submitted December 14, 2015.	Both C1 and C2 would cross ~~2~~ no roads and ~~no~~ 2 railroads.	The requested revision was made to the FEIS.
Executive Summary, Table ES-2	Recreation Areas, Route C Variations: "C1 would not cross the Nemadji Golf Course, which would avoid disrupting golf course operations whereas C2 would cross the Nemadji Golf Course…"	Route Variation C2 avoids impacts to the Nemadji Golf Course.	~~C1~~ C2 would not cross the Nemadji Golf Course, which would avoid disrupting golf course operations whereas ~~C2~~ C1 would cross the Nemadji Golf Course…	The requested revision was made to the FEIS based on updated information.
Executive Summary, Table ES-2	Vegetation (Plants), Route A Variations: "One more state-listed species of special concern occurs within 1 mile of the ROW for A1 than A2."	Per the December 14, 2015 submittal, there is one fewer species of special concern within 1 mile of A1. Also, special concern species are not officially "listed" species.	One more state~~-listed~~ species of special concern occurs within 1 mile of the ROW for ~~A1~~ A2 than ~~A2~~ A1.	The requested revision was made to the FEIS.
Executive Summary, Table ES-2	Water Resources, Route A Variations: "A1 would cross 14 more waterbodies than A2 (A2 would only impact 2 waterbody crossings)."	There are 2 waterbodies impacted by A2, but 4 crossings if considering construction of both pipelines.	A1 would have ~~cross~~ 14 more ~~waterbodies~~ waterbody crossings than A2 (A2 would only impact 2 ~~waterbody crossings~~ waterbodies).	The requested revision was made to the FEIS.
Executive Summary, Table ES-2	Water Resources, Route C Variations: "C1 would cross 5 fewer waterbodies than C2."	There are 5 fewer waterbody crossings, not waterbodies crossed, if considering construction of both pipelines.	C1 would have ~~cross~~ 5 fewer ~~waterbodies~~ waterbody crossings than C2.	The requested revision was made to the FEIS.
Executive Summary, Table ES-2	Wetlands, Route C Variations: "C1 would impact 5.8 fewer acres of wetland during construction and 5.8 fewer acres during operations than C2."	Per the December 14, 2015 submittal, C1 would impact 4.8 fewer acres of wetlands during construction and 5.7 during operations.	C1 would impact ~~5.8~~ 4.8 fewer acres of wetland during construction and ~~5.8~~ 5.7 fewer acres during operations than C2.	The requested revision was made to the FEIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
Executive Summary, Table ES-2	The Wetlands section of the table discusses construction and operations impacts.	It's unclear to the reader what defines the limits of construction and operations impacts.	Suggest including a footnote such as the following: Construction: Area of wetland impact within the construction workspace based typically on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas. Operations: Permanent conversion impacts include PFO wetland impacts within the construction workspace, and the area where PSS wetlands occur within the new permanently maintained easement.	The requested revision was made to the FEIS.
Executive Summary, 4.2	"Under the No Build Alternative, the DNR would deny the permit application(s) and the Sandpiper Pipeline and Line 3 Replacement Pipeline Project would not be constructed in Wisconsin."	Singular use of "Project" verses "Projects". They are distinct projects and should be referenced as such.	Under the No Build Alternative, the DNR would deny the permit application(s) and the Sandpiper Pipeline and Line 3 Replacement Pipeline Projects would not be constructed in Wisconsin.	The requested revision was made to the FEIS.
Executive Summary, 4.4	"Since 2010, Enbridge has conducted 46 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles)."	Enbridge provided an updated statistic in its July 15, 2015 submittal.	Since 2010, Enbridge has conducted ~~46~~ 50 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles).	Section 4.4 of the FEIS was revised with this updated information.
Executive Summary, 5	"Construction would begin with preparation of a 110-foot construction ROW. Construction activities would occur over a period of approximately 14 months, and would require 400 to 500 workers…"	Clarify in this section that the construction footprint would be 90 feet for each project. Also, the construction sequence and timing of the two projects is misleading in the first paragraph. Refer to the July 15, 2015 submittal for updated information.	Construction would begin with preparation of a ~~110-foot construction ROW~~ 90-foot-wide construction right-of-way for the new 30- and 36-inch-diameter pipelines, which will allow for temporary storage of topsoil and spoil as well as accommodate safe operation of construction equipment, for a total of 110-feet wide. For each project, ~~C~~construction activities would occur over a period of approximately 14 months, and would require 400 to 500 workers…	Topsoil and spoil information has been added. The description of 110-foot-right-of-way (ROW) has been maintained as it appears all storage/work areas will result in a ROW of this width.
Executive Summary,	Fish and Wildlife: "If construction occurs in upland sandpiper	The DNR requested all references of wood turtles	If construction occurs in ~~upland sandpiper~~ a state-listed rare bird's breeding habitat~~s~~	The requested revisions were not

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
5	breeding habitats during the breeding period, nests with eggs…" *and* "If wood turtles in the Pokegama River do not disperse due to construction equipment and noise…"	and upland sandpiper be redacted and referenced as a rare reptile and rare bird to "mask" the species.	during the breeding period, nests with eggs… *and* If ~~wood turtles~~ a state-listed rare reptile in the Pokegama River ~~do~~ does not disperse due to construction equipment and noise…	made to the FEIS, but locational data has been removed.
Executive Summary, 5	Forests and Other Woodland Resources: "Clearing of trees within between 72.7 and 89.5 acres of upland forests (depending on route variations chosen) would result in long-term forested landscape alteration given the long period of time needed for the community to mature to preconstruction conditions and maintenance mowing would prevent trees from reestablishing in (between 28.0 and 38.6 acres of) the permanent ROW."	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS; however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts. Also, there are typos in the first line as well as the parenthetical acre reference.	Clearing of trees ~~within~~ between ~~72.7~~ 86.2 and ~~89.5~~ 102.9 acres of upland forests (depending on route variations chosen) would result in long-term forested landscape alteration given the long period of time needed for the community to mature to preconstruction conditions and maintenance mowing would prevent trees from reestablishing in (between ~~28.0~~ 31.7 and ~~38.6~~ 42.3 acres ~~of~~) the permanent ROW.	Revisions have been made to reflect correct acres of impact from construction and operations.
Executive Summary, 9	"The Applicant has coordinated with several agencies in regard to the proposed Project. Enbridge has applied for a Section 404 Clean Water Act permit from the USACE for the discharge of dredge or fill material into waters of the United States, including in wetlands. The Applicant has also coordinated with the Midwest Region Ecological Services Field Office (Region 3) and the Green Bay Field Office of the U.S. Fish and Wildlife Service (USFWS) to address Project concerns related to: • Section 7 of the Endangered Species Act;	Enbridge applied for separate Section 404 Clean Water Act permits with the St. Paul District of the USACE for the Sandpiper and Segment 18 - Line 3 Replacement Projects where this text implies only one permit.	Enbridge has applied for ~~a~~ Section 404 Clean Water Act permits from the USACE for the discharge of dredge or fill material into waters of the United States, including in wetlands, for each project.	The requested revision was made to the FEIS.

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	• Migratory Bird Treaty Act; and • Bald and Golden Eagle Protection Act."			
1.1	Enbridge (U.S.) Inc. owns and operates a pipeline system that transports crude oil to supply refineries in North America. The North Dakota Pipeline Company LLC (NDPC), a joint venture between Enbridge Energy Partners, L.P. and the Williston Basin Pipeline LLC, is proposing to construct and operate the Sandpiper Pipeline, a new crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota. Enbridge Energy Partners, L.P. would be the constructing and operating partner for the proposed Sandpiper Pipeline. Additionally, Enbridge (U.S.) Inc. is proposing to build the new Line 3 Replacement Pipeline that would replace its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. Sections of both pipelines would be constructed and operated in Wisconsin, and both pipelines would terminate at an existing Enbridge terminal in Superior, Wisconsin. The route of these two pipelines through Wisconsin would generally follow an existing developed pipeline corridor operated and maintained by Enbridge (U.S.) Inc. The potential environmental	The Enbridge entities listed in this paragraph as the applicants are not correct per the application materials originally submitted February 24, 2014. Furthermore, the pipelines should be referred to collectively as "Projects" verses the singular.	Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership own~~s~~ and operate~~s~~ a pipeline system that transports crude oil to supply refineries in North America. ~~The North Dakota Pipeline Company LLC (NDPC), a joint venture between Enbridge Energy Partners, L.P. and the Williston Basin Pipeline LLC,~~ Enbridge (U.S.) Inc. is proposing to construct and operate the Sandpiper Pipeline, a new crude oil pipeline to transport domestic crude oil from the Williston Basin in Montana and North Dakota. ~~Enbridge Energy Partners, L.P. would be the constructing and operating partner for the proposed Sandpiper Pipeline.~~ Additionally,~~ Enbridge (U.S.) Inc.~~ Enbridge Energy, Limited Partnership is proposing to build the new Line 3 Replacement Pipeline that would replace its existing Line 3 Pipeline, which imports crude oil from Alberta, Canada, into the United States. Sections of both pipelines would be constructed and operated in Wisconsin, and both pipelines would terminate at an existing Enbridge terminal in Superior, Wisconsin. The route of these two pipelines through Wisconsin would generally follow an existing developed pipeline corridor operated and maintained by Enbridge (U.S.) Inc. The potential environmental impacts associated with the construction, operation, and decommissioning of both new pipelines, as well as the impacts associated with the decommissioning in place of the existing Line 3 Pipeline, are assessed in this Draft EIS. For convenience, ~~the NDPC~~ Enbridge	The requested revision was made to the FEIS.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	impacts associated with the construction, operation, and decommissioning of both new pipelines, as well as the impacts associated with the decommissioning in place of the existing Line 3 Pipeline, are assessed in this Draft EIS. For convenience, the NDPC and Enbridge (U.S.) Inc. are collectively referred to as "Enbridge" or the "Applicant" in this Draft EIS and the pipelines are collectively referred to as the "Project."		Energy, Limited Partnership and Enbridge (U.S.) Inc. are collectively referred to as "Enbridge" or the "Applicant" in this Draft EIS and the pipelines are collectively referred to as the "Projects."	
1.2.3	"The Sandpiper Pipeline Project is privately funded and is expected to cost approximately $2.6 billion for the entire 616 miles of construction, 14 miles of which would be in Wisconsin. The Line 3 Replacement Project is privately funded and is expected to cost approximately $2.6 billion for the approximately 364 miles in the United States, 14 miles of which would be in Wisconsin."	Do we want to update the costs?		No edits were made to FEIS as Applicant response to data requests presented these cost estimates and there are no suggested revisions.
Figure 1-2	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
1.3.1.1	"Enbridge applied for a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE) St. Paul District in February 2014 for construction of the pipelines	Enbridge applied for separate Section 404 Clean Water Act permits with the St. Paul District of the USACE for the Sandpiper (February 2014)	Enbridge applied for a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE) St. Paul District in February 2014 for construction of the ~~pipelines~~ Sandpiper Pipeline and May 2015	Section 1.3.1.1 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	including temporary bridges, grading, and utility crossings."	and Segment 18 - Line 3 Replacement (May 2015) Projects in Wisconsin where this text implies only one permit.	for construction of the Line 3 Replacement pipeline in Wisconsin including temporary bridges, grading, and utility crossings.	
1.3.3.1	"The North Dakota Public Service Commission is responsible for siting pipelines in North Dakota. A siting permit was submitted for the Sandpiper Pipeline Project in June 2014, and a siting permit was submitted for the Line 3 Replacement Pipeline Project in May 2014."	This information is not relevant to approvals in Wisconsin and should be removed from the final EIS.	Strike entire section	No revisions were made in order to retain important informational text.
1.3.3.2	"The Minnesota Public Utilities Commission (MPUC) is responsible for granting a Certificate of Need and Route Permit for the pipelines to be constructed and operated in Minnesota. The MPUC has accepted Enbridge's applications for these permits and commenced its regulatory review processes for both pipelines. It authorized the Minnesota Department of Commerce, Energy Environmental Review and Analysis division to commence environmental reviews for both pipelines."	This information is not relevant to approvals in Wisconsin and should be removed from the final EIS.	Strike entire section	No revisions were made in order to retain important informational text.
Table 1-1	NA	This table does not distinguish between the two projects thereby acknowledging that Enbridge is, in most instances, seeking separate authorizations as detailed in Tables 1.4.8-1 and 1.4.8-2 of the Environmental Impact Report	Include separate tables for each project verses one (see attached updated versions).	Revisions were made in the FEIS to specify project-specific authorizations.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		submitted in July 2015.		
Table 1-1, Stormwater Permits	"Enbridge submitted an application to DNR in December 2014 for a Wisconsin Pollutant Discharge Elimination System (WPDES) Individual Construction Stormwater Permit – Pipeline, pursuant to ch. NR 216, Wis. adm. code. This permit is currently pending decision. In August 2015, Enbridge submitted a Hydrostatic Test Discharge Permit pursuant to ch. NR 283, Wis. adm. code, Plastics Molding and Forming, which is also under review by the DNR."	The permits referenced are not part of the Sandpiper or Segment 18 - Line 3 Replacement projects. It is unclear where this information came from.	Strike entire section	Revisions were made in the FEIS to reflect accurate permit information.
Table 1-1, Stormwater Permits	"As of November 2015, Enbridge has not yet submitted a Construction Site Erosion Control permit application with the DNR pursuant to s. NR 216.46 Wis. adm. code, which would document reduced sediment transport by stormwater through use of best management practices (BMPs) during construction."	Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Segment 18 - Line 3 Replacement Project and received Notice of Coverage in December 2015. Enbridge has not submitted a Notice of Intent for the Sandpiper Project.	~~As of November 2015,~~ Enbridge has not yet submitted a Construction Site Erosion Control permit application with the DNR pursuant to s. NR 216.46 Wis. adm. code, which would document reduced sediment transport by stormwater through use of best management practices (BMPs) during construction for the Sandpiper Project. Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Segment 18 - Line 3 Replacement Project and received Notice of Coverage in December 2015.	Table 1-1 of the FEIS was revised with this updated information.
Table 1-1, Air Permits	"Enbridge will be submitting an Air Pollution Control Construction Permit application under ss. NR 400-499, Wis. adm. code) in fulfillment of both of these requirements."	Enbridge submitted an application in July 2015.	Enbridge ~~will be submitting~~ submitted an Air Pollution Control Construction Permit application under ss. NR 400-499, Wis. adm. code) in July 2015 in fulfillment of both of these requirements.	Table 1-1 of the FEIS was revised with this updated information.
Table 1-1, Broad Incidental Take	"Wisconsin DNR may allow for potential incidental taking of state endangered resources under a Broad Incidental Take	Enbridge has applied for an individual Incidental Take Permit for the wood turtle as well as rare plants and will	~~Wisconsin DNR may allow for potential incidental taking of state endangered resources under a Broad Incidental Take Permit/Authorization. In general, a Broad~~	Table 1-1 of the FEIS was revised with this updated information.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
Permit/Authorization	Permit/Authorization. In general, a Broad Incidental Take Permit/Authorization for common activities, such as pipeline maintenance impact on the slender grass lizard, can be permitted assuming specific protocol is followed to minimize impact. Enbridge has been coordinating with staff in the DNR's Bureau of Natural Heritage Conservation regarding the proposed Project since 2013."	not utilize the BITP.	~~Incidental Take Permit/Authorization for common activities, such as pipeline maintenance impact on the slender grass lizard, can be permitted assuming specific protocol is followed to minimize impact.~~ Enbridge has been coordinating with staff in the DNR's Bureau of Natural Heritage Conservation regarding the proposed Project since 2013. Enbridge officially applied for individual Incidental Take Permits in October 2015.	
Table 1-1, Public Service Commission of Wisconsin	NA	In February 2016, Enbridge withdrew its application to the PSCW based on easement acquisition.	Add a sentence at the end of the paragraph to reflect the withdrawal of the application.	Revisions were made in the FEIS to reflect accurate permit information
1.3.4	"In addition to the state permits, an erosion control/grading permit is required from the City of Superior before any land disturbing activity occurs in the city. This permit is one component of the Construction Site Pollutant Control, with the other being an Erosion Control Plan using best management practices (BMPs). Enbridge submitted an erosion control/grading permit to the city in December 2014, and the permit is currently pending approval."	Enbridge submitted the application in January 2016 for mainline construction activities associated with the Segment 18 - Line 3 Replacement Project and is currently pending approval. Enbridge has not submitted the application for the Sandpiper Pipeline Project. Furthermore, the City of Superior also requires a Post-Construction Stormwater Permit for each project. Enbridge submitted the application in January 2016 for mainline construction activities associated with the Segment	Enbridge submitted an erosion control/grading permit to the city in ~~December 2014~~ for the mainline construction activities associated with Line 3 Replacement Project in January 2016, and the permit is currently pending approval. Enbridge will submit application associated with the Sandpiper Pipeline mainline construction activities at a later date. The City of Superior also requires a Post-Construction Stormwater Permit for the Projects. Enbridge submitted the application in January 2016 for mainline construction activities associated with the Segment 18 - Line 3 Replacement Project and received approval in February 2016. Enbridge has not submitted the application for the Sandpiper Pipeline Project.	Section 1.3.4 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		18 - Line 3 Replacement Project and received approval in February 2016. Enbridge has not submitted the application for the Sandpiper Pipeline Project.		
1.4.1	NA	Section 1.4.1 lists the key issues identified in the public scoping process that the EIS should address. However, other than a generic statement that "All issues raised during scoping were considered in the development of this EIS," the DNR does not identify where each issue is addressed in the Draft EIS. To ensure that the record clearly reflects that the DNR considered each issue raised in the public scoping process, Enbridge requests that this section include where each issue is addressed or discussed in the final EIS.	See comments.	No revisions were made. DNR followed the scoping process as described in ch. NR 150.30 (f) 2, Wis. adm. code. The FEIS will include responses to any issues that were not addressed in the DEIS. DNR received no comments indicating that any suggested scoping topics were not addressed in the DEIS.
1.4.2	NA	The link provided for footnote 2 is broken. Also, update to include or replace with July 2015 filing information.	See comments.	The correct links for the 2014 and 2015 EIRs have been added to the footnote.
1.4.2	NA	The Final EIS should clearly state that the environmental resources analyzed in the Final EIS are limited to Wisconsin's environmental resources that may be impacted by the Wisconsin portion of each project. In its	Insert the following text after the bullet list: The scope of the Final EIS and therefore analysis of environmental resources is limited to the impacts of the Wisconsin segments of the projects under review. Specifically, the Final EIS analyzes the potential environmental resource impacts of the proposed projects from the	No revisions were made. The FEIS is comprehensive, ensuring that decision makers and the public have complete information to fully consider the short- and

