

December 2022 version

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at: <https://www.eqb.state.mn.us/>. The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project title: Mile Post 7 West Ridge Railroad Relocation, Dam Progressions, and Stream Mitigation Project

2. Proposer: Northshore Mining Company

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4. Reason for EAW Preparation: (check one)

Required:

- ☐ EIS Scoping
☒ Mandatory EAW

Discretionary:

- ☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s): MR 4410.4300, subp. 26.

Subpart 26, Stream Diversion: For a diversion, realignment, or channelization of any designated trout stream, or affecting greater than 500 feet of natural watercourse with a total drainage area of ten or more square miles unless exempted by part 4410.4600, subpart 14, Item E, or 17, the DNR or the local government unit is the Responsible Governmental Unit (RGU).

5. Project Location:

- County: Lake County
- City/Township: Beaver Bay
- PLS Location (¼, ¼, Section, Township, Range): See Table 1

- Watershed (81 major watershed scale): Lake Superior
- GPS Coordinates: See Table 1
- Tax Parcel Number: See Table 1

Table 1 summarizes the Public Land Survey (PLS) location, coordinates, and Tax Parcel Numbers for the project components.

Table 1 Summary of Project Location

Project Component	PLS Location	GPS Coordinates (Latitude, Longitude)	Tax Parcel Number
Dam 1 Progression	Sections 29, 30, 31, 32, T56N-R8W	47.300428/-91.387988	26-5608-29010, 26-5608-30010, 26-5608-31010, 26-5608-32010
Railroad Embankment/Dam 2 Progression	Section 6, T55N-R8W Sections 20, 21, 29, 30, 31, T56N-R8W	47.311302/-91.375415	26-5608-27010, 26-5608-30010, 26-5608-31010, 26-5608-21910, 26-5608-09250, 26-5608-20910, 25-5508-06010
South Clay Borrow Site	Section 9, T 55N- R8W	47.266429/-91.364379	26-5508-09490, 26-5508-09550, 26-5508-09370, 26-5508-09520, 26-5608-09250, 26-5508-09430
East Branch Beaver River	Section 27, T56N-R8W	47.312942/-91.327898	26-5608-27070, 26-5608-22610, 26-5608-27010
East Branch Beaver River – Tributary Ditch	Section 22, T56N-R8W	47.315193/-91.343805	26-5608-21910, 26-5608-22610, 26-5608-27070, 26-5608-28010
East Branch Beaver River - Berm	Section 21, T56N-R8W	47.318724/-91.352076	26-5608-21910
White Rock Creek	Section 36, T56N-R8W	47.289188/-91.282200	22-7470-10030, 22-7470-10020, 22-7470-10010, 22-7401-31680, 22-7401-31490, 22-7401-31685, 22-7401-31500, 22-7403-36585, 22-7403-36580, 22-7403-36910, 22-7401-31610, 22-7403-36583, 22-7401-31550, 22-7401-31672, 22-7401-31670, 22-7401-31860

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project (See Figure 1)
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable) (See Figure 2); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan (See Appendices A-E).

- List of data sources, models, and other resources (from the Item-by-Item Guidance: *Climate Adaptation and Resilience* or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project during the life of the project (as detailed below in EAW Item 7, Climate Adaptation and Resilience).

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Appendix J36	2023 EAW
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6. Project Description:

- a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

Northshore Mining Company proposes to relocate the West Ridge Railroad, progress Dams 1 and 2, construct a Dam 1 rail switchback, and develop a clay borrow site at the Mile Post 7 tailings basin. The project also includes approximately 12,900 linear feet of stream mitigation across four sites.

- b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities

Summary. Northshore Mining Company (Northshore or Proposer), which is an iron ore facility owned by Cleveland-Cliffs, Inc., proposes to make modifications to the Mile Post 7 Tailings Basin (Mile Post 7 Tailings Basin or Tailings Basin) toward attaining the maximum tailings storage capacity assessed and permitted by the 1977 Master Permit.¹ In this document, the existing and continued operation of the

¹The Tailings Basin was permitted by the DNR and Minnesota Pollution Control Agency (MPCA) in 1977 through the Master Permit after extensive environmental review and litigation. The 1977 Master Permit authorizes a Tailings Basin described as

basin for tailings deposition previously authorized by the 1977 Master Permit and subsequent associated permitting efforts is referred to as Ongoing Tailings Basin Operations. The Ongoing Tailings Basin Operations would include the placement of tailings within the currently permitted boundary, in addition to ongoing maintenance and refinement of existing dam features. To use the remaining portions of the Tailings Basin for Ongoing Tailings Basin Operations, several new features are required. Specifically:

- The West Ridge Railroad line and corridor would be relocated approximately 4,000 feet to the northwest of the existing rail line traversing the Tailings Basin. This is referred to as the West Ridge Railroad Relocation.
- Dam 1 and Dam 2 would progress westward from their existing extents to allow the basin to reach the final extents as designed in 1970s. This is referred to as the Dam 1 and 2 Progressions.
- A new Dam 1 rail switchback would be constructed, referred to as the Dam 1 Rail Switchback.
- Clay from various borrow pits would be excavated for dam construction from the areas referred to as the South Clay Borrow Site.

These are collectively referred to as the New Tailings Basin Features and would cover approximately 1,330 acres.

Because Ongoing Tailings Basin Operations within the permitted Tailings Basin footprint would result in the filling of remnant portions of Big Thirtynine Creek and Little Thirtynine Creek, the Proposed Project also includes approximately 12,900 linear feet (LF) of stream mitigation at four areas (the Proposed Stream Mitigation sites). Three of these sites are in the general vicinity of Mile Post 7 and a fourth site is within Silver Bay, Minnesota.

This set of activities, the development of the New Tailings Basin Features and the Proposed Stream Mitigation, collectively constitute the Proposed Project. The Proposed Project, combined with the Ongoing Tailings Basin Operations, is referred to as the Tailings Basin Project.²

RGU Note: The Proposed Project (the New Tailings Basin Features and the Proposed Stream Mitigation) is the focus of the responses to each item in this EAW. The Ongoing Tailings Basin Operations are being evaluated for cumulative potential effects together with the Proposed Project in responses to Item 21 of this EAW. That is, the cumulative potential effects analysis now includes an evaluation of the effects of the Proposed Project combined with effects from the Ongoing Tailings Basin Operations. The reason the Ongoing Tailings Basin Operations are included within the review is because the Minnesota Court of Appeals remanded the matter to the Minnesota Department of Natural Resources (DNR) to consider the Proposed Project and the Ongoing Tailings Basin Operation

follows: “The impoundment area will occupy approximately 6 square miles of land and will store eventually 733,000,000 long tons of fine and coarse tailings.” This was in addition to approximately 90,000,000 long tons of coarse tailings to construct the tailings dams to an ultimate crest elevation of 1,315 feet (above) mean sea level. *See Appendix J3-1977 Master Permit at 12 and 14.*

²For clarity, references to the Tailings Basin Project refer to the entirety of the work being evaluated under this EAW, meaning the (1) two Proposed Project elements and (2) the ongoing Tailings Basin Operations.

as connected actions for the purpose of determining whether an Environmental Impact Statement (EIS) is required. See *In re the Determination of Need for an Environmental Impact Statement for the Mile Post 7 West Ridge Railroad Relocation*, 2025 WL 368515 (Minn. Ct. App. Feb. 3, 2025).

New Tailings Basin Features – Proposed Activities

Dam 1 and Dam 2 Progressions. Northshore proposes to progress the western ends of Dam 1 and Dam 2 consistent with the footprint and ultimate crest elevation of 1,315 feet above mean sea level assessed and authorized in the 1970s Master Permit to accommodate the tailings in the Tailings Basin generated over the remaining permitted life of the Peter Mitchell Mine; see Figure 1 and Appendix A.1. These dam progressions will be centerline construction built on natural surface foundations and will connect to native topography elevations as discussed in Section 2 of Appendix F.

- *Dam 1 Progression.* Dam 1 is currently approximately 13,000 feet long and the planned progression would result in the construction of approximately 5,600 feet of dam consistent with the original footprint, which would cover approximately 60 acres. The Dam 1 progression would provide for isolation of the Tailings Basin and ponded water from the existing ash landfill. The height of Dam 1 progression at the connection with the existing dam would be approximately 70 feet, which is also the approximate maximum height of the dam along the proposed progression. Appendix A.1 depicts example cross-sections at a few locations along the proposed Dam 1 progression; the dam heights at the three extended Dam 1 transects from Appendix A.1 would respectively be: Transect No. 1 = 30 feet; Transect No. 3 = 60 feet; and Transect No. 4 = 30 feet.
- *Dam 2 Progression.* Dam 2 is currently approximately 6,500 feet long and the planned progression would result in the construction of approximately 2,400 feet of dam, consistent with the original footprint. The total acreage of the Dam 2 progression and relocated West Ridge Railroad would cover approximately 155 acres.³ The height of the Dam 2 progression at the connection with the existing dam would be approximately 70 feet, which is also the approximate maximum height of the dam along the proposed progression. Appendix A.2 provides an example cross-section along the proposed Dam 2 progression; the Dam 2 height at Appendix A.2, Transect No. 2, would be approximately 20 feet.

The Proposed Project would not change the ultimate crest elevation of the dams, as both dams would be constructed to their currently permitted maximum crest elevation of 1,315 feet, would not change the permitted capacity of the Tailings Basin to store 733,000,000 long tons of tailings, and would not change the final permitted area of tailings deposition nor the permitted basin footprint from the Tailings Basin concept that was studied in the 1975-76 Final EIS and subsequently permitted in 1977 and 1985.

Site preparation for dam construction would remove the surface vegetation, while excavation equipment would be used to remove underlying soils unsuitable for dam support, such as organic soils and/or soft/loose soils. Materials needed for the western progression of Dam 1 and Dam 2 would be sourced from the Northshore's Silver Bay processing plant, which produces plant aggregate (i.e., coarse tailings) and filter sands (i.e., finer fraction of the coarse tailings). See *Appendix J32-2024-2028*

³Because the eastern end of the proposed relocated West Ridge Railroad is contiguous to the proposed Dam 2 progression, reporting a combined acreage is warranted.

5YOP at 8-9. Construction of the Dam 1 and Dam 2 Progressions would consist of filter material and plant aggregate placed over prepared foundation soils. Filter material, which is the sand fraction size of the plant aggregate, would also be placed on the upstream slope between the tailings pond and coarse aggregate.

For the Dam 2 seepage cutoff, clay soils are used and obtained through borrow sources on the Northshore property. The clay borrow needs to meet specific design criteria included in the construction plans and specification so that it creates a sufficiently low permeable zone, limiting seepage through the dams. This clay material is to be extracted from the South Clay Borrow Site identified as a component of the Proposed Project.

Like historical activities, the crests of the dam progressions would be raised in increments in conjunction with raises for the main portions of the dams to match crest elevations. Dam progressions are anticipated to be constructed with typical mining construction equipment, such as haul trucks, bulldozers, and loaders. Dust suppression on active roadways would continue to be handled by a large, mobile water tanker that applies a dust suppressant and water to the trafficable surface.

Geotechnical monitoring instrumentation, including piezometers and inclinometers, would be installed at select locations. The data would aid the engineer of record (EOR) in their observation of the ongoing integrity of the dam progressions. Dam stability would be assessed by the EOR as part of the phased permit approval. Each phase would be required to meet or exceed the applicable minimum factors of safety.

The Factors of Safety⁴ assessed at the Mile Post 7 dam include various operational scenarios (e.g. pool elevations) and solid strength conditions. The analysis method searches for potential failure surfaces for each applicable scenario and strength condition. The strength conditions for silt and clay soils and fine tailings are Effective Stress Stability Analysis (ESSA) and Undrained Strength Stability Analysis (USSA) and liquefied undrained strength. For sand and gravel soils and plant aggregate, ESSA is used in all scenarios. The minimum Factors of Safety are based on the strength condition of the fined-grained soils and tailings. The DNR understands the current good engineering practice in the State of Minnesota uses the following values for minimum stability Factors of Safety: ESSA = 1.5; USSA = 1.3; and liquefied = 1.1. Tables 3, 4, and 5 of the 2024-2028 Five Year Operations Plan provide the Computed Factors of Safety for Various Scenarios for Dams 1, 2, and 5, respectively. The current Factors of Safety for the Mile Post 7 dams exceed the DNR minimum values. *See Appendix J33-2024-2028 5YOP at 19-26.* Furthermore, DNR's review of the most recent geotechnical evaluations of Dams 1, 2, and 5 indicate that all dams are robust with Factors of Safety well above these minimum levels. See Appendix F for additional discussion of assessment of geotechnical stability.

Throughout construction, runoff water management and erosion prevention would follow the applicable construction stormwater pollution prevention plan (SWPPP). As part of the SWPPP, best management practice (BMP) measures such as silt fence, biorolls, and ditch checks would be implemented during construction. Construction would also be phased to meet SWPPP requirements.

⁴Factor of Safety is a calculated measure of: 1) the actual load bearing capacity of a structure or component; or 2) the applicable margin of safety for structure or component according to code, law, or design requirements. Minimum Factor of Safety is the minimum required/acceptable ratio of strength to the applied load of a dam or other similar load-bearing structure. DNR has established minimum Factors of Safety for dams constructed and operated in Minnesota. Additional information is discussed in Appendix F.

The proposed West Ridge Railroad Relocation and Dam 1 Rail Switchback are subject to separate, distinct SWPPP(s); the requirements for erosion and sedimentation control for Dams 1 and 2 Progressions fall under Northshore's National Pollutant Discharge Elimination System (NPDES) Permit.

Once construction is complete, mulch and a native seed mix would be spread on the dam progression slopes as final grades are reached. Stormwater runoff would be impounded between the Dam 1 Progression and the existing diversion dike 2. As the elevation of the tailings pond increases over time, it would transition to become a seepage collection pond. A pump station would be constructed to manage water in this pond in a similar timeframe as the construction of the railroad grade. Other seepage management would consist of ditching along the toes of the dam progressions to route seepage to existing unlined seepage recovery ponds and pump stations. Culvert installation, as needed, would be an available water management measure. The dams would be subject to the site reclamation and closure requirements of Minn. R. Ch. 6130.

Dam 1 Rail Switchback. The Dam 1 Rail Switchback is the proposed railroad embankment that would be constructed along the southeastern side of the Dam 1 Progression. Construction of this feature allows for the current rail corridor that traverses the Tailings Basin to deliver plant aggregate for dam construction to be relocated to the edge of the basin, allowing the entirety of the permitted capacity to be used. The rail switchback would be approximately 3,700 feet long and would cover approximately 8.40 acres.

Relocation of the West Ridge Railroad. The existing West Ridge Railroad corridor would be relocated approximately 4,000 feet to the northwest; see Figure 1 and Appendix A.1. The proposed new corridor would cover approximately 52 acres and be 22,000 feet long. Once relocated, tailings placement would eventually progress over the present rail corridor into the remaining permitted 650 acres of the Tailings Basin up to an elevation of 1,315 feet. The majority of relocated railway embankment construction would occur separately from, as well as outside, the dam footprints. The exceptions would be: 1) where the new railway embankment would be constructed on a small section of the Dam 1 Progression, and 2) part of the relocated railway abutting the entire length of the Dam 2 Progression. The relocated railway would be inside the existing diversion ditches that were designed and constructed at the western limit of the Tailings Basin permit boundary. The relocated railway, as does the existing railway, would be used to supply plant aggregate and filter material as construction materials for ongoing development of the dams. Though integrated within the dam design in select areas, the railroad embankment itself has no structural function in entraining tailings; that is reserved for the dams and would not change under the Proposed Project. Further discussion of railroad loading and dams is provided in Appendix F.

Site preparation for the railroad embankment footprint would be done using excavation equipment by removing vegetation and underlying soils unsuitable for embankment support, including organic soils and/or soft/loose soils. Ditches would be constructed along the railroad embankment and would direct water contacting plant aggregate to seepage recovery facilities. Water that does not contact plant aggregate would be routed off site through culverts and ditches.

After construction is complete, topsoil or silty/clayey materials would be placed over slopes facing the exterior of the Tailings Basin and seeded with a native mix shortly following construction of the railroad embankment in compliance with the SWPPP and Minn. R. Ch. 6130. The exterior of the rail embankment would be designed with a specific, targeted slope and revegetation plan so that it would not have appreciable sheet flow. After the establishment of vegetation, no further amendments on

the outside slopes would be required in the event of closure. During closure, the inside slopes would be subject to the same reclamation requirements for the dams.

South Clay Borrow Site. Clay material would be extracted for ongoing dam construction, including select portions of the Dam 1 Progression from an existing borrow source area referred to as the South Clay Borrow Site. The material would be sourced from a clay borrow pit developed on approximately 108 acres of company-owned property located south of the basin; see Figure 1 and Appendix A.1. Clay material would be excavated to a depth of five to ten feet below the soil surface. After the clay borrow has been removed, excavators and haul trucks would be used to respectively extract and transport clay material. Approximately 15 acres of the clay borrow site has already been excavated, but the need for a continuous source of suitable clay as a construction material would be necessary. In addition, approximately 17 acres of the clay borrow site is delineated as wetland and would not be disturbed. Once clay removal ceases, the area would be reclaimed at the depth of the extracted resource, where the ground surface would be seeded with a native mix and mulched in accordance with Minn. R. Ch. 6130.

Schedule. The schedule for the West Ridge Railroad Relocation would be timed to be complete once the tailings pond begins to encroach on the freeboard limits of the existing West Ridge Railroad corridor; this is expected to take several years. This means it is possible that both the existing and future railroad grades would operate simultaneously for a limited time. Initial construction would commence shortly after project approval, but the schedule is highly dependent on the annual pellet production because the construction materials, by design, are generated as a byproduct of the pellet-making process. The Dams 1 and 2 Progressions would be constructed over the course of an estimated 40 years, with a numeric term applied in the Permit to Mine to match the remaining estimated life of the Peter Mitchell mine. Clay will be extracted from the clay borrow site over the duration of dam progression construction. The switchback is anticipated to be constructed in approximately 10 to 20 years to allow connection of the West Ridge Railroad Relocation with the track for a future elevation of Dam 1.

Stream Mitigation – Proposed Activities

Northshore is responsible for conducting four compensatory individual stream mitigation actions, including: East Branch Beaver River; East Branch Beaver River Tributary Ditch; East Branch Beaver River Tributary Berm Stream; and White Rock Creek; see Figure 1 and Appendix B through Appendix E. The proposed activity at the Proposed Stream Mitigation sites is summarized below:

East Branch Beaver River. The Proposed Project would restore approximately 3,000 LF of the East Branch Beaver River. The restoration design would address deficiencies noted in the existing conditions analysis by repositioning a set of perched culverts, making the floodplain accessible, moving the channel away from eroding banks, adding large woody debris, and improving bedform diversity.

East Branch Beaver River Tributary Ditch. The progression of Dam 2 would remove approximately 2 square miles of watershed from the East Branch Tributary restoration site. The site would however still retain stream function where the restoration is designed to complement the new, reduced watershed area by providing new calculated lift. The design would restore approximately 4,855 LF of the East Branch Beaver River Tributary Ditch by creating floodplain inside the ditched channel, adding bedform diversity, and adding large wood debris.

East Branch Beaver River Tributary Berm. The goal of the mitigation would be to remove the berm that is no longer necessary based on the current Tailings Basin design, which would reconnect the watershed flow through the downstream channel. Berm removal and resulting mitigation of the watershed drainage area would complete this mitigation. No other stream mitigation methods would be used downstream of the berm. The berm removal would restore 2,766 LF of the channel and 0.24 square miles of the watershed area, the latter of which represents restoration of the full watershed area. The return of flow changes the hydrology parameters in the Minnesota Stream Quantification Tool (SQT) tool by increasing bankfull flow calculations.

White Rock Creek. The design would restore approximately 3,501 LF of White Rock Creek by creating a floodplain within the confines of the narrowed valley, improving bedform diversity, and adding large woody debris. A riparian planting plan would also improve the vegetative community.

These actions were required by the US Army Corps of Engineers (USACE) to provide compensatory stream mitigation for the loss of function of remnant Big Thirtynine and Little Thirtynine Creeks due to the proposed construction of Dams 1 and 2 Progressions and West Ridge Railroad Relocation. The East Branch Beaver River and East Branch Tributary projects are located on Northshore property, whereas White Rock Creek flows through the City of Silver Bay. The goal of the mitigation is to provide functional uplift to the channels that would result in mitigation credit by stabilizing stream channels, restoring floodplain connectivity, and improving aquatic habitat.

The general goals and objectives to be met for each of the Proposed Stream Mitigation sites include:

- Establish natural stream processes within the watershed.
- Establish an appropriate pattern and profile for the valley and channel type.
- Establish appropriate channel dimensions for channel type.
- Establish a floodplain appropriate for the valley and channel type.
- Improve aquatic and floodplain habitat for the area.
- Meet all the objectives to provide the maximum uplift as determined by the Minnesota SQT.⁵

Improved stream function would be provided by increasing functional feet of each streams' reach, thereby providing functional lift on the channel reaches by creating bedform diversity and access to the floodplain. The design would generally follow the existing streams' alignment, and gravel riffles would provide habitat, roughness, and grade control. Toe wood structures and log J-hooks would replicate natural stream banks, protect the outer meander bends, and create woody habitat. In the higher gradient channels, the designs include step pool features along with floodplains appropriate to its stream type.

⁵The objectives include improvements in the hydrology, hydraulics, and geomorphology categories of the Minnesota SQT. A third-party consultant would complete the Minnesota SQT data entry and calculations before and after restoration work.

Construction would typically include use of an excavator and other associated heavy equipment to construct the new channel. An excavator with a hydraulic thumb would be used to install the in-stream structures including toe-wood, boulders, logs, and rocks. To facilitate construction, the streams would be temporarily diverted or pumped around active construction areas using an engineer-approved stream diversion plan. Temporary access trails have been designed to be located along existing roads and disturbed areas where possible. After construction is complete, the temporary access trails would be reclaimed and revegetated. Any stockpiles would have erosion and perimeter control and other BMPs would be implemented to prevent sediment from entering streams during construction.

The existing channel vegetation would be temporarily removed. The existing alder would be excavated and used as transplants in critical areas. Native seeds, trees, and shrubs would be planted along the stream banks and within the adjacent riparian corridor. Further back from the channel, a straw-type erosion control blanket would be used to hold the soils until the vegetation is established.

Silt fences, seeding and mulching, erosion control blankets, and other appropriate erosion control measures would be incorporated into the construction phase of the project. Other measures would include working during low flow periods and limiting the amount of disturbed area and soils exposed at any one time. Low-flow conditions are defined as July 1 – March 31 for White Rock Creek, and July 1 – September 14 for the other three projects. Disturbed sites would have the soil prepared for reseeding, would be reseeded with appropriate native vegetation, and would be mulched to encourage rapid revegetation. The riparian areas would be planted with native vegetation, with sites stabilized with erosion control blankets to allow vegetation to become established. Plantings would consist of native forbs and grass seed, shrubs, and trees.

Schedule. The Proposed Stream Mitigation would be completed in a two-phase schedule, with construction occurring in 2027 and 2029, respectively. The sequencing and batching of the four individual projects has yet to be determined. The projects would require one field season to complete.

c. Project magnitude:

Table 2 provides a breakout of the total project acreage for the New Tailings Basin Features and Proposed Stream Mitigation respectively. Table 3 provides information regarding the project magnitude.

Table 2 Project Acreage and Linear Feet

Project Feature	Total Project Acreage	Project Length (LF) ¹	Functional SQT Length (ft) ²
Dam 1 Progression	56.9	~5,600 ³	N/A
Dam 1 Rail Switchback	8.4	~3,700	N/A
West Ridge Railroad Relocation and Dam 2 Progression	154.7	~21,950	N/A

Project Feature	Total Project Acreage	Project Length (LF) ¹	Functional SQT Length (ft) ²
South Clay Borrow Site	108.3	N/A	N/A
Subtotal	328.3	31,250	N/A
East Branch Beaver River	N/A	3,000	316
East Branch Beaver River Tributary Ditch	N/A	4,855	1,250
East Branch Beaver River Tributary Berm	N/A	2,766	304
White Rock Creek	N/A	3,501	988
Subtotal	N/A	14,122	2,858
Total	328.3	35,372	2,858

Notes:

¹Stream mitigation length may vary. The original stream mitigation plan was based on 30% design. Minnesota SQT lengths were based on true ground measurement before and after construction (i.e., the stream gets longer in most cases after construction) and EAW “construction footprint” would differ from both because it does not factor in stream sinuosity.

²The functional debit and the functional lift are 668.2 feet apart, with the deficit on the functional lift. The functional lift directly satisfies 87% of the functional debits considering only the functional lift within the project reaches. The scope of the restoration activities and the lift provided downstream of stream mitigation project component provide adequate mitigation for the 668.2 foot-deficit.

³The acreage and linear feet of the Dam 1 progression have decreased from the values presented in the 2023 EAW because they are being measured from the current extent of the dam as constructed under the Ongoing Tailings Basin Operations.

Table 3 Project Magnitude

Project Feature	Acres
Total project acreage (New Tailings Basin Features)	328
Total project length (Proposed Stream Mitigation sites)	12,900 linear feet
Number and type of residential units	0
Residential building area (in square feet)	0
Commercial building area (in square feet)	0
Industrial building area (in square feet)	0

Project Feature	Acres
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	0
Structure height(s)	N/A

- d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the New Tailings Basin Features is to support the use of the entirety of the Tailings Basin already permitted in 1977 over the remaining operating life of the Peter Mitchell Mine, which is estimated to be approximately 40 years, but is dependent on actual pellet production rates.

The purpose of the Proposed Stream Mitigation sites is to provide mitigation required by the USACE and Minnesota Pollution Control Agency (MPCA) for the impacts to the remnants of Big Thirtynine Creek and Little Thirtynine Creek, whose upper watersheds were diverted in the late 1970s (as part of the originally permitted Tailings Basin construction), with the remnants planned to be covered with tailings over the present and future operating life of the Tailings Basin. All four (remaining) proposed individual stream actions would meet the functional uplift required by the Minnesota SQT to in turn meet the requirements of the stream debits as calculated by the Minnesota SQT. The designs provide the maximum uplift through the creation of a meandered channel appropriate for its channel type, with addition of riffles and pools, and both riparian and aquatic habitat.

- e. Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ☒ No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.
- f. Is this project a subsequent stage of an earlier project? ☒ Yes ☐ No
If yes, briefly describe the past development, timeline and any past environmental review.

Past Development, Any Past Environmental Review, and Timelines

DNR has compiled substantial information beyond this EAW regarding past development, any past environmental review, and timelines and permitting for development to date at Mile Post 7, which also includes information on the status of present operations at the facility. *See Appendix J, List of Supplemental Information Known to RGU*, for supplemental documentation cited in the discussion below and for other select EAW Items.

