

Minnesota Department of Natural Resources Division of Ecological & Water Resources

MNDNR PERMITTING AND REPORTING SYSTEM www.mndnr.gov/mpars

Reference Number: 2016-1363

REVISION 04132015

APP ID 6438

MNDNR PERMITTING AND REPORTING SYSTEM

East Pit Appropriation - Revised: 4/14/2017

Water A	Appro	priation P	ermit Ap	plication

Date Submitted to DNR: July 17, 2016 at 9:59 AM	Application Reference Name: Poly Met Mining, Inc.
DNR Lead Hydrologist: Michael Liljegren Area: Eveleth	DNR Region: Northeast Region 2 Address: Minnesota Department of Natural Resources
Email: michael liliegren@state.mn.us	500 Lafavette Road

Phone: 651-259-5689 St. Paul, MN, 55155

Parties (Individuals and Organizations associated with the permit application)

,	
U.S. Forest Service - Landowner or Government Unit	Address: Superior National Forest, 8901 Grand Ave Place, Duluth, MN 55808 Phone: 218-626-4300
Poly Met Mining, Inc Lessee	Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN 55750 Phone: 218-471-2150
Christie Kearney - Contact (representing Poly Met Mining, Inc.) (submitted application)	Address: 6500 County Road 666, Hoyt Lakes, MN 55750 Phone: 218-471-2163 Email: ckearney@polymetmining.com
Brenda Halter - Contact (representing U.S. Forest Service)	Address: 8901 Grand Avenue Place, Duluth, MN 55808 Phone: 218-626-4300 Email: r9_superior_NF@fs.fed.us

Proposed Activity

Mine Dewatering (Volume requested: 1000 mgy)

Location and Water Resources



Installation Name: East Pit Appropriation

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S2 SWNE UTM: X:578629 Y:5275039 Water Resources: Groundwater

Temporary Storage Site Name: Flotation Tailings

Basin Pond

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S9 NENE, T59N-R14W-S10 NWNW

UTM: X:566350 Y:5273787

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

See the next page for a listing of the discharge site names and information.

Appropriation Overview

1	Please assign a reference/project name to this application.	Poly Met Mining, Inc.
2	What is the main type of work you are proposing to do?	Pump water for irrigation, water supply, manufacturing, dewatering, etc.
3	What is the major category of water use?	Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.)
4	Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year?	Yes
5	Describe your proposed use of water and any relevant details of your water processing system.	East Pit: overburden stripping and pit dewatering
6	What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site.	One (1) single pump, gravity flow, or other system (e.g., water truck) at a lake, stream, wetland, etc.
7	Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks.	Yes
8	If yes, how many storage sites will be used?	1
9	How many separate discharge points will there be, if any?	10
10	When did you or will you begin withdrawing water?	08/01/2017

Discharge Sites

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE, T59N-R14W-S16 SWNE

UTM: X: 565896 Y: 6371954

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X: 563983 Y: 5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X: 564417 Y: 5275791 Water Resources: (N/A)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X: 564857 Y: 5276079 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X: 565381 Y: 5276076 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 NESE UTM: X: 565918 Y: 5276074 Water Resources: (N/A)

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM: X: 566331 Y: 5276044 Water Resources: (N/A)

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM: X: 566818 Y: 5276024 Water Resources: (N/A)

Discharge Site Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175 Water Resources: (N/A)

Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

A	Appropriation Overview (Continued)		
11	Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)?	No	
12	What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This is mine pit dewatering. Various pit configurations were evaluated, but this was the final configuration. See FEIS for additional details.	
13	What conservation practices will you employ? (check all that apply)	Recycling of Water	

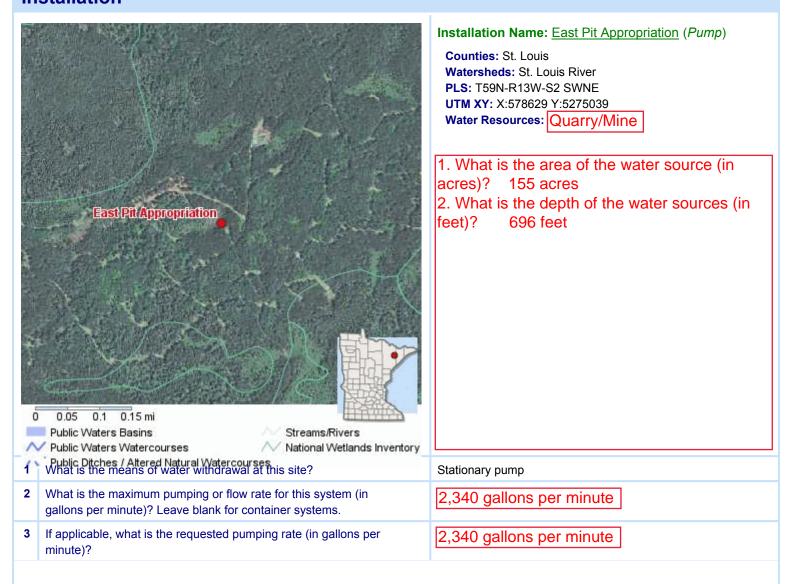
Activity Detail

Activity: Mine Dewatering

How much water are you requesting to use annually for this purpose <u>in millions of gallons per year</u>? (For example, enter 2,500,000 gallons as 2.5) <u>1,000 million gallons per year</u>

I don't know how much water I need N/A

Installation



In	Installation (Continued)		
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter	
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	quarry/mine	
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No	
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree	

Temporary Storage Site (Water pumped to a temporary holding area)



Temporary Storage Site Name: <u>Flotation Tailings</u> <u>Basin Pond</u> (*Unknown: Cell 1E, Dug Pit/Holding*

Pond)

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S9 NENE, T59N-R14W-S10 NWNW

UTM XY: X:566350 Y:5273787

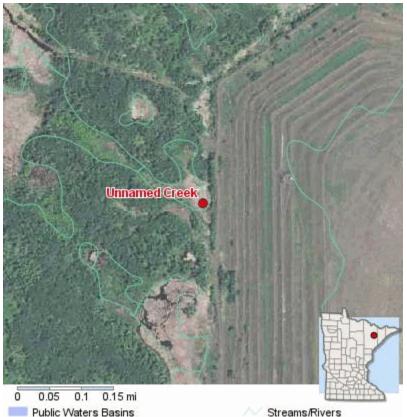
Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

1	What is the area of the temporary storage site (in acres)?	1,400 acres
2	What is the depth of the temporary storage site (in feet)?	10 feet
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	2
4	Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?	Yes

Temporary Storage Site (Continued)		
5	What is the predominant means of water withdrawal at this storage site?	Other (specify)
6	If Other, please specify:	Submersible pumps on a raft
7	If you cannot report a maximum pumping or flow rate for this site, please explain the reason.	Varies over time; not an appropriation (previously appropriated water)
8	A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter
9	Select the resource(s) below that describes where the water will be stored.	dug pit/holding pond

Discharge Sites (10)



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175 Water Resources: (N/A)

Public Waters Watercourses

Streams/Rivers National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Acknowledgment (By the party who submitted the permit application)

See the next page for a continuation of the discharge sites.

Continuation of the Discharge Site Details

Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X: 563983 Y: 5275733 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X: 564417 Y: 5275791 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X: 564857 Y: 5276079 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X: 565381 Y: 5276076 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 NESE UTM: X: 565918 Y: 5276074 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM: X: 566331 Y: 5276044 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM: X: 566818 Y: 5276024 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE, T59N-R14W-S16 SWNE

UTM: X: 565896 Y: 6371954

Water Resources: Stream/River: (MAJ-13194)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 433 gallons per minute

Acknowledgement (Continued)



I attest that:

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

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Minnesota Department of Natural Resources Division of Ecological & Water Resources

MNDNR PERMITTING AND REPORTING SYSTEM www.mndnr.gov/mpars

REVISION 04132015

APP ID 6433

MNDNR PERMITTING AND REPORTING SYSTEM

Central Pit Appropriation - Revised: 4/14/2017

Water Appropriation Permit Application

Reference Number: 2016-1364

Date Submitted to DNR: July 18, 2016 at 7:39 AM	Application Reference Name: Poly Met Mining, Inc.
DNR Lead Hydrologist: Michael Liljegren Area: Eveleth Email: michael.liljegren@state.mn.us Phone: 651-259-5689	DNR Region: Northeast Region 2 Address: Minnesota Department of Natural Resources 500 Lafayette Road St. Paul, MN, 55155

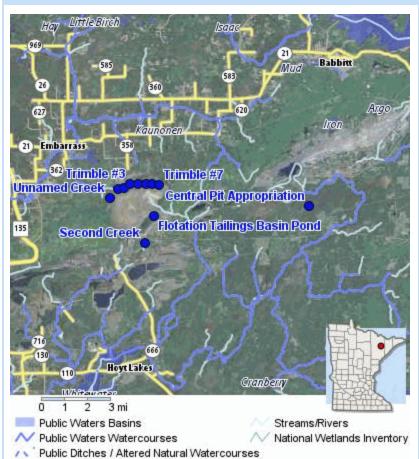
Parties (Individuals and Organizations associated with the permit application)

- ar area (mannadar and organizations descended man are point	
U.S. Forest Service - Landowner or Government Unit	Address: Superior National Forest, 8901 Grand Ave Place, Duluth, MN 55808 Phone: 218-626-4300
Poly Met Mining, Inc Lessee	Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN 55750 Phone: 218-471-2150
Christie Kearney - Contact (representing Poly Met Mining, Inc.) (submitted application)	Address: 6500 County Road 666, Hoyt Lakes, MN 55750 Phone: 218-471-2163 Email: ckearney@polymetmining.com
Brenda Halter - Contact (representing U.S. Forest Service)	Address: 8901 Grand Avenue Place, Duluth, MN 55808 Phone: 218-626-4300 Email: r9_superior_NF@fs.fed.us

Proposed Activity

Mine Dewatering (Volume requested: 700 mgy

Location and Water Resources



Installation Name: Central Pit Appropriation

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 NESE UTM: X:577274 Y:5274545 Water Resources: Groundwater

Temporary Storage Site Name: Flotation Tailings

Basin Pond

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S10 NWNW **UTM:** X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X:563983 Y:5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X:564417 Y:5275791 Water Resources: Lake: (Null)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X:564857 Y:5276079 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X:565381 Y:5276076 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Location and Water Resources (Continued)

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM: X:565918 Y:5276074 Water Resources: (N/A)

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM: X:566331 Y:5276044 Water Resources: (N/A)

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T60N-R14W-S34 NESW UTM: X:566818 Y:5276024 Water Resources: (N/A)

Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

Discharge Site Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175 Water Resources: (N/A)

Appropriation Overview

1	Please assign a reference/project name to this application.	Poly Met Mining, Inc.
2	What is the main type of work you are proposing to do?	Pump water for irrigation, water supply, manufacturing, dewatering, etc.
3	What is the major category of water use?	Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.)
4	Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year?	Yes
5	Describe your proposed use of water and any relevant details of your water processing system.	Central Pit: overburden stripping and pit dewatering
6	What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site.	One (1) single pump, gravity flow, or other system (e.g., water truck) at a lake, stream, wetland, etc.
7	Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks.	Yes
8	If yes, how many storage sites will be used?	1
9	How many separate discharge points will there be, if any?	10
10	When did you or will you begin withdrawing water?	08/01/2027
11	Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)?	No

4	Appropriation Overview (Continued)		
1	What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This is mine pit dewatering. Various pit configurations were evaluated, but this was the final configuration. See FEIS for additional details.	
1	What conservation practices will you employ? (check all that apply)	Recycling of Water	

Activity Detail

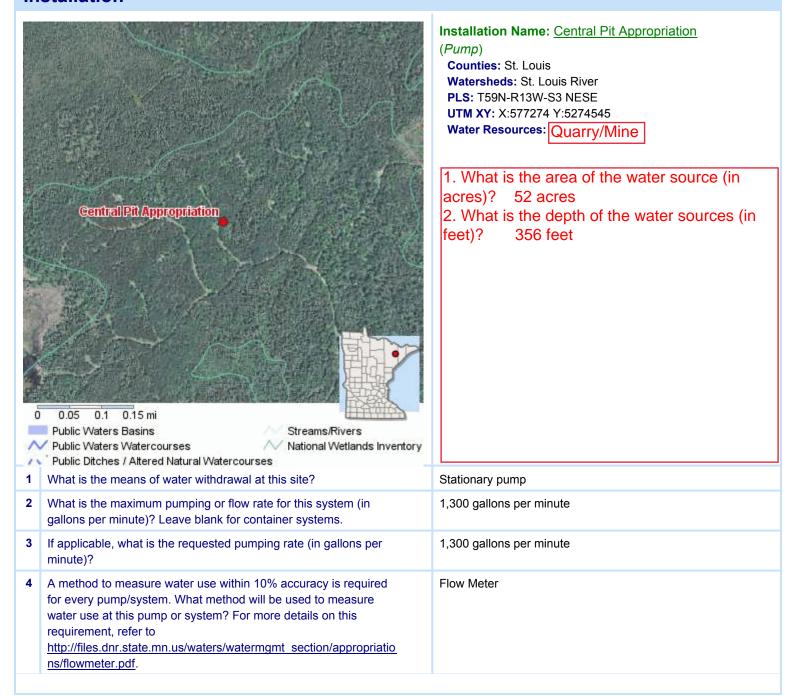
Activity: Mine Dewatering

How much water are you requesting to use annually for this purpose in millions of gallons per year? (For example,

enter 2,500,000 gallons as 2.5) 700 million gallons per year

I don't know how much water I need N/A

Installation



Installation (Continued)		
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	quarry/mine
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree

Temporary Storage Site (Water pumped to a temporary holding area)



Temporary Storage Site Name: Flotation Tailings
Basin Pond (Unknown: Cell 1E, Dug Pit/Holding

Pond)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S10 NWNW UTM XY: X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

1	What is the area of the temporary storage site (in acres)?	1,400 acres
2	What is the depth of the temporary storage site (in feet)?	10 feet
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	2
4	Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?	Yes
5	What is the predominant means of water withdrawal at this storage site?	Other (specify)
6	If Other, please specify:	Submersible pumps on a raft
7	If you cannot report a maximum pumping or flow rate for this site, please explain the reason.	Varies over time; not an appropriation (previously appropriated water)

Temporary Storage Site (Continued) 8 A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriatio ns/flowmeter.pdf.

Select the resource(s) below that describes where the water will be stored.

dug pit/holding pond

Discharge Sites (10)



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175

Water Resources: (N/A)

Public Waters Basins
Public Waters Watercourses

Streams/RiversNational Wetlands Inventory

Public Ditches / Attered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

2 What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

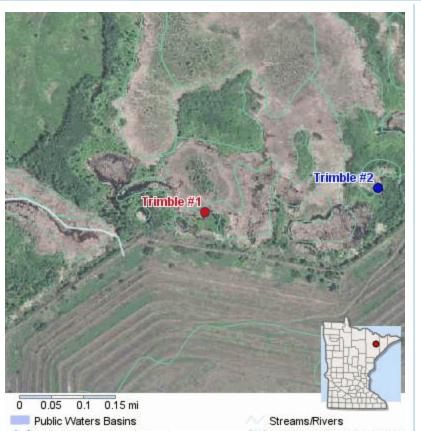
396 gallons per minute

Discharge Site #2 Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe, screen
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute



Discharge Site 3 Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM XY: X:563983 Y:5275733 Water Resources: (N/A)

Public Waters Watercourses

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

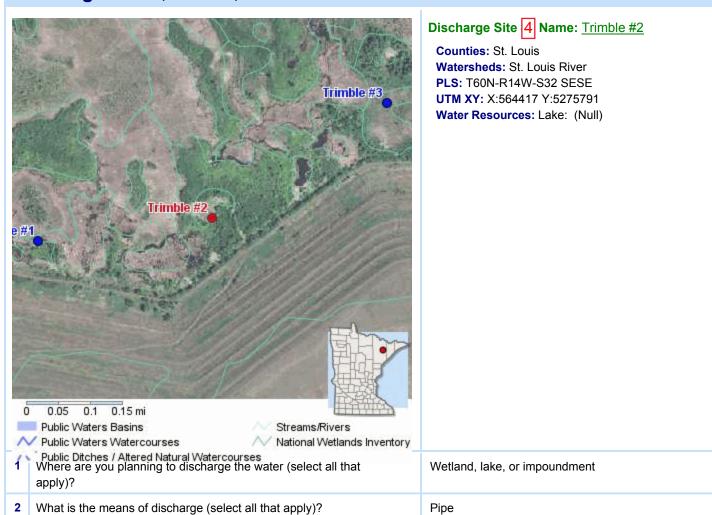
What is the means of discharge (select all that apply)?

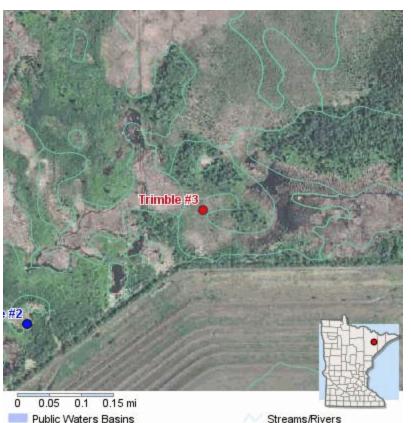
Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

What is the cumulative maximum discharge rate at this site (in

gallons per minute), if known?





Discharge Site 5 Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM XY: X:564857 Y:5276079 Water Resources: (N/A)

Public Waters Basins

Public Waters Watercourses

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses

Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?



Discharge Site 6 Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM XY: X:565381 Y:5276076 Water Resources: (N/A)

Wetland, lake, or impoundment

Pipe

National Wetlands Inventory

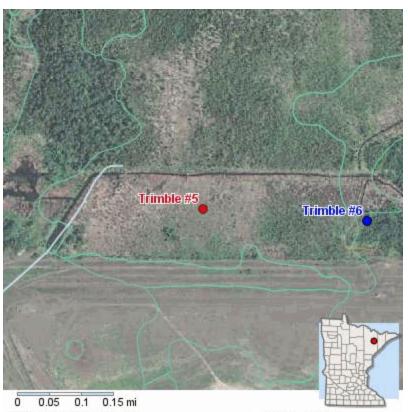
What is the means of discharge (select all that apply)?

Public Waters Watercourses

apply)?

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that



Discharge Site 7 Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM XY: X:565918 Y:5276074 **Water Resources:** (N/A)

0 0.05 0.1 0.15 mi
Public Waters Basins
Public Waters Watercourses

Streams/Rivers
National Wetlands Inventory

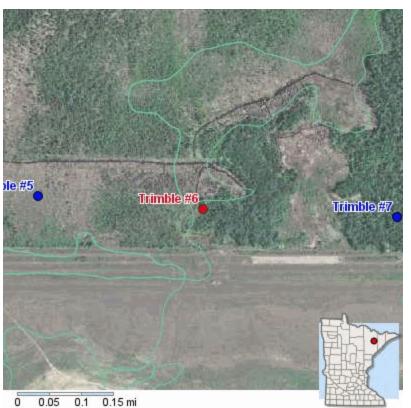
Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?



Discharge Site 8 Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM XY: X:566331 Y:5276044 Water Resources: (N/A)

0 0.05 0.1 0.15 mi
Public Waters Basins
Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Wetland, lake, or impoundment



Discharge Site 9 Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM XY: X:566818 Y:5276024 Water Resources: (N/A)

Public Waters Basins Streams/Rivers

Public Waters Watercourses National Wetlands

Public Ditches / Attered Natural Watercourses
Where are you planning to discharge the water (select all that

National Wetlands Inventory
er (select all that Wetland, lake, or impoundment

apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

What is the means of discharge (select all that apply)?



Discharge Site 10 Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM XY:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Stream, ditch, or river

Pipe

433 gallons per minute

Acknowledgment (By the party who submitted the permit application)



I attest that:

gallons per minute), if known?

apply)?

Public Ditches / Altered Natural Watercourses

Where are you planning to discharge the water (select all that

What is the cumulative maximum discharge rate at this site (in

What is the means of discharge (select all that apply)?

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

PRINTED: 07/18/2016 at 7:39 AM



Minnesota Department of Natural Resources Division of Ecological & Water Resources

www.mndnr.gov/mpars

REVISION 04132015

APP ID 6441

MNDNR PERMITTING AND REPORTING SYSTEM

West Pit Appropriation - Revised: 4/14/2017

Water Appropriation Permit Application

Water Appropriation Permit Application	Reference Number: 2016-1365
Date Submitted to DNR: July 18, 2016 at 8:14 AM	Application Reference Name: Poly Met Mining, Inc.

DNR Lead Hydrologist: Michael Liljegren DNR Region: Northeast Region 2

Area: Eveleth Address: Minnesota Department of Natural Resources

> 500 Lafayette Road St. Paul, MN, 55155

Parties (Individuals and Organizations associated with the permit application)

artioo (marriadais and organizations associated with the peri	at tios (mulviduals and organizations associated with the permit application)	
U.S. Forest Service - Landowner or Government Unit	Address: Superior National Forest, 8901 Grand Ave Place, Duluth, MN 55808 Phone: 218-626-4300	
Poly Met Mining, Inc Lessee	Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN 55750 Phone: 218-471-2150	
Christie Kearney - Contact (representing Poly Met Mining, Inc.) (submitted application)	Address: 6500 County Road 666, Hoyt Lakes, MN 55750 Phone: 218-471-2163 Email: ckearney@polymetmining.com	
Brenda Halter - Contact (representing U.S. Forest Service)	Address: 8901 Grand Avenue Place, Duluth, MN 55808 Phone: 218-626-4300 Email: r9_superior_NF@fs.fed.us	

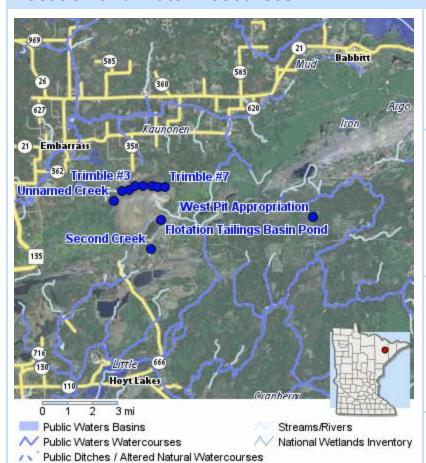
Proposed Activity

Mine Dewatering (Volume requested: 800 mgy)

Email: michael.liljegren@state.mn.us

Phone: 651-259-5689

Location and Water Resources



Installation Name: West Pit Appropriation

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S10 NENW, T59N-R13W-S3 SESW

UTM: X:576514 Y:5274027 Water Resources: Quarry/Mine

Temporary Storage Site Name: Flotation Tailings

Basin Pond

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S10 NWNW **UTM:** X:566533 Y:5273864

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM:** X:565896 Y:5271955

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X:563983 Y:5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X:564417 Y:5275791 Water Resources: Lake: (Null)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X:564857 Y:5276079 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X:565381 Y:5276076 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Location and Water Resources (Continued) Watersheds: St. Louis River PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE UTM: X:565918 Y:5276075 Water Resources: (N/A) Discharge Site Name: Trimble #6 Counties: St. Louis Watersheds: St. Louis River **PLS:** T60N-R14W-S34 NWSW UTM: X:566331 Y:5276044 Water Resources: (N/A) Discharge Site Name: Trimble #7 Counties: St. Louis Watersheds: St. Louis River **PLS:** T60N-R14W-S34 NESW UTM: X:566818 Y:5276024 Water Resources: (N/A) Discharge Site Name: Unnamed Creek #1 Discharge Site Name: Unnamed Creek #2 Counties: St. Louis Counties: St. Louis Watersheds: St. Louis River Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW PLS: T59N-R14W-S5 NWNW UTM: X: 563404 Y: 5274175 UTM: X: 563388 Y: 5275138 Water Resources: (N/A) Water Resources: (N/A) Appropriation Overview Please assign a reference/project name to this application. Poly Met Mining, Inc. What is the main type of work you are proposing to do? Pump water for irrigation, water supply, manufacturing, dewatering, etc. 3 What is the major category of water use? Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.) Will you use more than 10,000 gallons of water on any one day Yes and/or 1 million gallons of water in a year? Describe your proposed use of water and any relevant details of West Pit: overburden stripping and pit dewatering your water processing system. What is the initial means by which the water will be obtained One (1) single pump, gravity flow, or other system (e.g., (select one)? Note: subsequent questions will determine whether water truck) at a lake, stream, wetland, etc. water will also be pumped to and from a temporary storage site. Yes Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks. 1 8 If yes, how many storage sites will be used?

10

No

8/1/2019

How many separate discharge points will there be, if any?

Is this a one-time water appropriation expected to last 1 year or

When did you or will you begin withdrawing water?

less (i.e., temporary but not seasonal)?

9

10

Appropriation Overview (Continued)		
12	What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This is mine pit dewatering. Various pit configurations were evaluated, but this was the final configuration. See FEIS for additional details.
13	What conservation practices will you employ? (check all that apply)	Recycling of Water

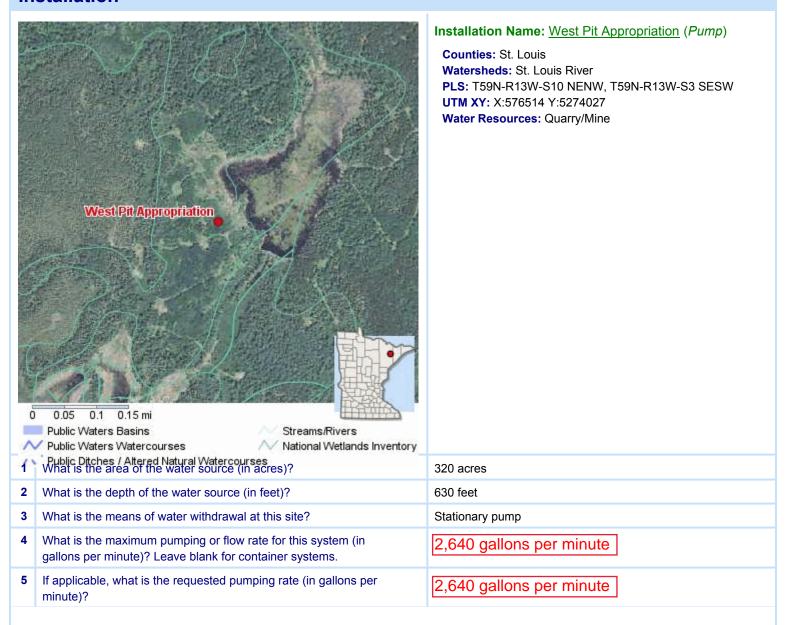
Activity Detail

Activity: Mine Dewatering

How much water are you requesting to use annually for this purpose <u>in millions of gallons per year</u>? (For example, enter 2,500,000 gallons as 2.5) 800 million gallons per year

I don't know how much water I need N/A

Installation



In	Installation (Continued)		
6	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter	
7	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	quarry/mine	
8	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No	
9	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree	

Temporary Storage Site (Water pumped to a temporary holding area)



Public Ditches / Altered Natural Watercourses

Temporary Storage Site Name: <u>Flotation Tailings</u> <u>Basin Pond</u> (*Unknown: Cell 1E, Dug Pit/Holding*

Pond)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S10 NWNW UTM XY: X:566533 Y:5273864

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

1	What is the area of the temporary storage site (in acres)?	1,400 acres
2	What is the depth of the temporary storage site (in feet)?	10 feet
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	2
4	Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?	Yes

Temporary Storage Site (Continued)		
5	What is the predominant means of water withdrawal at this storage site?	Other (specify)
6	If Other, please specify:	Submersible pumps on a raft
7	If you cannot report a maximum pumping or flow rate for this site, please explain the reason.	Varies over time; not an appropriation (previously appropriated water)
8	A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter
9	Select the resource(s) below that describes where the water will be stored.	dug pit/holding pond

Discharge Sites (10)



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

Discharge Site #2 Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

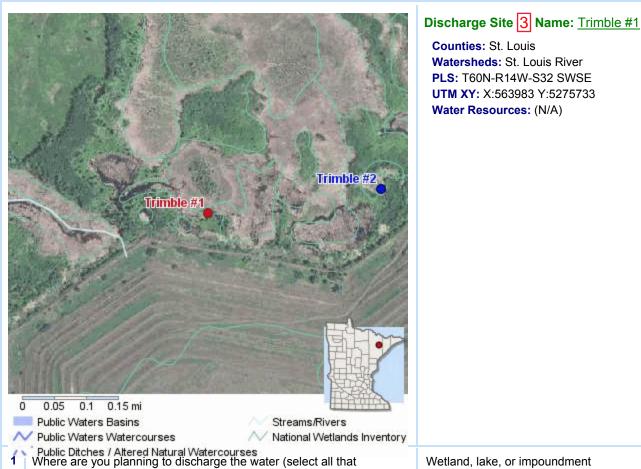
- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe, screen
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

apply)?

What is the means of discharge (select all that apply)?

gallons per minute), if known?

What is the cumulative maximum discharge rate at this site (in



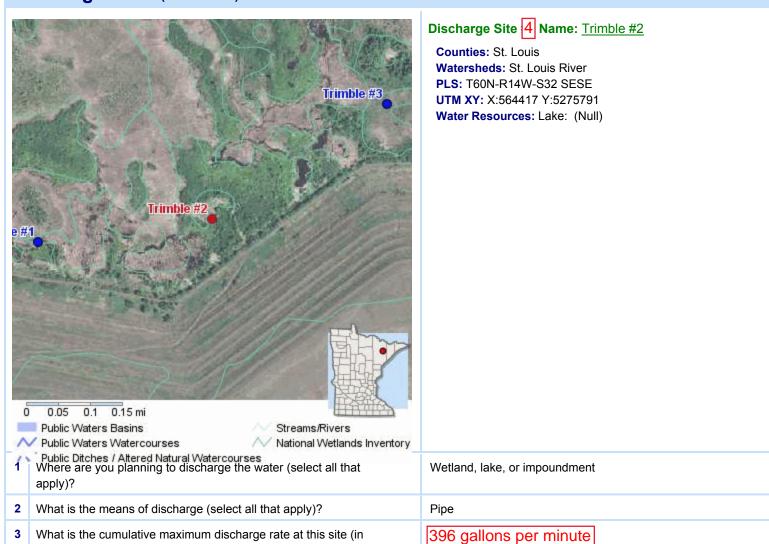
Wetland, lake, or impoundment

Pipe

396 gallons per minute

What is the cumulative maximum discharge rate at this site (in

gallons per minute), if known?





Discharge Site 5 Name: Trimble #3

Counties: St. Louis

Pipe

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM XY: X:564857 Y:5276079 Water Resources: (N/A)

Public Waters Watercourses

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

Public Waters Watercourses



Discharge Site 6 Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM XY: X:565381 Y:5276076 Water Resources: (N/A)

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

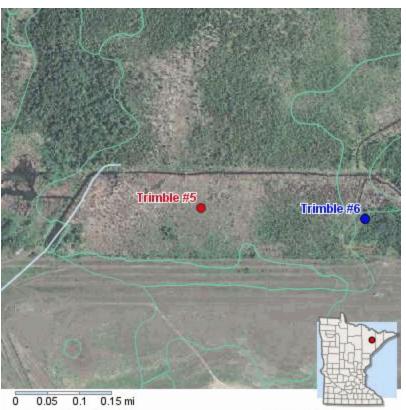
National Wetlands Inventory

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

What is the means of discharge (select all that apply)?

396 gallons per minute

Pipe



Discharge Site 7 Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM XY: X:565918 Y:5276075 **Water Resources:** (N/A)

Public Waters Basins

Public Waters Basins

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses

Where are you planning to discharge the water (select all that

Wetland, lake, or impoundment, Wetland, lake, or impoundment

Pipe

What is the means of discharge (select all that apply)?

apply)?

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?



Discharge Site 8 Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM XY: X:566331 Y:5276044 Water Resources: (N/A)

0 0.05 0.1 0.15 mi
 Public Waters Basins
 Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?



Discharge Site 9 Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM XY: X:566818 Y:5276024 Water Resources: (N/A)

0 0.05 0.1 0.15 mi
 Public Waters Basins
 Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in

What is the means of discharge (select all that apply)?

396 gallons per minute

Wetland, lake, or impoundment



Discharge Site 10 Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM XY:** X:565896 Y:5271955

Water Resources: Stream/River: (MAJ-13194)

Stream, ditch, or river

Pipe

What is the means of discharge (select all that apply)?

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

Where are you planning to discharge the water (select all that

Public Ditches / Altered Natural Watercourses

433 gallons per minute

Acknowledgment (By the party who submitted the permit application)



I attest that:

apply)?

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

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Minnesota Department of Natural Resources Division of Ecological & Water Resources

MNDNR PERMITTING AND REPORTING SYSTEM www.mndnr.gov/mpars

Reference Number: 2016-1367

MNDNR PERMITTING AND REPORTING SYSTEM

REVISION 04132015

APP ID 6444

Mine Site Infrastructure Appropriation - Revised: 4/14/2017

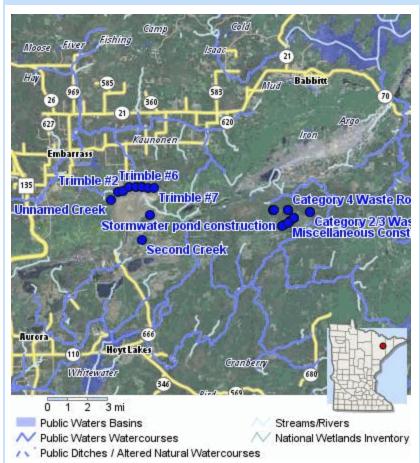
water Appropriation Permit Application	Reference Number. 2010-1307		
Date Submitted to DNR: July 18, 2016 at 8:54 AM	Application Reference Name: Poly Met Mining, Inc.		
DNR Lead Hydrologist: Michael Liljegren Area: Eveleth Email: michael.liljegren@state.mn.us Phone: 651-259-5689	DNR Region: Northeast Region 2 Address: Minnesota Department of Natural Resources 500 Lafayette Road St. Paul, MN 55155		
Parties (Individuals and Organizations associated with the per	mit application)		
U.S. Forest Service - Landowner or Government Unit	Address: Superior National Forest, 8901 Grand Ave Place, Duluth, MN 55808 Phone: 218-626-4300		
Poly Met Mining, Inc Lessee	Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN 55750 Phone: 218-471-2150		
Christie Kearney - Contact (representing Poly Met Mining, Inc.) (submitted application)	Address: 6500 County Road 666, Hoyt Lakes, MN 55750 Phone: 218-471-2163 Email: ckearney@polymetmining.com		
Brenda Halter - Contact (representing U.S. Forest Service)	Address: 8901 Grand Avenue Place, Duluth, MN 55808 Phone: 218-626-4300 Email: r9_superior_NF@fs.fed.us		
-			

Proposed Activity

Other Water Level Maintenance (Volume requested: 1,200 mgy

Water Appropriation Permit Application

Location and Water Resources



Installation Name: Category 1 Stockpile
Groundwater Containment System construction

Counties: St. Louis Watersheds: St. Louis River PLS: T59N-R13W-S3 SWSW UTM: X:576213 Y:5274261 Water Resources: Groundwater

Installation Name: Category 1 Stockpile
Groundwater Containment System operation

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SWSW UTM: X:576232 Y:5274265 Water Resources: Groundwater

Installation Name: Category 1 Waste Rock

Stockpile foundation construction

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SWSW UTM: X:576188 Y:5274258 Water Resources: Groundwater

Installation Name: Category 2/3 Waste Rock
Stockpile foundation, sumps, and overflow ponds

construction

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S1 SWSW, T59N-R13W-S2 SESE

UTM: X:579110 Y:5274152 Water Resources: Groundwater

Installation Name: Category 2/3 Waste Rock

Stockpile underdrains
Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S1 SWSW, T59N-R13W-S2 SESE

UTM: X:579110 Y:5274153 **Water Resources**: Groundwater

Installation Name: Category 4 Waste Rock
Stockpile foundation, sump, and overflow pond

construction

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SESE UTM: X:577323 Y:5274311 Water Resources: Groundwater

Installation Name: Category 4 Waste Rock

Stockpile underdrains
Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SESE UTM: X:577323 Y:5274311 Water Resources: Groundwater

Location and Water Resources (Continued)

Installation Name: Category 2/3 Waste Rock

Stockpile liner mine water drainage

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S1 SWSW, T59N-R13W-

S2 SESE

UTM: X: 579110 Y: 5274152 Water Resources: Precipitation

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Installation Name: Category 4 Waste Rock

Stockpile liner mine water drainage

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SESE UTM: X: 577323 Y: 5274311 Water Resources: Precipitation

_

Installation Name: Ore Surge Pile liner mine

water drainage Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-

R13W-S11 NWNW

UTM: X: 577828 Y: 5273646 Water Resources: Precipitation

Installation Name: Haul roads, OSLA, and

RTH mine water runoff Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NWSW UTM: X: 576897 Y: 5273083 Water Resources: Precipitation

Installation Name: Lined ponds, collected precipitation (EQ Basins, mine water ponds,

Construction Mine Water Basin)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NESE UTM: X: 577505 Y: 5273223 Water Resources: Precipitation **Installation Name:** Construction of new buildings

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S10 SENE, T59N-R13W-S11 SWNW

UTM: X:577540 Y:5273462 **Water Resources**: Groundwater

Installation Name: Mine Water Pond Construction

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NWSE UTM: X:577017 Y:5273148 Water Resources: Groundwater

Installation Name: Miscellaneous Construction

Dewatering

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S10 SENE, T59N-R13W-S10 NESE

UTM: X:577349 Y:5273307 Water Resources: Groundwater

Installation Name: Ore Surge Pile foundation,

sumps, and overflow pond construction

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-R13W-S11

NWNW

UTM: X:577828 Y:5273646
Water Resources: Groundwater

Installation Name: Ore Surge Pile underdrains

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-R13W-S11

NWNW

UTM: X:577828 Y:5273646
Water Resources: Groundwater

Installation Name: Stormwater pond construction

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NWSE UTM: X:576853 Y:5273032 Water Resources: Wetland

Temporary Storage Site Name: Flotation Tailings

Basin Pond

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S10 NWNW **UTM:** X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

Location and Water Resources (Continued)

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X:563983 Y:5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X:564417 Y:5275792 Water Resources: Lake: (Null)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X:564857 Y:5276079 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X:565381 Y:5276076 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM: X:565918 Y:5276074 **Water Resources:** (N/A)

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM: X:566331 Y:5276044

Water Resources: (N/A)

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River

Location and Water Resources (Continued) PLS: T60N-R14W-S34 NESW UTM: X:566818 Y:5276024

Water Resources: (N/A)

Counties: St. Louis

Discharge Site Name: Unnamed Creek #1 Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River
PLS: T59N-R14W-S5 SWSW
UTM: X: 563404 Y: 5274175
Water Resources: (N/A)

Watersheds: St. Louis River
PLS: T59N-R14W-S5 NWNW
UTM: X: 563388 Y: 5275138
Water Resources: (N/A)

Appropriation Overview

•			
Please assign a reference/project name to this application.	Poly Met Mining, Inc.		
What is the main type of work you are proposing to do?	Pump water for irrigation, water supply, manufacturing, dewatering, etc.		
What is the major category of water use?	Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.)		
Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year?	Yes		
Describe your proposed use of water and any relevant details of your water processing system.	Mine Site Infrastructure: dewatering		
What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site.	More than one pump, gravity flow, or other system at a single waterbody, all connected to a single distribution system (note this does not refer to buried or elevated tanks)		
How many individual pumps, gravity flow, or other systems are connected to the single distribution system?	18 separate installations		
Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks.	Yes		
If yes, how many storage sites will be used?	1		
How many separate discharge points will there be, if any?	9		
When did you or will you begin withdrawing water?	08/01/2017		
Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)?	No		
What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This includes construction dewatering and on-going dewatering. Various alternatives were evaluated. See FEIS for additional details.		
What conservation practices will you employ? (check all that apply)	Recycling of Water		
Do you have any other comments about the proposed water withdrawal? (optional)	There are not 18 pumps; there are 18 different installations associated with this permit request.		
	What is the main type of work you are proposing to do? What is the major category of water use? Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year? Describe your proposed use of water and any relevant details of your water processing system. What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site. How many individual pumps, gravity flow, or other systems are connected to the single distribution system? Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks. If yes, how many storage sites will be used? How many separate discharge points will there be, if any? When did you or will you begin withdrawing water? Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)? What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected? What conservation practices will you employ? (check all that apply) Do you have any other comments about the proposed water		

