

Antidegradation Demonstration
Great Lakes Tunnel Project
NPDES Permit Application



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GREAT LAKES TUNNEL PROJECT

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1.0 INTRODUCTION AND BACKGROUND

The Great Lakes Tunnel Project (Project) is an underground tunnel beneath the Straits of Mackinac (Straits) that will be constructed and operated by Enbridge Energy, Limited Partnership (Enbridge) and owned, upon the completion of its construction, by the Mackinac Straits Corridor Authority (Authority). The tunnel is being pursued in accordance with the “Tunnel Agreement” that was executed by Enbridge and the Authority on December 19, 2018. That Agreement was entered in furtherance of Public Act 359, through which the State of Michigan (State) established the Authority and delegated to it the right to acquire, construct, maintain, improve, repair, and manage a utility tunnel across the Straits. The Project tunnel will cross below the lakebed of the Straits, connecting to the existing 30-inch pipeline at Point La Barbe in Michigan’s Upper Peninsula to McGulpin Point in Michigan’s Lower Peninsula in Mackinac and Emmet Counties, respectively.

The Project will accommodate a replacement of Enbridge’s existing Line 5 dual 20-inch-diameter pipelines that cross the Straits with a single, 30-inch-diameter pipeline. The replacement pipeline would be installed and located entirely underground within the tunnel. Upon completion, the tunnel will also have the potential to accommodate other utilities. During construction, discharges through multiple outfalls to Lake Michigan will be required. Such discharges will consist of groundwater that infiltrates the tunnel shaft, water used in slurry treatment, noncontact cooling water, hydrostatic pressure testing water and storm water. Once construction is complete, the discharges will be comprised of groundwater that infiltrates the tunnel and storm water. All water will be treated prior to discharge and no Bioaccumulative Chemicals of Concern (BCCs) are expected to be present in the discharge of water to Lake Michigan during construction phase activities or the post-construction operating condition.

2.0 NECESSITY OF DISCHARGE – ALTERNATIVES REVIEW

Enbridge is requesting authorization under the National Pollutant Discharge Elimination System (NPDES) program to discharge 1 million gallons per day (MGD) for launch portal and retrieval shaft construction, 1.44 MGD during tunnel boring machine (TBM) operations, and up to 5 MGD of water for a short duration when extreme case TBM intervention maintenance is necessary to Lake Michigan. The Project has been designed to reduce the necessary daily discharge volumes to the maximum extent practicable. The reviewed alternatives to a surface water discharge into Lake Michigan are discussed below.

2.1 WATER REUSE

The first alternative, 100% reuse of water used in slurry treatment, is infeasible due to anticipated ground conditions. The coarser granular particles can be separated from the slurry during the treatment process, but finer grained silts and clays are also expected due to slaking (breaking down in the presence of water) of claystone and shales. These resulting clays mix with the bentonite slurry and are expected to result in a frequent need for fresh slurry. Treated process water will be suitable for reuse in the fresh slurry and will be stored in a tank for reuse to the extent practical during the sequence of tunnel construction



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activities. However, in order to maintain the continuous availability of suitable clean slurry that is essential for tunnel mining to progress, it will be necessary to draw water from the lake for slurry makeup water and discharge some of the treated water.

2.2 OFFSITE DISPOSAL

The second alternative, hauling untreated slurry and/or infiltrated groundwater water offsite for treatment and disposal, would result in a significant increase in truck traffic. This remains a viable contingency plan in the event that the volume of water to be treated during a limited period during the tunneling operation exceeds the capacity of the on-site slurry treatment plant and/or water treatment plant, or in the event of a performance issue with the slurry treatment plant and/or water treatment plant. In this instance, as a contingency plan, vacuum trucks will be used to off-haul the untreated slurry or excess tunnel water to a pre-approved disposal area and/or pre-approved land to decant, separate solid and liquid, and discharge the water to a pre-approved point of discharge. For normal operations, the robust sizing and appropriate design and operation of the slurry treatment plant and water treatment plant are expected to maintain discharge within water quality limits, and routine hauling of untreated slurry or tunnel water offsite for treatment and disposal will not be necessary.

2.3 INJECTION WELLS

The third alternative, discharge of treated water to injection wells, was considered potentially feasible subject to detailed evaluation of potential impacts to residential wells. Since slurry tunnel boring machine (TBM) process water will be treated to attain discharge standards, the only advantage of discharge to injection wells would be to reduce the potential for seasonal temperature differences between the discharge water and the receiving waters; this is not considered necessary due to the large volume of the receiving waters. In addition to the potential impacts to residential wells, which would require evaluation, a further significant disadvantage would be the need for multiple injection wells and water distribution system across the construction site. The water distribution system would require pumping and protection against freezing by burial and/or heat tracing. This would introduce unnecessary complexity and congestion to the already highly utilized land area of the tunnel construction sites.

