

Antidegradation Assessment – NorthMet Project Section 401 Certification

Prepared for
Poly Met Mining, Inc.

December 2017



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Contents

1.0	Introduction	1
2.0	Regulatory Context	2
2.1	Background to the Section 401 Certification Request.....	2
2.2	Antidegradation Standards and Procedures for Individual Section 401 Certifications	2
2.3	Scope of PolyMet’s Section 401 Antidegradation Assessment.....	4
3.0	Compensatory Mitigation	6
3.1	Quantity and Quality of Wetlands That Will Be Physically Altered by the Project	6
3.2	Quantity and Quality of Wetlands Where Mitigation Will Occur	7
4.0	Potential Indirect Wetland Impacts	8
4.1	Assessment of Potential Indirect Wetland Impacts.....	8
4.2	Monitoring for Potential Indirect Wetland Impacts.....	8
4.2.1	Triggers for More Frequent Vegetation Monitoring.....	9
4.2.2	Impact Criteria.....	9
4.3	Reporting	9
4.4	Adaptive Management.....	9
5.0	Section 401 Antidegradation Assessment Summary.....	11
5.1	Protection of Existing Uses	11
5.2	Compensatory Mitigation	11
5.2.1	Prudent and Feasible Alternatives Were Used to Avoid and Minimize Adverse Impacts to Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(1)).....	11
5.2.2	Mitigation Will Be Sufficient in Quantity and Quality to Ensure Replacement of Lost Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(2)).....	13
5.2.3	Compensatory Mitigation Will Restore Previously Impacted Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(3))	14
5.2.4	Compensatory Mitigation Will Occur Within the Same Watershed (Minnesota Rules, part 7065.0265, subpart 3(A)(4)).....	14
5.2.5	Compensatory Mitigation Will Be Completed Before or Concurrent With the Physical Alteration (Minnesota Rules, part 7065.0265, subpart 3(A)(5)).....	14
5.3	Protection of Beneficial Uses.....	14

5.4	Protection of Surface Waters of High Quality.....	14
5.5	Protection of Outstanding Resource Value Waters	15
5.6	Protection Against Impairments Associated with Thermal Discharges.....	15
6.0	Other Considerations Related to Antidegradation	16
6.1	Prohibition Against Causing or Contributing to a Violation of Water Quality.....	16
6.2	Waters of Downstream States	16
7.0	References	17

List of Tables

Table 2-1	Roadmap to Project Information Required by the Antidegradation Standard for Activities Regulated by Section 401 Certification (Minnesota Rules, part 7050.0265)	5
Table 3-1	Summary of Proposed Wetland Impacts.....	6

Acronyms

Acronym	Description
Band	Fond du Lac Band of Lake Superior Chippewa
CWA	Clean Water Act
FTB	Flotation Tailings Basin
DNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
ORVW	Outstanding Resource Value Water
SDS	State Disposal System
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WCA	Wetland Conservation Act
WWTS	Waste Water Treatment System

1.0 Introduction

Poly Met Mining, Inc. (PolyMet) has requested certification under Section 401 of the Clean Water Act (CWA) in connection with NorthMet Project (Project). PolyMet's request for Section 401 certification triggers antidegradation requirements under Minnesota Rules, part 7050.0250 through part 7050.0335. Antidegradation rules protect surface water quality by requiring dischargers to use water treatment technologies that avoid and minimize degradation. The purpose of this report is to demonstrate that the Project satisfies antidegradation requirements applicable to PolyMet's requested Section 401 certification.

Section 401 certification is required when a federal permit is required for an applicant to conduct activities that may result in a discharge to navigable waters. The federal permitting agency must be provided with the Section 401 certification from the state in which the discharge originates. The state must certify to the federal permitting agency that the proposed activity, as authorized, will comply with that state's water quality standards. For this Project, the Section 401 certification is required because PolyMet applied for a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE). PolyMet is requesting the Section 401 certification in accordance with the Minnesota Pollution Control Agency (MPCA) procedural regulations in Minnesota Rules, parts 7001.1400 through 7001.1470 and applicable substantive requirements in Minnesota Rules, chapters 7050 and 7052.

PolyMet's Section 404 permit application is based on the Project's anticipated wetland impacts. The Project is expected to result in direct and fragmentation (indirect) impacts to wetlands, covering a total of approximately 930 acres. PolyMet will purchase mitigation credits from within the Project watershed (Reference (1)).