Activity Detail

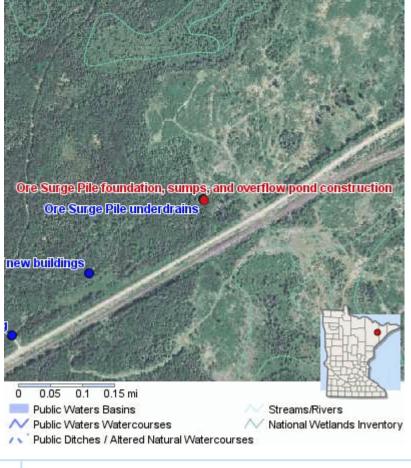
Activity: Other Water Level Maintenance

Activity Detail (Continued)

How much water are you requesting to use annually for this purpose <u>in millions of gallons per year</u>? (For example, enter 2,500,000 gallons as 2.5) <u>950 million gallons per year</u>

I don't know how much water I need N/A

Installations (18)



Installation #1 Name: Ore Surge Pile foundation, sumps, and overflow pond construction (Pump)

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-R13W-S11

NWNW

UTM XY: X:577828 Y:5273646 Water Resources: Groundwater

1	What is the means of water withdrawal at this site?	Portable pump		
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	200 gallons per minute		
3	If applicable, what is the requested pumping rate (in gallons per minute)?	200 gallons per minute		
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device		
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater		
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No		

In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels

I agree



Installation #2 Name: Construction of new

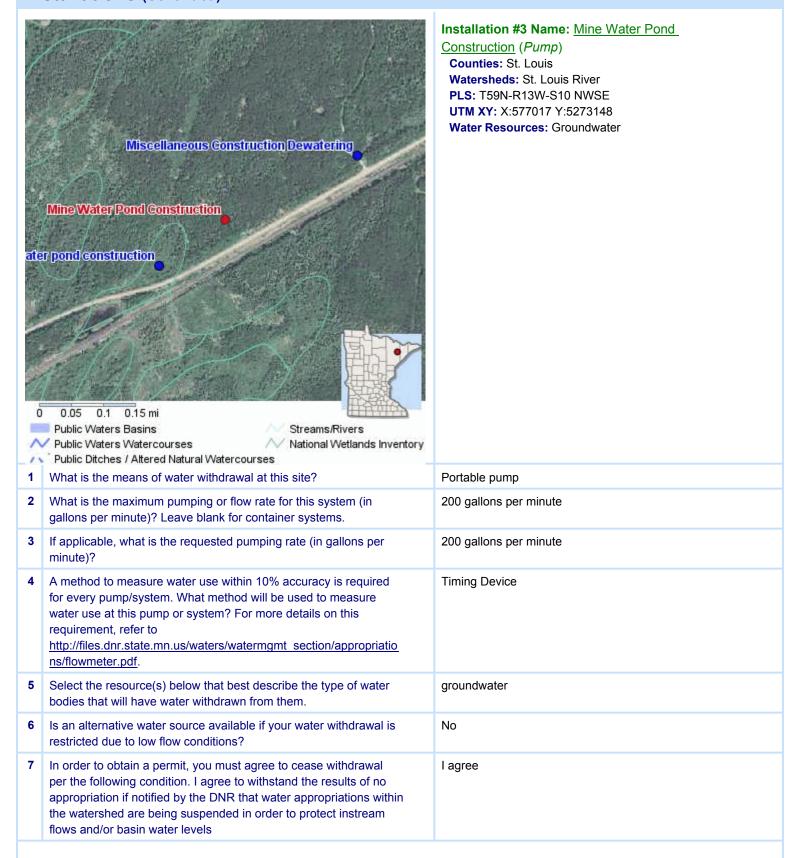
buildings (Pump)
Counties: St. Louis

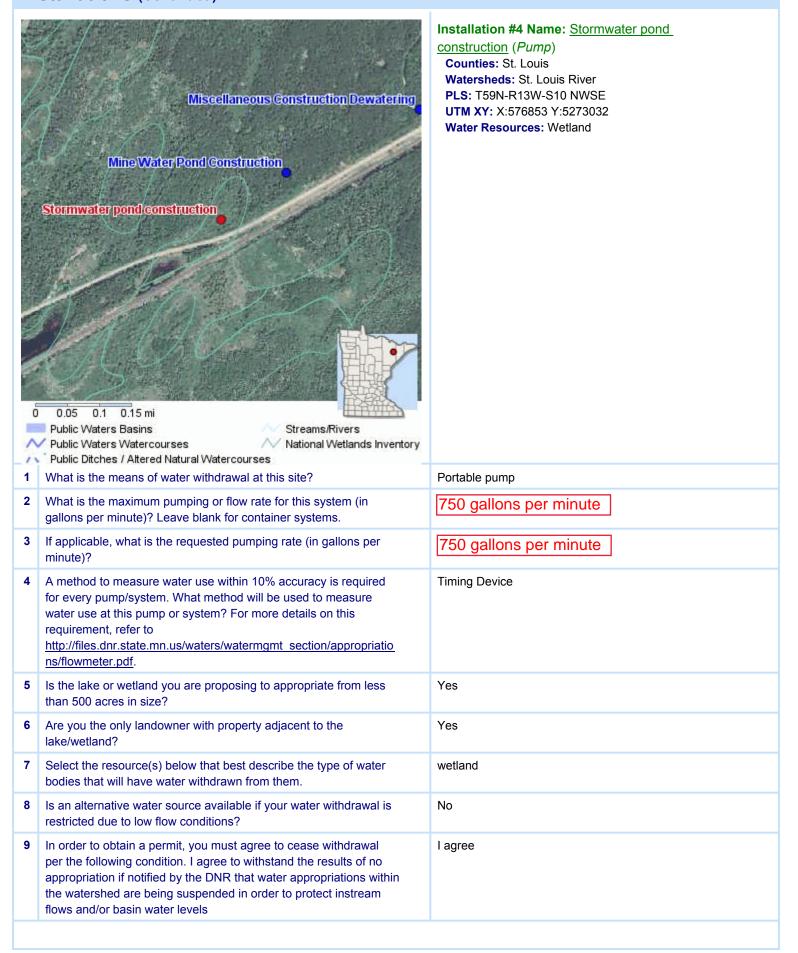
Watersheds: St. Louis River

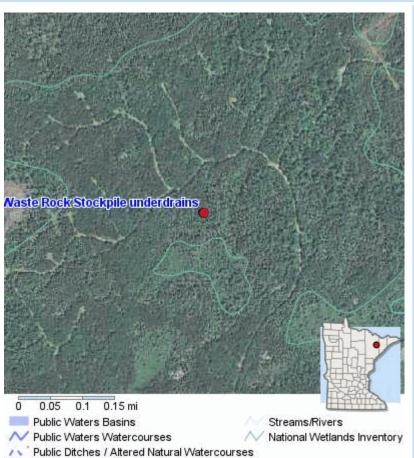
PLS: T59N-R13W-S10 SENE, T59N-R13W-S11 SWNW

UTM XY: X:577540 Y:5273462 Water Resources: Groundwater

Public Waters Watercourses National Wetlands Inventory Public Ditches / Altered Natural Watercourses What is the means of water withdrawal at this site? Portable pump What is the maximum pumping or flow rate for this system (in 50 gallons per minute gallons per minute)? Leave blank for container systems. 3 If applicable, what is the requested pumping rate (in gallons per 50 gallons per minute minute)? A method to measure water use within 10% accuracy is required **Timing Device** for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriatio ns/flowmeter.pdf. Select the resource(s) below that best describe the type of water groundwater bodies that will have water withdrawn from them. No Is an alternative water source available if your water withdrawal is restricted due to low flow conditions? In order to obtain a permit, you must agree to cease withdrawal I agree per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels







Installation #5 Name: Category 4 Waste Rock
Stockpile foundation, sump, and overflow pond

construction (Pump)
Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SESE UTM XY: X:577323 Y:5274311 Water Resources: Groundwater

1	What is the means of water withdrawal at this site?	Portable pump
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	850 gallons per minute
3	If applicable, what is the requested pumping rate (in gallons per minute)?	850 gallons per minute
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree



Public Ditches / Altered Natural Watercourses

Installation #6 Name: Category 2/3 Waste Rock
Stockpile foundation, sumps, and overflow ponds

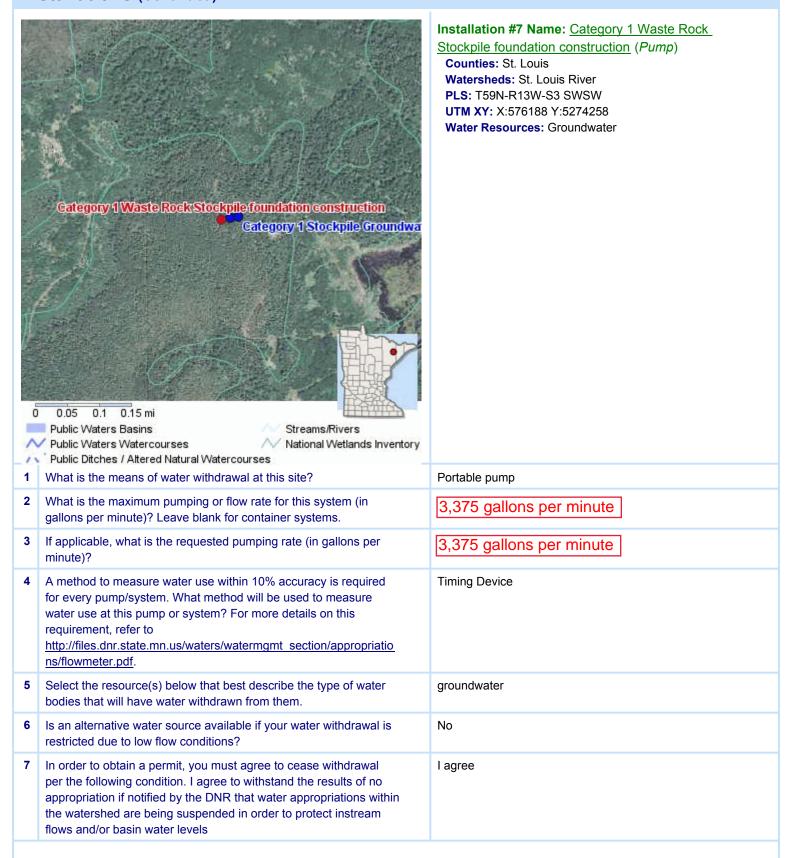
construction (Pump)
Counties: St. Louis

Watersheds: St. Louis River

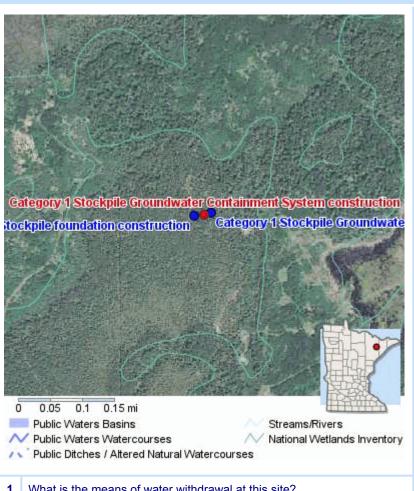
PLS: T59N-R13W-S1 SWSW, T59N-R13W-S2 SESE

UTM XY: X:579110 Y:5274152 **Water Resources:** Groundwater

1	What is the means of water withdrawal at this site?	Portable pump		
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	1,525 gallons per minute		
3	If applicable, what is the requested pumping rate (in gallons per minute)?	1,525 gallons per minute		
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	ure		
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater		
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No		
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree		



flows and/or basin water levels



Installation #8 Name: Category 1 Stockpile
Groundwater Containment System construction

(Pump)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SWSW UTM XY: X:576213 Y:5274261 Water Resources: Groundwater

1	What is the means of water withdrawal at this site?	Portable pump	
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	275 gallons per minute	
3	If applicable, what is the requested pumping rate (in gallons per minute)?	275 gallons per minute	
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device	
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater	
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No	
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream	I agree	

flows and/or basin water levels



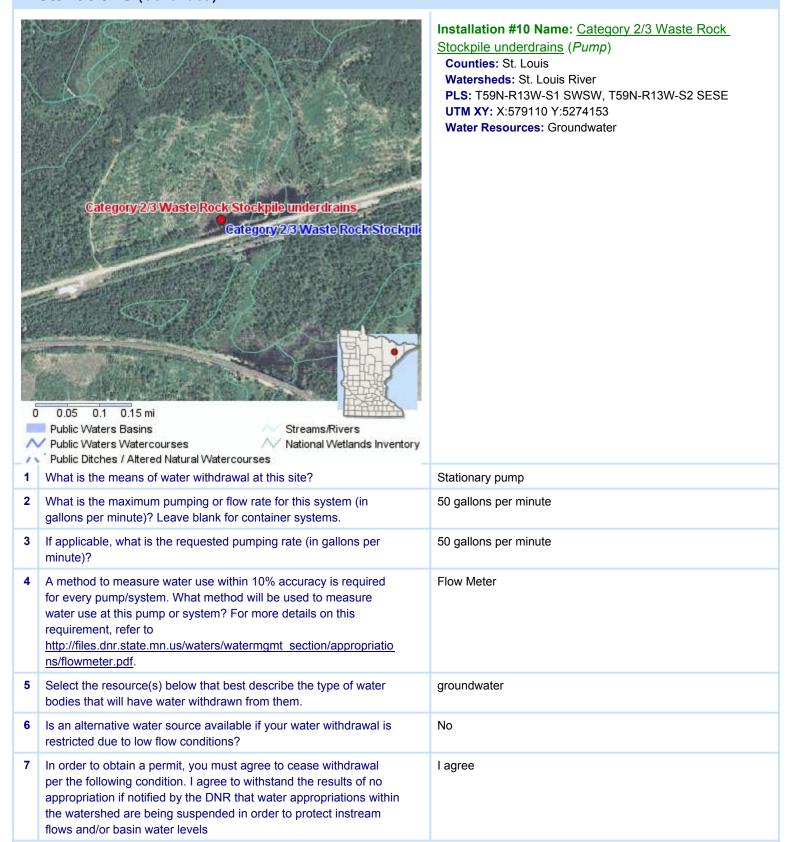
Installation #9 Name: Category 1 Stockpile
Groundwater Containment System operation

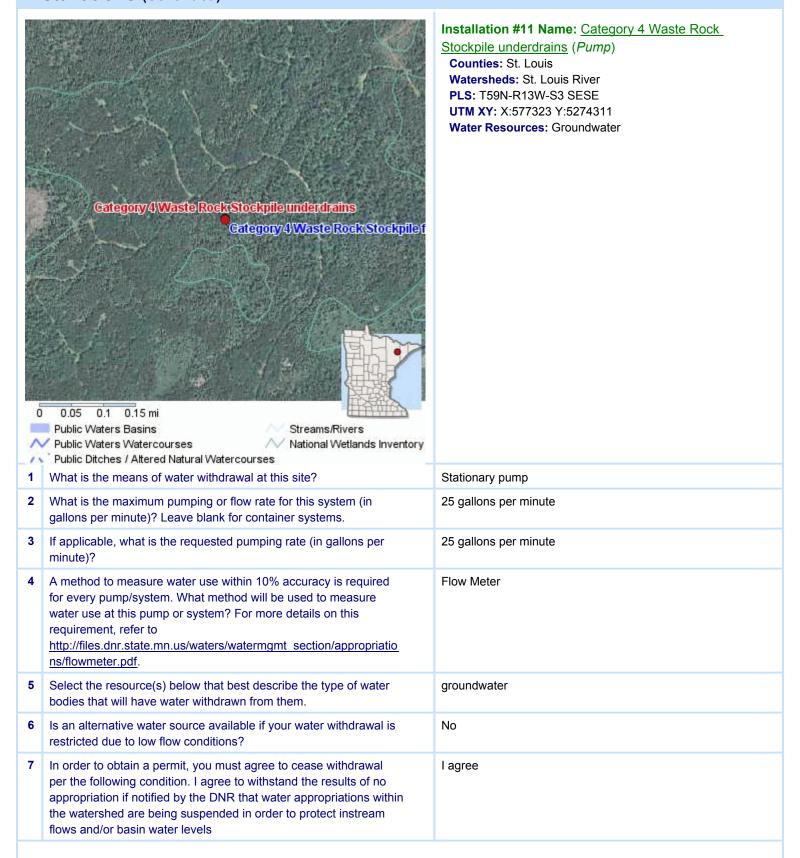
(Pump)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SWSW UTM XY: X:576232 Y:5274265 Water Resources: Groundwater

1	What is the means of water withdrawal at this site?	Stationary pump		
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	14,400 gallons per minute		
3	If applicable, what is the requested pumping rate (in gallons per minute)?	14,400 gallons per minute		
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter		
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater		
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No		
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream	I agree		







Installation #12 Name: Ore Surge Pile underdrains

(Pump)

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-R13W-S11

NWNW

UTM XY: X:577828 Y:5273646 Water Resources: Groundwater

1	What is the means of water withdrawal at this site?	Stationary pump	
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	25 gallons per minute	
3	If applicable, what is the requested pumping rate (in gallons per minute)?	25 gallons per minute	
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter	
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater	
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No	
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree	



the watershed are being suspended in order to protect instream

Temporary Storage Site (Water pumped to a temporary holding area)

flows and/or basin water levels

Installation #13 Name: Miscellaneous Construction

Dewatering (Pump)
Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S10 SENE, T59N-R13W-S10 NESE

UTM XY: X:577349 Y:5273307 **Water Resources:** Groundwater

See attached page for additional installations.

	Public Waters Basins Public Waters Watercourses National Wetlands Inventory Public Ditches / Altered Natural Watercourses	
1	What is the means of water withdrawal at this site?	Portable pump
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	100 gallons per minute
3	If applicable, what is the requested pumping rate (in gallons per minute)?	100 gallons per minute
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within	I agree

Continuation of the Installation Details

Installation #14 Name: Category 2/3 Waste Rock Stockpile liner mine water drainage

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S1 SWSW, T59N-R13W-S2 SESE

UTM: X: 579110 Y: 5274152 **Water Resources:** Precipitation

1. What is the means of water withdrawal at this site? Stationary pump

- 2. What is the maximum pumping or flow rate for this system? 430 gallons per minute
- 3. If applicable, what is the requested pumping rate? 430 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Installation #15 Name: Category 4 Waste Rock Stockpile liner mine water drainage

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S3 SESE UTM: X: 577323 Y: 5274311 Water Resources: Precipitation

- 1. What is the means of water withdrawal at this site? Stationary pump
- 2. What is the maximum pumping or flow rate for this system? 130 gallons per minute
- 3. If applicable, what is the requested pumping rate? 130 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Discharge Site Name: Ore Surge Pile liner mine water drainage

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R13W-S11 SWNW, T59N-R13W-S11 NWNW

UTM: X: 577828 Y: 5273646 **Water Resources:** Precipitation

1. What is the means of water withdrawal at this site? Stationary pump

- 2. What is the maximum pumping or flow rate for this system? 80 gallons per minute
- 3. If applicable, what is the requested pumping rate? 80 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Discharge Site Name: <u>Haul Roads</u>, OSLA, and RTH mine water drainage

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NWSW UTM: X: 576897 Y: 5273083 Water Resources: Precipitation

- 1. What is the means of water withdrawal at this site? Stationary pump
- 2. What is the maximum pumping or flow rate for this system? 470 gallons per minute
- 3. If applicable, what is the requested pumping rate? 470 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Discharge Site Name: <u>Lined Ponds, collected precipitation (EQ Basins, Construction Mine</u> Water Basin)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R13W-S10 NESE UTM: X: 577505 Y: 5273223 Water Resources: (N/A)

- 1. What is the means of water withdrawal at this site? Stationary pump
- 2. What is the maximum pumping or flow rate for this system? 75 gallons per minute
- 3. If applicable, what is the requested pumping rate? 75 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Temporary Storage Site (Continued)

Public Ditches / Altered Natural Watercourses

Discharge Sites 10



Temporary Storage Site Name: Flotation Tailings
Basin Pond (Unknown: Cell 1E, Dug Pit/Holding

Pond)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S10 NWNW UTM XY: X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

1	What is the area of the temporary storage site (in acres)?	1,400 acres		
2	What is the depth of the temporary storage site (in feet)?	10 feet		
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	2		
4 Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?				
5 What is the predominant means of water withdrawal at this storage site? Other (specify)		Other (specify)		
6	If Other, please specify:	Submersible pumps on a raft		
7	7 If you cannot report a maximum pumping or flow rate for this site, please explain the reason. Varies over time; not an appropriation (previous appropriated water)			
8	A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter		
9	Select the resource(s) below that describes where the water will be stored.	dug pit/holding pond		



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175

Water Resources: (N/A)

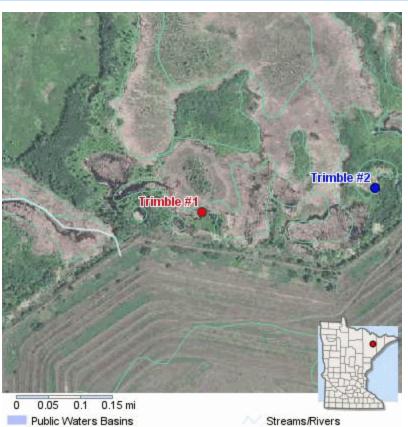
(0 0.05 0.1 0.15 mi	
_	■ Public Waters Basins Streams/Rivers ✓ Public Waters Watercourses National Wetlands Inventory	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the means of discharge (select all that apply)?	Pipe
3	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute

Discharge Site #2 Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe, screen
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute



Discharge Site 3 Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM XY: X:563983 Y:5275733 Water Resources: (N/A)

Public Waters Basins

Public Waters Watercourses

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses

Where are you planning to discharge the water (select all that apply)?

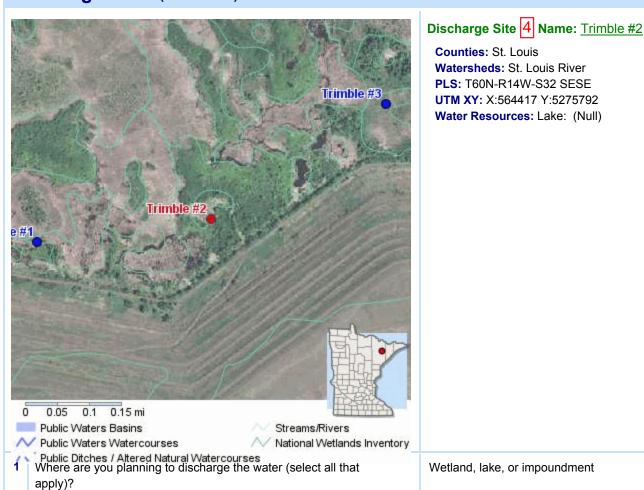
Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute



Pipe

What is the means of discharge (select all that apply)?

396 gallons per minute

Public Waters Watercourses



Discharge Site 5 Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM XY: X:564857 Y:5276079 Water Resources: (N/A)

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

What is the means of discharge (select all that apply)?

Pipe

National Wetlands Inventory

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?



Discharge Site 6 Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM XY: X:565381 Y:5276076 Water Resources: (N/A)

Public Waters Watercourses

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

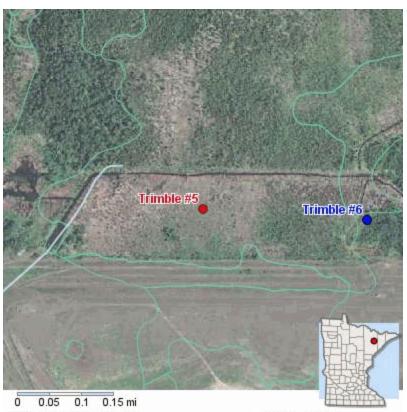
Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute



Discharge Site 7 Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM XY: X:565918 Y:5276074 **Water Resources:** (N/A)

0 0.05 0.1 0.15 mi
Public Waters Basins
Public Waters Watercourses

✓ Streams/Rivers
 ✓ National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

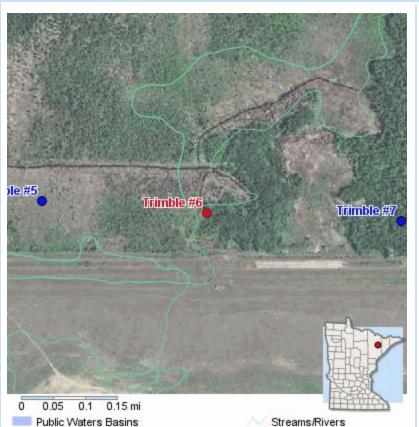
What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Public Waters Watercourses



Discharge Site 8 Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM XY: X:566331 Y:5276044 Water Resources: (N/A)

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

National Wetlands Inventory

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

What is the means of discharge (select all that apply)?

396 gallons per minute

Pipe



Discharge Site 9 Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM XY: X:566818 Y:5276024 Water Resources: (N/A)

0.05 0.1 0.15 mi
 Public Waters Basins
 Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Wetland, lake, or impoundment



Discharge Site 10 Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM XY:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Stream, ditch, or river

What is the means of discharge (select all that apply)?

42

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

Where are you planning to discharge the water (select all that

Public Ditches / Altered Natural Watercourses

433 gallons per minute

Acknowledgment (By the party who submitted the permit application)



I attest that:

apply)?

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

PRINTED: 07/18/2016 at 8:54 AM



Minnesota Department of Natural Resources Division of Ecological & Water Resources



Reference Number: 2016-1369

REVISION 04132015

APP ID 6446

MNDNR PERMITTING AND REPORTING SYSTEM

Plant Site Infrastructure Appropriation - Revised: 4/14/2017

Water A	ppro	priation	Permit A	\pi	olication
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Date Submitted to DNR: July 18, 2016 at 9:14 AM

DNR Lead Hydrologist: Michael Liljegren

Area: Eveleth

Email: michael.liljegren@state.mn.us

Phone: 651-259-5689

Application Reference Name: Poly Met Mining, Inc.

DNR Region: Northeast Region 2

Address: Minnesota Department of Natural Resources

500 Lafayette Road St. Paul, MN 55155

Parties (Individuals and Organizations associated with the permit application)

Address: P.O. Box 900, Hoyt Lakes, MN 55750 Cliffs Erie LLC - Landowner or Government Unit

Phone: 218-225-3127

Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN Poly Met Mining, Inc. - Lessee

55750

Phone: 218-471-2150

Christie Kearney - Contact (representing Poly Met Mining, Inc.) Address: 6500 County Road 666, Hoyt Lakes, MN 55750 (submitted application)

Phone: 218-471-2163

Email: ckearney@polymetmining.com

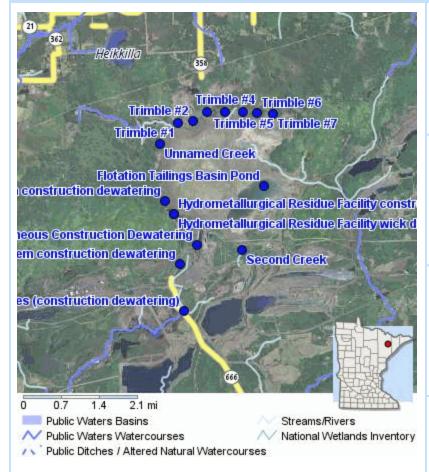
Andrea Hayden - Contact (representing Cliffs Erie LLC)

Address: Silver Bay, MN 55614

Proposed Activity

Other Water Level Maintenance (Volume requested: 675 mgy

Location and Water Resources



Installation Name: HRF liner, collected

precipitation

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S8 NESW, T59N-R14W-

S8 NWSE

UTM: X: 563868 Y: 5273031 Water Resources: Precipitation

Installation Name: Lined and concrete ponds, collected precipitation (WWTS, Sewage Treatment, Plant Reservoir)

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S17 SWNE, T59N-

R14W-S17 NWSE

UTM: X: 564023 Y: 5271539 Water Resources: Precipitation

Installation Name: Colby Lake pipeline upgrades

(construction dewatering)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S20 SWNE UTM: X:564164 Y:5270131 Water Resources: Groundwater

Installation Name: FTB Seepage Containment

System construction dewatering

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S8 SENW UTM: X:563596 Y:5273409 Water Resources: Groundwater

Installation Name: Hydrometallurgical Residue

Facility construction dewatering

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S8 NESW, T59N-R14W-S8 NWSE

UTM: X:563868 Y:5273031

Water Resources: Lake: (Null), Groundwater

Installation Name: <u>Hydrometallurgical Residue</u>

Facility wick drain operation

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S8 NESW, T59N-R14W-S8 NWSE

UTM: X:563868 Y:5273031

Water Resources: Lake: (Null), Groundwater

Installation Name: Miscellaneous Construction

Dewatering

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S17 NENE UTM: X:564554 Y:5272112 Water Resources: Groundwater

Installation Name: Sewage Treatment System

construction dewatering
Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S17 SWNE, T59N-R14W-S17 NWSE

UTM: X:564023 Y:5271539 Water Resources: Groundwater

Temporary Storage Site Name: Flotation Tailings

Basin Pond

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S10 NWNW **UTM:** X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

Location and Water Resources (Continued)

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X:563983 Y:5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X:564417 Y:5275791 Water Resources: Lake: (Null)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X:564857 Y:5276079 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM: X:565381 Y:5276076 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM: X:565918 Y:5276074 **Water Resources:** (N/A)

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM: X:566331 Y:5276044 Water Resources: (N/A)

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW

Location and Water Resources (Continued)

Discharge Site Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175 Water Resources: (N/A) **UTM:** X:566818 Y:5276024 **Water Resources:** (N/A)

Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

Appropriation Overview

, , ,		
1	Please assign a reference/project name to this application.	Poly Met Mining, Inc.
2	What is the main type of work you are proposing to do?	Pump water for irrigation, water supply, manufacturing, dewatering, etc.
3	What is the major category of water use?	Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.)
4	Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year?	Yes
5	Describe your proposed use of water and any relevant details of your water processing system.	Plant Site Infrastructure: dewatering
6	What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site.	More than one pump, gravity flow, or other system at a single waterbody, all connected to a single distribution system (note this does not refer to buried or elevated tanks)
7	How many individual pumps, gravity flow, or other systems are connected to the single distribution system?	8 separate installations
8	Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks.	Yes
9	If yes, how many storage sites will be used?	1
10	How many separate discharge points will there be, if any?	9
11	When did you or will you begin withdrawing water?	08/01/2017
12	Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)?	No
13	What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This includes construction dewatering and on-going dewatering. Various alternatives were evaluated. See FEIS for additional details.
14	What conservation practices will you employ? (check all that apply)	Recycling of Water
15	Do you have any other comments about the proposed water withdrawal? (optional)	There are not 8 pumps; there are 8 different installations associated with this permit request.

Activity Detail

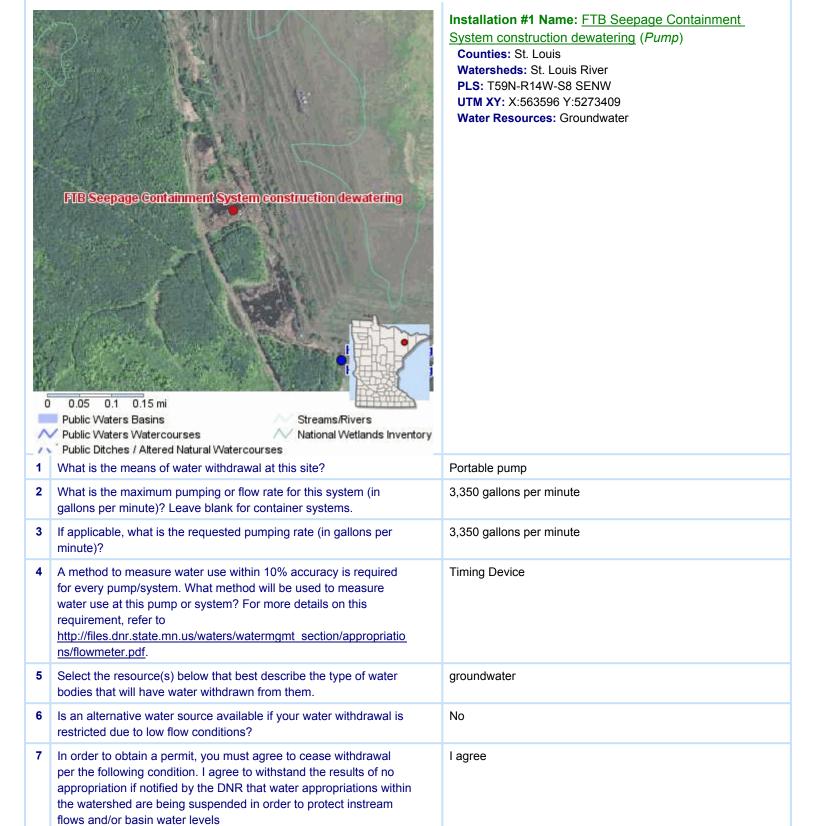
Activity: Other Water Level Maintenance

Activity Detail (Continued)

How much water are you requesting to use annually for this purpose in millions of gallons per year? (For example, enter 2,500,000 gallons as 2.5) 675 million gallons per year

I don't know how much water I need N/A

Installations (8)





Installation #2 Name: Sewage Treatment System

construction dewatering (Pump)

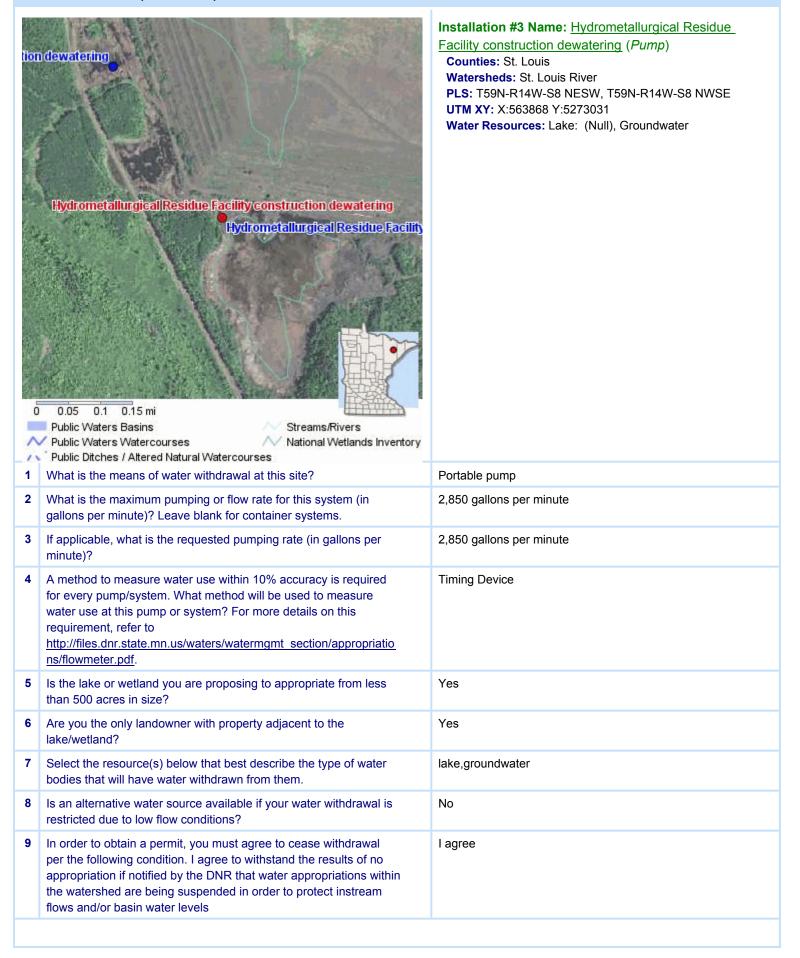
Counties: St. Louis

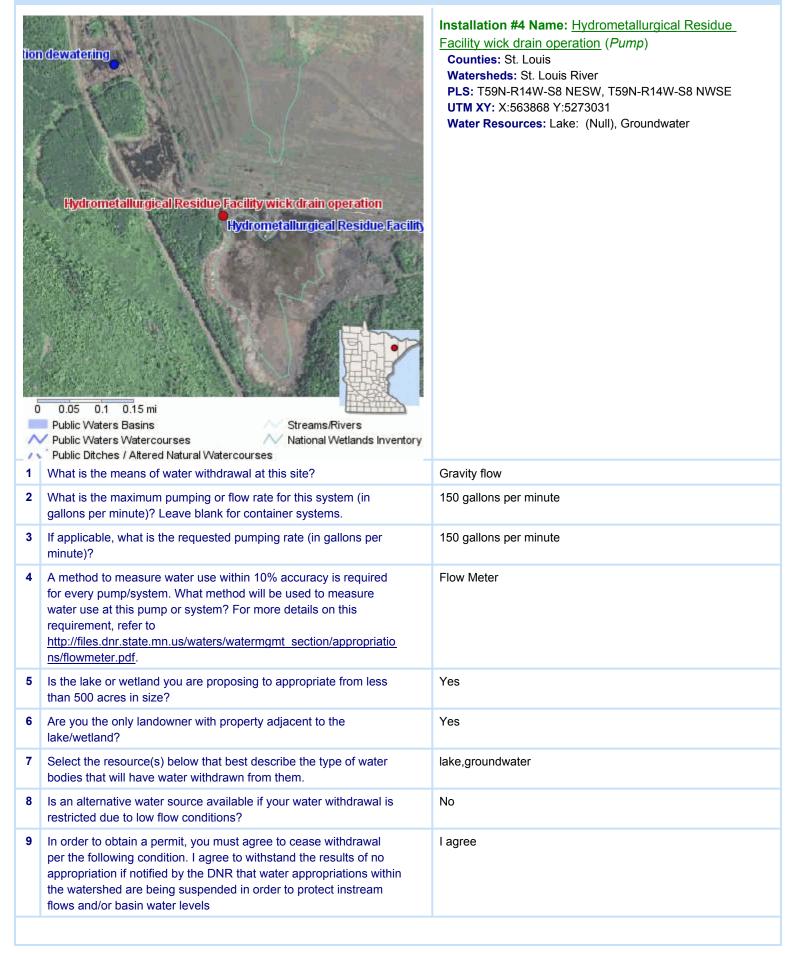
Watersheds: St. Louis River

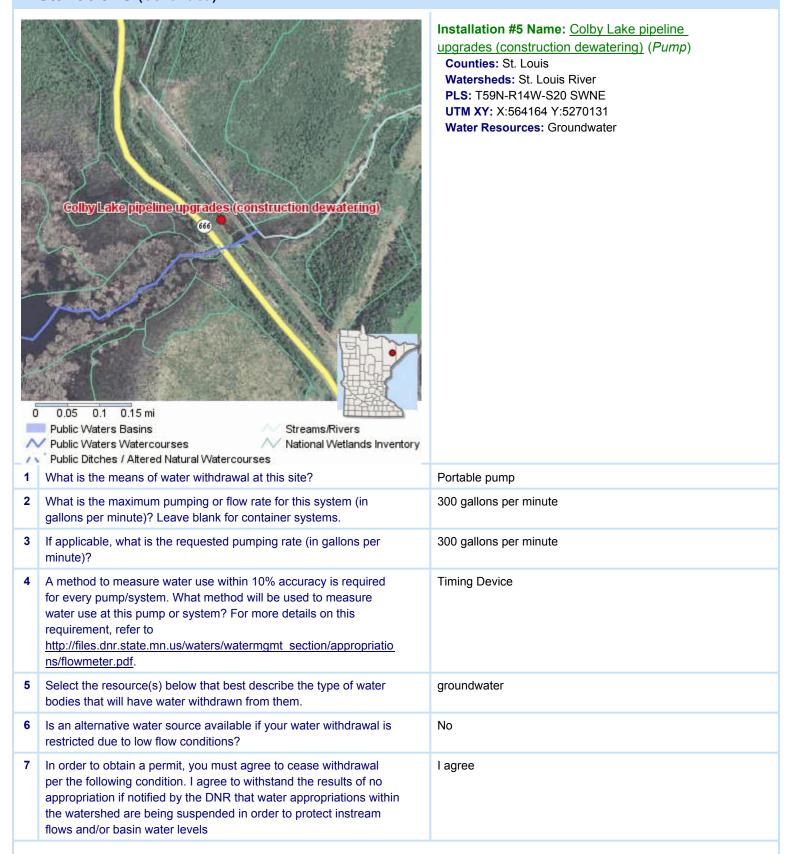
PLS: T59N-R14W-S17 SWNE, T59N-R14W-S17 NWSE

UTM XY: X:564023 Y:5271539 **Water Resources:** Groundwater

11	Public Ditches / Altered Natural Watercourses	
1	What is the means of water withdrawal at this site?	Portable pump
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	100 gallons per minute
3	If applicable, what is the requested pumping rate (in gallons per minute)?	100 gallons per minute
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device
5	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater
6	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No
7	In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree









Installation #6 Name: Miscellaneous Construction

Dewatering (Pump) Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S17 NENE **UTM XY:** X:564554 Y:5272112 Water Resources: Groundwater

Public Waters Basins Streams/Rivers	
What is the means of water withdrawal at this site?	Portable pump
What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	100 gallons per minute
If applicable, what is the requested pumping rate (in gallons per minute)?	100 gallons per minute
A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Timing Device
Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	groundwater
Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	No
In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream flows and/or basin water levels	I agree See attached page for additional installations.
	Public Waters Basins Public Waters Watercourses National Wetlands Inventory Public Ditches / Altered Natural Watercourses What is the means of water withdrawal at this site? What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems. If applicable, what is the requested pumping rate (in gallons per minute)? A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf . Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them. Is an alternative water source available if your water withdrawal is restricted due to low flow conditions? In order to obtain a permit, you must agree to cease withdrawal per the following condition. I agree to withstand the results of no appropriation if notified by the DNR that water appropriations within the watershed are being suspended in order to protect instream

Temporary Storage Site (Water pumped to a temporary holding area)

Continuation of the Installation Details

Installation #7 Name: <u>HRF liner (collected precipitation)</u>

Counties: St. Louis

Watersheds: St. Louis River

PLS: PLS: T59N-R14W-S8 NESW, T59N-R14W-S8 NWSE

UTM: X: 563868 Y: 5273031 **Water Resources:** Precipitation

1. What is the means of water withdrawal at this site? Stationary pump

- 2. What is the maximum pumping or flow rate for this system? 250 gallons per minute
- 3. If applicable, what is the requested pumping rate? 250 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter / Water balance
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Installation #8 Name: <u>Lined and concrete ponds, collected precipitation (WWTS, Sewage</u> Treatment System, Plant Reservoir)

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S17 SWNE, T59N-R14W-S17 NWSE

UTM: X: 564023 Y: 5271539 **Water Resources:** Precipitation

- 1. What is the means of water withdrawal at this site? Stationary pump
- 2. What is the maximum pumping or flow rate for this system? 50 gallons per minute
- 3. If applicable, what is the requested pumping rate? 50 gallons per minute
- 4. What method will be used to measure water use at this pump? Flow meter / Water balance
- 5. Select the resources below that best describes the type of water bodies that will have water withdrawn from them. Precipitation
- 6. Is an alternative water sources available if your water withdrawal is restricted due to low flow conditions? No
- 7. You must agree to cease withdrawal per the following permit condition. I agree

Temporary Storage Site (Continued)

Public Ditches / Altered Natural Watercourses



Temporary Storage Site Name: Flotation Tailings
Basin Pond (Unknown: Cell 1E, Dug Pit/Holding

Pond)

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S10 NWNW UTM XY: X:566533 Y:5273863

Water Resources: Unknown: Cell 1E, Dug Pit/Holding

Pond

1	What is the area of the temporary storage site (in acres)?	1,400 acres	
2	What is the depth of the temporary storage site (in feet)?	10 feet	
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	2	
4	Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?	Yes	
5	What is the predominant means of water withdrawal at this storage site?	Other (specify)	
6	If Other, please specify:	Submersible pumps on a raft	
7	If you cannot report a maximum pumping or flow rate for this site, please explain the reason.	Varies over time; not an appropriation (previously appropriated water)	
8	A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter	
9	Select the resource(s) below that describes where the water will be stored.	dug pit/holding pond	
Di	Discharge Sites 10		



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X: 563404 Y: 5274175

Water Resources: (N/A)

0 0.05 0.1 0.15 mi
Public Waters Basins
Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

 $Wetland, \, lake, \, or \, impoundment$

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Discharge Site #2 Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X: 563388 Y: 5275138 Water Resources: (N/A)

- 1. Where are you planning to discharge the water? Wetland, lake, or impoundment
- 2. What is the means of discharge? Pipe, screen
- 3. What is the cumulative maximum discharge rate at this site, if known? 396 gallons per minute

gallons per minute), if known?



