Joint Permit Application and Wetland Replacement Plan

West Ridge Railroad Relocation and Tailings Basin Progression

Prepared for
Northshore Mining Company

April 2019

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4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
952.832.2600
www.barr.com

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Acronyms

Acronym	Description
AJD	Approved Jurisdictional Determination
CWA	Clean Water Act
BWSR	Minnesota Board of Water and Soil Resources
EIS	Environmental Impact Statement
JD	Jurisdictional Determination
MDA	Minnesota Department of Agriculture
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NHIS	Natural Heritage Information System
NWI	National Wetland Inventory
PWI	Minnesota Public Waters Inventory
SHPO	Minnesota State Historic Preservation Office
TEP	Technical Evaluation Panel
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WCA	Minnesota Wetland Conservation Act
WRP	Wetland Replacement Plan

1.0 Introduction

Northshore Mining Company (Northshore) has initiated engineering design and environmental studies for a proposed relocation of the West Ridge railroad at the Milepost 7 Tailings Basin as part of the originally planned tailings basin progression (Figure 1). Northshore owns and operates the Peter Mitchell Mine in Babbitt, Minnesota; the EW Davis taconite processing facilities at Silver Bay, Minnesota; and an interconnecting railroad. These facilities have been in operation producing taconite pellets since the 1950s. With the current ore resources and the current rate of mining, production operations at these facilities would continue for several decades. The facilities, including the Milepost 7 Tailings Basin at Silver Bay, have been planned by Northshore and permitted through a Permit to Mine by the Minnesota Department of Natural Resources (MNDNR) for the life of the Peter Mitchell ore body. Barr Engineering Company (Barr) is assisting Northshore with engineering and permitting for the proposed railroad relocation and tailings basin progression project (Project). As part of the project, Northshore is pursuing an amendment to its U.S. Army Corps of Engineers (USACE) permit 2005-2628-TWP, consistent with the basin projection plans outlined in the 1977 USACE Environmental Impact Statement (EIS). Northshore is also seeking a permit from the MNDNR to fill Minnesota wetlands under the Minnesota Wetland Conservation Act (WCA). This document provides the supporting information necessary for the USACE and MNDNR to process the *Joint Application Form for Activities Affecting Water Resources in Minnesota*, submitted as in Appendix A. Section 7.0 of this document includes the proposed Wetland Replacement Plan required under WCA.

On July 22-24, 2015, and August 10-14, 2015, Barr conducted a wetland delineation within a 1,594-acre study area that extends beyond the planned Project limits (Study Area). The wetland delineation findings are described in the October 23, 2015 *West Ridge Railroad Final Wetland Delineation Report, Prepared for Northshore Mining Company*. The USACE, MNDNR and the Minnesota Board of Water and Soil Resources (BWSR) received copies of the wetland delineation report. A Technical Evaluation Panel (TEP) site evaluation of the wetland delineation was conducted October 12, 2015, with staff from USACE, MNDNR, BWSR and Lake County. The USACE concurred with the results of the wetland delineation in a May 9, 2016 letter to Northshore. MNDNR also concurred with the results of the wetland delineation in a March 16, 2016, Notice of Decision.

Jurisdictional and Incidental Determination applications were submitted to the USACE and MNDNR on April 28, 2016 (Appendix B). MNDNR provided a Notice of Decision dated August 25, 2016, approving the incidental determination request (Appendix C). On January 19, 2017, the USACE issued an approved jurisdictional determination (AJD) for 19 wetlands and water bodies associated with the project (Appendix K). With the exception of the deepwater habitat, defined as Murphy's Pond, the wetlands determined to be incidental by the MNDNR are the same wetlands the USACE determined to not be jurisdictional. For the remaining wetlands and water bodies not covered by the AJD, Northshore requests a preliminary determination, assuming they will be jurisdictional under Section 404 of the Clean Water Act similar to their jurisdiction under WCA. For the purposes of review of this wetland permit application, please consult the information and figures provided in both the wetland delineation report and the jurisdictional determination requests.

2.0 Project Description

2.1 Project Location

The Project area encompasses approximately 1,200 acres and is located about 6 miles west of Silver Bay, in Lake County, Minnesota. Some of the Project area consists of lands disturbed by past activities, including borrow pits and access roads. The legal location of the Project is described below:

Township: 55, Range: 8, Section: 6, Forty: NENE, NWNE
Township: 56, Range: 8, Section: 20, Forty: NESE, NWSE, SESE, SWSE, SESW
Township: 56, Range: 8, Section: 21, Forty: NESW, NWSW, SESE, SWSE, SESW, SWSW
Township: 56, Range: 8, Section: 28, Forty: NENE, NWNE, NENW, NWNW, SENW, SWNW, NWSW
Township: 56, Range: 8, Section: 29, Forty: All 16
Township: 56, Range: 8, Section: 30, Forty: SENE, NESE, NWSE, NESW, SESE, SWSE, SESW, SWSW
Township: 56, Range: 8, Section: 31, Forty: NENE, NWNE, NENW, NWNW, SENE, SWNE, NESE, NWSE, SESE, SWSE
Township: 56, Range: 8, Section: 32, Forty: NWNE, NENW, NWNW, SENW, SWNW, NWSW

Per the *Lake County, Minnesota Platbook/Land Atlas, 2014*, the entire legal location described above is owned by Northshore Mining Company (Lake County 2014).

2.2 Project Description

There is one principal construction component to the proposed Project. The embankment that currently supports the existing railroad would be relocated approximately 4,000 feet to the northwest (see Figure 2). Portions of the proposed new embankment would become the dam defining the ultimate limit of the tailings basin and some sections of dam would be constructed separately from the railroad embankment. The embankment will allow tailings deposition to progress to the northwest, per the original tailings basin design. Tailings would be deposited into the basin for the remaining life of the operation, until ultimately reaching the proposed new railroad embankment along areas where the natural topography is below a 1365' elevation. Within this application, the proposed rail relocation and basin progression are referred to as the proposed "Project".

Northshore presently operates three dams to contain the tailings basin. Dam 1 is on the south side of the basin, Dam 2 is on the north side, and Dam 5 is on the east side. The dams are constructed using coarse tailings that are delivered to the basin via rail. As the tailings basin rises due to tailings deposition, the dams must be raised. In order to continue delivery of coarse tailings to the dams, the railroad must periodically be raised as well. Rather than make smaller, incremental changes to the diversion ditches and railroad, it is imperative that the proposed railroad relocation represents the final raise for the tailings basin to serve the final dam construction and progression of tailings deposition. Preliminary designs have been completed to relocate the railroad to the far western extent of the basin at elevations that will allow

rail service onto the dams until basin closure. The railroad will also be located inside of existing diversion ditches that were designed and constructed at the western limit of the tailings basin boundary.

The proposed Project would also include an extension to Dam 1 to be constructed beginning at the west end of Dam 1 to prevent tailings deposition and water infiltration into the existing coal ash landfill. In addition, an embankment supporting a rail switchback from Dam 1 (allowing access for coarse tailings delivery to Dam 1) would be constructed near the southern end of the relocated primary railroad embankment. These Project features are shown on Figure 2.

2.3 Project Purpose and Need

The West Ridge Railroad transports coarse tailings generated at Northshore's Silver Bay plant to the tailings basin west of Silver Bay at Milepost 7. The railroad has carried tailings to the basin since the basin operation commenced. Coarse tailings hauled by the railroad are used to build the dams. The existing railroad embankment represents the current western limit of the tailings basin. However, tailings will continue to be deposited in the basin over the next several decades. The tailings basin is rising to a point where, within a few years, the basin water level will be in contact with the railroad grade which is undesirable for railroad stability. The tailings basin water elevation is projected to be at the current design maximum allowing at least 10-ft of freeboard from the existing embankment in 2020, and will exceed the existing railroad embankment maximum elevation in 2024. As a result, the existing western limit of the tailings basin must be extended to the northwest, with the result that the railroad alignment also needs to be moved further north and west. While the milestone events that drive these moves are 2.5 and 6.5 years out, respectively, the need to appropriately address both wetland permitting and railroad design issues ahead of these events create a time constraint in the overall project schedule, such that wetland permitting needs to be initiated in 2018.

The deposition of tailings within the basin would occur continually over approximately the next several decades, gradually filling the area between the existing railroad and the new alignment. The projected ongoing progression of the tailings basin and the anticipated need for relocation of the railroad were part of the overall project area evaluated in the 1977 EIS. The project limits depicted in the 1977 EIS extend well to the northwest of the current tailings basin, and beyond the proposed railroad relocation as well (see Figure 3). While it was stated in the 1977 EIS that the tailings basin would progress to the northwest, no details of the rail system for delivery of tailings to the tailings basin were discussed, probably due to uncertainty over the rate of progression and the need to retain flexibility in designing a rail system that would need to relocate as the basin progressed. Nevertheless, the 1977 EIS states that coarse tailings would be delivered to the tailings basin via rail. The railroad alignment that Northshore is proposing would become the ultimate western limit of the tailings basin, with the exception of the southwest corner at the proposed extension of Dam 1 near the landfill.

The design of the West Ridge railroad has been constrained by the following parameters established to ensure safe operation of the rail that meets the needs of the project:

- Horizontal track curvature must not exceed three degrees

- Vertical gradients must not exceed 1.5 percent
- Rail access must be provided to the entire length of Dams 1 and 2

As a result of the design adhering to these safety constraints, there are three areas in which the project boundary is adjusted to be beyond the 1977 EIS project limits:

1. Approximately 34 acres of the proposed railroad embankment would extend outside of the 1977 EIS project limits in one area along the northeast side of the basin (Area A on Figure 3). This is due to railroad design limitations related to the allowable track curvature and vertical gradients required to access Dam 2.
2. Approximately 2,000 feet of the West Ridge railroad, encompassing about 10 acres, falls outside of the 1977 EIS project limits in the southwest corner of the basin (Area B on Figure 3). The railroad is designed to go around the landfill while meeting the strict curvature and vertical gradient restrictions required for safe rail operation.
3. The rail switchback from Dam 1, allowing access for coarse tailings delivery to Dam 1, of which approximately 1,400 feet in length and three acres in area falls outside of the 1977 EIS project limits. The switchback track is planned as close to the West Ridge railroad embankment as practicable while meeting track curvature and vertical gradient requirements for safe operation.

These configurations minimize wetland impacts to the greatest extent practicable given engineering and operational constraints while meeting the project purpose. Moreover, the approximately 47-acre total area outside of the 1977 EIS boundary is small compared to the area of the overall project limits set in the 1977 EIS. The addition of these 47 acres represents less than 1% of the combined existing and proposed tailings basin area, which in turn will ultimately utilize only 75 percent of the over 5,000-acre project limit set in the 1977 EIS. The planned, ultimate tailings basin boundary closely follows or stays within the project limits evaluated in the 1977 EIS.

3.0 Project Alternatives: Avoiding and Minimizing Wetland Impacts

The proposed Project is consistent with the overall tailings basin plans evaluated in the 1977 USACE EIS. Alternatives were evaluated for the location and general extent of the tailings basin as part of the 1977 EIS process and the Record of Decision deemed the tailings basin location and planned extent as the least environmentally damaging practicable alternative. Planning efforts by Northshore, conducted since the 1977 EIS, have concluded that the ultimate tailings basin footprint does not need to extend to the project limits evaluated in the 1977 EIS to fulfill the project purpose. Therefore, the proposed tailings basin extent encompasses approximately 3,700 acres compared to about 5,000 acres established as the project limits in the 1977 EIS. The decision to forgo utilizing the remaining ~1,300 acres of the 1977 EIS project limits means that approximately 300 acres of wetlands in the remainder of the 1977 EIS project limits will not be filled by tailings. Because alternatives have been considered for the 1977 EIS project limits, the consideration of alternatives for avoiding and minimizing wetland impacts is focused only on project features that fall outside of the 1977 EIS project limits.

3.1 No Action

Under the No Action alternative, the existing railroad embankment would remain in place, and there would be no expansion of the existing tailings basin limits. This would prevent additional wetland impacts beyond those resulting from the existing, permitted tailings basin boundary and railroad alignment. However, as discussed in Section 2.3, if current tailings generation from the Silver Bay plant continues, the tailings basin is projected to overtop its current embankment in 2024. The only way to prevent this would be to halt generation of tailings, which in turn would require the shutdown of Northshore. This alternative is not feasible or prudent because the processing facilities and long-range tailings basin configuration were planned to operate through the mine life of the Peter Mitchell ore body, and the basic project purpose would not be fulfilled. Maintaining containment of the projected tailings volume requires that the tailings basin be expanded and the West Ridge Railroad be relocated. Moreover, the progression of the tailings basin, as proposed, was part of the original plan developed in 1977 for the basin and mine. Therefore, the No Action alternative is not a viable option.

3.2 Railroad Avoidance Alternative

One West Ridge railroad alignment alternative was evaluated that would avoid wetland impacts outside of the EIS project limits (Figure 5). The south part was determined to not be feasible when considering engineering and operational constraints. The south avoidance alignment of the West Ridge railroad would cut through two hills, which are as much as 80 feet higher in elevation than the existing rail to which it would connect, requiring approximately 40 feet of excavation. Because bedrock is documented as shallow, about 5 feet in that area, substantial excavation into bedrock would be required. Constructing a rail line deep into bedrock raises engineering and safety issues and would result in significantly higher construction costs. Because of engineering and safety issues, the south avoidance alignment was rejected. The avoidance alignment alternative shown on the north side was designed to stay within the EIS project

limits. This alignment would require a curve in the track on Dam 2 that would not allow for the safe unloading of coarse aggregate on the dam. Therefore, the north avoidance alignment was determined to be not prudent.

3.3 Alternative Embankment Alignments

Four alternative alignments in the south part and two alternative alignments in the north part were evaluated, including the proposed alternative, before choosing the current proposed alignment. A map showing each alternative alignment is provided as Figure 4. Other preliminary alignments were eliminated (Alternative 1 and B/C modifiers) as not feasible from an engineering perspective. The southern alternative alignments are designated 2, 3, 4 and Proposed and the northern alternative alignments are designated A and D (Alignment D is preferred). Maps showing each alignment individually and the respective wetland impacts are in Figures 15-20. A summary of the wetland impact acreages for each alternative is shown in Table 1.

Details regarding the four south railroad alignments (2, 3, 4, and Proposed) are discussed separate from the two north railroad alignments (A and D). Wetland impacts associated with the south railroad alignments are the least for the proposed alternative and approximately one to three acres more for Alternatives 2-4 (Table 1). The proposed alignment is the shortest route and requires the least excavation with no constructability issues related to bedrock. The other three alternatives would require up to 65 feet of excavation in areas, which would likely require substantial construction through bedrock, which has been documented at depths of about 5-15 feet in the area of the proposed alignment. Constructing a rail line deep into bedrock raises engineering and safety issues and would result in significantly higher construction costs. The excavation that would be required by Alternatives 2, 3, and 4 to meet the design standards would result in the need for placing large stockpiles of materials, which could require additional wetland impacts. Therefore, the proposed south railroad alignment minimizes wetland impacts to the greatest extent and provides the safest alignment for construction considerations while being the most economical for construction and operations.

Wetland impacts for the two northern alignment alternatives differ by about 2 acres with Alignment D (proposed, northern alignment) resulting in 8.11 acres of wetland impacts compared to 6.11 acres of impact for Alignment A (Table 1). The primary reason alternative Alignment A is not feasible is because the design exceeds the curvature design standard for rail operability under the anticipated loads carried by the trains. In addition, Alignment D provides a straighter approach to Dam 2, which is desirable from engineering and operational standpoints. Therefore, Alignment A is not feasible from an engineering perspective and Alignment D represents the only feasible and prudent rail alignment in the north part of the Project.

4.0 Aquatic Resources and Impacts

Please refer to Appendix D, the October 23, 2015 *West Ridge Railroad Final Wetland Delineation Report, Prepared for Northshore Mining Company* for a more detailed description of the wetlands to be impacted.

4.1 General Environmental Setting

The Project area encompasses approximately 1,082 acres and is located about 6 miles west of Silver Bay, Minnesota, (Figure 1). Some of the Project area consists of lands disturbed by past activities including borrow pits and small, flat access roads and is directly adjacent to the operating Milepost 7 tailings basin.

The Project area is primarily located within the Lower Beaver River minor watershed with smaller portions in the Thirtynine Creek and the East Branch Beaver River minor watersheds, all within the Lake Superior-South (#2) major watershed. These watersheds are located within Bank Service Area #1, and are estimated to have more than 80 percent of their pre-statehood wetlands remaining.

4.1.1 Remnant Water Courses

4.1.1.1 State Jurisdiction

Little Thirtynine and Big Thirtynine Creeks historically flowed southeasterly across the project area. However, flow in the lower portions of these creeks was diverted to the Beaver River by diversion ditches as part of the original construction of the tailings basin in the late 1970s. The remnant water courses of Little Thirtynine and Big Thirtynine Creeks remain, crossing the project area roughly from the northwest to the southeast. Currently, these remnant water courses are considered as long, linear riverine wetland basins for WCA jurisdiction with greatly reduced flow, including stretches with no discernible flow. Little Thirtynine Creek was delineated to encompass a total of 1.05 acres, including 0.81 acres within the project area (Table 3a). Big Thirtynine Creek was delineated to encompass 1.72 acres total, including 0.75 acres within the project area (Table 3a). Direct impacts include 0.81 acres of Little Thirtynine Creek and 0.75 acres of Big Thirtynine Creek (Table 3a). Potential indirect impacts include 0.97 acres of Big Thirtynine Creek (Table 3a). The nature of the potential indirect wetland impacts are discussed in Section 4.2.2.2.

Overland runoff from the contributing drainage areas downstream of the diversion ditches continues to reach the remnant water courses. However, the contributing drainage areas to the remnant water courses are less than the area required to qualify the water courses for the Minnesota Public Waters Inventory (PWI). Northshore contacted MNDNR in March 2015 regarding the PWI and trout stream designations for these remnant water courses. In March 2016, MNDNR provided concurrence that the remnant water courses no longer meet the PWI criteria, and because they are no longer connected to trout streams, they are no longer designated trout streams. Appendix E contains a March 15, 2016 e-mail from Mike Liljegren at MNDNR and a transcript of a March 17, 2016 voicemail left by MNDNR fisheries biologist Cliff Bentley to Daniel Jones at Barr Engineering. These items document the MNDNR concurrence.

4.1.1.2 Section 404 Clean Water Act Jurisdiction

In September 2017, Barr conducted a field investigation to identify the extent and location of stream resources downstream of the diversion ditches and within the project boundaries for evaluation under Section 404 of the Clean Water Act (CWA). Both remnant stream channels are currently affected by beaver activity with numerous impoundments within each stream segment. The extent of each stream resource was mapped based on the presence of defined bed and bank, at least seasonal flows, and an indication of an ordinary high water mark. In areas currently affected by impoundment, the stream channel was estimated utilizing information from upstream and downstream reaches, because the channel in those areas could not be identified. The lower extent of each stream was determined as the point where each channel no longer acted as a water course due to the long-term impoundment of Murphy's Pond. Little Thirtynine Creek was mapped as 3,421 linear feet encompassing 1.05 acres of riverine habitat, of which 2,589 linear feet are within the project area (0.81 acre of riverine habitat). Big Thirtynine Creek was mapped as 5,148 linear feet encompassing 1.72 acres of riverine habitat, of which 2,454 linear feet are within the project area (0.75 acre of riverine habitat). A total of 5,043 linear feet of direct stream habitat impacts are proposed (1.56 acres of riverine habitat), including 2,589 linear feet to Little Thirtynine Creek and 2,454 linear feet to Big Thirtynine Creek (Tables 2b and 3b). Potential indirect impacts are expected to be 2,694 linear feet of Big Thirtynine Creek (0.97 acres of riverine habitat), which is described in more detail in Section 4.2.2.2 (Table 2b).

4.2 Previously Permitted Wetlands

The USACE issued three permits in the late 1970s that were renewed several times. These permits are as follows:

- Permit 76-412B: authorized the construction of Dam Number 1
- Permit 76-412C: authorized the construction of Dam Number 2
- Permit 76-422: authorized the deposit of tailings in Mile Post 7 tailings basin

On May 12, 2005, Northshore completed a *Minnesota Local/State/Federal Application Form for Water/Wetland Projects*, with submittals to the USACE and MNDNR. A Wetland Replacement Plan dated May 2005 was also submitted to the MNDNR with the application.

After the Public Notice, the USACE issued Permit 2005-2628-TWP on August 31, 2005 (Appendix H), authorizing 20.00 acres of wetland impact. A table (*Table 2: Impacts to Historic Wetlands and Existing Wetland Summary, Revised July 8, 2005*) and figure (*Figure 3: Revised Wetland Impact Map*) were provided to the USACE in July 2005, showing the specific wetland impacts associated with that approval (Appendix L). Permit 2005-2628-TWP, in conjunction with Table 2 and Figure 3 (Appendix L) show that 6.39 acres within what is currently delineated as Murphy's Pond (Wetland/Deepwater 18) and what was formerly identified as Wetland 11 in the 2005 permitting; was considered an impact due to impoundment and mitigation was provided. This permit was intended to consolidate the three original USACE permits as explained in the USACE's *Evaluation and Decision Document that accompanied Permit 2005-2628-TWP*

(Appendix H). On June 6, 2006, the USACE provided a clarifying letter (Appendix H) in support of Permit 2005-2628-TWP explaining as follows:

> *All areas within the tailings basin dikes up to an elevation of 1252 feet were permitted by various DOA permits prior to the issuance of DOA permit 2005-2628-TWP. DOA permit 2005-2628-TWP authorized the discharge of fill materials in the wetlands between elevation 1,252' and the limits identified in DOA Permit 2005-2628-TWP. Appropriate compensatory mitigation has been provided for all of the wetlands permitted to be filled by these permits.*

On August 31, 2005, MNDNR's Steve Dewar approved (Appendix I) the May 2005 Wetland Replacement Plan that was submitted to the MNDNR as part of the permit application. That approval letter states:

> *The project involves impacting 20.0 acres of wetlands on the west side of the Mile Post 7 tailing basin. The permit conditions listed in the Corps of Engineers approval shall be followed for meeting the requirements of the Wetland Conservation Act.*

The WCA approval followed the conditions and terms of the USACE approval, including all wetlands lying between the 2005 tailings basin elevation (1202') and that of the new railroad location (1252'). All other wetlands had been covered by previous approvals.

The previously permitted wetlands that lie adjacent to the proposed Project are shown in yellow on Figures 6-14. Because all of those wetlands were previously approved, and wetland mitigation was provided, they are not included in wetland impacts for the proposed Project.

4.3 Wetland and Deepwater Habitats

4.3.1 Wetland Conservation Act

A total of 411.28 acres of wetlands and 35.96 acres of deepwater habitat were delineated in the vicinity of the Project area, which have not been previously permitted. This includes 46.38 acres of wetlands and deepwater habitat that were determined to not be jurisdictional under the Wetland Conservation Act; comprised of 10.42 acres of incidental wetlands and 35.96 acres of deepwater habitat as described in the August 25, 2016, Notice of Decision (Table 2a, Figure 7, and Appendix C). The wetland delineation report is attached as Appendix D, and should be consulted for details on methods and findings of the delineation effort. The wetlands are classified as alder thicket; coniferous swamp; fresh (wet) meadow; hardwood swamp; seasonally flooded basin; sedge meadow; shallow marsh; and shrub-carr wetlands along with deepwater habitat. Wetland Determination Data Forms are included in Appendix A of the Delineation Report, and photographs of wetlands and other regions of the Study Area are included in Appendix B of the Delineation Report. The delineated wetlands are described in Tables 3 and 4 of the Delineation Report, and the wetlands in the proposed project area are summarized in Table 6 of the Delineation Report.

4.3.2 Section 404 of the Clean Water Act

A total of 408.5 acres of wetlands and 35.96 acres of deepwater habitat were delineated in the vicinity of the Project area, which have not been previously permitted. A total of 10.42 acres of wetlands were determined to not be under jurisdiction of the CWA (Table 3b), based on an approved jurisdictional determination (AJD), included as Appendix K. A preliminary jurisdictional determination is requested for the remaining 398.08 acres of wetlands. The AJD (Appendix K) also indicates CWA jurisdiction over the 35.96 acres of deepwater habitat, described as Murphy's Pond or Wetland 18 (Figure 7). The wetland delineation report is attached as Appendix D, and should be consulted for details on methods and findings of the delineation effort. The wetlands are classified as alder thicket; coniferous swamp; fresh (wet) meadow; hardwood swamp; seasonally flooded basin; sedge meadow; shallow marsh; and shrub-carr wetlands along with deepwater habitat. Wetland Determination Data Forms are included in Appendix A of the Delineation Report, and photographs of wetlands and other regions of the Study Area are included in Appendix B of the Delineation Report. The delineated wetlands are described in Tables 3 and 4 of the Delineation Report, and the wetlands in the proposed project area are summarized in Table 6 of the Delineation Report.

4.4 Wetland and Deepwater Impacts

The Project would generate direct wetland impacts, including fragmentation impacts resulting from two main types of activities. The first activity type includes construction of the new railroad embankment, the extension of Dam 1, and the Dam 1 rail switchback embankment. These activities will result in permanent wetland impacts, and will occur over a relatively short period beginning in 2020. The second activity type is the progression of the tailings basin to the northwest. This will result in permanent impacts; however, it will take decades to fully occur.

4.4.1 Wetland Conservation Act Jurisdictional

Table 3a contains the detailed wetland impacts proposed for each jurisdictional wetland. A total of 42.73 acres of wetlands will be directly impacted by construction of the relocated railroad embankment, extension of Dam 1 and the Dam 1 rail switchback (Table 2a). An additional 180.98 acres of wetlands will be impacted as the tailings basin volume grows and progresses to the northwest. There are portions of 4 wetlands (Wetlands 13, 17A, 20, and 26) encompassing 4.58 acres that will be cut up by the Project features resulting in small, unsustainable fragments that are included as direct impacts (Figures 8-10 and 13). The fragments range in size from 0.02 acre to 1.53 acres with the largest fragment, Wetland 13, sandwiched between the railroad embankment and the rail switchback (Figure 8).

Figure 7 shows the direct wetland impacts as a result of the embankment, tailings basin progression, and fragmentation. The extent of previously-permitted wetland impacts is also shown, which are wetlands that were delineated and permitted for filling in 2005 for construction of the railroad embankment and work on Dams 1, 2 and 5.

Table 4a summarizes the wetland impacts, by wetland community type, for the proposed relocated railroad embankment, dam extensions, tailings basin progression, fragmentation, and potential indirect

impacts. Approximately half of the proposed direct and indirect impacts are in hardwood swamp communities with 48 percent comprised nearly equally of shallow marsh, alder thicket, and coniferous swamp communities (Table 4a). Table 5a summarizes direct and potential indirect wetland impacts by wetland quality. The 228.30 acres of direct wetland impacts include 124.08 acres of impacts to medium quality wetlands, 102.66 acres of impacts to high quality wetlands, and 1.56 acres of impacts to riverine wetlands for which quality was not determined, although the adjacent wetlands for all riverine communities are rated high quality.

4.4.2 Section 404 Clean Water Act Jurisdictional

Table 3b contains the detailed wetland impacts proposed for each jurisdictional wetland. A total of 42.16 acres of wetlands will be directly impacted by construction of the relocated railroad embankment, extension of Dam 1 and the Dam 1 rail switchback (Table 2b). An additional 180.00 acres of wetlands will be impacted as the tailings basin volume grows and progresses to the northwest. There are portions of 4 wetlands (Wetlands 13, 17A, 20, and 26) encompassing 4.58 acres that will be cut up by the Project features resulting in small, unsustainable fragments that are included as direct impacts (Figures 8-10 and 13). The fragments range in size from 0.02 acre to 1.53 acres with the largest fragment, Wetland 13, sandwiched between the railroad embankment and the rail switchback (Figure 8).

Figure 7 shows the direct wetland impacts as a result of the embankment, tailings basin progression, and fragmentation. The extent of previously-permitted wetland impacts is also shown, which are wetlands that were delineated and permitted for filling in 2005 for construction of the railroad embankment and work on Dams 1, 2 and 5.

Table 4b summarizes the wetland impacts, by wetland community type, for the proposed relocated railroad embankment, dam extensions, tailings basin progression, fragmentation, and potential indirect impacts. Half of the proposed direct and indirect impacts are in hardwood swamp communities with 48 percent comprised nearly equally of shallow marsh, alder thicket, and coniferous swamp communities (Table 4b). Table 5b summarizes direct and potential indirect wetland impacts by wetland quality. The 226.73 acres of direct wetland impacts include 124.08 acres of impacts to medium quality wetlands and 102.66 acres of impacts to high quality wetlands.

4.5 Indirect Wetland Impacts

An analysis was completed to determine the potential for indirect wetland impacts associated with the Project. Two primary, potential effects of the Project were evaluated to determine the potential for indirect wetland impacts: watershed diversion and impoundment. Figures 7-14 show the wetlands potentially affected by indirect impacts, and the type of potential impact. The two primary types of potential indirect impacts are:

1. Loss or diversion of watershed area supporting wetland hydrology
2. Impoundment with the potential to convert wetlands to other wetland types or deepwater habitat

Tables 3a and 3b list the wetlands where indirect impacts may potentially occur, the wetland community type, and the estimated extent of the indirect impact.

4.5.1.1 Watershed Diversion

All wetlands located between the existing extent of the tailings basin and either the railroad embankment or Dam 1 extension will be impacted by the deposition of tailings. The areas with the potential for indirect wetland impacts as a result of watershed diversion are within an approximately 100 acre area around the landfill and north and west of the railroad embankment. Figures 21 and 22 show the existing and proposed conditions watersheds for the Project area along with the proposed railroad embankment, the isolation dam, and the Dam 1 rail switchback. The first area is proposed to be isolated by an extension of Dam 1 along the north side, the railroad embankment on the south and west sides, and the existing tailings basin on the east side. There are seven wetlands located within the area; Wetlands 13, 34, 35, 38a, 38b, 38c, and 38d. Per the August 25, 2016 MNDNR Notice of Decision, Wetlands 38a-38d are incidental wetlands, not under WCA jurisdiction, and are not jurisdictional per the USACE AJD (Appendix K). Nevertheless, the watershed areas contributing to each of those wetlands will not be altered by the project, and therefore, no indirect impacts are expected.

Two of the remaining wetlands have the potential for impacts from watershed diversion, Wetlands 34 and 35. Wetland 34 is an 18.2 acre hardwood swamp that currently spans a watershed divide (Watersheds 1 and 2, Figure 21) located within the isolation area with 1.47 acres draining northwest towards the railroad embankment (Watershed 2) and 7.53 acres draining east towards the tailings basin (Watershed 1). Once the railroad and Dam 1 extension embankments are in place, approximately 9.0 acres of Wetland 34 will lie between the two embankments. The remaining 7.53 acres of Wetland 34 in Watershed 1 has an approximately 21 acre supporting watershed (Figure 22), which will not be altered from existing conditions (Figures 21 and 22) and the wetland will be allowed to discharge to the southeast at the wetland boundary elevation, so no diversion impacts are expected.

Wetland 35 is a 4.27 acre wetland of which 1.54 acres will be directly impacted. The remaining 2.73 acres of Wetland 35 lies within Watershed 2A (Figure 22). The remaining part of Wetland 35 is supported by an approximately 13 acre watershed that will not be altered by the project and the remaining wetland will be allowed to drain to the southeast along Dam 1 at the wetland boundary elevation (Figures 21 and 22), so no diversion impacts are expected for Wetland 35.

North and west of the railroad embankment there are three primary watersheds that will be bisected by the project (Watersheds 2, 3, and 4, Figure 21) where potential indirect wetland impacts could occur.

4.5.1.2 Impoundment

Approximately 157.7 acres of wetlands have been identified upstream of the proposed Project, of which about 109.9 acres currently discharge through the existing diversion ditches constructed during the initial construction of the basin (Wetlands 14, 19, and 29; see Figure 22). Therefore, hydrologic conditions supporting 109.9 acres of wetlands on the upstream side of the Project will not be altered and no indirect impacts are expected. The remaining 47.8 acres of wetlands identified west of the Project currently drain

to the southeast along four well-defined drainageways. These are Wetlands 2, 20, 23, 27, 34, 36, 37, 39A (a reach of Little Thirtynine Creek), and 39B (a reach of Big Thirtynine Creek) (see Figure 22). To the extent practicable, drainage provisions will be designed for the remaining 47.8 acres of wetland located northwest of the Project, to either maintain discharge through the railroad embankment or to route the discharge from those wetlands southerly to the Beaver River. Consideration has been given to connecting potentially impounded wetlands to the existing diversion ditches and/or to evaluating the feasibility of constructing additional diversion ditches to re-route the flow of water from those wetlands. Engineering designs, including pump stations, culverts, or diversion channels, have been evaluated to minimize the potential for impoundment impacts to wetlands north and west of the proposed railroad embankment that currently flow to the southeast.

The primary, bisected portion of Watershed 2 (2B) contains Wetlands 27, 34, 36, 37, and 39B (a reach of Big Thirtynine Creek). The ultimate, existing discharge point for this watershed is along the southeast side within a deep valley, at approximately elevation 1,258 feet MSL. The railroad embankment will be approximately 65 feet high at this wetland crossing and the dam will be even higher. The ultimate tailings deposition will extend well above the railroad embankment, so it is not possible to maintain discharge through the railroad embankment and Dam 1. The secondary, natural overflow elevation for the watershed is approximately 1,315 feet MSL, along the south side. Therefore, the watershed could potentially be impounded to an elevation of 1,315 feet MSL over time, which would result in the inundation of Wetlands 27, 34, 36, and 39B with more than three feet of water. Wetland 37 lies approximately 10 feet higher in the landscape, in a headwaters area, and will not be affected by the project. A total of 34.5 acres of WCA jurisdictional wetland impoundment is expected within Watershed 2B. A total of 33.53 acres of CWA jurisdictional wetland impoundment is expected within Watershed 2B along with impoundment impacts to 2,694 linear feet of stream habitat (0.97 acre).

The other disconnected portion of Watershed 2 (2C) contains approximately 1.47 acres of Wetland 34 that will not be directly impacted (Figure 22). That portion of Wetland 34 naturally drains northwest and will be cut off by the railroad impoundment. It is not prudent to maintain flow under the railroad embankment at this location, because overflow from Watershed 2C would be reintroduced into the tailings basin water management system, which would require treatment. Therefore, the new overflow elevation for that portion of Wetland 34 would be approximately 1,322 feet MSL, resulting in up to eight feet of impoundment, so 1.47 acres of Wetland 34 is expected to be indirectly impacted by impoundment, which is jurisdictional under both the WCA and the CWA.

In headwater Watershed 3A (Figure 22), there are 6.17 acres of WCA jurisdictional wetlands, including portions of Wetlands 23, 37, and 39A. The primary discharge from the watershed is along the southeast side through Wetland 39A (a reach of Little Thirtynine Creek). The contributing watershed area will not change as a result of the project and a culvert will be placed through the railroad embankment (Appendix J) to maintain the natural drainage direction. Therefore, no impoundment impacts are expected in Watershed 3A.

In headwater Watershed 4A (Figure 22), there are 4.43 acres of WCA jurisdictional wetlands, including portions of Wetlands 2 and 20. The contributing watershed area will not change as a result of the project and drainage from the remaining wetlands will naturally occur along the outside of the project area towards the east. Therefore, no impoundment impacts are expected in Watershed 4A.

Portions of four wetlands (Wetlands 27, 34, 36, and 39B) are expected to be impacted by impoundment encompassing 35.97 acres (including 0.97 acre of riverine/stream habitat), likely converting the majority of the wetlands to deepwater habitats or other wetland communities. These impacts are expected to occur over a long period of time after the natural discharge routes are blocked and excess hydrology slowly builds within the wetlands.

4.5.2 Monitoring of Indirect Wetland Impacts

Indirect wetland impacts due to fragmentation are expected to result in the loss of wetland functions, so wetland mitigation is proposed to compensate for those unavoidable wetland losses. An indirect wetland impact monitoring plan will be submitted to the MnDNR and Corps for review and approval before initiating monitoring.

4.6 Wetland Area and Impact Clarifications

In response to comments provided by MnDNR on September 4, 2018, December 7, 2018, and March 28, 2019, following are descriptions and clarifications related to wetland area and impact discrepancies. An overview map showing delineated wetlands throughout the project and surrounding areas is provide as Figure M-1 (Appendix M). The MnDNR commented that the total wetland area for many wetlands presented in Table 3 within the wetland delineation report differ from Table 3a in this wetland replacement plan (WRP). Detailed clarifications for the wetland area differences are provided in Table M-1 (Appendix M), which can be justified against Table 3a. The primary reasons include:

1. The wetland areas presented in the wetland delineation report included previously permitted wetlands, whereas this WRP does not, but those previously permitted wetlands are included in Table M-1 (Appendix M) and are shown on Figures 8-14.
2. The wetland areas presented in the wetland delineation report were cut off at the study area boundary, whereas this WRP includes the entire wetland area extending outside of the study area.
3. A noted change in area resulted from specifically identifying Big and Little 39 Creeks, which are present within Wetlands 27 and 23, respectively, so the stream area was removed from the area of those wetlands.

4.6.1 Wetland 20

The MnDNR requested additional information regarding the potential for indirect impacts to Wetland 20 (Comment 39). The 4.1 acres of Wetland 20 that will not be directly impacted by the project will lie between the project and CSAH 15 (Figure M-2, Appendix M). That unaffected portion of Wetland 20 is within a sloping part of the wetland fed hydrologically by a 47 acre watershed within the project area and from a larger watershed (253 ac) located north of CSAH 15, which discharges either via culvert or seepage

across the road. The northern watershed contribution will not change, which provides the primary hydrologic support for the wetland and the on-site watershed is expected to be reduced to 29 acres. While the wetland size will be reduced by 80%, the watershed will only be reduced by 6%, so no loss of hydrologic support is expected. The outflow characteristics from the remaining part of Wetland 20 will be maintained generally as existing, by allowing discharge down the slope to the southeast along the outside of the project limits.

4.6.2 Wetland 13

The MnDNR requested additional information showing the size of fragments for Wetland 13 regarding the source of impact as "Railroad and Dam" or "Fragmentation" (Comment 43). Details for Wetland 13 are shown on Figure M-3 (Appendix M) and as further described here. There are six separate pieces of Wetland 13 that will be directly impacted by the railroad or dam with areas of 0.01 ac, 0.06 ac, 0.19 ac, 1.61 ac, 1.86 ac, and 4.3 ac. Because the railroad and rail switchback are separated, seven separate fragments of Wetland 13 result with areas: 0.04 ac, 0.05 ac, 0.12 ac, 0.36 ac, 0.82 ac, 0.99 ac, and 1.53 ac that will not remain viable (Figure M-3, Appendix M).

4.6.3 Wetlands 17a and 17b

The MnDNR requested additional information showing the size of fragments for Wetlands 17a and 17b regarding the source of impact as "Railroad and Dam" or "Fragmentation" (Comments 44 and 55). Details for Wetlands 17a and 17b are shown on Figure M-4 (Appendix M) and as further described here. There are three separate pieces of Wetland 17a that will be directly impacted by the railroad or dam with the following areas: 0.05 ac, 0.07 ac, and 0.12 ac and one fragment of Wetland 17a comprising 0.10 ac that will not remain viable (Figure M-4, Appendix M). There are two separate pieces of Wetland 17b that will be directly impacted by the railroad or dam with areas of 0.145 ac and 0.215 ac. and one piece impacted by the tailings basin comprising 0.128 ac (Figure M-4, Appendix M).

4.6.4 Wetland 26

The MnDNR requested additional information showing the size of fragments for Wetland 26 regarding the source of impact as "Railroad and Dam," "Tailings Basin Progression," or "Fragmentation" (Comment 46). Details for Wetland 26 are shown on Figure M-5 (Appendix M) and as further described here. There are two separate pieces of Wetland 26 that will be directly impacted by the railroad or dam with areas of 1.09 ac and 1.46 ac along with 1.50 ac impacted by the tailings basin progression. Because the railroad and rail switchback are separated, one 0.18 ac fragment of Wetland 26 will be left between them along with a 0.02 ac fragment outside of the project area that will not remain viable (Figure M-5, Appendix M).

4.6.5 Monitored Wetlands

The MnDNR requested additional information showing the 35.97 acres of wetlands and stream that are proposed to be monitored (Comment 47). Details of monitored Wetlands 27, 34, and 36, along with Stream 39B are shown on Figure M-6 (Appendix M).

4.6.6 Wetland 34

The MnDNR requested additional information showing the size of fragments for Wetland 34 regarding the source of impact as "Railroad and Dam," "Tailings Basin Progression," "Impoundment," or "Unaffected" (Comment 48). Details for Wetland 34 are shown on Figure M-7 (Appendix M) and as further described here. There are three separate pieces of Wetland 34 that will be directly impacted by the railroad or dam with areas of 0.19 ac, 0.74 ac, and 2.83 ac along with 0.19 ac impacted by the tailings basin progression. Because Wetland 34 crosses the landfill area, which is excluded from the project, a 7.53 ac portion of Wetland 34 will be left between the railroad and the tailings basin with no changes to its watershed, so it is expected to remain viable. At the north end of Wetland 34, two fragments are expected to be impounded by the railroad, comprising 1.47 ac along the south side of the railroad and 5.46 ac along the north side (Figure M-7, Appendix M).

4.6.7 Wetland 16b

The MnDNR requested additional information regarding previously permitted and proposed impacts for Wetland 16b (Comment 50). Details for Wetland 16b are shown on Figure M-8 (Appendix M). The 2005 permitting resulted in the authorization of impacts to 3.85 acres of what was named Wetland 28 at the time, with a sliver of that wetland not authorized for impact. Not all of the authorized wetland impacts had occurred when the West Ridge Railroad wetland delineation was completed and that is why it was delineated at the time. The remaining, unpermitted portion of the wetland is proposed for impacts while the rest was previously authorized.

4.6.8 Wetlands 23/39A and 27/39B

The MnDNR requested additional information regarding the acreages of Wetlands 23 and 27 from the wetland delineation report to the WRP after they were split to separate out the stream habitats (Comments 51 and 52). Details for Wetlands 23/39a and 27/39b are shown on Figure M-9 (Appendix M). When the detailed field stream identification was completed for the USACE, there was a small, 0.04 ac stream bend that was added to Wetland 39a, which accounted for the additional wetland area. When the detailed field stream identification was completed for the USACE, there was a 0.20 ac sliver of stream that was added to Wetland 39b, which accounted for the additional wetland area.

5.0 Adjoining Property Owners

The Project lies entirely on land owned by Northshore, with a significant buffer of Northshore-owned land at least 0.25 mile wide between the Project and the nearest other landowners. The adjoining property owners, defined as the owners of property immediately adjacent to the sections listed in Section 2.1 above, are primarily the State of Minnesota, with one quarter-quarter section owned by Lake County. Lake County, the State of Minnesota Trust for Taxing District, and the State of Minnesota School Trust Lands also own property adjoining the northern edge of Northshore's property; however, these properties are a minimum of 0.75 mile from the Project (Table 6).

6.0 Special Considerations

6.1 Protected Plant and Wildlife Resources

The U.S. Fish and Wildlife Service (USFWS) has documented occurrences of three federally-protected wildlife species in Lake County. They are Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*) and northern long-eared bat (*Myotis septentrionalis*). There are no documented occurrences of these species within the project area. There is also designated critical habitat for Canada lynx and for gray wolf in Lake County. The extreme north end of the project crosses over into Canada lynx designated critical habitat. In addition, the proposed progression of the tailings basin to the northwest would occur in gray wolf designated critical habitat. USFWS has not designated critical habitat for northern long-eared bat.

On July 22–24, 2015, and August 12–14, 2015, a qualified botanist from Barr Engineering Co. (Barr) conducted a botanical survey of the proposed Project extent. No federal or state listed threatened or endangered plant species were found (Barr 2016). Two state special concern species were identified. They are neat spikerush (*Eleocharis nitida*) and twig rush (*Cladium mariscoides*). Each of these species was found in two locations. While these species are considered to be rare and their occurrences tracked and documented by MNDNR, their status as Minnesota special concern species does not provide them protection under either the federal Endangered Species Act (ESA) or the Minnesota Protection of Threatened and Endangered Species Statute (MN Statute 84.0895). Barr received an e-mail from Lisa Joyal at MNDNR on November 6, 2016 verifying the identification of the collected specimens and concurring with the findings of the report. The concurrence e-mail is included as Appendix F.

6.2 Unique Vegetation Communities

The project area does not contain any native plant communities, as classified by the MNDNR Ecological Classification System, that have a Conservation Status Rank of S1, S2 or S3. Moreover, no part of the project area is mapped as a Site of Biodiversity Significance with an Outstanding or High ranking. Therefore, the vegetation of the project area does not meet the criteria, under Minnesota Rule 8420.0515, Subpart 3, for a "rare natural community."

Two Sites of Biodiversity Significance (SBS) are near the Project area. The Silver Bay SW- Milepost 7 Ridge SBS is east of the existing tailings basin. The southern edge of the East Beaver River SBS is on the north side of Lake County Highway 15/NF-11, across from the Project area. Neither of these SBS overlap onto the Project area, and the Project will have no impact on them.

6.3 Special Fish and Wildlife Resources

Barr Engineering accessed the MNDNR Natural Heritage Information System (NHIS) database to check for documented sensitive fish and wildlife resources. The NHIS database indicates no documented colonial waterbird sites or migratory waterfowl stopovers. The NHIS database has a record for a bald eagle nest near the western edge of the existing tailings basin, east of the existing railroad embankment. However, the record is from 2000, and the tailings basin has progressed since that time beyond the documented

nest site. In addition, numerous natural resource surveys conducted by Barr biologists in the Project area since late 2014 have not observed an eagle's nest on the site. The NHIS database was reviewed in March 2018 to determine if any other state listed species have subsequently been documented near the Project. That NHIS database search included the most current data available, which was last updated October 27, 2017. No new listed species were found near the Project during that review.

While wildlife and deer may utilize portions of the Project area, there are no distinct wildlife travel corridors or documented deer wintering areas. The Project area is in an undeveloped part of Lake County, with abundant wildlife habitats and migration/travel routes.

There are no sensitive fish habitats or passages within the Project area.

6.4 Archaeological, Historical and Cultural Resources

Barr Engineering, acting on behalf of Northshore, contracted with the Duluth Archaeological Center (DAC) to conduct a Phase I archaeological reconnaissance survey on the project site in August 2016. The survey was conducted by DAC personnel under the direction of individuals who meet the Secretary of Interior standards for Principal Investigator (DAC 2016). DAC also contacted Tom Cinadr at the State Historic Preservation Office (SHPO) to check for any cultural resource records in the SHPO database. Based on the results of the Phase I survey and the SHPO State records, DAC recommends that the project warrants a No Historic Properties Affected determination.

6.5 Groundwater Sensitivity

Minnesota Pollution Control Agency (MPCA) GIS data layers were checked to assess the susceptibility of groundwater contamination in and around the Project area. According to the 1989 Porcher/MPCA "Groundwater Contaminant Susceptibility in Minnesota" mapping (Porcher 1989), the entire Project area and its immediate surroundings lie in an area of low groundwater contaminant susceptibility. Similarly, the Minnesota Department of Agriculture (MDA) "Minnesota Water Table Aquifer Vulnerability" dataset (MDA 2011) shows the Project area rated as a "low vulnerability" area.

6.6 Sensitive Surface Waters

The remnant water courses of Little Thirtynine and Big Thirtynine Creeks are discussed in Section 3.1.1 above. Prior to the diversion channel constructed in the late 1970s as part of the original Milepost 7 Tailings Basin, these two creeks were both on the Minnesota Public Water Inventory (PWI) and were also MNDNR-designated trout streams. Northshore provided information to MNDNR in March 2015 suggesting that the remnant channels of the two creeks, downstream of the diversion, should be removed from the PWI and the trout stream list, because the contributing drainage areas of the remnant channels did not meet the PWI criterion. Moreover, neither remnant channel is accessible to trout, due to the diversion. MNDNR has concurred with the information provided by Northshore that the Big Thirtynine and Little Thirtynine remnant water courses downstream of the diversion ditches are no longer PWI streams or are designated as Minnesota trout streams (see Appendix E). There are no other sensitive surface water features in the Project area.

6.7 Education or Research Use

There are no known wetland or other natural resource features that are currently used or have been used in the past as educational or research resources. The nearest Minnesota Scientific and Natural Area (SNA) is the Iona Beach SNA, approximately 8.5 miles south of the Project on the Lake Superior shoreline. Therefore, the Project will have no impact on local education or research resources.

6.8 Waste Disposal Sites

Project-related activities involving hazardous or potentially hazardous waste or contaminants would be conducted according to applicable federal and state standards.

6.9 Consistency with Other Comprehensive Regional Plans

The Project is consistent with the principles, goals and strategies of the *Lake County Comprehensive Plan and Land Use Ordinance #12, Effective August 11, 2011* (Lake County 2011).

Other known local, state and federal permits for this project include the following:

- USACE Section 404 permit under the Clean Water Act, including consultation with the USFWS to assure compliance with Section 7 of the Clean Water Act, as well as consultation with the Minnesota SHPO to assure compliance with Section 106 of the National Historic Preservation Act (as proposed herein)
- MN Dam Safety Permit per MN Rules 6615.0300 through 6115.0520
- Clean Water Act Section 401 Water Quality Certification through the MPCA
- NSPDES/SDS surface water discharge permit (MPCA)
- MNDNR Permit to Mine Amendment
- MNDNR WCA Permit (as proposed herein)

7.0 Wetland Replacement/Mitigation

Wetland mitigation opportunities were evaluated by following the guidelines in the *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota* (U.S. Army Corps of Engineers, 2009) and the WCA replacement standards, Minnesota Rules 8420.0522, Subp. 7. Each document generally requires that wetland mitigation sites be selected from within the same watershed as the impacts and that the highest priority siting location would occur within the same minor watershed, then moving to progressively larger watershed basins if suitable sites are not identified within the watershed at each level.

7.1 Minor Watershed

The first priority for siting of potential mitigation opportunities was considered at the Project site and within the minor watersheds in which Project impacts are proposed (Figure 23). The Project is located within three minor watersheds; the East Branch Beaver River minor watershed (HUC code 040101020104), the Thirtynine Creek minor watershed (HUC code 040101020103), and the Lower Beaver River minor watershed (HUC code 040102020105). The watersheds encompass 47 square miles with the Project located in the downstream part of the East Branch Beaver River and Thirtynine Creek watersheds and in the headwaters of the Lower Beaver River watershed. Approximately 15.3 sq. mi. of wetlands are mapped within the watersheds based on the National Wetland Inventory (NWI), which represents one-third of the area. The Natural Resources Conservation Service soil survey mapping has been completed for about 34 square miles within the three minor watersheds and classifies approximately 13 square miles of those watersheds as hydric soils, comprising 38 percent of the area.

The Board of Water and Soil Resources (BWSR, 2010) potential wetland mitigation site geographic information system (GIS) data were evaluated within the Project minor watersheds to determine if any practicable wetland mitigation sites were present (Figure 23). The BWSR potential mitigation site mapping included 3 gravel pits, none of which actually identified potential wetland mitigation opportunities. The mapped gravel pits included one within the Project area, one near the diversion channel that is mapped as wetland by the NWI, and a third that is only 3 acres in size on State land. Therefore, none of these potential mitigation opportunities were determined to be feasible. Therefore, no qualifying mitigation measures are present within the minor watershed.

7.2 Major Watershed

The next priority mitigation siting area is within the same major watershed as the wetland impacts. The Project is in the Lake Superior - South major watershed. The BWSR potential wetland mitigation site GIS data were evaluated within the Project major watershed to determine if any practicable wetland mitigation sites were present (BWSR, 2010). The BWSR potential mitigation site study identified possible mitigation opportunities based on various mitigation methods allowed for credit, including the restoration of drained or partially drained wetlands, establishment of wetlands in gravel pits, and several categories of preserving high value wetlands. Below is a summary of the findings for each of those categories.

The BWSR potential mitigation mapping data included 138 farmed wetland polygons, of which seven were 200 acres or more in size. All potential farmed wetland mitigation areas identified in the BWSR study were evaluated in more detail. Many of the areas were misidentified and were either never farmed or had reverted to natural habitats already. With the availability of more detailed topography, NWI, and soils information along with recent high resolution aerial photography since the BWSR study was conducted, it was possible to further refine the mitigation potential. Upon reviewing all of the areas mapped as farmed wetlands, only 72 areas remained, which have farmed land uses and the characteristics applicable for potential wetland mitigation. The primary characteristics used to include areas as having wetland mitigation potential include (which are consistent with the BWSR study methodology):

- Slopes of less than three percent
- No homesteads, buildings, driveways, roads, or other incompatible land uses
- Apparent farming activity, not native forested or shrub vegetation
- No NWI wetland mapping

The refined potential mitigation areas based on the farmed wetland mitigation method included 72 areas within the major watershed, but the largest contiguous area was only 36 acres in size. All of the areas identified were rated by the BWSR study as having low potential for wetland mitigation, unlike other areas of northeast Minnesota that had potential mitigation areas identified as having high potential. Three of the primary reasons for the low potential are:

- The majority of the areas have steep slopes
- The soil mappings for almost every area are classified as having only 50 percent hydric components or less, and
- Only a few of the areas have adjacent NWI wetland mappings, which are a strong indicator of historic wetlands.

Because all of the farmed wetland mitigation possibilities in the major watershed have low potential for success and they are all small in size, the restoration of farmed wetlands is not a feasible strategy.

Potential wetland restoration areas identified by the BWSR study for partially drained wetlands included 29 areas within the Lake Superior-South watershed. Partially drained wetlands typically are only allowed credit at a rate of 50 percent of the land area restored. All identified areas were reviewed using the most current information available. Areas were eliminated that contained the following characteristics:

- Wetlands adjacent to natural watercourses
- Wetlands with no apparent ditching
- Developed areas
- Wetlands adjacent to waterways carrying runoff from upstream properties

Upon evaluation of all of the possible partially drained areas, only five areas were determined to have potential, ranging in size from 12 acres to 83 acres. One of the sites is predominantly owned by the State, three others include a mix of at least four different landowners, and one site is entirely within a single

property. The single owner site has a natural watercourse running through it with small segments of channelization, but limited drainage that could be altered. Therefore, none of the partially drained wetland mitigation areas are feasible.

Nearly all of the identified gravel pits were either misidentified (are not gravel pits), are located on county or state land, or appear to be active private facilities. Therefore, gravel pits are not a feasible mitigation option.

The preservation of high value wetlands is typically afforded credit at a rate of 12.5 percent of the land area protected. In order to qualify, wetlands must be documented as meeting stringent requirements for containing rare or high value attributes and also be under threat of impacts in order to qualify for preservation credit. Therefore, in many cases, the preservation opportunities identified by the BWSR study do not actually meet those stringent criteria. One category of high value wetland identified in guidance is forested wetlands dominated by white cedar. A total of 81 areas were identified as possible white cedar wetlands in the BWSR study. However, The largest area identified was only 47 acres, which would result in a maximum of 6 credits if all of the qualifying criteria were met. Therefore, preservation of white cedar wetlands is not a feasible mitigation strategy. The preservation of wetlands adjacent to trout streams is another high value wetland type that was identified in the BWSR study, which included 137 areas in the Lake Superior-South watershed. The largest of those areas was 50 acres in size, which would qualify for a maximum of 6 credits if all of the other criteria were met, a willing landowner was present, and a conservation easement could be recorded. The preservation of wetlands along trout streams is therefore, not a feasible option. The preservation of high value wetlands on private land is another category evaluated by the BWSR study, which identified 39 such areas. The largest of those areas was only 102 acres in size, which would have the potential for a maximum of only 13 credits, if the stringent high value criteria and legitimate threat were also documented. The potential for suitable credits from protecting private wetlands is not feasible. The last category of wetland preservation identified by BWSR is high value wetlands on county or state land. The study identified 34 areas, of which the largest was 76 ac that would qualify for a maximum of 9.5 credits.

There is no potential to accomplish wetland mitigation for the project within the major watershed. In accordance with M.R. 8420.0522, Subp. 7.B(1), after evaluating replacement within the minor and major watersheds, wetland replacement in the greater than 80 percent areas may be accomplished by wetland banking. Wetland replacement for the proposed 228.33 acres of unavoidable direct wetland impacts and 35.97 acres of potential indirect wetland impacts (when documented) is proposed through the use of existing wetland bank credits located in Bank Service Area (BSA) 1. As the managing entity of Northshore, Cleveland-Cliffs, Inc. (Cliffs) has entered into a purchase agreement with EIP Credit CO., LLC (EIP Lake Superior Bank) to acquire wetland bank credits within BSA 1 (Appendix G). Due to the extended time period over which wetland impacts are expected to occur for the Northshore tailings basin progression, annual wetland impact projections are proposed to be included as part of the permit to mine annual operating report submitted in January each year with wetland credit debits made in conjunction with those projections.

7.3 Wetland Conservation Act Wetland Replacement

Wetland replacement ratios are proposed in conformance with M.R. 8420.0522, Subp. 4. According to M.R. 8420.0522, Subp. 4., wetland replacement in greater than 80 percent areas is required at a 1.5:1 ratio, which may be reduced by 0.5:1 when replacement consists of withdrawal of available credits from an approved wetland bank site within the same bank service area as the impacted wetland. Northshore proposes to purchase 228.30 wetland bank credits from Account 1609 established in the Minnesota Wetland Bank, located in BSA 1 and up to an additional 35.97 wetland bank credits if the indirect impoundment impacts occur as expected, for a total of 264.27 wetland bank credits. Therefore, because wetland bank credits will be used that are established within the project BSA, the applicable replacement ratio under the WCA is 1:1 for all proposed, unavoidable wetland impacts.

7.4 Compensatory Mitigation - Section 404 Clean Water Act

Compensatory wetland mitigation for the proposed 226.74 acres of unavoidable direct impacts to jurisdictional wetlands under the CWA is proposed by debiting 226.74 credits from existing wetland bank credits obtained from the EIP Lake Superior Bank, designated as Account S7700-1609 within RIBITS, located in BSA 1. In addition, indirect impoundment impacts will be documented by future monitoring, and it is anticipated that up to 35.00 acres of jurisdictional wetlands may be affected. Any documented indirect wetland impacts will also be mitigated through the use of established wetland bank credits from Account S7700-1609. Mitigation is proposed at a 1:1 ratio in accordance with USACE mitigation policy (USACE, 2009) starting at a base compensation ratio of 1.5:1 with reductions of 0.25:1 each for mitigation accomplished within the project BSA and ahead of the wetland impacts. Therefore, Northshore proposes to purchase up to 261.74 wetland credits from Account S7700-1609.

Wetland impacts and compensatory mitigation related to the 2005 tailings basin progression project were detailed in July 2005 via a table (*Table 2: Impacts to Historic Wetlands and Existing Wetland Summary, Revised July 8, 2005*) and figure (*Figure 3: Revised Wetland Impact Map*) that were provided to the USACE prior to completion of the approval (Appendix L). Permit 2005-2628-TWP, in conjunction with Table 2 and Figure 3 (Appendix L) show that 6.39 acres within what is currently delineated as Murphy's Pond (Wetland/Deepwater 18) and what was formerly identified as Wetland 11 in the 2005 permitting; was considered an impact due to impoundment and mitigation was provided. Therefore, compensatory mitigation for permanent, unavoidable impacts to 35.96 acres of deepwater habitat (Murphy's Pond) is proposed to be reduced by 6.39 acres to 29.57 acres. Compensatory mitigation for deepwater habitat losses is proposed through the development of deepwater habitat within the Peter Mitchell pit at the end of mining. In 2010, Northshore developed a concept mitigation plan for the Peter Mitchel pit (Barr 2010). The future pit lake is estimated to have a surface area of approximately 3,200 acres, including about 640 acres of littoral area with depths ranging from 0 to 30 ft, which greatly exceeds the 29.57 acres of impact.

Compensatory mitigation for the loss of 7,737 linear feet of stream habitat (2.53 acres) will be discussed with the USACE to determine what is appropriate.

8.0 References

Barr Engineering. 2010. *Peter Mitchell Pit Concept Mitigation Plan – Aquatic Habitat Enhancement through In-Pit Disposal of Overburden and Rock. Prepared for Northshore Mining Company*. Barr Engineering, Minneapolis, MN,

Barr Engineering. 2016. *West Ridge Railroad Relocation Endangered, Threatened, and Special Concern Plant Species Survey Report. Prepared for Northshore Mining Company*. Barr Engineering, Minneapolis, MN.

BWSR. 2010. Geographic information system data – potential wetland mitigation sites.

Duluth Archaeological Center (DAC). 2016. *Phase I Archaeological Survey for the Silver Bay Facility, Northshore Mining, Lake County, Minnesota*. Duluth Archaeological Center, Duluth, MN.

Lake County Office of Planning and Zoning (Lake County). 2011. *Lake County Comprehensive Plan and Land Use Ordinance #12, Effective August 11, 2011*.

Minnesota Department of Agriculture (MDA), 2011. Minnesota Water Table Aquifer Vulnerability. Minnesota Department of Agriculture. St. Paul, Minn.

Porcher, E. (1989), Ground water contamination susceptibility in Minnesota, Minnesota Pollution Control Agency, St. Paul, Minn.

U.S. Army Corps of Engineers. 2009. *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota*. St. Paul District. January 2009.

Tables

Table 1
Alternative Railroad Alignment Wetland Impact Summary

Alternative	Wetland Impacts South (ac)	Wetland Impacts North (ac)	Total Wetland Impacts (ac)
Alternative 2A	11.66	6.11	17.77
Alternative 2D	11.66	8.11	19.77
Alternative 3A	8.80	6.11	14.91
Alternative 3D	8.80	8.11	16.91
Alternative 4A	10.90	6.11	17.01
Alternative 4D	10.90	8.11	19.01
Proposed Alternative	9.48	8.11	17.59

Table 2a
Wetland Impact Summary by Resource and Impact Type
Wetland Conservation Act

Wetland Impact Type	**Area (acres)**
None - unchanged wetlands	136.54
No WCA Jurisdiction[1]	46.38
Potential Indirect Wetland and Riverine[2]	
Impoundment	35.97
Watershed diversion	0
Potential Indirect Wetland and Riverine[1] Total	**35.97**
Direct Wetland and Riverine[2]	
Railroad Embankment and Dam 1	42.73
Tailings Basin Progression	180.98
Fragmentation (certain indirect)	4.58
Direct Wetland and Riverine[1] Total	**228.30**

[1]Includes 35.96 ac of deepwater habitat, Murphy's Pond

[2]Remnant watercourses, Little 39 Creek and Big 39 Creek

Table 2b
Wetland Impact Summary by Resource and Impact Type
Section 404 Clean Water Act

Wetland Impact Type	**Area (acres)**
None - unchanged wetlands	136.54
No Federal Jurisdiction	10.42
Potential Indirect Water Resources	
Wetland Impoundment	35.00
Wetland Watershed diversion	0
Stream Habitat Impoundment	0.97 (2,694 lin ft)
Indirect Wetland Total	**35.00**
Direct Water Resources	
Railroad Embankment and Dam 1 Wetlands	42.16
Tailings Basin Progression Wetlands	180.00
Fragmentation Wetlands (certain indirect)	4.58
Stream Habitat	1.56 (5,043 lin ft)
Direct Wetland Total	**226.74**
Stream Habitat Total	**2.53 (7,737 lin ft)**
Deepwater Habitat[1]	**29.57**

[1]Corps permit authorization 2005-2628-TWP required compensatory mitigation for 6.39 acres of deepwater habitat within what is currently labeled Wetland 18 (Murphy's Pond), so the proposed 35.96 acre impact has been reduced by that area to avoid providing mitigation twice

Table 3a
Revised Wetland Impact Detail
February 27, 2019
Wetland Conservation Act

Aquatic Resource ID	WCA Wetland Jurisdiction	Aquatic Resource Type	Type of Impact[1]	Duration of Impact (P-permanent T-Temporary)	Total Aquatic Resource Area (ac)	Direct and Fragmentation Wetland Impacts (ac)	Potential Indirect Wetland Impacts (ac)	Total Wetland Impacts (ac)	Dominant Eggers and Reed Classification	Overall Quality
1a	Yes	Wetland	F	P	0.444	0.444	0.000	0.444	Hardwood Swamp	High
1b	Yes	Wetland	F	P	0.821	0.821	0.000	0.821	Hardwood Swamp	High
2	Yes	Wetland	F	P	8.295	7.982	0.000	7.982	Hardwood Swamp	Medium
2b	No	Wetland	NA	NA	0.884	-	-	-		
3a	Yes	Wetland	F	P	0.200	0.200	0.000	0.200	Hardwood Swamp	Medium
3b	Yes	Wetland	F	P	0.060	0.060	0.000	0.060	Hardwood Swamp	Medium
3c	Yes	Wetland	F	P	0.127	0.127	0.000	0.127	Hardwood Swamp	Medium
4	Yes	Wetland	F	P	10.420	10.420	0.000	10.420	Hardwood Swamp	Medium
5	Yes	Wetland	F	P	10.320	10.320	0.000	10.320	Hardwood Swamp	High
6	Yes	Wetland	F	P	1.249	1.249	0.000	1.249	Sedge Meadow	Medium
7a	No	Wetland	NA	NA	0.023	-	-	-	Sedge Meadow	
7b	No	Wetland	NA	NA	0.015	-	-	-	Sedge Meadow	
7c	No	Wetland	NA	NA	0.643	-	-	-	Sedge Meadow	
7d	No	Wetland	NA	NA	0.081	-	-	-	Sedge Meadow	
7e	No	Wetland	NA	NA	0.107	-	-	-	Sedge Meadow	
7f	No	Wetland	NA	NA	0.038	-	-	-	Sedge Meadow	
7g	No	Wetland	NA	NA	0.008	-	-	-	Sedge Meadow	
7h	No	Wetland	NA	NA	0.036	-	-	-	Sedge Meadow	
8	Yes	Wetland	F	P	2.664	2.664	0.000	2.664	Fresh (Wet) Meadow	Medium
9	Yes	Wetland	F	P	3.540	3.540	0.000	3.540	Hardwood Swamp	Medium
10	Yes	Wetland	F	P	3.623	3.623	0.000	3.623	Hardwood Swamp	High
11a	Yes	Wetland	F	P	0.043	0.043	0.000	0.043	Sedge Meadow	High
11b	Yes	Wetland	F	P	0.057	0.057	0.000	0.057	Sedge Meadow	High
11c	Yes	Wetland	F	P	0.130	0.130	0.000	0.130	Sedge Meadow	High
12	Yes	Wetland	F	P	9.463	9.463	0.000	9.463	Hardwood Swamp	Medium
13	Yes	Wetland	F, Fr	P	11.928	11.928	0.000	11.928	Alder Thicket	Medium
14	Yes	Wetland	F	P	27.229	1.360	0.000	1.360	Hardwood Swamp	Medium
15	Yes	Wetland	F	P	31.279	31.279	0.000	31.279	Alder Thicket	Medium
16b	Yes	Wetland	F	P	0.235	0.235	0.000	0.235	Shallow Marsh	Medium
17a	Yes	Wetland	F, Fr	P	0.344	0.344	0.000	0.344	Sedge Meadow	Medium
17b	Yes	Wetland	F	P	2.250	0.488	0.000	0.488	Shallow Marsh	Medium
18	Yes	Wetland	F	P	42.740	42.740	0.000	42.740	Shallow Marsh	Medium
18	No	Deepwater	F	P	35.960	0.000	0.000	0.000	Deepwater	NA
19	Yes	Wetland	F	P	81.166	0.743	0.000	0.743	Hardwood Swamp	High
20	Yes	Wetland	F, Fr	P	21.140	17.020	0.000	17.020	Coniferous Swamp	High
21	Yes	Wetland	F	P	8.167	8.167	0.000	8.167	Hardwood Swamp	High
22	Yes	Wetland	F	P	4.657	4.656	0.000	4.656	Hardwood Swamp	High
23	Yes	Wetland	F	P	19.895	14.208	0.000	14.208	Hardwood Swamp	High
24	Yes	Wetland	F	P	**2.185**	**2.185**	0.000	**2.185**	Hardwood Swamp	High
25	Yes	Wetland	F	P	**21.562**	**21.562**	0.000	**21.562**	Coniferous Swamp	High
26	Yes	Wetland	F, Fr	P	4.245	4.245	0.000	4.245	Hardwood Swamp	High
27	Yes	Wetland	F, I	P	33.025	5.049	27.975	33.025	Hardwood Swamp	High
28	Yes	Wetland	F	P	1.491	1.369	0.000	1.369	Hardwood Swamp	High
29	Yes	Wetland	F	P	3.344	1.054	0.000	1.054	Alder Thicket	High
30a	No	Wetland	NA	NA	0.829	-	-	-	Sedge Meadow	
30b	No	Wetland	NA	NA	0.169	-	-	-	Sedge Meadow	
30c	No	Wetland	NA	NA	1.108	-	-	-	Sedge Meadow	
30d	No	Wetland	NA	NA	0.355	-	-	-	Sedge Meadow	
31	No	Wetland	NA	NA	5.259	-	-	-	Alder Thicket	
32	Yes	Wetland	F	P	0.261	0.261	0.000	0.261	Alder Thicket	High
33	Yes	Wetland	F	P	1.380	1.380	0.000	1.380	Hardwood Swamp	High
34	Yes	Wetland	F, I	P	18.245	3.783	6.929	10.712	Hardwood Swamp	High
35	Yes	Wetland	F	P	4.271	1.542	0.000	1.542	Hardwood Swamp	High
36	Yes	Wetland	I	P	**0.095**	0.000	**0.095**	**0.095**	Hardwood Swamp	High
37	Yes	Wetland	None	None	5.484	-	-	-	Hardwood Swamp	
38a	No	Wetland	NA	NA	0.267	-	-	-	Shallow Marsh	
38b	No	Wetland	NA	NA	0.053	-	-	-	Shallow Marsh	
38c	No	Wetland	NA	NA	0.456	-	-	-	Shallow Marsh	
38d	No	Wetland	NA	NA	0.092	-	-	-	Shallow Marsh	
39a Little 39 Creek[2]	Yes	Wetland	F	P	1.047	0.810	0.000	0.810	Riverine	NA
39b Big 39 Creek[2]	Yes	Wetland	F, I	P	1.723	0.753	0.970	1.723	Riverine	NA
Total					**447.225**	**228.302**	**35.970**	**264.272**		

[1]Direct: F-Fill, Fr-Fragmentation, Indirect: I-Impoundment,

[2]Impacts to Big and Little 39 Creeks are treated as wetland impacts under WCA

Table 3b
Water Resources Impact Detail
Section 404 Clean Water Act

Aquatic Resource ID	Corps Jurisdiction[1]	Aquatic Resource Type	Type of Impact[2]	Duration of Impact (P-permanent T-Temporary)	Total Wetland Area (ac)	Direct and Fragmentation Wetland Impacts (ac)	Potential Indirect Wetland Impacts (ac)	Total Wetland Impacts (ac)	Deepwater Impacts (ac)	Stream Impacts (lin ft)	Dominant Eggers and Reed Classification	Overall Quality
1a	PJD	Wetland	F	P	0.44	0.44	0.00	0.44			Hardwood Swamp	High
1b	PJD	Wetland	F	P	0.82	0.82	0.00	0.82			Hardwood Swamp	High
2	PJD	Wetland	F	P	8.30	7.98	0.00	7.98			Hardwood Swamp	Medium
2b	No	Wetland	NA	NA	0.88	-	-	-				
3a	PJD	Wetland	F	P	0.20	0.20	0.00	0.20			Hardwood Swamp	Medium
3b	PJD	Wetland	F	P	0.06	0.06	0.00	0.06			Hardwood Swamp	Medium
3c	PJD	Wetland	F	P	0.13	0.13	0.00	0.13			Hardwood Swamp	Medium
4	PJD	Wetland	F	P	10.42	10.42	0.00	10.42			Hardwood Swamp	Medium
5	PJD	Wetland	F	P	10.32	10.32	0.00	10.32			Hardwood Swamp	High
6	PJD	Wetland	F	P	1.25	1.25	0.00	1.25			Sedge Meadow	Medium
7a	No	Wetland	NA	NA	0.02	-	-	-			Sedge Meadow	
7b	No	Wetland	NA	NA	0.01	-	-	-			Sedge Meadow	
7c	No	Wetland	NA	NA	0.64	-	-	-			Sedge Meadow	
7d	No	Wetland	NA	NA	0.08	-	-	-			Sedge Meadow	
7e	No	Wetland	NA	NA	0.11	-	-	-			Sedge Meadow	
7f	No	Wetland	NA	NA	0.04	-	-	-			Sedge Meadow	
7g	No	Wetland	NA	NA	0.01	-	-	-			Sedge Meadow	
7h	No	Wetland	NA	NA	0.04	-	-	-			Sedge Meadow	
8	PJD	Wetland	F	P	2.66	2.66	0.00	2.66			Fresh (Wet) Meadow	Medium
9	PJD	Wetland	F	P	3.54	3.54	0.00	3.54			Hardwood Swamp	Medium
10	PJD	Wetland	F	P	3.62	3.62	0.00	3.62			Hardwood Swamp	High
11a	PJD	Wetland	F	P	0.04	0.04	0.00	0.04			Sedge Meadow	High
11b	PJD	Wetland	F	P	0.06	0.06	0.00	0.06			Sedge Meadow	High
11c	PJD	Wetland	F	P	0.13	0.13	0.00	0.13			Sedge Meadow	High
12	PJD	Wetland	F	P	9.46	9.46	0.00	9.46			Hardwood Swamp	Medium
13	PJD	Wetland	F, Fr	P	11.93	11.93	0.00	11.93			Alder Thicket	Medium
14	PJD	Wetland	F	P	27.23	1.36	0.00	1.36			Hardwood Swamp	Medium
15	PJD	Wetland	F	P	31.28	31.28	0.00	31.28			Alder Thicket	Medium
16b	PJD	Wetland	F	P	0.24	0.24	0.00	0.24			Shallow Marsh	Medium
17a	PJD	Wetland	F, Fr	P	0.34	0.34	0.00	0.34			Sedge Meadow	Medium
17b	PJD	Wetland	F	P	2.25	0.49	0.00	0.49			Shallow Marsh	Medium
18	Yes	Wetland	F	P	42.74	42.74	0.00	42.74			Shallow Marsh	Medium
18	Yes[3]	Deepwater	F	P	35.96	0.00	0.00	0.00	29.57		Deepwater	NA
19	PJD	Wetland	F	P	81.17	0.74	0.00	0.74			Hardwood Swamp	High
20	PJD	Wetland	F, Fr	P	21.14	17.02	0.00	17.02			Coniferous Swamp	High
21	PJD	Wetland	F	P	8.17	8.17	0.00	8.17			Hardwood Swamp	High
22	PJD	Wetland	F	P	4.66	4.66	0.00	4.66			Hardwood Swamp	High
23	PJD	Wetland	F	P	19.90	14.21	0.00	14.21			Hardwood Swamp	High
24	PJD	Wetland	F	P	**2.18**	**2.18**	0.00	**2.18**			Hardwood Swamp	High
25	PJD	Wetland	F	P	**21.56**	**21.56**	0.00	**21.56**			Coniferous Swamp	High
26	PJD	Wetland	F, Fr	P	4.24	4.24	0.00	4.24			Hardwood Swamp	High
27	PJD	Wetland	F, I	P	33.02	5.05	27.98	33.02			Hardwood Swamp	High
28	PJD	Wetland	F	P	1.49	1.37	0.00	1.37			Hardwood Swamp	High
29	PJD	Wetland	F	P	3.34	1.05	0.00	1.05			Alder Thicket	High
30a	No	Wetland	NA	NA	0.83	-	-	-			Sedge Meadow	
30b	No	Wetland	NA	NA	0.17	-	-	-			Sedge Meadow	
30c	No	Wetland	NA	NA	1.11	-	-	-			Sedge Meadow	
30d	No	Wetland	NA	NA	0.35	-	-	-			Sedge Meadow	
31	No	Wetland	NA	NA	5.26	-	-	-			Alder Thicket	
32	PJD	Wetland	F	P	0.26	0.26	0.00	0.26			Alder Thicket	High
33	PJD	Wetland	F	P	1.38	1.38	0.00	1.38			Hardwood Swamp	High
34	PJD	Wetland	F, I	P	18.24	3.78	6.93	10.71			Hardwood Swamp	High
35	PJD	Wetland	F	P	4.27	1.54	0.00	1.54			Hardwood Swamp	High
36	PJD	Wetland	I	P	**0.095**	0.00	**0.095**	**0.095**			Hardwood Swamp	High
37	PJD	Wetland	None	None	5.48	-	-	-			Hardwood Swamp	
38a	No	Wetland	NA	NA	0.27	-	-	-			Shallow Marsh	
38b	No	Wetland	NA	NA	0.05	-	-	-			Shallow Marsh	
38c	No	Wetland	NA	NA	0.46	-	-	-			Shallow Marsh	
38d	No	Wetland	NA	NA	0.09	-	-	-			Shallow Marsh	
39a Little 39 Creek[4]	PJD	Stream	F	P	0.00	0.00	0.00	0.00		2,589 (0.81 ac)	Riverine	NA
39b Big 39 Creek[4]	PJD	Stream	F, I	P	0.00	0.00	0.00	0.00		5,148 (1.72 ac)	Riverine	NA
Corps Total					**444.46**	**226.74**	**35.00**	**261.74**	**29.57**	**7,737 (2.53 ac)**		

[1]PJD - preliminary jurisdictional determination (federal jurisdiction assumed through request of PJD)

[2]Direct: F-Fill, Fr-Fragmentation, Indirect: I-Impoundment,

[3]Corps permit authorization 2005-2628-TWP required compensatory mitigation for 6.39 acres of deepwater habitat within what is currently labeled Wetland 18 (Murphy's Pond), so the proposed impact has been reduced by that area to avoid providing mitigation twice

[4]Impacts to Big and Little 39 Creeks are treated as wetland impacts under WCA and stream impacts under Section 404 of the CWA regarding mitigation/replacement requirements

Table 4a
Wetland Plant Community Impact Summary
Wetland Conservation Act Jurisdiction

Plant Community Type	Direct Wetland Impacts (ac)				Potential Indirect Wetland Impacts[1] (ac)
	Railroad and Dams	Tailings Basin Progression	Fragmentation	Total Project Wetland Impacts	
Hardwood Swamp	23.78	71.88	0.00	95.66	35.00
Shallow Marsh	0.60	43.10	0.10	43.80	0.00
Alder Thicket	9.05	31.57	3.90	44.52	0.00
Coniferous Swamp	8.72	29.30	0.56	38.58	0.00
Sedge Meadow	0.0	1.48	0.02	1.50	0.0
Fresh (Wet) Meadow	0.0	2.66	0.00	2.66	0.0
Riverine	0.58	0.99	0.00	1.56	0.97
Total	**42.73**	**180.98**	**4.58**	**228.30**	**35.97**

[1]Potential indirect impacts due to impoundment

Table 4b
Wetland Plant Community and Stream Impact Summary
Section 404 Clean Water Act Jurisdiction

Plant Community Type	Direct Wetland Impacts (ac)				Potential Indirect Wetland Impacts[1] (ac)
	Railroad and Dams	Tailings Basin Progression	Fragmentation	Total Project Impacts	
Hardwood Swamp	23.78	71.88	0.00	95.66	35.00
Shallow Marsh	0.60	43.10	0.10	43.80	0.00
Alder Thicket	9.05	31.57	3.90	44.52	0.00
Coniferous Swamp	8.72	29.30	0.56	38.58	0.00
Sedge Meadow	0.0	1.48	0.02	1.50	0.0
Fresh (Wet) Meadow	0.0	2.66	0.00	2.66	0.0
Wetland Total	**42.16**	**180.00**	**4.58**	**226.74**	**35.00**
Little 39 Creek	0.35 (1,026 LF)	0.46 (1,563 LF)	0.00	0.81 (2,589 LF)	0.0
Big 39 Creek	0.22 (656 LF)	0.53 (1,798 LF)	0.00	0.75 (2,454 LF)	0.97 (2,694 LF)
Stream Total	**0.57 (1,682 LF)**	**0.99 (3,361 LF)**	**0.00**	**1.56 (5,043 LF)**	**0.97 (2,694 LF)**

[1]Potential indirect impacts due to impoundment

Table 5a
Wetland Impact Summary by Wetland Quality
Wetland Conservation Act

Wetland Quality	Direct Wetland Impacts (ac)				Potential Indirect Wetland Impacts[1] (ac)
	Railroad and Dams	Tailings Basin Progression	Fragmentation	Total Project Wetland Impacts	
Low	0.00	0.00	0.00	0.00	0.00
Medium	17.42	102.65	4.00	124.07	0.00
High	24.73	77.35	0.58	102.66	35.00
Riverine	0.58	0.99	0.00	1.56	0.97
Total	**42.73**	**180.98**	**4.58**	**228.30**	**35.97**

[1]Potential indirect impacts due to impoundment

Table 5b
Wetland Impact Summary by Wetland Quality
Section 404 Clean Water Act

Wetland Quality	Direct Wetland Impacts (ac)				Potential Indirect Wetland Impacts[1] (ac)
	Railroad and Dams	Tailings Basin Progression	Fragmentation	Total Project Wetland Impacts	
Low	0.00	0.00	0.00	0.00	0.00
Medium	17.42	102.65	4.00	124.08	0.00
High	24.73	77.35	0.58	102.66	35.00
Total	**42.16**	**180.00**	**4.58**	**226.73**	**35.00**

[1]Potential indirect impacts due to impoundment

Table 6
Adjacent Landowner Contact Information
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company

Parcel ID	Owner	Primary Address	City	State	Zip Code
26-5608-34610 26-5508-03250 26-5608-34010 26-5608-34130 26-5608-34490	BEAR LAKE FAMILY TR U/A 1995	PO BOX 5155	GRAND RAPIDS	MN	55744
29-5509-01010 29-5509-01190 26-5608-08850 26-5608-18790 29-5609-13730 26-5508-06610 29-5509-01910 26-5608-22740 29-5509-01730	LAKE COUNTY	601 3RD AVE	TWO HARBORS	MN	55616
26-5608-08670	MARQUARDT JENNIFER M & JORDAN G	14 MARKS DRIVE	SILVER BAY	MN	55614
26-5608-26370 26-5608-26310 26-5608-22550 26-5608-22490 26-5608-22790 26-5608-21190 26-5608-21130 26-5608-21250 26-5508-06670 26-5508-07010 26-5608-23610	STATE OF MINNESOTA		ST PAUL	MN	55155
26-5608-22730	STATE OF MINNESOTA TF	TAX FORFEITED 00000			
29-5609-13910 26-5608-18010 26-5608-18130 26-5608-18490 26-5608-17070 26-5608-17130 26-5608-17310 26-5608-17730	STATE OF MN IN TRST FOR TAXING DIST C/O LAKE COUNTY MN	601 3RD AVE	TWO HARBORS	MN	55616
26-5608-18370 26-5608-16610	STATE OF MN SCHOOL TRUST LANDS DNR - TAX SPECIALIST	500 LAFAYETTE ROAD BOX 45	ST PAUL	MN	55155
26-5608-27010	THURMER NORMAN J JR + THURMER K A	1721 PIONEER LANE	WHITE BEAR LAKE	MN	55110
26-5608-27735	TIMM JEFFREY M & MARA A	1204 JULIET AVE	ST PAUL	MN	55105
26-5608-22910	TOWN OF BEAVER BAY	711 MACDONALD AVENUE	BEAVER BAY	MN	55601
29-5609-24910 29-5609-25010 29-5609-25190 29-5609-36190 29-5609-36730 29-5609-36910 29-5609-24010 29-5609-24190 29-5609-25730 29-5609-25910 29-5609-36010	UNITED STATES OF AMERICA-SUPERIOR NATIONAL FOREST ATTN: DIANA M SOLAND	8901 GRAND AVENUE	ST PAUL	MN	55801

Figures

Public Water Inventory (PWI) Watercourse

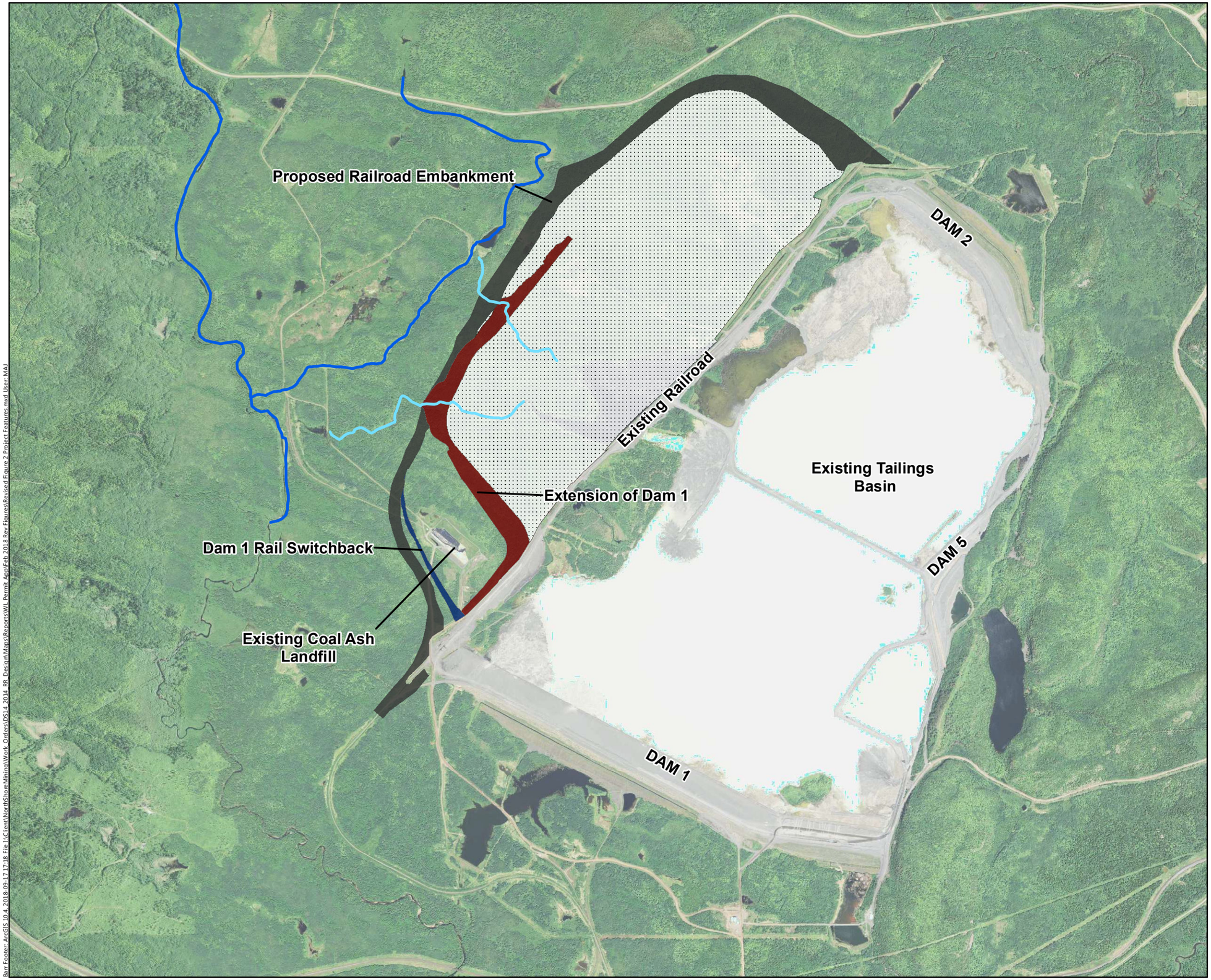
2,000 1,000 0 2,000

Feet

Figure 1

LOCATION MAP

Wetland Permit Application
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota



Unaffected Streams

Project Area Streams

Dam 1 Extension

Dam 1 Rail Swithback

Railroad

Tailings Basin

1 inch = 2,000 feet

2,000 0 2,000

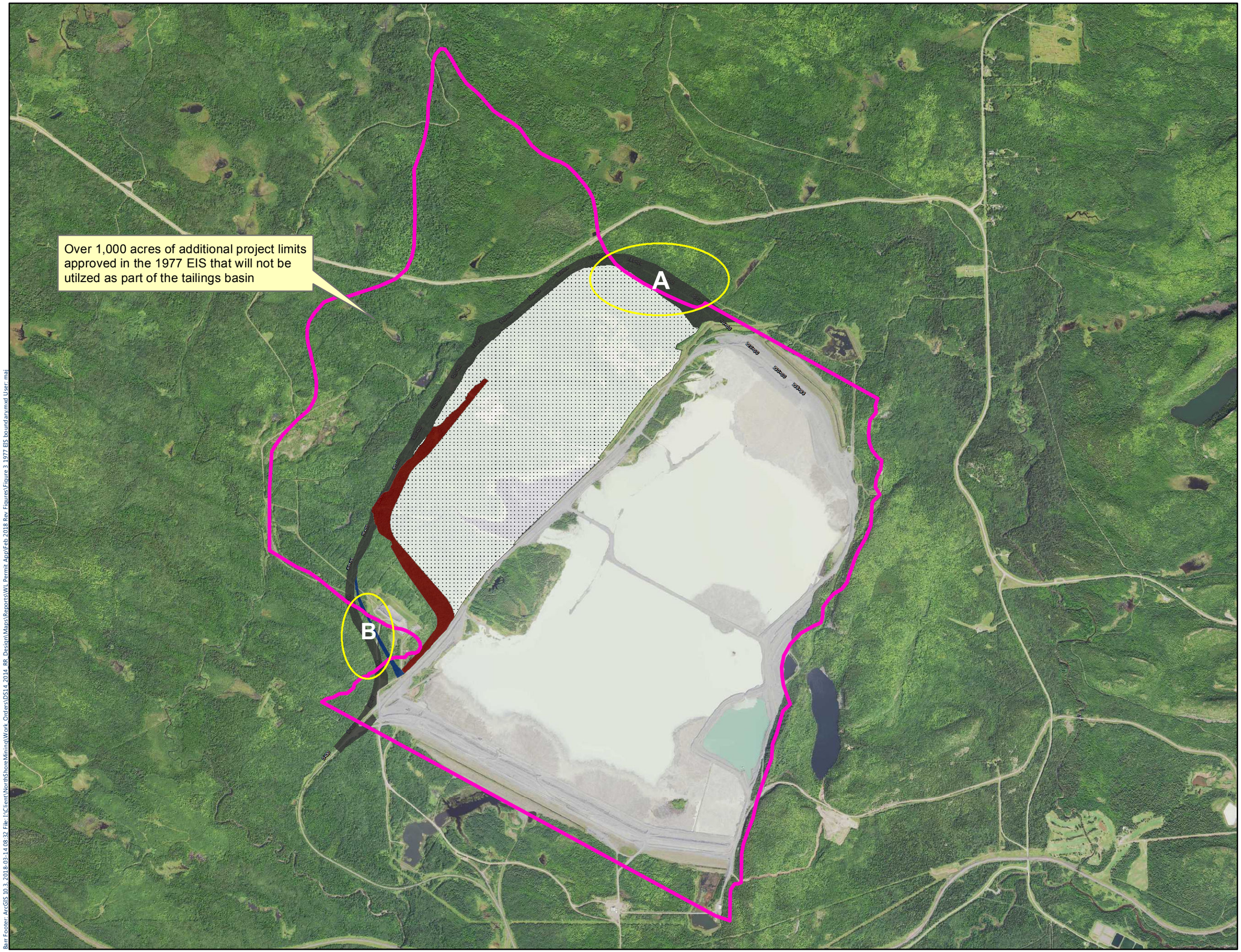
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Revised Figure 2

EXISTING AND PROPOSED PROJECT FEATURES

Wettland Permit Application
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota



1977 Approved EIS Project

Project Features

- Dam 1 Extension
- Dam 1 Rail Swithback
- Railroad Embankment
- Tailings Basin Progression

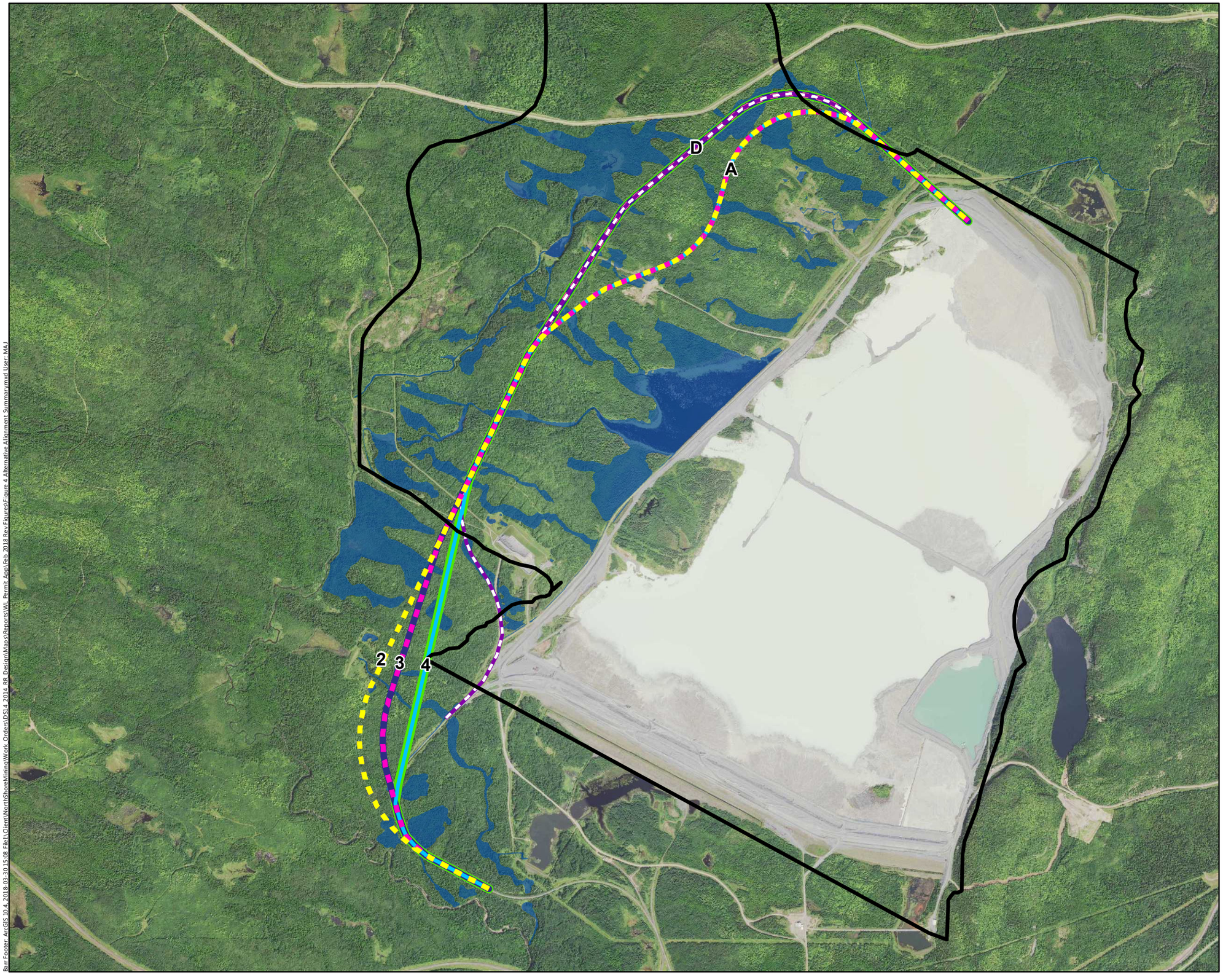
2,500 0 2,500

Feet

Figure 3

1977 EIS PROJECT LIMITS

West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



EIS Boundary

Wetlands/Waters

Alternative Alignments

2A

3A

4A

2D

3D

4D

Proposed

N

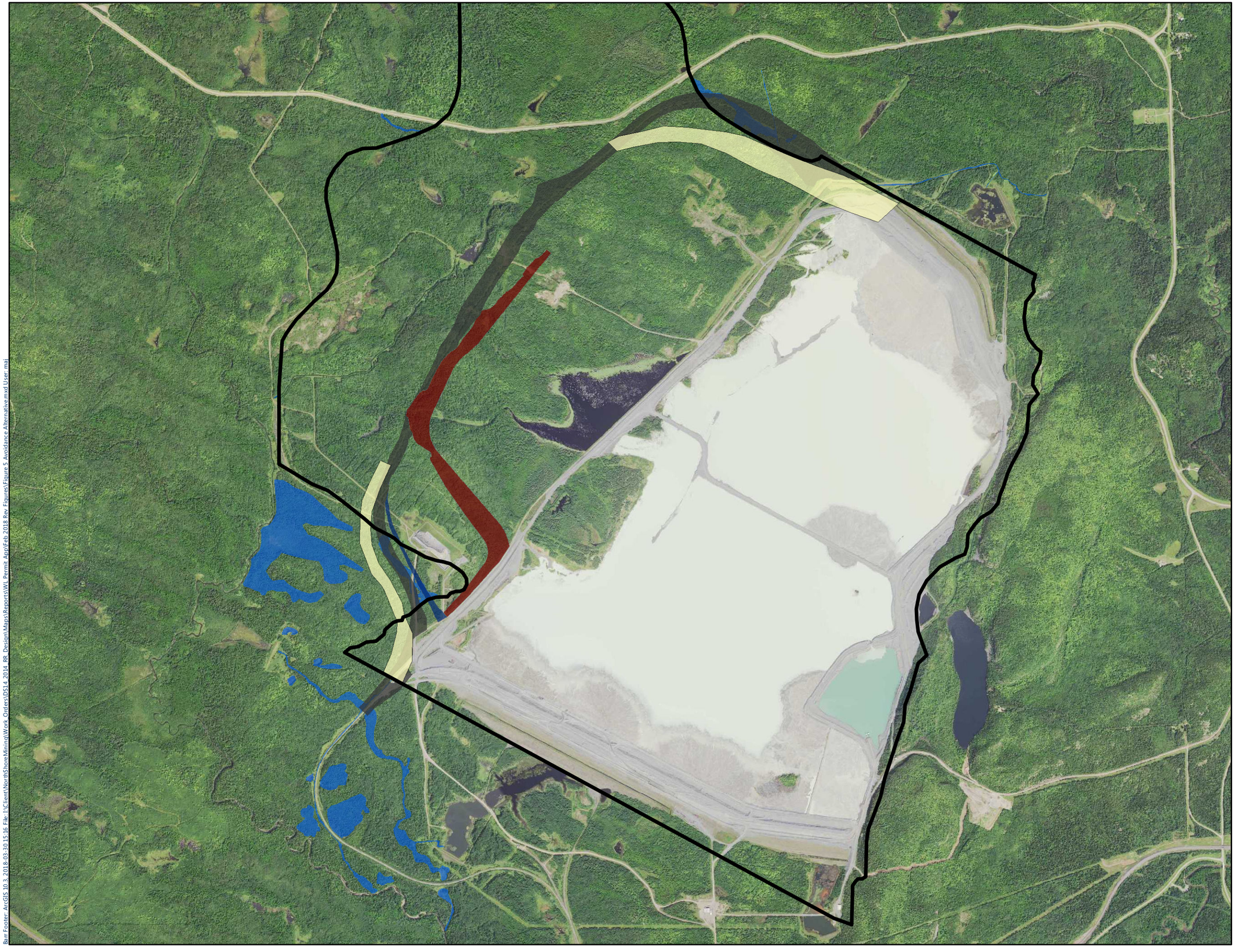
0 1,000 2,000 4,000

Feet

Aerial Imagery: FSA (2017)

Figure 4

ALTERNATIVE ALIGNMENT SUMMARY
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



EIS Boundary

Avoidance Alignment

Proposed Alignment

Dam 1 Extension

Dam 1 Rail Switchback

Railroad Embankment

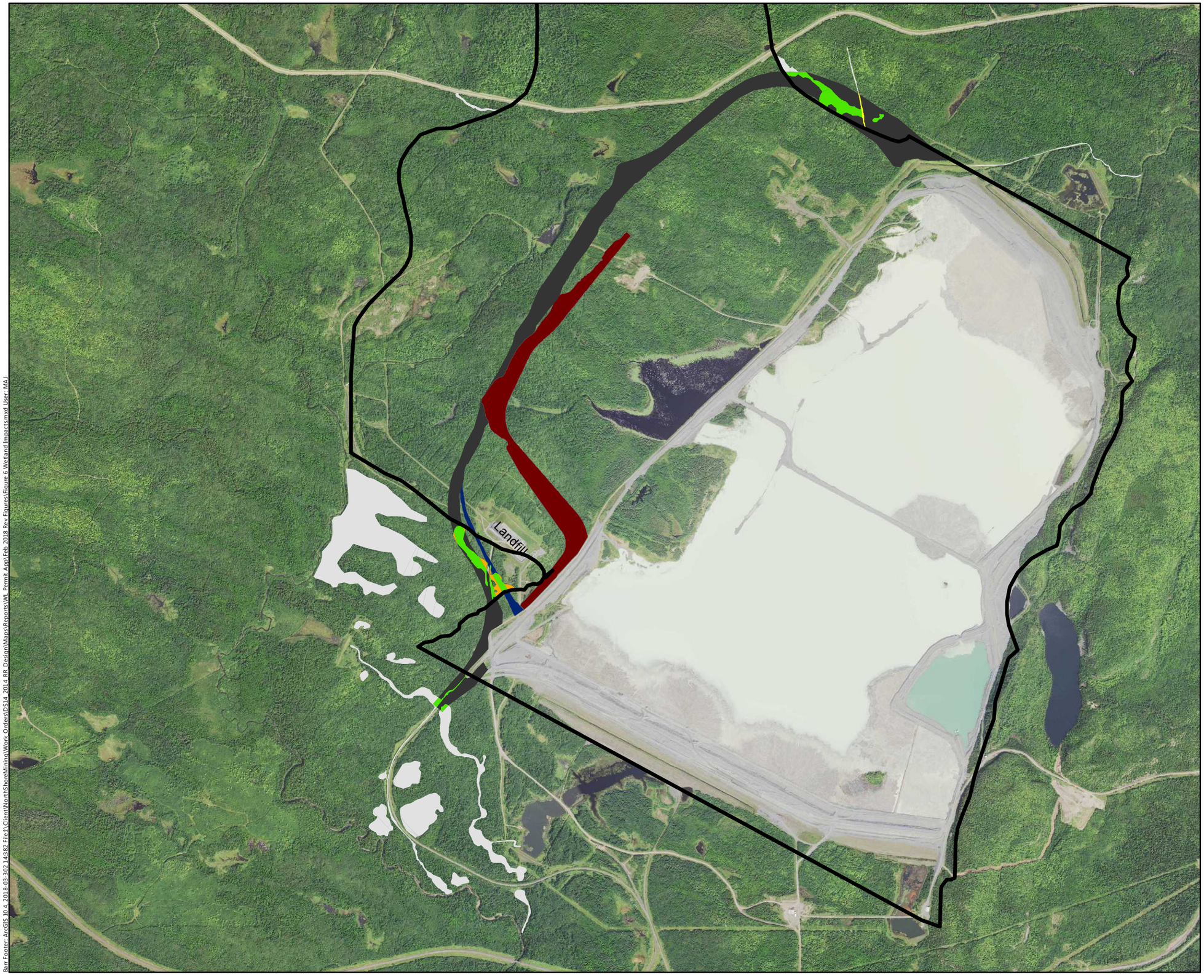
Wetlands Outside the EIS Boundary

0 1,000 2,000 4,000

Feet

Figure 5

WETLAND AVOIDANCE ALIGNMENT
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