Section 401 certification requires findings from MPCA that all applicable state water quality standards will be met. The NorthMet National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Waste Water Treatment System (WWTS) Antidegradation Evaluation (Appendix A of Reference (2)), provided MPCA with the evidence that the Project will meet applicable numeric and narrative state water quality standards, including wetland water quality standards, and will meet the applicable standards for designated uses. This report provides additional information for the Section 401 Antidegradation Assessment regarding physical alteration and indirect impacts to wetlands.

2.0 Regulatory Context

Antidegradation¹ refers to the concept that water bodies with water quality better than applicable standards be maintained at that existing high quality and not be degraded. It has its roots in the goal of the CWA to "...restore and maintain the chemical, physical, and biological integrity of the Nation's waters."² States must also have in place an antidegradation policy that is at least as stringent as the federal antidegradation policy in 40 C.F.R. § 131.12. The MPCA revised antidegradation rules (Minnesota Rules, part 7050.0250 to 7050.0335) contain specific antidegradation procedures that are required for Section 401 certifications.

2.1 Background to the Section 401 Certification Request

PolyMet has applied to the USACE for an individual CWA Section 404 permit for proposed Project activities with the potential to impact wetlands. PolyMet updated the Section 404 wetland permit application as the Project's environmental review progressed, with the initial application submitted to the USACE in 2004 and an updated application provided in 2013 (Reference (3)). In parallel with the Section 404 application to the USACE, PolyMet also provided a wetland replacement plan (Reference (1)) to the Minnesota Department of Natural Resources (DNR). Subsequently, and after discussions with DNR and USACE, PolyMet entered into an agreement to purchase wetland mitigation credits, rather than to directly implement its own wetland mitigation. These various documents provide information relevant to the Section 401 Antidegradation Assessment for the Project as discussed below.

As required by Minnesota Rules, part 7001.1470, MPCA's Section 401 certification for the Project, if issued, will confirm that the activities authorized by the USACE's Section 404 permit will not violate applicable water quality standards as long as the Section 404 permit incorporates any necessary conditions established by MPCA in the certification process.

2.2 Antidegradation Standards and Procedures for Individual Section 401 Certifications

MPCA revised antidegradation rules became effective in November 2016 (Minnesota Rules, part 7050.0250 to 7050.0335). This rulemaking repealed the state's former "nondegradation" requirements (Minnesota Rules, parts 7050.0185 and 7050.0180). The revised antidegradation rules created specific antidegradation procedures required for Section 401 certifications. The former nondegradation rules did not contain specific antidegradation requirements for Section 401 certifications.

The revised antidegradation rules include multiple antidegradation standards and procedures. The applicability of these specific standards and procedures is determined by the nature of the proposed activity and the type of "control document" required to authorize that activity. The term "control document" means any "authorization issued by the [MPCA] commissioner that specifies water pollution

¹ See 40 CFR 131.12.

² 33 USC § 1251(a) (CWA 101(a)) (emphasis added).

control conditions under which a regulated activity is allowed to operate” (Minnesota Rules, part 7050.0255, subpart 10). PolyMet is applying for multiple authorizations that trigger antidegradation requirements: the Section 401 certification, an individual NPDES/SDS wastewater permit, and general NPDES/SDS permit coverage for industrial stormwater and construction stormwater.

There is significant overlap in the antidegradation requirements that apply to the Section 401 certifications and individual NPDES permits. Activities regulated by individual Section 401 certifications and individual NPDES permits are both subject to the same antidegradation standards, which are set out in Minnesota Rules, part 7050.0265. The antidegradation procedures applicable to Section 401 certifications (Minnesota Rules, part 7050.0285) require an applicant to submit the same information required for individual NPDES permits (Minnesota Rules, part 7050.0280) *plus* additional information related to compensatory mitigation for physical alteration of surface waters.

The NPDES/SDS Surface Water Antidegradation Evaluation – NorthMet Waste Water Treatment System (WWTS) Discharge (WWTS Antidegradation Evaluation, Appendix A of Reference (2)), provided MPCA the data and analysis required by the antidegradation procedures for an individual NPDES waste water permit (Minnesota Rules, part 7050.0280, subpart 2), and includes all information needed to demonstrate that the WWTS discharge and related activities³ will meet the antidegradation requirements applicable to surface waters under the Lake Superior Basin rules (Minnesota Rules, parts 7052.0300 through 7052.0330). That report also fulfills the antidegradation requirements for CWA Section 401 certification relating to compliance with applicable surface water quality requirements (Minnesota Rules, part 7050.0280, subpart 2, as required under Minnesota Rules, part 7050.0285, subpart 2).