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		current form, section 1.4.2 in the Draft EIS appears to define the scope of the environmental resources analyzed based on the information provided by Enbridge, which includes background information Enbridge submitted to DNR to provide DNR with context regarding the Larger Projects. It is outside of DNR's jurisdiction and the appropriate scope of the Final EIS to analyze environmental affects for the entire scope of the Larger Projects. The suggested language clarifies that the scope of the Final EIS is limited to impacts to Wisconsin's environmental resources for the Wisconsin segments of each project	Wisconsin/Minnesota border to the Superior Terminal. The scope of the Final EIS is limited to the Wisconsin segments of each project because DNR has jurisdiction to issue permits for only the Wisconsin segment of each project. Appropriate governmental permitting authorities in Canada, Minnesota, and North Dakota are separately conducting environmental reviews of the portion of each proposed project within their jurisdiction. Enbridge supplied information regarding the Larger Projects in its submittals to DNR to provide context and background for the environmental analysis of the permits requested from DNR for the Wisconsin segments of each project. However, the detailed environmental impacts as well as alternatives analysis outside of the Wisconsin segment of each project are not subject to analysis in this Final EIS.	long-term impacts associated with the proposed Projects and their alternatives. Section 1.4.2 does not imply that detailed environmental impacts and alternatives outside of the Wisconsin DNR's jurisdiction are subject to analysis in the FEIS.
2.2	NA	The analysis in the Draft EIS fails to describe the importance of pipelines in transporting crude to the Midwest. From a context perspective, the Final EIS should first describe the importance of moving crude oil via pipeline to provide context. Refer to the Environmental Impact Report submitted July 2015 (§ 2.1, pg. 28)	Insert the following text before the first paragraph: The transportation of crude oil to regional refineries by pipeline is an essential component of the supply chain that delivers refined petroleum products to Midwestern consumers. Pipelines deliver almost all of the crude oil processed by Midwestern refineries.	Text indicating the integral nature of crude oil transport via pipeline was added to the FEIS.
2.3.1	NA	The Draft EIS does not	Insert the following text before the first	No revisions were

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		clearly translate the increase in recoverable oil to the clear benefits this creates for U.S. national security and consumers. This is an important benefit to consider when describing the need for the proposed projects, which is transportation of the recoverable oil in the Bakken region. Refer to the Environmental Impact Report submitted July 2015 (§ 2.1, pg. 28)	paragraph: The increase in technically and economically recoverable oil has fueled an unconventional oil and natural gas boom that has lowered United States' energy security risks by increasing supply security, reducing net imports, and putting downward pressure on energy costs and expenditures.	made. Certainly there are near-term benefits; however, there are long-term risks inherent in depleting North American petroleum reserves at a faster pace.
		The Draft EIS implies that overall there is a decrease in demand for crude oil without mentioning that there is still a deficient of refinery capacity in the Midwest. For the Midwest to be self-supporting, it would require additional refinery capacity and increased transportation of crude. Refer to the Environmental Impact Report submitted July 2015 (§ 2.1, pg. 30)	Add the following text at the end of the third full paragraph on page 2-4: However, according to the U.S. Energy Information Administration, the petroleum-using public in the Midwest consumed over 4.46 million bpd of refined petroleum products in 2013, which includes gasoline, diesel, jet fuel, asphalt, heating fuel, and petrochemical products. The total refining capacity of the Midwest was 3.7686 million bpd, which represents a shortfall of approximately 690,000 bpd.	Comment noted. A new section on crude oil transportation demand has been added to the Final EIS (see Section 2.3.4).
2.3.4 (new)	NA	Chapter 2 describes generally the current and future supply and demand for U.S. and Canadian crude. However, the purpose of the projects and the need the projects are serving is to supply transportation of crude oil from the Bakken region and Canada to	Add the following text as a new section after section 2.3.3 and before section 2.4: The proposed pipeline projects will serve a current demand for safe, cost effective transportation of crude oil from major production areas to markets for petroleum-based products. The proposed Line 3 replacement project will enable Enbridge to better meet the petroleum supply needs of PADD 2, Eastern Canada, and the Gulf	Section 2.3.4 was added to the FEIS to include how the proposed Projects would meet crude oil transportation demand.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		Midwestern and eventually East Coast markets. While the current and future supply and demand for U.S. and Canadian crude oil affects the demand for transportation of crude oil, these are not directly equivalent. The EIS should include a section specifically focusing on the need for transportation of crude oil. Additionally, when assessing the need for transportation of crude oil, the EIS should recognize that the Line 3 replacement project will serve demand that would have otherwise been served by the existing Line 3.	Coast by allowing Enbridge to more reliably and more efficiently transport an economic and secure supply of crude oil. [EIR, § 2.1, pg. 28] The proposed Line 3 replacement project will transport crude oil that would otherwise be transported through the existing pipeline in a more secure, reliable manner. The Line 3 replacement project will address Line 3's existing integrity risks by replacing the pipeline containing a large number of integrity anomalies with a new pipeline constructed with the latest technology and materials. Enbridge gathered extensive integrity data on Line 3 throughout its years of operation. The integrity data shows a high number of integrity anomalies – specifically, corrosion and long seam cracking. Line 3 has also experienced a number of failures during its more than 50-year history. As a result, Line 3 requires a high level of integrity monitoring and an extensive ongoing integrity dig and repair program to maintain safe operation of the line. The Line 3 replacement will avoid the large number of integrity digs currently forecasted to be executed on Line 3 over the next 15 years, as well as the related impacts to landowners and the environment. [EIR, § 2.3, pg. 31] A lack of pipeline capacity out of North Dakota has led to a large volume of crude oil shipments by rail which has led to an overburdened rail system and associated safety risks. [EIR, § 2.2, pg. 31] Adequate pipeline transportation infrastructure to move the oil to market is necessary in order to continue to realize the benefits of the unconventional oil boom in the United States. The Sandpiper project meets this national objective as it links the prolific	

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
			producing regions of the Bakken and Three Forks formations to premium refineries and major marketing centers that may otherwise have to rely on unstable sources of crude oil supplies to meet their feedstock requirements. The Sandpiper project will support the shift from non-North American crude oil by providing critical access that links rapidly increasing production in the Williston Basin to Wisconsin and Minnesota refineries. Other refinery and marketing centers in the Midwest and East Coast will also be connected to the Bakken supplies via the Enbridge Mainline System and other interconnecting third-party pipelines. [EIR, § 2.1, pg. 29]	
3.1	NA	The title of this section is "Applicant's Proposed Project." Enbridge is proposing two distinct projects; therefore, it is misleading to utilize "Project"	Update section title and include separate subjections to describe each project.	The requested revision was made to the FEIS.
3.1	"The replacement has already occurred between Hardisty and the U.S. border. The replacements within Minnesota and Wisconsin have not occurred and are under environmental and permitting review in both states."	This statement is incorrect; only two segments of replacement are complete in Canada.	~~The replacement has already occurred between Hardisty and the U.S. border.~~ In Canada, Enbridge already replaced two sections: (1) a 1.7-mile segment form Gretna, Manitoba to the Canadian/U.S. border; and (2) a 12.5-mile segment downstream of Cromer, Manitoba. The replacements within North Dakota, Minnesota, and Wisconsin have not occurred and are under environmental and permitting review ~~in both states~~.	Section 3.1.3 of the FEIS was revised with this updated information.
3.1.3	"In addition to new 30- and 36-inch-diameter underground crude oil pipelines from the Minnesota/Wisconsin border to Enbridge's terminal in Superior,	This implies only one project where there will be components for each within the Superior Terminal and they are not identical.	Strike text and replace with: In addition, within the fenced property of Enbridge's existing Superior Terminal, each Project requires pressure relief, isolation valves, and a receiving trap. The Line 3 Replacement	Revisions were made to reflect Project-specific information.