EIS Boundary

Railroad Embankment

Dam 1 Extension

Dam 1 Rail Switchback

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands

Embankment: Indirect Non-Jurisdictional

Embankment: Indirect Jurisdictional

Embankment: Direct Jurisdictional

Tailings Basin: Direct Jurisdictional

Embankment: Direct Non-Jurisdictional

Tailings Basin: Direct Non-Jurisdictional

1 inch = 2,000 feet

1,000 0 2,000

Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 6

PROPOSED ALTERNATIVE
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Map 13

Map 14

Map 11

Map 12

Map 9

Map 10

Map 8

- Index
- Project Area
- Deepwater Impacts
- Previously Permitted Wetlands
- Nonjurisdictional Wetlands

Unaffected Waters

- Wetlands
- Stream

Indirect Impacts

- Stream
- Impoundment Wetlands
- Fragmentation Wetlands

Direct Impacts

- Railroad and Dam Wetlands
- Tailings Basin Progression Wetlands
- Railroad and Dam Streams
- Tailings Basin Progression Streams

N

0 750 1,500 3,000

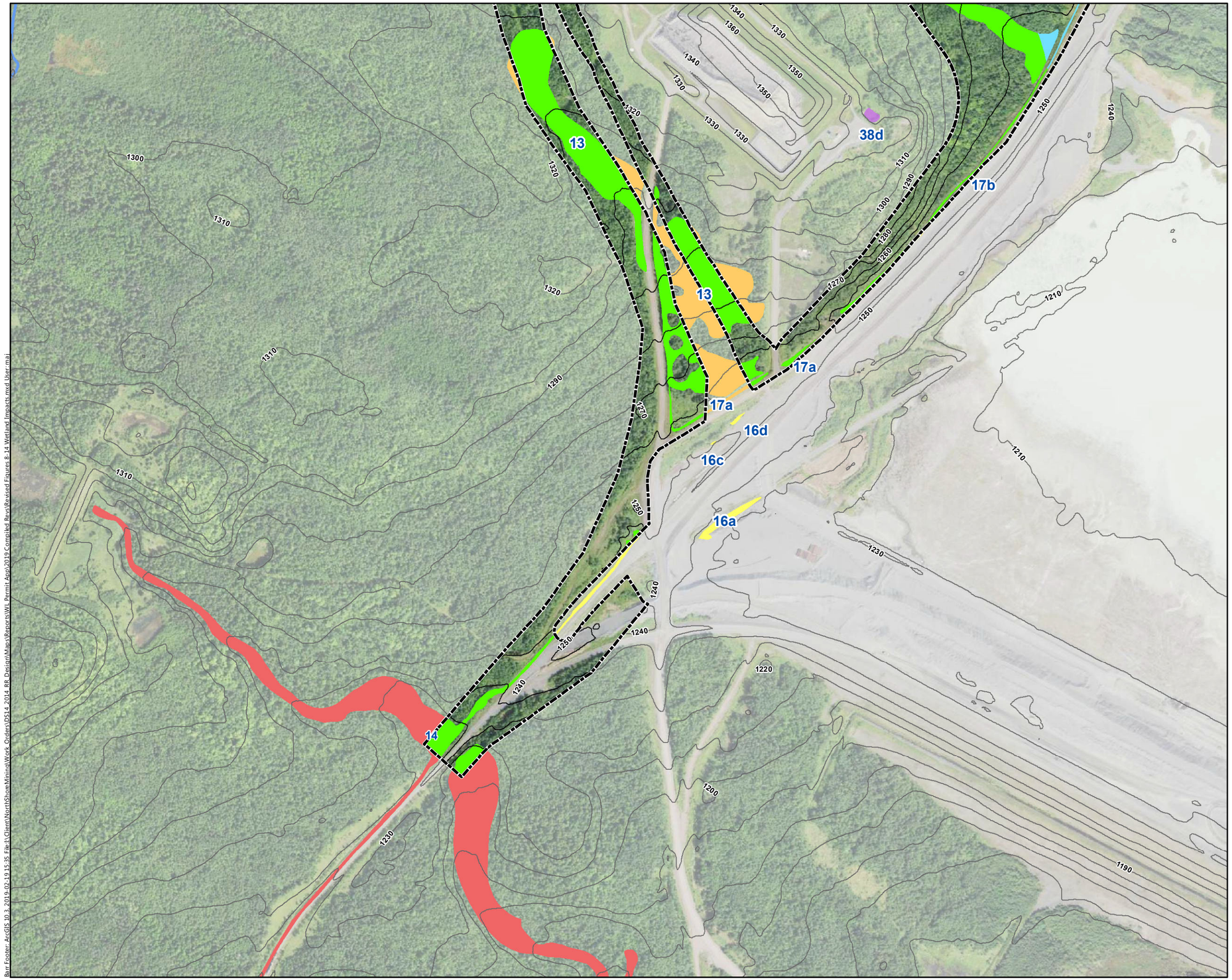
Feet

Aerial Imagery: FSA (2017)

Revised Figure 7

WETLAND OVERVIEW
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Barr Footer ArcGIS 10.3, 2018-09-17 16:29, File:N:\Client\NorthShoreMining\Work Orders\DS14_2014_RR Design\Maps\Reports\WL Permit App\Feb 2018 Rev Figures\Revised Figure 7 Wetland Overview.mxd User: maj



Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands
10-ft Contours

Unaffected Waters

Wetlands
Stream

Indirect Impacts

Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams

N

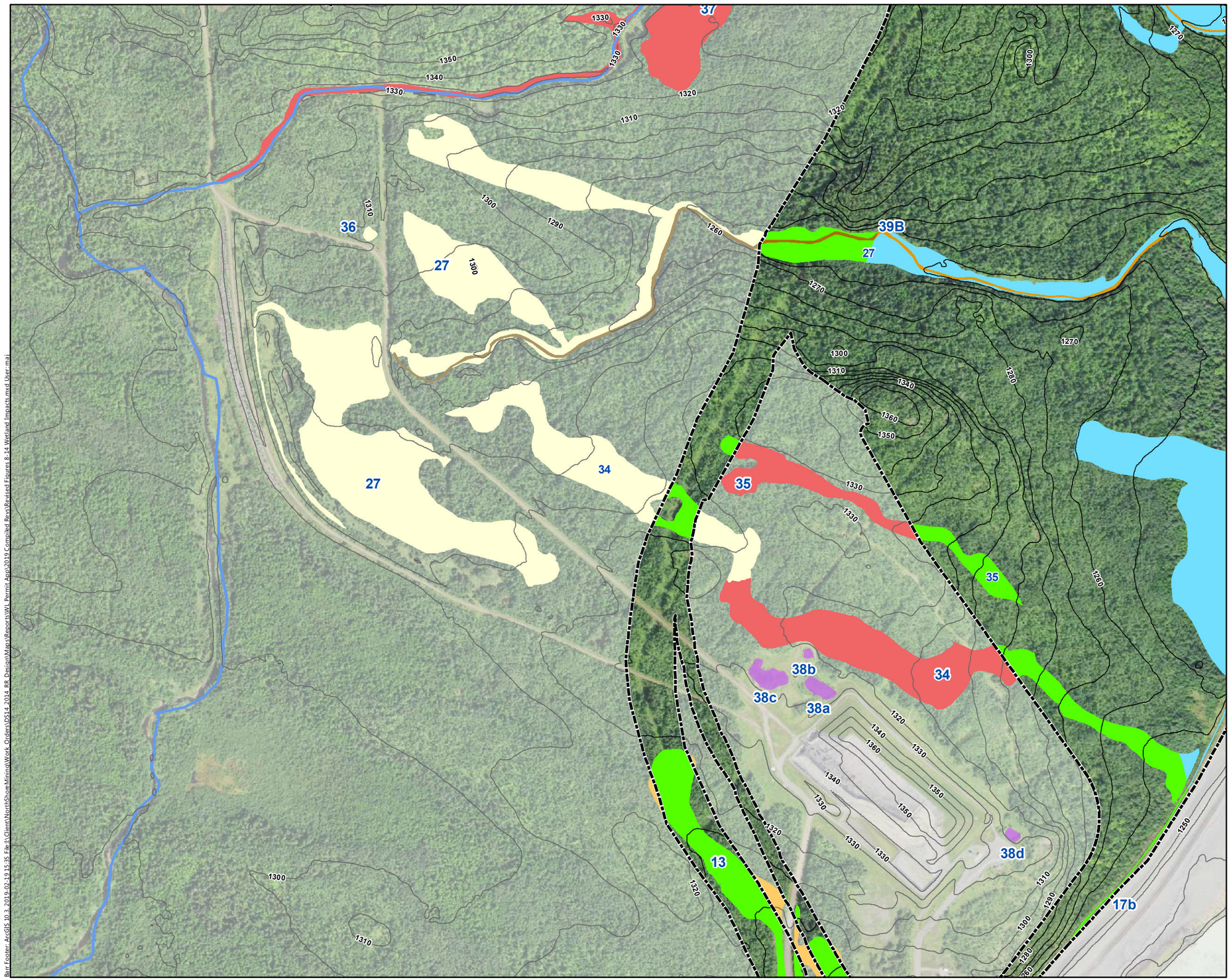
0 250 500 1,000

Feet

Aerial Imagery: FSA 2017
Contours: MN DNR 2011 LiDAR

Revised
Figure 8
WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2019-02-19 15:35 File:N:\Client\NorthShoreMining\Work_Orders\0514_2014_RR_Design\Maps\Reports\WI_Permit App\2019 Compiled Revs\Revised Figures 8-14 Wetland Impacts.mxd User: maj



Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands
10-ft Contours

Unaffected Waters
Wetlands
Stream

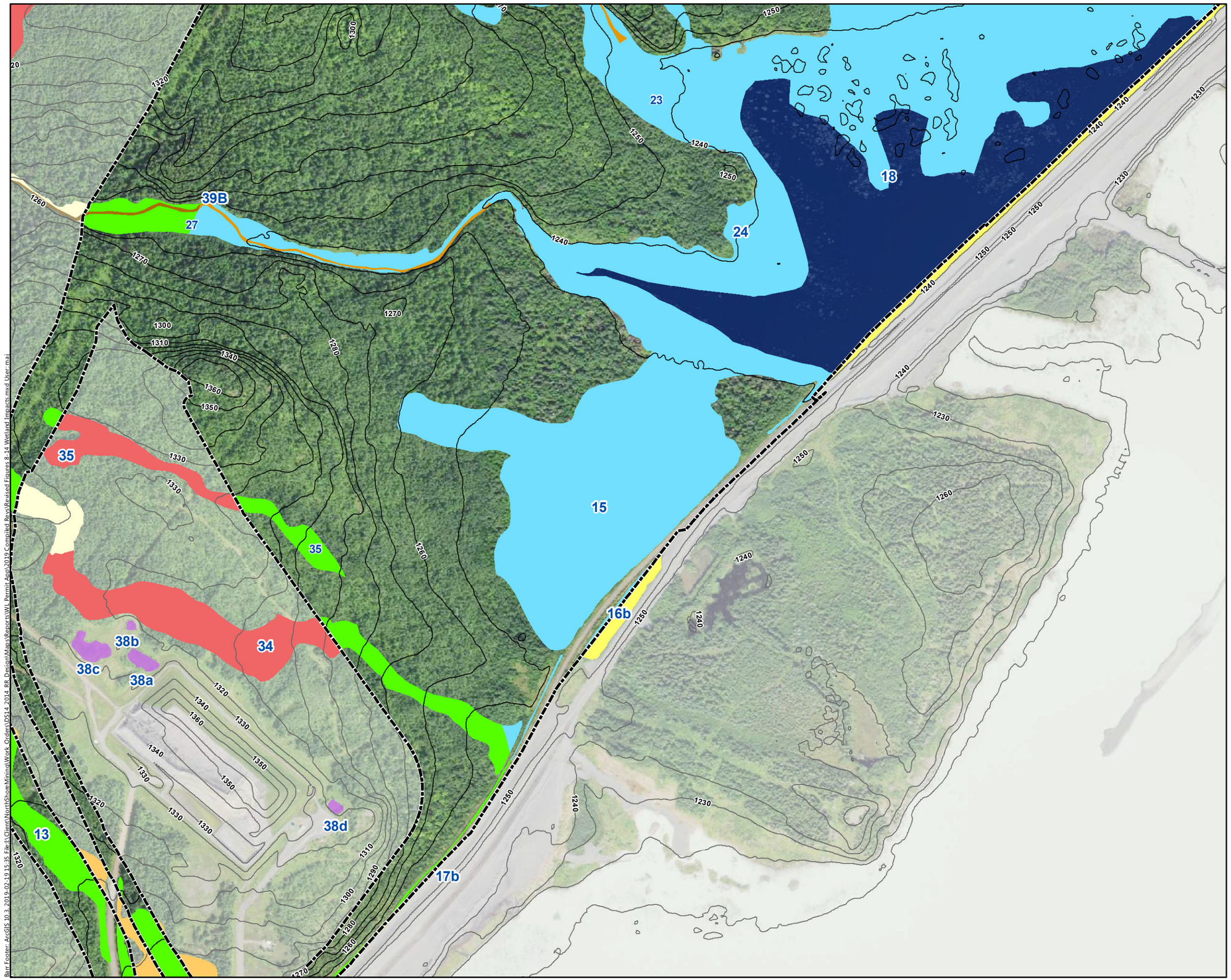
Indirect Impacts
Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts
Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams

0 250 500 1,000
Feet

Aerial Imagery: FSA 2017
Contours: MN DNR 2011 LiDAR

Revised
Figure 9
WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands
10-ft Contours

Unaffected Waters
Wetlands
Stream

Indirect Impacts
Stream
Impoundment Wetlands
Fragmentation Wetlands

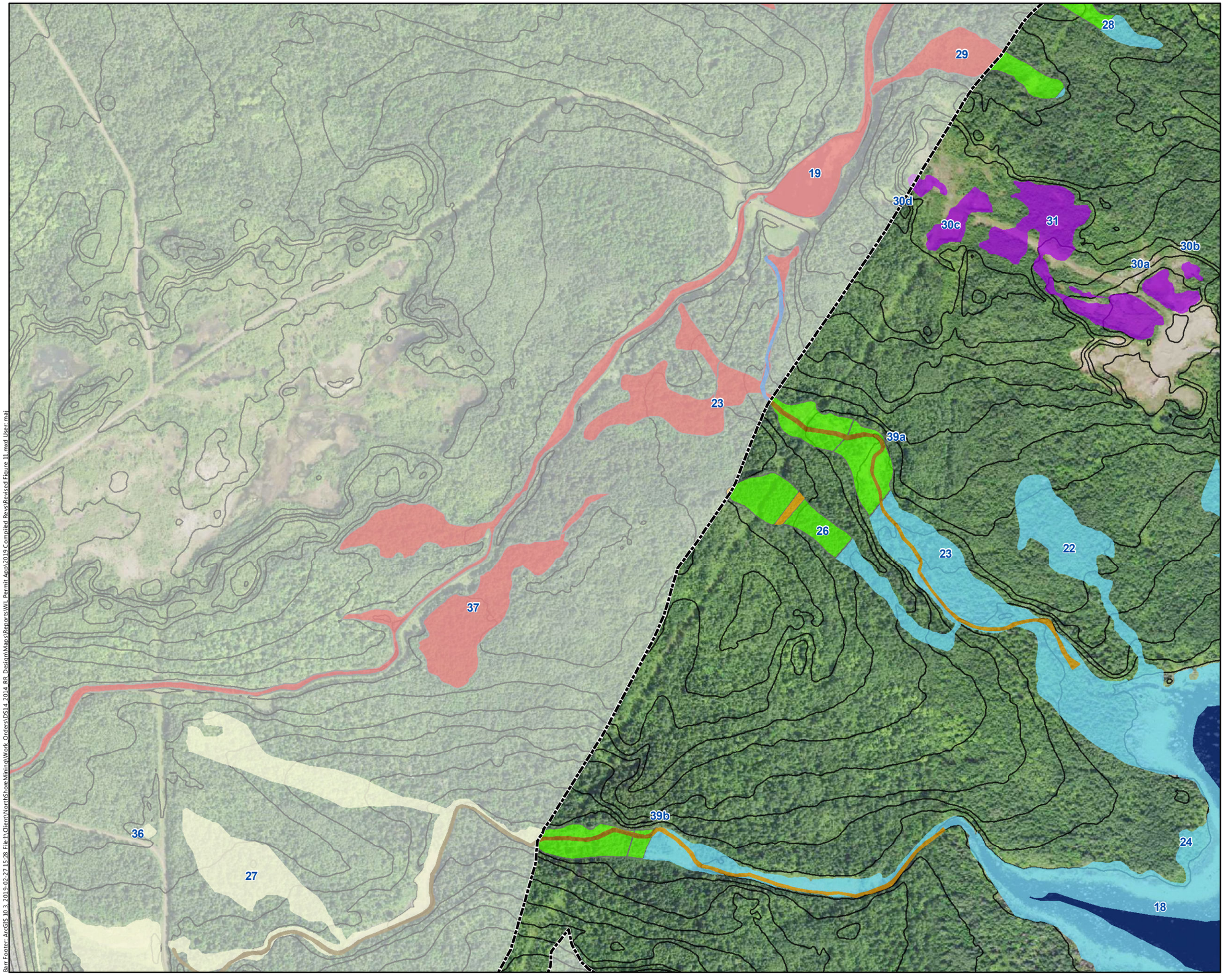
Direct Impacts
Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams

N

0 250 500 1,000
Feet

Aerial Imagery: FSA 2017
Contours: MN DNR 2011 LiDAR

Revised
Figure 10
WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



Project Area
Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands

Unaffected Waters

Wetlands
Stream

Indirect Impacts

Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams
10-ft Contours

0 250 500 1,000

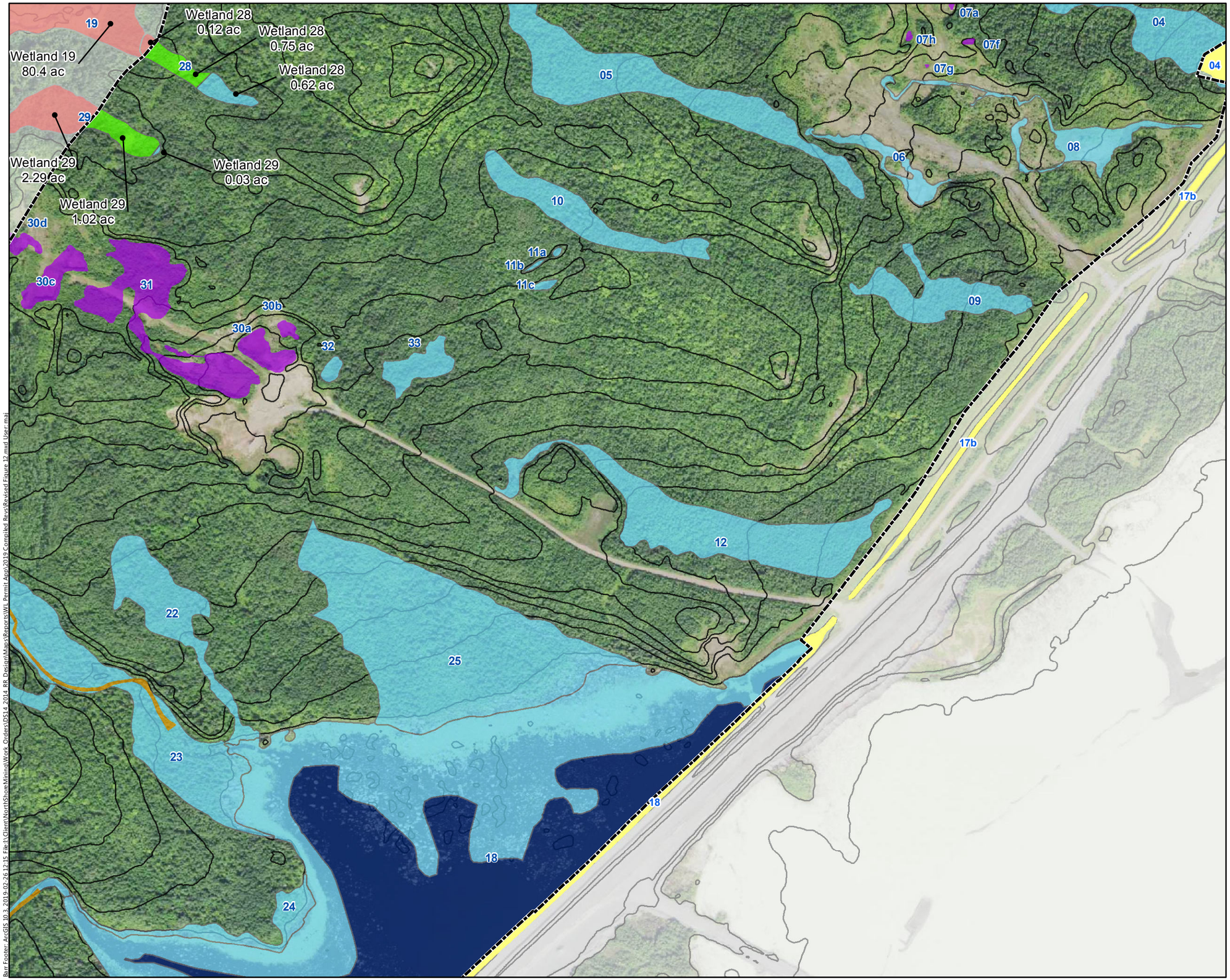
Feet

Aerial Imagery: FSA (2017)

Revised Figure 11

WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Barr Foster; ArcGIS 10.3; 2019-02-27 15:28 File:\\Client\NorthShoreMining\Work_Orders\0514_2014_RR_Design\Maps\Reports\WI_Permit App\2019 Compiled Revs\Revised Figure 11.mxd User: mai



Project Area
Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands

Unaffected Waters
Wetlands
Stream

Indirect Impacts
Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts
Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams
10-ft Contours

N

0 250 500 1,000
Feet

Aerial Imagery: FSA (2017)

Revised Figure 12

WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

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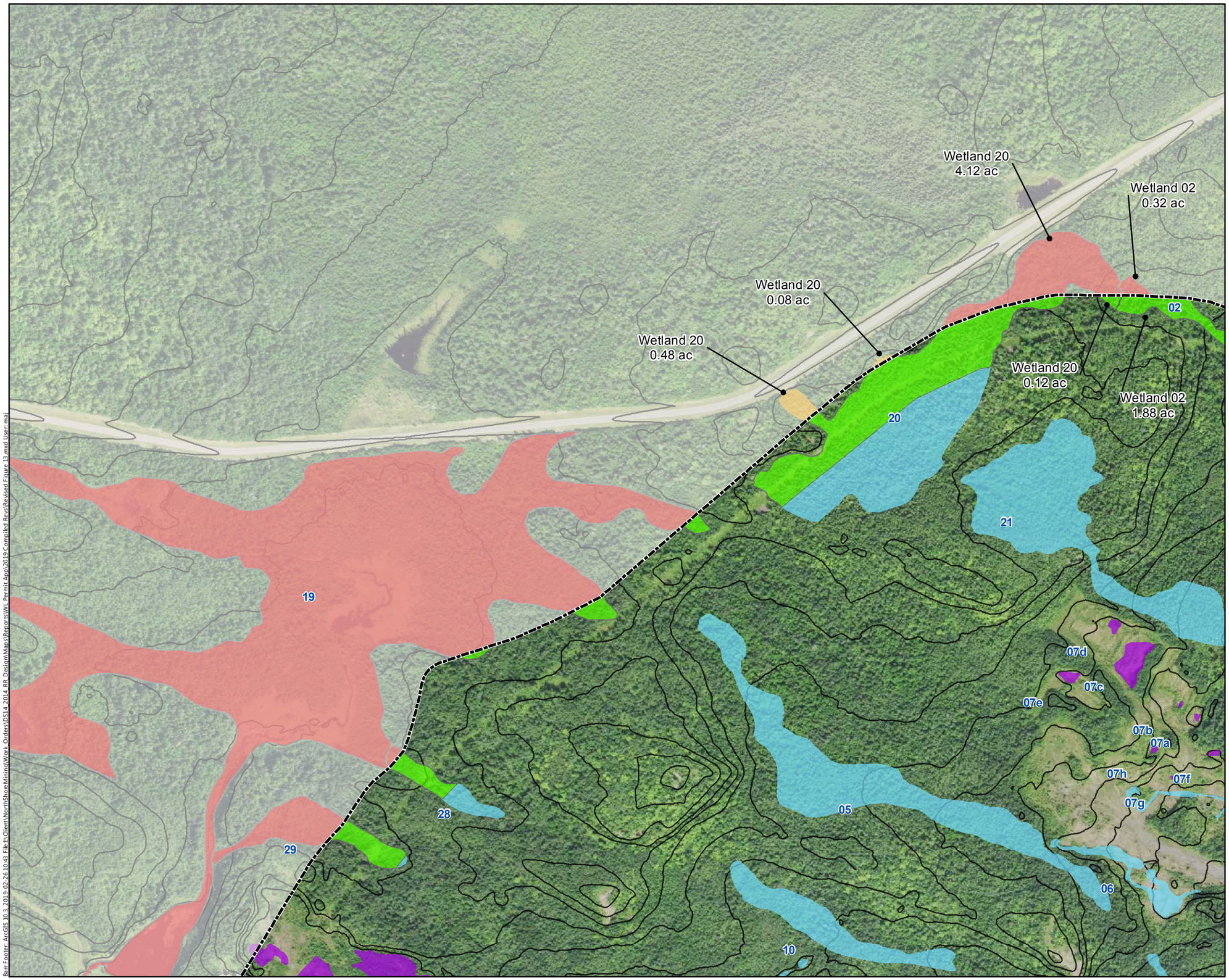


Project Area
Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands

Unaffected Waters
Wetlands
Stream

Indirect Impacts
Stream
Impoundment Wetlands
Fragmentation Wetlands

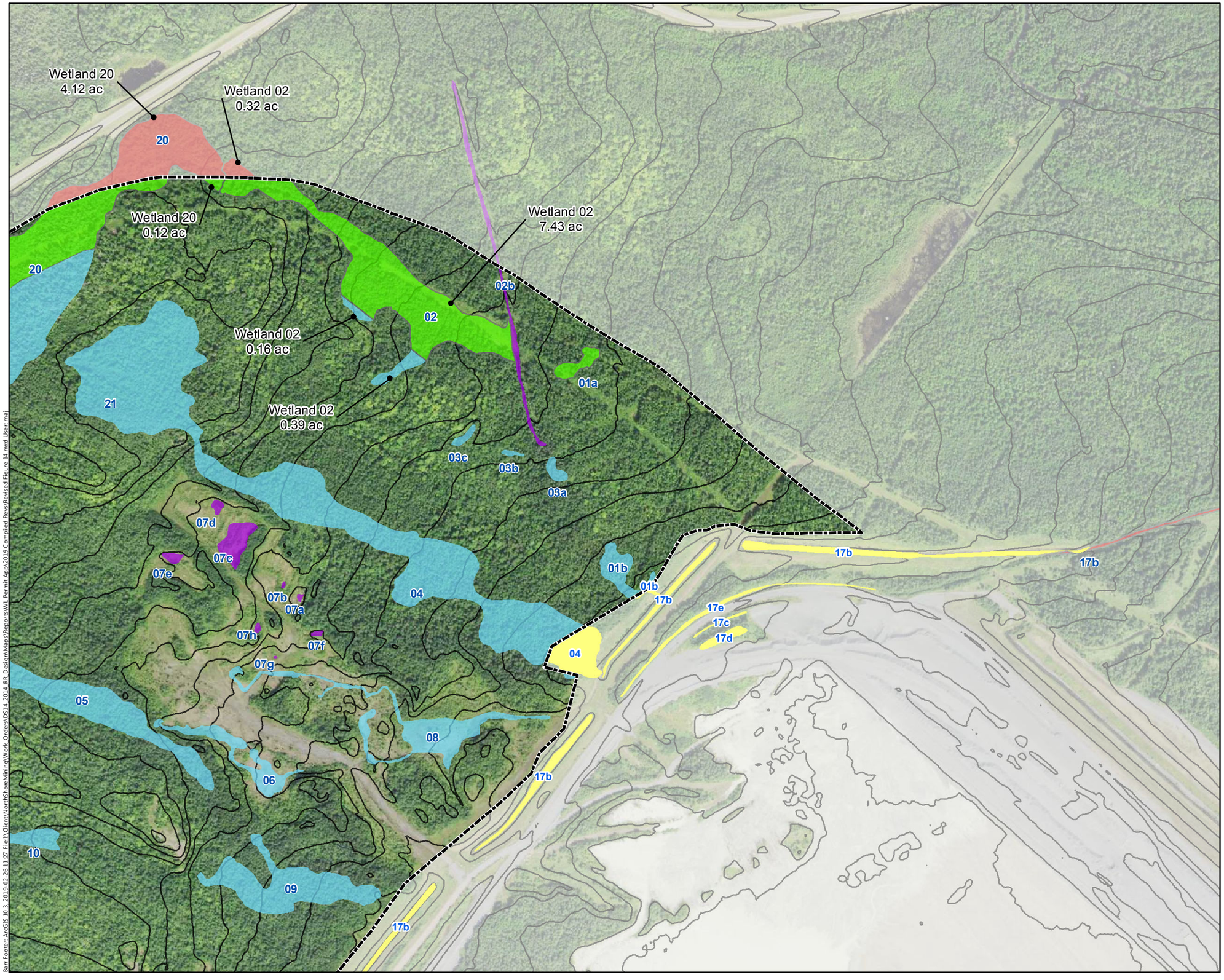
Direct Impacts
Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams
10-ft Contours

0 250 500 1,000
Feet

Aerial Imagery: FSA (2017)

Revised Figure 13

WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



Project Area
Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands

Unaffected Waters

Wetlands
Stream

Indirect Impacts

Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams
10-ft Contours

0 250 500 1,000
Feet

Aerial Imagery: FSA (2017)

Revised Figure 14

WETLAND IMPACT DETAILS
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

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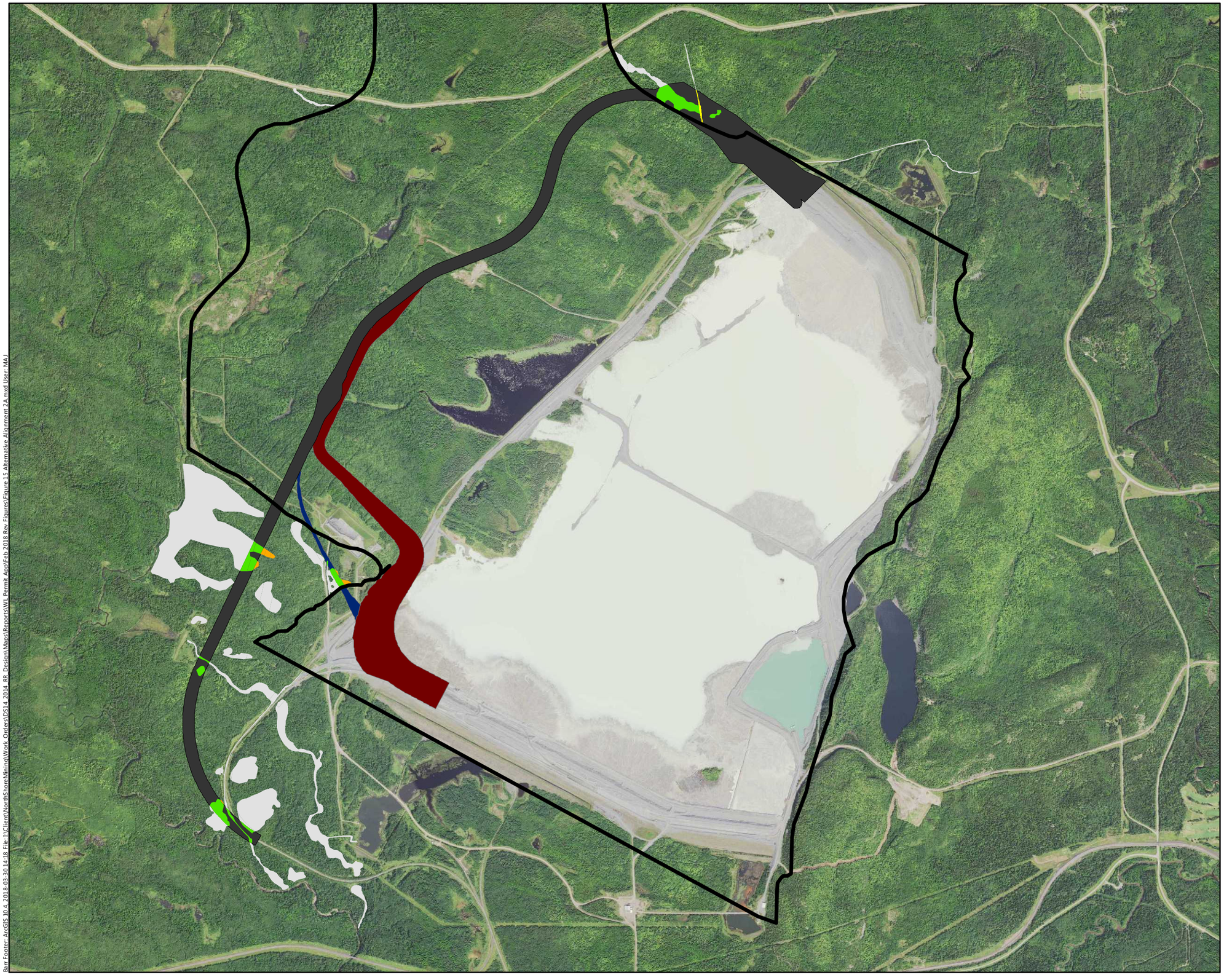


EIS Boundary
Railroad Construction Extents
Isolation dam footprint
Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands
Embankment: Indirect Non-Jurisdictional
Embankment: Indirect Jurisdictional
Embankment: Direct Jurisdictional
Tailings Basin: Direct Jurisdictional
Embankment: Direct Non-Jurisdictional
Tailings Basin: Direct Non-Jurisdictional

0 1,000 2,000 4,000
Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 15

ALTERNATIVE ALIGNMENT 2A
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

EIS Boundary
Railroad Construction Extents
Isolation dam footprint
Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands
Embankment: Indirect Non-Jurisdictional
Embankment: Indirect Jurisdictional
Embankment: Direct Jurisdictional
Tailings Basin: Direct Jurisdictional
Embankment: Direct Non-Jurisdictional
Tailings Basin: Direct Non-Jurisdictional

0 1,000 2,000 4,000
Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 16

ALTERNATIVE ALIGNMENT 2D
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

EIS Boundary
Railroad Construction Extents
Isolation dam footprint
Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands
Embankment: Indirect Non-Jurisdictional
Embankment: Indirect Jurisdictional
Embankment: Direct Jurisdictional
Tailings Basin: Direct Jurisdictional
Embankment: Direct Non-Jurisdictional
Tailings Basin: Direct Non-Jurisdictional

N

0 1,000 2,000 4,000
Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 17

ALTERNATIVE ALIGNMENT 3A
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

EIS Boundary
Railroad Construction Extents
Isolation dam footprint
Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands
Embankment: Indirect Non-Jurisdictional
Embankment: Indirect Jurisdictional
Embankment: Direct Jurisdictional
Tailings Basin: Direct Jurisdictional
Embankment: Direct Non-Jurisdictional
Tailings Basin: Direct Non-Jurisdictional

N

0 1,000 2,000 4,000
Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 18

ALTERNATIVE ALIGNMENT 3D
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

EIS Boundary

Railroad Construction Extents

Isolation dam footprint

Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands

Embankment: Indirect Non-Jurisdictional

Embankment: Indirect Jurisdictional

Embankment: Direct Jurisdictional

Tailings Basin: Direct Jurisdictional

Embankment: Direct Non-Jurisdictional

Tailings Basin: Direct Non-Jurisdictional

N

0 1,000 2,000 4,000

Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 19

ALTERNATIVE ALIGNMENT 4A
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

EIS Boundary

Railroad Construction Extents

Isolation dam footprint

Swithback footprint

Impacted Wetlands Outside the EIS Boundary

Non-Impacted Wetlands

Embankment: Indirect Non-Jurisdictional

Embankment: Indirect Jurisdictional

Embankment: Direct Jurisdictional

Tailings Basin: Direct Jurisdictional

Embankment: Direct Non-Jurisdictional

Tailings Basin: Direct Non-Jurisdictional

N

0 1,000 2,000 4,000

Feet

Aerial Imagery: FSA (2017)
Contours: MN DNR 2011 LiDAR

Figure 20

ALTERNATIVE ALIGNMENT 4D
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

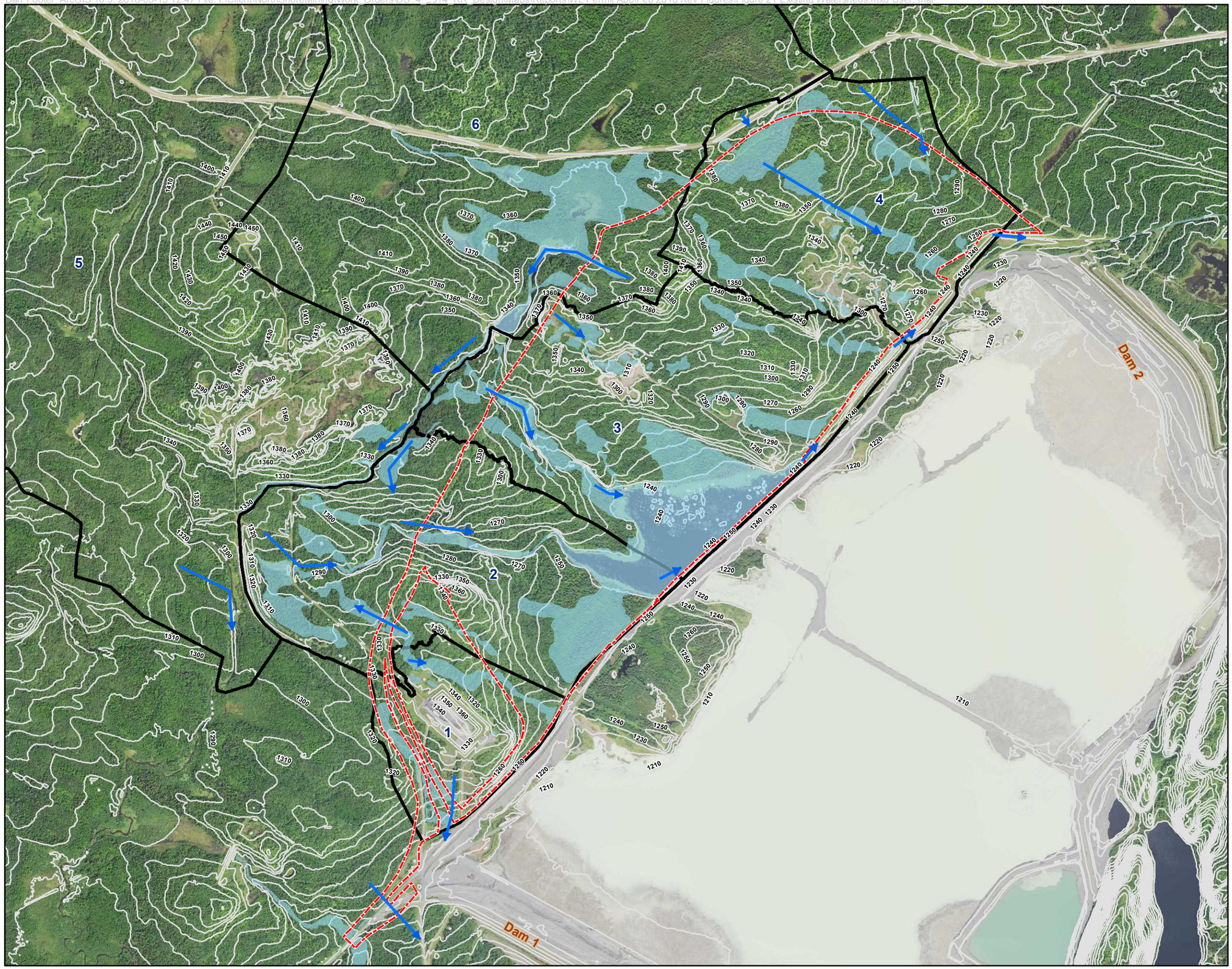
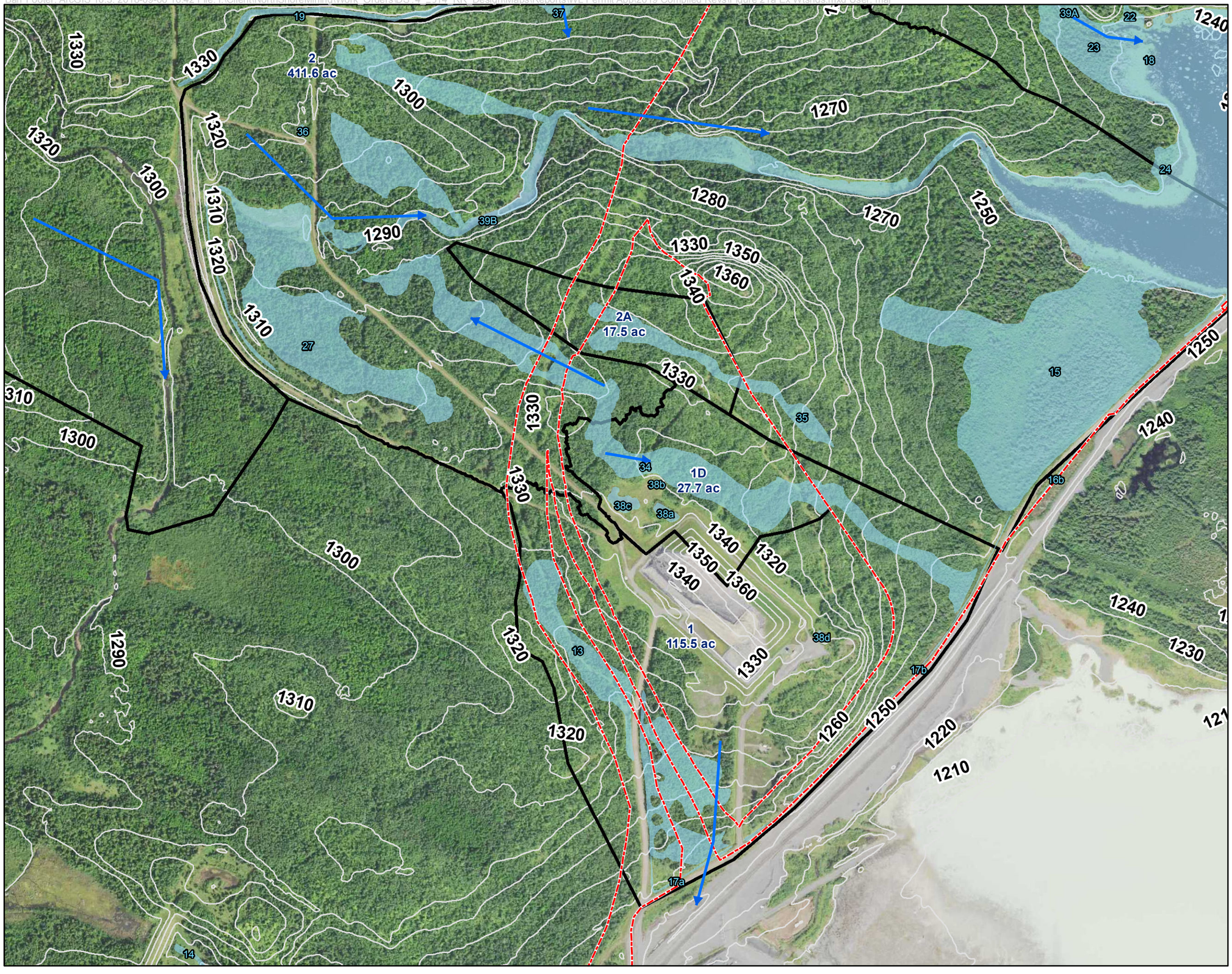


Figure 21
Existing Conditions Watersheds and Wetlands

West Ridge Proposed Railroad Realignment and Tailings Basin Progression
Northshore Mining Company
Lake County, MN



Existing Flow
Project Area
Wetlands
Existing Watersheds - 1
10 ft Contours

N

600 0 600
Feet

Figure 21a
Existing Conditions Watersheds and Wetlands

West Ridge Proposed Railroad Realignment and Tailings Basin Progression
Northshore Mining Company
Lake County, MN

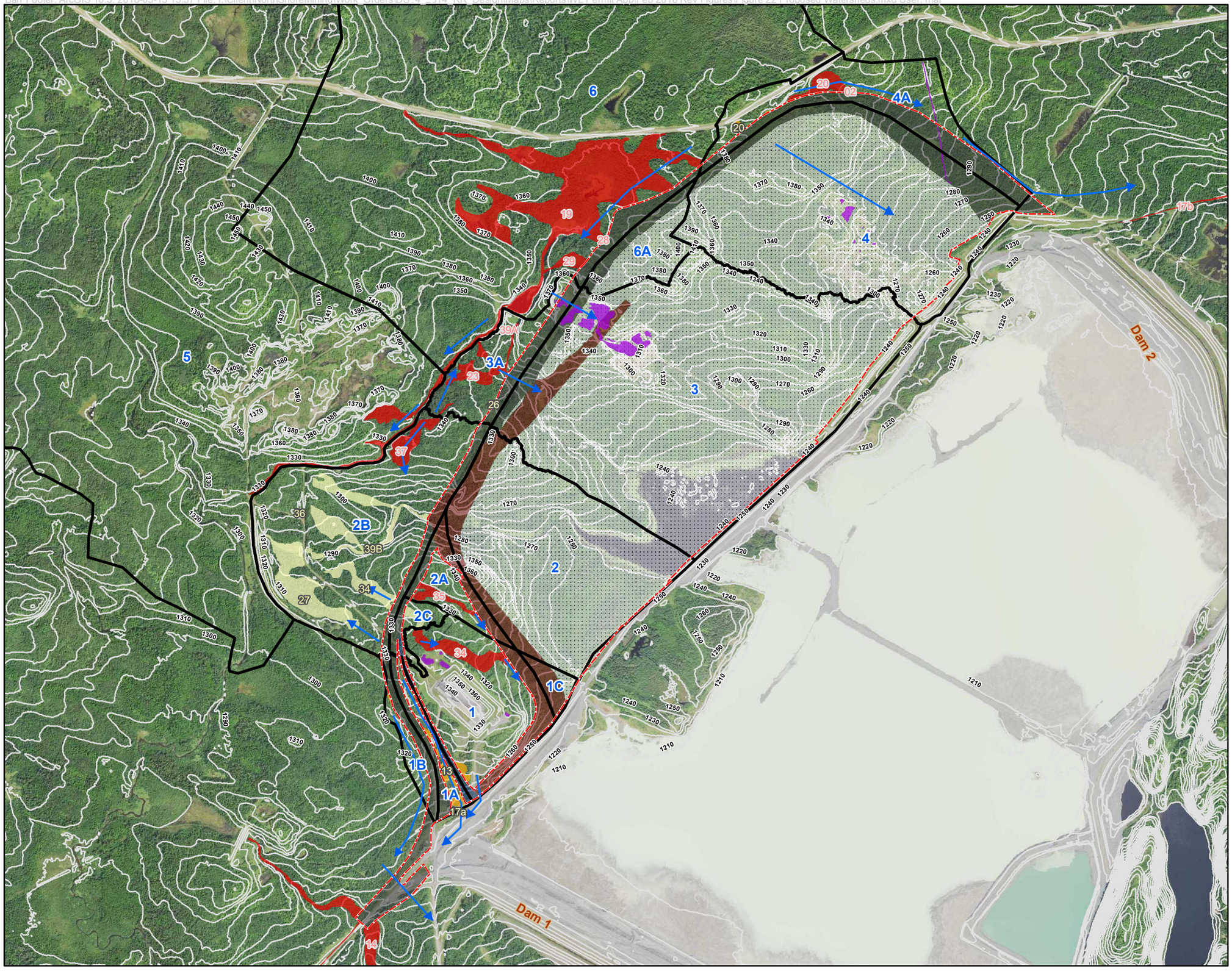
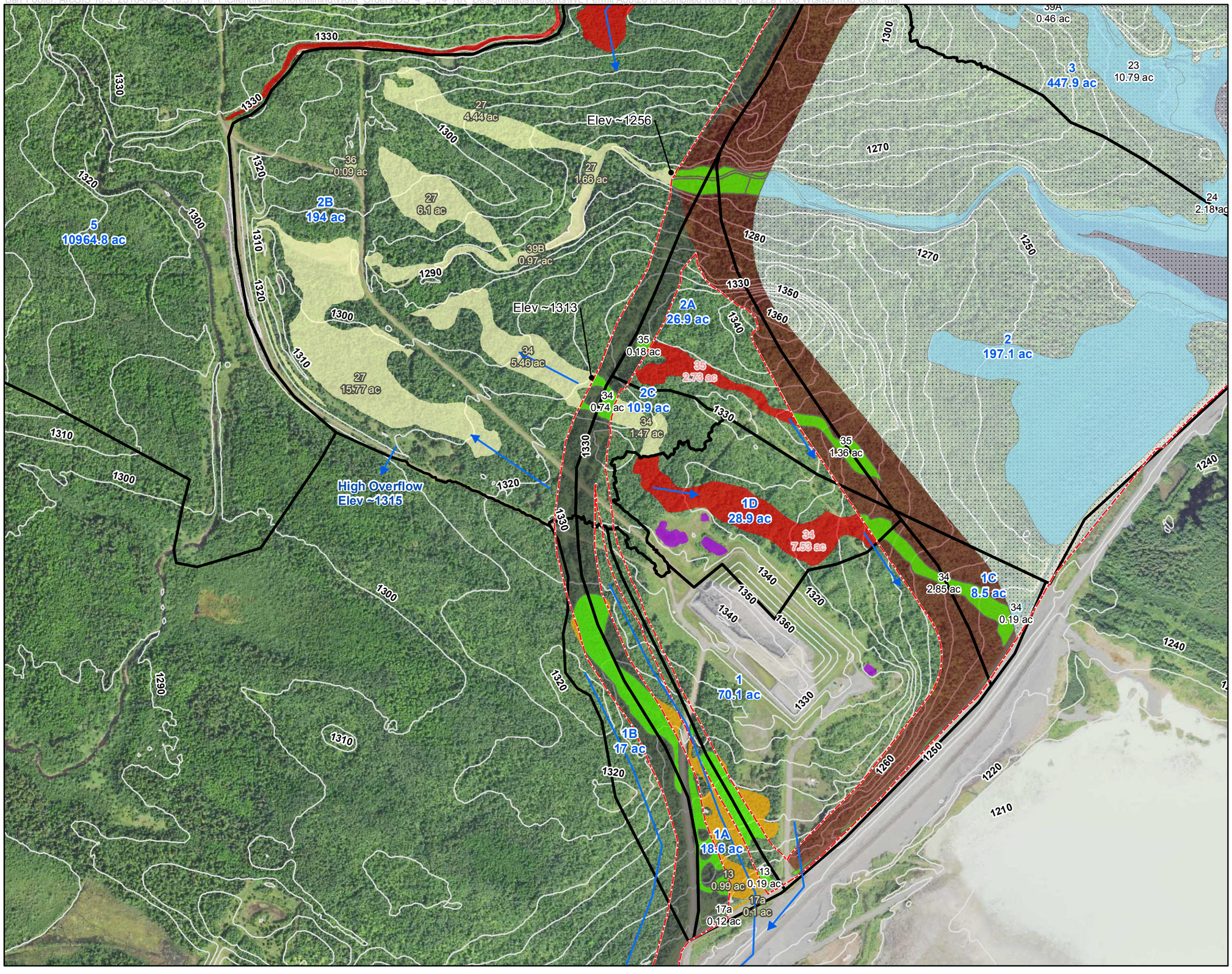


Figure 22
Proposed Conditions Watersheds
and Potential Indirect Wetland Impacts

West Ridge Proposed Railroad
Relocation and Tailings Basin
Progression
Northshore Mining Company
Lake County, MN



- Proposed Flow
- Project Area
- Proposed Watersheds 1A
- Unaffected Wetlands
- Impoundment
- Fragmentation
- Nonjurisdictional Wetlands

Project Features

- Dam 1 Extension
- Dam 1 Rail Switchback
- Railroad Embankment
- Tailings Basin Progression
- 10 ft Contours

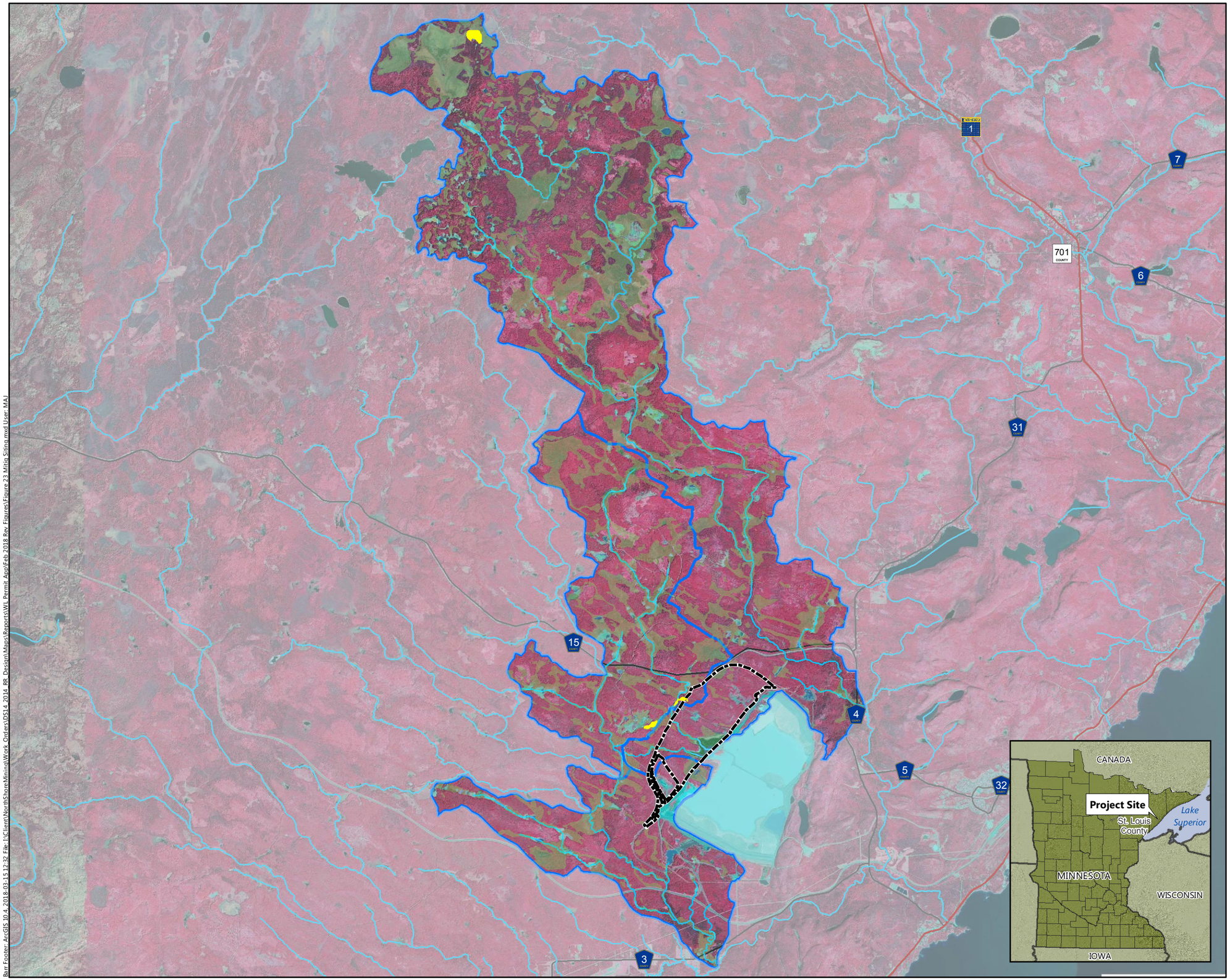
N

600 0 600

Feet

Figure 22a
Proposed Conditions Watersheds
and Potential Indirect Wetland Impacts

West Ridge Proposed Railroad
Relocation and Tailings Basin
Progression
Northshore Mining Company
Lake County, MN



Project Area

Project Minor Watersheds

BWSR Potential Mitigation Sites

Method

- Drained Wetlands
- Farmed Wetlands
- Gravel Pit
- Partially Drained Wetlands
- White Cedar

NWI Updated 2016

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Public Water Inventory (PWI) Watercourse

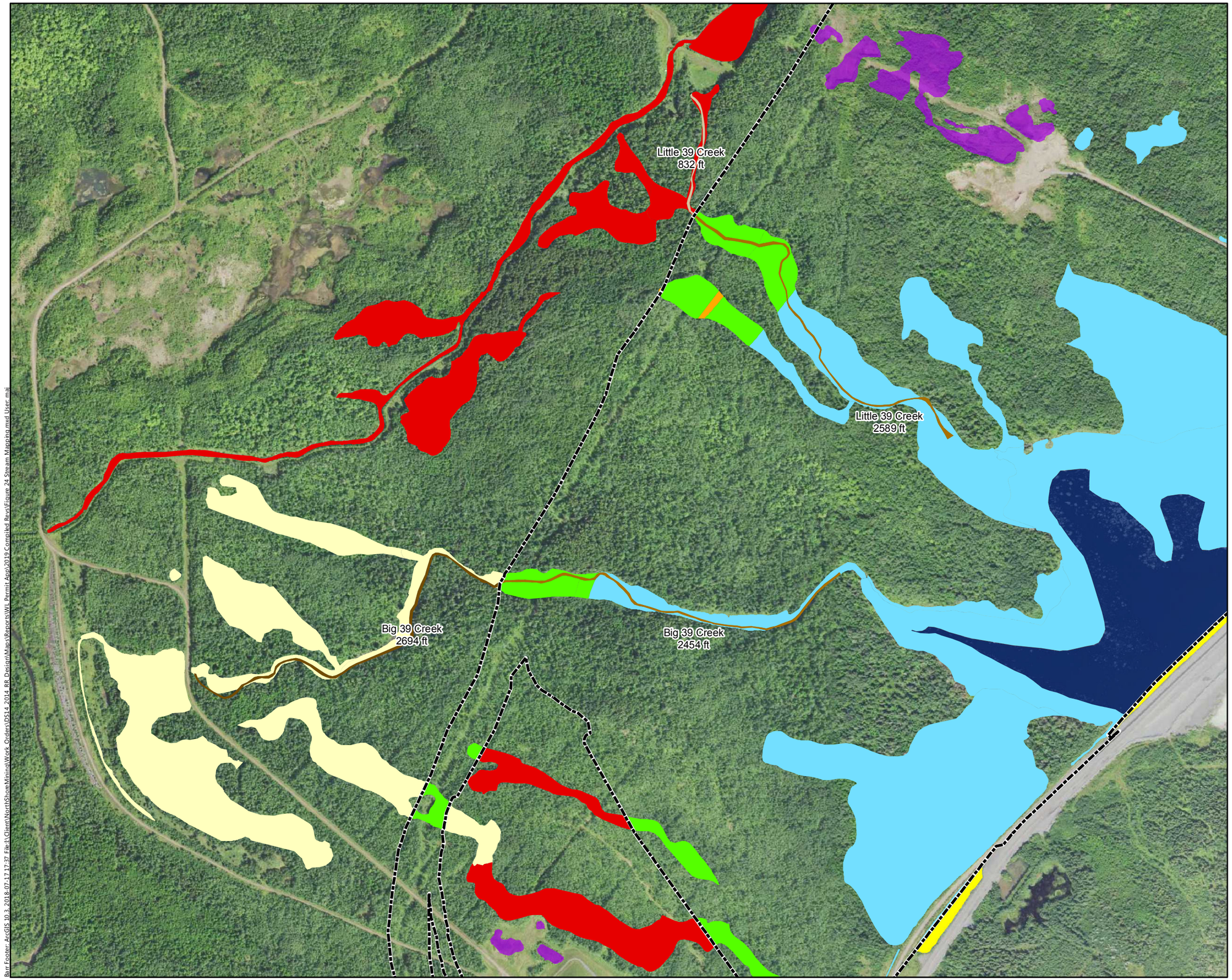
1.5 0.75 0 1.5

Miles

Figure 23

MINOR WATERSHED WETLAND MITIGATION SITING

West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



RefName

- Project Area
- Deepwater Impacts
- Previously Permitted Wetlands
- Nonjurisdictional Wetlands

Unaffected Wetlands

- Unaffected Wetlands
- Stream

Indirect Wetland Impacts

- Stream
- Impoundment
- Fragmentation

Direct Wetland Impacts

- Railroad and Dams
- Streams
- Tailings Basin Progression

0 300 600 1,200

Feet

Aerial Imagery: FSA (2017)

Figure 24

STREAM HABITAT IMPACTS
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Appendices

Appendix A

Joint Application Form for Activities Affecting Water Resources in Minnesota

Joint Application Form for Activities Affecting Water Resources in Minnesota

This joint application form is the accepted means for initiating review of proposals that may affect a water resource (wetland, tributary, lake, etc.) in the State of Minnesota under state and federal regulatory programs. Applicants for Minnesota Department of Natural Resources (DNR) Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. Applicants can use the information entered into MPARS to substitute for completing parts of this joint application form (see the paragraph on MPARS at the end of the joint application form instructions for additional information). This form is only applicable to the water resource aspects of proposed projects under state and federal regulatory programs; other local applications and approvals may be required. Depending on the nature of the project and the location and type of water resources impacted, multiple authorizations may be required as different regulatory programs have different types of jurisdiction over different types of resources.

Regulatory Review Structure

Federal

The St. Paul District of the U.S. Army Corps of Engineers (Corps) is the federal agency that regulates discharges of dredged or fill material into waters of the United States (wetlands, tributaries, lakes, etc.) under Section 404 of the Clean Water Act (CWA) and regulates work in navigable waters under Section 10 of the Rivers and Harbors Act. Applications are assigned to Corps project managers who are responsible for implementing the Corps regulatory program within a particular geographic area.

State

There are three state regulatory programs that regulate activities affecting water resources. The Wetland Conservation Act (WCA) regulates most activities affecting wetlands. It is administered by local government units (LGUs) which can be counties, townships, cities, watershed districts, watershed management organizations or state agencies (on state-owned land). The Minnesota DNR Division of Ecological and Water Resources issues permits for work in specially-designated public waters via the Public Waters Work Permit Program (DNR Public Waters Permits). The Minnesota Pollution Control Agency (MPCA) under Section 401 of the Clean Water Act certifies that discharges of dredged or fill material authorized by a federal permit or license comply with state water quality standards. One or more of these regulatory programs may be applicable to any one project.

Required Information

Prior to submitting an application, applicants are **strongly encouraged** to seek input from the Corps Project Manager and LGU staff to identify regulatory issues and required application materials for their proposed project. Project proponents can request a pre-application consultation with the Corps and LGU to discuss their proposed project by providing the information required in Sections 1 through 5 of this joint application form to facilitate a meaningful discussion about their project. Many LGUs provide a venue (such as regularly scheduled technical evaluation panel meetings) for potential applicants to discuss their projects with multiple agencies prior to submitting an application. Contact information is provided below.

The following bullets outline the information generally required for several common types of determinations/authorizations.

- For delineation approvals and/or jurisdictional determinations, submit Parts 1, 2 and 5, and Attachment A.
- For activities involving CWA/WCA exemptions, WCA no-loss determinations, and activities not requiring mitigation, submit Parts 1 through 5, and Attachment B.
- For activities requiring compensatory mitigation/replacement plan, submit Parts 1 thru 5, and Attachments C and D.
- For local road authority activities that qualify for the state's local road wetland replacement program, submit Parts 1 through 5, and Attachments C, D (if applicable), and E to both the Corps and the LGU.

Submission Instructions

Send the completed joint application form and all required attachments to:

U.S Army Corps of Engineers. Applications may be sent directly to the appropriate Corps Office. For a current listing of areas of responsibilities and contact information, visit the St. Paul District's website at: http://www.mvp.usace.army.mil/Missions/Regulatory.aspx and select "Minnesota" from the contact Information box. Alternatively, applications may be sent directly to the St. Paul District Headquarters and the Corps will forward them to the appropriate field office.

Section 401 Water Quality Certification: Applicants do not need to submit the joint application form to the MPCA unless specifically requested. The MPCA will request a copy of the completed joint application form directly from an applicant when they determine an individual 401 water quality certification is required for a proposed project.

Wetland Conservation Act Local Government Unit: Send to the appropriate Local Government Unit. If necessary, contact your county Soil and Water Conservation District (SWCD) office or visit the Board of Water and Soil Resources (BWSR) web site (www.bwsr.state.mn.us) to determine the appropriate LGU.

DNR Public Waters Permitting: In 2014 the DNR will begin using the Minnesota DNR Permitting and Reporting System (MPARS) for submission of Public Waters permit applications (https://webapps11.dnr.state.mn.us/mpars/public/authentication/login). Applicants for Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. To avoid duplication and to streamline the application process among the various resource agencies, applicants can use the information entered into MPARS to substitute for completing parts of this joint application form. The MPARS print/save function will provide the applicant with a copy of the Public Waters permit application which, at a minimum, will satisfy Parts one and two of this joint application. For certain types of activities, the MPARS application may also provide all of the necessary information required under Parts three and four of the joint application. However, it is the responsibility of the Applicant to make sure that the joint application contains all of the required information, including identification of all aquatic resources impacted by the project (see Part four of the joint application). After confirming that the MPARS application contains all of the required information in Parts one and two the Applicant may attach a copy to the joint application and fill in any missing information in the remainder of the joint application.

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name: Northshore Mining Company, c/o Andrea Hayden
Mailing Address: 10 Outer Drive, Silver Bay, MN 55614-1499
Phone: (218) 226-6032
E-mail Address: Andrea.hayden@cliffsnr.com

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name: Barr Engineering, c/o Mark Jacobson
Mailing Address: 4300 MarketPointe Drive, Suite 200, Minneapolis, MN 55435
Phone: (952) 832-2764
E-mail Address: mjacobson@barr.com

PART TWO: Site Location Information

County: Lake **City/Township:** NA
Parcel ID and/or Address: Milepost 7 Tailings Basin west of Silver Bay, MN
Legal Description (Section, Township, Range): Sections 20, 21, 27-32,Township 56, Range 8; and Section 6, Township 55, Range 8
Lat/Long (decimal degrees): Lat 47.291667, Long 91.375 (approximate project center)
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): ~1,082 acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted ***prior to*** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

See Sections 1 and 2 of the associated report.

PART FOUR: Aquatic Resource Impact[1] Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	**Aquatic Resource Type** (wetland, lake, tributary etc.)	**Type of Impact** (fill, excavate, drain, or remove vegetation)	**Duration of Impact** Permanent (P) or Temporary (T)[1]	**Size of Impact**[2]	**Overall Size of Aquatic Resource** [3]	**Existing Plant Community Type(s)** in Impact Area[4]	**County, Major Watershed #, and Bank Service Area #** of Impact Area[5]

[1]If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".
[2]Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).
[3]This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".
[4]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.
[5]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

The Aquatic Resource Impact Summary is included as Tables 3a (Wetland Conservation Act) and 3b (Section 404 Clean Water Act) in associated report.

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: _____ Date: 6/18/2018

I hereby authorize Barr Engineering to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

[1] **The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.**

Attachment C
Avoidance and Minimization

Project Purpose, Need, and Requirements. Clearly state the purpose of your project and need for your project. Also include a description of any specific requirements of the project as they relate to project location, project footprint, water management, and any other applicable requirements. Attach an overhead plan sheet showing all relevant features of the project (buildings, roads, etc.), aquatic resource features (impact areas noted) and construction details (grading plans, storm water management plans, etc.), referencing these as necessary:

Please see Section 2 of attached supporting report.

Avoidance. Both the CWA and the WCA require that impacts to aquatic resources be avoided if practicable alternatives exist. Clearly describe all on-site measures considered to avoid impacts to aquatic resources and discuss at least two project alternatives that avoid all impacts to aquatic resources on the site. These alternatives may include alternative site plans, alternate sites, and/or not doing the project. Alternatives should be feasible and prudent (see MN Rules 8420.0520 Subp. 2 C). Applicants are encouraged to attach drawings and plans to support their analysis:

Please see Section 3 of attached supporting report.

Minimization. Both the CWA and the WCA require that all unavoidable impacts to aquatic resources be minimized to the greatest extent practicable. Discuss all features of the proposed project that have been modified to minimize the impacts to water resources (see MN Rules 8420.0520 Subp. 4):

Please see Section 3 of attached supporting report.

Off-Site Alternatives. An off-site alternatives analysis is not required for all permit applications. If you know that your proposal will require an individual permit (standard permit or letter of permission) from the U.S. Army Corps of Engineers, you may be required to provide an off-site alternatives analysis. The alternatives analysis is not required for a complete application but must be provided during the review process in order for the Corps to complete the evaluation of your application and reach a final decision. Applicants with questions about when an off-site alternatives analysis is required should contact their Corps Project Manager.

The project site was originally designed and constructed in the 1980s, and has been in continuous operation since then. The project is a progression of the existing railroad and tailings basin. Therefore, there is no off-site alternative. Please see attached supporting report.

Attachment D
Replacement/Compensatory Mitigation

Complete this part ***if*** your application involves wetland replacement/compensatory mitigation not associated with the local road wetland replacement program. Applicants should consult Corps mitigation guidelines and WCA rules for requirements.

Replacement/Compensatory Mitigation via Wetland Banking. Complete this section if you are proposing to use credits from an existing wetland bank (with an account number in the State wetland banking system) for all or part of your replacement/compensatory mitigation requirements.

Wetland Bank Account #	County	Major Watershed #	Bank Service Area #	Credit Type (if applicable)	Number of Credits
S7700-1609	St. Louis	3-St. Louis R.	1		264.27

Applicants should attach documentation indicating that they have contacted the wetland bank account owner and reached at least a tentative agreement to utilize the identified credits for the project. This documentation could be a signed purchase agreement, signed application for withdrawal of credits or some other correspondence indicating an agreement between the applicant and the bank owner. *However, applicants are advised not to enter into a binding agreement to purchase credits until the mitigation plan is approved by the Corps and LGU.*

Project-Specific Replacement/Permittee Responsible Mitigation. Complete this section if you are proposing to pursue actions (restoration, creation, preservation, etc.) to generate wetland replacement/compensatory mitigation credits for this proposed project.

WCA Action Eligible for Credit[1]	Corps Mitigation Compensation Technique[2]	Acres	Credit % Requested	Credits Anticipated[3]	County	Major Watershed #	Bank Service Area #

[1]Refer to the name and subpart number in MN Rule 8420.0526.
[2]Refer to the technique listed in *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota*.
[3]If WCA and Corps crediting differs, then enter both numbers and distinguish which is Corps and which is WCA.

Explain how each proposed action or technique will be completed (e.g. wetland hydrology will be restored by breaking the tile.....) and how the proposal meets the crediting criteria associated with it. Applicants should refer to the Corps mitigation policy language, WCA rule language, and all associated Corps and WCA guidance related to the action or technique:

NA

Attach a site location map, soils map, recent aerial photograph, and any other maps to show the location and other relevant features of each wetland replacement/mitigation site. Discuss in detail existing vegetation, existing landscape features, land use (on and surrounding the site), existing soils, drainage systems (if present), and water sources and movement. Include a topographic map showing key features related to hydrology and water flow (inlets, outlets, ditches, pumps, etc.):

NA

Project Name and/or Number: Northshore Mining Co. West Ridge RR Relocation and Tailings Basin Progression

Attach a map of the existing aquatic resources, associated delineation report, and any documentation of regulatory review or approval. Discuss as necessary:

NA

For actions involving construction activities, attach construction plans and specifications with all relevant details. Discuss and provide documentation of a hydrologic and hydraulic analysis of the site to define existing conditions, predict project outcomes, identify specific project performance standards and avoid adverse offsite impacts. Plans and specifications should be prepared by a licensed engineer following standard engineering practices. Discuss anticipated construction sequence and timing:

NA

For projects involving vegetation restoration, provide a vegetation establishment plan that includes information on site preparation, seed mixes and plant materials, seeding/planting plan (attach seeding/planting zone map), planting/seeding methods, vegetation maintenance, and an anticipated schedule of activities:

NA

For projects involving construction or vegetation restoration, identify and discuss goals and specific outcomes that can be determined for credit allocation. Provide a proposed credit allocation table tied to outcomes:

NA

Provide a five-year monitoring plan to address project outcomes and credit allocation:

NA

Discuss and provide evidence of ownership or rights to conduct wetland replacement/mitigation on each site:

NA

Quantify all proposed wetland credits and compare to wetland impacts to identify a proposed wetland replacement ratio. Discuss how this replacement ratio is consistent with Corps and WCA requirements:

NA

By signature below, the applicant attests to the following (only required if application involves project-specific/permittee responsible replacement):

- All proposed replacement wetlands were not:
  - Previously restored or created under a prior approved replacement plan or permit
  - Drained or filled under an exemption during the previous 10 years
  - Restored with financial assistance from public conservation programs
  - Restored using private funds, other than landowner funds, unless the funds are paid back with interest to the individual or organization that funded the restoration and the individual or organization notifies the local government unit in writing that the restored wetland may be considered for replacement.
- The wetland will be replaced before or concurrent with the actual draining or filling of a wetland.
- An irrevocable bank letter of credit, performance bond, or other acceptable security will be provided to guarantee successful completion of the wetland replacement.
- Within 30 days of either receiving approval of this application or beginning work on the project, I will record the Declaration of Restrictions and Covenants on the deed for the property on which the replacement wetland(s) will be located and submit proof of such recording to the LGU and the Corps.

Applicant or Representative: Andrea Hayden Title: Environmental Manager

Signature: _____ Date: 6/18/2018

Appendix B

WCA and Section 404 Jurisdictional Determination Requests – April 28, 2016

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BARR

Technical Memorandum

To: Colleen Sullivan (MDNR)
From: Barr Engineering Company
Subject: Request for WCA Jurisdictional Review on Northshore Mining Company's West Ridge Railroad Realignment Project
Date: April 28, 2016
Project: 23381049.00
c: Daryl Wierzbinski (USACE)
Lynda Peterson (BWSR)
Andrea Hayden (Northshore Mining Company)

Barr Engineering Company (Barr) has completed a jurisdictional analysis for Northshore Mining Company's (Northshore) West Ridge Railroad Realignment Project (Project) and identified 18 wetlands (totaling 10.4 acres) and one deepwater habitat (37.9 acres) that appear to have non-natural origins, and are likely to be considered incidental under Minnesota's Wetland Conservation Act (WCA). Under WCA, incidental wetlands are not regulated under Chapter 8420, Section 0105, Subpart 2D, provided that sufficient documentation is presented to and approved by the Local Government Unit (LGU) administering the WCA. Barr hereby provides the documentation that the identified aquatic resources discussed herein have non-natural origins, and requests that the Minnesota Department of Natural Resources (MNDNR), as the Local Government Unit (LGU), review these findings and issue a written response. Figures 1 through 6 show the location of the study area and provide some general information regarding the study site, and Figures 7 through 11 detail five areas of interest within the study area. Table 1 summarizes the aquatic resources (wetlands and deepwater habitat) for which Northshore is seeking a jurisdictional review. Appendices A through E provide historical aerial photography of these areas. Appendix F includes site photographs taken during the 2015 wetland survey.

As it is expected that compensatory mitigation will be required for aquatic features that are jurisdictional under either Minnesota's WCA or Section 404 of the Clean Water Act (CWA), this request for a jurisdictional review is only for wetlands and deepwater habitats within the study area that are expected to be non-jurisdictional under both WCA and Section 404. Northshore will not be requesting jurisdictional review for the remaining wetlands in the study area that are expected to be jurisdictional under either or both the WCA or Section 404. On Northshore's behalf, Barr is providing an analogous Jurisdictional Determination request to the U.S. Army Corps of Engineers (USACE), and will provide copies to the regulatory representatives from MDNR and the Minnesota Board of Water and Soil Resources (BWSR).

It is recognized that Barr's jurisdictional analysis is only an estimate, and that the official jurisdictional status of each aquatic resource will be determined independently by each administrating regulatory agency. Jurisdictional information should not be considered final until a written concurrence has been issued by the appropriate regulatory agency.

1.0 Project Background

Northshore proposes to re-align the West Ridge railroad at the Milepost 7 Tailings Basin, and modify the original designed progression of the tailings basin. The existing railroad embankment is the current western limit of the tailings basin. Tailings will continue to be deposited in the basin over the next several decades. This means that the existing western limit of the tailings basin needs to progress to the northwest, with the result that the railroad alignment also needs to be moved further north and west. The tailings basin would progress to the northwest over the next ~35 years, filling the area between the existing railroad and the new alignment. The proposed new railroad alignment would become the ultimate western limit of the tailings basin.

In 2015, Barr Engineering Company (Barr) conducted field wetland delineations in a 1,594-acre area (study area) that could be impacted by this project. The study area is located in Township 55 Range 8 Section 6, and Township 56 Range 8 Sections 20, 21, and 28 through 32. Technical data and other information on the Project wetlands were provided in the *West Ridge Railroad Relocation Final Wetland Delineation Report* (Wetland Report) submitted to MNDNR on October 23, 2015. A Technical Evaluation Panel (TEP) met at the site on October 12, 2015 to review the wetland delineation. The TEP requested minor changes to the wetland dataset, which were completed prior to this jurisdictional request. On March 9, 2016, Northshore received verbal concurrence from Daryl Wierzbinski (with the USACE) and Colleen Sullivan (with the MNDNR) on the wetland delineation report. On March 16, 2015, Colleen Sullivan (MNDNR) provided a signed Notice of Decision approving the wetland delineation report.

2.0 Hydrology

The study area is primarily located within the Lower Beaver River and the East Branch Beaver River minor watersheds, which are within the Lake Superior-South (#2) major watershed. These watersheds are located within Bank Service Area #1, and are estimated to have more than 80 percent of their pre-statehood wetlands remaining. Figure 3 shows public hydrography data for the area, including the National Wetlands Inventory (NWI), the National Hydrography Dataset (NHD), and the Public Waters Inventory (PWI).

The nearest Public Water Basin is Bear Lake, which is over 1.5 miles southeast of the study area. However, the Milepost 7 tailings basin is located downslope of the study area, and upslope of Bear Lake, which precludes any surface water connections between the study area wetlands and Bear Lake.

The MNDNR is currently in the process of updating the records for Big Thirtynine and Little Thirtynine Creeks in the trout stream and PWI datasets. As shown on Figure 3, Watercourses 1 and 2 are remnants of the Big Thirtynine Creek and Little Thirtynine Creek that are downstream of a permitted diversion channel.

This channel was excavated in the late 1970s as part of construction of Northshore's Milepost 7 Tailings Basin. In March 2015, Barr submitted a request to the MNDNR, requesting concurrence that Watercourses 1 and 2 should be removed from the PWI, and are not considered trout streams. On March 15, 2016, MDNR Mining Hydrologist Mike Liljegren issued an email that summarized the MDNR's internal discussion on the issue, and concurred with Barr's request. Additional discussion on this matter is included in the final wetland report.

3.0 Methodology

Incidental wetlands are wetlands that were created or enlarged by activities (e.g., landscape alterations) not intended to create wetlands. Incidental wetlands are typically found where fill material impounds surface water, where excavated depressions in fine-grained soils collect and retain surface water, where excavations intersect the water table, where the use of heavy equipment compacts soils and prevents infiltration, or where ditching concentrates surface water runoff.

To estimate if a wetland could be incidental under the WCA, Barr considers the origin of each wetland by examining the study area for landscape alterations, and then evaluating each alteration's potential for hydrologic modification. Barr reviews a variety of data, including field observations from the wetland delineation, current and historical aerial imagery, public mapping, and datasets on hydrography, soils, and topography. Significant landscape alterations can often be seen on historical aerial photographs, along with the resulting hydrologic response. For wetlands enlarged by landscape alterations, the size of enlarged wetlands is calculated by comparing the size of the pre-disturbance wetland to the current wetland size.

4.0 Results of Preliminary Jurisdictional Analysis

The 18 wetlands and one deepwater habitat included in this request are grouped into five locations across the study area that share origins and physical characteristics (Figure 6). Observations and interpretations are included below for each of the five locations.

Historical aerial photography was examined to determine which photograph should be considered "baseline" for reviewing landscape changes. The oldest photo available was from 1940. However, the 1977 aerial photographs (Figure A1) and the 1969 aerial photographs (Figures B1, C1, D1 and E1) indicated little change since the 1940 photo, and were at a higher resolution. Also, the 1969 and 1977 aerial photography most closely precedes the initial construction of the Milepost 7 Tailings Basin in the late 1970s, and is therefore the image that best depicts the pre-construction wetlands conditions. The 1969 aerial was therefore used to estimate historical wetland boundaries, along with the 1954 USGS topography map (Figure C8). The estimated historical wetland boundaries were then compared to the

2015 delineated wetlands presented in the Wetland Delineation Report. All wetlands observed in the 1969 aerial photograph were assumed to be natural, as there is no evidence of landscape alterations in this area in 1969 (Figure C1).

4.1 Ditch (Wetland 2B)

Wetland 2B is located in a constructed ditch in the north part of the study area. It is a straight linear feature, oriented north-northwest to south-southeast. It is approximately 1,900 feet long, 17 feet wide, and approximately 3 feet deep. The ditch was excavated in an upland area, and the spoils were placed on the east side of the ditch and shaped into a raised road grade. Wetland 2B formed in the concave depression of this ditch. Figure 7 shows the 2015 conditions of this area.

Wetland 2B is connected to a larger, natural wetland community (Wetland 2A), but was not described separately in the 2015 wetland delineation report. For the purposes of the jurisdictional analysis, the "Wetland 2" polygon was subdivided into "Wetland 2A" (the natural wetland) and "Wetland 2B" (the constructed ditch wetland) (Figure 6).

The following observations suggest that this wetland has non-natural origins, and was formed in an area that was previously upland:

- Topography data from 2013 shows the excavated ditch and the placement of the spoils on the east side (Figures 2 and 7).
- This wetland is not represented on the NWI dataset (Figure 3).
- Soils data from the NRCS indicates that this area is otherwise an upland area. SSURGO data indicates that this area is an Augustana-Hegberg complex, 1 to 8 percent slopes with Map Unit Symbol, B1-40B. This is a native soil map unit shown for the area where the ditch is located (Figure 4).
- Field observations indicate the presence of soil disturbance. Areas along the spoil pile bank have been compacted by heavy machinery (Appendix F).
- A review of historical aerial photography indicates that the ditch was constructed sometime after 1977 and before 1991. The excavated ditch and adjacent road is visible on the aerial photography from 1991 to the present (Figures 7 and A1 through A5).

4.2 East Borrow Area (Wetlands 7a through 7h)

Wetlands 7a, 7b, 7c, 7d, 7e, 7f, 7g and 7h are located in the northeast part of the study area. The wetlands were created from the removal of native upland soil material and used to construct other on-site features. Figure 8 shows the 2015 conditions of this area. The following observations suggest that these wetlands are non-natural in origin:

- These wetlands are not represented on the NWI dataset (Figure 3).

- The NRCS's SSURGO soils data shows that this area has been modified, but the map unit appears to be incorrect. SSURGO data shows this area as "Tailings Basin" (K1-14), but a more accurate description of current conditions would be "Udorthents, loamy (cut and fill land)" (K1-13B). Native soil map units are adjacent to this area (Figure 4).

- Historical aerial imagery in prior to 1977 shows no clearing of trees and shrubs, 1980 to 2008 shows tree and shrub clearing, and 2008 to 2015 show the straight-edged outline of the wetland boundary and with inundation. This suggests that the borrow areas were created from manmade activities (Figure 8 and B1 through B8).

- Field observations indicate the presence of soil disturbance, including steep vertical banks lacking any topsoil or vegetation, very straight wetland boundaries, and compaction by heavy machinery (Appendix F).

4.3 Murphy's Pond (Wetland/Deepwater 18)

Wetland/Deepwater 18 is an area that became artificially flooded after the permitted construction of a railroad grade and tailings basin berm. The fill impeded surface runoff from the remnant watercourses of the previously diverted Big Thirtynine and Little Thirtynine Creeks (Watercourses 1 and 2), and inundated both wetland and upland habitats that were adjacent to the railroad grade. This flooded area is now informally known as Murphy's Pond. In the wetland report, this area was mapped as Wetland 18 and the deepwater component of this area was not shown or quantified.

Murphy's Pond has expanded over the years such that part of the pond is now deeper than 6.6 feet, and qualifies for classification as deepwater habitat. The depth of the pond was determined by comparing the current water elevations from 2012 Minnesota LiDAR derived 2-foot contours (Figure C8) to the 2003 2-foot contour topographic map (Figure C9). The approximate water elevation of Murphy's pond, 1,240 feet, was used because of the slight differences in the 2012 and 2003 topographic datasets. The 1,230-foot contour from the 2003 data was used to approximate deepwater habitat acreage. When all relevant

factors were considered, it was estimated that 37.9 acres of Murphy's Pond would qualify for classification as deepwater habitat (Table 2, Figure C10).

The methodology for determining what parts of Murphy's Pond are natural or incidental consisted of comparing the extent of wetlands present in 1969 aerial imagery to the 2015 wetland delineations. It is estimated that there are four types of habitat changes that occurred in this area as a result of the impoundment and flooding: uplands converted to wetlands, uplands converted to deepwater habitat, wetlands converted to wetter wetlands, and wetlands converted to deepwater habitat. Table 2 and Figure C10 detail the evolution of the Murphy's Pond site from 1969 to 2015. The polygon of Wetland 18 (as mapped in 2015) has been divided into wetland and deepwater habitats, and subdivided into estimated original habitats. Current wetland areas were divided into "previously wetland" and "previously upland" areas; current deepwater areas were also divided into "previously wetland" and "previously upland" areas. Figure 9 shows the conditions of the Murphy's Pond area in 2015.

Photographs 5 and 6 in Appendix F show the constructed impoundment, as well as open water conditions in areas containing flooded and drowned trees.

4.4 West Borrow Area (Wetlands 30a though 30d, and 31)

Wetlands 30a, 30b, 30c, 30d and 31 are located in the north central part of the study area. The wetlands were created from the removal of native upland soil material for activities such as road building. Figure 10 shows the 2015 conditions of this area. The following observations suggest that these wetlands are non-natural in origin:

- These wetlands are not represented on the NWI dataset (Figure 3).

- The NRCS's SSURGO soils data shows that this area has been modified, but the map unit appears to be incorrect. SSURGO data shows this area as "Pits, iron mine" (K1-11), but a more accurate description of current conditions would be "Udorthents, loamy (cut and fill land)" (K1-13B). Native soil map units are adjacent to this area (Figure 4).

- Historical aerial imagery prior to 1980 showed no clearing of trees and shrubs on aerial photos. In 1991, small depressions showing inundation become apparent on the aerial photographs as shown by the photo tone. Aerial photos after 1991 show slightly darker photo tone suggesting that the wetland very little inundation to being saturated near the surface for most years. This suggests that the borrow areas were created about that time (Figure 10 and Figures D1 through D7).

- This area has been excavated and reshaped into a series of enclosed depressions. The ground surface elevations of wetlands 30a, 30b, 30c, 30d and 31 range from 1,300 to 1,350 feet above MSL, which is approximately 30 feet lower than the adjacent native ground surface for 30a, 30b and 31 and approximately 10 feet lower than the adjacent native ground surface for 30c, 30d and 31 (Figure 10).

- Photographs 7 through 9 in Appendix F depict sparse vegetation atop coarse soil material that lacks organic matter (topsoil) in the upper layers due to excavation. Photograph 8 also shows an excavated bank.

4.5 Stormwater Ponds (Wetlands 38a through 38d)

Wetlands 38a, 38b, 38c, and 38d are located in the southeast corner of the study area. These wetlands most likely were created to capture storm water. Figure 11 shows the 2015 conditions of this area. The following observations suggest that these wetlands have non-natural origins:

- These wetlands are not represented on the NWI dataset (Figure 3).

- The NRCS's SSURGO soils data is mapped as "Udorthents, loamy (cut and fill land)" (K1-13B). Native soil map units are shown adjacent to this area (Figure 4).

- Historical aerial imagery from 1991 shows trees and shrubs covering the entire site, 2004 shows this area was cleared of tree and shrub cover. Wetland boundaries are unnaturally angular for wetlands 38a and 38d showing inundation. Historical aerial imagery from 2008 shows additional tree and shrub clearing and inundation on 2013 and 2015 aerial imagery for wetlands 38b and 38c (Figure 11 and E1 through E7).

- Field observations indicate the presence of soil disturbance and rip-rap around the edge of these which suggest soil disturbance and compaction by heavy machinery (Appendix F).

5.0 Schedule

Pending your determination of the jurisdictional status of the wetlands in the study area, Northshore plans to prepare and submit a "Joint Application Form for Activities Affecting Water Resources in Minnesota", including a permit under the WCA. Northshore currently anticipates that the joint application will be submitted in June 2016.

List of Attachments

Tables

Figures

Appendices

List of Attachments, cont'd

Appendix C – Supplemental Maps of Murphy's Pond Area (Wetland 18)

Figure C1 – 1969 Aerial Photography (Murphy's Pond)
Figure C2 – 1977 Aerial Photography (Murphy's Pond)
Figure C3 – 1980 Aerial Photography (Murphy's Pond)
Figure C4 – 1991 Aerial Photography (Murphy's Pond)
Figure C5 – 2004 Aerial Photography (Murphy's Pond)
Figure C6 – 2008 Aerial Photography (Murphy's Pond)
Figure C7 – 2013 Aerial Photography (Murphy's Pond)
Figure C8 – USGS Elevation Data (Murphy's Pond)
Figure C9 – 2003 Elevation Data (Murphy's Pond)
Figure C10 – Habitat Changes (Murphy's Pond)

Appendix D – Supplemental Maps of West Borrow Area (Wetlands 30a-30d, 31)

Figure D1 – 1969 Aerial Photography (West Borrow Area)
Figure D2 – 1977 Aerial Photography (West Borrow Area)
Figure D3 – 1980 Aerial Photography (West Borrow Area)
Figure D4 – 1991 Aerial Photography (West Borrow Area)
Figure D5 – 2004 Aerial Photography (West Borrow Area)
Figure D6 – 2008 Aerial Photography (West Borrow Area)
Figure D7 – 2013 Aerial Photography (West Borrow Area)

Appendix E – Supplemental Maps of Stormwater Ponds (Wetlands 38a – 38d)

Figure E1 – 1969 Aerial Photography (Stormwater Ponds)
Figure E2 – 1977 Aerial Photography (Stormwater Ponds)
Figure E3 – 1980 Aerial Photography (Stormwater Ponds)
Figure E4 – 1991 Aerial Photography (Stormwater Ponds)
Figure E5 – 2004 Aerial Photography (Stormwater Ponds)
Figure E6 – 2008 Aerial Photography (Stormwater Ponds)
Figure E7 – 2013 Aerial Photography (Stormwater Ponds)

Appendix F – Site Photographs

Tables

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Ditch	2B	Wetland	Hardwood Swamp	7	Moderate	July 2015	Non-natural	Excavated ditch created between 1977 and 1991. Approximately 1900 feet long, 17 feet wide, and 3 feet deep. Spoils were deposited on east side of ditch and graded to form a raised road.	Wetland is located within a topographically-enclosed depression. The downslope (south) end was inspected; no surficial outlets were observed.	1294-1340	56N	8E	21	NESW, SESW	0.9	0
East Borrow Area	7a	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1298	56N	8E	28	NWNW	0.02	0
East Borrow Area	7b	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1305	56N	8E	28	NWNW	0.02	0
East Borrow Area	7c	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1323	56N	8E	21	SWSW	0.6	0
East Borrow Area	7d	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
East Borrow Area	7e	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0
East Borrow Area	7f	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1300	56N	8E	28	NWNW	0.04	0
East Borrow Area	7g	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1292	56N	8E	28	NWNW	0.01	0
East Borrow Area	7h	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1317	56N	8E	28	NWNW	0.04	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Murphy's Pond	18 (D-18I)	Deepwater	---	---	---	July 2015	Non-natural	Initial impoundment developed from the construction of a road on the southeast side of Murphy's pond between 1977 and 1980. Between 1980 and 1991, a ditch was constructed diverting flow from Murphy's Pond to the north around the tailings basin to the East Beaver River. In 2005, the outlet elevation to the north was raised and the ditch was rerouted, flooding over 81 acres.	"Murphy's Pond" connects with roadside ditches and water flow continues to the northeast to East Beaver River. (The outlet of the Murphy's Pond wetland is at 1240 feet MSL.)	1238	56N	8E	32	NWNE, NENW	0	3.7
													29	SESW		
	18 (D-18J)											8E	32	NWNE, NENW	0	7.6
													29	SESW, SWSE		
	18 (D-18K)											8E	29	SESW, SWSE, SESE	0	19.2
	18 (D-18L)											8E	29	SWSE	0	1.3
	18 (D-18M)											8E	29	SWSE, SESE	0	4.1
	18 (D-18N)											8E	29	SESE, NESE	0	1.0
	18 (D-18O)											8E	29	SESE, NESE	0	1.1
West Borrow Area	30a	Wetland	Sedge Meadow	2	High	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308	56N	8E	29	SENW	0.8	0
West Borrow Area	30b	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1312	56N	8E	29	SENW	0.2	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
West Borrow Area	30c	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1344	56N	8E	29	SWNW, NWNW, SENW	1.1	0
West Borrow Area	30d	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1348	56N	8E	29	NWNW	0.4	0
West Borrow Area	31	Wetland	Alder Thicket	6	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308-1346	56N	8E	29	SENW, SWNW, NENW	5.3	0
Stormwater Ponds	38a	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1324	56N	8E	31	SENE	0.3	0
Stormwater Ponds	38b	Wetland	Shallow Marsh	3	Medium	August 2015	Non-natural	Stormwater pond constructed in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1322	56N	8E	31	SENE	0.1	0
Stormwater Ponds	38c	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond excavatued in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1326	56N	8E	31	SENE, SWNE	0.5	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Stormwater Ponds	38d	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1318	56N	8E	32	SWNW	0.1	0
														Subtotals:	**10.4**	**37.9**
														Totals:	**48.3**	

Table 2
Estimated Habitat Evolution in Murphy's Pond Area (Wetland 18)
West Ridge Railroad Realignment
Northshore Mining Company

Polygon label	2015 Conditions	1969			2015		
		Upland (acres)	Wetland (acres)	Deepwater (acres)	Upland (acres)	Wetland (acres)	Deepwater (acres)
W-18A	Wetland (artificially flooded upland)	0.2	0	0	0	0.2	0
W-18B	Wetland (artificially flooded wetland)	0	6.6	0	0	6.6	0
W-18C	Wetland (artificially flooded upland)	7.3	0	0	0	7.3	0
W-18D	Wetland (artificially flooded wetland)	0	13.0	0	0	13.0	0
W-18E	Wetland (artificially flooded upland)	0.7	0	0	0	0.7	0
W-18F	Wetland (artificially flooded upland)	3.5	0	0	0	3.5	0
W-18G	Wetland (artificially flooded upland)	5.3	0	0	0	5.3	0
W-18H	Wetland (artificially flooded wetland)	0	6.6	0	0	6.6	0
D-18I	Deepwater (artificially flooded wetland)	0	3.7	0	0	0	3.7
D-18J	Deepwater (artificially flooded upland)	7.6	0	0	0	0	7.6
D-18K	Deepwater (artificially flooded wetland)	0	19.2	0	0	0	19.2
D-18L	Deepwater (artificially flooded upland)	1.3	0	0	0	0	1.3
D-18M	Deepwater (artificially flooded upland)	4.1	0	0	0	0	4.1
D-18N	Deepwater (artificially flooded upland)	1.0	0	0	0	0	1.0
D-18O	Deepwater (artificially flooded wetland)	0	1.1	0	0	0	1.1
	Subtotals:	**31.0**	**50.2**	**0.0**	**0**	**43.2**	**37.9**
	Totals:	**81.1**			**81.1**		

This table shows the estimated habitat distribution of the Murphy's Pond area for both 1969 and 2015. In 2015, this area was mapped as Wetland 18, and wetland and deepwater habitats were combined into a single polygon. This table shows the habitat changes that occurred after a constructed road impounded surface water drainage.

Figures

2015 Wetland Delineation Study Area

N

0 1,000 2,000 4,000

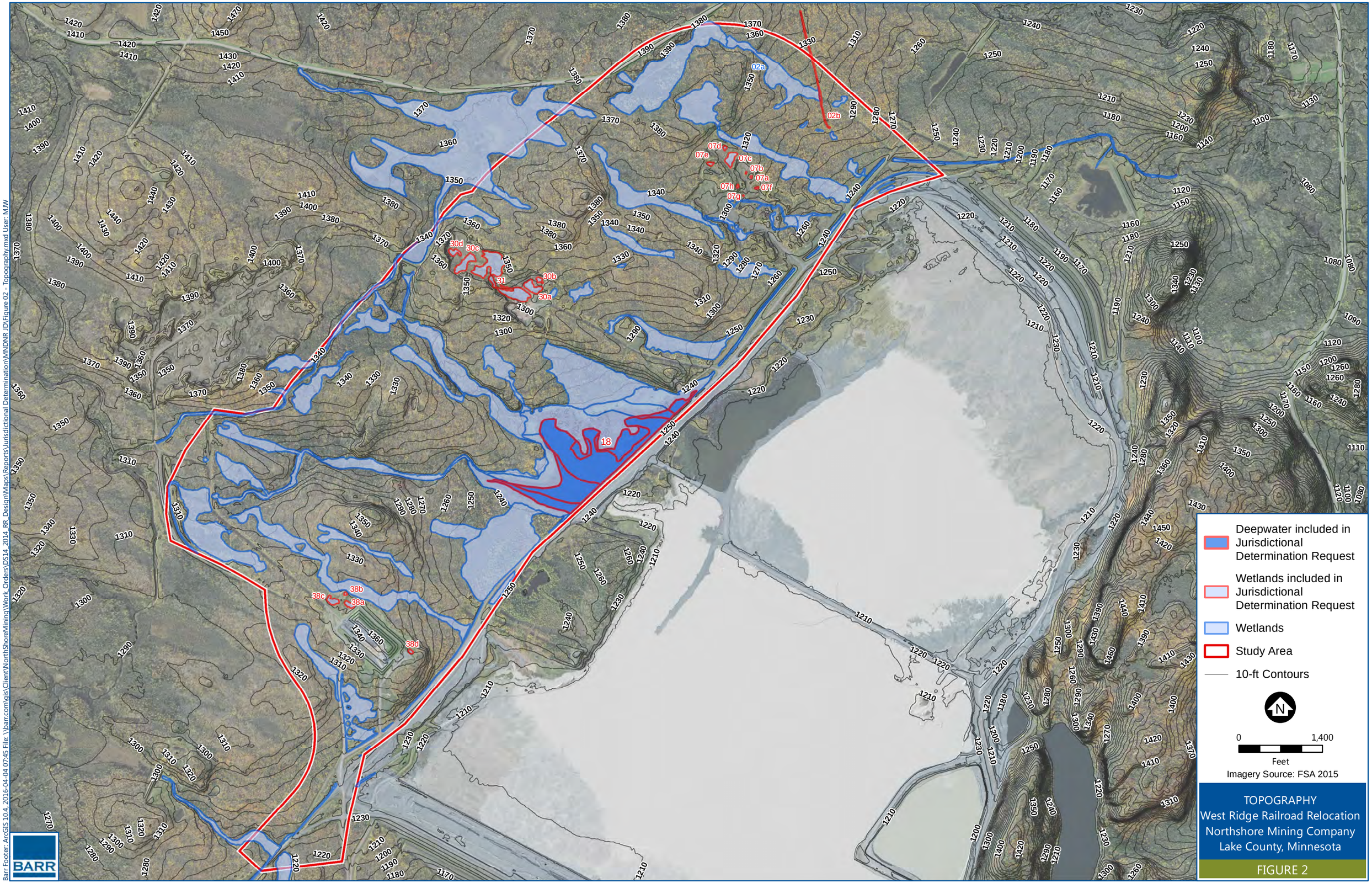
Feet

Imagery: USGS

SITE LOCATION MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 1

BARR



Barr Footer: ArcGIS 10.4 2016-04-04 07:45 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 02 - Topography.mxd User: MJW

Public Water Inventory (PWI) Watercourse

National Hydrography Dataset (NHD) Flowline

Public Water Basin

Wetlands (National Wetlands Inventory)

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Study Area

*Watercourses 1 and 2 are remnants of the Big Thirtynine Creek and Little Thirtynine Creek downstream of a permitted diversion channel constructed in the late 1970s as part of construction of the Northshore Mining Company's (NSM) Milepost 7 Tailings Basin. In March 2015, Barr Engineering Company submitted a request to the Minnesota Department of Natural Resources (MDNR), requesting concurrence that Watercourses 1 and 2 should be removed from the Public Waters Inventory (PWI) and are not considered trout streams. On March 15, 2016, MDNR Mining Hydrologist Mike Liljegren issued an email that summarized the MDNR's internal discussion on the issue, and concurred with Barr's request.