For construction and industrial stormwater discharges, PolyMet is requesting general NPDES/SDS permit coverage (Appendix C of Volume I of the NPDES/SDS Permit Application). The antidegradation assessments for stormwater discharges covered under these general permits were conducted by the MPCA during development of the Minnesota NPDES/SDS Construction Stormwater General Permit (Permit No. MNR100001) and the Minnesota NPDES/SDS Industrial Stormwater General Permit (Permit No. MNR050000). Therefore no further antidegradation procedures are required with respect to construction and industrial stormwater discharges.

Because the Project will physically alter wetlands, as described in Section 3.0 of this report, PolyMet is providing this Section 401 certification Antidegradation Assessment (Section 401 Antidegradation Assessment) which contains additional information concerning the antidegradation standards applicable to physical alteration of wetlands (Minnesota Rules, part 7050.0285, subpart 2). Wetland impacts from the Project will be subject to the requirements of the Section 404 permit issued by the USACE, as well as the DNR requirements under the Permit to Mine and WCA (specifically the DNR-approved wetland

³ “WWTS discharge and related activities” means the WWTS discharge and related activities that affect the quality and quantity of that discharge, including the FTB seepage capture systems, watershed changes at the Mine and Plant Sites, and the withdrawal of water from Colby Lake.

replacement plan which is governed by, among other requirements, Minnesota Statutes, sections 93.481, 103G.222 and 103G.2242 and Minnesota Rules, parts 6132.1300, .5300 and 8420.0930).

Collectively, with these separate analyses, referenced in the three preceding paragraphs, all surface water discharges from the Project have received the requisite antidegradation evaluations required by federal and state law.

2.3 Scope of PolyMet's Section 401 Antidegradation Assessment

This report summarizes the antidegradation information specifically required by Minnesota Rules, part 7050.0285 for a Section 401 Antidegradation Assessment. It does not contain new information, but rather references the NPDES/SDS WWTS Antidegradation Evaluation (Appendix A of Reference (2)) and summarizes the detailed information regarding the physical alteration of wetlands that has been provided in the Section 404 permit application (Reference (3)) submitted to the USACE, and the Wetland Replacement Plan submitted to the DNR (Reference (1)).

Table 2-1 provides a roadmap to sections in this report and in PolyMet's permit applications where the information needed for the Section 401 Antidegradation Assessment can be found.

Table 2-1 Roadmap to Project Information Required by the Antidegradation Standard for Activities Regulated by Section 401 Certification (Minnesota Rules, part 7050.0265)

Citation (Minnesota Rules, part 7050.0265)	Description	Information pertaining to potential water quality effects to surface waters and wetlands	Information pertaining to physical alteration of wetlands
Subpart 2	Protection of existing uses	Sections 7.1. and 9.1 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾ Sections 4 and 5 of Reference (4)	Sections 3.0, 4.0, and 5.1 of this report
Subpart 3	Compensatory mitigation	N/A	Sections 3.0, 4.0, and 5.2 of this report
Subpart 4	Protection of beneficial uses	Section 7.3 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾ Sections 4 and 5 of Reference (4)	N/A
Subpart 5(A)	Alternatives analysis	Sections 7.4 and 9.3 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾	Section 5.2.1 of this report
Subpart 5(B)	Economic and social benefits	Section 7.5 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾	Section 7.5 of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾
Subpart 5(C)	Compliance with all applicable surface water pollution control statutes and rules	Section 7.2 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾ Sections 4 and 5 of Reference (4)	Section 7.2 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾
Subparts 6 and 7	Protection of restricted outstanding resource value waters and prohibited outstanding resource value waters	Sections 7.6 and 9.5 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾ Section 5 of Reference (4)	Section 5.5 of this report
Subpart 8	Protection against impairments associated with thermal discharges	Section 7.7 of Appendix A of Volume III of the <i>NorthMet NPDES/SDS Permit Application</i> ⁽¹⁾	N/A

(1) Appendix A to Reference (2)

3.0 Compensatory Mitigation

The Project will include physical alteration of wetlands, so antidegradation procedures require PolyMet to submit a plan for compensatory mitigation (Minnesota Rules, part 7050.0285, subpart 2). This section summarizes the information on compensatory mitigation required by the antidegradation rules for Section 401 certification.

3.1 Quantity and Quality of Wetlands That Will Be Physically Altered by the Project

The quantity (area) and quality of wetlands that will be physically altered by the Project are summarized in Table 3-1. Details on these wetland impacts and the associated mitigation credits required are provided in Reference (1). None of the wetlands that will be physically altered are on the list of designated Outstanding Resources Value Waters (ORVW) identified under Minnesota Rules, part 7050.0335.