Summary. The Proposed Project includes stream mitigation actions and site modifications to allow Northshore to use the entirety of the Mile Post 7 Tailings Basin as permitted in 1977. Original construction of the Mile Post 7 Tailings Basin arose out of a court order directing then Reserve Mining to cease tailings disposal in Lake Superior after being granted a reasonable time to find an on-land disposal facility for tailings associated with processing ore from the Peter Mitchell Mine. *See Appendix J25-Reserve Mining Co. v EPA.*⁶ The ultimate site selected and permitted as the on-land disposal

⁶See *Appendix J25-Reserve Mining Co. v. Environmental Protection Agency et al.*, 514 F.2d 492 (8th Cir. 1975) in Appendix J.

facility for tailings associated with processing ore at Silver Bay from the Peter Mitchell Mine was the Mile Post 7 Tailings Basin. This site was selected, and permits were issued, for the Mile Post 7 Tailings Basin only after completion of environmental review of the entire footprint of the Mile Post 7 Tailings Basin as well as of other alternative sites, extensive public input, and extensive litigation culminating in an order from the Minnesota Supreme Court directing the state to issue the permits necessary to construct and operate the Mile Post 7 Tailings Basin in 1977. *See Appendix J26-Reserve Mining Co. v Herbst at 845-846.*⁷ Subsequently the DNR and the MPCA issued Reserve Mining a permit to operate the Mile Post 7 Tailings Basin in August 1977. *See Appendix J3-1977 Master Permit.*

Below is a brief chronology of the important milestones detailing the Mile Post 7 Tailings Basin Site's history and associated references:

1956	Reserve Mining Company began full operations at its Silver Bay taconite processing plant. Tailings from the Silver Bay plant were dumped into Lake Superior. <i>See Appendix J10-1975 Draft EIS at 5.</i>
Jun 1973	In June 1973, the US Environmental Protection Agency (USEPA) released documentation of the discovery of asbestiform fibers in City of Duluth's drinking water. Reserve Mining Company's discharge to Lake Superior was thought to be the source of the asbestiform fibers in Duluth, Minnesota's, drinking water. <i>Id. at 7.</i>
Apr 1974	Minnesota Federal District Court finds Reserve Mining Company's discharge of tailings into Lake Superior was a violation of the Federal Water Pollution Control Act, enjoins the further disposal of tailings into Lake Superior, and orders Reserve Mining Company to locate an on-land disposal facility for its tailings. <i>See Appendix J31-United States v. Reserve Mining Co. 1974.</i> ^{8 & 9}
Nov 1974	Reserve Mining Company submits permit applications to the DNR and MPCA to build an on-land tailings basin at Mile Post 7. <i>See Appendix J10-1975 Draft EIS at 7.</i>
May 1975	Minnesota Environmental Quality Council designated DNR and MPCA as joint responsible agencies for preparation of an Environmental Impact Statement for Reserve Mining Company's Mile Post 7 plan. <i>Id.</i>
Oct 1975	DNR and MPCA issued the Draft Environmental Impact Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan (1975 Draft EIS). ¹⁰ <i>See Appendix J10-1975 Draft EIS in total.</i>
Jun 1976	DNR deems Final Environmental Impact Statement (1975-76 Final EIS) for "Reserve Mining Company's Proposed On Land Tailings Disposal Plan" to be complete. <i>See</i>

⁷*See Appendix J26-Reserve Mining Co. v. Herbst et.al*, 256 N.W. 2d 808, 845-46 (Minn. 1977) in Appendix J.

⁸*See Appendix J-31-United States v. Reserve Mining Co.*, 380 F. Supp. 11 (D. Minn. 1974) *aff'd and modified by Reserve Mining Co. v. EPA*, 514 F.2d 492 (8th Cir. 1975) (i.e., *J25-Reserve Mining Co. v EPA 1975*).

⁹Reserve Mining's disposal practices prior to the establishment of the Mile Post 7 Basin was the subject of extensive federal and state litigation. A documentation of the history of this litigation can be found in the 1975 Draft Environmental Impact Statement.

¹⁰All citations to the 1975 Draft EIS apply to the Draft Environmental Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan (October 1975).

Appendix J9-1975-76 Final EIS at PDF 355. The FEIS assumed that the Tailings Basin would have a 40-year life, equivalent to the time needed to complete mining at the Peter Mitchell Mine. *Id. at PDF 363.*

May 1977	US Army Corps of Engineers releases Final Environmental Impact Statement for Power Plant Discharge Structure, Delta Stabilization Dike, and On-Land Taconite Tailings Disposal for Reserve Mining Company. <i>See Appendix J29-1977 USACE Final EIS.</i>
Aug 1977	DNR issues a Master Permit to Reserve Mining Company for the Mile Post 7 On Land Tailings Disposal Plan at Silver Bay, Minnesota. <i>See Appendix J3-1977 Master Permit.</i>
Apr 1978	MPCA issues its permits for construction and operation of a disposal system (i.e., Mile Post 7). <i>See Appendix J13-1984 NPDES Permit MN0055301 at PDF 15.</i>
Feb 1981	Reserve Mining Company submits an Application for a Permit to Mine (1981 Permit to Mine Application) to DNR upon passage of the Mineland Reclamation Act. <i>See Appendix J23-1981 Permit to Mine Application.</i>
May 1984	MPCA issues NPDES Permit MN0055301 to allow a discharge from Mile Post 7. <i>See Appendix J13-1984 NPDES Permit MN0055301.</i>
Mar 1985	DNR issues a Permit to Mine (1985 Permit to Mine) to Reserve Mining Company Peter Mitchell Mine and Stockpiles, Reserve Railroad, E.W. Davis Works, and Milepost 7 Tailings Basin Site pursuant to the state Mineland Reclamation Act. <i>See Appendix J5-1985 Permit to Mine.</i>
Aug 1986	Reserve Mining Company files for bankruptcy under Chapter 11. <i>See Appendix J17-1995-1998 Five Year Operations Plan (5YOP) at 2.</i>
Aug 1989	Reserve Mining interests in Mile Post 7 and the Peter Mitchell Mine are transferred to Cyprus Mineral Company. Mile Post 7 NPDES Permits, the 1977 Master Permit, and the 1985 Permit to Mine transferred to Cyprus Mineral Company and Cyprus Northshore Mining. <i>See Appendix J27-1989 Stipulation Agreement.</i>
Sep 1994	Cleveland Cliffs purchases Cyprus Mineral Company including Northshore Mining and Cyprus Northshore Mining is renamed Northshore Mining. <i>See Appendix J17-1995-1998 5YOP at 2.</i>
Jan 1995	MPCA issues Air Emission Permit No. 07500003 as a Total Facility Operating Permit. <i>See Appendix J11-MPCA Air Permit 07500003-101 at 2.</i>
Aug 1995	Master Permit renewed. <i>See Appendix J4-1995 Master Permit Renewal.</i> ¹¹
Sep 1996	MPCA combines three water quality NPDES/SDS Permits for the Mile Post 7 Tailings Basin into a single NPDES/SDS Permit No. MN0055301. <i>See Appendix J15-Furnace 5 Reactivation Record of Decision at 3.</i>

¹¹The Master Permit has been subsequently renewed, which occurred most recently in 2024.

Mar 1997	Milepost 7 Tailings Basin Five Year Operations Plan prepared for Northshore Mining Company by Sitka Corp.
Dec 2002	Disposal System 5 Year Operations Plan prepared for Northshore Mining Company by Sitka Corp.
Dec 2003	Five Year Operations Plan Years 2004-2008 Milepost 7 Tailings Basin, prepared for Northshore Mining Company by Barr Engineering Co. <i>See Appendix J18-2004-2008 5YOP.</i>
Mar 2005	DNR's assignment of the 1985 and 1989 Permit to Mine to Cleveland Cliffs and Northshore Mining Company completed. <i>See Appendix J6-2005 Permit to Mine Assignment, et al.</i>
Dec 2005	MPCA reissues NPDES/SDS Permit MN0055301 to Northshore Mining Company, Silver Bay Power Company, and Cleveland-Cliffs Inc. <i>See Appendix J14-2005 NPDES Permit MN0055301.</i>
Dec 2008	Five Year Operations Plan Years 2009-2013, Milepost 7 Tailings Basin, prepared for Northshore Mining Company by Barr Engineering Co.
Dec 2013	Five Year Operations Plan Years 2014-2018, Milepost 7 Tailings Basin, prepared for Northshore Mining Company by Barr Engineering Co.
Jan 2019	Five Year Operations Plan Years 2019-2023, Milepost 7 Tailings Basin, prepared for Northshore Mining Company by Barr Engineering Co. <i>See Appendix J19-2019-2023 5YOP.</i>
May 2024	Operational and Engineering Design Plan in Conformity to Milepost 7 Master Permit, Years 2024-2028, prepared for Cleveland-Cliffs, Inc. by Barr Engineering Co. <i>See Appendix J32-2024-2028 5YOP.</i>
Jun 2024	DNR renews Master Permit and approves 2024-2028 Five Year Operations Plan. <i>See Appendix J33-2024 Master Permit Renewal.</i>
Apr 2025	Perimeter Dam Stability Evaluations, Dam 1, Dam 2, and Dam 5, prepared for Northshore Mining Company by Barr Engineering Co. <i>See Appendix J34-2025 Perimeter Dam Stability Evaluations.</i>
Apr 2026	MPCA reissues NPDES/SDS Permit MN0055301 to Northshore Mining Company. <i>See Appendix J35-2026 NPDES Permit MN0055301.</i>

In addition to the state and federal EISs and other documents cited above, other information has been compiled as detailed in the following documents:

- "Cleveland-Cliffs, Inc. and Northshore Mining Company Mile Post 7 Tailings Basin Progression and Clay Borrow Site Environmental Review Need Determination," with references, figures,

and attachments, dated June 28, 2021 (2021 DNR ERND). *See Appendix J2-2021 DNR ERND.*

- “Record of Decision on the Need for an Environmental Assessment Worksheet for the Mile Post 7 Tailings Basin Progression, Lake County, Minnesota,” with citations of material evidence, proposer information, and additional information known to DNR, dated February 4, 2022 (J7-2022 DNR Record of Decision). *See Appendix J7-2022 DNR Record of Decision.*
- “Mile Post 7 West Ridge Railroad Relocation, Dam Extensions, and Stream Mitigation Project Environmental Assessment Worksheet,” with references, figures, and attachments, published on April 18, 2023. *See Appendix J36-2023 EAW.*
- “Record of Decision on the Need for an Environmental Impact Statement for the Mile Post 7 West Ridge Railroad Relocation, Dam Extensions, and Stream Mitigation Project,” dated March 1, 2024. *See Appendix J37—2024 Record of Decision.*
- State of Minnesota Court of Appeals, “In the Matter of Determination of Need for an Environmental Impact Statement for the Mile Post 7 West Ridge Railroad Relocation, Dam Extensions, and Stream Mitigation Project, Lake County, Minnesota,” filed February 3, 2025(reversed and remanded to DNR with instructions for further environmental review of the Project). *See Appendix J38-2025 Court of Appeals Decision.*
- “Perimeter Dam Stability Evaluations, Dam 1, Dam 2, and Dam 5.” Prepared for Northshore Mining Company by Barr Engineering Co. April 2025. *See J34-2025 Perimeter Dam Stability Evaluations.*
- MPCA National Pollutant Discharge Elimination System/State Disposal System Permit MN0055301. April 2026. *See Appendix J35-2026 NPDES Permit MN0055301.*

Any references from these respective decision documents not cited in this EAW can be made available upon request.

The following paragraphs describing the Mile Post 7 Tailings Basin rely on these documents and other information known to DNR. Past development included the construction and/or operation of: the Mile Post 7 Tailings Basin; two stream diversions with associated berms (necessitated by the construction of the original Tailings Basin dams); the West Ridge Railroad; a wastewater treatment plant; and an ash disposal landfill.

Mile Post 7 Tailings Basin

Past Development. The Mile Post 7 Tailings Basin was designed and constructed to accept tailings from ore mined from the Peter Mitchell Pit and processed in Silver Bay, Minnesota. The design capacity or volume of the Tailings Basin was based on the estimated remaining ore and rate of mining anticipated in the Peter Mitchell Mine. When processed, taconite ore originating from the Peter Mitchell Mine (at Babbitt, Minnesota) produces both coarse and fine tailings that are disposed at Mile Post 7 Tailings Basin. The plant aggregate fraction is shipped by rail to the Tailings Basin for use in the historic and ongoing construction of Dams 1, 2, and 5 and the West Ridge Railroad. Fine tailings are pumped up from Silver Bay in a slurry and spigotted into the Tailings Basin. The Proposed Project is

necessary to allow use of the Tailings Basin at its total designed capacity. This entails continued delivery of: (1) plant aggregate for construction of Dams 1, 2, and 5; (2) plant aggregate to construct the dam progressions and relocated materials supply railroad; and (3) fine tailings deposited within the basin itself, all of which would occur over the remaining operating life of the Peter Mitchell Mine.

As designed, tailings deposited at the Mile Post 7 Tailings Basin are physically contained by a combination of site topography and three existing perimeter dams designated as Dams 1, 2, and 5; see Figure 1. Tailings dams are compacted fill embankments continuously constructed (raised and expanded) over the life of a tailings basin, typically beginning with construction of a starter dam that is subsequently raised in individual lifts over time. The current crest elevations of Dams 1 and 2 are approximately 1,260 feet. The maximum anticipated crest elevation for these dams is 1,315 feet.

Past development at the Tailings Basin proper also includes a seepage collection system (i.e., catchment areas) at the toe of the dams to capture seepage through the dams. The captured seepage is pumped and thus recycled back into the tailings pond to minimize release to the environment. MPCA's permits require continuous monitoring of both surface and groundwater losses from the seepage collection system.

As for the development parameters for the Mile Post 7 Tailings Basin proper, the following text provides additional details on the: final dam and tailings elevations; volume of tailings deposition; and area of tailings deposition.

Final Dam and Tailings Elevations. The history of the maximum permitted elevation for the dams and tailings is summarized as follows:

- The final dam height evaluated in the 1975 Draft EIS was 1,280 feet above mean sea level (amsl). This was conceptually depicted in 1975 Draft EIS Figure 3, Proposed Mile Post 7 Disposal Area. *See Appendix J10-1975 Draft EIS at 21.*
- The final dam heights in the 1975-76 Final EIS were adjusted upward by approximately 30 feet, meaning the final dam height by the end of environmental review was ~1,310 feet amsl. *See Appendix J9-1975-76 Final EIS at PDF 364,* (summarizing the modifications made in the dam height during the administrative hearing proceedings and reflected in the 1975-76 Final EIS).
- The final dam height identified at Section 1.050 of the 1977 USACE Final EIS was 1,315 feet amsl, which was selected to “to provide sufficient storage capacity for 40 years of operations.” *See Appendix J29-1977 USACE Final EIS at 12.*
- The 1977 Master Permit set the final height of the “Tailings Containment Dams,” and specified “Dams 1 and 2-3...will be constructed to ultimate crest elevation 1,315 mean sea level, over a period of years, according to a predetermined construction schedule.” *See Appendix J3-1977 Master Permit, Section V, at 12.* Similarly, Dams 4, 5, and 6 were proposed to be constructed to ultimate crest elevation 1,315 mean sea level. *Id.* This has not changed in subsequent permitting nor is it proposed to be changed under the current action.
- The 1985 Permit to Mine approved the tailings basin with “an average level of ultimate tailing pond area will be about elevation 1,305 while the dam crests will be elevation 1,315.” *See*

Appendix J23-1981 Permit to Mine Application at 48. This has not changed in subsequent permitting nor is it proposed to be changed under the current action.¹²

No change in permitted final dam elevations, which is 1,315 feet amsl, is required to achieve the Proposed Project's objectives.

Volume of Tailings Deposition. The history of the anticipated volume of tailings to be placed at Mile Post 7 is summarized as follows:

- The 1975 Draft EIS assumed 20,417,000 long tons of fine tailings would be pumped annually into the Mile Post 7 tailings basin over the 40-year operational life of the Mile Post 7 tailings basin. This amounts to a total deposition of 816,680,000 long tons of fine tailings over the life of the tailings storage facility. This was the amount of stored tailings assessed to determine the environmental impact of the tailings basin at its maximum capacity. *See Appendix J2-2021 DNR ERND at 14.*
- The 1977 Master Permit described the tailings basin as an "impoundment area [that] will occupy approximately 6 square miles of land and will store eventually 733,000,000 long tons of fine and coarse tailings." This was in addition to approximately 90,000,000 long tons of coarse tailings used for the original dam construction. These approximations for tailings storage were based on the best information at the time for the maximum dam height (1,315 feet) authorized in the Master Permit. *See Appendix J2-2021 DNR ERND at 14.* Although not directly comparable to the 1975-76 Final EIS estimate, the 1977 Master Permit provided the tailings basin would eventually store 733,000,000 long tons of "fine and coarse tailings." *Id.*

The Proposer reports that actual tailings production has not met the original projections of ~20 million long tons per year over the estimated 40-year life of the Peter Mitchell Mine. The tailings production rate from 1985 to 2005 ranged from ~4.0-5.3 million long tons per year, resulting in the deposition of an estimated 88,736,000 long tons of fine tailings within the Mile Post 7 Tailings Basin. Much of this deviation from the original estimate of 20,417,000 long tons per year can be attributed to the vagrancies of the steel market over time, including four years of no tailings production while Reserve Mining was in bankruptcy. Since 2005 to the present, fine tailings production has ranged from ~5.5-7.9 million long tons per year, resulting in the placement of an additional ~102,383,000 long tons of fine tailings within the tailings basin. In aggregate, the Proposer estimates that the total volume of tailings deposited at the Mile Post 7 Tailings Basin between 1985 and 2019 is 191,118,000 long tons. *Id. at 14-15.*

The Proposer used Lidar-based modeling and tailings disposal data to calculate the remaining volume in the Tailings Basin from a baseline date of May 2019; this assumed dam construction to the permitted final dam height of 1,315 feet amsl. Based on this analysis, the remaining volume in the Tailings Basin is estimated to be 561,905,000 long tons of tailings. When the volume of existing tailings (119,118,000 long tons) is added to the remaining capacity (561,905,000 long tons), the total volume of tails in the Mile Post 7 Tailings Basin is projected to be 753,023,000 long tons of tailings. *Id. at 15.* The Proposer's updated Lidar-based estimate is comparable to the volume of tailings estimated in the

¹²In temporary closure, the final tailings elevation would be 1,305 ft amsl with freeboard in place. In final closure, the final tailings elevation will depend on the facility configuration, especially if there is no pool. As the final permitted dam height is 1,315 ft amsl, for the purposes of the EAW the final tailings elevation is also identified as 1,315 ft amsl.

1977 Master Permit.

No change in the permitted volume of tailings storage is required to achieve the Proposed Project's objectives.

Area of Tailings Deposition. The anticipated area of tailings deposition at Mile Post 7 Tailings Basin has remained consistent throughout its history, and is summarized as follows:

- The total area assigned to the Tailings Basin footprint in the 1975-76 Final EIS was approximately 6 square miles, or 3,850 acres. *See Appendix J9-1975-76 Final EIS at PDF 364.* The 1975-76 Final EIS did not specifically assign areas for fine or coarse tailings disposal, which meant the entire internal volume of the Tailings Basin up to the maximum dam crest elevation 1,315 feet and approximately 2,950 acres were available for tailings storage.
- The area evaluated in the 1975-76 Final EIS was incorporated into the 1977 Master Permit. The Tailings Basin permitted in the 1977 Master Permit would encompass "approximately six square miles," or ~3,850 acres total. *See Appendix J3-1977 Master Permit at 2.* Because there was no change in the final dam heights from the 1975-76 Final EIS, this equated to ~2,950 acres allocated for actual disposal of fine tailings under the 1977 Master Permit. There were no modifications to the Tailings Basin acreage made under the 1985 Permit to Mine. *See Appendix J23-1981 Permit to Mine Application at 48.* In short, the acreage for disposal of fine tailings in the Tailings Basin has remained constant since the 1975-76 Final EIS.

The Proposer has updated the estimated total acreage available in the basin for the final dam elevation of 1,315 feet. That calculation estimates the Tailings Basin at capacity will cover ~2,800 acres, which is slightly less than the estimates from the 1975-76 Final EIS and 1977 Master Permit. *See Appendix J2-2021 DNR ERND at 15-16.* The tailings pond at the Mile Post 7 Tailings Basin currently covers ~2,150 acres of the 2,800 acres evaluated in the 1975-76 Final EIS, which was subsequently permitted in both the 1977 Master Permit and 1985 Permit to Mine.

The Proposed Project, if implemented, would allow Northshore to use the remaining 650 acres of the Tailings Basin already permitted for placement of fine tailings. At that point, the Mile Post 7 Tailings Basin would reach its 2,800 acres of permitted capacity. When the Mile Post 7 Tailings Basin reaches this permitted capacity, it will undergo reclamation and closure as required under the most recent provisions of both the 1977 Master Permit and the 1985 Permit to Mine.

No change in the permitted area to receive tailings is required to achieve the Proposed Project's objectives.

Past Environmental Review. The Mile Post 7 Tailings Basin was subject to both state and federal environmental review.

State Environmental Review. The Mile Post 7 Tailings Basin was subject to state environmental review. The "Reserve Mining Company's Proposed On Land Tailings Disposal Plan" EIS was conducted over 1975 and 1976. A Draft EIS was released in October 1975.¹³ The Final EIS issued in June 1976 consists

¹³All citations to the 1975 Draft EIS apply to the "Draft Environmental Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan" (October 1975).

of the Draft EIS and the Finding, Conclusions and Recommendations, Index to Transcripts, and Listing of Exhibits from the administrative proceedings. *See generally Appendix J9-1975-76 Final EIS.*

Federal Environmental Review. National Environmental Policy Act (NEPA) environmental review requirements were fulfilled when on May 17, 1977, when the USACE issued a federal EIS for the proposed “Power Plant Discharge Structure, Delta Stabilization Dike, and On-Land Taconite Tailings Disposal” project at Mile Post 7. Like the state’s 1975-76 Final EIS, the federal final environmental impact statement considered the environmental impacts associated “with authorization of Federal permits” for the Mile Post 7 Tailings Basin. *See generally Appendix J29-1977 USACE Final EIS.*

Timeline Post-State EIS. Upon completion of the 1975-76 Final EIS, the MPCA and DNR undertook consideration of Reserve Mining’s permit applications previously submitted in November 1974. After reviewing the 1975-76 Final EIS and the information submitted by Reserve Mining, the DNR and MPCA denied Reserve Mining’s request for permits for constructing and operating a tailings basin at Mile Post 7 on July 1, 1976. Upon review of the extensive administrative record including the 1975 Draft EIS and Transcript of the Administrative Hearing (i.e., 1975-76 Final EIS), the Hearing Officer’s Order at the completion of said hearing and extensive briefing, the Minnesota Supreme Court on May 27, 1977, ordered the DNR and MPCA to issue Reserve Mining the permits necessary to construct and operate the Mile Post 7 Tailings Basin. *See Appendix J2-6Reserve Mining Co. v. Herbst 1977.*

Subsequently, after the Minnesota Supreme Court’s decision in August 1977, DNR and MPCA jointly issued a Master Permit to Reserve Mining to operate a tailings disposal facility at Mile Post 7. By its terms, the permit was to be updated every five years. This update is accomplished through Mile Post 7 Operations Plans (5-Year Operations Plans). *See Appendix J3-1977 Master Permit at 4.* As the name implies, the 5-Year Operations Plans were to be submitted every five years for review and approval by DNR and MPCA over the anticipated 40-year life of the Mile Post 7 Tailings Basin. *Id.* The 2024-2028 Five Year Operations Plan is currently in effect. *See Appendix J32-2024-2028 5YOP.* Because the laws governing dam safety were not in place until 1979, the 1977 Master Permit also regulates dam safety at Mile Post 7.¹⁴

With the passage of the Mineland Reclamation Act rules for ferrous mining in 1981, Reserve Mining applied for a Permit to Mine to DNR in February 1981. *See Appendix J23-1981 Permit to Mine Application.* In March 1985, DNR issued a Permit to Mine to Reserve Mining for all its Northshore operations, including the Mile Post 7 Tailings Basin, Peter Mitchell Mine, and the taconite ore processing facilities at Silver Bay.¹⁵ The Permit to Mine is reviewed annually. The permit assumed an operating life of the mine at the Peter Mitchell Pit to be at least 35 years as it was believed that within 35 to 40 years all available ore in the Peter Mitchell Mine would have been mined. Thus, the lifespan

¹⁴Tailings dams in Minnesota are subject to DNR’s Dam Safety Program pursuant to Minn. Stat. § 103G.501 through 103G.561. Also see Minn. R. 6115.0300 through 6115.0520. Because the laws governing dam safety were not effective until 1979, the Master Permit regulates dam safety at Mile Post 7 [consistent with established dam safety standards in Minnesota]. Because the dams at Mile Post 7 are Class 1 dams, they are monitored daily by the basin engineer and other employees working on the dam. The Factors of Safety consistently assessed at the Mile Post 7 dams include various scenarios for Effective Stress Stability Analysis (ESSA) and Undrained Strength Stability Analysis (USSA); these scenarios include various iterations around block failure, fine tailings yield strength, and liquefied strength. DNR accepts the following values for minimum Factors of Safety: ESSA = 1.50; USSA = 1.30; and liquefied = 1.10. The current Factors of Safety for the Mile Post 7 dams exceed the DNR minimum values. *See Appendix J19-2019-2023 5YOP at 19-26 and Appendix F.*

¹⁵Reserve Mining declared bankruptcy 1986. All original permits have been transferred to Cleveland Cliffs and its subsidiary Northshore Mining Company.

of the Mile Post 7 Tailings Basin coincides with the remaining mine life of the Peter Mitchell Mine to exhaust the available iron ore. *See Appendix J5-1985 Permit to Mine at 1.* As the amount of ore mined and tailings generated slowed over the years, the number of years that the Mine and the Tailings Basin would need to operate to exhaust the iron ore increased, but the volume of tailings ultimately stored in the basin remained the same.

Summary. Under the Proposed Project, there is: 1) no change in the maximum permitted elevation of the dams and tailings; 2) no expansion of the final tailings storage volume;¹⁶ and 3) no change in the final permitted area of tailings deposition, from the Tailings Basin concept that was studied in the 1975-76 Final EIS and subsequently permitted in 1977 and 1985. Therefore, the continued placement of tailings within the permitted footprint and storage capacity of the Mile Post 7 Tailings Basin is a previously permitted action outside the scope of the Proposed Project but considered as a connected action with potential cumulative effects as directed by the Court of Appeals decision. *See Appendix J38-2025 Court of Appeals Decision at 12-13.*

Diversions of Big Thirtynine Creek and Little Thirtynine Creek

Past Development. Tailings basin development included two constructed stream diversions involving both Big Thirtynine Creek and Little Thirtynine Creek. The purpose of the diversions was to route water around the interior areas of the future tailings basin. New channels (Diversion Channels) were constructed to direct water from the upper watersheds of Big and Little Thirtynine Creeks to the west into the Beaver River. These Diversion Channels today are effectively ditches carrying water from the upper watersheds of both creeks. A series of berms was also constructed to meet this water management objective. The result was to effectively isolate the lower reaches of both creeks from their upper watershed, which was estimated to be 7.0 miles of Big Thirtynine Creek and 2.7 miles for Little Thirtynine Creek. *See Appendix J10-1975 Draft EIS at 230.* The construction substantially reduced contributing flows from those of natural, historic levels within the stream remnants of both creeks (remaining within the currently unused portions of the Tailings Basin).

Prior to construction of the Mile Post 7 Tailings Basin, the stream reaches below the diversions and berms were designated trout streams. *See Appendix J10-1975 Draft EIS at 141.* After the diversions, both historic stream channels were removed from the list of designated trout streams and the new Diversion Channels were in turn designated as a trout stream. Thus, the remnants of both of Little Thirtynine and Big Thirtynine Creeks located below the diversion are no longer designated trout streams and have not been designated trout streams for many years.

Regarding the Proposed Project, the Proposed Stream Mitigation sites are designed to mitigate the impacts of filling these remaining creek remnants resulting from construction of the newly proposed infrastructure (dam progressions and rail line relocation), and the loss of functions and values of the remnant portions of Big and Little Thirtynine Creeks within the Tailings Basin. The mitigation for these impacts includes creating more natural stream functions and values within the two Diversion Channels to better match the respective trout stream designations.

¹⁶The term “expansion” is defined by rule as “an extension of the capability of a facility to produce or operate beyond its existing capacity.” Minn. R. 4410.0200, subp. 28. The term “extension” is defined in Merriam Webster as “an enlargement in scope of operation,” and the Oxford English Dictionary defines the term extension as “a part that is added to something to enlarge or prolong it, a continuation.”

Past Environmental Review. The diversions of both Big Thirtynine Creek and Little Thirtynine Creek were assessed in the state and federal EISs.

The state's 1975 Draft EIS documents that approximately 7 miles of Big Thirtynine Creek, and 2.7 miles of Little Thirtynine Creek, lay within the boundary of the proposed Mile Post 7 Tailings Basin. According to the 1975 Draft EIS, the "[T]ailings [B]asin [would] occupy 7.6 square miles and eliminate approximately 9.7 miles of streams," which would result in reduced capacity of the drainage basin to carry waters downstream thus reducing downstream flows. These changes in flow regimes caused by the diversions in the Creeks would result in varying reductions in river miles and an associated loss of fishing habitat. *See Appendix J10-1975 Draft EIS at 231.*

The 1975 Draft EIS also found that Diversion Channels 1 and 2, if implemented, would divert 22.6 square miles of the 31.3 square miles of stream flow in the Big and Little Thirtynine Creeks watershed, which is a sub-watershed of the Beaver River watershed. It was estimated that 23 cubic feet of water per second would be diverted or lost from the watershed. *Id. at 46.* The diversions would also eliminate one waterfall. *Id. at 220.*

Sections 4.053 through 4.063 of the 1977 USACE Final EIS considered how construction and operation of the Mile Post 7 Tailings Basin would impact aquatic habitats within the Beaver River Watershed. *See Appendix J29-1977 USACE Final EIS at 61-62.* Although not as detailed as the state 1975-76 Final EIS, the documented anticipated impacts to water resources were consistent across both the state and federal EISs, especially in terms of the changes to Big and Little Thirtynine Creeks resulting from construction of Diversion Channels 1 and 2.