N

0 3,000

Feet

Aerial Imagery: FSA 2015

HYDROLOGY MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 07:51 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure 03 - Hydrology Map.mxd User: MJW

Map Unit Symbol	Map Unit Name
A1-11F	Quetico, stony-Barto, stony-Rock outcrop complex, 35 to 60 percent slopes
A1-20D	Mesaba, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes
A1-20F	Barto, stony-Mesaba, stony-Rock outcrop complex, 35 to 60 percent slopes
A1-30D	Barto, stony-Greysolon-Rock outcrop complex, 0 to 18 percent slopes
A1-40B	Normanna-Greysolon-Rock outcrop complex, 2 to 8 percent slopes
A1-41D	Ahmeek-Normanna-Mesaba, stony-Rock outcrop complex, 4 to 18 percent slopes
A2-19A	Twig, rubbly-Rock outcrop complex, 0 to 3 percent slopes
A2-30D	Mesaba, stony-Giese, rubbly-Barto, stony-Rock outcrop complex, 0 to 18 percent slopes
A3-11A	Twig-Tacoosh-Giese complex, 0 to 1 percent slopes, depressional
A3-12A	Giese muck, depressional, 0 to 1 percent slopes
A3-13A	Giese muck, 0 to 2 percent slopes, rubbly
A3-20A	Canosia loam, 0 to 2 percent slopes
A3-21A	Hermantown silt loam, 1 to 3 percent slopes
A3-22B	Normanna-Hermantown complex, 1 to 8 percent slopes
A3-30B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes
A3-31D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes
A3-41B	Normanna-Giese, depressional complex, 0 to 8 percent slopes, pitted
B1-20B	Hegberg-Eldes complex, 0 to 3 percent slopes
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes
B1-41D	Forbay-Augustana complex, 3 to 18 percent slopes
B2-41D	Forbay, moderately deep-Augustanna, moderately deep-Rock outcrop complex, 3 to 18 percent slopes
C1-20A	Badriver complex, 0 to 3 percent slopes
C1-40B	Badriver complex, 0 to 8 percent slopes
C1-41D	Sanborg-Badriver complex, 3 to 18 percent slopes
C3-40B	Badriver-Rock outcrop complex, 0 to 8 percent slopes
C3-41D	Sanborg-Badriver-Rock outcrop complex, 1 to 18 percent slopes
D3-41D	Amnicon-Cuttre-Rock outcrop complex, 5 to 18 percent slopes
E1-14F	Ahmeek-Rock outcrop-Udifluvents, frequently flooded complex, 1 to 70 percent slopes
E1-27D	Sanborg-Fluvaquebts, frequently flooded-Rock outcrop complex, 0 to 18 percent slopes
E1-29E	Odanah-Fluvaquents, frequently flooded-Rock outcrop complex, 0 to 45 percent slopes
E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex, 1 to 18 percent slopes
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes
E2-12D	Forbay-Udifluvents, frequently flooded complex, 1 to 18 percent slopes
E2-20B	Badriver-Fluvaquents, frequently flooded complex, 0 to 8 percent slopes
E2-21D	Sanborg-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes
E2-31D	Amnicon-Fluvaquents, frequently flooded, complex, 0 to 18 percent slopes
F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes
J1a10A	Rifle soils, dense substratum, 0 to 1 percent slopes
J1a11A	Mooselake muck, 0 to 1 percent slopes
J1a40A	Greenwood soils, dense substratum, 0 to 1 percent slopes
J2-40A	Cathro muck, depressional, dense substratum, 0 to 1 percent slopes
K1-11	Pits, iron mine
K1-13B	Udorthents, loamy (cut and fill land)
K1-14	Tailings basin
K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded
W	Water

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Soil Map Unit

Disturbed Soil Map Units

Study Area

N

0 1,000 2,000

Feet

Imagery Source: FSA 2015

SOILS MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 4

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 07:53 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014 RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 04 - Soils.mxd User: MJW

Road and ditch created
Ditch
Ditch
Diversion channel of the Big and Little 39 creeks
Borrow Pit
Road, railroad and embankment
Ditch
Borrow Pit
Road, railroad and embankment
Stock pile
Ditch
Road
Quarry
Impoundment of streams
Road
Road, railroad and embankment
Road, railroad and embankment
Road
Landfill
Tailings basin
Ditch
Road
Road, railroad and embankment

Areas of Site Disturbance
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

N

0 600 1,200 2,400
Feet

Aerial Imagery: FSA 2015

SITE DISTURBANCE MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 5

BARR

Barr Foster ArcGIS 10.4, 2016-04-04 09:06 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 05 - Site Disturbance Map.mxd User: MJW

Appendix A - Ditch

02b

07d

07e

07c

07h

07a

07f

07g

Appendix B - East Borrow Area

Appendix D - West Borrow Area

30d

31

30b

30c

30a

Appendix C - Murphy's Pond

Appendix E - Stormwater Ponds

38b

38c

38a

38d

Study Area

Alder Thicket

Coniferous Swamp

Fresh (Wet) Meadow

Hardwood Swamp

Sedge Meadow

Shallow Marsh

Deepwater included in Jurisdictional Determination Request

N

0 750 1,500 3,000

Feet

Aerial Imagery: FSA 2015

SITE DETAIL INDEX MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 6

BARR

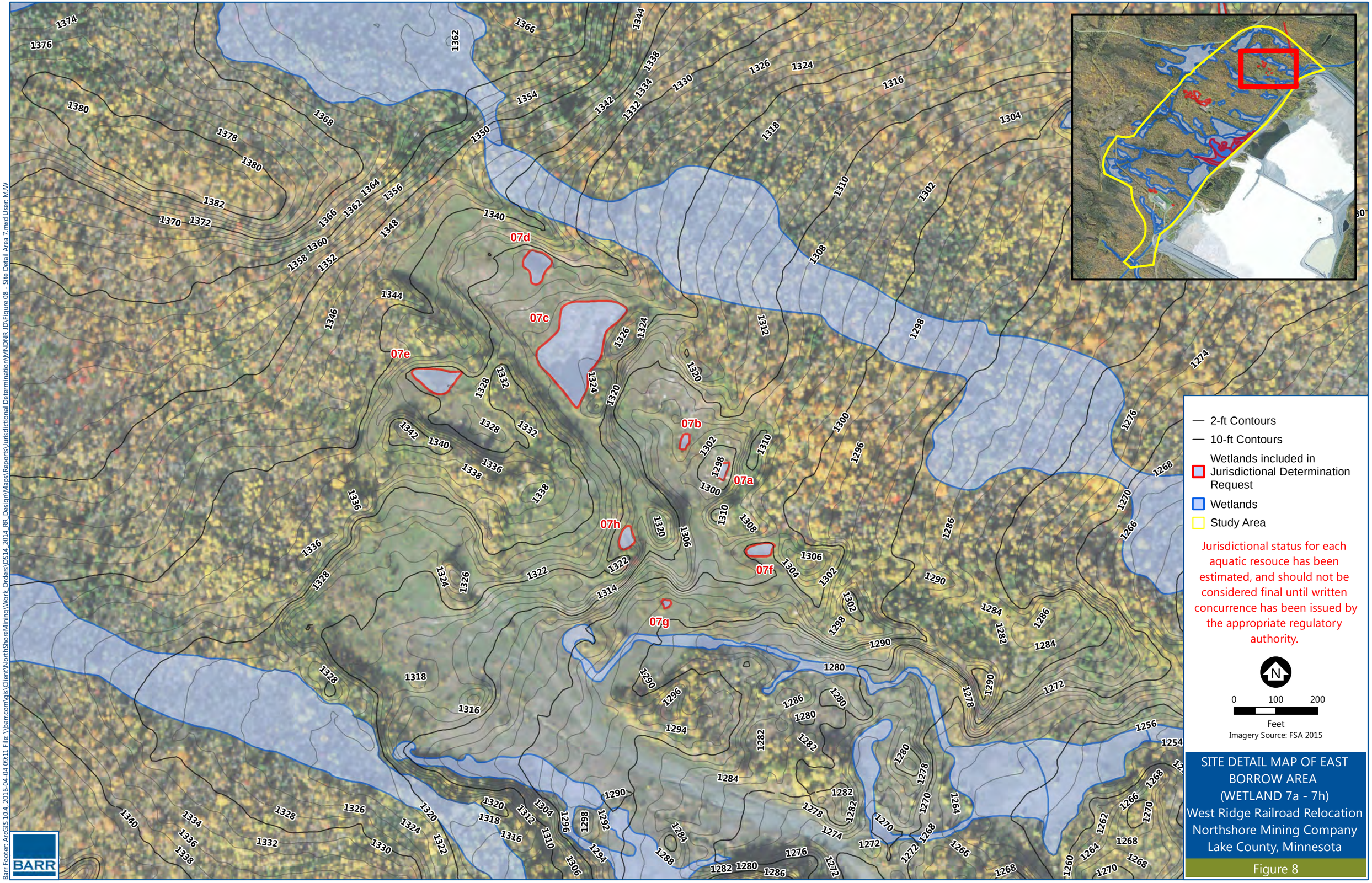
Barr Foster ArcGIS 10.4, 2016-04-04 07:56 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 06 Wetland Overview.mxd User: MJW

SITE DETAIL MAP OF
DITCH AREA (WETLAND 2)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 7

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:00 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 07 - Site Detail Area 7.mxd User: MJW

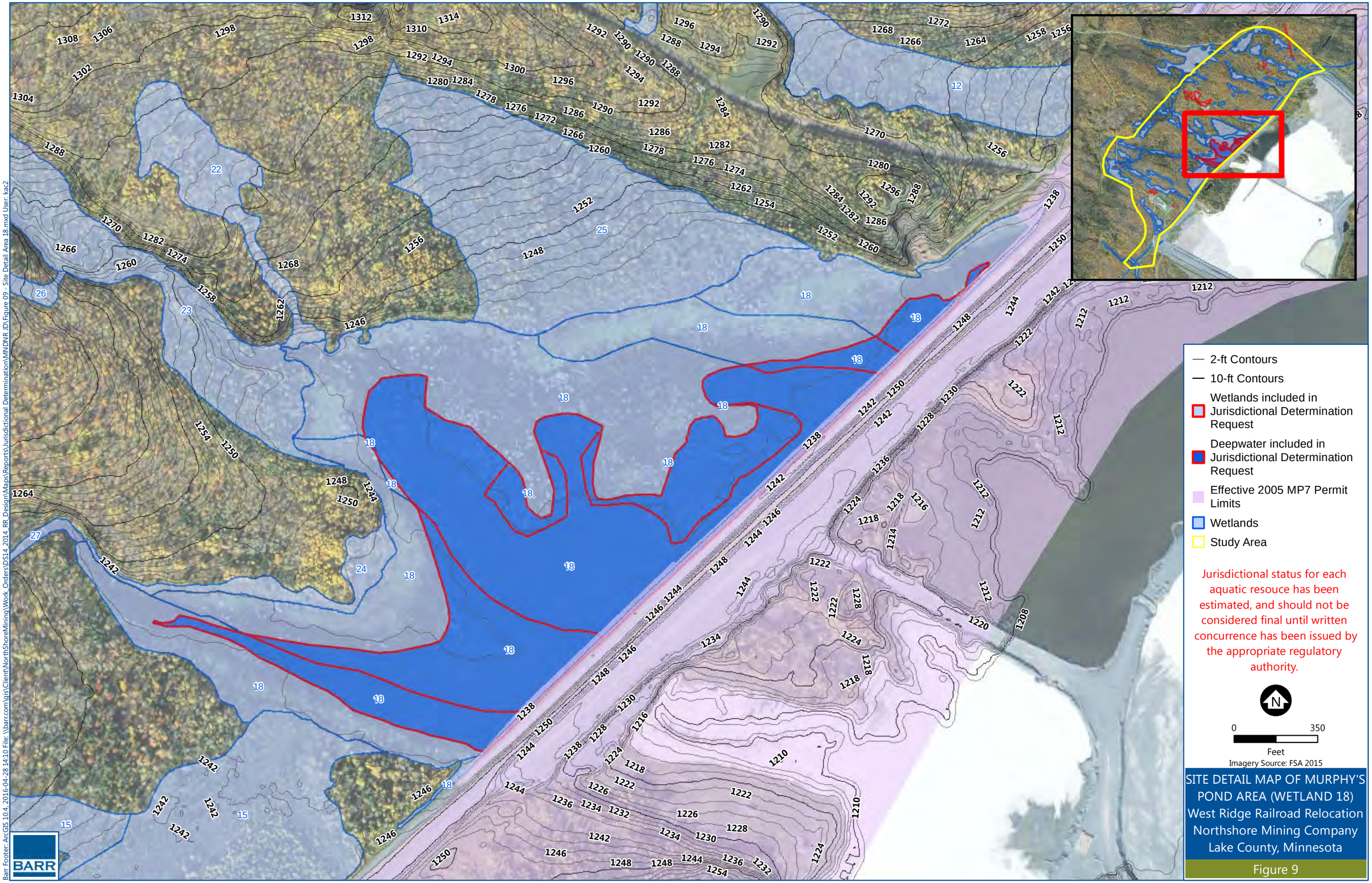


SITE DETAIL MAP OF EAST BORROW AREA (WETLAND 7a - 7h)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

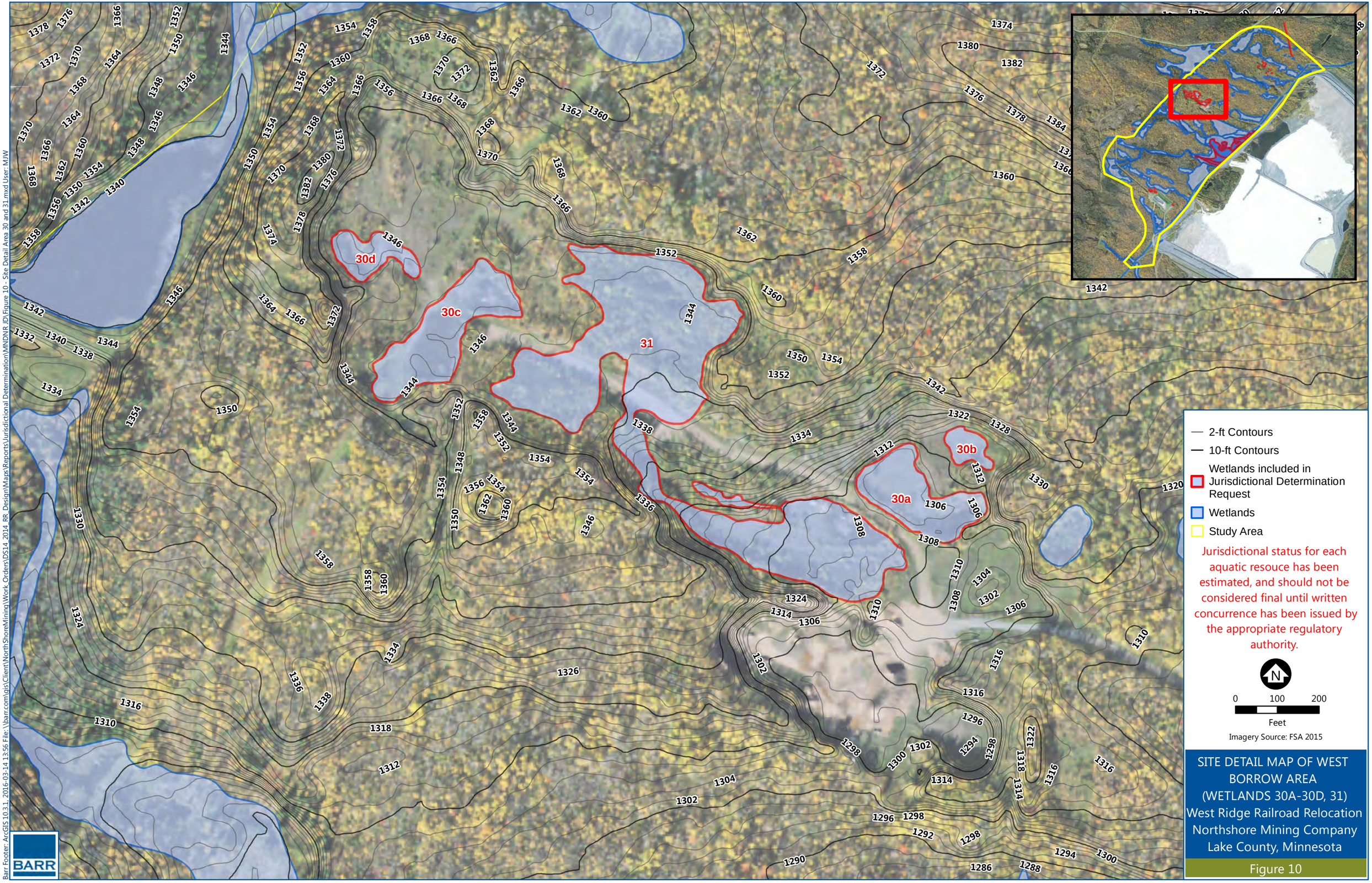
Figure 8

BARR



SITE DETAIL MAP OF MURPHY'S POND AREA (WETLAND 18)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 9

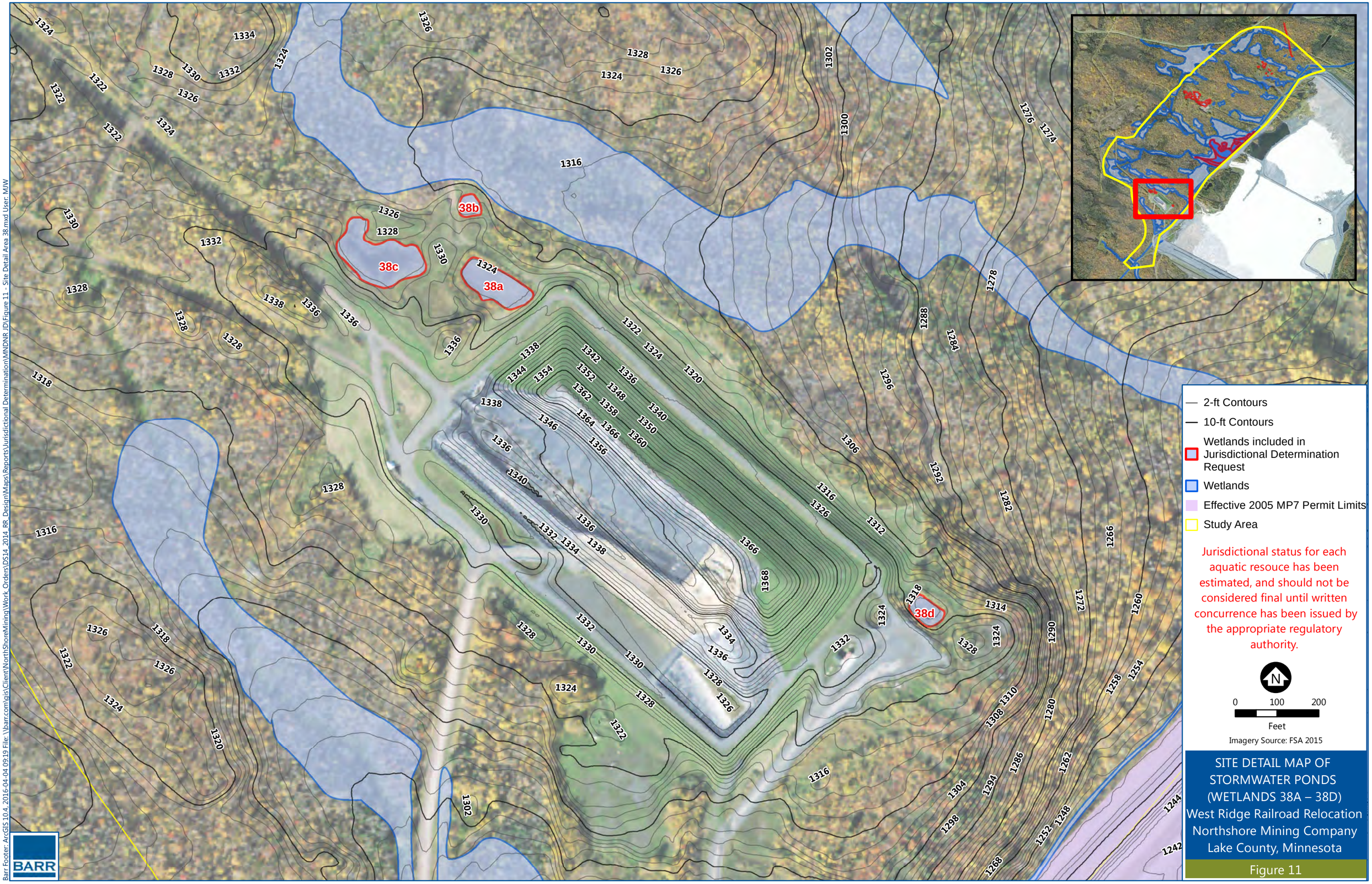


SITE DETAIL MAP OF WEST BORROW AREA (WETLANDS 30A-30D, 31)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 10

BARR



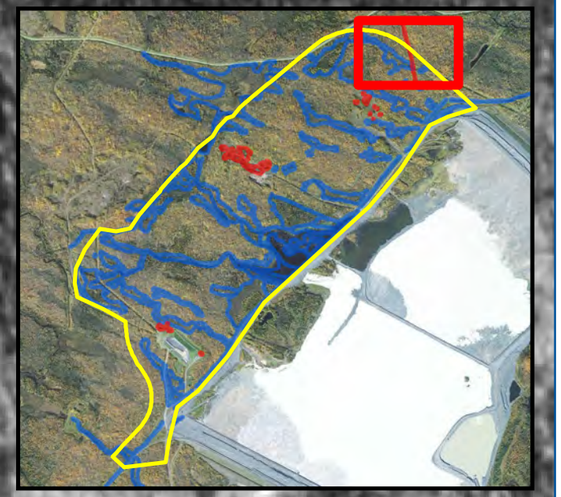
SITE DETAIL MAP OF STORMWATER PONDS (WETLANDS 38A – 38D)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 11

BARR

Appendix A

Supplemental Maps of Ditch Area (Wetland 2B)



20

02a

02b

21

01a

21

03c

03b

03a

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: MN DNR 1977

1977 AERIAL PHOTOGRAPHY (WETLAND 2B DITCH AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A1

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:30 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure A1 - Area 2_1977.mxd User: MJW

20

02a

02b

21

01a

21

03c

03b

03a

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

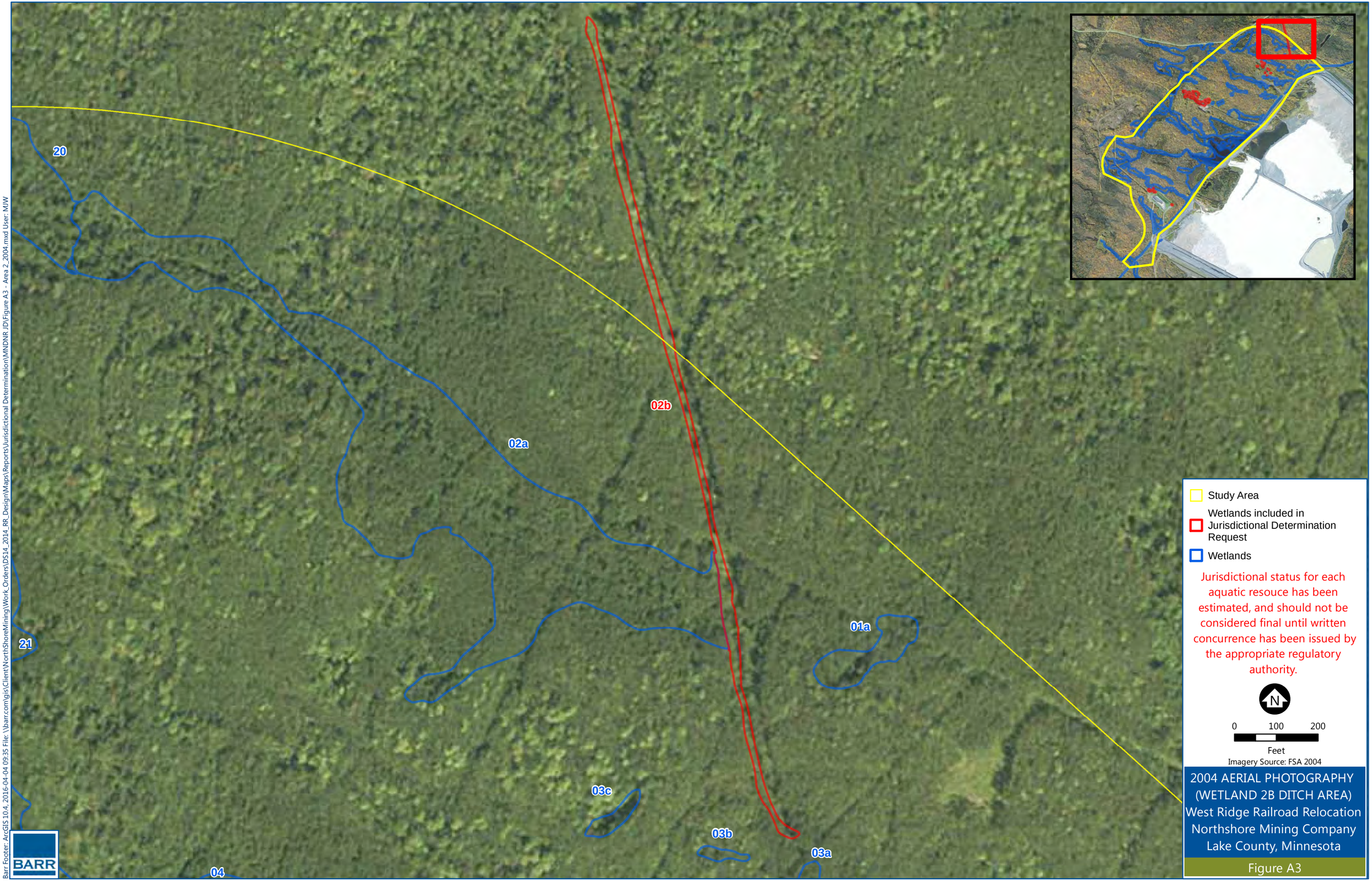
Imagery Source: USGS 1991

1991 AERIAL PHOTOGRAPHY
(WETLAND 2B DITCH AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A2

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:30 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure A2 - Area 2_1991.mxd User: MJW

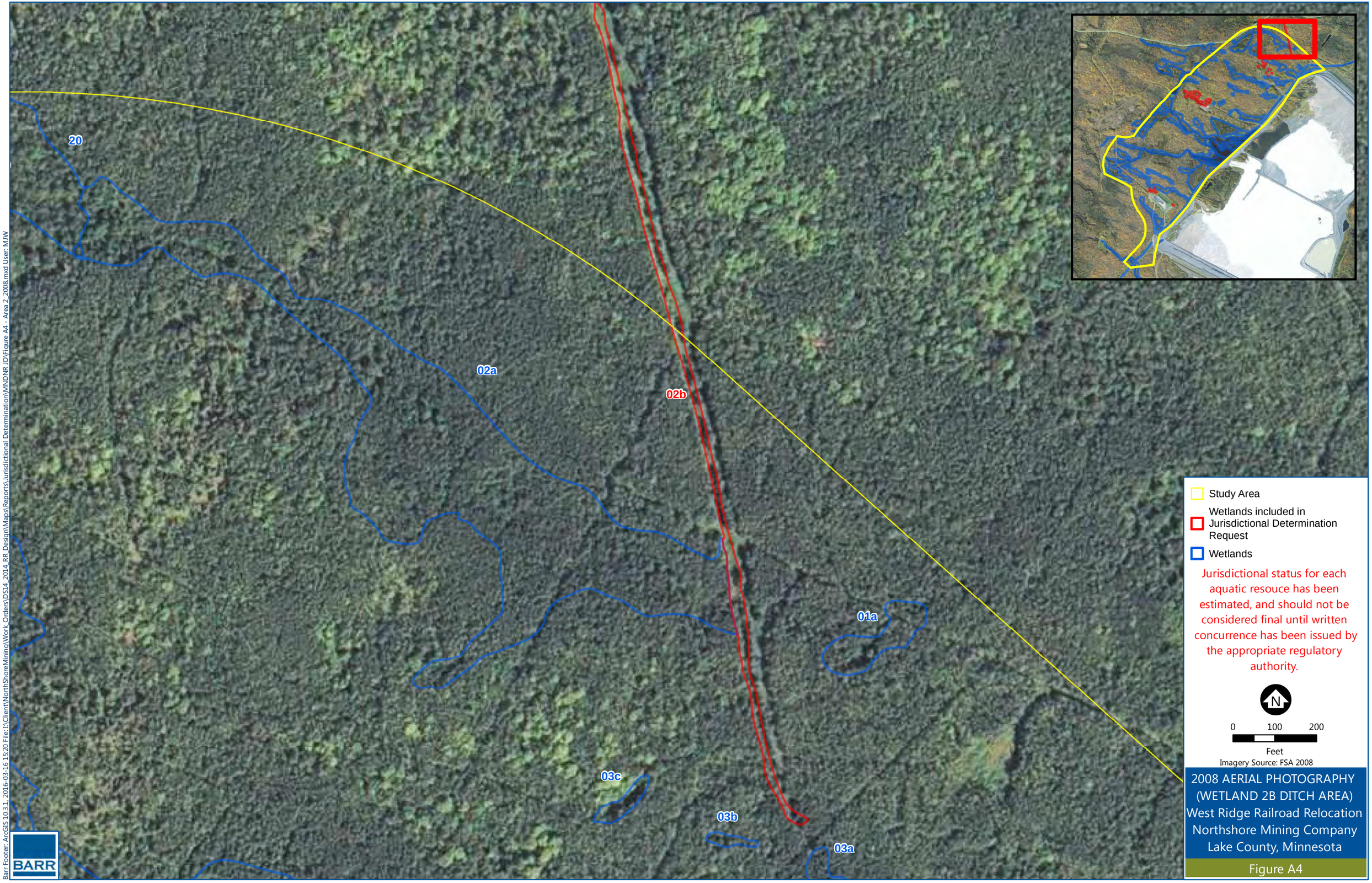


2004 AERIAL PHOTOGRAPHY
(WETLAND 2B DITCH AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:35 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure A3 - Area 2_2004.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2008

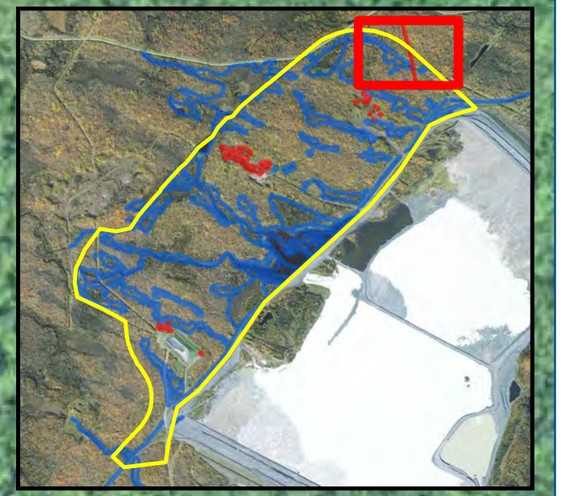
2008 AERIAL PHOTOGRAPHY (WETLAND 2B DITCH AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A4

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:20 File:I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure A4 - Area 2_2008.mxd User: MJW



20
02a
02b
21
01a
03c
03b
03a
04

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2013

2013 AERIAL PHOTOGRAPHY (WETLAND 2B DITCH AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

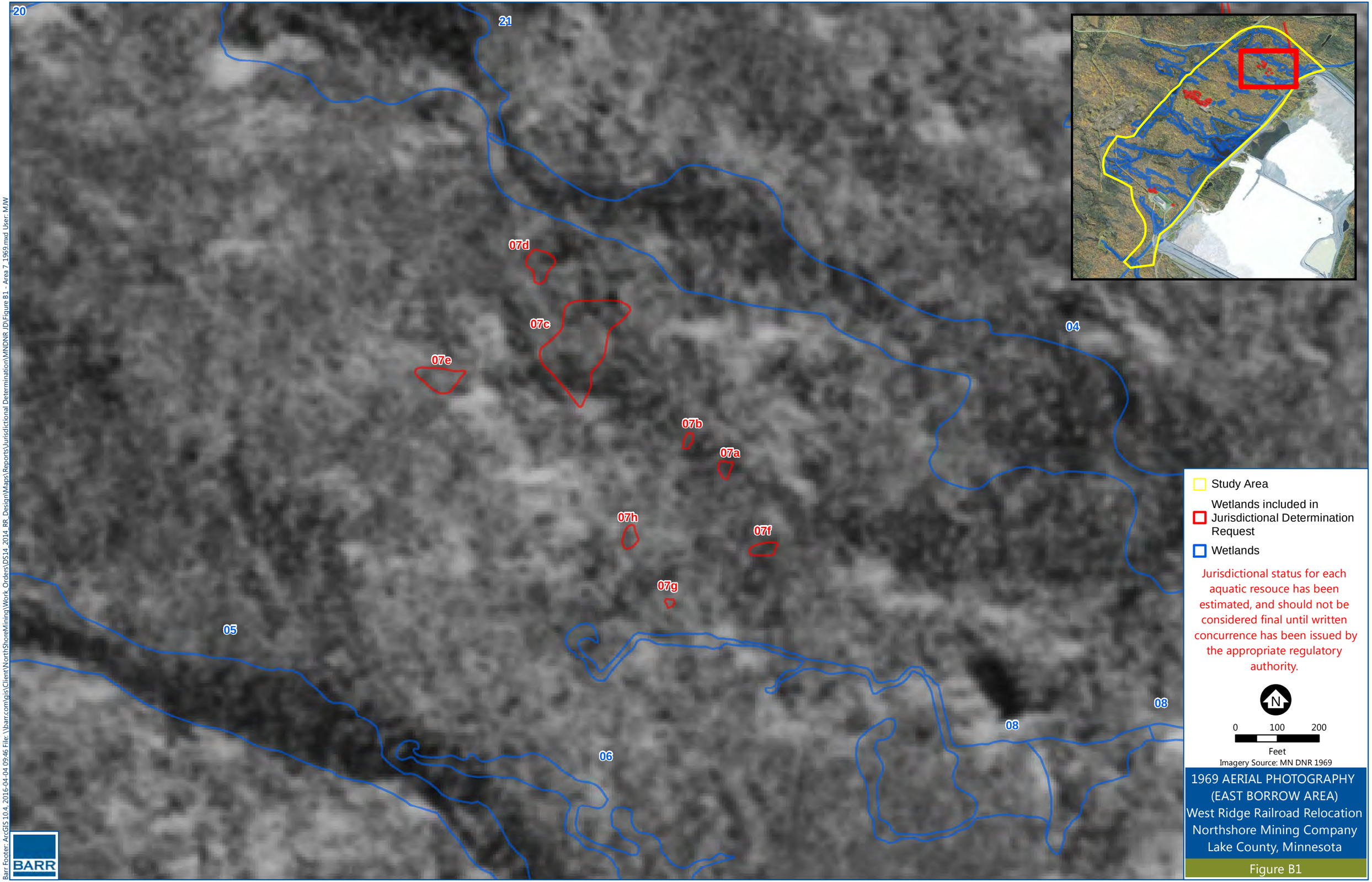
Figure A5

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:39 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure A5 - Area 2_2013.mxd User: MJW

Appendix B

Supplemental Maps of East Borrow Area (Wetlands 7A – 7H)



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

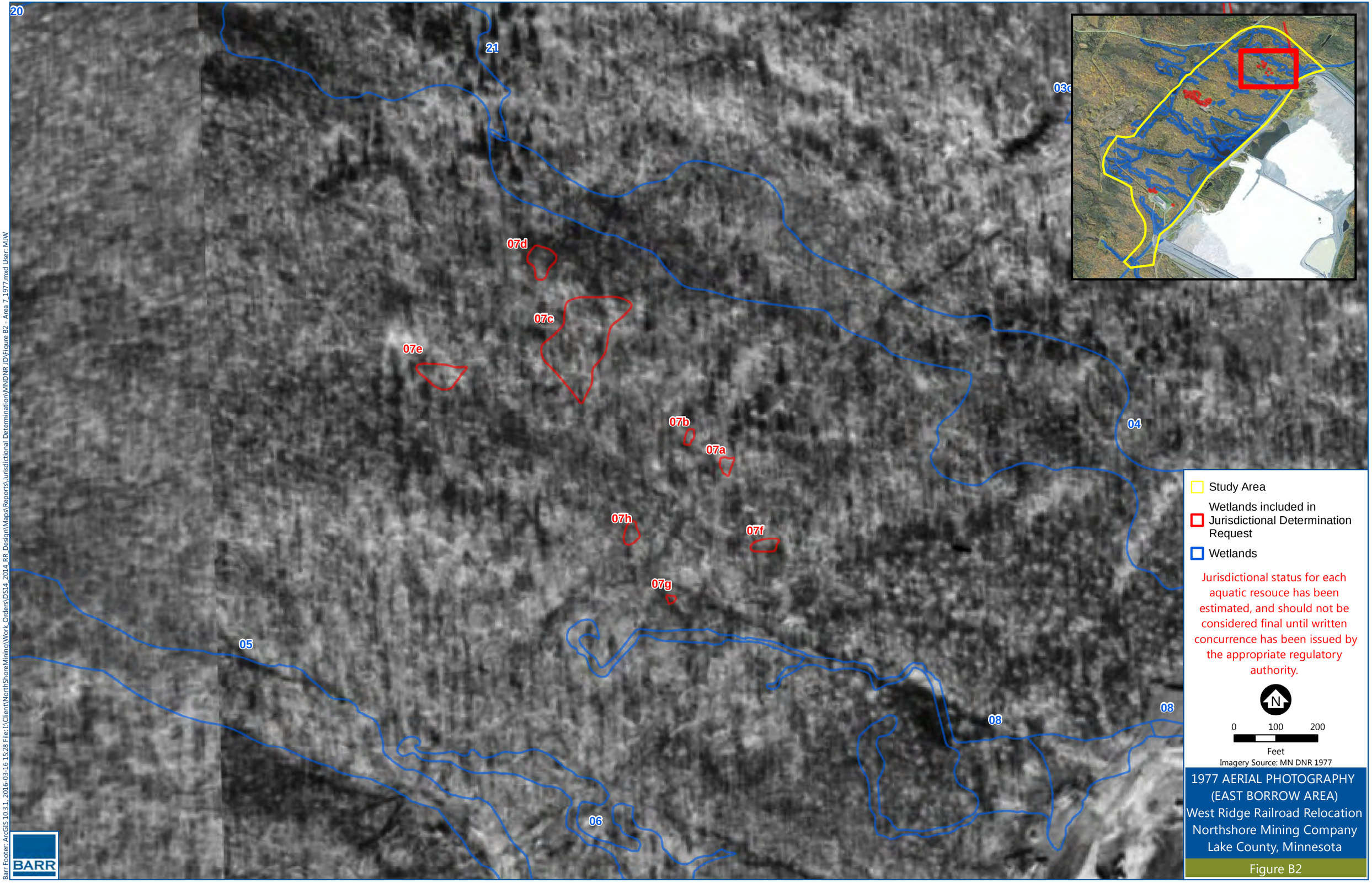
Imagery Source: MN DNR 1969

1969 AERIAL PHOTOGRAPHY (EAST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B1

BARR



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: MN DNR 1977

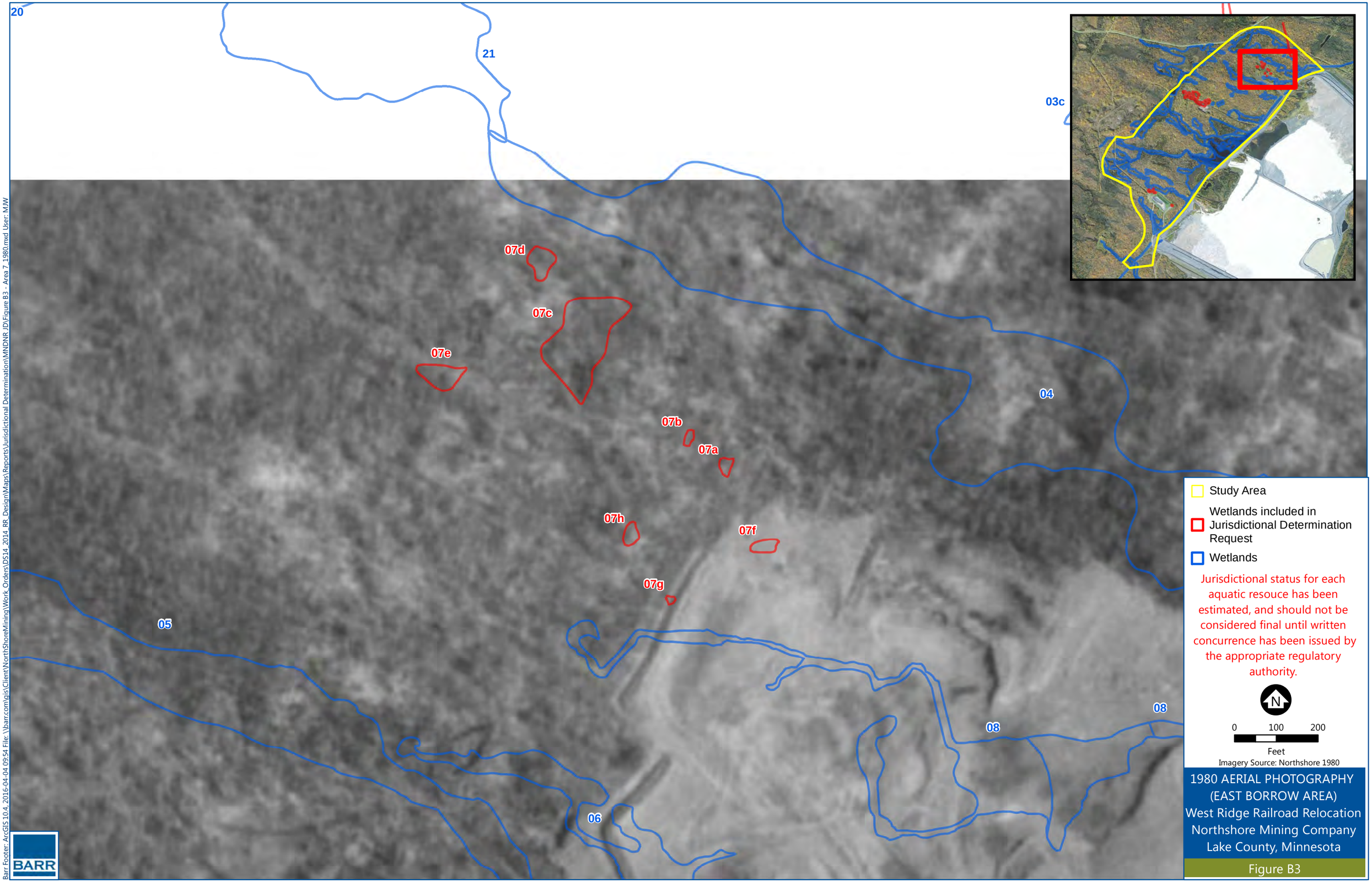
1977 AERIAL PHOTOGRAPHY (EAST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B2

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:28 File:I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure B2 - Area 7_1977.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: Northshore 1980

1980 AERIAL PHOTOGRAPHY
(EAST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:54 File:\\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure B3 - Area 7_1980.mxd User: MJW

21
03c
07d
07c
07e
07b
07a
07h
07f
07g
04
05
08
08
06

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

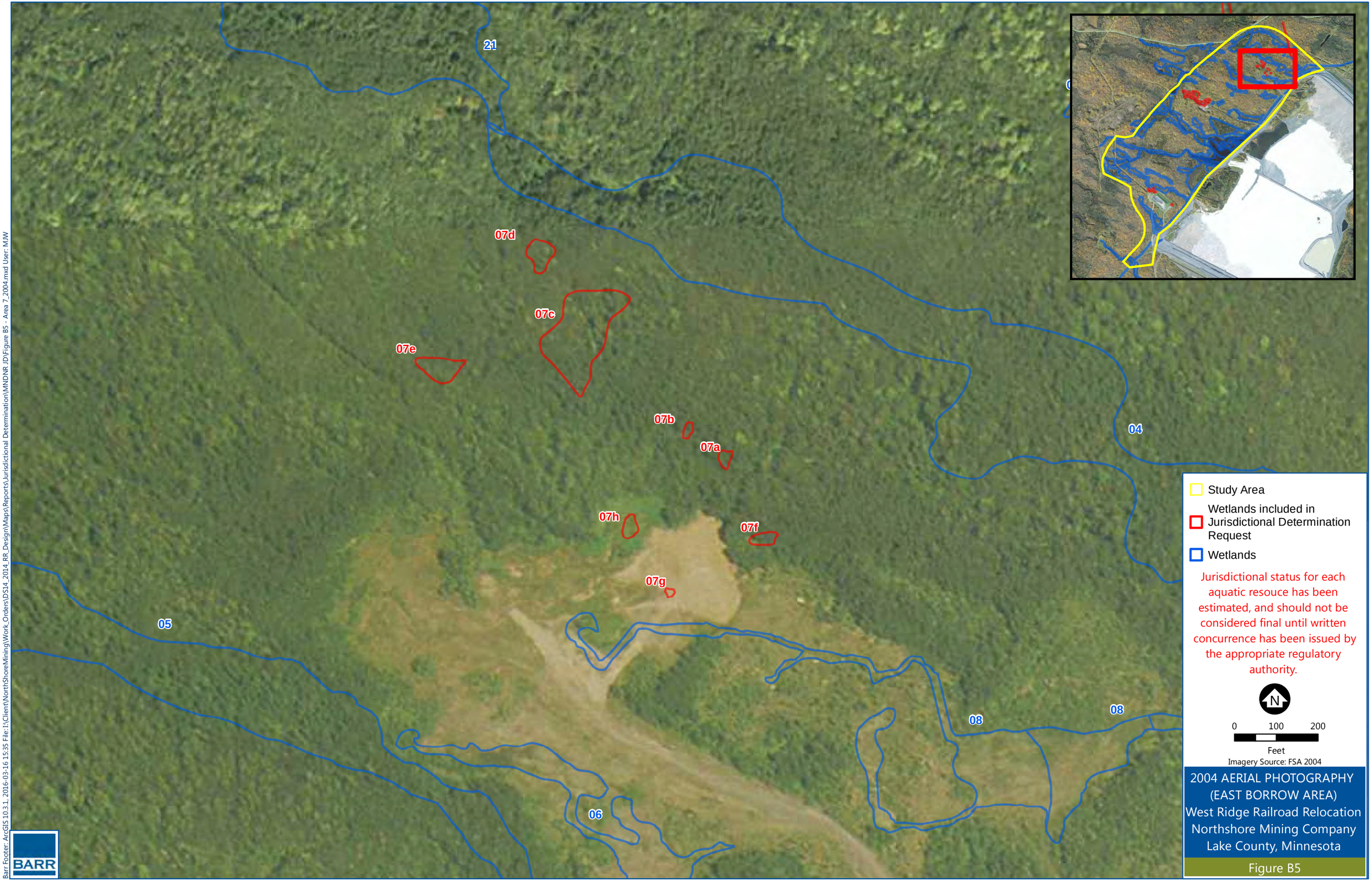
Imagery Source: USGS 1991

1991 AERIAL PHOTOGRAPHY
(EAST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B4

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:56 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure B4 - Area 7_1991.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2004

2004 AERIAL PHOTOGRAPHY (EAST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B5

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:35 File: J:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure B5 - Area 7_2004.mxd User: MJW

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2008

2008 AERIAL PHOTOGRAPHY (EAST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure B6

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:04 File:\\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure B6 - Area 7_2008.mxd User: MJW

2013 AERIAL PHOTOGRAPHY
(EAST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

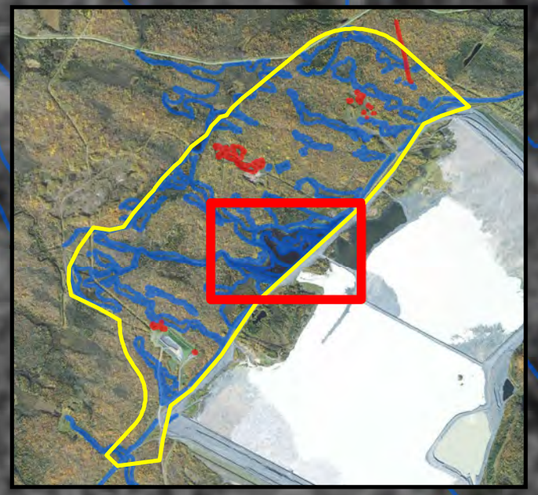
Figure B7

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:03 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure B7 - Area 7_2013v2.mxd User: MJW

Appendix C

Supplemental Maps of Murphy's Pond Area (Wetland/Deepwater 18)



17b
25
18
27
24
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

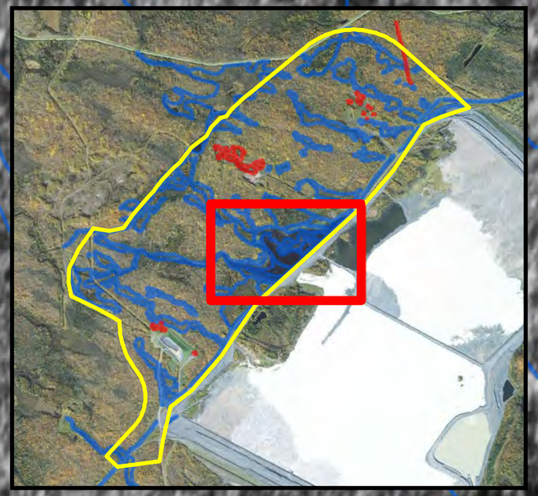
Imagery Source: MN DNR 1969

1969 AERIAL PHOTOGRAPHY (MURPHY'S POND)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C1

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:13 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C1 - Murphy_1969.mxd User: MJW



25
17b
22
18
23
27
24
18
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

Imagery Source: MN DNR 1977

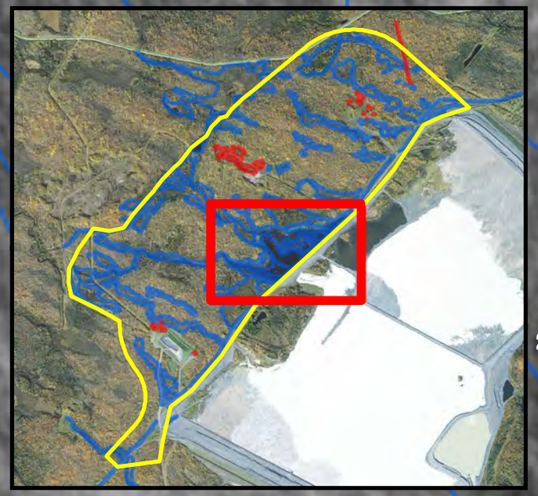
1977 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C2

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:15 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C2 - Murphy_1977.mxd User: MJW



17b
25
22
18
23
27
24
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

Imagery Source: Northshore 1980

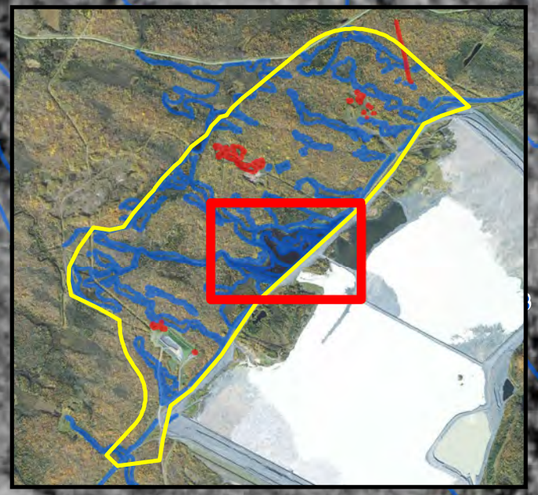
1980 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:16 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure C3 - Murphy_1980.mxd User: MJW



22

25

17b

18

27

24

15

Murphy's Pond 2015 Extent

Effective 2005 MP7 Permit Limits

Study Area

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: USGS 1991

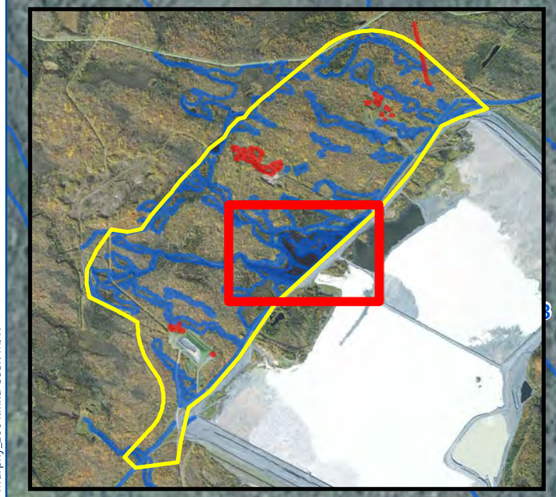
1991 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C4

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:11 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure C4 - Murphy_1991.mxd User: MJW



22
25
17b
18
27
24
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

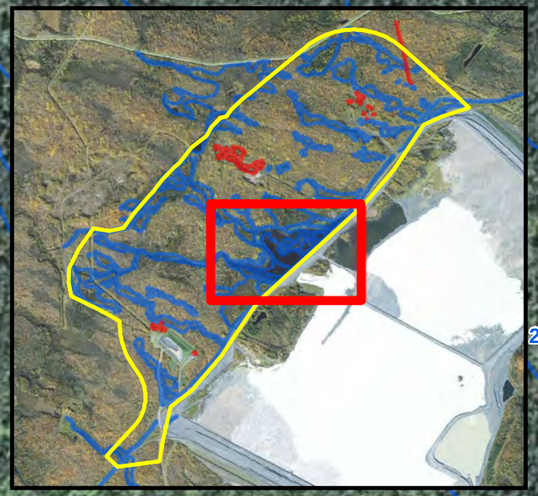
Imagery Source: FSA 2004

2004 AERIAL PHOTOGRAPHY (MURPHY'S POND)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C5

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:19 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C5 - Murphy_2004.mxd User: MJW



22
25
17b
18
23
27
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: FSA 2008

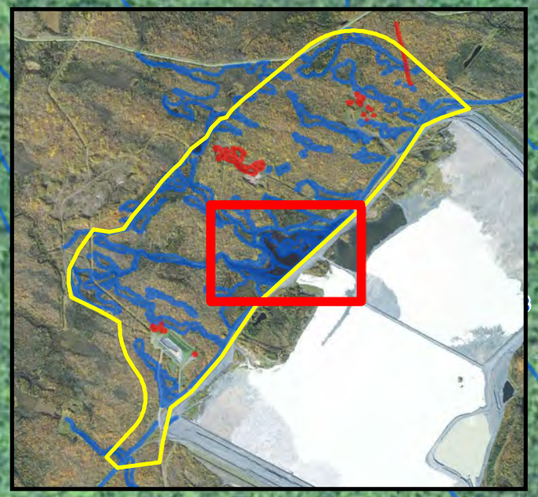
2008 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C6

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:56 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C6 - Murphy_2008.mxd User: MJW



Murphy's Pond 2015 Extent

Effective 2005 MP7 Permit Limits

Study Area

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: FSA 2013

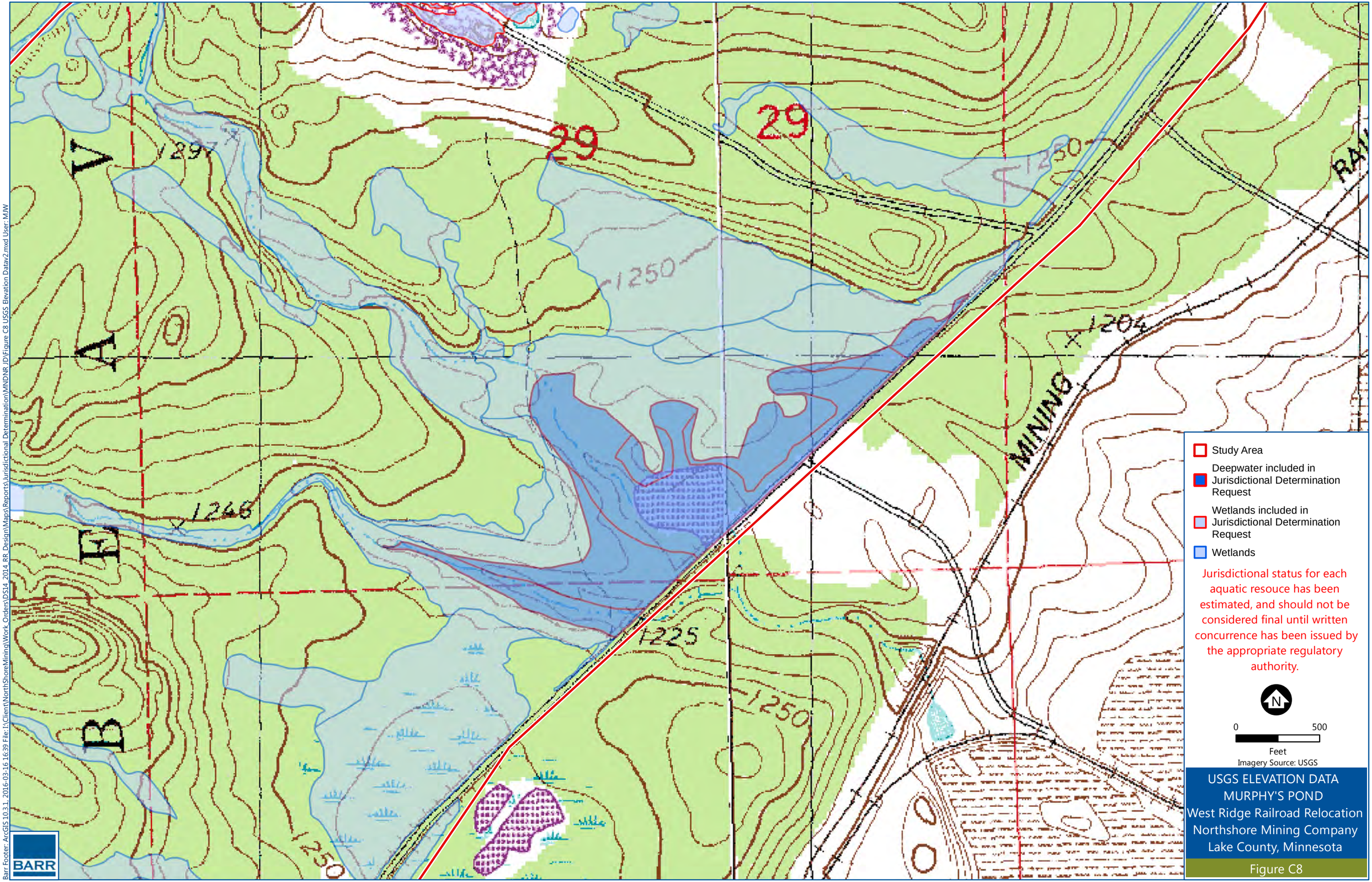
2013 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

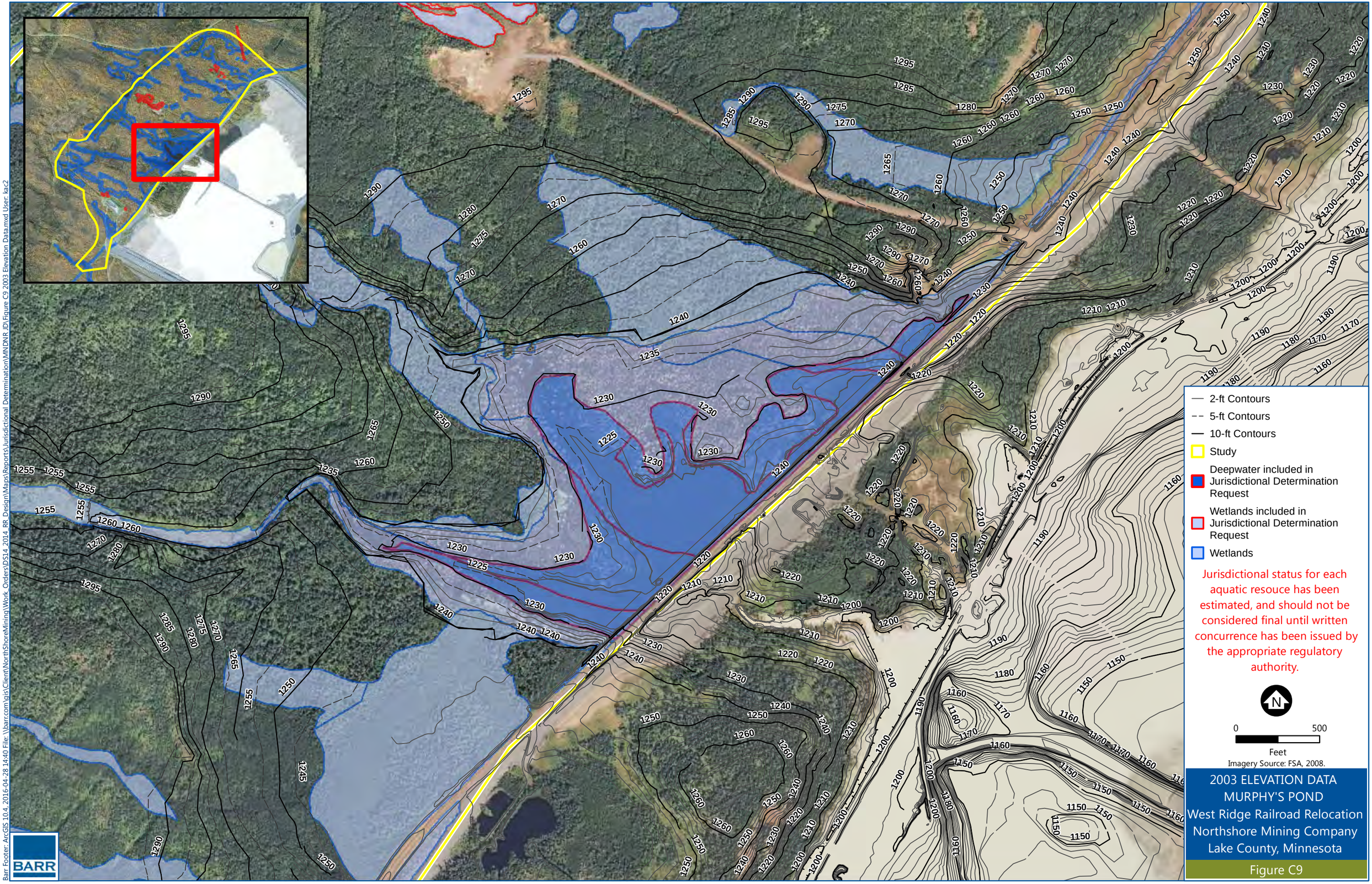
Figure C7

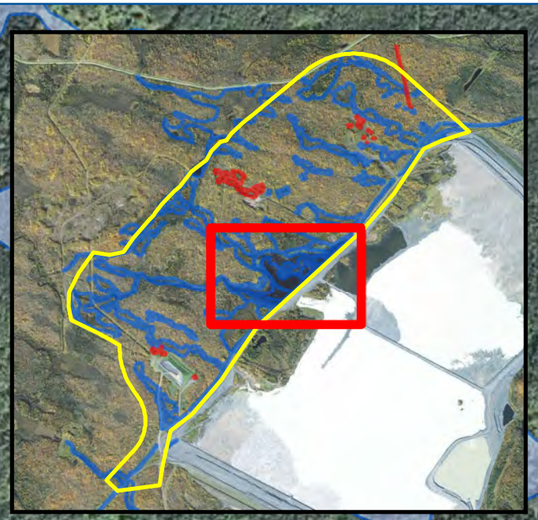
BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 10:58 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C7 - Murphy_2013v2.mxd User: MJW



Barr Footer: ArcGIS 10.3.1, 2016-03-16 16:39 File:I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure C8 USGS Elevation Datav2.mxd User: MJW





W-18H
W-18G
D-18O
D-18N
W-18D
W-18F
D-18M
W-18E
D-18L
D-18K
W-18C
D-18J
W-18B
D-18I
W-18A

Study

Habitat Changes

- Deepwater, artificially flooded upland
- Deepwater, artificially flooded wetland
- Wetland, artificially flooded upland
- Wetland, artificially flooded wetland
- Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 400

Feet

Imagery Source: FSA, 2008.

HABITAT CHANGES
MURPHY'S POND
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

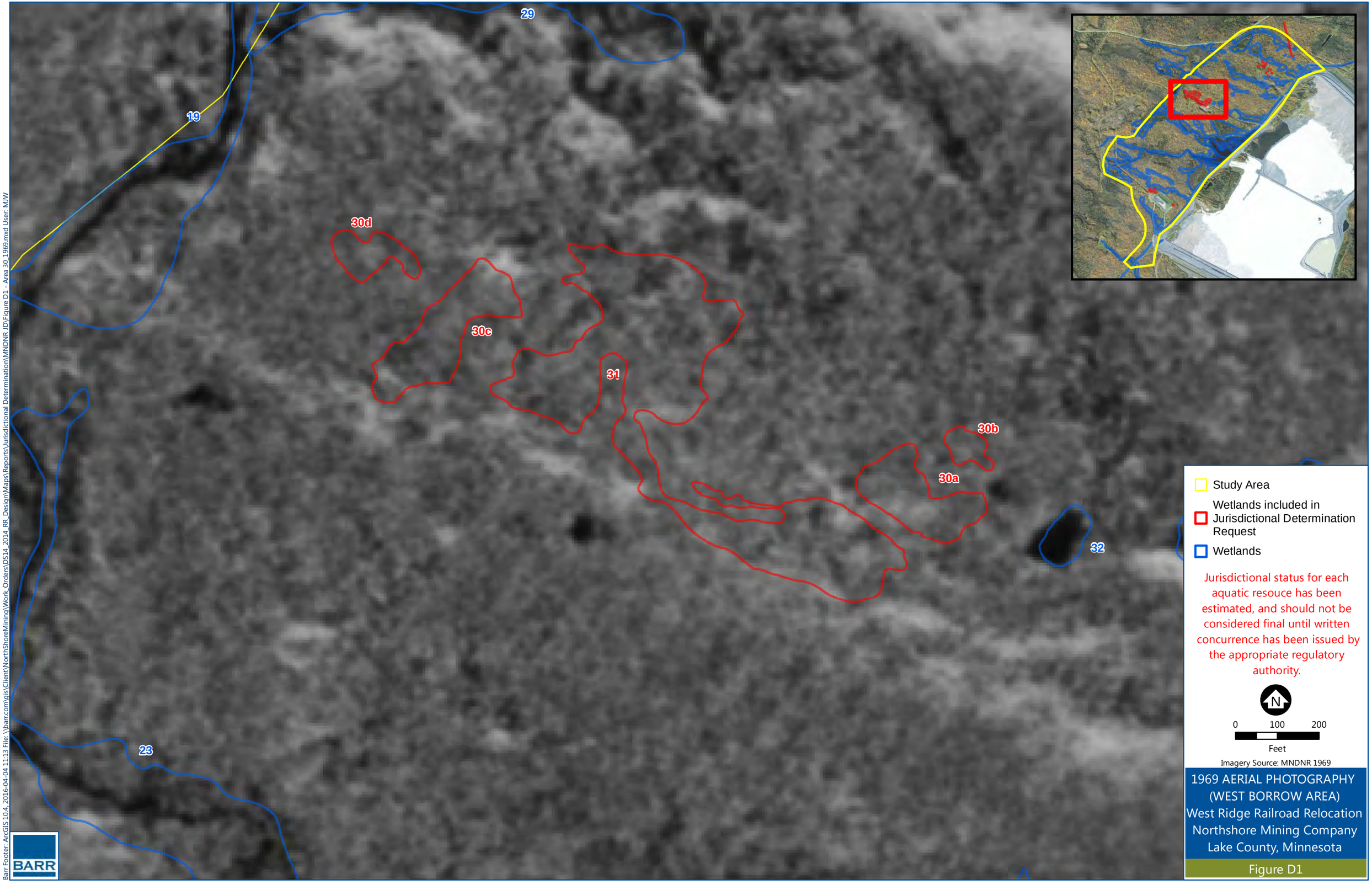
Figure C10

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 11:09 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_ID\Figure C10 Habitat Change.mxd User: MJW

Appendix D

Supplemental Maps of West Borrow Area (Wetlands 30A-30D, 31)



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

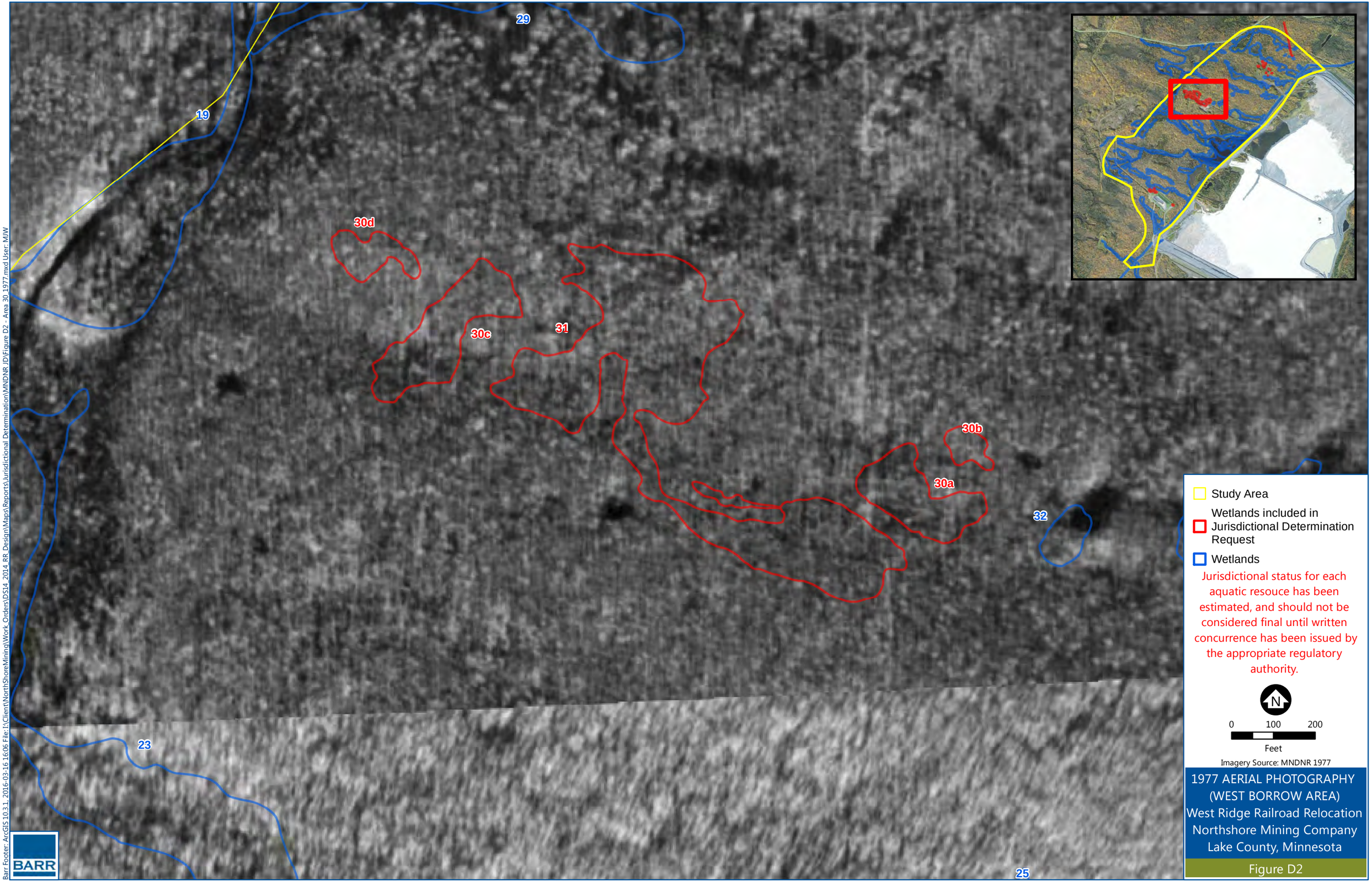
Imagery Source: MNDNR 1969

1969 AERIAL PHOTOGRAPHY (WEST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D1

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 11:13 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure D1 - Area 30_1969.mxd User: MJW

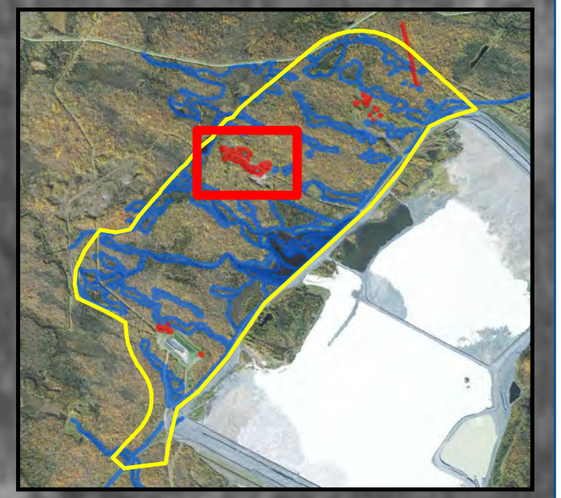


1977 AERIAL PHOTOGRAPHY
(WEST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D2

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 16:06 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure D2 - Area 30_1977.mxd User: MJW



29
19
30d
31
30c
30b
30a
32
23

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

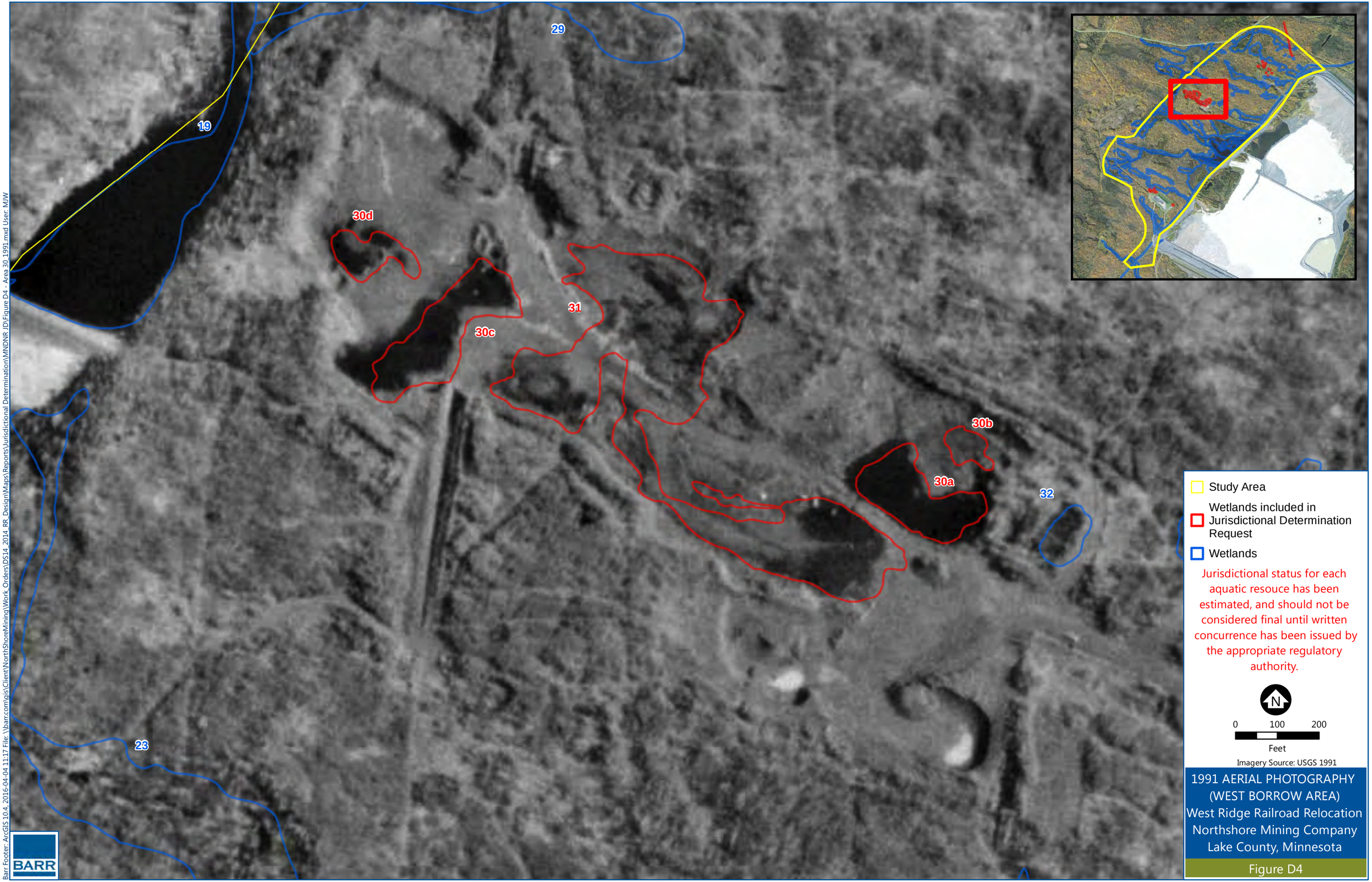
Imagery Source: Northshore 1980

1980 AERIAL PHOTOGRAPHY (WEST BORROW AREA)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 11:16 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure D3 - Area 30_1980.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

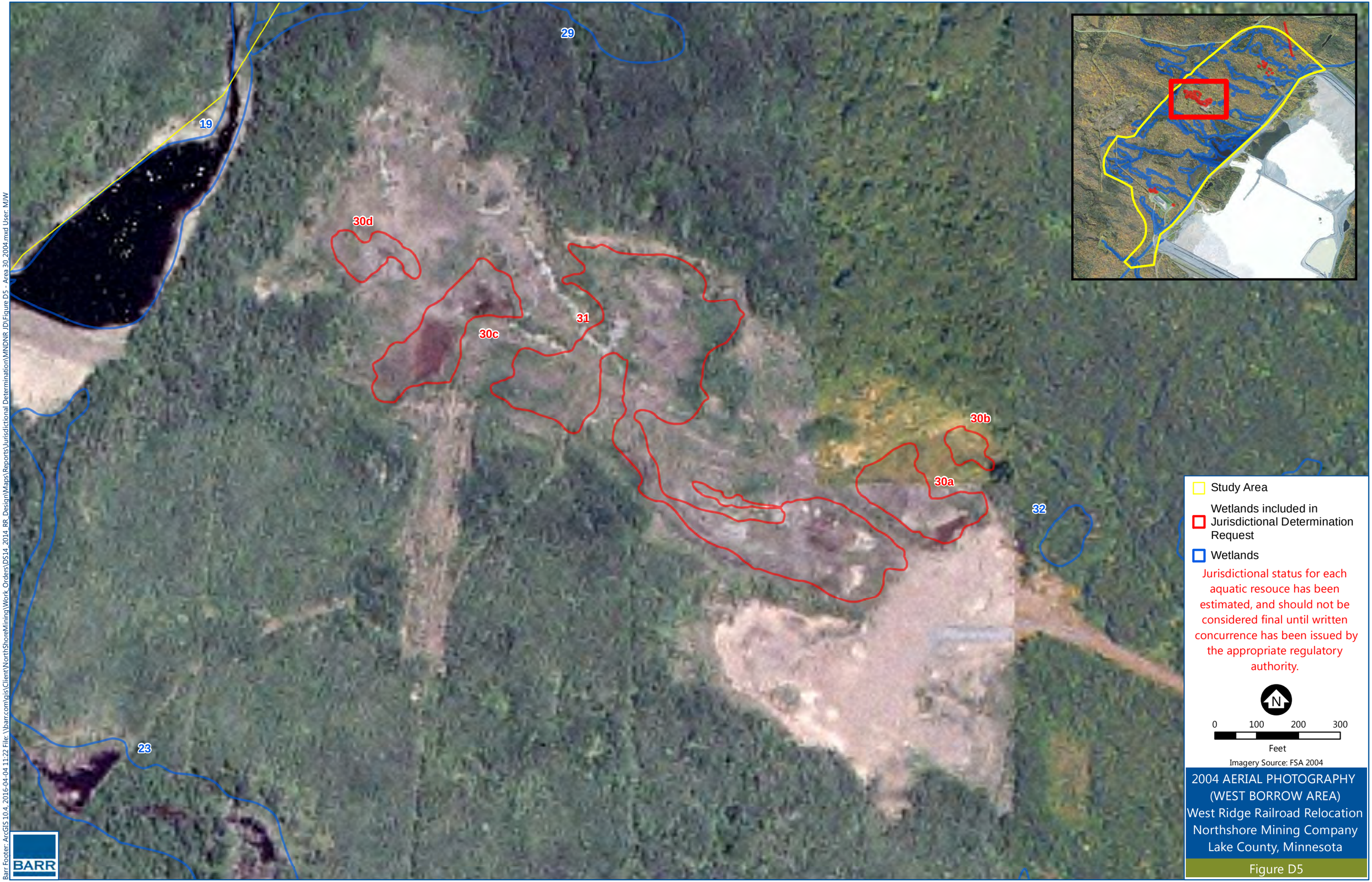
Imagery Source: USGS 1991

1991 AERIAL PHOTOGRAPHY (WEST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D4

BARR



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: FSA 2004

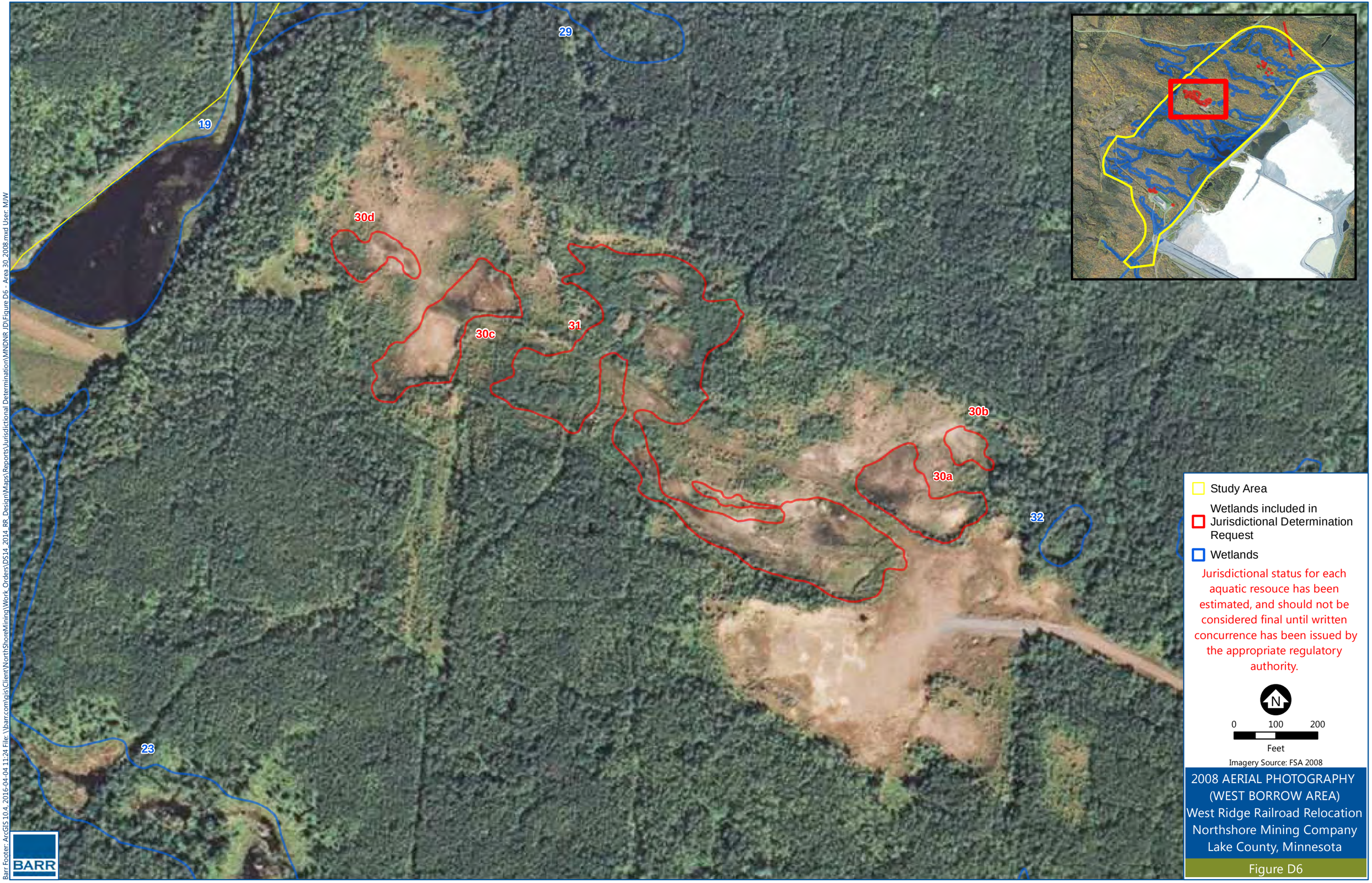
2004 AERIAL PHOTOGRAPHY (WEST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D5

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 11:22 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure D5 - Area 30_2004.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2008

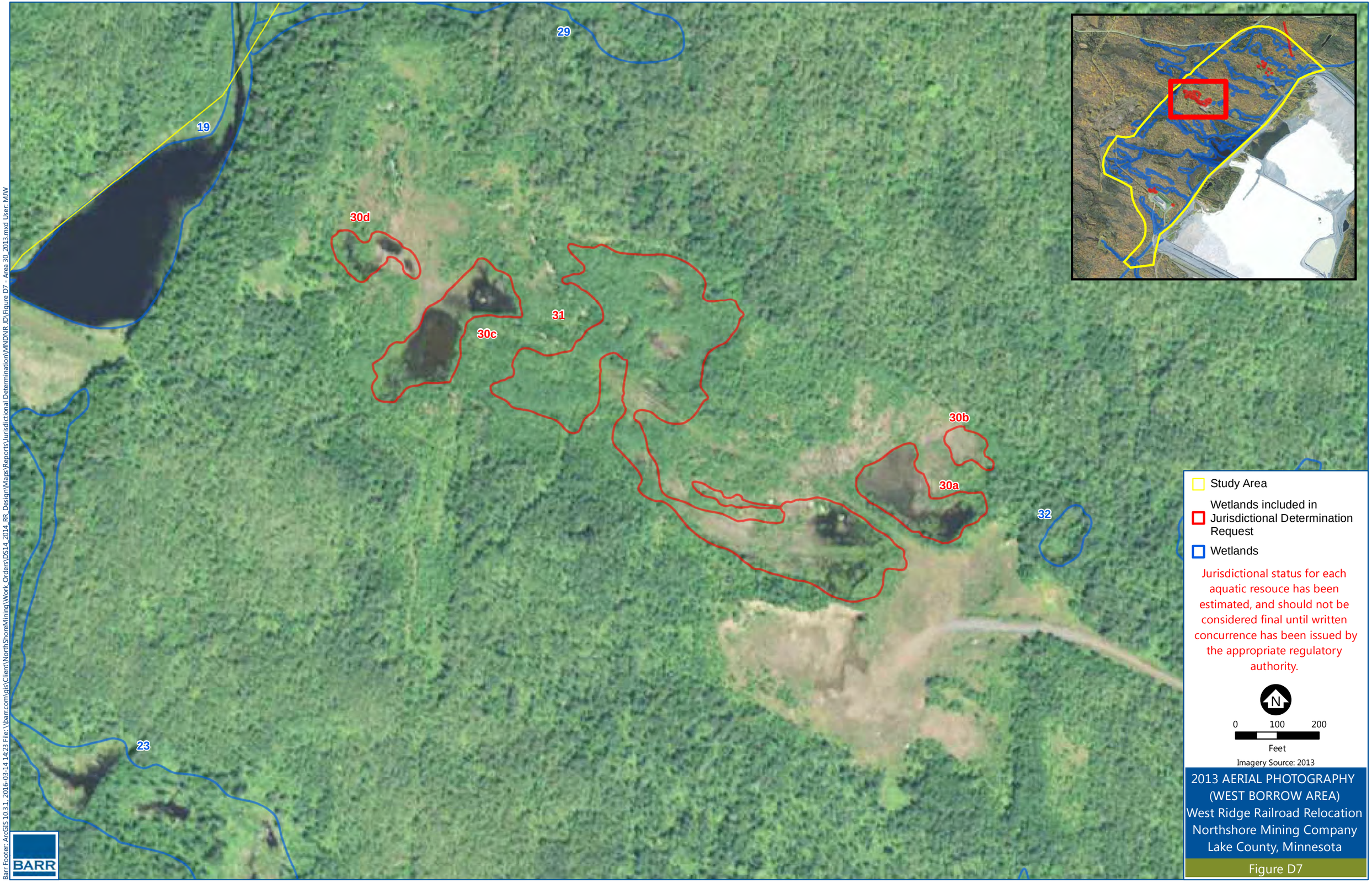
2008 AERIAL PHOTOGRAPHY (WEST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure D6

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 11:24 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure D6 - Area 30_2008.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: 2013

2013 AERIAL PHOTOGRAPHY (WEST BORROW AREA)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

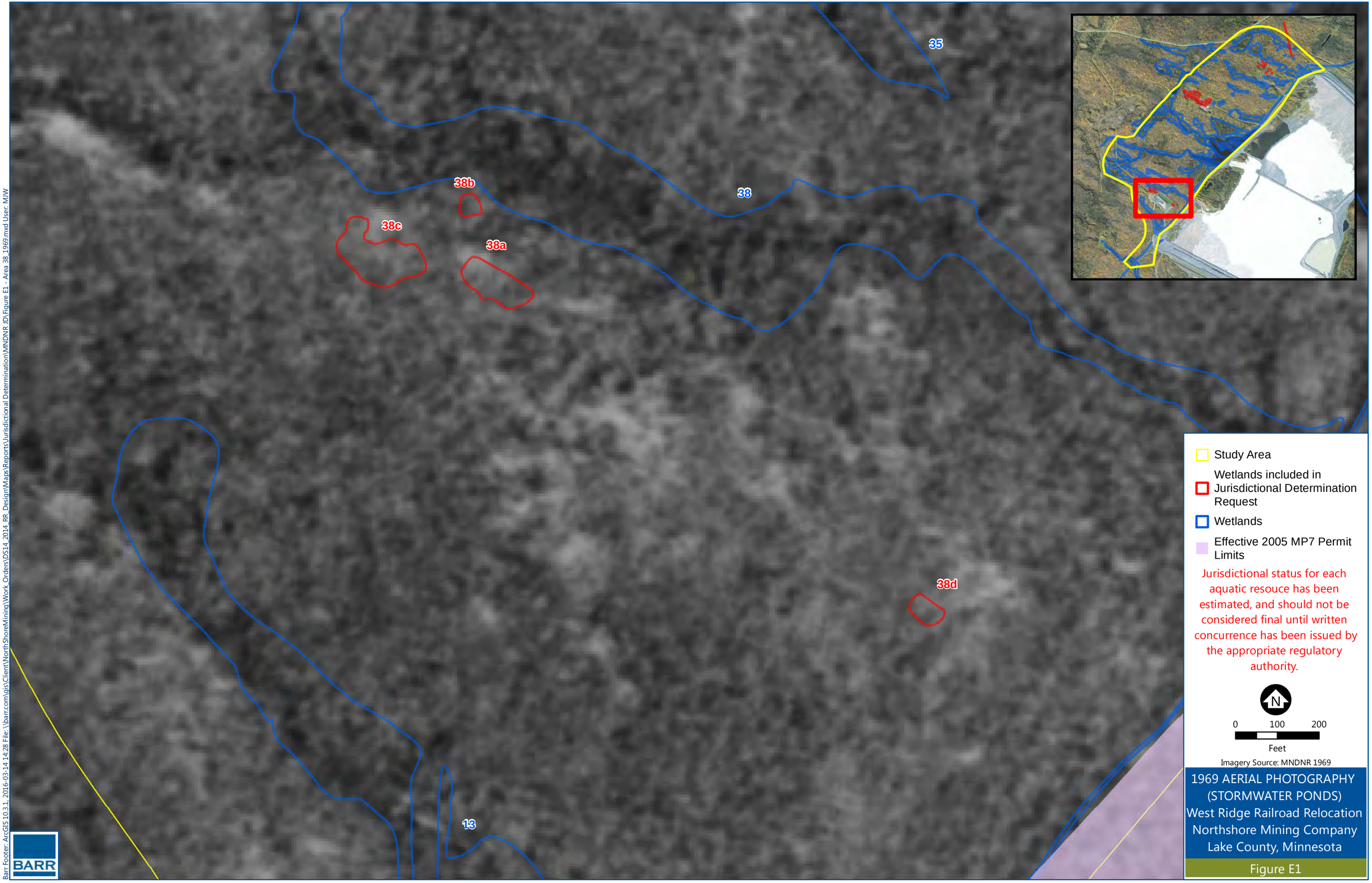
Figure D7

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:23 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure D7 - Area 30_2013.mxd User: MJW

Appendix E

Supplemental Maps of Stormwater Ponds (Wetlands 38A – 38D)

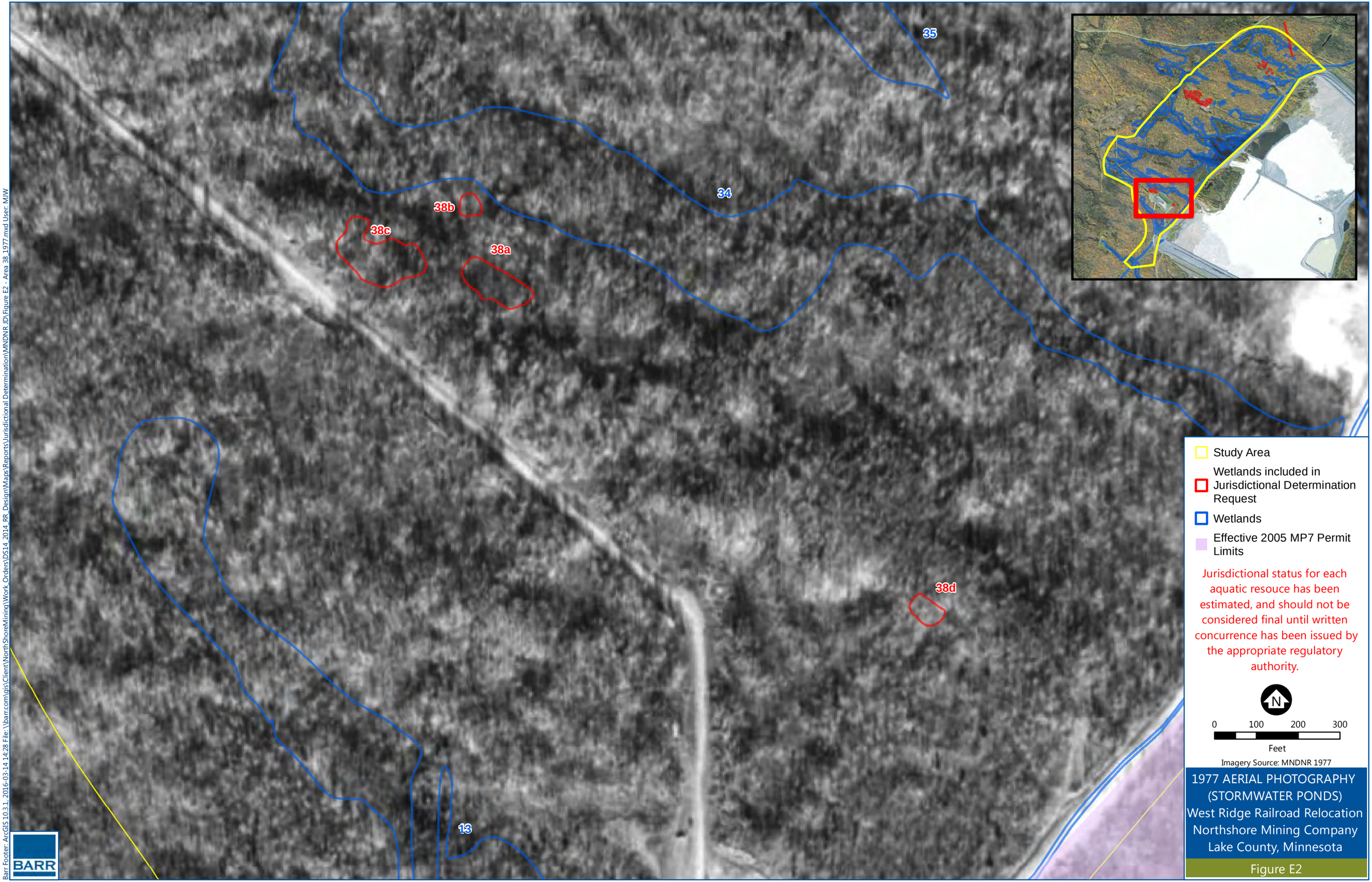


1969 AERIAL PHOTOGRAPHY
(STORMWATER PONDS)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E1

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:28 File:\\barr.com\gis\Client\NorthShoreMining\Work_Orders\D514_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure E1 - Area 38_1969.mxd User: MJW



1977 AERIAL PHOTOGRAPHY
(STORMWATER PONDS)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E2

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:28 File:\\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure E2 - Area 38_1977.mxd User: MJW

35

34

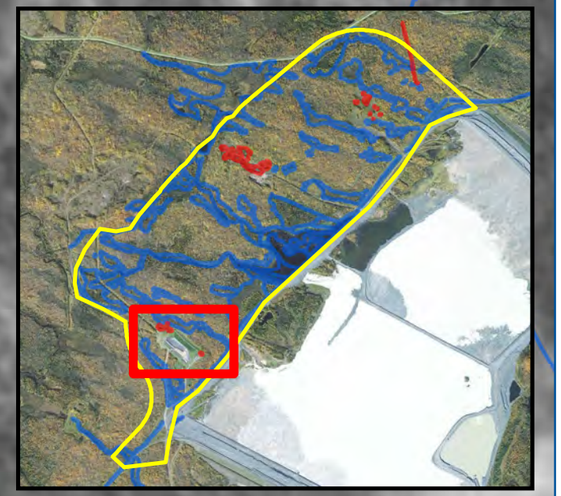
38b

38c

38a

38d

13



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

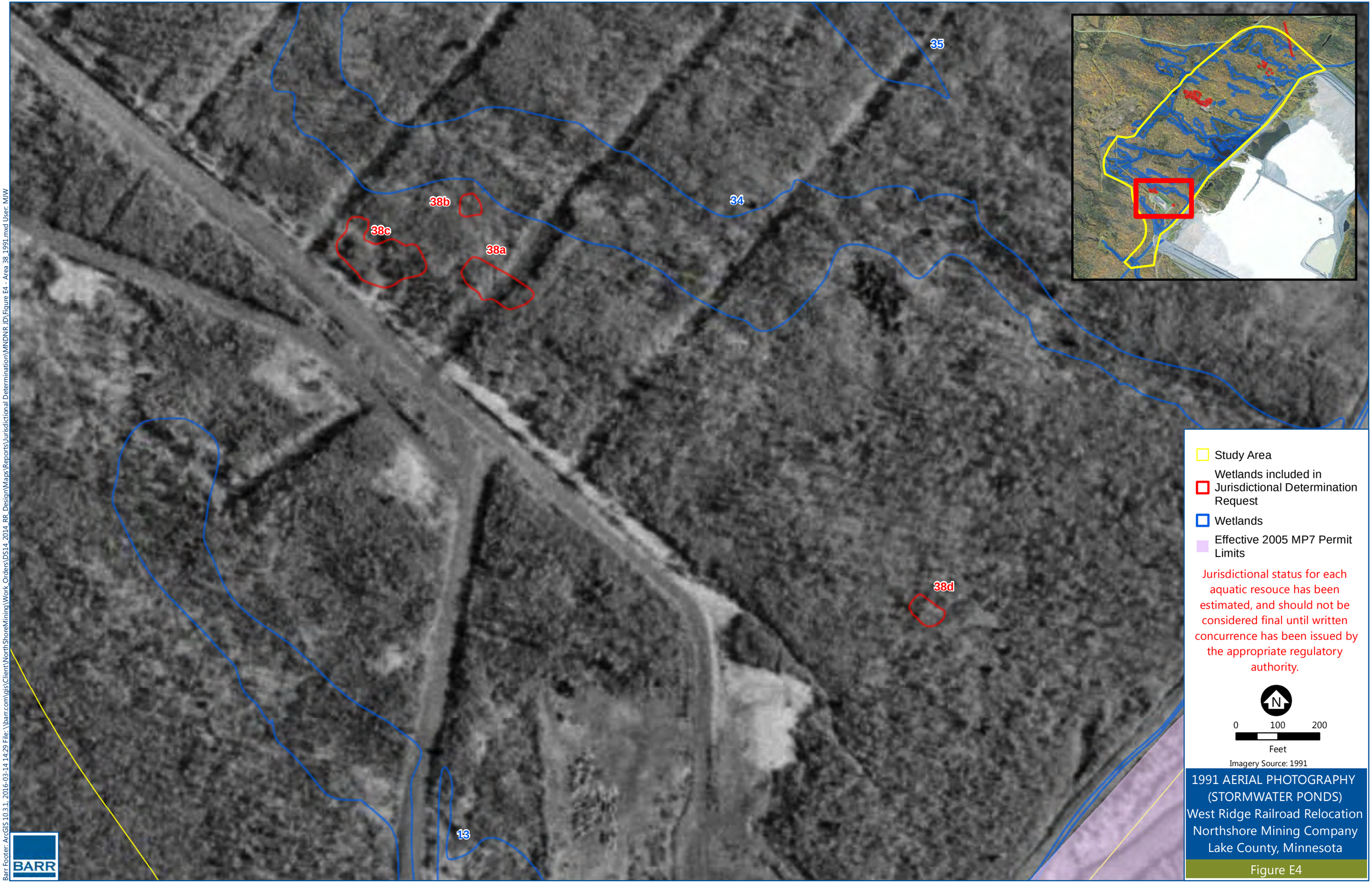
Imagery Source: Northshore 1980

1980 AERIAL PHOTOGRAPHY (STORMWATER PONDS)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E3

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:29 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure E3 - Area 38_1980.mxd User: MJW



Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: 1991

1991 AERIAL PHOTOGRAPHY (STORMWATER PONDS)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E4

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:29 File:\\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure E4 - Area 38_1991.mxd User: MJW

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2004

2004 AERIAL PHOTOGRAPHY (STORMWATER PONDS)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E5

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 12:56 File: \\barr.com\vjs\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure E5 - Area 38_2004.mxd User: MJW

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2008

2008 AERIAL PHOTOGRAPHY (STORMWATER PONDS)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E6

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 14:30 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure E6 - Area 38_2008.mxd User: MJW

Study Area

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: FSA 2013

2013 AERIAL PHOTOGRAPHY (STORMWATER PONDS)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure E7

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 12:58 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure E7 - Area 38_2013.mxd User: MJW

Appendix F

Site Photographs

Photograph 1 (#RIMG0070): Photo of wetland 2B taken on July 22, 2015.