Table 3-1 Summary of Proposed Wetland Impacts

Circular 39 Wetland Classification ⁽¹⁾	Eggers and Reed Wetland Community ⁽²⁾	Impacted Area ⁽³⁾ (acres)	Wetland Quality		
			High	Moderate	Low
1	Seasonally Flooded	0	---	---	---
2	Fresh (Wet) Meadow	15.80	91%	0%	9%
2	Sedge Meadow	23.93	71%	28%	<1%
3	Shallow Marsh	70.45	34%	11%	55%
4	Deep Marsh	75.67	<1%	<1%	100%
5	Shallow, Open Water	0	---	---	---
6	Shrub-Carr	3.89	64%	0%	36%
6	Alder Thicket	110.56	93%	1%	6%
7	Hardwood Swamp	13.17	95%	0%	5%
7	Coniferous Swamp	85.69	85%	2%	13%
8	Open Bog	7.64	100%	0%	0%
8	Coniferous Bog	523.38	100%	0%	0%
---	Deep water	0	---		
Total ⁽³⁾		930.18	83%	2%	15%

Source: Large Table 2 of Reference (1)

(1) Reference (5)

(2) Reference (6)

(3) Includes both direct and indirect (fragmented) wetland impacts

3.2 Quantity and Quality of Wetlands Where Mitigation Will Occur

PolyMet will purchase compensatory mitigation credits from a wetland bank to accomplish the required wetland mitigation. This purchase follows the preferential sequencing for compensatory mitigation provided by the USACE St. Paul District Policy for Compensatory Mitigation in Minnesota (Reference (7)). Under that policy, the preference is that wetland mitigation banks under consideration be located in the Bank Service Area (BSA) #1, which is the BSA where the Project wetland impacts will occur.

With this approach, Poly will purchase wetland bank credits in BSA #1, in the St. Louis River watershed, before construction of the Project begins. These credits will replace and mitigate all wetlands directly impacted by the Project or indirectly impacted by fragmentation from the Project (Reference (1)).

4.0 Potential Indirect Wetland Impacts

4.1 Assessment of Potential Indirect Wetland Impacts

During environmental review of the Project, PolyMet assessed six factors that could cause indirect wetland impacts:

- Changes in wetland watershed areas
- Groundwater drawdown resulting from open pit mine dewatering
- Groundwater drawdown resulting from operation of the Flotation Tailings Basin (FTB) including the FTB seepage capture systems
- Changes in stream flow near the Mine Site and FTB and associated impacts to wetlands abutting the streams
- Wetland fragmentation from Project elements such as open pits, stockpiles, haul roads, etc.
- Potential change in wetland water quality related to atmospheric deposition of dust and rail car spillage associated with Mine Site and FTB operations

Each wetland in the Project vicinity was assessed to determine whether it could potentially be affected by any of the six factors listed above (Reference (1), Reference (8), and Reference (9)). A potential indirect impact rating was developed based on the number of factors that may potentially affect a wetland – from No Impact (0 factors) to 6 (all six factors potentially indirectly impacting the wetland). For more information on the analysis of potential indirect wetland impacts, see the Wetland Replacement Plan (Reference (1)). For additional details on potential indirect wetland impacts associated with Project atmospheric emissions, see Reference (4).

4.2 Monitoring for Potential Indirect Wetland Impacts

PolyMet's wetland monitoring plan is based on the results of its potential indirect impact analysis. Monitoring will occur within all wetlands with a potential indirect wetland impact factor rating of 3-5 and within a sampling of those wetlands with factor ratings of 1-2. Wetland monitoring will provide early information so that PolyMet could use adaptive management to minimize indirect wetland impacts, if necessary.

Hydrology, vegetation, and wetland boundaries will be monitored, documented, and compared with baseline monitoring and reference wetlands to determine if indirect impacts occur. A total of 61 monitoring wells, including five reference wells have been installed to document potential indirect wetland impacts that could be attributed to the Project (Large Figure 2 and Large Figure 3 of Attachment F of Reference (1)). Pre-Project baseline vegetation monitoring was conducted in June 2015 at each of the 61 well locations, as described in Section 5.0 of Attachment F of Reference (1). Wetland hydrology monitoring will be conducted annually, as described in (Reference (1)). Wetland vegetation

monitoring is scheduled once every five years, with specific triggers for more frequent vegetation monitoring if indications of potential indirect impacts from the Project are observed (Reference (1)). Wetland boundary evaluations will be conducted as described in Section 4.0 of Attachment F of Reference (1).