Discharge Site 3 Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM XY: X:563983 Y:5275733 Water Resources: (N/A)

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

What is the means of discharge (select all that apply)?

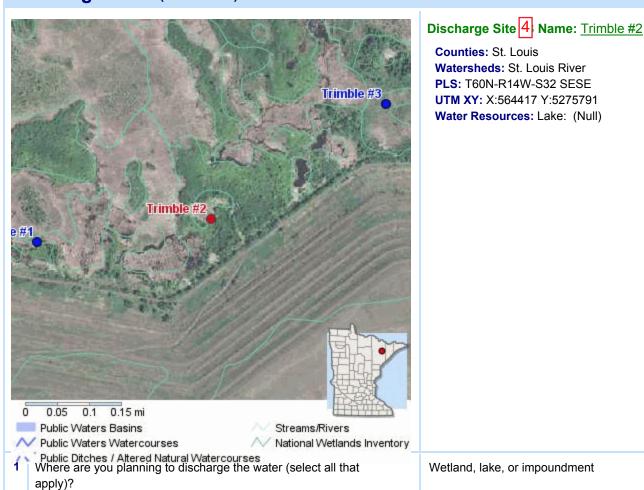
Pipe

What is the cumulative maximum discharge rate at this site (in 396 gallons per minute)

What is the means of discharge (select all that apply)?

gallons per minute), if known?

What is the cumulative maximum discharge rate at this site (in



396 gallons per minute

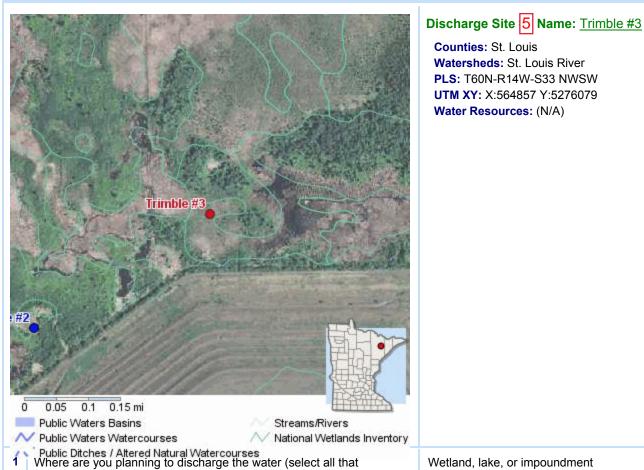
Pipe

apply)?

What is the means of discharge (select all that apply)?

gallons per minute), if known?

What is the cumulative maximum discharge rate at this site (in



Watersheds: St. Louis River **PLS:** T60N-R14W-S33 NWSW UTM XY: X:564857 Y:5276079 Water Resources: (N/A) Wetland, lake, or impoundment Pipe 396 gallons per minute



Discharge Site 6 Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM XY: X:565381 Y:5276076 Water Resources: (N/A)

0.05 0.1 0.15 mi
 Public Waters Basins
 Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

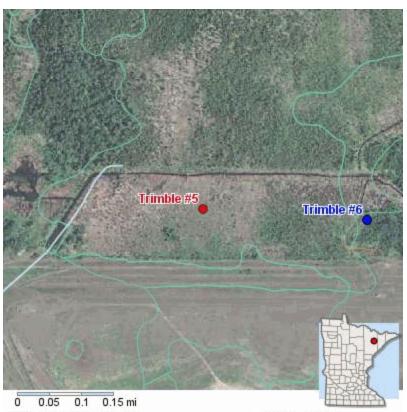
Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute



Discharge Site 7 Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM XY: X:565918 Y:5276074 **Water Resources:** (N/A)

0 0.05 0.1 0.15 mi
Public Waters Basins
Public Waters Watercourses

Streams/Rivers
National Wetlands Inventory

Public Ditches / Altered Natural Watercourses
Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute



Discharge Site 8 Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NWSW UTM XY: X:566331 Y:5276044 Water Resources: (N/A)

0.05 0.1 0.15 mi
 Public Waters Basins
 Public Waters Watercourses

Streams/Rivers

National Wetlands Inventory

Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?

What is the means of discharge (select all that apply)?

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

396 gallons per minute

Wetland, lake, or impoundment



Discharge Site 9 Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S34 NESW UTM XY: X:566818 Y:5276024 Water Resources: (N/A)

Public Waters Basins

Public Waters Watercourses

Public Ditches / Altered Natural Watercourses

Where are you planning to discharge the water (select all that apply)?

Wetland, lake, or impoundment

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

What is the means of discharge (select all that apply)?

396 gallons per minute



Discharge Site 10 Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE,

T59N-R14W-S16 SWNE **UTM XY:** X:565896 Y:5271954

Water Resources: Stream/River: (MAJ-13194)

Stream, ditch, or river

What is the means of discharge (select all that apply)?

433 gallons per minute

Pipe

What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?

Where are you planning to discharge the water (select all that

Public Ditches / Altered Natural Watercourses

Acknowledgment (By the party who submitted the permit application)



I attest that:

apply)?

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

PRINTED: 07/18/2016 at 9:14 AM



Minnesota Department of Natural Resources Division of Ecological & Water Resources

MNDNR PERMITTING AND REPORTING SYSTEM www.mndnr.gov/mpars

Reference Number: 2017-0260

REVISION 04132015

APP ID 7483

MNDNR PERMITTING AND REPORTING SYSTEM

Colby Lake Appropriation - Revised: 4/14/2017

Water Ap	propriation	Permit Ap	plication
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Date Submitted to DNR: February 13, 2017 at 12:51 PM	Application Reference Name: Poly Met Mining, Inc.	
DNR Lead Hydrologist: Michael Liljegren Area: Eveleth	DNR Region: Northeast Region 2	
Email: michael.liljegren@state.mn.us	Address: Minnesota Department of Natural Resources 500 Lafayette Road	
Phone: 651-259-5689	St. Paul, MN, 55155	

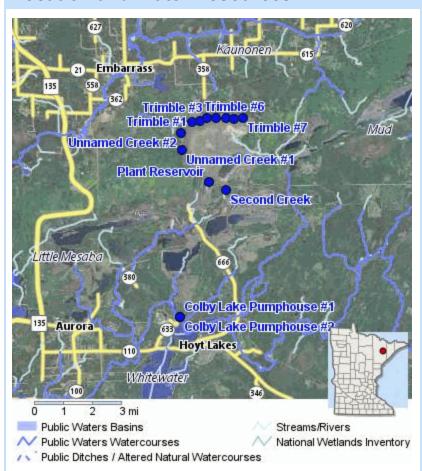
Parties (Individuals and Organizations associated with the permit application)

Cliffs Erie LLC - Landowner or Government Unit	Address: P.O. Box 900, Hoyt Lakes, MN 55750-0900 Phone: 218-225-3127
Poly Met Mining, Inc Lessee	Address: 6500 Co Rd 666, PO Box 475, Hoyt Lakes, MN 55750 Phone: 218-471-2150
Christie Kearney - Contact (representing Poly Met Mining, Inc.) (submitted application)	Address: 6500 County Road 666, Hoyt Lakes, MN 55750 Phone: 218-471-2163 Email: ckearney@polymetmining.com
Andrea Hayden - Contact (representing Cliffs Erie LLC)	Address: Silver Bay, MN 55614

Proposed Activity

Mine Processing (excludes sand/gravel) (Volume requested: 1800 mgy)

Location and Water Resources



Installation Name: Colby Lake Pumphouse #1

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T58N-R14W-S6 SESE **UTM:** X:563323 Y:5264837

Water Resources: Lake: Colby (69024900) - Public

Waters Basin

Installation Name: Colby Lake Pumphouse #2

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T58N-R14W-S6 SESE **UTM:** X:563325 Y:5264838

Water Resources: Lake: Colby (69024900) - Public

Waters Basin

Temporary Storage Site Name: Plant Reservoir

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T59N-R14W-S9 SWSW **UTM:** X:564938 Y:5272404

Water Resources: Lake: (Null), Dug Pit/Holding Pond

Discharge Site Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE

UTM: X:565897 Y:5271960

Water Resources: Stream/River: (MAJ-13194)

Discharge Site Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM: X:563981 Y:5275733 Water Resources: (N/A)

Discharge Site Name: Trimble #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM: X:564406 Y:5275786 Water Resources: Lake: (Null)

Discharge Site Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM: X:564827 Y:5275995 Water Resources: (N/A)

Discharge Site Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River

Location and Water Resources (Continued)

PLS: T60N-R14W-S33 NESW UTM: X:565348 Y:5275987 Water Resources: (N/A)

Discharge Site Name: Trimble #5

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM: X:565859 Y:5275981 **Water Resources:** (N/A)

Discharge Site Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S34 NWSW, T60N-R14W-S34

SWSW

UTM: X:566314 Y:5275949 **Water Resources:** (N/A)

Discharge Site Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S34 NESW, T60N-R14W-S34 SESW

UTM: X:566817 Y:5275967 **Water Resources:** (N/A)

Discharge Site Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM: X:563404 Y:5274175 Water Resources: (N/A)

Discharge Site Name: Unnamed Creek #2

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 NWNW UTM: X:563388 Y:5275138 Water Resources: (N/A)

Appropriation Overview

1	Please assign a reference/project name to this application.	Poly Met Mining, Inc.
2	What is the main type of work you are proposing to do?	Pump water for irrigation, water supply, manufacturing, dewatering, etc.
3	What is the major category of water use?	Non-Irrigation (e.g., municipal water supply, power generation, industrial processing, construction dewatering, water level maintenance, etc.)
4	Will you use more than 10,000 gallons of water on any one day and/or 1 million gallons of water in a year?	Yes
5	Describe your proposed use of water and any relevant details of your water processing system.	Colby Lake: make-up water

Appropriation Overview (Continued)				
6	What is the initial means by which the water will be obtained (select one)? Note: subsequent questions will determine whether water will also be pumped to and from a temporary storage site.	More than one pump, gravity flow, or other system at a single waterbody, all connected to a single distribution system (note this does not refer to buried or elevated tanks)		
7	How many individual pumps, gravity flow, or other systems are connected to the single distribution system?	2		
8	Do you plan to use stormwater runoff from a stormwater collection site as the source of water?	No		
9	Do you intend to pump the water to a temporary storage site before the intended use (e.g., to a pit, pond, wetland)? Do NOT mark yes for water trucks.	Yes		
10	If yes, how many storage sites will be used?	1		
11	How many separate discharge points will there be, if any?	10		
12	When did you or will you begin withdrawing water?	08/01/2017		
13	Is this a one-time water appropriation expected to last 1 year or less (i.e., temporary but not seasonal)?	No		
14	What alternative sources of water and withdrawal methods did you consider and why was the proposed action selected?	This source is for make-up water, after other appropriations are accounted for (see 5 other applications). Various alternatives were evaluated; see consolidated water appropriation permit application and FEIS for additional details on alternatives.		
15	What conservation practices will you employ? (check all that apply)	Recycling of Water		
16	Do you have any other comments about the proposed water withdrawal? (optional)	This appropriation would use an existing pumphouse and pipeline system, which was constructed for the Erie Mining Company/LTVSMC and is still in place and operable.		

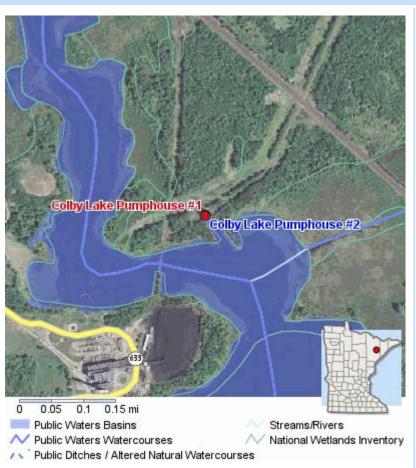
Activity Detail

Activity: Mine Processing (excludes sand/gravel)

How much water are you requesting to use annually for this purpose <u>in millions of gallons per year</u>? (For example, enter 2,500,000 gallons as 2.5) 1,800 million gallons per year

I don't know how much water I need N/A

Installations (2)



Installation #1 Name: Colby Lake Pumphouse #1

(Pump)

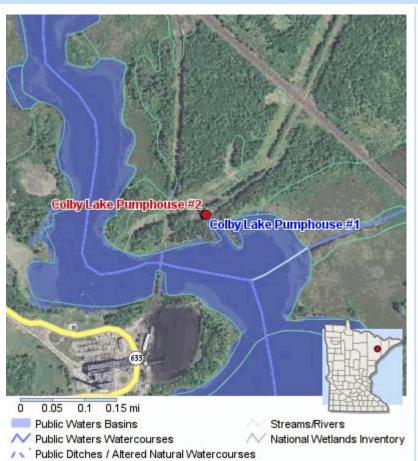
Counties: St. Louis

Watersheds: St. Louis River **PLS:** T58N-R14W-S6 SESE **UTM XY:** X:563323 Y:5264837

Water Resources: Lake: Colby (69024900) - Public

Waters Basin

1	What is the means of water withdrawal at this site?	Stationary pump
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	12,000 gallons per minute
3	If applicable, what is the requested pumping rate (in gallons per minute)?	3,400 gallons per minute
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter
5	Is the lake or wetland you are proposing to appropriate from less than 500 acres in size?	No
6	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	lake
7	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	Yes



Installation #2 Name: Colby Lake Pumphouse #2

(Pump)

Counties: St. Louis

Watersheds: St. Louis River **PLS:** T58N-R14W-S6 SESE **UTM XY:** X:563325 Y:5264838

Water Resources: Lake: Colby (69024900) - Public

Waters Basin

1	What is the means of water withdrawal at this site?	Stationary pump
2	What is the maximum pumping or flow rate for this system (in gallons per minute)? Leave blank for container systems.	12,000 gallons per minute
3	If applicable, what is the requested pumping rate (in gallons per minute)?	3,400 gallons per minute
4	A method to measure water use within 10% accuracy is required for every pump/system. What method will be used to measure water use at this pump or system? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter
5	Is the lake or wetland you are proposing to appropriate from less than 500 acres in size?	No
6	Select the resource(s) below that best describe the type of water bodies that will have water withdrawn from them.	lake
7	Is an alternative water source available if your water withdrawal is restricted due to low flow conditions?	Yes

Temporary Storage Site (Water pumped to a temporary holding area)

Temporary Storage Site (Continued)



Temporary Storage Site Name: Plant Reservoir

(Lake: (Null), Dug Pit/Holding Pond)

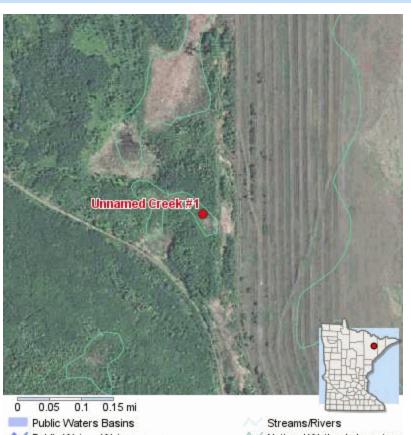
Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S9 SWSW UTM XY: X:564938 Y:5272404

Water Resources: Lake: (Null), Dug Pit/Holding Pond

0	0.05 0.1 0.15 mi Public Waters Basins Streams/Rivers Public Waters Watercourses National Wetlands Inventory Public Ditches / Altered Natural Watercourses	
1	What is the area of the temporary storage site (in acres)?	19 acres
2	What is the depth of the temporary storage site (in feet)?	31 feet
3	How many individual pumps, gravity flow, or other system will be used at this site to withdraw water?	1
4	Will the amount of water pumped from the temporary storage site exceed the amount of water obtained via the intial source?	No
5	What is the predominant means of water withdrawal at this storage site?	Gravity flow
6	If you cannot report a maximum pumping or flow rate for this site, please explain the reason.	Max. flow will be dependent on the required use. The reservoir holds 10 MG (with a sloped bottom and an overflow to the tailings basin). The bottom 2 million gallons of this reservoir is reserved for fire water, with final design not yet complete for pumping rates to this system, which will be the maximum flow rate.
7	A method to measure water use within 10% accuracy is required. What is the predominant method that will be used to measure water use from this site? For more details on this requirement, refer to http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf .	Flow Meter
8	Select the resource(s) below that describes where the water will be stored.	lake,dug pit/holding pond

Discharge Sites (10)



Discharge Site #1 Name: Unnamed Creek #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T59N-R14W-S5 SWSW UTM XY: X:563404 Y:5274175 Water Resources: (N/A)

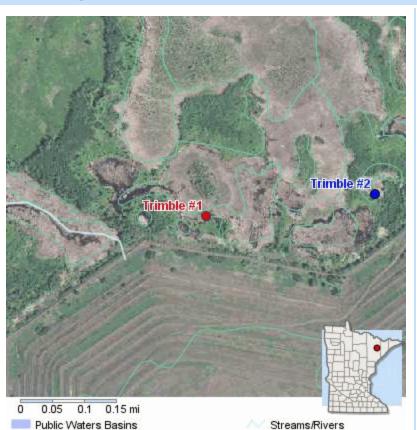
1	✓ Public Waters Watercourses ✓ National Wetlands Inventory		
ł,	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment	
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year	
;	What is the means of discharge (select all that apply)?	Pipe	
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute	



Discharge Site #2 Name: Unnamed Creek #2

PLS: T59N-R14W-S5 NWNW UTM XY: X:563388 Y:5275138

Wetland, lake, or impoundment What is the quantity of water to be discharged at this site (in Max. of 210 million gallons per year million gallons per year)? 3 What is the means of discharge (select all that apply)? Pipe What is the cumulative maximum discharge rate at this site (in 396 gallons per minute gallons per minute), if known?

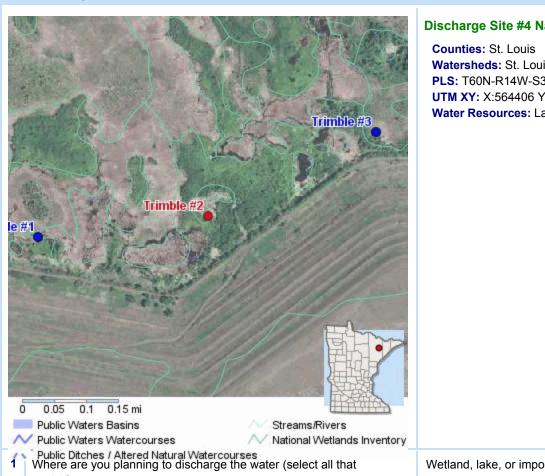


Discharge Site #3 Name: Trimble #1

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S32 SWSE UTM XY: X:563981 Y:5275733 Water Resources: (N/A)

1	✓ Public Waters Watercourses ✓ National Wetlands Inventory	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute



What is the quantity of water to be discharged at this site (in

What is the cumulative maximum discharge rate at this site (in

What is the means of discharge (select all that apply)?

million gallons per year)?

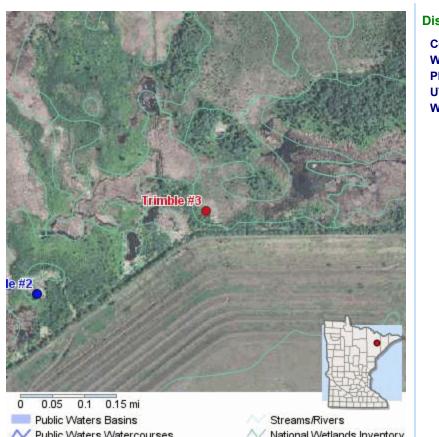
gallons per minute), if known?

3

Discharge Site #4 Name: Trimble #2

Watersheds: St. Louis River PLS: T60N-R14W-S32 SESE UTM XY: X:564406 Y:5275786 Water Resources: Lake: (Null)

Wetland, lake, or impoundment Max. of 210 million gallons per year Pipe 396 gallons per minute

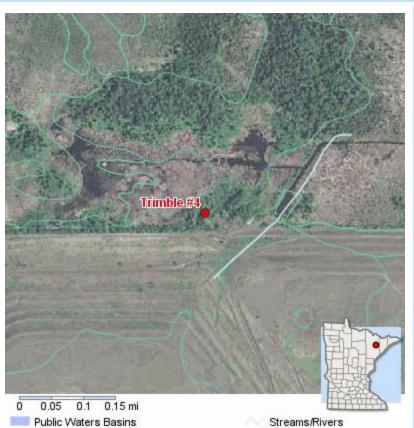


Discharge Site #5 Name: Trimble #3

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NWSW UTM XY: X:564827 Y:5275995 Water Resources: (N/A)

1	Public Waters Watercourses Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute

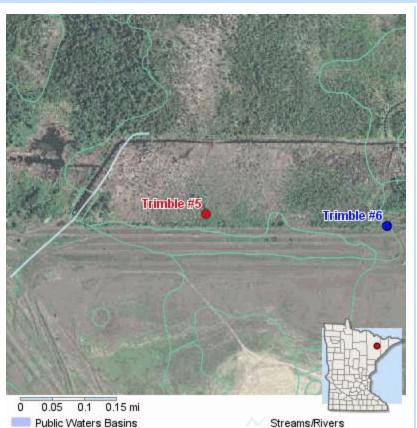


Discharge Site #6 Name: Trimble #4

Counties: St. Louis

Watersheds: St. Louis River PLS: T60N-R14W-S33 NESW UTM XY: X:565348 Y:5275987 Water Resources: (N/A)

1	✓ Public Waters Watercourses ✓ National Wetlands Inventory	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute



Discharge Site #7 Name: Trimble #5

Counties: St. Louis

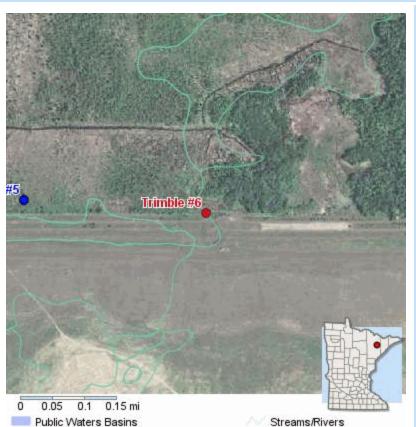
Watersheds: St. Louis River

PLS: T60N-R14W-S33 NESE, T60N-R14W-S33 NWSE

UTM XY: X:565859 Y:5275981 **Water Resources:** (N/A)

1	✓ Public Waters Watercourses ✓ National Wetlands Inventory	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute

Public Waters Watercourses



Discharge Site #8 Name: Trimble #6

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S34 NWSW, T60N-R14W-S34

SWSW

UTM XY: X:566314 Y:5275949 **Water Resources:** (N/A)

1	Public Ditches / Altered Natural Watercourses	
1	Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute

National Wetlands Inventory



Discharge Site #9 Name: Trimble #7

Counties: St. Louis

Watersheds: St. Louis River

PLS: T60N-R14W-S34 NESW, T60N-R14W-S34 SESW

UTM XY: X:566817 Y:5275967 **Water Resources:** (N/A)

1	✓ Public Waters Watercourses ✓ National Wetlands Inventory	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Wetland, lake, or impoundment
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 210 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	396 gallons per minute



Discharge Site #10 Name: Second Creek

Counties: St. Louis

Watersheds: St. Louis River

PLS: T59N-R14W-S16 NENE, T59N-R14W-S16 NWNE

UTM XY: X:565897 Y:5271960

Water Resources: Stream/River: (MAJ-13194)

1	✓ Public Waters Watercourses	
1	Public Ditches / Altered Natural Watercourses Where are you planning to discharge the water (select all that apply)?	Stream, ditch, or river
2	What is the quantity of water to be discharged at this site (in million gallons per year)?	Max. of 230 million gallons per year
3	What is the means of discharge (select all that apply)?	Pipe
4	What is the cumulative maximum discharge rate at this site (in gallons per minute), if known?	433 gallons per minute

Acknowledgment (By the party who submitted the permit application)



I attest that:

- ·I own or control (by lease, license, or other permission) the land from which groundwater or surface water will be appropriated, AND
- ·There are no easements or other restrictions on the land that would prohibit the proposed activities from being authorized under a permit, AND
 - ·I possess the authority to undertake the work described, or I am acting as a duly authorized agent, AND
- ·The information submitted and the statements made concerning this application are true and correct to the best of my knowledge.

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Water Appropriation Permit Applications

Individual Non-Irrigation

Prepared for Poly Met Mining, Inc.



Version 5 April 2017

Individual Non-Irrigation Water Appropriation Permit Applications

Version 5 April 2017

Contents

1.0	Introdu	ction	1
2.0	Regulat	tory Context	2
3.0	NorthM	let Water Appropriation Overview	6
3.1	Wate	er Appropriation Permitting Approach	6
3	.1.1 Inc	dividual Permits	6
3	.1.2 Exe	empt Sources	
3.2	Wate	er Conservation and Reuse	8
3.3	Strea	m Augmentation	(
3.4	Disch	narges	
4.0	Locatio	n and Ownership	11
5.0	Stateme	ent of Justification for Individual Permits	13
5.1	Over	view and Pumping Schedule	13
5.2	Hydro	ogeology and Hydrology of Water Sources	15
5	.2.1 Mi	ine Site	15
	5.2.1.1	Mine Site Surficial Aquifer	15
	5.2.1.2	Mine Site Bedrock	15
	5.2.1.3	Mine Site Test Hole Data	16
	5.2.1.4	Mine Site Hydrology	16
	5.2.1.5	Watershed Hydrology	17
5	.2.2 Pla	ant Site	18
	5.2.2.1	Plant Site Surficial Aquifer	18
	5.2.2.2	Test Hole Data	19
	5.2.2.3	Hydrologic Studies	19
5	.2.3 Co	olby Lake	19
	5.2.3.1	Hydrology	20
	5.2.3.2	Colby Lake Appropriation Contingency Plan	21
5.3	Propo	osed Pumping Rates and Quantities	21
5	.3.1 Me	ethods to Estimate Proposed Pumping	21

	5.3.1.1	Probabilistic Water Modeling	22
	5.3.1.2	Engineering Estimates	23
	5.3.1.3	Estimates Based on the Design Pump Capacity	24
	5.3.1.4	Maximum Daily, Monthly, and Annual Pumping Rates	25
5.	3.2 F	Pumping Rates and Quantities	25
5.	3.3 N	Nethods of Appropriation	30
5.4	Alte	ernatives Considered	31
6.0	Additi	onal Requirements and Conditions for Dewatering (Minnesota Rules, part 6115.0710)	33
6.1	Rea	sonable Necessity for Dewatering (Minnesota Rules, part 6115.0710(A))	33
6.2		charge Will Not Adversely Affect the Public Interest in the Receiving Waters (Minnesota es, part 6115.0710(B))	33
6.3		posed Dewatering is Not Prohibited by Any Existing Law (Minnesota Rules, part 5.0710(C))	35
7.0		onal Requirements and Conditions for Mining and Processing (Minnesota Rules, part	36
7.1	Plai	ns and Specifications (Minnesota Rules, part 6115.0720, subpart 1(A))	36
7.2		nsumption of Appropriated Water in Mineral Processing (Minnesota Rules, part 6115.0720	
7.3	Crit	eria Used for Estimating Appropriations (Minnesota Rules, part 6115.0720, subpart 1(C)) .	37
7.4	Det	ails of Water Released (Minnesota Rules, part 6115.0720, subpart 1(D))	37
7.5	Нус	rologic and Hydraulic Impacts (Minnesota Rules, part 6115.0720, subpart 1(E))	38
7.	5.1 F	otential Effects on the Partridge River and Colby Lake	38
7.	5.2 F	Potential Effects on the Embarrass River	39
7.	5.3 F	otential Effects Due to Groundwater Drawdown	39
	7.5.3.1	Mine Site	39
	7.5.3.2	Plant Site	40
7.6	Pric	oritization of Water Supply Sources and Other Mining-Specific Requirements	41
7.7	Res	toration of Surface Water Flow	41
8.0	Comp	liance with Sustainability and Water Supply Management Requirements	42
8.1	Gro	undwater Sustainability Standard	42
8.	1.1	Groundwater Appropriations are Sustainable	42
8.	1.2 E	ffects on Ecosystems	43
	8.1.2.1	Effects Due to Drawdown	43
	8.1.2.2	Effects Due to Hydrologic Changes	43
	8.1.2.3	Effects Due to Discharge	43

8.1.3 I	Effects on Water Resources	44
8.1.4 I	Effects on Public or Private Wells	44
8.2 Wa	ter Supply Management Rules (Minnesota Statutes, section 103G.265)	45
8.2.1 I	Regulatory Context	45
8.2.2 I	NorthMet Consumptive Use	45
8.2.2.1	Estimation Methods	45
8.2.2.2	Consumptive Use Estimates	46
8.2.3	Adequacy of Lake Superior Basin Water Resources	48
8.2.3.1	Description of Relevant Water Resources	48
8.2.3.2	Project Effect on Great Lakes Basin Water Supply	48
8.3 Oth	ner State and Local Plans	49
8.3.1 I	Minnesota Statewide Drought Plan	49
	St. Louis County Land Ordinance 27 and St. Louis County Comprehensive Water Management Plan	49
8.3.3 I	ocal Water Resources Management Plans	50
9.0 Propo	osed Monitoring Plan	52
9.1 Gro	oundwater Monitoring	53
9.2 Sur	face Water Monitoring	53
9.3 Ap	propriation Source Monitoring	54
9.4 Ter	nporary Construction Dewatering Monitoring	54
9.5 Str	eam Augmentation Monitoring	54
9.5.1	mplementation Considerations	54
9.5.2 I	Monitoring Approach	56
9.5.3 I	Reporting and Adaptive Management	57
10.0 Refer	ences	58

List of Tables

Table 3-1	Summary of NorthMet Individual Permit Applications	7
Table 3-2	NorthMet Sources That Do Not Require a Water Appropriation Permit	8
Table 5-1	Individual Permit Application Overview	13
Table 5-2	Probabilistic Model Results Used to Estimate Maximum Monthly Pumping Rates	23
Table 5-3	Estimated Pumping Summary: by Individual Permit	26
Table 5-4	Estimated Pumping by Installation: Mine Site Infrastructure Permit	27
Table 5-5	Estimated Pumping by Installation: Plant Site Infrastructure Permit	29
Table 5-6	Estimated Colby Lake Make-Up Water Demand	30
Table 6-1	Dewatering Discharge Destination, by Installation	34
Table 9-1	Streamflow Data Collected During Biotic Surveys (gpm)	55

List of Large Tables

Large Table 1	Pumping Estimation Methods and Assumptions
Large Table 2	Water Appropriation Monitoring: Groundwater
Large Table 3	Water Appropriation Monitoring: Surface Water
Large Table 4	Water Appropriation Monitoring: Appropriation Sources
Large Table 5	Water Appropriation Monitoring: Stream Augmentation Monitoring

List of Figures

Figure 8-1	Monthly Total Pumping46		
	List of Large Figures		
Large Figure 1	Project Location		
Large Figure 2	Water Appropriation During Pre-Operation Construction		
Large Figure 3	Water Appropriation During Operations – Mine Years 1-11		
Large Figure 4	Water Appropriations During Operations – Mine Years 12-20		
Large Figure 5	Annual Average Flows in Mine Year 10		
Large Figure 6	Mine Site Individual Permit Appropriation Installation Locations		
Large Figure 7	Plant Site Individual Permit Appropriation Installation Locations		
Large Figure 8	Colby Lake Individual Permit Appropriation Location		
Large Figure 9	Water Appropriation Permits Monitoring Overview		
Large Figure 10	Proposed Groundwater Monitoring Stations		
Large Figure 11	Proposed Surface Water Flow Monitoring Stations		
Large Figure 12	Mine Site Proposed Appropriation Source Monitoring Stations		
Large Figure 13	Plant Site Proposed Appropriation Source Monitoring Stations		
Large Figure 14 Proposed Stream Augmentation Monitoring Stations			
	List of Appendices		
	List of Appendices		
Appendix A	Application Forms		
Appendix B	Notification to Local Government Officials		
Appendix C	Additional Detail on Pumping Rate Estimates		
Appendix D	Permit Application Support Drawings		
Appendix E	NorthMet Water Monitoring Locations: Water Appropriation Permits and NPDES/SDS Permit		

List of Acronyms and Abbreviations

Acronym or

Abbreviation Description BIF Biwabik Iron Formation **BMPs** best management practice cfs cubic feet per second DNR Minnesota Department of Natural Resources FEIS Final Environmental Impact Statement Flotation Tailings Basin FTB Gallons per Minute gpm Hydrometallurgical Residue Facility HRF **Individual Permits** Individual Non-Irrigation Water Appropriation Permits LTVSMC LTV Steel Mining Company total volume MG **MPCA** Minnesota Pollution Control Agency **NPDES** National Pollutant Discharge Elimination System **NSPS New Source Performance Standard** P90 9th percentile Project NorthMet Project PolyMet Poly Met Mining, Inc. SDS State Disposal System **SWPPP** Stormwater Pollution Prevention Plan

USGS U.S. Geological Survey

WWTS Waste Water Treatment System

1.0 Introduction

Poly Met Mining, Inc. (PolyMet) is proposing to develop the NorthMet Project (Project) copper-nickel-platinum-group elements mine and associated processing facilities. The Project is described in the NorthMet Mining Project and Land Exchange Final Environmental Impact Statement (FEIS) (Reference (1)). The Project is located south of the city of Babbitt and north of the city of Hoyt Lakes in St. Louis County, Minnesota, as shown on Large Figure 1.