Photograph 2 (#RIMG0192): Photo of wetland 7C taken on July 23, 2015.

Photograph 3 (#RIMG0189): Photo of upland landscape around East Borrow Area taken on July 23, 2015.

Photograph 4 (#R0016704): Photo of wetland 7E taken on July 22, 2015. This photograph is also representative of wetlands 7A, 7B, 7D, 7F, 7G, and 7H.

Photograph 5 (#RIMG0189): Photo of road impounding Murphy's Pond (wetland 18) taken on July 24, 2015.

Photograph 6 (#RIMG0194): Photo of Murphy's Pond (wetland 18) taken on July 24, 2015.

Photograph 7 (#R0014257): Photo of wetland 30C taken on August 12, 2015. This photograph is also representative of wetlands 30A, 30B, and 30D.

Photograph 8 (#R0014270): Photo of wetland 30A taken on August 12, 2015.

Photograph 9 (#R0016751): Photo around West Borrow Area taken on July 24, 2015.

Photograph 10 (#R0014345): Photo of wetland 38C taken on August 14, 2015. This photograph is also representative of conditions in wetlands 38A, 38B, and 38D.

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engineering and environmental consultants

BARR

Technical Memorandum

To: Daryl Wierzbinski (USACE)
From: Barr Engineering Company
Subject: Request for Section 404 Jurisdictional Determination on Northshore Mining Company's West Ridge Railroad Realignment Project
Date: April 28, 2016
Project: 23381049.00
c: Colleen Sullivan (MNDNR)
Lynda Peterson (BWSR)
Andrea Hayden (Northshore Mining Company)

Barr Engineering Company (Barr) has completed a jurisdictional analysis for Northshore Mining Company's (Northshore) West Ridge Railroad Realignment Project (Project) and identified 18 wetlands (totaling 10.4 acres) that appear to have no surface connection to Waters of the United States (WOTUS), and one deepwater habitat (37.9 acres). Other wetlands on the Project site have a surface connection to WOTUS via either East Beaver River or Beaver River, both of which flow to Lake Superior.

Barr hereby provides the documentation that the identified aquatic resources discussed herein are either hydrologically isolated, or are deepwater habitat, which would classify them as non-jurisdictional under Section 404 of the Clean Water Act (CWA). Barr requests that the U.S. Army Corps of Engineers review these findings and, if concurring, issue an Approved Jurisdictional Determination (AJD). Figures 1 through 6 show the location of the study area and provide some general information regarding the study site, and Figures 7 through 11 detail each of the five areas of interest. Table 1 summarizes the aquatic resources (wetlands and deepwater habitat) for which Northshore is seeking an AJD. Figures in Appendix A document the habitat changes that have occurred at the Murphy's Pond area. Appendix B includes site photographs taken during the 2015 wetland survey.

As it is expected that compensatory mitigation will be required for aquatic features that are jurisdictional under either Minnesota's Wetland Conservation Act (WCA) or Section 404 of the CWA, this request for a jurisdictional review is only for wetlands and deepwater habitats within the study area that are expected to be non-jurisdictional under both WCA and Section 404. Northshore will not be requesting jurisdictional review for the remaining wetlands in the study area that are expected to be jurisdictional under either or both the WCA or Section 404. On Northshore's behalf, Barr is providing an analogous jurisdictional review request to the Minnesota Department of Natural Resources (MNDNR), and will provide copies to the regulatory representatives from USACE and the Minnesota Board of Water and Soil Resources (BWSR).

It is recognized that Barr's jurisdictional analysis is only an estimate, and that the official jurisdictional status of each aquatic resource will be determined independently by each administrating regulatory

agency. Jurisdictional information should not be considered final until a written concurrence has been issued by the appropriate regulatory agency.

1.0 Project Background

Northshore proposes to re-align the West Ridge railroad at the Milepost 7 Tailings Basin, and modify the original designed progression of the tailings basin. The existing railroad embankment is the current western limit of the tailings basin. Tailings will continue to be deposited in the basin over the next several decades. This means that the existing western limit of the tailings basin needs to progress to the northwest, with the result that the railroad alignment also needs to be moved further north and west. The tailings basin would progress to the northwest over the next ~35 years, filling the area between the existing railroad and the new alignment. The proposed new railroad alignment would become the ultimate western limit of the tailings basin.

In 2015, Barr Engineering Company (Barr) conducted field wetland delineations in a 1,594-acre area (study area) that could be impacted by this project. The study area is located in Township 55 Range 8 Section 6, and Township 56 Range 8 Sections 20, 21, and 28 through 32. Technical data and other information on the Project wetlands were provided in the *West Ridge Railroad Relocation Final Wetland Delineation Report* (Wetland Report) submitted to MNDNR on October 23, 2015. A Technical Evaluation Panel (TEP) met at the site on October 12, 2015 to review the wetland delineation. The TEP requested minor changes to the wetland dataset, which were completed prior to this jurisdictional request. On March 9, 2016, Northshore received verbal concurrence on the wetland delineation from Daryl Wierzbinski (USACE). A written USACE concurrence letter is pending. On March 16, 2015, Colleen Sullivan (MNDNR) provided a signed Notice of Decision approving the wetland delineation report.

2.0 Hydrology

The study area is primarily located within the Lower Beaver River and the East Branch Beaver River minor watersheds, which are within the Lake Superior-South (#2) major watershed. These watersheds are located within Bank Service Area #1, and are estimated to have more than 80 percent of their pre-statehood wetlands remaining. Figure 3 shows public hydrography data for the study area, including the National Wetlands Inventory (NWI), the National Hydrography Dataset (NHD), and the Public Waters Inventory (PWI).

Within the East Branch Beaver River minor watershed at the north end of the study area, drainage is primarily from the west, flowing toward the southeast along wetland slopes and through Watercourses One and Two toward Murphy's Pond. Watercourses One and Two have intermittent flow within the site. Drainage from seasonally flooded wetland slopes is also intermittent. From the eastern railroad ditch,

water flows northeast out of the study area into Unnamed Creek, which discharges into the East Branch Beaver River. The East Branch Beaver River flows into the Beaver River, which flows into Lake Superior near the town of Beaver Bay, which is southeast of the study area.

Within the Lower Beaver River minor watershed at the south end of the study area, drainage is primarily from the west, flowing toward the southeast along wetland slopes into a canal ditch (Wetland 17a) at the southeast end of the site. The drainage from wetland slopes into the ditch is intermittent as the wetlands are seasonally flooded. This ditch discharges into the Beaver River south of the study area. The Beaver River flows into Lake Superior near the town of Beaver Bay, which is southeast of the study area.

The MNDNR is currently in the process of updating the records for Big Thirtynine and Little Thirtynine Creeks in the trout stream and PWI datasets. In March 2015, Barr submitted a request to the MNDNR, requesting concurrence that Watercourses 1 and 2 should be removed from the PWI, and are not considered trout streams. On March 15, 2016, MNDNR Mining Hydrologist Mike Liljegren issued an email that summarized the MNDNR's internal discussion on the issue, and concurred with Barr's request. Additional discussion on this matter is included in the final wetland delineation report (October 2015).

The nearest Public Water Basin is Bear Lake, which is over 1.5 miles southeast of the study area. However, the Milepost 7 tailings basin is located downslope of the study area, and upslope of Bear Lake, which precludes any surface water connections between the study area wetlands and Bear Lake.

3.0 Methodology

To determine if wetlands have surficial hydrologic connections to navigable waters, Barr looks for evidence of surficial drainage from each aquatic resource, and tracks the connectivity and flow paths of surface water, whether permanent or intermittent. Isolated wetlands are located in topographically-enclosed depressions with no apparent surface water outlets. Topographic and hydrographic data are reviewed in GIS, along with current and historical aerial photographs. Deepwater habitats are defined by the persistence of inundation over 6.6 feet deep and the absence of live vegetation.

4.0 Results of Preliminary Jurisdictional Analysis

The 18 wetlands and one deepwater habitat included in this request are grouped into five locations across the study area that share origins and physical characteristics (Figure 6). Observations and interpretations are included below for each of the five locations.

4.1 Ditch (Wetland 2B)

Wetland 2B is located in a constructed ditch in the north part of the study area. It is a straight linear feature, oriented north-northwest to south-southeast. It is approximately 1,900 feet long, 17 feet wide, and approximately 3 feet deep. The ditch was excavated in an upland area, and the spoils were placed on the east side of the ditch and shaped into a raised road grade. Wetland 2B formed in the concave depression of this ditch. Current conditions of this area are shown in Figure 7.

Wetland 2B is connected to a larger, natural wetland community (Wetland 2A), but was not described separately in the 2015 wetland delineation report. For the purposes of the jurisdictional analysis, the "Wetland 2" polygon was subdivided into "Wetland 2A" (the natural wetland) and "Wetland 2B" (the constructed ditch wetland) (Figure 6). Both Wetland 2A and 2B appear to lack a surficial hydrologic connection to navigable waters.

The following observations suggest that this wetland does not have a surficial hydrologic connection to navigable waters:

- Field observations at the downslope end of the wetland indicate the absence of a surface water discharge (permanent or intermittent) from the wetland.

- An examination of the surrounding topography shows that wetland 2B extends from a higher ground surface elevation of 1,342 feet above mean sea level (AMSL) and slopes south to a lower ground surface elevation of approximately 1,294 feet AMSL (Figure 7). The north end of the wetland 2B is approximately 30 feet lower than the surrounding upland at a maximum elevation of 1,372 feet AMSL. The southernmost, downslope end of the wetland has a subtle ridge 1 to 2 feet higher that deters overland flow out of the wetland.

4.2 East Borrow Area (Wetlands 7a through 7h)

Wetlands 7a, 7b, 7c, 7d, 7e, 7f, 7g and 7h are located in the northeast part of the study area. The wetlands were created from the removal of native upland soil material and used to construct other on-site features.

- Field observations at the downslope end of the wetland indicate the absence of a surface water discharge (permanent or intermittent) from the wetland.

- An examination of the surrounding topography show the following (Figure 8):

Wetland 7a is located at an elevation of approximately 1,298 feet AMSL, and is surrounded by concentric topographic lines indicating no outlets. The surrounding upland is approximately 4 feet higher than the disturbed adjacent upland surface ranging from an elevation of 1,300 to 1,302 feet AMSL.

Wetland 7b is located at an elevation between 1,304 to 1,306 feet AMSL, and is surrounded on the north and west sides by upland that is approximately 4 feet higher. The downslope side of the wetland has a subtle ridge (not shown on the figure) that deters surface water flow out of the wetland.

Wetland 7c is located at an elevation of 1,322 feet AMSL. The adjacent upland area surrounds the entire wetland at elevations ranging from 1,324 to 1,326 feet AMSL, approximately 4 feet higher than the elevation of the wetland which deters surface water flow out of the wetland.

Wetland 7d and **Wetland 7e** are located between elevations of 1,328 to 1,330 feet AMSL. The wetlands are about 10 to 14 feet lower than the surrounding, disturbed upland at an approximate surface elevation of 1,340 to 1,344 feet AMSL. The south, downslope side of each wetland has subtle ridges (not shown on the figure) that deter surface water flow out of each of the wetlands.

Wetland 7f is located at an elevation of 1,300 feet AMSL. The adjacent upland area surrounds the entire wetland at elevations ranging from 1,302 to 1,306 feet AMSL, approximately 4 feet higher than the elevation of the wetland which deter surface water flow out of the wetland.

Wetland 7g is located between elevations of 1,286 to 1,288 feet AMSL. The wetland is about 20 feet lower than the surrounding disturbed upland area to the north at an approximate elevation of 1,304 feet AMSL. On the south, downslope side of the wetland, a subtle 1 feet ridge (not shown on the figure) deters surface water flow out of the wetland.

Wetland 7h is located between elevations of 1,318 to 1,320 feet AMSL. The wetland is about 2 feet lower than the surrounding disturbed upland area to the south, at an approximate elevation of 1,322 feet AMSL. To the north of the wetland, a subtle ridge (not visible on the figure) deters surface water flow out of the wetland.

4.3 Murphy's Pond (Wetland/Deepwater 18)

Wetland/Deepwater 18 is an area that became artificially flooded after the permitted construction of a railroad grade and tailings basin berm. The fill impeded surface runoff from the remnant watercourses of the previously diverted Big Thirtynine and Little Thirtynine Creeks, and inundated both wetland and upland habitats that were adjacent to the railroad grade. This flooded area is now informally known as Murphy's Pond. In the wetland report, this area was mapped as Wetland 18 and the deepwater component of this area was not shown or quantified.

Murphy's Pond has expanded over the years such that part of the pond is now deeper than 6.6 feet, and qualifies for classification as deepwater habitat. The depth of the pond was determined by comparing the current water elevations from 2012 Minnesota LiDAR derived 2-foot contours (Figure A8) to the 2003 2-foot contour topographic map (Figure A9). The approximate water elevation of Murphy's pond, 1,240 feet was used because of the slight differences in the 2012 and 2003 topographic datasets. The 1,230-foot contour from the 2003 data was used to approximation deepwater habitat acreage. When all relevant factors were considered, it was estimated that 37.9 acres of Murphy's Pond would qualify for classification as deepwater habitat (Table 2, Figure A10).

It is estimated that there are four types of habitat changes that occurred in this area as a result of the impoundment and flooding: uplands converted to wetlands, uplands converted to deepwater habitat, wetlands converted to wetter wetlands, and wetlands converted to deepwater habitat. Table 2 and Figure A10 detail the evolution of the Murphy's Pond site from 1969 to 2015. The polygon of Wetland 18 (as mapped in 2015) has been divided into wetland and deepwater habitats, and subdivided into estimated original habitats. Current wetland areas were divided into "previously wetland" and "previously upland" areas; current deepwater areas were also divided into "previously wetland" and "previously upland" areas. Figure 9 shows the conditions of the Murphy's Pond area in 2015.

Photographs 5 and 6 in Appendix B show the constructed impoundment, as well as open water conditions in areas containing flooded and drowned trees.

4.4 West Borrow Area (Wetlands 30a though 30d, and 31)

Wetlands 30a, 30b, 30c, 30d and 31 are located in the north central part of the study area. The wetlands were created from the removal of native upland soil material for activities such as road building. For the purpose of describing the wetland and upland topography in the disturbed area around wetlands 30a through 30d and 31, the wetlands have been grouped into northern wetlands and the southern wetlands or parts of the wetland has been used to describe it in detail.

The following observations suggest that these wetlands do not have a surficial connection to navigable waters:

- Field observations for wetlands 30a, 30b, 30c and 30d lack any evidence of channels downslope from any of the wetlands and current or former channelized flow out of the wetlands. Wetland 31 is on a slight slope and has a broad northern portion that has a narrow sloping channel to the southeast with subsurface flow that seeps into the southern portion of wetland 31. Off of the southern broader portion of wetland 31 there is a long, sloping seepage that empties via subsurface drainage to the broad southern portion of wetland 31. All wetlands lack any evidence of current or former channelized flow out of the wetlands. The bedrock is within 20 to 40 inches of the soil surface in the long narrow steep slopes causing perching of water and subsurface water flow in wetland 31.

- Study of the surrounding topography show the following (Figure 10):

  Setting of Northern and Southern Wetlands-The ground elevations for the northern wetlands (wetlands 30c, 30d and the northern portion of wetland 31) are about 20 feet higher than for the southern wetlands (wetlands 30a, 30b and the southern portion of wetland 31).The northern group of wetlands are about 10 to 30 feet lower in elevation than the surrounding native upland soils. Wetlands 30c and the northern portion of wetland 31 have a ground surface elevation of about 1,344 feet AMSL while wetland 30d has a ground surface elevation of 1,346 feet AMSL. The approximate upland ground surface elevation range from 1,354 to 1,374 feet above AMSL. The southern wetlands (wetlands 30a, 30b and the southern portion of wetland 31) are about 2 to 30 feet lower in elevation than the surrounding upland landscape. The elevation of the surrounding uplands at higher elevation on the north, east and south sides of the borrow pit where the southern wetlands are located range from 1,318 to 1,342 feet AMSL.

  Wetland 30a is located at a ground surface elevation about 1,308 feet AMSL.

  Wetland 30b is located at an elevation between 1,308 to 1,310 feet AMSL level.

  Wetland 31 south is located at an elevation about 1,310 for the broader portion of the basin and 1,316 feet AMSL for some of the slightly narrow portions of the basin.

  Long narrow seepage channel that connects wetland 31 northern and southern portions has an upper elevation of 1,340 feet AMSL at the upper end of the slope and with a lower elevation of the wetland of 1,316 feet AMSL.

Long narrow seepage channel connected to southern portion has an upper elevation of about 1,327 feet AMSL and a lower elevation of about 1,311 feet AMSL.

4.5 Stormwater Ponds (Wetlands 38a through 38d)

Wetlands 38a, 38b, 38c, and 38d are located in the southeast corner of the study area. These wetlands most likely were created to capture storm water. The following observations suggest that this wetland does not have a surficial connection to navigable waters:

- Field observations for each of the wetlands lack any evidence of channels downslope from any of the wetlands and current or former channelized flow out of the wetlands.

- Study of the surrounding topography show the following (Figure 11):

  Wetland 38a and **38b** are located at a ground surface elevation of approximately 1,324 feet AMSL. The wetlands are 4 to 10 feet lower than the surrounding upland ground surface ranging from an approximate elevation of 1,328 to 1,334 feet AMSL.

  Wetland 38c is located between surface ground elevations of 1,324 and 1,326 feet AMSL. The wetland is 2 to 5 feet lower than the surrounding upland ground surface ranging from an approximate elevation of 1,327 to 1,330 feet AMSL. The northeast, downslope boundary of this wetland has a slight ridge that deters water flow out of the wetland.

  Wetland 38d is located at a ground surface elevation of approximately 1,316 to 1,318 feet AMSL, and is surrounded by concentric topographic lines indicating no outlets. The wetland is about 8ft. lower than the surrounding disturbed, adjacent upland surface at an approximate elevation of 1326 feet AMSL. The northeast, downslope boundary of the wetland has a subtle ridge (not shown on the figure) that deters water flow out of the wetland.

5.0 Schedule

Pending your determination of the jurisdictional status of the wetlands in the study area, Northshore plans to prepare and submit a "Joint Application Form for Activities Affecting Water Resources in Minnesota", including a permit under the WCA. Northshore currently anticipates that the joint application will be submitted in June 2016.

List of Attachments

Tables

Figures

Appendices

Tables

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Ditch	2B	Wetland	Hardwood Swamp	7	Moderate	July 2015	Non-natural	Excavated ditch created between 1977 and 1991. Approximately 1900 feet long, 17 feet wide, and 3 feet deep. Spoils were deposited on east side of ditch and graded to form a raised road.	Wetland is located within a topographically-enclosed depression. The downslope (south) end was inspected; no surficial outlets were observed.	1294-1340	56N	8E	21	NESW, SESW	0.9	0
East Borrow Area	7a	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1298	56N	8E	28	NWNW	0.02	0
East Borrow Area	7b	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1305	56N	8E	28	NWNW	0.02	0
East Borrow Area	7c	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1323	56N	8E	21	SWSW	0.6	0
East Borrow Area	7d	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
East Borrow Area	7e	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0
East Borrow Area	7f	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1300	56N	8E	28	NWNW	0.04	0
East Borrow Area	7g	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1292	56N	8E	28	NWNW	0.01	0
East Borrow Area	7h	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1317	56N	8E	28	NWNW	0.04	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Murphy's Pond	18 (D-18I)	Deepwater	---	---	---	July 2015	Non-natural	Initial impoundment developed from the construction of a road on the southeast side of Murphy's pond between 1977 and 1980. Between 1980 and 1991, a ditch was constructed diverting flow from Murphy's Pond to the north around the tailings basin to the East Beaver River. In 2005, the outlet elevation to the north was raised and the ditch was rerouted, flooding over 81 acres.	"Murphy's Pond" connects with roadside ditches and water flow continues to the northeast to East Beaver River. (The outlet of the Murphy's Pond wetland is at 1240 feet MSL.)	1238	56N	8E	32	NWNE, NENW	0	3.7
													29	SESW		
	18 (D-18J)											8E	32	NWNE, NENW	0	7.6
													29	SESW, SWSE		
	18 (D-18K)											8E	29	SESW, SWSE, SESE	0	19.2
	18 (D-18L)											8E	29	SWSE	0	1.3
	18 (D-18M)											8E	29	SWSE, SESE	0	4.1
	18 (D-18N)											8E	29	SESE, NESE	0	1.0
	18 (D-18O)											8E	29	SESE, NESE	0	1.1
West Borrow Area	30a	Wetland	Sedge Meadow	2	High	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308	56N	8E	29	SENW	0.8	0
West Borrow Area	30b	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1312	56N	8E	29	SENW	0.2	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
West Borrow Area	30c	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1344	56N	8E	29	SWNW, NWNW, SENW	1.1	0
West Borrow Area	30d	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1348	56N	8E	29	NWNW	0.4	0
West Borrow Area	31	Wetland	Alder Thicket	6	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308-1346	56N	8E	29	SENW, SWNW, NENW	5.3	0
Stormwater Ponds	38a	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1324	56N	8E	31	SENE	0.3	0
Stormwater Ponds	38b	Wetland	Shallow Marsh	3	Medium	August 2015	Non-natural	Stormwater pond constructed in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1322	56N	8E	31	SENE	0.1	0
Stormwater Ponds	38c	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond excavatued in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1326	56N	8E	31	SENE, SWNE	0.5	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Stormwater Ponds	38d	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1318	56N	8E	32	SWNW	0.1	0
														Subtotals:	**10.4**	**37.9**
														Totals:	**48.3**	

Table 2
Estimated Habitat Evolution in Murphy's Pond Area (Wetland 18)
West Ridge Railroad Realignment
Northshore Mining Company

Polygon label	2015 Conditions	1969			2015		
		Upland (acres)	Wetland (acres)	Deepwater (acres)	Upland (acres)	Wetland (acres)	Deepwater (acres)
W-18A	Wetland (artificially flooded upland)	0.2	0	0	0	0.2	0
W-18B	Wetland (artificially flooded wetland)	0	6.6	0	0	6.6	0
W-18C	Wetland (artificially flooded upland)	7.3	0	0	0	7.3	0
W-18D	Wetland (artificially flooded wetland)	0	13.0	0	0	13.0	0
W-18E	Wetland (artificially flooded upland)	0.7	0	0	0	0.7	0
W-18F	Wetland (artificially flooded upland)	3.5	0	0	0	3.5	0
W-18G	Wetland (artificially flooded upland)	5.3	0	0	0	5.3	0
W-18H	Wetland (artificially flooded wetland)	0	6.6	0	0	6.6	0
D-18I	Deepwater (artificially flooded wetland)	0	3.7	0	0	0	3.7
D-18J	Deepwater (artificially flooded upland)	7.6	0	0	0	0	7.6
D-18K	Deepwater (artificially flooded wetland)	0	19.2	0	0	0	19.2
D-18L	Deepwater (artificially flooded upland)	1.3	0	0	0	0	1.3
D-18M	Deepwater (artificially flooded upland)	4.1	0	0	0	0	4.1
D-18N	Deepwater (artificially flooded upland)	1.0	0	0	0	0	1.0
D-18O	Deepwater (artificially flooded wetland)	0	1.1	0	0	0	1.1
	Subtotals:	**31.0**	**50.2**	**0.0**	**0**	**43.2**	**37.9**
	Totals:	**81.1**			**81.1**		

This table shows the estimated habitat distribution of the Murphy's Pond area for both 1969 and 2015. In 2015, this area was mapped as Wetland 18, and wetland and deepwater habitats were combined into a single polygon. This table shows the habitat changes that occurred after a constructed road impounded surface water drainage.

Figures

2015 Wetland Delineation Study Area

N

0 1,000 2,000 4,000

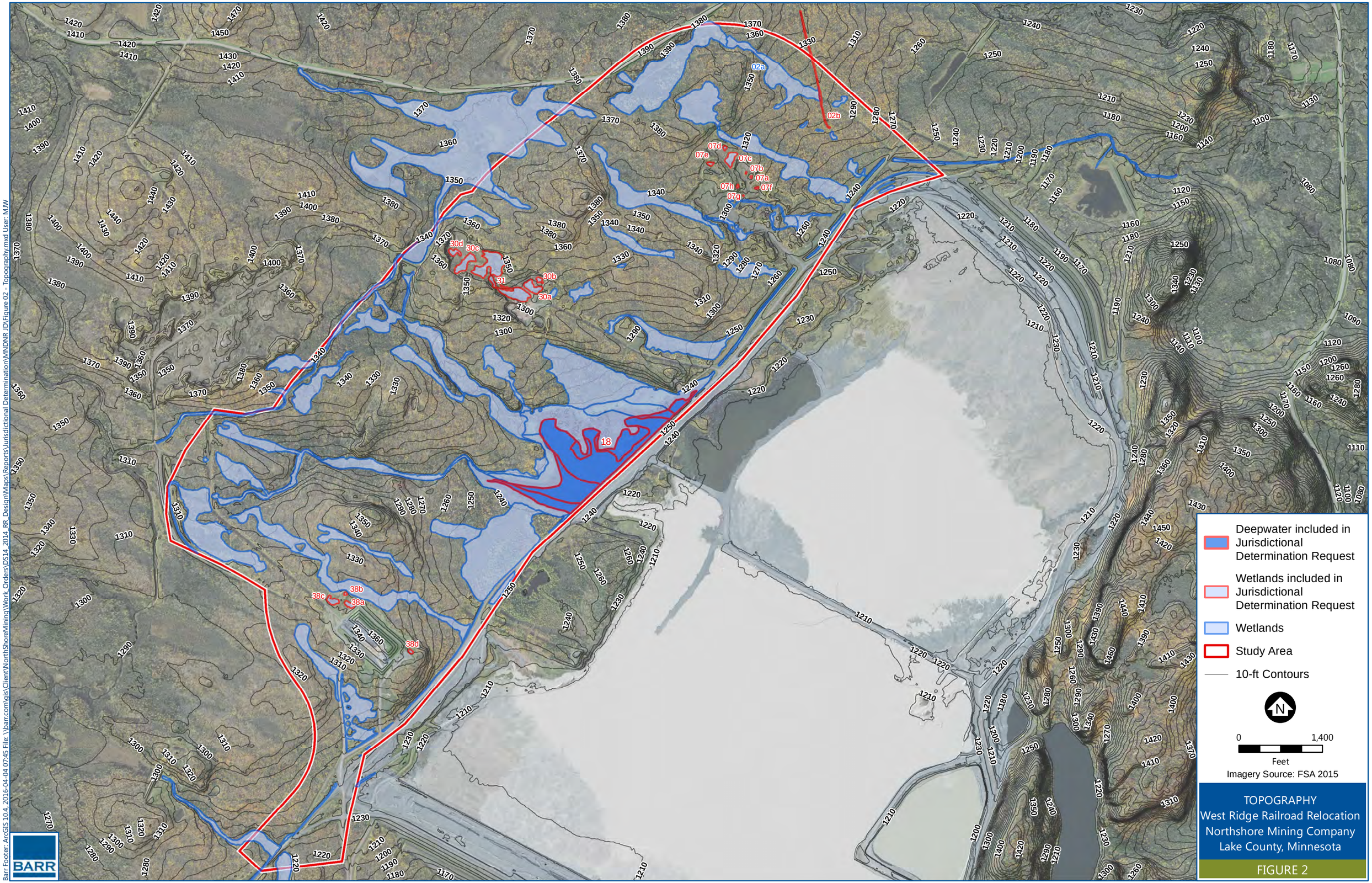
Feet

Imagery: USGS

SITE LOCATION MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 1

BARR



Barr Footer: ArcGIS 10.4 2016-04-04 07:45 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 02 - Topography.mxd User: MJW

Public Water Inventory (PWI) Watercourse

National Hydrography Dataset (NHD) Flowline

Public Water Basin

Wetlands (National Wetlands Inventory)

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Study Area

*Watercourses 1 and 2 are remnants of the Big Thirtynine Creek and Little Thirtynine Creek downstream of a permitted diversion channel constructed in the late 1970s as part of construction of the Northshore Mining Company's (NSM) Milepost 7 Tailings Basin. In March 2015, Barr Engineering Company submitted a request to the Minnesota Department of Natural Resources (MDNR), requesting concurrence that Watercourses 1 and 2 should be removed from the Public Waters Inventory (PWI) and are not considered trout streams. On March 15, 2016, MDNR Mining Hydrologist Mike Liljegren issued an email that summarized the MDNR's internal discussion on the issue, and concurred with Barr's request.

N

0 3,000

Feet

Aerial Imagery: FSA 2015

HYDROLOGY MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 07:51 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR_JD\Figure 03 - Hydrology Map.mxd User: MJW

Map Unit Symbol	Map Unit Name
A1-11F	Quetico, stony-Barto, stony-Rock outcrop complex, 35 to 60 percent slopes
A1-20D	Mesaba, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes
A1-20F	Barto, stony-Mesaba, stony-Rock outcrop complex, 35 to 60 percent slopes
A1-30D	Barto, stony-Greysolon-Rock outcrop complex, 0 to 18 percent slopes
A1-40B	Normanna-Greysolon-Rock outcrop complex, 2 to 8 percent slopes
A1-41D	Ahmeek-Normanna-Mesaba, stony-Rock outcrop complex, 4 to 18 percent slopes
A2-19A	Twig, rubbly-Rock outcrop complex, 0 to 3 percent slopes
A2-30D	Mesaba, stony-Giese, rubbly-Barto, stony-Rock outcrop complex, 0 to 18 percent slopes
A3-11A	Twig-Tacoosh-Giese complex, 0 to 1 percent slopes, depressional
A3-12A	Giese muck, depressional, 0 to 1 percent slopes
A3-13A	Giese muck, 0 to 2 percent slopes, rubbly
A3-20A	Canosia loam, 0 to 2 percent slopes
A3-21A	Hermantown silt loam, 1 to 3 percent slopes
A3-22B	Normanna-Hermantown complex, 1 to 8 percent slopes
A3-30B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes
A3-31D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes
A3-41B	Normanna-Giese, depressional complex, 0 to 8 percent slopes, pitted
B1-20B	Hegberg-Eldes complex, 0 to 3 percent slopes
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes
B1-41D	Forbay-Augustana complex, 3 to 18 percent slopes
B2-41D	Forbay, moderately deep-Augustanna, moderately deep-Rock outcrop complex, 3 to 18 percent slopes
C1-20A	Badriver complex, 0 to 3 percent slopes
C1-40B	Badriver complex, 0 to 8 percent slopes
C1-41D	Sanborg-Badriver complex, 3 to 18 percent slopes
C3-40B	Badriver-Rock outcrop complex, 0 to 8 percent slopes
C3-41D	Sanborg-Badriver-Rock outcrop complex, 1 to 18 percent slopes
D3-41D	Amnicon-Cuttre-Rock outcrop complex, 5 to 18 percent slopes
E1-14F	Ahmeek-Rock outcrop-Udifluvents, frequently flooded complex, 1 to 70 percent slopes
E1-27D	Sanborg-Fluvaquebts, frequently flooded-Rock outcrop complex, 0 to 18 percent slopes
E1-29E	Odanah-Fluvaquents, frequently flooded-Rock outcrop complex, 0 to 45 percent slopes
E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex, 1 to 18 percent slopes
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes
E2-12D	Forbay-Udifluvents, frequently flooded complex, 1 to 18 percent slopes
E2-20B	Badriver-Fluvaquents, frequently flooded complex, 0 to 8 percent slopes
E2-21D	Sanborg-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes
E2-31D	Amnicon-Fluvaquents, frequently flooded, complex, 0 to 18 percent slopes
F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes
J1a10A	Rifle soils, dense substratum, 0 to 1 percent slopes
J1a11A	Mooselake muck, 0 to 1 percent slopes
J1a40A	Greenwood soils, dense substratum, 0 to 1 percent slopes
J2-40A	Cathro muck, depressional, dense substratum, 0 to 1 percent slopes
K1-11	Pits, iron mine
K1-13B	Udorthents, loamy (cut and fill land)
K1-14	Tailings basin
K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded
W	Water

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Soil Map Unit

Disturbed Soil Map Units

Study Area

N

0 1,000 2,000

Feet

Imagery Source: FSA 2015

SOILS MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 4

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 07:53 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014 RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 04 - Soils.mxd User: MJW

Road and ditch created
Ditch
Ditch
Diversion channel of the Big and Little 39 creeks
Borrow Pit
Road, railroad and embankment
Ditch
Borrow Pit
Road, railroad and embankment
Stock pile
Ditch
Road
Quarry
Impoundment of streams
Road
Road, railroad and embankment
Road, railroad and embankment
Road
Landfill
Tailings basin
Ditch
Road
Road, railroad and embankment

Areas of Site Disturbance
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

N

0 600 1,200 2,400
Feet

Aerial Imagery: FSA 2015

SITE DISTURBANCE MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 5

BARR

Barr Foster ArcGIS 10.4, 2016-04-04 09:06 File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 05 - Site Disturbance Map.mxd User: MJW

Ditch

02b

07d

07e

07c

07h

07a

07f

07g

East Borrow Area

30d

31

West Borrow Area

30b

30c

30a

Appendix A - Murphy's Pond

Stormwater Ponds

38b

38c

38a

38d

Study Area

Alder Thicket

Coniferous Swamp

Fresh (Wet) Meadow

Hardwood Swamp

Sedge Meadow

Shallow Marsh

Deepwater included in Jurisdictional Determination Request

N

0 750 1,500 3,000

Feet

Aerial Imagery: FSA 2015

SITE DETAIL INDEX MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 6

BARR

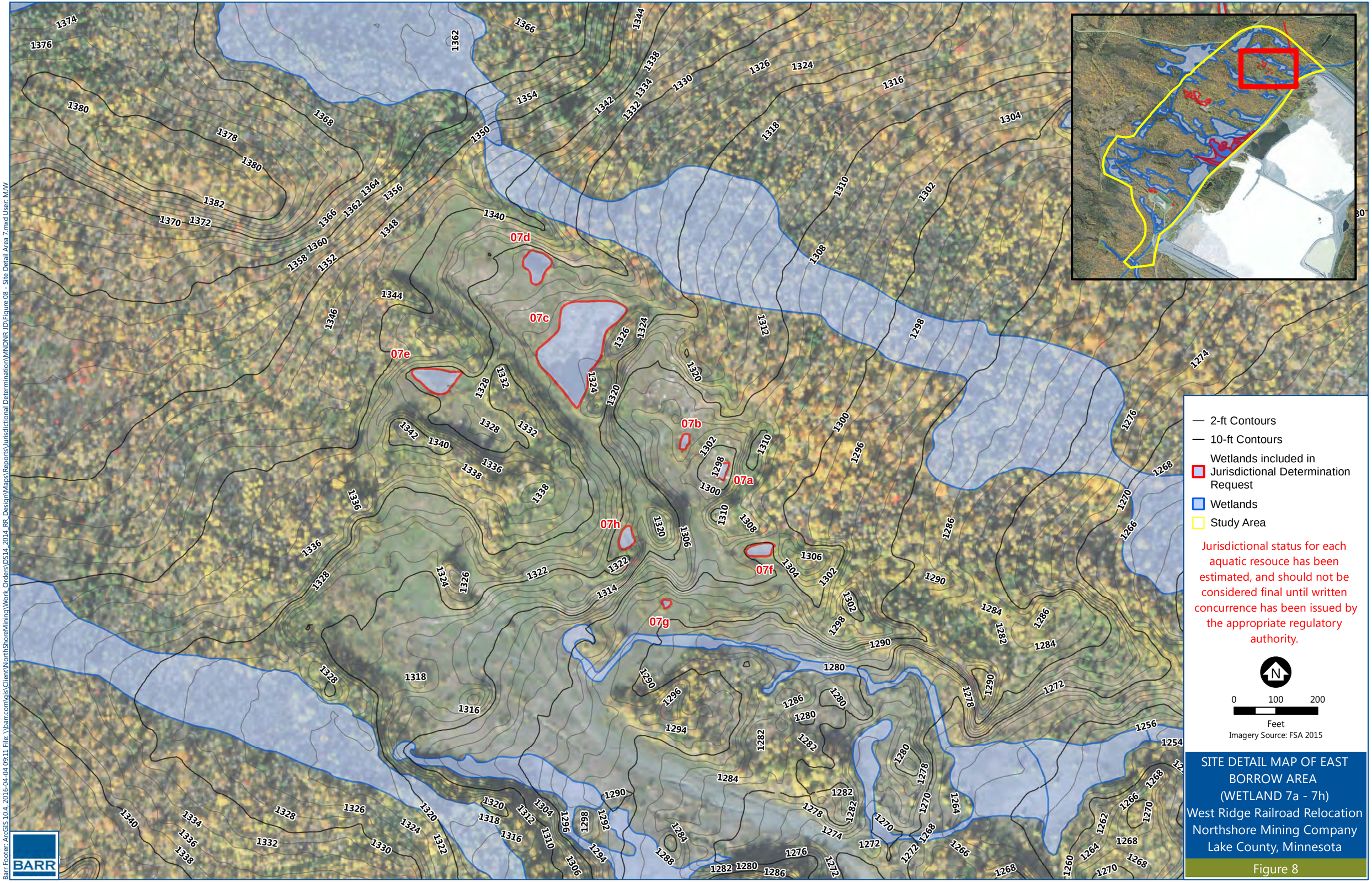
Barr Foster; ArcGIS 10.4; 2016-04-05 13:24; File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure 06 Wetland Overview.mxd; User: MJW

SITE DETAIL MAP OF
DITCH AREA (WETLAND 2)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 7

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:00 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 07 - Site Detail Area 7.mxd User: MJW

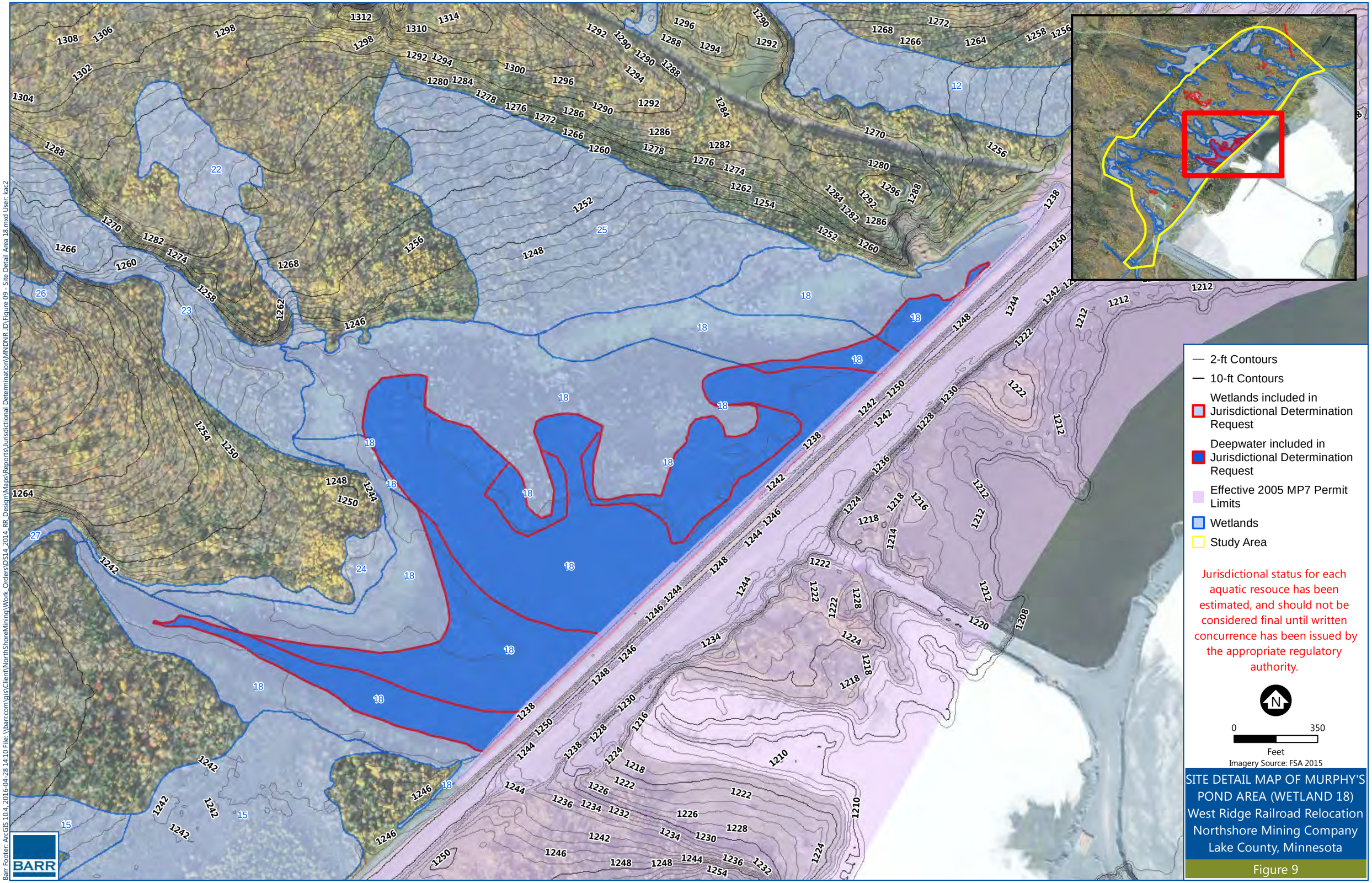


SITE DETAIL MAP OF EAST BORROW AREA (WETLAND 7a - 7h)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

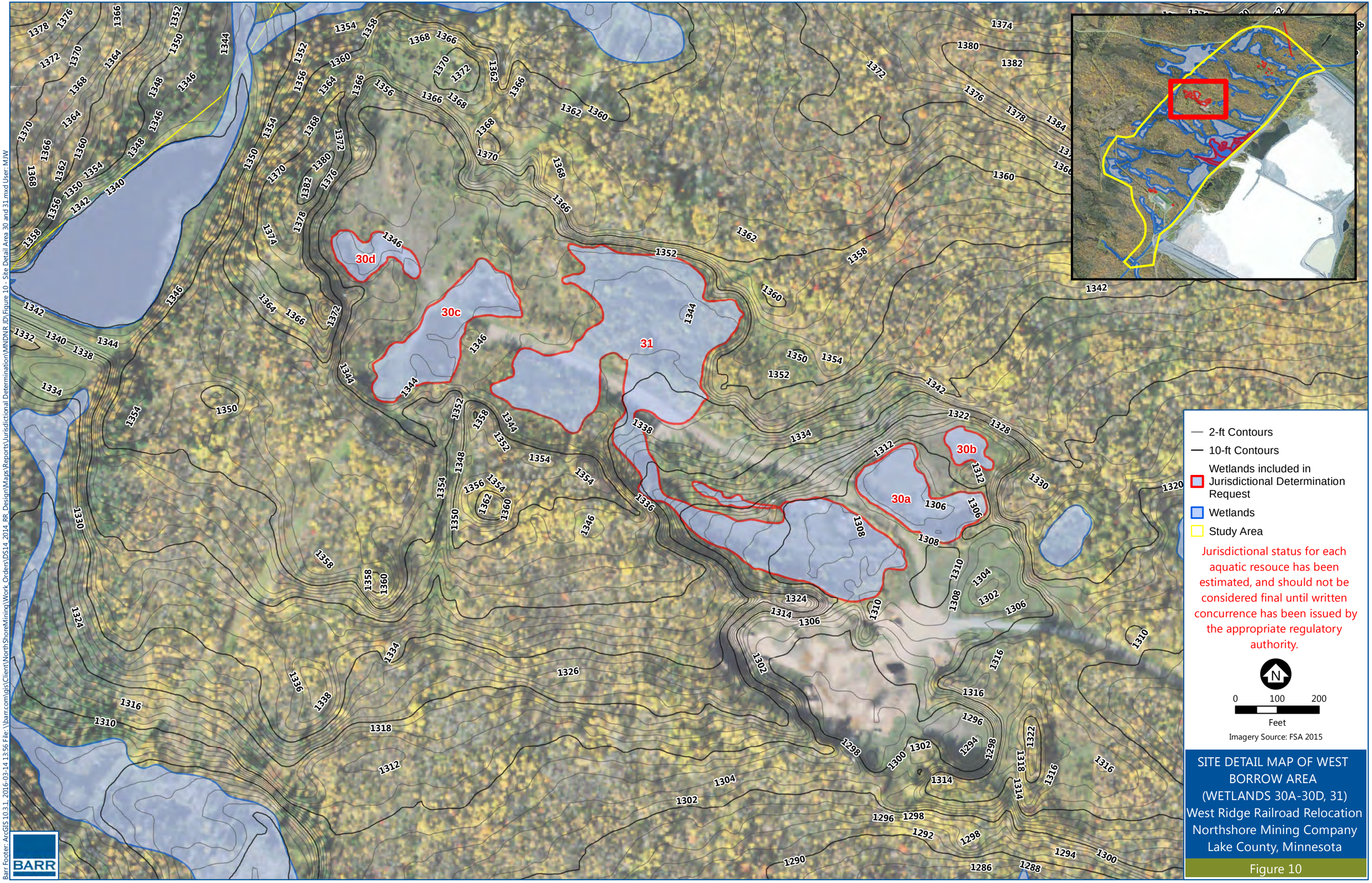
Figure 8

BARR



SITE DETAIL MAP OF MURPHY'S POND AREA (WETLAND 18)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 9

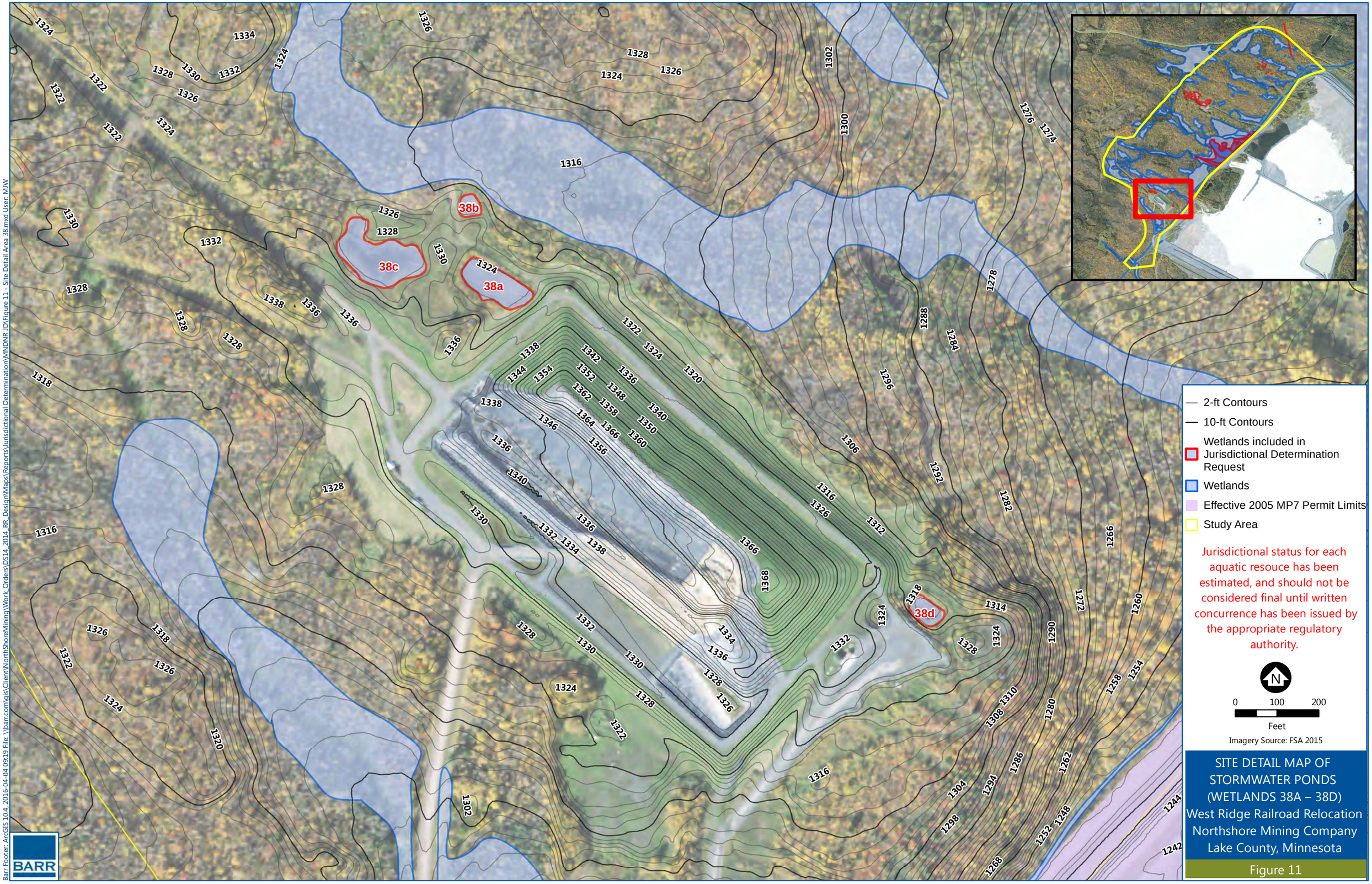


SITE DETAIL MAP OF WEST BORROW AREA (WETLANDS 30A-30D, 31)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 10

BARR



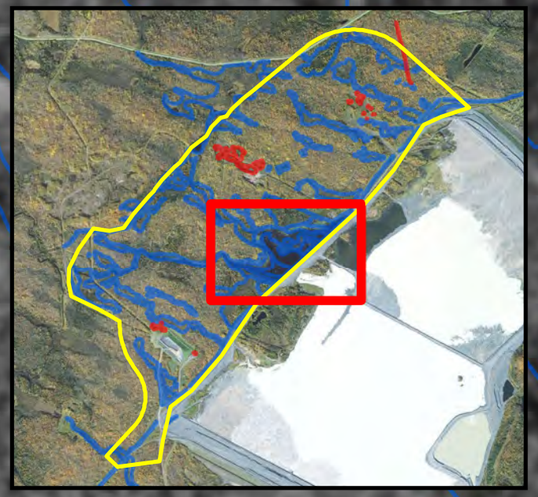
SITE DETAIL MAP OF STORMWATER PONDS (WETLANDS 38A – 38D)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 11

BARR

Appendix A

Supplemental Maps of Murphy's Pond Area (Wetland/Deepwater 18)



17b
25
18
27
24
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

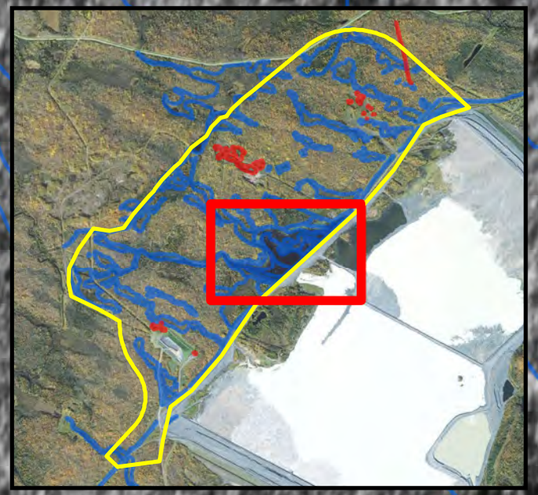
Imagery Source: MN DNR 1969

1969 AERIAL PHOTOGRAPHY (MURPHY'S POND)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A1

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:18 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A1 - Murphy_1969.mxd User: MJW



25
17b
22
18
23
24
27
18
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

Imagery Source: MN DNR 1977

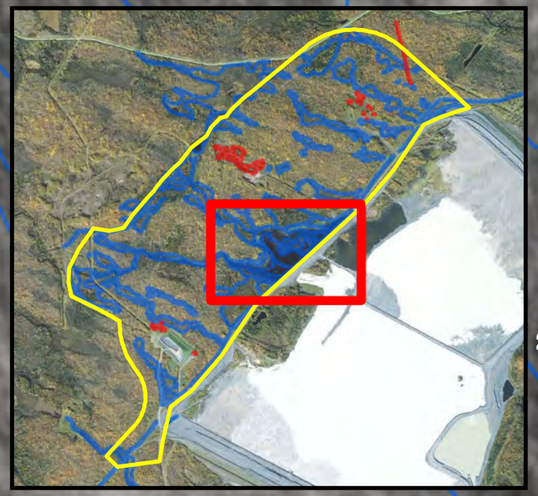
1977 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A2

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:25 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A2 - Murphy_1977.mxd User: MJW



17b
25
22
18
23
27
24
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

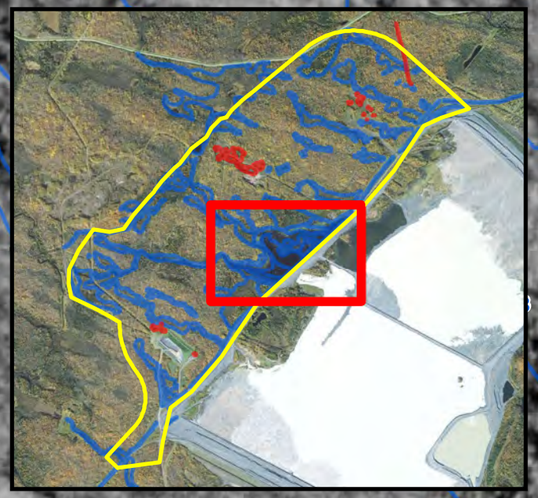
Imagery Source: Northshore 1980

1980 AERIAL PHOTOGRAPHY (MURPHY'S POND)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A3

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:25 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A3 - Murphy_1980.mxd User: MJW



22

25

17b

18

27

24

15

Murphy's Pond 2015 Extent

Effective 2005 MP7 Permit Limits

Study Area

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: USGS 1991

1991 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A4

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:26 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\D514_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A4 - Murphy_1991.mxd User: MJW

22

25

17b

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27

24

15

Murphy's Pond 2015 Extent

Effective 2005 MP7 Permit Limits

Study Area

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300

Feet

Imagery Source: FSA 2004

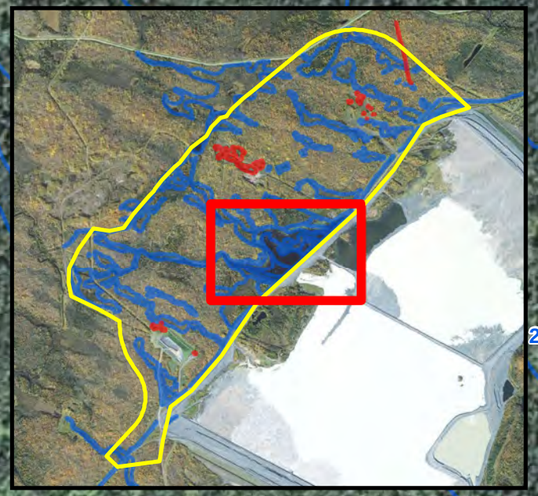
2004 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A5

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:27 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A5 - Murphy_2004.mxd User: MJW



17b
25
22
18
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27
15

Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

Imagery Source: FSA 2008

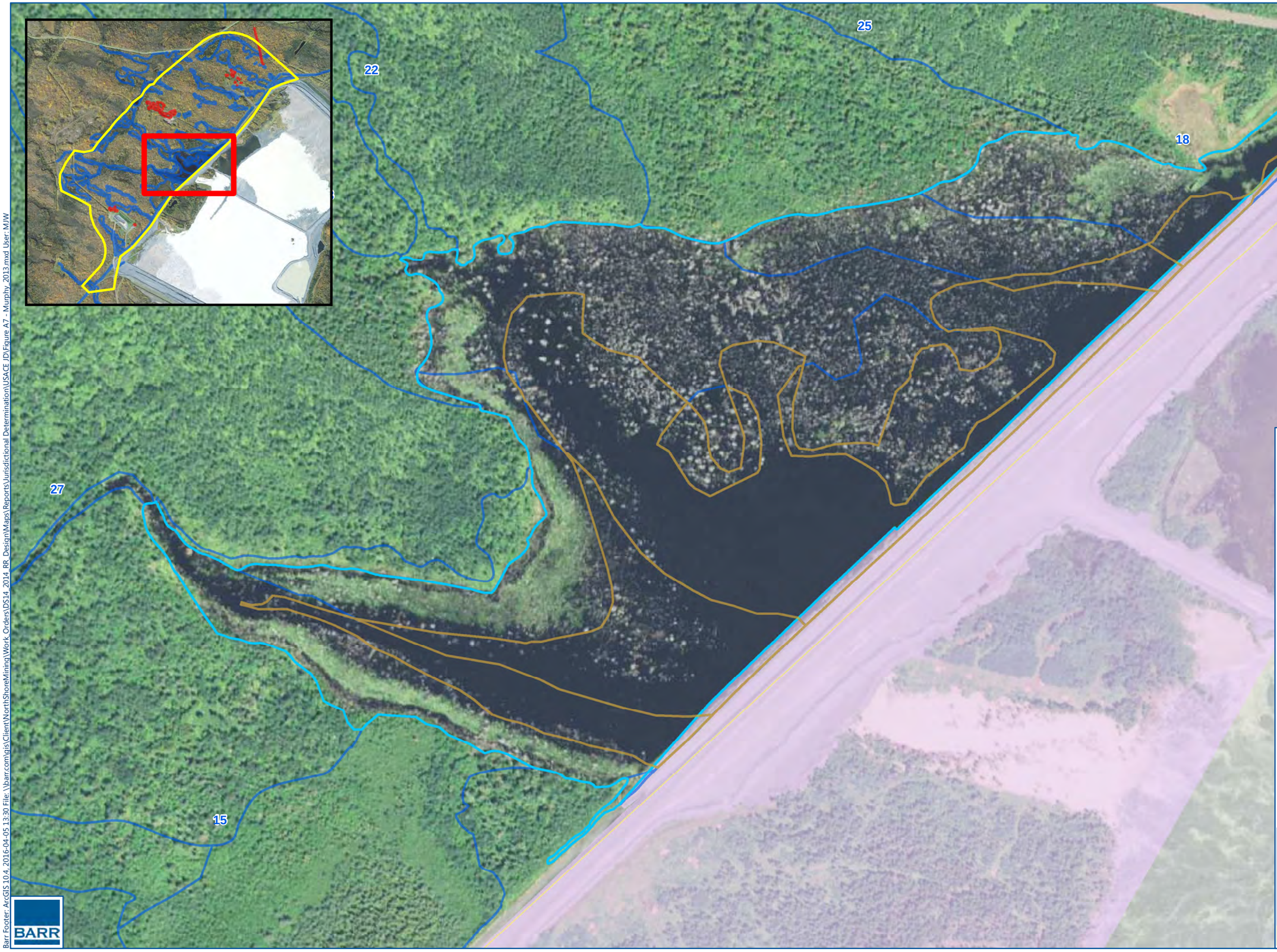
2008 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A6

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:28 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A6 - Murphy_2008.mxd User: MJW



Murphy's Pond 2015 Extent
Effective 2005 MP7 Permit Limits
Study Area
Deepwater included in Jurisdictional Determination Request
Wetlands included in Jurisdictional Determination Request
Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200 300
Feet

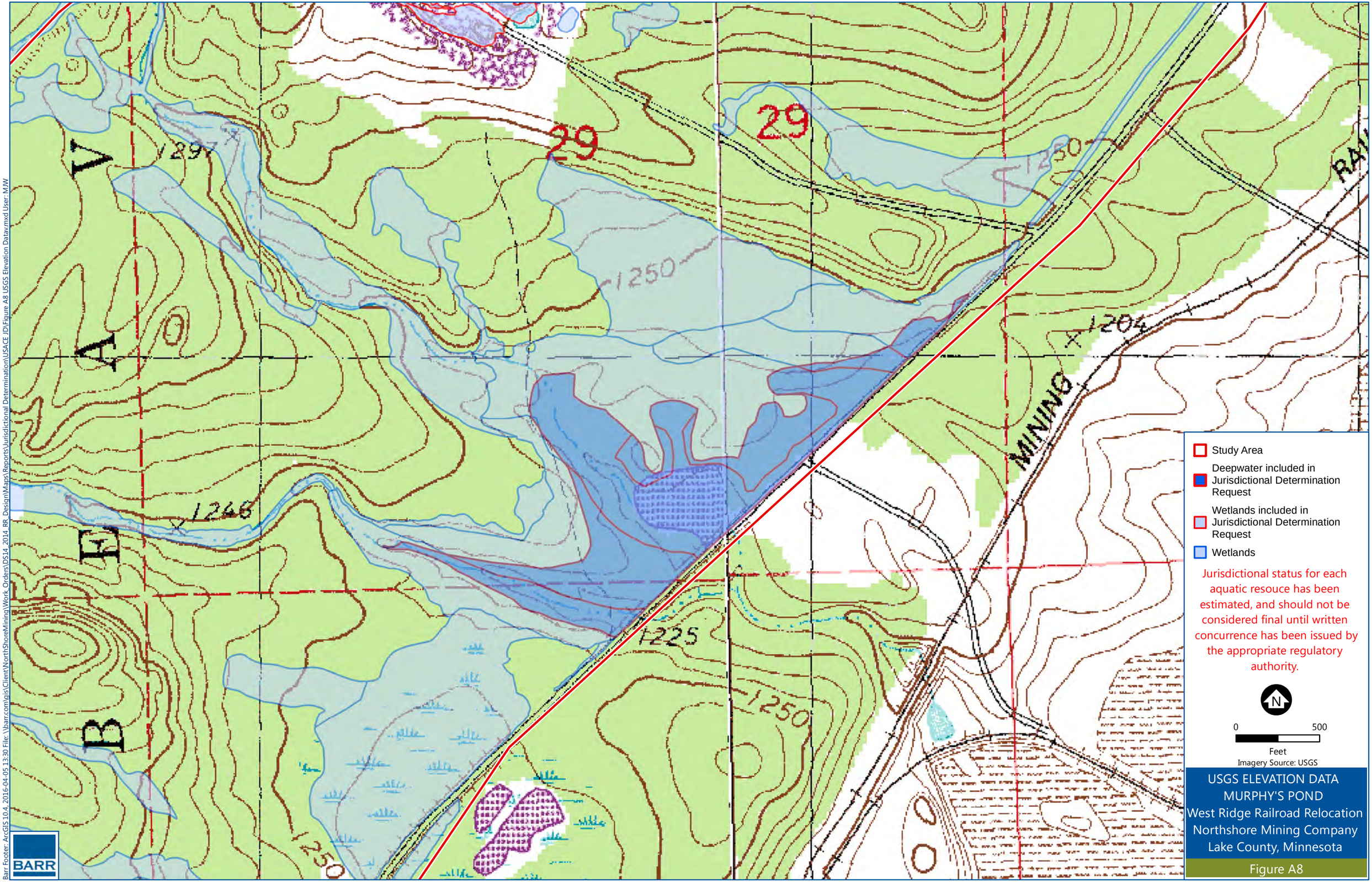
Imagery Source: FSA 2013

2013 AERIAL PHOTOGRAPHY (MURPHY'S POND)

West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A7

BARR

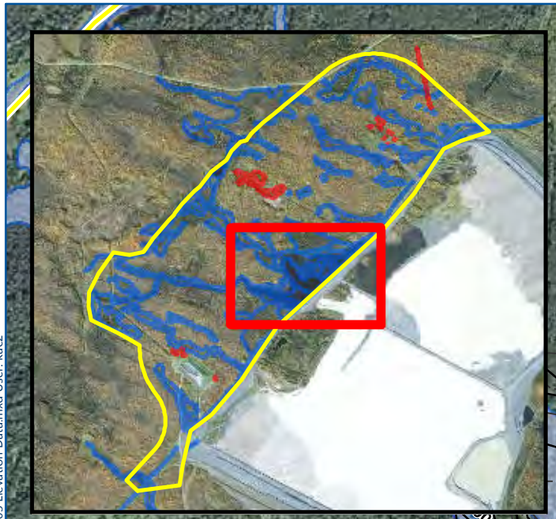


USGS ELEVATION DATA
MURPHY'S POND
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A8

BARR

Barr Footer: ArcGIS 10.4 2016-04-05 13:30 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A8 USGS Elevation Data.mxd User: MJW



— 2-ft Contours

-- 5-ft Contours

— 10-ft Contours

Study Area

Deepwater included in Jurisdictional Determination Request

Wetlands included in Jurisdictional Determination Request

Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 500

Feet

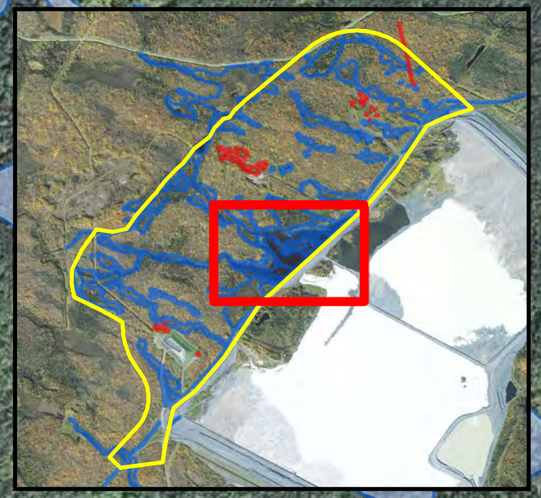
Imagery Source: FSA, 2008.

2003 ELEVATION DATA
MURPHY'S POND
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A9

BARR

Barr Footer: ArcGIS 10.4, 2016-04-28 14:50 File: \\barr.com\vjs\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A9 2003 Elevation Data.mxd User: kac2



W-18H
W-18G
D-18O
D-18N
W-18D
W-18F
D-18M
W-18E
D-18L
D-18K
W-18C
D-18J
W-18B
D-18I
W-18A

Study Area

Habitat Changes

- Deepwater, artificially flooded upland
- Deepwater, artificially flooded wetland
- Wetland, artificially flooded upland
- Wetland, artificially flooded wetland
- Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 400

Feet

Imagery Source: MN DNR 1969

HABITAT CHANGES
MURPHY'S POND
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure A10

BARR

Barr Footer: ArcGIS 10.4, 2016-04-05 13:31 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\D514_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure A10 Habitat Change.mxd User: MJW

Appendix B

Site Photographs

Photograph 1 (#RIMG0070): Photo of wetland 2B taken on July 22, 2015.

Photograph 2 (#RIMG0192): Photo of wetland 7C taken on July 23, 2015.

Photograph 3 (#RIMG0189): Photo of upland landscape around East Borrow Area taken on July 23, 2015.

Photograph 4 (#R0016704): Photo of wetland 7E taken on July 22, 2015. This photograph is also representative of wetlands 7A, 7B, 7D, 7F, 7G, and 7H.

Photograph 5 (#RIMG0189): Photo of road impounding Murphy's Pond (wetland 18) taken on July 24, 2015.

Photograph 6 (#RIMG0194): Photo of Murphy's Pond (wetland 18) taken on July 24, 2015.

Photograph 7 (#R0014257): Photo of wetland 30C taken on August 12, 2015. This photograph is also representative of wetlands 30A, 30B, and 30D.

Photograph 8 (#R0014270): Photo of wetland 30A taken on August 12, 2015.

Photograph 9 (#R0016751): Photo around West Borrow Area taken on July 24, 2015.

Photograph 10 (#R0014345): Photo of wetland 38C taken on August 14, 2015. This photograph is also representative of conditions in wetlands 38A, 38B, and 38D.

Appendix C

MN Wetland Conservation Act; Notice of Decision, Permit to Mine (WCA Incidental Determination), August 25, 2016

Minnesota Wetland Conservation Act
Notice of Decision
Permit to Mine

Approving Authority	Address
Department of Natural Resources **Division of Lands and Minerals**	**500 Lafayette Road N, Box 45** **St. Paul, MN 55155-4045**

1. PROJECT INFORMATION

Applicant Name	Project Name	Date of Application
Northshore Mining Company	Incidental Request for West Ridge Railroad Realignment	April 29, 2016
☒ Attach site locator maps: Figure 1 – Site Location Map		

Type of Decision:

☒ Wetland Boundary or Type ☐ No-Loss ☒ Incidental ☐ Sequencing
☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☐ Approve ☐ Approve with conditions ☐ Deny

Summary (or attach):

2. APPROVING AUTHORITY UNIT DECISION

Date of Decision: August 25, 2016

☒ Approved ☐ Approved with conditions (include below) ☐ Denied

Approving Authority Findings and Conclusions

DNR has reviewed the incidental wetland determination request received from Northshore Mining Company for the West Ridge Railroad Realignment at the Mile Post 7 Tailings Basin in Lake County. Northshore requested an incidental wetland determination for eighteen wetlands labeled 2B, 7a – 7h, 30a - 30d, 31, and 38a – 38d (totaling 10.4 acres and summarized in Table 1). Northshore also requested a refinement of the wetland delineation to classify 37.9 acres of wetland 18 (Murphy's Pond, areas D-18I – D-18O) as deepwater habitat (Table 1 and Figure C-10.) The request was sent out to project reviewers on May 20, 2016. No comments were received. DNR conducted a site visit with Corps representatives on August 11, 2016. DNR approves the request as reported in the April 29, 2016 report and summarized in Table 1 and Figures 2 and C-10 (attached.)

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest 0.01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met.

Approving Authority Authorized Signature:

Name **Jess Richards**	Title **Director, DNR Division of Lands and Minerals**	
Signature	Date 8-25-16	Phone Number and E-mail **651/259-5379** **jess.richards@state.mn.us**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

3. APPEAL OF THIS DECISION

Pursuant to Minn. Stat., sec. 93.50, any person aggrieved by this decision may appeal the decision in the manner provided for a contested case hearing under Minn. Stat., Secs. 14.57 to 14.62 and the procedures prescribed in Minn. Rules, parts 1400.5100 to 1400.8500. An appeal of this decision by an aggrieved party must be received by the commissioner within 30 calendar days of the date of the mailing of this Notice. The appeal shall be sent to:

Jess Richards, Director
Division of Lands and Minerals
Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155

4. LIST OF ADDRESSEES

- ☒ SWCD TEP member: **Derrick Passe, Lake County SWCD**
- ☒ BWSR TEP member: **Lynda Peterson**
- ☒ LGU TEP member (if different than LGU Contact): **Walt Van Den Huevel, Lake County**
- ☒ DNR TEP member: **Cliff Bentley**
- ☐ DNR Regional Office (if different than DNR TEP member)
- ☐ WD or WMO (if applicable):
- ☒ Applicant and Landowner (if different) **Andrea Hayden, Northshore Mining Company**
  Dan Jones, Barr Engineering
- ☒ Members of the public who requested notice:
  Kathryn Hoffman, MCEA
  Les Lemm, BWSR
  Catherine Neuschler, MPCA
  Jim Brist, MPCA
  Jen Oknich, MPCA
- ☒ Corps of Engineers Project Manager: **Andrew Beaudet**
- ☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. ATTACHMENTS

In addition to the site locator map, list any other attachments:

- ☒ **Table 1 – Wetland Summary**
- ☒ **Figure 2 – Topography**
- ☒ **Figure C10 – Habitat Changes for Murphy's Pond**

2015 Wetland Delineation Study Area

N

0 1,000 2,000 4,000

Feet

Imagery: USGS

SITE LOCATION MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 1

BARR

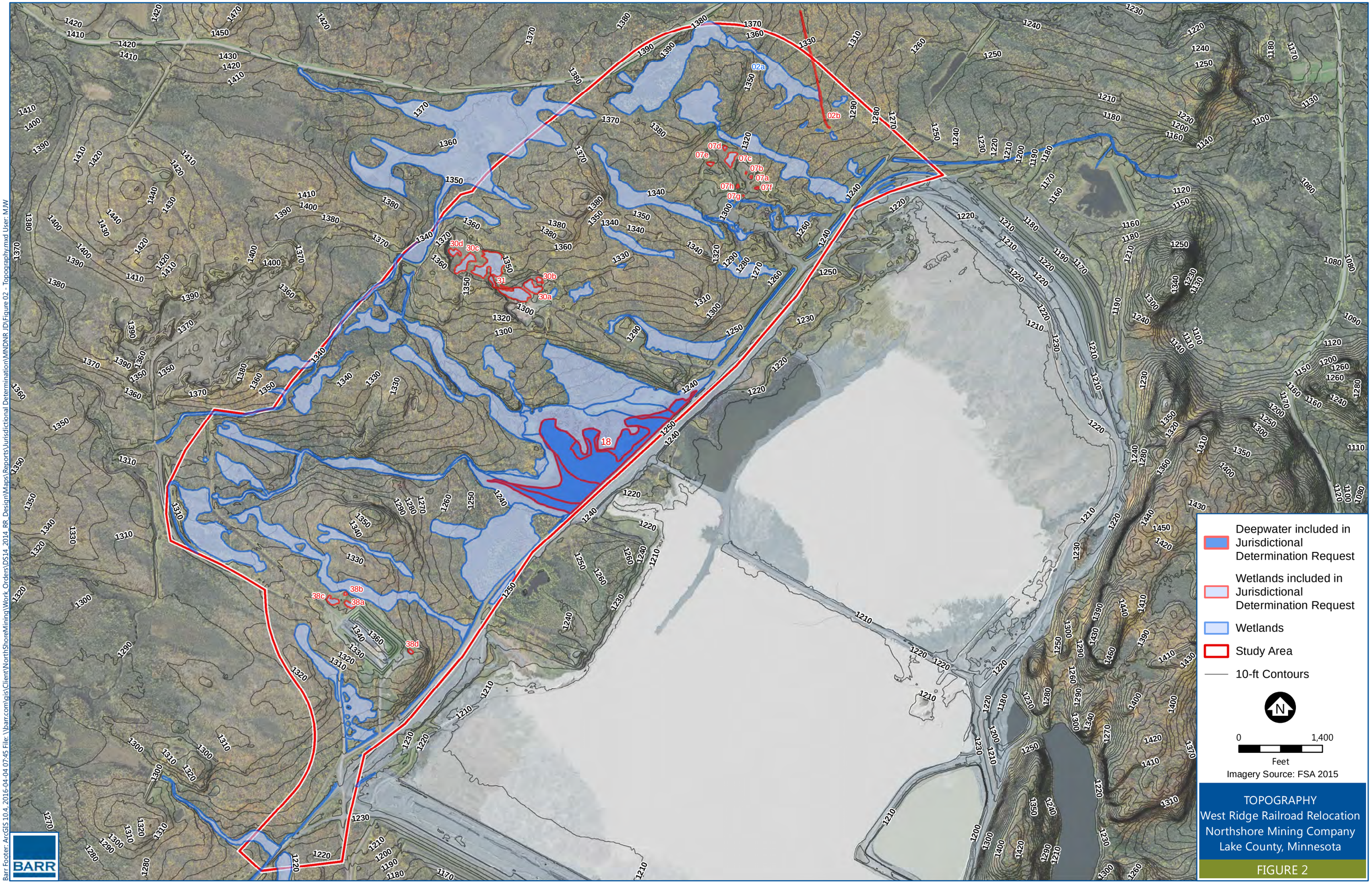


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Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Ditch	2B	Wetland	Hardwood Swamp	7	Moderate	July 2015	Non-natural	Excavated ditch created between 1977 and 1991. Approximately 1900 feet long, 17 feet wide, and 3 feet deep. Spoils were deposited on east side of ditch and graded to form a raised road.	Wetland is located within a topographically-enclosed depression. The downslope (south) end was inspected; no surficial outlets were observed.	1294-1340	56N	8E	21	NESW, SESW	0.9	0
East Borrow Area	7a	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1298	56N	8E	28	NWNW	0.02	0
East Borrow Area	7b	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1305	56N	8E	28	NWNW	0.02	0
East Borrow Area	7c	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1323	56N	8E	21	SWSW	0.6	0
East Borrow Area	7d	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
East Borrow Area	7e	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1328	56N	8E	21	SWSW	0.1	0
East Borrow Area	7f	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1300	56N	8E	28	NWNW	0.04	0
East Borrow Area	7g	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1292	56N	8E	28	NWNW	0.01	0
East Borrow Area	7h	Wetland	Sedge Meadow	2	Moderate	July 2015	Non-natural	Upland areas were excavated by 2008 as "borrow areas" for sand and gravel for mining activities. The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1317	56N	8E	28	NWNW	0.04	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

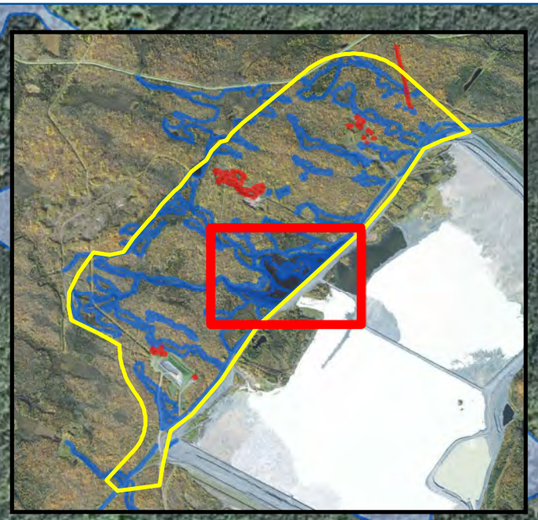
Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Murphy's Pond	18 (D-18I)	Deepwater	---	---	---	July 2015	Non-natural	Initial impoundment developed from the construction of a road on the southeast side of Murphy's pond between 1977 and 1980. Between 1980 and 1991, a ditch was constructed diverting flow from Murphy's Pond to the north around the tailings basin to the East Beaver River. In 2005, the outlet elevation to the north was raised and the ditch was rerouted, flooding over 81 acres.	"Murphy's Pond" connects with roadside ditches and water flow continues to the northeast to East Beaver River. (The outlet of the Murphy's Pond wetland is at 1240 feet MSL.)	1238	56N	8E	32	NWNE, NENW	0	3.7
													29	SESW		
	18 (D-18J)											8E	32	NWNE, NENW	0	7.6
													29	SESW, SWSE		
	18 (D-18K)											8E	29	SESW, SWSE, SESE	0	19.2
	18 (D-18L)											8E	29	SWSE	0	1.3
	18 (D-18M)											8E	29	SWSE, SESE	0	4.1
	18 (D-18N)											8E	29	SESE, NESE	0	1.0
	18 (D-18O)											8E	29	SESE, NESE	0	1.1
West Borrow Area	30a	Wetland	Sedge Meadow	2	High	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308	56N	8E	29	SENW	0.8	0
West Borrow Area	30b	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1312	56N	8E	29	SENW	0.2	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
West Borrow Area	30c	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1344	56N	8E	29	SWNW, NWNW, SENW	1.1	0
West Borrow Area	30d	Wetland	Sedge Meadow	2	Moderate	August 2015	Non-natural	Upland areas were excavated between 1980 to 1991 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1348	56N	8E	29	NWNW	0.4	0
West Borrow Area	31	Wetland	Alder Thicket	6	Moderate	August 2015	Non-natural	Upland areas were excavated between 1977 to 1980 as "borrow areas" for sand and gravel for mining activities.The resulting excavated depressions developed wetland conditions, as ponded water was unable to drain off the site.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1308-1346	56N	8E	29	SENW, SWNW, NENW	5.3	0
Stormwater Ponds	38a	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1324	56N	8E	31	SENE	0.3	0
Stormwater Ponds	38b	Wetland	Shallow Marsh	3	Medium	August 2015	Non-natural	Stormwater pond constructed in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1322	56N	8E	31	SENE	0.1	0
Stormwater Ponds	38c	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond excavatued in upland area between 2008 and 2009.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1326	56N	8E	31	SENE, SWNE	0.5	0

Table 1
Wetland Summary
West Ridge Railroad Realignment
Northshore Mining Company

Location	Resource ID	Resource Type	Eggers & Reed Plant Community	Circular 39 Type	Quality	Delineation Date	Estimated Origin	Origins & Disturbance	Surface Water Connection	Wetland Elevation (ft MSL)	Twp	Range	Section	Quarter-quarter Section	Wetland Size (acres)	Deepwater Size (acres)
Stormwater Ponds	38d	Wetland	Shallow Marsh	3	Moderate	August 2015	Non-natural	Stormwater pond constructed in upland area between 1991 and 2003.	Wetland is located within a topographically-enclosed depression. The entire wetland perimeter was inspected, and no surficial outlets were observed.	1318	56N	8E	32	SWNW	0.1	0
														Subtotals:	**10.4**	**37.9**
														Totals:	**48.3**	



W-18H
W-18G
D-18O
D-18N
W-18D
W-18F
D-18M
W-18E
D-18L
D-18K
W-18C
D-18J
W-18B
D-18I
W-18A

Study

Habitat Changes

- Deepwater, artificially flooded upland
- Deepwater, artificially flooded wetland
- Wetland, artificially flooded upland
- Wetland, artificially flooded wetland
- Wetlands

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 400

Feet

Imagery Source: FSA, 2008.

HABITAT CHANGES
MURPHY'S POND
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure C10

BARR

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Appendix D

October 23, 2015 West Ridge Railroad Final Wetland Delineation Report, Prepared for Northshore Mining Company

West Ridge Railroad Relocation

Final Wetland Delineation Report

Prepared for
Northshore Mining Company

October 2015

4700 West 77th Street
Minneapolis, MN 55435-4803
Phone: 952.832.2600
Fax: 952.832.2601

West Ridge Railroad Relocation

Final Wetland Delineation Report

October 2015

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1.0 Introduction

Northshore Mining Company (Northshore) has initiated engineering design and environmental studies for a proposed realignment of the West Ridge railroad at the Milepost 7 Tailings Basin, and the original designed tailings basin progression (see attached Figure 1, Location Map). The existing railroad embankment is the current western limit of the tailings basin. However, the current volume of tailings into the basin is projected to continue to increase over the next several decades. This means that the existing western limit of the tailings basin needs to progress to the northwest, with the result that the railroad alignment also needs to be moved further north and west. The tailings basin would progress to the northwest over the next ~35 years, filling the area between the existing railroad and the new alignment. The proposed new railroad alignment would become the ultimate western limit of the tailings basin. Within this report, the proposed basin progression and rail re-alignment will be referred to as the "proposed Project".

Northshore is pursuing an amendment to their U.S. Army Corps of Engineers (USACE) permit 2005-1560-TWP, consistent with the basin projection plans outlined in the 1977 USACE EIS. The extent of the proposed Project is shown in Figure 1.

On July 22-24, 2015, and August 10-14, 2015, Barr Engineering Company (Barr) conducted wetland delineations in the proposed Project extent to assist with the planning and permitting activities. The wetland delineations included previously unpermitted wetlands within an approximately 1,594 acre area in Township 55 Range 8 Section 6, and Township 56 Range 8 Sections 20, 21, 28, 29, 30, 31, and 32. Within this report, the area in which wetland delineations were conducted will be referred to as the "study area",

The tailings basin elevation is projected to be at the 10-ft freeboard of the existing embankment in 2020, and will exceed the existing railroad embankment in 2024. While these milestone events are 4.5 and 7.5 years out, respectively, the need to appropriately address both wetland permitting and railroad design issues ahead of these events create a time constraint in the overall project schedule that needs to be addressed in the 2015-2016 timeframe. As a result, Northshore plans to submit a completed Joint Application Form for Activities Affecting Water Resources in Minnesota no later than June 2016. Prior to submitting the joint application, Northshore will also be submitting a Jurisdictional Determination (JD) request form to USACE by the end of this year (December 2015). In order for USACE to review and process the JD request form, it is necessary to have USACE staff participation in a Technical Evaluation Panel (TEP) site evaluation, scheduled for October 12, 2015. Therefore, this Wetland Delineation Report has been prepared to provide the USACE and other TEP members with detailed information of the wetlands on the site ahead of the October 12, 2015 TEP.

2.0 Environmental Setting

The study area encompasses approximately 1594 acres and is located about 6 miles west of Silver Bay, Minnesota, (Figure 1). Much of the study area consists of lands disturbed by past activities including borrow pits and small, flat access roads.

2.1 Geology, Landform, and Topography

The study area straddles the eastern edge of the Duluth Complex and the western edge of the Northshore Volcanic Group, which is predominantly gabbro and basalt, and is located approximately 5 miles from Lake Superior. Landforms are the Nickerson and Highland moraines, which contain drift over dense Superior till at depths of a few inches to more than 50 feet over bedrock. Topography is sloping with ridges and valleys and slopes generally ranging from 4 to 5 percent to the west of the existing tailings basin, with interspersed uplands and wetlands. Wetlands are typically found in a several topographic forms, including long drainage ways on slopes, relict excavated seepage areas with eroded material over bedrock, ditches, broad organic flats, and floodplains. A gravel road along the existing railroad tracks borders the eastern edge of the study area and western extent of the existing tailings basin. The western extent of the study area is partially bordered by a diversion channel and much of the remainder closely follows a watershed divide (Figure 3). A local impoundment of surface runoff against the existing railroad embankment is referred to as Murphy's Pond, which is fed in part by the remnant watercourses of Big Thirtynine and Little Thirtynine Creeks. Those watercourses were diverted to the Beaver River upstream of the study area during the original construction of the Milepost 7 Tailings Basin in the late 1970s. These remnant watercourses are referred to in this report as Watercourse One for the remnant downstream of the diversion of Big Thirtynine Creek, and Watercourse Two for the remnant downstream of the diversion of Little Thirtynine Creek. See Section 2.4 for further detail on the diversion of Big and Little Thirtynine Creeks, and the subsequent references to the remnant channels downstream of the diversion channel.

Slopes within most of the study area wetlands range from approximately zero to three percent, and the wetlands are generally flat to slightly concave in shape (Figure 2). However, wetlands within the study area occurring on slopes contain some narrow channels with grades up to eight percent. In contrast, uplands in the study area have short and irregular areas that are much steeper, ranging from 8 percent grade to steep vertical bedrock faces that are convex. Generally, elevations in and around the study area decrease from the northwest to the southeast, sloping towards Lake Superior. Within the study area, elevations range from approximately 1190 to 1390 ft. above mean sea level (AMSL).

2.2 Hydrology

The study area is primarily located within the Lower Beaver River and the East Branch Beaver River minor watershed areas and the Lake Superior-South major watershed (#2) within Lake County in Bank Service Area #1 in the less than 80 percent pre-settlement wetland zone. The study area watershed boundaries are shown in Figure 3.

Within the East Branch Beaver River minor watershed at the north end of the study area, drainage is primarily from the west, flowing toward the southeast along wetland slopes and through Watercourses One and Two toward Murphy's Pond. Watercourses One and Two have intermittent flow within the site. Drainage from seasonally flooded wetland slopes is also intermittent. From the eastern railroad ditch, water flows northeast out of the study area into Unnamed Creek, which discharges into the East Branch Beaver River. The East Branch Beaver River ultimately discharges into Lake Superior southeast of the site in Beaver Bay.

Within the Lower Beaver River minor watershed at the south end of the site, drainage is primarily from the west, flowing toward the southeast along wetland slopes into a canal ditch (Wetland 17a) at the southeast end of the site. The drainage from wetland slopes into the ditch is intermittent as the wetlands are seasonally flooded. This ditch discharges into the Beaver River south of the study area. The Beaver River ultimately discharges into Lake Superior southeast of the study area in Beaver Bay.

2.3 National Wetlands Inventory

A National Wetlands Inventory (NWI) map of the study area is shown on Figure 4. All of the NWI wetlands in the study area are mapped as palustrine systems. The most common NWI mapped wetlands are forested, primarily deciduous wetlands that are saturated to the surface for extended periods during the growing season (PFOB, PFO1B, PFO6B). Many of the forested wetlands are also mapped with adjacent shrub-carr saturated wetlands (PSSB). Forested and shrub-carr wetlands adjacent to Watercourses One and Two are mapped as having a seasonally flooded/saturated water regime (PFOC and PFO/SSE). One area to the north of Murphy's Pond is mapped as forested needle-leaved evergreen saturated wetland (PFO4B). Only one acre of Murphy's Pond is mapped as permanently flooded with an unconsolidated bottom and modified by beaver activity (PUBHb). Approximately four acres of Murphy's Pond is mapped as having dead woody plants resulting from impoundment of water (PFO5Eb). Emergent seasonally flooded and saturated wetlands (PEMC and PEME) are mapped in portions of Murphy's Pond as well as a few small topographically-enclosed wetlands with no apparent surface water outlet throughout the site. Overall, only about 38 acres of the roughly 82 acre Murphy's Pond is mapped as wetland on the NWI.

The NWI mapping shows about 100 ac less wetland within the study area than the field delineated wetlands. Some apparently incidental areas that have been scraped or excavated are not mapped in the NWI along with several drainageway wetlands.

2.4 Public Waters Inventory

Public Waters within the study area have been strongly influenced by the construction and operation of the Milepost 7 Tailings Basin over the past several decades. There are three streams within the project area that are currently on the MNDNR Public Waters Inventory (PWI). These are:

- Watercourse One (remnant of Big Thirtynine Creek)
- Watercourse Two (remnant of Little Thirtynine Creek)
- A diversion channel that carries the upstream flow of Big and Little Thirtynine Creeks west to Beaver River

When the Milepost 7 Tailings Basin was initially constructed in the late 1970s, the diversion channel was also permitted by the MNDNR master permit issued July 27, 1977, and constructed to divert Big Thirtynine Creek and Little Thirtynine Creek to Beaver River. Prior to the diversion channel's existence, the two creeks flowed into what is now the tailings basin, joined, and flowed to Beaver River. In order to cut off flow from these two creeks into the tailings basin, the diversion channel was constructed. The diversion of Big Thirtynine Creek and Little Thirtynine Creek was constructed with the advice of the MNDNR and the U.S.

Fish and Wildlife Service. A discussion of the purpose and need for the diversion of the creeks was included in the original 1981 Permit to Mine application, which was approved in March 1985.

Once the diversion channel was constructed, the stream channels of Big Thirtynine Creek and Little Thirtynine Creek downstream of the diversion channel were cut off from their historic watersheds. These remnant channels of Big Thirtynine Creek and Little Thirtynine Creek are referred to in this report as Watercourse 1 and Watercourse 2 on Figure 3, because they no longer receive surface flows from their original watersheds located upstream of the diversion channel. They only receive local surface runoff from their adjacent contributing drainage areas. Figure 3 shows the general flow paths and directions of Watercourse 1 and Watercourse 2. Inclusion of the flow paths on Figure 3 was made at the request of the USACE during the October 12, 2015 Technical Evaluation Panel (TEP). However, the inclusion of the flow paths does not infer that Watercourse 1 and Watercourse 2 are streams and/or Waters of the United States. The decision on the status of Watercourse 1 and Watercourse 2 will be made through the state and federal Jurisdictional Determination application to be submitted in December 2015.

According to the 1981 Permit to Mine application, the historic watershed areas (prior to the diversion) of Big Thirtynine Creek and Little Thirtynine Creek were 24.2 square miles and 7.1 square miles, respectively. With the construction of the diversion channel, Watercourse One, the remnant of Big Thirtynine Creek downstream of the diversion channel, now has a drainage area of 0.70 square miles. Watercourse Two, the remnant of Little Thirtynine Creek downstream of the diversion channel, has a drainage area of 0.73 square miles.

Minnesota Statutes 103G.005, Subdivision 15(a) provides eleven criteria for defining public waters. Watercourses One and Two clearly do not meet criteria 1-8, and 11. Criteria 9 states that a public water includes "natural and altered watercourses with a total drainage area greater than 2 square miles." Both Watercourse One and Watercourse Two are therefore well below the criterion of a two square mile drainage area, and should therefore be removed from the PWI. A letter explaining the diversion and the resulting drainage areas was sent to MNDNR Area Hydrologist Cliff Bentley on March 11, 2015. Mr. Bentley has since agreed that the two watercourses no longer meet the criteria for public waters. Northshore has ongoing coordination with MNDNR to formalize the removal of Watercourses One and Two from the PWI.

Both watercourses are significantly diminished from their pre-diversion conditions. Field observations and measurements made at five location along Watercourse 2 on October 12, 2015 found that the bankfull channel width ranged from 0.25 meter to approximately 15 meters. There was little to no flow near the upstream end (south of the diversion channel), with some degree of low flow further downstream. The actual flowing channel widths ranged from 0.25 meter to 0.35 meter (10"-14"). Mid-channel depths ranged from 4 inches to 18".

Similarly, field observations of both streams in October 2014 found intermittent flow in both channels, with several reaches where no water was present. Both watercourses were also narrow (less than 2' wide in some areas) and shallow (<4" in places) where flow was observed.

Watercourse 1 and Watercourse 2 would be partially filled by construction of the new railroad embankment, and would ultimately be inundated by the progression of the tailings basin. The diversion channel flows along most of the western edge of the study area, and would not be affected by the proposed Project.

The nearest PWI basin is Bear Lake, south and east of the existing tailings basin. The proposed Project would have no effect on Bear Lake.

2.5 Soils

A Soil Survey Geographic Database (SSURGO) soil survey at a scale of 1:24,000 has been completed for the entire study area. The soil survey shows that the majority of the study area contains undisturbed soils, while several areas are mapped as impacted by previous mining activity, road construction, railroad construction, and tailings basin construction (Figure 5). Additionally, a map of hydric soil ratings in the study area is presented in Figure 6. A general description of the dominant soils types found within study area wetlands and the dominant characteristics associated with each are provided below rather than a description of every soil map unit.

In general, there are three commonly occurring features in the study area that perch water within soil profiles. They are dense till, heavier clay dominated soils (greater than 18 percent clay), and bedrock. All three features are found in both upland and wetland areas. Wetlands in the study area tend to occur when the surface slope shape is concave or linear on slopes of less than 3 percent (with some areas up to 8 percent, as discussed in section 2.1) as water tends to pond in these areas. Mineral upland and wetland soils are derived from red (7.5YR or redder beneath the topsoil layer) Superior Lobe glacial till associated with two separate ice advances, the Automaba and Nickerson. The till of the Automaba phase is coarse loamy with less than 18 percent clay throughout the profile. The Automba till ranges from loam, silt loam, fine sandy loam or very fine sandy loam throughout a profile, with bedrock or dense till occasionally found within 24 inches of the soil surface. Upland Automba phase soil series include Ahmeek, Normanna, Mesaba, and Barto, while wetland soils include Hermantown, Canosia, Twig, and Giese. The Nickerson phase is fine loamy, contains 18 to 32 percent clay, and is most commonly found in a horizon located within 24 inches of the soil surface. The Nickerson phase textures range between loam, silt loam, fine sandy loam and very fine sandy loam in the upper horizons, while the third horizon usually ranges between loam, clay loam and silt loam, and contains between 18 to 32 percent clay within 24 inches of the soil surface. The Nickerson phase associated soil series are Augustana and Forbay in uplands, with Eldes and Hegberg in wetlands. Course fragments for the Automba and Nickerson phases range from 1 to 10 percent in the upper mantle and 8 to 25 percent in the dense till.

Wetlands dominated by organic soils are found in low parts of the study area. Those soils include peat, muck, and mucky and over mineral Superior lobe glacial drift. Common soil series and family groups found within the study area include: Rifle, Mooselake, Greenwood, Tacoosh, Bowstring, and fluvents and udifluvents frequently flooded. Organic soils are frequently shallow over rocks and boulders, but are deeper when they overlay dense glacial till. Mineral soil depth in the study area is moderately deep (20-40

inches over bedrock) to very deep (greater than 60 inches over bedrock). However, there are bedrock outcrops in many of the areas throughout the study area.

Field observations indicate that soils in the study area typically consist of peat, mucky peat, mucky loam, mucky silt loam, sandy loam, clay loam, loam and silt loam present from the soil surface to 24 inches below the ground. In the upland areas, soils consist of very dark brown (10YR 2/2) sandy loam or loam, underlain by layers with matrix colors that include 7.5YR 4/3, 7.5YR 4/4, 7.5YR 3/4, 7.5YR 3/2, and 7.5YR 3/1. In the organic wetland areas, organic soils were predominant with matrix colors typically 10YR 2/1 with no redoximorphic concentrations observed and hemic mucky peat material was dominant. In areas dominated by mineral wetland soils, the soil ranged from loam, silt loam, fine sandy loam or very fine sandy loam and clay loam and consisted of 7.5YR or 5YR 4/3, 4/4, 3/4, 3/2, 4/6, 4/2 with redox features. Overall, the soil series described in the field seemed to match those mapped in the soil survey. However, the soil survey was investigated at a more generalized level (1:24,000). In the field, a more detailed investigation was done at a mapping scale of approximately 1:1,000. At that reduced scale, some wetlands were found in areas that were previously mapped as upland.

2.6 Vegetation

Vegetation within the study area comprises predominantly native forest communities, which is true for both upland and wetland communities. A minority of the study area is comprised of altered communities dominated by a mixture of native and exotic species, particularly herbaceous species. These communities develop incidentally or by deliberate seeding after anthropogenic disturbance such as road and ditch construction or excavation of borrow material for use in mine operations.

Upland forests are dominated by aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*). Typical for forests in the region, these forests have likely been managed for timber resources for decades. Canopy trees are mostly in the range of 6-8 inches dbh (diameter at breast height) or smaller. Canopy cover is roughly 50 percent, with significant variation, suggesting early successional forest thinning. Few, if any, larger canopy trees are present, and canopy tree species richness is very low. Occasional individuals of balsam fir (*Abies balsamifera*) are present. Forest understories include saplings of aspen, birch, balsam fir, and black ash (*Fraxinus nigra*) and shrubs including hazel (*Corylus americana* and *C. cornuta*), and mountain maple (*Acer spicatum*). Ground cover herbs include ubiquitous north woods species such as big-leaved aster (*Eurybia macrophylla*), wild sarsaparilla (*Aralia nudicaulis*), blue bead lily (*Clintonia borealis*) and Canada mayflower (*Maianthemum canadense*). Native Plant Community (NPC) classes for these upland forests are FDn33 (Northern Dry-Mesic Mixed Woodland) and FDn43 (Northern Mesic Mixed Forest).

Most forested wetlands in the study area are black ash swamps, but conifer swamps are also present in the form of mixed conifers and cedar swamps. In ash swamps, the forest canopy is dominated by black ash, creating as much as 75 percent cover. Individual trees are typically 6-8 inches dbh, but occasional trees may approach 12 inches dbh. Subcanopy species consist of black ash saplings, mountain maple, and speckled alder (*Alnus incana*). The herbaceous ground cover commonly includes bluejoint (*Calamagrostis canadensis*), sedges (such as *Carex intumescens*, *C. leptalea*, *C. projecta*, and *C.*

intumescens), and various forbs. The NPC class for these swamps is WFn55 (Northern Wet Ash Swamp). Conifer and cedar swamps comprise canopy-sized black spruce (*Picea mariana*), tamarack (*Larix laricina*), and white cedar (*Thuja occidentalis*). Understories include saplings of those wetland conifers as well as alder and small shrubs such as Labrador tea (*Ledum groenlandicum*) and blueberry (*Vaccinium angustifolium*). Groundcover of these conifer swamps may be sparse and includes *Sphagnum* spp. moss, sedges (various Carex spp.), and threeleaf false lily of the valley (*Maianthemum trifolium*). The NPC classes (MNDNR 2003) for these conifer swamps include FPn62 (Northern Rich Spruce Swamp (Basin)) and WFn53 (Northern Wet Cedar Forest). Many hardwood swamps are oriented in a northwest-southeast manner in slight swales or drainages across undulating glacial till, in general, draining to the southeast to constructed ditches.