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	Wisconsin, the following associated facilities would be constructed within the fenced Superior Terminal: • A densitometer/viscometer for batch detection • A sampling system with a static mixer • Holding pressure control valves • Emergency backup power generation with auto transfer switch • Electrical building • Line and manifold tie-ins • Connectivity piping replacement for manifolds and tanks"		Project will include densitometer/viscometer for batch detection, a sampling system with a static mixer, holding pressure control valves, emergency backup power generation with auto transfer switch, electrical building, line and manifold tie-ins, connectivity piping replacement for manifolds and tanks within the fenced property of the Superior Terminal. The Sandpiper Project requires installation of custody transfer metering, a meter prover, pressure control valves, and a sampling facility.	
Figure 3-1	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
Figure 3-5	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it.	The C1 and C2 identifications are incorrect.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around.	The requested revision was made to the FEIS based on updated information.
Table 3-1	NA	Use one Project's mileposts consistently throughout the document. For example, Sandpiper MPs are used in the discussion of the proposed project route and on figures, but Table 3-1 uses Line 3 MPs. Also, use consistent and current version of MPs.	See comments.	Mileposts have been updated throughout the FEIS.
Table 3-3	NA	An updated access road	See comments.	The requested revision

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		table was provided as PD-11 data request in Dec 2015.		was made to the FEIS.
3.1.7	"One pipe storage yard has been identified near South Range, Wisconsin, and additional pipe storage yards and contractor yards may be identified as Project planning and engineering progresses."	Enbridge is no longer planning to utilize a pipe storage yard in Wisconsin. Refer to the Environmental Impact Report dated July 2015.	~~One pipe storage yard has been identified near South Range, Wisconsin, and additional pipe storage yards and contractor yards may be identified as Project planning and engineering progresses.~~ Enbridge currently does not intend to utilize pipeyards or contractor yards in Wisconsin. Enbridge may identify additional pipeyards and contractor yards as the Projects planning and engineering progresses.	The requested revision was made to the FEIS.
3.2.4	"The Project depth of cover would vary from 36 to 60 inches, depending on permit requirements, landowner agreements, and site-specific conditions (e.g., depth of drain tile)."	The maximum depth of cover proposed in Wisconsin for either pipeline is 48 inches.	The Projects depths of cover would vary from 36 to ~~60~~ 48 inches, depending on permit requirements, landowner agreements, and site-specific conditions (e.g., depth of drain tile).	The requested revision was made to the FEIS.
Table 3-4	NA	The depths of cover presented do not align with the Environmental Impact Report filed in July 2015.	Replace Table 3-4 with Table 4.3.4-1 from the Environmental Impact Report filed in July 2015.	The requested revision was made to the FEIS.
3.2.12	"Specialized seed mixes have also been developed for residential areas, pasture land, wildlife areas, native vegetation areas, and roadway ROWs. These seed mixes would be available to landowners by request"	Tables 24, 25, and 26 in Appendix C of the Environmental Protection Plan (dated September 2015) include the only three mixes proposed for Wisconsin.	~~Specialized seed mixes have also been developed for residential areas, pasture land, wildlife areas, native vegetation areas, and roadway ROWs. These seed mixes would be available to landowners by request~~	The requested revision was made to the FEIS.
3.2.13	"Consistent with the requirements of state regulation (ch. NR 216 of Wis. Stat.), Enbridge intends to request an authorization from DNR to discharge construction stormwater and will submit its Notice of Intent to discharge stormwater to the DNR for review	Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Segment 18 - Line 3 Replacement Project and received Notice of Coverage in December 2015. Enbridge has not submitted a Notice of	Consistent with the requirements of state regulation (ch. NR 216 of Wis. Stat.), Enbridge intends to request an authorization from DNR to discharge construction stormwater and will submit its Notice of Intent to discharge stormwater to the DNR for review and potential approval prior to initiation of construction activities of the	The requested revision was made to the FEIS.

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	and potential approval prior to initiation of construction activities."	Intent for the Sandpiper Project.	Sandpiper Pipeline. Enbridge submitted a Notice of Intent to the DNR in October 2015 for the Line 3 Replacement Project and received Notice of Coverage in December 2015.	
3.2.15	"The two methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Project are…"	Singular use of "Project" verses "Projects". They are distinct projects and should be referenced as such.	The two methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Projects are…	The requested revision was made to the FEIS.
Figure 3-10	NA	This figure is not current. Figure 15 from Appendix A of the Environmental Protection Plan (dated September 2015) includes the current version of this figure.	Replace with Figure 15 from Appendix A of the Environmental Protection Plan (dated September 2015).	The requested revision was made to the FEIS.
Figure 3-11	NA	This figure is not current. Figure 16 from Appendix A of the Environmental Protection Plan (dated September 2015) includes the current version of this figure.	Replace with Figure 16 from Appendix A of the Environmental Protection Plan (dated September 2015).	The requested revision was made to the FEIS.
Figure 3-12	NA	This figure is not current. Figure 17 from Appendix A of the Environmental Protection Plan (dated September 2015) includes the current version of this figure.	Replace with Figure 17 from Appendix A of the Environmental Protection Plan (dated September 2015).	The requested revision was made to the FEIS.
3.2.16	"The utility crossing methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Project…"	Singular use of "Project" verses "Projects". They are distinct projects and should be referenced as such.	The utility crossing methods proposed to be used for the Sandpiper and Line 3 Replacement Pipeline Projects…	The requested revision was made to the FEIS.
3.2.17	"Wetlands without standing water would be seeded with an unsaturated wetland seed mix (listed in 3.2.12) to provide temporary cover (refer to Table 4 in	This references a table in the older version of the Environmental Protection Plan. The correct reference is Tables 25 and 26 in	Wetlands without standing water would be seeded with an unsaturated wetland seed mix (listed in 3.2.12) to provide temporary cover (refer to ~~Table 4~~ Tables 25 and 26 in Appendix C Seed Mixes of Appendix B)	Section 3.2.17 of the FEIS was revised with this updated information.

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	Appendix C Seed Mixes of Appendix B)."	Appendix C of the Environmental Protection Plan.		
3.2.17	"To offset impacts to wetlands from conventional construction techniques, compensatory mitigation has been proposed in accordance with DNR and USACE requirements. Enbridge proposes to offset impacts to wetlands by providing in-place mitigation. The Crawford Creek mitigation site (Hydrologic Unit Code [HUC] 10 – 0401030105; Lower Nemadji River) includes proposed preservation, enhancement, and restoration of wetlands on an approximately 48.4-acre site in the same watershed as the proposed pipeline crossings. The site is located in northern Douglas County, Lake Superior Basin, Lower Nemadji River Watershed (HUC 10), in the NE ¼ of Section 23, Township 48 North, Range 14 West, in the town of Superior on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The proposed mitigation site includes two areas: a 29.4-acre ditched hayfield and an eastern 19.0-acre wooded area adjacent to Crawford Creek. Proposed enhancement and restoration activities include restoring hydrology and wetland characteristics by blocking human-made ditches in the hayfield and preventing channelized flow of	Enbridge withdrew this request in March 2015 and requested to utilize the in-lieu fee program and is not proposing to construct the Crawford Creek mitigation site.	~~To offset impacts to wetlands from conventional construction techniques, compensatory mitigation has been proposed in accordance with DNR and USACE requirements. Enbridge proposes to offset impacts to wetlands by providing in-place mitigation. The Crawford Creek mitigation site (Hydrologic Unit Code [HUC] 10 – 0401030105; Lower Nemadji River) includes proposed preservation, enhancement, and restoration of wetlands on an approximately 48.4-acre site in the same watershed as the proposed pipeline crossings. The site is located in northern Douglas County, Lake Superior Basin, Lower Nemadji River Watershed (HUC 10), in the NE ¼ of Section 23, Township 48 North, Range 14 West, in the town of Superior on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The proposed mitigation site includes two areas: a 29.4-acre ditched hayfield and an eastern 19.0-acre wooded area adjacent to Crawford Creek. Proposed enhancement and restoration activities include restoring hydrology and wetland characteristics by blocking human-made ditches in the hayfield and preventing channelized flow of water through the site into Crawford Creek using 16 ditch plugs covering approximately 11,000 square feet. The existing surrounding vegetation would be used as a guide in developing a planting plan and vegetation design would consider reestablishing impacted habitat types as closely as practicable. The primary goal of the wetland~~	Section 3.2.17 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	water through the site into Crawford Creek using 16 ditch plugs covering approximately 11,000 square feet. The existing surrounding vegetation would be used as a guide in developing a planting plan and vegetation design would consider reestablishing impacted habitat types as closely as practicable. The primary goal of the wetland restoration is the redevelopment of more natural wetland hydrology and development of a diverse assemblage of wetland communities. Enbridge would prepare a compensation site plan that would approved by DNR prior to mitigation site construction, and a letter of compliance would be obtained from the department following construction. In addition, a management plan is required to specify how the site will be used, how the site will be maintained, who will be responsible for the work, and the schedule for these activities. Enbridge would provide annual monitoring reports to the department for at least 5 years following construction (ch. NE 350, Wis. adm. code)."		~~restoration is the redevelopment of more natural wetland hydrology and development of a diverse assemblage of wetland communities. Enbridge would prepare a compensation site plan that would approved by DNR prior to mitigation site construction, and a letter of compliance would be obtained from the department following construction. In addition, a management plan is required to specify how the site will be used, how the site will be maintained, who will be responsible for the work, and the schedule for these activities. Enbridge would provide annual monitoring reports to the department for at least 5 years following construction (ch. NE 350, Wis. adm. code).~~	
3.2.17	"In January 2016, Enbridge also submitted a request to consider compensating for wetland impacts through the Wisconsin Wetland Conservation Trust, an in-lieu fee program…"	Grammatical edit to reflect revision to previous paragraph.	In January 2016, Enbridge ~~also~~ submitted an official request to consider compensating for wetland impacts through the Wisconsin Wetland Conservation Trust, an in-lieu fee program…	Section 3.2.17 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
3.2.21	"Construction activities would occur over a period of approximately 14 months."	This implies only one project where construction may not be concurrent.	Construction activities for each project would occur over a period of approximately 14 months and may not be concurrent.	The requested revision was made to the FEIS.
3.2.22	"An agricultural inspector (AI) would be retained by Enbridge as part of Enbridge's environmental inspection team. The role of the AI would be to ensure that the measures identified in the APP care undertaken during construction of the pipelines. The AI would provide training to construction personnel on the provisions of the APP before the start of construction including field training on specific topics, such as protocols for topsoil stripping, and would observe construction activities on agricultural land on a continual basis. The AI would work collaboratively with the Enbridge EI, ROW agents, and an agricultural monitor (AM) in achieving compliance with the APP, would document instances of noncompliance, and would work with construction personnel to identify and implement appropriate corrective actions as needed. The AI would also have the authority to stop construction activities that are determined to be out of compliance with the provisions of the APP. In addition to the AI, an AM would also inspect construction work on agricultural lands in Wisconsin. The AM would be an independent third-party inspector providing direct reports to the Wisconsin DATCP,	Enbridge did not propose to utilize an Agricultural Inspector or Agricultural Monitor in Wisconsin in the application materials based on the very small amount of active agricultural land present. The Agricultural Protection Plan Enbridge prepared and submitted also applies to construction activities in Minnesota and North Dakota where there higher occurrence of agricultural land. Therefore, this text should be stricken.	~~An agricultural inspector (AI) would be retained by Enbridge as part of Enbridge's environmental inspection team. The role of the AI would be to ensure that the measures identified in the APP care undertaken during construction of the pipelines. The AI would provide training to construction personnel on the provisions of the APP before the start of construction including field training on specific topics, such as protocols for topsoil stripping, and would observe construction activities on agricultural land on a continual basis. The AI would work collaboratively with the Enbridge EI, ROW agents, and an agricultural monitor (AM) in achieving compliance with the APP, would document instances of noncompliance, and would work with construction personnel to identify and implement appropriate corrective actions as needed. The AI would also have the authority to stop construction activities that are determined to be out of compliance with the provisions of the APP.~~ ~~In addition to the AI, an AM would also inspect construction work on agricultural lands in Wisconsin. The AM would be an independent third-party inspector providing direct reports to the Wisconsin DATCP, and would be responsible for auditing Enbridge's compliance with the provisions of the APP. The AM would participate in preconstruction training, monitor construction and restoration activities on agricultural land, report instances of noncompliance to Enbridge's AI, prepare regular compliance reports for submittal to the DATCP, act as a liaison~~	The requested revision was made to the FEIS.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	and would be responsible for auditing Enbridge's compliance with the provisions of the APP. The AM would participate in preconstruction training, monitor construction and restoration activities on agricultural land, report instances of noncompliance to Enbridge's AI, prepare regular compliance reports for submittal to the DATCP, act as a liaison between landowners and DATCP when necessary, and report landowner complaints to Enbridge's AI or ROW representative. "		~~between landowners and DATCP when necessary, and report landowner complaints to Enbridge's AI or ROW representative.~~	
3.2.23	"A description of spill response action is provided in Section 8.4.7."	Section 3.2.23 discusses construction related equipment spills. Section 8.4.7 discusses operational pipeline spills. Therefore, this reference requires clarification.	A description of operational pipeline spill response action is provided in Section 8.4.7.	The requested revision was made to the FEIS.
4	"As detailed in Chapter 3, Enbridge proposes to co-construct two crude oil pipelines in Wisconsin…"	Enbridge is seeking separate permits for the Sandpiper and Line 3 Replacement Projects to facilitate a flexible construction schedule (construction of one pipeline first and the second at another time, or co-construct). Therefore, it is not appropriate to reference that Enbridge is proposing a co-construction scenario.	As detailed in Chapter 3, Enbridge proposes to ~~co-~~construct two crude oil pipelines in Wisconsin…	The requested revision was made to the FEIS.
4	"• Six to eight mainline valves (with three to four on each new pipeline)"	There are currently three mainline valves for each pipeline for a total of six.	• Six ~~to eight~~ mainline valves (with three ~~to four~~ on each new pipeline)	Section 4 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
4	NA	This does not include the ultimate design capacity for the Sandpiper Pipeline. Refer to Table 1.1-1 in the Environmental Impact Report submitted July 2015.	Update to reflect the ultimate design capacity of the Sandpiper Pipeline.	No revision was made. The design capacity of 375,000 barrels per day (bpd) is already noted in Table 4-1.
Figure 4-1	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
4.1.3	"The volume of oil that would otherwise be transported by pipeline (375,000 bpd and 760,000 bpd for the proposed Sandpiper and Line 3 Replacement Pipelines, respectively), would require approximately 1,875 tanker trucks and 3,800 tanker trucks, respectively."	The number of tanker trucks for Sandpiper is incorrect per the application materials submitted in July 2015. Furthermore, Enbridge's alternative analysis for Line 3 concluded that it is not a relevant or feasible alternative, since Enbridge will replace Line 3 tie it into the existing infrastructure.	The volume of oil that would otherwise be transported by pipeline (375,000 bpd ~~and 760,000 bpd~~ for the proposed Sandpiper Pipeline ~~and Line 3 Replacement Pipelines, respectively~~), would require approximately ~~1,875~~ 4,354 tanker trucks ~~and 3,800 tanker trucks, respectively~~. Since Enbridge will replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a relevant or feasible alternative to the Line 3 Replacement Project.	The proposed final sentence was added to the text in the FEIS. The number of tanker trucks was not altered because the Applicant's reasoning for using 86 bbl/tanker truck, rather than the 200 bbl used in the Draft EIS, was not provided.
4.1.4	"The volume of oil that would otherwise be transported by pipeline (375,000 bpd and 760,000 bpd for the proposed Sandpiper and Line 3 Replacement Pipelines, respectively), would require approximately 1,875 tanker trucks and 3,800 tanker trucks, respectively."	The number of tanker trucks for Sandpiper is incorrect per the application materials submitted in July 2015. Furthermore, Enbridge's alternative analysis for Line 3 concluded that it is not a relevant or feasible alternative, since Enbridge will replace Line 3 tie it into the existing infrastructure.	The volume of oil that would otherwise be transported by pipeline (375,000 bpd ~~and 760,000 bpd~~ for the proposed Sandpiper Pipeline ~~and Line 3 Replacement Pipelines, respectively~~), would require approximately ~~1,875~~ 4,354 tanker trucks ~~and 3,800 tanker trucks, respectively~~. Since Enbridge will replace Line 3 and tie it into the existing infrastructure, a truck alternative is not a relevant or feasible alternative to the Line 3 Replacement Project.	The proposed final sentence was added to the text in the Final EIS. The number of rail cars was not altered because the Applicant's reasoning for this recalculation was not provided.
4.1.4	NA	The Draft EIS discusses the	Add the following text as the second	Revision was made to