The Project consists of the Mine Site, the Plant Site, and the Transportation and Utility Corridors that connect them. The Mine Site is a greenfield site that will be developed into an open pit mine and is located approximately six miles south of the city of Babbitt and two miles south of the Northshore Mining Company's active, open pit taconite mine (known as the Peter Mitchell Mine). Development of the Mine Site for the Project will include construction of new facilities, including mine pits, ore handling facilities, waste rock stockpiles, an overburden storage and laydown area, mine water¹ management systems, stormwater management systems, an Equalization Basin Area, and supporting infrastructure. The Plant Site, located west of the Mine Site, is a brownfield site, including a former taconite process plant and tailings basin previously operated by LTV Steel Mining Company (LTVSMC). Redevelopment of the Plant Site for the Project will include refurbishment of former LTVSMC processing facilities and construction of new facilities. Plant Site features will include a Beneficiation Plant, a Hydrometallurgical Plant, other processing facilities, a Flotation Tailings Basin (FTB), FTB seepage capture systems, a Hydrometallurgical Residue Facility (HRF), a Waste Water Treatment System (WWTS), a Sewage Treatment System, and other ancillary facilities (e.g., Colby Lake water pipeline). The Beneficiation Plant will produce Flotation Tailings throughout the 20 years of ore processing. Flotation Tailings, which are the materials remaining after metallic sulfide minerals are liberated from the finely ground ore in the flotation process, will be deposited in the FTB, which will be placed on top of a portion of the existing former LTVSMC tailings basin. In this permit application, the "FTB" means the newly constructed NorthMet Flotation Tailings Basin, the "LTVSMC tailings basin" means the existing former LTVSMC tailings basin, and the "Tailings Basin" means the combined LTVSMC tailings basin and the FTB. The Mine Site and the Plant Site are connected by approximately 7- to 8-mile-long Transportation and Utility Corridors, which will include new and upgraded infrastructure to link activities at the Mine Site and Plant Site. The location of the Project is shown in Large Figure 1.

This document presents the information required by the Minnesota Department of Natural Resources (DNR) for the issuance of six Individual Non-Irrigation Water Appropriation Permits (Individual Permits) to PolyMet for the Project. Application forms are included in Appendix A. To provide context, this document also describes the overall Project water appropriation permitting approach.

¹ Mine water is defined for this Project as water that has contacted surfaces disturbed by mining activities, such as drainage collected on stockpile liners, pit dewatering water, and runoff contacting ore, waste rock, and Mine Site haul roads. Mine water is collected by mine water management systems at the Mine Site. Once mine areas are reclaimed, runoff is no longer considered mine water.

As shown on Large Figure 1, portions of the Project are located within the municipal boundaries of both Hoyt Lakes and Babbitt; therefore, copies of this application have been submitted to both of these cities and the North St. Louis Soil and Water Conservation District, as required by Minnesota Rules, part 6115.0660, subpart 3(D). Cover letters documenting these submittals are included in Appendix B, and an affidavit was submitted separately to the DNR to document the mailing of these copies.

The Project will include four phases:

- Pre-operation construction, which will last for approximately 18 to 24 months, will include temporary dewatering for construction of infrastructure and engineering controls, and for overburden stripping in preparation for mining.
- Operation, which will last approximately 20 years, will include dewatering of the mine pits, and dewatering for operation of engineering controls.
- Reclamation, which will take place after mining ceases, will include pumping water from the mine pits, treating it, then returning it to the pits, in order to improve water quality in the flooded pits.
- Closure and postclosure maintenance, the periods after reclamation, which will last for an unknown duration, do not include water appropriations.

This application for Individual Permits provides information on expected appropriation schedules and rates from the pre-operation construction phase through the operation phase. The planned permit coverage is based on current estimates of water flow rate and duration. If water flow rate or duration differs from what is expected to the extent that a change in water appropriation permit coverage is required, PolyMet will apply for amendments or additional permit coverage, as required.

Appropriations from the mine pits will continue, subject to applicable permit terms, into the reclamation phase. If appropriations sources, rates, or quantities change substantially during reclamation, PolyMet will apply for amendments or additional permit coverage, as required.

The outline of this application is:

Section 1.0

- Provides an introduction and outline of this application document. Section 2.0 Summarizes the statute and rule requirements related to water appropriation and the applicability of those requirements to the Project. Section 3.0 Describes the overall Project water appropriation permitting approach, the Project water conservation and reuse strategy, and the water that will be released from the Project.
- Section 4.0 Provides information on location and ownership of proposed appropriation locations.

Section 5.0	Describes the need for the appropriations and establishes that the appropriations are reasonable and practical, including information on proposed pumping rates, schedules and volumes.
Section 6.0	Provides the additional information required for dewatering.
Section 7.0	Provides the additional information required for water appropriations associated with mining. Addresses certain Individual Permit requirements common to the Mine Site and Plant Site.
Section 8.0	Describes the Project's compliance with groundwater sustainability and water supply management requirements.
Section 9.0	Presents the proposed water appropriations monitoring plan.
Section 10.0	Lists references.

2.0 Regulatory Context

"Waters of the state," which include both surface water and groundwater, may not be appropriated without a water use (or "appropriation") permit from the DNR except in limited circumstances (Minnesota Statutes, section 103G.271, subdivision 1). Chapter 103G of the Minnesota Statutes and chapter 6115 of the DNR's rules set forth the requirements for appropriating waters of the state. Appropriation is broadly defined as the "withdrawal, removal, or transfer of water from its source regardless of how the water is used" (Minnesota Statutes, section 103G.005, subdivision 4). Types of withdrawals that do not require an appropriation permit include:

- withdrawals of less than 10,000 gallons per day and totaling no more than 1 million gallons per year (Minnesota Rules, part 6115.0620(C))
- recapture of water that has been previously appropriated (Minnesota Rules, part 6115.0620(E))
- test pumping of a groundwater source (Minnesota Rules, part 6115.0620(B)

DNR rules require permit applications for each non-exempt surface or groundwater "source" from which water is proposed to be appropriated (Minnesota Rules, part 6115.0660, subpart 1). The term "source" is not expressly defined in the applicable statute or rule, however prior DNR practice has been to treat each mine pit as a "source." Individual appropriation permits are required for users withdrawing more than 10,000 gallons of water per day or greater than one million gallons per year for agricultural, irrigation, and non-irrigation purposes (Minnesota Rules, part 6115.0620).

Requirements for appropriations under Individual Permits vary depending on the type of source (surface water or groundwater) and the purpose of the appropriation (irrigation, public water supply, dewatering, and mining) (Minnesota Rules, part 6115.0660 – .0720). Key regulatory requirements for Individual Permits include the following:

- All permit applications must provide the information specified in Minnesota Rules, part 6115.0660.
- Minnesota Rules, part 6115.0670 identifies review and analysis that DNR must conduct with respect to each permit application.
- Applications for permits for dewatering and permits for appropriations related to mining and mineral processing are subject to additional requirements and substantive standards (Minnesota Rules, part 6115.0720).
- Monitoring and recordkeeping is required under all permits. The quantity of water appropriated
 must be recorded, and for appropriations of groundwater, water levels must be monitored.
 (Minnesota Rules, part 6115.0750, subpart 3).

- Appropriations of groundwater must comply with the groundwater sustainability standard (Minnesota Statutes, section 103G.287, subdivision 5).
- Appropriations that involve "consumptive uses" above specified volumes must comply with water supply management requirements (Minnesota Statutes, section 103G.265, subdivisions 3 and 4).

Some of the water withdrawn by PolyMet under individual water appropriation permits will ultimately become FTB seepage, be captured by the FTB seepage capture systems, treated at the WWTS, and then be used to augment flow in streams and wetlands downstream of the FTB seepage capture systems. The regulatory context for stream augmentation involves a variety of state and federal agencies, with oversight through various permits, including water appropriation permits, wetland permits, and National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permits:

- Water appropriation permitting—the focus of this application—is performed by the DNR, which will regulate the quantity of water discharged from the WWTS for stream augmentation and oversee potential effects of stream augmentation on flow conditions in downstream creeks.
- Wetland permitting is performed by the U.S. Army Corps of Engineers and the DNR, which will
 oversee potential effects on wetlands.
- NPDES/SDS permitting is performed by the Minnesota Pollution Control Agency (MPCA), which will regulate the quality and quantity of water discharged from the WWTS for stream augmentation. The quantity of discharge will be subject to limits in the NPDES/SDS permit, in accordance with federal New Source Performance Standards (NSPS) for new mills that use the froth-flotation process for the beneficiation of copper, lead, zinc, gold, silver, and molybdenum ores (40 C.F.R. 440.104(b)(1)). The NSPS, which is referred to as the "zero discharge" standard, prohibits the discharge of process wastewater generated from the processing of ore; however, allowable discharges include net precipitation and mine drainage. The NSPS sets an upper limit on the amount that can be discharged from the WWTS, which will also be the upper limit on the stream augmentation rate.

3.0 NorthMet Water Appropriation Overview

PolyMet will appropriate water to mine ore, operate engineering controls, and construct buildings and other infrastructure that extend below the water table. PolyMet will also pump surface water from Colby Lake when make-up water is needed at the Plant Site.² The Project Water Management Plans (Reference (2) and Reference (3)) emphasize conservation and reuse. Water appropriated for mining activities will be used as process water for the Beneficiation Plant to the extent possible, minimizing the amount of make-up water that will be needed from Colby Lake, and minimizing the amount of appropriated water that may be released off-site. Excess water from the Project will be treated at the WWTS, then discharged to Trimble Creek, Unnamed Creek, and Second Creek to augment flow in streams and wetlands downstream of the FTB seepage capture systems. Discharge quality will meet applicable effluent limits and surface water quality standards, and discharge quantity will be managed to meet the zero discharge requirements of the NSPS³ and to minimize ecologic and hydrologic impacts to the receiving waters.

The following subsections present an overview of the NorthMet water appropriation permitting approach, summarize the Project water conservation and reuse strategies and methods, describe Project discharges, and present Project plans for stream augmentation.

3.1 Water Appropriation Permitting Approach

The Project will obtain Individual Permit coverage for withdrawals that require a water appropriation permit. Large Figure 2, Large Figure 3 and Large Figure 4 present flow diagrams of anticipated permitted Project water appropriations during the pre-operation construction phase and operation phase.

3.1.1 Individual Permits

This consolidated application is for six Individual Permits: one permit for each of the three mine pits, one for construction and operation of Mine Site infrastructure, one for construction and operation of Plant Site infrastructure, and one for withdrawal of water from Colby Lake for use as make-up water for the Plant Site. Pumping installations included in each of the Individual Permits are listed in Table 5-1. Individual Permit application forms are included in Appendix A. Application information required by Minnesota statutes and rules, as described in Section 2.0, is provided in Sections 4.0 through 7.7 of this application document. The six Individual Permit applications are summarized in Table 3-1.

6

² Make-up water from Colby Lake will be pumped to the Plant Reservoir. Water from the reservoir will primarily be used to process ore and supplement the hydrometallurgical process. Additional, secondary uses of make-up water will be to supply water for the potable water treatment plant, fire water, dust control, air emission control scrubber system water, gland seal water, and miscellaneous Project water needs for construction and operation, including filling the Tailings Basin prior to startup. This make-up water supplements the overall Project water balance, allowing

recycled water to be used to maintain FTB Pond water levels and treated water to be used for stream augmentation. ³ 40 C.F.R., section 440.104

Table 3-1 Summary of NorthMet Individual Permit Applications

Individual Permit	Location	Activities Covered	Time Frame	Form Number
East Pit	Mine Site	dewatering for overburden strippingpit dewatering	Pre-operation construction phase to Mine Year 20	1
Central Pit	Mine Site	dewatering for overburden strippingpit dewatering	Operation phase (Mine Year 11 to 20)	2
West Pit	Mine Site	dewatering for overburden strippingpit dewatering	Operation phase (Mine Year 2 to 20)	3
Mine Site Infrastructure	Mine Site	 temporary construction dewatering Category 1 Stockpile Groundwater Containment System operation Stockpile underdrain operation (if needed) Collection of mine water and precipitation on stockpile liners and in lined ponds 	Pre-operation construction phase to Mine Year 20	4
Plant Site Infrastructure	Plant Site	 temporary construction dewatering Hydrometallurgical Residue Facility (HRF) wick drain operation (if needed) Collection of precipitation in the HRF and other lined and concrete ponds 	Pre-operation construction phase to Mine Year 20	5
Colby Lake	Plant Site	withdrawal to supply make-up water to the Plant Site	Pre-operation construction phase to Mine Year 20	6

3.1.2 Exempt Sources

Several Project water withdrawals will be exempt from water appropriation permitting requirements. As listed in Table 3-2, exempt sources involve test pumping of monitoring wells and collection of previously appropriated water.

Table 3-2 NorthMet Sources That Do Not Require a Water Appropriation Permit

Water Source	Location	Appropriation Period	Source Water	Rationale
Test pumping during installation of groundwater monitoring wells	Mine Site and Plant Site	Pre-operation construction	Groundwater	Exempt in rule (Minnesota Rules, part 6115.0620(C))
Flotation Tailings Basin (FTB) seepage capture systems	Plant Site	Operation	Tailings basin seepage	Previously appropriated water (Minnesota Rules, part 6115.0620(E))
Hydrometallurgical Residue Facility (HRF) drainage and leakage collection systems	Plant Site	Operation	HRF drainage and leakage	Previously appropriated water (Minnesota Rules, part 6115.0620(E))

3.2 Water Conservation and Reuse

The overall Project water management strategy is integrated across the Mine and Plant Sites in order to maximize water conservation and recycling. Appropriated water from the Mine Site will be routed to the Plant Site to serve as process water, minimizing the amount of make-up water that will be withdrawn from Colby Lake. All water described below as being pumped to the FTB will be used as process water at the Beneficiation Plant. The strategy includes the following activities:

- Groundwater appropriated for dewatering associated with overburden stripping and mining will be treated and pumped to the FTB.
- Groundwater withdrawn by the Category 1 Stockpile Groundwater Containment System will be treated and pumped to the FTB.
- Mine water, which is water that has contacted surfaces disturbed by mining activities, water from construction dewatering, and precipitation collected in lined ponds will be treated and pumped to the FTB.
- Process water will be recycled between the Beneficiation Plant and the FTB.
- Process water will be recycled between the Hydrometallurgical Plant and the HRF.
- Seepage from the Tailings Basin will be captured, and as much as possible will be returned to the
 FTB for reuse as process water. Seepage in excess of what can be recycled to the FTB will be
 treated at the WWTS, then discharged to the environment as stream augmentation. Discharge
 quality will meet applicable effluent limits and surface water quality standards, and discharge
 quantity will be managed to meet the zero discharge requirements of the NSPS and to minimize
 ecologic and hydrologic impacts to the receiving waters.

The integrated water management strategy is expected to provide 88% to 98% of the process water needed by the Project, minimizing the amount of make-up water appropriated from Colby Lake. The amount of make-up water needed will vary over the course of operations, depending primarily on the amount of pit dewatering. When pit dewatering rates are higher, the Colby Lake appropriation rate will be lower. Large Figure 5 shows the annual average flows in Mine Year 10, illustrating the extent of water recycling that has been designed into the Project.

3.3 Stream Augmentation

Because the FTB seepage capture systems will block seepage from the existing LTVSMC tailings basin that currently flows to Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek, PolyMet has agreed to augment flow in these streams to avoid ecologic and hydrologic impacts. PolyMet will augment the streamflow by discharging treated effluent from the WWTS to the headwater areas of Trimble Creek, Unnamed Creek, and Second Creek and diverting runoff that currently flows into the Tailing Basin to the Unnamed (Mud Lake) Creek watershed via a drainage swale. WWTS discharge will be managed under the terms of an NPDES/SDS permit and water appropriation permits.

The stream augmentation objective, as stated in the FEIS, is to limit the change in average annual streamflow to ±20% of existing conditions (conditions before the implementation of the pumpback systems, which are short term mitigation measures as part of the Cliffs Erie Consent Decree) (Section 5.2.2 of Reference (1)). Stream augmentation flow rates will also be subject to NSPS requirements under the MPCA's NPDES/SDS permit (as explained in Section 2.0). PolyMet will operate the stream augmentation system with the goal of maintaining average annual flow in streams downgradient of the FTB seepage capture systems within ±20% of existing conditions; however, the total discharge from the WWTS will not exceed the NSPS limit.

Section 9.0 addresses the implementation and proposed monitoring for stream augmentation, and Section 3.4 summarizes additional regulatory requirements applicable to stream augmentation.

3.4 Discharges

During the pre-operation construction phase, appropriated water will either be pumped to the Construction Mine Water Basin for subsequent transfer to the FTB or released off-site as construction stormwater under the terms of an MPCA stormwater construction permit and associated Stormwater Pollution Prevention Plan (SWPPP). Water that will be released off-site during pre-operation construction is illustrated on Large Figure 2.

During the operation phase, the WWTS discharge will augment water flows in Trimble Creek, Unnamed Creek, and Second Creek under terms of an NPDES/SDS permit and water appropriation permits. The three receiving waters are in the St. Louis River watershed of the Great Lakes Basin. Trimble and Unnamed Creeks are tributaries of the Embarrass River, and Second Creek is a tributary of the Partridge River. The discharge will include water appropriated from the Mine Site and from Colby Lake that has been treated or used in the Beneficiation Plant, respectively, and then added to the FTB Pond. From there, some of the appropriated water will infiltrate through the tailings to the toe of the Tailings Basin, be captured by the

FTB seepage capture systems, and routed to the WWTS for treatment. The discharge may also include a small amount of groundwater from the surficial aquifer at the Plant Site that is collected by HRF wick drains and routed to the WWTS for treatment, as well as precipitation collected in the Sewage Treatment System ponds and the Plant Reservoir. WWTS discharge and associated appropriation flows during operations are illustrated on Large Figure 3. The quality of the WWTS discharge will be regulated by the MPCA under the NDPES/SDS permit for the Project, and the quantity of the WWTS discharge will be regulated by the MPCA and DNR under the NDPES/SDS permit and water appropriation permits for the Project.

The quantity of discharge from the WWTS will vary during operations depending on many factors. PolyMet will determine how much seepage to recycle back to the FTB Pond and how much to send to the WWTS for treatment and discharge, based on factors such as weather, operational needs, FTB size, dam safety permit requirements, and other regulatory requirements (e.g., permit conditions under the NPDES/SDS permit, the water appropriation permits, and the wetland permits for the Project).

Generally, the WWTS discharge rate is expected to be between approximately 1,700 and 3,200 gallons per minute (gpm). This is the range estimated to maintain 80% to 120% of existing conditions streamflow, as documented in Table 5.2.2-41 of the FEIS (Reference (1)). The anticipated WWTS discharge rate was estimated using the Project GoldSim model, considering operational needs, stream augmentation objectives, variable precipitation, and NSPS requirements. For this analysis, the Plant Site GoldSim model developed for the FEIS was adapted to simulate the scenario in which the Mine Site and Plant Site experience a range of climatic conditions simultaneously (Appendix D of Reference (4)). Once appropriations begin, the discharge rates will be monitored and reported to the DNR and the MPCA.

4.0 Location and Ownership

Large Figure 6 shows the configuration of the Mine Site in Mine Year 11 and the approximate locations of the pumping installations associated with the permit applications for the East Pit (1 installation), Central Pit (1 installation), West Pit (up to 2 installations), and Mine Site Infrastructure (number of installations will be determined in final design and construction). Some temporary construction dewatering activities associated with the Mine Site Infrastructure Permit that will occur at various locations (e.g., construction of new buildings, miscellaneous construction dewatering, etc.) are listed, but not specifically shown, on Large Figure 6.

Large Figure 7 shows the configuration of the Plant Site and the approximate locations of the primary pumping installations associated with the Plant Site Infrastructure Permit application. The final number of installations for the Plant Site will be determined in final design and construction, and is dependent on site-specific conditions (e.g., groundwater depth associated with excavations). Some temporary construction dewatering activities associated with the Plant Site Infrastructure Permit that will occur at various locations (e.g., miscellaneous construction dewatering) are listed, but not specifically shown, on Large Figure 7.

Large Figure 8 shows the location of the Colby Lake Pumphouse (1 installation), the Colby Lake Pipeline, and the Plant Reservoir. Temporary construction dewatering associated with necessary repairs of the Colby Lake Pipeline will be covered by the Plant Site Infrastructure water appropriation permit.

Under Minnesota Rules, part 6115.0660, subpart 2, a water appropriation permit applicant must provide "written evidence of ownership, or control of, or license to use, the land overlying the groundwater source or abutting the surface water source from which water will be appropriated." PolyMet will assume ownership of the surface lands at the Mine Site, including the appropriation points, upon completion of the pending land exchange with the U.S. Forest Service, as shown on Large Figure 6. The U.S. Forest Service issued its Record of Decision to move forward with the land exchange on January 8, 2017. In addition, PolyMet currently leases the private mineral rights underlying the Mine Site. These mineral rights not only provide PolyMet with access to the subsurface at the Mine Site for purposes of mining, they also provide the legal basis for accessing surface lands as necessary to carry out mining activities, which include water appropriation from surface water and groundwater sources. Accordingly, PolyMet has the requisite control of Mine Site water appropriation sources to satisfy the requirements of Minnesota Rules, part 6115.0660, subpart 2. Further discussion and details concerning PolyMet's agreements and legal interests that give it control over lands in the Mine Site that will be used for water appropriation will be provided separately.

PolyMet likewise controls the lands overlying the groundwater sources or abutting the surface water sources from which water will be appropriated at the Plant Site and Colby Lake, as shown on Large Figure 7 and Large Figure 8. Specifically, under its contractual arrangements with Cliffs Erie, PolyMet currently holds equitable title to the Plant Site and all necessary rights for possession, access, and use of the Plant Site. Upon completion of certain conditions, Cliffs Erie is required to convey fee simple title to

PolyMet to the Plant Site. PolyMet also has arrangements with Cliffs Erie and Minnesota Power with respect to PolyMet's control of the Colby Lake pumphouse and pipeline, as well as the riparian land abutting Colby Lake on which the pumphouse and associated equipment are located. The current and future rights held by PolyMet provide it with sufficient control of the Plant Site and the Colby Lake facilities to satisfy the access requirements of Minnesota Rules 6115.0660, subpart 2. Further discussion and details concerning PolyMet's agreements and legal interests that give it control over properties at the Plant Site (including the Colby Lake pipeline corridor) and abutting Colby Lake that will be used for water appropriation pursuant to the Plant Site Infrastructure Permit and the Colby Lake Permit will be provided separately.

5.0 Statement of Justification for Individual Permits

Dewatering is necessary for PolyMet to construct mining facilities, mine copper-nickel ore from open pits, and operate environmental controls. Withdrawal of water from Colby Lake is necessary for PolyMet to provide make-up water to the Plant Site (uses of make-up water are described in Section 3.0). The water appropriations proposed under the six Individual Permits are reasonable and practical, as detailed in the following subsections, and are necessary for the Project to provide the social and economic benefits documented in Section 5.2.10 of the FEIS (Reference (1)).

5.1 Overview and Pumping Schedule

PolyMet is applying for six Individual Permits: one permit for each of the three mine pits, one for construction and operation of Mine Site infrastructure, one for construction and operation of Plant Site infrastructure, and one for withdrawal of water from Colby Lake.

Table 5-1 provides an overview of the Individual Permit applications, the installations covered under each permit, and the schedule for pumping from each installation. The pumping schedule was estimated based on the Project schedule as detailed in the FEIS and the preliminary schedule for construction of Project infrastructure.

Table 5-1 Individual Permit Application Overview

Individual Permit	Installation	Pumping Schedule
East Pit	Overburden stripping	Pre-operation construction phase
EdSt Pit	East Pit Sump	Mine Years 1 to 20
Central Pit	Overburden stripping	Mine Year 11
Central Pit	Central Pit Sump	Mine Years 11 to 20
West Pit	Overburden stripping	Intermittent, Mine Years 2 to 11
west Pit	West Pit Sump 1 and Sump 2	Mine Years 2 to 20
	Ore Surge Pile foundation, sumps, and overflow ponds construction	Pre-operation construction
	Construction of new buildings	Pre-operation construction
Mina Cita	Mine water pond construction	Intermittent, pre-operation construction to Mine Year 6
Mine Site Infrastructure	Stormwater pond construction	Intermittent, pre-operation construction to Mine Year 2
	Category 4 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	Intermittent, pre-operation construction and Mine Year 3
	Category 2/3 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	Intermittent, pre-operation construction to Mine Year 6

Individual Permit	Installation	Pumping Schedule
	Category 1 Waste Rock Stockpile foundation construction	Intermittent, pre-operation construction to Mine Year 6
	Category 1 Stockpile Groundwater Containment System construction	Intermittent, pre-operation construction to Mine Year 5
	Category 1 Stockpile Groundwater Containment System operation	Mine Years 1 to 21
	Category 2/3 Waste Rock Stockpile liner mine water drainage (collected precipitation)	Mine Years 1 to 19
	Category 2/3 Waste Rock Stockpile underdrains, if needed	Mine Years 1 to 19
Mine Site Infrastructure	Category 4 Waste Rock Stockpile liner mine water drainage (collected precipitation)	Mine Years 1 to 11
(cont.)	Category 4 Waste Rock Stockpile underdrains, if needed	Mine Years 1 to 11
	Ore Surge Pile liner mine water drainage (collected precipitation)	Mine Years 1 to 20
	Ore Surge Pile underdrains, if needed	Mine Years 1 to 20
	Haul Roads, OSLA and RTH mine water runoff (collected runoff and precipitation)	Mine Years 1 to 20
	Lined ponds (Equalization Basins and Construction Mine Water Basin (collected precipitation))	Mine Years 1 to 20
	Miscellaneous construction dewatering	Intermittent, as needed
	Flotation Tailings Basin (FTB) Seepage Containment System construction	Intermittent, pre-operations construction and Mine Year 7
	Sewage Treatment System construction	Pre-operations construction
	Hydrometallurgical Residue Facility (HRF) construction	Intermittent, Pre-operations construction and Mine Year 3
Plant Site	HRF liner (collected precipitation)	Mine Year 4 through 20
Infrastructure	HRF wick drains, if needed	Pre-operations construction to Mine Year 20
	Lined and concrete ponds (WWTS, Sewage Treatment System, Plant Reservoir–collected precipitation)	Mine Year 1 through 20
	Colby Lake pipeline upgrades	Pre-operations construction
	Miscellaneous construction dewatering	Intermittent, as needed
Colby Lake	Colby Lake Pumphouse	Pre-operation construction phase to Mine Year 20

5.2 Hydrogeology and Hydrology of Water Sources

5.2.1 Mine Site

Water appropriated at the Mine Site will be primarily drawn from two hydrogeologic units: the unconsolidated deposits (known as the "surficial aquifer", Section 5.2.1.1) and bedrock (Section 5.2.1.2). These hydrogeologic units and the field investigations performed for the Project are described in detail in the FEIS (Section 4.2.2.2.1 of Reference (1)) and Project documents (Section 4.3 of Reference (5)). See also the test hole data and long-term water level measurements referenced in Section 5.2.1.3 of this application, and hydrologic studies referenced in Section 5.2.1.4 of this application. This information provides the basis for the groundwater appropriation estimates supporting PolyMet's four (three Mine Pits and one infrastructure) Mine Site Individual Permit applications.

5.2.1.1 Mine Site Surficial Aquifer

The surficial materials overlying bedrock at the Mine Site include glacial deposits, including two layers of glacial till, outwash, and reworked glacial sediments (collectively referred to as "drift"). There are also extensive wetlands and the potential for limited alluvium. Based on drilling, geophysics, and outcrop mapping, the depth to bedrock across the Mine Site ranges from 0 to approximately 60 feet. The thickest unconsolidated deposits are generally associated with wetland areas, which tend to fill pre-existing depressions in bedrock. The depth to groundwater is typically less than 10 feet. Field testing of the various unconsolidated deposits found a range of hydraulic conductivity values from 0.012 to 31 feet/day. The ability of the surficial aquifer to transmit water, however, is related to the thickness of the sediments. Groundwater flow paths are likely short because of the thin and discontinuous nature of the surficial aquifer. Work conducted to-date has not identified laterally continuous outwash sand or gravel deposits that might be preferential groundwater conduits within the surficial deposits. There are no private wells in the surficial aquifer in the vicinity of the Mine Site.

The water table is generally a subdued replica of the land surface, with upland areas generally associated with groundwater divides. In general, groundwater levels fluctuate seasonally, rising in spring and early summer in response to snowmelt and rainfall, and falling through late summer/fall into winter lows. The magnitude of groundwater elevation fluctuation varies by well across the Mine Site, but the overall annual fluctuation of water levels observed at a single well is typically less than four feet.

Wetlands extend across the Mine Site. Information from well logs, soil borings, soil mapping, and wetland characterization suggest that, in some areas, wetlands have minimal hydraulic connection to the underlying groundwater. A 2010 field survey, for example, found that most of the wetlands on the Mine Site (69%) were "ombrotrophic bogs", a type of wetlands almost entirely supported (with water and minerals) by direct precipitation (Section 4.2.3.1.2 of Reference (1)).

5.2.1.2 Mine Site Bedrock

The NorthMet Deposit is located within the Partridge River Intrusion of the Duluth Complex, which sub-crops at the Mine Site and dips to the southeast. Underlying the Duluth Complex is the Virginia Formation, a metasedimentary rock, which sub-crops to the north of the Mine Site. Mining will occur near

the contact between the Duluth Complex and the Virginia Formation, and during mining operations, the Virginia Formation will be exposed along portions of the northern wall of the East Pit. Underlying the Virginia Formation is the Biwabik Iron Formation (BIF), which is the source of taconite iron ore. The BIF is used regionally as a water resource (for example, by the City of Biwabik); however, there are no residential or community wells in the immediate vicinity of the Mine Site. Current drilling and interpolation of geology between drill holes indicates there will be approximately 130-150 feet of separation between the BIF and the final extent of the mine pits.

Groundwater flow within bedrock is primarily through fractures (i.e., secondary porosity features). The BIF is generally considered to be the most permeable bedrock unit, followed by the Virginia Formation, with the Duluth Complex having hydraulic conductivity at least one order of magnitude lower. Specific capacity tests conducted in the Virginia Formation wells P-3 and P-4 indicate that the upper portion of the Virginia Formation is more permeable than the lower portion. This is consistent with observations from the Duluth Complex, where the upper 200 to 300 feet of the formation is more extensively fractured and jointed, potentially resulting in increased permeability. Additional information on bedrock hydrogeology is presented in Section 4.3.3.2 of Reference (5).

5.2.1.3 Mine Site Test Hole Data

Since 2005, a number of subsurface investigations have been conducted at the Mine Site to develop and refine the hydrogeologic and geologic models of the site. The investigations are summarized in Section 4.3.1 of Reference (5). Hydrogeologic data collection locations are shown on Large Figure 2 of Reference (5).

Boring logs for surficial and bedrock borings at the Mine Site are provided in Attachment A to Reference (5). At the Mine Site, PolyMet has measured groundwater levels at 21 locations in the surficial aquifer for between three and ten years each, and at five locations in bedrock for up to nine years. Water level records are provided in Large Table 1 and Large Table 2 in Attachment B to Reference (5).

Hydrologic testing of the unconsolidated and bedrock material at the Mine Site was performed in three separate phases between 2005 and 2006. Individual test results are documented in References (6), (7), and (8).

5.2.1.4 Mine Site Hydrology

PolyMet developed a MODFLOW model of the Mine Site (Attachment B of Reference (5)), which was calibrated for existing conditions using measured groundwater elevations in wells completed in the surficial aquifer and bedrock, as well as estimates of baseflow in the Partridge River. This model is the basis for projected water appropriations due to mine pit dewatering as well as the capture efficiency of the Category 1 Stockpile Groundwater Containment System. The MODFLOW model was not used to quantify groundwater drawdown at the Mine Site (Section 5.2.2.3.2 of Reference (1)); potential impacts to groundwater elevations from Mine Site water appropriations are discussed in Section 8.1.2.1. The model met its calibration objectives and was reviewed and accepted during the environmental review process. Key conclusions of the modeling effort relevant to water appropriations included:

- Groundwater flow into the mine pits is estimated to increase as the pits expand horizontally and vertically with maximum annual average appropriations of approximately 850 gpm occurring in Mine Year 11. The timing of flows from each pit will vary over the 20 years of mine operations, and the peak flow rates will not occur at the same time (Appendix C), but generally these flows are summarized as follows:
 - The annual average groundwater flow into the East Pit is estimated to range from approximately 100 gpm to 760 gpm. East Pit groundwater inflow will increase as the pit is developed and is anticipated to begin decreasing as the pit is backfilled with rock and flooded.
 - The annual average groundwater flow into the West Pit is estimated to range from approximately 30 gpm to 70 gpm, peaking in Mine Year 12, and thereafter ranging from 40 gpm to 50 gpm.
 - The annual average groundwater flow into the Central Pit is estimated to range from approximately 5 gpm to 25 gpm.
- The Category 1 Stockpile Groundwater Containment System is capable of capturing 91% to more than 99% of the drainage from the Category 1 Waste Rock Stockpile (Attachment E of Reference (9)). The capture percentage of the containment system varies through time due to the influence of the mine pits on the groundwater gradients in the vicinity of the stockpile. The majority of the drainage not captured in the containment system eventually flows to the mine pits.

PolyMet also developed hydrologic models to estimate the run-on that will be collected by the Category 1 Stockpile Groundwater Containment System and the mine pit dewatering. These models include a probabilistic model of monthly and annual precipitation, evaporation, and runoff (the Mine Site GoldSim model, Section 5.2 of Reference (5)); and a calculation of runoff from design snowmelt events (Section 2.1 of Reference (2)). Runoff water will be collected along with the groundwater appropriations during mine pit dewatering and operation of the Category 1 Stockpile Groundwater Containment System.

5.2.1.5 Watershed Hydrology

PolyMet developed a hydrologic/hydraulic model for the Partridge River upstream of Colby Lake using XP-SWMM software (Sections 5.2.4.3 and 6.4 of Reference (5)). The purpose of the model is to evaluate the potential impacts of the Project on the Partridge River flows and stream morphology and on the Colby Lake and Whitewater Reservoir water levels. The XP-SWMM model is designed to estimate relative impacts to streamflow, as opposed to calculating future flows. That is, future flows are estimated based on observed flows scaled by the relative difference between an existing conditions XP-SWMM model and a future conditions XP-SWMM model.

The model was originally calibrated to U.S. Geological Survey (USGS) gage data on the Partridge River upstream of Colby Lake from water year 1985 and validated against the remainder of the 1978-1988 gage

period. Since the initial model calibration, the USGS gage data has been modified to account for augmentation due to historical mine pit dewatering. The model met its calibration objectives and was reviewed and accepted during the environmental review process.

The results of the XP-SWMM model are discussed in Section 8.1.2.2 with respect to the impact of Mine Site appropriations on the hydrology of the Partridge River and Colby Lake.

5.2.2 Plant Site

Water appropriated at the Plant Site will be drawn from one hydrogeologic unit: the unconsolidated deposits (known as the "surficial aquifer", Section 5.2.2.1). The surficial aquifer and the field investigations performed for the Project are described in detail in the FEIS (Section 4.2.2.4.1 of Reference (1)) and Project documents (Section 4.3 of Reference (10)). See also the test hole data and long-term water level measurements, referenced in Section 5.2.2.2 of this application and hydrologic studies referenced in Section 5.2.2.3 of this application.

5.2.2.1 Plant Site Surficial Aquifer

The unconsolidated surficial deposits in the vicinity of the Plant Site are glacial till, reworked sediments, and peat deposits. The existing LTVSMC tailings basin was constructed on top of these materials, which were used in starter dams in several locations before LTVSMC tailings deposition. Soil borings advanced through the LTVSMC tailings and into the underlying native materials reveal that the dominant till lithology underlying the LTVSMC tailings basin is an unsorted sandy loam with pebbles, cobbles, and boulders. Some areas are stratified, with lenses of sorted sediment. In places, the till is overlain by up to 10 feet of organic peat deposits.

The thickness of surficial deposits (depth to bedrock) along the containment system alignment to the west, northwest, and north sides of the LTVSMC tailings basin ranges from 3.5 to 42.5 feet. The average thickness of surficial deposits along these alignments is 19.5 feet. Peat was encountered in some borings, ranging in thickness from less than a foot to several feet. No substantial surficial deposits are present along the southern and much of the eastern sides of the LTVSMC tailings basin, where the basin abuts bedrock. Surficial deposits underlie a portion of the alignment of the East Dam.

Most of the area between the existing LTVSMC tailings basin and the Embarrass River is covered by wetlands and minor surface water features. Unlike the ombrotrophic bogs at the Mine Site, where sphagnum peat has elevated the bog and reduced connection between the surface water and water table, the wetlands between the LTVSMC tailings basin and Embarrass River likely represent surficial expressions of the water table, and reflect, at least in part, groundwater and surface water flow from LTVSMC tailings basin seepage.

Field testing of the surficial deposits indicates a range of hydraulic conductivity values from 0.15 to 130 feet/day. The geometric mean conductivity of 4.4 feet/day is considered to be the best representation of in situ conditions in the glacial till surrounding the LTVSMC tailings basin (Section 4.2.2.4.1 of Reference (1).

5.2.2.2 Test Hole Data

Since 2008, a number of subsurface investigations have been conducted at the Plant Site to develop and refine the hydrogeologic models of the site. The investigations are summarized in Section 4.2.2.4.1 of Reference (1)). The investigations that are the most applicable to this appropriation permit are the geotechnical investigations performed in 2013/2014 to support the design of the FTB Seepage Containment System. Test hole locations, boring logs, and testing results from surficial and bedrock borings along the FTB Seepage Containment System alignment are provided in Attachment F of Reference (11).

In addition to subsurface testing associated with the FTB Seepage Containment System design, PolyMet has measured groundwater levels in the Plant Site surficial aquifer and the LTVSMC tailings basin at 28 locations for between 2 and 12 years each. Water level records are provided in Attachment A to Reference (10).

5.2.2.3 Hydrologic Studies

PolyMet developed a MODFLOW model of the Tailings Basin (Attachment A to Reference (10)), which was calibrated for existing conditions using measured groundwater elevations in the surficial aquifer and the LTVSMC tailings basin. This model is the basis for the estimated seepage rates from the Tailings Basin under existing conditions and with the Project. The estimated seepage under existing conditions, however, is understood to exceed the capacity of the surficial aquifer.

The quantity of water flowing through the saturated unconsolidated deposits in the vicinity of the Tailings Basin has been estimated based on observed hydraulic gradients and estimates of hydraulic conductivity and aquifer thickness. The saturated thickness of the surficial aquifer encountered in soil borings at the LTVSMC tailings basin toe averages approximately 23 feet. The saturated thickness of the surficial aquifer increases to the north and northwest, as the thickness of the surficial deposits increase toward the Embarrass River. The estimated total groundwater flow through the aquifer downgradient of the LTVSMC tailings basin and toward the west, northwest, and north, is approximately 200 gpm (Table 5.2.2-37 of Reference (1)).

Because the seepage rate from the LTVSMC tailings basin exceeds the capacity of the surficial aquifer to transmit groundwater, the excess seepage upwells to the ground surface. As discussed in Section 5.2.1.4, the wetlands between the LTVSMC tailings basin and Embarrass River likely represent surficial expressions of the water table and reflect, at least in part, the flow from LTVSMC tailings seepage.

5.2.3 Colby Lake

Surface water will be withdrawn from Colby Lake, which is an in-stream lake within the Partridge River. The existing hydrology of Colby Lake is described in detail in the FEIS (Section 4.2.2 of Reference (1)) and summarized in Section 5.2.3.1 of this application. The FEIS also contains a detailed analysis of the effect of proposed withdrawals from Colby Lake (Section 5.2.2 of Reference (1)), which is summarized in Section 7.5.1 of this application. As required by Minnesota Rules, part 6115.0660, subpart 3(G)(1), a contingency plan is included as Section 5.2.3.2 of this application.

5.2.3.1 Hydrology

Colby Lake is located on the Partridge River approximately 8 miles southwest from the Mine Site and about 4 miles south of the Plant Site. It is mesotrophic and has a surface area of approximately 539 acres, and a maximum depth of approximately 30 feet. The outlet control of Colby Lake is at an elevation of approximately 1,439 feet above mean sea level (amsl). The outflow from the lake stops when levels drop below this level.