Timeline. The 1977 Master Permit Section VII.D, "Diversion Dikes and Channels – Surface Water Diversions 1 and 2," authorized construction of Diversions 1 and 2. The purpose of these Diversions was to prevent surface runoff and flows from entering the Tailings Basin. Both Diversions were required to be designed to control the probable maximum precipitation event. Diversion Channel 1 would connect Little Thirtynine Creek with Big Thirtynine Creek. Diversion Channel 2 would connect Big Thirtynine Creek with the Beaver River. *See Appendix J3-1977 Master Permit at 18.*

Diversion Channels 1 and 2, and Diversion Dikes 1 and 2, were constructed in 1978. Diversion 1 was 6,400 feet long and Diversion 2 was 2,420 feet long. Both Diversions are routinely inspected and have been maintained since being constructed. Similarly, flows in the two reaches of Big Thirtynine Creek and Little Thirtynine Creeks south of the diversions have been restricted since the original construction of Diversions 1 and 2. This means all watershed-scale impacts resulting from constructing the Diversions, and subsequent impacts to the streams from reduced flows, have been in place since 1978.

Big Thirtynine Creek and Little Thirtynine Creek Mitigation

Past Development. Northshore has completed two stream mitigation projects for Big Thirtynine Creek and Little Thirtynine Creek. Approximately 5,700 LF of Little Thirtynine Creek was restored by adding a bankfull bench, adding large wood debris, and increasing bedform diversity through the addition of riffles and pools where appropriate. In addition, approximately 1,700 LF of Big Thirtynine Creek was restored by creating an accessible floodplain (bankfull bench), adding large woody debris, adding sinuosity or meander, and maximizing the bedform diversity parameter through the addition of riffles and pools. Restoration of these projects was completed in October 2024.

The goal of these restoration activities is to provide functional uplift to the channels that would result in mitigation credit by stabilizing stream channels, restoring floodplain connectivity, and improving aquatic habitat.

Past Environmental Review. The Big Thirtynine Creek and Little Thirtynine Creek mitigation projects were assessed in an EAW prepared by DNR in 2023. *See generally Appendix J36-2023 EAW.* The DNR concluded the Big Thirtynine Creek and Little 39 Creek projects did not have the potential for significant environmental effects. *See Appendix J37-2024 Record of Decision at 240.* Because the two projects have been constructed, all governmental decisions have been made and they were the subject of prior environmental review, they are exempt from further Environmental Review and are not evaluated in this EAW.

West Ridge Railroad

Past Development. Plant aggregate required for dam construction have historically been delivered to the Mile Post 7 site, and across the Tailings Basin to the Dam sites, by means of a spur rail line emanating originally from Reserve Mining's existing mining railroad. Although no location for where the rail line would traverse the Tailings Basin was originally specified, it was generally understood this rail line would move over time to accommodate the changing construction areas for the dams and as the basin filled with tailings. The railroad grade itself is composed of plant aggregate, which is material authorized to be placed within the basin. This railroad grade is not a dam and serves no structural function. To date the railway has operated in two locations. The second and current location of the rail line has been in place since 2005. The rail line will shift a third and final time under the Proposed Project to an elevation above 1,315 ft amsl to avoid overtopping with tailings.

Past Environmental Review. The need for a materials supply railroad, which eventually became known as the West Ridge Railroad, was assessed in both the state and federal EISs.

The 1975-76 Final EIS provided that the coarse tails required for dam construction would be delivered to the Mile Post 7 site by means of a spur rail line from Reserve Mining's existing mining railroad. This was shown in the 1975 Draft EIS in Figure 16, which is detailed in the J2-DNR 2021 ERND at Attachment 5 – Possible Railroad Spur. *See (complete) Appendix J2-DNR 2021 ERND at PDF 85.* Although no location was specified for this spur line in the 1975-76 Final EIS, an estimated 5.5 miles of new railroad construction was necessary to connect the existing Reserve Railroad line at Mile Post 6.5 to the future operations at Mile Post 7. It was generally understood this spur line would move over time to accommodate the changing construction areas for the dams and as the basin filled with tailings. Thus, the spur line is little more than a convenience for the transportation of building materials to the Tailings Basin dam sites as the basin was filled. *Id. at 24.*

Whereas the 1975 Draft EIS only referenced a general "possible railroad spur" off the existing Reserve Railroad to convey the dam construction materials across the Tailings Basin site, the 1977 USACE Final EIS addressed the future materials supply railroad in detail at Sections 1.056 to 1.060, and in "Exhibit 31 – Construction Railway General Alignment." Railroad components were expected to evolve over time and included the: spur railroad; initial railroad; intermediate railroad(s); and the ultimate railroad, where subsequent components were to be relocated upgradient along the western side of the Tailings Basin over time. *See Appendix J29-1977 USACE Final EIS at 13-14, A-36.* This rail line was, in fact, constructed at its original location, and was then relocated to its present alignment.

Northshore now proposes to relocate the West Ridge Railroad under the Proposed Project to its final alignment; this alignment is depicted as the “ultimate railroad” on Exhibit 31, Construction Railway General Arrangement, in the 1977 USACE Final EIS. *Id. at A-36*. The greater detail in the 1977 USACE Final EIS reinforces the understanding of this site feature at the time of the 1975-76 Final EIS, as well as the understanding that this rail line was intended to move over time.

Timeline. The 1977 Master Permit provided there would be “eleven stream crossings by roads, railroads, and pipelines.” See *Appendix J3-1977 Master Permit at 3*. Similarly, the 1981 Permit to Mine Application specifies the use of “the conveying and rail-haul system” as necessary to transport the dam construction materials. See *Appendix J23-1981 Permit to Mine Application at 44*. Once operational, the 1995-1998 Five Year Operations Plan identified the need to relocate the original West Ridge Railroad corridor upslope to the west once the tailings pond reached an elevation of 1,220 feet. See *Appendix J17-1995-1998 5YOP at 7*. This happened in 2005 when the West Ridge Railroad was moved approximately 1000-2000 feet west from its original alignment to its current location at an elevation of ~1,240 feet. See *Appendix J18-2004-2008 5YOP at 15*. The relocation of the West Ridge Railroad in the Proposed Project would require an amendment to the Permit to Mine and would be subject to the 2024-2028 Five Year Operations Plan. See *Appendix J32-2024-2028 5YOP*.

Wastewater Treatment Plant

Past Development. A water treatment plant was added to the Mile Post 7 Tailings Basin facility in 1985. It was designed to remove excess water from the Tailings Basin, treat it, and discharge it into the Beaver River. It was located south of the east-end of Dam 1. In 2007, the water treatment facility was upgraded by adding additional treatment lines thereby increasing the facility’s capacity. Since the 2007 upgrade, the normal treatment rate ranges from 2,500 to 3,500 gpm, but rates as high as 4,200 gpm have been recorded. These treatment flows have maintained basin water levels within acceptable engineering norms. See *Appendix J19-2019-2023 5YOP at 14*. The Proposed Project does not substantially change the current facility water balance and thus does not affect operations or discharges from the wastewater treatment plant.

Past Environmental Review. The Water Treatment Plant was reviewed by MPCA in the context of issuing construction and discharge permits but was not required to undergo formal state or federal Environmental Review. Reserve Mining sanctioned preparation of a Preliminary Engineering Report for Excess Water Discharge in March 1984. The report noted that because the mining, processing, and operating levels resulted in reduced production rates, water levels in the basin were rising faster than the dams could be constructed. This required discharge of some of the water to maintain the water balance in the system. The Water Treatment Plant was constructed at the Tailings Basin so this water could be treated prior to discharge to the Beaver River. See *Appendix J24-1984 Water Discharge Study at 1-3*.

Timeline. In 1985, MPCA issued permits to Reserve Mining for the construction of a water treatment facility and initiating a permitted water discharge. The MPCA issued three separate permits to Reserve Mining regulating water resources at Reserve Mining’s Northshore facilities: one for the operation of the Mile Post 7 Tailings disposal system; a second to regulate the Mile Post 7 water treatment plant and discharge to the Beaver River; and a third to regulate the discharge of non-contact cooling water from the Silver Bay Power Plant to Lake Superior and the discharge of process wastewaters from the Silver Bay Plant to the Mile Post 7 Tailings basin. See *Appendix J15-Furnace 5 Reactivation Record of Decision – Permitting History at 3*. These permits were reissued and/or transferred to Cyprus Mineral

Company and Cyprus Northshore Mining Company in August 1989, when that company acquired the assets of Reserve Mining. *Id.* The three permits were subsequently combined into a single MPCA NPDES/SDS Permit No. MN0055301, which was issued to Cyprus Mineral Company and Cyprus Northshore Mining Company in 1996. *Id.*

The permit was again reissued in 2005 to Northshore Mining Company, Silver Bay Power Company, and Cleveland-Cliffs Inc. and in 2025 to Northshore Mining Company as MPCA NPDES/SDS Permit MN0055301 (MPCA NPDES Permit). *See Appendix J14-2005 NPDES Permit MN0055301; see Appendix J35-2026 NPDES Permit MN0055301.* This permit continues to govern water quality at the Mile Post 7 site. This global permit regulates not only the water quality of the treatment plant effluent, but also the monitoring requirements for all other potential sources of impacts to surface water and groundwater resources at the Mile Post 7 Tailings Basin and the Silver Bay processing facility. *Id.* Operations of the wastewater treatment facility are also documented in the 2019-2023 Five Year Operations Plan (*at 14*) and the 2024-2028 Five-Year Operations Plan. *See Appendix J19-2019-2023 5YOP; see Appendix J32-2024-2028 5YOP.*

Ash Disposal Facility

Past Development. A lined solid waste disposal facility for disposal of demolition debris and coal ash is located at the west corner of the Mile Post 7 site (Disposal Facility). *See Appendix J12-MPCA Solid Waste Permit SW-409 at 4.* As designed the ash landfill is 30 acres with a total capacity of 566,000 cubic yards. The Disposal Facility was constructed in phases. Construction of Phases I, II, and III have been completed and filled with waste. A portion of the Phase IV liner was constructed in 2008 (designated as Phase IVA) for the purpose of managing stormwater from Phases I-III. *Id.* The ash landfill is projected to continue to be used for the disposal of coal ash and other approved waste up to its ultimate design capacity. The orientation of the Dam 1 progression and the West Ridge Railroad under the Proposed Project are designed to avoid impacts to the ash disposal facility.

Past Environmental Review. The need for this disposal and eventual development of a landfill was neither anticipated nor analyzed in the 1975-76 Final EIS, nor in the 1977 USACE Final EIS. The landfill was assessed in the context of construction and operating permits, but neither mandatory nor discretionary Environmental Review were triggered for the landfill facility.

Timeline. The MPCA issued to the Proposer its Solid Waste Permit SW-409 authorizing construction of the ash disposal facility in 2000. *Id.* This permit was reissued in 2004, 2010, and most recently on May 18, 2017. The ash landfill is currently permitted through 2027. The Proposed Project is not anticipated to change any operations of the ash disposal facility.

7. Climate Adaptation and Resilience:

- a. Describe the climate trends in the general location of the project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location during the life of the project.

The DNR Minnesota Climate Trends tool provides a summary of historical climate data for various regions across Minnesota. The climate data that is presented in this tool was collected from nationally available sources, the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information, and the Parameter-elevation Regression on Independent Slopes Model

(PRISM) Climate Group (reference (4)). Data was analyzed for the Lake Superior-South watershed, which spans from the city of Duluth to the outskirts of Silver Bay. This watershed encompasses the entire Proposed Project area.

Graphic 1 summarizes the mean, maximum, and minimum average daily temperature from 1895 to 2024 for Lake Superior - South. It also shows the temperature trends per decade from 1895 to 2024 and from 1980 to 2024 to represent the full record of data and more recent data since 1980, respectively (reference (4)). In each temperature statistic, Lake Superior-South exhibits an increase in daily temperature from 1895 to 2024. The annual average minimum temperature has increased at the largest rate of the three temperature statistics for the full record of data and for data from 1980 to 2024. Table 4 summarizes the trends for mean, maximum, and minimum average daily temperatures.

Graphic 1 Historical Annual Mean, Maximum, and Minimum Daily Air Temperature (°F) for Lake Superior-South from 1895 to 2024

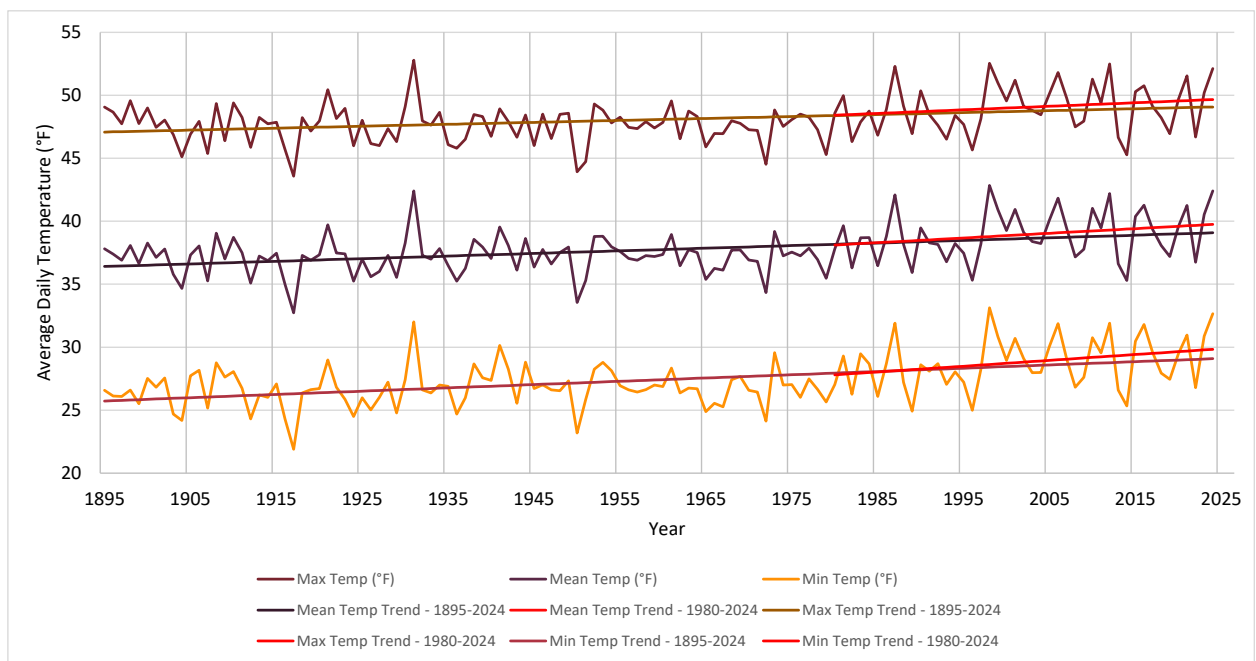


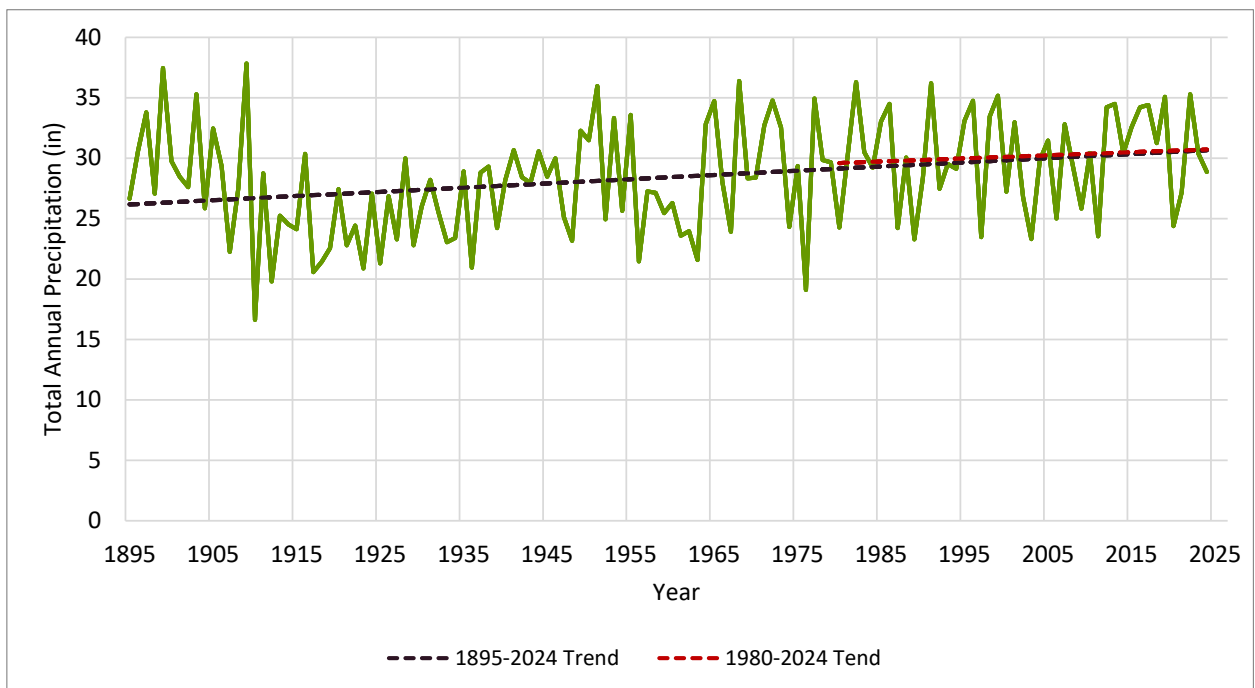
Table 4 Historical and Projected Temperature Trends for the Project

Temperature Statistic	Years	Trend (°F/decade)
Minimum Average Daily	1895-2024	0.26
Minimum Average Daily	1980-2024	0.46
Mean Average Daily	1895-2024	0.21

Temperature Statistic	Years	Trend (°F/decade)
Mean Average Daily	1980-2024	0.37
Maximum Average Daily	1895-2024	0.15
Maximum Average Daily	1980-2024	0.28

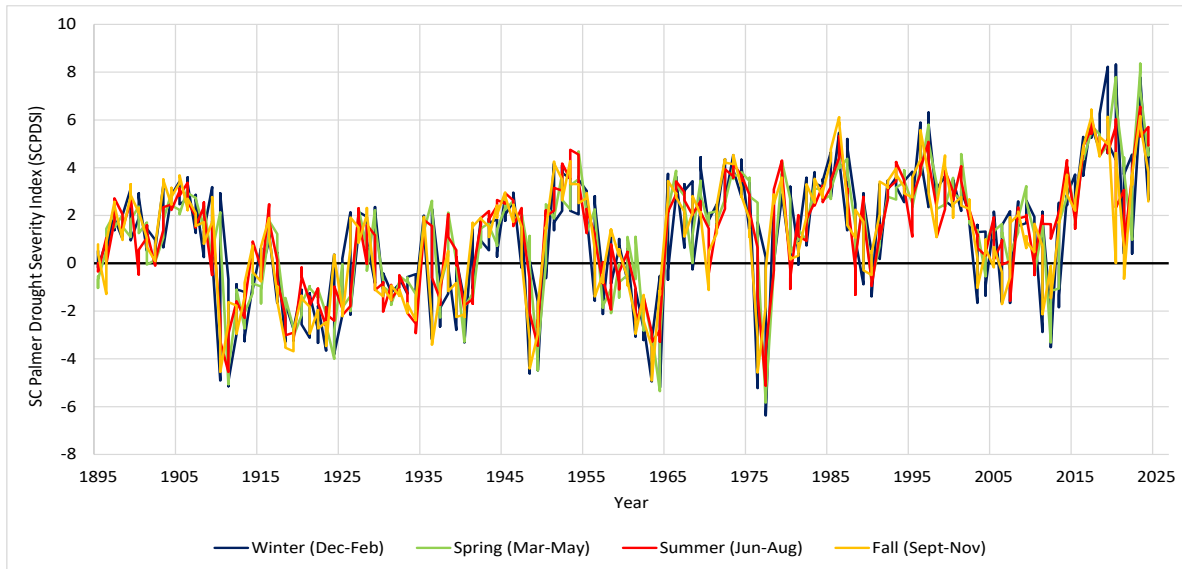
Graphic 2 shows the total annual precipitation for Lake Superior-South from 1895 to 2024. Total annual precipitation has increased from 1895 to 2024 by a rate of 0.24 inches/decade and decreased from 1980 to 2024 by a rate of 0.05 inches/decade.

Graphic 2 Historical Total Annual Precipitation(inches) for Lake Superior-South from 1895 to 2024



Graphic 3 shows the seasonal drought severity for Lake Superior - South from 1895 to 2024 using the Self-Calibrated Palmer Drought Severity Index (scPDSI). The scPDSI is a meteorological drought index that measures the departure of moisture. Negative scPDSI values indicate drought conditions, positive values indicate wet conditions, and values near zero indicate normal conditions (reference (5)). Lake Superior - South experienced frequent drought episodes from 1910 to 1940 and 1950 to 1975. From 1990 to 2024, seasonal wet conditions have generally been more frequent than drought conditions.

Graphic 3 Historical Drought Severity for Lake Superior-South from 1895 to 2024



Future projections are based on the Minnesota dynamically downscaled climate model data that was developed by the University of Minnesota and are summarized in three scenarios: Shared Socioeconomic Pathway (SSP) 245, SSP370, and SSP585. SSP is a measure adopted by the Intergovernmental Panel on Climate Change (IPCC) to represent various greenhouse gas concentration pathways as well as social and economic decisions (reference (6)).

SSP245 represents a “Middle of the Road” scenario in which economic, social, and technological trends follow historical patterns, population growth is moderate, and inequality persists. Additionally, SSP245 includes an intermediate emissions scenario, where a net radiative forcing of 4.5 watts per meter squared (W/m^2) is received by Earth due to the greenhouse gas (GHG) effect, and emissions begin to decrease around 2040 (reference (6)).

SSP370 represents a “Regional Rivalry” scenario where nations focus on regional issues instead of cross-collaboration and development. SSP370 also includes a high emissions scenario, where a net radiative forcing of 7.0 W/m^2 is received by Earth (reference (6)).

SSP585 represents a “Fossil-fueled Development” scenario where there is increased development in competitive markets driven by an increased global consumption of fossil fuels. SSP585 also includes a very high emissions scenario, where a net radiative forcing of 8.5 W/m^2 is received by Earth and no emissions are reduced through 2100 (reference (6)).

Table 5 shows the modeled historical and projected temperature values for the Proposed Project. Under all scenarios for each statistic, temperature values are projected to increase through the end of the 21st century. The largest increases occur in the minimum daily temperature under most scenarios.

Table 5 Modeled Historical and Projected Temperature Trends for the Project

Scenario	Time Period	Average Daily Temperature (°F) – Ensemble Mean	Minimum Daily Temperature (°F) – Ensemble Mean	Maximum Daily Temperature (°F) – Ensemble Mean
Historical	1995-2014	39.1	32.9	47.0
ssp245	2040-2059	42.8 (3.7)	36.8 (3.8)	50.6 (3.6)
ssp245	2060-2079	44.3 (5.1)	38.3 (5.3)	51.9 (4.9)
ssp245	2080-2099	45.7 (6.6)	39.7 (6.8)	53.4 (6.4)
ssp370	2040-2059	43.5 (4.4)	37.3 (4.4)	51.4 (4.4)
ssp370	2060-2079	45.8 (6.7)	39.7 (6.8)	53.6 (6.6)
ssp370	2080-2099	47.8 (8.7)	41.9 (9.0)	55.5 (8.4)
ssp585	2040-2059	43.5 (4.4)	37.4 (4.5)	51.3 (4.3)
ssp585	2060-2079	46.3 (7.2)	40.4 (7.5)	54.0 (6.9)
ssp585	2080-2099	50.7 (11.5)	44.9 (12.0)	58.0 (11.0)

Table 6 shows the modeled historical and projected precipitation values for the Proposed Project. Under the SSP245 scenario, a slight increase in precipitation is projected. Under SSP370, a decrease in precipitation from modeled historical values is projected to occur from 2040-2079, and an increase is projected from 2080-2099. For SSP585, an increase in precipitation from modeled historical values is projected.

Table 6 Modeled Historical and Projected Precipitation Trends for the Project

Scenario	Time Period	Total Annual Precipitation (in) - Ensemble Mean
Historical	1995-2014	32.1
ssp245	2040-2059	33.7 (1.6)
ssp245	2060-2079	32.3 (0.2)

Scenario	Time Period	Total Annual Precipitation (in) - Ensemble Mean
ssp245	2080-2099	32.8 (0.7)
ssp370	2040-2059	30.2 (-1.9)
ssp370	2060-2079	30.4 (-1.7)
ssp370	2080-2099	33.1 (1.1)
ssp585	2040-2059	32.4 (0.3)
ssp585	2060-2079	33.8 (1.8)
ssp585	2080-2099	35.6 (3.6)

The EPA Climate Resilience Evaluation and Awareness Tool (CREAT) anticipates an increase in 100-year storm intensity of 10.7% in 2035 and 20.9% in 2060.¹⁷ The EPA Streamflow Projections Map anticipates an increase in streamflow by a ratio of 0.9 to 1.2 in 2071 to 2100 (RCP 8.5) compared to baseline historical flow (1976 to 2005).

The First Street Risk Factor risk assessment and map tool was used to determine a risk assessment for Lake County to help identify current and future climate change risks (reference (7)). In Lake County, flood risk is major, wildfire risk is major, and air quality risk is minor (references 8-10)).

- b. For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified. See Table 4.

See Table 7.

¹⁷The EPA CREAT [tool] only provides predictions for the 100-year recurrence interval. While the CREAT does not estimate 500-year or greater events, it does provide climate change scenarios that present useful information for higher intensity events, including higher than is being used currently for 100-year events. The tool also identifies adaptation options to increase resilience.

Table 7 **Proposed Climate Adaptations**

Resource Category	Climate Considerations (as identified in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Proposed Project Design	More frequent and intense rain events, flood risk, warmer temperatures, and wildfire risk.	The design of the New Tailings Basin Features includes shedding of precipitation exterior of the basin while accommodating precipitation interior to the basin. The Proposed Stream Mitigation design would reconnect the floodplain, allowing flood flows to spill into the floodplain. Use of floodplain reduces velocities and attenuates peak flood flows.	Based on the design considerations, further adaptations are not necessary to address future climatic conditions because the design is based on the probable maximum precipitation event. Tailings Basin planning is updated every 5 years, at which time pond level and probable maximum precipitation event is re-evaluated. All precipitation that falls within the footprint of the basin is captured, regardless of precipitation intensity or frequency, forest cover, or wetlands, so the only climate trend consideration is total annual precipitation, for which the basin operation is adjusted every 5 years. The Probable Maximum Precipitation Estimation Modernization project is underway at NOAA bringing estimates more in line with a changing climate. Northshore intends to update the Tailings Basin design as needed to adjust for the potential changing PMP. The Proposed Stream Mitigation would reduce shear stresses from flood flows. With more floodplain capacity, channel erosion would be reduced, and the channel would remain resilient to more frequent flood flows. BMPs, as outlined in the SWPPPs for the Proposed Stream Mitigation (Appendix B through Appendix E) and the SWPPPs for the New Tailings Basin Features, would be followed during construction to minimize risks.