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		potential environmental impacts of a rail transport alternative but includes no discussion of the greenhouse gas emissions associated with transportation via rail. In addition to the rail loading and unloading infrastructure impacts, movement of 2,052 rail cars per day from the Bakken region to Superior, Wisconsin would result in a significant amount of greenhouse gas emissions. The Final EIS should calculate the estimated greenhouse gas emissions associated with rail transport on a daily basis and include it as an impact associated with the rail transport alternative.	paragraph on page 4-10: Rail service would result in greenhouse gas emissions from the 2,052 rail cars required to move the equivalent volume of crude oil per day. Estimated greenhouse gas emissions from 2,052 rail cars are [. . .]	refer to the GHG discussion in Section 7.4.2.2 in FEIS.
Figure 4-5	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The February 2014 figure was used which illustrates old versions of the centerlines.	The C1 and C2 identifications are incorrect. In addition, it depicts previous iterations of the pipeline routes~~.~~	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. In addition, the current proposed routes -should be depicted. Use the centerline shapefile data provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
4.2	"Route Variation C1 was proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course (Figure 4-8). Although Route Variation C1 has the advantage of avoiding business operations at the golf course that would be impacted during construction and restoration and would also avoid some railroad tracks, existing pipelines, and a	The C1 and C2 route variations are incorrect.	Route Variation ~~C1~~ C2 was proposed to avoid impacts to the City of Superior stormwater ponds and to the Nemadji Golf Course (Figure 4-8). Although Route Variation ~~C1~~ C2 has the advantage of avoiding business operations at the golf course that would be impacted during construction and restoration and would also avoid some railroad tracks, existing pipelines, and a snowmobile trail, this variation would result in greater impacts to	The requested revision was made to the FEIS based on updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	snowmobile trail, this variation would result in greater impacts to greenfield sites, wetlands, and rare plant sites. Route Variation C2 would cross the Nemadji Golf Course but would impact fewer greenfield sites, wetlands, and rare plant sites."		greenfield sites, wetlands, and rare plant sites. Route Variation ~~C2~~ C1 would cross the Nemadji Golf Course but would impact fewer greenfield sites, wetlands, and rare plant sites.	
Figure 4-8	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it.	The C1 and C2 identifications are incorrect.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around.	The requested revision was made to the FEIS based on updated information.
4.3.2.1	"It is recommended that the Applicant provide an Abandonment Plan to the DNR prior the start of abandonment that outlines the precise steps that would be taken during the abandonment process and that addresses the following recommendations…"	The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for each of these recommended mitigation measures, including the development of an Abandonment Plan requiring DNR approval.	~~It is recommended that the Applicant provide an Abandonment Plan to the DNR prior the start of abandonment that outlines the precise steps that would be taken during the abandonment process and that addresses the following recommendations…~~	The requested revision was made to the FEIS.
4.4.2	"Since 2010, Enbridge has conducted 46 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles)."	Enbridge provided an updated statistic in its July 15, 2015 submittal.	Since 2010, Enbridge has conducted ~~46~~ 50 repair and maintenance excavations on Line 3 from the Wisconsin border to the Superior Terminal (approximately 13 miles).	Section 4.4.2 of the FEIS was revised with this updated information.
5	"The likely impacts of Project construction and operation were analyzed for each resource using data from the Applicant, including the Environmental Impact Report (Enbridge 2014a)…"	The Environmental Impact Report referenced is not current version submitted to the WDNR in July 2015.	Update reference to the July 2015 Environmental Impact Report	Chapter 5 of the FEIS was revised with this updated information.
5.1.2	"Enbridge has identified one potential pipe yard area near South Range, Wisconsin. Short-term	Enbridge is no longer planning to utilize a pipe storage yard in Wisconsin.	~~Enbridge has identified one potential pipe yard area near South Range, Wisconsin. Short-term impacts would occur during~~	Section 5.1.2 of the FEIS was revised with this updated

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	impacts would occur during pipeline construction when the yard would contain sections of pipe. Aesthetic impacts from construction activities would occur during the time it takes to install the pipeline and restore the ROW."	Refer to the Environmental Impact Report dated July 2015.	~~pipeline construction when the yard would contain sections of pipe. Aesthetic impacts from construction activities would occur during the time it takes to install the pipeline and restore the ROW.~~	information.
5.1.2	"Permanent aboveground facilities would consist of six to eight mainline valves (three or four for each pipeline)"	There are currently three mainline valves for each pipeline for a total of six.	Permanent aboveground facilities would consist of six ~~to eight~~ mainline valves (three ~~or four~~ for each pipeline)	Section 5.1.2 of the FEIS was revised with this updated information.
5.1.2	"Most aesthetic impacts to hunters informally using the ROW for recreational purposes would also be short term, however the permanent loss of an estimated 28.0 to 38.6 acres of forest land that would not be re-established in the permanent ROW would be a long-term impact."	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS; however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts.	Most aesthetic impacts to hunters informally using the ROW for recreational purposes would also be short term, however the permanent loss of an estimated ~~28.0 to 38.6~~ 31.7 to 42.3 acres of forest land that would not be re-established in the permanent ROW would be a long-term impact.	Revisions have been made to reflect proper acres of impact.
5.1.3	"Revegetate construction work areas temporarily where 14 or more days will elapse between: the installation of the Sandpiper and Line 3 Replacement; the completion of final grading at a site and the establishment of permanent vegetation; and/or, where there is a high risk of erosion du to site-specific soil conditions and topography."	Enbridge did not commit to temporary seeding. Enbridge's EPP states: "Installation of temporary seeding, mulch (straw or hydromulch), and erosion control mats may be required by Enbridge in certain locations (including topsoil piles) if there are construction delays within a spread of at least 14 days. The Contractor may be required by Enbridge to install temporary stabilization materials sooner based on site conditions, or as required in project permits."	~~Revegetate construction work areas temporarily where 14 or more days will elapse between: the installation of the Sandpiper and Line 3 Replacement; the completion of final grading at a site and the establishment of permanent vegetation; and/or, where there is a high risk of erosion du to site-specific soil conditions and topography.~~ Installation of temporary seeding, mulch (straw or hydromulch), and erosion control mats may be required by Enbridge in certain locations (including topsoil piles) if there are construction delays within a spread of at least 14 days. The Contractor may be required by Enbridge to install temporary stabilization materials sooner based on site conditions, or as required in project permits.	Introductory language in Section 5.1.3 was revised to "The following mitigation measures would reduce impacts to aesthetics during construction of the pipelines:"

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5.1.3	"• Use paint colors for pump stations that blend into the existing landscape and vegetation. • Plant vegetation around pump stations that would minimize aesthetic impacts."	Neither pipeline requires pump stations in Wisconsin; therefore, Enbridge did not propose these mitigation measures. It is unclear what data source the DNR utilized to include these statements.	~~• Use paint colors for pump stations that blend into the existing landscape and vegetation. • Plant vegetation around pump stations that would minimize aesthetic impacts.~~	The requested revision was made to the FEIS.
5.2.3	"The following mitigation measures are proposed by Enbridge to reduce air quality impacts during construction of the pipelines: • Ensure that all construction equipment for the proposed Project is maintained in accordance with the manufacturers' specifications. • Ensure that diesel-powered equipment is properly maintained and shut off when not in use. • Prohibit engine tampering to increase horsepower. • Where practical, operate equipment as far as possible from residential areas and sensitive receptors (schools, daycare centers, and hospitals). • Use ultra-low sulfur diesel fuel for the Project's equipment if it is available for purchase within a reasonable distance to the construction spreads. • Minimize, to the extent practical, construction-related trips of workers and equipment. • Where practical, use 1996 or newer model year equipment and vehicles. "	Enbridge did not propose these mitigation measures in any of the submittals associated with the Sandpiper Pipeline or Line 3 Replacement Projects in Wisconsin. This appears to be text from previous projects and is not appropriate to include in this EIS.	~~The following mitigation measures are proposed by Enbridge to reduce air quality impacts during construction of the pipelines:~~ ~~• Ensure that all construction equipment for the proposed Project is maintained in accordance with the manufacturers' specifications.~~ ~~• Ensure that diesel-powered equipment is properly maintained and shut off when not in use.~~ ~~• Prohibit engine tampering to increase horsepower.~~ ~~• Where practical, operate equipment as far as possible from residential areas and sensitive receptors (schools, daycare centers, and hospitals).~~ ~~• Use ultra-low sulfur diesel fuel for the Project's equipment if it is available for purchase within a reasonable distance to the construction spreads.~~ ~~• Minimize, to the extent practical, construction-related trips of workers and equipment.~~ ~~• Where practical, use 1996 or newer model year equipment and vehicles.~~	The requested revision was made to the FEIS. DNR-recommended measures were added to FEIS.
5.2.3	"In addition to these measures	There are insufficient upland	~~In addition to these measures committed to~~	The DNR continues to

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	committed to by Enbridge, DNR recommends the following measures to further reduce impacts to air quality: • Allow the burning of small brush piles only. The burning of mature trees (with a minimum dbh of 6 inches) would not be allowed. Mature trees must instead be sold or chipped in place. Wood chips can be scattered along the permanent ROW or removed."	areas available within the construction ROW to spread chips. Furthermore, spreading the chips in upland areas could prohibit revegetation. In addition, Enbridge did not design the workspaces to accommodate stacking logs/timber in preparation for sale. Therefore, additional workspace would be necessary and would likely include more wetland impacts given the amount present. For these reasons, it is Enbridge's opinion that for the proposed projects, burning would result in less impact than the DNR's additional recommendations.	~~by Enbridge, DNR recommends the following measures to further reduce impacts to air quality:~~ ~~• Allow the burning of small brush piles only. The burning of mature trees (with a minimum dbh of 6 inches) would not be allowed. Mature trees must instead be sold or chipped in place. Wood chips can be scattered along the permanent ROW or removed.~~	encourage and recommend that Enbridge limit open burning and follow the original recommendations to the extent possible. Open burning and malodorous emissions have requirements under chapter NR 429, Wis. adm. code, as well as there being other general rule requirements to not create air pollution. Burning of wet wood can produce very smoky (high opacity) and poorly burning fires that can be a source of malodorous emissions as well as particulate matter and hazardous air pollutants that are a product of poor combustion and can harm human health. Those operations that are using open burning to dispose of solid wood waste may also require solid waste disposal approvals, as determined by the DNR regional air quality specialist.

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Table 5-4	NA	The first column (MP 602-605.8) in the table does not have the correct acreages listed. Refer to Enbridge's December 2015 updated impact tables. Also, the MP ranges shown in the table are old and are not consistent with the figures presented in section 4 (alternatives) of the draft EIS.	See comments.	The requested revisions were made to the FEIS.
5.3.1	"The Enbridge Environmental Inspector (EI) and/or Enbridge Agricultural Inspector…"	Enbridge did not propose to utilize an Agricultural Inspector in Wisconsin in the application materials based on the very small amount of active agricultural land present. The Agricultural Protection Plan Enbridge prepared and submitted also applies to construction activities in Minnesota and North Dakota where there higher occurrence of agricultural land. Therefore, this text should be stricken.	"The Enbridge Environmental Inspector (EI) ~~and/or Enbridge Agricultural Inspector~~…"	The requested revision was made to the FEIS.
5.3.1	"The independent third-party Agricultural Monitor (AM) would inspect construction work on agricultural lands and would be responsible for auditing Enbridge's compliance with the provisions of the APP. The AM would act as a liaison between landowners and the DATCP when necessary, and report landowner complaints to Enbridge. "	Enbridge did not propose to utilize an Agricultural Monitor in Wisconsin in the application materials based on the very small amount of active agricultural land present. The Agricultural Protection Plan Enbridge prepared and submitted also applies to construction activities in Minnesota and North Dakota where there	~~The independent third-party Agricultural Monitor (AM) would inspect construction work on agricultural lands and would be responsible for auditing Enbridge's compliance with the provisions of the APP. The AM would act as a liaison between landowners and the DATCP when necessary, and report landowner complaints to Enbridge.~~	Section was revised to indicate that an AM could be used but because the area involved is very small and consists primarily of hay land, the use of an AM is not warranted.