Around 1955, in order to provide a reliable source of water for mining, Erie Mining Company (predecessor to LTVSMC) constructed the Whitewater Reservoir and the diversion works, which connect Colby Lake and Whitewater Reservoir. DNR authorized construction of this reservoir and diversion works under a water appropriation permit (#1949-0135), which is currently held jointly by Cliffs Erie and Minnesota Power. The diversion works, which PolyMet understands is owned and operated by Minnesota Power, separate the two waterbodies and allow water to be exchanged between the two bodies of water. Whitewater Reservoir has a surface area of approximately 1,210 acres and a maximum depth of approximately 73 ft.

The existing water appropriation permit (#1949-0135) authorizes withdrawals from Colby Lake. Publicly-available information indicates when the former LTVSMC process plant was in operation, water management under permit #1949-0135 would typically result in water flowing through the diversion works gates from Colby Lake to Whitewater Reservoir during the spring runoff and then being pumped back into Colby Lake when needed. Permit #1949-0135 includes a condition that when water levels in Colby Lake fall below 1,439.0 feet amsl, the withdrawals of water from Colby Lake are limited to the rate that water can be pumped from Whitewater Reservoir to replace the water withdrawn. DNR's records indicate that since 2001, when LTVSMC ceased operating, the only actions under permit #1949-0135 have been Minnesota Power's maintenance activities of water levels between the Colby Lake and the Whitewater Reservoir and its maintenance activities of the dams associated with the Whitewater Reservoir in accordance with the permit.

Discharges to the Partridge River from the Northshore Mine (Peter Mitchell Pit) also influence Colby Lake hydrology. The Northshore Mine, which is located at the headwaters of the Partridge River, is permitted to discharge up to 29 cubic feet per second (cfs) to the Partridge River watershed under water appropriations permit #1982-2097. Discharges associated with pit dewatering have occurred since 1956 and are expected to continue until approximately 2070 (Section 4.2.2.2.1 of Reference (1)).

DNR records show that under relatively natural flows, in the 5-year period from January 2001 to December 2006 after LTVSMC stopped its water withdrawals and discharges from the Northshore Mine were only occurring sporadically, water levels in Colby Lake were higher with less fluctuation than when LTVSMC and its predecessors were withdrawing water for its mining operations. Over the same period, Whitewater Reservoir also experienced smaller fluctuations and higher average water levels than when the former LTVSMC facilities were operating.

There are two other water appropriation permits that authorize withdrawal of water from the Colby Lake-Whitewater Reservoir system. The City of Hoyt Lakes relies on the Colby Lake-Whitewater Reservoir

system, withdrawing an annual average of 0.6 cfs from Colby Lake for municipal potable use and discharging an annual average of 0.5 cfs of treated waste water effluent into Whitewater Reservoir under its water appropriation permit #1954-0036 (Section 6.2.2 of Reference (1)). Additionally, Minnesota Power withdraws cooling water from Colby Lake and discharges once-through non-contact cooling water back to Colby Lake with a permitted evaporative loss of 4.2 cfs under its water appropriation permit #1950-0172 (Section 6.2.2 of Reference (1)).

5.2.3.2 Colby Lake Appropriation Contingency Plan

Minnesota Rules, part 6115.0660, subpart 3(G)(1) require a permit applicant to describe the alternatives it would use if at any time appropriation were restricted to meet instream flow needs or to protect the level of a basin, or to agree to withstand the results of no appropriation.

The Whitewater Reservoir was constructed, in accordance with water appropriation permit #1949-0135, specifically to provide a reliable source of water for mining while also protecting Colby Lake levels and Partridge River instream flow needs (Section 5.2.3.2). The Colby Lake-Whitewater Reservoir system uses "...water appropriated during high flows and levels and stored for later use." Water appropriation permit #1949-0135 also requires active water level management between Colby Lake and the Whitewater Reservoir and supplemental discharge requirements to the Partridge River based on water levels.

However, if at any time withdrawals from Colby Lake by all holders of water appropriation permits were to be restricted to meet in-stream flow needs or to protect the lake level in accordance with the requirements of Minnesota Statutes, chapter 103G and the related rules of DNR, PolyMet would agree to withstand the results of no water appropriation, in accordance with Minnesota Statutes, section 103G.285, subdivision 6, when called upon to do so along with other water appropriation permit holders of these surface waters. Notably, the need to impose such restrictions on any of the permitted users of Colby Lake water is unlikely because of the active water level management under water appropriation permit #1949-0135.

PolyMet intends to work with Minnesota Power and Cliffs Erie, as the joint permit holders of water appropriation permit #1949-0135, to develop a water management plan describing how water appropriations under PolyMet's Colby Lake water appropriation permit and activities by Minnesota Power and Cliffs Erie under water appropriation permit #1949-0135 will be collectively managed to meet the requirements of both water appropriation permits to minimize impacts to the water level in Colby Lake (primarily) and Whitewater Reservoir (secondarily) as necessary, as well as in the Partridge River.

5.3 Proposed Pumping Rates and Quantities

5.3.1 Methods to Estimate Proposed Pumping

Three methods were used to estimate pumping from appropriated sources: 1) results of probabilistic water modeling conducted for the FEIS, 2) engineering estimates based on the area to be dewatered, the

21

⁴ Minnesota Rules, part 6115.0660, subpart 3(G)(2)

depth to the water table, typical soil properties, and pumping duration, and 3) preliminary design of pump capacity for mine water sumps and ponds. Methods and assumptions for pumping estimates derived from probabilistic modeling are summarized in Section 5.3.1.1, methods and assumptions for pumping estimates derived from engineering estimates are summarized in Section 5.3.1.2, and methods and assumptions for pumping estimates based on the design pump capacity are summarized in 5.3.1.3. Large Table 1 provides additional detail on pumping estimation assumptions and methods.

5.3.1.1 Probabilistic Water Modeling

Results of the probabilistic water modeling conducted for the FEIS were used to estimate the maximum monthly pumping rates for the installations listed in Table 5-2. The FEIS Mine Site and Plant Site water models were run for a duration of 200 years and 500 years, respectively, using a monthly time step for 500 realizations (individual transient model runs with probabilistic inputs) (Reference (5)). For each month of the simulation, results are summarized for this application as the 90th percentile (P90) values. This indicates that for any given month, 90% of all model realizations are less than or equal to the P90 value. Results may be further summarized for a specific year of the simulation by taking the average or the maximum value of the monthly statistics.

The range of annual precipitation values used in the probabilistic water balance was developed based on the current 30-year climate normal period (1981-2010) and ranges from approximately 20 to 40 inches of precipitation per year (Section 5.2.1.1 of Reference (5)).

The Mine Site probabilistic model uses pit inflow rate estimated by the Mine Site MODFLOW model as the mean or most likely value of groundwater inflow. The uncertainty in the groundwater inflow rate is represented with a probability distribution that scales the model-estimated inflow values, based on examination of the model during the environmental review process. This log-normal distribution is defined such that the mean is the model-estimated value (scaling factor of 1.0) and the 95% confidence interval extends from approximately 0.75 to 2.0 times the model-estimated value. Because the probabilistic modeling incorporates uncertainty and variability, the P90 results were not multiplied by an additional "uncertainty factor" to obtain the pumping estimates.

The Plant Site probabilistic model estimates the amount of water that will be needed from Colby Lake, taking into account the uncertainty and variability in precipitation, evaporation, seepage rates, and mine pit dewatering. GoldSim and MODFLOW modeling methods used to estimate make-up water demand are described in Section 5.2 of Reference (10). Because the probabilistic modeling incorporates uncertainty and variability, the P90 results were not multiplied by an additional "uncertainty factor" to obtain the pumping estimates.

The dewatering pumping schedule for the installations listed in Table 5-2 was based on the Project schedule as presented in the FEIS and is still relevant for permitting and planned operations.

Table 5-2 Probabilistic Model Results Used to Estimate Maximum Monthly Pumping Rates

Individual Permit	Installation	Values used for pumping estimate
East Pit	East Pit Sump	P90 monthly groundwater inflow P90 monthly net precipitation
Central Pit	Central Pit Sump	P90 monthly groundwater inflow P90 monthly net precipitation
West Pit	West Pit Sump	P90 monthly groundwater inflow P90 monthly net precipitation
Mine Site Infrastructure	Operation of the Category 1 Stockpile Groundwater Containment System Category 2/3 and Category 4 Waste Rock Stockpiles and Ore Surge Pile liner Overburden Storage and Laydown Area, Haul Roads, and Rail Transfer Hopper	P90 monthly total flow to the Mine Water system
Plant Site Infrastructure	Hydrometallurgical Residue Facility liner	P90 monthly precipitation P10 monthly evaporation P90 monthly run-on from interior dams and watershed
Colby Lake	Colby Lake Pumphouse	P90 monthly total pumping rates

5.3.1.2 Engineering Estimates

The total amount to be pumped during construction dewatering was calculated using information such as construction area, depth of excavation, approximate depth to water table, typical material properties, assumed construction method, and the preliminary construction schedule. Pumping amounts for construction dewatering are order-of-magnitude estimates that include both groundwater and precipitation, including precipitation on lined facilities constructed prior to the beginning of operations. The maximum monthly rate and total amount of precipitation collected in lined ponds that was not modeled in GoldSim has been calculated for this application using the area of the pond and monthly values of precipitation and evaporation. Uncertainty factors were applied to the calculated amounts, based on the level of uncertainty associated with the various components of the engineering estimate, as detailed in Large Table 1. Engineering estimates are the basis of total pumping volumes for the following installations:

- mine pit overburden stripping (East, Central, and West Pits)
- mine water pond construction (Mine Site Infrastructure)
- stormwater infrastructure construction (Mine Site Infrastructure and Plant Site Infrastructure)
- Category 1 Stockpile Groundwater Containment System construction (Mine Site Infrastructure)

- stockpile foundation, sump, and overflow pond construction (Mine Site Infrastructure)
- Ore Surge Pile foundation, sump, and overflow pond construction (Mine Site Infrastructure)
- equalization basins, mine water ponds, and stockpile sumps and overflow ponds net precipitation collected during operations (maximum monthly rate and total volume) (Mine Site Infrastructure)
- stockpile underdrain operation, if needed (Mine Site Infrastructure)
- construction of new buildings (Mine Site Infrastructure)
- FTB Seepage Containment System construction⁵ (Plant Site Infrastructure)
- Sewage Treatment System construction (Plant Site Infrastructure)
- HRF foundation construction (Plant Site Infrastructure)
- HRF wick drain construction and operation (Plant Site Infrastructure)
- WWTS basin, Plant Reservoir, and Sewage Treatment System ponds net precipitation collected during operations (Plant Site Infrastructure)
- Colby Lake pipeline upgrades (Plant Site Infrastructure)
- miscellaneous construction dewatering (Mine Site Infrastructure and Plant Site Infrastructure)
- secondary uses for make-up water from Colby Lake

5.3.1.3 Estimates Based on the Design Pump Capacity

For some installations, the maximum daily pumping rates were estimated based on the preliminary engineering design of the pump capacity selected to remove the mine water from the respective sumps or ponds, as described in Section 2.1.1 of Reference (2). The maximum daily pumping rates were based on pump capacity for the following installations:

- East Pit
- West Pit
- Central Pit
- operation of the Category 1 Stockpile Groundwater Containment System
- precipitation collected on Category 2/3 and Category 4 Waste Rock Stockpiles and Ore Surge Pile liners

⁵ Conservatively assuming open trench construction methods. In-situ construction methods would result in less pumping.

 runoff collected from Overburden Storage and Laydown Area, Haul Roads, and Rail Transfer Hopper

5.3.1.4 Maximum Daily, Monthly, and Annual Pumping Rates

For each of the Individual Permit applications, PolyMet summed the estimated pumping rates of all installations included in the permit application on a monthly basis, according to the schedule set out in the FEIS and the preliminary construction schedule. The maximum monthly pumping rate was identified as the highest of all summed monthly pumping rates. As a conservative estimate, the maximum annual pumping rate was set equal to the maximum monthly pumping rate. For the permit application for Colby Lake, the maximum daily pumping rate was also set equal to the maximum monthly pumping rate. For the permit applications for the mine pits, the maximum daily pumping rate was based on the design pump capacities. For the Mine Site Infrastructure and Plant Site Infrastructure permit applications, the maximum daily pumping rate was derived from short-term construction dewatering that lasts less than one month. When the preliminary construction schedule shows multiple short-term dewatering installations occurring in the same month, the estimate conservatively assumes that they occur concurrently. Because the maximum daily rate for the Mine Site Infrastructure permit application occurs during the month of May, maximum daily flow rates based on design pump capacity were included for installations that collect precipitation, because of the potential for both snowmelt and rain during the spring.

5.3.2 Pumping Rates and Quantities

Table 5-3 summarizes estimated pumping rates and quantities for each Individual Permit. Pumping rates include both the flow of appropriated groundwater and the flow of water that originates as precipitation. In practice, these flows cannot be physically separated. During operations, flow monitoring will record the total flow, and PolyMet will pay the appropriation fee for the entire recorded volume pumped under the Individual Permits.

For the Mine Site Infrastructure Permit and the Plant Site Infrastructure Permit, which each include multiple installations, the maximum daily pumping rate and the total pumped quantity estimated for each installation are itemized in Table 5-4 and Table 5-5, respectively. Appendix C provides additional detail on the development of the pumping rate estimates. Table 5-6 lists the Project water uses that contribute to demand for make-up water from Colby Lake.

Table 5-3 Estimated Pumping Summary: by Individual Permit

Individual Permit	Maximum Daily Rate ⁽¹⁾ (gpm)	Maximum Monthly Rate ⁽¹⁾⁽²⁾ (gpm)	Maximum Annual Rate ⁽¹⁾⁽³⁾ (gpm)	Maximum Annual Volume ⁽⁴⁾ (MG)	Average Annual Rate ⁽⁵⁾ (gpm)
East Pit	2,340 ⁽⁶⁾	1,900	1,900	1,000	200 – 800
Central Pit	1,300 ⁽⁶⁾	1,300	1,300	700	50 – 250
West Pit	2,640 ⁽⁶⁾	1,500	1,500	800	150 – 550
Mine Site Infrastructure ⁽⁷⁾	20,250 ⁽⁸⁾	2,250	2,250	1,200	50 – 500
Plant Site Infrastructure ⁽⁷⁾	3,750 ⁽⁹⁾	1,300	1,300	675	250 – 300
Colby Lake	3,400(10)	3,400 ⁽¹¹⁾	3,400	1,800	550-2,000

- (1) Maximum daily, monthly, and annual pumping rates for the Individual Permits occur in different time periods. Rates cannot be summed.
- (2) Highest monthly value of all installations included in permit have been combined: P90 for pit dewatering, operation of the Category 1 Stockpile Groundwater Containment System, precipitation collected in lined features; runoff collected from compacted features, and Colby Lake needs; engineering estimate for other installations with uncertainty factors applied, and rounded up to the nearest 50 gpm.
- (3) To be conservative, maximum annual rate is set equal to maximum monthly rate.
- (4) Maximum annual volume is calculated from the maximum annual rate, rounded up to the nearest 25 MG.
- (5) Range of the average monthly P50 values, on an annual basis, over the years of the appropriation, plus any appropriations associated with scheduled overburden stripping, rounded up to the nearest 50 gpm. This information is provided for context.
- (6) Maximum daily rate based on the design pump capacity.
- (7) See Appendix C for details on the installations that contribute to the maximum rate, the uncertainty factors applied to the flow from each installation, and the rounding that was applied.
- (8) Maximum daily rate is driven by design pump capacities, but also includes short-term construction dewatering that lasts less than one month. To be conservative, all short-term dewatering installations scheduled for a given month are assumed to occur concurrently.
- (9) Maximum daily rate is driven by short-term construction dewatering that lasts less than one month. To be conservative, all short-term dewatering installations scheduled for a given month are assumed to occur concurrently.
- (10) Maximum daily rate set equal to maximum monthly rate, because rate was estimated in GoldSim on a monthly basis.
- (11) Maximum monthly rate includes P90 Goldsim estimate of primary make-up water demands, and engineering estimates of other make-up water demands, See Table 5-6 for details.

Table 5-4 Estimated Pumping by Installation: Mine Site Infrastructure Permit

Installations	Pumping Schedule	Maximum Daily Rate (gpm)	Total Volume ⁽¹⁾ (MG)
Ore Surge Pile foundation, sumps, and overflow ponds construction	Intermittent, pre-operation construction	200(2)	30
Construction of new buildings	Intermittent, pre-operation construction	50 ⁽²⁾	5
Mine water pond construction	Intermittent, pre-operation construction to Mine Year 6	200(2)	40
Stormwater pond construction	Intermittent, pre-operation construction to Mine Year 2	750 ⁽²⁾	35
Category 4 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	Intermittent, pre-operation construction to Mine Year 3	850 ⁽²⁾	50
Category 2/3 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	Intermittent, pre-operation construction to Mine Year 6	1,525 ⁽²⁾	135
Category 1 Waste Rock Stockpile foundation construction	Intermittent, Pre-operation construction to Mine Year 6	3,375 ⁽²⁾	45
Category 1 Stockpile Groundwater Containment System construction	Intermittent, pre-operation construction to Mine Year 5	275 ⁽²⁾	80
Category 1 Stockpile Groundwater Containment System operation	Continuous, Mine Years 1 to 21	14,400 ⁽³⁾	3,115
Category 2/3 Waste Rock Stockpile liner mine water drainage (collected precipitation)	Continuous, Mine Years 1 to 19	430 ⁽³⁾	1,115
Category 2/3 Waste Rock Stockpile underdrain operation, if needed	Continuous, Mine Years 1 to 19	50 ⁽²⁾	185
Category 4 Waste Rock Stockpile liner mine water drainage (collected precipitation)	Continuous, Mine Years 1 to 11	130 ⁽³⁾	230
Category 4 Waste Rock Stockpile underdrain operation, if needed	Continuous, Mine Years 1 to 11	25 ⁽²⁾	40
Ore Surge Pile liner mine water drainage (collected precipitation)	Continuous, Mine Years 1 to 20	80 ⁽³⁾	255
Ore Surge Pile underdrain operation, if needed	Continuous, Mine Years 1 to 20	25 ⁽²⁾	85
Haul Roads, OSLA and RTH mine water runoff (collected runoff and precipitation)	Continuous, Mine Years 1 to 20	470 ⁽³⁾	795

Installations	Pumping Schedule	Maximum Daily Rate (gpm)	Total Volume ⁽¹⁾ (MG)
Lined ponds, collected precipitation (EQ Basins and Construction Mine Water Basin)	Continuous, Mine Years 1 to 20	75 ⁽²⁾	280
Miscellaneous construction dewatering	Intermittent as needed	100(2)	20
	Total Mine Site Infrastructure	N/A ⁽⁴⁾	6,550 ⁽⁵⁾

- (1) Engineering estimate of volume for temporary construction dewatering with uncertainty factor applied, rounded up to nearest 5 MG. GoldSim P90 total volume for precipitation collected in lined features and runoff collected from compacted mine water features, rounded up to nearest 5 MG. See Appendix C for additional details on estimation of the total volume for each installation.
- (2) Maximum daily rate from engineering estimate for temporary construction dewatering with uncertainty factor applied, rounded up to nearest 25 gpm. GoldSim P90 maximum monthly rate for precipitation collected in lined features and runoff collected from compacted features, rounded up to nearest 25 gpm.
- (3) Maximum daily rate based on design pump capacity.
- (4) Maximum daily rates for the individual installations occur in different time periods. Rates cannot be summed. Maximum daily rate is driven by short-term construction dewatering that lasts less than one month. To be conservative, all short-term dewatering installations scheduled for a given month are assumed to occur concurrently.
- (5) Total volume rounded up to the nearest 25 MG.

Table 5-5 Estimated Pumping by Installation: Plant Site Infrastructure Permit

Installations	Pumping Schedule	Maximum Daily Rate ⁽¹⁾ (gpm)	Total Volume ⁽²⁾ (MG)
Flotation Tailings Basin (FTB) Seepage Containment System construction dewatering	Intermittent, pre-operation construction and Mine Year 7	3,350	295
Sewage Treatment System construction dewatering	Pre-operation construction	100	5
Hydrometallurgical Residue Facility (HRF) construction dewatering, if needed	Intermittent, pre-operation construction to Mine Year 3	2,850	125
HRF wick drain operation, if needed	Continuous, Mine Year 1 through 20	150	30
HRF liner (collected precipitation)	Continuous, Mine Year 3 through 20	250	810
Lined and concrete ponds, collected precipitation (WWTS, Sewage Treatment, Plant Reservoir)	Continuous, Mine Year 1 through 20	50	165
Colby Lake pipeline upgrades (construction dewatering)	Pre-operation construction	300	15
Miscellaneous construction dewatering	Intermittent as needed	100	15
	Total Plant Site Infrastructure	N/A ⁽³⁾	1,475 ⁽⁴⁾

⁽¹⁾ Maximum daily rate from engineering estimate for temporary construction dewatering with uncertainty factor applied, rounded up to nearest 25 gpm. GoldSim P90 maximum monthly rate for precipitation collected in lined features rounded up to nearest 25 gpm.

⁽²⁾ Engineering estimate of volume for temporary construction dewatering with uncertainty factor applied, rounded up to nearest 5 MG. GoldSim P90 total volume for precipitation collected in lined and concrete features, rounded up to nearest 5 MG. See Appendix C for additional details on estimation of the total volume for each installation.

⁽³⁾ Maximum daily pumping rates for the individual installations occur in different time periods. Rates cannot be summed. Maximum daily rate is driven by short-term construction dewatering that lasts less than one month. To be conservative, all short-term dewatering installations scheduled for a given month are assumed to occur concurrently.

⁽⁴⁾ Total volume rounded up to the nearest 25 MG.

Table 5-6 Estimated Colby Lake Make-Up Water Demand

Make-Up Water Use	Maximum Monthly Rate (gpm)		
Primary Water Uses			
Process ore; supplement the hydrometallurgical process; fill FTB Pond prior to startup	3,150 ⁽¹⁾		
Secondary Water Uses ⁽²⁾			
Potable water use	50 ⁽³⁾		
Dust control	100(3)		
Air emission control scrubber systems	50 ⁽³⁾		
Miscellaneous water demand	50 ⁽³⁾		
Total Colby Lake Make-Up Water Demand	3,400		

Note: Make-up water supplements the overall Project water balance, allowing recycled water to be used to maintain FTB Pond water levels and treated water to be used for stream augmentation.

- (1) P90 GoldSim monthly rate, rounded up to the nearest 25 gpm
- (2) There are a few additional secondary water uses that are non-consumptive, such as gland seal water, which require water, but do not consume water. There are a few additional secondary uses that are not annual uses, such as fire water and water required for the startup of Tailings Basin operations that are not listed in this table of annual use, but that are accounted for in the estimated maximum monthly rates.
- (3) Engineering Estimate, rounded up to the nearest 25 gpm

5.3.3 Methods of Appropriation

Method of appropriation will vary by installation. Mine pit overburden stripping dewatering will occur via separate mobile pumping systems prior to pit development; flow from stripping may be directed to the mine pit collection sumps once the sumps are constructed.

Water management within the pits (Section 2.1.3 of Reference (2)) will occur as part of mine development, with the pit floors sloped toward collection sumps. The sumps will be excavated as part of mine operations. Pumps in the sumps will either be submersible pumps or pumps on a raft floating in the sump. Hoses will connect the pumps to pipes which may connect to additional pumps at the rim of the pits conveying the water for treatment. The size and location of the sumps and pumps will change as the pits expand in size and depth, requiring periodic evaluation of the pumping system. The pumping system capacities will be designed to handle groundwater inflows and the average annual runoff volumes from a snowmelt event (Section 2.1.3 of Reference (2)). Flow meters will be installed to track pumped rates and volumes from the mine pit collection sumps.

The Category 1 Stockpile Groundwater Containment System (Section 2.1.2 of Reference (9)) will consist of a cutoff wall (a low permeability compacted soil hydraulic barrier) combined with a drainage collection system around the perimeter of the stockpile near the stockpile toe. The final configuration of the containment system will completely encircle the stockpile. Stockpile drainage collected in the drain pipes will flow by gravity to a collection sump where it will be pumped to the Low Concentration Equalization Basin. Collection sumps will have emergency overflows to the East or West Pits. Flow meters will be

installed to track pumped rates and volumes from the collection sumps to the Low Concentration Equalization Basins.

Precipitation collected on stockpile liners as mine water drainage will be pumped from the stockpile sumps and overflow ponds to the High Concentration Equalization Basin. Runoff collected from the haul roads and Rail Transfer Hopper will be pumped to the Low Concentration Equalization Basins. Runoff collected from the Overburden Storage and Laydown Area will be pumped to the Construction Mine Water Basin. Precipitation collected in lined or concrete ponds, such as within the mine water sumps and ponds, Equalization Basins, the Construction Mine Water Basin, the WWTS Basin, the Plant Reservoir, and Sewage Treatment System ponds, will be managed together with the respective pond water.

If stockpile underdrains are needed, the water collected would flow by gravity to underdrain sumps, be transferred to the mine water sumps, and then be pumped to the High Concentration Equalization Basin.

Construction dewatering (under the Mine Site Infrastructure Permit and the Plant Site Infrastructure Permit) will be accomplished via temporary dewatering with movable pumps and piping. Dewatering may be necessary for construction of features such as new buildings, Equalization Basins, stormwater ponds, and mine water sumps and ponds. Most construction dewatering will be groundwater dewatering; however run-on and standing water may be pumped from construction areas, if needed. Pumping of standing water is anticipated only for construction of the FTB Seepage Containment System and the HRF foundation.

Colby Lake pumping will occur from the existing Colby Lake Pumphouse and associated equipment, which will pump water to the Plant Reservoir via the existing pipeline. A flow meter will track pumped rate and volume. Precipitation collected in the Plant Reservoir will be managed with this Colby Lake water.

5.4 Alternatives Considered

The objective of all proposed appropriations is to construct and operate Project features below the water table, with four exceptions, which are described below. Dewatering is the only alternative available to accomplish this objective. By using water appropriated from Project sources (e.g., mine pits), PolyMet will limit the need to appropriate water from other sources.

The objective of the Category 1 Stockpile Groundwater Containment System is to limit potential groundwater impacts from the Project's only permanent stockpile. During the environmental review process, this option was determined to be the preferred alternative to accomplish this objective (Section 3.2.3.3 of Reference (1)).

The objective of the underdrains on temporary waste rock stockpiles and the temporary Ore Surge Pile and HRF wick drains, if they are needed, is to support the integrity and performance of the liner systems, which will limit potential groundwater impacts from the Project's temporary stockpiles, Ore Surge Pile and the HRF. The underdrains may be necessary under both the stockpiles and the associated sumps and ponds. There are alternative ways to construct the foundation systems of these infrastructure, but, use of

underdrains and wick drains for foundation drainage, if needed, are the preferred methods to accomplish the desired objective.

The objective of the collection of precipitation in the lined and concrete ponds and basins with the Project's mine and process waters is to limit potential groundwater impacts from this water management. During the environmental review process, this water management approach was determined to be the preferred alternative to accomplish this objective (Section 3.2.3.3 of Reference (1)).

The objective of pumping from Colby Lake is to provide make-up water, as needed, to the Plant Site. Uses of make-up water are described in Section 3.0. The primary alternative to appropriation of water from Colby Lake would be to recycle more of the captured seepage from the Tailings Basin for use as process water; however, this alternative was rejected because it would decrease the quantity of water available for stream augmentation. Stream augmentation was identified in the environmental review process as an important activity to limit potential hydrologic and ecologic impacts of the Project to downstream water resources at the Plant Site, and pumping from Colby Lake is critical to maintaining an adequate supply for stream augmentation (Sections 5.2.2. and 5.2.6 of Reference (1)). The selected alternative is consistent with the use prioritization requirements of Minnesota Rules, part 6115.0660, subpart 3(G)(2), which requires that "alternatives for appropriating water have been considered including use of water appropriated during high flows and levels and stored for later use, and the use of groundwater." The proposed appropriations are consistent with these priorities. Water will be drawn from the Colby Lake-Whitewater Reservoir system, which was constructed specifically to provide a stable water supply for mining by storing water during high flows for later use. In addition, the Project will meet more than 80% of its water demand using groundwater appropriated for dewatering necessary to conduct mining operations.

6.0 Additional Requirements and Conditions for Dewatering (Minnesota Rules, part 6115.0710)

This section provides the additional information required for the five NorthMet water appropriation permit applications that involve dewatering: the permit applications for the East Pit, Central Pit, West Pit, Mine Site Infrastructure, and Plant Site Infrastructure. The Colby Lake water appropriation permit application does not involve dewatering, so it is not covered in this section.

6.1 Reasonable Necessity for Dewatering (Minnesota Rules, part 6115.0710(A))

All proposed dewatering covered by the four Individual Permit applications at the Mine Site and the Individual Permit application at the Plant Site is necessary to construct and operate the Project. Implementation of PolyMet's proposal for dewatering is practical and consistent with standard industry practice.

6.2 Discharge Will Not Adversely Affect the Public Interest in the Receiving Waters (Minnesota Rules, part 6115.0710(B))

The discharge destination will vary by installation, as indicated in Table 6-1.

Most water withdrawn under the four Mine Site Individual Permits and the Plant Site Individual Permit will be discharged to the FTB, from where it will be recycled for use in mineral processing. Water used in mineral processing will be routed to the FTB and some may eventually emerge as seepage from the FTB, which will then be collected, treated, and discharged from the WWTS as described in Section 3.4.

PolyMet has evaluated potential effects of the WWTS discharge (Section 8.1.2.3) and determined that the discharge will not cause exceedances of any applicable State surface water quality standards (Section 6.5 of Reference (5) and Section 6.7 of Reference (10)). Furthermore, the carrying capacity of the outlet to which waters will be discharged is adequate. The discharge quantity will be managed to "replace" water that is captured by the FTB seepage capture systems, in order to avoid adverse ecologic and hydrologic impacts to the receiving waters that could result from operation of the NorthMet FTB seepage capture systems (Section 3.3).

Some dewatering installations under the Mine Site Infrastructure Permit and the Plant Site Infrastructure Permit will be discharged off-site under the terms of an MPCA construction stormwater permit and associated SWPPPs prepared in accordance with the NPDES/SDS Construction Stormwater General Permit (R1000001), using best management practices to prevent adverse water quality, hydrologic, or ecologic effects.

Therefore, discharge of appropriated water will not negatively affect the public interest in the receiving waters.

Table 6-1 Dewatering Discharge Destination, by Installation

Individual Permit	Installation	Dewatering Discharge Destination ⁽¹⁾
Foot Dit	Overburden stripping	Flotation Tailings Basin (FTB)
East Pit	East Pit Sump	FTB
Control Dit	Overburden stripping	FTB
Central Pit	Central Pit Sump	FTB
Central Pit West Pit Mine Site Infrastructure	Overburden stripping	FTB
	West Pit Sump 1 and Sump 2	FTB
	Ore Surge Pile foundation, sumps, and overflow ponds construction	FTB
	Construction of new buildings	FTB or off-site through the stormwater management system (to Partridge River tributaries)
	Mine water pond construction	FTB or off-site through the stormwater management system (to Partridge River tributaries)
	Stormwater pond construction	FTB or off-site through the stormwater management system (to Partridge River tributaries)
	Category 4 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	FTB
Mine Site	Category 2/3 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	FTB
Infrastructure	Category 1 Waste Rock Stockpile foundation construction	FTB
	Category 1 Stockpile Groundwater Containment System construction	FTB
	Category 1 Stockpile Groundwater Containment System operation	FTB
	Category 2/3 Waste Rock Stockpile underdrains, if needed	FTB or East Pit during pit flooding
	Category 4 Waste Rock Stockpile underdrains, if needed	FTB or East Pit during pit flooding
	Ore Surge Pile underdrains, if needed	FTB or East Pit during pit flooding
	Miscellaneous construction dewatering	FTB or off-site through the stormwater management system (to Partridge River tributaries)

Individual Permit	Installation	Dewatering Discharge Destination ⁽¹⁾
	FTB Seepage Containment System construction	FTB or off-site to the Embarrass River tributaries
	Sewage Treatment System construction	Off-site via the stormwater management system (to Second Creek)
	Hydrometallurgical Residue Facility (HRF) construction	FTB or off-site via the stormwater management system (to Second Creek)
PL + 6%	HRF wick drains, if needed	FTB or Waste Water Treatment System (WWTS) via the FTB Seepage Containment System
Plant Site Infrastructure	HRF liner, collected precipitation	HRF
	WWTS pre-treatment basin, collected precipitation	Off-site with WWTS discharge to Trimble Creek, Unnamed Creek, and Second Creek
	Sewage Treatment System ponds, collected precipitation	FTB
	Plant Reservoir, collected precipitation	FTB or HRF
	Colby Lake pipeline upgrades	Off-site to Partridge River tributaries
	Miscellaneous construction dewatering	FTB or off-site via the stormwater management system (to Second Creek)

⁽¹⁾ When multiple locations are identified, the final discharge location will be dependent on NPDES/SDS permitting.

6.3 Proposed Dewatering is Not Prohibited by Any Existing Law (Minnesota Rules, part 6115.0710(C))

No existing law prohibits the proposed dewatering.

7.0 Additional Requirements and Conditions for Mining and Processing (Minnesota Rules, part 6115.0720)

7.1 Plans and Specifications (Minnesota Rules, part 6115.0720, subpart 1(A))

Construction plans have been developed based on the permit-level design with associated specifications incorporated. This permit-level design has been used to determine the required withdrawal of waters of the state for construction and operations. The use, storage, and disposal of waters of the state are described in this permit application in Sections 6.2 and 7.2 and shown in permit-level designs attached in Appendix D for the following features:

- Mine Site and Dunka Road Earthwork Permit Application Support Drawings
- Category 1, 2/3, and 4 Stockpiles and Ore Surge Pile Design Permit Application Support Drawings
- Mine Site Mechanical Infrastructure Permit Application Support Drawings
- Mine Site Stormwater Permit Application Support Drawings
- Plant Site Stormwater Permit Application Support Drawings
- Category 1 Stockpile Groundwater Containment System Permit Application Support Drawings
- FTB Seepage Containment and Stream Augmentation Systems Permit Application Support Drawings
- Hydrometallurgical Residue Facility Permit Application Support Drawings
- Flotation Tailings Basin Permit Application Support Drawings
- WWTS Preliminary Drawings

Other engineering design drawings, including various buildings, the Sewage Treatment System, and Colby Lake pipeline repairs will not be completed until further geotechnical investigations are completed. The construction dewatering estimated for these systems, as provided in this application, have been adequately estimated for those features.

7.2 Consumption of Appropriated Water in Mineral Processing (Minnesota Rules, part 6115.0720, subpart 1(B))

Appropriated water that is sent to the FTB (Table 6-1) will be used for mineral processing. The water will be recirculated between the FTB and the Beneficiation Plant, with relatively small losses due to evaporation within the plant and water in the concentrate product. Water will be lost during mineral

processing at the Beneficiation Plant at an average rate of approximately 48 gpm (Section 2.1.1 of Reference (3)).

Additionally, there will be losses of appropriated water in the FTB, from the following processes:

- Water entrained in the tailings (i.e., void losses), which will increase over the life of the Project ranging from an average of approximately 1,400 gpm in Mine Year 1 to a peak of approximately 1,500 gpm.
- Evaporation losses, dependent on climatic conditions and size of the FTB Pond, ranging from approximately 1,300 gpm to approximately 1,800 gpm based on average annual conditions.

There will also be minor losses of appropriated water associated with waste water treatment, from the following processes:

- Operation of the WWTS will result in a loss of approximately 5 gpm in the chemical precipitation sludge (Section 6.1.2.4 of Reference (5)).
- Seepage and evaporation loss from the double-lined WWTS equalization basins will be minimal and will total less than 0.1 gpm (Section 6.1.2.4 of Reference (5)).
- Operation of the WWTS will not result in a loss of appropriated water during operations, because all non-discharge water (filter backwash, reject concentrate, and treated mine water) will be either be internally recycled or returned to the FTB Pond (Section 6.1.4 of Reference (10)).

7.3 Criteria Used for Estimating Appropriations (Minnesota Rules, part 6115.0720, subpart 1(C))

Criteria used for estimating appropriation rates for the water withdrawn under the six Individual Permits, including information on climatic data and uncertainty, are presented in Section 5.3.1.

7.4 Details of Water Released (Minnesota Rules, part 6115.0720, subpart 1(D))

Information regarding the source, rate, and volume of water released from the Project via the WWTS is discussed in Section 3.4. Water from some dewatering installations may be discharged off-site under terms of an MPCA construction stormwater permit and associated SWPPPs. Estimates of the source, rate, and volume of water that may be released off-site (installations noted on Table 6-1) are provided in Table 5-4 and Table 5-5 for the Mine Site and the Plant Site, respectively.

7.5 Hydrologic and Hydraulic Impacts (Minnesota Rules, part 6115.0720, subpart 1(E))

PolyMet assessed potential hydrologic and hydraulic impacts in the Partridge River watershed and the Embarrass River watershed due to water appropriations and other aspects of Project operations. The findings of this assessment are summarized below.

7.5.1 Potential Effects on the Partridge River and Colby Lake

Project actions that could cause hydrologic effects to the Partridge River and Colby Lake are the operation of the South Seepage Management System at the Plant Site, watershed area changes at the Mine Site, and appropriation of surface water from Colby Lake. Each of these actions were addressed during the environmental review process.

- The South Seepage Management System will intercept seepage from the Tailings Basin that has historically flowed to Second Creek, a tributary of the Partridge River; however, stream augmentation downstream of this system will minimize hydrologic and hydraulic impacts to Second Creek, as described in Section 3.3.
- The XP-SWMM model for the Partridge River (Section 5.2.1.5) was used to evaluate the effects on streamflow from watershed area changes at the Mine Site (Section 5.2.2.3.2 of Reference (1)). Key conclusions of the modeling effort include:
 - The primary difference between existing conditions and future conditions as estimated in the XP-SWMM models is the resulting change in the total tributary area to the Partridge River as Mine Site development alters subwatershed divides and diverts runoff for treatment. The total watershed area tributary to each model output location during future conditions ranges from 94% to 99% of the existing-conditions watershed area.
 - Basic statistics characterizing flow patterns at different locations along the Partridge River during Project operations indicate that average and high flows will change by less than 10% throughout the stages of Mine Site development. The changes in average and high flows will be greatest in the vicinity of the Mine Site but decrease to less than 5% below the confluence of the Partridge River with the South Branch of the Partridge River (SW004a) and less than 3% immediately upstream of Colby Lake (SW006). Low flows will decrease by less than 10%.
- The FEIS assessed the potential effects of Project withdrawals from Colby Lake on water levels in Colby Lake and the Whitewater Reservoir. The FEIS assessed an average pumping rate of 3,500 gpm for Project appropriations from Colby Lake. At a 3,500 gpm withdrawal rate and average flow conditions associated with that withdrawal, the average Colby Lake drawdown attributable to the Project is estimated to be 0.01 feet with an average annual water level fluctuation of about 3.6 feet, compared to 3.9 feet for zero withdrawal. The active management of Colby Lake water levels associated with the Project will reduce water level fluctuation in Colby

Lake even with Project withdrawals. Whitewater Reservoir would also be affected by water withdrawals for the Project, as it is used to help maintain water levels in Colby Lake as described in Section 5.2.3 of this application. Under this 3,500 gpm withdrawal and average flow conditions scenario, drawdown on Whitewater Reservoir that would be attributable to the Project is estimated to be about 0.4 foot with a maximum annual fluctuation of about 4.2 feet, compared to about 2.9 feet for zero withdrawal (Section 5.2.2 of Reference (1)). Water level fluctuation in Whitewater Reservoir will be increased over the base case because water will be removed from the reservoir in order to manage water levels in Colby Lake. Effects of the appropriation rate requested in this application would be similar to the effects estimated for the FEIS (3,500 gpm evaluated in the FEIS, and 3,400 gpm requested in this water appropriation application).