Resource Category	Climate Considerations (as identified in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Land Use	More frequent and intense rain events, flood risk, warmer temperatures, and wildfire risk.	The development of the New Tailings Basin Features would result in loss of wetlands and associated flood storage specific to the footprint only. The loss of wetland would be mitigated by purchasing wetland bank credits according to the previously issued authorizations (Table 8). In addition, loss of forest cover could increase stormwater run-off and decrease carbon sequestration. The Proposed Stream Mitigation would not change land use or increase the amount of impervious surface, and the riparian area would be vegetated with trees and native vegetation. The trees that are planted would offset a portion of the loss of carbon sequestration from the New Tailings Basin Features.	Based on the design considerations, further adaptations are not necessary to address future climatic conditions because the design is based on the probable maximum precipitation event. For the Proposed Stream Mitigation, access to floodplain increases cross-sectional area of peak flow. The increased cross-sectional area and wetted perimeter decreases velocity of flow. The floodplain is also rougher (> manning's "n" factor) which further reduces velocity. A reduced velocity decreases erosive potential and as flows decrease areas of the floodplain retain water. These areas capture sediment, provide wetland habitat, and decrease the total volume of water in flood flows beyond that point. The tree species planned for the Proposed Stream Mitigation sites, such as cedar and spruce, are native to the area and are flood-tolerant, and as such these species should perform well in an environment that may have increased flood risk. Once established, the trees would provide an overstory, and maintain cool water and air temperatures
Water Resources	Address in Item 12	Address in Item 12	Address in Item 12

Resource Category	Climate Considerations (as identified in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Contamination Hazardous Materials Wastes	Not Applicable	Not Applicable	Not Applicable
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	More frequent and intense rain events, flood risk, warmer temperatures, and wildfire risk.	The New Tailings Basin Features would result in loss of wetland and upland habitat. The Proposed Stream Mitigation would enhance habitat through installation of woody debris, bedform diversity, and restoration of the riparian area with trees and native vegetation.	Loss of wetland habitat would be mitigated by purchasing wetland bank credits created from wetlands generation and improvement projects. The Proposed Stream Mitigation would increase floodplain access, increase wetland habitat, prolong post precipitation/snow melt impact on flow (keeping baseflow higher) and capture sediment. The increase in woody debris and increased bedform diversity would provide habitat diversity, thermal refuge, and spawning areas.

8. Cover types:

Estimate the acreage of the site with each of the following cover types before and after development:

Table 8 and Table 9 summarize the cover types estimated using National Land Cover Database (NLCD) 2019 Land Cover Data unless otherwise noted; see Figure 3. The values indicated in Table 8 and Table 9 do not include field-calculated data unless otherwise noted.

Table 8 Existing and Proposed Cover Types for Proposed Stream Mitigation

Cover Types	Before (acres) ¹	After (acres) ²
Wetlands and shallow lakes (<2 meters deep)	33.3	33.3
Deep lakes (>2 meters deep)	0	0
Wooded/forest	45.4	45.4
Rivers/streams	14,122 LF	14,122 LF
Brush/grassland	3.3	3.3
Cropland	0	0
Livestock rangeland/pastureland	0.6	0.6
Lawn/landscaping	0	0
Green infrastructure TOTAL (from Table 6)	0	0
Impervious surface	0	0
Developed or barren land ³	1.8	1.8
Other (none)	0	0
TOTAL	84.4	84.4

¹Before calculations include the Proposed Project area for the four individual stream mitigation projects.

²Wetland values were obtained from desktop wetland delineation results.

³This acreage is a combination of land classifications of developed, low intensity, medium intensity, open space, and barren land that overlap the individual stream mitigation project sites.

Table 9 Existing and Proposed Cover Types for New Tailings Basin Features

Cover Types	Before (acres) ¹	After (acres) ²
Wetlands and shallow lakes (<2 meters deep) ³	66.7 ⁴	22.9 ⁴
Deep lakes (>2 meters deep)	0	0
Wooded/forest	238	0
Rivers/streams	0	0
Brush/grassland	8.9	8.8
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0	0
Green infrastructure TOTAL (from Table 6)	0	0
Impervious surface	0	0
Developed or barren land ⁵	14.7	0
Other (describe): Dam 1, Dam 2, rail switchback, rail embankment, borrow site	0	296.6
TOTAL	328.3	328.3

¹Before calculations include areas within the New Tailings Basin Features.

²After calculations include the area of the New Tailings Basin Features and does not include land cover changes as part of the Ongoing Tailings Basin Operations.

³Wetland data was obtained from field-collected data.

⁴Includes the South Clay Borrow Site wetlands.

⁵This acreage is a combination of land classifications of developed, low intensity, medium intensity, open space, and barren land that overlap the South Clay Borrow Site, Dam 1 Progression and Rail Switchback, and West Ridge Railroad Relocation embankment.

Table 10 Existing and Proposed Green Infrastructure

Green Infrastructure	Before	After
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	N/A	N/A
Constructed tree trenches and tree boxes	N/A	N/A
Constructed wetlands	N/A	N/A
Constructed green roofs	N/A	N/A
Constructed permeable pavements	N/A	N/A
Other (describe)	N/A	N/A
TOTAL	N/A	N/A

Table 11 Existing and Proposed Trees

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during development	Proposed Stream Mitigation: Unknown New Tailings Basin Features: 100%	Proposed Stream Mitigation: Unknown New Tailings Basin Features: Unknown
Number of new trees planted	N/A	Proposed Stream Mitigation sites: approximately 12,000 New Tailings Basin Features: Determined at the time of reclamation and closure

9. Permits and approvals required:

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate*

environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 12 Permits and Approvals

Unit of Government	Type of Application/Approval	Status
USACE	Clean Water Act Section 404 approval Section 106 consultation Section 7 consultation MN SQT uplift	Section 404 authorization MVP-2015-02528-RMM issued 09/23/2021 for New Tailings Basin Features and Proposed Stream Mitigation
DNR	Permit to Mine Amendment (for clay borrow sites and mining boundary adjustments)	Pending Northshore's response to DNR's initial comments for New Tailings Basin Features
DNR	Wetland Conservation Act (WCA) Replacement Plan approval	WCA Notice of Decision issued 05/09/2019 for New Tailings Basin Features
DNR	Natural Heritage Information System / Protected Species Review	Completed 10/07/22; updated request completed 12/09/25
DNR	Work in Public Waters approval for each individual Proposed Stream Mitigation sites (x4)	To be submitted for remaining 4 Proposed Stream Mitigation sites
MPCA	Construction Stormwater – General Permit MNR100001	Issued 05/04/2022 for West Ridge Railroad Relocation project (coverage ID C00063648)
MPCA	Construction Stormwater – General Permit MNR100001	To be submitted for four Proposed Stream Mitigation sites
MPCA	Section 401 Water Quality Certification	Issued for New Tailings Basin Features on 06/29/2021
MPCA	Section 401 Water Quality Certification	Issued for Proposed Stream Mitigation sites

Unit of Government	Type of Application/Approval	Status
MPCA	Section 401 Water Quality Certification	To be submitted for remaining 4 Proposed Stream Mitigation sites ¹⁸
MPCA	NPDES Permit MN0055301 Reissuance	Reissued 08/28/25
MN State Historical Preservation Office (SHPO)	Historic Properties Review	Received 01/2023
Lake County	Land Use Application Grade/Fill	Pending submittal

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No. 22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use:

- a. Describe:
 - i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.

New Tailings Basin Features

Existing land use around the New Tailings Basin Features is idled forested lands located on mine property designated for eventual tailings storage. Land immediately adjacent to the east comprises the active Mile Post 7 tailings pond and deposition area, with adjacent lands to the north, west, and south representing idled forest land uses. The South Clay Borrow Site is actively used for tailings storage related activities. The Northshore Mining Railroad is located to the southwest/west of the site; it is 47 miles long and connects the Peter Mitchell Mine to the processing plant at Silver Bay.

No parks, cemeteries, trails, or prime farmland are located within the Proposed Project area.

Lands within the Superior National Forest (SNF) are located approximately 0.6 miles west of the proposed railroad embankment. The SNF was established by the US Forest Service in 1909. It exhibits a forest ecosystem dotted with lakes exhibiting plants and animals typical to a boreal ecosystem. The SNF provides a range of outdoor recreation opportunities, including hiking, camping, nature viewing, and both motorized and non-motorized vehicle trails. No designated SNF facilities or special recreation opportunities occur in the Proposed Project vicinity.

¹⁸MPCA indicates each individual stream mitigation project will require its own individual Section 401 Water Quality Certification.

The western boundary of Tettegouche State Park is located approximately 1.5 miles of the Tailings Basin. This park is typical of state parks along the Lake Superior shore in providing scenic vistas, high cliffs, and hiking opportunities. The park is centered around the Baptism River and surrounding highlands. Picnicking and camping opportunities are present at the western Bean Lake part of the park.

The general area along the North Shore of Lake Superior has both motorized and non-motorized recreational trails but not in the immediate project vicinity. These include:

- C.J. Ramstad/North Shore State Trail. This is a 146-mile-long multi-purpose, natural surface trail from Duluth to Grand Marais. Although primarily a snowmobile trail, some sections are suited for summer uses. This trail is located in the SNF approximately 1.3 miles west of the proposed railroad embankment.
- Superior Hiking Trail. This is a 310-mile-long hiking trail that extends from Jay Cooke State Park to Lake Superior. This trail parallels the shore of Lake Superior and is located outside the western limits of Beaver Bay and Silver Bay, between the Tailings Basin and these two cities.
- Red Dot Trail. This is a 30-mile-long all-terrain vehicle (ATV) and snowmobile trail that runs from Silver Bay through the Palisade Valley Recreation Unit of Tettegouche State Park before connecting the Moose Walk and Moose Run trails. The Red Dot Trail goes from southeast to northwest with a nearest approach approximately 0.5 miles east of the Tailings Basin.
- Gitchi-Gami State Trail. This is a 29-mile stretch of paved trail, currently being constructed in segments, that eventually will run for 88 miles. The trail connects Silver Bay with Beaver Bay, where from there the longest trail segment connects Beaver Bay with Gooseberry Falls State Park. This trail is 2.5+ miles from the Tailings Basin.

Proposed Stream Mitigation

Existing land use for five of the sites proposed for the individual stream mitigation actions is principally idled forestland and wetlands located outside the current and proposed active areas of the Tailings Basin. The exception is White Rock Creek, which flows through the City of Silver Bay; it is adjacent to residential parcels, the Lake County Services Center, Essentia Health Pharmacy, and United Protestant Church, and continues to flow through open space behind the Silver Bay Youth Hockey Club. The land use for White Rock Creek is therefore considered as forested, wetlands, and urban.

There is a cemetery approximately one-half mile northeast and upgradient of the East Branch Beaver River site.

Recreation resources in the vicinity are the same as identified for the Tailings Basin, with distances varying slightly depending on the location of each individual stream mitigation site. The Silver Bay Loop Trail, which is part of the greater Red Dot ATV and Snowmobile Trail, is located to the south of the White Rock Creek stream mitigation site on the opposite side of Penn Boulevard. The proposed White Rock Creek stream mitigation project is separate and removed from the Red Dot Trail.

- ii. Plans. Describe planned land use as identified in comprehensive plan (if available)

and anyother applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Lake County Comprehensive Plan is the legal basis of its official controls to promote the “health, welfare, moral, and general welfare of the community.” Official controls include zoning and subdivision regulations that the county uses to establish standards for development and regulate land use. The Lake County Land Use Ordinance relies on zoning districts as the main means of implementing the comprehensive plan, which is further refined through the ordinance text and official zoning map. Private parcels of project-related land subject to the Comprehensive Plan include: New Tailings Basin Features; East Branch Beaver River; East Branch Beaver River Tributary Berm and East Branch Beaver River Tributary Ditch. The White Rock Creek stream mitigation project occurs on City of Silver Bay and Lake County right-of-way with a small portion on private property, all of which is subject to the Comprehensive Plan.

The Lake County Local Water Management Plan was first adopted in 2005 and subsequently amended in 2010, 2012, and 2015. According to the Board of Soil and Water Resources (BWSR), the current plan (amended 2015) expires at the end of 2025. The purpose of the plan is to address a county’s water problems in the context of watershed units and groundwater systems. All of the Proposed Project is subject to the water management plan.

The Lake Superior South Watershed Restoration and Protection Strategy Report (2018) employed water quality assessment, watershed analysis, civic engagement, planning, implementation, and measurement of results into a 10-year cycle to address both watershed restoration and protection. The Beaver River Watershed was identified as a targeted geographic area for restoration in the report, which includes the Proposed Stream Mitigation sites.

The Lake Superior North One Watershed One Plan (2017) addresses surface water and groundwater resources, water quantity and quality, and land use to leverage the existing requirements for local government comprehensive water management plans to achieve the goals of the Plan. The Plan identifies priorities, management goals, and implementation activities for Cook and Lake Counties. The Beaver River Watershed is identified as a Tier 1 Priority Area for water resource management, protection, and restoration within the Lake Superior North Watershed. This includes the Proposed Stream Mitigation Sites.

The Proposed Project area is entirely within the 1854 Treaty Ceded Territory, which was created by the 1854 Treaty of La Pointe that ceded the northeast portion of present-day Minnesota to the United States. Along with other federally recognized Tribes, the Bois Forte Band of Chippewa, the Fond du Lac Band of Lake Superior Chippewa, and Grand Portage Band of Lake Superior Chippewa that reside within the 1854 Treaty Ceded Territory retain hunting, fishing, and other usufructuary rights that extend throughout the entire 1854 Treaty Ceded Territory. These tribes jointly-manage treaty resources within the 1854 Treaty Ceded Territory with federal, state and county management entities. See Figure 1 that includes an insert depicting the 1854 Treaty Ceded Territory.

The 1854 Treaty Authority is an Inter-tribal Natural Resources Management Organization that manages the off-reservation hunting, fishing, and gathering rights of the Grand Portage Band of Lake Superior Chippewa and Bois Forte Band Chippewa in the 1854 Treaty Ceded Territory under legal agreement with the State of Minnesota. The 1854 Treaty Authority’s mission statement is to “provide an Inter-Tribal natural resource program to ensure that the rights secured to member Native

American tribes by treaties of the United States to hunt, fish, and gather within the 1854 Treaty Ceded Territory shall be protected, preserved and enhanced for the benefit of present and future member Native American tribes in a manner consistent with the character of such rights, through provisions of services.” The 1854 Treaty Authority’s management of natural resources focuses on resources most important to and commonly utilized by the Bois Forte and Grand Portage Bands and as directed by their Tribal Councils.

The exercise of usufructuary rights to hunt, fish, and gather by the Fond du Lac Band in the 1854 Treaty Ceded Territory is governed by the Fond du Lac Tribal Council.

- iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The New Tailings Basin Features, East Branch Beaver River Tributary Berm, and East Branch Beaver River Tributary Ditch projects are located on private property within unincorporated Lake County zoned as FR/Forest-Recreation District (Figure 4-1 and Figure 4-2). The FR district provides for remote residential development distant from public services, restricts destruction of natural or man-made resources, maintains large tracts for forest recreation purpose, provides for the continuation of forest management and production programs, and fosters certain recreational uses and other activities which are compatible with the public welfare. Aggregate pits are listed as an interim use with the FR district. In addition, the stream mitigation work is considered a permitted use in the FR District according to section 9.02 of the Lake County Comprehensive Plan and Land Use Ordinance (Ordinance #12).

The East Branch Beaver River is in the Lake County Residential (R-1) District (Figure 4-3), which provides low density residential development on large lots in areas not requiring public water and sewer services. This district also supports general agriculture and forest-related development.

There are no mapped floodplains, wild and scenic rivers, or agricultural preserves within the Proposed Project area.

- iv. If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.

The Proposed Project does not include any proposed critical facilities in floodplain areas or other areas identified as at risk for localized flooding.

- b. Discuss the project’s compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The Lake County Comprehensive Plan and Land Use Ordinance identifies the goals of the county and acts as a guide for achieving them. The goals related to the Proposed Project include the plan’s commercial/industrial development Goal 2 that identifies the following objectives:

- Identify commercially viable aggregate resources within the county.

- Establish aggregate extraction districts that identify the location of possible future aggregate mining operations based upon an aggregate resource evaluation study.
- Establish protocols to inform developers and residents interested in developing land near aggregate production districts of the potential for noise, dust, traffic, and visual impacts associated with such industrial operations.
- Act to reduce conflict in aggregate industrial operations.

The New Tailings Basin Features are compatible with the Lake County Comprehensive Plan and Land Use Ordinance because the New Tailings Basin Features were approved under Northshore's existing conditional use permit.

The City of Silver Bay Comprehensive Plan lists the following goals and objectives specifically for the Northshore Mining operations.

- Support ongoing operations and improvements to processing operations.
- Work with Northshore Mining to identify land use and design opportunities to announce the City of Silver Bay along the Highway 61 corridor.

The Proposed Project would support the first goal based on the ongoing operations and improvements to Northshore's facility. Therefore, the Proposed Project would be compatible with the City of Silver Bay's Comprehensive Land Use Plan.

The Project would support the first goal based on the ongoing operations and improvements to Northshore's facility. Therefore, the Proposed Project would be compatible with the City of Silver Bay's Comprehensive Land Use Plan.

The Proposed Project would not restrict access to public lands for pursuit of usufructuary rights to hunt, fish, and gather within the 1854 Treaty Ceded Territory.

- c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.

No incompatibility has been identified.

11. Geology, soils and topography/land forms:

- a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

The Proposed Project area straddles the Duluth Complex and the North Shore Volcanic Group that are predominantly gabbro and basalt. Surficial geology primarily consists of glacial sediment deposited by

the Superior Lobe glaciation, including the Cromwell formation and Barnum formation.

No sinkholes or karst geology are present in the Proposed Project area.

Previous geotechnical investigations around Northshore's property have not encountered shallow aquifers. Because the soils in the area are predominantly low permeability glacial sediment underlain by gabbro and basalt, shallow aquifers are generally absent from the region. Test borings performed along the West Ridge Railroad Relocation and Dams 1 and 2 Progressions areas indicate subsurface conditions consist of glacial till soils underlain by bedrock. Glacial till soils are mainly comprised of lean clay, sandy lean clay, silty sand, and silty clayey sand with thin layers of glacial outwash present in a few select locations. Alluvial soils in the two valleys north of the landfill consist mainly of silty sand, with a near-surface layer at one location comprised of gravel. The igneous bedrock also has limited groundwater available for use as water supply. No impacts to site geology are anticipated.

- b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12b.ii.

Elevations across the Proposed Project area range from approximately 850 to 1,388 feet. The lowest elevations are associated with the White Rock Creek stream mitigation project. The highest elevations are associated with the northern part of the railroad embankment project area.

The Natural Resources Conservation Service (NRCS) Web Soil Survey allowed identification of near surface soil types that occur across the Proposed Project area. The text below describes the dominant soil types for both the New Tailings Basin Features and Proposed Stream Mitigation sites; the potential impacts are also identified.

New Tailings Basin Features

The NRCS identifies 21 soil map units in the areas of the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation; see Figure 5-1 and Figure 5-2. Seven soil map units collectively make up approximately 75 percent of these areas; see Table 13. These seven soil map units are all non-hydric or predominantly non-hydric and primarily consist of silt loams and sandy loams, often with gravel; see Figure 5-1 and Figure 5-2. Only 6 percent of these areas have soil mapped as hydric or predominantly hydric; see Figure 5-1 and Figure 5-2; these soil map units are generally located in wetlands and contain soils with high organic matter content.

The NRCS maps four soil types within the South Clay Borrow Site, and as shown in Table 13 and on Figure 5-1, two soil types represent over 80 percent of this area. Soils in the South Clay Borrow Site consist of silt loams, silty clay loams, silty clay, and clay. There is one hydric soil type in this area, which is in a wetland and represents just under 11 percent of the area. Because 21 soil types were identified in the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation areas,

only the dominant seven soil types are listed in Table 13; these seven soil types represent approximately 75 percent of the area.

The South Clay Borrow Site is approximately 108 acres in size, of which 14.7 acres have been previously excavated, and 17.3 acres include delineated wetlands that would not be disturbed, leaving approximately 76.3 acres available for borrow material. The remaining area would be excavated to a depth of 5 to 10 feet as needed for the construction of the Dam 1 Progression. It is not anticipated that the entire area would be excavated as part of the Proposed Project.

Table 13 Soil Types in New Tailings Basin Features Area

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A1-40B	Normanna-Greysolon complex, 2 to 8 percent slopes, very rocky	Loam and gravelly sandy loam	Non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	20.1%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Silt loam and very fine and gravelly sandy loam	Predominantly non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	18.9%
F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Sandy loam, very gravelly loamy sand, and very gravelly sand	Predominantly non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	11.9%
A1-41D	Ahmeek-Normanna-Mesaba, stony complex, 4 to 18 percent slopes, very rocky	Silt loam and gravelly sandy loam	Predominantly non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	7.7%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A3-31D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes	Fine sandy loam over gravelly sandy loam	Predominantly non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	6.6%
A1-20D	Mesaba, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes	Gravelly sandy loam	Non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	5.9%
E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex, 1 to 18 percent slopes	Silt loam and gravelly sand loam	Predominantly non-hydric	Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation	4.3%
C3-41D	Sanborg-Badriver complex, 1 to 18 percent slopes, very rocky	Silt loam, silty clay loam, clay, silty clay	Non-hydric	South Clay Borrow Site	47.6%
D1-50B	Cuttre complex, 0 to 8 percent slopes	Silt loam, silty clay loam, clay	Predominantly non-hydric	South Clay Borrow Site	36.2%
C1-10A	Palmer, depression-Badriver complex, 0 to 1 percent slopes	Silt loam, clay	Hydric	South Clay Borrow Site	10.7%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
E1-39E	Miskoaki-Fluvaquents, frequently flooded-Rock outcrop complex, 0 to 45 percent slopes	Silt loam, silty clay loam, clay	Predominantly non-hydric	South Clay Borrow Site	5.5%

Prior to construction, topsoil, organic soils, and soft/loose materials unsuitable for support would be removed throughout the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation areas. Topsoil of varying depth is present in areas where existing basin features are absent. Investigations to date have not identified any specific zones of unsuitable soils, however, consistent with any construction project, it is anticipated that soft, wet, and/or disturbed soils would be encountered over the course of foundation preparation and will require removal.

Soils from the South Clay Borrow Pit would be excavated and used for construction of select areas of the railroad embankment and dam progressions. As discussed below in Item 12, wetlands and associated hydric soils would be avoided when excavating soil from the South Clay Borrow Pit; see Figure 5-1.

Construction activities under the Proposed Project would be subject to applicable BMPs that are identified in the construction SWPPP(s) applicable to the New Tailings Basin Features. The purpose of these measures is to minimize runoff and potential erosion during and after construction.

Proposed Stream Mitigation

The NRCS maps several soil types across the individual stream mitigation project areas; see Table 14, Figure 5-1, Figure 5-2, and Figure 5-3. Additional information on the soils within and adjacent to the individual stream mitigation projects areas can be found in Appendix B through Appendix F.

Table 14 Soil Types in Proposed Stream Mitigation Areas

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River	60.7%
K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded	Muck and stratified fine sand to loamy find sand	Hydric	East Branch Beaver River	36.8%
C1-20A	Bad River complex, 0 to 3 percent slopes	Silt Loam, silty clay loam, and clay	Partially hydric	East Branch Beaver River	2.1%
B1-20B	Hegberg-Eldes complex, 0 to 3 percent slopes	Loam and gravelly sandy loam	Partially hydric	East Branch Beaver River	0.4%
K1-14	Tailings Basin	Metal ore extraction mine spoil	Non-hydric	East Branch Beaver River Tributary Ditch	44.1%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	28.4%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	18.4%
B1-41D	Forbay-Augustana complex, 3 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	8.9%
B2-41D	Forbay, moderately deep-Augustanna, moderately deep complex, 3 to 18 percent slopes, very rocky	Loam	Non-hydric	East Branch Beaver River Tributary Ditch	0.2%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Loam	Predominantly non-hydric	East Branch Beaver River Tributary Berm	100%
E1-30F	Odanah-Udifluents, frequently flooded rock outcrop complex, 1 to 70 percent slopes	Silt loam to silty clay loam	Predominantly non-hydric	White Rock Creek	95.6%
K1-21B	Urban land-Cuttre complex, 0 to 8 percent slopes, very rocky	Fill material	Predominantly non-hydric	White Rock Creek	1.8%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A1-20C	Mesaba, stony-Greysolon-Rock outcrop complex, 2 to 15 percent slopes	Gravelly sandy loam	Non-hydric	White Rock Creek	1.3%
A1-11D	Quetico, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes	Fine sandy loam and gravelly fine sandy loam	Non-hydric	White Rock Creek	1.3%

The soils in the individual Proposed Stream Mitigation areas consist primarily of rocky soils, mucky soils, loamy soils, and fluvial deposits associated with these soil types. The soil K-factor is a measure of erodibility, with the higher the value the more susceptible a soil is to erosion. The K-factor for soils in the individual Proposed Stream Mitigation areas ranges between 0.15 to 0.43. As such, soils in the individual stream mitigation site have moderate to low erodibility. The entirety of the Proposed Stream Mitigation areas (aside from material staging) would occur within the existing stream valleys. The soils and topography do not require any special considerations during construction.

Grading of the new stream alignments and floodplain would occur to allow for the project goal of an accessible floodplain (where greater than bankfull flows can access the stream's floodplain). This allows for natural stream processes to occur, including both erosion and deposition. The excess cut material would be removed from the project area and placed on Northshore property, in upland areas, within proximity of the Tailings Basin. BMPs would be used during construction to reduce risk of erosion of the temporarily exposed soil. Post-construction, the exact alignment of the streams is expected to adjust slightly due to natural stream processes, but the grade control and stabilization structures are designed to maintain the appropriate hydrology, hydraulics, geomorphology, physiochemical and biological conditions proposed. Table 15 provides a summary of the excavated material for the individual stream mitigation projects.

Table 15 Summary of Excavated Material for Proposed Stream Mitigation

Project Component	Cut/Fill Volume (cubic yards)
East Branch Beaver River	12,000 cut/fill
East Branch Beaver River Tributary	2,500 cut/fill

Project Component	Cut/Fill Volume (cubic yards)
East Branch Beaver River Tributary Berm	4,000 cut/fill
White Rock Creek	2,790 cut/1,640 fill

Soil erosion control measures would be implemented during and after construction to prevent unnecessary erosion and stabilize disturbed slopes and stream banks until new vegetation takes hold. Construction vehicle traffic would be confined to a minimal number of access roads and routes to prevent widespread rutting and soil compaction. The contractor would not work during large rain events and would minimize impacts to soils susceptible to rutting. Access paths and areas that may experience soil compaction can be tilled at the end of construction to loosen soils. See Item 14d for information on non-native invasive plant species control measures.

- NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 11.

12. Water resources:

- Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.
 - Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

The Proposed Project is in the Hydrologic Unit Code (HUC) 10 Beaver River-Frontal Lake Superior watershed in the Lake Superior-South (No. 2) major watershed, and in the following subwatersheds: East Branch Beaver River, Lower Beaver River, Big Thirtynine Creek, and the existing Tailings Basin; see Figure 6-1 through Figure 6-5. Table 16 summarizes the special designation waters, identifies the MPCA 303d Impaired Waters, and lists known aquatic invasive species waters within 1 mile of the Proposed Project; also see Figure 6-1.

Table 16 Summary of Special, Impaired, and Infested Waters

Project Component	Watercourse / Waterbody	Designation	Identification Number	Relative Location to Project Component	Impairment
East Branch Beaver River and Tributary	East Branch Beaver River	Trout Stream	S-035-001	Project	None
East Branch Beaver River and Tributary	East Branch Beaver River Tributary	Trout Stream (Tributary)	S-035-001-002.3	Project	None
East Branch Beaver River and Tributary	East Branch Beaver River Tributary	Trout Stream (Tributary)	S-035-001-003	Upstream	None
East Branch Beaver River and Tributary	Cedar Creek	Trout Stream	S-035-001-002	Downstream Confluence into Beaver River East Branch	None
East Branch Beaver River and Tributary	Cedar Creek Tributary	Trout Stream (Tributary)	S-035-001-002-000.5	Confluence into Cedar Creek	None
White Rock Creek	White Rock Creek	Infested	None	Project	Infested: White Perch, Viral Hemorrhagic Septicemia; Round Goby

Project Component	Watercourse / Waterbody	Designation	Identification Number	Relative Location to Project Component	Impairment
White Rock Creek	Lake Superior	Lake	16-0001-00	Downstream	Impaired: Mercury and PCB in Fish Tissue
Big and Little 39 Creeks	Little 39 Creek	Trout Stream	S-035-010-002	Project	None
Big and Little 39 Creeks	Big 39 Creek	Trout Stream	S-035-010	Project	None
Big and Little 39 Creeks	Big 39 Creek Tributary	Trout Stream (Tributary)	S-035-010-003	Upstream	None
Big and Little 39 Creeks	Beaver River	Trout Stream, Impaired and Infested	S-035	Downstream	Impaired: Fish Bioassessments; Mercury in Water Column; Turbidity; pH
Big and Little 39 Creeks	Kit Creek (Tributary to Beaver River)	Trout Stream (Tributary)	S-035-009	Confluence into Beaver River	None

According to the DNR List of Infested Waters, there are no aquatic invasive species in the East Branch Beaver River or its tributary, or Big Thirtynine and Little Thirtynine Creeks.