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		higher occurrence of agricultural land. Therefore, this text should be stricken.		
5.3.3	"Install signage along the permanent ROW in agricultural lands to reduce the potential for excavation damage."	Enbridge installs permanent pipeline markers in accordance with PHMSA requirements and also implements a damage prevention program (detailed within the EIS). Therefore, this recommendation is not necessary.	~~Install signage along the permanent ROW in agricultural lands to reduce the potential for excavation damage.~~	Section 5.3.3 of the FEIS was revised with this updated information.
5.3.3	"Monitor restoration activities in agricultural lands for 3 years after construction to ensure that agricultural lands have returned to preconstruction productivity levels."	There are only 2.6 acres of agricultural land within the construction ROW of the proposed Projects, most of which is in hay production. Therefore, this recommendation is not necessary.	~~Monitor restoration activities in agricultural lands for 3 years after construction to ensure that agricultural lands have returned to preconstruction productivity levels.~~	The requested revision was made to the FEIS.
5.3.3	"Report on the restoration actions that have been taken to address issues and provide the report to DATCP at the end of each yearly monitoring period in collaboration with the independent third-party AM."	Enbridge did not propose to utilize an Agricultural Monitor in Wisconsin in the application materials based on the very small amount of active agricultural land present. The Agricultural Protection Plan Enbridge prepared and submitted also applies to construction activities in Minnesota and North Dakota where there higher occurrence of agricultural land. Therefore, this text should be stricken.	~~Report on the restoration actions that have been taken to address issues and provide the report to DATCP at the end of each yearly monitoring period in collaboration with the independent third-party AM.~~	The requested revision was made to the FEIS.
5.5	"…consultation under Section 7 of the ESA is required for this Project	Singular use of "Project" verses "Projects". They are	…consultation under Section 7 of the ESA is required for ~~this~~ these Projects because of	The requested revision was made to the FEIS.

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	because of the need for an Individual Permit authorization from the …The USACE is the federal action agency for Section 7 consultation for this Project"	distinct projects and should be referenced as such.	the need for ~~an~~ Individual Permit authorizations from the …The USACE is the federal action agency for Section 7 consultation for ~~this~~ these Projects"	
5.5.1.2	"Enbridge subsequently submitted a BA of these three species (Enbridge 2015c) to the USACE. The USACE initiated consultation with the USFWS on November 10, 2015, which included submittal of the BA. The USFWS is currently reviewing the BA and preparing a Biological Opinion."	These three sentences are specific to the Line 3 Replacement Project in Wisconsin, not the Sandpiper Project. Furthermore, subsequent to the issuance of the final 4d rule for Northern long-eared bats, the USFWS is no longer preparing a Biological Opinion for the Line 3 Replacement Project in Wisconsin.	~~Enbridge subsequently submitted a BA of these three species (Enbridge 2015c) to the USACE. The USACE initiated consultation with the USFWS on November 10, 2015, which included submittal of the BA. The USFWS is currently reviewing the BA and preparing a Biological Opinion.~~ Consultation between the USFWS and USACE for both Projects is currently in progress.	Section 5.5.1.2 of the FEIS was revised with this information.
5.5.2.2	"The USFWS responded on October 18, 2013, with a letter of concurrence regarding the Canada lynx, piping plover, Kirtland's warbler, and Fassett's locoweed that no federally listed, proposed, or candidate species would be present in the Project area, and that here was no critical habitat in the Project area. Since this correspondence, three additional species have been listed or re-listed under the ESA, including the Northern long-eared bat, gray wolf (Western Great Lakes population), and rufa red knot. Enbridge has determined in its BA that the Project would be not likely to adversely affect the gray wolf and rufa red	This entire section is specific to the Line 3 Replacement Project in Wisconsin and does not reflect the Sandpiper Project. Furthermore, subsequent to the issuance of the final 4d rule for Northern long-eared bats, the USFWS is no longer preparing a Biological Opinion for the Line 3 Replacement Project in Wisconsin. Therefore, the Final EIS should have separate subsections for each project.	Line 3 Replacement Project: The USFWS responded on October 18, 2013, with a letter of concurrence regarding the Canada lynx, piping plover, Kirtland's warbler, and Fassett's locoweed that no federally listed, proposed, or candidate species would be present in the Project area, and that here was no critical habitat in the Project area. Since this correspondence, three additional species have been listed or re-listed under the ESA, including the Northern long-eared bat, gray wolf (Western Great Lakes population), and rufa red knot. Enbridge has determined in its BA that the Project would be not likely to adversely affect the gray wolf and rufa red knot, but that since some clearing may take place within the Northern long-eared bat's active season, the Project may be likely to adversely affect the Northern long-eared bat. ~~The USFWS is~~	Section 5.5.2.2 of the FEIS was revised with this updated information.

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	knot, but that since some clearing may take place within the Northern long-eared bat's active season, the Project may be likely to adversely affect the Northern long-eared bat. The USFWS is currently reviewing the BA (Enbridge 2015c) and preparing a Biological Opinion."		~~currently reviewing the BA (Enbridge 2015c) and preparing a Biological Opinion.~~ Sandpiper: Enbridge has been communicating with the USFWS since April 2013 on the Sandpiper Project. Similar to Line 3, Enbridge determined in its BA that the Project would be not likely to adversely affect the gray wolf and rufa red knot, but that since some clearing may take place within the northern long-eared bat's active season, the Project may be likely to adversely affect the northern long-eared bat. The USFWS is currently reviewing the Draft BA submitted in December 2015. Enbridge will be submitting a Final BA later in 2016.	
5.5.3	"The following mitigation should be considered to reduce potential impacts to Canada lynx den sites: • Perform clearing of forested areas in greenfield sites (Route Variations A1, B1, and C1) outside of the denning season (April to July). • In the event that clearing is required during the denning season, survey all forested areas within 0.5 mile on either side of the centerline of proposed routes where forested land would be cleared in greenfield areas (Route Variations A1, B1, and C1) for the presence of Canada lynx den sites. These surveys would be carried out by professional ecologists/biologists. Provide a report of the surveys to the DNR on completion. All surveys must be carried out prior to any construction activity including vehicle movements or staging of	The USFWS or the DNR have not requested surveys for the Canada lynx throughout the consultation for either project. The DNR should provide justification for the assumption/likelihood that the lynx would be located near the Projects' construction area in support of the proposed mitigation measures. Lastly, the Canada lynx is a federally protected species; therefore, the DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for each of these recommended mitigation measure.	~~The following mitigation should be considered to reduce potential impacts to Canada lynx den sites: • Perform clearing of forested areas in greenfield sites (Route Variations A1, B1, and C1) outside of the denning season (April to July). • In the event that clearing is required during the denning season, survey all forested areas within 0.5 mile on either side of the centerline of proposed routes where forested land would be cleared in greenfield areas (Route Variations A1, B1, and C1) for the presence of Canada lynx den sites. These surveys would be carried out by professional ecologists/biologists. Provide a report of the surveys to the DNR on completion. All surveys must be carried out prior to any construction activity including vehicle movements or staging of equipment. If a Canada lynx den site is discovered, clearing activities would be postponed in areas within 1 mile of the ROW until the end of the denning season (August) and until a~~	Section 5.5.3 of the FEIS was revised with this updated information.

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	equipment. If a Canada lynx den site is discovered, clearing activities would be postponed in areas within 1 mile of the ROW until the end of the denning season (August) and until a professional ecologist/biologist has re-surveyed the area to confirm that the kittens have left the den."		~~professional ecologist/biologist has re-surveyed the area to confirm that the kittens have left the den.~~	
5.5.3	"• Survey all forested areas within 0.5 mile on either side of the centerline of proposed routes where forested land would be cleared in greenfield areas (Route Variations A1, B1, and C1) for the presence of maternity colonies in the event that clearing is required during the summer breeding season. These surveys would be carried out by professional ecologists/biologists. Provide a report of the surveys to the DNR on completion. All surveys must be carried out prior to any construction activity including vehicle movements or staging of equipment. If a maternal colony site is discovered, clearing activities would be postponed within 150 feet of the maternal colony site until after the maternity roosting season (after August 15). Prior to clearing activities a professional ecologist/biologist would re-survey the area to confirm that Northern long-eared bats are no longer roosting in the area. • Conduct summer surveys for Northern long-eared bats between	Enbridge has been actively consulting with the DNR and USFWS on both projects regarding the Northern long-eared bat for several years. Enbridge completed summer surveys (acoustic, mist netting, and telemetry) in 2014 documenting that there are no known maternity roost trees within 150 feet of the proposed construction ROW (including all route variations). Enbridge provided copies of the survey reports to the DNR, USACE, and USFWS. Therefore; these bullets are not applicable and should be stricken.	~~• Survey all forested areas within 0.5 mile on either side of the centerline of proposed routes where forested land would be cleared in greenfield areas (Route Variations A1, B1, and C1) for the presence of maternity colonies in the event that clearing is required during the summer breeding season. These surveys would be carried out by professional ecologists/biologists. Provide a report of the surveys to the DNR on completion. All surveys must be carried out prior to any construction activity including vehicle movements or staging of equipment. If a maternal colony site is discovered, clearing activities would be postponed within 150 feet of the maternal colony site until after the maternity roosting season (after August 15). Prior to clearing activities a professional ecologist/biologist would re-survey the area to confirm that Northern long-eared bats are no longer roosting in the area.~~ ~~• Conduct summer surveys for Northern long-eared bats between May 15 and August 15, following the "2015 Rangewide Indiana Bat Summer Survey Guidelines" (USFWS 2015b), which have been approved by the DNR for use for Northern long-eared bat presence/probable absence surveys if clearing is required during the summer breading season.~~	Section 5.5.3 of the FEIS was revised with this updated information.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	May 15 and August 15, following the "2015 Rangewide Indiana Bat Summer Survey Guidelines" (USFWS 2015b), which have been approved by the DNR for use for Northern long-eared bat presence/probable absence surveys if clearing is required during the summer breading season. • Modify all phases/aspects of the Project to avoid tree removal in excess of what is required to implement the Project safely. • Do not cut down documented Northern long-eared bat roosts (that are still suitable for roosting) or documented foraging habitat any time of year."		~~• Modify all phases/aspects of the Project to avoid tree removal in excess of what is required to implement the Project safely.~~ ~~• Do not cut down documented Northern long-eared bat roosts (that are still suitable for roosting)or documented foraging habitat any time of year.~~	
5.6.1.3	"Two SGCN and state-listed special concern fish are known to occur within 2 miles of the proposed pipelines: American eel (Anguilla rostrata) and lake sturgeon (Acipenser fulvescens). The American eel has a low association score for the Superior Coastal Plain and all American eel occurrences are located in the St. Louis River/Superior Bay/Allouez Bay or in the Nemadji River and are more than 20 years old. The lake sturgeon has a high association score for the Superior Coastal Plain, but it prefers large rivers and lakes, which do not occur in the Project area."	The DNR requested that any specific NHI related information be redacted from Enbridge's text. The draft EIS text includes specific species related to NHI review (e.g., american eel, lake sturgeon) and should be referenced as rare fish to "mask" the species.	See comments.	The requested revision was made to the FEIS.
5.6.1.4	NA	The DNR requested all	See comments and edit section as	Section 5.6.1.4 has