2.4 MUNICIPAL SEWER

The alternative of discharging to a local wastewater treatment plant (WWTP) was reviewed. The nearest municipal plant to the Mackinaw Station – South Side site is the Mackinaw City WWTP which is authorized to discharge up to 0.82 MGD of treated sanitary wastewater to Lake Huron. Daily wastewater flows from tunnel construction activities at the South Side site are projected at 1.0 MGD for launch portal construction, 1.44 MGD from TBM operations and up to 5 MGD during TBM intervention maintenance. At these design flows, the Mackinaw City WWTP would not have adequate treatment works capacity to accept the daily volumes of wastewater that will be generated. In addition, the Mackinaw City WWTP is designed to process sanitary wastewater. Specialized infrastructure is necessary to treat the unique type of wastewater produced during tunnel construction. This infrastructure is not present at the Mackinaw City WWTP. Based on limited existing hydraulic capacity and wastewater treatment process capability, discharging construction wastewater to the Mackinaw City WWTP is not considered a viable alternative.



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The St. Ignace WWTP is the nearest facility to the North Straits Facility – North Side site. The NPDES permit issued for this municipal plant is based on a design flow of 1.5 MGD. Wastewater flows generated during retrieval shaft construction are projected at 1.0 MGD. It is unlikely that the St. Ignace WWTP has adequate treatment works capacity to accept an additional 1 MGD of shaft construction wastewater. As with the Mackinaw City WWTP on the South Side, the St. Ignace WWTP is designed to process municipal wastewater. Without specialized infrastructure required to effectively treat tunnel construction wastewater and limited reserve plant capacity, discharging construction wastewater to the St. Ignace WWTP is also not considered a viable alternative.

3.0 BENEFITS TO ENVIRONMENT AND COMMUNITY

The Tunnel Agreement, and the commitment to construct the Project, resulted from years of study and negotiation between Enbridge and the State to identify a feasible alternative for the replacement of that portion of Enbridge's Line 5 pipeline (Line 5) that crosses the Straits. Based upon the alternatives report submitted to the State by Enbridge, *Alternatives for Replacing Enbridge's Dual Line 5 Pipelines Crossing the Straits of Mackinac*,^[1] which identified an underground tunnel as a feasible alternative, the State and Enbridge agreed in the Tunnel Agreement to construct, operate, and maintain an underground tunnel connecting the Upper and Lower Peninsulas of Michigan to accommodate a replacement of that portion of Line 5 and to provide the potential to accommodate use by other utilities. The placement of a replacement segment of Line 5 within the tunnel is expected to virtually eliminate the risk of a potential release from Line 5 at the Straits. The tunnel may also allow utilities, such as electric and broadband cables, that may otherwise be located in the water of the Straits to instead be located within an underground tunnel, thereby eliminating the potential for other utilities to adversely impact the Straits.

Enbridge's Line 5 pipeline serves a vital need for pipeline transportation in Michigan and the surrounding region. Line 5 transports light crude oil, light synthetic crude oil, light sweet crude oil, and natural gas liquids ("NGLs") volumes, and has an annual average capacity of 540,000 barrels per day. Among other things, Line 5 delivers NGLs to depropanization facilities that provide much of the propane used to heat homes and power industry in Michigan. Line 5 also transports light crude that is ultimately delivered to refineries, which then produce the petroleum products, including gasoline and aviation fuels, used by consumers in Michigan and the surrounding region.

The social, economic, and environmental benefits of relocating this segment of Line 5 within a tunnel beneath the Straits would be forgone if the discharge sought by this application is not permitted.

^[1] Available at

https://www.enbridge.com/~media/Enb/Documents/Projects/line5/ENB_Line5_AltEvaluation_Report_June15.pdf.



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4.0 SOCIOECONOMIC IMPACTS OF THE PROJECT

Unemployment rates in December 2019 for Emmet and Mackinac Counties were 5.8 percent and 17.0 percent, respectively. During Project construction, an average of approximately 200 workers including construction and inspection personnel will be employed on the Project. Nearly two million labor staff-hours will be required to complete this project. The Project is expected to have a short-term positive impact on local and regional employment rates.

During construction, the Project would also have a positive effect on the local economy through spending of worker payroll for housing, food, fuel, entertainment and other items. Construction personnel may temporarily occupy rental units in or near the Project area, representing a short-term positive impact on the area rental industry. With a total estimated construction cost of between \$300 and \$500 million, the construction contractor is estimating a potential for \$10.5 million for subcontracting opportunities including lodging, fuel, food, and other ancillary services; and has committed to utilizing Indigenous Peoples' services for at least 10 percent of the total operating, engineering, and labor staff-hours worked.

5.0 SUMMARY

Alternatives to a discharge to Lake Michigan were considered; however, none of the alternatives are feasible or viable because they fail, in accordance with the Tunnel Agreement, to provide an underground tunnel to accommodate a Line 5 replacement segment and potentially other utilities so as to virtually eliminate a release to the Straits. Construction and operation of the Project is expected to positively impact the local economy through employment opportunities and local purchases and alleviate an environmental concern raised by the State. The social and economic benefits of the proposed Project include temporary job creation, economic stimulus, and improved income.