Wetlands within the vicinity of the Proposed Project area are shown on Figure 7. To date, wetlands have been field delineated across the New Tailings Basin Features, including the South Clay Borrow Site. The field delineated wetlands are classified as follows: alder thicket, coniferous swamp, fresh (wet) meadow, hardwood swamp, seasonally flooded basin, sedge meadow, shallow marsh, shrub-carr wetlands, and deepwater habitat. Barr completed two wetland delineations within the South Clay Borrow Site to demonstrate wetland avoidance. Additional delineation may be necessary for the remaining individual Proposed Stream Mitigation sites. Wetland delineation reports will be submitted to the LGU and MPCA, if necessary, in support of any required WCA review and MPCA Section 401 Water Quality Certification.

- ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The Proposed Project area is not within a wellhead protection area. According to the Minnesota Well Index (MWI), there are seven wells within one mile of the New Tailings Basin Features; see Table 17. Six of the wells have been sealed and one remains active. Most of these wells are located along the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation; see Figure 6-5. The depth to groundwater indicated by available MWI logs ranges from approximately 2.7 feet to 24 feet.

An industrial solid waste landfill was permitted, constructed, and has been operating since 2000; see Item 6f for a history of the site. The facility is currently permitted through 2027. Groundwater is monitored by a network of wells surrounding the active industrial landfill under MPCA solid waste permit SW-409. The SEEP/W model results show that an increase in the Tailings Basin pond elevation, beyond what is proposed (1,305 feet amsl with a 10-ft freeboard), with a drainage ditch at the dam toe, would not cause the groundwater elevations at the landfill to rise. Although no impacts are anticipated, according to the landfill permit, the permittee shall take appropriate corrective action to maintain an effective leak detection and groundwater monitoring system for the landfill if the Tailings Basin pond elevation is determined to influence the groundwater under and surrounding the landfill in such a way that the landfill can no longer be monitored effectively. The Proposer's monitoring wells are shown on Figure 6-5 and listed in Table 17.

Work would generally be conducted at or below the water table to restore the streams at the Proposed Stream Mitigation sites. According to the Minnesota Well Index, the groundwater elevation near the East Branch Beaver River is approximately 1,108 feet amsl and the surface water of the East Branch Beaver River is at approximately 1,070 feet amsl. Groundwater near the White Rock Creek is approximately 602 feet amsl, or the elevation of Lake Superior. White Rock Creek flows through a steep valley at an approximate elevation of 900 feet amsl. There are few well records around White Rock Creek area; however, downgradient approximately 0.73 miles the surface water elevation is 603 feet amsl. The streams occur where the topography meets the elevation of the groundwater in the area, so depth to groundwater increases from zero at the stream's edges.

Table 17 Summary of MN Well Index Wells and Northshore Monitoring Wells within One Mile of Project Sites

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
New Tailing Basin Features	486968	MW-1	Sealed	0.07	1,283.6	24.4
New Tailing Basin Features	486969	MW-2	Sealed	0.00	1,331.4	6.6
New Tailing Basin Features	486970	MW-3	Sealed	0.00	1,321	8.0
New Tailing Basin Features	486971	MW-4	Sealed	0.00	1,306.8	5.2
New Tailing Basin Features	486972	MW-5	Sealed	0.11	1,312.3	2.7
New Tailing Basin Features	486973	MW-6	Sealed	0.09	1,318	7.0
New Tailing Basin Features	641875	Private	Active	0.12	Not Available	Not Available
East Branch Beaver River	613993	Private	Active	0.95	1,204	20.0
East Branch Beaver River	850421	MW-M5A	Active	0.55	1,108	-2.0
East Branch Beaver River	850422	MW-M5	Active	0.55	1,108	-2.0

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
East Branch Beaver River	850420	MW-M5BB	Active	0.55	1,106	0
East Branch Beaver River	773313	Private	Active	0.53	1,144	8.0
East Branch Beaver River	548413	Private	Active	0.91	1,240	20.0
White Rock Creek	551226	MW-4	Active	0.73	602.7	9.3
White Rock Creek	148934	Reserve Mining Co.	Sealed	0.55	839	16.0
White Rock Creek	341088	CP-6	Sealed	0.89	748	13.0
White Rock Creek	762010	PB-6	Sealed	0.79	759.5	8.5
White Rock Creek	701012	Private RW	Sealed	0.76	765.1	2.9
White Rock Creek	762007	PB-3	Sealed	0.76	769.9	9.1
White Rock Creek	762008	PB-4	Active	0.78	759	9.0
White Rock Creek	762011	BP-7	Active	0.79	757.4	7.6

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
New Tailing Basin Features	NA	R-2	Active	0.82	No data	No data
New Tailing Basin Features	NA	R-3	Active	1.09	No data	No data
New Tailing Basin Features	NA	M010	Active	0.17	No data	No data
New Tailing Basin Features	NA	M013	Active	0.66	No data	No data
New Tailing Basin Features	NA	S007-366	Active	0.70	No data	No data
New Tailing Basin Features	NA	M011	Active	0.00	No data	No data
New Tailing Basin Features	NA	M012	Active	0.14	No data	No data
New Tailing Basin Features	NA	R-8	Active	0.75	No data	No data
New Tailing Basin Features	NA	S000-252	Active	0.80	No data	No data
New Tailing Basin Features	NA	S006-273	Active	0.77	No data	No data
New Tailing Basin Features	NA	S007-598	Active	0.29	No data	No data

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
New Tailing Basin Features	NA	S007-948	Active	0.83	No data	No data
New Tailing Basin Features	NA	S007-967	Active	0.30	No data	No data
New Tailing Basin Features	NA	S007-968	Active	0.37	No data	No data
New Tailing Basin Features	NA	S008-005	Active	0.32	No data	No data
New Tailing Basin Features	NA	S105_SW-002	Active	0.79	No data	No data
New Tailing Basin Features	NA	S106_SW-003	Active	0.79	No data	No data
New Tailing Basin Features	NA	SD1-S010	Active	0.24	No data	No data
East Branch Beaver River	NA	S007-603	Active	S007-603	No data	No data
East Branch Beaver River	NA	M005	Active	M005	No data	No data
East Branch Beaver River	NA	R-4	Active	R-4	No data	No data
East Branch Beaver River	NA	S006-277	Active	S006-277	No data	No data

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
East Branch Beaver River	NA	S007-360	Active	S007-360	No data	No data
East Branch Beaver River	NA	S007-413	Active	S007-413	No data	No data
East Branch Beaver River	NA	S101_SW-004	Active	S101_SW-004	No data	No data
East Branch Beaver River	NA	S102_SW-001	Active	S102_SW-001	No data	No data

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

- i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

The Tailings Basin has an industrial wastewater discharge and seepage recovery system authorized and regulated by Northshore's NPDES/SDS Permit MN0055301 (most recently reissued by the MPCA on August 28, 2025). The Dam 1 and Dam 2 Progressions would become part of this greater facility system, but the dam progressions themselves would not produce or discharge wastewater. Discharge associated with the overall Tailings Basin routes through the Mile Post 7 water treatment plant or as otherwise authorized by the NPDES/SDS Permit. Because the Proposed Project would not result in changes to ore processing nor the rates of processing and tailings deposition at the Tailings Basin, it is not expected to result in a significant change in the volume of water treated, the influent quality, treatment efficiency, or effluent quality of the surface discharges from the water treatment plant. See *Appendix J7-2022 DNR Record of Decision at 75*.

Seepage management would consist of ditching along the toes of dam progressions to route seepage to existing seepage recovery ponds and pump stations. The natural materials at the base of the seepage recovery ponds have low permeability. A segment of the Dam 1 Progression generally co-located with a section of the railroad grade would be constructed as a plant aggregate dam with a clay cutoff. Runoff water would be impounded between this dam and an existing diversion dam, which would transition to become a seepage collection pond as the elevation of the Tailings Basin pond surface increases over time. A pump station would be constructed to manage water in this pond, which will be subsequently discharged as permitted or pumped back to the tailings pond. For the Dam

2 Progression, both water that contacts its surface and seepage would be captured by the ditch closest to the Dam 2 toe, which would then be directed to the Tailings Basin seepage recovery facilities. Overall, seepage would not be expected to substantially increase with the progression of the dams. *See Appendix J2-2021 DNR ERND at 37 and J7-2022 Record of Decision at 72.*

Overall, the New Tailings Basin Features would not significantly alter wastewater discharges to surface waters or groundwater in either quantity or quality, so additional effects to water resources are not anticipated.

The Proposed Stream Mitigation would not produce wastewater.

- 1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

N/A

- 2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.

N/A

- 3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.

N/A

- ii. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific BMPs to address

soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

New Tailings Basin Features

Construction Stormwater. During construction of the New Tailings Basin Features, much of the construction stormwater would either run off toward, or be collected and route to, the Tailings Basin, where it would be regulated under Northshore's NPDES/SDS Permit MN0055301. Coverage under the Minnesota Construction Stormwater General Permit (MNR100001) was obtained in May 2022 for the West Ridge Railroad Relocation project to authorize construction stormwater in areas with potential for runoff away from the Tailings Basin.

Northshore would implement applicable BMPs, as outlined in the construction SWPPP(s) applicable to the New Tailings Basin Features, to minimize runoff and erosion during and after construction. These BMPs generally include use of: silt fence, biorolls, mulch, erosion control blankets, check dams, and/or temporary sedimentation basins as applicable.

Once covered with 6 inches of native materials and vegetated after construction, precipitation on the majority of the outer slopes of the Dam 1 Rail Switchback embankment would be shed and routed outside the Tailings Basin. The approximately nine acres of remaining outer embankment slopes would drain to an impounded watershed, which in turn would not discharge downstream. Precipitation would infiltrate into the Dams 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Relocation and would be collected within the interior of the Tailings Basin, where it would become part of the operating water supply under Northshore's NPDES/SDS Permit.

The quantity of runoff water from the outer embankment and dam slopes, discharging to non-impounded areas outside of the New Tailings Basin Features, has been estimated using the Natural Resources Conservation Service SCS curve number method and XPSWMM version 2019.1.2. Runoff estimates have been modeled using a monthly time step (which overestimates actual runoff) based on current precipitation data (1980-99) and four future climate scenarios. The future climate scenarios include the periods from 2040-59 and 2080-99, and two modeled climate regimes within each of those periods: Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. "RCP" is a measure adopted by the IPCC to represent various GHG concentration pathways. The values (i.e., 4.5 and 8.5) represent the amount of net radiative force the earth receives in W/m^2 where a higher RCP signifies a more intense GHG effect resulting in a higher level of warming. The IPCC describes RCP 4.5 as the scenario in which emissions peak around 2040 and then decline, while under RCP 8.5 emissions continue to rise throughout the Twenty-First Century. The RCP 4.5 scenario is comparable to the SSP245 scenario described in Item 7a and the RCP 8.5 scenario is comparable to the SSP585 scenario.

Runoff from the exterior slopes of the New Tailings Basin Features will discharge to three separate receiving waters; see Figure 6-3:

- Beaver River – southwest part of the New Tailings Basin Features.
- Little Thirtynine Creek – northwest part of the New Tailings Basin Features.
- East Branch Beaver River – northeast part of the New Tailings Basin Features.

The New Tailings Basin Features area watershed draining to the Beaver River is comprised of 11.0 acres, which drains through an unnamed waterway approximately 1.1 mi. before reaching the Beaver River. The New Tailings Basin Features area watershed draining to Little Thirtynine Creek is comprised of 4.4 acres, which drains via sheet flow through a 25-acre wetland complex before reaching Little Thirtynine Creek. The New Tailings Basin Features area watershed draining to the East Branch Beaver River is comprised of 32.9 acres, which drains through a ditch system and unnamed creek before reaching the East Branch Beaver River approximately 1.2 mi. downstream.

The average annual runoff to the Beaver River would decrease by 0.03 acre-feet (ac-ft) in both mid-century scenarios and would increase by 0.16 ac-ft to 0.28 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 18. That increase in runoff is equivalent to the amount of water that would be flowing in the Beaver River within about 30 seconds to one minute under its normal average discharge rate but represents the maximum additional runoff that would be expected over the course of a typical year. Therefore, the increase in runoff to the Beaver River under future climate scenarios would be negligible.

The average annual runoff to Little Thirtynine Creek would decrease by 0.01 ac-ft in both mid-century scenarios and would increase by 0.048 ac-ft to 0.084 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 18. The increase in runoff is equivalent to 0.024 inch to 0.048 inch of water spread over the 25-acre wetland complex over the course of a typical year, which would be negligible.

The average annual runoff to the East Branch Beaver River would decrease by 0.08 ac-ft in both mid-century scenarios and would increase by 0.48 ac-ft to 0.84 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 18. That increase in runoff is equivalent to the amount of water that would be flowing in the East Branch Beaver River during a 1.5-year return period storm within one to two minutes but represents the maximum additional runoff that would be expected over the course of a typical year. Therefore, the increase in runoff to the East Branch Beaver River under future climate scenarios would be negligible.

Due to the negligible increase in runoff from the New Tailings Basin Features because of expected future climate change, no mitigation measures are proposed.

Table 18 New Tailings Basin Features Runoff Estimates under Current and Future Climate Scenarios

Parameter	Unit	Beaver River	Little 39 Creek	East Branch Beaver River
Watershed area	acres	11	4.4	32.9
Current climate (1980 – 1999) average annual runoff	ac-ft	0.76	0.23	2.29
RCP 4.5 2040 – 2059 average annual runoff	ac-ft	0.73	0.22	2.20
RCP 4.5 2080 – 2099 average annual runoff	ac-ft	0.92	0.28	2.77
RCP 8.5 2040 – 2059 average annual runoff	ac-ft	0.73	0.22	2.20
RCP 8.5 2080 – 2099 average annual runoff	ac-ft	1.04	0.32	3.13
Average annual runoff volume change from current climate, RCP 4.5 2040 – 2059	ac-ft	-0.03	-0.01	-0.08
Average annual runoff volume change from current climate, RCP 4.5 2080 – 2099	ac-ft	0.16	0.05	0.48
Average annual runoff volume change from current climate, RCP 8.5 2040 – 2059	ac-ft	-0.03	-0.01	-0.08
Average annual runoff volume change from current climate, RCP 8.5 2080 – 2099	ac-ft	0.28	0.10	0.84

Industrial Stormwater. Industrial stormwater activities are covered under Northshore’s NPDES/SDS

Permit MN0055301, and by extension the 2024-2028 Five Year Operations Plan and subsequent Five Year Operations Plans, as required by Items 5.43.242 through 5.43.246 of the NPDES/SDS Permit. See *Appendix J35-2026 NPDES Permit MN0055301*. The NPDES/SDS Permit Item 5.43.242 states that Northshore is responsible for operating the Tailings Basin according to the most recent Five Year Operations Plan as approved by the MPCA and DNR. *Id.* Northshore submitted the current Five Year Operations Plan to MPCA and DNR on November 10, 2023, for review and approval.

Northshore's NPDES/SDS Permit authorizes industrial stormwater to either be collected and discharged through a permitted NPDES outfall or discharged separately in accordance with the terms and conditions of Items 5.44.271 through 5.44.342. As required by the NPDES/SDS Permit, Northshore implements an Industrial SWPPP with stormwater control measures to reduce or eliminate contact or exposure of pollutants to stormwater; to prevent erosion, control sediment, and manage runoff; and remove pollutants from stormwater prior to discharge from the facility. The Industrial SWPPP is applicable to stormwater that is not collected, treated, and discharged through a permitted NPDES outfall where the discharged waters are subject to effluent limitations identified in the NPDES/SDS Permit. *Id.*

Collection and treatment (i.e., settling and filtration via existing basin operations) of stormwater is also discussed in Ch. 4.5.6 (Seepage Recovery Facilities) and 4.3.2 (Schedule for Fine Tailings Storage) of the Five Year Operations Plan. MPCA staff reviewed the 2024-2028 Five Year Operations Plan with a focus on the plan's discussion of water management issues and other aspects of the plan with relevance to the NPDES/SDS Permit. A formal approval of the 2024-2028 Five Year Operations Plan was issued by the DNR on June 26, 2024. See *Appendix J33-2024-2028 5YOP*. The MPCA reissued NPDES/SDS Permit MN0055301 on August 28, 2025, which was subsequently modified on April 1, 2026. See *Appendix J35-2026 NPDES Permit MN0055301*.

Overall, the New Tailings Basin Features are not expected to result in a substantial change in the volume or quality of industrial stormwater, therefore, associated impacts to water resources are not anticipated.

Proposed Stream Mitigation

The East Branch Beaver River and Tributary, and Big and Little Thirtynine Creeks, drain into the Beaver River and ultimately into Lake Superior. White Rock Creek flows directly into Lake Superior. Land cover will change from grassland to forested. There would also be a change to surface hydrology regarding the East Branch Beaver River – Tributary, where a mitigation of 0.24 square miles of drainage area would be reconnected.

Most of the individual stream mitigation projects would result in changes to instream hydrology by promoting a more natural stream function that attenuates the impact of increased rainfall intensity and spring runoff events by providing (improved) access to the floodplain. This is because the current site conditions rapidly remove water from the landscape that exacerbates the downstream effects of more intense and frequent precipitation events. Restored hydraulics would also reduce the sediment load from these reaches as well as provide access of higher flows to the floodplain.

The Proposed Stream Mitigation sites would retain more water resulting from the increased access to floodplains. The topography beyond that would be altered only to add sinuosity, grade control, and habitat structures to the stream reaches. The route of water, runoff destination, and receiving waters

would not change. The individual stream mitigation projects would increase the landscape's ability to absorb and reduce the downstream effects of climate change-driven increases in precipitation events. The peak runoff rate would be reduced by retaining water on the landscape, but the overall runoff volume should remain mostly unchanged. The makeup of the surface would include an increase in woody species cover but would not create any new pollutant sources. The quality and quantity of pre- and post-construction stormwater runoff for the individual stream mitigation projects would be the same given there would not be a change to impervious surfaces.

Construction of the individual stream mitigation projects would occur during low-flow conditions. This is defined as July 1 – March 31 for White Rock Creek, and July 1 – September 14 for the other individual stream mitigation projects. BMPs would be used to minimize soil erosion, including stabilization of constructed channels prior to the introduction of stream flow. Because using a phased approach to construct the channel(s) is one way to mitigate potential stormwater pollution, the individual stream mitigation projects' SWPPP outlines the phasing proposed to minimize sediment transport downstream; see Appendix B through Appendix E.

- iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.

The Proposed Project does not require appropriation of surface water or groundwater, nor does it require connection(s) to existing municipal water supply(ies). No impact avoidance or contingency measures would be necessary.

iv. Surface Waters

- a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for

unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

New Tailings Basin Features

Construction of the New Tailings Basin Features would result in direct and indirect impacts to wetland resources.

Direct wetland impacts would occur from construction of the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation. Approximately 43.8 acres of wetlands would be impacted by excavation and fill due to construction activities; see Figure 7-2. Fragmentation effects, which are also considered to be a direct impact, would result in portions of seven (7) wetlands encompassing approximately 5.3 acres; see Figure 7-2. These impacts would be permanent.

Indirect wetland impacts would also occur due to the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation from impoundment resulting from construction of the West Ridge Railroad Relocation; these impacts would be permanent. Four (4) wetlands encompassing approximately 40.2 acres would be affected as shown on Figure 7-2. These impounded wetlands are currently composed of hardwood swamps and would not be permanently lost but would undergo a wetland type conversion to other wetland types or deep-water habitat. These impacts would be expected to occur over time after the natural discharge routes are blocked and excess water builds within the wetlands.¹⁹

Table 19 summarizes the wetland impacts by affected community type. The greatest amount of impact occurs in hardwood swamp-type wetland communities, where alder thicket and coniferous swamp together represent over 25 percent of the affected types of wetlands. See Table 19.

Table 19 Wetland Impacts from New Tailings Basin Features

Wetland Community Type	Railroad Embankment and Dam Progression Impact (acres)	Fragmentation Impact (acres)	Impoundment Impact (acres)	Total Wetland Impacts (acres)
Hardwood Swamp	23.6	0.2	40.2	64.0
Alder Thicket	9.1	3.9	0	13.0
Coniferous swamp	8.7	0.6	0	9.3

¹⁹The 1975-76 Final EIS assessed alternatives across multiple potential locations for siting a tailings storage facility. After the EIS and permitting, the Proposer conducted detailed in-basin alternatives analyses to avoid and minimize wetland impacts under the Proposed Project. The result is the extent of the planned railroad relocation and dam progressions has reduced the overall footprint of the Tailings Basin by approximately 1,300 acres from the entire project footprint envisioned in the EIS, which has in turn reduced wetland impacts by about 300 acres compared to the original conceptual design.

Wetland Community Type	Railroad Embankment and Dam Progression Impact (acres)	Fragmentation Impact (acres)	Impoundment Impact (acres)	Total Wetland Impacts (acres)
Sedge Meadow	1.6	0.1	0	1.7
Fresh (Wet) Meadow	0.4	0.5	0	0.9
Shallow Marsh	0.4	0	0	0.4
Total	43.8	5.3	40.2	89.3

No impacts are projected to wetlands in the South Clay Borrow Site; this is because borrow material would only be obtained from upland areas. A wetland delineation would be completed within the South Clay Borrow Site prior to project construction. The wetland delineation report will be submitted to the DNR for approval under the WCA.

The DNR and USACE consolidated mitigation requirements for both the Proposed Project and Ongoing Tailings Basin Operations at Mile Post 7 into one regulatory action to simultaneously meet the requirements of both WCA and the Federal Clean Water Act Section 404. This included a detailed evaluation of the potential for conducting wetland mitigation within the project minor and major watersheds. That evaluation determined that there were no practicable alternatives available for wetland mitigation within the minor and major watersheds.²⁰

Mitigation was ultimately identified for both direct and indirect impacts of the Proposed Project and Ongoing Tailings Basin Operations.²¹ A WCA Notice of Decision approval for the Proposed Project was issued on May 9, 2019.²² The MPCA Section 401 Water Quality Certification for the Proposed Project was issued on June 29, 2021.²³ The USACE Section 404 permit for the Proposed Project was issued on September 23, 2021.²⁴ Wetland mitigation was accomplished by purchasing existing wetland bank credits at a 1:1 ratio from within the same Bank Service Area. The debiting of wetland bank credits that complied with the state and federal permit requirements was completed on November 4, 2021.²⁵

Proposed Stream Mitigation

²⁰See Appendix J22-2019 Joint Permit Application/WRP in Appendix J.

²¹Because the West Ridge Railroad Relocation occurs above the 1,315 feet elevation in the northeast-interior part of the Tailings Basin, approximately 550 acres not permitted to be covered by tailings are effectively isolated. The 2019 Wetland Replacement Plan therefore identified these wetlands as impacted by the Proposed Project and required mitigation for these wetland losses.

²²See Appendix J8-DNR WCA Notice of Decision.

²³See Appendix J16-MPCA MP7 Section 401 Certification.

²⁴See Appendix J30-USACE Section 404 Permit Decision.

²⁵See Appendix J1-Debiting of WCA Credits.

The individual stream mitigation projects would result in a small amount of wetland conversion to open water post-construction, with temporary impacts to wetlands projected to occur during construction associated with equipment access. The Proposer anticipates no compensatory mitigation requirement to be necessary for stream-related activities subject to final determinations to be made for the USACE Section 404 Permit, the MPCA Section 401 Water Quality Certification, and WCA permitting. The loss of an existing use(s) resulting from physical alterations to a surface water is prohibited unless appropriately replaced through mitigation. Construction and any required post-construction monitoring would occur following the conditions of the permits/authorizations identified in Item 9.

Requirements of the MPCA Section 401 Water Quality Certification include but are not limited to:

- Delineate all potentially-impacted wetlands prior to restoration to ensure no net-loss of wetlands at the project site(s);
- Conduct Floristic Quality Index (FQI) surveys at each site prior to restoration to assess the health and type of vegetation communities to ensure no net-loss of wetland quality at the project site(s);
- Observe and record the hydrologic regime at each site prior to restoration to ensure no more than a 20% departure from the existing hydroperiod (magnitude and timing) post-project(s); and
- Conduct monitoring prior to restoration work, and every five years after the restoration work, until the hydrology and vegetation have stabilized.

Reports would be submitted to MPCA in 2028, 2030, and 2032 to document the progress and success in meeting mitigation objectives.

Regarding the Proposed Project's potential mitigation of predicted local climate trends, the individual stream mitigation projects would increase floodplain capacity (e.g., flood storage) that would make the post-project area more capable of sustaining any potential increase in the frequency and intensity of precipitation events.

- b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water BMPs that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of

watercraft on any water body, including current and projected watercraft usage.

New Tailings Basin Features

The Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation would impact the remnant reaches of Big and Little Thirtynine Creeks and the Beaver River Watershed.

Big and Little Thirtynine Creeks. Approximately 1,710 LF of these remnant creeks within the Tailings Basin would intersect the realigned materials supply railroad and the extended dams, thus resulting in their elimination from the site. Permanent indirect impoundment impacts, which would result from impoundment from railroad embankment construction, would affect 3,535 LF of the Big and Little Thirtynine Creeks' remnants.

The streamflow modeling methods are described in Section 5.1 of the Watershed Assessment Report. U. S. Geological Survey's (USGS) web-based GIS application, StreamStats v4.3.11, was used to predict streamflow changes resulting from the New Tailings Basin Features. The USGS regression equation determined that watershed area, and percent of the watershed comprised of ponds and lakes, provided the information necessary to estimate streamflows in the Tailings Basin watershed. The bankfull events were estimated using the 1.5-year recurrence interval and streamflows for the 100-year recurrence interval were also modeled.

No changes would occur within the remaining Little Thirtynine Creek or Big Thirtynine Creek watersheds. As noted in Item 6f, both streams were routed to a diversion ditch when the Tailings Basin was initially constructed in the late 1970s into early 1980s. The diversion ditch was planned just outside the planned extent of the basin, so that the future Tailings Basin would not impact any resources upstream.

The MPCA and USACE consolidated mitigation requirements for both the Proposed Project and continuation of historic tailings management activities at Mile Post 7 into one regulatory action to simultaneously meet requirements of the federal Clean Water Act Sections 404 and 401.²⁶ An MPCA Section 401 Water Quality Certification was issued on June 29, 2021. The USACE Section 404 authorization for the Proposed Project was issued on September 23, 2021. Mitigation was identified for both direct and indirect impacts to stream resources and the continued progression of tailings to the final permitted elevation of 1,315 feet amsl. Mitigation would be accomplished according to the Final Stream Mitigation Plan.²⁷

Beaver River Watershed. The construction of the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation would result in the removal of approximately 85 acres from the Beaver River subwatershed, which has a total drainage area of 78,727 acres. No streams or ditches are proposed to be impacted. Low flows downstream of the Proposed Project are estimated to increase 0.5 percent. Bankfull and 100-year flows are estimated to stay the same as existing. The physical functions and values of downstream water resources are not projected to be adversely affected from the Proposed Project.

²⁶See Appendix J16-MPCA MP7 Section 401 Certification and Appendix J30-USACE MP7 Section 404 PermitJ.

²⁷See Appendix J21-Final Stream Mitigation Plan.

Approximately 997 acres of the Proposed Project area are within the East Branch Beaver River subwatershed, which has a total drainage area of 32,320 acres. The Proposed Project directly impacts approximately 5,040 LF of streams and 5,780 LF of ditch within the sub-watershed. The Proposed Project indirectly impacts approximately 3,530 LF of streams within the sub-watershed. Post-Project low flows in the East Branch Beaver River are estimated to be 12 percent lower than existing flow, which would correspond to a 0.25-inch decrease in stream water level. It is estimated that bankfull flows would be reduced by 3 percent, which would correspond to a 0.25-inch water level reduction. Flows for the 100-year recurrence interval are estimated to decrease by 1 percent that would correspond to a 0.1-inch stream water level reduction. The physical functions and values of downstream water resources are not projected to be adversely affected from the Proposed Project.