Overall, these results demonstrate that the Project is expected to have minimal hydrologic and hydraulic effects on the Partridge River watershed, including Colby Lake. There are no anticipated hydrologic or hydraulic impacts that would preclude issuing the relevant Individual Permits for the Partridge River watershed under the applicable Minnesota statutes or rules.

7.5.2 Potential Effects on the Embarrass River

PolyMet will minimize hydrologic and hydraulic impacts to the Embarrass River by managing excess water in a manner that complies with the requirements of Minnesota Rules, part 6115.0720, subpart 2(C). Specifically, PolyMet will use the water management strategy referred to as stream augmentation, as described in Section 3.3, to address potential reductions in streamflow resulting from the FTB seepage capture systems. The rate of discharge from the WWTS to tributaries of the Embarrass River will be managed so that the average annual flow in receiving waters is maintained at ±20% of existing conditions. Similarly, the hydrology in Unnamed (Mud Lake) Creek will be maintained by diversion of runoff from the adjacent watershed via a drainage swale. Evaluation of this drainage area shows that average annual streamflow will be maintained at ±20% of existing conditions. The DNR, in response to comments on the FEIS, stated that "Moderate changes to flow within these systems are expected to be protected by riparian vegetation, and these reaches are expected to be stable under moderate changes to streamflow and sediment supply." (p. A-335 of Reference (1)). Discharges from the WWTS also will meet State water quality standards imposed under the Project's NPDES/SDS permit. Therefore, the Project is not expected to cause adverse hydrologic or hydraulic effects in the receiving waters of the Embarrass River and will be in compliance with applicable Minnesota statutes and rules.

7.5.3 Potential Effects Due to Groundwater Drawdown

7.5.3.1 Mine Site

Water levels at the Mine Site will be drawn down due to pit dewatering. At the Mine Site, the FEIS concluded that due to the heterogeneity of the Mine Site surficial aquifer, and based on previous studies of mine pits in northeastern Minnesota, it was not reasonable to attempt to quantify drawdown at the Mine Site using the MODFLOW model (Section 5.2.2.3.1 of Reference (1)). Therefore, an analog study was performed using data from the Canisteo Pit as well as the Minntac West Pit, which are located 70 and 29

miles from the Mine Site, respectively. Based on the analog site evaluation, the FEIS reached the following conclusions with respect to potentially measurable drawdown at the Mine Site:

- 0 to 1,000 feet from the pit rim: groundwater drawdown from pit dewatering may occur and may be measurable;
- 1,000 to 1,700 feet from the pit rim: groundwater drawdown from pit dewatering may occur, but may be difficult to distinguish from natural variations in background water levels;
- 1,700 to 3,200-plus feet from the pit rim: groundwater drawdown from pit dewatering may occur, but would likely only occur under certain hydrogeologic conditions, and may not be discernible from natural variability; and
- Beyond 3,200 feet from the pit: no drawdown effects would be expected.

There are few surface water bodies within the 0- to 1,000-foot zone or the 1,000- to 1,700-foot zone surrounding the Mine Site pit rims where groundwater drawdown may occur and would potentially be distinguishable from natural variations. Potentially impacted surface waters within these first two zones include Unnamed (West Pit Outlet) Creek and the headwaters of the Partridge River. The proposed Category 1 Stockpile Groundwater Containment System, with its low-permeability cutoff wall keyed into bedrock, would minimize effects of pit drawdown on the headwaters of the Partridge River.

The potential indirect impacts on wetlands due to change in wetland hydrology from groundwater drawdown at the Mine Site were assessed in the FEIS using the results of the analog site evaluation and consideration of wetland type and connection to groundwater (Section 5.2.3.2.2 of Reference (1)). Potentially impacted wetlands within the first two analog zones include portions of One Hundred Mile Swamp, to which impacts would be minimized by the proposed Category 1 Stockpile Groundwater Containment System and its low-permeability cutoff wall keyed into bedrock. As part of its wetland monitoring plan developed as part of the federal and state permitting process, PolyMet will conduct monitoring of wetland hydrology and vegetation communities to document the extent and magnitude of wetland responses, if any (potential indirect effects), from disturbances related to the Project. In particular, wetlands that have a higher potential for indirect effects as a result of groundwater drawdown will be monitored in accordance with the wetland monitoring plan.

7.5.3.2 Plant Site

At the Plant Site, potential drawdown from construction dewatering at the Plant Site will be temporary and localized to the areas immediately adjacent to the construction areas, and any potential drawdown from the use of the HRF wick drains, if needed, will be localized to the area immediately below the HRF. Water that is currently flowing to the wetlands north and west of the LTVSMC tailings basin will be managed in accordance with an MPCA construction stormwater permit and associated SWPPP. No hydrologic or hydraulic effects are expected at the Plant Site as a result of the construction dewatering activities or the dewatering from the HRF wick drains, if they are used.

7.6 Prioritization of Water Supply Sources and Other Mining-Specific Requirements

Minnesota Rules part 6115.0720 subpart 2(A and B) directs the applicant to use available surplus water from mining operations or facilities, and to prioritize water supply sources based on various criteria. The water appropriations PolyMet is requesting in the East Pit permit application, the Central Pit permit application, The West Pit permit application, the Mine Site Infrastructure permit application, and the Plant Site Infrastructure permit application will consist of surplus water generated by dewatering that is necessary for mining operations, and of precipitation and runoff collected by engineering controls. Water from these installations will be primarily conserved through recycling within the Project facilities and operations, with some treated WWTS discharge used for stream augmentation purposes as described in Sections 3.3 and 7.5.2 of this application. Project water uses and appropriation installations are consistent with the top two priority water supply sources under Minnesota Rules, part 6115.0720, subpart 2(B): 1) runoff from the mining areas, and 2) water from active mine pits and tailing basins.

Minnesota Statutes, section 103G.297 contains additional provisions applicable to mining activities. These provisions include requirements that the proposed use of waters:

- will be necessary for the mining of deposits of ore, and another more feasible and economic method of mining the ore is not reasonably available;
- will not substantially impair the interests of the public in, or beneficial public uses of, lands or waters except as authorized by permit;
- will not endanger public health or safety; and
- will be in the public interest, and the proposed public benefits will warrant the proposed water use

PolyMet believes the Project has met these requirements of Minnesota Statutes, section 103G.297, as documented in the review of alternatives, potential economic and social effects, and cumulative impacts of the FEIS (Reference (1)). Also, the more detailed discussions in the other sections of this application provide further support for the DNR commissioner's determinations under Minnesota Statues, section 103G.297.

7.7 Restoration of Surface Water Flow

Minnesota Rules, part 6115.0720, subpart 2(C) calls for the permittee to manage discharge of appropriated water in a manner that will restore the flow in areas where a mining operation will cause reductions in watercourse flow. Stream augmentation at the Plant Site, as described in Section 3.3 and Section 7.5.2, will restore the flow to Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek, that would otherwise be reduced by operation of the FTB seepage capture systems.

8.0 Compliance with Sustainability and Water Supply Management Requirements

The overall Project water appropriation permitting approach is designed to meet the State groundwater sustainability standard (Minnesota Statutes, section 103G.287 subdivision 5), applicable water supply management requirements of the State of Minnesota (Minnesota Statutes, section 103G.265), and other State and local plans related to water appropriations.

8.1 Groundwater Sustainability Standard

The FEIS concluded that the Project is not expected to have a significant effect on groundwater hydrology in the Partridge River or Embarrass River watersheds (Sections 5.2.2.3.2 and 5.2.2.3.3 of Reference (1)). This permit application builds upon that analysis. The following subsections demonstrate that the proposed groundwater appropriations are sustainable to continue to supply the needs of future generations and will not harm ecosystems, degrade water, or reduce water levels beyond the reach of public water supply and private domestic wells. Thus, PolyMet's proposed appropriations will comply with Minnesota's groundwater sustainability standard from Minnesota Statutes, section 103G.287, subdivision 5.

8.1.1 Groundwater Appropriations are Sustainable

Groundwater resources that could be affected by the Project are the Mine Site surficial aquifer and bedrock in the Partridge River watershed and the Plant Site surficial aquifer, which is primarily in the Embarrass River watershed, with a small section in the Partridge River watershed, as described in Section 5.2.

The Mine Site surficial aquifer, like most glacial aquifers in the region, is generally thin, discontinuous, and limited in yield (Reference (12)). The dewatering at the Mine Site is expected to result in relatively localized effects on the Mine Site surficial aquifer, as described in Section 7.5.3.1. No private wells have been identified that pump from the surficial aquifer in the vicinity of the Mine Site.

The only bedrock unit that is considered to be an aquifer in the vicinity of the Project is the BIF, which serves as a source of municipal water supply for some Iron Range cities (Reference (12)). Mine Site pit dewatering will draw water from the Duluth Complex and the Virginia Formation, bedrock units which are not used for water supply in the area (Reference (11)). The mine pits will not extend into the BIF, thus dewatering is not expected to affect the BIF (Section 3.2.4 of Reference (13)).

The Plant Site surficial aquifer, similar to the surficial aquifer at the Mine Site, is a glacial aquifer that is generally thin, discontinuous, and limited in yield (Reference (12)). The temporary construction dewatering and the dewatering from the HRF wick drains, if needed, at the Plant Site are expected to result in highly localized effects on the Plant Site surficial aquifer, as described in Section 7.5.3.2. This will minimize the potential for Project water appropriations from the Plant Site surficial aquifer to affect downgradient users of groundwater.

In summary, the effects of the proposed appropriations on groundwater resources are not expected to negatively affect the groundwater supply in the Partridge River watershed or the Embarrass River watershed.

8.1.2 Effects on Ecosystems

PolyMet also assessed the potential for impacts to ecosystems due to drawdown associated with water appropriations, hydrologic changes, and discharges from the Project. The results of that assessment are presented below.

8.1.2.1 Effects Due to Drawdown

Although drawdown of the water table associated with water appropriations is not anticipated to be significant and is not expected to impact aquatic ecosystems by lowering water levels in surface water bodies and wetlands, there is some potential for such an impact. This issue was addressed during the environmental review process. PolyMet will conduct monitoring during Project construction and operations as described in this subsection so that it is able to implement adaptive management measures if necessary to avoid and minimize any drawdown effects.

Section 7.5.3.1 of this application discusses the potential drawdown of groundwater at the Mine Site and the potential effect this drawdown could have on wetlands at the Mine Site, which were matters discussed in the FEIS (Section 5.2.2.3.2 of Reference (1)). As a result of this possibility, PolyMet, during the Project, will conduct ongoing monitoring for potential indirect wetland impacts in accordance with the wetland monitoring plan.

Similarly, Section 7.5.3.2 of this application discusses the anticipated temporary impact from the Plant Site water appropriations. Wetland monitoring at the Plant Site will also be completed in accordance with the monitoring plan to evaluate potential changes as a result of the proposed water appropriations and operation of the FTB Seepage Containment System.

8.1.2.2 Effects Due to Hydrologic Changes

Project water appropriations are not expected to cause adverse hydrologic or hydraulic effects (as discussed in Section 7.5.1 as well as in the preceding subsections of this Section 8.1.2). Therefore, effects to ecosystems due to hydrologic changes are not anticipated.

8.1.2.3 Effects Due to Discharge

Discharges from the WWTS are not expected to adversely affect ecosystems, because the discharges will not cause adverse hydrologic changes (Section 8.1.2.2 of this application), nor will they cause exceedances of applicable surface water quality standards that are protective of ecosystems (Section 6.7 of Reference (10)).

Construction dewatering from some Project installations may be discharged off-site under the terms of an MPCA construction stormwater permit and associated SWPPP (Table 6-1). Best management practices

(BMPs) will be used to avoid adverse effects to ecosystems from authorized off-site discharge during construction dewatering.

8.1.3 Effects on Water Resources

PolyMet assessed the net effects of the water appropriation, including the planned groundwater appropriations, on surface water and groundwater quality, and determined that the water appropriation is not projected to degrade water resources. Analysis conducted for the FEIS determined that:

- The water appropriation is not projected to cause exceedances of applicable surface water quality standards (Section 6.5 of Reference (5) and Section 6.7 of Reference (10)).
- The water appropriation is not projected to cause exceedances of applicable groundwater quality standards at the property boundary (Section 6.3 of Reference (5) and Section 6.5 of Reference (10)).

8.1.4 Effects on Public or Private Wells

Potential drawdown effects on private or public wells associated with the proposed appropriations at the Mine Site and the Plant Site were evaluated. The evaluation indicates that the Project's water appropriations will not interfere with private or public wells.

At the Mine Site, mine pit dewatering is expected to result in groundwater drawdown, but due to the relatively low hydraulic conductivity of the bedrock, the effect is expected to be localized. There may be measureable decreases in groundwater levels within a 1,000-foot distance from the mine pit rims (Section 7.5.3.1). However, no public or private wells are known to exist in the vicinity of the Mine Site. This indicates that the appropriations will not reduce water levels beyond the reach of public water supply or private domestic wells, and no impacts to other groundwater users are expected.

Plant Site construction dewatering is expected to result in drawdown in the surficial aquifer that is minor, temporary, and localized (Section 7.5.3.2). Plant Site dewatering from the HRF wick drains, if needed, would be longer term, but would also be minor and localized (Section 7.5.3.2). Public records indicated that approximately 38 residential wells are located in the area between the Plant Site and the Embarrass River, some of which draw water from the surficial aquifer and some from bedrock. The closest well is more than one mile from the Plant Site boundary (Figure 4.2.2-18 of Reference (1)) The drawdown from dewatering at the Plant Site will not reduce water levels beyond the reach of these private domestic wells, no public water supply wells are present in the vicinity of the Plant Site, and no impacts to other groundwater users are expected.

8.2 Water Supply Management Rules (Minnesota Statutes, section 103G.265)

8.2.1 Regulatory Context

Minnesota Statutes, section 103G.265, governs water supply management and establishes various thresholds that apply to consumptive use of waters of the state. "Consumptive use" is defined as "water that is withdrawn from its source for immediate further use in the area of the source and is not directly returned to the source" (Minnesota Statutes, section 103G.005, subdivision 8). The volume thresholds in the consumptive use provisions of section 103G.265 are applied in this Section 8.2 to each permit or plan, consistent with the applicable statutory requirements.⁶

PolyMet has evaluated water appropriation on a permit-by-permit basis. For the purposes of consumptive use analysis in this Section 8.2, however, and based on DNR's request, PolyMet also evaluated water appropriations based on three separate geographic areas: the Mine Site, the Plant Site, and Colby Lake. More specifically, PolyMet has evaluated consumptive use in the context of three general plans for appropriation of water, one relating to the Mine Site (which includes all four Individual Permits applicable to the Mine Site), one at the Plant Site, and one for Colby Lake. These three plans reflect the geographic separation of the Mine and Plant Sites (which are located approximately 7 to 8 miles apart), the fact that the water appropriations from the two Sites are not from the same hydrogeologic units, and the fact that the Colby Lake appropriation will be entirely surface water, and located approximately 4 and 9 miles from the Plant and Mine Sites, respectively.

Minnesota Statutes, section 103G.265, subdivision 3 states that a water appropriation permit involving consumptive use of more than 2,000,000 gallons per day on average over a 30-day period may be approved where "the water remaining in the basin of origin will be adequate to meet the basin's water resources needs during the specified life of the consumptive use." The "basin of origin" refers to the "drainage basin of the Great Lakes" (Minnesota Statutes, section 103G.005, subdivision 6). Minnesota Statutes, section 103G.265, subdivisions 2 and 4 contain provisions related to diversion of water, but because the Project will not divert water from the Great Lakes Basin, these statutory provisions related to diversions do not apply. Minnesota Statutes, section 103G.265, subdivision 4 also governs consumptive use from the Great Lakes Basin of greater than 5,000,000 gallons on average per day (over a 30-day period), but this threshold will not be exceeded by the Project.

8.2.2 NorthMet Consumptive Use

8.2.2.1 Estimation Methods

PolyMet has calculated consumptive use estimates based on the estimates of pumping rates described in Section 5.3.1 and Appendix C.

⁶ See Minnesota Statutes, section 103G.265, which applies the thresholds to each "water use permit or plan that requires a permit..."

For this evaluation, all estimated groundwater pumping rates were summed on a monthly basis based on the Mine Site and Plant Site geographic areas. Estimated surface water pumping from Colby Lake was also evaluated. The analysis uses the appropriation schedules and assumptions described in Section 5.3.1.

8.2.2.2 Consumptive Use Estimates

The estimated monthly consumptive use over time of water appropriated from the Mine Site, the Plant Site, and Colby Lake is shown on Figure 8-1. Refer to Appendix C for additional detail on the estimated monthly consumptive use for each of the Mine Site and Plant Site Individual Permits. Water appropriation for the Colby Lake permit and for the total of all Mine Site Individual Permits is estimated to be above the 2,000,000 gallon-per-day average threshold as set forth in Minnesota Statutes, section 103G.265; prompting further consumptive use analysis (Section 8.2.3). However, appropriations for each of these areas will be below the 5,000,000 gallon-per-day average threshold established in Minnesota Statutes, section 103G.265, subdivision 4.

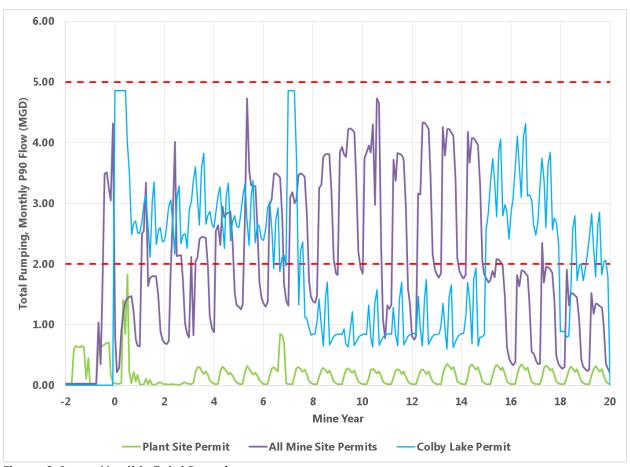


Figure 8-1 Monthly Total Pumping

The pattern of Mine Site consumptive use, shown on Figure 8-1, is primarily influenced by the following factors:

- Overburden stripping results in spikes in monthly appropriations during discrete stripping episodes that occur first during pre-operation construction, and continue through Mine Year 11.
- Construction dewatering for episodic expansion of the stockpile foundations and the Category 1
 Stockpile Groundwater Containment System also results in spikes in monthly appropriations.
- Operation of the Category 1 Stockpile Groundwater Containment System shows regular seasonal effects, with higher pumping rates in the summer than in the winter. Pumping rates are estimated to increase as the stockpile is expanded, then decrease when reclamation of the stockpile begins.
- The maximum 30-day average pumping rates are estimated to coincide with the final overburden stripping episodes for the West Pit.
- Collected precipitation and runoff (i.e., mine water) show regular seasonal effects, with higher pumping rates in the summer than in the winter.

The pattern of Plant Site consumptive use (Figure 8-1) shows the effects of construction dewatering for the FTB Seepage Containment System over two construction seasons during the pre-operation construction phase, and again in Mine Year 7 when the eastern segment of the system will be constructed, along with the seasonal pattern of precipitation collected in lined and concrete ponds.

The pattern of consumptive use from Colby Lake shows the largest withdrawals when PolyMet is filling the FTB Pond at the beginning of operations (in Mine Year 1) and again when FTB cells 1E and 2E merge and the pond expands (in Mine Year 7). Appropriations decline from approximately Mine Year 9 through Mine Year 15, when the pit dewatering rate is highest, so less make-up water is needed. When pit flooding takes place, in Mine Year 16 through Mine Year 20, the Colby Lake appropriation rate increases, to provide make-up water to the Plant Site, as described in Section 3.0.

Based on Figure 8-1, estimated consumptive use can be summarized as follows:

- Estimated consumptive use will not exceed 5 million gallons per day average over a 30-day period from the Mine Site, the Plant Site, or Colby Lake. Therefore, proposed appropriations will not trigger the Great Lakes Basin consumptive-use requirements of Minnesota Statutes, section 103G.265, subdivision 4.
- Estimated consumptive use from all installations at the Plant Site will not exceed 2 million gallons per day average over a 30-day period.
- Estimated consumptive use of appropriated water from the Mine Site and of surface water from Colby Lake will exceed 2 million gallons per day average over a 30-day period. Therefore, to inform the Commissioner's review of this application, PolyMet has provided information on the

adequacy of Lake Superior Basin water resources in accordance with Minnesota Statutes, section 103G.265.

8.2.3 Adequacy of Lake Superior Basin Water Resources

8.2.3.1 Description of Relevant Water Resources

The water resources of interest encompass the Great Lakes Basin as defined in Minnesota Statutes, section 103G.005. Within the Great Lakes Basin, the relevant water resources are those in the St. Louis River watershed, specifically in the Partridge River watershed and the Embarrass River watershed.

Surface water resources of the Partridge River watershed include the Partridge River and its tributaries, ten lakes larger than 10 acres, and numerous smaller water bodies (Reference (14)). Surface water resources of the Embarrass River watershed include the Embarrass River and its tributaries, 42 lakes larger than 10 acres, and numerous smaller water bodies (Reference (14)).

As shown on Large Figure 1, portions of the Project are within the city of Hoyt Lakes and the city of Babbitt municipal boundaries. The city of Hoyt Lakes draws their municipal water supply from Colby Lake, within the Partridge River watershed, and the city of Babbitt draws their municipal water supply from a glacial aquifer within neither the Partridge River nor the Embarrass River watersheds.

The cities of Aurora, Biwabik, Belgrade, and McKinley are also located within these watersheds. Aurora is within the Partridge River watershed and draws their municipal water supply from the St. James Pit. The cities of Biwabik, Belgrade, and McKinley are in the Embarrass River watershed. Biwabik and McKinley currently draw their municipal water supply from former mine pits: the Canton Pit and the Corsica Pit, respectively. Belgrade draws their municipal water supply from the glacial aquifer within the Embarrass River watershed.

Groundwater resources of the Partridge River watershed and the Embarrass River watershed are described in Section 8.1.

8.2.3.2 Project Effect on Great Lakes Basin Water Supply

The cumulative effect on surface water resources in the St. Louis River watershed of the Project and other uses were evaluated in the FEIS. This evaluation included the Project actions with the potential to affect surface water flow (watershed area changes, groundwater withdrawals, operation of the FTB seepage capture systems, stream augmentation, and surface water withdrawal from Colby Lake). It also included the effects of the other mining, municipal, and power facilities that withdraw or discharge surface water in the Partridge River and Embarrass River watersheds. The FEIS concluded that the net effect of hydrologic changes from the Project and other uses would be an increase in flow of between 3.6 and 7.8 cfs at the confluence with the St. Louis River, or about 7% of average annual flow (Section 6.2.2.3 of Reference (1)).

The Project is not expected to adversely affect groundwater supply in the Partridge River watershed or Embarrass River watershed, as described in Sections 8.1.1 and 8.1.4 above.

Given the minimal impacts to surface waters in the Partridge River and Embarrass River watersheds, the net effect of the Project, including estimated consumptive use of groundwater and surface water, is not expected to impact surface water supply in the Great Lakes Basin, and the water remaining will be adequate to meet the basin's water resources needs during the during the appropriation period of PolyMet's operation.

8.3 Other State and Local Plans

Minnesota Statutes, section 103G.271, subdivision 2 requires that appropriations must be consistent with state, regional, and local water and related land resources management plans. Compliance with other applicable water management plans is described in the following sections.

8.3.1 Minnesota Statewide Drought Plan

In 1990, Minnesota Statutes, section 103G.293 mandated that DNR establish a drought plan to minimize conflicts and negative impacts on Minnesota's natural resources and economy. DNR developed the Minnesota Statewide Drought Plan which provides the framework for preparing for and responding to droughts. This plan uses a staged approach to implementing drought response actions, and it is available at: http://files.dnr.state.mn.us/natural resources/climate/drought/drought_plan matrix.pdf.

This application includes detailed information that can assist the DNR in its in watershed management decisions implementing the Minnesota Statewide Drought Plan when necessary. In particular, Sections 4.3, 4.4, and 6.2 through 6.5 of Reference (5) and Sections 4.2 through 4.5, 6.3, and 6.5 through 6.7 of Reference (10) provide information related to Project water that may be relevant to drought response considerations.

8.3.2 St. Louis County Land Ordinance 27 and St. Louis County Comprehensive Water Management Plan

St. Louis County Land Ordinance 27 contains policies, statements, goals, and plans for private and public land and water use in St. Louis County. Section 21 of this Ordinance provides a management plan for the St. Louis, Cloquet, and Whiteface Corridors in which portions of the Project are located. The Ordinance includes standards for several aspects of development, including the following management requirements applicable to Project water appropriations:

- water supply
- extractive use standards general standards for sand and gravel or mineral mining
- geology and mineral resource management general standards for the location of surface disturbances associated with this development

In addition, the St. Louis County Comprehensive Water Management Plan (CWMP) provides analysis of water and related land resources coupled with a recommended series of strategies designed to achieve the County's water management goals (Reference (15)).

PolyMet will meet the requirements of St. Louis County Ordinance 27 and CWMP, to the extent they are applicable and are not superseded by State law, by complying with the DNR and MPCA requirements under the terms of the following permits to be issued for the Project:

- NPDES/SDS permits, including an individual permit and general stormwater permit coverage (MPCA) (regulating water quality)
- Permit to Mine (DNR) (regulating mineral mining)
- Individual Permits for water appropriation (DNR) (regulating water supply)

8.3.3 Local Water Resources Management Plans

Source Water Assessments for the cities of Babbitt, Aurora, and Hoyt Lakes are publically available from the Minnesota Department of Health. The primary purpose of these documents is to assess the susceptibility of each community's drinking water supply to contamination; however, they also provide information related to the local management of drinking water resources. A summary of drinking water supply management information for each city is provided below:

- The city of Hoyt Lakes currently obtains drinking water from Colby Lake, which is within the Partridge River watershed. The Inner Emergency Response Area, as documented on the city of Hoyt Lakes' Source Water Assessment (Reference (16)), is more than three miles from the Plant Site and seven miles from the Mine Site. The text of the Source Water Assessment states that the Outer Source Water Management Area "generally follows the boundary of the sub-watersheds for Colby and Whitewater Lakes." The boundary of this sub-watershed, as shown in the FEIS⁷, is located approximately one mile south of the Plant Site and more than five miles from the Mine Site. As described in Section 7.5.3, potential drawdown effects at the Plant Site are expected to be localized and minor in nature and potential drawdown effects from the Mine Site are not expected beyond 3,200 feet from the pit edge. Therefore, the Outer Source Water Management Area for Colby Lake is outside the area of expected drawdown effects related to the proposed water appropriation. Other effects from the Project on water levels in Colby and Whitewater Lakes, including the combined impact of changes in Partridge River flow and Project appropriations from Colby Lake, were assessed for the FEIS (Section 5.2.2 of Reference (1)), and are described in Section 7.5.1.
- The city of Babbitt currently obtains drinking water from wells completed in a glacial aquifer below the city. The source area for water entering these wells, encompassed within the Drinking Water Supply Management Area (Reference (17)), is located outside the Partridge River and Embarrass River watersheds and is approximately five miles northeast of the Mine Site. As

⁷ The boundaries of the sub-watershed for Colby and Whitewater Lakes as shown in the FEIS differ from the boundaries documented on the Source Water Assessment. The FEIS boundaries, which are more current than those in the November 2002 Source Water Assessment, are assumed to be more accurate.

- described in Section 8.1.4, the proposed water appropriations are not projected to interfere with public wells, including those located in the city of Babbitt.
- The city of Aurora currently obtains drinking water from the St. James Pit, which is located in the Partridge River watershed. The Source Water Assessment (Reference (18)) defines both an Inner Emergency Response Area, designed to help the city address contaminant releases which present an imminent (acute) health concern to water users, and an Outer Source Water Management Area designed to enable protection of water users from long-term (chronic) health effects related to low levels of chemical contamination or the periodic presence of contaminants at low levels in the surface water used by the city. The nearest boundary of the Outer Source Water Management Area is one mile from the Plant Site and more than seven miles from the Mine Site. As described in Section 7.5.3, potential drawdown effects at the Plant Site are expected to be localized and minor in nature, and potential drawdown effects from the Mine Site are not expected beyond 3,200 feet from the pit edge. Therefore, the Outer Source Water Management Area for the St. James Pit is outside the area of expected drawdown effects related to the proposed water appropriation.

9.0 Proposed Monitoring Plan

Monitoring in connection with water appropriations will measure flow rates and water levels to document appropriation rates and monitor potential effects of permitted dewatering. This section presents the proposed monitoring plan, including the proposed monitoring strategy, station locations and numbers, and frequency of water level monitoring and flow data collection. The contents of this proposed monitoring plan are subject to change prior to issuance of the water appropriation permits. Monitoring results will be reported to the State based on requirements in the relevant permits.

In addition to stations that will monitor the potential effects of permitted withdrawals, the water appropriation monitoring plan also includes stations that will monitor stream augmentation to evaluate potential hydrologic or ecological effects associated with decreased surface water flow in creeks downstream of the FTB seepage capture systems (Section 2.5 of Reference (3)).

The water appropriation monitoring plan includes four types of monitoring:

- Groundwater monitoring to identify the effects of permitted groundwater withdrawals on groundwater levels.
- Surface water monitoring to identify the effects of permitted groundwater withdrawals and associated discharges on surface water flow downstream of the Mine Site and the Plant Site.
- Appropriation source monitoring to document the volume of water withdrawn during operations by Project infrastructure (such as the mine pits, the Category 1 Stockpile Groundwater Containment System, and the Colby Lake Pumphouse).
- Stream augmentation monitoring to document the ecologic conditions in Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek, the amount of seepage collected by the FTB seepage capture systems, and the amount of water provided for stream augmentation.

The water appropriation monitoring plan is summarized in a series of figures and tables, as follows:

- Large Figure 9 through Large Figure 14 show the proposed monitoring stations for groundwater, surface water, appropriation sources, and stream augmentation.
- Large Table 2 through Large Table 5 describe the purpose, type, and frequency of monitoring, the proposed parameter groups to be monitored, and the proposed frequency and method of reporting.

Additional monitoring information on groundwater levels and surface water quality and flow will be collected under the NPDES/SDS permit. For reference, Large Figures E-1 through Large Figure E-5 are provided in Appendix E, which show the proposed monitoring stations for both the Project NPDES/SDS permit application and the water appropriation consolidated permit application.

- Large Figure E-1 and Large Figure E-2 show groundwater monitoring stations at the Mine Site and Plant Site, respectively.
- Large Figure E-3 shows surface water, stormwater, and stream augmentation monitoring locations across the Project.
- Large Figures E-4 and E-5 show internal monitoring locations at the Mine Site and Plant Site, respectively.

Information on the proposed monitoring for the water appropriation permits is described further in the following sections.

9.1 Groundwater Monitoring

Groundwater monitoring will measure the effects of permitted water appropriations on groundwater levels in the surficial aquifer and in bedrock at the Mine Site, as shown on Large Figure 10.

Large Table 2 lists the Mine Site groundwater monitoring stations and describes their location and purpose.

Effects of Plant Site groundwater withdrawals are expected to be localized; therefore, no groundwater monitoring at the Plant Site is proposed.

9.2 Surface Water Monitoring

Surface water monitoring will measure streamflow in the Partridge River and Embarrass River watersheds to assess potential changes associated with permitted withdrawals and stream augmentation. In addition, a reference surface water monitoring station will measure streamflow at a location in the Embarrass River watershed that will not be affected by the Project. At most stations, stream gages will continuously record flow rates. Stream gage locations were confirmed during field reconnaissance in August 2016 by DNR, PolyMet, and Barr. The field survey determined that no feasible location for permanent stream gaging exists on Trimble Creek due to a combination of channel morphology, culvert conditions unsuitable for gaging equipment at accessible locations, and extensive beaver activity. The field survey also identified no feasible location for permanent stream gaging on Bear Creek due to channel morphology and culvert conditions unsuitable for gaging equipment at accessible locations. It was determined that the DNR will take regular spot measurements on Trimble and Bear Creeks on a "4 to 6 week interval throughout the year, during the season of interest, or as needed during high flow conditions." The field survey determined that flow monitoring is not feasible along Unnamed Creek due to limited access and channel morphology heavily influenced by wetland vegetation and beaver activity, preventing accurate gage and spot measurements; therefore no surface water monitoring station will be established on this stream. Large Table 3 lists the surface water monitoring stations and describes their purpose and locations. The proposed surface water monitoring stations are shown on Large Figure 11.

9.3 Appropriation Source Monitoring

Appropriation source monitoring will measure flows from infrastructure that will withdraw groundwater and surface water, as well as water levels in the Mine Pits. The water level in Colby Lake is currently monitored by Minnesota Power under water appropriation permit #1949-0135. PolyMet does not anticipate that duplicative monitoring of the lake level is necessary for its Colby Lake appropriation permit. Should Minnesota Power discontinue Colby Lake water level monitoring, PolyMet is prepared to add Colby Lake water level monitoring to its appropriation source monitoring. PolyMet will monitor pumping rates from the Colby Lake Pumphouse to the Plant Reservoir via flow meters.

Large Table 4 lists the appropriation source monitoring stations and describes their purpose and location. The proposed appropriation source monitoring stations are shown on Large Figure 12 and Large Figure 13. Continuous flow monitoring will occur at these locations via flow meters. If underdrain systems are constructed at any of the temporary stockpiles, flow meters will be installed. If wick drains are used at the HRF, PolyMet will establish an appropriation source monitoring station to measure those flows.

Flows of precipitation and run-on collected in lined ponds (i.e., Equalization Basins, Construction Mine Water Basin, WWTS Basin, Sewage Treatment System ponds), concrete ponds (i.e., Plant Reservoir), and the HRF Pond will be estimated using water balance calculations, because it will not be practical to directly measure these flows. The amount of water appropriated will be estimated by subtracting the inflow (monitored) and change in storage (monitored as a function of water level) from the outflow (monitored).

9.4 Temporary Construction Dewatering Monitoring

The volume of water pumped from each temporary construction dewatering installation will be measured within 10% accuracy using industry standard methods appropriate to the specific installation, as required under Minnesota Rules, part 6115.0750, subpart 3(B). Temporary construction dewatering monitoring methods and locations will be described in annual reports for the year that the temporary dewatering occurs.

9.5 Stream Augmentation Monitoring

Stream augmentation monitoring is part of the Project's overall water appropriation monitoring to measure flow rates and water levels to evaluate potential effects of permitted withdrawals and stream augmentation. Stream augmentation implementation and monitoring must take into account the applicable regulatory context as well as technical considerations such as existing hydraulic conditions and uncertainties associated with those conditions. The following sections describe relevant considerations for implementing stream augmentation, present PolyMet's proposed monitoring approach, and describe proposed reporting and adaptive management that could be used, if needed.

9.5.1 Implementation Considerations

Because stream augmentation is subject to multiple regulations by state and federal agencies (as described in Sections 2.0, 3.3, and 3.4), implementation must account for a variety of applicable targets

and requirements. PolyMet's stream augmentation objective for Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek is to maintain average annual flow within ±20% of existing conditions (i.e., before Cliff Erie's implementation of short-term mitigation measures at the former LTVSMC tailings basin under its Consent Decree with MPCA) for purposes of maintaining hydrology and existing aquatic ecology (Section 5.2.2.3.3 of Reference (1)). These flow targets will be overseen by the DNR through conditions of the water appropriation permits for the Project. Flow quantity will also be subject to the requirements of the NSPS, overseen by the MPCA through conditions of the NPDES/SDS permit for the Project (Sections 2.0 and 3.4).

PolyMet's plans for stream augmentation take into account the existing hydraulic characteristics of Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek, although these existing conditions are subject to variability and uncertainty. These streams flow at very low velocity through wetlands with only intermittent channels, which results in low precision for stream gages. In addition, water levels are largely influenced by beaver activities (which frequently change in location and configuration), causing flow variability at any potential surface water monitoring station. Spot estimates of streamflow, made during biotic surveys (Table 9-1), demonstrate the flow variability in response to shortterm mitigation measures (seepage pumpback systems) under the Cliffs Erie Consent Decree, as well as variation due to other factors, such as beaver activity and precipitation. Seepage pumpback systems were installed in 2011. As shown in Table 9-1, between 2011 and 2015, flow decreased by approximately 1,500 gpm in Unnamed Creek at monitoring station PM-11/SW003 (Large Figure 14). Pumpback systems at existing tailings basin seeps that formerly flowed to Unnamed Creek (SD004 and SD006) account for approximately only 500 gpm of the decrease, illustrating the substantial variability caused by factors which are not related to seepage flow, such as beaver activity, variations in precipitation and possibly others. These data demonstrate that streamflow alone is an insufficient metric to evaluate the performance of stream augmentation.

Table 9-1 Streamflow Data Collected During Biotic Surveys (gpm)

Sampling Date	Unnamed (Mud Lake) Creek (MLC-2)	Trimble Creek (PM- 19)	Unnamed Creek (PM-11)	Second Creek (0.2 miles downstream of SD026)
9/16/2010		1,185	1,135	454
6/2/2011		1,693	1,550	399
7/26/2011			1	
6/17/2015(2)	135	157	54	0 ⁽¹⁾
9/16/2015(2)				0(1)

Notes:

Data from Reference (19)

- -- No flow estimate made this date
- (1) Flow estimates of 0 gpm are recorded when water at the monitoring point is impounded, and there is no measurable flow.
- (2) Seepage pumpback systems were installed in 2011, which accounts for a reduction in flows to downstream waterbodies.

PolyMet will be able to reduce the current uncertainties regarding existing hydraulic characteristics of the creek described above by collecting approximately 2 years of monitoring data before the FTB Seepage Containment System begins operating and stream augmentation commences. Also, seepage flow is relatively constant year-round, with precipitation effects added onto the constant seepage flow. Existing seepage flow rates to the watershed of each creek were estimated during environmental review using the Project Plant Site MODFLOW model. Once the FTB seepage capture systems are in place, monitoring data will indicate with greater precision the seepage volume to the subwatershed for each creek (the amount of water that needs to be replaced by stream augmentation).

Because of the considerations outlined above, streamflow data alone should not be used to assess Project performance relative to the goal of maintaining average annual flows within ±20% of existing conditions. Therefore, PolyMet proposes to implement stream augmentation using the following management principles:

- The total discharge from the WWTS will not exceed the NSPS limit, as specified in the NPDES/SDS Permit.
- Flow from the WWTS will be distributed to headwater areas of Trimble Creek, Unnamed Creek, and Second Creek in proportion to the amount of seepage captured from their respective subwatersheds. Continuous flow monitors will measure the amount of seepage collected by the seepage capture systems from each watershed.
- Flow to Unnamed (Mud Lake) Creek through the drainage swale will be monitored. The flow rate
 will be a function of net precipitation and runoff over the modified sub-watershed area tributary
 to the swale
- Stream augmentation flows may be adjusted during Project operations based on hydrologic and biologic monitoring results. Potential adaptive management of stream augmentation flows will consider the results of monitoring conducted under the water appropriation permits, the wetland permits, and the NPDES/SDS Permit for the Project.

9.5.2 Monitoring Approach

Based on the management principles described in Section 9.5.1, three types of monitoring are proposed for stream augmentation monitoring:

- Macroinvertebrate monitoring will document the characteristics of the biotic community in a channelized portion of each creek. It will be conducted once a year, following MPCArecommended protocol. Proposed monitoring locations coincide with baseline monitoring locations but may need to be adjusted, year-to-year, due to beaver activity and other stream characteristics.
- Seepage flow monitoring will record the amount of water collected by the FTB seepage capture systems from the headwater area of each creek. Flow will be measured at appropriate locations in

the return piping system. Continuous flow monitoring will occur at each of these stations via flow meters.