Shrub wetlands are less common than forested wetlands in the study area. The majority of shrub wetlands are alder thicket, dominated by speckled alder with occasional black ash saplings. The understories include red raspberry and dwarf red raspberry (*Rubus idaeus* var. *strigosus* and *R. pubescens*), blue joint, and sedges. A portion of shrub wetlands are shrub-carr dominated by willows such as pussy willow, Bebb's willow and meadow willow (*Salix discolor*, *S. bebbiana*, and *S.petiolaris*). Alder thicket wetlands have NPC code FPn73 (Northern Alder Swamp), and shrub-carr wetlands have NPC code WMn82 (Northern Wet Meadow/Carr).

In areas that have been modified through anthropogenic disturbance, a variety of early successional communities occur. In uplands, shallow soils limit vegetation to sapling of aspen and birch and grasses such as smooth brome (*Bromus inermis*) and timothy (*Phleum pratense*), and forbs such as red clover (*Trifolium pratense*), hybrid clover (*Trifolium hybridum*), and birds foot trefoil (*Lotus corniculatus*). Similar species are found along roadways and constructed ditches. In wetlands in scraped areas typical vegetation includes narrow-leaved cattail (*Typha angustifolia*), dwarf scouring rush (*Equisetum scirpoides*), alpine bulrush (*Trichophorum alpinum*), and little green sedge (*Carex viridula*). Wetlands along ditches includes native and exotic vegetation, dominated by species such as cattails (*Typha latifolia* and *Typha angustifolia*) reed canarygrass (*Phalaris arundinacea*) and sedges (e.g., *Carex lacustris*, *C. stipata*, *C. scoparia*). Shallow marshes and seasonally flooded basins are generally dominated by cattail (*Typha angustifolia*). In general, upland and wetland communities in areas modified by mine activities do not fit any defined NPC classes.

Anthropogenically altered areas include two sites in the interior of the study area that were used as sources of borrow material during previous tailings pit expansions. Additionally, there is a large ditch and road system on the upslope (northwest) side of the tailings basin. A landfill is present in the southwest portion of the site with adjacent constructed stormwater ponds.

3.0 Wetland Delineation

3.1 Wetland Delineation and Classification Methods

Barr conducted on-site wetland delineations in the study area on July 22-24, 2015, and August 10-14, 2015. The delineations were established according to the Routine On-Site Determination Method specified in the *U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual* (U.S. Army Corps, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (US Army Corps of Engineers, 2012). The entire study area was field reviewed. Soil borings were placed in and around the wetlands and potential wetlands, to a depth of at least 15 inches below the ground surface, or until bedrock or large rocks were encountered. Representative soil samples from each boring were examined for the presence of hydric soil indicators. Soil textures were determined by feel. Soil colors were determined using a Munsell® soil color chart and were noted on Wetland Determination Data Forms (Appendix A). Hydrologic conditions were evaluated at each soil boring and this information was recorded on the Wetland Determination Data Forms. The plant species at each sample location were identified and dominant species were determined using the 50/20 rule. Wetland indicator status of each species was taken from the current National Wetland Plant List (Lichvar, 2013) for the Northcentral and Northeast region.

Precipitation data were analyzed in comparison to the statistical climatic WETS table data developed by the Natural Resources Conservation Service (NRCS) specifically for evaluating climatic normalcy in conducting wetland delineations (Table 1). Gridded precipitation data were downloaded from the University of Minnesota Climatology website and used as a surrogate for on-site precipitation measurements. The delineations were conducted during the 2014-2015 water year (defined as October 1, 2014 through September 30, 2015). During the first ten months of the 2015 water year through July, 2015 precipitation was above the normal range for 1 month, below the normal range for 6 months, and within the normal range for 2 months (based on the current long-term normal period for precipitation statistics, 1981-2010). Therefore, the water year to-date is been drier than normal. However, both sets of wetland delineations were conducted during normal periods based on evaluation of precipitation during the three previous months (Table 2). During the three months prior to the July delineation work, precipitation was above the normal range in May and within the normal range in April and June. During the three months prior to the August delineation work, precipitation was above the normal range in May, within the normal range in June, and below the normal range in July. Since the delineations were conducted during normal periods of precipitation, it was expected that wetland hydrology may be observable in most wetlands. However, July is also one of the months with the highest evapotranspiration rates.

Wetland boundaries were located in the field using a Trimble GeoXH 6000 Global Positioning System (GPS) Unit, capable of recording positions with sub-foot horizontal accuracy. Wetland boundaries were later digitized in esri® ArcGIS for Desktop Geographic Information System software. Delineated wetlands were classified using the U.S. Fish and Wildlife Service Circular 39 System (U.S. Fish and Wildlife, 1956), the U.S. Fish and Wildlife Service Cowardin System (Cowardin et al., 1979), and the Eggers and Reed Plant Community Classification System (Eggers and Reed, 1997).

3.2 Wetland Descriptions

The study area covered a total of 1,594 acres, with a total of 362.3 wetland acres delineated within the study area. The wetlands are classified as alder thicket; coniferous swamp; deep marsh; fresh (wet) meadow; hardwood swamp; seasonally flooded basin; sedge meadow; shallow marsh; shallow, open water; and shrub-carr wetlands. Wetland Determination Data Forms are included in Appendix A and photographs of wetlands and other regions of the study area are included in Appendix B. The delineated wetlands are described in Tables 3 and 4. The wetlands in the proposed project area are summarized in Table 6.

3.2.1 Alder Thicket

Alder thicket wetlands (Type 6, PSS1/PSS1B/PSS1C) are prevalent within the study area and cover 53.49 acres (Figure 7). Speckled alder (*Alnus incana*, FACW) dominates thickets with between 30 to 95 percent coverage. Other dominant woody vegetation consists of black ash (*Fraxinus nigra*, FACW, 5 to 50 percent cover), pussy willow (*Salix discolor*, FACW, 30 percent cover), and quaking aspen (*Populus tremuloides*, FAC, 10 percent cover). Dominant grass and sedge species are bluejoint (*Calamagrostis canadensis*), fowl mannagrass (*Glyceria striata*, OBL), and *Carex* sp. with between 10 to 50 percent coverage each. Other dominant herbaceous species include American water horehound (*Lycopus americanus*, OBL), pussy willow seedlings (*Salix discolor*, FACW), and ostrich fern (*Matteuccia struthiopteris*, FAC) with between 20 to 25 percent coverage each. Sphagnum moss is not present within the alder thicket wetlands with one exception. Wetland soil typically consists of peat, hydric mineral soil, or mucky mineral soil. Three wetland soils within the alder thicket wetlands are classified as histosols or histic epipedons. Primary hydrologic indicators are a high water table (within zero to two inches of ground surface), soil saturation (within 12 inches of ground surface), and a sparsely vegetated concave surface. Common secondary hydrologic indicators are geomorphic position, a shallow aquitard, and the FAC-Neutral Test. Wetland slopes vary between zero to 10 percent. Wetland vegetation occurred within micro depressions between boulders making wetland delineations more challenging. The wetland-upland boundary was generally determined by a change in the vegetation community and subtle changes in topography.

3.2.2 Coniferous Swamp

Coniferous swamps (Type 7, PF04B) cover 57.32 acres of the study area (Figure 7). Two main types of coniferous swamps were observed: cedar swamps and spruce/tamarack swamps.

Dominant woody vegetation within the cedar swamps consists of northern white cedar (*Thuja occidentalis*, FACW, 50 percent cover), speckled alder (*Alnus incana*, FACW, 60 percent cover), and pussy willow (*Salix discolor*, FACW, 30 percent cover). Dominant ground cover species within the cedar swamps are American water horehound (*Lycopus americanus*, OBL), American mountain ash seedlings (*Sorbus americana*, FAC), bluejoint (*Calamagrostis canadensis*, OBL, 10%), longstalk sedge (*Carex pedunculata, FACU*), and western oakfern (*Gymnocarpium dryopteris*, FACU) with between 5 to 25 percent cover each. Sphagnum moss is present within the tamarack/black spruce swamps (up to five percent).

Dominant woody vegetation within the tamarack/spruce swamps consists of tamarack (*Larix laricina*, FACW, 25 percent), black spruce (*Picea mariana*, FACW, 40 to 50 percent), low bush blueberry (*Vaccinium*

angustifolium), and balsam fir *(Abies balsamea,* as minor canopy trees and saplings). Dominant ground cover species are: western Labrador tea *(Ledum groenlandicum),* threeleaf false lily of the valley *(Maianthemum trifolium),* three seeded sedge *(Carex trisperma), and* harlequin blueflag *(Iris versicolor)*. Sphagnum moss is present within the tamarack/black spruce swamps.

Wetland soils at the two coniferous swamp sample points were histosols consisting of a top layer of mucky peat underlain by sandy loam or muck. Primary hydrologic indicators are water-stained leaves, high water table, and soil saturation (at the surface). Wetlands slopes vary between zero and four percent.

Wetland vegetation occurred within micro depressions between boulders making wetland delineations more challenging. The wetland-upland boundary was generally determined by a change in the vegetation community and subtle changes in topography.

3.2.3 Deep Marsh

Deep marsh wetland (Type 4, PABH) is located within one wetland polygon and covers 4.06 acres of the study area (Figure 7). Emergent plant species observed include floating pondweed (*Potamogeton natans,* OBL, 10 percent cover) and broadleaf cattail (*Typha latifolia,* OBL, 5 percent cover). Sphagnum moss is not present within the deep marsh wetland. Wetland soil at the sample point, south of the marsh, consisted of gravelly sandy loam saturated at the surface. The deep marsh wetland is inundated with approximately six inches of water. Hydrologic indicators are visible inundation on aerial imagery, geomorphic position, and the FAC-Neutral Test. Wetland slopes vary between zero and four percent. The deep marsh wetland within Murphy's Pond ultimately drains north through a roadside wetland ditch. The wetland-upland boundary was generally determined by a changes in topography often defined by past disturbance, fill, or excavation.

3.2.4 Fresh (Wet) Meadow

Fresh (wet) meadows (Type 2, PEM1B/PEMB/PEM1C) cover 6.67 acres of the study area (Figure 7). Ground cover is dominated by jewelweed (*Impatiens capensis*, FACW), reed canary grass (*Phalaris arundinacea,* FACW), fowl mannagrass (*Glyceria striata*, OBL), and sensitive fern (*Onoclea sensibilis*, FACW) with between 20 and 40 percent coverage each. Dominant woody vegetation in the surrounding wetland community is black ash (*Fraxinus nigra*, FACW, 20 to 70 percent) and speckled alder (*Alnus incana*, FACW, 5 to 50 percent). Sphagnum moss is not present within the wetlands. Wetland soil typically consists of a top layer of loamy mucky mineral soil underlain by loam and red parent material. A restrictive layer was found within 24 inches of the ground surface and wetland soil is usually saturated within 22 inches of the ground surface. Other common hydrologic indicators are geomorphic position, shallow aquitard, and the FAC-Neutral Test. Wetlands slopes are between one and three percent. The wetland-upland boundary was generally determined by changes in topography often defined by past disturbance, fill, or excavation.

3.2.5 Hardwood Swamp

Hardwood swamps (Type 7, PF01A/PF01B/PF01C) cover 143.75 acres and are prevalent within the study area (Figure 7). Black ash swamps are the most common of this wetland type. Dominant woody vegetation consists of black ash (*Fraxinus nigra*, FACW, 20 to 75 percent cover), speckled alder (*Alnus incana*, FACW,

10 to 70 percent cover), pussy willow (*Salix discolor*, FACW, 10 to 50 percent cover), mountain maple (*Acer spicatum*, FACU, 5 to 15 percent cover), and quaking aspen (*Populus tremuloides*, FAC, 5 to 25 percent cover). Dominant grass and sedge species are bluejoint (*Calamagrostis canadensis*, OBL), reed canary grass (*Phalaris arundinacea*, FACW), fowl mannagrass (*Glyceria striata*, OBL), and *Carex* sp. (FACW) with between 5 to 95 percent coverage. Other dominate ground covers include jewelweed (*Impatiens capensis*, FACW), yellow marsh marigold (*Caltha palustris*, OBL), and dwarf red blackberry (*Rubus pubescens*, FACW) with between 20 to 40 percent coverage each. Sphagnum moss is not present within these wetlands with two exceptions. Wetland soil typically consists of peat, hydric mineral soil, or loamy mucky mineral soil and includes red parent material. Three wetland soils are classified as histosols and/or histic epipedons. Secondary hydrologic indicators are the most common and typically include geomorphic position, a shallow aquitard (within 24 inches below ground surface, bgs), microtopographic relief, and the FAC-Neutral Test. Wetland slopes are between zero and three percent. Wetland vegetation occurred within micro depressions between boulders making wetland delineations more challenging. The wetland-upland boundary was generally determined by a change in the vegetation community and subtle changes in topography.

3.2.6 Seasonally Flooded Basin

Seasonally flooded basins (Type 1, PEMA) are located in two wetland polygons and cover 0.63 acres of the study area (Figure 7). Ground cover is dominated by awlfruit sedge (*Carex stipata*, OBL), dwarf horsetail (*Equisetum scirpoides*, FAC), and woolgrass (*Carex cyperinus*, OBL) with between 25 and 40 percent coverage each. Dominant woody vegetation at the wetland sample point includes black ash (*Fraxinus nigra*, FACW) and quaking aspen (*Populus tremuloides*, FAC) with 20 percent or less coverage each. No sphagnum moss is present within the wetlands. Wetland soil consisted of loam or sand underlain by loam. A shallow aquitard was observed within one wetland sample point at 13 inches bgs. Other hydrologic indicators include moss trim lines, geomorphic position, and the FAC-Neutral Test. The wetland-upland boundary was generally determined by a changes in topography often defined by past disturbance, fill, or excavation.

3.2.7 Sedge Meadow

Sedge meadows (Type 2, PEMA/PEMB/PEM1B/PEM1Bd/ PEM1C) are prevalent within the study area and cover 15.87 acres (Figure 7). Wetlands 108a-e are linear wetlands formed in ditches adjacent to a roadway or railroad embankment. Dominant sedge species include lake sedge (*Carex lacustris*, OBL), awlfruit sedge (*Carex stipata*, OBL), broom sedge (*Carex scoparia*, FACW), and little green sedge (*Carex viridula*, OBL) with between 20 and 60 percent coverage each. Woody vegetation, if present, is predominantly speckled alder (*Alnus incana*, FACW, 75 to 95 percent cover), black ash (*Fraxinus nigra*, FACW, 5 to 20 percent cover), and quaking aspen (*Populus tremuloides*, FAC, 5 percent cover). Sphagnum moss is not present within these wetlands. Wetland soil typically consists of a top layer of mucky loam or loam underlain by mineral soil and red parent material. Primary hydrologic indicators include soil saturation (within 12 inches of the ground surface), the presence of an algal mat/crust, or a sparsely vegetated concave surface. Common secondary hydrologic indicators are geomorphic position, a shallow aquitard (within 16 inches of the ground surface), and the FAC-Neutral Test. Wetlands slopes vary between zero and two percent. The

wetland-upland boundary was generally determined by a changes in topography often defined by past disturbance, fill, or excavation.

3.2.8 Shallow Marsh

Shallow marshes (Type 3, PEMC/PEM1C/PEMC1d) cover 72.47 acres of the study area (Figure 7). Vegetation at the wetland observation points is dominated by woolgrass (*Carex cyperinus*, OBL), broadleaf cattail (*Typha latifolia,* OBL), common rush (*Juncus effuses*, OBL), and toad rush (*Juncus bufonius*, FACW) with approximately 30 to 45 percent cover each. Narrowleaf cattail (*Typha angustifolia*, OBL) was observed with up to 100 percent coverage in places. Sphagnum moss is not present within these wetlands. Wetland soil is saturated at the surface and typically consisted of gravelly sandy loam or sandy clay loam. The water table was observed within four inches bgs or was not observed within the soil boring. Other hydrologic indicators include geomorphic position and the FAC-Neutral Test. Wetlands slopes vary between zero and two percent. The wetland-upland boundary was generally determined by a changes in topography often defined by past disturbance, fill, or excavation.

3.2.9 Shallow, Open Water

Shallow, open water wetlands (Type 5, PABC1/PABC3) cover 8.11 acres of the study area (Figure 7). Dominant floating vegetation typically consists of floating pondweed (*Potamogeton natans,* OBL, 10 percent cover). Submergent vegetation was not observed, but is likely present. Sphagnum moss is not present within these wetlands. Maximum open water depth is 6.6 feet. Primary hydrologic indicators include the presence of surface water and visible inundation on aerial imagery. Wetlands slopes vary between zero and two percent. The wetland-upland boundary was generally determined by a changes in topography often defined by past disturbance, fill, or excavation.

3.2.10 Shrub-carr

Shrub-carr wetlands (Type 6, PSS1A/PSS1B) cover 0.89 acres of the study area (Figure 7). Dominant woody vegetation consists of pussy willow (*Salix discolor*, FACW, 10 percent cover) and quaking aspen (*Populus tremuloides*, FAC, 10 percent cover). Dominant ground cover species are speckled alder seedlings (*Alnus incana*, FACW, 30 percent cover), jewelweed (*Impatiens capensis*, FACW, 40 percent cover), and reed canary grass (*Phalaris arundinacea*, FACW, 40 percent cover). Sphagnum moss is not present within these wetlands. Wetland soil consists of a top layer of mucky silt loam or silt/sandy loam underlain by loam. Common hydric soil indicators include depleted matrix or depleted below dark surface. Red parent material is common. Primary hydrologic indicators include high water table and soil saturation (at surface). Common secondary hydrologic indicators are geomorphic position, shallow aquitard, and the FAC-Neutral Test. Wetlands slopes vary between zero and two percent. Wetland vegetation occurred within micro depressions between boulders making wetland delineations more challenging. The wetland-upland boundary was generally determined by a change in the vegetation community and subtle changes in topography.

4.0 Regulatory Implications

Field observations and aerial photo evidence suggest that a few of the wetlands in the study area were created by excavation, road and railroad impoundment, and mining activities, and are not historic, natural wetlands. Initial observations of incidental wetlands have been provided in this report; however, further documentation of these areas will be provided along with a formal request that they be considered incidental wetlands per Minnesota Rules 8420.0105, Subp. 2.D., and not regulated under Minnesota's Wetland Conservation Act (WCA). See Table 5 for comments on history and origin of delineated wetlands. Wetlands 6, 7a through 7h, 8, 30a through 30d, and 31 appear to have been created by excavation and surface soil scraping used for borrow soils. Wetland 16a appears to be incidental due to soil disturbance in 2011. The area of Wetlands 16b through 16d appears to have been impacted by clearing in 2003-2004 and then wetlands were incidentally created in about 2006 by railroad construction. The northeast ditch system designated as Wetland 17a through 17e appears to have been created incidentally by railroad and roadway construction. Portions of Murphy's Pond (Wetland 18) may be incidentally created due to impoundment from the roadway and the railroad. Wetlands 38a through 38d are man-made stormwater ponds.

Wetlands 1a, 2, 3a through 3c, 7a through 7h, 10, 11a through 11c, 13, 16a through 16d, 17c, 17d, 30a through 30d, 31, 32, 33, 35, 37, and 38a through 38d appear to be topographically-enclosed wetlands with no apparent surface water outlet and therefore appear to not be under the jurisdiction of Section 404 of the Clean Water Act (CWA). These wetlands are not connected to the Diversion Channel, Watercourse 1, Watercourse 2, Murphy's Pond, or the canal ditch system (Wetland 17a+b), which flows to Beaver River or East Branch Beaver River. Wetlands 1b, 5, 6, 8, 9, 10, 12, 15, are intermittently connected with the canal ditch system as they are seasonally flooded and likely only overflow to the ditch in the spring during flooded conditions. See Table 5 for comments on connections observed.

This report along with the attached joint application form (Appendix C) requests wetland boundary and type concurrence from the Minnesota Department of Natural Resources as the local government unit administering the WCA for projects requiring a permit to mine. This submittal also is requesting an approved jurisdictional determination from the U.S. Army Corps of Engineers to verify the jurisdictional status of site wetlands with respect to their authority to administer Section 404 of the CWA.

5.0 References

Cowardin, L.M., V. Carter, F.C. Golet, R.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service, FWS/OBS079/31, 103 pp.

Eggers, Steve D., and Donald M. Reed. 1997. *Wetland Plants and Plant Communities of Minnesota and Wisconsin*. U.S. Army Corps of Engineers, St. Paul District, MN.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W. N. Kirchner. 2014. *The National Wetland Plant List*. 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42. U.S. Army Corps of Engineers 2014. National Wetland Plant List, version 3.2. http://wetland_plants.usace.army.mil/ U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH.

Minnesota Department of Natural Resources. 2003. Field Guide to the Native Plant Communities of Minnesota: the Laurentian Mixed Forest Province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. MNDNR St. Paul, MN.

U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1*. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-09-19. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service. 1956. *Wetlands of the United States Circular 39*. U.S. Government Printing Office, Washington, D.C.

Tables

Table 1

Precipitation Summary Compared to WETS Statistics

Wetland Delineation Precipitation Data Retrieval from a Gridded Database

Obtaining a long-term precipitation data time-series for wetland delineation efforts can be a difficult and time-consuming process. Locating the nearest precipitation monitoring station to the wetland often proves challenging. Once a nearby monitoring location is identified, retrieving the data, accounting for gaps in the record, and generating the summary statistics can provide further challenges.

By offering access to "synthetic" data, this application assists users in overcoming some the challenges inherent in assembling a precipitation data set. The synthetic data are made up of regularly-spaced grid nodes whose values were calculated using data interpolated from Minnesota's outstanding, but spatially and temporally irregular, precipitation data base.

Click to learn more about **Precipitation Grids**.

select a wetland location

Precipitation data for target wetland location:	
county: **Lake**	township number: **56N**
township name: **unnamed**	range number: **9W**
nearest community: **Beaver Crossing**	section number: **36**

To create a **precipitation documentation worksheet** using USDA-NRCS methodology, select the date of the site visit or aerial photograph and click on "create worksheet".

2015 August 17

create worksheet

precipitation totals are in inches

color key:
total is in lowest 30th percentile of the period-of-record distribution
total is => 30th and <= 70th percentile
total is in highest 30th percentile of the period-of-record distribution

multi-month totals:
WARM = warm season (May thru September)
ANN = calendar year (January thru December)
WAT = water year (Oct. previous year thru Sep. present year)

Period-of-Record Summary Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.61	0.56	0.90	1.39	2.21	3.02	2.45	2.42	2.49	1.44	1.03	0.74	15.76	25.96	26.19
70%	1.18	1.10	1.77	2.72	3.97	4.68	4.27	4.33	4.08	2.90	2.12	1.45	19.55	31.31	31.71
mean	1.09	0.92	1.46	2.20	3.17	3.91	3.60	3.48	3.54	2.49	1.76	1.18	17.70	28.81	28.85

1971-2000 Summary Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.92	0.64	1.30	1.54	2.20	3.25	2.61	2.68	3.34	1.53	1.35	0.71	17.85	30.10	29.91
70%	1.68	1.02	2.00	2.89	3.47	4.55	4.89	4.72	5.02	3.90	3.14	1.48	21.64	34.41	33.91

mean	1.38	1.03	1.86	2.24	3.08	4.00	4.10	3.84	4.08	2.82	2.37	1.15	19.09	31.96	32.06
1981-2010 Summary Statistics															
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
30%	0.83	0.62	1.00	1.80	2.22	3.23	2.58	2.52	3.21	2.06	1.37	0.88	17.29	30.66	30.80
70%	1.56	1.39	1.81	3.06	3.96	4.55	4.75	3.80	4.13	4.01	3.08	1.78	19.35	34.45	33.57
mean	1.41	1.18	1.58	2.56	3.20	3.95	3.89	3.46	3.94	3.20	2.32	1.45	18.44	32.15	32.03
Year-to-Year Data															
Year	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
2015	0.48	0.78	0.44	1.66	4.54	4.34	2.13								
2014	1.14	1.72	1.52	5.12	3.63	4.59	1.72	3.80	3.24	1.42	0.81	1.52	16.98	30.23	34.56
2013	1.63	1.33	1.71	4.43	4.11	6.67	3.78	3.15	1.43	3.50	1.03	3.55	19.14	36.32	33.40
2012	0.56	1.59	2.11	2.67	6.36	7.47	3.17	1.95	0.59	2.21	1.78	1.17	19.54	31.63	28.57
2011	1.67	0.27	0.80	2.67	3.78	5.19	2.35	2.38	1.33	0.86	0.71	0.53	15.03	22.54	28.32
2010	1.32	0.71	0.95	0.53	2.54	5.55	2.70	5.08	3.72	3.81	2.07	2.00	19.59	30.98	32.71
2009	1.18	1.51	3.53	2.42	2.13	2.16	2.97	3.68	0.72	5.27	1.40	2.94	11.66	29.91	26.94
2008	0.40	0.36	0.99	4.41	2.50	6.82	2.45	2.64	4.08	2.74	1.64	2.26	18.49	31.29	36.81
2007	0.69	2.50	2.70	3.18	2.58	3.81	1.41	2.00	7.45	8.58	0.86	2.72	17.25	38.48	31.04
2006	0.75	1.63	1.47	1.12	4.25	3.58	4.53	1.39	3.55	1.62	1.54	1.56	17.30	26.99	33.15
2005	4.29	2.02	0.64	0.83	4.36	5.95	1.58	1.10	3.21	3.98	3.90	3.00	16.20	34.86	31.30
2004	3.14	1.49	1.54	2.72	5.27	2.08	3.21	3.75	3.76	3.94	0.29	3.09	18.07	34.28	31.58
2003	0.23	0.38	1.61	2.00	3.96	3.10	4.75	1.54	2.38	1.98	1.46	1.18	15.73	24.57	23.61
2002	0.26	0.64	1.79	1.85	1.99	3.68	2.90	4.94	2.73	2.47	0.43	0.76	16.24	24.44	27.44
2001	1.45	2.41	0.91	7.20	4.55	3.31	4.31	3.75	2.21	2.88	2.84	0.94	18.13	36.76	38.57
2000	0.94	1.26	1.78	1.67	2.23	4.12	2.28	3.37	2.62	2.09	5.45	0.93	14.62	28.74	23.87
1999	1.51	1.35	1.41	3.08	3.22	3.29	7.22	4.80	5.62	2.45	0.83	0.32	24.15	35.10	44.87
1998	2.38	4.07	2.00	1.53	2.41	3.87	1.75	2.75	4.99	7.16	4.47	1.74	15.77	39.12	30.84
1997	2.33	0.81	2.03	1.57	2.12	5.21	2.41	2.19	3.21	3.54	1.24	0.31	15.14	26.97	32.56
1996	2.22	2.14	0.74	2.07	2.17	3.59	5.25	2.24	5.77	4.09	4.30	2.29	19.02	36.87	35.72
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
1995	1.23	1.10	1.64	2.11	3.25	0.50	8.52	6.61	3.49	4.38	2.57	2.58	22.37	37.98	32.62
1994	2.60	0.40	1.59	4.32	2.61	5.95	3.05	3.41	3.59	1.89	1.78	0.50	18.61	31.69	31.88
1993	1.60	0.57	0.22	2.76	4.50	3.85	7.96	3.68	1.79	0.41	3.01	0.94	21.78	31.29	33.53
1992	0.75	1.30	1.01	3.50	3.20	2.91	4.62	3.90	3.40	1.63	3.35	1.62	18.03	31.19	32.97
1991	0.50	0.61	3.26	3.05	2.86	3.33	4.79	1.16	7.65	2.57	4.79	1.02	19.79	35.59	33.65
1990	0.87	0.74	2.01	4.49	0.79	4.29	2.74	1.82	4.24	4.12	1.24	1.08	13.88	28.43	24.56
1989	2.42	0.32	1.87	2.08	3.96	6.01	1.73	2.65	3.08	1.27	0.78	0.52	17.43	26.69	29.98
1988	1.54	0.25	3.37	0.37	3.02	2.21	2.45	8.81	3.82	0.83	3.26	1.77	20.31	31.70	29.13
1987	1.03	0.62	0.37	0.61	6.41	1.57	5.30	1.93	4.03	1.05	1.58	0.66	19.24	25.16	25.84
1986	1.03	0.89	1.36	3.31	1.81	4.47	5.12	5.24	6.37	0.95	2.70	0.32	23.01	33.57	34.89
1985	0.52	0.69	1.47	1.68	5.85	4.74	4.07	3.66	5.24	2.29	2.32	0.68	23.56	33.21	35.42
1984	1.00	0.82	0.61	2.73	1.62	6.72	1.90	5.24	3.77	4.42	1.29	1.79	19.25	31.91	33.35
1983	1.18	0.58	1.77	2.82	1.93	2.26	4.76	4.96	5.08	3.27	3.90	1.77	18.99	34.28	36.32
1982	2.68	0.56	1.96	2.13	5.67	1.89	7.34	2.85	3.83	6.02	3.51	1.45	21.58	39.89	34.96
1981	0.18	2.68	0.86	4.70	2.21	7.70	2.63	2.69	2.84	4.43	0.90	0.72	18.07	32.54	30.69
1980	1.88	0.65	1.16	0.76	1.19	3.05	2.57	5.31	6.36	1.95	1.05	1.20	18.48	27.13	26.87
1979	0.47	1.63	3.68	1.40	7.05	4.08	2.48	2.86	1.56	2.49	1.16	0.29	18.03	29.15	29.63
1978	0.74	0.39	0.68	1.55	3.68	3.15	7.98	4.61	3.44	1.19	1.37	1.86	22.86	30.64	34.51
1977	0.50	0.71	3.44	1.35	2.75	3.89	3.55	4.68	9.22	3.82	3.09	1.38	24.09	38.38	31.59
1976	2.52	0.74	3.64	0.72	0.50	6.59	1.59	1.17	1.13	0.66	0.32	0.52	10.98	20.10	24.15
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
1975	2.99	0.98	4.26	2.51	1.18	3.87	3.36	2.42	3.39	1.27	3.34	0.94	14.22	30.51	29.75

1974	0.95	0.70	0.83	3.22	3.97	4.19	2.92	4.10	1.12	2.00	1.59	1.20	16.30	26.79	29.54
1973	0.82	0.69	1.46	1.01	3.46	5.31	4.07	6.07	3.60	4.42	1.73	1.39	22.51	34.03	30.80
1972	1.18	0.93	1.69	3.39	3.14	2.20	5.52	7.66	5.29	1.30	1.46	1.55	23.81	35.31	41.68
1971	0.98	1.69	3.60	0.82	3.49	5.27	3.14	2.30	2.74	6.70	2.69	1.29	16.94	34.71	35.71
1970	0.79	0.49	0.94	2.61	4.01	1.92	2.85	1.39	2.61	7.14	3.15	1.39	12.78	29.29	23.56
1969	4.29	0.28	0.31	1.32	3.34	2.79	2.21	4.61	4.10	2.84	1.25	1.86	17.05	29.20	32.06
1968	0.72	0.18	1.85	4.49	2.98	6.23	3.39	4.46	3.61	4.91	1.36	2.54	20.67	36.72	31.17
1967	2.46	0.44	0.73	2.64	1.17	5.51	3.26	2.62	2.59	1.57	0.64	1.05	15.15	24.68	26.56
1966	1.14	0.68	4.62	2.06	1.19	3.00	3.23	5.16	1.28	2.49	1.00	1.65	13.86	27.50	30.37
1965	0.59	1.17	3.71	2.16	4.25	3.78	3.22	3.21	6.19	2.59	3.38	2.04	20.65	36.29	31.96
1964	0.91	0.41	0.74	3.98	5.55	5.88	1.71	4.48	5.22	1.07	0.92	1.69	22.84	32.56	32.69
1963	0.22	0.65	1.87	2.38	2.20	3.07	2.07	2.59	2.94	0.90	1.44	1.47	12.87	21.80	19.41
1962	0.61	1.67	0.19	1.85	5.48	2.82	3.46	2.90	3.22	0.66	0.21	0.55	17.88	23.62	26.59
1961	0.28	0.61	1.52	3.79	3.55	1.08	2.08	0.97	5.26	1.93	1.43	1.03	12.94	23.53	24.99
1960	0.84	0.34	0.25	4.07	3.75	1.95	4.63	2.07	2.07	2.28	2.51	1.06	14.47	25.82	24.40
1959	0.39	0.36	0.19	0.62	4.73	4.04	1.87	5.65	3.70	2.40	0.72	1.31	19.99	25.98	26.50
1958	0.69	0.35	0.75	0.91	1.76	3.04	4.49	6.57	4.00	1.04	2.75	1.16	19.86	27.51	26.53
1957	0.35	1.12	1.05	2.39	2.91	5.73	4.11	1.31	3.80	1.39	2.18	0.40	17.86	26.74	27.54
1956	0.73	0.30	0.92	2.10	2.44	1.67	3.10	3.94	1.93	1.88	1.14	1.75	13.08	21.90	23.20
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1955	0.92	1.32	1.27	1.00	3.47	3.76	7.33	2.42	5.34	2.37	2.42	1.28	22.32	32.90	29.70
1954	1.61	0.62	1.49	3.62	4.67	3.58	1.77	1.87	3.42	1.68	0.85	0.34	15.31	25.52	26.65
1953	1.12	0.68	1.55	1.81	5.11	4.70	5.37	6.77	2.42	0.52	1.82	1.66	24.37	33.53	31.12
1952	0.87	0.25	1.76	1.77	1.43	4.81	6.66	4.56	1.08	0.37	1.09	0.13	18.54	24.78	28.41
1951	0.57	1.69	1.51	2.13	4.14	3.83	2.64	5.66	5.40	2.72	1.28	1.22	21.67	32.79	33.15
1950	2.17	0.41	1.70	2.96	5.05	2.82	3.81	2.91	2.05	3.49	0.92	1.17	16.64	29.46	31.88
1949	1.80	0.72	1.61	0.83	5.11	3.67	5.37	1.29	1.64	5.61	1.16	1.23	17.08	30.04	26.28
1948	1.08	0.56	1.18	5.00	0.76	3.01	3.99	1.95	0.44	0.85	2.11	1.28	10.15	22.21	22.21
1947	0.47	0.20	0.48	2.51	2.50	4.98	1.90	5.10	3.07	0.80	2.69	0.75	17.55	25.45	27.85
1946	1.27	0.74	0.49	1.29	2.51	5.46	1.88	2.93	5.43	3.73	1.51	1.40	18.21	28.64	25.29
1945	0.88	1.20	1.77	2.17	1.04	4.03	3.64	4.88	3.76	0.69	1.70	0.90	17.35	26.66	26.85
1944	0.28	0.56	0.83	0.68	5.08	7.77	4.22	4.81	1.69	0.48	2.52	0.48	23.57	29.40	29.79
1943	1.13	0.37	0.66	1.43	3.29	6.05	2.44	4.32	2.67	2.31	1.38	0.18	18.77	26.23	26.05
1942	0.57	0.35	2.10	1.26	4.81	4.77	5.46	3.22	2.81	1.83	0.98	0.88	21.07	29.04	28.07
1941	1.07	0.56	0.35	3.39	2.38	3.11	2.89	6.53	6.38	1.85	0.44	0.43	21.29	29.38	34.00
1940	0.42	0.83	1.33	2.94	3.50	2.77	4.86	2.67	2.29	2.79	4.12	0.43	16.09	28.95	23.95
1939	1.79	2.64	0.91	0.64	3.34	5.36	1.39	8.22	1.34	1.78	0.22	0.34	19.65	27.97	30.47
1938	1.03	0.60	2.19	3.94	4.70	4.43	1.76	2.79	2.08	0.85	2.86	1.13	15.76	28.36	27.86
1937	1.69	1.24	0.21	2.80	4.01	1.32	1.73	5.16	4.01	1.73	1.59	1.02	16.23	26.51	27.07
1936	0.99	1.08	1.87	1.30	2.76	1.23	1.90	3.17	2.50	0.92	1.69	2.29	11.56	21.70	21.75
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1935	2.23	0.37	1.96	1.30	1.64	3.68	4.97	5.05	2.59	2.75	1.05	1.15	17.93	28.74	30.94
1934	0.51	0.72	0.88	1.03	1.24	3.43	2.28	2.39	3.92	3.85	1.78	1.52	13.26	23.55	22.08
1933	0.54	0.77	0.74	2.40	1.42	2.97	2.67	1.20	6.23	3.05	1.41	1.22	14.49	24.62	25.62
1932	1.17	0.57	0.90	1.64	3.66	2.90	3.77	5.67	0.81	2.73	3.04	0.91	16.81	27.77	28.32
1931	0.41	0.30	0.89	0.68	3.50	5.90	1.47	3.34	4.21	3.81	3.15	0.27	18.42	27.93	25.44
1930	0.65	1.23	0.77	0.90	3.68	4.52	4.28	0.67	5.81	2.09	2.26	0.39	18.96	27.25	26.63
1929	1.81	0.59	1.50	1.21	1.60	3.58	1.47	2.15	4.79	2.16	0.75	1.21	13.59	22.82	22.69
1928	0.62	0.22	0.99	2.21	0.96	5.51	6.15	5.36	4.56	2.57	0.71	0.71	22.54	30.57	32.15
1927	0.76	1.37	1.12	1.69	3.11	2.59	3.61	1.42	1.58	1.21	2.45	1.91	12.31	22.82	22.07
1926	0.71	0.63	1.20	0.28	1.73	4.29	4.34	2.91	7.17	2.39	1.61	0.82	20.44	28.08	25.83

1925	0.55	1.08	1.00	0.67	1.56	3.89	2.39	4.58	5.14	0.91	0.92	0.74	17.56	23.43	24.14
1924	0.64	0.76	0.43	2.85	1.86	3.87	3.49	3.98	4.42	2.20	0.49	0.59	17.62	25.58	24.84
1923	1.64	0.51	1.32	0.98	1.64	3.61	6.69	2.10	1.87	0.54	1.17	0.83	15.91	22.90	24.62
1922	0.43	3.62	1.37	1.56	3.32	3.50	2.92	1.30	2.35	0.46	2.85	0.95	13.39	24.63	22.41
1921	0.69	0.69	1.28	2.01	3.19	1.85	5.41	1.47	4.06	0.75	0.42	0.87	15.98	22.69	26.58
1920	0.73	0.46	0.95	1.17	2.51	5.13	4.19	2.08	2.06	3.41	1.14	1.38	15.97	25.21	24.51
1919	0.55	1.14	1.05	1.19	1.26	3.44	1.79	3.29	2.18	1.79	3.11	0.33	11.96	21.12	22.35
1918	0.75	0.59	0.09	1.97	4.24	1.05	1.72	2.27	1.23	2.80	1.84	1.82	10.51	20.37	18.02
1917	0.27	0.91	3.18	1.19	1.07	3.70	2.37	3.71	1.54	3.07	0.14	0.90	12.39	22.05	20.07
1916	2.66	0.22	2.07	2.72	2.94	6.33	1.80	4.64	5.94	1.60	0.03	0.50	21.65	31.45	36.37
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1915	0.99	0.38	0.24	1.50	1.73	4.87	1.31	1.57	1.42	2.38	3.75	0.92	10.90	21.06	16.26
1914	0.94	0.41	0.79	1.95	1.82	4.15	1.73	3.52	2.27	0.79	1.08	0.38	13.49	19.83	21.49
1913	0.30	0.54	1.70	1.03	3.41	2.19	3.55	1.15	1.91	3.12	0.63	0.16	12.21	19.69	17.82
1912	0.26	0.20	0.24	1.72	5.21	2.32	2.08	2.44	3.24	0.80	0.33	0.91	15.29	19.75	22.64
1911	0.80	1.74	1.15	1.01	4.26	2.58	3.82	3.90	5.61	0.93	1.87	2.13	20.17	29.80	27.52
1910	0.52	0.90	0.39	1.59	1.80	1.14	4.58	1.78	3.31	1.17	0.82	0.66	12.61	18.66	26.33
1909	1.11	1.66	0.97	1.97	3.34	1.67	8.78	5.93	5.16	3.30	4.53	2.49	24.88	40.91	32.93
1908	0.49	1.11	1.55	2.94	6.42	3.71	5.26	1.90	2.53	1.30	0.56	0.48	19.82	28.25	27.41
1907	1.71	0.67	1.78	1.81	1.44	1.10	2.99	4.06	5.50	0.70	0.49	0.31	15.09	22.56	28.90
1906	1.22	0.28	1.00	1.45	3.85	5.56	1.06	3.65	3.40	2.76	4.01	1.07	17.52	29.31	25.88
1905	0.64	0.43	1.22	2.91	2.72	6.69	5.19	2.41	7.70	2.22	2.08	0.11	24.71	34.32	36.29
1904	0.35	0.65	1.96	0.72	2.14	4.30	3.27	2.58	4.15	4.69	0.30	1.39	16.44	26.50	25.59
1903	0.75	0.62	2.40	3.39	4.21	2.39	5.04	5.06	6.33	3.49	1.16	0.82	23.03	35.66	36.65
1902	0.60	1.10	0.54	1.39	4.40	3.04	4.27	2.98	3.24	2.52	2.05	1.89	17.93	28.02	25.88
1901	0.36	0.57	2.20	1.90	1.58	7.77	4.60	2.57	2.24	2.02	1.67	0.63	18.76	28.11	27.34
1900	0.86	0.42	0.35	0.97	0.74	1.54	4.16	9.33	7.20	2.67	0.51	0.37	22.97	29.12	32.02
1899	0.68	0.97	0.79	2.81	4.87	6.88	5.35	5.00	3.43	4.20	0.71	1.54	25.53	37.23	37.21
1898	0.48	0.87	1.45	0.67	3.88	6.62	2.99	3.24	2.52	4.67	1.35	0.41	19.25	29.15	26.61
1897	2.15	2.40	2.18	1.09	2.32	3.55	9.82	3.92	2.98	2.62	0.67	0.60	22.59	34.30	39.04
1896	1.04	0.57	2.65	3.82	5.08	2.38	3.56	2.72	1.86	3.51	4.07	1.05	15.60	32.31	26.42
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1895	0.56	0.69	0.74	2.35	4.08	4.78	3.25	2.22	7.07	0.65	1.26	0.83	21.40	28.48	35.26
1894	1.18	0.47	2.65	6.24	4.00	2.77	1.26	1.97	2.89	6.43	1.31	1.78	12.89	32.95	29.67
1893	1.20	1.66	2.55	3.91	2.45	2.48	4.25	2.89	1.39	3.31	1.00	1.93	13.46	29.02	25.03
1892	0.51	1.42	1.56	3.05	4.86	3.12	2.91	3.17	1.04	0.26	1.69	0.30	15.10	23.89	26.45
1891	0.74	2.14	2.05	1.60	1.38	2.79	3.88	2.56	3.06	1.44	1.00	2.37	13.67	25.01	

Table 2

Wetland Delineation Precipitation Status

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lake** township number: **56N**
township name: **unnamed** range number: **9W**
nearest community: **Beaver Bay** section number: **36**

Aerial photograph or site visit date:
Monday, July 20, 2015

Score using 1971-2000 normal period

(values are in inches)	first prior month: **June 2015**	second prior month: **May 2015**	third prior month: **April 2015**
estimated precipitation total for this location:	**4.35**	**4.54**	**1.67**
there is a 30% chance this location will have less than: *	2.87	2.07	1.46
there is a 30% chance this location will have more than: *	4.73	3.69	2.71
type of month: dry normal wet	**normal**	**wet**	**normal**
monthly score	**3 * 2 = 6**	**2 * 3 = 6**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**14 (Normal)**		

Score using 1981-2010 normal period

(values are in inches)	first prior month: **June 2015**	second prior month: **May 2015**	third prior month: **April 2015**
estimated precipitation total for this location:	**4.35**	**4.54**	**1.67**
there is a 30% chance this location will have less than: *	2.79	2.37	1.62
there is a 30% chance this location will have more than: *	4.69	3.76	3.10
type of month: dry normal wet	**normal**	**wet**	**normal**
monthly score	**3 * 2 = 6**	**2 * 3 = 6**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**14 (Normal)**		

view USDA-NRCS WETS data for Lake County

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Hydrology Tools for Wetland Determination*, USDA-NRCS

* from USDA-NRCS two-parameter gamma distribution fit

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:	
county: **Lake**	township number: **56N**
township name: **unnamed**	range number: **9W**
nearest community: **Beaver Crossing**	section number: **36**

Aerial photograph or site visit date:
Monday, August 10, 2015

Score using 1971-2000 normal period

(values are in inches)	first prior month: **July 2015**	second prior month: **June 2015**	third prior month: **May 2015**
estimated precipitation total for this location:	**2.13**	**4.34**	**4.54**
there is a 30% chance this location will have less than: *	2.91	2.88	2.06
there is a 30% chance this location will have more than: *	4.86	4.73	3.68
type of month: dry normal wet	**dry**	**normal**	**wet**
monthly score	**3 * 1 = 3**	**2 * 2 = 4**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**10 (Normal)**		

Score using 1981-2010 normal period

(values are in inches)	first prior month: **July 2015**	second prior month: **June 2015**	third prior month: **May 2015**
estimated precipitation total for this location:	**2.13**	**4.34**	**4.54**
there is a 30% chance this location will have less than: *	2.74	2.80	2.37
there is a 30% chance this location will have more than: *	4.61	4.68	3.75
type of month: dry normal wet	**dry**	**normal**	**wet**
monthly score	**3 * 1 = 3**	**2 * 2 = 4**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**10 (Normal)**		

view USDA-NRCS WETS data for Lake County

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Hydrology Tools for Wetland Determination*, USDA-NRCS

* from USDA-NRCS two-parameter gamma distribution fit

Table 3

Wetland Delineation Summary

Table 3: Wetland Delineation Results for the 2015 Project Areas

Wetland ID	Total Wetland Area (acres)	Dominant Circular 39 Type	Secondary Circular 39 Type	Additional Circular 39 Type	Dominant Cowardin Type	Secondary Cowardin Type	Additional Cowardin Type	Dominant Eggers and Reed Classification	Secondary Eggers and Reed Classification	Additional Eggers and Reed Classification	Data Plots	Field Delineation
1a	0.44	7	2		PFO1B	PEM1B		Hardwood Swamp	Fresh (Wet) Meadow		1a-W,1a-U KSW,JTK	Yes
1b	0.89	7	2		PFO1B			Hardwood Swamp			1a-W,1a-U KSW,JTK	Yes
2	8.80	7	2	6	PFO1B	PEMB	PSS1B	Hardwood Swamp	Fresh (Wet) Meadow	Scrub-carr	2-W,2-U KSW,JTK	Yes
3a	0.20	7			PFO1C			Hardwood Swamp			3a-W,3a-U KSW,JTK	Yes
3b	0.06	7			PFO1C			Hardwood Swamp			3a-W,3a-U KSW,JTK	Yes
3c	0.13	7			PFO1C			Hardwood Swamp			3a-W,3a-U KSW,JTK	Yes
4	11.70	7	2		PFO1A	PEM1B		Hardwood Swamp	Fresh (Wet) Meadow		4-W,4-U KSW,JTK	Yes
5	10.32	7			PFO1A			Hardwood Swamp			5-W,5-U KSW,JTK	Yes
6	1.25	2	6		PEMB	PSS1B		Sedge Meadow	Alder Thicket		6-W,6-U KSW,JTK	Yes
7a	0.02	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7b	0.01	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7c	0.64	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7d	0.08	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7e	0.11	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7f	0.04	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7g	0.01	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
7h	0.04	2			PEMB			Sedge Meadow			7a-W,7a-U KSW,JTK	Yes
8	2.66	2	6		PEMB	PSS1B		Fresh (Wet) Meadow	Scrub-carr		8-W,8-U KSW,JTK	Yes
9	3.54	7			PFO1A			Hardwood Swamp			9-W,9-U KSW.JTK	Yes
10	3.62	7	6		PFO1A	PSS1A		Hardwood Swamp	Scrub-carr		10-W,10-U KSW,JTK	Yes
11a	0.04	2	7		PEMB	PFO1A		Sedge Meadow	Hardwood Swamp		11a-W KSW,JTK	Yes
11b	0.06	2	6		PEMB	PSS1A		Sedge Meadow	Scrub-carr		11a-W KSW,JTK	Yes
11c	0.13	2	1		PEMB	PEMA		Sedge Meadow	Seasonally Flooded Basin		11a-W KSW,JTK	Yes
12	9.46	7			PFO1B			Hardwood Swamp			12-W,12-U KSW,JTK	Yes
13	11.93	6	7		PSS1B	PFO1B		Alder Thicket	Hardwood Swamp		13-W, 13-U LBN,KMS2	Yes
14	4.15	7			PFO1B			Hardwood Swamp			14-W,14-U LBN,KMS2	Yes
15	31.28	6	7		PSS1B	PFO4B		Alder Thicket	Coniferous Swamp		15-W, 15-U LBN,KMS2	Yes

Wetland ID	Total Wetland Area (acres)	Dominant Circular 39 Type	Secondary Circular 39 Type	Additional Circular 39 Type	Dominant Cowardin Type	Secondary Cowardin Type	Additional Cowardin Type	Dominant Eggers and Reed Classification	Secondary Eggers and Reed Classification	Additional Eggers and Reed Classification	Data Plots	Field Delineation
16a	0.01	3	5		PEMC1d	PABC1		Shallow Marsh	Shallow, Open Water		16a-W,16a-U LBN,KMS2	Yes
16b	1.17	3	6		PEM1C	PSS1		Shallow Marsh	Alder Thicket		16a-W,16a-U LBN,KMS2	Yes
16c	0.01	2			PEMB			Sedge Meadow			16a-W,16a-U LBN,KMS2	Yes
16d	0.03	2			PEMB			Sedge Meadow			16a-W,16a-U LBN,KMS2	Yes
17a	0.34	2			PEMBd			Sedge Meadow			17a-W,17a-U LBN,KMS2	Yes
17b	3.41	3			PEM1C			Shallow Marsh			17a-W,17a-U LBN,KMS2	Yes
17c	0.08	2			PEMBd			Sedge Meadow			17a-W,17a-U LBN,KMS2	Yes
17d	0.25	2			PEMBd			Sedge Meadow			17a-W,17a-U LBN,KMS2	Yes
17e	0.49	2			PEMBd			Sedge Meadow			17a-W,17a-U LBN,KMS2	Yes
18	81.14	3	5	4	PEM1C	PABC3	PABH	Shallow Marsh	Shallow, Open Water	Deep Marsh	18-W,18-U LBN,KMS2	Yes
19	12.79	7			PFO1B			Hardwood Swamp			19-W,19-U DRD,JTK	Yes
20	21.00	7	7	6	PFO4B	PFO1B	PSS1B	Coniferous Swamp	Hardwood Swamp	Alder Thicket	20-W,20-U DRD,JTK	Yes
21	8.18	7			PFO1A			Hardwood Swamp			21-W,21-U DRD,JTK	Yes
22	4.66	7			PFO1B			Hardwood Swamp			22-W,22-U DRD,JTK	Yes
23	20.91	7	2	3	PFO1A	PEMB	PEMC	Hardwood Swamp	Fresh (Wet) Meadow	Shallow Marsh	23-W,23-U DRD,JTK	Yes
24	2.18	7			PFO1A			Hardwood Swamp			24-W,24-U DRD,JTK	Yes
25	21.56	7	7		PFO4B	PFO1B		Coniferous Swamp	Hardwood Swamp		25-W DRD,JTK	Yes
26	4.24	7			PFO1B			Hardwood Swamp			26-W,26-U DRD,JTK	Yes
27	34.54	7	2	6	PFO1B	PEMB	PSS1B	Hardwood Swamp	Sedge Meadow	Alder Thicket	27-W,27-U DRD,JTK	Yes
28	1.51	7			PFO1B			Hardwood Swamp			28-W,28-U DRD,JTK	Yes
29	3.31	6			PSS1B			Alder Thicket			29-W DRD,JTK	Yes
30a	0.83	2	1		PEMB	PEMA		Sedge Meadow	Seasonally Flooded Basin		30a-W,30a-U DRD,JTK	Yes
30b	0.17	2	1		PEMB	PEMA		Sedge Meadow	Seasonally Flooded Basin		30a-W,30a-U DRD,JTK	Yes
30c	1.11	2	1		PEMB	PEMA		Sedge Meadow	Seasonally Flooded Basin		30a-W,30a-U DRD,JTK	Yes
30d	0.35	2	1		PEMB	PEMA		Sedge Meadow	Seasonally Flooded Basin		30a-W,30a-U DRD,JTK	Yes
31	5.26	6	2		PSS1B	PEMB		Alder Thicket	Sedge Meadow		31-W,31-U DRD,JTK	Yes
32	0.26	6			PSS1B			Alder Thicket			32-W,32-U DRD,JTK	Yes

Wetland ID	Total Wetland Area (acres)	Dominant Circular 39 Type	Secondary Circular 39 Type	Additional Circular 39 Type	Dominant Cowardin Type	Secondary Cowardin Type	Additional Cowardin Type	Dominant Eggers and Reed Classification	Secondary Eggers and Reed Classification	Additional Eggers and Reed Classification	Data Plots	Field Delineation
33	1.38	7			PFO1B			Hardwood Swamp			33-W DRD,JTK	Yes
34	18.24	7			PFO1B			Hardwood Swamp			34-W,34-U DRD,JTK	Yes
35	4.27	7			PFO1B			Hardwood Swamp			35-W,35-U DRD,JTK	Yes
36	0.10	7			PFO1B			Hardwood Swamp			36-W,36-U DRD,JTK	Yes
37	5.48	7			PFO1B			Hardwood Swamp				No
38a	0.27	3	2		PEMC	PEMB		Shallow Marsh	Sedge Meadow		38a-W	Yes
38b	0.05	3	2		PEMC	PEMB		Shallow Marsh	Sedge Meadow		38a-W	Yes
38c	0.46	3	2		PEMC	PEMB		Shallow Marsh	Sedge Meadow		38a-W	Yes
38d	0.09	3	2		PEMC	PEMB		Shallow Marsh	Sedge Meadow		38a-W	Yes

[1]Riverine systems are not included in the assessment of acreages.

Table 4

Wetland Functional Assessments

Northshore West Ridge RR Realignment
Table 4. Wetland Function Assessment Results

Wetland ID	1a	1b	2	3a	3b	3c	4	5	6	7a	7b	7c	7d	7e
Date	7/22/2015	7/22/2015	7/22/2015	7/22/2015	7/22/2015	7/22/2015	7/23/2015	7/23/2015	7/23/2015	7/23/2015	7/23/2015	7/23/2015	7/23/2015	7/23/2015
Field Team	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK
Community 1 Eggers and Reed	`	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Sedge Meadow	Sedge Meadow	Sedge Meadow	Sedge Meadow	Sedge Meadow	Sedge Meadow
Community 1 %	70%	100%	80%	100%	100%	100%	90%	100%	80%	100%	100%	100%	100%	100%
Wetland Plot ID	1a-W	1a-W	2-W	3a-W	3a-W	3a-W	4-W	5-W	6-W	7a-W	7a-W	7a-W	7a-W	7a-W
Upland Plot ID	1a-U	1a-U	2-U	3a-U	3a-U	3a-U	4-U	5-U	6-U	7a-U	7a-U	7a-U	7a-U	7a-U
Community 2 Eggers and Reed	Fresh (Wet) Meadow		Fresh (Wet) Meadow	-	-	-	Fresh (Wet) Meadow	-	Alder Thicket	-	-	-	-	-
Community 2 %	30%		10%	-	-	-	10%	-	20%	-	-	-	-	-
Wetland Plot ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upland Plot ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Community 3 Eggers and Reed	-	-	Shrub-carr	-	-	-	-	-	-	-	-	-	-	-
Community 3 %	-	-	10%	-	-	-	-	-	-	-	-	-	-	-
Community 4 Eggers and Reed	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Community 4 %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Native Plant Community (NPC)	WFn55 & WMn82	WFn55	WFn55	WFn55	WFn55	WFn55	WFn55	WFn55	-	-	-	-	-	-
Topographic Setting	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Slope	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Slope	Slope	Slope	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet
Vegetative Diversity	H (1.0)	H (1.0)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	M (0.5)	M (0.5)	M (0.5)	M (0.5)
Outlet Configuration	H (1.0)	H (1.0)	H (1.0)	L (0.1)	H(1.0)	H(1.0)	H(1.0)	H (1.0)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
Upland Condition	M (0.5)	M (0.5)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	M (0.5)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
Wildlife Habitat	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
Public Value	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
Average Value	0.72	0.72	0.62	0.64	0.64	0.64	0.64	0.72	0.54	0.36	0.36	0.36	0.36	0.36
Overall Condition	H	H	M	M	M	M	M	H	M	M	M	M	M	M
Human Disturbance	M	M	M	L	L	L	L	L	H	H	H	H	H	H
Comments on history, origin, and connectivity	Natural wetland partially disturbed by trail	Natural wetland, appears topographically-enclosed wetland with no apparent surface water outlet	Natural wetland, partially disturbed by ditch	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet	Natural wetland, connected to 108b ditch system	Natural wetland, intermittently connected with Wetland 10, which is intermittently connected with 108b ditch system	Wetland appears incidental dur to excavation possibly for borrow soil. Intermittently overflows along roadway channel and into108b ditch system during flooded conditions.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.

Northshore West Ridge RR Realignment
Table 4. Wetland Function Assessment Results

7f	7g	7h	8	9	10	11a	11b	11c	12	13	14	15	16a	16b	16c
7/23/2015	7/23/2015	7/23/2015	7/23/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/23/2015	7/23/2015	7/23/2015	7/24/2015	7/23/2015	7/24/2015
KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	KSW & JTK	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2
Sedge Meadow	Sedge Meadow	Sedge Meadow	Fresh (Wet) Meadow	Hardwood Swamp	Hardwood Swamp	Sedge Meadow	Sedge Meadow	Sedge Meadow	Hardwood Swamp	Alder Thicket	Hardwood Swamp	Alder Thicket	Shallow Marsh	Shallow Marsh	Sedge Meadow
100%	100%	100%	90%	100%	90%	90%	90%	90%	100%	80%	100%	75%	75%	75%	100%
7a-W	7a-W	7a-W	8-W	9-W	10-W	11a-W	11a-W	11a-W	12-W	13-W	14-W	15-W	16a-W	16a-W	16a-W
7a-U	7a-U	7a-U	8-U	9-U	10-U	11a-U	11a-U	11a-U	12-U	13-U	14-U	15-U	16a-U	16a-U	16a-U
-	-	-	Shrub-carr	-	Alder Thicket	Hardwood Swamp	Shrub-carr	Seasonally Flooded Basin	-	Hardwood Swamp	-	Coniferous Swamp	Shallow, Open Water	Alder Thicket	-
-	-	-	10%	-	10%	10%	10%	10%	-	20%	-	25%	25%	25%	-
-	-	-	-	-	-	-	-	-	-	101-W	-	104a-W	105-W	-	-
-	-	-	-	-	-	-	-	-	-	101-U	-	104a-U	105-U	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	WMn82	WFn55	WFn55 & FPn73	WMn82 & WFn55	WMn82	WMn82	WFn55	FPn73 & WFn55	WFn55	FPn73 & FPn62	MRn83	WMn82 & FPn73	-
Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-flow through	Slope	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-tributary	Depressional - tributary	Depressional-tributary	Depressional-tributary	Depressional with a culvert at the inlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet
M (0.5)	M (0.5)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	H (1.0)	M (0.5)	M (0.5)
L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	M (0.5)	M (0.5)	L (0.1)	L (0.1)	L (0.1)	M (0.5)
L (0.1)	L (0.1)	L (0.1)	M (0.5)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	M (0.5)	M (0.5)	M (0.5)	L (0.1)	M (0.5)	L (0.1)
H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	H (1.0)	M (0.5)
L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
0.36	0.36	0.36	0.54	0.54	0.82	0.82	0.82	0.82	0.62	0.62	0.62	0.44	0.36	0.44	0.34
M	M	M	M	M	H	H	H	H	M	M	M	M	M	M	M
H	H	H	H	L	L	unknown	unknown	unknown	L	M	M	M	H	M	H
Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	This wetland is a seepage wetland that starts higher in the landscape with narrow drainageway then empties into large, broad, open depression. Wetland appears incidental due to surface scraping. Wetland intermittently overflows into 108b ditch sysetm during flooded conditions.	Natural wetland. Wetland intermittently overflows into 108b ditch system during flooded conditions.	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland. Wetland intermittently overflows to channel which intermittently overflows into 108b ditch system during flooded conditions.	Natural wetland, which is topographically-enclosed wetland with no apparent surface water outlet. Wetland connects to road ditch, which flows south and then northeast and then terminates.	Natural wetland. Wetland connects via culvert that crosses under RR grade. Appears to connect to waterway at the south end. Cut off from water source at the north end by a large berm.	Wetland flows to "Murphy's Pond", which is connected to road ditches that flow northeast to E. Beaver River.	Topographically-enclosed wetland with no apparent surface water outlet - but receives water via a culvert. Source of water/ culvert was not apparent. Most likely an incidental wetland - this area was completely re-worked in 2011.	Topographically-enclosed wetland with no apparent surface water outlet. 2006 RR installation cut off this wetland from stream and other wetlands in the area.	Topographically-enclosed wetland with no apparent surface water outlet. 2003-2004 this area was impacted by clearing, and then in 2006 by the RR construction.

Northshore West Ridge RR Realignment
Table 4. Wetland Function Assessment Results

16d	17a	17b	17c	17d	17e	18	19	20	21	22	23	24	25	26	27
7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	7/24/2015	8/10/2015	8/10/2015	8/10/2015	8/11/2015	8/11/2015	8/11/2015	8/11/2015	8/12/2015	8/12/2015
LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	LBN & KMS2	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD
Sedge Meadow	Sedge Meadow	Shallow Marsh	Sedge Meadow	Sedge Meadow	Sedge Meadow	Shallow Marsh	Hardwood Swamp	Coniferous Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Coniferous Swamp	Hardwood Swamp	Coniferous Swamp
100%	100%	100%	100%	100%	100%	85%	100%	60%	100%	100%	80%	100%	75%	100%	60%
16a-W	17a-W	17a-W	17a-W	17a-W	17a-W	18-W	19-W	20-W	21-W	22-W	23-W	24-W	25-W	26-W	27-W
16a-U	17a-U	17a-U	17a-U	17a-U	17a-U	18-U	19-U	20-U	21-U	22-U	23-U	24-U		26-U	27-U
-	-	-	-	-	-	Shallow, Open Water	-	Hardwood Swamp	-	-	Fresh (Wet) Meadow	-	Hardwood Swamp	-	Sedge Meadow
-	-	-	-	-	-	10%	-	30%	-	-	10%	-	25%	-	20%
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	Deep Marsh	-	Alder Thicket	-	-	Shallow Marsh	-	-	-	Alder Thicket
-	-	-	-	-	-	5%	-	10%	-	-	10%	-	-	-	20
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
-	-	-	-	-	-	MRn83	WFn55	FPn73, FPn62, & WFn55	WFn55	WFn55	FFn57	WFn55	WFn53 & WFn55	WFn55	WFn55 , FPn73, & WMn82
Depressional-no inlet/outlet	Depressional-tributary	Depressional-tributary	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-tributary	Depressional-tributary	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-tributary	Depressional-no inlet/outlet	Riverine	Lacustrine fringe	Slope	Depressional-no inlet/outlet	Depressional-flow through
M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
M (0.5)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	M (0.5)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)	H (1.0)	H (1.0)	H (1.0)
L (0.1)	M (0.5)	M (0.5)	M (0.5)	M (0.5)	M (0.5)	M (0.5)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
M (0.5)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
0.34	0.36	0.36	0.36	0.36	0.44	0.52	0.82	0.82	0.82	0.82	0.82	0.72	0.82	0.82	0.82
M	M	M	M	M	M	M	H	H	H	H	H	H	H	H	H
H	M	M	M	M	M	M	L	L	L	L	L	L	L	L	L
Topographically-enclosed wetland with no apparent surface water outlet. 2003-2004 this area was impacted by clearing, and then in 2006 by the RR construction.	Ditch wetland follows roadway, connects with the E. Beaver River.	Ditch wetland follows roadway, connects with the E. Beaver River.	Topographically-enclosed wetland with no apparent surface water outlet . Incidentally created in about 2008 by roadway construction.	Topographically-enclosed wetland with no apparent surface water outlet wetland. Cut off from nearby wetlands by RR construction in about 2011.	Ditch wetland connects to the northeast at Unnamed Creek. Created in about 2008 by roadway construction.	"Murphy's Pond" connects with roadside ditches and water flow continues to the northeast to E. Beaver River. Impounded on the southeast side by roadway and RR.	Natural wetland that drains to Little 39 Creek.	Natural wetland that drains to East Beaver River.	Natural wetland, connected to 108b ditch system.	Natural wetland that drains to Murphy's Pond.	Natural wetland that drains to Murphy's Pond.	Natural wetland that drains to Murphy's Pond.	Natural wetland that drains to Murphy's Pond.	Natural wetland that drains to wetland 205 to Murphy's Pond.	Natural wetland that drains to Murphy's Pond.

Northshore West Ridge RR Realignment
Table 4. Wetland Function Assessment Results

28	29	30a	30b	30c	30d	31	32	33	34	35	36
8/12/2015	8/12/2015	8/12/2015	8/13/2015	8/14/2015	8/15/2015	8/13/2015	8/13/2015	8/13/2015	8/13/2015	8/14/2015	8/14/2015
JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD	JTK & DRD
Hardwood Swamp	Alder Thicket	Sedge Meadow	Sedge Meadow	Sedge Meadow	Sedge Meadow	Alder Thicket	Alder Thicket	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp	Hardwood Swamp
100%	100%	75%	75%	75%	75%	60%	100%	100%	100%	100%	100%
28-W	29-W	30a-W	30a-W	30a-W	30a-W	31-W	32-W	33-W	34-W	35-W	36-W
28-U		30a-U	30a-U	30a-U	30a-U	31-U	32-U		34-U	35-U	36-U
-	-	Seasonally Flooded Basin	Seasonally Flooded Basin	Seasonally Flooded Basin	Seasonally Flooded Basin	Sedge Meadow	-	-	-	-	-
-	-	25%	25%	25%	25%	40%	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
WFn55	FPn73	-	-	-	-	FPn73 & WMn82	FPn73	WFn55	WFn55	WFn55	WFn55
Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-no inlet/outlet	Depressional-flow through
H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
H (1.0)	H (1.0)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	M (0.5)
H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)	H (1.0)
L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)	L (0.1)
0.82	0.82	0.82	0.64	0.64	0.64	0.64	0.82	0.82	0.82	0.82	0.72
H	H	H	M	M	M	M	H	H	H	H	H
L	L	L	L	L	L	L	L	L	L	L	L
Natural wetland that drains to Little 39 Creek.	Natural wetland that drains to Little 39 Creek.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Topographically-enclosed wetland with no apparent surface water outlet.	Wetland appears incidental due to excavation possibly for borrow soil. Wetland is topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland, topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland, connected to 108b.	Connection is uncertain. Wetland may be topographically-enclosed wetland with no apparent surface water outlet.	Natural wetland that drains to Murphy's Pond.

Table 5

Wetland Regulatory Implications

Northshore Mining Company
West Ridge Railroad Relocation
Wetland Delineation Report
Table 5

Wetland ID	Suggested Determination (for ACOE)	Suggested Determination	Comments on history, origin, and connectivity
01a	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland partially disturbed by trail
01b	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, appears topographically-enclosed wetland with no
02	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, partially disturbed by ditch
03a	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
03b	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
03c	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
04	Connected	Natural	Natural wetland, connected to 108b ditch system
05	Connected	Natural	Natural wetland, intermittently connected with Wetland 10, which is
06	Connected	Incidental	Wetland appears incidental dur to excavation possibly for borrow soil.
07a	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07b	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07c	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07d	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07e	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07f	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07g	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
07h	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
08	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	This wetland is a seepage wetland that starts higher in the landscape with
09	Connected	Natural	Natural wetland. Wetland intermittently overflows into 108b ditch system
10	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
11a	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
11b	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
11c	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
12	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland. Wetland intermittently overflows to channel which
13	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, which is topographically-enclosed wetland with no
14	Connected	Natural	Natural wetland. Wetland connects via culvert that crosses under RR
15	Connected		Wetland flows to "Murphy's Pond", which is connected to road ditches that
16a	Topographically-enclosed wetland with no apparent surface water outlet.		Topographically-enclosed wetland with no apparent surface water outlet -
16b	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Topographically-enclosed wetland with no apparent surface water outlet.
16c	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Topographically-enclosed wetland with no apparent surface water outlet.
16d	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Topographically-enclosed wetland with no apparent surface water outlet.
17a	Connected		Ditch wetland follows roadway, connects with the E. Beaver River.
17b	Connected		Ditch wetland follows roadway, connects with the E. Beaver River.
17c	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Topographically-enclosed wetland with no apparent surface water outlet .
17d	Topographically-enclosed wetland with no apparent surface water outlet.		Topographically-enclosed wetland with no apparent surface water outlet
17e	Connected		Ditch wetland connects to the northeast at Unnamed Creek. Created in
18	Topographically-enclosed wetland with no apparent surface water outlet.; can overflow into ditch to NE	Primarily Incidental	"Murphy's Pond" connects with roadside ditches and water flow continues to the northeast to E. Beaver River. Impounded on the southeast side by
19	Connected	Natural	Natural wetland that drains to Little 39 Creek.
20	Connected	Natural	Natural wetland that drains to East Beaver River.
21	Connected	Natural	Natural wetland, connected to 108b ditch system.
22	Connected	Natural	Natural wetland that drains to Murphy's Pond.
23	Connected	Natural	Natural wetland that drains to Murphy's Pond.
24	Connected	Natural	Natural wetland that drains to Murphy's Pond.
25	Connected	Natural	Natural wetland that drains to Murphy's Pond.
26	Connected	Natural	Natural wetland that drains to wetland 205 to Murphy's Pond.
27	Connected	Natural	Natural wetland that drains to Murphy's Pond.
28	Connected	Natural	Natural wetland that drains to Little 39 Creek.
29	Connected	Natural	Natural wetland that drains to Little 39 Creek.
30a	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
30b	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
30c	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
30d	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
31	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Wetland appears incidental due to excavation possibly for borrow soil.
32	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
33	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Natural wetland, topographically-enclosed wetland with no apparent
34	Connected	Natural	Natural wetland, connected to 108b.
35	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Connection is uncertain. Wetland may be topographically-enclosed
36	Connected	Natural	Natural wetland that drains to Murphy's Pond.
37	Topographically-enclosed wetland with no apparent surface water outlet.	Natural	Desktop Delineated, Natural wetland, topographically-enclosed wetland
38a	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Stormwater pond, manmade wetland, topographically-enclosed wetland
38b	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Stormwater pond, manmade wetland, topographically-enclosed wetland
38c	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Stormwater pond, manmade wetland, topographically-enclosed wetland
38d	Topographically-enclosed wetland with no apparent surface water outlet.	Incidental	Stormwater pond, manmade wetland, topographically-enclosed wetland

Table 6

Wetland Type Summary

Table 6. Predominant and Minor Wetland Types within the Proposed Project Area[1]

Wetland Classification systems			
Eggers & Reed	**USFWS Circular 39**	**Cowardin et al.**	**Area (ac)**
Alder thicket	Type 6	PSS1/PSS1B/PSS1C	49.64
Coniferous swamp	Type 7	PF04B	57.32
Deep marsh	Type 4	PABH	4.06
Fresh (wet) meadow	Type 2	PEM1B/PEMB /PEM1C	6.67
Hardwood swamp	Type 7	PF01A/PF01B/PF01C	143.74
Seasonally flooded basin	Type 1	PEMA	0.63
Sedge meadow	Type 2	PEMA/PEMB/PEM1B/ PEM1Bd/ PEM1C	17.98
Shallow marsh	Type 3	PEMC/PEM1C/PEMC1d	72.47
Shallow, open water	Type 5	PABC1/PABC3	8.12
Shrub-carr	Type 6	PSS1A/PSS1B	1.15
		Total	*361.78*

[1] Four additional minor wetland types are included in Table 6 that are not found within the figures, which are labeled based on the dominant type.

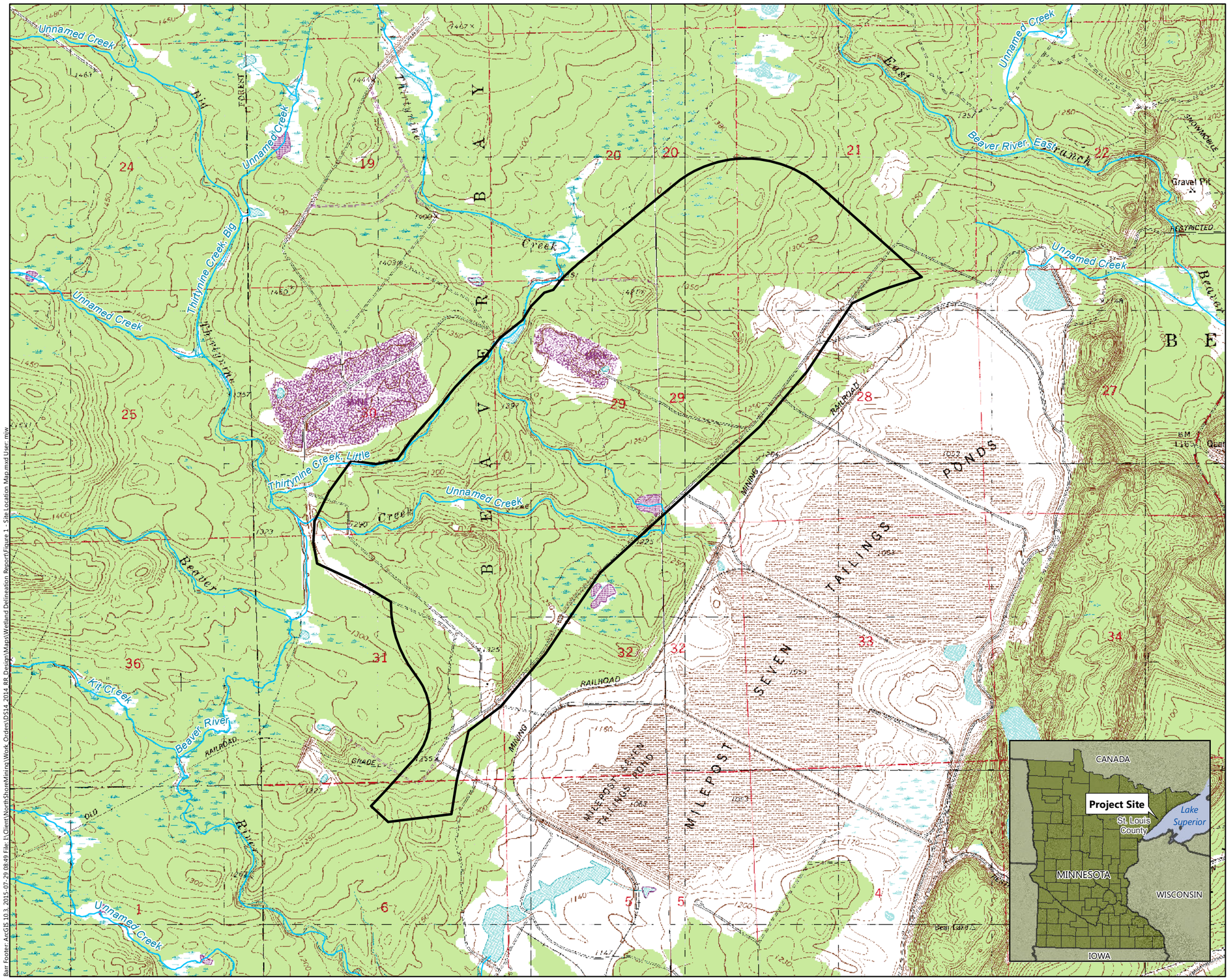
Figures

Figure 1

Site Location

Public Water Inventory (PWI) Watercourse

Study Area



0 1,000 2,000 4,000

Feet

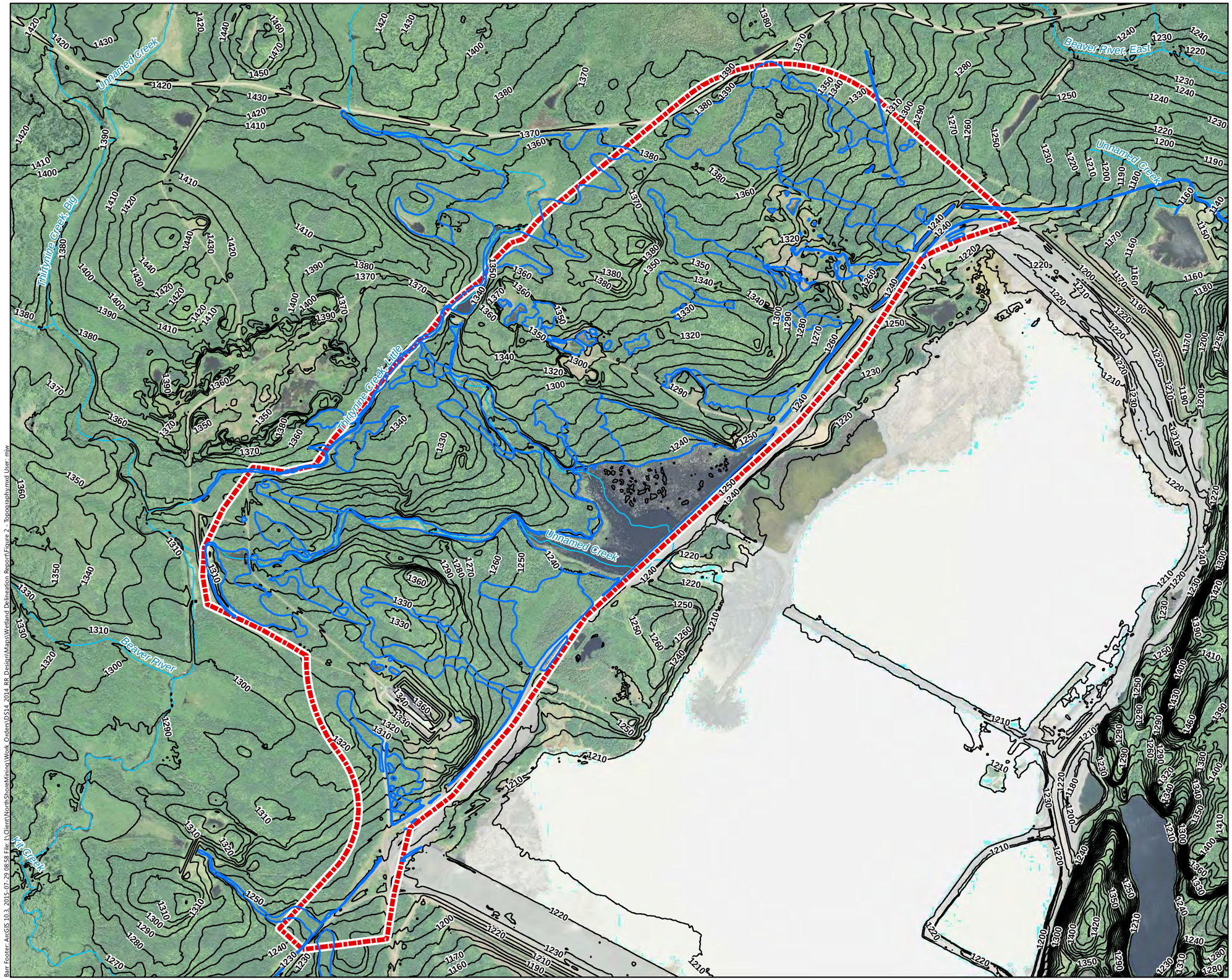
Figure 1

SITE LOCATION MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3 2015-07-29 08:49 File: N:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 1 - Site Location Map.mxd User: mjw

Figure 2

Topography



10-ft Contours

Public Water Inventory (PWI) Watercourse

Study Area

0 750 1,500 3,000

Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

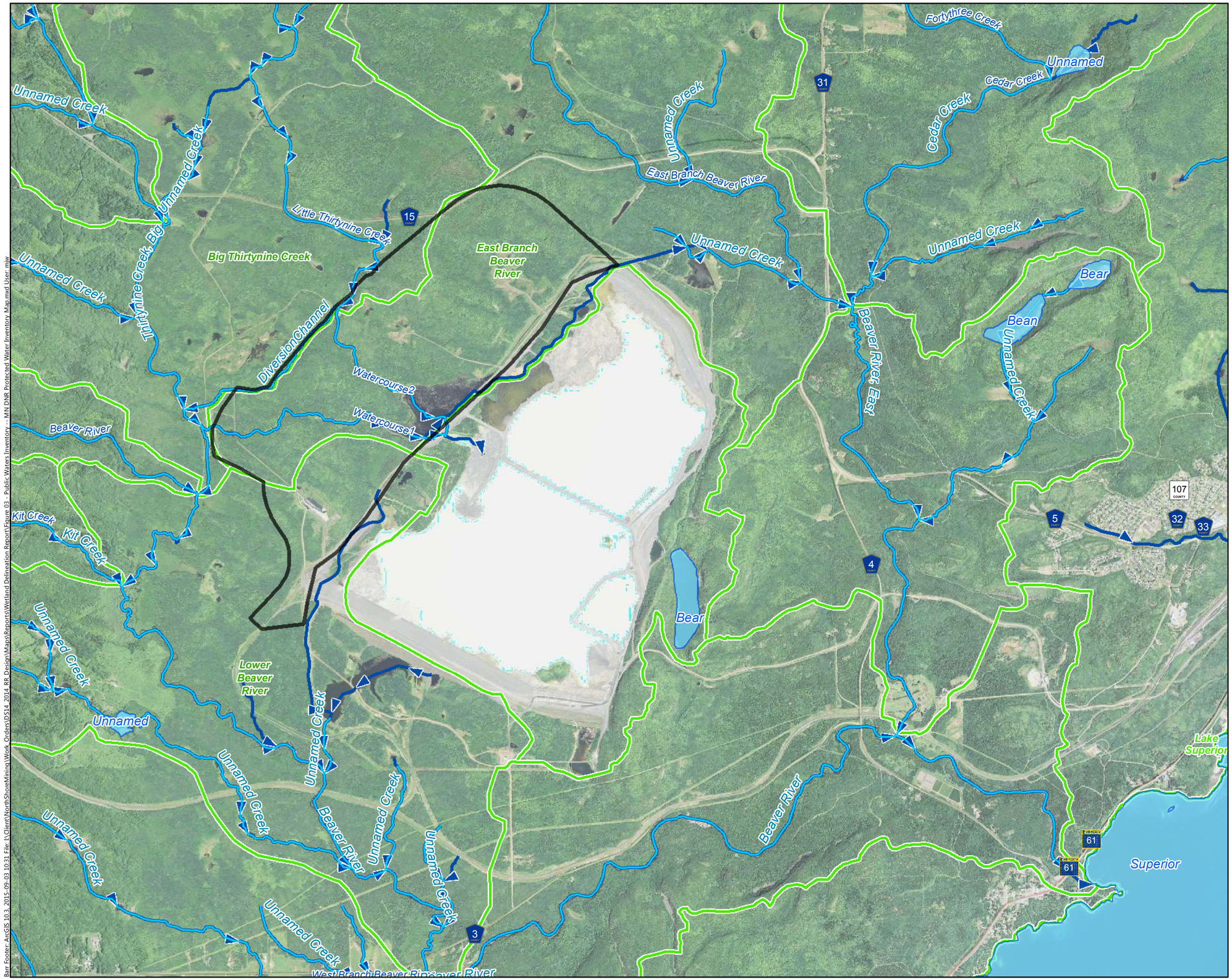
Figure 2

TOPOGRAPHY
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-07-29 08:58 File: H:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topography.mxd User: mlw

Figure 3

Public Waters Inventory – MN DNR Protected Inventory Map



Public Water Inventory (PWI) Watercourse

National Hydrography Dataset (NHD) Flowline

Public Water Basin

Watershed Boundary

Study Area

0 1,500 3,000 6,000

Feet

Aerial Imagery: ESRI World Imagery

Figure 3

MN DNR PUBLIC WATERS INVENTORY AND WATERSHED BOUNDARY MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-09-03 10:31 File: N:\Client\NorthShoreMining\Work Orders\0514_2014_RR Design\Maps\Reports\Wetland Delineation Report\Figure 03 - Public Waters Inventory -- MN DNR Protected Water Inventory Map.mxd User: mw

Figure 4

National Wetland Inventory

Study Area

Wetlands (National Wetlands Inventory)

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake

Public Water Inventory (PWI) Watercourse

0 600 1,200 2,400

Feet

Aerial Imagery: Lake County (2013)

Figure 4

NATIONAL WETLAND INVENTORY
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 5

Soils

Map Unit Symbol	Map Unit Name	Map Unit Symbol	Map Unit Name
A1-20D	Mesaba, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes	B2-41D	Forbay, moderately deep-Augustanna, moderately deep-Rock outcrop complex
A1-20F	Barto, stony-Mesaba, stony-Rock outcrop complex, 35 to 60 percent slopes	C1-20A	Badriver complex, 0 to 3 percent slopes
A1-30D	Barto, stony-Greysolon-Rock outcrop complex, 0 to 18 percent slopes	C1-40B	Badriver complex, 0 to 8 percent slopes
A1-40B	Normanna-Greysolon-Rock outcrop complex, 2 to 8 percent slopes	C3-40B	Badriver-Rock outcrop complex, 0 to 8 percent slopes
A1-41D	Ahmeek-Normanna-Mesaba, stony-Rock outcrop complex	E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex
A3-11A	Twig-Tacoosh-Giese complex, 0 to 1 percent slopes, depressional	E2-31D	Amnicon-Fluvaquents, frequently flooded, complex, 0 to 18 percent slopes
A3-12A	Giese muck, depressional, 0 to 1 percent slopes	F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes
A3-13A	Giese muck, 0 to 2 percent slopes, rubbly	J1a10A	Rifle soils, dense substratum, 0 to 1 percent slopes
A3-20A	Canosia loam, 0 to 2 percent slopes	J1a11A	Mooselake muck, 0 to 1 percent slopes
A3-21A	Hermantown silt loam, 1 to 3 percent slopes	J1a40A	Greenwood soils, dense substratum, 0 to 1 percent slopes
A3-22B	Normanna-Hermantown complex, 1 to 8 percent slopes	K1-11	Pits, iron mine
A3-30B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	K1-13B	Udorthents, loamy (cut and fill land)
A3-31D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes	K1-14	Tailings basin
A3-41B	Normanna-Giese, depressional complex, 0 to 8 percent slopes, pitted	K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded
B1-20B	Hegberg-Eldes complex, 0 to 3 percent slopes	W	Water
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes		

Study Area

Map Unit

Public Water Inventory (PWI) Watercourse

0 600 1,200 2,400

Feet

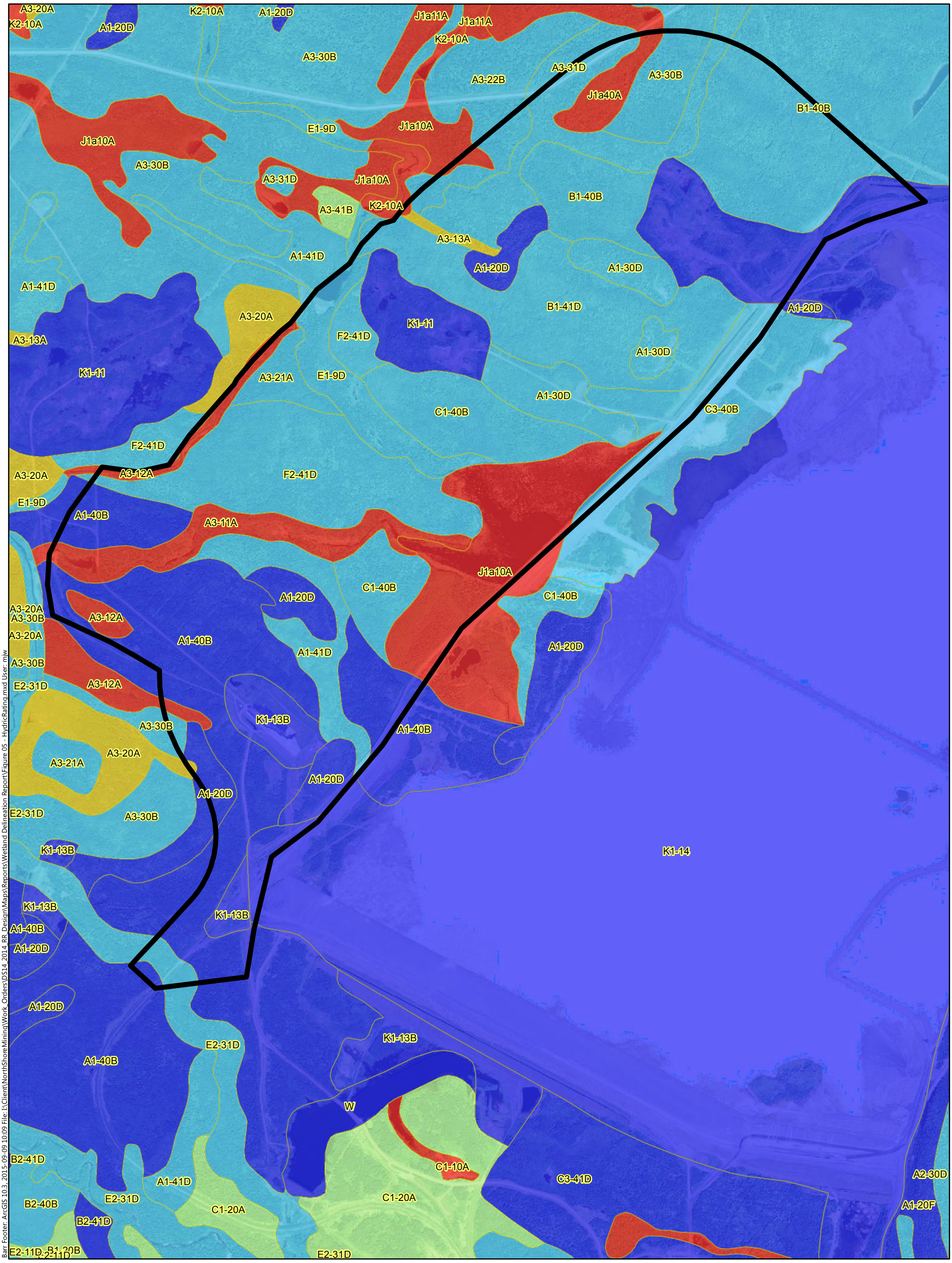
Aerial Imagery: Lake County (2013)

Figure 5

LAKE COUNTY SSURGO SOILS MAP
West Ridge Railroad Relocation
Northshore Mining Company
St. Louis County, Minnesota

Figure 6

Hydric Rating



Barr Footer: ArcGIS 10.3, 2015-09-09 10:09 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Wetland Delineation Report\Figure 05 - HydricRating.mxd User: mjw

Study Area

Map Unit

Hydric Rating

0% = Not hydric

1% - 33% = Predominantly non-hydric

34% - 66% = Partially hydric

67% - 99% = Predominantly hydric

100% = All hydric

0 600 1,200 2,400

Feet

Figure 6

SSURGO SOILS HYDRIC RATING
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 7

Wetland Overview

Map 13
Map 14
Map 11
Map 12
Map 9
Map 10
Map 8

Study Area
Index
Alder Thicket
Coniferous Swamp
Fresh (Wet) Meadow
Hardwood Swamp
Sedge Meadow
Shallow Marsh
Wetlands Connections
Channel - Field Verified
Compacted Trail - Field Verified
Culvert, Desktop
Culvert - Field Verified
Ditch - Desktop
Ditch - Field Verified

0 400 800 1,600
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 7

WETLAND OVERVIEW
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-09-10 14:49 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Wetland Delineation Report\Figure 07 Wetland Overview.mxd User: mjw

Figures 8-14

Wetland Delineations with Topography

Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

0 200 400 800

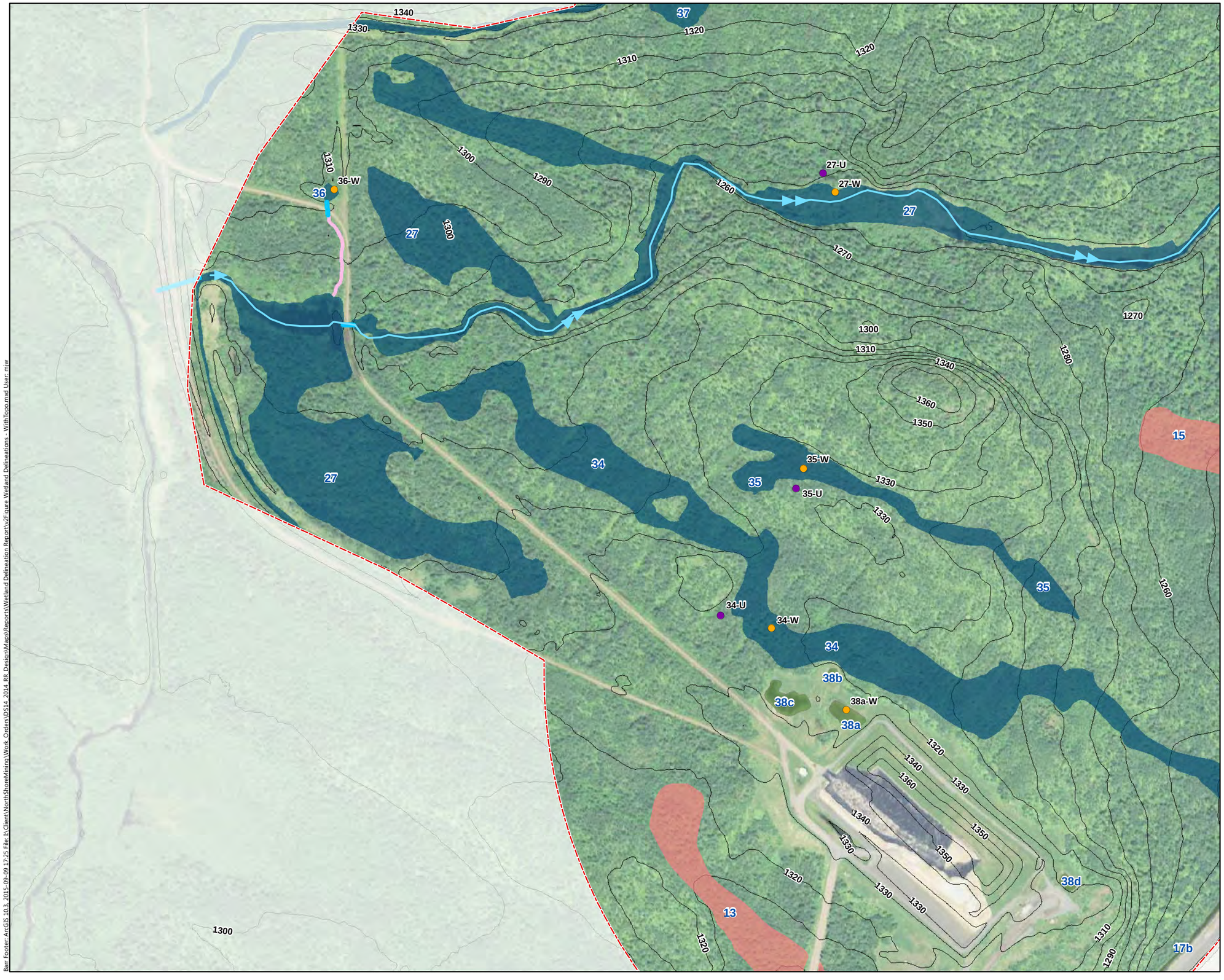
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 8

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-09-09 17:25 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Wetland Delineation Report\v2\Figure Wetland



Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 9

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-09-09 17:25 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Wetland Delineation Report\v2\Figure Wetland Delineations - WithTopo.mxd User: mjw

Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

N

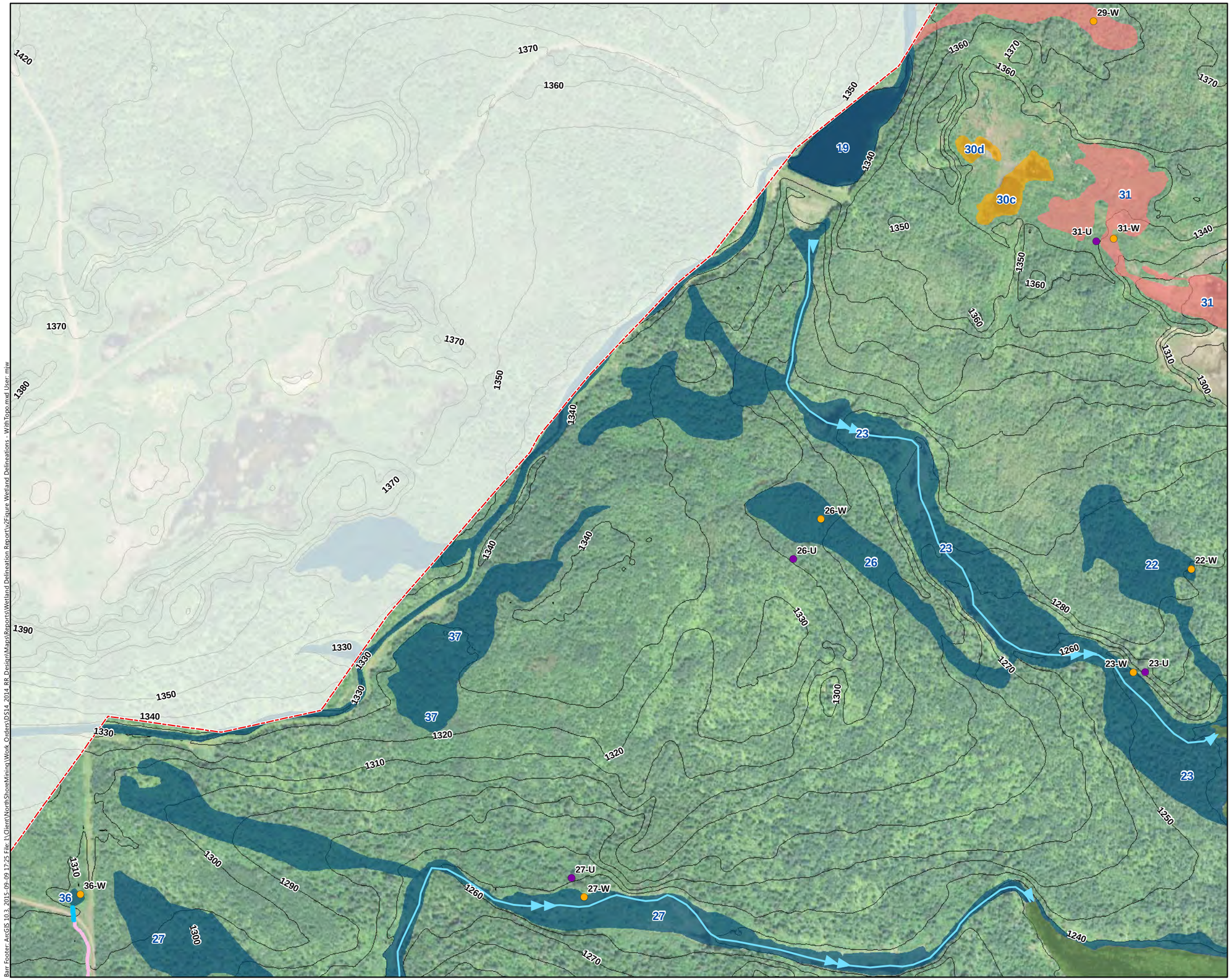
0 200 400 800

Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 10

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota



Bam Footer: ArcGIS 10.3, 2015-09-09 17:25 File: I:\Client\NorthShoreMining\Work Orders\0514_2014_RR Design\Maps\Reports\Wetland Delineation Report\v2\Figure Wetland Delineations - WithTopo.mxd User: mjw

Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

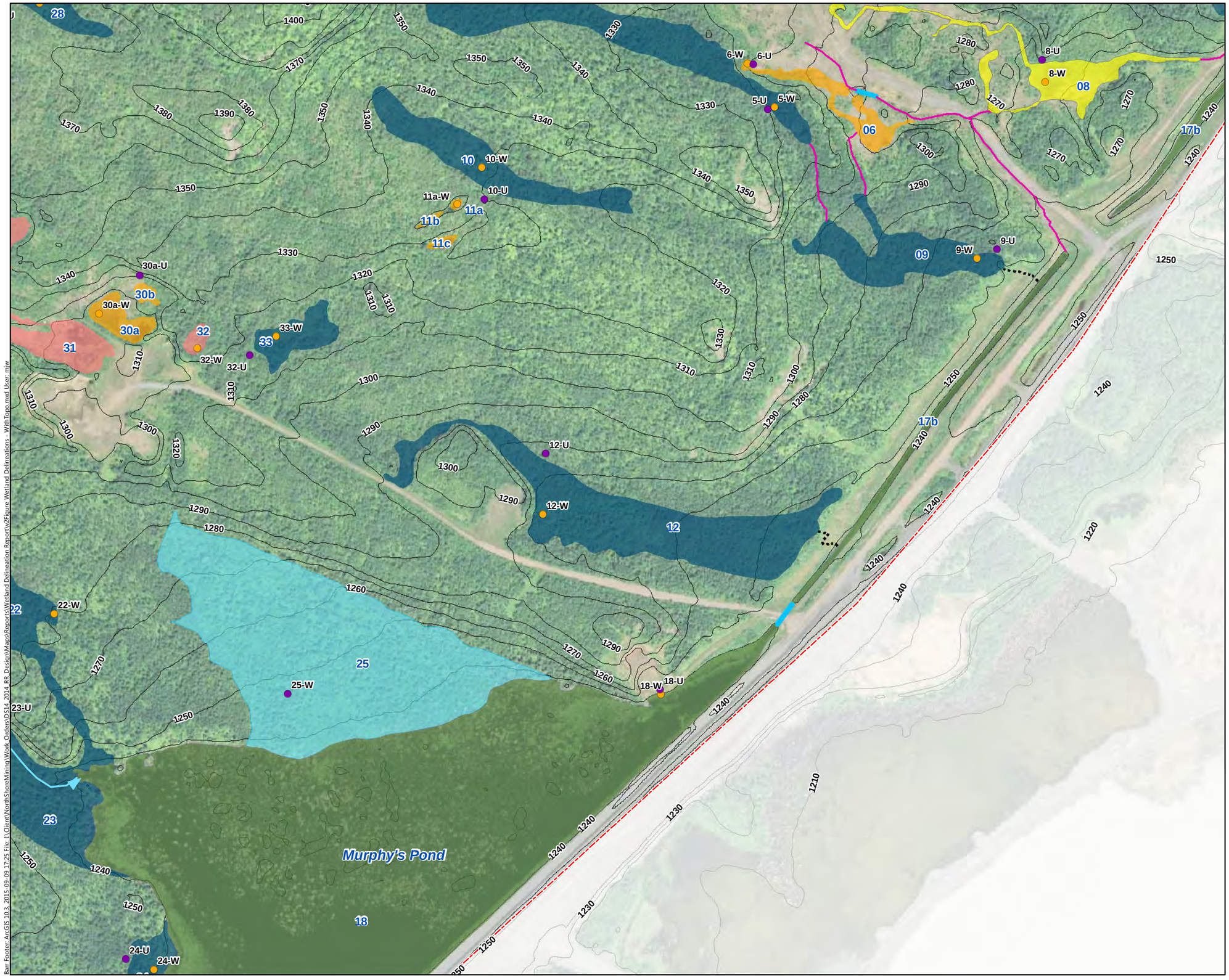
0 200 400 800

Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 11

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota



Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

0 200 400 800

Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 12

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

0 200 400 800

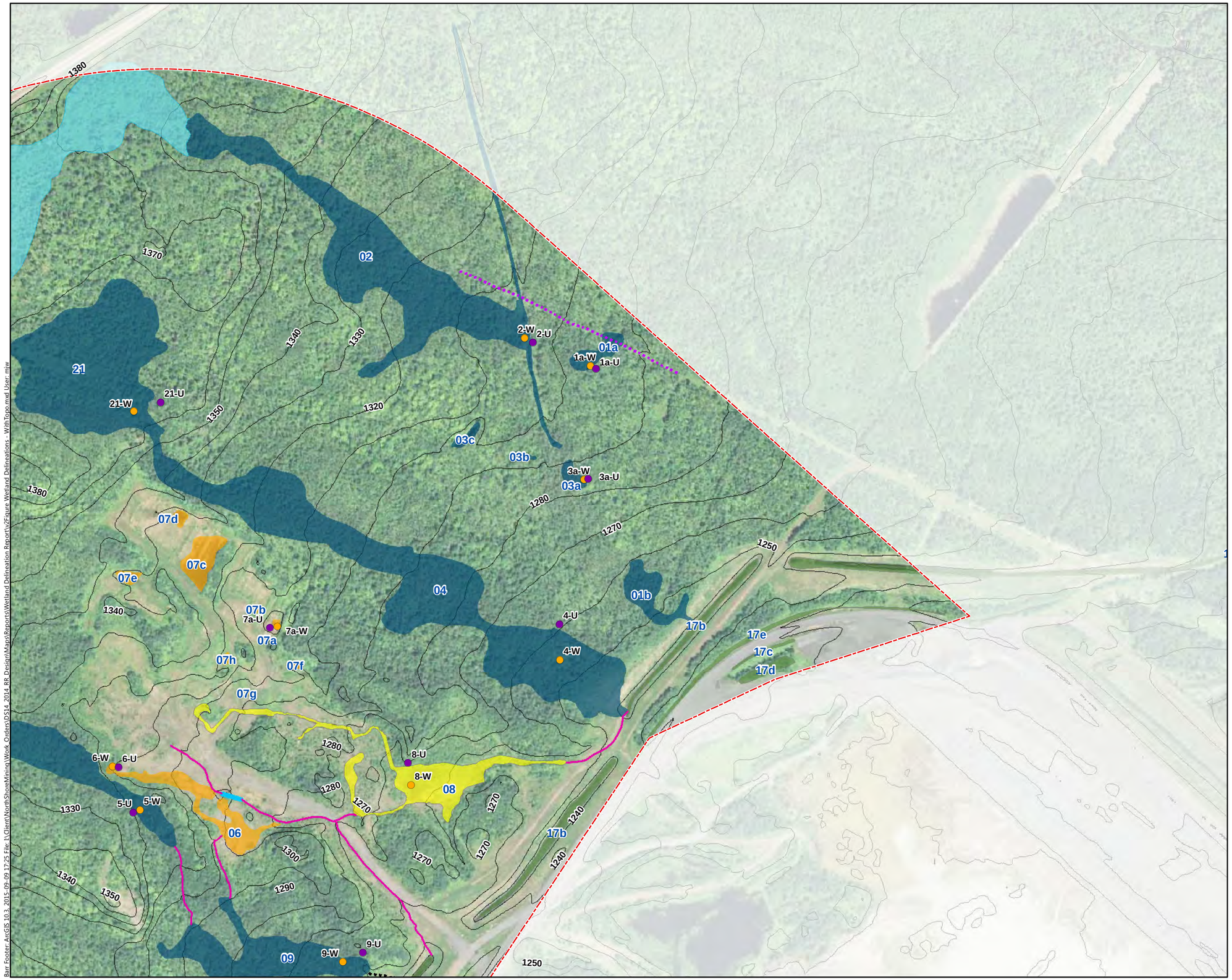
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 13

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-09-09 17:25 File: I:\Client\NorthShoreMining\Work_Orders\0514_2014_RR_Design\Maps\Reports\Wetland Delineation Report\v2\Figure Wetland Delineations - WithTopo.mxd User: mjw



Barr Foster-ArcGIS 10.3 - 2015-09-09 17:25 File: h:\Client\NorthShoreMining\Work Orders\DS14_2014_RR Design\Maps\Report\Wetland Delineation Report\v2\Figure Wetland Delineations - WithTopo.mxd User: mjw

Study Area

Predominant Wetland Type

- Alder Thicket
- Coniferous Swamp
- Fresh (Wet) Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- 10-ft Contours

Wetlands Connections

- Channel - Field Verified
- Compacted Trail - Field Verified
- Culvert, Desktop
- Culvert - Field Verified
- Ditch - Desktop
- Ditch - Field Verified
- Water Conveyance
- Upland data point
- Wetland data point

Notes:
Wetlands beyond study area are approximate.
See table 3 for wetland type details.