Proposed Stream Mitigation

The proposed individual stream mitigation projects require physical alteration to the existing bed, floodplain, and adjacent riparian zones to achieve the objective of increased long-term functionality in terms of improved stream hydrology, hydraulics, and geomorphology compared to the existing condition. This is accomplished by providing uplift to the current environmental condition via the Minnesota SQT standards. Thus project-related construction would have temporary physical impacts on stream channels and riparian areas but exhibit sustainable riparian functions and values long-term.

Existing conditions of note that impede natural riparian functions and values at each of the individual stream mitigation projects are noted below:

- *East Branch Beaver River.* The channel is unstable due to historical logging, road crossings, watershed diversions, and other disturbances. This land use has caused the channel to be unstable with high rates of erosion in areas where the channel does not have access to its floodplain. During flood events, this causes high shear stresses and high near-bank stresses resulting in erosion along the banks and valley walls. The watershed area contributing to the lower end of the project site is approximately 30 square miles.
- *East Branch Beaver River Tributary Ditch.* This channel is downstream of the Tailings Basin. It is a high-gradient, partially-armored ditched tributary to the East Branch Beaver River that was constructed to drain water from the remnant Big and Little Thirtynine Creeks. Further downstream the channel is highly incised and eroding both sides of its banks while lacking a floodplain. This channel lacks geomorphic features and channel and floodplain connectivity. The existing contributing watershed area is 2.64 square miles.
- *East Branch Beaver River Tributary Berm.* This is a high-gradient, historic diversion caused by a berm that forced water to flow northeast directly into the East Branch Beaver River. In the past, approximately 60 percent of the watershed flow was diverted away from the Mile Post 7 facility by the berm, leaving the channel oversized with its new smaller watershed and resulting lower flows.
- *White Rock Creek.* The White Rock Creek channel is a moderate to high-gradient channel.

The channel occurs in an urban setting and receives stormwater contributions from surrounding urban land use, which includes high road density and multiple culvert crossings. The watershed disturbances have made this channel unstable, thus causing channel degradation and aggradation throughout the system.

Each individual stream mitigation project itself would require vegetation clearing in the riparian zone for construction access; the width of disturbance along the streams range from 10 to 30 feet. Heavy equipment would reshape the channels by grading back the floodplain and excavating new channel alignments, if required. The individual stream mitigation projects would establish a stream pattern like the previous, historic channels through excavation of a new channel. The channels are designed to the appropriate bankfull width and cross-sectional area, as determined by the reference cross-sections in stable riffles from the reference reach. Riffle and pool morphology would be created along with habitat features such as toe wood and riffle rock and gravel structures; see Appendix B through Appendix E for detailed schematics for each mitigation action.

The individual stream mitigation projects would be phased and stabilized as they are completed in 500-foot segments. Construction may require pumping and diverting the stream flow to complete the work when working in the main flow of the channel. This would limit the turbidity created during the construction of the project, resulting in minor and temporary effects on the dewatered section. The diversion channels would remain until construction is complete and the diverted water would be redirected back into the newly constructed channel. This would limit sediment transport and impacts to water quality both at the project site(s) and downstream during construction.

All construction and post-construction activities would follow the prescriptions of each SWPPP. As noted in Item 14d, site restorations would include re-establishment of trees and vegetation with vegetation monitoring and reporting required annually. Permits would likely include performance standards for mortality-related parameters and invasive species cover. In particular, the Minnesota SQT includes specific performance standards for canopy cover (%) and woody stem basal area (sqm/hectare), both of which would require successful establishment of potential deer-browsed woody species.

Requirements of the MPCA Section 401 Water Quality Certification include but are not limited to:

- Completing two functional stream restorations in 2023, 2025, and 2027 at the locations identified in the June 2020 Stream Restoration Plan;
- Reporting stream work completed the previous year;
- Annual reporting of project compliance with the objectives of the June 2020 Stream Restoration Plan until the goals are obtained;
- Ensure invasive species control; and
- Meet requirements for: USACE escrow; adaptive management planning; erosion and sedimentation control; and implementing a SWPPP.

To address potential climate change, the purpose of the Proposed Project would attenuate flood

flows by retaining high-water flows over bankfull conditions in the floodplain, release those same flows over a greater time, thus improving the reliance of the system to changing hydrology related to climate change. This would contrast the existing condition that is effective at moving water downstream and creating higher peak flows, which would not address frequent and more intense precipitation events as projected in the future.

The streams are not navigable by typical watercraft.

13. Contamination/Hazardous Materials/Wastes:

- a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

According to the MPCA *What's In My Neighborhood*, there are no known hazardous contamination conditions within the New Tailings Basin Features and Proposed Stream Mitigation site areas; see Figure 8.

As noted above in Item 12, an industrial solid waste landfill was permitted, constructed, and operated since 2000, with the facility currently permitted through 2027. Given the location of the ash landfill on the site, both the Dam 1 Progression and West Ridge Railroad Relocation must be designed to go “around” the landfill in ways that avoid impacts to this existing site infrastructure. In addition, any impacts that might result from Ongoing Tailings Basin Operations, upgradient to ten feet less than the ultimate dam elevation of 1,315 feet, must be addressed in the Proposed Project design. The proposed corridors of disturbance for the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation are thus designed to avoid impacts to the ash landfill and vice versa.

A site with underground tanks and petroleum remediation site is 90 feet upgradient of the White Rock Creek stream mitigation project component. The investigations and associated cleanup were completed in 1997. A letter from the MPCA, which is dated from 1997, states that if there is any development of this property or surrounding area, then it should be assumed that petroleum contamination may still be present. If it is encountered, the MPCA staff should be notified immediately. No excavation of soils at this cleanup site is anticipated. However, excavation of soils near the leak site described above could expose some hidden contamination at White Rock Creek. If unknown materials are encountered (i.e., underground storage tanks, unknown seepage, petroleum), Northshore would evaluate the risk of contamination and remove the materials under guidance from local or MPCA hazardous material authorities after being contacted.

- b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate

adverse effects from the generation/storage of solidwaste including source reduction and recycling.

Construction of the New Tailings Basin Features and Proposed Stream Mitigation would generate small amounts of municipal solid wastes, such as plastic and paper containers and packaging. Any waste produced would be removed from the Proposed Project sites either at the end of each workday or during final clean-up and properly disposed.

The Proposed Project would not generate wastes during operation. Therefore, measures to avoid, minimize, or mitigate effects from the generation/storage of solid wastes during operations are not proposed.

- c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Hazardous materials used for the Proposed Project would be stored and handled in accordance with Northshore's Spill Prevention Control and Countermeasures (SPCC) Plan. Each Department at Northshore has a specific Spill Reporting Environmental Standard Operating Procedure (ESOP) that would be implemented should spills occur. Emergencies would be handled in accordance with Northshore's Emergency Response Plan/Disaster Management Plan that covers the entire Northshore facility.

There are no existing storage tanks near the Proposed Project. It is likely that fuels, lubricants, diesel exhaust fluid (DEF) and hydraulic oil would be stored onsite. The contractor would determine if storage tanks would be necessary (even temporarily) during construction. Northshore maintains agreement with all contractors that they follow applicable federal and state rules regarding the storing of such materials, clean up, and the reporting of spills. The agreement requires contractors to have spill response materials available and to complete vehicle inspections. Northshore would also periodically inspect the site and note spills or leaks if discovered.

Northshore and their contractors would be prepared to respond to spills and to recover and contain spilled materials as quickly and thoroughly as possible. For petroleum spills that are five or more gallons, Northshore or their contractors are required to contact the State Duty Officer. Reporting procedures are found in Northshore's ESOPs as described above.

- d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The Proposed Project would not generate nor require storage of hazardous wastes during construction or operation. No measures are proposed.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

- a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The Proposed Project occurs in the North Shore Highlands Subsection of the Northern Superior Uplands Section of the Laurentian Mixed Forest Province. This is a narrow strip 20 to 25 miles wide that follows the shoreline of Lake Superior from Duluth to the easternmost tip of Minnesota. A mosaic of forest habitats stretches across this landscape, which is heavily influenced by aspen-birch, with minor amounts of white and red pine, mixed hardwood-pine, and conifer bogs and swamp. Numerous short streams, some 10 to 15 miles in length, run from the highland to the shore of Lake Superior, with most ending in waterfalls near the shoreline.

Native plant communities at the New Tailings Basin Features and Proposed Stream Mitigation sites are typical to the North Shore Highlands Subsection. Existing vegetation consists of herbaceous plants and woody vegetation dominated by speckled alder, black ash, black spruce, tamarack, quaking aspen, red pine, white pine, paper birch, reed canary grass, and other species typical of this subsection.

Regarding representative aquatic biota, the MPCA has conducted surveys within the Proposed Project stream reaches and identified the following:

- *Fish Resources.* Types of fish identified include but are not limited to: blacknose dace; brook stickleback; brook trout; central mudminnow; common shiner; creek chub; fathead minnow; finescale dace; Johnny darter; longnose dace; mottled sculpin; northern redbelly dace; pearl dace; and white sucker.
- *Invertebrate Resources.* Types of invertebrates include but are not limited to: alderflies; balloon flies; black flies; caddisflies; chiggers; circular-seamed flies; clubtails; common stoneflies; darners; finger-Net; caddisflies; fingernail clam; gastropods; giant stoneflies; long-horn caddisflies; long-toe water beetles; mayflies; midges; net-spinning caddisflies; northern caddisflies; riffle beetles; and small winter stoneflies.

The New Tailings Basin Features and Proposed Stream Mitigation sites are in a larger complex of scrub-shrub wetlands, forested wetlands, and forested uplands adjacent to the existing Tailings Basin. The area is likely used by commonly occurring species such as: migratory songbirds; small mammals such as voles, mice, shrews; and medium to large mammals such as snowshoe hare, bobcat, Canada lynx, red fox, gray fox, American marten, fisher, moose, white-tailed deer, bear, and gray wolf among others.

- b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-__) and/or correspondence number (MCE 2022-00465) from which the data were obtained and

attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

State Listed Species

The Proposer initially requested a natural heritage review from the DNR and received the Natural Heritage Review letter in 2022; a follow-up review request was submitted in 2025, and the review letter was received December 9, 2025. (MCE 2022-00465-02) (Appendix G). The Natural Heritage review informs proposers of any required actions to follow state law and provides recommended measures to avoid or minimize disturbance to ecologically significant areas or state-listed species.

The review letter identified a number of state-listed species that have been documented in the vicinity of the Proposed Project, however no state-listed species have been previously identified within the Proposed Project features see Table 20.

Table 20 State Listed Species Documented within the Vicinity of the Proposed Project Area According to the DNR Natural Heritage Information System

Scientific Name	Common Name	State Status	Habitat
<i>Carex media</i>	Intermediate Sedge	Special Concern	Intermediate sedge occurs on the shore rocks of Lake Superior, more specifically in the peaty vegetation mats that develop in rock crevices and along the margins of small rock pools. Inland habitats typically develop where water seeps out from seams and crevices in a cliff, creating a small and unique microhabitat.
<i>Cladium mariscoides</i>	Twig Rush	Special Concern	Twig rush is typically found in sunny, sedge-dominated habitat that is saturated and has peat soils. Twig rush is typically found in prairie rich fens, northern rich fens, and calcareous fens according to the DNR.
<i>Crataegus douglasii</i>	Black Hawthorn	Special Concern	Black hawthorn is found within about ten miles of Lake Superior in a narrow band from the Gooseberry River (Lake County) northeastward to the Canadian border at Grand Portage (Cook County). The species is typically found in streamside thickets with rocky, gravelly, or clayey substrates. These habitats are often flooded in the spring but rarely experience much sedimentation.
<i>Eleocharis nitida</i>	Neat Spikerush	Special Concern	Neat spikerush may be found in temporary and seasonal wetlands typically in small depressions such as ditches, pits, and trails.
<i>Huperzia appalachiana</i>	Appalachian Fir Moss	Special Concern	Appalachian fir moss is found on shaded mesic cliffs and sometimes adjacent mesic talus. Suitable cliffs tend to vary from northeast- to northwest-facing and consist of diabase, basalt, and other weakly alkaline to circumneutral bedrock types.

Scientific Name	Common Name	State Status	Habitat
<i>Huperzia porophila</i>	Rock Fir Moss	Threatened	Rock fir moss is found at several sites in northeastern Minnesota, typically on diabase cliffs. Sites in the northeast are typically northerly facing, wooded habitats that are moist and well shaded.
<i>Sorex fumeus</i>	Smoky Shrew	Special Concern	Smoky shrews have been found in: glacial boulder streams; second-growth black spruce, fir, paper birch forests; mossy, talus slopes; and sphagnum bogs.
<i>Torreyochloa pallida</i>	Torrey's Mannagrass	Special Concern	Torrey's mannagrass occurs in a wide variety of wetland habitats including the shores and shallows of streams, lakes, vernal ponds, and beaver ponds. Water is often slower moving, and substrates are typically mucky.
<i>Trisetum spicatum</i>	Spike Trisetum	Special Concern	All the Minnesota occurrences of spike trisetum are found in full sunlight on exposed bedrock within a short distance of Lake Superior. The habitat is characterized by a cool summer microclimate, low winter temperatures, variable snow depth, high desiccating winds, intermittent wave action, and potentially scouring ice.
<i>Woodsia alpina</i>	Alpine Woodsia	Threatened	Alpine woodsia is found in crevices and on small ledges of moist and partially shaded cliffs. The cliffs are composed of circumneutral to weakly alkaline bedrock, including basalt and diabase. They occur mostly in cool river gorges near Lake Superior and sheltered Lake Superior shorelines that are not exposed to storm waves and ice scouring. A few populations occur on cliffs located further inland as well.

Other state listed species of special concern whose range overlaps the Proposed Project area but were not identified in the Natural Heritage review letter, includes moose (*Alces alces*), Canada lynx (*Lynx canadensis*), and mountain lion (*Puma concolor*).

On July 22-24, 2015, and August 12-14, 2015, Barr conducted a botanical survey for the proposed realignment of the West Ridge Railroad and the Dams 1 and 2 progressions to inform planning and permitting activities. During the surveys, no federal or state listed threatened or endangered plant species were found. Two state special concern species were identified: neat spikerush (*Eleocharis nitida*) and twig rush (*Cladium mariscoides*).

Federally Listed Species

The Proposer reports a review of USFWS Information for Planning and Consultation (IPaC) tool was used on October 7, 2025, to identify federally listed species that may occur within the Proposed Project area. The review identified three federally endangered or threatened mammals including the Canada lynx (*Lynx canadensis*; threatened), northern long-eared bat (*Myotis septentrionalis*; endangered), gray wolf (*Canis lupus*; threatened); one endangered bird, the piping plover (*Charadrius melodus*); and three proposed endangered or threatened species, including the tricolored bat (*Perimyotis subflavus*; proposed endangered), Suckley's cuckoo bumble bee (*Bombus suckleyi*; proposed endangered), and the monarch butterfly (*Danaus plexippus*; proposed threatened).

Rare Features

Data from the DNR Minnesota Biological Survey (MBS) were reviewed to determine if any Minnesota Biological Survey sites of biodiversity significance, native plant communities, scientific natural areas, or other sensitive ecological resources are present within or near the Proposed Project area.

There is one site of biodiversity significance within the East Branch Beaver River stream mitigation project. This is the *Silver Bay SW – Mile Post 7 Ridges* site of biodiversity significance, which is ranked as high. Sites ranked as high contain very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes. This site contains the following native plant communities (listed with their conservation status rank) in the direct vicinity of the proposed East Branch Beaver River stream mitigation project:

- Upland White Cedar Forest – vulnerable to extirpation
- Aspen – Birch Forest, Balsam Fir Subtype – secure
- Alder – (Maple – Loosestrife) Swamp – secure
- Beaver Wetland Complex – imperiled

Two sites of biodiversity significance are located outside of but adjacent to the Proposed Project area. The Lower Beaver – Fault Line Riders site of biodiversity significance (ranked outstanding) is located southeast of the Proposed Project area and the East Branch Beaver site of biodiversity significance (ranked moderate) is located north of the Proposed Project area. These sites of biodiversity significance contain several native plant communities.

None of the proposed New Tailings Basin Features are located within sites of biodiversity significance.

- c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

General Impacts to Fish, Wildlife, and Plant Communities

Construction of the Proposed Project features would have temporary minor impacts on the local wildlife and ecological communities. Noise, dust, and construction activity would temporarily dislocate species sensitive to those activities. For riparian habitats, it is anticipated the temporarily displaced species would return to use them upon final restoration.

The Proposed Project would also result in minor adverse impacts to common wildlife species due to the loss of approximately 328.3 acres of wildlife habitat because of the conversion of land use for the construction of the New Tailings Basin Features. For common wildlife species, this loss is considered minor because their populations are stable, and as such small losses of habitat are not concerning at the population level. Furthermore, most common species are habitat generalists with a relatively high tolerance of disturbance and human presence.

Fish and invertebrate species at the Proposed Stream Mitigation sites would be subject to temporary habitat disruption during construction that could result in injury and/or mortality, however at a very localized level. Post-project, habitat creation and enhancement are an integral part of the Proposed Project design and would provide beneficial effects for fish and invertebrate species. For fish in particular, new pools would provide thermal refuge, cover, feeding and resting and nursery areas; riffles would improve oxygenation of the water column and provide spawning areas; and root wads would provide woody cover and habitat and stabilize stream banks.

As part of the individual stream mitigation projects, invasive species would be removed and the areas would be revegetated with native species. Vegetation management would adhere to the Minnesota SQT standards, which require a minimum of 5 years of post-construction vegetation monitoring and maintenance to confirm native vegetation is restored/established. A monitoring report would be submitted to the LGU annually to ensure performance standards for vegetation are met.

After construction is complete, the individual stream mitigation projects would enhance fisheries and wildlife habitat. Access trails and staging areas would be restored to a condition that is equal to or better than the existing conditions. The site's ability to resist impacts related to climate trends would be enhanced by the completion of this Proposed Project. Increased floodplain access, roughness, and woody vegetation increases the streams' ability to handle greater frequency and intensity of storms by reducing peak flows and reducing erosive power of stream flow.

State Listed Species

Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules

(Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, without a permit; special concern status species are not protected by Minnesota's Endangered Species Statute or the associated Rules, however their status in the state is being carefully monitored.

Threatened species identified within the vicinity of the Proposed Project are discussed below.

- *Rock Fir Moss*. The previously recorded population of rock fir moss was identified in 1943 along what is now Marina Drive Road located adjacent to Lake Superior. There is no suitable habitat within the Proposed Project area; as such, the Proposed Project would not adversely impact rock fir moss.
- *Alpine Woodsia*. This species occurs mostly in cool river gorges near Lake Superior and sheltered Lake Superior shorelines that are not exposed to storm waves and ice scouring. A few populations of alpine woodsia occur on cliffs located further inland as well. The Proposed Project would not impact any cliffs or gorges that the alpine woodsia would inhabit; as such, the Proposed Project would not adversely impact alpine woodsia.

Special concern species identified within the vicinity of the Proposed Project are discussed below.

- *Smoky Shrew*. The smoky shrew has been found in the Proposed Project vicinity. This species prefers larger and older forest blocks where the preferred microhabitat includes a cool, damp forest floor with a thick litter layer, mossy-covered rocks, and decaying debris. The riparian areas and wooded wetlands within the individual stream mitigation projects would be considered suitable habitat for this species. Impacts, if any, would most likely be due to post-project revegetation measures if measures to minimize impacts were not deployed.
- *Twig Rush; Neat Spike Rush; Black Hawthorn; Torrey's Mannagrass*. As noted in Item 14b, twig rush and neat spike rush were documented in wet meadows in direct vicinity of the Proposed Project. Black hawthorn and Torrey's mannagrass have been documented along streams in the vicinity of the Proposed Project, where they are found in shallow wetlands or along the edges of streams and lakes. Impacts could result from construction of the New Tailings Basin Features or Proposed Stream Mitigation if these species were present.

For other state listed species of special concern whose range overlaps the Proposed Project site identified in Item 14b, see the Federally Listed Species section for Canada lynx. Regarding moose and mountain lion, specifically:

- *Moose*. Habitat for moose is likely available within the Proposed Project area. The key habitat types considered moose habitat include mature forest, grassland/brushland, and aquatic environments. As such, the Proposed Project would likely affect individuals in the vicinity through habitat loss and fragmentation for the New Tailings Basin Features, though not likely at the population level.
- *Mountain lion*. There is no evidence that the mountain lion has a self-sustaining, breeding population in Minnesota, although some sightings are confirmed in the state including on camera near the Proposed Project site. The species is highly mobile and seems to be nomadic.

in their presence in the state. Given the secretive and transient nature of the individuals that may be present in Minnesota and in the Proposed Project area, no discernable impacts are anticipated due to the Proposed Project.

Federally Listed Species

Potential impacts to federal listed species in the Proposed Project vicinity are detailed below.

- *Piping Plover*. The piping plover occupies open sandy areas such as sandbars and shores of lakes and rivers, and, in St. Louis County is found only along the shores of Lake Superior. No open sandy coastal areas would be impacted. As a result, the Proposed Project would have no impacts on the piping plover.
- *Canada Lynx*. Suitable habitat for the Canada lynx, broadly characterized as northern forest, is present within and adjacent to the Proposed Project. USFWS designated critical habitat (DCH) for the lynx is in the Proposed Project area. While patches of suitable habitat are present, impacts to the Canada lynx are unlikely as they prefer large tracts of dense, contiguous northern boreal forest with a high abundance of snowshoe hare. The Proposed Project location within the greater landscape amidst current Tailings Basin Operations does not provide the amount or quality of habitat lynx prefer. Lynx are a mobile and highly secretive species and field surveys are not likely to provide reliable presence or absence information. It is possible for construction activities to impact the movements of the species as the lynx could travel through the area, however it is unlikely for lynx to inhabit the Proposed Project area due to the proximity to the existing Tailings Basin and the presence of more suitable habitat in the surrounding areas. As a result, the Proposed Project is unlikely to adversely impact the Canada lynx.
- *Gray Wolf*. The Proposed Project is located within designated critical habitat (DCH) for the gray wolf and suitable habitat for the gray wolf is present within the Proposed Project and surrounding landscape. In Minnesota, gray wolves occupy a variety of habitats but are generally closely tied to northern forests and ungulate (e.g., white tailed-deer; moose) populations. Den sites for wolves are found in natural berms or hillsides and beneath fallen timber, while rendezvous sites, which are used seasonally, are typically openings within wooded areas. The highly mobile, migrant nature of wolves is advantageous for the species in responding to disturbance at a given location within suitable habitat. It is likely the species would avoid the Proposed Project site due to the level of surrounding human disturbance. The Proposed Project would have a negligible impact on the suitable habitat for the species in Minnesota, and as a result the Proposed Project is unlikely to adversely impact the gray wolf.
- *Northern Long-eared Bat*. Suitable habitat for the northern long-eared bat is present within the Proposed Project area and surrounding landscape. Northern long-eared bat forage in upland forested areas and use trees greater than 3-inches diameter at breast height (dbh) with loose, peeling bark, or crevices as roost sites. Hibernation occurs in caves and mines. According to USFWS and DNR data, there are no known maternity roost trees or hibernacula in the vicinity of the Proposed Project area. Potential habitat for the northern long-eared bat would be removed because of the Proposed Project.

- *Tri-colored Bat*. Tri-colored bats occupy forested habitat during their active season and caves and mines during their inactive season. Suitable active-season habitat for the tri-colored bat is present within the Proposed Project area and surrounding landscape. According to DNR NHIS data, no tri-colored bats have been identified within one mile of the Proposed Project area. Potential active-season habitat for the tri-colored bat would be removed because of the Proposed Project.
- *Suckley's Cuckoo Bumble Bee*. Suckley's cuckoo bumble bees are nest parasites of other bumble bee species. They occupy a diversity of habitats including prairies, grasslands, meadows, woodlands, and agricultural and urban areas. Suitable habitat for Suckley's cuckoo bumble bee is present within the Proposed Project area and surrounding landscape. The DNR NHIS data does not document or track Suckley's cuckoo bumble bees. Suckley's cuckoo bumble bees are known to be rare in Minnesota. The Proposed Project would have a negligible impact on the suitable habitat for the species in Minnesota, and as a result the Proposed Project is unlikely to adversely impact Suckley's cuckoo bumble bees.
- *Monarch Butterfly*. Monarch butterflies inhabit areas with a high number of flowering plants for foraging; milkweed (*Asclepias* spp.) is required to complete the caterpillar life stage. Suitable habitat for the monarch butterfly is minimal within the Proposed Project area and surrounding landscape. The DNR NHIS data does not document or track monarch butterflies. The Proposed Project would have a negligible impact on the suitable habitat for the species in Minnesota, and as a result the Proposed Project is unlikely to adversely impact the monarch butterfly.

Rare Features

The White Rock Creek stream mitigation project would involve vegetation removal and restoration activities within the *Silver Bay SW – Mile Post 7 Ridges* site of biodiversity significance. However, these activities would stabilize and restore this portion of the East Branch Beaver River due to disturbance from historical logging, road crossings, and other activities. Because no permanent Proposed Project features would be located at the site, and the measures to stabilize riparian vegetation and control potential invasive species, it is anticipated the Proposed Project would improve the ecological functions and values of this portion of the site of biodiversity significance.

No impacts to the Lower Beaver – Fault Line Ridges or East Branch Beaver River sites of biodiversity significance are anticipated from the Proposed Project.

- d. Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

The Proposer commits to implement the following measures to minimize potential impacts to fish, wildlife, native plant communities, ecosystems, and sensitive ecological resources:

- Stream mitigation construction work would occur during non-spawning periods of trout.
- The channel mitigation work would occur in phases instead of disturbing the entire area at once.

- Northshore would coordinate with the local DNR fisheries office to move fish out of the active construction area prior to diverting water, if necessary.
- Work from the upper to lower waters within the watershed.
- Limit access to the project locations to areas shown on the plans.
- Limit the size of staging areas and install perimeter sediment fence to reduce sediment runoff.
- Suspend construction during rain events if necessary to limit rutting and excess erosion from the construction equipment.
- The construction timeline for the individual stream mitigation projects would be short to minimize the amount of time that areas are disturbed.
- Use only native species that are appropriate to the existing terrestrial ecology to restore the disturbed areas.
- Avoid parking in or moving through existing patches of invasive species when getting to and from the work site. When unavoidable, clean vehicle of all visible evidence of soil and vegetation when leaving the parking site.
- Use natural netting for erosion control blanket to avoid ensnaring wildlife.
- Adhere to the construction SWPPPs for the New Tailings Basin Features and Proposed Stream Mitigation sites.
- If possible, work along stream and in wet meadows and shallow marshes would be conducted under frozen ground conditions.
- Disturbed soils would be revegetated with native species suitable to the local habitat as soon possible after construction.
- A qualified surveyor would conduct a habitat assessment in any potential habitat that would be impacted by the Proposed Project. If the habitat for alpine woodsia, rock fir moss, intermediate sedge, Appalachian fir moss, or other sensitive species is identified and cannot be avoided, a botanical survey would occur following DNR protocols.

The Proposer would implement appropriate actions/BMPs to prevent the spread of invasive species. Northshore would require cleaning of equipment for the Proposed Project before entering the site to minimize any introduction of invasive species. Seeding and planting of native species would be completed once grading is finalized on each stream mitigation reach. Other available measures include:

- Restoration of native vegetation, including woody species, as quickly as possible to prevent new infestations of invasive species.

- Treating local invasive species infestations first prior to soil disturbance if possible.
- Cleaning equipment of debris before moving to another project site to avoid spreading seeds or vegetation parts and creating new infestations.

The Proposer will implement the following minimization measures for construction to reduce effects on the MBS sites:

- Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities)
- Do not park equipment or stockpile supplies in ecologically significant areas
- Use effective erosion prevention and sediment control measures
- Require contractors to inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species
- As much as possible, operate within already disturbed areas
- Revegetate disturbed soils with native species suitable to the local habitat as soon after construction as possible; and
- Use only weed-free seed mixes when possible. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

Measures identified by the DNR Natural Heritage Review letter to address impacts to the smoky shrew include:

- Any use of erosion control mesh be limited to wildlife-friendly materials
- Use of erosion control blanket should be limited to “bio-netting” or “natural netting” types, which should not include products containing plastic mesh netting or other plastic components
- Awareness should also be present regarding hydro-mulch products that may contain small synthetic (plastic) fibers, which if became loose could make their way to Public Waters

To minimize potential impacts to smoky shrew, Northshore commits to use natural netting type erosion control blankets and avoid using products containing plastics.