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		references of wood turtles and upland sandpiper be redacted and referenced as a rare reptile and rare bird to "mask" the species.	appropriate.	been revised to remove locational data for species.
5.6.2.2	"To avoid impacts to birds protected under the MBTA, DNR recommends that all clearing activities in forested areas occur outside the nesting season for most species (May 1 through August 30)"	Enbridge has been actively consulting with the DNR and USFWS regarding timing of clearing balancing potential impacts to wildlife and protected flora. This recommendation further restricts clearing timing beyond what has been discussed to date. In addition, the DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for this recommended mitigation measure.	~~To avoid impacts to birds protected under the MBTA, DNR recommends that all clearing activities in forested areas occur outside the nesting season for most species (May 1 through August 30)~~	The requested revision was made to the FEIS.
5.6.2.3	"Enbridge will be applying for an Incidental Take Permit for the wood turtle."	Enbridge applied for Incidental Take Permits for each project for the wood turtle in 2015.	Enbridge ~~will be applying~~ applied for ~~an~~ Incidental Take Permits for the wood turtle.	Section 5.6.2.3 of the FEIS was revised to reflect updated permit application information.
5.6.3	"Plant trees in suitable locations to offset permanent loss of forested habitat in consultation with the DNR. See section 5.7.3 below for further details."	The majority of the impacts occur in wetlands; therefore, compensatory mitigation will provide an offset for impacts to forested habitat. The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for this recommended mitigation	~~Plant trees in suitable locations to offset permanent loss of forested habitat in consultation with the DNR. See section 5.7.3 below for further details.~~	The requested revision was made to the FEIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		measure.		
5.6.3	"Carry out bald eagle surveys in areas of suitable habitat within 1 mile of the proposed Project route prior to construction to reduce the potential for impacts to bald eagle nests and important winter foraging areas. In the event that bald eagle nests or important winter foraging areas are identified, the Applicant should consult with the USFWS for recommendations on how to avoid disturbance and whether a permit is necessary."	Enbridge has actively consulted with the USACOE and USFWS regarding bald eagles, including conducting surveys. The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for these recommended mitigation measures.	~~Carry out bald eagle surveys in areas of suitable habitat within 1 mile of the proposed Project route prior to construction to reduce the potential for impacts to bald eagle nests and important winter foraging areas. In the event that bald eagle nests or important winter foraging areas are identified, the Applicant should consult with the USFWS for recommendations on how to avoid disturbance and whether a permit is necessary.~~	The requested revision was made to the FEIS.
5.7.1	"The NLCD 2006 (Fry et al. 2011) Classification System was used to obtain information on forest land in the Project area."	Update reference to reflect Enbridge's July 2015 submittal.	The NLCD ~~2006~~ 2011 (Fry et al. 2011) Classification System was used to obtain information on forest land in the Project area.	The requested revision was made to the FEIS.
5.7.1 & Table 5-10	"There are eight properties that are enrolled in either the Forest Crop Law (FCL) or Managed Forest Law (MFL) programs that would be crossed by the proposed Project. The FCL and MFL are landowner incentive programs that encourage long-term, sustainable management of private woodlands by providing tax benefits. Table 5-10 identifies the tract number, milepost, crossing length, and legal description of these parcels."	Effective January 1, 2016, all tracts enrolled in the MFL have been withdrawn. There are no affected tracts within the FCL. Therefore, Table 5-10 should be removed from the Final EIS and text updated accordingly.	~~There are eight properties that are enrolled in either the Forest Crop Law (FCL) or Managed Forest Law (MFL) programs that would be crossed by the proposed Project. The FCL and MFL are landowner incentive programs that encourage long-term, sustainable management of private woodlands by providing tax benefits. Table 5-10 identifies the tract number, milepost, crossing length, and legal description of these parcels.~~ Effective January 1, 2016, all tracts enrolled in the MFL have been withdrawn. There are no affected tracts within the FCL.	The requested revision was made to the FEIS.
5.7.2	"The Project would result in the clearing of an estimated 72.7 to 89.5 acres of forest land during construction of the Project, depending on the route variation	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS;	The Project would result in the clearing of an estimated ~~72.7~~ 86.2 to ~~89.5~~ 102.9 acres of forest land during construction of the Project, depending on the route variation chosen (Table 5-4). Of this acreage, an estimated	Revisions were made to reflect proper acres of impact.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	chosen (Table 5-4). Of this acreage, an estimated 28.0 to 38.6 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW since it would be maintained clear of trees for operational purposes, such as facilitating aerial inspections, preserving pipeline integrity, and providing access for maintenance or emergency work."	however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts.	~~28.0~~ 31.7 to ~~38.6~~ 42.3 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW since it would be maintained clear of trees for operational purposes, such as facilitating aerial inspections, preserving pipeline integrity, and providing access for maintenance or emergency work.	
5.7.2	"An estimated 28.0 to 38.6 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW…"	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS; however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts.	An estimated ~~28.0~~ 31.7 to ~~38.6~~ 42.3 acres of forest lands would not be allowed to reestablish within the permanently maintained ROW...	Revisions were made to reflect proper acres of impact.
5.7.3	In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce overall impacts to forest land in Douglas County that would be affected by the proposed Project: • Create a Compensatory Tree Planting Plan that addresses the planting of between 28.0 and 38.6 acres of trees to compensate for the loss of the same amount of forest land as a result of pipeline maintenance. This plan would include replanting procedures outlined in the Douglas County Forest Comprehensive Land Use Plan 2006–2020 (Douglas County	The majority of the impacts occur in wetlands; therefore, compensatory mitigation will provide an offset for impacts to forested habitat. The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for each recommended mitigation measure.	~~In addition to these measures committed to by Enbridge, DNR recommends the following measures to reduce overall impacts to forest land in Douglas County that would be affected by the proposed Project:~~ ~~• Create a Compensatory Tree Planting Plan that addresses the planting of between 28.0 and 38.6 acres of trees to compensate for the loss of the same amount of forest land as a result of pipeline maintenance. This plan would include replanting procedures outlined in the Douglas County Forest Comprehensive Land Use Plan 2006–2020 (Douglas County 2008). It would be drafted in consultation with the DNR and would be approved by DNR before implementation. The plan should identify suitable locations for tree planting, the types of trees that~~	The requested revision was made to the FEIS.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	2008). It would be drafted in consultation with the DNR and would be approved by DNR before implementation. The plan should identify suitable locations for tree planting, the types of trees that would be planted and their sources, and the methods of tree planting and monitoring for success."		~~would be planted and their sources, and the methods of tree planting and monitoring for success.~~	
5.9.3	"Treat major areas of noxious weed infestations with the recommended herbicides or their equivalents as identified through consultation with local authorities prior to clearing and grading of the construction ROW and pending landowner permission."	Enbridge's EPP states: Prior to clearing and grading of the construction right-of-way and pending landowner permission, major infestation areas identified during surveys or by Enbridge's EIs may be treated with the recommended herbicides or their equivalents as identified through consultation with local authorities.	Enbridge may ~~T~~treat major areas of noxious weed infestations with the recommended herbicides or their equivalents as identified through consultation with local authorities prior to clearing and grading of the construction ROW and pending landowner permission.	The requested revision was made to the FEIS.
5.9.3	"Develop an Invasive Species Forest Management Plan to address the spread of noxious weeds in forested areas. The plan should include measures for eradicating invasive weeds on forested lands, including mechanical, biological, and chemical control methods. Though herbicide use is currently prohibited on Douglas County Forest Lands, the County Board of Supervisors has the authority to grant permission for their use, should the need arise (County Pesticide Ordinance 1.17). The plan should also include monitoring procedures	Enbridge cannot be held responsible to eradicate invasive weeds on forested lands, especially where they are open to the public for recreational use. In addition, while the County has provisions to approve the use of herbicides, it is not a forgone conclusion that they will do so. Lastly, the DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for each recommended mitigation	~~Develop an Invasive Species Forest Management Plan to address the spread of noxious weeds in forested areas. The plan should include measures for eradicating invasive weeds on forested lands, including mechanical, biological, and chemical control methods. Though herbicide use is currently prohibited on Douglas County Forest Lands, the County Board of Supervisors has the authority to grant permission for their use, should the need arise (County Pesticide Ordinance 1.17). The plan should also include monitoring procedures and invasive species management goals for 3 years post-construction. The plan would be submitted to the DNR prior to the start of construction and would require approval prior to~~	No edit has been made. Enbridge has committed to implement prevention and control measures regarding invasive species as outlined in their Environmental Protection Plan. If approved, erosion control and stormwater management permit coverage would need to be consistent with ch. NR 40, Wis. adm. code regarding invasive species.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	and invasive species management goals for 3 years post-construction. The plan would be submitted to the DNR prior to the start of construction and would require approval prior to implementation."	measure.	~~implementation.~~	
Figure 5-2	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
5.12.3	"•Restore all lawn areas, shrubs, specialized landscaping, fences, and other structures to their preconstruction appearance when construction has been completed."	The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for this recommended mitigation measure.	~~•Restore all lawn areas, shrubs, specialized landscaping, fences, and other structures to their preconstruction appearance when construction has been completed~~	Revisions were made to indicate that this mitigation is recommended but not required by DNR.
Figure 5-3	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
5.13.2	"Route Variation C2 would cross the Nemadji Golf Course….There is also congestion along Route Variation C2 were it….The use of Route Variation C1 would…."	The C1 and C2 identifications are incorrect.	"Route Variation ~~C2~~ C1 would cross the Nemadji Golf Course….There is also congestion along Route Variation ~~C2~~ C1 were it….The use of Route Variation ~~C1~~ C2 would…."	The requested revision was made to the FEIS based on updated information.
5.13.3	"Enbridge is also proposing to mitigate for wetland impacts through a Project-specific consolidated Crawford Creek (Hydrologic Unit Code [HUC] 10 –	Enbridge withdrew this request in March 2015 and requested to utilize the in-lieu fee program and is not proposing to construct the	~~Enbridge is also proposing to mitigate for wetland impacts through a Project-specific consolidated Crawford Creek (Hydrologic Unit Code [HUC] 10 – 0401030105; Lower Nemadji River) wetland mitigation site~~	Section 5.13.3 of the FEIS was revised with this updated information.

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	0401030105; Lower Nemadji River) wetland mitigation site located in the Nemadji River watershed (see Section 5.20.3 for more detail). The approximately 48.4-acre site includes proposed preservation, enhancement, and restoration of wetlands and may provide a new area for recreational use."	Crawford Creek mitigation site.	~~located in the Nemadji River watershed (see Section 5.20.3 for more detail). The approximately 48.4-acre site includes proposed preservation, enhancement, and restoration of wetlands and may provide a new area for recreational use.~~	
Table 5-13	NA	Enbridge presented updated socioeconomic information in its July 2015 submittal.	See comment.	Table 5-13 of the FEIS was revised with this updated information.
5.15.2	"Construction activities would occur over an approximate 14 month period, with employment opportunities provided to local workers where the local workforce possesses the required skills"	This implies only one project where construction may not be concurrent.	Construction activities for each would occur over an approximate 14 month period, with employment opportunities provided to local workers where the local workforce possesses the required skills	The requested revision was made to the FEIS.
5.15.3	"In the event that previously unknown wild rice populations are encountered….Reinitiate tribal consultation and adjust mitigation measures based on that consultation."	Enbridge conducted wetland and waterbody delineations and rare plant surveys along the proposed construction ROW and Route Variations for both projects and did not find evidence of wild rice or suitable habitat. Therefore, entire section of text seems unnecessary.	~~In the event that previously unknown wild rice populations are encountered….Reinitiate tribal consultation and adjust mitigation measures based on that consultation.~~	Revisions have been made to indicate that in the event that previously unknown wild rice populations are encountered within the project area, additional consultation with the tribes may be necessary.
Table 5-15	NA	The first column (MP 602-605.8) in the table does not have the correct acreages listed. Also, the MP ranges shown in the table are old and are not consistent with the figures presented in section 4 (alternatives) of the draft EIS. Finally, update	See comments.	Revisions to Table 5-15 have been made in response to this comment. Mileposts have been updated and are now consistent across all chapters.

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		soils impacts to reflect Enbridge's December 2015 impact tables.		
Figure 5-7	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not shown on the figure.	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	The requested revision was made to the FEIS based on updated information.
5.17.3	"Request that construction workers leave personal vehicles at contractor yards and participate in ride shares to work sites with other workers. Use a bus to transport contractors from yards and other central locations to the ROW on a daily basis."	Enbridge did not make these commitments but provided a general narrative in the Environmental Impact Report. Therefore, it appears there is a miss-interpretation of text included in the Environmental Impact Report: "*In addition, construction workers typically will leave their personal vehicles at contractor yards and participate in ride shares to work sites with other workers; this will help reduce road congestion in the vicinity of work sites. Enbridge is also considering busing contractors from yards and other central locations to minimize the number of personal vehicles accessing the right-of-way.*"	~~Request that construction workers leave personal vehicles at contractor yards and participate in ride shares to work sites with other workers. Use a bus to transport contractors from yards and other central locations to the ROW on a daily basis.~~	Introductory language in Section 5.17.3 has been edited to read "The following mitigation measures would reduce impacts to transportation systems during construction of the pipelines:"
5.17.3	"Require Enbridge to pay for the cost of flaggers and other personnel required to ensure the safety of transportation on roads during construction of the proposed	Enbridge will take all necessary measures to protect the safety of the public and contractor employees, including the use	~~Require Enbridge to pay for the cost of flaggers and other personnel required to ensure the safety of transportation on roads during construction of the proposed pipelines.~~	Revisions were made to indicate that this mitigation is recommended but not required by DNR.

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Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	pipelines."	of flaggers. The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for this recommended mitigation measure.		
5.18.1.1, Table 5-16	NA	The DNR requested that any specific NHI related information be redacted from Enbridge's text. The draft EIS text includes specific natural community information related to NHI review and should be redacted.	See comments and edit section as appropriate.	The requested revision was made to the FEIS.
5.18.1.1	"In addition, 10 special concern plant species are known to occur within 1 mile of the Project area according to NHI data."	There are only 9 special concern species within 1-mile.	In addition, 9 ~~10~~ special concern plant species are known to occur within 1 mile of the Project area according to NHI data.	The requested revision was made to the FEIS.
5.18.1.2, Tables 5-17 and 5-18, 5.18.2.2	NA	The DNR requested that any specific NHI related information be redacted from Enbridge's text. The draft EIS text includes specific rare plant information related to NHI review and should be redacted.	See comments and edit section as appropriate.	The requested revision was made to the FEIS.
5.18.1.2, Tables 5-17 and 5-18, 5.18.2.2	NA	Results of 2013 and 2014 botanical surveys presented in text are not consistent with the information presented in Table 5-18. For example, the second sentence states, "Biologists observed…all species in Table 5-17 except floating marsh-marigold and	<u>If DNR approves of including this location-specific rare plant information (requested to be redacted from Enbridge's submittals)</u>, update the text and tables in these sections to be consistent with the information in Tables 5-17 and 5-18.	The requested revision was made to the FEIS.