0 200 400 800

Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure 14

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Appendices

Appendix A

Wetland Delineation Data Forms

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 10-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 3 | Soil Map Unit Name: B1-41D - Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5241021.1 mN | Longitude: 622952.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Soils are problematic with red parent material noted. Field ID is 11-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula papyrifera	30	Yes	FACU
2.	Populus tremuloides	30	Yes	FAC
3.	Acer spicatum	5	No	FACU
4.		0		
	Total Cover:	65		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rubus idaeus	5	No	FAC
2.	Corylus cornuta	30	Yes	FACU
3.	Fraxinus nigra	5	No	FACW
4.		0		
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	60	Yes	UPL
2.	Aralia nudicaulis	20	No	FACU
3.	Pteridium aquilinum	30	Yes	FACU
4.	Fraxinus pennsylvanica	5	No	FACW
5.	Rubus pubescens	1	No	FACW
6.	Maianthemum canadense	1	No	FACU
7.	Diervilla lonicera	5	No	UPL
8.		0		
	Total Cover:	122		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	13	32.5
Sapling/Shrub Stratum	8	20
Herb Stratum	24.4	61
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 20.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	11	X 2	22	
FAC Species	35	X 3	105	
FACU Species	116	X 4	464	
UPL Species	65	X 5	325	
Column Totals:	227	(A)	916	(B)

Prevalence Index = B/A = 4.04

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

9/18/2015 11:17:45 AM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 10-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/2	100					loam	dry
2.	3 - 12	7.5YR 4/3	100					loam	dry
3.	12 - 24	7.5YR 4/3	70	7.5YR 4/6	30	C	M	fine sandy loam	dry
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: none observed Depth (inches): -

Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 10-W

Land Form: Depression | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: B1-41D - Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5241066.0 mN | Longitude: 622948.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1A/PSS1A | Circular 39 Classification: Type 7/6 | Mapped NWI Classification: PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Hardwood Swamp

Eggers & Reed (secondary): Shrub-Carr

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID was 11-W.

If yes, optional Wetland Site ID: 10

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	50	Yes	FACW
2.	Picea mariana	5	No	FACW
3.		0		
4.		0		
	Total Cover:	55		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	70	Yes	FACW
2.	Acer spicatum	2	No	FACU
3.	Cornus alba	2	No	FACW
4.		0		
5.		0		
	Total Cover:	74		
	Herb Stratum (Plot Size: 5 ft)			
1.	Carex intumescens	10	Yes	FACW
2.	Carex scoparia	10	Yes	FACW
3.	Impatiens capensis	5	Yes	FACW
4.	Calamagrostis canadensis	5	Yes	OBL
5.	Carex sp.	3	No	
6.	Glyceria canadensis	3	No	OBL
7.	Rubus idaeus	5	Yes	FAC
8.	Rubus pubescens	2	No	FACW
	Total Cover:	43		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 23 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	11	27.5
Sapling/Shrub Stratum	14.8	37
Herb Stratum	8.6	21.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	8	X 1	8	
FACW Species	154	X 2	308	
FAC Species	5	X 3	15	
FACU Species	2	X 4	8	
UPL Species	0	X 5	0	
Column Totals:	169	(A)	339	(B)
Prevalence Index = B/A =			2.01	

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 10-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 2.5/1	100					silt loam	dry
2.	5 - 11	7.5YR 4/3	80	7.5YR 4/2	15	D	M	very fine sandy loam	dry
3.	-			7.5YR 4/6	5	C	M		
4.	11 - 24	5YR 4/4	60	5YR 4/6	40	C	M	silt clay loam	slightly moist
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** silty clay loam **Depth (inches):** 11 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Shallow aquitard noted at 11". 50% bare soils is likely from previous inundation.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 11a-W

Land Form: Depression | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: B1-41D - Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5241014.6 mN | Longitude: 622914.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1C/PFO1A | Circular 39 Classification: Type 2/7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Sedge Meadow
Eggers & Reed (secondary): Hardwood Swamp
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID was 12a-W.

If yes, optional Wetland Site ID: 11

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	20	Yes	FACW
2.	Populus tremuloides	5	Yes	FAC
3.		0		
4.		0		
	Total Cover:	25		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Onoclea sensibilis	5	No	FACW
2.	Cornus alba	5	No	FACW
3.	Carex leptalea	5	No	OBL
4.	Carex intumescens	15	No	FACW
5.	Carex stipata	25	Yes	OBL
6.	Carex hystericina	10	No	OBL
7.	Scirpus cyperinus	25	Yes	OBL
8.		0		
	Total Cover:	90		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

30% non-sphagnum moss is noted on boulders.

50/20 Thresholds:	20%	50%
Tree Stratum	5	12.5
Sapling/Shrub Stratum	0	0
Herb Stratum	18	45
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	65	X 1	65	
FACW Species	45	X 2	90	
FAC Species	5	X 3	15	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	115	(A)	170	(B)

Prevalence Index = B/A = 1.48

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 11a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 2.5/1	60					mucky silt loam	dry
2.	-	7.5YR 3/4	30	7.5YR 4/6	10	C	M		
3.	6 - 12	7.5YR 4/1	80	7.5YR 4/6	20	C	M	loam	dry
4.	12 - 24	5YR 4/3	60	5YR 4/6	30	C	M	clay loam	slightly moist
5.	-			5YR 4/1	10	D	M		
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 12 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☑ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Shallow aquitard noted at 12".

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 12-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: B1-41D - Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5240661.4 mN | Longitude: 623039.1 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Soils are problematic with red parent material noted. Field ID is 15-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	30	Yes	FACW
2.	Populus tremuloides	30	Yes	FAC
3.	Abies balsamea	10	No	FAC
4.	Betula papyrifera	10	No	FACU
	Total Cover:	80		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus cornuta	50	Yes	FACU
2.	Acer rubrum	5	No	FAC
3.		0		
4.		0		
5.		0		
	Total Cover:	55		
	Herb Stratum (Plot Size: 5 ft)			
1.	Pteridium aquilinum	50	Yes	FACU
2.	Fragaria virginiana	10	No	FACU
3.	Eurybia macrophylla	10	No	UPL
4.	Impatiens capensis	1	No	FACW
5.	Aralia nudicaulis	5	No	FACU
6.	Carex intumescens	1	No	FACW
7.		0		
8.		0		
	Total Cover:	77		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 23 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	16	40
Sapling/Shrub Stratum	11	27.5
Herb Stratum	15.4	38.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	50.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	32	X 2	64	
FAC Species	45	X 3	135	
FACU Species	125	X 4	500	
UPL Species	10	X 5	50	
Column Totals:	212	(A)	749	(B)
Prevalence Index = B/A =			3.53	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

9/18/2015 11:17:45 AM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 12-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/1	100					fine sandy loam	dry
2.	3 - 10	7.5YR 3/2	100					fine sandy loam	dry
3.	10 - 15	7.5YR 3/3	90					loam	dry
4.	-	7.5YR 3/4	10						
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 15 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/03/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 12-W

Land Form: Depression | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: C3-40B-Badriver-Rock outcrop 0-8% slope

Subregion (LRR): K | Latitude: 5240575.4 mN | Longitude: 623035.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFO1B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 15-W.

If yes, optional Wetland Site ID: 12

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula papyrifera	10	No	FACU
2.	Fraxinus nigra	50	Yes	FACW
3.	Populus tremuloides	10	No	FAC
4.	Abies balsamea	5	No	FAC
	Total Cover:	75		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	20	Yes	FACW
2.	Acer spicatum	20	Yes	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Carex blanda	20	Yes	FAC
2.	Carex trisperma	20	Yes	OBL
3.	Cornus alba	5	No	FACW
4.	Rubus pubescens	10	No	FACW
5.	Equisetum sylvaticum	5	No	FACW
6.	Carex leptalea	5	No	OBL
7.	Rubus idaeus	2	No	FAC
8.	Solidago gigantea	2	No	FACW
	Total Cover:	69		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0

% Sphagnum Moss Cover: 15

Vegetation Remarks: (include photo numbers here or on a separate sheet)

15% non-sphagnum moss is noted.

50/20 Thresholds:	20%	50%
Tree Stratum	15	37.5
Sapling/Shrub Stratum	8	20
Herb Stratum	13.8	34.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 80.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	25	X 1	25	
FACW Species	92	X 2	184	
FAC Species	37	X 3	111	
FACU Species	30	X 4	120	
UPL Species	0	X 5	0	
Column Totals:	184	(A)	440	(B)

Prevalence Index = B/A = 2.39

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 12-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 9	7.5YR 2.5/1	100					mucky-peat	saturated, H6, Oe
2.	9 - 20	7.5YR 3/2	100					mucky fine sandy loam	super saturated
3.	20 - 24	5YR 4/4	80	5YR 4/6	20	C	M	clay loam	moist
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☑ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 11

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Saturation is present at surface level.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 13-U

Land Form: Upland | Local Relief: Convex | Slope %: 2 | Soil Map Unit Name: A1-40B - Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5238759.7 mN | Longitude: 621567.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil Yes Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed):

Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine. Soils are problematic with red parent material noted. Field ID is 101-U.

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Centaurea stoebe	40	Yes	UPL
2.	Rubus idaeus	10	No	FAC
3.	Leucanthemum vulgare	2	No	UPL
4.	Lotus corniculatus	40	Yes	FACU
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	92		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

The plot contains fill soil.

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	18.4	46
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 0.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	10	X 3	30	
FACU Species	40	X 4	160	
UPL Species	42	X 5	210	
Column Totals:	92	(A)	400	(B)

Prevalence Index = B/A = 4.35

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 13-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	-								
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? No

Soil Remarks: Auger refusal at ground surface with no soil observed. Material observed at sample point is coarse gravel fill.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 13-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A1-40B - Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5238751.0 mN | Longitude: 621559.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1/PSS1 | Circular 39 Classification: Type 6/7 | Mapped NWI Classification: PFO/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Shrub-Carr
Eggers & Reed (secondary): Hardwood Swamp
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and is within a forested wetland. Soils are problematic with red parent material noted. Field ID is 101-W.

If yes, optional Wetland Site ID: 13

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0		
2.	0		
3.	0		
4.	0		
Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Alnus incana	80	Yes	FACW
2.	0		
3.	0		
4.	0		
5.	0		
Total Cover:	80		
Herb Stratum (Plot Size: 5 ft)			
1. Alnus incana	30	Yes	FACW
2. Rubus idaeus	10	No	FAC
3. Solidago gigantea	20	No	FACW
4. Geum aleppicum	2	No	FAC
5. Impatiens capensis	40	Yes	FACW
6. Phalaris arundinacea	2	No	FACW
7. Equisetum pratense	15	No	FACW
8. Rubus pubescens	6	No	FACW
Total Cover:	125		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 5

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	16	40
Herb Stratum	25	62.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	193	X 2	386	
FAC Species	12	X 3	36	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	205	(A)	422	(B)

Prevalence Index = B/A = 2.06

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Wetland has several drainage channels as well as small depressions with little or no vegetation. Channels appear to be oriented east to west.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 13-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 2	10YR 2/2	100					silt loam	
2.	2 - 18	10YR 3/2	90					silt loam	
3.	-	10YR 3/3	10						
4.	18 - 24	7.5YR 3/1	50	7.5YR 4/6	10	C	M	loam	
5.	-	7.5YR 4/3	40						
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** loam (>18% clay) **Depth (inches):** 18 -24

Hydric soil present? Yes

Soil Remarks: Best professional judgement, soil has dark surface with saturation in the driest time of the year within 12 inches of the soil surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 11

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): LBN, KMS2 | Section: 6 | Township: 55N | Range: 8W | Sampling Point: 14-U

Land Form: Upland | Local Relief: Convex | Slope %: 20 | Soil Map Unit Name: E2-31D-Amnicon-Fluvaquents 0-18% slope

Subregion (LRR): K | Latitude: 5238011.5 mN | Longitude: 621148.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed):

Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Soils are problematic with red parent material noted. Field ID is 102-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula papyrifera	20	Yes	FACU
2.	Abies balsamea	15	Yes	FAC
3.	Picea glauca	5	No	FACU
4.		0		
	Total Cover:	40		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Betula papyrifera	10	Yes	FACU
2.	Corylus cornuta	25	Yes	FACU
3.	Populus tremuloides	5	No	FAC
4.		0		
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	85	Yes	UPL
2.	Aralia nudicaulis	5	No	FACU
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	90		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	8	20
Sapling/Shrub Stratum	8	20
Herb Stratum	18	45
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 20.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	20	X 3	60	
FACU Species	65	X 4	260	
UPL Species	85	X 5	425	
Column Totals:	170	(A)	745	(B)
Prevalence Index = B/A =			4.38	

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 14-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 3/3	100					sandy loam	roots, gravel, dry
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 6 inches below ground surface by coarse fragments .

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): LBN, KMS2 | Section: 6 | Township: 55N | Range: 8W | Sampling Point: 14-W

Land Form: Depression | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: E2-31D - Amnicon-Fluvaquents 0-18% slope

Subregion (LRR): K | Latitude: 5238000.0 mN | Longitude: 621121.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1 | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed):

Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 102-W.

If yes, optional Wetland Site ID: 14

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	75	Yes	FACW
2.	Betula papyrifera	10	No	FACU
3.		0		
4.		0		
	Total Cover:	85		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Fraxinus nigra	75	Yes	FACW
2.	Acer spicatum	5	No	FACU
3.	Alnus incana	10	No	FACW
4.		0		
5.		0		
	Total Cover:	90		

Herb Stratum (Plot Size: 5 ft)				
1.	Acer spicatum	5	No	FACU
2.	Abies balsamea	10	Yes	FAC
3.	Alnus incana	10	Yes	FACW
4.	Athyrium filix-femina	15	Yes	FAC
5.	Solidago gigantea	2	No	FACW
6.	Rubus pubescens	5	No	FACW
7.	Dryopteris carthusiana	5	No	FACW
8.				
	Total Cover:			

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 30 | % Sphagnum Moss Cover: 10

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	17	42.5
Sapling/Shrub Stratum	18	45
Herb Stratum		
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	182	X 2	364	
FAC Species	25	X 3	75	
FACU Species	20	X 4	80	
UPL Species	0	X 5	0	
Column Totals:	227	(A)	519	(B)

Prevalence Index = B/A = 2.29

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 14-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 2	10YR 2/1	100					mucky peat	25% fibers
2.	2 - 3	7.5YR 2.5/1	95					mucky silt loam	
3.	-	7.5YR 3/4	5						
4.	3 - 8	7.5YR 2.5/1	100					mucky silt loam	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - **Hydric soil present?** Yes

Soil Remarks: Auger refusal at 8 inches below ground surface by coarse fragments. Numerous exposed boulders.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☑ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 0

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Drainageway along adjacent rail road ditch may contribute to surface runoff to wetland. Water is ponded on NW side of railroad embankment.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): LBN, KMS2 | Section: 32 | Township: 56N | Range: 8W | Sampling Point: 15-U

Land Form: Hillslope | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A1-40B - Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239280.5 mN | Longitude: 622126.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Field ID is 104a-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	25	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	25		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.	Fraxinus pennsylvanica	25	Yes	FACW
2.	Acer spicatum	25	Yes	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	50		

Herb Stratum (Plot Size: 5 ft)

1.	Rubus idaeus	30	Yes	FAC
2.	Geum aleppicum	5	No	FAC
3.	Rubus parviflorus	10	Yes	FACU
4.	Impatiens capensis	5	No	FACW
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	50		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 15 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	5	12.5
Sapling/Shrub Stratum	10	25
Herb Stratum	10	25
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	60.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	30	X 2	60	
FAC Species	60	X 3	180	
FACU Species	35	X 4	140	
UPL Species	0	X 5	0	
Column Totals:	125	(A)	380	(B)
Prevalence Index = B/A =			3.04	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 15-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 25	7.5YR 3/2	100					sandy loam	gravel and cobbles
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - **Hydric soil present?** No

Soil Remarks: Soil at plot is noted as dry, small cobbles and gravel throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): LBN, KMS2 | Section: 32 | Township: 56N | Range: 8W | Sampling Point: 15-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A1-40B - Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239284.9 mN | Longitude: 622148.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1/PF04 | Circular 39 Classification: Type 6/7 | Mapped NWI Classification: PFOB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Alder Thicket

Eggers & Reed (secondary): Coniferous Swamp

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Field ID is 104a-W.

If yes, optional Wetland Site ID: 15

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.	Alnus incana	60	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	60		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Salix discolor	30	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	30		

Herb Stratum (Plot Size: 5 ft)				
1.	Calamagrostis canadensis	10	Yes	OBL
2.	Rubus pubescens	5	No	FACW
3.	Eutrochium purpureum	2	No	FAC
4.	Lycopus americanus	25	Yes	OBL
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	42		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 50 | % Sphagnum Moss Cover: 5

Vegetation Remarks: (include photo numbers here or on a separate sheet)

Sample point in alder thicket.

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	6	15
Herb Stratum	8.4	21
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	35	X 1	35	
FACW Species	95	X 2	190	
FAC Species	2	X 3	6	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	132	(A)	231	(B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 15-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	10YR 2/1	100					mucky peat	
2.	10 - 16	10YR 2/2	100					mucky peat	
3.	16 - 24	10YR 4/3	95	10YR 5/6	5	C	M	sandy loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [x] Drainage Patterns (B10)
- [x] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [x] **Water Table Depth (inches):** 1

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 16a-U

Land Form: Fill | Local Relief: Convex | Slope %: 2 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5238311.4 mN | Longitude: 621554.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation Yes Soil Yes Hydrology No significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? No

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Field ID was 105-U.

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 100 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

The plot contains no vegetative cover.

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	0	0
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW or FAC: (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #Num!

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- #Type! — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 16a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 25	10Y 3/1	100					sand	85% gravel
2.	25 - 28	7.5YR 3/2	60	7.5YR 4/4	5	C	M	sand	85% gravel
3.	-	7.5YR 3/1	35						
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Soil appears to be sharp gravel and fine tailings.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☑ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 19

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: No hydrology observed.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 16a-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5238311.9 mN | Longitude: 621553.1 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1d/PAB1 | Circular 39 Classification: Type 3 | Mapped NWI Classification: PFO/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow Marsh

Eggers & Reed (secondary): Shallow, Open Water

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a footslope. Field ID was 105-W.

If yes, optional Wetland Site ID: 16a

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Typha latifolia	20	No	OBL
2.	Scirpus cyperinus	5	No	OBL
3.	Solidago gigantea	20	No	FACW
4.	Juncus bufonius	30	Yes	FACW
5.	Salix lucida	5	No	FACW
6.	Juncus effusus	30	Yes	OBL
7.	Salix discolor	5	No	FACW
8.		0		
	Total Cover:	115		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	23	57.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	55	X 1	55	
FACW Species	60	X 2	120	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	115	(A)	175	(B)

Prevalence Index = B/A = 1.52

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 16a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 2	10YR 3/2	100					sandy clay loam	moist
2.	2 - 17	7.5YR 3/3	78	7.5YR 4/1	15	D	M	sandy clay loam	moist
3.	-			7.5YR 4/6	7	C	M		
4.	17 - 25	7.5YR 3/4	93	7.5YR 4/6	7	C	M	sandy clay loam	moist
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** sandy clay loam **Depth (inches):** 0 -25

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 17a-U

Land Form: Hillslope | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5238605.2 mN | Longitude: 621680.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed): Plot position is within an upland. Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Field ID was 108a-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)

1.	Phalaris arundinacea	90	Yes	FACW
2.	Rubus idaeus	2	No	FAC
3.	Populus deltoides	10	No	FAC
4.	Zizia aurea	2	No	FAC
5.	Solidago sp.	5	No	
6.		0		
7.		0		
8.		0		
	Total Cover:	109		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	21.8	54.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	100.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	90	X 2	180	
FAC Species	14	X 3	42	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	104	(A)	222	(B)
Prevalence Index = B/A =			2.13	

Hydrophytic Vegetation Indicators:

Yes	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 17a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	10YR 3/2	100					sandy loam	gravel
2.	10 - 14	10YR 3/3	100					sandy loam	gravel
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 14 inches below ground surface by coarse fragments. Soil at plot is noted as dry, with gravel throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 17a-W

Land Form: Ditch | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5238594.7 mN | Longitude: 621684.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1Bd | Circular 39 Classification: Type 2 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Sedge Meadow

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID was 108a-W.

If yes, optional Wetland Site ID: 17a

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Scirpus cyperinus	10	No	OBL
2.	Juncus effusus	25	Yes	OBL
3.	Juncus bufonius	10	No	FACW
4.	Typha latifolia	5	No	OBL
5.	Carex scoparia	25	Yes	FACW
6.	Carex vulpinoidea	5	No	OBL
7.	Juncus sp.	25	Yes	FAC
8.		0		
	Total Cover:	105		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	21	52.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	45	X 1	45	
FACW Species	35	X 2	70	
FAC Species	25	X 3	75	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	105	(A)	190	(B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 17a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 3/2	100					sandy loam	
2.	4 - 24	7.5YR 3/4	75	7.5YR 4/2	15	C	M	sandy clay loam	
3.	-			7.5YR 4/6	10	C	M		
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** sandy clay loam **Depth (inches):** 4 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 17

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: A ditch on the northwest side of the road and railroad tracks connect to the SW to 101-W ditch.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 18-U

Land Form: Rocky Slope | Local Relief: Linear | Slope %: 0 | Soil Map Unit Name: J1a10A - Rifle soils 0-1% slope

Subregion (LRR): K | Latitude: 5240328.0 mN | Longitude: 623200.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Sample point at base of steep, rocky slope. Field ID is 104b-U.

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Solidago canadensis	5	No	FACU
2.	Achillea millefolium	30	Yes	FACU
3.	Lotus corniculatus	50	Yes	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	85		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	17	42.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 0.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	0	X 3	0	
FACU Species	85	X 4	340	
UPL Species	0	X 5	0	
Column Totals:	85	(A)	340	(B)
Prevalence Index = B/A =			4.00	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 18-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	5YR 3/2	100					gravelly sandy loam	
2.	10 - 12	5YR 3/2	94	5YR 4/6	1	C	M	gravelly sandy loam	
3.	-	7.5YR 3/1	5						
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 12 inches below ground surface by gravel.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 18-W

Land Form: Pond Shoreline | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: J1a10A - Rifle soils 0-1% slope

Subregion (LRR): K | Latitude: 5240321.2 mN | Longitude: 623201.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1/PAB3/PAB5 | Circular 39 Classification: Type 3/5/4 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow Marsh
Eggers & Reed (secondary): Shallow, Open Water
Eggers & Reed (tertiary): Deep Marsh
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 104b-W.

If yes, optional Wetland Site ID: 18

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size: 5 ft)			
1.	Salix discolor	25	Yes	FACW
2.	Salix lucida	10	No	FACW
3.	Scirpus cyperinus	45	Yes	OBL
4.	Populus deltoides	5	No	FAC
5.	Calamagrostis canadensis	5	No	OBL
6.		0		
7.		0		
8.		0		
	Total Cover:	90		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	18	45
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	X 1	50	
FACW Species	35	X 2	70	
FAC Species	5	X 3	15	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	90	(A)	135	(B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 18-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 3/3	100					gravelly sandy loam	
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks: Auger refusal at 5 inches below ground surface by gravel. There is not a clear hydric soil indicator because of problematic soil conditions including red parent material and course gravelly soils. Best professional judgement, water table is within 5 inches of soil surface during the dry time of year.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	☐	**Surface Water Depth (inches):**	
Water table present?	☑	**Water Table Depth (inches):**	4.5
Saturation present? (includes capillary fringe)	☑	**Saturation Depth (inches):**	0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Sample point is located adjacent to pond shoreline

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/10/15

Investigator(s): JTK, DRD | Section: 20 | Township: 56N | Range: 8W | Sampling Point: 19-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: A3-31D-Ahmeek-Normanna-Can. 0-18% slope

Subregion (LRR): K | Latitude: 5241740.7 mN | Longitude: 622789.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Soils are problematic with red parent material noted. Field ID was 201-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	25	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	25		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.	Corylus americana	50	Yes	FACU
2.	Prunus virginiana	20	Yes	FACU
3.	Fraxinus nigra	10	No	FACW
4.	Acer spicatum	10	No	FACU
5.	Rubus idaeus	1	No	FAC
	Total Cover:	91		

Herb Stratum (Plot Size: 5 ft)

1.	Aralia nudicaulis	25	Yes	FACU
2.	Pteridium aquilinum	25	Yes	FACU
3.	Oryzopsis asperifolia	5	No	UPL
4.	Clintonia borealis	1	No	FAC
5.	Carex pensylvanica	5	No	UPL
6.	Galium triflorum	1	No	FACU
7.	Eurybia macrophylla	50	Yes	UPL
8.	Apocynum androsaemifolium	1	No	UPL
	Total Cover:	113		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	5	12.5
Sapling/Shrub Stratum	18.2	45.5
Herb Stratum	22.6	56.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	16.67%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	10	X 2	20	
FAC Species	27	X 3	81	
FACU Species	131	X 4	524	
UPL Species	61	X 5	305	
Column Totals:	229	(A)	930	(B)
Prevalence Index = B/A =			4.06	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 19-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 2.5/2	100					loam	very dry
2.	6 - 24	2.5YR 3/3	100					fine sandy loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/10/15

Investigator(s): JTK, DRD | Section: 20 | Township: 56 | Range: 8 | Sampling Point: 19-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A3-22B-Normanna-Hermantown 1-8% slope

Subregion (LRR): K | Latitude: 5241737.8 mN | Longitude: 622705.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID was 201-W.

If yes, optional Wetland Site ID: 19

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	50	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	**50**		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	25	Yes	FACW
2.	Betula papyrifera	5	No	FACU
3.	Acer spicatum	5	No	FACU
4.	Corylus americana	10	Yes	FACU
5.	Alnus incana	5	No	FACW
	Total Cover:	**50**		
	Herb Stratum (Plot Size: 5 ft)			
1.	Rubus pubescens	20	Yes	FACW
2.	Fraxinus nigra	10	No	FACW
3.	Calamagrostis canadensis	15	Yes	OBL
4.	Phegopteris connectilis	5	No	FACU
5.	Acer rubrum	1	No	FAC
6.	Clintonia borealis	5	No	FAC
7.	Dryopteris carthusiana	5	No	FACW
8.	Symphyotrichum lateriflorum	5	No	FAC
	Total Cover:	**66**		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	**0**		

% Bare Ground in Herb Stratum: 5 **% Sphagnum Moss Cover:**

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	10	25
Herb Stratum	13.2	33
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 80.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	15	X 1	15	
FACW Species	115	X 2	230	
FAC Species	11	X 3	33	
FACU Species	25	X 4	100	
UPL Species	0	X 5	0	
Column Totals:	166	(A)	378	(B)

Prevalence Index = B/A = 2.28

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 19-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 9	10YR 3/1	85	10YR 4/6	15	C	M	silt loam	80% rock fragments
2.	9 - 15	10YR 3/1	90	10YR 4/6	10	C	M	silt loam	35% rock fragments; dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____

Hydric soil present? Yes

Soil Remarks: Best professional judgement is a high chroma redox 4/6 found on the surface of coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):** _____

Water table present? ☐ **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):** _____

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 1a-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241774.2 mN | Longitude: 624006.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Soils are problematic with red parent material noted. Field ID is 01-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	30	Yes	FAC
2.	Fraxinus nigra	5	No	FACW
3.	Betula papyrifera	10	Yes	FACU
4.		0		
	Total Cover:	45		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus cornuta	20	Yes	FACU
2.	Acer spicatum	5	Yes	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	25		
	Herb Stratum (Plot Size: 5 ft)			
1.	Aralia nudicaulis	30	Yes	FACU
2.	Fragaria virginiana	5	No	FACU
3.	Rubus idaeus	5	No	FAC
4.	Eurybia macrophylla	30	Yes	UPL
5.	Carex pensylvanica	5	No	UPL
6.	Clintonia borealis	3	No	FAC
7.	Streptopus lanceolatus	2	No	FACU
8.	Rubus pubescens	2	No	FACW
	Total Cover:	82		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 13 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	9	22.5
Sapling/Shrub Stratum	5	12.5
Herb Stratum	16.4	41
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 16.67% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	7	X 2	14
FAC Species	38	X 3	114
FACU Species	72	X 4	288
UPL Species	35	X 5	175
Column Totals:	152 (A)		591 (B)

Prevalence Index = B/A = 3.89

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 1a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	10YR 2/2	100					fine sandy loam	dry
2.	4 - 10	7.5YR 3/3	100					loam	dry
3.	10 - 21	7.5YR 3/4	60	7.5YR 4/6	40	C	M	fine sandy loam	dry
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Augar refusal at 21 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 1a-W

Land Form: Depression | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241778.5 mN | Longitude: 623998.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B/PEM1B | Circular 39 Classification: Type 7/2 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Hardwood Swamp

Eggers & Reed (secondary): Fresh (Wet) Meadow

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Field ID was 1-W.

If yes, optional Wetland Site ID: 1a

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	20	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	20		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	5	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	5		
	Herb Stratum (Plot Size: 5 ft)			
1.	Impatiens capensis	20	Yes	FACW
2.	Carex magellanica	10	No	OBL
3.	Onoclea sensibilis	20	Yes	FACW
4.	Glyceria striata	20	Yes	OBL
5.	Carex scoparia	5	No	FACW
6.	Caltha palustris	5	No	OBL
7.	Calamagrostis canadensis	10	No	OBL
8.	Rubus idaeus	5	No	FAC
	Total Cover:	95		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	4	10
Sapling/Shrub Stratum	1	2.5
Herb Stratum	19	47.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	45	X 1	45	
FACW Species	70	X 2	140	
FAC Species	5	X 3	15	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	120	(A)	200	(B)

Prevalence Index = B/A = 1.67

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 1a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 22	10YR 2/2	100					mucky very fine sandy loam	moist
2.	22 - 24	10YR 3/2	100					mucky silt loam	saturated
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** dense till **Depth (inches):** 24 -

Hydric soil present? Yes

Soil Remarks: Auger refusal at 24 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☑ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 22

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/10/15

Investigator(s): JTK, DRD | Section: 20 | Township: 56N | Range: 8W | Sampling Point: 20-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: J1a40A-Greenwood soils 0-1% slope

Subregion (LRR): K | Latitude: 5241771.3 mN | Longitude: 622884.6 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: PFOB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Alder Thicket
Eggers & Reed (secondary): Coniferous Swamp
Eggers & Reed (tertiary): Hardwood Swamp
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Field ID was 202-W.

If yes, optional Wetland Site ID: 20

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Larix laricina	5	Yes	FACW
2.	Picea mariana	10	Yes	FACW
3.		0		
4.		0		
	Total Cover:	15		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	60	Yes	FACW
2.	Acer rubrum	10	No	FAC
3.	Sorbus americana	5	No	FAC
4.	Abies balsamea	5	No	FAC
5.	Ledum groenlandicum	5	No	OBL
	Total Cover:	85		
	Herb Stratum (Plot Size: 5 ft)			
1.	Picea glauca	1	No	FACU
2.	Dryopteris carthusiana	1	No	FACW
3.	Carex trisperma	50	Yes	OBL
4.	Iris versicolor	10	No	OBL
5.	Trientalis borealis	1	No	FAC
6.		0		
7.		0		
8.		0		
	Total Cover:	63		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 99

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	3	7.5
Sapling/Shrub Stratum	17	42.5
Herb Stratum	12.6	31.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	65	X 1	65	
FACW Species	76	X 2	152	
FAC Species	21	X 3	63	
FACU Species	1	X 4	4	
UPL Species	0	X 5	0	
Column Totals:	163	(A)	284	(B)

Prevalence Index = B/A = 1.74

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 20-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 2.5/2	100					peat	fibric
2.	6 - 15	10YR 2/1	100					mucky peat	moist
3.	15 - 22	10YR 2/1	98					mucky silt loam	
4.	-	7.5YR 3/4	2						
5.	22 - 26	7.5YR 2.5/1	70					mucky silt loam	
6.	-	10YR 3/1	20	5YR 4/6	10	C	M		

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☑ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Shrubs on edge of conifer swamp.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/10/15

Investigator(s): JTK, DRD | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 21-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: A3-31D-Ahmeek-Normanna 0-18% slope

Subregion (LRR): K | Latitude: 5241727.0 mN | Longitude: 623392.0 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a footslope. Soils are problematic with red parent material noted. Field ID is 203-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	20	Yes	FAC
2.	Picea glauca	10	Yes	FACU
3.	Abies balsamea	10	Yes	FAC
4.	Betula papyrifera	10	Yes	FACU
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus americana	10	Yes	FACU
2.	Diervilla lonicera	25	Yes	UPL
3.	Ribes triste	1	No	OBL
4.	Fraxinus nigra	5	No	FACW
5.	Acer spicatum	1	No	FACU
	Total Cover:	42		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	75	Yes	UPL
2.	Calamagrostis canadensis	1	No	OBL
3.	Aralia nudicaulis	5	No	FACU
4.	Clintonia borealis	1	No	FAC
5.	Doellingeria umbellata	5	No	FACW
6.	Anemone quinquefolia	1	No	FACU
7.	Carex prasina	1	No	OBL
8.	Luzula acuminata	5	No	FACU
	Total Cover:	94		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.				
2.		0		
	Total Cover:			

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	8.4	21
Herb Stratum	18.8	47
Woody Vine Stratum		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 28.57% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	3	X 1	3	
FACW Species	10	X 2	20	
FAC Species	31	X 3	93	
FACU Species	42	X 4	168	
UPL Species	100	X 5	500	
Column Totals:	186	(A)	784	(B)

Prevalence Index = B/A = 4.22

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 21-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/2	100					loam	
2.	3 - 12	7.5YR 3/3	100					loam	
3.	12 - 24	7.5YR 4/4	90					loam	
4.	-	5YR 4/3	10						
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/10/15

Investigator(s): JTK, DRD | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 21-W

Land Form: Depression | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: A3-30B-Normanna-Canosia 0-8% slope

Subregion (LRR): K | Latitude: 5241714.3 mN | Longitude: 623354.0 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFOB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Hardwood Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 203-W.

If yes, optional Wetland Site ID: 21

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	50	Yes	FACW
2.	Populus tremuloides	10	No	FAC
3.		0		
4.		0		
	Total Cover:	60		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	5	No	FACW
2.	Alnus incana	25	Yes	FACW
3.	Rubus idaeus	25	Yes	FAC
4.		0		
5.		0		
	Total Cover:	55		

	Herb Stratum (Plot Size: 5 ft)			
1.	Doellingeria umbellata	5	No	FACW
2.	Carex stipata	50	Yes	OBL
3.	Impatiens capensis	10	No	FACW
4.	Rubus pubescens	5	No	FACW
5.	Caltha palustris	5	No	OBL
6.	Equisetum pratense	1	No	FACW
7.	Carex projecta	50	Yes	FACW
8.	Chelone glabra	1	No	OBL
	Total Cover:	127		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	11	27.5
Herb Stratum	25.4	63.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	56	X 1	56	
FACW Species	151	X 2	302	
FAC Species	35	X 3	105	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	242	(A)	463	(B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 21-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	10YR 2/1	100					mucky peat	moist
2.	4 - 10	7.5YR 4/3	45	7.5YR 4/6	30	C	M	clay loam	moist
3.	-	10YR 2/1	10	7.5YR 4/1	15	D	M		
4.	10 - 24	7.5YR 4/3	60	7.5YR 5/8	40	C	M	loam	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 4 -10

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 22-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: C1-40B-Badriver complex 0-8% slope

Subregion (LRR): K | Latitude: 5240435.1 mN | Longitude: 622344.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 204-W.

If yes, optional Wetland Site ID: 22

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	50	Yes	FACW
2. Populus tremuloides	20	Yes	FAC
3.	0		
4.	0		
Total Cover:	70		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Fraxinus nigra	25	Yes	FACW
2. Corylus cornuta	25	Yes	FACU
3. Acer spicatum	5	No	FACU
4.			
5.	0		
Total Cover:			
Herb Stratum (Plot Size: 5 ft)			
1. Matteuccia struthiopteris	50	Yes	FAC
2. Dryopteris carthusiana	20	Yes	FACW
3. Aralia nudicaulis	5	No	FACU
4. Calamagrostis canadensis	20	Yes	OBL
5. Ribes triste	1	No	OBL
6. Symphyotrichum lateriflorum	5	No	FAC
7. Rubus pubescens	5	No	FACW
8. Eurybia macrophylla	10	No	UPL
Total Cover:	116		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	14	35
Sapling/Shrub Stratum		
Herb Stratum	23.2	58
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 85.71% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	21	X 1	21	
FACW Species	100	X 2	200	
FAC Species	75	X 3	225	
FACU Species	35	X 4	140	
UPL Species	10	X 5	50	
Column Totals:	241	(A)	636	(B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 22-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 8	10YR 2/2	95	10YR 4/6	5	C	M	silt loam	
2.	8 - 24	5YR 3/3	95	5YR 4/6	5	C	M	fine sandy loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** dense till **Depth (inches):** 24 -

Hydric soil present? Yes

Soil Remarks: Weak hydric soil indicators noted.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Weak indicators noted.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 23-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 10 | Soil Map Unit Name: E1-9D-Ahmeek-Udifluvents 1-18% slope

Subregion (LRR): K | Latitude: 5240290.1 mN | Longitude: 622278.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil Yes Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Soils are problematic with red parent material noted. Field ID is 205-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Abies balsamea	30	Yes	FAC
2.	Populus balsamifera	10	No	FACW
3.	Betula papyrifera	20	Yes	FACU
4.		0		
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus cornuta	25	Yes	FACU
2.	Amelanchier arborea	5	No	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	30		
	Herb Stratum (Plot Size: 5 ft)			
1.	Pteridium aquilinum	20	Yes	FACU
2.	Aralia nudicaulis	50	Yes	FACU
3.	Oryzopsis asperifolia	20	Yes	UPL
4.	Carex pedunculata	10	No	FACU
5.	Maianthemum canadense	10	No	FACU
6.		0		
7.		0		
8.		0		
	Total Cover:	110		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	6	15
Herb Stratum	22	55
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 16.67% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	10	X 2	20	
FAC Species	30	X 3	90	
FACU Species	140	X 4	560	
UPL Species	20	X 5	100	
Column Totals:	200	(A)	770	(B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 23-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/1	100					fine sandy loam	very dry
2.	3 - 24	7.5YR 3/3	100					loamy fine sand	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 23-W

Land Form: Floodplain | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: E1-9D-Ahmeek-Udifluvents 1-18%

Subregion (LRR): K | Latitude: 5240289.4 mN | Longitude: 622262.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 1/7 | Mapped NWI Classification: PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Floodplain Forest
Eggers & Reed (secondary): Hardwood Swamp
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 205-W.

If yes, optional Wetland Site ID: 23

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	20	Yes	FACW
2.	Picea mariana	20	Yes	FACW
3.	Betula papyrifera	10	No	FACU
4.	Abies balsamea	10	No	FAC
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	15	Yes	FACW
2.	Acer spicatum	15	Yes	FACU
3.	Alnus incana	15	Yes	FACW
4.		0		
5.		0		
	Total Cover:	45		
	Herb Stratum (Plot Size: 5 ft)			
1.	Glyceria striata	10	No	OBL
2.	Caltha palustris	5	No	OBL
3.	Doellingeria sericocarpoides	5	No	FACW
4.	Poa palustris	5	No	FACW
5.	Equisetum pratense	20	Yes	FACW
6.	Thalictrum dasycarpum	10	No	FACW
7.	Carex intumescens	50	Yes	FACW
8.	Athyrium filix-femina	5	No	FAC
	Total Cover:	110		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 1 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	9	22.5
Herb Stratum	22	55
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 85.71% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	15	X 1	15	
FACW Species	160	X 2	320	
FAC Species	15	X 3	45	
FACU Species	25	X 4	100	
UPL Species	0	X 5	0	
Column Totals:	215	(A)	480	(B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 23-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10YR 2/2	95	10YR 4/6	5	C	M	mucky fine sandy loam	
2.	10 - 15	7.5YR 2.5/2	60					mucky fine sandy loam	
3.	-	5YR 3/3	40						
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks: Augar refusal at 15 inches below ground surface by course fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 11

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 5

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic. Seepage apparent in locations at toe of slope along floodplain.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56 | Range: 8 | Sampling Point: 24-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 1 | Soil Map Unit Name: F2-41D-Aldenlake-Ahmeek 8-18% slope

Subregion (LRR): K | Latitude: 5239946.8 mN | Longitude: 622445.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine. Soils are problematic with red parent material noted. Field ID is 206-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	40	Yes	FACW
2.	Betula alleghaniensis	5	No	FAC
3.	Populus tremuloides	25	Yes	FAC
4.		0		
	Total Cover:	70		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.	Fraxinus nigra	25	Yes	FACW
2.	Acer spicatum	10	No	FACU
3.	Corylus cornuta	20	Yes	FACU
4.		0		
5.		0		
	Total Cover:	55		

Herb Stratum (Plot Size: 5 ft)

1.	Athyrium filix-femina	25	Yes	FAC
2.	Eurybia macrophylla	25	Yes	UPL
3.	Aralia nudicaulis	25	Yes	FACU
4.	Phegopteris connectilis	10	No	FACU
5.	Carex pedunculata	10	No	FACU
6.	Betula alleghaniensis	5	No	FAC
7.		0		
8.		0		
	Total Cover:	100		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	14	35
Sapling/Shrub Stratum	11	27.5
Herb Stratum	20	50
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	57.14%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	65	X 2	130	
FAC Species	60	X 3	180	
FACU Species	75	X 4	300	
UPL Species	25	X 5	125	
Column Totals:	225	(A)	735	(B)
Prevalence Index = B/A =			3.27	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 24-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	10YR 2/2	100					silt loam	
2.	5 - 12	7.5YR 3/2	100					silt loam	dry
3.	12 - 20	2.5YR 3/3	98	7.5YR 4/6	2	C	M	silt loam	dry
4.	20 - 24	5YR 4/4	60					clay loam	dry
5.	-	2.5YR 3/4	40						
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 20 -24

Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 8 | Range: 56 | Sampling Point: 24-W

Land Form: Pond Edge | Local Relief: Linear | Slope %: 2 | Soil Map Unit Name: F2-41D-Aldenlake-Ahmeek 8-18% slope

Subregion (LRR): K | Latitude: 5239931.9 mN | Longitude: 622485.1 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a flat. Soils are problematic with red parent material noted. Field ID is 206-W.

If yes, optional Wetland Site ID: 24

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	20	Yes	FACW
2.	Populus tremuloides	20	Yes	FAC
3.		0		
4.		0		
	Total Cover:	40		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	20	Yes	FACW
2.	Populus tremuloides	10	Yes	FAC
3.	Salix bebbiana	20	Yes	FACW
4.	Acer spicatum	0		FACU
5.		0		
	Total Cover:	50		
	Herb Stratum (Plot Size: 5 ft)			
1.	Athyrium filix-femina	60	Yes	FAC
2.	Polygonatum pubescens	5	No	FACU
3.	Aralia nudicaulis	50	Yes	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	115		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 25 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	8	20
Sapling/Shrub Stratum	10	25
Herb Stratum	23	57.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 85.71% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	60	X 2	120	
FAC Species	90	X 3	270	
FACU Species	55	X 4	220	
UPL Species	0	X 5	0	
Column Totals:	205	(A)	610	(B)
Prevalence Index = B/A =			2.98	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 24-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 2.5/1	100					loam	moist
2.	4 - 12	7.5YR 4/4	60					fine sandy loam	moist
3.	-	7.5YR 3/2	30	7.5YR 4/6	10	C	M		
4.	12 - 24	7.5YR 3/3	70	7.5YR 4/1	30	D	M	fine sandy loam	saturated
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☑ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 20

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 12

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/11/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 25-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 4 | Soil Map Unit Name: C1-40B-Badriver complex, 0-8% slope

Subregion (LRR): K | Latitude: 5240322.2 mN | Longitude: 622674.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO4B | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFO4/6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Coniferous Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine. Field ID is 207-W.

If yes, optional Wetland Site ID: 25

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Thuja occidentalis	50	Yes	FACW
2.	Betula alleghaniensis	20	Yes	FAC
3.	Fraxinus nigra	5	No	FACW
4.		0		
	Total Cover:	75		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Thuja occidentalis	5	No	FACW
2.	Acer spicatum	10	Yes	FACU
3.	Corylus cornuta	10	Yes	FACU
4.	Abies balsamea	5	No	FAC
5.		0		
	Total Cover:	30		

	Herb Stratum (Plot Size: 5 ft)			
1.	Sorbus americana	5	Yes	FAC
2.	Carex pedunculata	5	Yes	FACU
3.	Gymnocarpium dryopteris	5	Yes	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	15		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 85 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	15	37.5
Sapling/Shrub Stratum	6	15
Herb Stratum	3	7.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 42.86% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	60	X 2	120	
FAC Species	30	X 3	90	
FACU Species	30	X 4	120	
UPL Species	0	X 5	0	
Column Totals:	120	(A)	330	(B)

Prevalence Index = B/A = 2.75

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 25-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 12	10YR 2/2	100					mucky peat	dry; Oe, H8
2.	12 - 24	10YR 2/1	100					muck	moist muck; Oa, H10
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks: 4 percent slope with presumed lateral groundwater flow from upslope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Hydrology is difficult to infur. Dominance of thuja occidentalis on histosol strongly suggests wetland hydrology is present.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/14

Investigator(s): JTK, DRD | Section: 30 | Township: 56N | Range: 8W | Sampling Point: 26-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 5 | Soil Map Unit Name: F2-41D-Aldenlake-Ahmeek 8-18% slope

Subregion (LRR): K | Latitude: 5240449.1 mN | Longitude: 621782.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Soils are problematic with red parent material noted. Field ID is 208-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	25	Yes	FAC
2.	Betula papyrifera	25	Yes	FACU
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Acer spicatum	25	Yes	FACU
2.	Corylus cornuta	50	Yes	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	75		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	95	Yes	UPL
2.	Pteridium aquilinum	20	No	FACU
3.	Carex pedunculata	10	No	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	125		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	15	37.5
Herb Stratum	25	62.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 20.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	25	X 3	75	
FACU Species	130	X 4	520	
UPL Species	95	X 5	475	
Column Totals:	250	(A)	1070	(B)
Prevalence Index = B/A =			4.28	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 26-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	10YR 3/2	100					silt loam	very dry
2.	5 - 24	7.5YR 3/3	100					fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 26-W

Land Form: Drainageway | Local Relief: Convex | Slope %: 2 | Soil Map Unit Name: A3-21A-Hermantown silt loam 1-3% slope

Subregion (LRR): K | Latitude: 5240505.7 mN | Longitude: 621821.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 208-W.

If yes, optional Wetland Site ID: 26

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	75	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	75		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	25	Yes	FACW
2.	Rubus idaeus	5	No	FAC
3.	Prunus virginiana	5	No	FACU
4.		0		
5.		0		
	Total Cover:	35		
	Herb Stratum (Plot Size: 5 ft)			
1.	Symphyotrichum lateriflorum	10	No	FAC
2.	Athyrium filix-femina	5	No	FAC
3.	Impatiens capensis	1	No	FACW
4.	Carex projecta	95	Yes	FACW
5.	Laportea canadensis	1	No	FACW
6.		0		
7.		0		
8.		0		
	Total Cover:	112		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	15	37.5
Sapling/Shrub Stratum	7	17.5
Herb Stratum	22.4	56
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	197	X 2	394	
FAC Species	20	X 3	60	
FACU Species	5	X 4	20	
UPL Species	0	X 5	0	
Column Totals:	222	(A)	474	(B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

Yes — Rapid Test for Hydrophytic Vegetation
Yes — Dominance Test is >50%
Yes — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 26-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	10YR 2/1	100					mucky silty loam	dry
2.	12 - 24	7.5YR 3/4	60	7.5YR 4/6	40	C	M	fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** dense till **Depth (inches):** 24 - **Hydric soil present?** Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 30 | Township: 56N | Range: 8W | Sampling Point: 27-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 0 | Soil Map Unit Name: A3-11A-Twig-Tacoosh-Giese 0-1% slope

Subregion (LRR): K | Latitude: 5239999.4 mN | Longitude: 621469.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Soils are problematic with red parent material noted. Field ID is 209-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea glauca	25	Yes	FACU
2.	Abies balsamea	50	Yes	FAC
3.	Betula papyrifera	25	Yes	FACU
4.		0		
	Total Cover:	100		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	5	Yes	FACW
2.	Corylus cornuta	10	Yes	FACU
3.	Acer spicatum	10	Yes	FACU
4.		0		
5.		0		
	Total Cover:	25		
	Herb Stratum (Plot Size: 5 ft)			
1.	Athyrium filix-femina	50	Yes	FAC
2.	Actaea rubra	5	No	FACU
3.	Carex pedunculata	25	Yes	FACU
4.	Rubus pubescens	10	No	FACW
5.	Oryzopsis asperifolia	5	No	UPL
6.		0		
7.		0		
8.		0		
	Total Cover:	95		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	20	50
Sapling/Shrub Stratum	5	12.5
Herb Stratum	19	47.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 37.50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	15	X 2	30	
FAC Species	100	X 3	300	
FACU Species	100	X 4	400	
UPL Species	5	X 5	25	
Column Totals:	220	(A)	755	(B)

Prevalence Index = B/A = 3.43

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 27-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 2.5/2	100					fine sandy loam	dry
2.	5 - 24	7.5YR 3/3	100					fine sandy loam	dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 30 | Township: 56N | Range: 8W | Sampling Point: 27-W

Land Form: Floodplain | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: A3-11A-Twig-Tacoosh-Giese 0-1% slope

Subregion (LRR): K | Latitude: 5239972.3 mN | Longitude: 621487.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Alder Thicket

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 209-W.

If yes, optional Wetland Site ID: 27

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Alnus incana	75	Yes	FACW
2.	Fraxinus nigra	5	No	FACW
3.	Rubus idaeus	20	No	FAC
4.	Cornus rugosa	10	No	UPL
5.	Salix discolor	5	No	FACW
	Total Cover:	115		

Herb Stratum (Plot Size: 5 ft)				
1.	Calamagrostis canadensis	50	Yes	OBL
2.	Onoclea sensibilis	10	No	FACW
3.	Carex lacustris	20	Yes	OBL
4.				
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:			

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	23	57.5
Herb Stratum		
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	70	X 1	70	
FACW Species	95	X 2	190	
FAC Species	20	X 3	60	
FACU Species	0	X 4	0	
UPL Species	10	X 5	50	
Column Totals:	195	(A)	370	(B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes — Rapid Test for Hydrophytic Vegetation
Yes — Dominance Test is >50%
Yes — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 27-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	7.5YR 3/2	60	5YR 4/6	20	C	M	fine sandy loam	moist
2.	-	7.5YR 2.5/3	20						
3.	12 - 24	10YR 3/1	98	10YR 4/6	2	C	M	mucky silty loam	saturated
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 12

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic with occasional flooding evidence of buried mucky mineral soils.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 28-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 1 | Soil Map Unit Name: B1-41D-Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5241268.9 mN | Longitude: 622254.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Soils are problematic with red parent material noted. Field ID is 210-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	50	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus americana	60	Yes	FACU
2.	Prunus virginiana	10	No	FACU
3.	Fraxinus nigra	5	No	FACW
4.	Rubus idaeus	10	No	FAC
5.	Lonicera hirsuta	5	No	FAC
	Total Cover:	90		
	Herb Stratum (Plot Size: 5 ft)			
1.	Carex pensylvanica	25	Yes	UPL
2.	Luzula acuminata	20	Yes	FACU
3.	Eurybia macrophylla	20	Yes	UPL
4.	Clintonia borealis	10	No	FAC
5.	Aralia nudicaulis	10	No	FACU
6.	Oryzopsis asperifolia	5	No	UPL
7.		0		
8.		0		
	Total Cover:	90		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	18	45
Herb Stratum	18	45
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 20.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	5	X 2	10	
FAC Species	75	X 3	225	
FACU Species	100	X 4	400	
UPL Species	50	X 5	250	
Column Totals:	230	(A)	885	(B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
No — Dominance Test is >50%
No — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 28-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 3/2	100					silt loam	very dry
2.	6 - 24	7.5YR 3/4	100					fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 28-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A3-13A-Giese muck 0-2% slope

Subregion (LRR): K | Latitude: 5241298.6 mN | Longitude: 622323.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Field ID is 210-W.

If yes, optional Wetland Site ID: 28

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	60	Yes	FACW
2.	Populus tremuloides	10	No	FAC
3.		0		
4.		0		
	Total Cover:	70		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	10	Yes	FACW
2.	Alnus incana	20	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	30		
	Herb Stratum (Plot Size: 5 ft)			
1.	Calamagrostis canadensis	50	Yes	OBL
2.	Equisetum sylvaticum	5	No	FACW
3.	Solidago gigantea	5	No	FACW
4.	Carex scoparia	40	Yes	FACW
5.	Chelone glabra	1	No	OBL
6.	Caltha palustris	5	No	OBL
7.	Matteuccia struthiopteris	5	No	FAC
8.		0		
	Total Cover:	111		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	14	35
Sapling/Shrub Stratum	6	15
Herb Stratum	22.2	55.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	56	X 1	56	
FACW Species	140	X 2	280	
FAC Species	15	X 3	45	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	211	(A)	381	(B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 28-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 16	10YR 2/1	100					mucky peat	dry; Oe, H6
2.	16 - 20	10YR 2/1	100					mucky loam	dry
3.	20 - 24	5YR 3/3	90	5YR 4/6	10	C	M	clay loam	moist
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 20 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [x] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 29-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: B1-41D-Forbay-Augustana 3-18%

Subregion (LRR): K | Latitude: 5241208.1 mN | Longitude: 622205.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Alder Thicket

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 211-W.

If yes, optional Wetland Site ID: 29

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	10	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	10		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	60	Yes	FACW
2.	Populus tremuloides	10	No	FAC
3.	Rubus idaeus	20	Yes	FAC
4.				
5.		0		
	Total Cover:			
	Herb Stratum (Plot Size: 5 ft)			
1.	Carex scoparia	50	Yes	FACW
2.	Equisetum sylvaticum	10	No	FACW
3.	Calamagrostis canadensis	10	No	OBL
4.	Matteuccia struthiopteris	20	Yes	FAC
5.	Carex projecta	5	No	FACW
6.		0		
7.		0		
8.		0		
	Total Cover:	95		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	2	5
Sapling/Shrub Stratum		
Herb Stratum	19	47.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	X 1	10	
FACW Species	125	X 2	250	
FAC Species	60	X 3	180	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	195	(A)	440	(B)
Prevalence Index = B/A =			2.26	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 29-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 7	7.5YR 3/1	90					mucky silt loam	dry
2.	-	7.5YR 3/4	10						
3.	7 - 14	5YR 3/1	70	5YR 4/4	30	C	M	silt loam	moist
4.	14 - 24	5YR 4/3	70					silty clay	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☑ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** silty clay **Depth (inches):** 14 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrphic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 2-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241811.4 mN | Longitude: 623917.4 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Soils are problematic with red parent material noted. Field ID is 2-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Cornus alba	5	Yes	FACW
2.	Salix discolor	10	Yes	FACW
3.	Populus tremuloides	5	Yes	FAC
4.	Populus grandidentata	5	Yes	FACU
5.		0		
	Total Cover:	25		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phalaris arundinacea	60	Yes	FACW
2.	Rubus idaeus	30	Yes	FAC
3.	Matteuccia struthiopteris	5	No	FAC
4.	Calamagrostis canadensis	2	No	OBL
5.	Impatiens capensis	1	No	FACW
6.		0		
7.		0		
8.		0		
	Total Cover:	98		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.	Clematis virginiana	5	Yes	FAC
2.		0		
	Total Cover:	5		

% Bare Ground in Herb Stratum: 2 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	5	12.5
Herb Stratum	19.6	49
Woody Vine Stratum	1	2.5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 85.71% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	2	X 1	2	
FACW Species	76	X 2	152	
FAC Species	45	X 3	135	
FACU Species	5	X 4	20	
UPL Species	0	X 5	0	
Column Totals:	128	(A)	309	(B)

Prevalence Index = B/A = 2.41

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 2-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 3/3	100					fine sandy loam	dry
2.	4 - 17	7.5YR 2.5/3	95	7.5YR 4/6	5	C	M	fine sandy loam	dry
3.	17 - 24	7.5YR 3/4	70					loam	dry
4.	-	7.5YR 4/3	30	7.5YR 4/6	10	C	M		
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 2-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241817.6 mN | Longitude: 623905.6 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1/PEM/PSSB | Circular 39 Classification: Type 7/2/6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Hardwood Swamp
Eggers & Reed (secondary): Fresh (Wet) Meadow
Eggers & Reed (tertiary): Shrub-Carr
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 2-W.

If yes, optional Wetland Site ID: 2

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	5	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	5		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Populus tremuloides	5	Yes	FAC
2.	Salix discolor	10	Yes	FACW
3.	Alnus incana	5	Yes	FACW
4.		0		
5.		0		
	Total Cover:	20		
	Herb Stratum (Plot Size: 5 ft)			
1.	Impatiens capensis	20	Yes	FACW
2.	Rubus idaeus	5	No	FAC
3.	Caltha palustris	10	No	OBL
4.	Eutrochium maculatum	5	No	OBL
5.	Phalaris arundinacea	40	Yes	FACW
6.	Ribes triste	2	No	OBL
7.	Carex intumescens	5	No	FACW
8.	Carex scoparia	3	No	FACW
	Total Cover:	90		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 10 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	1	2.5
Sapling/Shrub Stratum	4	10
Herb Stratum	18	45
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	17	X 1	17	
FACW Species	83	X 2	166	
FAC Species	15	X 3	45	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	115	(A)	228	(B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 2-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/1	100					mucky sandy loam	saturated
2.	3 - 15	7.5YR 3/4	80	7.5YR 4/6	20	C	M	clay loam	moist
3.	15 - 24	7.5YR 3/4	60	7.5YR 4/6	40	C	M	loam	moist
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 3 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: 90% of wetland is saturated at surface level.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 30a-U

Land Form: Cutbank | Local Relief: Convex | Slope %: 20 | Soil Map Unit Name: K1-11-Pits, iron mine

Subregion (LRR): K | Latitude: 5240913.1633 | Longitude: 622465.5897 | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil Yes Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine. Field ID is 214a-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula papyrifera	10	Yes	FACU
2.		0		
3.		0		
4.		0		
	Total Cover:	10		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rubus idaeus	10	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	10		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phleum pratense	20	Yes	FACU
2.	Trifolium pratense	10	Yes	FACU
3.	Lotus corniculatus	10	Yes	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	40		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 60 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	2	5
Sapling/Shrub Stratum	2	5
Herb Stratum	8	20
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 20.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	10	X 3	30	
FACU Species	50	X 4	200	
UPL Species	0	X 5	0	
Column Totals:	60	(A)	230	(B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 30a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	2.5YR 3/2	100					fine sandy loam	very dry
2.	3 - 24	7.5YR 3/4	100					fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/12/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 30a-W

Land Form: Depression | Local Relief: Linear | Slope %: 0 | Soil Map Unit Name: K1-11-Pits, iron mine

Subregion (LRR): K | Latitude: 5240859.5 mN | Longitude: 622407.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEMA1/PEMB1 | Circular 39 Classification: Type 2 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Sedge Meadow

Are vegetation No Soil Yes Hydrology No significantly disturbed?

Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position and local relief are flat. Soils are problematic with red parent material noted. Field ID is 214a-W.

If yes, optional Wetland Site ID: 30a

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Carex viridula	60	Yes	OBL
2.	Equisetum scirpoides	40	Yes	FAC
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	100		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	20	50
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	X 1	60	
FACW Species	0	X 2	0	
FAC Species	40	X 3	120	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	100	(A)	180	(B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 30a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 6	7.5YR 3/3	50	7.5YR 4/2	30	D	M	fine sandy loam	
2.	-			7.5YR 4/6	20	C	M		
3.	6 - 13	7.5YR 3/3	90	7.5YR 4/6	10	C	M	loamy fine sand	
4.	13 - 24	5YR 4/2	98	5YR 4/6	2	C	M	clay loam	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 13 -24

Hydric soil present? Yes

Soil Remarks: Sandy material is likely sediment deposited from runoff from adjacent slope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 31-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 5 | Soil Map Unit Name: K1-11-Pits, iron mine

Subregion (LRR): K | Latitude: 5240897.4 mN | Longitude: 622209.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil Yes Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 216-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Betula papyrifera	50	Yes	FACU
2.	Alnus incana	10	No	FACW
3.	Salix discolor	10	No	FACW
4.	Prunus pensylvanica	20	Yes	FACU
5.	Rubus idaeus	10	No	FAC
	Total Cover:	100		
	Herb Stratum (Plot Size: 5 ft)			
1.	Fragaria virginiana	10	Yes	FACU
2.	Bromus ciliatus	20	Yes	FACW
3.	Trifolium pratense	20	Yes	FACU
4.	Hieracium aurantiacom	5	No	UPL
5.	Solidago canadensis	10	Yes	FACU
6.	Phleum pratense	5	No	FACU
7.	Poa palustris	5	No	FACW
8.	Lotus corniculatus	5	No	FACU
	Total Cover:	80		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	20	50
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	16.67%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	45	X 2	90	
FAC Species	10	X 3	30	
FACU Species	120	X 4	480	
UPL Species	5	X 5	25	
Column Totals:	180	(A)	625	(B)
Prevalence Index = B/A =			3.47	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
No	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 31-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 3/2	100					fine sandy loam	very dry
2.	4 - 24	7.5YR 3/3	100					loamy sand	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 31-W

Land Form: Depression | Local Relief: Concave | Slope %: 10 | Soil Map Unit Name: K1-11-Pits, iron mine

Subregion (LRR): K | Latitude: 5240901.5 mN | Longitude: 622234.5 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Alder Thicket

Are vegetation No Soil Yes Hydrology No significantly disturbed?

Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Area previously excavated. Field ID is 216-W.

If yes, optional Wetland Site ID: 31

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0		
2.	0		
3.	0		
4.	0		
Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Alnus incana	75	Yes	FACW
2. Betula populifolia	10	No	FAC
3.	0		
4.	0		
5.	0		
Total Cover:	85		
Herb Stratum (Plot Size: 5 ft)			
1. Fraxinus nigra	1	No	FACW
2. Glyceria striata	50	Yes	OBL
3. Eutrochium maculatum	10	No	OBL
4. Doellingeria umbellata	5	No	FACW
5. Impatiens capensis	10	No	FACW
6. Equisetum pratense	5	No	FACW
7.	0		
8.	0		
Total Cover:	81		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 10 **% Sphagnum Moss Cover:**

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	17	42.5
Herb Stratum	16.2	40.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	X 1	60	
FACW Species	96	X 2	192	
FAC Species	10	X 3	30	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	166	(A)	282	(B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 31-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 2	10YR 2/1	100					mucky loamy fine sand	
2.	2 - 9	7.5YR 3/3	100					loamy coarse sand	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - **Hydric soil present?** Yes

Soil Remarks: Auger refusal at 9 inches below ground surface by coarse fragments. There is not a clear hydric soil indicator because of problematic soil conditions including past excavation, red parent material, sandy soils, and discharge areas for iron-enriched groundwater. Soil is hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☑ **Surface Water Depth (inches):** 2

Water table present? ☑ **Water Table Depth (inches):** 2

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic. Water in soil boring was very cold and shows evidence of ground water seepage.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 32-U

Land Form: Hilslope | Local Relief: Convex | Slope %: 3 | Soil Map Unit Name: B1-41D-Forbay-Augustana 3-18%

Subregion (LRR): K | Latitude: 5240800.5 mN | Longitude: 622620.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Soils are problematic with red parent material noted. Field ID is 217-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	40	Yes	FAC
2.	Betula papyrifera	25	Yes	FACU
3.		0		
4.		0		
	Total Cover:	65		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Ulmus americana	5	No	FACW
2.	Salix discolor	5	No	FACW
3.	Acer spicatum	20	Yes	FACU
4.	Alnus incana	10	Yes	FACW
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	40	Yes	UPL
2.	Pteridium aquilinum	40	Yes	FACU
3.	Aralia nudicaulis	10	No	FACU
4.	Carex pedunculata	10	No	FACU
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	100		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	13	32.5
Sapling/Shrub Stratum	8	20
Herb Stratum	20	50
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	33.33%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	20	X 2	40	
FAC Species	40	X 3	120	
FACU Species	105	X 4	420	
UPL Species	40	X 5	200	
Column Totals:	205	(A)	780	(B)
Prevalence Index = B/A =			3.80	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
No	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 32-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 2.5/2	100					loam	
2.	5 - 12	7.5YR 3/3	100					loam	dry
3.	12 - 24	5YR 4/3	100					silt loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 32-W

Land Form: Depression | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: K1-11-Pits, iron mine

Subregion (LRR): K | Latitude: 5240810.8 mN | Longitude: 622547.1 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Alder Thicket

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is toeslope. Field ID is 217-W.

If yes, optional Wetland Site ID: 32

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	5	Yes	FACW
2.	0		
3.	0		
4.	0		
Total Cover:	5		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Alnus incana	30	Yes	FACW
2. Fraxinus nigra	5	No	FACW
3.	0		
4.	0		
5.	0		
Total Cover:	35		
Herb Stratum (Plot Size: 5 ft)			
1. Salix discolor	20	Yes	FACW
2. Salix pyrifolia	10	No	FACW
3. Carex tuckermanii	50	Yes	OBL
4. Poa palustris	10	No	FACW
5. Epilobium ciliatum	5	No	FACW
6.	0		
7.	0		
8.	0		
Total Cover:	95		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 25 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	1	2.5
Sapling/Shrub Stratum	7	17.5
Herb Stratum	19	47.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	X 1	50	
FACW Species	85	X 2	170	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	135	(A)	220	(B)

Prevalence Index = B/A = 1.63

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 32-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 18	10YR 2/1	100					muck	dry, Oa; h9, moist at 16"
2.	18 - 32	10YR 2/1	100					mucky peat	moist, Oe; h7
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 33-W

Land Form: Depression | Local Relief: | Slope %: 1 | Soil Map Unit Name: B1-41D-Forbay-Augustana 3-18% slope

Subregion (LRR): K | Latitude: 5240827.6 mN | Longitude: 622658.4 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1B | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFOB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 218-W.

If yes, optional Wetland Site ID: 33

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	60	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	30	Yes	FACW
2.	Fraxinus nigra	20	Yes	FACW
3.	Eurybia macrophylla	5	No	UPL
4.		0		
5.		0		
	Total Cover:	55		
	Herb Stratum (Plot Size: 5 ft)			
1.	Carex rostrata	50	Yes	OBL
2.	Carex projecta	10	No	FACW
3.	Poa palustris	10	No	FACW
4.	Caltha palustris	5	No	OBL
5.	Eutrochium maculatum	5	No	OBL
6.		0		
7.		0		
8.		0		
	Total Cover:	80		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 20 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	11	27.5
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	X 1	60	
FACW Species	130	X 2	260	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	5	X 5	25	
Column Totals:	195	(A)	345	(B)

Prevalence Index = B/A = 1.77

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 33-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 32	10YR 2/1	100					mucky peat	Oe; h7
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Sparsely Vegetated Concave Surface (B8)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Plot is minerotrophic.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 34-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 4 | Soil Map Unit Name: A1-40B-Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239371.9 mN | Longitude: 621325.0 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed):

Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Soils are problematic with red parent material noted. Field ID is 219-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	40	Yes	FAC
2.	Betula papyrifera	10	No	FACU
3.	Abies balsamea	10	No	FAC
4.		0		
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus cornuta	50	Yes	FACU
2.	Diervilla lonicera	50	Yes	UPL
3.	Rubus idaeus	20	No	FAC
4.		0		
5.		0		
	Total Cover:	120		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	75	Yes	UPL
2.	Apocynum androsaemifolium	10	No	UPL
3.	Calamagrostis canadensis	1	No	OBL
4.	Uvularia sessilifolia	1	No	FACU
5.	Carex pedunculata	20	No	FACU
6.		0		
7.		0		
8.		0		
	Total Cover:	107		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	24	60
Herb Stratum	21.4	53.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 25.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	1	X 1	1	
FACW Species	0	X 2	0	
FAC Species	70	X 3	210	
FACU Species	81	X 4	324	
UPL Species	135	X 5	675	
Column Totals:	287	(A)	1210	(B)

Prevalence Index = B/A = 4.22

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
No — Dominance Test is >50%
No — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 34-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 3/2	100					loam	very dry
2.	4 - 24	7.5YR 4/3	100					loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/13/15

Investigator(s): JTK, DRD | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 34-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A1-40B-Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239353.8 mN | Longitude: 621396.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 219-W.

If yes, optional Wetland Site ID: 34

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	60	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	20	Yes	FACW
2.	Cornus alba	10	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	30		
	Herb Stratum (Plot Size: 5 ft)			
1.	Calamagrostis canadensis	50	Yes	OBL
2.	Poa palustris	25	Yes	FACW
3.	Doellingeria umbellata	10	No	FACW
4.	Carex stipata	5	No	OBL
5.	Glyceria striata	5	No	OBL
6.	Carex projecta	5	No	FACW
7.	Equisetum sylvaticum	1	No	FACW
8.	Caltha palustris	1	No	OBL
	Total Cover:	102		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 5 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	6	15
Herb Stratum	20.4	51
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	61	X 1	61	
FACW Species	131	X 2	262	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	192	(A)	323	(B)

Prevalence Index = B/A = 1.68

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 34-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 9	10YR 2/1	100					silt loam	dry
2.	9 - 17	7.5YR 3/3	60	7.5YR 4/6	30	C	M	clay loam	dry
3.	-			7.5YR 4/2	10	D	M		
4.	17 - 24	5YR 3/3	98	5YR 4/6	2	C	M	silty clay loam	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam and silty clay loam **Depth (inches):** 9 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/14/15

Investigator(s): JTK, DRD | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 35-U

Land Form: Hillslope | Local Relief: Linear | Slope %: 2 | Soil Map Unit Name: A1-40B-Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239551.7 mN | Longitude: 621431.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 220-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	50	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Corylus cornuta	30	Yes	FACU
2.	Lonicera dioica	10	No	FACU
3.	Diervilla lonicera	40	Yes	UPL
4.	Fraxinus nigra	5	No	FACW
5.	Rubus idaeus	1	No	FAC
	Total Cover:	86		
	Herb Stratum (Plot Size: 5 ft)			
1.	Athyrium filix-femina	5	No	FAC
2.	Aralia nudicaulis	20	Yes	FACU
3.	Fragaria virginiana	10	Yes	FACU
4.	Cornus canadensis	10	Yes	FAC
5.	Petasites frigidus	1	No	FACW
6.	Trientalis borealis	1	No	FAC
7.		0		
8.		0		
	Total Cover:	47		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 53 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	17.2	43
Herb Stratum	9.4	23.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 33.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	6	X 2	12	
FAC Species	67	X 3	201	
FACU Species	70	X 4	280	
UPL Species	40	X 5	200	
Column Totals:	183	(A)	693	(B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
No — Dominance Test is >50%
No — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 35-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 3/2	100					loam	very dry
2.	5 - 13	7.5YR 3/3	100					loam	
3.	13 - 24	5YR 4/3	95	5YR 4/6	5	C	M	stratified loam/clay loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 13 -24

Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/14/15

Investigator(s): JTK, DRD | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 35-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: A1-40B-Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239580.7 mN | Longitude: 621442.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Alder Thicket
Eggers & Reed (secondary):
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed):

Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 220-W.

If yes, optional Wetland Site ID: 35

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	25	Yes	FACW
2.	Populus tremuloides	25	Yes	FAC
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Fraxinus nigra	25	Yes	FACW
2.	Populus tremuloides	5	No	FAC
3.	Acer spicatum	1	No	FACU
4.	Alnus incana	10	Yes	FACW
5.	Ribes triste	5	No	OBL
	Total Cover:	46		
	Herb Stratum (Plot Size: 5 ft)			
1.	Calamagrostis canadensis	75	Yes	OBL
2.	Rubus pubescens	10	No	FACW
3.	Aralia nudicaulis	5	No	FACU
4.	Poa palustris	5	No	FACW
5.	Eurybia macrophylla	5	No	UPL
6.	Carex intumescens	10	No	FACW
7.	Symphyotrichum lateriflorum	1	No	FAC
8.	Lycopus americanus	1	No	OBL
	Total Cover:	112		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	9.2	23
Herb Stratum	22.4	56
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	81	X 1	81	
FACW Species	85	X 2	170	
FAC Species	31	X 3	93	
FACU Species	6	X 4	24	
UPL Species	5	X 5	25	
Column Totals:	208	(A)	393	(B)
Prevalence Index = B/A =			1.89	

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 35-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	10YR 2/1	100					silt loam	dry
2.	6 - 13	7.5YR 4/3	80	7.5YR 4/6	10	C	M	loamy	
3.	-			7.5YR 4/1	10	D	M		
4.	13 - 24	5YR 4/3	98	5YR 4/6	2	C	M	silty clay	evidence of carbonates
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** silty clay **Depth (inches):** 13 -24

Hydric soil present? Yes

Soil Remarks: Dry at bottom of the hole.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Plot is minerotrophic

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/14/14

Investigator(s): JTK, DRD | Section: 30 | Township: 56N | Range: 8W | Sampling Point: 36-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: A1-40B-Normanna-Greysolon 2-8% slope

Subregion (LRR): K | Latitude: 5239976.3 mN | Longitude: 620776.6 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PSS1B | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Alder Thicket

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 221-W.

If yes, optional Wetland Site ID: 36

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Salix discolor	50	Yes	FACW
2.	Alnus incana	30	Yes	FACW
3.	Abies balsamea	10	No	FAC
4.		0		
5.		0		
	Total Cover:	90		
Herb Stratum (Plot Size: 5 ft)				
1.	Carex intumescens	50	Yes	FACW
2.	Calamagrostis canadensis	10	No	OBL
3.	Osmunda claytoniana	25	Yes	FAC
4.	Equisetum pratense	1	No	FACW
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	86		
Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 14 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	18	45
Herb Stratum	17.2	43
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	X 1	10	
FACW Species	131	X 2	262	
FAC Species	35	X 3	105	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	176	(A)	377	(B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 36-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 3/2	100					loam	
2.	3 - 13	7.5YR 3/4	90	7.5YR 4/6	10	C	M	loam	dry
3.	13 - 24	5YR 3/4	98	5YR 4/6	2	C	M	fine sandy loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - **Hydric soil present?** Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 08/14/15

Investigator(s): DRD, JTK | Section: 31 | Township: 56N | Range: 8W | Sampling Point: 38a-W

Land Form: Toeslope | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: K1-13B-Udorthents, loamy (cut and fill)

Subregion (LRR): K | Latitude: 5239237.8 mN | Longitude: 621503.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEMC | Circular 39 Classification: Type 3 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil Yes Hydrology Yes significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Shallow Marsh

Eggers & Reed (secondary): Sedge Meadow

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is in a depression. Wetland is in constructed stormwater pond.

If yes, optional Wetland Site ID: 38a

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Typha angustifolia	75	Yes	OBL
2.	Scirpus cyperinus	5	No	OBL
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	80		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	80	X 1	80	
FACW Species	0	X 2	0	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	80	(A)	80	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 38a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	-								
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** **Hydric soil present?** Yes

Soil Remarks: No soil boring taken. Assumed soil is hydric because of standing water in a basin.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☑ **Surface Water Depth (inches):** 6

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Surface water runoff into landfill from stormwater pond.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 3a-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 3 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slopes

Subregion (LRR): K | Latitude: 5241619.1 mN | Longitude: 623995.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a shoulder. Soils are problematic with red parent material noted. Field ID is 3a-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer rubrum	50	Yes	FAC
2.	Acer spicatum	20	Yes	FACU
3.	Tilia americana	20	Yes	FACU
4.		0		
	Total Cover:	90		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Fragaria virginiana	5	Yes	FACU
2.	Maianthemum canadense	2	No	FACU
3.	Fraxinus pennsylvanica	5	Yes	FACW
4.	Ribes cynosbati	2	No	FACU
5.	Corylus cornuta	10	Yes	FACU
6.	Phalaris arundinacea	2	No	FACW
7.	Eurybia macrophylla	5	Yes	UPL
8.	Rubus pubescens	2	No	FACW
	Total Cover:	33		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 63 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	18	45
Sapling/Shrub Stratum	0	0
Herb Stratum	6.6	16.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 28.57% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	9	X 2	18	
FAC Species	50	X 3	150	
FACU Species	59	X 4	236	
UPL Species	5	X 5	25	
Column Totals:	123	(A)	429	(B)

Prevalence Index = B/A = 3.49

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 3a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	10YR 2/2	100					silt loam	dry
2.	3 - 12	7.5YR 3/3	60					loam	dry
3.	-	7.5YR 3/2	40						
4.	12 - 21	7.5YR 3/4	100					fine sandy loam	dry
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 21 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/22/15

Investigator(s): KSW, JTK | Section: 21 | Township: 56N | Range: 8W | Sampling Point: 3a-W

Land Form: Depression | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241618.1 mN | Longitude: 623989.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1C | Circular 39 Classification: Type 7 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Hardwood Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 3a-W.

If yes, optional Wetland Site ID: 3a

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	70	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	70		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Fraxinus nigra	5	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	5		

Herb Stratum (Plot Size: 5 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 100 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	14	35
Sapling/Shrub Stratum	1	2.5
Herb Stratum	0	0
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	75	X 2	150	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	75	(A)	150	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 3a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	10YR 2/1	85					mucky silt loam	
2.	-	7.5YR 3/4	10	7.5YR 4/6	5	C	M		
3.	10 - 24	7.5YR 4/3	95	7.5YR 4/6	5	C	M	very fine sandy loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** dense very fine sandy loam **Depth (inches):** 10 -24

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: No saturation present, but shallow aquitard at 24" observed. Bare soil has previously been inundated.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 4-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 3 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241413.7 mN | Longitude: 623954.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed):
Hydric soil present?	No	Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is a stairstepping sideslope located on bedrock controlled moraine and hillslope position is a footslope. Soils are problematic with red parent material noted. Field ID is 4-U.
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	**If yes, optional Wetland Site ID:**

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.	Abies balsamea	40	Yes	FAC
2.	Fraxinus nigra	2	No	FACW
3.	Populus tremuloides	30	Yes	FAC
4.		0		
	Total Cover:	72		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.	Fraxinus nigra	2	No	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	2		

Herb Stratum (Plot Size: 5 ft)

1.	Eurybia macrophylla	40	Yes	UPL
2.	Cornus alba	5	No	FACW
3.	Fragaria virginiana	10	No	FACU
4.	Cornus canadensis	2	No	FAC
5.	Aralia nudicaulis	10	No	FACU
6.	Carex gracillima	2	No	FACU
7.	Poa palustris	2	No	FACW
8.	Corylus cornuta	5	No	FACU
	Total Cover:	76		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 19 | **% Sphagnum Moss Cover:**

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	14.4	36
Sapling/Shrub Stratum	0.4	1
Herb Stratum	15.2	38
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	66.67%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	11	X 2	22	
FAC Species	72	X 3	216	
FACU Species	27	X 4	108	
UPL Species	40	X 5	200	
Column Totals:	150	(A)	546	(B)
Prevalence Index = B/A =			3.64	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 4-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/3	100					silt loam	dry
2.	3 - 12	7.5YR 3/2	100					silt loam	dry
3.	12 - 24	7.5YR 3/4	90	7.5YR 4/6	10	C	M	fine sandy loam	dry
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 4-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 3 | Soil Map Unit Name: B1-40B - Augustana-Hegberg 1-8% slope

Subregion (LRR): K | Latitude: 5241363.5 mN | Longitude: 623955.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1A/PEMB | Circular 39 Classification: Type 7/2 | Mapped NWI Classification: PEME

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Hardwood Swamp

Eggers & Reed (secondary): Fresh (Wet) Meadow

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a footslope. Soils are problematic with red parent material noted. Field ID is 4-W.

If yes, optional Wetland Site ID: 4

VEGETATION

Tree Stratum (Plot Size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	70	Yes	FACW
2. Abies balsamea	5	No	FAC
3.	0		
4.	0		
Total Cover:	75		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Fraxinus nigra	5	No	FACW
2. Alnus incana	50	Yes	FACW
3.	0		
4.	0		
5.	0		
Total Cover:	55		
Herb Stratum (Plot Size: 5 ft)			
1. Impatiens capensis	30	Yes	FACW
2. Carex leptalea	5	No	OBL
3. Ribes triste	5	No	OBL
4. Carex scoparia	5	No	FACW
5. Fragaria virginiana	2	No	FACU
6. Symphyotrichum lanceolatum	2	No	FACW
7. Poa palustris	5	No	FACW
8. Alnus incana	5	No	FACW
Total Cover:	59		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 20 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

Non-spagnum moss 10 percent.

50/20 Thresholds:	20%	50%
Tree Stratum	15	37.5
Sapling/Shrub Stratum	11	27.5
Herb Stratum	11.8	29.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	X 1	10	
FACW Species	172	X 2	344	
FAC Species	5	X 3	15	
FACU Species	2	X 4	8	
UPL Species	0	X 5	0	
Column Totals:	189	(A)	377	(B)
Prevalence Index = B/A =			1.99	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 4-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	10YR 2/1	100					mucky silt loam	moist
2.	4 - 14	7.5YR 2.5/2	80	7.5YR 4/6	20	C	M	loam	moist
3.	14 - 24	7.5YR 4/4	60	7.5YR 4/6	40	C	M	loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - **Hydric soil present?** Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 5-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: A1-30D-Barto, Greysolon-Rock 0-18% slope

Subregion (LRR): K | Latitude: 5241148.2 mN | Longitude: 623353.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO6/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a backslope. Soils are problematic with red parent material noted. Field ID is 5-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	30	Yes	FAC
2.	Fraxinus nigra	1	No	FACW
3.		0		
4.		0		
	Total Cover:	31		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Acer spicatum	5	No	FACU
2.	Corylus cornuta	60	Yes	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	65		
	Herb Stratum (Plot Size: 5 ft)			
1.	Aralia nudicaulis	70	Yes	FACU
2.	Eurybia macrophylla	20	No	UPL
3.	Streptopus lanceolatus	2	No	FACU
4.	Rubus idaeus	5	No	FAC
5.	Acer spicatum	5	No	FACU
6.	Fragaria virginiana	2	No	FACU
7.	Clintonia borealis	1	No	FAC
8.	Maianthemum canadense	1	No	FACU
	Total Cover:	106		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	6.2	15.5
Sapling/Shrub Stratum	13	32.5
Herb Stratum	21.2	53
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 33.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	1	X 2	2	
FAC Species	36	X 3	108	
FACU Species	145	X 4	580	
UPL Species	20	X 5	100	
Column Totals:	202	(A)	790	(B)

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 5-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	7.5YR 2.5/3	100					loam	dry
2.	4 - 20	7.5YR 3/3	100					loam	dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 20 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 5-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241151.7 mN | Longitude: 623362.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PFO1A | Circular 39 Classification: Type 7 | Mapped NWI Classification: PFO6/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Hardwood Swamp

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions are were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a toeslope. Soils are problematic with red parent material noted. Field ID is 5-W.

If yes, optional Wetland Site ID: 5

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus nigra	70	Yes	FACW
2.	Populus tremuloides	5	No	FAC
3.		0		
4.		0		
	Total Cover:	75		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Acer spicatum	5	Yes	FACU
2.	Fraxinus nigra	5	Yes	FACW
3.	Alnus incana	2	No	FACW
4.		0		
5.		0		
	Total Cover:	12		
	Herb Stratum (Plot Size: 5 ft)			
1.	Caltha palustris	40	Yes	OBL
2.	Impatiens capensis	30	Yes	FACW
3.	Poa palustris	10	No	FACW
4.	Carex scoparia	5	No	FACW
5.	Symphyotrichum lanceolatum	5	No	FACW
6.	Cornus alba	5	No	FACW
7.	Ribes triste	2	No	OBL
8.	Fraxinus nigra	5	No	FACW
	Total Cover:	102		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	15	37.5
Sapling/Shrub Stratum	2.4	6
Herb Stratum	20.4	51
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 80.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	42	X 1	42	
FACW Species	137	X 2	274	
FAC Species	5	X 3	15	
FACU Species	5	X 4	20	
UPL Species	0	X 5	0	
Column Totals:	189	(A)	351	(B)

Prevalence Index = B/A = 1.86

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 5-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	7.5YR 2.5/1	100					mucky silt loam	dry
2.	10 - 20	5YR 2.5/1	70	5YR 4/6	30	C	M	silty clay	dry
3.	20 - 24	5YR 4/3	60	5YR 4/6	20	C	M	silt loam	dry
4.	-			7.5YR 4/2	20	C	M		
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☑ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** silty clay **Depth (inches):** 10 -20

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 6-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 2 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241212.0 mN | Longitude: 623332.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? No | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a summit. Field ID is 6-U.

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0		
2.	0		
3.	0		
4.	0		
Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1. Populus tremuloides	1	No	FAC
2. Cornus alba	1	No	FACW
3.	0		
4.	0		
5.	0		
Total Cover:	2		
Herb Stratum (Plot Size: 5 ft)			
1. Trifolium pratense	1	No	FACU
2. Lotus corniculatus	3	No	FACU
3. Poa pratensis	3	No	FACU
4. Leucanthemum vulgare	2	No	UPL
5. Melilotus officinalis	1	No	FACU
6. Rudbeckia hirta	1	No	FACU
7. Populus balsamifera	1	No	FACW
8. Phleum pratense	1	No	FACU
Total Cover:	13		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 87 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0.4	1
Herb Stratum	2.6	6.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: #Num! (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	2	X 2	4
FAC Species	1	X 3	3
FACU Species	10	X 4	40
UPL Species	2	X 5	10
Column Totals:	15 (A)		57 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- #Type! — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 6-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	-								
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Bedrock outcrop noted with no soil observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 29 | Township: 56N | Range: 8W | Sampling Point: 6-W

Land Form: Drainageway | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241213.5 mN | Longitude: 623324.2 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1B/PSS1B | Circular 39 Classification: Type 2/6 | Mapped NWI Classification: PFO6/SSB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Sedge Meadow

Eggers & Reed (secondary): Alder Thicket

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Soils are problematic with red parent material noted. Field ID is 6-W.

If yes, optional Wetland Site ID: 6

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	5	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	5		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Alnus incana	95	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	95		

	Herb Stratum (Plot Size: 5 ft)			
1.	Solidago gigantea	2	No	FACW
2.	Impatiens capensis	2	No	FACW
3.	Rubus pubescens	2	No	FACW
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	6		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 94 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	1	2.5
Sapling/Shrub Stratum	19	47.5
Herb Stratum	1.2	3
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	101	X 2	202	
FAC Species	5	X 3	15	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	106	(A)	217	(B)
Prevalence Index = B/A =			2.05	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 6-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 2.5/2	100					silt loam	dry
2.	3 - 10	7.5YR 4/3	80	7.5YR 4/6	20	C	M	silt loam	dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** bedrock **Depth (inches):** 10 -

Hydric soil present? Yes

Soil Remarks: Auger refusal at 10 inches below ground surface by bedrock. Bedrock outcrop is less than 30' away from boring.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: 90% bare soil is noted from previous inundation.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 7a-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 2 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241409.0 mN | Longitude: 623545.9 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a footslope. Soils are problematic with red parent material noted. Field ID is 7a-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Salix bebbiana	1	No	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	1		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phleum pratense	5	No	FACU
2.	Poa pratensis	20	Yes	FACU
3.	Agrostis stolonifera	20	Yes	FACW
4.	Melilotus officinalis	10	No	FACU
5.	Salix bebbiana	1	No	FACW
6.	Salix discolor	1	No	FACW
7.	Lotus corniculatus	10	No	FACU
8.	Symphyotrichum puniceum	1	No	OBL
	Total Cover:	68		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 30 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0.2	0.5
Herb Stratum	13.6	34
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	50.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	1	X 1	1	
FACW Species	23	X 2	46	
FAC Species	0	X 3	0	
FACU Species	45	X 4	180	
UPL Species	0	X 5	0	
Column Totals:	69	(A)	227	(B)
Prevalence Index = B/A =			3.29	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
No	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 7a-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 12	7.5YR 3/3	100					fine sandy loam	very dry
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 12 inches below ground by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 7a-W

Land Form: Depression | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241410.7 mN | Longitude: 623556.8 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1C | Circular 39 Classification: Type 2 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil Yes Hydrology No significantly disturbed? | Are "normal circumstances" present? No

Are vegetation No Soil Yes Hydrology Yes naturally problematic?

Eggers & Reed (primary): Sedge Meadow
Eggers & Reed (secondary):
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Area has been excavated and soils are problematic with red parent material noted. Field ID is 7a-W.

If yes, optional Wetland Site ID: 7a

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size: 5 ft)			
1.	Scirpus cyperinus	40	Yes	OBL
2.	Poa palustris	10	No	FACW
3.	Glyceria striata	5	No	OBL
4.	Calamagrostis canadensis	2	No	OBL
5.	Eleocharis obtusa	1	No	OBL
6.	Phalaris arundinacea	1	No	FACW
7.	Trifolium hybridum	1	No	FACU
8.	Carex scoparia	1	No	FACW
	Total Cover:	61		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 38 **% Sphagnum Moss Cover:**

Vegetation Remarks: (include photo numbers here or on a separate sheet)

No vegetation present within plot. Overall wetland vegetation noted. Area was likely scraped for borrow pit.

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	12.2	30.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	48	X 1	48	
FACW Species	12	X 2	24	
FAC Species	0	X 3	0	
FACU Species	1	X 4	4	
UPL Species	0	X 5	0	
Column Totals:	61	(A)	76	(B)

Prevalence Index = B/A = 1.25

Hydrophytic Vegetation Indicators:

Yes Rapid Test for Hydrophytic Vegetation
Yes Dominance Test is >50%
Yes Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 7a-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	7.5YR 3/3	60	7.5YR 4/2	20	C	M	silt loam	very dry and cracked
2.	-			7.5YR 4/6	20	C	M		
3.	12 - 16	7.5YR 3/3	95	7.5YR 4/6	5	C	M	clay loam	moist and cracked
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** clay loam **Depth (inches):** 12 -16

Hydric soil present? Yes

Soil Remarks: Auger refusal at 16 inches below ground surface by coarse rock fragments

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Bare cracked soil from previous inundation in 50% of wetland was observed.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW & JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 8-U

Land Form: Hillslope | Local Relief: Convex | Slope %: 5 | Soil Map Unit Name: K1-14-Tailings Basin

Subregion (LRR): K | Latitude: 5241218.4mN | Longitude: 623740.7mE | Datum: NAD83

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlelled moraine and hillslope position is footslope. Field ID is 9-U.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula papyrifera	40	Yes	FACU
2.	Picea mariana	5	No	FACW
3.		0		
4.		0		
	Total Cover:	45		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Populus balsamifera	30	Yes	FACW
2.	Abies balsamea	5	No	FAC
3.		0		
4.		0		
5.		0		
	Total Cover:	35		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	60	Yes	UPL
2.	Equisetum hyemale	10	No	FAC
3.	Cornus alba	5	No	FACW
4.	Fragaria virginiana	2	No	FACU
5.	Trifolium pratense	2	No	FACU
6.	Solidago gigantea	1	No	FACW
7.	Achillea millefolium	1	No	FACU
8.	Phleum pratense	1	No	FACU
	Total Cover:	82		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 17 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	9	22.5
Sapling/Shrub Stratum	7	17.5
Herb Stratum	16.4	41
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 33.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	41	X 2	82	
FAC Species	15	X 3	45	
FACU Species	46	X 4	184	
UPL Species	60	X 5	300	
Column Totals:	162	(A)	611	(B)

Prevalence Index = B/A = 3.77

Hydrophytic Vegetation Indicators:

No Rapid Test for Hydrophytic Vegetation
No Dominance Test is >50%
No Prevalence Index ≤ 3.0 [1]
No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 8-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 3/2	100					fine sandy loam	very dry
2.	3 - 10	7.5YR 3/3	100					fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 10 inches below ground surface due to coarse fragments. Soils do not meet a hydric soil indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):** None

Water table present? ☐ **Water Table Depth (inches):** None

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):** None

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: No visible evidence of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW & JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 8-W

Land Form: Depression | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: K1-14-Tailings Basin

Subregion (LRR): K | Latitude: 5241187.2.mN | Longitude: 623745.3 mE | Datum: NAD83

Cowardin Classification: PEM1C/SS1B | Circular 39 Classification: Types 2 and | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil Yes Hydrology No significantly disturbed?

Are vegetation No Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Fresh (Wet) Meadow

Eggers & Reed (secondary): Shrub-Carr

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlelled moraine and hillslope position is flat. Area has been scraped. Field ID is 9-W.

If yes, optional Wetland Site ID: 8

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0		
2.	0		
3.	0		
4.	0		
Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	0		
2.	0		
3.	0		
4.	0		
5.	0		
Total Cover:	0		
Herb Stratum (Plot Size: 5 ft)			
1. Equisetum scirpoides	70	Yes	FAC
2. Eleocharis elliptica	10	No	OBL
3. Trichophorum alpinum	10	No	OBL
4. Euthamia graminifolia	5	No	FAC
5. Carex aurea	5	No	FACW
6. Solidago gigantea	2	No	FACW
7. Parnassia palustris	2	No	OBL
8. Carex magellanica	2	No	OBL
Total Cover:	106		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 0

% Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	21.2	53
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	24	X 1	24	
FACW Species	7	X 2	14	
FAC Species	75	X 3	225	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	106	(A)	263	(B)

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 8-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	7.5YR 3/3	80	7.5YR 4/6	20	C	M	very fine sandy loam	saturated
2.	10 - 30	7.5YR 4/2	60	7.5YR 4/6	40	C	M	loam	saturated
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☑ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):** None

Water table present? ☑ **Water Table Depth (inches):** 18

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 9-U

Land Form: Hillslope | Local Relief: Concave | Slope %: 5 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241218.4 mN | Longitude: 623740.7 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil Yes Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is a footslope. Soils are problematic with red parent material noted. Field ID is 10-U.
Hydric soil present?	No	
Indicators of wetland hydrology present?	No	
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea mariana	5	No	FACW
2.	Betula papyrifera	40	Yes	FACU
3.		0		
4.		0		
	Total Cover:	45		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Abies balsamea	5	No	FAC
2.	Populus balsamifera	30	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	35		
	Herb Stratum (Plot Size: 5 ft)			
1.	Eurybia macrophylla	60	Yes	UPL
2.	Equisetum hyemale	10	No	FAC
3.	Cornus alba	5	No	FACW
4.	Fragaria virginiana	2	No	FACU
5.	Solidago gigantea	1	No	FACW
6.	Achillea millefolium	1	No	FACU
7.	Trifolium pratense	2	No	FACU
8.	Phleum pratense	1	No	FACU
	Total Cover:	82		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.	Lotus corniculatus	0		FACU
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 17 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	9	22.5
Sapling/Shrub Stratum	7	17.5
Herb Stratum	16.4	41
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	33.33%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	41	X 2	82	
FAC Species	15	X 3	45	
FACU Species	46	X 4	184	
UPL Species	60	X 5	300	
Column Totals:	162	(A)	611	(B)
Prevalence Index = B/A =			3.77	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
No	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

Additional Herb Stratum Species: Lotus corniculatus 1%

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 9-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	7.5YR 3/2	100					fine sandy loam	very dry
2.	3 - 10	7.5YR 3/3	100					fine sandy loam	very dry
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** - | **Hydric soil present?** No

Soil Remarks: Auger refusal at 10 inches below ground surface by coarse fragments.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☐ **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):**

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/23/15

Investigator(s): KSW, JTK | Section: 28 | Township: 56N | Range: 8W | Sampling Point: 9-W

Land Form: Depression | Local Relief: None | Slope %: 0 | Soil Map Unit Name: K1-14 - Tailings basin

Subregion (LRR): K | Latitude: 5241187.2 mN | Longitude: 623745.3 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1C/SS1B | Circular 39 Classification: Type 2/6 | Mapped NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation Yes Soil Yes Hydrology No significantly disturbed?