4.2.1 Triggers for More Frequent Vegetation Monitoring

PolyMet has established hydrology and vegetation evaluation criteria which could trigger more frequent vegetation monitoring. These triggers, which are described in Reference (10), are designed to provide early detection of potential adverse indirect impacts, which will allow PolyMet to proactively implement adaptive management, if needed, before impact levels reach regulatory impact criteria.

4.2.2 Impact Criteria

Criteria that may indicate an adverse, indirect wetland impact attributable to the Project are detailed in Reference (1). The regulatory criteria are as follows:

- a 50% reduction of the baseline wetland hydroperiod
- specific changes in vegetation species composition and/or cover that are inconsistent with vegetation changes in the reference wetlands
- changes in monitored wetland boundaries that are inconsistent with changes in boundaries of reference wetlands

4.3 Reporting

The results of hydrology, vegetation, and wetland boundary monitoring will be compiled into annual reports to be submitted to the USACE, DNR, and MPCA. Annual reports will include methods, results, comparison to the regulatory impact criteria, and evaluation of potential adverse indirect wetland impacts. In years when vegetation and wetland boundary monitoring is conducted, that data will also be included in the annual report.

PolyMet will discuss the results of monitoring on an annual basis with the agencies and will determine if there is a need to modify the monitoring plan.

4.4 Adaptive Management

As described in the revised wetland permit application to the USACE, (Reference (3)), an adaptive approach will be used to evaluate the most effective monitoring strategy for potential indirect effects. The monitoring plan will be updated annually based on results from the previous year. If indirect impacts are observed, additional monitoring may be developed to focus on those areas and/or to focus on a specific impact factor. Additional monitoring may include new monitoring locations in other wetlands and more detailed delineation and vegetation data collection.

The adaptive monitoring plan will be incorporated in two phases. Phase I of the adaptive monitoring plan will be broad-based monitoring to identify changes to wetlands or changes that may affect wetlands or surface waters as a result of the Project. Phase II monitoring may be implemented to provide a more detailed assessment in a given area to analyze a potential impact factor. If necessary, the Phase II monitoring will be designed and implemented as needed to address the changes identified in Phase I monitoring. Phase II will be used to determine any need for additional mitigation or to develop a plan to control the changes identified in Phase I and minimize future impacts to wetlands.

5.0 Section 401 Antidegradation Assessment Summary

5.1 Protection of Existing Uses

Existing uses will be maintained and protected, as documented in Section 7.1 and Section 9.1 of the NPDES/SDS WWTS Antidegradation Evaluation (Appendix A of Reference (2)), and additional analysis presented in Reference (4). With regard to stormwater, existing uses will be maintained and protected by meeting the conditions of the Minnesota NPDES/SDS Construction Stormwater General Permit (MN R100001) and Industrial Stormwater Multi-Sector General Permit (MN R050000). For activities involving the physical alteration of wetlands, existing uses are maintained and protected by means of compensatory mitigation, as documented in Section 5.2 of this report. Therefore the Project, including the activities regulated by the Section 401 certification, will comply with the antidegradation standard in Minnesota Rules, part 7050.0265, subpart 2.

5.2 Compensatory Mitigation

Minnesota's antidegradation standard that is specifically applicable to compensatory mitigation, Minnesota Rules, part 7050.0265, subpart 3, states that "the commissioner shall allow compensatory mitigation as a means to preserve an existing use when there is a physical alteration to a surface water only when all of the ... conditions [listed in Minnesota Rules, part 7050.0265, subpart 3(A)] are met." This section summarizes information about the Project's expected performance relative to the specific conditions in the antidegradation standard for compensatory mitigation as a means of maintaining and protecting the existing uses of wetlands that will be physically altered by the Project.

5.2.1 Prudent and Feasible Alternatives Were Used to Avoid and Minimize Adverse Impacts to Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(1))

Regulations implementing Section 404 of the CWA and WCA require that impacts to wetlands will be, to the extent practicable, avoided or where avoidance is not feasible, minimized. Accordingly, avoiding and minimizing wetland impacts was one of the objectives during the environmental review process for the Project.

The Project was modified during environmental review to result in the least impacts practicable to wetlands, as well as to other biological resources (e.g., vegetation, wildlife, threatened and endangered species, etc.). Final regulations and guidelines associated with Section 404 of the CWA require that project proponents eliminate or reduce adverse impacts to Waters of the U.S. by implementing specific steps during project planning:

- modify the project to avoid adverse impact
- incorporate measures to minimize adverse impacts

-
- compensate for unavoidable adverse impacts through restoration, enhancement, creation, or in certain circumstances generally not applicable in Minnesota, preservation

The Project has been modified to avoid wetlands to the extent practicable. Geology dictates the location and dimension of the mine pits for this Project. The polymetallic ore bodies of the NorthMet deposit can be developed only where the mineral resource exists in economically minable quantities. Extensive exploration programs have been conducted to define the resource, which has allowed a refinement of the pit locations (Attachment A of Reference (11)). These studies indicate that the ore reserves identified as the East Pit, Central Pit, and West Pit are the areas where polymetallic ore is present in the quantity and quality necessary (and taking into account the distribution and amount of waste rock) for mining to be economically feasible. Mining in other areas of the deposit cannot currently be supported based on these studies.