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		all species in Table 5-18 except Vasey's rush." This statement is not supported by Table 5-17, which lists additional species that were not observed during 2013 surveys, or Table 5-18, which shows multiple occurrences of Vasey's rush were documented as a result of the 2013 survey. In addition, the species listed as most and least frequent are not consistent with the information presented in Table 5-18. Update common names of species in Table 5-18 to be consistent with names presented in Table 5-17. Cloaked bulrush is not listed in Table 5-17. Verify that this species was not found in the NHI data presented in Table 5-17 or add the species to the Table 5-18		
5.19.1.2	"The Project crosses either 14 or 4 ASNRI-designated waterbodies depending on whether Route Variation A1 or A2 is selected."	The number of ASNRI presented is not consistent with information in Table 5-19, which shows 8 ASNRI crossings for A1 and 4 ASNRI for A2, if considering construction of both pipelines.	The Projects would have ~~crosses~~ either ~~14~~ 8 or 4 crossings of ASNRI-designated waterbodies depending on whether Route Variation A1 or A2 is selected.	The requested revision was made to the FEIS.
Table 5-20	NA	The MP ranges shown in the table are old and are not consistent with the figures presented in section 4	See comments. Delete total acres per segment row, and update footnote to reflect that the impacts provided in this table represent the 110-foot-wide workspace.	The requested revision was made to the FEIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

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		(alternatives) of the draft EIS. The total acres per segment row is incorrect. The total acres impacted within the 110-foot-wide workspace is shown in the "construction" portion of the table. Also, footnote "d" that indicates a 90-110 foot wide workspace is incorrect. Should be 110, not 90.		
5.20.2	"To offset these impacts, a compensatory mitigation plan for the preservation, enhancement, and restoration of 48.4 acres of wetlands has been proposed. The Crawford Creek mitigation site is located in the Town of Superior on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The compensatory site is located in the same Lake Superior Bank Service Area as the impacted wetlands (HUC 10 – 0401030105; Lower Nemadji River), and thus provides mitigation 'in-place'. The approximately 48.4-acre site includes two portions: a 29.4-acre ditched hayfield and an eastern 19.0-acre wooded area adjacent to Crawford Creek. The proposed site management includes proposed preservation, enhancement, and restoration of wetlands."	Enbridge withdrew this request in March 2015 and requested to utilize the in-lieu fee program and is not proposing to construct the Crawford Creek mitigation site.	To offset these impacts, Enbridge is proposing to utilize the in-lieu fee program. ~~a compensatory mitigation plan for the preservation, enhancement, and restoration of 48.4 acres of wetlands has been proposed. The Crawford Creek mitigation site is located in the Town of Superior on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The compensatory site is located in the same Lake Superior Bank Service Area as the impacted wetlands (HUC 10 – 0401030105; Lower Nemadji River), and thus provides mitigation 'in-place'. The approximately 48.4-acre site includes two portions: a 29.4-acre ditched hayfield and an eastern 19.0-acre wooded area adjacent to Crawford Creek. The proposed site management includes proposed preservation, enhancement, and restoration of wetlands.~~	Section 5.20.3 of the FEIS was revised with this updated information.
5.20.3	"Enbridge is proposing to mitigate wetland impacts through a Project-specific wetland mitigation plan at	Enbridge withdrew this request in March 2015 and requested to utilize the in-lieu	~~Enbridge is proposing to mitigate wetland impacts through a Project-specific wetland mitigation plan at the Crawford Creek~~	Section 5.20.3 of the FEIS was revised with this updated

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	the Crawford Creek mitigation site. Hydrology and wetland characteristics would be restored at the Crawford Creek mitigation site by blocking man-made ditches in the hayfield and preventing channelized flow of water through the site into Crawford Creek. The mitigation plan includes placing 16 ditch plugs covering approximately 11,000 square feet. The existing surrounding vegetation would be used as a guide in developing a planting plan and would replace impacted habitat types to the extent practicable. The primary goal of the restoration part of the wetland mitigation plan is the re-development of more natural wetland hydrology and the development of a diverse assemblage of wetland communities."	fee program and is not proposing to construct the Crawford Creek mitigation site.	~~mitigation site. Hydrology and wetland characteristics would be restored at the Crawford Creek mitigation site by blocking man-made ditches in the hayfield and preventing channelized flow of water through the site into Crawford Creek. The mitigation plan includes placing 16 ditch plugs covering approximately 11,000 square feet. The existing surrounding vegetation would be used as a guide in developing a planting plan and would replace impacted habitat types to the extent practicable. The primary goal of the restoration part of the wetland mitigation plan is the re-development of more natural wetland hydrology and the development of a diverse assemblage of wetland communities.~~	information.
6.1	"…and Route Variation C1 was proposed to avoid impacts to the City of Superior…"	The C1 and C2 identifications are incorrect.	…and Route Variation ~~C1~~ C2 was proposed to avoid impacts to the City of Superior…	The requested revision was made to the FEIS based on updated information.
6.1	"Enbridge would use a ratio of 1.67 feet of construction workspace per diameter inch for the proposed pipelines, an approximately 17 percent decrease from previous pipeline projects."	Revise to reflect updated information from July 2015 submittal.	Enbridge would use a ratio of 1.67 feet of construction workspace per diameter inch for the proposed pipelines, an approximately ~~17~~ 14 percent decrease from previous pipeline projects.	The requested revision was made to the FEIS.
Figure 6-1	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The February 2014 figure was used which illustrates old versions of the	The C1 and C2 identifications are incorrect. In addition, it depicts previous iterations of the pipeline routes.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. In addition, the current proposed routes should be depicted. Use the centerline shapefile data provided in	The requested revision was made to the FEIS based on updated information.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	centerlines.		Enbridge's December 2015 submittal.	
6.2.1	"Route Variation A1 (13.0 miles) would be 1.4 miles longer than Route Variation A2 (11.6 miles), and it would affect 1 additional mile of greenfield area compared with Route Variation A2 (1.6 miles for Route Variation A1 versus 0.6 mile for Route Variation A2) (Figure 6-2). In addition, Route Variation A1 would be co-located with Enbridge's existing ROW for a shorter distance (0.8 mile for Route Variation A1 versus 3.6 miles for Route Variation A2). The environmental impacts of Route Variations A1 and A2 are provided in Table 6-1."	Indicate when mileage provided is for both projects (e.g., Route Variation A1 is a *combined* 13 miles).	See comments.	The requested revision was made to the FEIS.
6.2.1 & Table 6-1	Refer to comments	The calculations represented appear to be from the co-construct scenario in updated Environmental Impact Report tables submitted December 14, 2015; however, this is not clear to the reader. In the December 14, 2015 submittal where Enbridge utilized miles as unit of measure it represents the pipeline centerline; therefore, under the co-construct scenario the information is the sum of the Sandpiper and Line 3 Replacement pipelines. Therefore, the total number of features on the landscape such as roads or railroads does not change but the total	Utilize a format similar to the tables provided on December 14, 2015 to make clear the distinction between the two projects, where the data assumes the a co-construct scenario, and the units of measure for each data point presented. Alternatively, insert footnotes to explain the data more clearly.	Tables were revised to clarify that values are for co-construction of the Projects. Units of measurement are provided for each resource area/impact.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		number of individual times a pipeline will cross it does. Furthermore, it is not clear to the reader the units of measure for each of the data points represented.		
6.2.2 & Table 6-2	Refer to comments	The calculations represented appear to be from the co-construct scenario in updated Environmental Impact Report tables submitted December 14, 2015; however, this is not clear to the reader. In the December 14, 2015 submittal where Enbridge utilized miles as unit of measure it represents the pipeline centerline; therefore, under the co-construct scenario the information is the sum of the Sandpiper and Line 3 Replacement pipelines. Therefore, the total number of features on the landscape such as roads or railroads does not change but the total number of individual times a pipeline will cross it does. Furthermore, it is not clear to the reader the units of measure for each of the data points represented.	Utilize a format similar to the tables provided on December 14, 2015 to make clear the distinction between the two projects, where the data assumes the a co-construct scenario, and the units of measure for each data point presented. Alternatively, insert footnotes to explain the data more clearly.	Tables were revised to clarify that values are for co-construction of the Projects. Units of measurement are provided for each resource area/impact.
6.2.3 & Table 6-3	Refer to comments	The references to C1 and C2 are incorrect through this section and table. In addition, the calculations represented appear to be from the co-construct	Correct the references to C1 and C2. Utilize a format similar to the tables provided on December 14, 2015 to make clear the distinction between the two projects, where the data assumes the a co-construct scenario, and the units of measure for each	Footnotes were added to information in Chapter 6 to clarify that the impacts are for a co-construct scenario.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		scenario in updated Environmental Impact Report tables submitted December 14, 2015; however, this is not clear to the reader. In the December 14, 2015 submittal where Enbridge utilized miles as unit of measure it represents the pipeline centerline; therefore, under the co-construct scenario the information is the sum of the Sandpiper and Line 3 Replacement pipelines. Therefore, the total number of features on the landscape such as roads or railroads does not change but the total number of individual times a pipeline will cross it does. Furthermore, it is not clear to the reader the units of measure for each of the data points represented.	data point presented. Alternatively, insert footnotes to explain the data more clearly.	
Figure 6-4	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it.	The C1 and C2 identifications are incorrect.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around.	The requested revision was made to the FEIS based on updated information.
Table 7-1, Item 6	Details: "• Expand Line 61 ROW to construct a new pipeline (up to 42-inch-diameter) and associated facilities from Superior Terminal, Wisconsin, to Flanagan Terminal, Indiana. • Expected capacity of 800,000 bpd." Status: "Preliminary, coordinating early development activities."	Enbridge has informed investors that it is coordinating early development activities to assess the opportunity and industry interest of a pipeline in Wisconsin and Illinois. The pipeline could be up to 42 inches in outside diameter with an initial capacity of up	Details: • ~~Expand Line 61 ROW to~~ construct a new pipeline (up to 42-inch-diameter) and associated facilities from Superior Terminal, Wisconsin, to Flanagan Terminal, ~~Indiana~~ Illinois. ~~• Expected capacity~~ of up to 800,000 bpd." Disagree with wording - edit to say the company has ann Status: "~~Preliminary~~, Not currently proposed, coordinating early development activities."	Table 7-1 of the FEIS was revised with updated information.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		to 800,000 barrels per day and would generally be immediately adjacent to Enbridge's existing mainline system. This potential project does not yet have a defined scope and as such is not considered a proposed project.		
7.4.2.1	"If construction of any of the RFFAs overlapped with the 14-month construction period of the proposed Project, minor regional cumulative impacts to air quality from construction activities could occur."	This implies only one project where construction may not be concurrent.	If construction of any of the RFFAs overlapped with the 14-month construction period ~~of the proposed Project~~ for each Project, minor regional cumulative impacts to air quality from construction activities could occur.	The requested revision was made to the FEIS.
7.4.5	"Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between 72.7 and 89.5 acres for the proposed Project, of which an estimated 28.0 to 38.6 acres of forest lands would not reestablish within the permanently maintained ROWs."	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS; however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts.	Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between ~~72.7 and 89.5~~ 86.2 and 102.9 acres for the proposed Project, of which an estimated ~~28.0 to 38.6~~ 31.7 and 42.3 acres of forest lands would not reestablish within the permanently maintained ROWs.	Revisions have been made to reflect proper acres of impact from construction and operations.
7.4.6.3	NA	The DNR requested that any specific NHI related information be redacted from Enbridge's text. The draft EIS text includes specific wood turtle and upland sandpiper information related to NHI review and should be redacted.	See comments and edit section as appropriate.	The requested revision was made to the FEIS.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
7.4.7	"Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between 72.7 and 89.5 acres for the proposed Project, of which an estimated 28.0 to 38.6 acres of forest lands would not reestablish within the permanently maintained ROWs."	Refer to the December 14, 2015 submittal for updated impact numbers. The 8 route options Enbridge identified were not identified in the EIS; however, Enbridge assumes this acreage range uses the 8 routes to estimate clearing impacts.	Construction of the Line 61 Twin Project and addition of new pump stations as part of the Line 61 Capacity Expansion Project (Southern Access Pipeline) would result in the loss of forested habitats in addition to the clearing of between ~~72.7 and 89.5~~ 86.2 and 102.9 acres for the proposed Project, of which an estimated ~~28.0 to 38.6~~ 31.7 and 42.3 acres of forest lands would not reestablish within the permanently maintained ROWs.	Revisions have been made to reflect proper acres of impact from construction and operations.
7.4.15	"If construction of any of the RFFAs overlapped with the 14-month construction period of the Project, potential short-term cumulative socioeconomic impacts could occur in the region"	This implies only one project where construction may not be concurrent.	If construction of any of the RFFAs overlapped with the 14-month construction period of ~~the~~ each Project, potential short-term cumulative socioeconomic impacts could occur in the region	The requested revision was made to the FEIS.
7.4.20	"Cumulative impacts would be reduced with implementation of the compensatory mitigation plan for the preservation, enhancement, and restoration of 48.4 acres of wetlands as part of the proposed Project."	Enbridge withdrew this request in March 2015 and requested to utilize the in-lieu fee program and is not proposing to construct the Crawford Creek mitigation site.	Cumulative impacts would be reduced with implementation ~~of the compensatory mitigation plan~~ in lieu fee program for the preservation, enhancement, and restoration of ~~48.4 acres~~ of wetlands as part of the proposed Projects.	Section 7.4.20 of the FEIS was revised with this updated information.
8.3.3.2	"The Spill Coordinator, in consultation with the Applicant's Environmental Inspector and appropriate agencies, would determine if evacuation is necessary to safeguard human health"	Section 8.3.3.2 discusses potential operational incidents. The Spill Coordinator and Environmental Inspector are construction-related rolls.	~~The Spill Coordinator, in consultation with the Applicant's Environmental Inspector~~ Enbridge Emergency Response staff and appropriate agencies, would determine if evacuation is necessary to safeguard human health	The requested revision was made to the FEIS.
Figure 8-3	The alternative routes "C" show C1 as going around the Nemadji Golf Course and C2 going through it. The Sandpiper centerline is not	The C1 and C2 identifications are incorrect and the Sandpiper centerline is not depicted.	C1 should be the route alternative through the Nemadji Golf Course and C2 should be the one going around. The two centerlines deviate slightly at the border as well as the	The requested revision was made to the FEIS based on updated information.