Are vegetation Yes Soil Yes Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Fresh (Wet) Meadow

Eggers & Reed (secondary): Shrub-Carr

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine and hillslope position is flat. Area has been scraped and soils are problematic with red parent material noted. Field ID is 10-U.

If yes, optional Wetland Site ID: 9

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Solidago gigantea	2	No	FACW
2.	Parnassia palustris	2	No	OBL
3.	Trichophorum alpinum	10	No	OBL
4.	Equisetum scirpoides	60	Yes	FAC
5.	Euthamia graminifolia	5	No	FAC
6.	Carex aurea	5	No	FACW
7.	Carex magellanica	2	No	OBL
8.	Eleocharis elliptica	10	No	OBL
	Total Cover:	96		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 **% Sphagnum Moss Cover:**

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	19.2	48
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	24	X 1	24	
FACW Species	7	X 2	14	
FAC Species	65	X 3	195	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	96	(A)	233	(B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Additional Herb Stratum Species: Fragaria virginiana 1%, Liparis loeselii 1%, Populus balsamifera 1%, lycopus americanus 1%, & Eleocharis nitida 1%

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: 9-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	7.5YR 3/3	80	7.5YR 4/6	20	C	M	very fine sandy loam	saturated
2.	10 - 30	7.5YR 4/2	60	7.5YR 4/6	40	C	M	loam	saturated
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☑ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☑ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):**

Water table present? ☑ **Water Table Depth (inches):** 18

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Saturation present at surface and water in pit at 18".

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 32 | Township: 56N | Range: 8W | Sampling Point: SB-10 W

Land Form: | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: J1a10A - Rifle soils, dense substratum

Subregion (LRR): K | Latitude: 5239701.9 mN | Longitude: 622634.4 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1B/PAB3 | Circular 39 Classification: Type 3/5 | Mapped NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil Yes Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow Marsh

Eggers & Reed (secondary): Shallow, Open Water

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Plot position is within a wetland. Soil map unit name also includes 0 to 1% slopes. Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Soils are problematic with red parent material noted.

If yes, optional Wetland Site ID: SB-10

VEGETATION

Tree Stratum (Plot Size: 30 ft)

		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)

1.	Typha latifolia	5	No	OBL
2.	Typha angustifolia	15	Yes	OBL
3.	Brasenia schreberi	20	Yes	OBL
4.	Impatiens capensis	10	Yes	FACW
5.	Scirpus atrovirens	10	Yes	OBL
6.	Pontederia cordata	5	No	OBL
7.	Salix bebbiana	5	No	FACW
8.	Phalaris arundinacea	10	Yes	FACW
	Total Cover:	80		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	55	X 1	55	
FACW Species	25	X 2	50	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	80	(A)	105	(B)

Prevalence Index = B/A = 1.31

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Photos #192-201 Additional Herb Stratum Species: Mentha sp. 5%, Iris versicolor 1%, Salix amygdaloides 5%, Fragaria virginiana 5%, & Carex lacustris 1%. Sample point collected to compare with sample data collected in 2005.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: SB-10 W

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	7.5YR 3/2	100					gravelly sandy loam	numerous roots
2.	5 - 24	5YR 3/3		5YR 4/1	5	C	M	gravelly sandy loam	
3.	-			7.5YR 4/6	1	D	M		
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** none observed **Depth (inches):** -

Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☑ **Surface Water Depth (inches):** 0

Water table present? ☑ **Water Table Depth (inches):** 1

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Surface water noted at surface level.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Northshore Mine West Ridge RR | Applicant/Owner: Northshore Mine | City/County: Silver Bay, Lake County | State: MN | Sampling Date: 07/24/15

Investigator(s): LBN, KMS2 | Section: 29 | Township: 56N | Range: 8W | Sampling Point: SB-11

Land Form: | Local Relief: Concave | Slope %: 0 | Soil Map Unit Name: C3-40B-Badriver complex 0-8% slope

Subregion (LRR): K | Latitude: 5240095.8 mN | Longitude: 623071.1 mE | Datum: UTM, NAD 83, meters

Cowardin Classification: PEM1B/PAB3 | Circular 39 Classification: Type 3 | Mapped NWI Classification: PFO4B/PFO6B

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed?

Are vegetation No Soil No Hydrology No naturally problematic?

Are "normal circumstances" present? Yes

Eggers & Reed (primary): Shallow Marsh

Eggers & Reed (secondary): Shallow, Open Water

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? 0

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Antecedent moisture conditions were within the normal range. Soils data are from the SSURGO National Soils dataset found on the NRCS Web Soil Survey. Plot is located on bedrock controlled moraine.

If yes, optional Wetland Site ID: SB-11

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)				
1.	Typha latifolia	25	Yes	OBL
2.	Typha angustifolia	5	No	OBL
3.	Brasenia schreberi	60	Yes	OBL
4.	Salix bebbiana	10	No	FACW
5.	Carex lacustris	5	No	OBL
6.	Sparganium sp.	5	No	OBL
7.	Solidago gigantea	20	No	FACW
8.	Lotus corniculatus	10	No	FACU
	Total Cover:	140		

Woody Vine Stratum (Plot Size: 30 ft)				
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 0 | % Sphagnum Moss Cover: 0

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	28	70
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	X 1	100	
FACW Species	30	X 2	60	
FAC Species	0	X 3	0	
FACU Species	10	X 4	40	
UPL Species	0	X 5	0	
Column Totals:	140	(A)	200	(B)

Prevalence Index = B/A = 1.43

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Photos #184-191Sample point collected to compare with sample data collected in 2005.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: SB-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	-								
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ **Hydric soil present?** 0

Soil Remarks: Soil data was not collected since soil data was not collected in 2005 for comparison.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):** _____

Water table present? ☐ **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):** _____

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Sample point is adjacent to pond shoreline.

Appendix B

Photographs

Photo (R0014137): Example of alder thicket canopy. Wetland 20.

Photo (R0014139): Example of alder thicket understory. Wetland 20.

Photo (R0014156): Example of coniferous swamp (spruce/tamarack swamp) canopy. Wetland 20.

Photo (R0014157): Example of coniferous swamp (spruce/tamarack swamp) understory. Wetland 20.

Photo (R0014204): Example of coniferous swamp (cedar swamp) understory. Wetland 25.

Photo (R0014207): Example of coniferous swamp (cedar swamp) canopy. Wetland 25.

Photo (RIMG0185): Example of deep marsh (Murphy's Pond). Wetland 18.

Photo (RIMG0187): Example of deep marsh (Murphy's Pond). Wetland 18.

Photo (R0014228): Example of wet meadow and shallow marsh. Wetland 23

Photo (RIMG0105_tag): Example of wet meadow along a ditch. Wetland 2.

Photo (R0014350): Example of hardwood swamp canopy dominated by black ash. Wetland 34.

Photo (R0014354): Example of hardwood swamp understory and microtopography. Wetland 34.

Photo (R0014262): Example of seasonally flooded basin in previously excavated area. Wetland 30c.

Photo (R0014257): Example of seasonally flooded basin in previously excavated area. Wetland 30c.

Photo (R0014240): Example of sedge meadow. Wetland 27.

Photo (R0014270): Example of sedge meadow in previously excavated area. Wetland 30a.

Photo (R0014221): Example of shallow marsh, wet meadow and sedge meadow. Wetland 23

Photo (R0014345): Example of shallow marsh, excavated as storm water pond. Wetland 38a.

Photo (R0016744): Example of shrub-carr and wet meadow in previously excavated area. Wetland 8.

Photo (RIMG0294_tag): Example of shrub-carr on edge of sedge meadow. Wetland 11b.

Appendix C

Joint Application Form

Joint Application Form for Activities Affecting Water Resources in Minnesota

This joint application form is the accepted means for initiating review of proposals that may affect a water resource (wetland, tributary, lake, etc.) in the State of Minnesota under state and federal regulatory programs. Applicants for Minnesota Department of Natural Resources (DNR) Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. Applicants can use the information entered into MPARS to substitute for completing parts of this joint application form (see the paragraph on MPARS at the end of the joint application form instructions for additional information). This form is only applicable to the water resource aspects of proposed projects under state and federal regulatory programs; other local applications and approvals may be required. Depending on the nature of the project and the location and type of water resources impacted, multiple authorizations may be required as different regulatory programs have different types of jurisdiction over different types of resources.

Regulatory Review Structure

Federal

The St. Paul District of the U.S. Army Corps of Engineers (Corps) is the federal agency that regulates discharges of dredged or fill material into waters of the United States (wetlands, tributaries, lakes, etc.) under Section 404 of the Clean Water Act (CWA) and regulates work in navigable waters under Section 10 of the Rivers and Harbors Act. Applications are assigned to Corps project managers who are responsible for implementing the Corps regulatory program within a particular geographic area.

State

There are three state regulatory programs that regulate activities affecting water resources. The Wetland Conservation Act (WCA) regulates most activities affecting wetlands. It is administered by local government units (LGUs) which can be counties, townships, cities, watershed districts, watershed management organizations or state agencies (on state-owned land). The Minnesota DNR Division of Ecological and Water Resources issues permits for work in specially-designated public waters via the Public Waters Work Permit Program (DNR Public Waters Permits). The Minnesota Pollution Control Agency (MPCA) under Section 401 of the Clean Water Act certifies that discharges of dredged or fill material authorized by a federal permit or license comply with state water quality standards. One or more of these regulatory programs may be applicable to any one project.

Required Information

Prior to submitting an application, applicants are **strongly encouraged** to seek input from the Corps Project Manager and LGU staff to identify regulatory issues and required application materials for their proposed project. Project proponents can request a pre-application consultation with the Corps and LGU to discuss their proposed project by providing the information required in Sections 1 through 5 of this joint application form to facilitate a meaningful discussion about their project. Many LGUs provide a venue (such as regularly scheduled technical evaluation panel meetings) for potential applicants to discuss their projects with multiple agencies prior to submitting an application. Contact information is provided below.

The following bullets outline the information generally required for several common types of determinations/authorizations.

- For delineation approvals and/or jurisdictional determinations, submit Parts 1, 2 and 5, and Attachment A.
- For activities involving CWA/WCA exemptions, WCA no-loss determinations, and activities not requiring mitigation, submit Parts 1 through 5, and Attachment B.
- For activities requiring compensatory mitigation/replacement plan, submit Parts 1 thru 5, and Attachments C and D.
- For local road authority activities that qualify for the state's local road wetland replacement program, submit Parts 1 through 5, and Attachments C, D (if applicable), and E to both the Corps and the LGU.

Submission Instructions

Send the completed joint application form and all required attachments to:

U.S Army Corps of Engineers. Applications may be sent directly to the appropriate Corps Office. For a current listing of areas of responsibilities and contact information, visit the St. Paul District's website at: http://www.mvp.usace.army.mil/Missions/Regulatory.aspx and select "Minnesota" from the contact Information box. Alternatively, applications may be sent directly to the St. Paul District Headquarters and the Corps will forward them to the appropriate field office.

Section 401 Water Quality Certification: Applicants do not need to submit the joint application form to the MPCA unless specifically requested. The MPCA will request a copy of the completed joint application form directly from an applicant when they determine an individual 401 water quality certification is required for a proposed project.

Wetland Conservation Act Local Government Unit: Send to the appropriate Local Government Unit. If necessary, contact your county Soil and Water Conservation District (SWCD) office or visit the Board of Water and Soil Resources (BWSR) web site (www.bwsr.state.mn.us) to determine the appropriate LGU.

DNR Public Waters Permitting: In 2014 the DNR will begin using the Minnesota DNR Permitting and Reporting System (MPARS) for submission of Public Waters permit applications (https://webapps11.dnr.state.mn.us/mpars/public/authentication/login). Applicants for Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. To avoid duplication and to streamline the application process among the various resource agencies, applicants can use the information entered into MPARS to substitute for completing parts of this joint application form. The MPARS print/save function will provide the applicant with a copy of the Public Waters permit application which, at a minimum, will satisfy Parts one and two of this joint application. For certain types of activities, the MPARS application may also provide all of the necessary information required under Parts three and four of the joint application. However, it is the responsibility of the Applicant to make sure that the joint application contains all of the required information, including identification of all aquatic resources impacted by the project (see Part four of the joint application). After confirming that the MPARS application contains all of the required information in Parts one and two the Applicant may attach a copy to the joint application and fill in any missing information in the remainder of the joint application.

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name: Northshore Mining Company, c/o Andrea Hayden
Mailing Address: 10 Outer Drive, Silver Bay, MN 55614-1499
Phone: (218) 226-6032
E-mail Address: Andrea.hayden@cliffsnr.com

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name: Barr Engineering, c/o Daniel W. Jones
Mailing Address: 4700 W. 77th Street, Minneapolis, MN 55435
Phone: (952) 832-2875
E-mail Address: djones@barr.com

PART TWO: Site Location Information

County: Lake **City/Township:** NA
Parcel ID and/or Address: Milepost 7 Tailings Basin west of Silver Bay, MN
Legal Description (Section, Township, Range): Sections 20, 21, 27-32 in Township 56, Range 8, and Section 6 in Township Range 8
Lat/Long (decimal degrees): Lat 47.291667, Long 91.375 (approximate project center)
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): ~1,420 acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted ***prior to*** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

See Section 1.0 of the attached Wetland Delineation Report

PART FOUR: Aquatic Resource Impact[1] Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	**Aquatic Resource Type** (wetland, lake, tributary etc.)	**Type of Impact** (fill, excavate, drain, or remove vegetation)	**Duration of Impact** Permanent (P) or Temporary (T)[1]	**Size of Impact**[2]	**Overall Size of Aquatic Resource** [3]	**Existing Plant Community Type(s)** in Impact Area[4]	**County, Major Watershed #, and Bank Service Area #** of Impact Area[5]

[1]If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".
[2]Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).
[3]This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".
[4]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.
[5]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

NA

PART FIVE: Applicant Signature

☒ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: _____ Date:

I hereby authorize Barr Engineering to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

[1] **The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.**

Attachment A
Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☒ **Wetland Type Confirmation**

☒ **Delineation Concurrence**. Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☐ **Preliminary Jurisdictional Determination**. A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☐ **Approved Jurisdictional Determination**. An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).
http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx

Project Name and/or Number:

Attachment B
Supporting Information for Applications Involving Exemptions, No Loss Determinations, and Activities Not Requiring Mitigation

Complete this part ***if*** you maintain that the identified aquatic resource impacts in Part Four do not require wetland replacement/compensatory mitigation OR ***if*** you are seeking verification that the proposed water resource impacts are either exempt from replacement or are not under CWA/WCA jurisdiction.

Identify the specific exemption or no-loss provision for which you believe your project or site qualifies:

Provide a detailed explanation of how your project or site qualifies for the above. Be specific and provide and refer to attachments and exhibits that support your contention. Applicants should refer to rules (e.g. WCA rules), guidance documents (e.g. BWSR guidance, Corps guidance letters/public notices), and permit conditions (e.g. Corps General Permit conditions) to determine the necessary information to support the application. Applicants are strongly encouraged to contact the WCA LGU and Corps Project Manager prior to submitting an application if they are unsure of what type of information to provide:

Project Name and/or Number:

Attachment C
Avoidance and Minimization

Project Purpose, Need, and Requirements. Clearly state the purpose of your project and need for your project. Also include a description of any specific requirements of the project as they relate to project location, project footprint, water management, and any other applicable requirements. Attach an overhead plan sheet showing all relevant features of the project (buildings, roads, etc.), aquatic resource features (impact areas noted) and construction details (grading plans, storm water management plans, etc.), referencing these as necessary:

Avoidance. Both the CWA and the WCA require that impacts to aquatic resources be avoided if practicable alternatives exist. Clearly describe all on-site measures considered to avoid impacts to aquatic resources and discuss at least two project alternatives that avoid all impacts to aquatic resources on the site. These alternatives may include alternative site plans, alternate sites, and/or not doing the project. Alternatives should be feasible and prudent (see MN Rules 8420.0520 Subp. 2 C). Applicants are encouraged to attach drawings and plans to support their analysis:

Minimization. Both the CWA and the WCA require that all unavoidable impacts to aquatic resources be minimized to the greatest extent practicable. Discuss all features of the proposed project that have been modified to minimize the impacts to water resources (see MN Rules 8420.0520 Subp. 4):

Off-Site Alternatives. An off-site alternatives analysis is not required for all permit applications. If you know that your proposal will require an individual permit (standard permit or letter of permission) from the U.S. Army Corps of Engineers, you may be required to provide an off-site alternatives analysis. The alternatives analysis is not required for a complete application but must be provided during the review process in order for the Corps to complete the evaluation of your application and reach a final decision. Applicants with questions about when an off-site alternatives analysis is required should contact their Corps Project Manager.

Project Name and/or Number:

Attachment D
Replacement/Compensatory Mitigation

Complete this part ***if*** your application involves wetland replacement/compensatory mitigation not associated with the local road wetland replacement program. Applicants should consult Corps mitigation guidelines and WCA rules for requirements.

Replacement/Compensatory Mitigation via Wetland Banking. Complete this section if you are proposing to use credits from an existing wetland bank (with an account number in the State wetland banking system) for all or part of your replacement/compensatory mitigation requirements.

Wetland Bank Account #	**County**	**Major Watershed #**	**Bank Service Area #**	**Credit Type** (if applicable)	**Number of Credits**

Applicants should attach documentation indicating that they have contacted the wetland bank account owner and reached at least a tentative agreement to utilize the identified credits for the project. This documentation could be a signed purchase agreement, signed application for withdrawal of credits or some other correspondence indicating an agreement between the applicant and the bank owner. *However, applicants are advised not to enter into a binding agreement to purchase credits until the mitigation plan is approved by the Corps and LGU.*

Project-Specific Replacement/Permittee Responsible Mitigation. Complete this section if you are proposing to pursue actions (restoration, creation, preservation, etc.) to generate wetland replacement/compensatory mitigation credits for this proposed project.

WCA Action Eligible for Credit[1]	**Corps Mitigation Compensation Technique[2]**	**Acres**	**Credit % Requested**	**Credits Anticipated[3]**	**County**	**Major Watershed #**	**Bank Service Area #**

[1]Refer to the name and subpart number in MN Rule 8420.0526.
[2]Refer to the technique listed in *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota*.
[3]If WCA and Corps crediting differs, then enter both numbers and distinguish which is Corps and which is WCA.

Explain how each proposed action or technique will be completed (e.g. wetland hydrology will be restored by breaking the tile……) and how the proposal meets the crediting criteria associated with it. Applicants should refer to the Corps mitigation policy language, WCA rule language, and all associated Corps and WCA guidance related to the action or technique:

Attach a site location map, soils map, recent aerial photograph, and any other maps to show the location and other relevant features of each wetland replacement/mitigation site. Discuss in detail existing vegetation, existing landscape features, land use (on and surrounding the site), existing soils, drainage systems (if present), and water sources and movement. Include a topographic map showing key features related to hydrology and water flow (inlets, outlets, ditches, pumps, etc.):

Project Name and/or Number:

Attach a map of the existing aquatic resources, associated delineation report, and any documentation of regulatory review or approval. Discuss as necessary:

For actions involving construction activities, attach construction plans and specifications with all relevant details. Discuss and provide documentation of a hydrologic and hydraulic analysis of the site to define existing conditions, predict project outcomes, identify specific project performance standards and avoid adverse offsite impacts. Plans and specifications should be prepared by a licensed engineer following standard engineering practices. Discuss anticipated construction sequence and timing:

For projects involving vegetation restoration, provide a vegetation establishment plan that includes information on site preparation, seed mixes and plant materials, seeding/planting plan (attach seeding/planting zone map), planting/seeding methods, vegetation maintenance, and an anticipated schedule of activities:

For projects involving construction or vegetation restoration, identify and discuss goals and specific outcomes that can be determined for credit allocation. Provide a proposed credit allocation table tied to outcomes:

Provide a five-year monitoring plan to address project outcomes and credit allocation:

Discuss and provide evidence of ownership or rights to conduct wetland replacement/mitigation on each site:

Quantify all proposed wetland credits and compare to wetland impacts to identify a proposed wetland replacement ratio. Discuss how this replacement ratio is consistent with Corps and WCA requirements:

By signature below, the applicant attests to the following (only required if application involves project-specific/permittee responsible replacement):

- All proposed replacement wetlands were not:
  - Previously restored or created under a prior approved replacement plan or permit
  - Drained or filled under an exemption during the previous 10 years
  - Restored with financial assistance from public conservation programs
  - Restored using private funds, other than landowner funds, unless the funds are paid back with interest to the individual or organization that funded the restoration and the individual or organization notifies the local government unit in writing that the restored wetland may be considered for replacement.
- The wetland will be replaced before or concurrent with the actual draining or filling of a wetland.
- An irrevocable bank letter of credit, performance bond, or other acceptable security will be provided to guarantee successful completion of the wetland replacement.
- Within 30 days of either receiving approval of this application or beginning work on the project, I will record the Declaration of Restrictions and Covenants on the deed for the property on which the replacement wetland(s) will be located and submit proof of such recording to the LGU and the Corps.

Applicant or Representative: Title:

Signature: _____ Date:

Project Name and/or Number:

Attachment E
Local Road Replacement Program Qualification

Complete this part ***if*** you are a local road authority (county highway department, city transportation department, etc.) seeking verification that your project (or a portion of your project) qualifies for the MN Local Government Road Wetland Replacement Program (LGRWRP). If portions of your project are not eligible for the LGRWRP, then Attachment D should be completed and attached to your application.

Discuss how your project is a repair, rehabilitation, reconstruction, or replacement of a currently serviceable road to meet state/federal design or safety standards/requirements. Applicants should identify the specific road deficiencies and how the project will rectify them. Attach supporting documents and information as applicable:

Provide a map, plan, and/or aerial photograph accurately depicting wetland boundaries within the project area. Attach associated delineation/determination report or otherwise explain the method(s) used to identify and delineate wetlands. Also attach and discuss any type of review or approval of wetland boundaries or other aspects of the project by a member or members of the local Technical Evaluation Panel (TEP) or Corps of Engineers:

In the table below, identify only the wetland impacts from Part 4 that the road authority has determined should qualify for the LGRWRP.

Wetland Impact ID (as noted on overhead view)	**Type of Impact** (fill, excavate, drain)	**Size of Impact** (square feet or acres to 0.01)	**Existing Plant Community Type(s)** in Impact Area[1]	**County, Major Watershed #, and Bank Service Area #** of Impact[2]

[1]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.

[2]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

Discuss the feasibility of providing onsite compensatory mitigation/replacement for important site-specific wetland functions:

Please note that under the MN Wetland Conservation Act, projects with less than 10,000 square feet of wetland impact are allowed to commence prior to submission of this notification so long as the notification is submitted within 30 days of the impact. The Clean Water Act has no such provision and requires that permits be obtained prior to any regulated discharges into water of the United States. To avoid potential unauthorized activities, road authorities must, at a minimum, provide a complete application to the Corps and receive a permit prior to commencing work.

By signature below, the road authority attests that they have followed the process in MN Rules 8420.0544 and have determined that the wetland impacts identified in Attachment D are eligible for the MN Local Government Road Wetland Replacement Program.

Road Authority Representative: Title:

Signature: _____ Date:

Technical Evaluation Panel Concurrence: Project Name and/or Number:

TEP member: Representing:

Concur with road authority's determination of qualification for the local road wetland replacement program? ☐ Yes ☐ No

Signature: _____ Date:

TEP member: Representing:

Concur with road authority's determination of qualification for the local road wetland replacement program? ☐ Yes ☐ No

Signature: _____ Date:

TEP member: Representing:

Concur with road authority's determination of qualification for the local road wetland replacement program? ☐ Yes ☐ No

Signature: _____ Date:

TEP member: Representing:

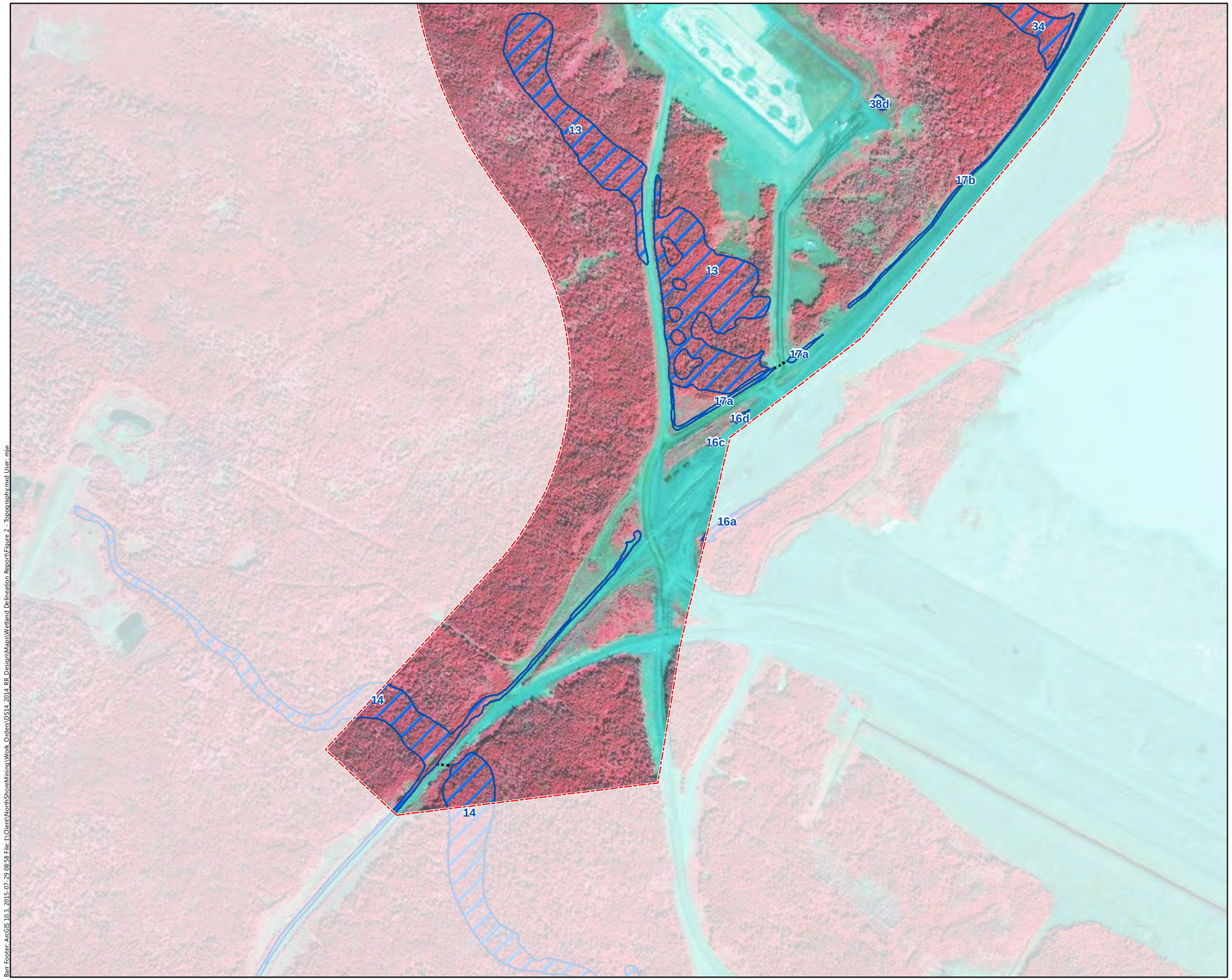
Concur with road authority's determination of qualification for the local road wetland replacement program? ☐ Yes ☐ No

Signature: _____ Date:

Upon approval and signature by the TEP, application must be sent to: **Wetland Bank Administration**
Minnesota Board of Water & Soil Resources
520 Lafayette Road North
Saint Paul, MN 55155

Appendix D

Wetland Delineations on Infrared Background



Study Area
Wetlands
Wetlands Connections
Water Conveyance

N

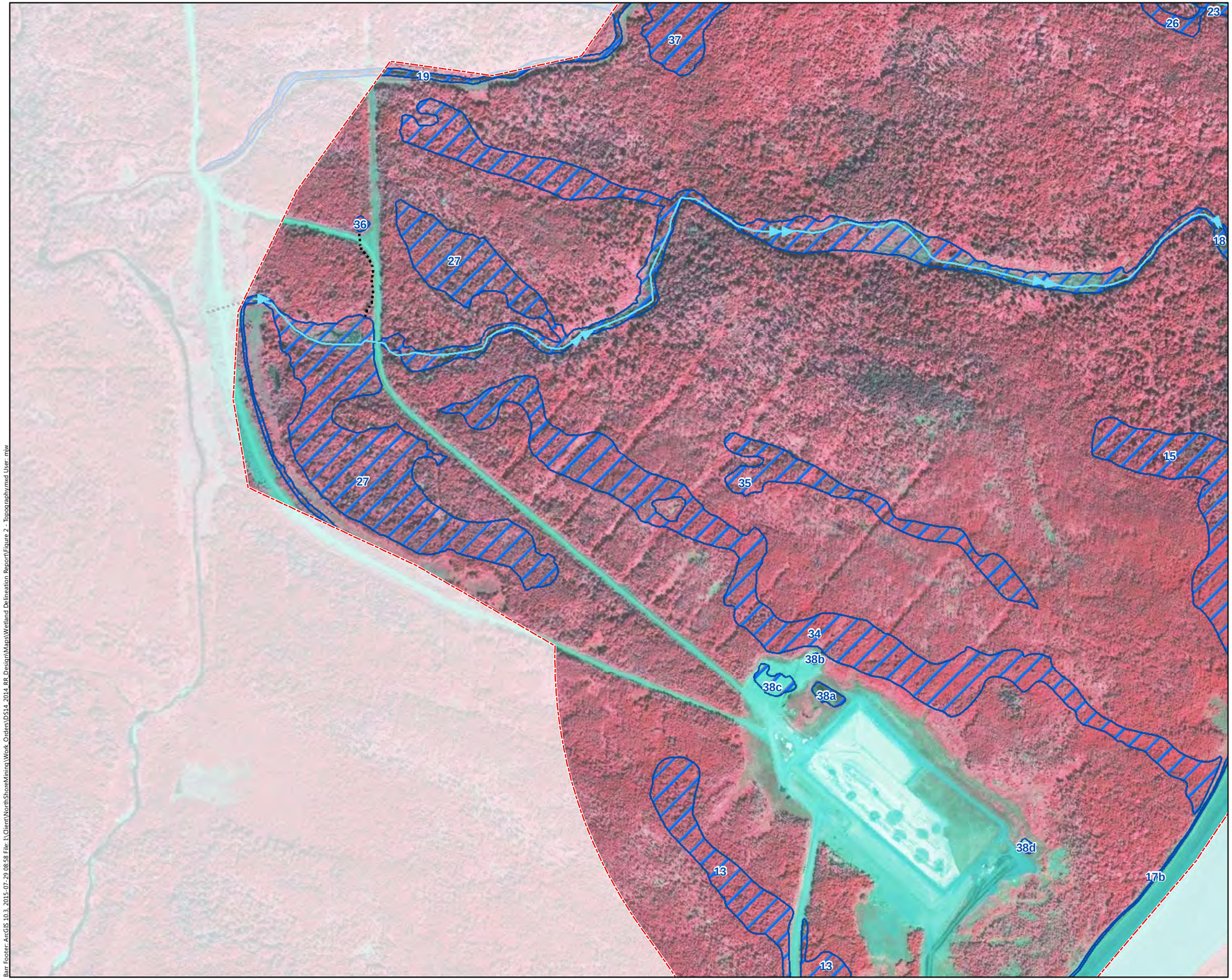
0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A1

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topographymxd User: mjw



Study Area
Wetlands
Wetlands Connections
Water Conveyance

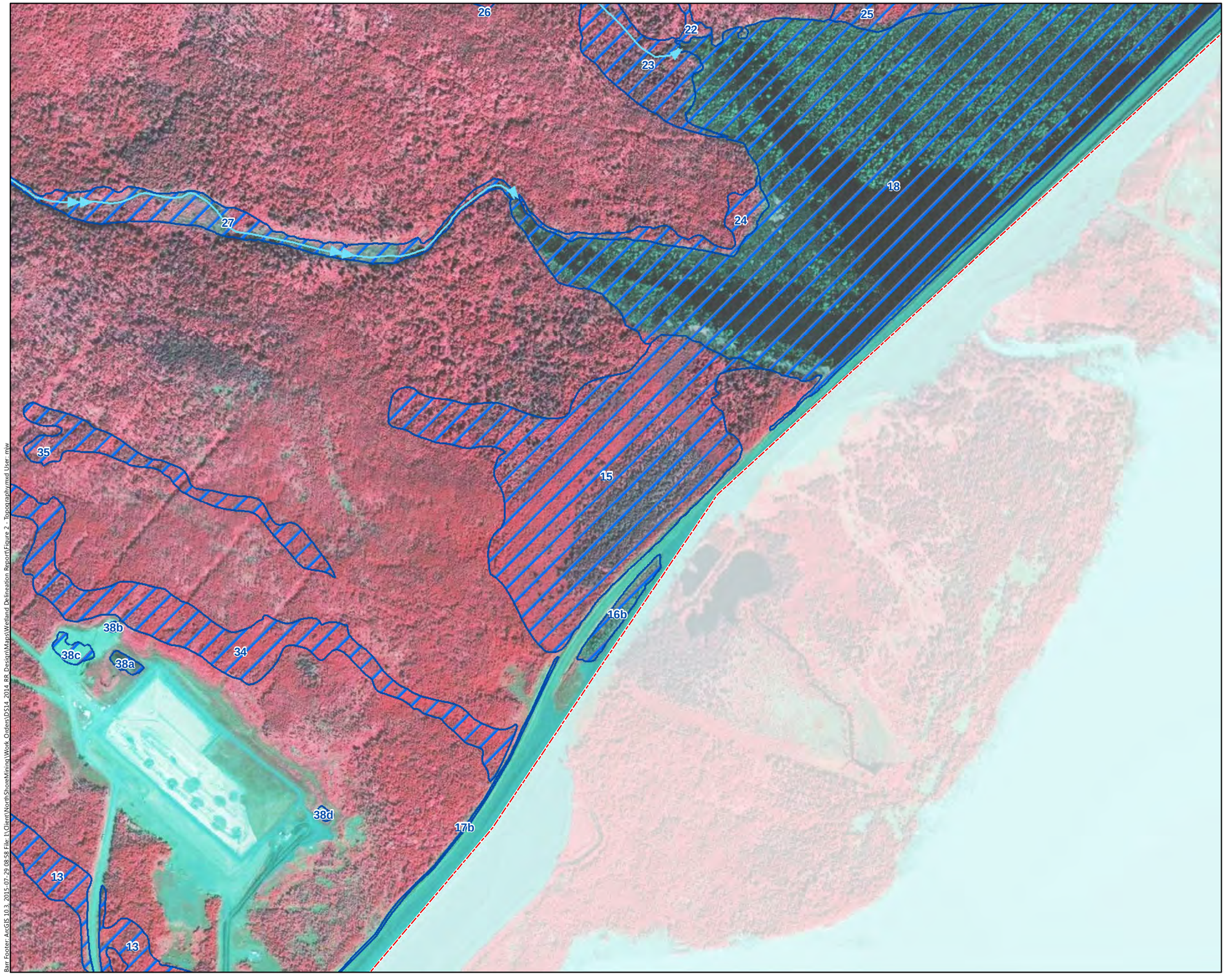
0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A2

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topographymxd User: mjw



Study Area
Wetlands
Wetlands Connections
Water Conveyance

N

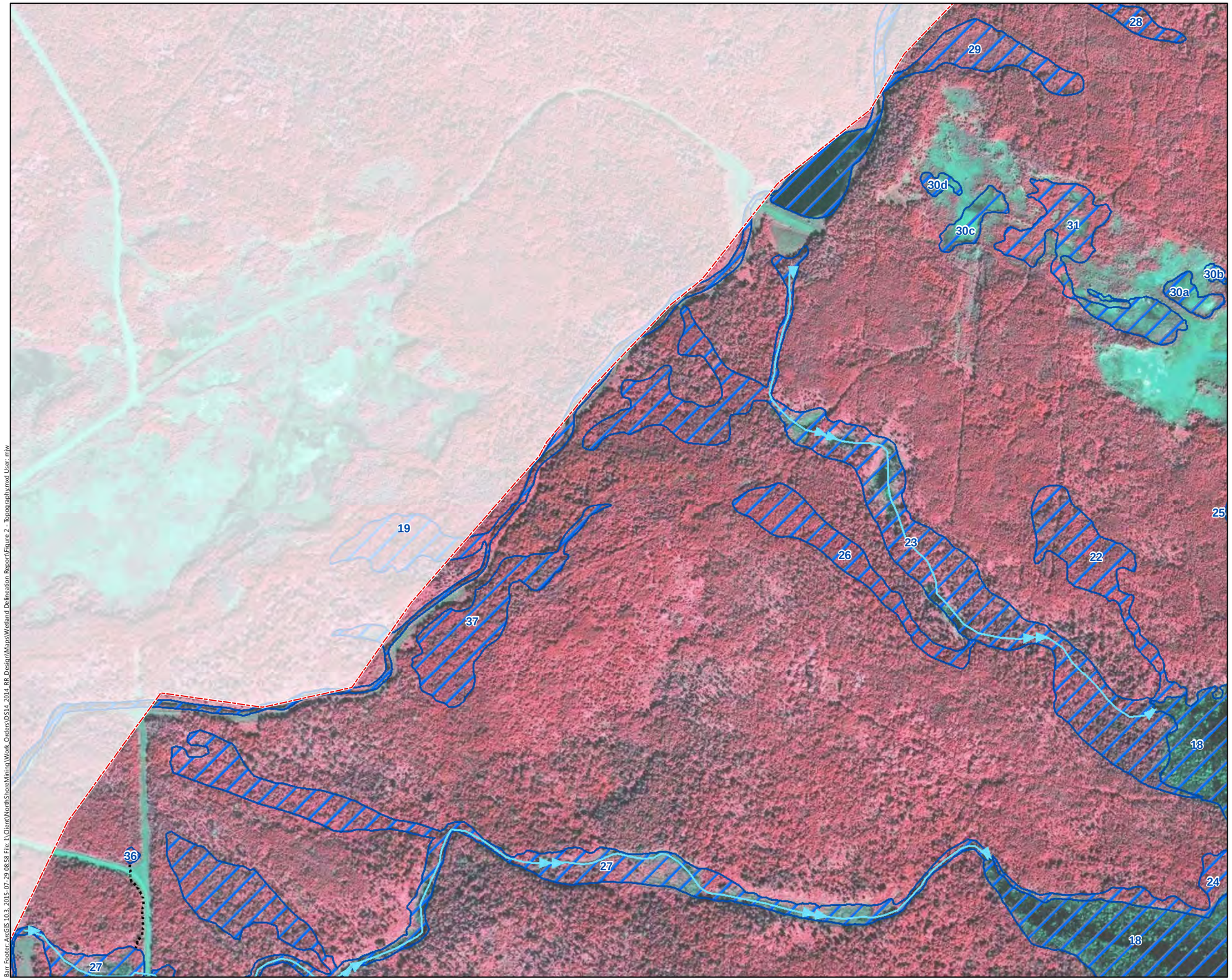
0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A3

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topography.mxd User: mjw



Study Area
Wetlands
Wetlands Connections
Water Conveyance

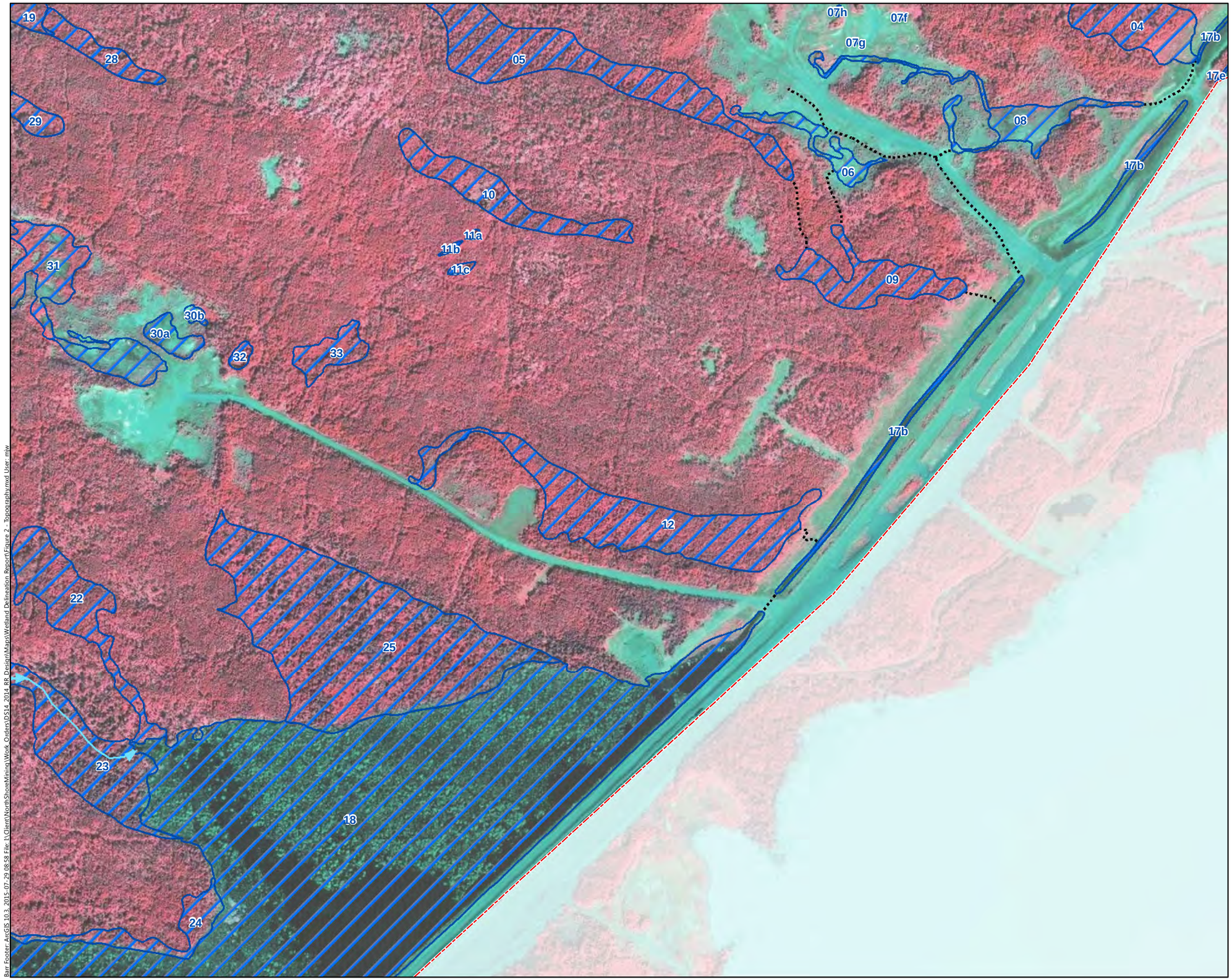
0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A4

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Foster ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topographymxd User: mjw



Study Area
Wetlands
Wetlands Connections
Water Conveyance

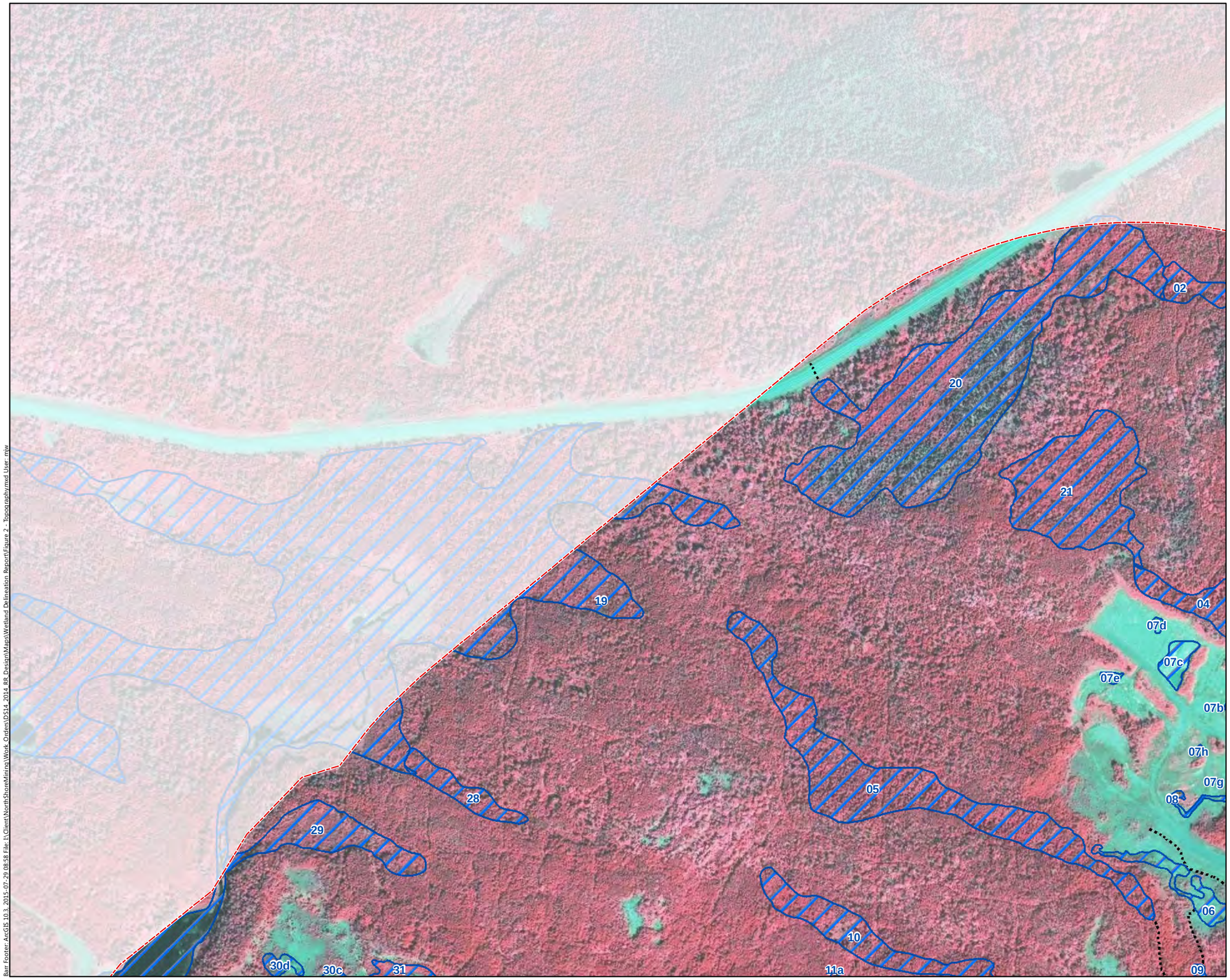
0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A5

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Foster ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topography.mxd User: mjw

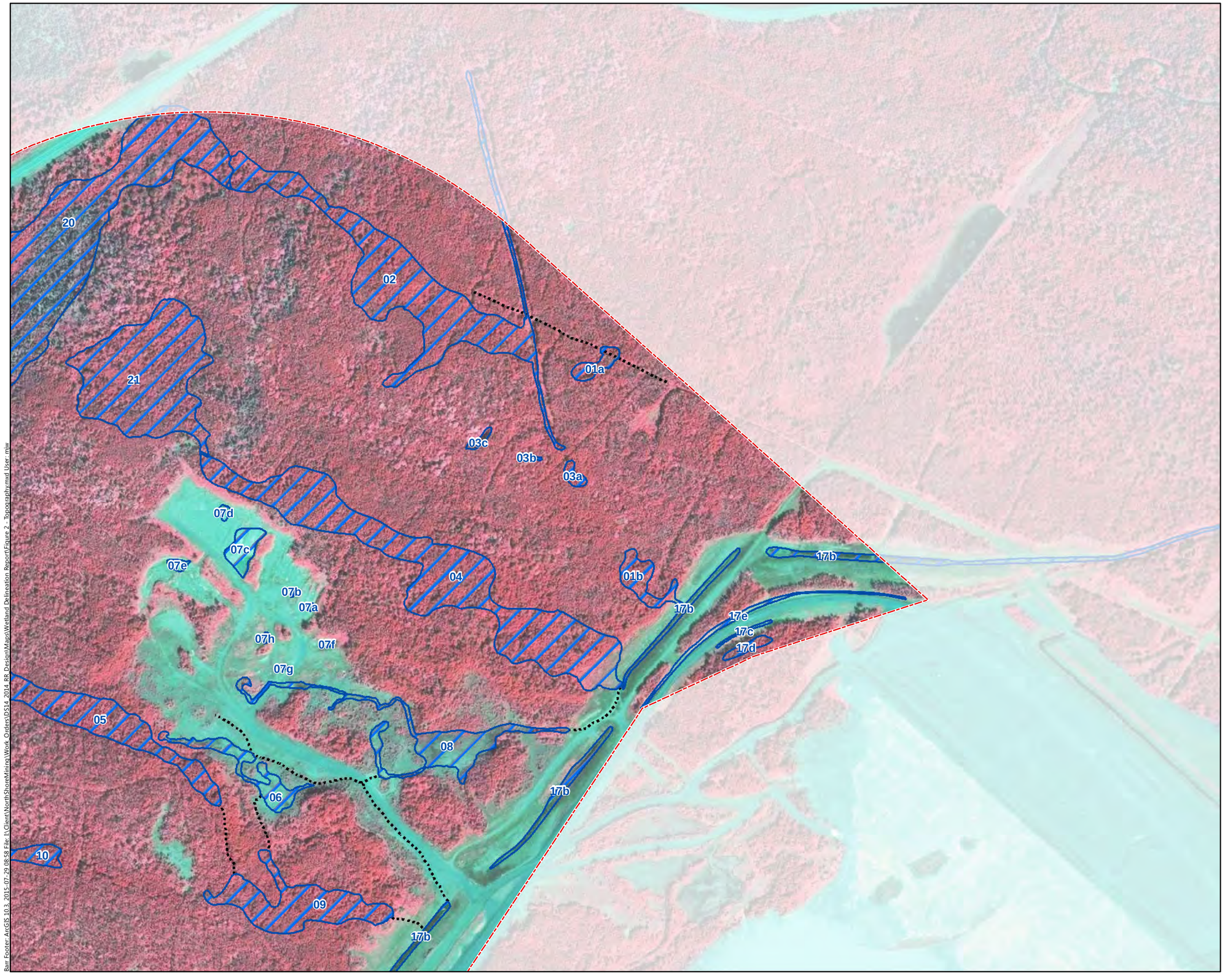


Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A6

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Footer: ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Wetland Delineation Report\Figure 2 - Topographymxd User: mw



Study Area
Wetlands
Wetlands Connections
Water Conveyance

0 200 400 800
Feet

Aerial Imagery: Lake County (2013)
Contours: MN DNR 2011 LiDAR

Figure A7

WETLAND DELINEATIONS
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Barr Foster ArcGIS 10.3, 2015-07-29 08:58 File: I:\Client\NorthShoreMining\Work Orders\0514_2014_RR Design\Maps\Wetland Delineation Report\Figure 2 - Topography.mxd User: mjw

Appendix E

Documentation of MNDNR Concurrence with Northshore Proposal to Remove the Remnant Watercourses of Big Thirtynine and Little Thirtynine Creeks from the PWI and Trout Stream List

Daniel W. Jones

From: Liljegren, Michael W (DNR) <michael.liljegren@state.mn.us>
Sent: Tuesday, March 15, 2016 4:04 PM
To: Daniel W. Jones
Cc: Jordan, Julie E (DNR); Bentley, Cliff (DNR)
Subject: Big and Little 39 creek remnant stream channel designation

Hi Daniel

I was able to meet with Brian Nerbonne (DNR Fisheries Staff) and Tome Hovey (DNR EWR Public Waters Permitting Supervisor) today to discuss the remnant portions of big and little 39 creek as designated tributaries to a designated trout stream.

Attached below is the determination that was made on the remnant stream channels.

Let me know if you have any further questions. I will reach out to Cliff Bentley to discuss the Public Water Status.

Thanks
Mike

From: Nerbonne, Brian A (DNR)
Sent: Tuesday, March 15, 2016 2:12 PM
To: Paron, Dean (DNR); Bentley, Cliff (DNR)
Cc: Hovey, Tom E (DNR)
Subject: RE: Mile Post 7 Tailings Basin and Trout Streams

I finally was able to chat with the department's mining hydrologist and public waters program supervisor about this matter. We all looked at some maps and discussed the situation and came to a consensus opinion. The trout stream sections that were once designated within the tailings basin have been removed from our trout stream designation list that appears in rule, I would presume at the time that the rerouting occurred for Little and Big 39 Creeks. The sections that remain designated encompass the rerouted channels. The former beds of the streams are shown on our trout stream layer as designated tributaries. However, those former channels are not tributary to the rerouted channels. What flow remains in them continues to travel toward the tailings basin, to where water impounds against one side of the railroad grade that forms the western boundary. Because these channels are not tributary to a designated trout stream, they should not be included on our trout stream layer. Our opinion concurs with the memo from Barr Engineering that you sent me.

As such, I am going to ask Jamie Schulz to remove these tributaries from our GIS layer.

Brian

Michael Liljegren, Supervisor
Mine Permitting and Coordination Section
Mining Hydrologist
MN DNR Lands and Minerals
500 Lafayette Road
St. Paul, MN 55155-

651-259-5689 (W)
651-297-3517 (F)
michael.liljegren@state.mn.us

Transcript of March 17, 2016 voicemail message from Cliff Bentley, DNR Area Fisheries Biologist to Daniel Jones at Barr Engineering:

Hi Daniel

This is Cliff Bentley with DNR in Two Harbors, and I am returning your phone call from yesterday about the big and little 39 creeks up by mile post 7 near Beaver Bay. You don't need to call me back, I talked to Mike Liljegren yesterday, and my approach on this will be that there's nothing that you need to do with me to complete the process that is going on. The streams are going to be removed from the trout stream GIS layer and Mike is going to work with people in St. Paul to have it removed from the public waters inventory. Also, as far as I am concerned, because they are neither trout streams nor public waters there is no reason that you need to even get anything from me. You don't need apply for permit and then being and then have it be told that there are not regulated and you don't need a permit, that is just administrative bureaucracies that is unnecessary. So, there is nothing further that you need to do in that regard. If you have any questions of course you can call me back or if what I have explained doesn't make sense to you can call me back but otherwise it is my opinion that you don't need any further authorization or contact from me, and that you guys are good to go, and if you are going to be working on that streams, go ahead. Again you can call me back if you have any questions or if you need anything further, but that's my opinion, on the matter. My number is 218-834-1441 and that's all take care maybe talk to you later. Bye Daniel.

Appendix F

November 6, 2016 email from Lisa Joyal, MNDNR, concurring with ETSC report findings

Daniel W. Jones

From: Joyal, Lisa (DNR) <Lisa.Joyal@state.mn.us>
Sent: Sunday, November 06, 2016 3:00 PM
To: Daniel W. Jones; Johnson, Bill H (DNR)
Cc: Hayden, Andrea J.
Subject: Northshore Mining Co.; West Ridge RR botanical survey report
Attachments: 2015 Northshore West Ridge Relocation ETSC Report 10062016_R.PDF

Hi Daniel,

Thank you for submitting the attached rare plant survey report. The DNR has reviewed the report and verified the identification of plant specimens. As stated in the report, twig rush (*Cladium mariscoides*) and neat spikerush (*Eleocharis nitida*), both state-listed species of concern, have been documented within the project area. Given that no state-listed threatened or endangered species were found during the survey, impacts to state-protected plants are not anticipated and a takings permit is not needed to proceed with the project.

Thank you,

Lisa Joyal

~~~~~~

Lisa Joyal
Endangered Species Review Coordinator
NHIS Data Distribution Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155

phone: 651-259-5109
lisa.joyal@state.mn.us
www.mndnr.gov/eco

From: Daniel W. Jones [mailto:DJones@barr.com]
Sent: Friday, October 07, 2016 2:42 PM
To: Joyal, Lisa (DNR) <Lisa.Joyal@state.mn.us>
Cc: Hayden, Andrea J. <Andrea.Hayden@CliffsNR.com>; Johnson, Bill H (DNR) <bill.johnson@state.mn.us>
Subject: Northshore Mining Co.; West Ridge RR botanical survey report

Lisa: Attached is a pdf of the "West Ridge Railroad Endangered, Threatened and Special Concern Plant Species Survey Report, prepared for Northshore Mining Company". This report summarizes field work done for ETSC plant species at Northshore's Milepost 7 Tailings Basin in July 2015, following an approved May 2015 Work Plan. The survey was conducted in support of environmental studies for the relocation of the railroad at the tailings basin, and the eventual progression of the tailings basin to the northwest. Two special concern species, neat spikerush (*Eleocharis nitida*) and twig rush (*Cladium mariscoides*) were found, each in two locations. No endangered or threatened plant species were found. The DNR Excel Observation Database spreadsheet and a zipped file with the field shapefiles are also attached.
~~~~~~

I realize that this report is very late in getting to you. The field investigator and principal author, who is no longer with Barr Engineering, was late in getting the report written. Then, in April 2016 he informed me that the report had been completed and submitted to you. Whether I misunderstood or there was some other miscommunication, I have been assuming since April that you had the report. In a September 19, 2016 memo that I prepared for Northshore in response to a query from Bill Johnson at DNR, I stated that the report had been submitted to DNR in April 2016. This Wednesday, Bill got back to Northshore and said that no report could be found. That's when I realized the mistake, finalized the report and compiled it into the attached document.

I apologize for the delay. Please review the report and get back to me with any comments or questions. I will provide a hard copy early next week. I also located the specimens that the field surveyor collected, and will get those prepared for submittal to Welby Smith early next week as well.

Thank you, Lisa.

Daniel W. Jones

Senior Environmental Scientist
Minneapolis, MN office: 952.832.2875
djones@barr.com
www.barr.com

Appendix G

Amended and Restated Purchase and Sale Agreement

AMENDED AND RESTATED PURCHASE AND SALE AGREEMENT

THIS AMENDED AND RESTATED PURCHASE AND SALE AGREEMENT (this "**Agreement**"), dated as of ~~February~~ March [8], 2016 (the "**Effective Date**") is entered into by and between **NORTHERN CONSERVATION L.L.C.**, a Minnesota limited liability company (the "**Buyer**"), **EIP CREDIT CO., LLC**, a Delaware limited liability company (the "**Seller**"), and solely for purposes of Sections 7(b) and 10 **EIP MINNESOTA, LLC**, a Delaware limited liability company ("**EIP Minnesota**").

Recitals.

A. Subsidiaries and affiliates of subsidiaries of the Buyer's parent company (the "**Mining Companies**") explore for, mine, extract and beneficiate taconite and other mineralized materials within St. Louis County, Minnesota, under mining permits issued by the State of Minnesota, Department of Natural Resources (the "**DNR**").

B. Mining activities of the Mining Companies occasionally impact wetlands, requiring that the Mining Companies mitigate the impacts by offsetting them with compensatory wetland mitigation credits produced by the construction or development, and monitoring, of wetland banks as provided by the Minnesota Wetland Conservation Act, MINN. STAT. ch. 103G, and Section 404 of the Federal Water Pollution Control Act, 33 U.S.C. § 1344.

C. The mitigation of wetland impacts resulting from activities of the Mining Companies under or related to their permits to mine are subject to the supervision and requirements of the DNR pursuant to MINN. STAT. §§ 93.481 & 103G.222, subd. 1(a), and Minn. R. part 8420.0200, subp. 1.

D. Certain real property legally described in Exhibit A attached hereto (the "**Real Property**") within Wetland Bank Service Area 1 in the State of Minnesota ("**Wetland Bank Service Area 1**"), was purchased by EIP Minnesota and leased to Seller for purposes of the Seller constructing or developing, and monitoring a wetland mitigation bank (the "**Project**") to produce certain compensatory wetland mitigation credits pursuant to Section 404 of the Federal Water Pollution Control Act, 33 U.S.C. § 1344 (each such credit from the Project a "**Credit**") for deposit into the Minnesota Wetland Credit Bank administered by Minnesota Board of Soil and Water Resources ("**BWSR**") pursuant to the Minnesota Wetland Conservation Act, MINN. STAT. ch. 103G and Minn. R. parts 8420.0700. – 0760 upon certification by the U.S. Army Corps of Engineers ("**Corps**") and BWSR ("**Certified**").

E. The Buyer desires to purchase the Credits from the Seller, and the Seller desires to sell the Credits to the Buyer, after the Credits are Certified by the Corps and BWSR and deposited into the Minnesota Wetland Bank administered by BWSR pursuant to Minn. R. part 8420.0725 and freely transferable ("**Deposited**"), subject to and as provided by the terms, covenants, and conditions of this Agreement.

F. The Buyer and the Seller entered into that certain Purchase and Sale Agreement, dated as of September 25, 2013, for the purchase and sale of Credits (as amended, modified or supplemented, the "**Original Agreement**").

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written.

BUYER:

NORTHERN CONSERVATION L.L.C.

By _____
Robert S. Lee
Its President

SELLER:

EIP CREDIT CO., LLC

By _____
Nicholas Dilks
Its Manager

Solely for purposes of Sections 7(b) and 10 of this Agreement:

EIP ~~CREDIT~~ MINNESOTA, LLC

By _____
Nicholas Dilks
Its Manager

The undersigned Escrow Agent hereby acknowledges receipt of the Deposit and a copy of this Agreement and agrees to hold and disperse the Deposit in accordance with the provisions of this Agreement. It is expressly acknowledged and agreed by the Escrow Agent that in no event shall the joinder, consent, agreement or signature of the Escrow Agent be necessary or required for the effectiveness of this Agreement or in connection with any amendment, modification or termination of this Agreement.

ESCROW AGENT:

ITASCA COUNTY ABSTRACT COMPANY, AGENT OF FIRST AMERICAN TITLE INSURANCE COMPANY

Date of execution:

_____ __, 2016

By: _____
Name:
Title:

Appendix H

USACE Permit 2005-2628-TWP Authorization, Decision Document, and June 6, 2006 Clarification Letter

Includes Decision Document

DEPARTMENT OF THE ARMY
St. Paul District Corps of Engineers
190 Fifth Street East
St. Paul, Minnesota 55101-1683

AUG 12 2005

REPLY TO
ATTENTION OF
Operations
Regulatory (2005-2628-TWP)

Mr. Denny Wagner
Northshore Mining Company
10 Outer Drive
Silver Bay, Minnesota 55614

Dear Mr. Wagner:

A favorable determination has been made on your Department of the Army permit application to place fill in 20.0 acres of wetland adjacent to Lake Superior, in conjunction with the next approximately 160-acre development of Northshore Mining Company's Milepost 7 Tailings Disposal Basin to accommodate the next 25 years of the basin's use. The project site is in Sections 21, 28, 29, 31, and 32., T. 56N., R. 8W., Lake County, Minnesota.

Although we do not have a copy in our file, it is our understanding that the Minnesota Pollution Control Agency (MPCA) has granted water quality certification for this project.

Your permit and a Notification of Administrative Appeal Options and Process and Request for Appeal are enclosed. If the permit, with all conditions, is acceptable, the permittee or authorized representative should sign each copy on the line above the words "PERMITTEE SIGNATURE," add the date, print or type the signatory's name clearly underneath the signature, and return both forms to this office. The District Engineer, or his designated representative, will then sign both copies and return one to you for your records. The permit is not valid without that signature.

If you disagree with the enclosed jurisdictional determination, you may provide new information. Please follow the directions in Section D of the enclosed Notification of Administrative Appeal Options and Process and Request for Appeal.

If this permit is not acceptable and you would like to appeal the permit decision, please follow the directions in Section A of the enclosed Notification of Administrative Appeal Options and Process and Request for Appeal.

Federal Regulations require a fee of $100.00 for the processing of permits that authorize the development of commercial activities in waters of the United States. Please make your check or money order for that amount payable to USACE-FAO-ST.PAUL.

If your project will require off-site fill material that is not obtained from a licensed commercial facility, you must notify us at least five working days before start of work. A cultural resources survey may be required if a licensed commercial facility is not used.

The decision regarding this action is based on information found in the administrative record, which documents the District's decision-making process, the basis for the decision, and the final decision.

If you have any questions, contact Mr. Tim Peterson in our Two Harbors office at (218) 834-6630. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,

Robert J. Whiting
Chief, Regulatory Branch

Enclosure

DEPARTMENT OF THE ARMY PERMIT

Permittee Northshore Mining Company

Permit No. 2005-2628-TWP

Issuing Office St. Paul District
U.S. Army Corps of Engineers

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

You are authorized to discharge fill material in 20.00 acres of wetlands tributary to Lake Superior for the next approximately 160-acre development of Northshore Mining Company's Milepost 7 Tailings Disposal Basin to accommodate the next 25 years of the basin's use. The authorized work area is shown on the attached drawings labeled 2005-2628-TWP, drawings 1 through 8.

Project Location:
The project site is located in Sections 21, 28, 29, 31, and 32, T. 56N., R. 8W., Lake County, Minnesota.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2030. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the

authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archaeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall insure that none of the work performed to construct, operate, or maintain this project (including preparatory work, staging, and/or site clean-up) causes impacts (including non-jurisdictional impacts such as drainage or non-point source sedimentation) to jurisdictional waters or wetlands except for those impacts expressly authorized by this (or a subsequent) Corps permit.

2. At least one week prior to the commencement of any work authorized by this permit, the permittee shall advise Mr. Tim Peterson in writing at St. Paul District, Corps of Engineers, Regulatory Branch, 1554 Highway 2, Two Harbors, Minnesota; or by phone at (218) 834-6630.

3. As compensation for the 20.0 acres of wetlands lost due to this project, the permittee shall purchase a minimum of 20.0 acres of new wetland credit from the Cliffs Erie, LCC, Embarrass River Mitigation Bank located in Sec. 3, T. 59N., R. 15W.; and Sec. 34 and 35, T. 60N., R. 15W., St. Louis County, Minnesota (replacement ratio 1:1). The

replacement wetlands shall include 12.27 acres of wet meadow/scrub-shrub, 3.51 acres of shallow/deep marsh, and 4.22 acres of forested wetlands.

4. Prior to the start of work in the wetlands on the project site, the permittee shall provide the District Engineer with documented proof of purchase for the credits detailed in Special Condition 3. Documented proof shall include the name and location of the wetland mitigation bank, amounts and types of credits purchased, date of purchase, and the balance of wetland credits available at the bank prior to and after the purchase of the 20.0 acres of wetland credits for this project. This document shall be signed on the date of purchase by the responsible bank official.

5. Refer to Standard Conditions attachment.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest

decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE SIGNATURE) (DATE)

(PERMITTEE PRINTED OR TYPED NAME)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT ENGINEER) (DATE)

Michael F. Pfenning
Colonel, Corps of Engineers
District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE SIGNATURE) (DATE)

(TRANSFEREE PRINTED OR TYPED NAME)

In addition to general and special conditions, this permit is subject to the following standard conditions, as applicable:

1. All work or discharges to a watercourse resulting from permitted construction activities, particularly hydraulic dredging, must meet applicable Federal, State, and local water quality and effluent standards on a continuing basis.

2. Measures must be adopted to prevent potential pollutants from entering the watercourse. Construction materials and debris, including fuels, oil, and other liquid substances, will not be stored in the construction area in a manner that would allow them to enter the watercourse as a result of spillage, natural runoff, or flooding.

3. If dredged or excavated material is placed on an upland disposal sight (above the ordinary high-water mark), the site must be securely diked or contained by some other acceptable method that prevents the return of potentially polluting materials to the watercourse by surface runoff or by leaching. The containment area, whether bulkhead or upland disposal sight, must be fully completed prior to the placement of any dredged material.

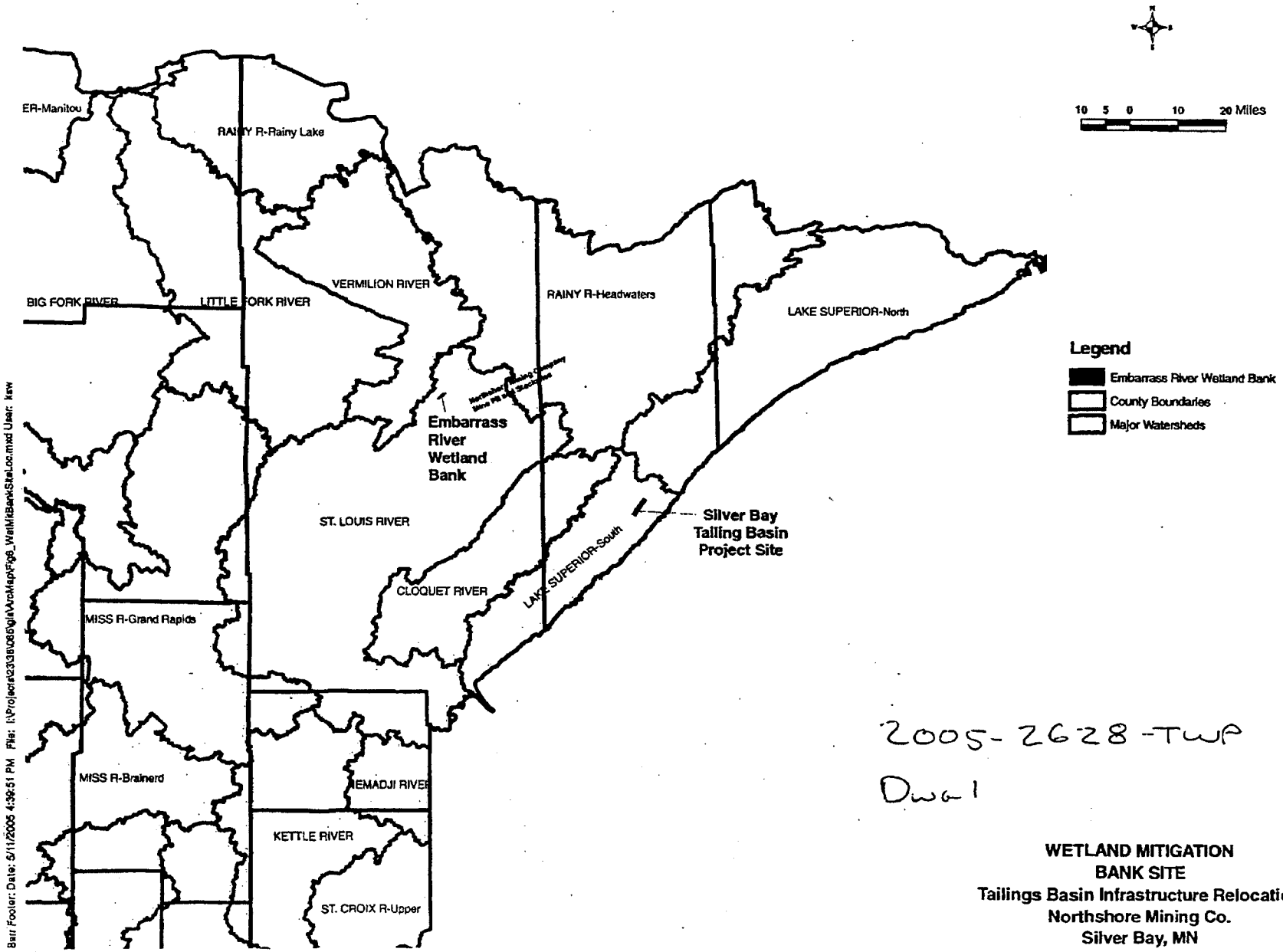
4. Upon completion of earthwork operations, all exposed slopes, fills, and disturbed areas must be given sufficient protection by appropriate means such as landscaping, or planting and maintaining vegetative cover, to prevent subsequent erosion.

5. All fill (including riprap), if authorized under this permit, must consist of suitable material free from toxic pollutants in other then trace quantities. In addition, rock or fill material used for activities dependent upon this permit and obtained by excavation must either be obtained from existing quarries or, if a new borrow site is opened up to obtain fill material, the State Historic Preservation Officer (SHPO) must be notified prior to the use of the new site. Evidence of this consultation with the SHPO will be forwarded to the St. Paul District Office.

6. If cultural, archaeological, or historical resources are unearthed during activities authorized by this permit, work must be stopped immediately and the State Historic Preservation Officer must be contacted for further instruction.

7. An investigation must be made to identify water intakes or other activities that may be affected by suspended solids and turbidity increases caused by work in the watercourse. Sufficient notice must be given to the owners of property where the activities would take place to allow them to prepare for any changes in water quality.

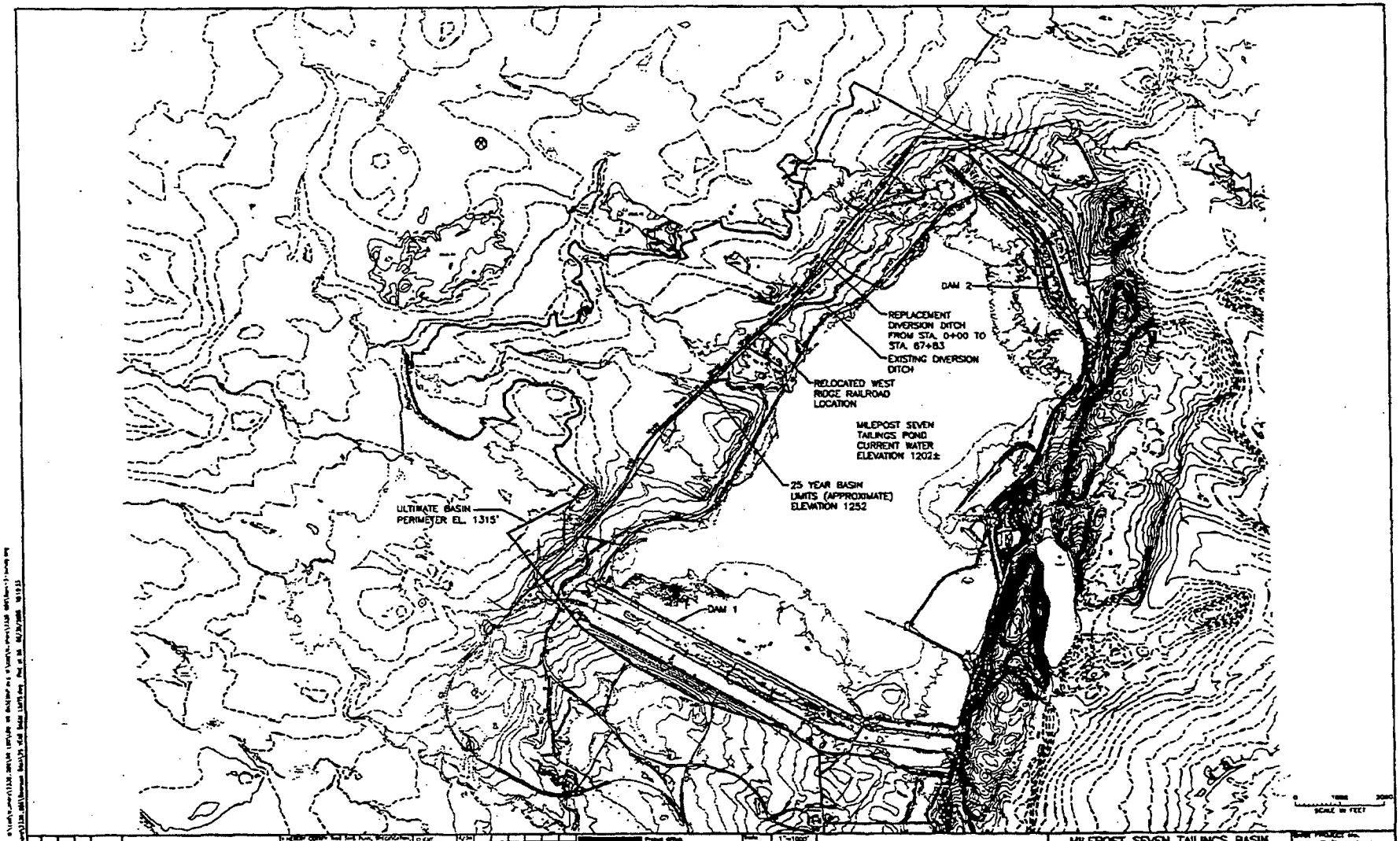
8. A contingency plan must be formulated that would be effective in the event of a spill. This requirement is particularly applicable in operations involving the handling of petroleum products. If a spill of any potential pollutant should occur, it is the responsibility of the permittee to remove such material, to minimize any contamination resulting from this spill, and to immediately notify the State Department of Natural Resources and the U.S. Coast Guard at telephone number (800) - 424-8802.



2005-2628-TWP

Dwg 1

WETLAND MITIGATION
BANK SITE
Tailings Basin Infrastructure Relocation
Northshore Mining Co.
Silver Bay, MN



2005-2628-TWP
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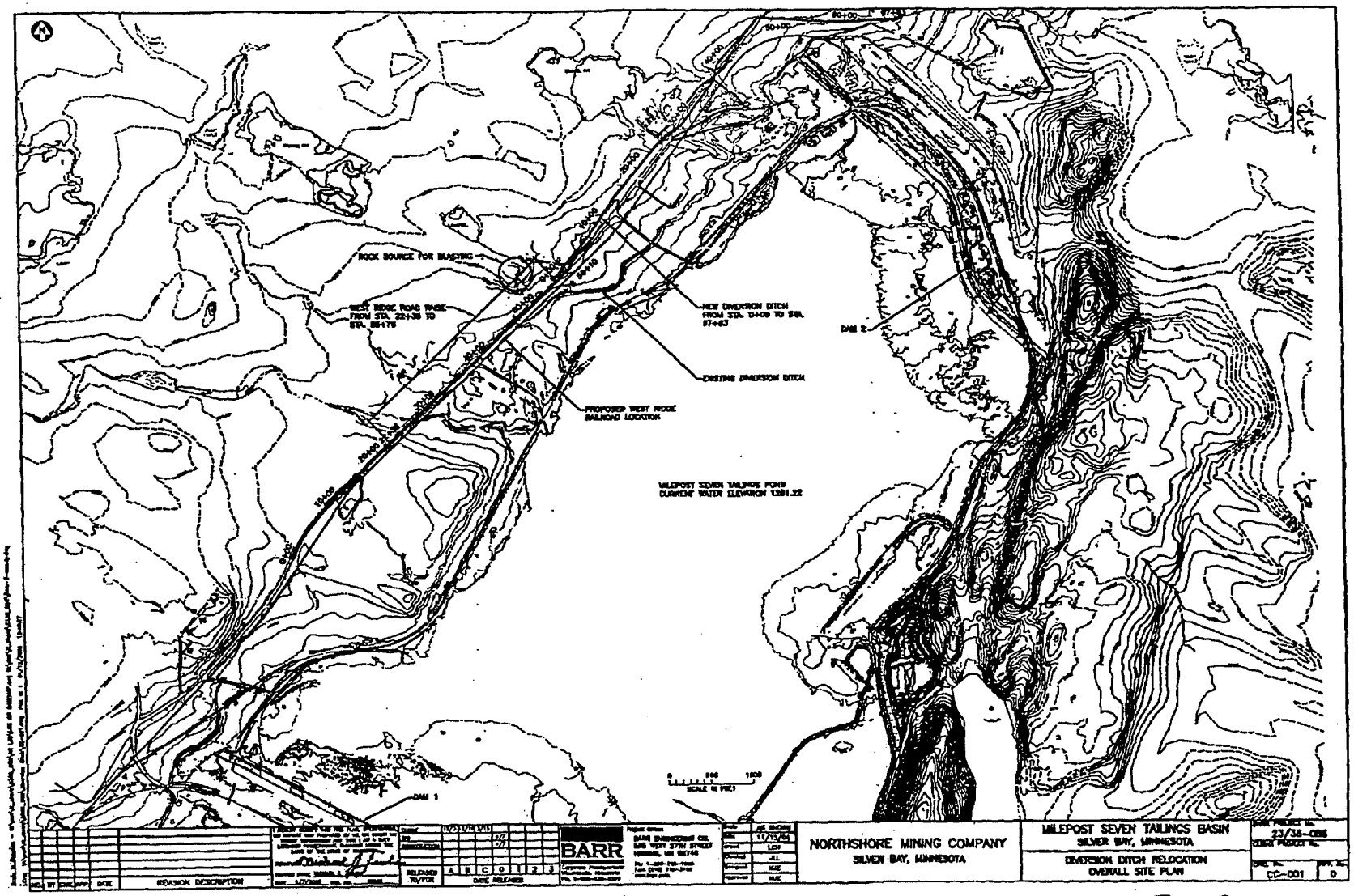

2005-2628-TWP

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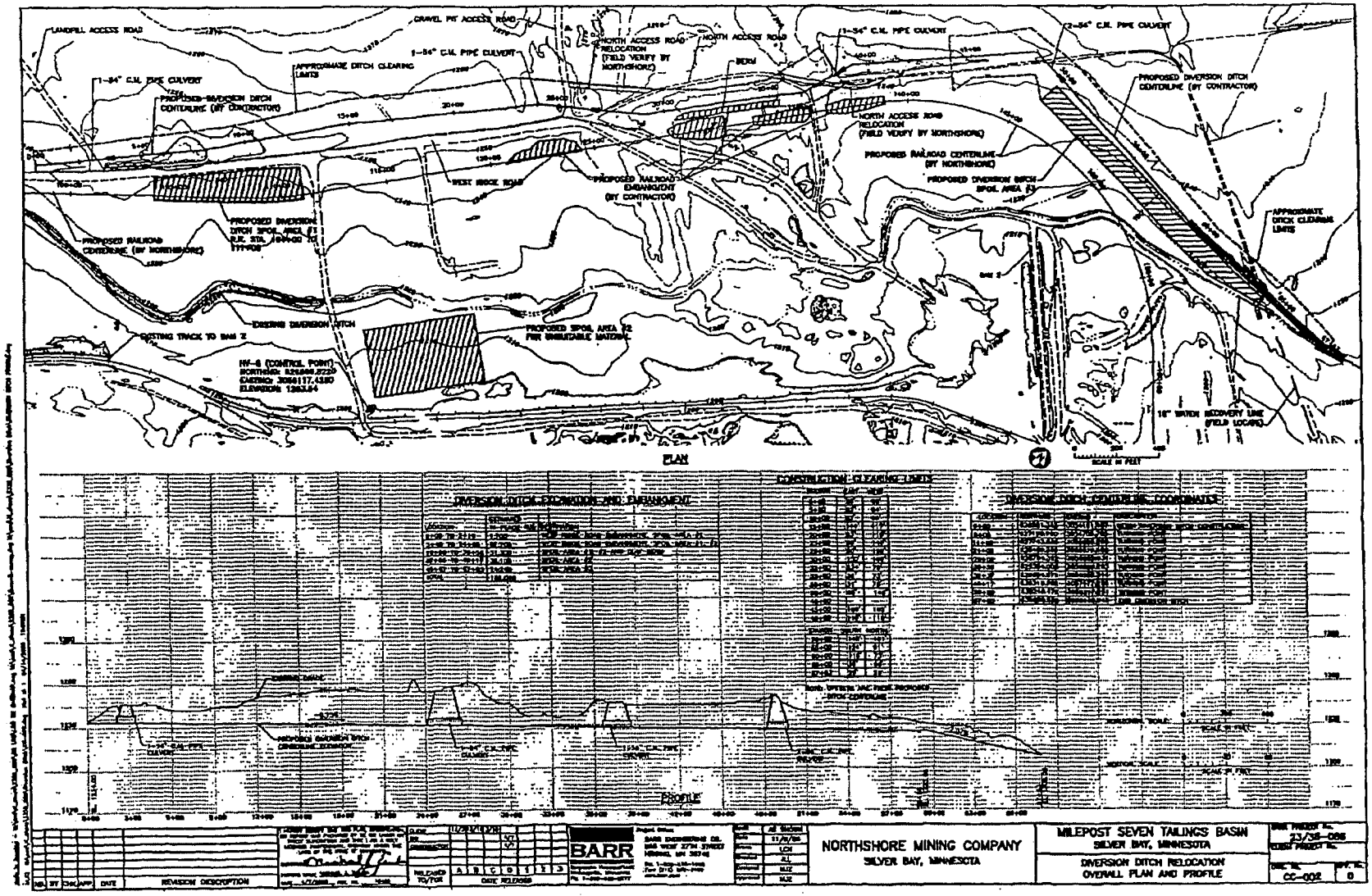

2005-2628-TWP

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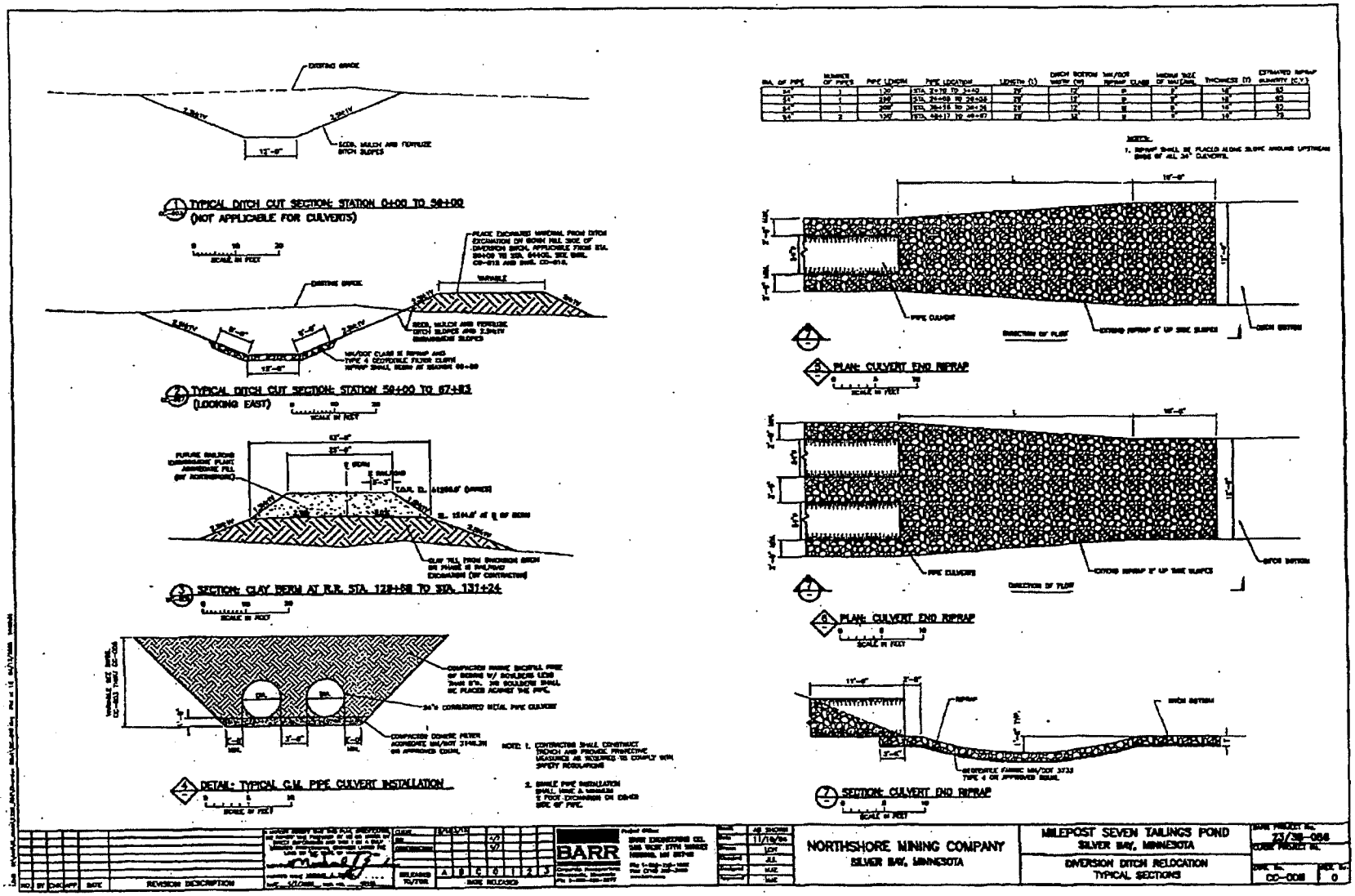

2005-2628-TWP

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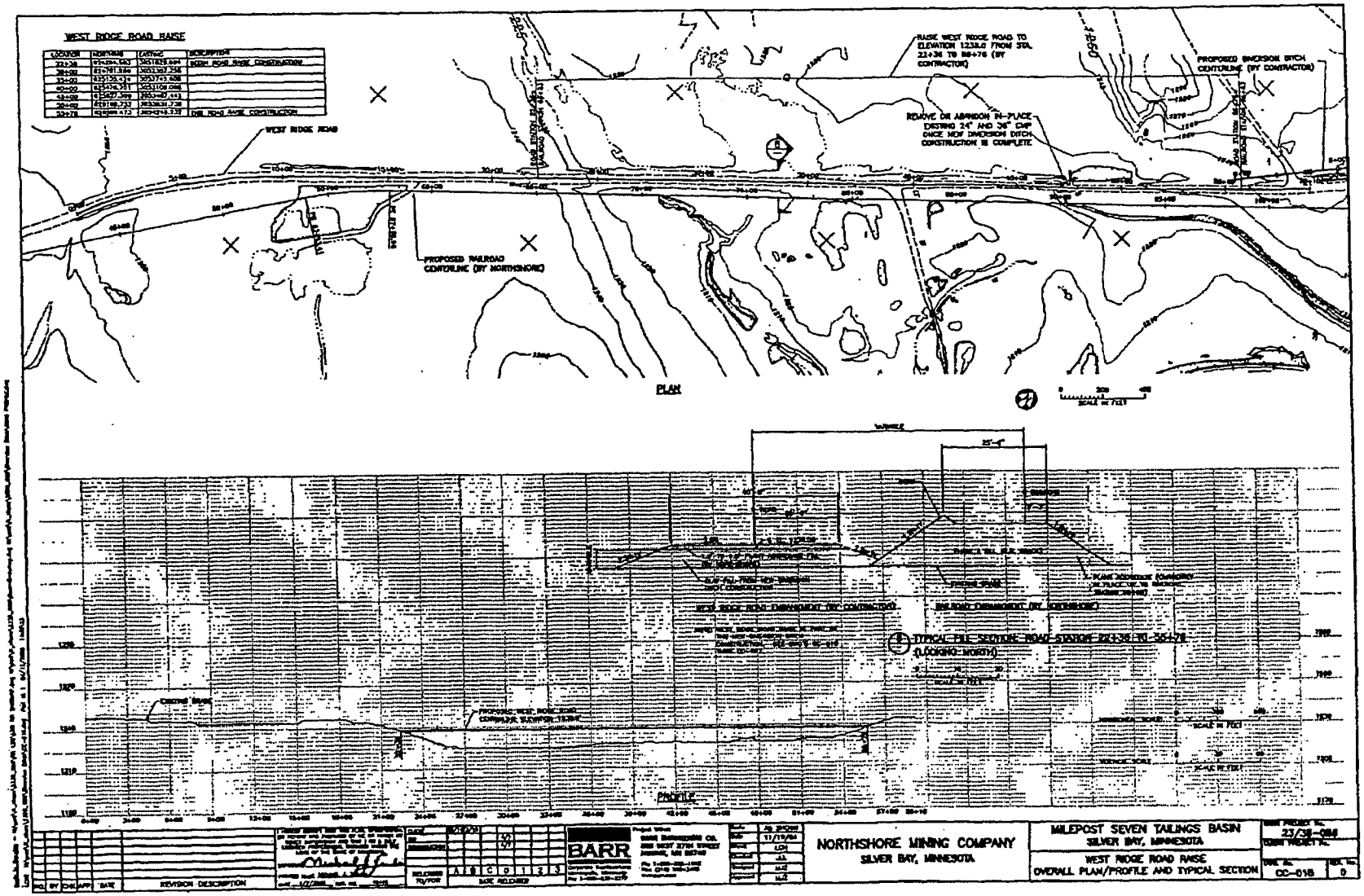

2005-2628-TWP

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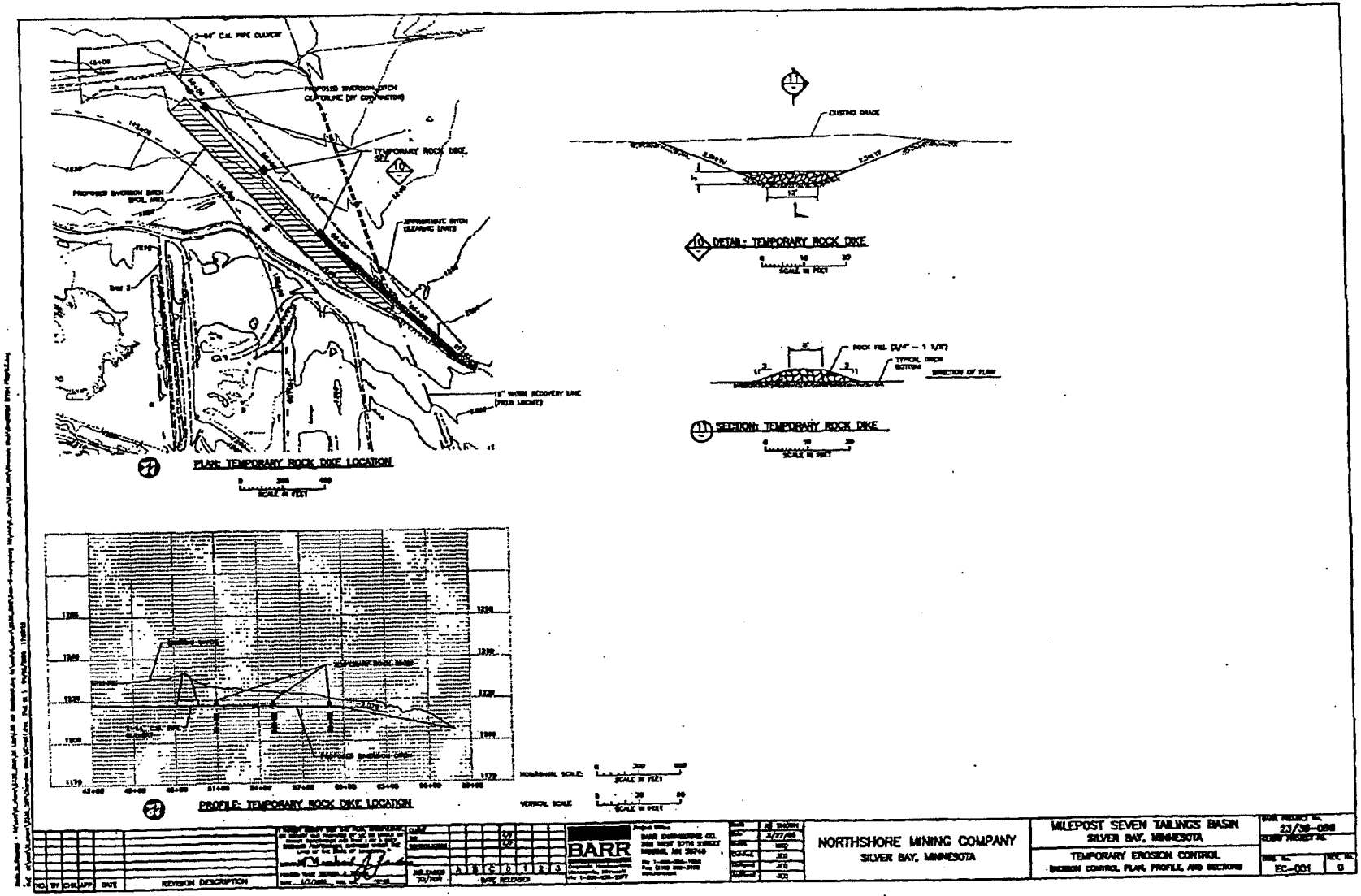


2005-2628-TWP

Dwg 7

Table 2: Impacts to Historic Wetlands and Existing Wetland Summary
Revised July 8, 2005
Tailing Basin Railroad, Road, and Diversion Ditch Construction
Northshore Mining
Silver Bay, Minnesota

Wetland ID[1]	Location	Circular 39 Type[2]	Cowardin Wetland Classification[3]	Dominant Plant Community[4]	Size of Wetland Affected	Type of Proposed Impact to Historic Wetland	Impacts to Historic Wetland (Acres)
1	South	2/3/4	PEMB/C/F	Wet meadow	1.8	None	0.0
2	South	2	PSSB	Shrub carr	0.3	None	0.0
3	South	4/3/2/6	PEMH/EMC/EMB/SS	Deep marsh	44.2	None	0.0
4	South	6/5/2	PSSB/UBG/EMB	Shrub carr	3.3	None	0.0
5	South	6	PSSC	Shrub carr	0.4	None	0.0
6	South	6/3	PSSB/EMB	Alder thicket	17.2	None	0.0
7	Southwest	6	PSSB	Shrub carr	1.1	None	0.0
8	West	6/7	PSSC/FOB	Shrub carr	1.9	None	0.0
9	West	8	PFO2/3	Cedar/tamarack bog	28.2	None	0.0
10	West	5/2/6	PUBH/EMB/SSB	Shallow, open water	24.2	None	0.0
11	West	8/2	PFO3/FO1/EMB	Cedar bog	43.5	Impoundment >2 m.	6.39
12	West	7/3	PFOB/EMC	Wooded swamp	7.5	Diversion Ditch	0.30
13	West	6/2	PSS/EMB	Shrub carr	0.9	RR Fill	0.34
14	West	3/2	PEMF/B	Shallow marsh	3.4	RR Fill	1.27
15	West	6/7	PSS/FOB	Alder thicket	11.4	RR Fill	3.74
16	West	7/2	PFO/EMB	Wooded swamp	0.3	None	0.0
17	West	3/2	PEMC/B	Shallow marsh	5.9	None	0.0
18	West	2	PEMB	Wet meadow	1.2	None	0.0
19	West	6/7	PSS/FOB	Alder thicket	2.1	None	0.0
20	West	5	PUBG	Shallow open water	1.3	None	0.0
21	North	6/7	PSS/FOB	Alder thicket	9.1	None	0.0
22	North	3/2/6	PEMC/EMB/SSB	Shallow marsh	2.4	None	0.0
23	West	6/7	PSS/FOB	Shrub carr	2.5	RR Fill	0.54
24	West	2	PEMB	Wet meadow	0.3	None	0.0
25	West	6	PSSB	Shrub carr	2.3	RR Fill	1.52
26	West	5/3	PUBH/EMC	Shallow open water	6.4	RR Fill	1.33
27	West	6/3	PSS/EMC	Shrub carr	1.9	None	0.00
28	West	8	PFO2/3B	Cedar/Tamarack bog	35.0	RR Fill	3.85
~~29~~[5]	~~West~~	~~2/7~~	~~PEM/FOB~~	~~Wet meadow~~	~~0.3~~	~~RR Fill~~	~~0.29~~
30	West	2/7	PEM/FOB	Wet meadow	5.9	Tailings Load-out	0.39
31	South	8	PFO3B	Cedar bog	12.5	None	0.0
32	West	6	PSSB	Alder thicket	1.0	RR Fill	0.18
33	West	3	PEMC	Shallow marsh	0.1	None	0.0
34	Southwest	2	PEMB	Wet meadow	0.7	None	0.0
35	Southwest	7	PFOB	Black ash swamp	0.6	None	0.0
36	West	7	PFOB	Black ash swamp	0.6	None	0.0
37	West	3	PEMF	Shallow marsh	1.0	None	0.0
38	West	5	PUBF	Shallow open water	1.8	None	0.0
39	West	6/7	PSS/FOB	Shrub carr	5.3	Tailings Load-out	0.16
40	West	3	PEMF	Shallow marsh	1.1	None	0.0
41	West	5	PUBGd	Shallow open water	3.1	None	0.0
42	West	7	PFOB	Black ash swamp	1.1	None	0.0
43	West	6	PSSB	Alder thicket	1.2	None	0.0
TOTAL					208.0		20.0

[1] Missing wetland numbers represent wetlands delineated in the field but were later determined to be outside of the expansion areas

[2] U.S. Fish and Wildlife Service, Circular 39 Classification System

[3] U.S. Fish and Wildlife Service, Cowardin Classification System

[4] Eggers and Reed *Wetlands Plants and Plant Communities of Minnesota and Wisconsin*

[5] Wetland 29 was initially misidentified, this area is part of the existing diversion ditch

2005-2628-TWP
Dwg 8

JURISDICTIONAL DETERMINATION
U.S. Army Corps of Engineers

Revised 8/13/04

DISTRICT OFFICE: St. Paul District
FILE NUMBER: 2005-2628-TWP
PROJECT LOCATION INFORMATION:
State: **Minnesota**
County: **Lake**
Center coordinates of site (latitude/longitude): **47.30318254/-91.37138556**
Approximate size of area (parcel) reviewed, including uplands: **2500** acres.
Name of nearest waterway: **East Branch Beaver River**
Name of watershed: **Beaver-Lester, Minnesota**
JURISDICTIONAL DETERMINATION
Completed: Desktop determination ☒ Date: **May 5, 2005**
Site visit(s) ☐ Date(s):

Jurisdictional Determination (JD):
☐ Preliminary JD - Based on available information, ☐ *there appear to be* (or) ☐ *there appear to be no* "waters of the United States" and/or "navigable waters of the United States" on the project site. A preliminary JD is not appealable (Reference 33 CFR part 331).