 Augmentation flow monitoring will record the amount of water the Project delivers to the headwater area of each creek. Augmentation flows to Trimble Creek, Unnamed Creek, and Second Creek will be measured at the WWTS splitter structure via flow meters. Augmentation flow to Unnamed (Mud Lake) Creek will be measured at the outlet of the drainage swale.

Large Table 5 lists the appropriation source monitoring stations and describes their purpose and location. The proposed stream augmentation monitoring stations are shown on Large Figure 14. Proposed locations may be refined during permitting, and final locations will be determined based on final engineering.

9.5.3 Reporting and Adaptive Management

PolyMet will submit annual water appropriation reports to the DNR in accordance with permit conditions. The annual report will include the results of the monitoring conducted under the water appropriation permits, including the stream augmentation monitoring. The annual report will assess streamflow in Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek, and compare the volume of seepage captured to the volume of water discharged to Trimble Creek, Unnamed Creek, and Second Creek and routed through the Unnamed (Mud Lake) Creek drainage swale. The annual report will also include macroinvertebrate monitoring results. If results over a multi-year period suggest that hydrologic or in-stream biologic conditions are changing, PolyMet will assess root causes and evaluate potential solutions.

Results of water appropriation monitoring may also be used to adjust augmentation flow rates. Augmentation flows may be adaptively managed to improve stream augmentation performance using information gathered during operations about seepage flow rates and the hydrologic and biologic conditions in the creeks.

10.0 References

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Large Tables

Large Table 1 Pumping Estimation Methods and Assumptions

Flow Source	Individual Permit	Installations	Estimate Methods and Key Assumptions	Uncertainty Factor	Rationale for uncertainty factor	
Pit groundwater	East Pit Central Pit West Pit	East Pit Central Pit West Pit	MODFLOW results with an uncertainty factor applied in GoldSim (GoldSim P90 = 1.3x MODFLOW)		GoldSim includes uncertainty, P90 used	
Net precipitation onto pits ⁽¹⁾	East Pit Central Pit West Pit	East Pit Central Pit West Pit	GoldSim results including precipitation variability (P90 snowmelt is approximately 8.1-inches (in) over one month)		GoldSim includes uncertainty, P90 used	
Water collected by Category 1 Stockpile Groundwater Containment System ⁽¹⁾	Mine Site Infrastructure	Category 1 Stockpile Groundwater Containment System (operation)	GoldSim results including precipitation variability (P90 monthly precipitation is approximately 4.9-in)	1.0	GoldSim includes uncertainty, P90 used	
	East Pit	East Pit (overburden stripping)				
	Central Pit	Central Pit (overburden stripping)				
	West Pit	West Pit (overburden stripping)				
Mine Site construction dewatering (initial porewater)	Mine Site Infrastructure	Ore Surge Pile construction Construction of new buildings Mine water pond construction Stormwater pond construction Category 4 Waste Rock Stockpile construction Category 2/3 Waste Rock Stockpile construction Category 1 Waste Rock Stockpile construction Category 1 Stockpile Groundwater Containment System construction	Depth of excavation from 8-ft to 20-ft Depth to water table from 0-ft to 5-ft Porosity of mineral soils 47% Porosity of peat 89% Assumed 50% of pore water dewatered, remainder excavated with soil	1.5	50% increase to reflect uncertainty in pore water dewatering	
	East Pit	East Pit (overburden stripping)				
	Central Pit	Central Pit (overburden stripping)				
	West Pit	West Pit (overburden stripping)				
Mine Site construction dewatering (groundwater inflows)	Mine Site Infrastructure	Ore Surge Pile construction Construction of new buildings Mine water pond construction Stormwater pond construction Category 4 Waste Rock Stockpile construction Category 2/3 Waste Rock Stockpile construction Category 1 Waste Rock Stockpile construction Category 1 Stockpile Groundwater Containment System construction	Inflow to excavations from surficial aquifer and bedrock is estimated based on Reference (18) Estimated surficial aquifer hydraulic conductivity (the primary sensitive parameter) is 2.9 ft/day, which is within the central portion of the range of values resulting from the calibration of the Mine Site MODFLOW model (Reference (4))	6.0	The maximum surficial aquifer hydraulic conductivity used in GoldSim modeling near the pits is approximately 18 ft/day, resulting in an estimated high-end inflow approximately 6 times higher	

Flow Source	Individual Permit	Installations	Estimate Methods and Key Assumptions	Uncertainty Factor	Rationale for uncertainty factor	
	East Pit	East Pit (overburden stripping)				
	Central Pit	Central Pit (overburden stripping)				
Min City of the second	West Pit	West Pit (overburden stripping)	3.2-in. All runoff from constructed lined facilities included prior to beginning of operations. Rock Stockpile construction te Rock Stockpile construction		Results in runoff similar to the GoldSim peak	
Mine Site excavation runoff	Mine Site Infrastructure	Ore Surge Pile construction Category 4 Waste Rock Stockpile construction Category 2/3 Waste Rock Stockpile construction Category 1 Waste Rock Stockpile construction			P90 used for the precipitation on the Category 1 Waste Rock Stockpile	
Stockpile foundation underdrains (if needed)	Mine Site Infrastructure	Category 2/3 Waste Rock Stockpile underdrains, if needed Category 4 Waste Rock Stockpile underdrains, if needed Ore Surge Pile underdrains, if needed	Inflow from soil compression based on consolidation theory and laboratory consolidation tests, with depth to bedrock from 14-ft to 26-ft and stockpile height from 40-ft to 145-ft (Reference (19))	6.0	Consistent with excavation groundwater uncertainty	
Runoff collected from compacted features ⁽¹⁾	Mine Site Infrastructure	Haul Roads, OSLA and RTH collected runoff	GoldSim results including precipitation variability (P90 snowmelt is approximately 8.1-inches (in) over one month)	1.0	GoldSim includes uncertainty, P90 used	
Net precipitation collected in lined features ⁽¹⁾	Mine Site Infrastructure	Category 2/3 Waste Rock Stockpile liner mine water drainage Category 4 Waste Rock Stockpile liner mine water drainage Ore Surge Pile liner mine water drainage	GoldSim results including precipitation variability (P90 snowmelt is approximately 8.1-inches (in) over one month)	1.0	GoldSim includes uncertainty, P90 used	
reatures		Equalization basins Mine water ponds (Haul roads, OSLA, RTH) Stockpile sumps and overflow ponds	Monthly net precipitation estimated using P90 annual precipitation (34.8-in) and P10 annual evaporation (19.1-in) and monthly distributions from GoldSim modeling (Reference (5)).		Consistent with Mine Site construction dewatering uncertainty	
Plant Site standing water in wetlands	Plant Site Infrastructure	Flotation Tailings Basin (FTB) Seepage Containment System construction	Wetlands assumed to represent 50% to 75% of construction footprint	2.0	100% increase to reflect uncertainty in depth of water to drain	
5		Hydrometallurgical Residue Facility (HRF) construction	Wetlands assumed to contain 2-ft of standing water			
Plant Site excavation runoff	Plant Site Infrastructure	FTB Seepage Containment System construction HRF construction seepage collection	Total direct precipitation and runoff assumed to equal 5 times the average monthly direct precipitation from GoldSim inputs	1.0	Conservatism included in runoff assumption	
FTB Seepage Containment System construction dewatering (initial porewater)	Plant Site Infrastructure	FTB Seepage Containment System construction	Assumed 5 gpm per linear foot of excavation for initial dewatering	3.0	100% increase from Mine Site construction dewatering of initial porewater uncertainty due to uncertain soils	
Plant Site construction dewatering	Digat Cita Infractoristi va	FTB Seepage Containment System construction	Assumed 0.087 gpm per linear foot of excavation for steady groundwater inflows	6.0	Consistent with Mine Site excavation	
(groundwater inflows)	Plant Site Infrastructure	HRF construction	Assumed 0.05 gpm per linear foot of excavation due to shallow nature of system	6.0	groundwater uncertainty	
Plant Site construction dewatering	Plant Site Infrastructure	Colby Lake pipeline upgrades	Assumed 200 gpm continuous dewatering during construction in Muskeg soils	1.5	Consistent with Mine Site construction	
	Fiant Site Infrastructure	Sewage Treatment System construction	Assumed 50 gpm continuous dewatering during construction of sewage sump		dewatering uncertainty	

Flow Source	Individual Permit	Individual Permit Installations Estimate Methods and Key Assumptions		Uncertainty Factor	Rationale for uncertainty factor
HRF wick drains	Plant Site Infrastructure	Assumed porosity of 50% Volume of water removed during liner pre-loading estimated based on subgrade deflection estimates Volume during operations estimated based on stockpile foundation underdrain rates		2.0	100% increase to reflect uncertainty in pore water dewatering
Net precipitation onto HRF	nto HRF Plant Site Infrastructure HRF liner variability		GoldSim results including precipitation, evaporation, and runoff variability (P90 snowmelt is approximately 8.1-inches (in) over one month)	1.0	GoldSim includes uncertainty, P90 used
Net precipitation collected in lined features	Plant Site Infrastructure	WWTS Basin Monthly net precipitation estimated using P90 annual precipitation (34.8-in) and P10 annual evaporation (19.1-in) and monthly distributions from GoldSim modeling (Reference (10)).		1.5	Consistent with Mine Site construction dewatering uncertainty
Colby Lake	Colby Lake	Colby Lake	GoldSim results including variability in Plant Site demand		GoldSim includes uncertainty, P90 used

⁽¹⁾ Maximum daily pumping rates estimated based on the design pump capacity (Section 5.3.1.3)

Large Table 2 Water Appropriation Monitoring: Groundwater

Existing Station ID	Proposed Appropriation Station ID	Bedrock or Surficial Aquifer	Description	Monitoring Type	Parameter Group(s)	Frequency	Reporting	Overlapping Monitoring
MW-2	GW402	Surficial Aquifer	Monitors groundwater downgradient from the West Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-3	GW403	Surficial Aquifer	Monitors groundwater downgradient from the Category 2/3 Waste Rock Stockpile and the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-7	GW407	Surficial Aquifer	Monitors groundwater downgradient from the Ore Surge Pile, the Category 2/3 Waste Rock Stockpile and the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-8S	GW408	Surficial Aquifer	Monitors groundwater south of the Category 1 Stockpile Groundwater Containment System and southwest of the West Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-10S	GW409	Surficial Aquifer	Monitors groundwater downgradient of the Equalization Basin Area, Overburden Storage and Laydown Area (OSLA), Category 4 Waste Rock Stockpile, and the Central Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-12	GW412	Surficial Aquifer	Monitors groundwater northeast of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-14	GW414	Surficial Aquifer	Monitors groundwater west of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-15	GW415	Surficial Aquifer	Monitors groundwater north of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-16	GW416	Surficial Aquifer	Monitors groundwater downgradient from the West Pit and the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-17	GW417	Surficial Aquifer	Monitors groundwater downgradient from the Category 2/3 Waste Rock Stockpile	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
MW-18	GW418	Surficial Aquifer	Monitors groundwater downgradient from the Category 1 Waste Rock Stockpile and west of the West Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
GWM001	GW419	Surficial Aquifer	Monitors groundwater downgradient of the Category 4 Waste Rock Stockpile and the Central Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW430	Surficial Aquifer	Monitors groundwater downgradient from the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	
(New Station)	GW468	Surficial Aquifer	Monitors groundwater between the West Pit and the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW470	Surficial Aquifer	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW471	Surficial Aquifer	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW472	Surficial Aquifer	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW473	Surficial Aquifer	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW478	Surficial Aquifer	Monitors groundwater north of the West Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW479	Surficial Aquifer	Monitors groundwater north of the West Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS

Existing Station ID	Proposed Appropriation Station ID	Bedrock or Surficial Aquifer	Description	Monitoring Type	Parameter Group(s)	Frequency	Reporting	Overlapping Monitoring
(New Station)	GW499	Surficial Aquifer	Monitors groundwater north of the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW501	Bedrock	Monitors groundwater southeast of the Category 2/3 Waste Rock Stockpile and the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW502	Bedrock	Monitors groundwater downgradient from the West Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
OB-4	GW504	Bedrock	Monitors groundwater adjacent to and north of the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
OB-5	GW505	Bedrock	Monitors groundwater adjacent to and northeast of the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW506	Bedrock	Monitors groundwater southeast of the Category 2/3 Waste Rock Stockpile and the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
OB-1	GW507	Bedrock	Monitors groundwater between the West Pit and the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW508	Bedrock	Monitors groundwater between the West Pit and the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW509	Bedrock	Monitors groundwater north of the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW510	Bedrock	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW512	Bedrock	Monitors groundwater northeast of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW514	Bedrock	Monitors groundwater west of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW515	Bedrock	Monitors groundwater north of the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW516	Bedrock	Monitors groundwater downgradient from the West Pit and the Category 1 Stockpile Groundwater Containment System	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW518	Bedrock	Monitors groundwater north of the West Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW519	Bedrock	Monitors groundwater north of the West Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
New Station)	GW521	Bedrock	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
New Station)	GW522	Bedrock	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
New Station)	GW523	Bedrock	Monitors groundwater north of the East Pit, north of the Mine Site boundary	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW524	Bedrock	Monitors groundwater downgradient of the Equalization Basin Area, Overburden Storage and Laydown Area (OSLA), Category 4 Waste Rock Stockpile, and Central Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW525	Bedrock	Monitors groundwater downgradient of the Category 4 Waste Rock Stockpile and the Central Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	NPDES/SDS
(New Station)	GW530	Bedrock	Monitors groundwater downgradient from the East Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	
(New Station)	GW531	Bedrock	Monitors groundwater adjacent to the Category 2/3 Waste Rock Stockpile	Appropriation	Water Levels	Monthly; Year-round	Annual Report	
(New Station)	GW532	Bedrock	Monitors groundwater adjacent to the West Pit	Appropriation	Water Levels	Monthly; Year-round	Annual Report	

Large Table 3 Water Appropriation Monitoring: Surface Water

Water Body	Existing Station ID	Proposed Appropriation Station ID	tion Description Monitoring Type Parameter Group(s)		Frequency	Reporting	Overlapping Monitoring	
Embarrass River	PM-13 / SW005	SW005	Monitors Embarrass River downstream of the Plant Site	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Embarrass River	(New Station)	SW041	Monitors Embarrass River upstream of the Plant Site	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Unnamed (Mud Lake) Creek	(New Station)	SW042	Monitors Unnamed (Mud Lake) Creek	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Embarrass River	(New Station)	SW043	Monitors Embarrass River downstream of the Plant Site. This is the location of the historical USGS gage 04017000	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Second Creek	(New Station)	SW044	Monitors Second Creek	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Trimble Creek	(New Station)	SW045	Monitors Trimble Creek in a channelized location	Appropriation	Regular Flow Monitoring	Regular flow monitoring; Year- round	Annual Report	
Bear Creek	(New Station)	SW046	Monitors Bear Creek in a channelized location	Appropriation	Regular Flow Monitoring	Regular flow monitoring; Year- round	Annual Report	
Partridge River	(New Station)	SW430	Monitors Partridge River upstream of the Mine Site	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Partridge River	By Teck	By Teck	Monitors Partridge River upstream of the confluence with Stubble Creek (data collected by Teck American Incorporated (Teck) and reported in PolyMet's annual report)	Appropriation	By Teck	By Teck	Annual Report	
Partridge River	(New Station)	SW431	Monitors Partridge River downstream of the confluence with the South Branch of the Partridge River and downstream of the Mine Site	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
South Branch of Partridge River	(New Station)	SW432	Monitors South Branch of Partridge River	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	

Large Table 4 Water Appropriation Monitoring: Appropriation Sources

Appropriation Source	Existing Station ID	Proposed Appropriation Station ID	Description	Monitoring Type	Parameter Group(s)	Frequency	Reporting	Overlapping Monitoring
East Pit		WS401	Monitors flow from East Pit dewatering and water level in the East Pit	Appropriation	Continuous Flow Monitoring Water level	Continuous flow monitoring; Year-round Water level; monthly year-round	Annual Report	NPDES/SDS
West Pit		WS402	Monitors flow from West Pit dewatering and water level in the West Pit	Appropriation	Continuous Flow Monitoring Water level	Continuous flow monitoring; Year-round Water level; monthly year-round	Annual Report	NPDES/SDS
West Pit		WS403	Monitors flow from West Pit dewatering and water level in the West Pit	Appropriation	Continuous Flow Monitoring Water level	Continuous flow monitoring; Year-round Water level; monthly year-round	Annual Report	NPDES/SDS
Central Pit		WS404	Monitors flow from Central Pit dewatering and water level in the Central Pit	Appropriation	Continuous Flow Monitoring Water level	Continuous flow monitoring; Year-round Water level; monthly year-round	Annual Report	NPDES/SDS
Category 1 Stockpile Groundwater Containment System		WS411	Monitors flow from the Category 1 Stockpile Groundwater Containment System sump	Appropriation 1 Continuous Flow Monitoring 1 Continuous flow monitoring year-roung 1 Ann		Annual Report	NPDES/SDS	
Category 1 Stockpile Groundwater Containment System		WS412	Monitors flow from the Category 1 Stockpile Groundwater Containment ystem sump Continuous Flow Monitoring Continuous flow monitoring; Year-round Appropriation		Annual Report	NPDES/SDS		
OSLA		WS413	Monitors flow from the OLSA Pond	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Construction Mine Water		WS414	Monitors flow from the Construction Mine Water Basin that goes to the Flotation Tailings Basin via the Construction Mine Water Pipeline	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Low Concentration Mine Water		WS415	Monitors flow from the Low Concentration Equalization Basins that goes to the WWTS via the Low Concentration Pipeline	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
High Concentration Mine Water		WS416	Monitors flow from the High Concentration Equalization Basin that goes to the WWTS via the High Concentration Pipeline	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 2/3 Waste Rock Stockpile mine water drainage		WS421	Monitors flow collected on the Category 2/3 Waste Rock Stockpile liner	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 2/3 Waste Rock Stockpile mine water drainage		WS422	Monitors flow collected on the Category 2/3 Waste Rock Stockpile liner	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 2/3 Waste Rock Stockpile mine water drainage		WS423	Monitors flow collected on the Category 2/3 Waste Rock Stockpile liner	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 4 Waste Rock Stockpile mine water drainage		WS424	Monitors flow collected on the Category 4 Waste Rock Stockpile liner	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Ore Surge Pile mine water drainage		WS425	Monitors flow collected on the Ore Surge Pile liner	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Construction mine water and OSLA runoff		WS441	Monitors flow into the Construction Mine Water Basin	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	

Appropriation Source	Existing Station ID	Proposed Appropriation Station ID	Description Monitoring Type Parameter Group(s) Frequence		Frequency	Reporting	Overlapping Monitoring	
Low Concentration Mine Water		WS442	Monitors flow into Low Concentration Equalization Basin 1	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Low Concentration Mine Water		WS443	Monitors flow into Low Concentration Equalization Basin 2	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
High Concentration Mine Water		WS444	Monitors flow into the High Concentration Equalization Basin	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Category 2/3 Waste Rock Stockpile Underdrain		GW491	Monitors flow from the Category 2/3 Stockpile underdrain system (if underdrain is installed)	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 2/3 Waste Rock Stockpile Underdrain		GW492	Monitors flow from the Category 2/3 Stockpile underdrain system (if underdrain is installed)	Appropriation I (optibility Flow) Michigary 1 (optibility Flow) Mi		Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Category 2/3 Waste Rock Stockpile Underdrain		GW493	Monitors flow from the Category 2/3 Stockpile underdrain system (if inderdrain is installed) Appropriation Continuous Flow Monitoring Continuous flow monitoring; Year-round		Annual Report	NPDES/SDS		
Category 4 Waste Rock Stockpile Underdrain		GW494	Monitors flow from the Category 4 Stockpile underdrain system (if underdrain is installed)	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Ore Surge Pile Underdrain		GW495	Monitors flow from the Ore Surge Pile underdrain system (if underdrain is installed)	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	NPDES/SDS
Hydrometallurgical Residue Facility (HRF) Wick Drain	_	GW496	Monitors flow from the HRF wick drain system (if installed)	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
HRF Pond		WS004	Monitors precipitation collected in the HRF Pond	Appropriation	Continuous Flow Monitoring; Water level monitoring	Continuous flow monitoring; Year-round Water level; Daily year-round	Annual Report	NPDES/SDS
Sewage Treatment System Ponds		WS009	Monitors precipitation collected in the Sewage Treatment System ponds	Appropriation	Continuous Flow Monitoring Water level monitoring	Inflow; Year-round. Outflow; During discharge periods Water level; Daily year-round	Annual Report	NPDES/SDS
WWTS Basin		WS051	Monitors precipitation collected in the WWTS	Appropriation	Continuous Flow Monitoring Water level monitoring	Continuous flow monitoring; Year-round Water level; Daily year-round	Annual Report	NPDES/SDS
Plant Reservoir		WS031	Monitors precipitation collected in the Plant Reservoir	Appropriation	Water level monitoring	Water level; Daily year-round	Annual Report	
Colby Lake		SW047	Monitors the flow from Colby Lake	Appropriation	Continuous Flow Monitoring	Continuous flow monitoring; Year-round	Annual Report	
Colby Lake	By Minnesota Power	By Minnesota Power	Colby Lake water level (data collected by Minnesota Power and reported in PolyMet's annual report)	Appropriation	By Minnesota Power	By Minnesota Power	Annual Report	

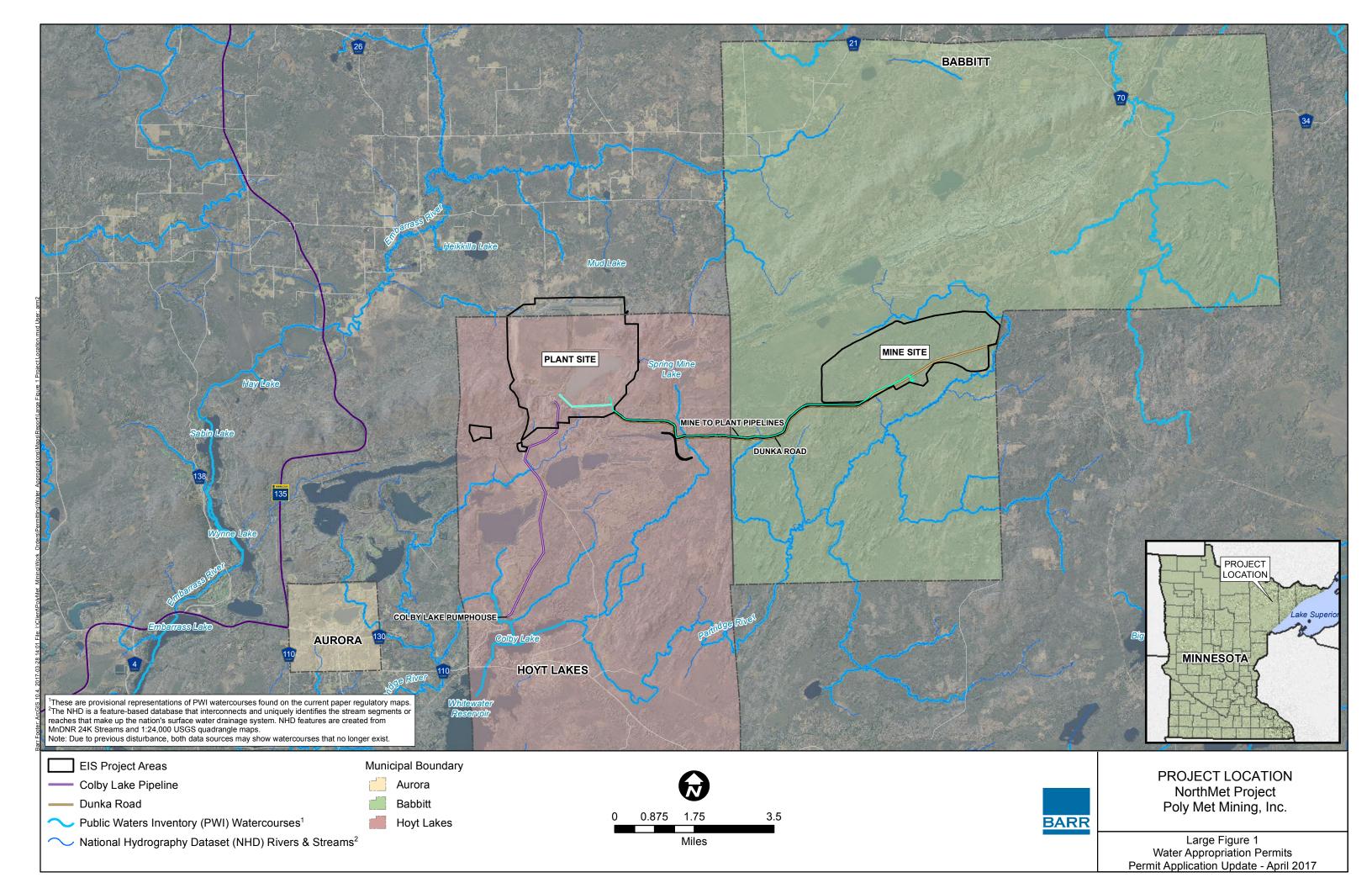
Note: Temporary construction dewatering installations will be measured within 10% accuracy using industry standard methods appropriate to the specific installation.

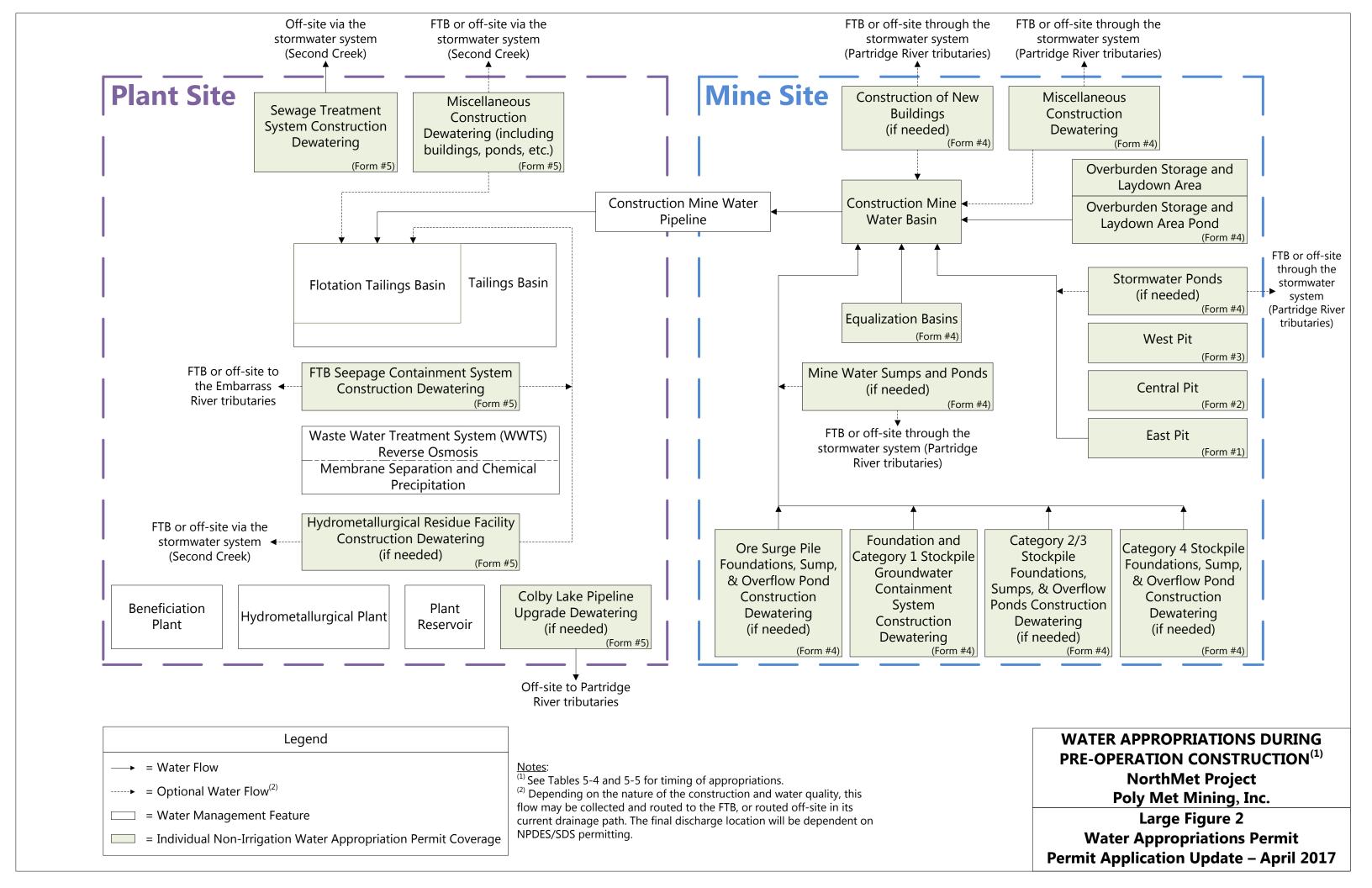
Large Table 5 Water Appropriation Monitoring: Stream Augmentation Monitoring

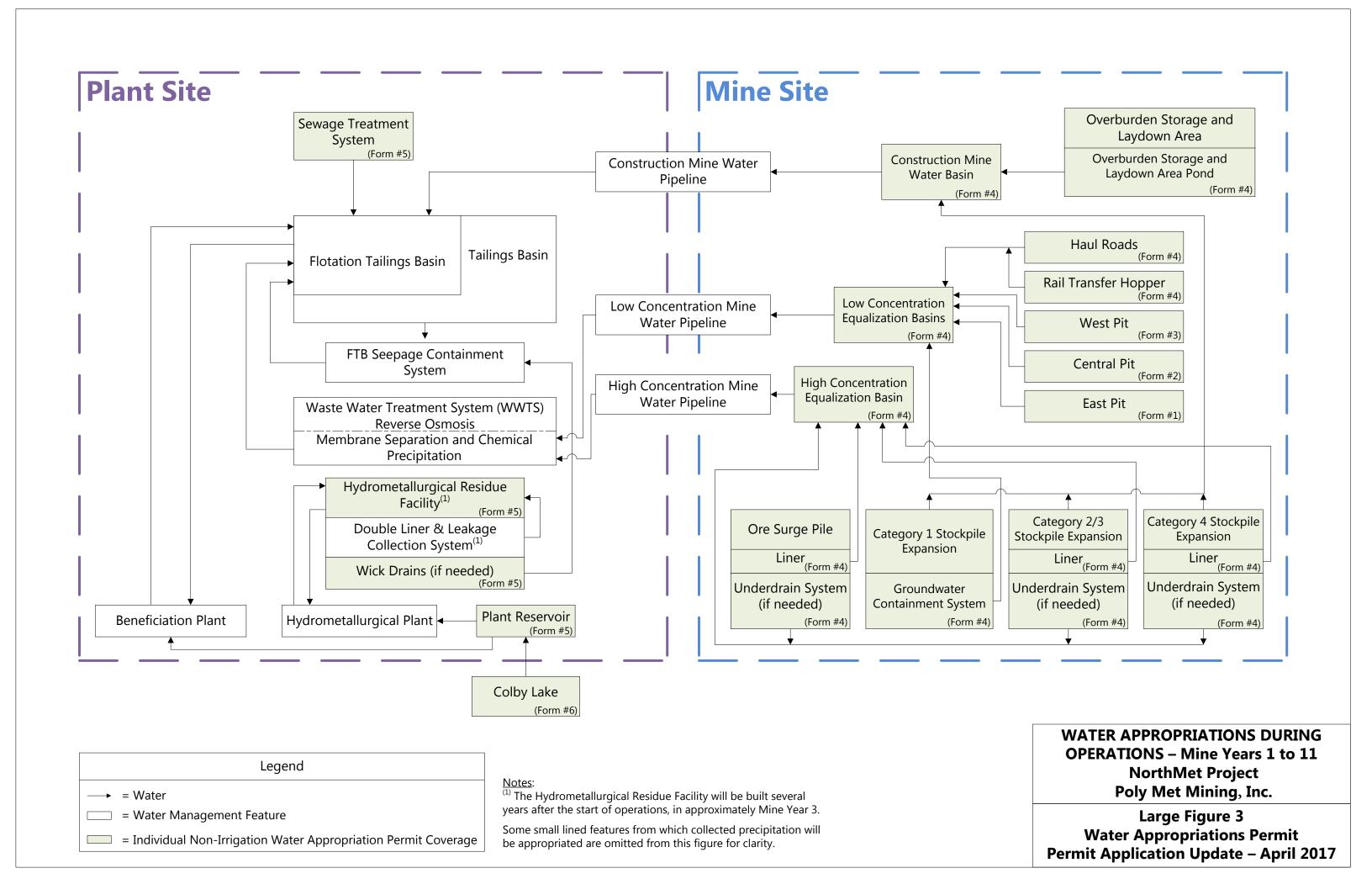
Water Body	Existing Station ID	Proposed Appropriation Station ID	Description	Monitoring Type	Parameter Group(s)	Frequency of Monitoring	Frequency of Reporting	Overlapping Monitoring
Seepage Flow Me	onitoring							
Second Creek	(New Station)	WS003	Monitors amount of seepage extracted from Second Creek watershed	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Unnamed (Mud Lake) Creek	(New Station)	WS006	Monitors amount of seepage extracted from Unnamed (Mud Lake) Creek watershed	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	
Trimble Creek	(New Station)	WS007	Monitors amount of seepage extracted from Trimble Creek watershed	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	
Unnamed Creek	(New Station)	WS008	Monitors amount of seepage extracted from Unnamed Creek watershed	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	
Augmentation Fl	low Monitoring							
Unnamed Creek	(New Station)	SD002	Monitors Waste Water Treatment System (WWTS) discharge flow to headwater wetlands of Unnamed Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Unnamed Creek	(New Station)	SD003	Monitors WWTS discharge flow to headwater wetlands of Unnamed Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD004	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD005	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD006	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD007	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD008	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD009	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Trimble Creek	(New Station)	SD010	Monitors WWTS discharge flow to headwater wetlands of Trimble Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Second Creek	(New Station)	SD011	Monitors WWTS discharge flow to Second Creek for stream augmentation. Monitoring point is at the WWTS or applicable splitter structure.	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	NPDES/SDS
Unnamed (Mud Lake) Creek	(New Station)	SW050	Monitors flow from drainage swale to headwaters area of Unnamed (Mud Lake) Creek	Stream Augmentation	Continuous Flow Monitoring	Year-round	Annual Report	

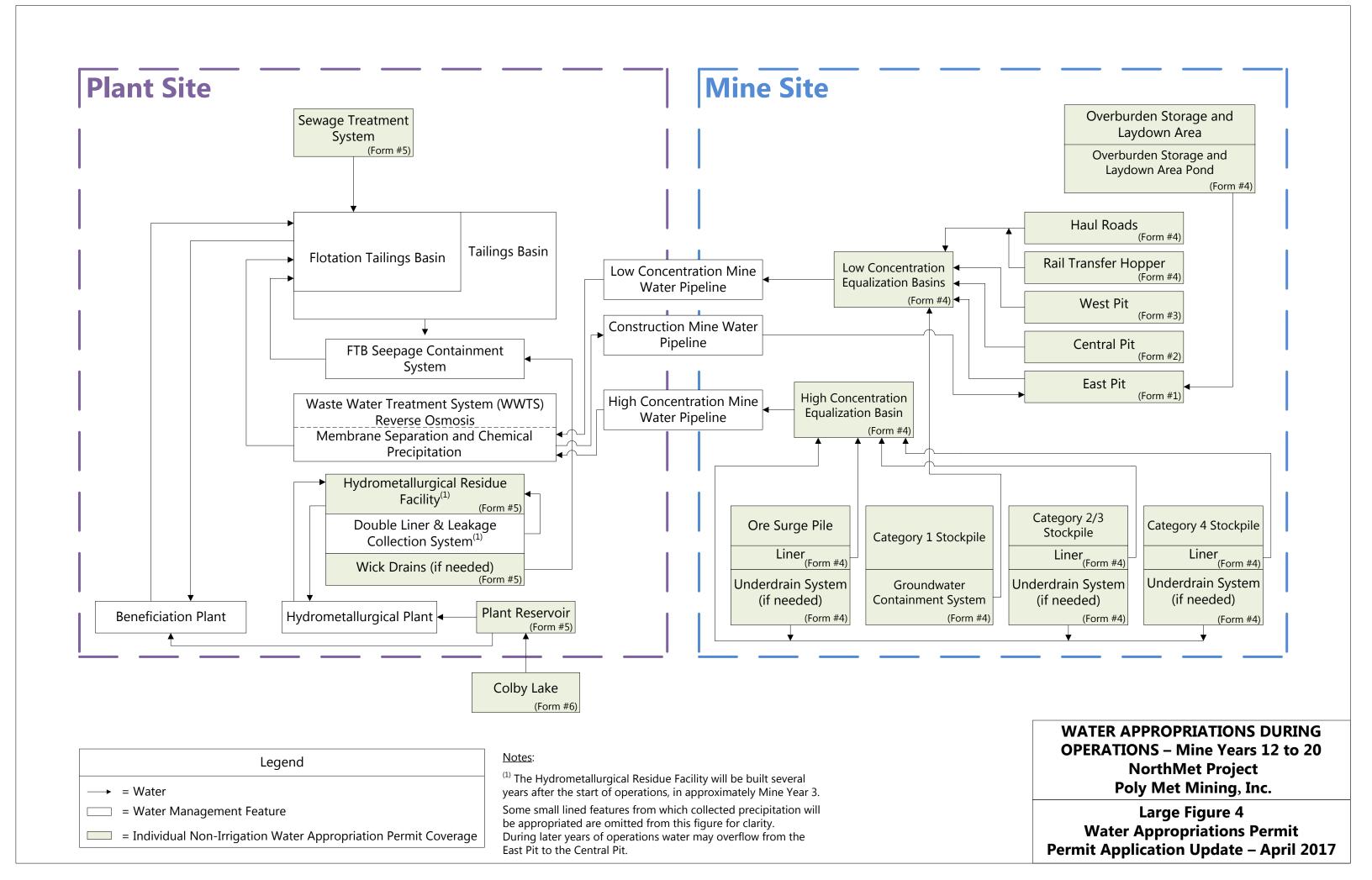
Water Body	Existing Station ID	Proposed Appropriation Station ID	Description	Monitoring Type	Parameter Group(s)	Frequency of Monitoring	Frequency of Reporting	Overlapping Monitoring
Macroinvertebra	te Monitoring							
Unnamed Creek	PM-11 / SW003	SW003	Monitors Unnamed Creek in a channelized location, downstream of surface water discharge	Stream Augmentation	Macroinvertebrate Survey	Annually	Annual Report	NPDES/SDS
Bear Creek	(New Station)	SW009	Monitors Bear Creek as an off-site reference point that is not affected by the Project	Stream Augmentation	Macroinvertebrate Survey	Annually	Annual Report	NPDES/SDS
Second Creek	PM-7 / SD026	SW020	Monitors Second Creek in a channelized location, downstream of surface water discharge	Stream Augmentation	Macroinvertebrate Survey	Annually	Annual Report	NPDES/SDS
Unnamed (Mud Lake) Creek	MLC-2	SW048	Monitors Unnamed (Mud Lake) Creek in a channelized location, downstream of the drainage swale	Stream Augmentation	Macroinvertebrate Survey	Annually	Annual Report	NPDES/SDS
Trimble Creek	PM-19	SW049	Monitors Trimble Creek in a channelized location, downstream of surface water discharge	Stream Augmentation	Macroinvertebrate Survey	Annually	Annual Report	NPDES/SDS