Although complete avoidance of impacts to wetlands is impossible, the Project will employ numerous methods to minimize impacts. Minimization alternatives use the following general strategies:

- minimize the footprint and optimize the placement of mining features, mainly at the Mine Site
- maintain a smaller disturbance footprint by re-using existing infrastructure, mainly at the Plant Site, which is a brownfield area
- utilize existing facilities and structures, to the extent practicable, to support ongoing activities
- maintain future tailings disposal in a single location and within the existing watershed where the current facility is located
- expand the existing tailings disposal site upward, to the extent geotechnically practicable, thus disturbing less surface area while allowing more material to be placed in the same footprint
- divert runoff upgradient of facilities into undisturbed drainages
- install culverts to facilitate flow across wetland areas
- maintain surface water pollution protection plans (SWPPPs), using best management practices (BMPs), to prevent site erosion and subsequent downstream sedimentation
- collect and treat runoff and other contact water
- implement interim, concurrent (as practicable) and permanent reclamation at areas within the Project

Therefore, in accordance with antidegradation standards in Minnesota Rules, part 7050.0265, subpart 3(A)(1), the Project has incorporated prudent and feasible alternatives to avoid and minimize adverse impacts to wetlands.

5.2.2 Mitigation Will Be Sufficient in Quantity and Quality to Ensure Replacement of Lost Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(2))

The CWA antidegradation regulations, 40 C.F.R. § 131.12(a)(1), require that existing uses of water bodies be maintained and protected. The U.S. Environmental Protection Agency (USEPA) has recognized that a "literal interpretation of 40 C.F.R. §131.12(a)(1) could prevent certain physical modifications to a water body that are clearly allowed by the CWA, such as wetland fill operations permitted under Section 404 of the CWA." *See Water Quality Standards Handbook, Second Edition* (Chapter 4, p.5 of Reference (12)). To address this situation, the USEPA rules allow compensatory mitigation to replace the lost of an existing use resulting from physical alteration in some circumstances, including the total filling or dredging, of a wetland where Section 404 permitting requirements are met. *See* 40 C.F.R. § 332.

MPCA's antidegradation rules follow this same approach, allowing physical alterations of wetlands as long as (1) there is compensatory mitigation to replace the loss of the existing uses of the impacted wetlands and (2) the mitigation generally meets the CWA Section 404 requirements for a dredge and fill permit (pages 24-25 of Reference (13)). MPCA's requirements, however, are slightly stricter in that compensatory mitigation, in order to satisfy the Minnesota antidegradation requirements for maintaining existing uses, is limited to restoration, establishment, and enhancement to provide replacement wetlands. Preservation of existing wetlands, which in some circumstances is an acceptable mitigation option under the federal regulations, is excluded under the Minnesota antidegradation rules (page 24 of Reference (13)). Credits may be used, however, to provide the requisite wetlands replacement as long as they otherwise meet the requirements of the CWA.

To give practical effect to these mitigation requirements, Section 404 of the CWA and the WCA each follow rules and guidance in developing "crediting" criteria to evaluate whether mitigation is sufficient in quantity and quality to replace the wetlands impacted by a project. These crediting criteria establish ratios for how many acres of wetland must be restored for each acre that is impacted. PolyMet's proposed wetland replacement plan provides sufficient mitigation credits of wetlands to compensate for impacts associated with physical alteration of wetlands.

The Project will impact approximately 930 acres of wetlands. Using WCA crediting rules, approximately 930 mitigation credits are required for the Project, and using USACE crediting rules, approximately 1,282 mitigation credits are required for the Project, and, as shown in Large Table 5 and Large Table 6 of Reference (1)), respectively. PolyMet's proposed wetland mitigation will be accomplished by purchasing all required compensatory mitigation credits from a wetland bank, as described in Section 3.2. Therefore, the proposed compensatory mitigation is sufficient in terms of quantity and quality to replace the loss of existing uses in the impacted wetlands, which satisfies the antidegradation standards in Minnesota Rules, part 7050.0265 subpart 3(A)(2).