To demonstrate avoidance of rock fir moss and alpine woodsia, the DNR requires that a qualified surveyor determine if suitable habitat exists within the activity impact area and, if so, conduct a survey prior to any project activities.

For the twig rush and neat spike rush the DNR recommends that the project avoid or minimize impacts

to species of special concern.

Invasive species monitoring and protection is part of the pre- and post-project monitoring required by the related USACE permit and MPCA water quality certification for each stream mitigation project. Monitoring would be conducted annually for five years post construction. Invasive species performance standards and adaptive management measures would be included in permit conditions.

Existing channel vegetation would be temporarily removed during construction. Existing alder would be excavated and used as transplants in critical areas. Native seed, trees, and shrubs would be planted along the stream banks and within the adjacent riparian corridor. Further back from the channel, a natural netting erosion control blanket would be used to stabilize the soils until the vegetation establishes. Plantings would consist of native forbs and grass seed, shrubs, and trees.

15. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

A review of the Minnesota Office of the State Archaeologist online Portal indicates that no documented archaeological sites are in or adjacent to the Proposed Project area. The Minnesota Statewide Historic Inventory Portal (MnSHIP) indicates that 10 historic architectural resources have been documented in or adjacent to the Proposed Project area (Table 21).

Table 21 Documented Historic Architectural Resources In or Adjacent to the Project

Resource Number	Resource Name	NRHP Eligibility	Location
LA-SVB-00012	Reserve Mining Company Milepost 7 Tailings Basin	Unevaluated for the NRHP individually; Contributing property to NRHP-eligible Silver Bay Historic District	in Project area
LA-SVB-00011	Mary MacDonald School	Unevaluated for the NRHP individually; Contributing property to NRHP-eligible Silver Bay Historic District	within 500 feet
LA-SVB-00001	William Kelley High School	Unevaluated for the NRHP individually; Contributing property to NRHP-eligible Silver Bay Historic District	within 500 feet
LA-SVB-00002	Frank Rukavina Arena	Unevaluated for the NRHP individually; Contributing property to NRHP-eligible Silver Bay Historic District	within 500 feet

Resource Number	Resource Name	NRHP Eligibility	Location
LA-BBT-00031	Milepost 7 Tailings Basin Railroad Spur	Unevaluated for the NRHP	in Project area
LA-XXX-00001	Reserve Mining Company Tailings Basin Pipelines	Unevaluated for the NRHP	in Project area
LA-XXX-00002	Milepost 7 Tailings Basin Electrical Distribution System & Transmission Lines	Unevaluated for the NRHP	in Project area
LA-XXX-00003	Minnesota Power Transmission Line, Two Harbors to Silver Bay	Unevaluated for the NRHP	in Project area
LA-SVB-00009	Silver Bay Historic District	Eligible for the NRHP	in Project area
XX-ROD-00160	Reserve Milepost 7 Tailings Basin Road Network	Unevaluated for the NRHP	in Project area

As part of the New Tailings Basin Features activities, a Phase I Archaeological Reconnaissance was completed throughout a large portion of the Tailings Basin property in 2016. An intensive Architectural History Survey was also completed for portions of the Proposed Project in 2020. The 2016 Phase I archaeological reconnaissance did not identify any archaeological sites within the Proposed Project footprint. The 2020 intensive architectural history survey resulted in the identification of two resources eligible for the National Register of Historic Places (NRHP): the Reserve Mining Company Milepost 7 Tailings Basin (LA-SVB-012) and Reserve Mining Company Mainline Railroad, Silver Bay to Peter Mitchell Mine (XX-RRD-047). The architectural history investigation also determined that the Reserve Mining Company Milepost 7 Tailings Basin (LA-SVB-012) is a contributing property to the previously determined eligible Silver Bay Historic District (LA-SLB-009).

The Phase I Archaeological Reconnaissance completed in 2016 included portions of the Proposed Project, including the Dam 1 and 2 Progression, Dam 1 Rail Switchback, and the West Ridge Railroad

Relocation. However, the Proposed Stream Mitigation and the South Clay Borrow Site are located outside of the previous area of investigation. The Area of Potential Effects (APE) for architectural history investigated in 2020 also included most of the Proposed Project activities. However, the proposed stream mitigation on East Branch Beaver Creek and White Rock Creek are located outside of the APE investigated for history/architecture.

Proposed Project activities would occur within the boundaries of the Reserve Mining Company Milepost 7 Tailings Basin NRHP property boundary (LA-SVB-012). These activities however are related to its continued use and function as an industrial mining facility and therefore do not adversely affect the resource's NRHP eligibility.

As required under Item 18, a project review request was submitted to SHPO in September 12, 2022. The SHPO responded via letter on January 17, 2023; see Appendix H. In their letter, the SHPO agreed that pursuant to Section 106 of the National Historic Preservation Act (NHPA), the proposed activities would have no adverse effect to the Reserve Mining Company Milepost 7 Tailings Basin. They noted that they have not yet reviewed effects pursuant to Section 106 of the NHPA for the East Branch Beaver River stream mitigation project and the White Rock Creek stream mitigation project. The SHPO also acknowledged in their letter that state administrative rules only require consideration of historic properties listed in the NRHP or State Register of Historic Places (Minn. Stat. § 138.665). No listed NRHP or State Register of Historic Places properties are in the Proposed Project area.

Regarding archaeological resources, the SHPO recommended a Phase I archaeological reconnaissance be completed for both the East Branch Beaver River (river, tributary, and berm) and White Rock Creek stream mitigation projects. Northshore anticipates completing a Phase I archaeological reconnaissance of these areas prior to the implementation of mitigation activities. Based on the findings to date, Northshore does not propose to develop an Unanticipated Discoveries Plan (UDP) for the Proposed Project.

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no designated scenic views or vistas within the Proposed Project sites.

New Tailings Basin Features

The Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation would alter the visual features on the land in the immediate Proposed Project area. The topography of the land surrounding the Proposed Project area varies greatly and the vast majority is heavily vegetated, thus limiting visibility beyond the Proposed Project limits. To the south of the Tailings Basin, the land is generally at an elevation between 1,050 and 1,200 feet. This is lower than the ultimate maximum proposed elevation of the dams at 1,315 feet, thereby increasing its potential for visibility over the life of the Proposed Project, with greatest likelihood potentially along County State Aid Highway (CSAH) 3 to the southeast. Directly east of the Tailings Basin, around Bear Lake, the land is generally at elevations between 1,300 to 1,450 feet. Therefore, to the east the ultimate elevation of the dams

at 1,315 feet would have some visibility from Lax Lake and Bear Lake Roads. To the north and west of the Tailings Basin, the land is generally at an elevation of between 1,200 and 1,350 feet. The greatest area for potential visibility is from CSAH 15 to the north and northwest of the Proposed Project area. Due to the varying topographic changes and dense vegetation surrounding the New Tailings Basin Features along with the slow vertical rise within the Proposed Project area, which would be indiscernible in many areas from the existing Tailings Basin, the potential for indirect visual effects during construction and operation of the Proposed Project is likely limited.

Proposed Stream Mitigation

The East Branch Beaver River and Tributary sites are located within a valley, just northwest of Lax Lake Road. The East Branch Beaver River stream mitigation project would be visible from Lax Lake Road, but the Proposed Project components would not be visible.

White Rock Creek is located within Silver Bay and would be visible from Penn Boulevard. Construction activities would occur during daylight hours; therefore, temporary lighting would not be necessary or visible at any time. Most of the work related to the site would occur in the stream or adjacent riparian area. Construction activities beyond the road vantage point would most likely be hidden from view due to the relatively lower elevation of the White Rock Creek project components.

17. Air:

- a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

The Proposed Project would not generate stationary source emissions. No additional measures are proposed.

- b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

The generation of vehicle emissions would be from onsite mobile construction equipment and contractor's individual vehicles driving to and from the site daily associated with the individual stream mitigation projects, and mobile construction equipment associated with the New Tailings Basin Features.

Specific to the individual stream mitigation projects, Northshore would encourage limiting construction time, carpooling, and seeking nearby locations to stay during the week (to the extent practicable) to reduce daily vehicle emissions.

- c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

New Tailings Basin Features

Construction and operation would generate dust from the use of haul roads and placement of fill material as well as from the potential increase in exposed fine tailings beaches as the basin expands. Northshore is required to mitigate fugitive dust by implementing dust control measures consistent with its existing Fugitive Dust Control Plan for the facility, required by Northshore's Air Permit #07500003-101.²⁸ These measures include taking advantage of optimum weather conditions to avoid dust dispersal via wind and placement of plant matter and other dust suppressant materials when needed. Additional measures such as applying water and crushed rock on roadway surfaces would also be considered, if applicable, to reduce and thus mitigate the amount of dust generated.

The only odors anticipated from the construction of the New Tailings Basin Features would be associated with diesel exhaust from equipment for mining-related operations and temporary events from blasting. The construction and operation of the New Tailings Basin Features would not involve any increase in such odors above those associated with the facility. There are no noticeable off-site odor impacts from these activities.

Proposed Stream Mitigation

The individual stream mitigation projects may create some temporary dust and noise during construction activities. Fugitive dust could arise during hauling and stockpiling of earthen materials and large tree branches and trunks. Odors are unlikely during construction. Construction would involve excavation and grading of soils and rocks and placement of boulders. Most materials handled do not generate fugitive dust during construction.

The potential for fugitive dust would be minimal due to work within the streams (wet conditions). Work in wet conditions, rapid re-vegetation, and erosion/sediment control BMPs would minimize fugitive dust.

The contractor would be required to follow BMPs to reduce dust such as:

- Covering loads during transport if wind-blown debris could be generated during hauling.
- Watering access routes and exposed soils when powdery conditions are evident.
- Placing mulch, temporary cover, and erosion control mats on exposed areas and stockpiles.
- Require fill and stone materials to be clean and free of dirt and debris, with exception of in-situ fill.

²⁸See Appendix J11-MPCA Air Permit 07500003-101.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

- a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.

Identified GHG emissions consist of direct emissions generated from mobile equipment during the construction of the Proposed Project and those related to land use change during construction and operation. GHG emissions from Ongoing Tailings Basin Operations are discussed in Item 21.

The amount of energy absorbed by 1 ton of a GHG over a given period is known as the Global Warming Potential (GWP). The order of common GHGs by GWP from lowest to highest is CO₂, CH₄, N₂O, and fluorinated gases (reference (11)). For ease of comparison, GWPs are calculated relative to the energy absorption of 1 ton of CO₂. Emission of a given GHG is normalized using the GWP; the resultant value is referred to as carbon dioxide equivalent (CO₂e). GHG emissions were calculated for carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), and presented as tons CO₂e. GWPs used for calculations were obtained from Table A-1 to Subpart A of Part 98, Title 40.

Fuel use, horsepower, and vehicle miles were estimated from previous similar projects. Emissions were calculated for construction equipment for both on-road and off-road use. On-road vehicle emissions are generated from haul trucks, passenger vehicles, and light vehicles traveling to-and-from the Proposed Project sites. Off-road vehicle emissions are those generated by construction equipment that would remain on the Proposed Project site for the duration of the construction. This consists of earthmoving equipment such as excavators and loaders. Emission factors used to calculate emissions from construction equipment are based on the USEPA Center for Corporate Climate Leadership (CCCL) Emission Factors for Greenhouse Gas Inventories and the California South Coast Air Quality Management District.

Most of the New Tailings Basin Features and Proposed Stream Mitigation projects would alter forested lands, grasslands, and wetlands, resulting in removal of a carbon sink from the area. Land use change emissions were calculated using the emission factors for a 30-year land transition from the Minnesota Environmental Quality Board (EQB) Climate Calculator (reference (12)).

See Table 22 through Table 24 that summarize the GHG emissions for the Proposed Project. Detailed calculations can be provided upon request; these are compiled as Appendix I.

Table 22 Estimated Construction Greenhouse Gas Emissions

Emission Source	CO ₂ (tons)	CH ₄ (tons)	N ₂ O (tons)	CO ₂ e (tons)
East Branch Beaver River	109.55	9.77E-03	5.97E-03	111.40

Emission Source	CO ₂ (tons)	CH ₄ (tons)	N ₂ O (tons)	CO ₂ e (tons)
East Branch Beaver River - Ditch	109.55	9.77E-03	5.97E-03	111.40
East Branch Beaver River - Berm	9.13	8.14E-04	4.98E-04	9.28
White Rock River	109.55	9.77E-03	5.97E-03	111.40
Dam 1 Progression	17,370.05	6.91E-01	1.12E+00	17,686.57
Dam 2 Progression	13,580.22	5.40E-01	8.77E-01	13,827.68
West Ridge Railroad Relocation	6,312.63	2.51E-01	4.07E-01	6,427.64
South Clay Borrow Site	2,846.48	1.11E-01	1.92E-01	2,900.39
Construction - Subtotal	40,447.15	1.62	2.62	41,185.77

Table 23 Estimated Construction and Operations Land-Use Change Greenhouse Gas Emissions

Emission Source	CO ₂ (tons)	CH ₄ (tons)	N ₂ O (tons)	CO ₂ e (tons)
New Tailings Basin Features	120,430.09	N/A	N/A	120,430.09
Proposed Stream Mitigation Projects	30,588.33	N/A	N/A	30,588.33
Land-Use Change – Subtotal ¹	151,018.42	N/A	N/A	151,018.42
Construction	40,447.15	1.62	2.62	41,185.77
Land-Use Change	151,018.42	N/A	N/A	151,018.42
TOTAL¹	191,465.56	1.62	2.62	192,204.19

¹Land-Use Change emissions are excluded from the total CO₂, CH₄, and N₂O and only included in CO₂e because the emission factor reflects CO₂e.

Table 24 Estimated Total Project Greenhouse Gas Emissions

Emission Source	CO ₂ (tons)	CH ₄ (tons)	N ₂ O (tons)	CO ₂ e (tons)
Construction	40,676.27	1.87	1.37	41,130.53
Land-Use Change	N/A	N/A	N/A	13,389.95
TOTAL ¹	40,676.27	1.87	1.37	54,520.47

¹Land-Use Change emissions are excluded from the total CO₂, CH₄, and N₂O and only included in CO₂e because the emission factor reflects CO₂e.

b. GHG Assessment

i. Describe any mitigation considered to reduce the project's GHG emissions.

It is estimated that the GHG emissions from equipment usage would result in approximately 41,186 tons during construction. An additional 151,018 tons is estimated from land use changes for a total of 192,204 tons during construction and from land use change. GHG emissions from Ongoing Tailings Basin Operations are discussed in Item 21.

Northshore is not proposing CO₂e mitigation for this Proposed Project. However, Northshore would consider adaptive mitigation for the construction site such as:

- Reduce any unnecessary clearing and grubbing.
- Maintain tree canopy when feasible.
- Practice vehicle and equipment maintenance.
- Carpool when possible and turn off equipment when not in use.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.

N/A

iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

The anticipated net lifetime GHG emissions from the Proposed Project is 4,805 tons/year, which is less than 0.001% of the total CO₂e emissions that were emitted in Minnesota in 2022. The anticipated net lifetime GHG emissions from Ongoing Tailings Basin Operations (Item 21) is 26,977 tons/year, which is less than 0.001% of the total CO₂e emissions that were emitted in Minnesota in 2022. The net annual lifetime GHG emissions from the Proposed Project are extremely small compared to the

state total and therefore the effects from the Proposed Project on achieving the Next Generation Energy Act goals are negligible. Nonetheless, the Proposed Project is proposing a net increase in overall GHG emissions that would affect Minnesota's GHG reduction goals.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including: 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Additional heavy equipment would operate during construction of the Proposed Project. Work for the individual stream mitigation projects would typically occur during daylight hours Monday through Friday. Work for the New Tailings Basin Features would typically occur during daylight hours. The Proposer and stream mitigation construction crews would be required to follow local noise ordinances and restrictions. Post construction, the operation of the Proposed Project would produce no noise.

Construction on the East Branch Beaver River and Tributary is adjacent to the Tailings Basin equipment operation. At no time would the noise intensity from equipment related to this stream mitigation project exceed that of equipment used in daily operation of the Tailings Basin. There are no sensitive receptors near this stream mitigation site. The East Branch Beaver River stream mitigation site is directly adjacent to Lax Lake Road, CSAH 4, and approximately 0.6 miles from the nearest residence. The East Branch Beaver River stream mitigation site is also approximately 0.8 miles northeast of the active Tailings Basin but is otherwise remote. Noise for these Proposed Stream Mitigation sites would be limited to the construction period only.

Construction on the White Rock Creek is directly adjacent to Penn Boulevard, approximately 300 feet from the Essentia Health Silver Bay Pharmacy, approximately 300 feet from residential homes, and 150 feet from United Protestant Church on Horn Boulevard. Construction southeast of Penn Boulevard would be 150 feet from the Silver Bay Recreation Buildings. Any noise impacts would be limited to the construction period where noise-limiting equipment, such as mufflers, would serve to ameliorate some of the impact. The contractor would place signs along the construction corridor and any trails to alert pedestrians of the construction activity to limit perceived disturbance.

For the New Tailings Basin Features, noise from construction would be consistent with ongoing operations and would have minimal effects on existing noise levels in the area.

20. Transportation

- a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Northshore would use existing facility roads to construct the New Tailings Basin Features. Most of the materials and equipment would be obtained from existing onsite sources. Therefore, additional traffic

on public roads would be minimal. No additional parking spaces would be needed.

Any parking and staging areas for the Proposed Stream Mitigation sites would be small with predicted daily traffic generation at less than 10 vehicles per day. Due to the remote nature of the work, no alternative transportation modes would be applicable.

- b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html>), or a similar local guidance.

The New Tailings Basin Features would be constructed using existing facility roads. As a result, construction activities would not increase peak hour traffic generation more than 250 vehicles or generate more than 2,500 daily trips.

A short period of mobilization associated with the individual stream mitigation projects would increase semi-truck traffic in the area and directly off CSAH 4 and Penn Boulevard. During construction, crews would report daily during weekdays. This would be an addition of approximately 10 vehicles per day. Most materials required for the Proposed Stream Mitigation would be acquired onsite; however, some additional materials may be required to be delivered for the completion of the individual stream mitigation projects. The individual stream mitigation projects may see an increase in traffic during rainfall events when there is an increase in inspections or potential maintenance.

- c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

The Proposed Project would have limited traffic impacts thus no minimization and mitigation measures have been identified.

21. Cumulative potential effects:

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

RGU Note: The cumulative potential effects analysis includes an evaluation of the effects of Ongoing Tailings Basin Operations because the Minnesota Court of Appeals remanded the matter to DNR to consider the Ongoing Tailings Basin Operation of the existing facilities as a connected action for the purpose of determining whether an Environmental Impact Statement (EIS) is required. See *In re the Determination of Need for an Environmental Impact Statement for the Mile Post 7 West Ridge Railroad Relocation*, 2025 WL 368515 (Minn. Ct. App. Feb. 3, 2025).

- a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative

potential effects.

The overall geographic scale for assessing cumulative potential effects for the Proposed Project includes:

- the Beaver River-Frontal Lake Superior watershed; and
- the area within 0.5 miles of the White Rock Creek stream mitigation site.

The timeframe for assessing cumulative potential effects differs between the New Tailings Basin Features and the Proposed Stream Mitigation as listed below:

- *New Tailings Basin Features.* The construction of the Dam 1 and 2 Progressions, Dam 1 Rail Switchback, and West Ridge Railroad Relocation, along with the extraction from the South Clay Borrow Site, are anticipated to span over approximately 40 years. The actual length of time would depend on Northshore's production schedule as described in Item 6b.
 - *Proposed Stream Mitigation.* The individual stream mitigation projects would be constructed in a two-phase schedule, with construction occurring in 2027 and 2029. Construction itself would take one field season per each two-action project as described in Item 6b. Once construction is complete, the environmental setting would revert over time to resemble pre-project conditions over the long term but exhibiting more natural instream and riparian corridor functions and values.
- b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

This section describes the present and reasonably foreseeable future projects that may occur in the Beaver River-Frontal Lake Superior watershed, and/or within 0.5 miles of the White Rock Creek stream mitigation project and therefore could potentially interact with the environmental effects of the Proposed Project.

Ongoing Tailings Basin Operations

Northshore's Tailings Basin Operations have been underway for more than 45 years. Construction and operation of the complete, planned Tailings Basin was reviewed in the 1975-76 Final EIS (*see Appendix J9-1975-76 Final EIS*) and approved in the 1977 Master Permit (*see Appendix J3-1977 Master Permit*). Ongoing Tailings Basin Operations include the deposition of fine tailings, which consist of fine waste rock mixed with water transported as a slurry from the processing plant in Silver Bay to the Tailings Basin via pipeline. Fine tailings are deposited as a slurry within the basin itself by a supplemental pipeline system routed around the Tailings Basin. Plant aggregate from the processing plant are also transported to the Tailings Basin via a dedicated rail system. The plant aggregate is then delivered to designated areas using heavy-duty rail cars and off-road haul trucks to construct perimeter dams Dam 1, Dam 2, and Dam 5, and ancillary elements.²⁹ Excavation of clay from nearby borrow pits is also

²⁹Ancillary elements include elements such as the splitter dikes, rail grades, roadways, buttressing, or other embankments

conducted to support dam construction. Such Ongoing Tailings Basin Operations occur independently of the Proposed Project as deposition of fine tailings is a prerequisite to the day-to-day activity at the Tailings Basin and Northshore Mining Company.

Plant aggregate is strategically placed using earthmoving equipment such as bulldozers, excavators, haul trucks, and motor graders to construct engineered raises for progression of the basin's containment structures along with associated ancillary elements required for operations. Currently, fine tailings have been deposited to elevations ranging between approximately 1,210 and 1,244 feet and will continue to occur until the ultimate elevation of 1,315 feet is reached. Therefore, the Proposed Project under evaluation in this EAW provides for this continued progression of the footprint to 1,315 feet. *Id. at 12.*

The fine tailings deposition area is depicted on Figure 9. The Tailings Basin would continue to progress west into the area referred to as the future tailings progression area, depicted on Figure 9, generally consistent with the "future tailings progression area" defined in the 1975-76 Final EIS and previously permitted. This area of future tailings progression would result in an additional 650 acres of surface disturbance within the Tailings Basin. The future tailings progression area would be subject to the site reclamation and closure requirements of Minn. R. Chapter 6130 and any other applicable requirements in place at the time of closure. The environmental effects of closure activities are evaluated in the 1975-76 Final EIS and Appendix F (i.e., Geotechnical Dam Safety).

The Ongoing Tailings Basin Operations would also include development of a seepage recovery pond west of the Dam 1 Progression (Figure 9). The seepage recovery pond is designed to capture water that seeps through the tailings dam. This pond will serve as a containment area for seepage water prior to reuse or discharge in accordance with environmental permits. The Ongoing Tailings Basin Operations may also require from time to time external buttressing to support dam stability that may require wetlands assessment, permitting, mitigation and offsets to neutralize the impact of buttressing on wetlands.

Other Projects

Other present and reasonably foreseeable future projects outside of Northshore property consist of the following:³⁰

- Housing development off Golf Course Road in Silver Bay
- Multimodal trailhead center off Outer Drive in Silver Bay
- Water treatment facility upgrades and booster station in Silver Bay
- Silver Bay City Street Improvement project, Phase 1A and 1B (city-wide, not shown on Figure

required for operations that are not dams.

³⁰As identified in Item 6f, Northshore intends to continue placement of tailings on the remaining permitted footprint within the Tailings Basin. This is a result of continuation of ongoing mining and processing operations at the Peter Mitchell Mine and the processing facilities at Silver Bay. These impacts were assessed in the 1975-76 Final EIS and 1977 USACE Final EIS, and originally permitted in 1977, thus the ongoing tailings placement is not within the scope of the Proposed Project under consideration in this EAW but only evaluated for purposes of the cumulative effects analysis.

10)

- Banks & Edison Boulevard Reconstruction Project (Lake County CSAH 32)
- Downtown Concept Vision Plan
- Silverpointe II Multi-family Housing
- Penn Boulevard Housing Development
- Citywide Perimeter Ditching (city-wide, not shown on Figure 10)
- City-Wide Street & Utility Construction – Phase 2 (city-wide, not shown on Figure 10)

The remaining present and reasonably foreseeable future projects are all relatively small-scale utility/street repair and residential/resort development projects, primarily located in the Silver Bay and Beaver Bay area. The projects within 0.5 miles of the White Rock Creek stream mitigation project, located in the City of Silver Bay, are shown on Figure 10. General short-term construction-related impacts associated with these projects may include increased noise, dust generation, traffic, and associated equipment and vehicular emissions. Longer-term impacts would primarily be associated with the residential/resort development projects, whose potential impacts may include minor loss of wetlands, trees/forested areas, and associated wildlife habitat. However, due to the small-scale nature of these projects, they are not anticipated to result in cumulative effects with the Proposed Project.

- c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

This cumulative effects section evaluates how the Proposed Project may interact with the Ongoing Tailings Basin Operations and other reasonably foreseeable actions within the geographic and temporal scope of the Proposed Project.

Land Use and Covertype Changes

The 1975-76 Final EIS analyzed land use changes associated with the operations of the Tailings Basin that assumed 100% conversion of natural cover to industrial uses. In total, the Tailings Basin permitted boundary encompasses approximately 2,800 acres, of which approximately 68 percent of the Tailings Basin area has been developed by the Ongoing Tailings Basin Operations. Like the original site, the remaining area includes a mix of forested habitat, grassland/brush, wetland, and riverine wetlands; see Table 25. This remaining area would be converted to industrial land use over the course of the remaining Tailings Basin lifespan.

As discussed in Item 8, the project would result in the conversion of 328.3 acres to industrial land use in addition to the land cover conversion associated with the Ongoing Tailings Basin Operations. See Table 25 that shows the change in land cover change resulting from construction of the New Tailings Basin Features together with the Ongoing Tailings Basin Operations. This land cover change would

occur within the permitted boundary of the Tailings Basin, which is subject to the Permit to Mine. Depending on final reclamation requirements for the Permit to Mine, it is likely there will be some return in vegetative cover and possibly some limited wetlands with some restored habitat. When compared to the landcover in the Beaver River-Frontal Lake Superior Watershed, the cumulative effects to land use and cover type change to wetlands, streams, and forest type are negligible, especially considering final reclamation and closure requirements.

Table 25 Land Cover Data¹

Cover Types	Before (acres)²	After (acres)
Wetlands and shallow lakes (<2 meters deep) ³	204.5	0
Deep lakes (>2 meters deep)	0	0
Wooded/forest	660.6	0
Rivers/streams	2	0
Brush/grassland	32.2	0
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0	0
Green infrastructure TOTAL (from Table 6)	0	0
Impervious surface	0	0
Developed or barren land ^{4,5}	1,906.8	2,806.1
Other (none)	0	0
TOTAL	2,806.1	2,806.1

¹Cover types estimated using NLCD 2019 Land Cover Data unless otherwise noted; see Figure3. The values listed do not include field-calculated data unless otherwise noted.

²Before calculations include areas within the Tailings Basin permitted boundary.

³Wetland data was obtained from field-collected data.

⁴This acreage is a combination of NLCD 2019 Land Cover Data land classifications of developed, low intensity, medium intensity, open space, and barren land that overlap the Tailings Basin.

⁵Primarily tailings pond, seepage pond.

Geology, soils, topography/landforms

Existing topography and landforms would be covered by the Dam 1 and 2 Progressions and deposited fine tailings footprints up to the ultimate elevation of 1,315 feet. Topography and landforms would be covered within the West Ridge Railroad Relocation and Dam 1 Rail Switchback footprints up to the design embankment surface elevations. The geology of soils beneath Ongoing Tailings Basin Operations and Proposed Project footprints will generally remain unchanged except where unsuitable soils are removed and replaced for appropriate Proposed Project feature foundation support or where removed to create ditches for water management. Given the relatively minor amount of any change that might occur, little or no cumulative effects are anticipated.

Water resources

Surface Water. The Proposed Project would affect surface waters, as described in Item 12.

Impacts to surface waters that are associated with the present or foreseeable future projects, with the exception of the Ongoing Tailings Basin Operations, are minimal. The Proposed Project, combined with these present and foreseeable future projects, are not anticipated to result in cumulative potential effects to surface waters.

The Proposed Project combined with the Ongoing Tailings Basin Operations would result in cumulative potential effects on surface waters which are discussed further below.