☒ Approved JD – An approved JD is an appealable action (Reference 33 CFR part 331).
Check all that apply:

☐ *There are* "navigable waters of the United States" (as defined by 33 CFR part 329 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☒ *There are* "waters of the United States" (as defined by 33 CFR part 328 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☐ *There are "isolated, non-navigable, intra-state* waters or wetlands" within the reviewed area.
☐ Decision supported by SWANCC/Migratory Bird Rule Information Sheet for Determination of No Jurisdiction.

BASIS OF JURISDICTIONAL DETERMINATION:
A. Waters defined under 33 CFR part 329 as "navigable waters of the United States":
☐ The presence of waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

B. Waters defined under 33 CFR part 328.3(a) as "waters of the United States":
☐ (1) The presence of waters, which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
☐ (2) The presence of interstate waters including interstate wetlands[1].
☐ (3) The presence of other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce including any such waters (check all that apply):
☐ (i) which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ (iii) which are or could be used for industrial purposes by industries in interstate commerce.
☐ (4) Impoundments of waters otherwise defined as waters of the US.
☐ (5) The presence of a tributary to a water identified in (1) – (4) above.
☐ (6) The presence of territorial seas.
☒ (7) The presence of wetlands adjacent[2] to other waters of the US, except for those wetlands adjacent to other wetlands.

Rationale for the Basis of Jurisdictional Determination (applies to any boxes checked above). *If the jurisdictional water or wetland is not itself a navigable water of the United States, describe connection(s) to the downstream navigable waters. If B(1) or B(3) is used as the Basis of Jurisdiction, document navigability and/or interstate commerce connection (i.e., discuss site conditions, including why the waterbody is navigable and/or how the destruction of the waterbody could affect interstate or foreign commerce). If B(2, 4, 5 or 6) is used as the Basis of Jurisdiction, document the rationale used to make the determination. If B(7) is used as the Basis of Jurisdiction, document the rationale used to make adjacency determination:* **The wetlands on the site are tributary to the East Branch Beaver, which is tributary to Lake Superior, a navigable water of the United States.**

Lateral Extent of Jurisdiction: (Reference: 33 CFR parts 328 and 329)

☐ Ordinary High Water Mark indicated by:
- ☐ clear, natural line impressed on the bank
- ☐ the presence of litter and debris
- ☐ changes in the character of soil
- ☐ destruction of terrestrial vegetation
- ☐ shelving
- ☐ other:

☐ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gages
- ☐ other:

☐ Mean High Water Mark indicated by:
☐ survey to available datum; ☐ physical markings; ☐ vegetation lines/changes in vegetation types.

☒ Wetland boundaries, as shown on the attached wetland delineation map and/or in a delineation report prepared by:
Barr Engineering Company

Basis For Not Asserting Jurisdiction:

☐ The reviewed area consists entirely of uplands.
☐ Unable to confirm the presence of waters in 33 CFR part 328(a)(1, 2, or 4-7).
☐ Headquarters declined to approve jurisdiction on the basis of 33 CFR part 328.3(a)(3).
☐ The Corps has made a case-specific determination that the following waters present on the site are not Waters of the United States:
- ☐ Waste treatment systems, including treatment ponds or lagoons, pursuant to 33 CFR part 328.3.
- ☐ Atificially irrigated areas, which would revert to upland if the irrigation ceased.
- Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
- ☐ Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.
- ☐ Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States found at 33 CFR 328.3(a).
- ☐ Isolated, intrastate wetland with no nexus to interstate commerce.
- ☐ Prior converted cropland, as determined by the Natural Resources Conservation Service. Explain rationale:
- ☐ Non-tidal drainage or irrigation ditches excavated on dry land. Explain rationale:
- ☐ Other (explain):

DATA REVIEWED FOR JURSIDICTIONAL DETERMINATION (mark all that apply):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant.
☒ Data sheets prepared/submitted by or on behalf of the applicant.
- ☒ This office concurs with the delineation report, dated **May 2005**, prepared by (company):
Barr Engineering Company
- ☐ This office does not concur with the delineation report, dated prepared by (company):

☐ Data sheets prepared by the Corps.
☒ Corps' navigable waters' studies:
☐ U.S. Geological Survey Hydrologic Atlas:
☒ U.S. Geological Survey 7.5 Minute Topographic maps:
☐ U.S. Geological Survey 7.5 Minute Historic quadrangles:
☐ U.S. Geological Survey 15 Minute Historic quadrangles:
☐ USDA Natural Resources Conservation Service Soil Survey:
☒ National wetlands inventory maps:
☐ State/Local wetland inventory maps:
☐ FEMA/FIRM maps (Map Name & Date):
☐ 100-year Floodplain Elevation is: (NGVD)
☒ Aerial Photographs (Name & Date):
☐ Other photographs (Date):
☐ Advanced Identification Wetland maps:
☐ Site visit/determination conducted on:
☐ Applicable/supporting case law:
☐ Other information (please specify):

[1]Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (87 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology).

[2]The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant.	File Number: 2005-2628-TWP	Date:
Attached is:		See Section below
X	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A. INITIAL PROFERRED PERMIT: You may accept or object to the permit.

ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approve jurisdictional determinations associated with the permit.

• OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B. PROFFERED PERMIT: You may accept or appeal the permit.

• ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

• APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D. APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

• ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

• APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E. PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION.

If you have questions regarding this decision and/or the appeal process you may contact: U.S. Army Corps of Engineers CEMVP-OP-R TIM PETERSON 1554 HIGHWAY 2 SUITE 2 TWO HARBORS MN 55616 Telephone218-834-6630	If you only have questions regarding the appeal process you may also contact: Division Engineer c/o Martha S. Chieply, Appeal Review Office CEMVD P. O. Box 80 Vicksburg, MS 39181-0080 Telephone (601) 634-5820

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

St. Paul District
U. S. Army Corps of Engineers

DEPARTMENT OF THE ARMY PERMIT
EVALUATION AND DECISION DOCUMENT

APPLICATION NUMBER: 2005-2628-TWP
APPLICANT:Northshore Mining Company

PROJECT:Milepost 7

PART I - INTRODUCTION

This document includes an environmental assessment, as required by the National Environmental Policy Act; the District Engineer's statement of findings, including a determination regarding compliance with the Section 404(b)(1) guidelines (if appropriate) and the need for an environmental impact statement; and the District Engineer's determination as to whether or not the project is contrary to the public interest. (NOTE: The Corps of Engineers permit regulations are at Title 33 of the Code of Federal Regulations {CFR}, Parts 320 through 330.)

A public notice describing the project and its location is attached (Attachment A). However, the applicant has stated that the use of the word expansion in the public notice has caused some confusion. Several Department of the Army permits were issued in the late 1970's authorizing the discharge of fill material for the entire tailings basin, and associated dikes and diversion structures. Three of the permits included currently on-going activities required for continued use of the basin. In particular, permit 76-412B authorized fill for the construction of Dam Number 1, permit 76-413B authorized fill for the construction of Dam Number 2, and permit 76-422 authorized the deposit of tailings in the Milepost 7 tailings basin. No compensatory mitigation was included as a condition of any of these permits. After they were issued, the above permits were renewed several times, but have recently expired. The current application is to consolidate the permits, and authorize continued use and expansion of the active portion of the previously authorized tailings disposal area for the next 25 years of operation of the tailings basin. The footprint of the tailings basin at the end of the 25 - year span would still not encompass the entire previously authorized fill area.

After the of the public notice was issued, the applicant has determined that of the 22.21 acres of impact to wetlands due to this phase of the project, 20.0 acres are wetlands which were present on the site prior to initiation of activities at the tailings basin, and 2.21 acres are wetland areas which have been created due to construction and use of the tailings basin to date. Therefore, the proposed compensatory mitigation has been adjusted to reflect impacts to the 20.0 acres of natural wetlands only.

PART II - ENVIRONMENTAL ASSESSMENT

PROJECT PURPOSE.

The purpose of the project is to obtain authorization to continue to use and enlarge, within the previously authorized tailings basin footprint, Northshore Mining Company's Milepost 7 Tailings Basin for the next 25 years of use.

PARTICIPANTS IN THE PUBLIC INTEREST REVIEW.

The public notice was sent to all known interested parties, including the appropriate Federal, State, and local agencies. A public notice mailing list is included in the permit file. A summary of comments follows:

U.S. Environmental Protection Agency (EPA). The EPA did not provide any comments.

U.S. Fish and Wildlife Service (FWS). The FWS responded that they could not, at this time, concur with the Corps determination that the proposed action would not have an adverse affect on federally-listed species or their critical habitat, pending a complete assessment of all related actions (i.e., public notice 2005-1560 regarding a proposed mine expansion near Babbitt, Minnesota). They offered the following recommendations:

1. There are three species in the project area that are listed as threatened species; critical habitat is listed in the area for one species. The Corps must complete a determination of effects from all proposed and related Northshore Mining, Inc., projects upon federally-listed threatened and endangered species and critical habitat. Consultation with the FWS will be required if the action may affect any listed species or critical habitat. Consultation must be completed before a permit is issued.
2. The public notice indicated that 22.21 acres of wetlands will be directly lost due to expansion of the Milepost 7 Tailings disposal Basin. This acreage is in addition to an associated 89.68 acres of wetlands proposed to be excavated and filled at Northshore Mining, Inc.,'s main and East Pits. The Corps must ensure that all measures to avoid and minimize wetland impacts have been addressed by all proposed and related Northshore Mining, Inc,. project proposals. Following that, the Corps must provide the replacement mitigation plans and features before reviewing agencies can assess the scope of impacts

associated with the proposed action.

3. The proposed mine operation with anticipated impacts to wetlands has a potential for adversely impacting the quality of water in the Dunka River watershed and receiving waters in the Lake Superior watershed. The Corps should ensure that a Section 401 Water Quality Certification for all proposed and related Northshore Mining, Inc., projects be completed by the Minnesota Pollution Control Agency before permit validation.
4. Secondary and cumulative impacts from this and other new or proposed mine expansions in Minnesota's Iron Range require careful evaluation and environmental documentation. The Corps should conduct an assessment of secondary and cumulative impacts on wetlands and aquatic habitats resulting from this and other similar mine-related actions through processes established by the National Environmental Policy Act (NEPA). The results of this assessment should be a principal instrument in evaluating the indirect effects of current and future permit applications in Minnesota's Iron Range.

Pending fulfillment of the above recommendations, the FWS requests that the permit, be denied without prejudice. Pursuant to Part IV, Paragraph 3(a) of the Memorandum of Agreement Between the Department of the Interior and the Department of the Army on Section 404(q) of the Clean Water Act dated December 21, 1992, it is the opinion of the Department of the Interior that this project may result in substantial and unacceptable impacts to Aquatic Resources of National Importance (e.g., Federal and Tribal Trust resources, including endangered species, and migratory birds and their habitats associated with wetlands and aquatic species). The FWS has reserved the right to elevate the individual permit action if significant differences remain between the FWS and Corps on the disposition of the permit.

Note: The Corps has determined that since the requested authorization is within the footprint of the previously authorized tailings basin area, and since an EIS was prepared for the initial tailings basin project, an EIS will not be required for this project.

The Corps has also determined that although both the tailings basin project and the proposed mine expansion are technically both part of the ongoing Northshore Mining Company operation, they are separate actions and may be reviewed separately. First, the tailings basin would require ongoing management even if the mine and processing plant ceased operations. Under current operating conditions, the tailings delivered to the basin are delivered in a slurry form. In addition, the tailings basin

receives water both directly and through runoff from rain events. Water from the basin is returned to the plant for use in ore processing. If the operation of the plant ceased, water levels in the basin would still need to be managed. Second, it is possible, although unlikely due to various economic considerations, that the Northshore Mining Company processing plant could continue to operate by obtaining ore from another source.

See, also, Secondary and Cumulative Effects and Endangered Species, below.

State Department of Natural Resources (DNR). The DNR did not provide any comments. However, the project does require permits to mine, water appropriation, and Minnesota Wetland Conservation Act authorizations from the DNR.

Minnesota Pollution Control Agency (MPCA). The MPCA did not provide any comments. However, the applicant has stated that the MPCA has previously issued Section 401 water quality certification for the entire originally permitted Milepost 7 Tailings disposal Basin project. The project would also require NPDES permits from the MPCA.

State Historic Preservation Officer (SHPO). The SHPO responded that based on available information, they conclude that no properties eligible for or listed on the National Register of Historic Places are within the projects area of effect.

ALTERNATIVES KEY.

Throughout the remainder of Part II of this document, the proposed project and its alternatives will be identified according to the following key:

P = Project as described in the public notice (or as subsequently modified).

D = Denial of the permit.

ALTERNATIVES NOT EVALUATED.

No other alternatives were considered during the public interest review, since this project is development of the next portion of the previously authorized Milepost 7 Tailings Basin Disposal Area project.

MITIGATION AND THE SECTION 404(B)(1) RESTRICTIONS ON DISCHARGE.

Guidelines issued by the U.S. Environmental Protection Agency (EPA) pursuant to Section 404(b)(1) of the Clean Water Act restrict discharges of dredged or fill material under certain circumstances (see 40 CFR 230.10). These circumstances include specified types of environmental harm that would be caused by the discharge under review.

The guidelines also restrict discharges when there are feasible, less environmentally-damaging alternatives available. In general, this portion of the guidelines corresponds to the definition of mitigation found in the guidelines issued by the Council on Environmental Quality to implement the National Environmental Policy Act (see 40 CFR 1508.20). The policies and procedures for implementing the 404(b)(1) guidelines were set forth in a Mitigation Memorandum of Agreement (MOA) issued by the EPA and the Corps on February 7, 1990. According to the MOA, "The Corps will strive to avoid adverse impacts and offset unavoidable adverse impacts to existing aquatic resources, and for wetlands, will strive to achieve a goal of no overall net loss of values and functions." To carry out this policy, the Corps will, in general, evaluate Section 404 applications by gathering and reviewing all information on a project, including potential mitigation, at the same time. Then the Corps makes the following sequence of determinations:

1) Avoidance - The Corps first makes a determination that potential impacts have been avoided to the maximum extent practicable. To determine the availability of alternatives that would avoid impacts, one of the following two criteria must be applied:

a) If the project is in a special aquatic site (such as a wetland), and if the project does not need to be in or near the special aquatic site to fulfill its basic purpose (i.e., the project is not "water dependent"), then the Corps is required to assume that there are practicable alternatives that do not involve special aquatic sites. To overcome this presumption, the applicant must clearly demonstrate to the Corps that practicable alternatives are not available. If the presumption is not overcome, the Corps must deny the permit application.

b) If the project is not in a special aquatic site and/or is water dependent, the Corps is not required to assume that there are practicable upland alternatives. However, if the Corps identifies such alternatives, the applicant must clearly

demonstrate that they are not feasible. If such a demonstration cannot be made, the Corps must deny the permit application.

2) Minimization - The Corps will next mitigate unavoidable impacts, to the extent appropriate and practicable, by requiring steps to minimize those impacts.

3) Compensation - Finally, the Corps will mitigate unavoidable impacts, to the extent appropriate and practicable, by requiring steps to compensate for aquatic resource values.

In determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes. The Corps will give full consideration to the views of the resource agencies when making this determination.

(NOTE: It may be appropriate to deviate from the above sequence when the discharge is necessary to avoid environmental harm or when the proposed discharge can reasonably be expected to result in environmental gain or insignificant environmental losses.)

The following is a summary of the mitigation sequence as it pertains to the proposal (Alternative P) and, if applicable, its alternatives (A1, A2, etc.). If denial of the permit (Alternative D) is not specifically addressed, the reader may assume that no discharge subject to Section 404(b)(1) sequencing would result from such action.

Avoidance/Minimization.

The purpose of this project is to continue development and use of Northshore Mining Company's Milepost 7 Tailings Disposal Basin. This is not a water-dependent activity because taconite tailings do not need to be disposed of in wetlands to fulfill their basic purpose. Furthermore, the project site is a wetland, which is a special aquatic site. Therefore, the Corps must assume that there are practicable alternatives available that would avoid wetland impacts.

The proposed action is the permitting of the next phase of development of the applicant's previously authorized tailings disposal basin. Due to the size of the area required for tailings disposal, and the prevalence of wetlands in the area, the applicant has not been able to design a project which would avoid or minimize wetland impacts.

Compensation.

As compensation for the 20.0 acres of jurisdictional wetlands which would be lost due to this project, the applicant is proposing to purchase 20.0 acres of new wetland credit from the Cliffs Erie, LCC, Embarrass River Mitigation Bank located in Sec. 3, T. 59N., R. 15W.; and Sec. 34 and 35, T. 60N., R. 15W., St. Louis County, Minnesota (replacement ratio 1:1).

The project would result in the loss of 10.24 acres of bog, 0.30 acres of wooded swamp, 2.56 acres of shrub carr, 1.27 acres of shallow marsh, 3.92 acres of alder thicket, 1.33 acres of shallow open water, and 0.39 acres of wet meadow wetlands, tributary to Lake Superior. The replacement includes 12.27 acres of wet meadow/scrub-shrub. 3.51 acres of shallow/deep marsh, and 4.22 acres of forested wetlands.

For a summary of all elements of Sec. 404(b)(1) compliance (including the alternatives criteria discussed above), see the matrix that follows the list of Technical Evaluation Factors.

GENERAL PUBLIC INTEREST FACTORS.

IMPACT KEY:
B = Beneficial effect.
A = Adverse effect.
0 = No effect.

NOTE: The absence of narrative under any heading with a "B" or "A" in the parenthesis indicates that, although there would be an impact, it would be a very minor one. If assessing more than one alternative, the impacts for each alternative will be shown in separate parentheses. However, if none of the alternatives would have an impact (either beneficial or adverse) on a given factor, a single (0) will be used after that factor.

Noise levels. (0)

The proposed project includes the next phase of development of the existing Northshore Mining Company Milepost 7 Tailings Disposal Basin area. Noise levels in the project area should not be higher than under the current operating conditions.

Aesthetic values. (0)

The project is the next phase of development of an existing tailings basin. It is located within an area of the mining/processing operation, and is not accessible to the public.

Recreation. (0)

The project site is located within an area of Northshore Mining Company's mining/processing operation, and is not accessible to the public.

Transportation. (0)

The project would not require the use of public transportation services. The project would not result in increases in the transportation of taconite ore from Northshore Mining Company's mine near Babbitt, Minnesota, to their processing facility in Silver Bay, Minnesota.

Public health. (0)

The project should have no effect on public health.

Safety. (0)

The project is the development of the next phase of a previously permitted tailings disposal area. It should have no effect on safety.

Community growth. (0)

The project would not result in community growth. Development of the next phase of the tailings basin would allow the continued operation of Northshore Mining Company, a major employer in the area.

Business/home relocations. (0)

The project would not require the relocation of any homes or businesses.

Existing/potential land use. (0)

The area of the proposed project is located within the previously authorized Milepost 7 Tailings Basin Disposal Area. Due to land-form, cost, and the use of coarse tailings for its construction, the tailings basin is being constructed incrementally. The current phase of development is immediately adjacent to the active tailings disposal area.

Property values. (0)

The project should not effect property values in the area.

Tax revenues. (B)

The project would allow the continued operation of Northshore Mining Company. The mining company is a major employer in the area.

Public facilities and services. (0)

The project would not result in expanded use of public facilities or services.

Employment. (B)

The project would allow for the continued operation of Northshore Mining Company, a major employer in the area.

Business activity. (B)

The project would allow for the continued operation of Northshore Mining Company. In addition to directly providing employment at its operations, the company purchases a considerable amount of supplies and services from numerous vendors.

Farmland/food supply. (0)

The project does not include any farmland, and would have no effect on food supplies.

Flooding. (0)

The project site is not located in or near a floodplain, discharges from the site would not increase and would not increase the chances of down gradient flooding.

Energy. (0)

The project would not require increased energy usage at the Northshore Mining Company operation.

Mineral needs. (B)

Northshore Mining Company mines and processes taconite for steel production. The proposed project would allow the continued operation of the company.

Air quality. (0)

The proposed project would not result in increased equipment usage, and should not affect air quality in the project area.

Terrestrial habitat. (A)

The project would result in the loss of approximately 140 acres of terrestrial habitat. This area would become inundated with water and taconite tailings. Once mining operations cease, the area would be reclaimed to either forest, grassland, or wetland.

Aquatic habitat. (A)

The project would result in the loss of 1.27 acres of shallow marsh and 1.33 acres of shallow open water habitat.

Habitat diversity and interspersion. (0)

Due to the amount of undeveloped habitat in the area similar to that proposed to be impacted, the project should not have a substantial impact on habitat diversity and interspersion.

Water quality. (0)

The project includes only the development of the next phase of the previously permitted Milepost 7 Tailings Disposal basin project. Water discharges from the site should not change from current levels.

Water supply. (0)

The project site is not located in an area providing water supplies.

Groundwater. (0)

The project should have no effect on groundwater.

Soils. (0)

The project should not affect soils in the area.

Shoreline processes. (0)

The project does not include any shoreline areas.

Wetlands. (A)

The project would result in the loss of 10.24 acres of bog, 0.30 acres of wooded swamp, 2.56 acres of shrub carr, 1.27 acres of shallow marsh, 3.92 acres of alder thicket, 1.33 acres of shallow open water, and 0.39 acres of wet meadow wetlands, tributary to Lake Superior.

As compensation for the 20.0 acres of natural wetlands which would be lost due to this project, the applicant is proposing to purchase 20.0 acres of new wetland credit from the Cliffs Erie, LCC, Embarrass River Mitigation Bank located in Sec. 3, T. 59N., R. 15W.; and Sec. 34 and 35, T. 60N., R. 15W., St. Louis County, Minnesota (replacement ratio 1:1). The replacement includes 12.27 acres of wet meadow/scrub-shrub. 3.51 acres of shallow/deep marsh, and 4.22 acres of forested wetlands.

Secondary and cumulative effects. (0)

The FWS commented that secondary and cumulative impacts from this and other new or proposed mine expansions in Minnesota's Iron Range require careful evaluation and environmental documentation. They state that the Corps should conduct an assessment of secondary and cumulative impacts on wetlands and aquatic habitats resulting from this and other similar mine-related actions through processes established by the National Environmental Policy Act (NEPA). The results of this assessment should be a principal instrument in evaluating the indirect effects of current and future permit applications in Minnesota's Iron Range.

The Corps agrees that mining in general has, and is, resulting in cumulative effects. However, the Corps has determined that, in this instance, the current project includes only the next phase of the applicant's tailings basin development, and since an EIS was previously completed for the entire tailings basin project, an EIS for this phase of the development is not warranted.

PUBLIC INTEREST FACTORS MERITING SPECIAL CONSIDERATION.

Navigation. (0)

The project would have no effect on navigation.

Endangered species. (0)

None were identified by the applicant or are known to exist in the permit area. However, Lake County is within the known or historic range of the following Federally-listed threatened (T) and endangered (E) species:

Species	Habitat
Bald eagle (T)	Mature forest near water
Grey wolf (T)	Northern forested areas
Canada lynx (T)	Northern forested areas

None of the above listed species are known to nest or den in the immediate project area, although all of the species could use the area for hunting, resting, or as a travel corridor. No critical habitat for any of the listed species is known to exist in the project area. Since the project is an expansion of an existing mine tailings facility, and since there is an abundance of similar habitat in the vicinity of the project, the Corps has determined that the proposed project would not have an adverse effect on any of the species listed above, or their critical habitat.

The project was discussed with Mr. Paul Burke of the FWS who verbally agreed with this determination.

Historical/archaeological. (0)

The SHPO responded that based on available information, they conclude that no properties eligible for or listed on the National Register of Historic Places are within the projects area of effect.

Wild and scenic rivers. (0)

The project is not located in the vicinity of any wild or scenic rivers.

Tribal Trust resources. (0)

The project site is located within an active area of Northshore Mining Company's mining and processing operation. It would not affect the quantity or quality of water leaving the site. Therefore, it should have no effect on Tribal trust resources.

State listed impaired (Section 303(d)) waters. (0)

The site does not contain any state listed impaired waters.

Section 176(c) of the Clean Air Act General Conformity Rule Review.

The proposal has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean

Air Act. It has been determined that the activities proposed under this permit will not exceed de minimis levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this permit.

THE ENVIRONMENTAL PROTECTION AGENCY'S 404(B)(1) GUIDELINES.

As explained above, the discharge of dredged or fill material will be evaluated in accordance with guidelines developed by the EPA. The guidelines are found at Title 40, Code of Federal Regulations, Part 230.

Testing.

The Section 404(b)(1) guidelines require testing of the extraction site for contaminants except under certain circumstances. These include the existence of prior test results, scientific research and/or experience that indicates that contaminants are not present in the material to be discharged. Testing may also be omitted if the discharge site is adjacent to the extraction site and subject to the same sources of contaminants, and materials at the two sites are substantially similar. Testing may also be omitted if constraints are available to reduce contamination to acceptable levels, and if the potential discharger is willing and able to implement such constraints. In this case, testing is not required because all construction materials would consist of coarse taconite tailings obtained from Northshore Mining Company's ore processing operation, or be obtained on site.

Technical Evaluation Factors.

In making our findings on compliance with the Section 404(b)(1) guidelines, we have considered the potential impacts of the project (and alternatives, if any) on the physical and chemical characteristics of the aquatic ecosystem. These characteristics are listed in Subparts C - F of the guidelines, 40 CFR Part 230.20 - 230.54, as found on pp. 85350 - 85354 of the Federal Register, Vol. 45, No. 249. The characteristics include substrate, suspended particulates/turbidity, water, current patterns and water circulation, normal water fluctuations, salinity gradients, threatened and endangered species, fish, crustaceans, mollusks, and other aquatic organisms in the food

web, other wildlife, sanctuaries and refuges, wetlands, mud flats, vegetated shallows, riffle and pool complexes, municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.

Section 404(b)(1) compliance summary matrix.

P = Proposal. D = No action (denial). A1, A2 = Additional alternatives, if any. Where only a P is shown, it indicates that all alternatives meet compliance criteria for that item. An unknown is a noncompliance; this will be designated with a U in the DOES NOT COMPLY column.

CRITERIA	MEETS	DOES NOT COMPLY
1. The applicant must overcome the presumption that a practicable, less environmentally damaging alternative site, outside special aquatic sites, exists. If the project is water dependent, OR is not in a special aquatic site, enter only N/A (not applicable).	P	
2. There must be no alternative that is practicable, is less damaging to the aquatic ecosystem, and has no other significant, adverse environmental effects.	P	
3. The discharge must not violate state water quality standards or Clean Water Act Section 307 toxic effluent standards or bans.	P	
4. The project must not jeopardize the continued existence of an endangered species.	P	
5. The project must not cause significant adverse effects on municipal water supplies, plankton, fish, shellfish, wildlife, special aquatic sites, or other aspects of human health or welfare.	P	
6. The project must not cause significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.	P	

7. The project must not cause significant adverse effects on ecosystem diversity, productivity, or stability.	P	: : :
8. The project must not cause significant adverse effects on recreational, aesthetic or economic values.	P	: : :
9. All appropriate and practicable steps, to minimize potential adverse effects of the discharge on the aquatic ecosystem, must be taken.	P	: : : :

OTHER AUTHORIZATIONS.

Water-quality certification: Granted. (See public notice, Attachment A.)

Coastal zone management consistency determination: Not applicable.

State and/or local authorizations: The project also requires various permits from the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Natural Resources (DNR).

PART III - SUMMARY AND STAFF RECOMMENDATION

GENERAL EVALUATION.

The relative extent of the public and private need for the proposed work.

The proposed project is the next phase of development of the previously authorized Northshore Mining Company Milepost 7 Tailings Basin Disposal area. The project would allow continued operation of Northshore Mining Company. Northshore Mining Company is one of only six companies in Minnesota producing taconite ore for the steel industry, and is a major employer in northeastern Minnesota.

The practicability of using reasonable alternative locations and methods to accomplish the objective of the structure or work.

The proposed project is the next phase of development of the

previously authorized Northshore Mining Company Milepost 7 Tailings Basin disposal area. The previously issued Department of the Army permits for the tailings basin and associated structures have expired. The applicant's current application requests that several of the previously issued permits be consolidated, and that the project be reauthorized for the next 20 years of operation, incorporating current permit conditions. Use of an alternate area would require extensive work and expense for construction of a containment area, including dikes, dams, and diversion of overland runoff and possibly streams. In addition, with the extensive area required for tailings disposal, it is extremely unlikely that the applicant could locate an area which would have fewer wetlands than the proposed site.

The extent and permanence of the beneficial and detrimental effects that the proposed structure or work is likely to have on the public and private uses to which the area is suited.

The project would be beneficial because:

1) It would allow the continued operation of Northshore Mining Company, a major producer of taconite in northeastern Minnesota, and a major employer in the area. In addition to directly providing employment at its operations, the company purchases a considerable amount of supplies and services from numerous vendors. Continued operation of Northshore Mining Company is very important for the economy of Northeastern Minnesota, and

2) Regardless of whether Northshore Mining Company continues operating, the project would be required to insure integrity of the tailings basin dikes and dams. If Northshore Mining Company ceased operations of its taconite processing facility it would no longer obtain water from the tailings basin and water levels in the basin would rise.

The project would, however, result in the loss of 10.24 acres of bog, 0.30 acres of wooded swamp, 2.56 acres of shrub carr, 1.27 acres of shallow marsh, 3.92 acres of alder thicket, 1.33 acres of shallow open water, and 0.39 acres of wet meadow wetlands, tributary to Lake Superior. This loss would be permanent.

As compensation for the 20.0 acres of naturally occurring wetlands which would be lost due to this project, the applicant is proposing to purchase 20.0 acres of new wetland credit from the Cliffs Erie, LCC, Embarrass River Mitigation Bank located in Sec. 3, T. 59N., R. 15W.; and Sec. 34 and 35, T. 60N., R. 15W., St. Louis County, Minnesota (replacement ratio 1:1). The replacement includes 12.27 acres of wet meadow/scrub-shrub. 3.51 acres of shallow/deep marsh, and 4.22 acres of forested wetlands.

If the wetland mitigation site is maintained appropriately, the water quality and wildlife benefits obtained should last indefinitely.

STAFF RECOMMENDATION. Based on an evaluation of all data submitted or gathered during the public interest review, it is the recommendation of the Regulatory Branch that a Department of the Army permit be issued for the project.

8/9/05
Date

Timothy W. Peterson
Project Manager

8/10/05
Date

Maria L. Wolnacki
Robert J. Whiting
for Chief, Regulatory Branch

PART IV - FINDINGS AND DECISION OF THE DISTRICT ENGINEER

I have considered the foregoing facts, analysis, and recommendation. The following are my views on this permit application:

FINDING OF NO SIGNIFICANT IMPACT.

Having reviewed the information provided by the applicant, the comments submitted by interested parties, and the environmental assessment contained in this document, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an environmental impact statement will not be required.

SECTION 404(B)(1) COMPLIANCE/NON-COMPLIANCE DETERMINATION.

The discharge complies with the guidelines, with the inclusion of appropriate and practicable conditions to minimize pollution or other harmful impacts to the affected ecosystem.

PUBLIC HEARING REQUEST.

CEMVP-OP-R (2005-2628-TWP)
APPLICANT: Northshore Mining Company

No public hearing request was received.

DECISION.

I have reviewed and evaluated, in light of the overall public interest, the documents and factors concerning this permit application as well as the stated views of other interested agencies and the concerned public. In doing so, I have considered the possible consequences of this project in accordance with regulations published in 33 CFR Part 320 to 330 and 40 CFR Part 230. I find that issuance of a Department of the Army permit (with special conditions):

__X_____ would not be contrary to the public interest.

_____ would be contrary to the public interest.

_____ I further find that restoration is necessary to restore those values and functions that have been adversely affected by the unauthorized discharge of dredged and/or fill material.

Aug 12, 2005
Date

Michael F. Pfenning
Colonel, Corps of Engineers
District Engineer

No public hearing request was received.

DECISION.

I have reviewed and evaluated, in light of the overall public interest, the documents and factors concerning this permit application as well as the stated views of other interested agencies and the concerned public. In doing so, I have considered the possible consequences of this project in accordance with regulations published in 33 CFR Part 320 to 330 and 40 CFR Part 230. I find that issuance of a Department of the Army permit (with special conditions):

__X_____ would not be contrary to the public interest.

_____ would be contrary to the public interest.

_____ I further find that restoration is necessary to restore those values and functions that have been adversely affected by the unauthorized discharge of dredged and/or fill material.

_____ _____

Date

Michael F. Pfenning
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
190 FIFTH STREET EAST
ST. PAUL MN 55101-1638

June 6, 2006

Operations
Regulatory (2005-2628-TWP)

Mr. Denny Wagner
Northshore Mining Company
10 Outer Drive
Silver Bay, Minnesota 55614

Dear Mr. Wagner:

This letter regards Department of the Army (DOA) Permit 2005-2628-TWP, issued August 31, 2005, which authorized the discharge of fill material in 20.0 acres of wetland adjacent to Lake Superior, in conjunction with the next approximately 160 - acre development of Northshore Mining Company's Milepost 7 Tailings Disposal Basin to accommodate the next 25 years of the basin's use. The project site is in Sections 21, 28, 29, 31, and 32., T. 56N., R. 8W., Lake County, Minnesota.

The St. Paul District, Corps of Engineers, has been asked to provide clarification on which areas of the tailings basin have been included in wetland permits, to date, and if all permitted wetland areas have been mitigated.

All areas within the tailings basin dikes up to an elevation of 1252 feet were permitted by various DOA permits prior to the issuance of DOA permit 2005-2628-TWP. DOA Permit 2005-2628-TWP authorized the discharge of fill materials in the wetlands between elevation 1252 and the limits identified in DOA Permit 2005-2628-TWP. Appropriate compensatory mitigation has been provided for all of the wetlands permitted to be filled by these permits.

If you have any questions, contact Tim Peterson in our Two Harbors office at (218) 834-6630. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,

For Robert J. Whiting
Chief, Regulatory Branch

Appendix I

WCA Approval Letter

Minnesota Department of Natural Resources

DIVISION OF LANDS AND MINERALS
1525 THIRD AVENUE EAST
HIBBING, MINNESOTA 55746
TELEPHONE: (218) 262-7324 FAX: (218) 262-7328
E-MAIL: steve.dewar @dnr.state.mn.us

August 31, 2005

Mr. Denny Wagner
Northshore Mining Company
10 Outer Drive
Silver Bay, MN 55614

Dear Mr. Wagner:

The Northshore Mining Company Wetland Replacement Plan, dated May 2005, entitled "Tailing Basin Railroad Relocation, Diversion Ditch Relocation, and Road Rise" has been found to meet the requirements of the Wetland Conservation Act. The project involves impacting 20.0 acres of wetlands on the west side of the Mile Post 7 tailing basin. The permit conditions listed in the Corps of Engineers approval shall be followed for meeting requirements of the Wetland Conservation Act. Prior to the start of work in the wetlands on the project site, the Lands and Minerals Division of the DNR shall also receive the documented proof of purchase from the wetland mitigation bank.

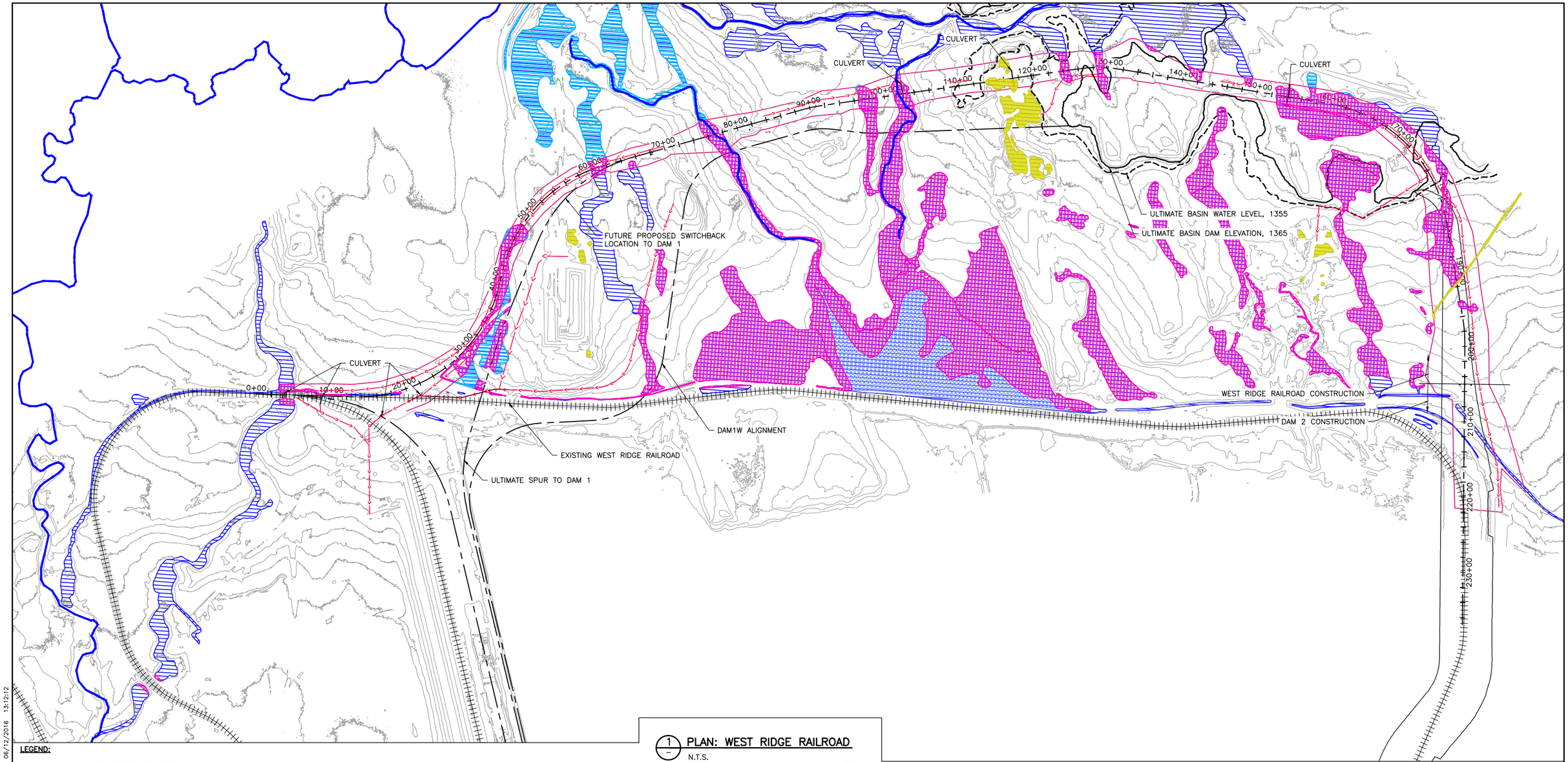
Sincerely,

Steve Dewar, Field Supervisor
Mineland Reclamation

c: Dave Skolasinski, Northshore
Mark Nelson, BWSR
Walt Van Den Huelvel, Lake County
Dave Holmbeck, Eco Services
A. Knoll
A. Jagunich

Appendix J

Project Plans



1 — PLAN: WEST RIDGE RAILROAD
N.T.S.

LEGEND:

- RAILROAD ALIGNMENT
- EXISTING RAILROAD
- 1365 CONTOUR
- 1315 CONTOUR
- WETLANDS, DELINEATED SUMMER 2015
- WETLANDS – DEEPWATER IMPACTS
- WETLANDS – DIRECT IMPACTS
- WETLANDS – INDIRECT IMPACTS
- NON-JURISDICTIONAL WETLANDS
- WRRR CONSTRUCTION EXTENTS
- FUTURE DITCH
- EXISTING STREAMS

PRELIMINARY DRAFT
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME _____

SIGNATURE _____

DATE _____ LICENSE # _____

CLIENT	A	B	C	0	1	2	3
BID							
CONSTRUCTION							
RELEASED TO/FOR	DATE RELEASED						

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
3128 14TH AVENUE EAST
HIBBING, MN 55746
Ph: 1-800-225-1966
Fax: (218) 262-3460
www.barr.com

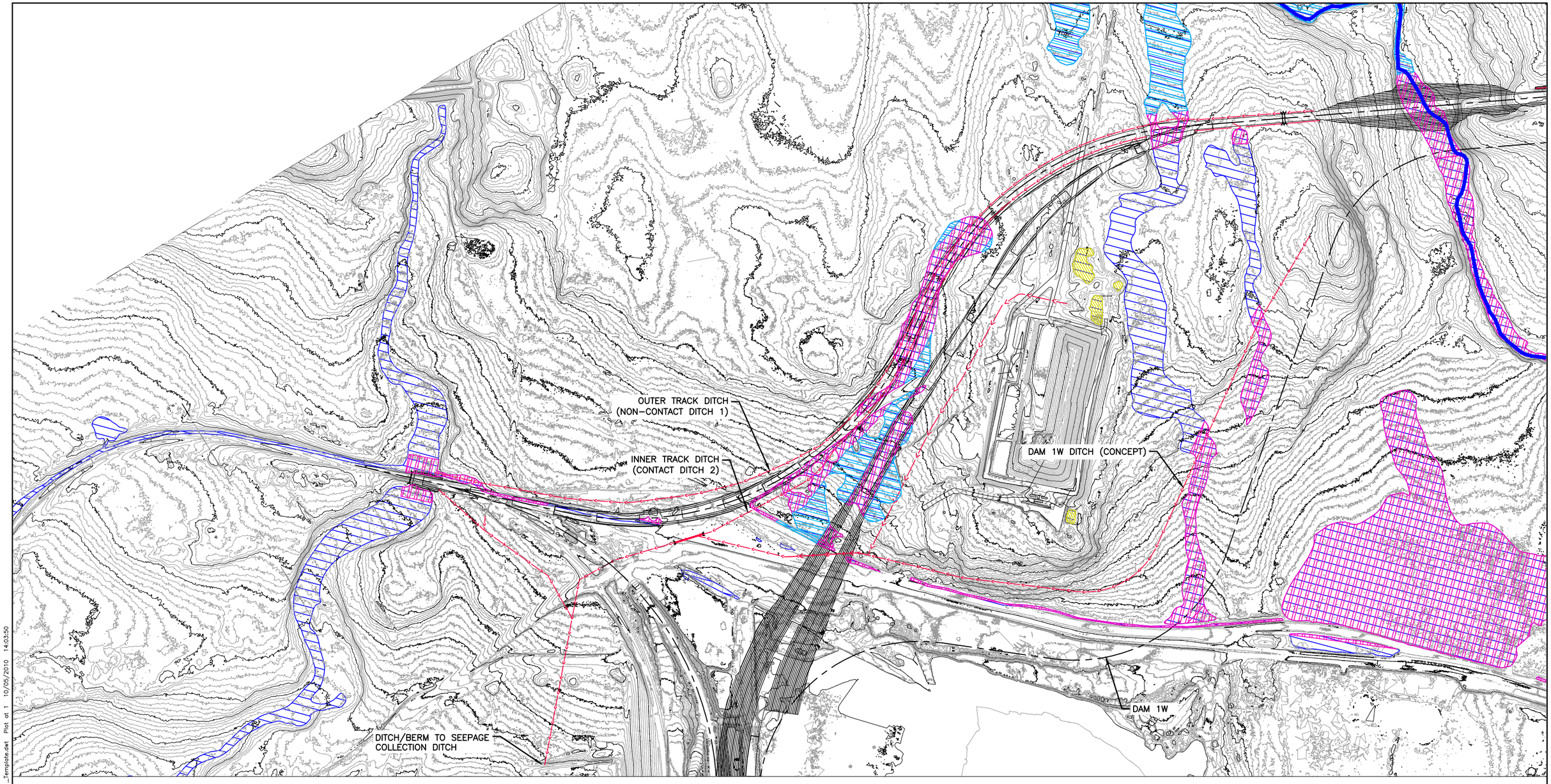
Scale	AS SHOWN
Date	3/8/2015
Drawn	GSJ
Checked	LCH2
Designed	GSJ
Approved	

NORTHSHORE MINING COMPANY
SILVER BAY, MINNESOTA

MILEPOST 7 TAILINGS BASIN
WEST RIDGE RAILROAD

LONG RANGE RAILROAD
OVERALL PLAN – WETLANDS

BARR PROJECT No. 23/38-1049
CLIENT PROJECT No.
DWG. No.
REV. No. A



LEGEND:

- EXISTING 10' MAJOR CONTOUR
- EXISTING 2' MINOR CONTOUR
- PROPOSED 25' MAJOR EMBANKMENT CONTOUR
- PROPOSED 5' MINOR EMBANKMENT CONTOUR
- WRRR CONSTRUCTION EXTENTS
- FUTURE DITCH
- EXISTING STREAM
- RAILROAD ALIGNMENT
- EXISTING RAILROAD
- WETLANDS, DELINEATED SUMMER 2015
- WETLANDS – DIRECT IMPACTS
- WETLANDS – INDIRECT IMPACTS
- NON–JURISDICTIONAL WETLANDS

1 PLAN: ISOLATION DAM/LANDFILL WATER MANAGEMENT

PRELIMINARY DRAFT
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINTED NAME
SIGNATURE
DATE ____ LICENSE # ____

CLIENT
BID
CONSTRUCTION
RELEASED TO/FOR

A	B	C	0	1	2	3

DATE RELEASED

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1–800–632–2277

Project Office:
BARR ENGINEERING CO.
3128 14TH AVENUE EAST
HIBBING, MN 55746
Ph: 1–800–225–1966
Fax: (218) 262–3460
www.barr.com

Scale	AS SHOWN
Date	3/3/2016
Drawn	GSJ
Checked	
Designed	GSJ
Approved	

NORTHSHORE MINING COMPANY
SILVER BAY, MINNESOTA

MILEPOST 7 TAILINGS BASIN
LANDFILL/ISOLATION DAM WATER CONTROL

OVERALL
CONCEPTUAL PLAN

BARR PROJECT No. 23/38–1049
CLIENT PROJECT No.
DWG. No. FIGURE A
REV. No. A

CADD USER: Greg Johnson FILE: M:\DESIGN\23381049.00\23381049_ISO DAM AND LANDFILL DITCHES–ILDWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2018 12:13 PM
BAR M:\AutoCAD 2011\AutoCAD 2011 Support\enu\Template\Barr_2011_Template.dwt Plot at 1 10/05/2010 14:03:50

Appendix K

U.S. Army Corps of Engineers Approved Jurisdictional Determination
January 19, 2017

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

REPLY TO ATTENTION OF
REGULATORY BRANCH

JAN 19 2017

Regulatory File No. 2015-02528-RMM

Northshore Mining Company
c/o Andrea Hayden
10 Outer drive
Silver Bay, Minnesota 55614

Dear Ms. Hayden:

This letter is in response to your request for an approved jurisdictional determination (AJD) for the aquatic resources identified as Ditch 02b, Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g, 07h, 30a, 30b, 30c, 30d, 31, 38a, 38b, 38c, 38d, and Murphy's Pond within the review area. The review area for our AJD can be seen on the enclosed figures labeled MVP-2015-02528-RMM Page 1 of 8. The project site is located in Sections 20, 21, and 28-32, Township 56 North, Range 8 West, and Section 6, Township 55 North, Range 8 West, Lake County, Minnesota.

We have determined that Murphy's Pond identified in the review area is a water of the United States and therefore is subject to Corps of Engineers jurisdiction as shown on the enclosed figure labeled MVP-2015-02528-RMM Page 4 of 8. Pursuant to Section 404 of the Clean Water Act, the Corps of Engineers has regulatory jurisdiction over the discharge of dredged and fill materials in waters of the United States.

We have determined that the review area also contains aquatic resources that are not subject to Corps of Engineers jurisdiction. These aquatic resources include the following: Ditch 02b, Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g, 07h, 30a, 30b, 30c, 30d, 31, 38a, 38b, 38c, and 38d as shown on the enclosed figures labeled MVP-2015-02528-RMM Page 5 of 8 through Page 8 of 8.

The rationale for the jurisdictional and non-jurisdictional resources is provided in the attached AJD form. If you object to this AJD, you may request an administrative appeal under Corps regulations at 33 CFR 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination, you must submit a completed RFA form to the Mississippi Valley Division Office at the address shown on the form.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the attached NAP. It is not necessary to submit an RFA form to the division office if you do not object to the determination in this letter

This AJD may be relied upon for five years from the date of this letter. However, the Corps reserves the right to review and revise the boundary in response to changing site conditions, information that was not considered during our initial review, or off-site activities that could indirectly alter the extent of wetlands and other resources on-site. This determination may be renewed at the end of the five year period provided you submit a written request and our staff are able to verify that the limits established during the original determination are still accurate.

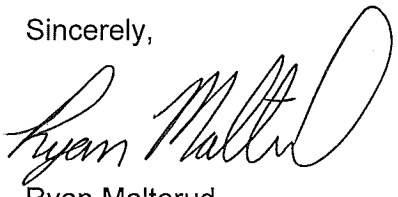
At this time we are unable to complete a Preliminary Jurisdictional Determination for the remainder of the review area because we believe some aquatic resources have been incorrectly identified. Sufficient evidence has not been provided documenting the absence of an ordinary high water mark (OHWM) or bed and banks within Wetland 23 (Little Thirtynine Creek) and Wetland 27 (Big Thirtynine Creek). If these resources have both a bed and banks and an OHWM they should be classified as a stream. Although the upper parts of the Little Thirtynine and Big Thirtynine Creek were diverted in the 1970's as referenced in the draft application dated December 2016, there appears to be enough flow to continue to support a bed and banks and OHWM. It is also our understanding that there has not been any physical alteration to the streams that could have changed any of the morphological characteristics of the streams. These resources likely have a bed and banks and OHWM.

A site visit was conducted on August 10-11, 2016 and several parts of the review area were walked. We had several conversations with Barr Engineering about the importance of adequately documenting all aquatic resources including wetlands and tributaries. We talked about what the components of a tributary are and noted that Wetland 23 and Wetland 27 were likely tributaries. We noted the delineation would need to be updated to reflect those resources. Unless sufficient information is provided documenting the limits of the tributaries a site visit will have to be conducted by us during the growing season to document the presence or absence of a bed and banks and OHWM on Wetlands 23 (Little Thirtynine Creek) and 27 (Big Thirtynine Creek).

Please note that we cannot start the application review process until all aquatic resources have been accurately identified and documented in the administrative record.

If you have any questions, please contact me in our St. Paul office at (651) 290-5286 or ryan.m.malterud@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,



Ryan Malterud
Senior Project Manager

Enclosures

cc:
Bill Johnson (DNR)
Ann Foss (MPCA)
Colleen Sullivan (DNR)
Daniel Jones (Agent)
Walt VanDenHeuvel (Lake County)

Review Area is located within the red boundary labeled as 2015 Wetland Delineation Study Area

2015 Wetland Delineation Study Area

N

0 1,000 2,000 4,000

Feet

Imagery: USGS

SITE LOCATION MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 1

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 13:13 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 01 - Site Location Map.mxd User: MJW

TOPOGRAPHY
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 2

BARR

Ditch
02b
07d
07e
07c
07h
07a
07f
07g
East Borrow Area
30d
31
West Borrow Area
30b
30c
30a
Appendix A - Murphy's Pond
Stormwater Ponds
38b
38c
38a
38d

Study Area
Alder Thicket
Coniferous Swamp
Fresh (Wet) Meadow
Hardwood Swamp
Sedge Meadow
Shallow Marsh
Deepwater included in Jurisdictional Determination Request

N

0 750 1,500 3,000

Feet

Aerial Imagery: FSA 2015

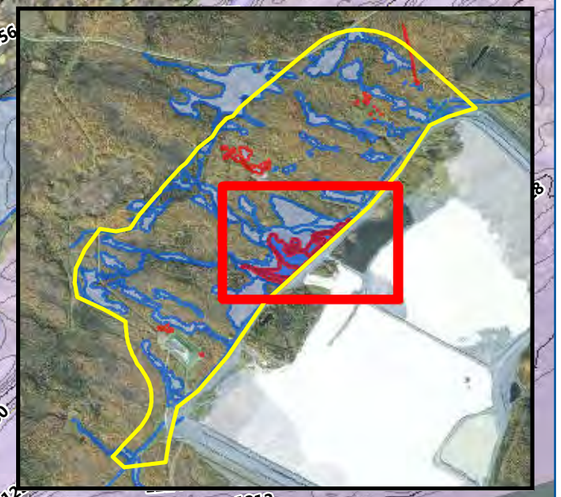
SITE DETAIL INDEX MAP
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

FIGURE 6

BARR

Barr Foster; ArcGIS 10.4; 2016-04-05 13:24; File: \\barr.com\gis\Client\NorthShoreMining\Work Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\USACE JD\Figure 06 Wetland Overview.mxd; User: MJW

The dark blue area represents the 37.9 acre resource identified as Murphy's Pond subject to this AJD



— 2-ft Contours

— 10-ft Contours

Wetlands included in Jurisdictional Determination Request

Deepwater included in Jurisdictional Determination Request

Effective 2005 MP7 Permit Limits

Wetlands

Study Area

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

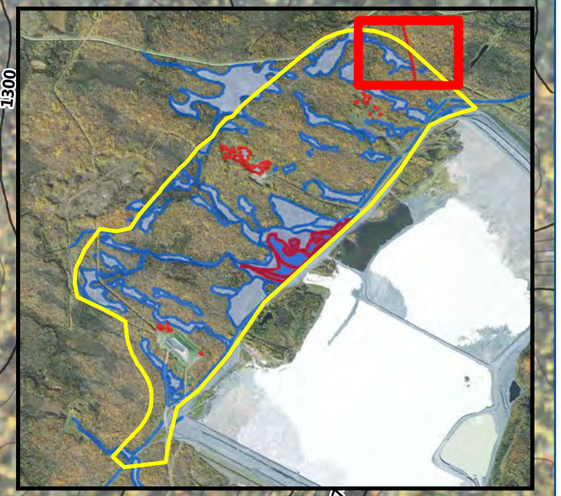
0 350

Feet

Imagery Source: FSA 2015

SITE DETAIL MAP OF MURPHY'S POND AREA (WETLAND 18)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 9



Ditch 2B

2B

01a

02

03b

03c

20

21

21

2-ft Contours

10-ft Contours

Wetlands included in Jurisdictional Determination Request

Wetlands

Study Area

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2015

SITE DETAIL MAP OF
DITCH AREA (WETLAND 2)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 7

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-16 15:00 File: I:\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 07 - Site Detail Area 7.mxd User: MJW

Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g, and 07h

07a
07b
07c
07d
07e
07f
07g
07h

— 2-ft Contours
— 10-ft Contours
Wetlands included in Jurisdictional Determination Request
Wetlands
Study Area

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200
Feet

Imagery Source: FSA 2015

SITE DETAIL MAP OF EAST BORROW AREA
(WETLAND 7a - 7h)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

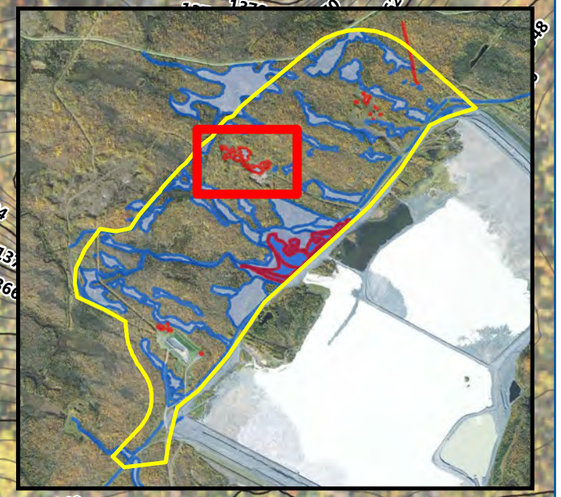
Figure 8

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:11 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 08 - Site Detail Area 7.mxd User: MJW

Wetlands 30a, 30b, 30c, 30d, and 31

30a
30b
30c
30d
31



2-ft Contours
10-ft Contours
Wetlands included in Jurisdictional Determination Request
Wetlands
Study Area

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200
Feet

Imagery Source: FSA 2015

SITE DETAIL MAP OF WEST BORROW AREA
(WETLANDS 30A-30D, 31)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 10

BARR

Barr Footer: ArcGIS 10.3.1, 2016-03-14 13:56 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\ Figure 10 - Site Detail Area 30 and 31.mxd User: MJW

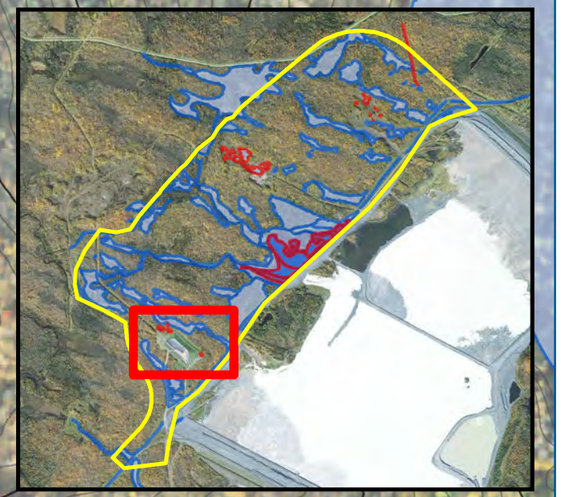
Wetlands 38a, 38b, 38c, and 38d

38a

38b

38c

38d



— 2-ft Contours

— 10-ft Contours

Wetlands included in Jurisdictional Determination Request

Wetlands

Effective 2005 MP7 Permit Limits

Study Area

Jurisdictional status for each aquatic resouce has been estimated, and should not be considered final until written concurrence has been issued by the appropriate regulatory authority.

N

0 100 200

Feet

Imagery Source: FSA 2015

SITE DETAIL MAP OF STORMWATER PONDS (WETLANDS 38A – 38D)
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota

Figure 11

BARR

Barr Footer: ArcGIS 10.4, 2016-04-04 09:19 File: \\barr.com\gis\Client\NorthShoreMining\Work_Orders\DS14_2014_RR_Design\Maps\Reports\Jurisdictional Determination\MNDNR JD\Figure 11 - Site Detail Area 38.mxd User: MJW

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): JAN 19 2017

B. ST PAUL, MN DISTRICT OFFICE, FILE NAME, AND NUMBER: MVP-2015-02528-RMM

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: MN County/parish/borough: Lake City: Silverbay

Center coordinates of site (lat/long in degree decimal format): Lat. 47.30049° N, Long. 91.37251° W.

Universal Transverse Mercator:

Name of nearest waterbody: Big Thirtynine Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Lake Superior

Name of watershed or Hydrologic Unit Code (HUC): 04010102

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: December 19, 2016

☒ Field Determination. Date(s): August 10-11, 2016

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      - ☐ TNWs, including territorial seas
      - ☐ Wetlands adjacent to TNWs
      - ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      - ☐ Non-RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      - ☐ Impoundments of jurisdictional waters
      - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or Murphy's Pond: 37.9 acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
      Elevation of established OHWM (if known): Not known.

2. **Non-regulated waters/wetlands (check if applicable):**[3]

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.

[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The review area includes several aquatic resources. The following 18 aquatic resources were determined to be non-jurisdictional: Ditch 02b, Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g, 07h, 30a, 30b, 30c, 30d, 31, 38a, 38b, 38c, and 38d.**

Ditch 02b is located in the northeast part of the review area. It is a straight linear ditch feature constructed in a northwest to southeast direction. It is approximately 1,900 feet long, 17 feet wide, and approximately 3 feet deep. The ditch was constructed in upland as confirmed in the field on August 10, 2016. The ditch was walked and it was not draining any wetlands. The ditch was fully vegetated and did not appear to have a definitive bed bank or ordinary high water mark. Due to the presence of vegetation and the small watershed of the ditch, we have determined it does not carry a relatively permanent flow. The ditch does have a wetland abutting it; however, it is not draining it. The ditch is not deep enough to have a drainage effect on the wetland. As stated in the memorandum dated December 02, 2008, titled Clean Water Act Jurisdiction Following the U.S. Supreme court's Decision in Rapanos v. United States & Carabell v. United States, the agencies will generally not assert jurisdiction over ditches excavated wholly in and draining only upland and that do not carry a relatively permanent flow. Therefore Ditch 02b is not jurisdictional under Section 404 of the Clean Water Act.

Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g and 07h are located in the northeast part of the review area and Wetlands 30a, 30b, 30c, 30d, and 31 are located in the north central part of the review area. The wetlands were excavated in upland for the purpose of obtaining fill for other uses on the mine site. The preamble for 33 CFR 328, published in Federal Register Volume 51, Number 219, published November 13, 1986 (page 41217), states "For clarification, it should be noted that we generally do not consider the following waters to be "Waters of the United States.... (e) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of Waters of the U.S." These basins were excavated in uplands. Active mining is occurring on the mine site near these waters and has not been abandoned. Therefore, 07a, 07b, 07c, 07d, 07e, 07f, and 07h are not considered to be waters of the U.S. and are not jurisdictional under Section 404 of the Clean Water Act.

Wetlands 38a, 38b, 38c, and 38d are located in the southeast corner of the review area. These wetlands were excavated in upland for the purpose of capturing storm water. The preamble for 33 CFR 328, published in Federal Register Volume 51, Number 219, published November 13, 1986 (page 41217), states "For clarification, it should be noted that we generally do not consider the following waters to be "Waters of the United States....(c) Artificial lakes or ponds created by excavating and / or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing." These basins were constructed in uplands to prevent sediment from washing directly into Gifford Lake, a tributary of the Minnesota River. Therefore, Wetlands 38a, 38b, 38c, and 38d are not considered to be waters of the U.S. and are not jurisdictional under Section 404 of the Clean Water Act.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

[3] Supporting documentation is presented in Section III.F.

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☐ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List**. Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
- ☐ clear, natural line impressed on the bank
- ☐ changes in the character of soil
- ☐ shelving
- ☐ vegetation matted down, bent, or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ other (list):
- ☐ the presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gauges
- ☐ other (list):

☐ Mean High Water Mark indicated by:
- ☐ survey to available datum;
- ☐ physical markings;
- ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width): .
☐ Wetland fringe. Characteristics: .
☐ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain: .
Wetland quality. Explain: .
Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

Flow is: Pick List. Explain:

Surface flow is: Pick List
Characteristics:

Subsurface flow: Pick List. Explain findings:
☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
☐ Discrete wetland hydrologic connection. Explain:
☐ Ecological connection. Explain:
☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are Pick List river miles from TNW.
Project waters are Pick List aerial (straight) miles from TNW.
Flow is from: Pick List.
Estimate approximate location of wetland as within the Pick List floodplain.

(ii) Chemical Characteristics:
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:
Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):
☐ Riparian buffer. Characteristics (type, average width):
☐ Vegetation type/percent cover. Explain:
☐ Habitat for:
☐ Federally Listed species. Explain findings:
☐ Fish/spawn areas. Explain findings:
☐ Other environmentally-sensitive species. Explain findings:
☐ Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)
All wetland(s) being considered in the cumulative analysis: Pick List
Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☒ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: The RPW in question is identified as Murphy's Pond (37.9 acres) within the review area. Murphy's Pond comprises 37.9 acres of a larger wetland identified as Wetland 18 within the delineation report. On behalf of the landowner, Barr Engineering submitted a technical memorandum dated April 28, 2016, which provided topographic evidence that Murphy's Pond is approximately 10 feet deep. Barr Engineering stated they compared the current water elevations from 2012 Minnesota LiDAR derived 2-foot contours to the 2003 2-foot contours topographic map. They estimated the bottom elevation of Murphy's Pond was 1,230 feet while the water elevation was at 1,240 feet. This would indicate the water levels in Murphy's Pond are approximately 10 feet deep. The presence of 10 feet of water makes this resource perennial.

     The connection from Murphy's pond to the next TNW (Lake Superior, a Section 10 water) was documented by Barr Engineering and confirmed in the field by the Corps on August 11, 2016. Murphy's pond flows through a ditch which flows into to the East Beaver Creek where the water flows downstream to Lake Superior. There is a continuous surface water connection from Murhpy's Pond to Lake Superior.
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☒ Other non-wetland waters: **37.9** acres.
     Identify type(s) of waters: **Pond/Lake**.

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
   ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
   ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
   ☐ which are or could be used for industrial purposes by industries in interstate commerce.
   ☐ Interstate isolated waters. Explain: .
   ☐ Other factors. Explain: .

   Identify water body and summarize rationale supporting determination: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).

---

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☒ Other non-wetland waters: Ditch 02b 1,900 linear feetacres. List type of aquatic resource: .
☒ Wetlands: Wetland 07a (0.02 acre), Wetland 07b (0.02 acre), Wetland 07c (0.6 acre), Wetland 07d (0.1 acre), Wetland 07e (0.1 acre), Wetland 07f (0.04 acre), Wetland 07g (0.01 acre), Wetland 07h (0.04 acre), Wetland 30a (0.8 acre),Wetland 30b (0.2 acre), Wetland 30c (1.1 acres), Wetland 30d (0.4 acre), Wetland 31 (5.3 acres), Wetland 38a (0.3 acre), Wetland 38b (0.1 acre), Wetland 38c (0.5 acre), and Wetland 38d (0.1 acre)acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: .
☒ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: .
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☒ National wetlands inventory map(s). Cite name:NWI.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☐ Photographs: ☐ Aerial (Name & Date): .
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: This AJD references several different aquatic resources. Here is an overall summary of what is contained in this AJD:

1. Murphy's Pond is an RPW which flows into Lake Superior. This resource is jurisdictional under Section 404 of the Clean Water Act.

2. Ditch 02b (1,900 linear feet) was constructed in uplands, does not drain a water of the US and does not carry a relatively permanent flow. This resource is not jurisdictional under Section 404 of the Clean Water Act.

3. Wetlands 07a, 07b, 07c, 07d, 07e, 07f, 07g, and 07h were all excavated in dryland for the purpose of obtaining fill, sand, or gravel. These resources are not jurisdictional under Section 404 of the Clean Water Act.

4. Wetlands 38a, 38b, 38c, and 38d were constructed as stormwater ponds in dryland. These resources are not jurisdictional under Section 404 of the Clean Water Act.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: Northshore Mining company	**File No.:** 2015-02528-RMM	**Date:** JAN 19 2017

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

U.S. Army Corps of Engineers
Attn. Ryan Malterud
180 Fifth Street East, Suite 700
St. Paul, MN 55101

If you only have questions regarding the appeal process you may also contact the Division Engineer through:

Mr. Thomas McCabe
Administrative Appeals Review Officer
Mississippi Valley Division
P.O. Box 80 (1400 Walnut Street)
Vicksburg, MS 39181-0080
601-634-5820 FAX: 601-634-5816

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

Appendix L

July 8, 2005 Tailings Basin Railroad, Road and Diversion Ditch Wetland Impact Table and Figure

Table 2: Impacts to Historic Wetlands and Existing Wetland Summary
Revised July 8, 2005
Tailing Basin Railroad, Road, and Diversion Ditch Construction
Northshore Mining
Silver Bay, Minnesota

Wetland ID[1]	Location	Circular 39 Type [2]	Cowardin Wetland Classification[3]	Dominant Plant Community[4]	Existing Wetland Area (ac)	Type of Proposed Impact to Historic Wetland	Impacts to Historic Wetland (Acres)
1	South	2/3/4	PEMB/C/F	Wet meadow	1.8	None	0.0
2	South	2	PSSB	Shrub carr	0.3	None	0.0
3	South	4/3/2/6	PEMH/EMC/EMB/SS	Deep marsh	44.2	None	0.0
4	South	6/5/2	PSSB/UBG/EMB	Shrub carr	3.3	None	0.0
5	South	6	PSSC	Shrub carr	0.4	None	0.0
6	South	6/3	PSSB/EMB	Alder thicket	17.2	None	0.0
7	Southwest	6	PSSB	Shrub carr	1.1	None	0.0
8	West	6/7	PSSC/FOB	Shrub carr	1.9	None	0.0
9	West	8	PFO2/3	Cedar/tamarack bog	28.2	None	0.0
10	West	5/2/6	PUBH/EMB/SSB	Shallow, open water	24.2	None	0.0
11	West	8/2	PFO3/FO1/EMB	Cedar bog	43.5	Impoundment >2 m.	6.39
12	West	7/3	PFOB/EMC	Wooded swamp	7.5	Diversion Ditch	0.30
13	West	6/2	PSS/EMB	Shrub carr	0.9	RR Fill	0.34
14	West	3/2	PEMF/B	Shallow marsh	3.4	RR Fill	1.27
15	West	6/7	PSS/FOB	Alder thicket	11.4	RR Fill	3.74
16	West	7/2	PFO/EMB	Wooded swamp	0.3	None	0.0
17	West	3/2	PEMC/B	Shallow marsh	5.9	None	0.0
18	West	2	PEMB	Wet meadow	1.2	None	0.0
19	West	6/7	PSS/FOB	Alder thicket	2.1	None	0.0
20	West	5	PUBG	Shallow open water	1.3	None	0.0
21	North	6/7	PSS/FOB	Alder thicket	9.1	None	0.0
22	North	3/2/6	PEMC/EMB/SSB	Shallow marsh	2.4	None	0.0
23	West	6/7	PSS/FOB	Shrub carr	2.5	RR Fill	0.54
24	West	2	PEMB	Wet meadow	0.3	None	0.0
25	West	6	PSSB	Shrub carr	2.3	RR Fill	1.52
26	West	5/3	PUBH/EMC	Shallow open water	6.4	RR Fill	1.33
27	West	6/3	PSS/EMC	Shrub carr	1.9	None	0.00
28	West	8	PFO2/3B	Cedar/Tamarack bog	35.0	RR Fill	3.85
~~29~~ [5]	~~West~~	~~2/7~~	~~PEM/FOB~~	~~Wet meadow~~	~~0.3~~	~~RR Fill~~	~~0.29~~
30	West	2/7	PEM/FOB	Wet meadow	5.9	Tailings Load-out	0.39
31	South	8	PFO3B	Cedar bog	12.5	None	0.0
32	West	6	PSSB	Alder thicket	1.0	RR Fill	0.18
33	West	3	PEMC	Shallow marsh	0.1	None	0.0
34	Southwest	2	PEMB	Wet meadow	0.7	None	0.0
35	Southwest	7	PFOB	Black ash swamp	0.6	None	0.0
36	West	7	PFOB	Black ash swamp	0.6	None	0.0
37	West	3	PEMF	Shallow marsh	1.0	None	0.0
38	West	5	PUBF	Shallow open water	1.8	None	0.0
39	West	6/7	PSS/FOB	Shrub carr	5.3	Tailings Load-out	0.16
40	West	3	PEMF	Shallow marsh	1.1	None	0.0
41	West	5	PUBGd	Shallow open water	3.1	None	0.0
42	West	7	PFOB	Black ash swamp	1.1	None	0.0
43	West	6	PSSB	Alder thicket	1.2	None	0.0
TOTAL					**296.0**		**20.0**

[1] Missing wetland numbers represent wetlands delineated in the field but were later determined to be outside of the expansion areas

[2] U.S. Fish and Wildlife Service, Circular 39 Classification System

[3] U.S. Fish and Wildlife Service, Cowardin Classification System

[4] Eggers and Reed *Wetlands Plants and Plant Communities of Minnesota and Wisconsin*

[5] Wetland 29 was initially misidentified, this area is part of the existing diversion ditch

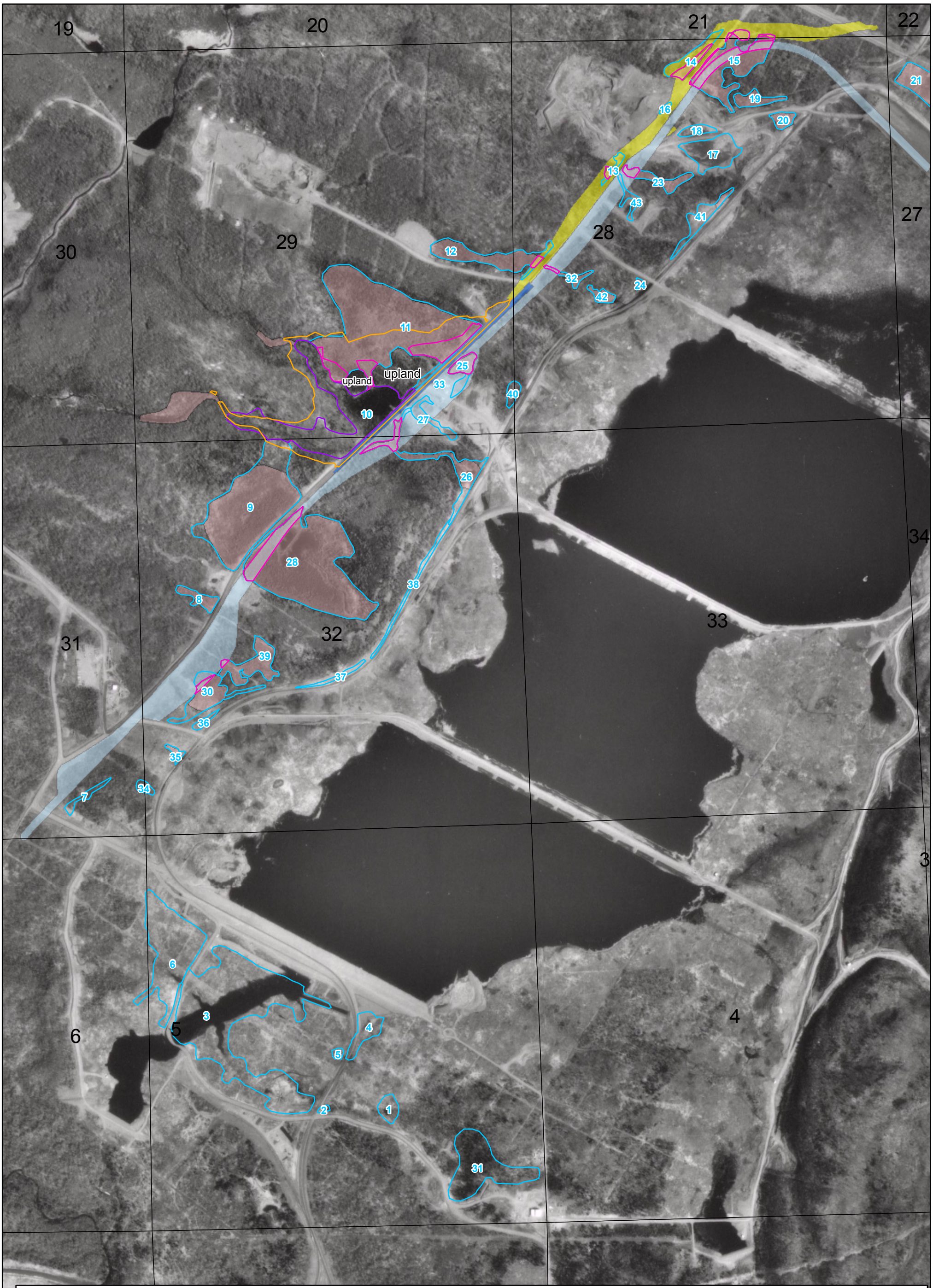


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Figure 3

REVISED WETLAND IMPACT MAP
Tailings Basin Infrastructure Relocation
Northshore Mining Co.
Silver Bay, MN

Appendix M

Wetland Area and Impact Clarifications

Table M-1
Wetland Delineation Area Discrepancy Jusification
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company

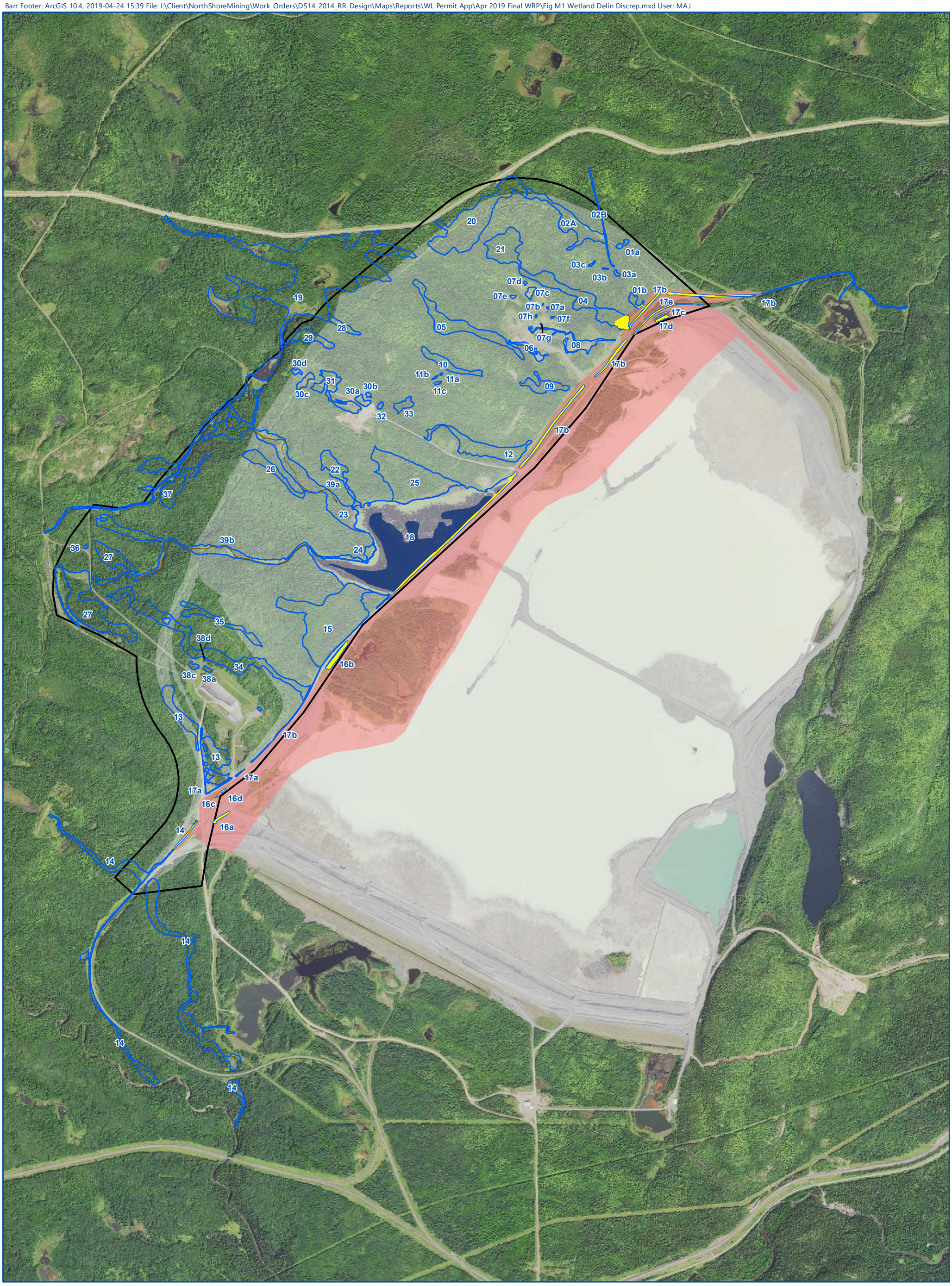
Aquatic Resource ID	Wetland Delineation Report		Wetland Replacement Plan			Actual Change in Wetland Area - Delineation to WRP (ac)	Description/Justification
	Delineation Report Total Wetland Area[1] (ac)	Total Delineated Wetland Area[2] (ac)	WRP Total Aquatic Resource Area[3] (ac)	Previously Permitted Wetland Area[4] (ac)	Total Wetland Area Represented (ac)		
1b	0.894	0.894	0.821	0.073	0.894	0.000	Previously permitted wetland not included in WRP
2	8.796	8.295	8.295		8.295	0.000	Delineation report had not split out 2b originally and only included wetland area within study area
2b		0.884	0.884		0.884	0.000	2b eventually split out as non-jurisdictional
4	11.704	11.704	10.420	1.284	11.704	0.000	Previously permitted wetland not included in WRP
14	4.152	27.484	27.229	0.252	27.481	-0.003	Only wetland area within study area represented in delineation report, otherwise discrepancy due to rounding
16a	0.008	0.276		0.276	0.276	0.000	Previously permitted wetland not included in WRP
16b	1.168	1.168	0.235	0.933	1.168	0.000	Previously permitted wetland not included in WRP
16c	0.008	0.008		0.008	0.008	0.000	Previously permitted wetland not included in WRP
16d	0.030	0.030		0.030	0.030	0.000	Previously permitted wetland not included in WRP
17b	3.409	5.836	2.250	3.586	5.836	0.000	Only wetland area within study area represented in delineation report, previously permitted wetland not included in WRP
17c	0.080	0.080		0.080	0.080	0.000	Previously permitted wetland not included in WRP
17d	0.250	0.250		0.250	0.250	0.000	Previously permitted wetland not included in WRP
17e	0.490	0.490		0.490	0.490	0.000	Previously permitted wetland not included in WRP
18	43.240	43.234	42.740	0.500	43.240	0.005	Delineation report included 0.5 ac that had been previously permitted and the boundary between 18 and 25 was changed slightly at some point so the two differences negate each other.
18-DW	37.900	37.900	35.960	1.940	37.900	0.000	Delineation report included 1.94 ac that had been previously permitted
19	12.794	81.166	81.166		81.166	0.000	Only wetland area within study area included in delineation report
20	21.002	21.140	21.140		21.140	0.000	Only wetland area within study area included in delineation report
21	8.177	8.167	8.167		8.167	0.000	Slightly different value than actual included in delineation report
23 39a Little 39 Creek[2]	20.908	20.906	19.895 1.047		20.942	0.036	Wetland 23 includes Little 39 Creek (aka 39a), which was formally field-identified in fall 2017 following federal regulations. The stream identification resulted in minor additional area outside of original delineation.
24	2.184	2.186	2.185		2.185	-0.001	Minor rounding difference
25	21.561	21.567	21.562		21.562	-0.005	The boundary of 25 is adjacent to 18 and a minor change was made at some point so the two differences negate each other.
27 39b Big 39 Creek[2]	34.542	34.543	33.025 1.723		34.748	0.205	Wetland 27 includes Big 39 Creek (aka 39b), which was formally field-identified in fall 2017 following federal regulations. The stream identification resulted in minor additional area outside of original delineation.
28	1.508	1.491	1.491		1.491	0.000	Slightly different value included in delineation report than delineated
29	3.312	3.344	3.344		3.344	0.000	Slightly different value included in delineation report than delineated
36	0.095	0.095	0.095		0.095	0.000	No change (appeared to be a difference due to significant digits)

[1]The total wetland area reported in the delineation report represented only the wetland area within the study area boundaries.

[2]The total wetland area delineated, including area outside of study area.

[3]Total wetland area included in WRP report did not include previously permitted wetlands.

[4]As shown on Figures 8-14 of WRP report.



Legend

- Previously Permitted Wetlands
- Stream
- Approved Wetland Delineation
- Wetland Delineation Study Area
- Previously Permitted Area
- Deepwater Habitat
- Project Features

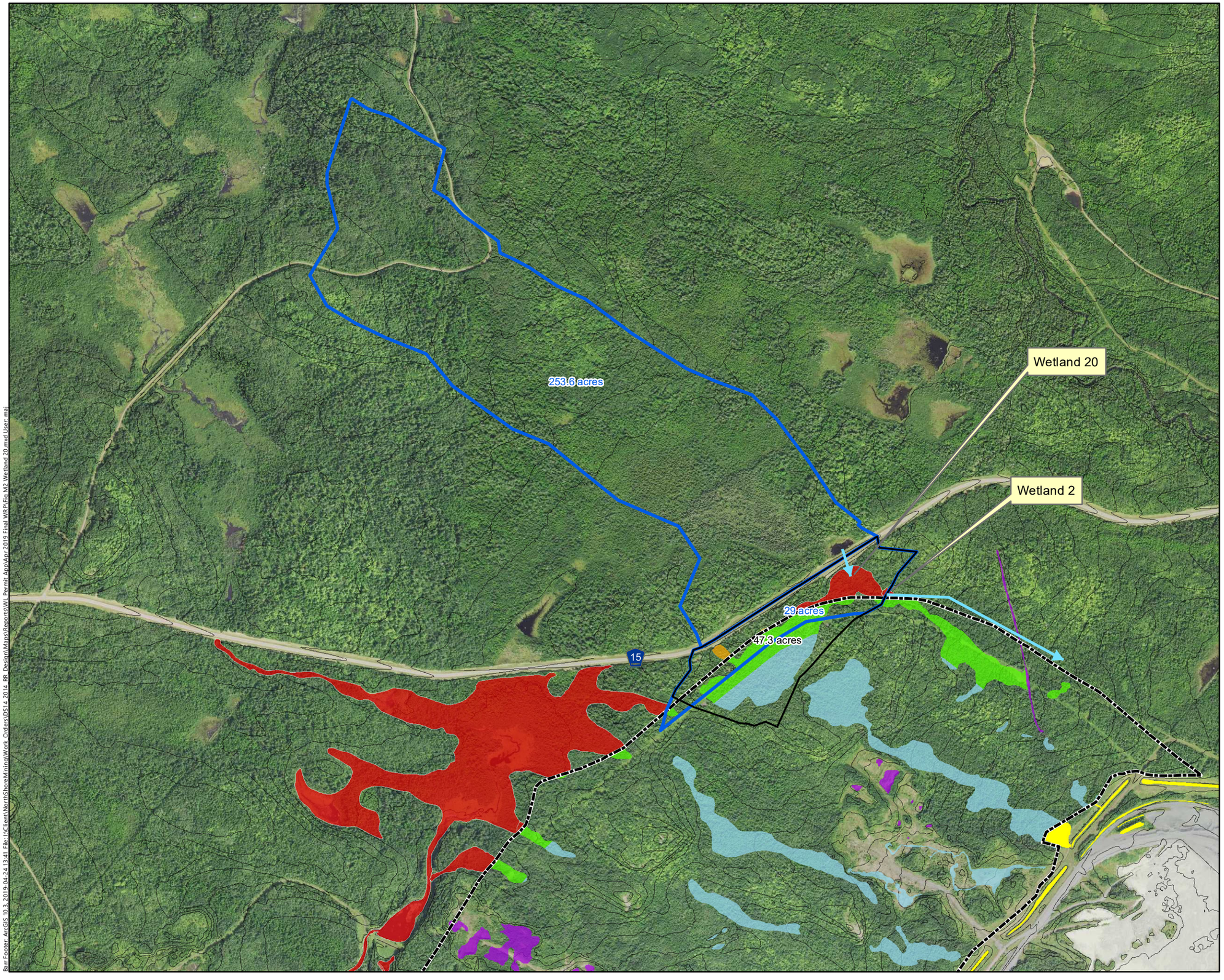
0 1

Miles

Imagery Source: FSA 2017

Figure M-1

WETLAND DELINEATION
AREA DISCREPANCIES
West Ridge Railroad Relocation
Northshore Mining Company
Lake County, Minnesota



Existing Watersheds
Proposed Watersheds

RefName

Project Area
Unaffected Wetlands
Impoundment
Fragmentation
Railroad and Dams
Tailings Basin Progression
Deepwater Impacts
Previously Permitted Wetlands
Nonjurisdictional Wetlands
10-ft Contours

0 500 1,000 2,000

Feet

Aerial Imagery: FSA (2017)

Figure M-2

UNIMPACTED WETLAND 20
DNR COMMENT 39
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Project Area

Indirect Impacts

- Stream
- Impoundment Wetlands
- Fragmentation Wetlands

Direct Impacts

- Railroad and Dam Wetlands
- Tailings Basin Progression Wetlands
- Railroad and Dam Streams
- Tailings Basin Progression Streams

0 150 300 600

Feet

Aerial Imagery: FSA (2017)

Figure M-3

WETLAND 13 IMPACT
DETAILS - DNR COMMENT 43
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Project Area

Indirect Impacts

Stream

Impoundment Wetlands

Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands

Tailings Basin Progression Wetlands

Railroad and Dam Streams

Tailings Basin Progression Streams

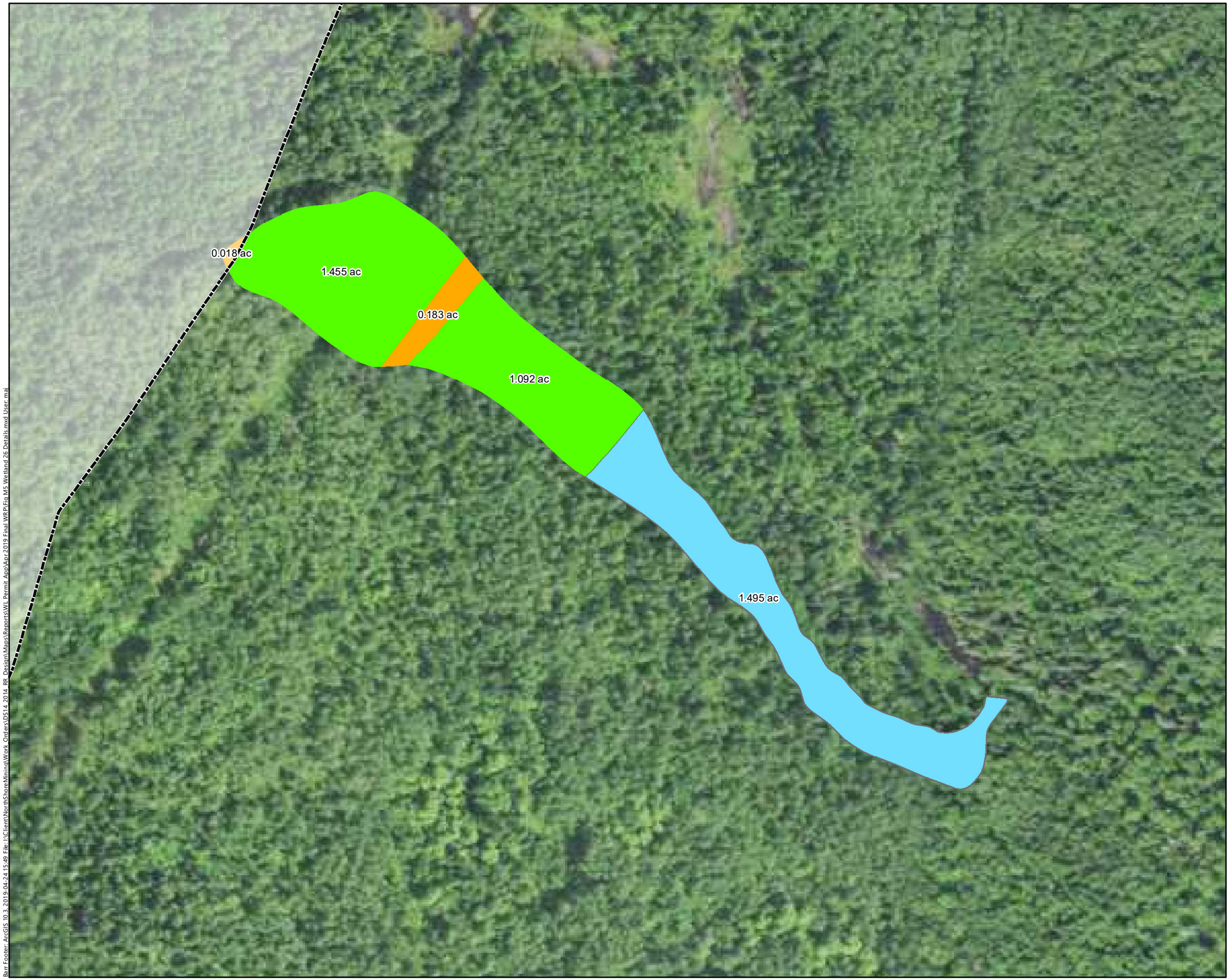
0 150 300 600

Feet

Aerial Imagery: FSA (2017)

Figure M-4

WETLANDS 17a and 17b IMPACT DETAILS - DNR COMMENTS 44 & 55
West Ridge Railroad Relocation and Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota



Project Area

Indirect Impacts

Stream

Impoundment Wetlands

Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands

Tailings Basin Progression Wetlands

Railroad and Dam Streams

Tailings Basin Progression Streams

N

0 75 150 300

Feet

Aerial Imagery: FSA (2017)

Figure M-5

WETLAND 26 IMPACT
DETAILS - DNR COMMENT 46
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

Project Area

Water Resource Monitoring

Stream

Wetland

0 150 300 600

Feet

Aerial Imagery: FSA (2017)

Figure M-6

MONITORED WETLANDS
DNR COMMENT 47
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

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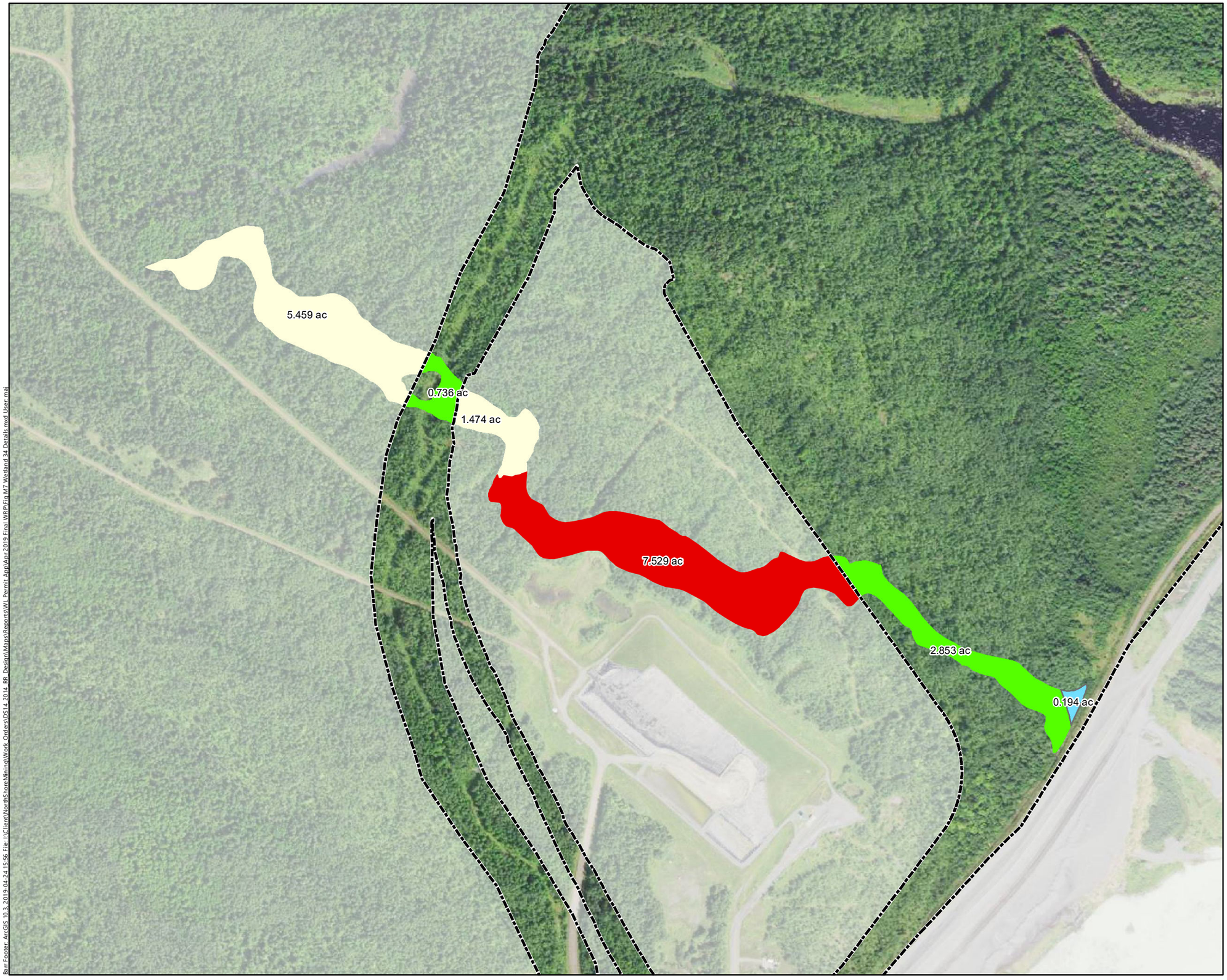

Project Area

Unaffected Waters

Wetlands

Stream

Indirect Impacts

Stream

Impoundment Wetlands

Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands

Tailings Basin Progression Wetlands

Railroad and Dam Streams

Tailings Basin Progression Streams

0 200 400 800

Feet

Aerial Imagery: FSA (2017)

Figure M-7

WETLAND 34 IMPACT
DETAILS - DNR COMMENT 48
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

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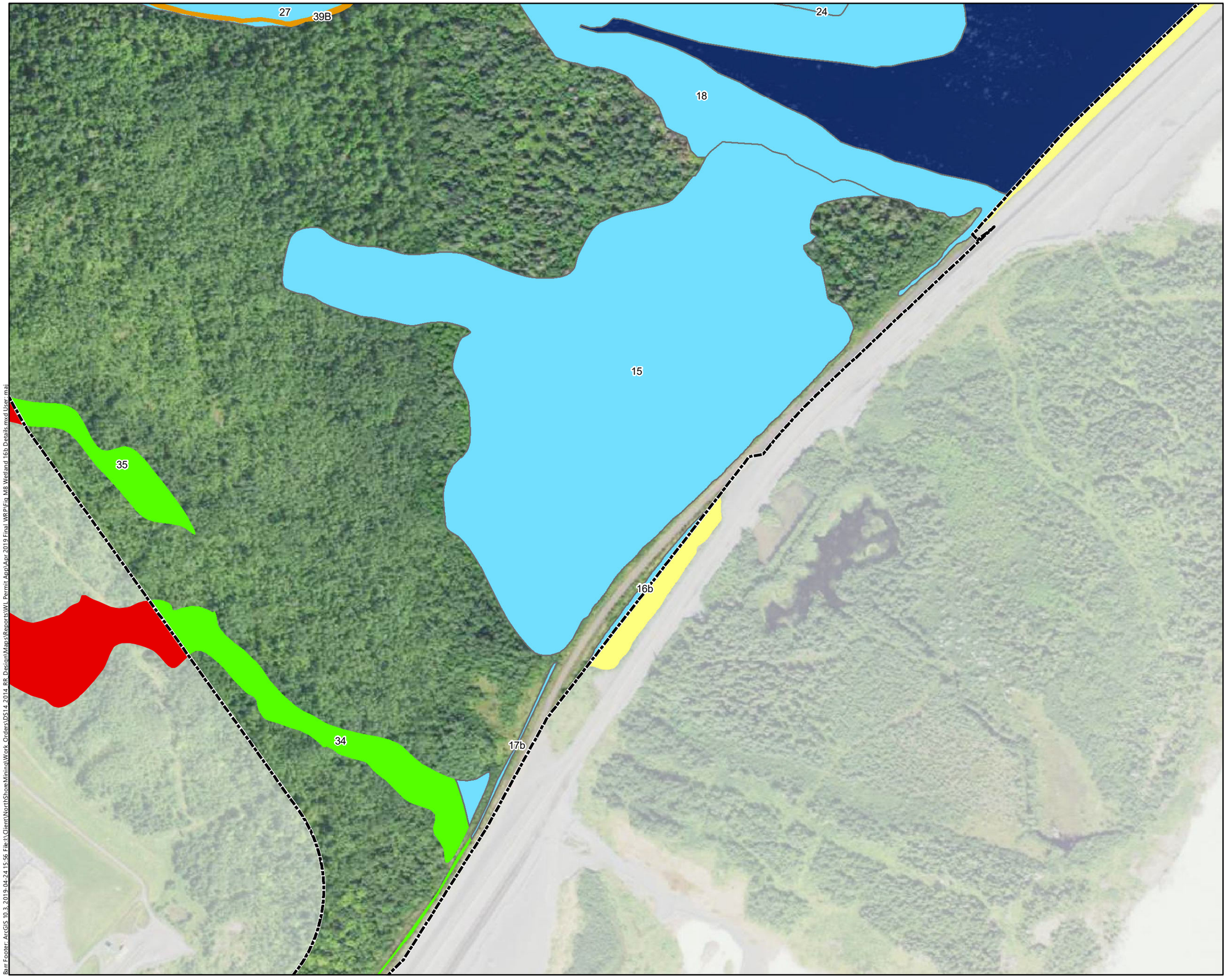

Project Area
Deepwater Impacts
Previously Permitted Wetlands

Unaffected Waters

Wetlands
Stream

Indirect Impacts

Stream
Impoundment Wetlands
Fragmentation Wetlands

Direct Impacts

Railroad and Dam Wetlands
Tailings Basin Progression Wetlands
Railroad and Dam Streams
Tailings Basin Progression Streams

0 150 300 600

Feet

Aerial Imagery: FSA (2017)

Figure M-8

WETLAND 16b IMPACT
DETAILS - DNR COMMENT 50
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota

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Project Area

Original Wetland Delineations

Direct Impacts

Railroad and Dam Wetlands

Tailings Basin Progression Wetlands

Railroad and Dam Streams

Tailings Basin Progression Streams

0 150 300 600

Feet

Aerial Imagery: FSA (2017)

Figure M-9

WETLANDS 23/39A and 27/39B
DETAILS - DNR COMMENTS 51 and 52
West Ridge Railroad Relocation and
Tailings Basin Progression
Northshore Mining Company
Lake County, Minnesota