PolyMet will also monitor for potential indirect wetland impacts, as described in Section 4.0. If indirect wetland impacts occur that trigger specific regulatory criteria, PolyMet would mitigate, as required, the wetlands indirectly impacted by the Project.

5.2.3 Compensatory Mitigation Will Restore Previously Impacted Wetlands (Minnesota Rules, part 7065.0265, subpart 3(A)(3))

As described in Section 3.2, PolyMet will purchase wetland mitigation credits that are for previously impacted wetlands which have been restored, with the majority of credits from in-kind mitigation. The Project does not rely on preservation of any existing wetlands for compensatory mitigation purposes. Therefore, the Project's compensatory mitigation is in accordance with antidegradation standards in Minnesota Rules, part 7050.0265 subpart, 3(A)(3).

5.2.4 Compensatory Mitigation Will Occur Within the Same Watershed (Minnesota Rules, part 7065.0265, subpart 3(A)(4))

PolyMet will purchase wetland mitigation credits that are all associated with wetland replacement within the Project watershed, as described in Sections 3.2. Thus, in accordance with antidegradation standards in Minnesota Rules, part 7050.0265, subpart 3(A)(4), the proposed compensatory mitigation will occur in the same watershed to the extent prudent and feasible.

5.2.5 Compensatory Mitigation Will Be Completed Before or Concurrent With the Physical Alteration (Minnesota Rules, part 7065.0265, subpart 3(A)(5))

PolyMet will purchase wetland mitigation credits from a wetland bank prior to the start of construction. Thus, in accordance with antidegradation standards in Minnesota Rules, part 7050.0265, subpart 3(A)(5), the proposed compensatory mitigation will be completed before or concurrent with the actual physical alteration of wetlands, to the extent prudent and feasible.

5.3 Protection of Beneficial Uses

The WWTS and related activities will not permanently preclude attainment of water quality standards, as documented in Section 7.3 of the NPDES/SDS WWTS Antidegradation Evaluation (Appendix A of Reference (2)), and additional analysis presented in Reference (4). With regard to stormwater, beneficial uses will be protected by meeting the conditions of the Minnesota NPDES/SDS Construction Stormwater General Permit (MN R100001) and Industrial Stormwater Multi-Sector General Permit (MN R050000). For activities involving the physical alteration of wetlands, beneficial uses will be protected by means of compensatory mitigation, as documented in Section 5.2 of this report. Therefore the Project activities regulated by the Section 401 certification will comply with the antidegradation standard in Minnesota Rules, part 7050.0265, subpart 4.

5.4 Protection of Surface Waters of High Quality

For the purposes of the antidegradation rule, "high quality" means water quality that exceeds, on a parameter-by-parameter basis, levels necessary to support the protection and propagation of aquatic life and recreation in and on the water (Minnesota Rules, part 7050.0255, subpart 21). The concept of "high quality" only applies to parameters for which there are Class 2 standards (Reference (13)). Baseline monitoring shows that receiving and downstream surface waters are high quality for numerous Class 2

parameters (Section 6.2.4 of Appendix A of Reference (2)). Baseline water quality monitoring for the Class 2D parameters has not been conducted in the receiving wetlands or wetlands that will be physically altered. However, regardless of whether these wetlands would be considered “high quality” for antidegradation purposes, PolyMet has provided the information required by Minnesota Rules, part 7050.0805 subpart 2 (Section 7.4 and Section 7.5 of Appendix A of Reference (2)), as summarized below.

The Project includes extensive management and treatment measures designed to avoid and minimize degradation and to protect high quality waters (Section 7.4 of Appendix A of Reference (2)). Based on the WWTS discharge quality evaluated for the antidegradation assessment, the Project is estimated to result in an increase in concentrations and loading of some parameters of concern in high quality receiving and downstream surface waters (Section 6.3 of Appendix A of Reference (2)). Therefore, PolyMet has provided the required information on the important economic and social benefits that the Project will provide (Section 7.5 of Appendix A of Reference (2)). These benefits include increasing employment and commercial opportunities, enhancing incomes and property values, improving water quality impacted by legacy mining operations, and remediating existing environmental conditions of concern.

5.5 Protection of Outstanding Resource Value Waters

The Project will not directly discharge to an ORVW, or have a measurable effect on any downstream ORVW (Section 7.6 and Section 9.5 of Appendix A of Reference (2) and Section 5 of Reference (4)), and none of the wetlands that will be physically altered are on the list of designated ORVW identified under Minnesota Rules, part 7050.0335. Therefore the Project will comply with the antidegradation standards in Minnesota Rules, part 7050.0265, subparts 6 and 7.