Northshore completed an Aquatic and Forest Resources Cumulative Effects Analysis (CEA) in 2019, which assessed the Proposed Project combined with the Ongoing Tailings Basin Operations. *See generally Appendix J20-Northshore Cumulative Effects Analysis.* The purpose of this analysis is to consider the aquatic and forest resources available in the past compared to those present currently, and the effects of reasonably foreseeable future action. The results of this analysis provide context for assessing the cumulative effects on wetland, lake, and deepwater habitat, stream, and forest resources. The analysis area for the CEA encompassed 1,200 acres within the Beaver River-Frontal Lake Superior watershed. Since the analysis has been completed, there have been no large-scale developments within the evaluated watershed that would significantly alter the results from the previous study.

As summarized in the CEA, the Proposed Project, in combination with the Ongoing Tailings Basin Operations, would affect approximately 278 acres of wetland, with the Ongoing Tailings Basin Operations comprising the majority of wetland impacts. An additional 10 acres is reasonably added to account for impacts associated with ancillary elements³¹ needed for dam safety, resulting in approximately 288 acres of wetland affected. Including construction of the Proposed Project and the Ongoing Tailings Basin Operations, a total of approximately 22,749 acres of wetlands are projected to be present in the watershed in the foreseeable future, comprising 23.6 percent of the land area. The change in wetlands, as a proportion of all wetlands within the study area, would be a 1.3 percent reduction compared to existing conditions.³² As such, cumulative effects on wetlands are not anticipated to be substantial.

³¹Ancillary elements might include critical infrastructure such as components of seepage management systems, various small channels, or seepage return systems installed along the toe of the dam(s).

³²The change in wetlands, as a proportion of all wetlands within the study area, would be a 1.3 percent reduction compared to existing conditions at the time of the 2019 CEA.

As summarized in the CEA, the Proposed Project, in combination with the Ongoing Tailings Basin Operations and the other present and reasonably foreseeable future projects, would likely result in the following cumulative stream effects in the Beaver River watershed: Approximately 186.6 stream miles were present pre-settlement, at this time there are approximately 182.2 linear miles of streams. Cumulative impacts in the foreseeable future will result in a total of 181.8 linear miles of streams remaining in the watershed. The Proposed Project will result in a reduction of 0.9% of total stream miles within the watershed. This will also result in a cumulative loss of 2.6% when compared to pre-settlement conditions.

Wastewater. Northshore's NPDES/SDS Permit MN0055301 was most recently reissued by the MPCA on August 28, 2025, and modified April 1, 2026. *See generally Appendix J35-2026 MPCA NPDES Permit MN0055301.* This NPDES/SDS Permit authorizes operation of the Tailings Basin as a disposal system under Minnesota's SDS program and discharge of industrial wastewater under the NPDES program. Specifically, Northshore is authorized to manage and route water from seepage recovery ponds to the reclaim pond, Tailings Basin, water treatment plant, the SD001 outfall, and other seepage recovery ponds. Excess water is pumped to the water treatment plant, which discharges treated water to the Beaver River at an average and maximum rate of 6.0 mgd and 7.5 mgd. The SD001 outfall is permitted to discharge 6,000 gpm, which is 8.64 mgd. At the north side of the basin, two pressure relief wells at the toe of seepage recovery dam 2-3 are discharged at NPDES station SD005 at an average and maximum rate of 0.004 and 0.01 mgd to an unnamed tributary to the East Branch of the Beaver River. As described in Item 12b.i, the Dam 1 and Dam 2 progressions would become part of this greater industrial wastewater discharge and seepage recovery system (which includes seepage recovery ponds, pump stations, pipes, and ditches), but the dam progressions themselves would not produce or discharge wastewater.

The Ongoing Tailings Basin Operations would eventually result in a dam crest elevation generally consistent with the ultimate dam crest elevation evaluated by the 1975-76 Final EIS. *See Appendix J10-1975 Draft EIS at 25.* Therefore, it is not anticipated that there would be a significant increase in uncollected seepage or additional seepage water quality impacts receiving waters beyond those previously considered and authorized. *See Appendix J2-2021 DNR ERND at 37.* Additionally, because neither the Ongoing Tailings Basin Operations nor the New Tailings Basin Features would result in changes to ore processing nor the rates of processing and tailings deposition at the Tailings Basin, they are not expected to result (either individually or cumulatively) in a significant change in the volume of water treated, the influent quality, treatment efficiency, or effluent quality compared to current discharges authorized under the NPDES/SDS Permit. *See Appendix J7-2022 DNR Record of Decision at 75.* Overall, the Ongoing Tailings Basin Operations considered cumulatively with the New Tailings Basin Features is not anticipated to alter wastewater discharges to surface waters in either quantity or quality, thus, additional effects to water resources beyond those previously authorized are not anticipated.

The 1975-76 EIS analyzed potential water quality impacts associated with construction, operation, reclamation, and closure of the Mile Post 7 Project, including potential impacts related to turbidity, chlorides, pipeline breakage, coarse tailings storage, seepage, fibers, and dam failure. For the 2021 ERND, the DNR consulted with the MPCA and reviewed extensive documentation regarding water quality in the 1975-76 EIS and subsequent permitting actions with focus on identifying new information or circumstances regarding water quality impacts available since the EIS and on

considering the impacts of the Proposed Project.³³ See *Appendix J2-2021 DNR ERND at 36-39 and 44-52*. Based on this review, the DNR concluded “that there is no new information or changed circumstances concerning water quality not studied in the 1975-76 EIS and addressed in subsequent water quality permitting that constitute new information or a change in circumstance that give rise to significant potential environmental effects from the Proposed Project that were not considered in the final EIS, or subsequent permitting premised thereon.” See *Appendix J2-2021 DNR ERND at 39 and 52*. Refer to the 2021 ERND (at 36-39 and 44-52) for the details supporting this conclusion. This conclusion remains true when considering the cumulative effects of the New Tailings Basin Features and the Ongoing Tailings Basin Operations, the potential water quality effects of the Ongoing Tailings Basin Operations and the New Tailings Basin Features considered cumulatively are consistent with the effects considered in and authorized by the 1975-76 EIS and subsequent permitting.

Stormwater. Runoff from Dams 1, 2, and 5 and adjacent direct watersheds is collected by the seepage recovery systems and routed to the Tailings Basin, where it is managed under Northshore’s NPDES/SDS Permit MN0055301. See *Appendix J32-2024-2028 5YOP at 15*. As stormwater from the Ongoing Tailings Basin Operations does not discharge to the surrounding environment, no cumulative impacts are anticipated related to stormwater.

Groundwater. As described in EAW Item 12b.i. and in the Wastewater subsection above, the New Tailings Basin Features would not significantly alter wastewater discharges to groundwater (seepage) in either quantity or quality; therefore, cumulative effects to groundwater resources beyond those associated with Ongoing Tailings Basin Operations are not anticipated.

Seepage associated with Ongoing Tailings Basin Operations is managed, monitored, and regulated under Northshore’s NPDES/SDS Permit MN0055301, which was most recently reissued by the MPCA on August 28, 2025, and modified April 1, 2026. Seepage recovery ponds exist at each dam of the Tailings Basin and seepage collection ditches are located at Dam 1 and Dam 2. The seepage recovery ponds capture seepage from the toes of the tailings dams, seepage routed from the seepage collection ditches, and seepage from the relief wells, which are present along Dam 1 and Dam 2. Water in the seepage recovery ponds is either pumped back into the Tailings Basin or sent to the water treatment plant and may be discharged in compliance with NPDES/SDS permit terms and effluent limits.

The NPDES/SDS Permit includes a total of twelve monitoring wells to monitor groundwater conditions upgradient and downgradient of the Tailings Basin. Eight wells are located downgradient of the Tailings Basin in three groups and four wells are located upgradient of the Tailings Basin in two groups. Each group includes two or three wells screened at different depths. NPDES/SDS Permit limits and monitoring requirements for groundwater are assigned to ascertain the impact of Ongoing Tailings Basin Operations on downgradient groundwater quality. Permit requirements are based on MPCA sampling policies and/or state health requirements.

Based on the data collected from the monitoring wells, there is no evidence that seepage from Ongoing Tailings Basin Operations is adversely affecting downgradient groundwater. The historical NPDES/SDS permits, as well as the current NPDES/SDS permit, for the Mile Post 7 Tailings Basin have

³³At the time of the 2021 ERND, the Proposed Project included the “extension of Dams 1 and 2,” “progressing the area of tailings deposition”, “westward relocation of the West Ridge Railroad”, and “development of a new clay borrow site.” (See *J2-2021 DNR ERND at 5-6*.)

contained requirements for Northshore to “ensure to the maximum practicable extent that the ground and surface waters of the state are maintained at their natural quality.” The historical and existing NPDES/SDS permits have been successful at regulating the seepage from the Tailings Basin to maintain natural quality of the downgradient groundwater. Elevated boron concentrations noted at one downgradient well (GW008) were evaluated and have been determined to be naturally occurring and not related to Ongoing Tailings Basin Operations. Total dissolved solids (TDS) concentrations exceeding the NPDES/SDS Permit intervention limit have been observed in two monitoring wells (GW009 and GW010) in the well nest located downgradient of Seepage Recovery Pond 1B. The TDS concentrations in these wells have been relatively stable in recent years and, based on the lack of groundwater receptors downgradient from the wells and TDS concentrations in the Beaver River being consistently below the secondary drinking water standard of 500 mg/L, there are no known impacts associated with the groundwater TDS concentrations being at or slightly above the intervention limit.

Contamination/Hazardous Materials/Wastes

According to the MPCA What’s In My Neighborhood website, there are no known hazardous contamination conditions within either the Ongoing Tailings Basin Operations, New Tailings Basin Features, or Proposed Stream Mitigation areas; see Figures 8-1 and 8-2.

As discussed in Item 13, an industrial solid waste landfill (ash landfill) was permitted and constructed and has operated at the site since 2000. Ongoing Tailings Basin Operations and the Proposed Project are designed to avoid impacts to the ash landfill.

Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources

The Proposed Project would affect fish, wildlife, native plant communities, and sensitive ecological resources (biological and ecological resources), as described in Item 14. Because the impacts to biological and ecological resources that are associated with the present or foreseeable future projects, with the exception of the Ongoing Tailings Basin Operations, are minimal, the Proposed Project combined with these present and foreseeable future projects, are not anticipated to result in cumulative potential effects to biological and ecological resources.

The Proposed Project, combined with the Ongoing Tailings Basin Operations, would result in cumulative potential effects on biological and ecological resources, particularly as a result of habitat loss. However, given the proximity of the Proposed Project to the Ongoing Tailings Basin Features and the disturbed nature of this area, the additional effects of the Proposed Project on habitat is anticipated to be minimal. This is consistent with the impact assessment from the 1975 Draft EIS conducted on the Tailings Basin Features and Ongoing Tailings Basin Operations, which stated: “On-land tailings deposition will eliminate the faunal components of the selected site. With few exceptions, the area used for tailings disposal will not be suitable for higher animal life for at least 40 years.” *See Appendix J10a-1975 Draft EIS at 233.*

The CEA that was completed for the Proposed Project, combined with the Ongoing Tailings Basin Operations, concluded that approximately 1,200 acres of potential wildlife habitat would be removed, with forested habitat representing the most dominant habitat type. As summarized in the CEA, including construction of the Proposed Project and the Ongoing Tailings Basin Operations, a total of approximately 86,505 acres of forests are projected to be present in the watershed in the foreseeable

future, comprising 89.9 percent of the land area. The change in forest, as a proportion of the total watershed, would be a 1.0 percent reduction compared to existing conditions.³⁴ This loss of habitat could affect those species that currently depend on it. However, given the presence of comparable and higher quality habitat in the area, this loss of habitat would have minimal effects on common or federal or state-protected species.

Historic Properties

The Proposed Project, combined with the Ongoing Tailings Basin Operations, would result in cumulative effects to the Reserve Mining Company Mainline Railroad, Silver Bay to Peter Mitchell Mine (XX-RRD-047) and the Reserve Mining Company Milepost 7 Tailings Basin (LA-SVB-012), the latter which is a contributing resource to the NRHP-eligible Silver Bay Historic District (LA-SVB-009). However, these cumulative effects are directly related to the continued use and function of these resources as an active, industrial mining facility. Therefore, any effects to these resources as a result of the Proposed Project and the Ongoing Tailings Basin Operations would not be adverse.

Cumulative effects to historic properties outside of Northshore property would occur in Silver Bay as a result of the White Rock Creek stream mitigation as well as development, reconstruction, and improvement projects planned in and around the city. The location of the White Rock Creek stream mitigation site falls partially within the boundaries of the Silver Bay Historic District (LA-SVB-009) and contributing resources to the district are located within 500 feet of the stream corridor. Cumulative effects of the proposed stream mitigation, when considered alongside foreseeable future actions, may include land use and development changes within the Silver Bay Historic District, including changes in traffic patterns, parking demand, and infrastructure needs, potentially impacting contributing properties. Ground disturbance from stream mitigation and future utility upgrades may also affect buried archaeological deposits, if present. Enhanced access to restored stream and park areas may also increase foot traffic and tourism, which could lead to wear and tear on historic resources if not properly managed.

Visual

The Proposed Project would result in visual impacts as described in Item 16. The Ongoing Tailings Basin Operations would result in the continued deposition of tailings up to the ultimate permitted elevation of 1,315 feet. Since the deposition of tailings would occur within the Dam 1 and Dam 2 Progression areas there would be no additional cumulative visual impacts associated with the Ongoing Tailings Basin Operations.

Air

The Proposed Project has the potential to affect air emissions, as described in Item 17. Because the impacts to air quality that are associated with the present or foreseeable future projects, with the exception of the Ongoing Tailings Basin Operations, are minimal, the Proposed Project combined with these present and foreseeable future projects, are not anticipated to result in cumulative potential effects to air quality. The Proposed Project combined with the Ongoing Tailings Basin Operations would result in cumulative potential effects on air quality which are discussed further below.

³⁴The change in forest, as a proportion of the total watershed, would be a 1.0 percent reduction compared to existing conditions, at the time of the 2019 CEA.

The 1975-76 EIS identified particulate emissions as the primary air impact at the site. Primary sources of particulate emissions include fugitive dust from construction and operational activities from land clearing, haul road traffic, and wind erosion of dry tailings around the basin perimeter. The 1975-76 EIS determined that the anticipated total suspended particulates (TSP) during construction and operations for the facility would not exceed the primary standard of 75 µg/m³ but would exceed the non-degradation standard of 10 µg/m³, where non-degradation standards apply to areas that do not exceed the National Ambient Air Quality Standards (NAAQS) at the time of the EIS. The 1975-76 EIS also analyzed the concentrations of fibers and noted that all alternatives would contain fibers. The results of the analysis showed that a predicted representative increase of 1 µg/m³ in mass concentrations of fibers at population centers would occur.

Fugitive emissions from the facility are regulated under MPCA Air Permit No. 07500003-010/-101 issued in February 2004 and most recently amended in February 2015 and January 2020. *See generally Appendix J11-MPCA Air Permit 07500003-101.* Within the MPCA Air Permit, the MPCA addresses air topics identified in the 1975-76 EIS with regard to particulate emissions and fibers. The MPCA Air Permit requires compliance with the National Primary and Secondary Ambient Air Quality Standards (NAAQS) and the Minnesota Ambient Air Quality Standards (MAAQs) through operation of TSP and PM₁₀ ambient air quality monitors. This remains consistent with the primary and secondary TSP standards which were analyzed in the 1975-76 EIS. Northshore has adopted a fugitive dust control plan for controlling TSP, which includes specific methods for controlling dust with plant aggregate surfaces and fine tailings beaches.

In the MPCA Air Permit, Northshore is required to monitor ambient air quality data for TSP and PM₁₀ and to report those results to the MPCA. Data from monitoring indicates that the facility has been in compliance with the established particulate matter criteria. Table 26 provides a summary of recent TSP and PM₁₀ ambient monitoring data.

Table 26 Average Monitored Concentrations for PM₁₀ and TSP over 2015-2025

Year	Average PM ₁₀ Concentration (µg/m ³)	Average Total Suspended Particulates (TSP) Concentration (µg/m ³)
2015	15	24
2016	11	18
2017	14	21
2018	17	33

Year	Average PM ₁₀ Concentration (µg/m ³)	Average Total Suspended Particulates (TSP) Concentration (µg/m ³)
2019	16	26
2020	12	18
2021	17	26
2022	12	16
2023	20	21
2024	11	17
2025	13	18
Overall (2015-1025)	14	22

Furthermore, the MPCA Air Permit regulates Minnesota Fibers by requiring fiber air monitoring and comparing those values against an Action Level for Minnesota Fibers set at a concentration of 4,000 fibers/m³ based on a 365-day rolling geometric mean. The MPCA Air Permit notes, “The Action Level is not based upon a human health risk value, as one does not exist, and should not be interpreted as such.” If the monitored ambient concentration of fibers increases to levels greater than or equal to the Action Level, the MPCA Air Permit requires the facility to conduct an investigation into the likely sources, implement additional control measures, and develop and implement a Fiber Action Level Plan until the ambient concentrations are below the Action Level. *Id. at PDF 13*. Two monitoring sites have been established onsite and results are reported to the MPCA. Since establishment of the Fiber Action Level, the Action Level has not been triggered, and the MPCA reports that current permitted levels of fibers are significantly below the concentration levels identified in the 1975-76 EIS. Table 27 provides a summary of recent ambient fiber monitoring data.

Table 27 Monitored Fibers 365-Day Rolling Geomean Average Over 2018-2025

Year	Average 365-day Rolling Geomean (fibers/m³)	Action Level (fibers/m³)
2018	2,303	4,000
2019	2,366	4,000
2020	1,692	4,000
2021	2,371	4,000
2022	1,882	4,000
2023	831	4,000
2024	2,804	4,000
2025	2,679	4,000
Overall (2018 - 2025)	2,093	4,000

The Ongoing Tailings Basin Operations would result in air emissions from equipment and vehicles, dust from the use of haul roads and placement of fill material, and onsite odors from diesel exhaust from equipment. However, these emissions are not new and there is no change to emissions information that pertains to the Tailings Basin nor a change to the ambient air boundary. The air quality impacts associated with the Tailings Basin up to its maximum capacity were studied in the 1975-76 EIS and continue to be regulated under the MPCA Air Permit.

The DNR also reviewed, in consultation with the MPCA, documentation regarding air quality in the

1975-76 EIS and the subsequent Air Permit focusing on identifying new information regarding air quality impacts since the EIS and considerations for the Proposed Project. *See Appendix J2-2021 DNR ERND at 41-43.* Based on this review, the DNR concluded “that there is no new information or changed circumstances relating to the air impacts of the Mile Post 7 Project that were not studied in the original EIS and subsequently incorporated in the MPCA Air Permit for the Mile Post 7 Project.” *See Appendix J2-2021 DNR ERND at 43.* This conclusion remains true when considering the cumulative effects of the New Tailings Basin Features and the Ongoing Tailings Basin Operations. The potential air quality effects of the Ongoing Tailings Basin Operations and the New Tailings Basin Features considered cumulatively are consistent with the effects considered in and authorized by the 1975-76 EIS and subsequent permitting.

Greenhouse Gas (GHG) Emissions/Carbon Footprint

The Proposed Project, the Ongoing Tailings Basin Operations, and the other present and reasonably foreseeable future projects would result in GHG emissions. GHG emission sources identified for Ongoing Tailings Basin Operations include mobile equipment operation (referred to as “On-Road Equipment Operation” and “Off-Road Equipment Operation” in Table 26), fuel delivery services, electrical consumption, and land use change. Mobile equipment emissions were calculated using emission factors from 40 Code of Federal Regulations (CFR) Part 98 Subpart C. Fuel delivery emissions were calculated using emission factors from 40 CFR Part 98 Subpart C and the USEPA CCCL Emission Factors for Greenhouse Gas Inventories. Electrical consumption emissions were calculated using emission factors from the USEPA CCCL Emission Factors for Greenhouse Gas Inventories. Land use change emissions were calculated using the emission factors for a 30-year land transition from the Minnesota EQB Climate Calculator.

GHG emissions were calculated for CO₂, CH₄, and N₂O, and presented as tons CO₂e. GWPs used for calculations were obtained from Table A-1 to Subpart A of Part 98, Title 40. Table 28 summarizes the GHG emissions that would occur from the Ongoing Tailings Basin Operations and the estimated GHG emissions from the Proposed Project, as well as the cumulative total. Table 29 summarizes the estimated GHG emissions from the land-use changes associated with the Ongoing Tailings Basin Operations and the Proposed Project, as well as the cumulative total. Detailed calculations can be provided upon request; these are compiled as Appendix I. GHG emissions from the Proposed Project are discussed in Item 18 and summarized in Tables 22-24. Cumulative GHG emissions from the Ongoing Tailings Basin Operations and the Proposed Project construction, in combination with the changes in land use, are summarized in Table 30.

Table 28 Estimated Cumulative Greenhouse Gas Emissions

Emission Source	CO₂ (tons/yr)	CH₄ (tons/yr)	N₂O (tons/yr)	CO₂e (tons/yr)
Ongoing Tailings Basin Operations Sources	Not applicable	Not applicable	Not applicable	Not applicable
On-Road Equipment Operation	2,250.91	0.09	0.02	2,258.31

Emission Source	CO₂ (tons/yr)	CH₄ (tons/yr)	N₂O (tons/yr)	CO₂e (tons/yr)
Off-Road Equipment Operation	7,523.85	0.33	0.51	7,669.51
Electrical Consumption	3,069.12	0.32	0.05	3,090.56
Fuel Delivery Services	7.37	0.00	0.00	7.44
Ongoing Tailings Basin Operations - Subtotal	12,851.25	0.74	0.58	13,025.81
Proposed Project Subtotal¹	1,011.18	0.04	0.07	1,029.64
Cumulative Total²	13,862.43	0.78	0.65	14,055.45

¹Project Construction Greenhouse Gas Emissions are provided in Table 22 under EAW Item 18.

² Cumulative total includes the estimated GHG emissions from the Ongoing Tailings Basin Operations and the Proposed Project.

Table 29 Estimated Cumulative Land-Use Change Greenhouse Gas Emissions

Emission Source	CO₂ (tons)	CH₄ (tons)	N₂O (tons)	CO₂e (tons)
Ongoing Tailings Basin Operations, 30-year Transition Subtotal ¹	418,547.48	N/A	N/A	418,547.48
Proposed Project Land-Use Change – Subtotal ²	151,018.42	N/A	N/A	151,018.42
Cumulative Land-Use Total³	569,565.90	N/A	N/A	569,565.90

¹Land-Use Change emissions are excluded from the total CH₄ and N₂O and because the emission factor reflects CO₂.

² Proposed Project Greenhouse Gas Emissions are provided in Table 24 under EAW Item 18.

Table 30 Estimated Total Cumulative Greenhouse Gas Emissions

Emission Source	CO₂ (tons/yr)	CH₄ (tons/yr)	N₂O (tons/yr)	CO₂e (tons/yr)
Cumulative Construction and Operations	13,862.43	0.78	0.65	14,055.45
Cumulative Land-Use Change	17,727.04	N/A	N/A	17,727.04
Total¹	31,589.47	0.78	0.65	31,782.49

¹Land-Use Change emissions are excluded from the total CH₄ and N₂O and because the emission factor reflects CO₂.

It is estimated that the GHG emissions from Ongoing Tailings Basin Operations would be 13,026 metric tons CO₂e annually. An additional 418,547 tons is estimated from land use changes over a 30-year transition timeframe. Assuming each year of land transition results in approximately 13,952 metric tons of CO₂e, the total estimated annual emissions would be 26,977 metric tons CO₂e. The total estimated annual emissions from the Project are 4,805 metric tons CO₂e. Combined, annual emissions would be 31,782 metric tons CO₂e. This is approximately 0.03% of the total CO₂e emissions that were emitted in Minnesota in 2023. The annual lifetime GHG emissions from Ongoing Tailings Basin Operations and the Proposed Project are extremely small compared to the state total, and therefore, the effects from Ongoing Tailings Basin Operations and Proposed Project on achieving the Next Generation Energy Act goals are negligible. Nonetheless, the Ongoing Tailings Basin Operations proposed would result in a net increase in overall GHG emissions that would affect Minnesota's GHG reduction goals. These emissions could minimally contribute to climate change impacts such as changes in temperature, precipitation, and extreme weather events.

Noise

As discussed in Item 19, noise from construction of the Proposed Project would be consistent with equipment utilized for Ongoing Tailings Basin Operations and would have minimal effects on existing noise levels in the area. Some short-term increases in noise may occur in the immediate vicinity of the stream mitigation sites during construction, with no long-term cumulative impact once complete. Construction activity at the stream mitigation sites will yield noise impacts much like other short-term construction that may occur in the community, (e.g., road works, utility maintenance, building construction).

Transportation

As discussed in Item 20, Northshore would use existing facility roads to construct the New Tailings Basin Features and would use existing roads for the Ongoing Tailings Basin Operations. Most of the materials and equipment would be obtained from existing onsite sources. Therefore, additional traffic on public roads would be minimal. No additional parking spaces would be needed. It is not anticipated

that the projects identified in Item 21b, combined with the Proposed Project, would result in significant cumulative impacts to transportation within the region.

22. Other potential environmental effects:

If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

RGU Note: The Minnesota Court of Appeals directed the DNR to consider the tailings basin operation as a connected action for the limited purpose of determining whether an Environmental Impact Statement (EIS) is required. See *In re the Determination of Need for an Environmental Impact Statement for the Mile Post 7 West Ridge Railroad Relocation*, 2025 WL 368515 (Minn. Ct. App. Feb. 3, 2025). The operations, as the Court explained, constitute a “local project already in existence or planned for the future” that is a “prerequisite to continuing the tailings basin project.” *Id.* Therefore, both should be evaluated as a “single project in determining whether an EIS is required.” *Id.*

Issues raised in public comments and the subsequent litigation for the 2023 EAW included the dam construction method, and geotechnical stability, of the dams being constructed for the Ongoing Tailings Basin Operations. While not addressed by the Court nor required for an EAW, DNR provides the following summary of dam safety information as currently understood at Mile Post 7 tailings storage facility.

Geotechnical Dam Safety

Northshore proposes relocating the West Ridge Railroad tracks, progressing Dams 1 and 2, and constructing a Dam 1 switchback under the New Tailings Basin Features part of the Proposed Project. All dams would be raised in increments, as has been done in the past, to limit excess pore water pressure buildup. Some of the starting construction of proposed Dam 1 and Dam 2 progressions would include placing filter materials, which is the sand fraction of tailings that can be used for internal drainage zones, over a prepared foundation that would then be followed by placement of plant aggregate. In addition, a clay seepage cutoff to control water movement in the structure is proposed for Dam 2.

Northshore’s Professional Engineering Consultant (Barr Engineering, Inc.) has analyzed and concluded that the existing (operational) and proposed (future closure) perimeter dams have been, and will remain, stable as defined by current Dam Engineering Standards. Analyses were performed based on established references including Robertson (2016) and ICOLD (2023 and 2025). See *Appendix F at 17; see generally Appendix J39-2016 Robertson Cone Penetration Test*. The Proposer’s analyses considered upstream and downstream circular and wedge failures and dam toe seepage uplift.

The Professional Engineering Consultant concluded that based on undrained strength stability analyses (USSA), effective stress stability analyses (ESSA), and liquified (residual strength) analyses that the perimeter dams meet target minimum factors of safety for continued raises and planned progressions. The analysis goes up to and includes the final permitted dam crest elevation of 1,315 ft amsl and considered normal and maximum tailings basin water elevations.

To further assess dam performance, a comprehensive network of instrumentation has been installed

to monitor dam performance during construction and post closure. The instrumentation monitoring results can be used to determine if the actual conditions correspond to the assumptions made for the completed analyses.

Rigorous stability analyses would continue to be completed every five (5) years on Dams 1, 2, and 5 as part of the permit renewal process. This would apply to all new future dam raises as well as the Dams 1 and 2 progressions. These analyses are reviewed by the DNR during the permit renewal review and Operations Plan review.

At Northshore's request, Barr Engineering has prepared a Geotechnical Dam Safety Appendix to the EAW to address dam structure and stability issues that have been raised on the dams at Mile Post 7. This assessment is contained in Appendix F – Geotechnical Dam Safety Appendix.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature_____

Date_____

Title_____