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
	shown on the figure.		entrance into the Superior Terminal. Include the Sandpiper centerline provided in Enbridge's December 2015 submittal.	
8.5.13	"Enbridge's existing easement and Route Variation C2 bisect the Nemadji Golf…"	The C1 and C2 identifications are incorrect.	Enbridge's existing easement and Route Variation ~~C2~~ C1 bisect the Nemadji Golf…	The requested revision was made to the FEIS based on updated information.
-	-	Enbridge submitted a Wetland Mitigation Compensation Site Plan for an applicant-developed, project-specific wetland mitigation site in February 2014. Subsequently, the DNR implemented an in lieu fee program. As a result, Enbridge withdrew the submitted Wetland Mitigation Compensation Site Plan and requested to utilize the in lieu fee program to compensate for wetland impacts in March 2015. The Final Environment Impact Statement should only reflect the request to utilize in lieu fee program.	-	The FEIS was updated to include the wetland mitigation in-lieu fee program.
-	-	The Draft EIS makes many references to the Environmental Information Report submitted in May 2014. However, the most current version is dated July 2015. Use of the current document, including clearly explaining the impacts for each project should construction occur consecutively verses	-	Enbridge provided the updated EIR dated July 2015 as part of their comments on the Draft EIS. This document was reviewed and edits have been made in the FEIS to reflect changes made in the EIR. The FEIS was revised to clarify the

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		concurrently, would provide clarity to the reader.		impacts attributable to each pipeline in the event of consecutive construction.
-	-	The Enbridge-prepared plans included as appendices to the Draft EIS are not the most current versions of each document.	-	Enbridge provided updated plans as part of their comments on the Draft EIS. These updated plans have been reviewed and edits have been made in the FEIS to reflect changes made in the plans.
-	-	Chapter 2 of the DEIS describes generally the current and future supply and demand for U.S. and Canadian crude. However, the purpose of the projects and the need the projects are serving is to supply transportation of crude oil from the Bakken region and Canada to Midwestern markets and beyond. While the current and future supply and demand for U.S. and Canadian crude oil affects the demand for transportation of crude oil, these are not directly equivalent. The EIS should include a section specifically focusing on the need for transportation of crude oil.	-	A new section (2.3.4) has been added to Chapter 2 of the FEIS to describe the demand for transportation of crude oil.
-	-	The EIS should recognize that the Line 3 replacement	-	Section 2.1 has been revised to include this

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		project will serve demand that would have otherwise been served by the existing Line 3.		information.
-	-	Chapter 5 of the Draft EIS sections conclude with mitigation measures proposed by Enbridge and may include additional recommended mitigation measures the DNR proposes. There are instances where the DNR incorrectly stated mitigation measures that Enbridge did not propose in its application materials.	-	Enbridge provided updated reports since publication of the Draft EIS including updates to the Agricultural Protection Plan, Environmental Protection Plan, and Enbridge EIR. The measures identified as being proposed by Enbridge in the Draft EIS were checked against these most recent reports and revised as appropriate.
-	-	Some of the mitigation measures described in the DEIS may not be practical, may not reduce environmental impacts, or it is unclear whether the DNR has the authority to include. The DNR should point to specific, explicit authority in statute or administrative rule as required by Wis. Stat. § 227.10(2m) for each recommended mitigation measure.	-	The mitigation measures presented in the Draft and Final EISs are DNR-proposed measures that could reduce impacts to environmental resources from construction or operation of the proposed Projects. In the event that the permit(s) are granted, they would likely contain a final set of mitigation measures that must be carried

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
				out to reduce impacts as directed by the DNR. These measures would all be within the authority of the DNR to impose as conditions to the permit(s).
-	-	The life cycle analysis for climate change impacts associated with the proposed projects is seriously flawed. It assumes that all eventual GHG emissions from the product conveyed by the proposed Sandpiper and Line 3 replacement projects will be caused by the presence of these projects. However, these GHG emissions are not caused by the proposed Sandpiper and Line 3 replacement projects, but are instead attributable to the demand for and use of the refined products produced from the crude oil.	-	Section 7.4.2.2 of the FEIS estimates the GHG emissions that would be generated by the various stages of a cradle-to-grave analysis. The discussion clarifies that some GHG emissions estimates would be from activities indirectly related to the proposed Projects (e.g., crude oil extraction, refining, and product end use combustion). This section has been revised to clarify that the GHG emissions from activities indirectly related to the proposed Line 3 Replacement Project would occur regardless of whether the proposed Line 3 Replacement Project is permitted, constructed, and operated. GHGs associated with the proposed Sandpiper

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
				Project may or may not occur without the construction of the Sandpiper Project, due to uncertainties in the energy market.
-	-	The GHG analysis does not include any analysis of GHG emissions associated with the alternative modes of transportation (e.g., rail) that would be used to transport the product in the absence of the construction of the Sandpiper and Line 3 replacement projects. The Draft EIS fails to: (1) assess the life cycle GHG emissions associated with the conveyance of the petroleum product by these alternative modes of transportation that would be used if the proposed projects are not constructed; and (2) compare these emissions associated with alternative transport methods to the emissions calculated for transport by the proposed pipeline projects. This failure in the Draft EIS results in a significant overstatement of GHG emissions for these pipeline projects.	-	Section 7.4.2.2 has been revised to include a discussion of potential emissions from alternative modes of transportation including trucks and unit trains, as compared with emissions from pipelines in general.
-	-	Any GHG analysis in an EIS analysis conducted in accordance with the	-	The analysis in Section 7.4.2.2 is recognized to include GHG

Table 9-4 Applicant Comments on the Draft EIS and Responses

Draft EIS Section	Existing Text	Applicant Comment	Applicant Suggested Revision	Response
		Wisconsin Environmental Policy Act should be limited to the portion of the proposed pipeline project over which the State of Wisconsin has direct permitting authority/control, to wit: the 14-mile portion of the proposed pipeline projects from the Minnesota/Wisconsin border to the Superior Terminal. This suggested GHG emission analysis should: (1) be limited to this small portion of the pipeline projects located in Wisconsin; (2) describe only those GHG emissions directly caused by the Wisconsin portion of these projects.		estimates from the entirety of both pipelines. Notes have been added to that section to clarify that the emissions estimates from the pipelines are for the entire pipelines and not just for the portions in Wisconsin. Life-cycle emissions from the Sandpiper Pipeline may or may not occur regardless of whether the Sandpiper Project is built and operated. Oil may be produced and conveyed by rail, or may not be produced at all in any given month. Also, if the Wisconsin portion of Sandpiper is not permitted, the segments of the project in North Dakota and Minnesota may or may not be built and operated.

9.4 References

Environment Canada, Emergencies Science and Technology, Fisheries and Oceans Canada, Centre for Offshore Oil, Gas and Energy Research, Natural Resources Canada, Canmet ENERGY. 2013. Properties, Composition and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands, November 30. Available at: http://crrc.unh.edu/sites/crrc.unh.edu/files/1633_dilbit_technical_report_e_v2_final-s.pdf. Accessed May 9, 2016.

NOAA and API. 1994. Inland Oil Spills, Options for Minimizing Environmental Impacts of Freshwater Spill Response. September 1994. Available at: http://www.fws.gov/contaminants/fws_oscp_05/fwscontingencyappendices/N-Manuals-Response-Assessment/FreshwaterResponse_NOAA.pdf. Accessed January 21, 2016.

Region 5 Regional Response Team (Region 5 RRT). 2015. Regional Contingency Plan/Area Contingency Plan. Available at: http://rrt5.org/RCPACPMain.aspx. Accessed December 10, 2015.

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PUBLIC HEARING NOTICE

Wisconsin Department of Natural Resources
Phone: 1-888-936-7463 TDD: 711
http://dnr.wi.gov

SUBJECT: Public Hearing for Proposed Enbridge Sandpiper/Line 3 Pipeline Projects Environmental Impact Statement

The DNR will host a public hearing beginning at 4:30 p.m. and resuming at 6:30 p.m. on Thursday, March 10, 2016 at the Superior Public Library, 1530 Tower Avenue (1/2 block south of Belknap Street), in Superior, WI, for two purposes:

1) to receive public comment on the draft Environmental Impact Statement (EIS) for the Enbridge Sandpiper Pipeline construction and Line 3 replacement projects, proposed to be located in northwestern Douglas County. Additional information on this project, including the Draft EIS, is available at: http://dnr.wi.gov/topic/EIA/Enbridge.html.

2) to receive comments on the Line 3 replacement project wetland and waterway permit application. Details on the permit application portion of the hearing will be provided under separate announcement.

Comments can be provided at the hearing, or in writing through the submittal date listed below.

The proposed projects would involve construction of a new 30-inch diameter (375,000 barrels per day) crude oil pipeline (Sandpiper), which would be the Wisconsin portion of the larger Sandpiper Pipeline project extending from the Bakken Shale region in North Dakota through Minnesota to Superior. The proposed project also would include replacement of an existing 34-inch diameter pipeline, known as "Line 3", with a 36 inch diameter (760,000 barrels per day) pipeline. Both pipelines would cross approximately 14 miles of land in the Town of Superior, Village of Superior and City of Superior and terminate at the Enbridge Superior Terminal.

Developed in compliance with the Wisconsin Environmental Policy Act (WEPA), environmental impact statements inform decision-makers and the public about the anticipated effects of a project as well as alternatives to the proposed projects. This draft EIS looks at direct local effects, as well as broader impacts at regional, statewide and global scales.

Hearings on the permit applications required for the proposed Sandpiper pipeline project in Wisconsin would be held at a later date, as yet undetermined. Completion of the Sandpiper permit applications is dependent upon regulatory decisions in the State of Minnesota. In addition, federal permits from the US Army Corps of Engineers are to be considered through a separate process.

Parking adjacent to the library is limited to two hours. Therefore, library staff recommend parking in the North Parking Lot, or on a nearby street.

The hearing will begin at 4:30 pm, with DNR staff presenting a brief overview of the environmental impact statement process. Any interested individuals at the hearing will then have the opportunity to provide comments on the draft EIS, orally or in writing. DNR staff will be on hand to receive either written or oral comments. DNR staff will present the overview information again at 6:30 pm.

DNR will consider all comments from the public hearing in preparing a final environmental impact statement. The public will be notified when the final EIS is available. No permit decisions will be made until after the environmental impact statement process is complete.

The DNR's draft EIS and other information can be found by visiting DNR.wi.gov and searching for "Enbridge Sandpiper."

Individuals can submit comments about the draft environmental impact statement through Friday, March 25, 2016. Comments can be mailed to Jeff Schimpff (EA/7), Wisconsin DNR, Box 7921, Madison, WI 53707-7921 or sent by email to DNROEEAComments@wisconsin.gov. [See the separate announcement on the wetland and waterway permit application regarding comment submittal details for that application.]

To receive email or mobile alerts for updates to the Enbridge Sandpiper environmental impact statement, sign up here.

Contacts: Ben Callan, DNR spokesperson, benjamin.callan@wisconsin.gov , 608-266-3524; Jeff Schimpff, EIS coordinator, jeff.schimpff@wisconsn.gov, 608-267-7853; or Jennifer Sereno, communications, jennifer.sereno@wisconsin.gov, 608-770-8084.

FOR IMMEDIATE RELEASE
August 30, 2016

Contacts: Ben Callan, DNR project manager, 608-266-3524; Jennifer Sereno, DNR communications, 608-770-8084, Jennifer.Sereno@wisconsin.gov

DNR issues permit for Enbridge Line 3 Replacement Project

SUPERIOR, Wis. - The Wisconsin Department of Natural has issued a permit for wetland and waterway crossings required for Enbridge to replace a 14-mile segment of pipeline known as "Line 3" in Douglas County.

Line 3 extends from Alberta, Canada through North Dakota and Minnesota to Superior. The project in Wisconsin involves replacing the 1960's vintage 34 inch pipe with a new 36 inch diameter pipeline that could carry up to 760,000 barrels per day. The pipeline would cross approximately 14 miles of land mostly following the old pipeline route in the town of Superior, village of Superior and city of Superior, terminating at the Enbridge Superior Terminal.

Enbridge has also proposed construction of a new 30-inch diameter crude oil pipeline, called "Sandpiper" that could carry up to 375,000 barrels per day and extend 600 miles from the Bakken Shale region in North Dakota through Minnesota to Superior.

"At this time we are only addressing the permits for Line 3. The next steps for our review of the Sandpiper permit application will depend on the regulatory decision process in the state of Minnesota," said Ben Callan, DNR project manager. "We do not know how recent reports of investment by the company in a pipeline through Iowa and Illinois will affect the Sandpiper project proposal at this time."

Before any construction can occur on Line 3, permits from the US Army Corps of Engineers will be addressed through a separate federal process.

The DNR has completed an environmental impact statement (or EIS) process to evaluate the potential impacts of both Line 3 and Sandpiper to provide information to the public and decision makers in advance of any regulatory decisions.

The environmental impact statement is meant to inform decision makers, agencies, tribes, local governments and the public about the environmental effects associated with the construction, operation and maintenance of the pipelines in Wisconsin.

The department prepared a draft environmental impact statement in compliance with NR 150, Wis. Adm. Code. The draft statement was available for public review from February 24 to March 25, 2016. A public hearing was held at the Superior Public Library on March 10, 2016, with more than 70 individuals attending. The department has summarized and responded to all the public comments received.

The comment and response document is included in the final environmental impact statement. Both the final environmental impact statement and the DNR permit for the Line 3 project can be found at http://dnr.wi.gov/topic/eia/enbridge.html.