5.6 Protection Against Impairments Associated with Thermal Discharges

The WWTS discharge will present no reasonable potential for water quality impairment associated with thermal discharge (Section 7.7 of Appendix A of Reference (2)), therefore, the Project will comply with the antidegradation standard in Minnesota Rules, part 7050.0265, subpart 8.

6.0 Other Considerations Related to Antidegradation

6.1 Prohibition Against Causing or Contributing to a Violation of Water Quality

The CWA prohibits issuance of a permit for a new discharge or new discharger that will “cause or contribute to the violation of water quality standards,” (40 CFR 122.4(i)). The NPDES/SDS WWTS Antidegradation Evaluation demonstrates that the WWTS discharge and related activities will not cause or contribute to a violation of water quality standards (Section 10.1 of Appendix A of Reference (2)). Additional studies performed as part of the NorthMet permitting process demonstrated that cumulative Project effects will not cause or contribute to a violation of water quality standards (Reference (4)).

6.2 Waters of Downstream States

Approximately 116 river miles downstream from the Project, the St. Louis River forms the northeastern border of the Fond du Lac Reservation. The Fond du Lac Band of Lake Superior Chippewa (Band) has been granted “treatment as a state” status under the CWA, and the Band has developed its own water quality standards and antidegradation requirements. The NPDES/SDS WWTS Antidegradation Evaluation demonstrates that the WWTS discharge and related activities will not cause or contribute to a lowering of water quality within the Reservation boundaries or to a violation of any of the Band’s water quality standards, nor will the Project degrade or adversely affect any existing or designated uses of waters within the Reservation (Section 10.2 of Appendix A of Reference (2)).

This Antidegradation Assessment report shows that PolyMet’s compensatory mitigation replaces the quantity and quality of wetlands physically altered by the Project upstream of the Reservation in the St. Louis River watershed; therefore, physical alteration of wetlands will not cause or contribute to a lowering of water quality within the Reservation boundaries or to a violation of any of the Band’s water quality standards,, nor will the Project degrade or otherwise adversely affect any existing or designated uses of waters within the Reservation. Additional studies performed as part of the NorthMet permitting process demonstrated that cumulative Project effects will not cause or contribute to a lowering of water quality within the Reservation boundaries or to a violation of any water quality standards in waters within the Reservation, nor degrade or otherwise adversely affect any existing or designated uses of waters within the Reservation (Reference (4)).

7.0 References

1. **Barr Engineering Co.** NorthMet Project Wetland Replacement Plan (v3) Prepared for Poly Met Mining, Inc. December 2017.
2. —. NPDES/SDS Permit Application Volume III - Waste Water Treatment Facility (WWTF) Waste Water Treatment Plant (WWTP). Prepared for Poly Met Mining, Inc. July 2016.
3. **Poly Met Mining Inc.** Revised Wetland Permit Application (v2). August 19, 2013.
4. **Barr Engineering Co.** Cross-Media Analysis to Assess Potential Effects on Water Quality from Project-Related Deposition of Sulfur and Metal Air Emissions. October 2017.
5. **Cowardin, L.M., V. Carter, F.C. Golet, R.T. LaRoe.** *Classification of Wetlands and Deepwater Habitats of the United States*. s.l. : U.S. Fish and Wildlife Service, 1979. p. 103. FWS/OBS079/31.
6. **Eggers, Steve D. and Donald M. Reed.** Wetland Plants and Plant Communities of Minnesota and Wisconsin. s.l. : U.S. Army Corps of Engineers, St. Paul District, July 2015. Vol. Version 3.2.
7. **U.S. Army Corps of Engineers St. Paul District.** St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota. January 2009.
8. **Poly Met Mining, Inc.** Addendum to Poly Met Mining Inc. Wetland Data Package v7 Technical Memorandum. March 22, 2013.
9. **Poly Met Mining Inc.** NorthMet Project Wetland Analysis Work Plan (v3). October 13, 2011.
10. —. NorthMet Project Wetland Data Package (v11). April 2015.
11. **Poly Met Mining, Inc.** NorthMet Project Rock and Overburden Management Plan (v9). August 2017.
12. **U.S. Environmental Protection Agency.** Water Quality Standards Handbook: Second Edition (EPA 823-B-94-005a). August 1994.
13. **Minnesota Pollution Control Agency - Environmental Analysis and Outcomes Division.** Statement of Need and Reasonableness (SONAR) - Antidegradation (wq-rule3-60d). Revisor No.: 4030. OAH # 19-2200-32243. 2016.