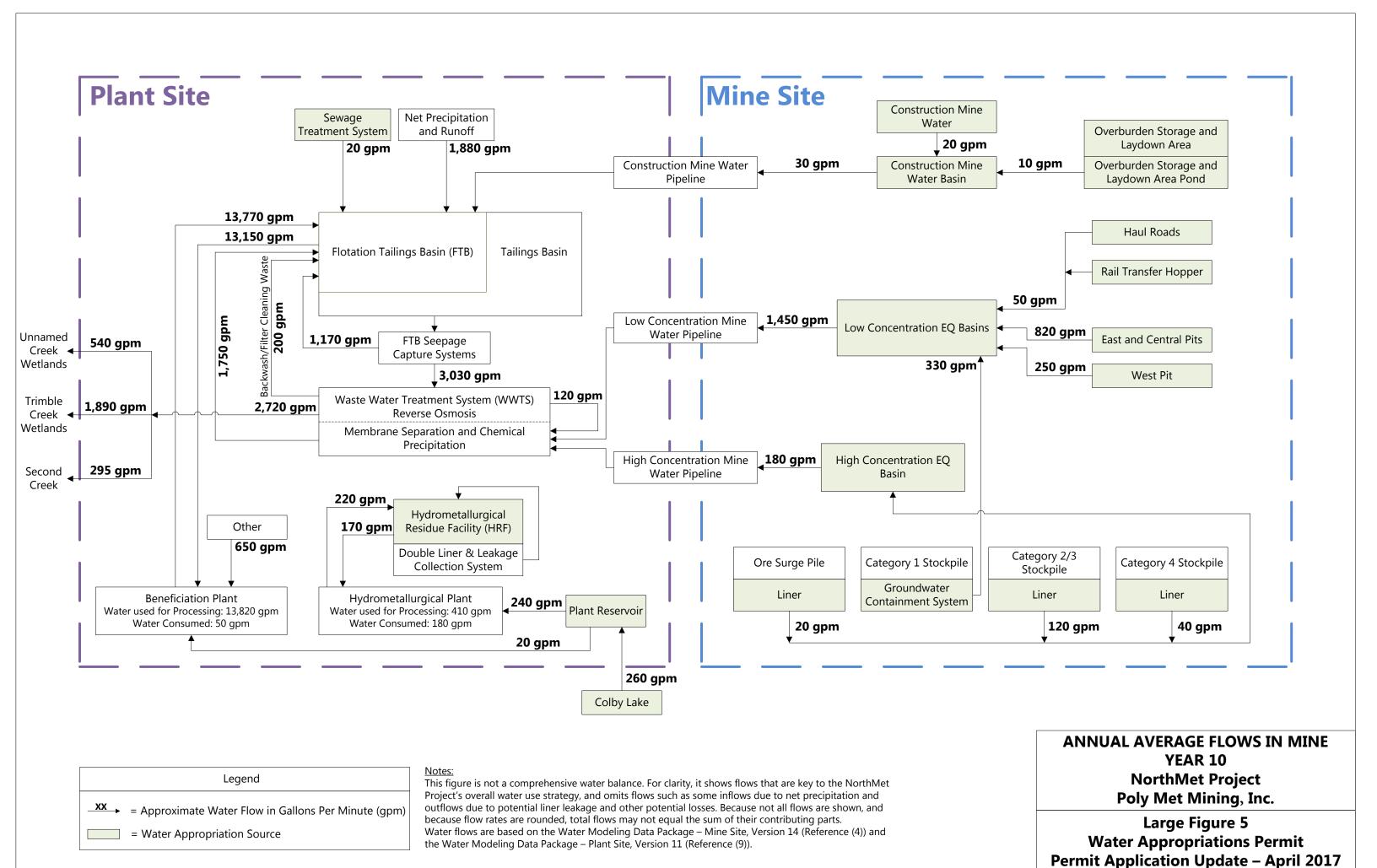
Large Figures

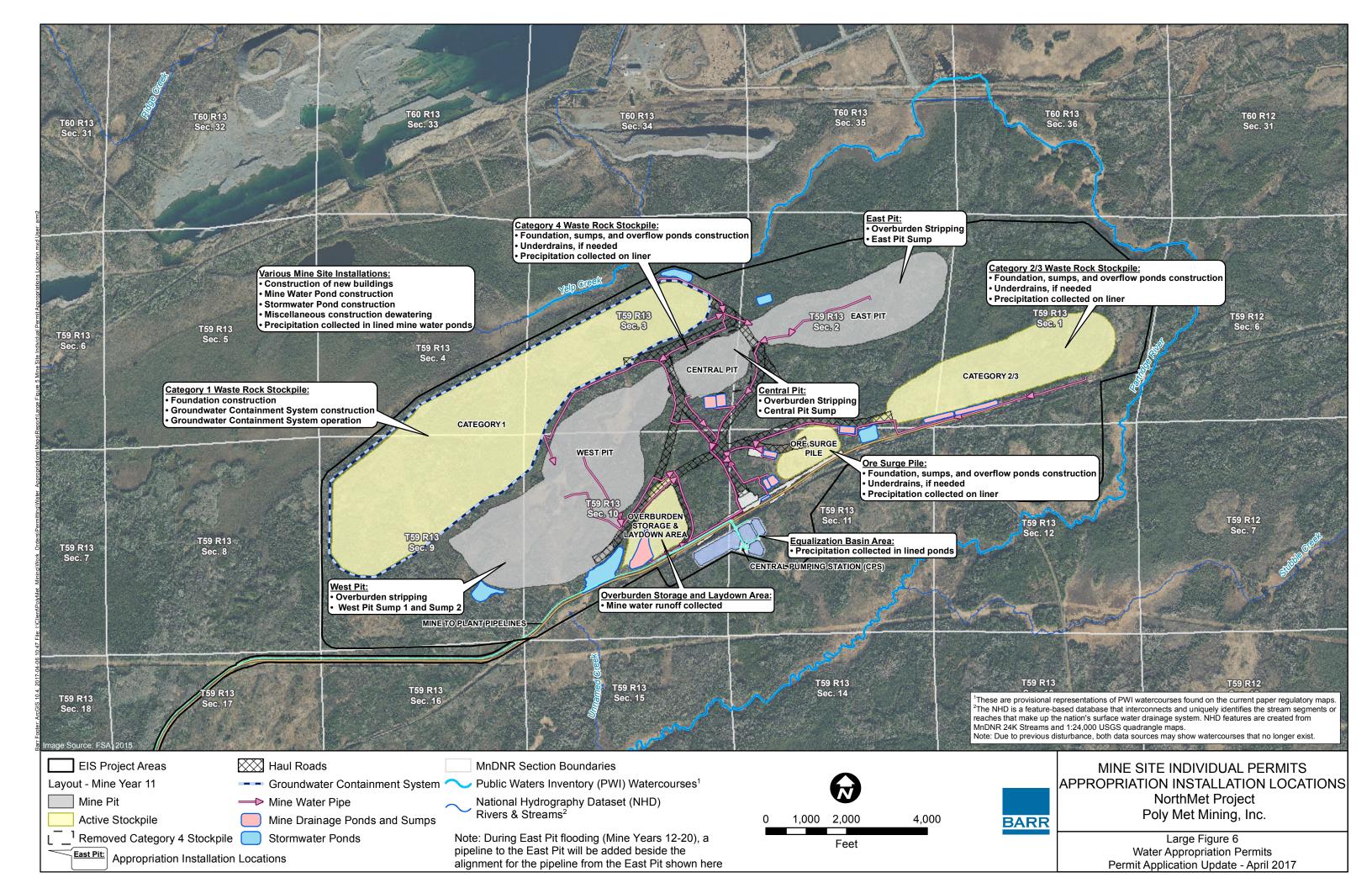


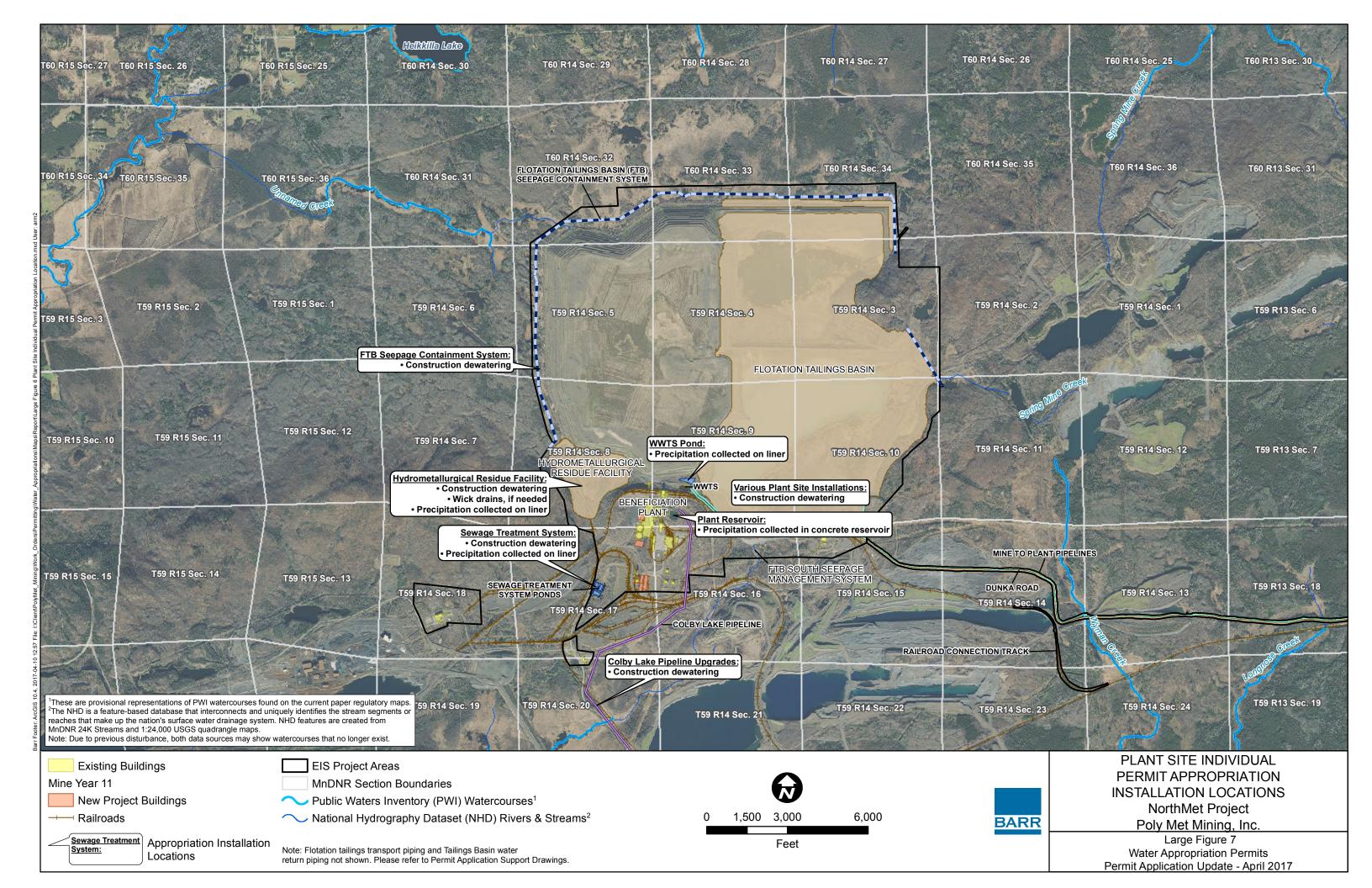


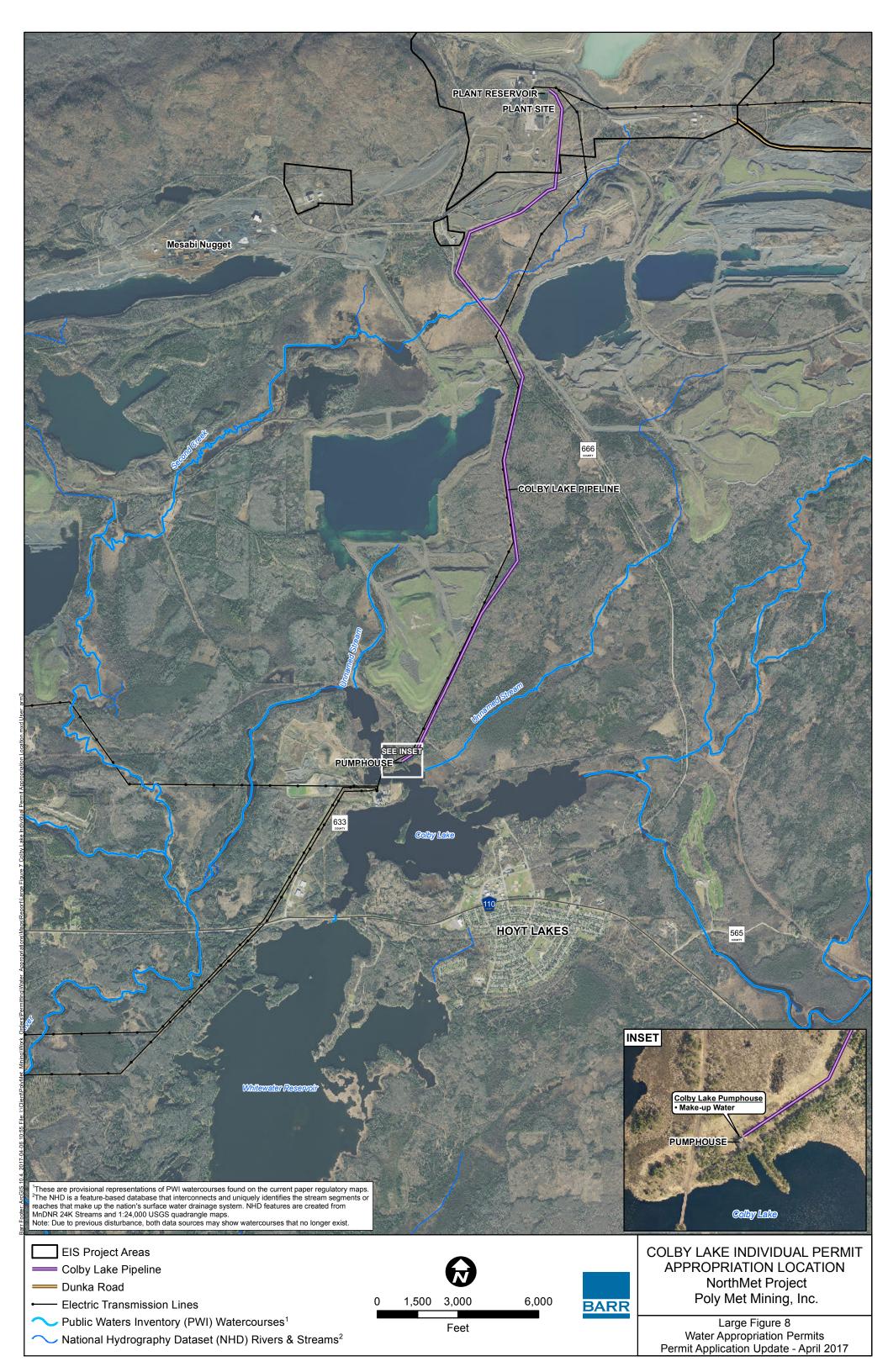


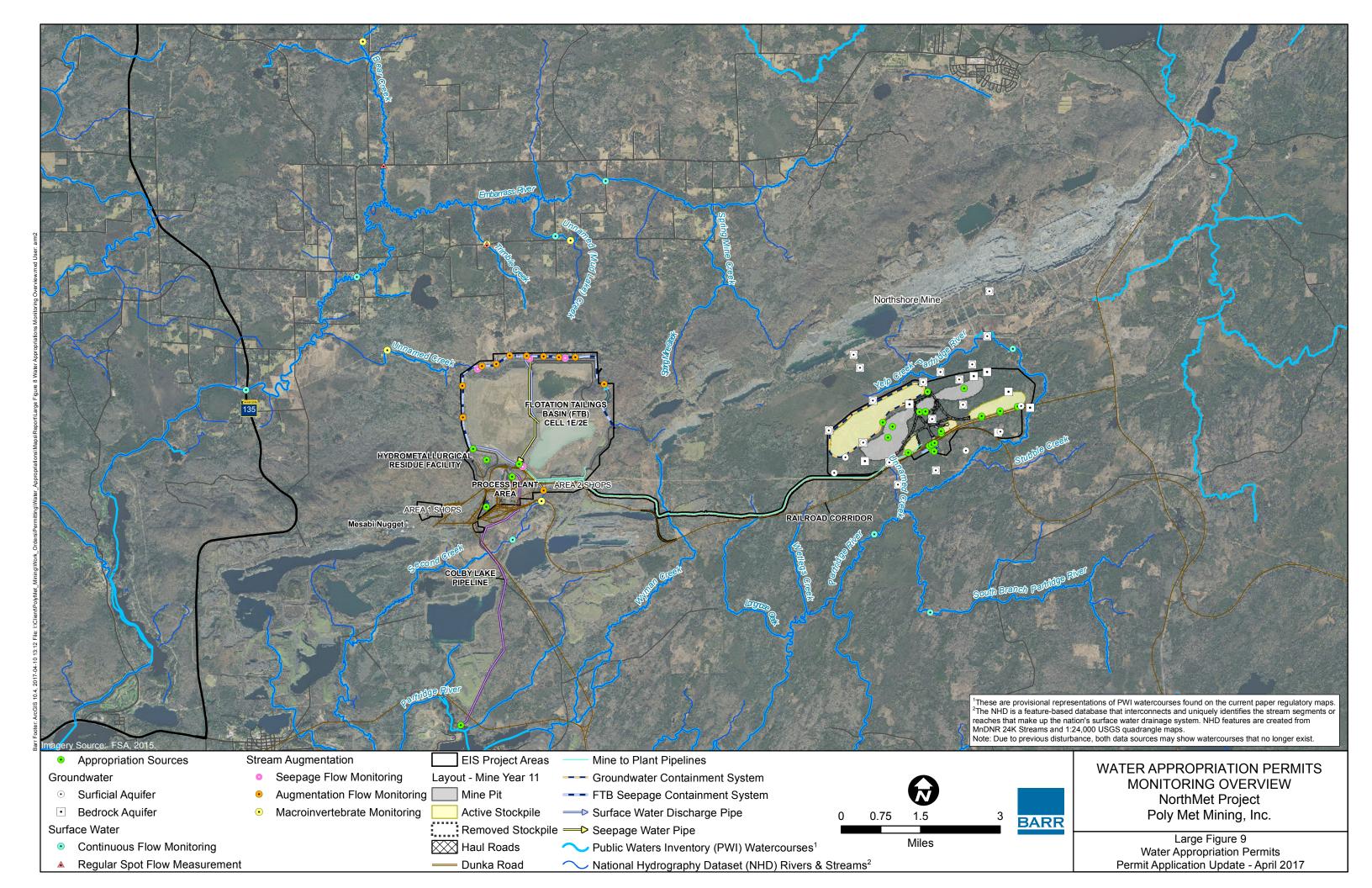


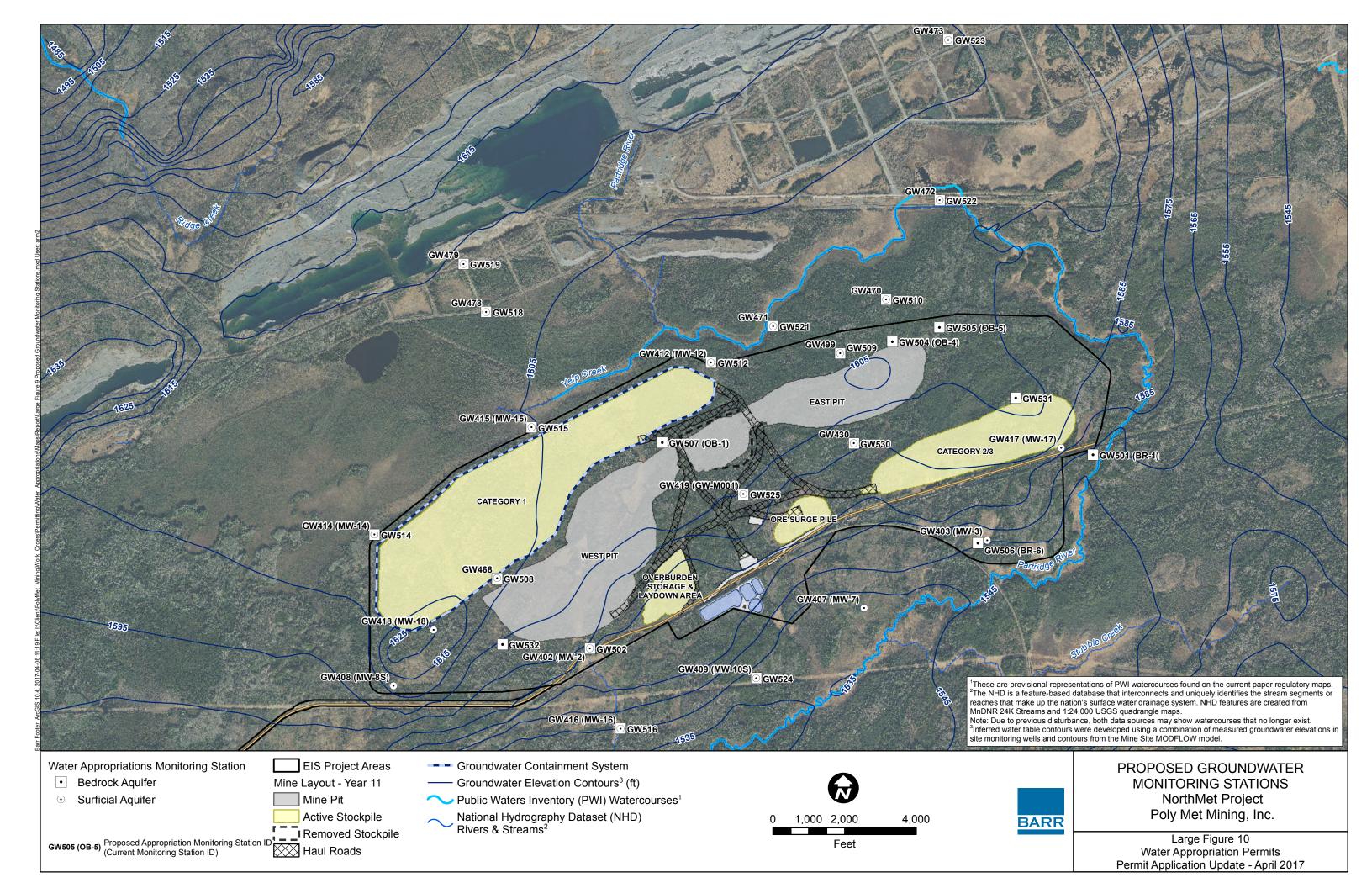


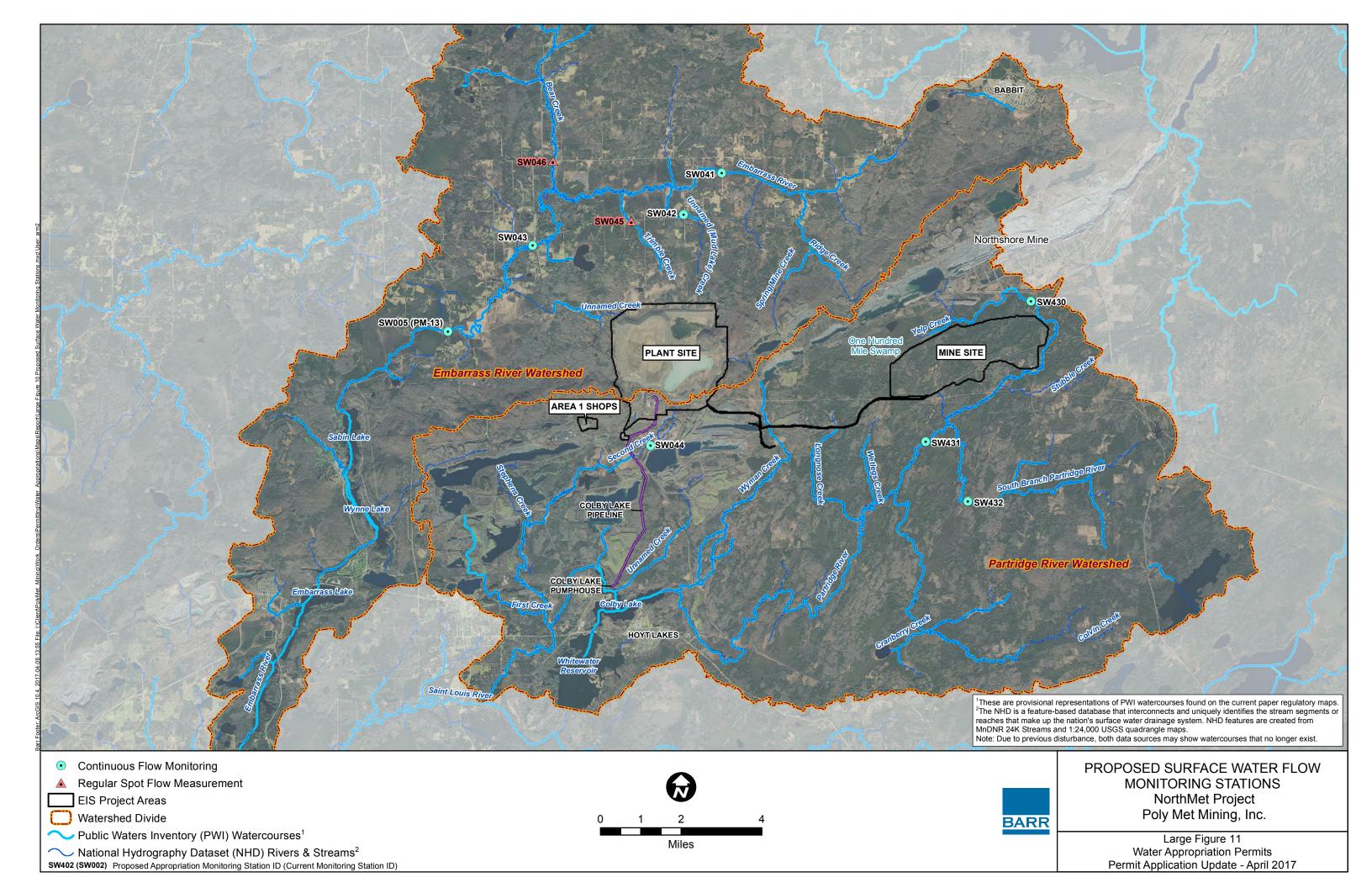


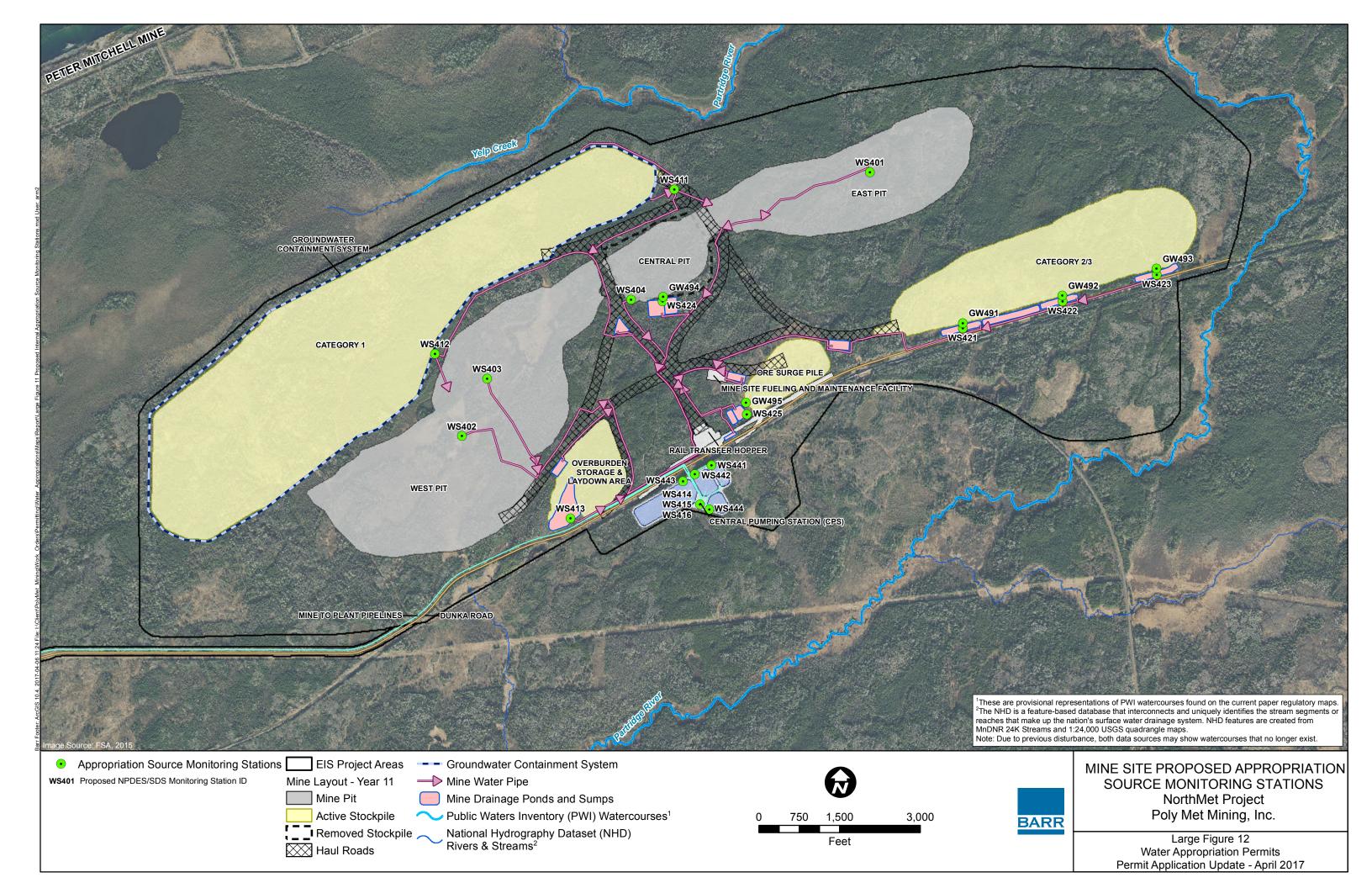


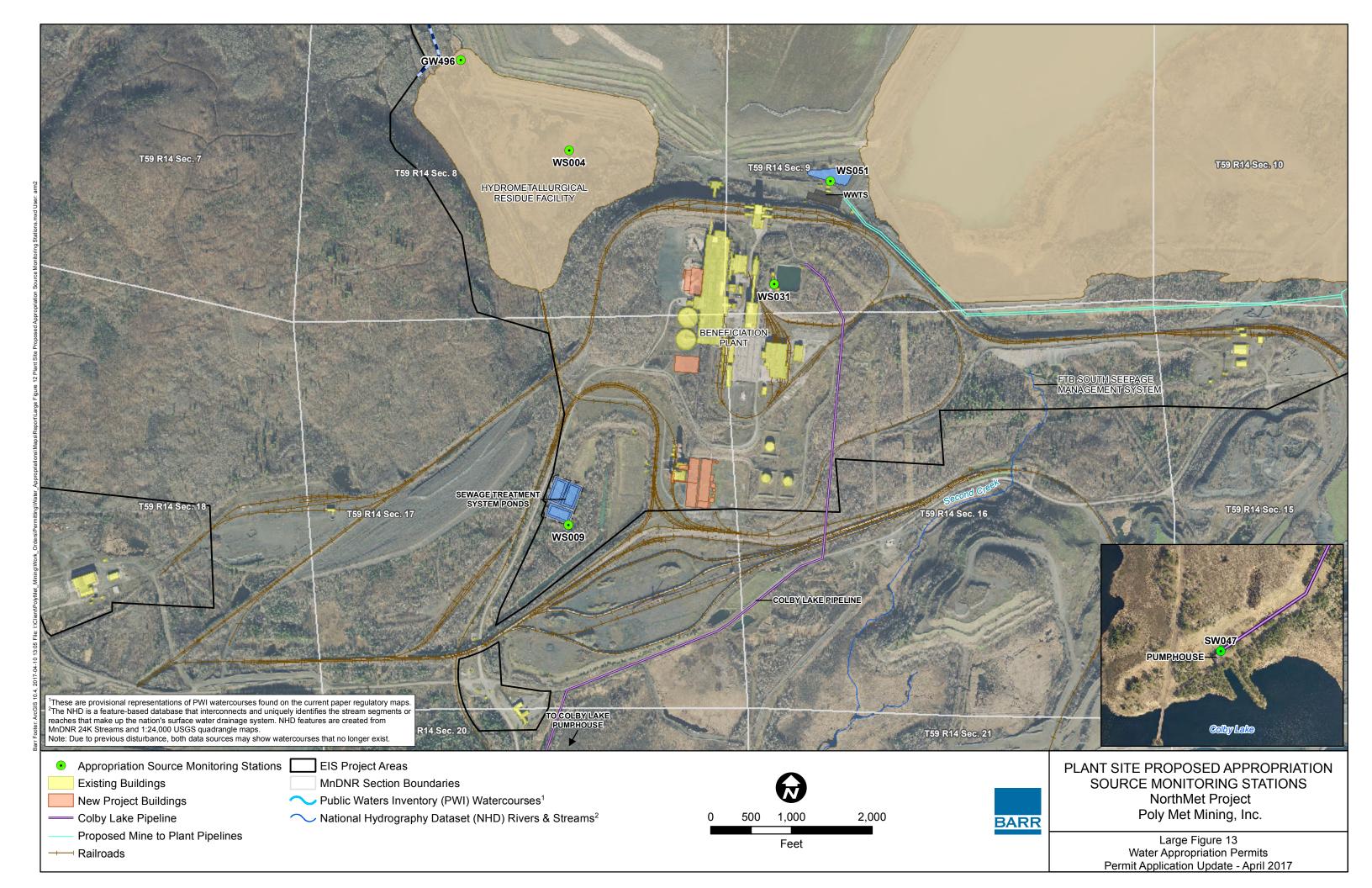


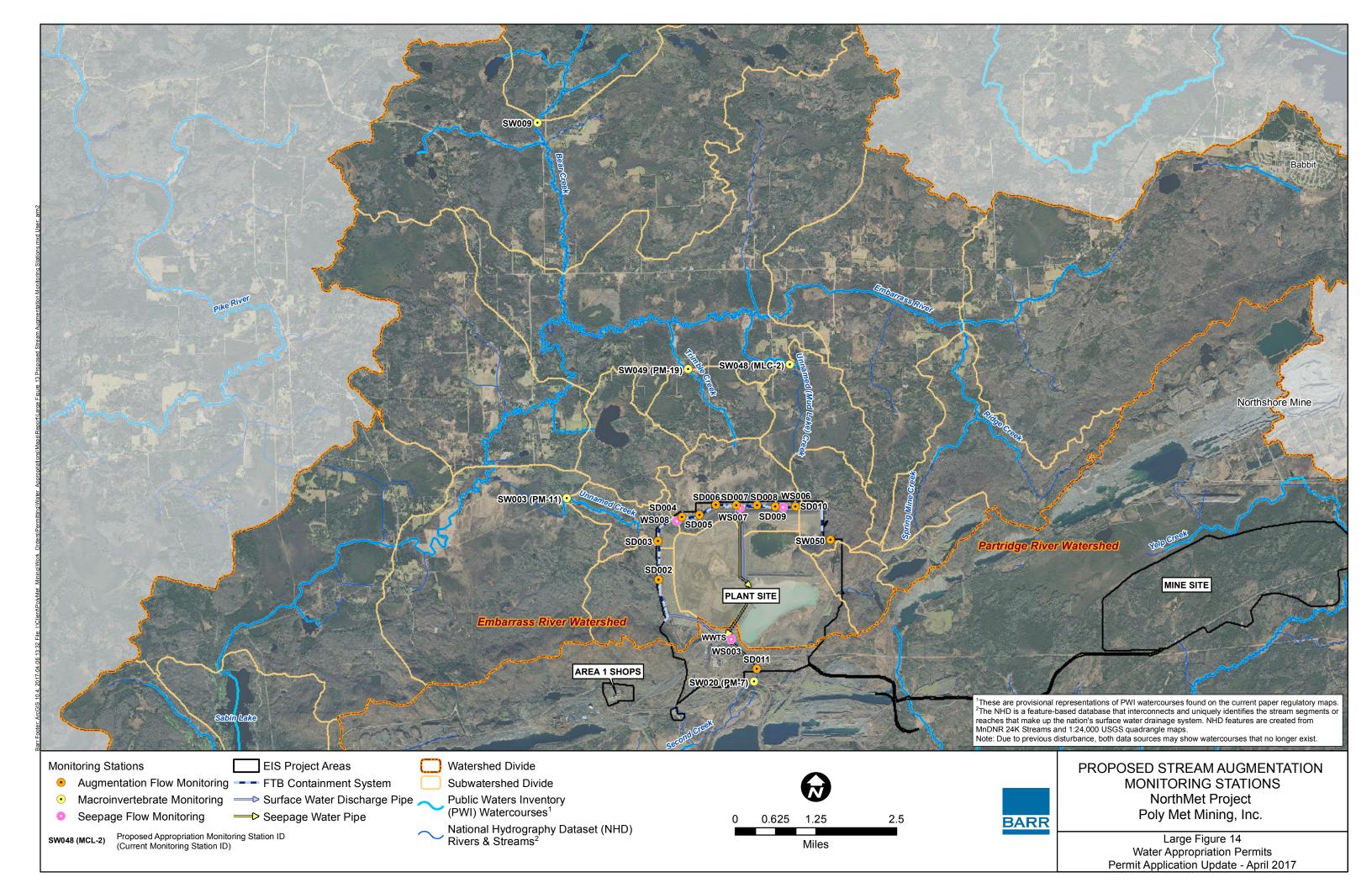












Appendices

Appendix A Application Forms



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.	
	Date(s) Served
☐ SWCD_	
□WSD _	
CITY _	

NOTICE OF WARNING: All information provided on this form is considered to be public information in accordance with the Minnesota Data Privacies Act (M.S. 15.1611 to 15.1698).

SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

	(landowner or renter	-)	2	2. Business Name				
Poly Met M	ining, Inc.			Poly Met Mining, Inc.				
3. Authorized Agent (if applicable)				4. Phone Numbers (with area codes)				
Brad Moore				(218)4	71-2150			
5. Mailing Address			(6. City, State	, Zip Code			
PO Box 475	j			Hoyt La	akes, MN 55750			
		be used for)			Commercial/Industrial	☐ Water L	evel N	laintenance
☐ Pollution Co	ontainment	☐ Temporary (1		Other				
8. Source of Water	("X" one and comple	suppl	ional information MUST be ied for each source.		of Taking/Pumping Site			
a. ☐ One well			to instructions (8 & 9) for rements.	1	1/4 of1/4 of			
b	_ manifolded wells				Section No. 2			
c. ☐ Stream, ditch	n, or river (name)				Township No. 59			
d. ☐ Wetland, lake	e, or impoundment (ı	name)	· · · · · · · · · · · · · · · · · · ·	d.	Range No. 13			
e. X Other East	Pit: overburden	stripping and p	oit dewatering	e.	County St. Louis			
10. Means of Takin	g and Rate	11. Method of Measurement	12. Means of Dist	ribution	13. Legal Description-La	nd Owned/R	ented '	ł .
a. X Stationary Pu	mp(s) at <u>TBD</u> gpm	a. X Flow Meter	a. pipedia	mlengt	h Township Range	Section		actional Sect. Gov't. Lots
	p at gpm	b. ☐ Timing Device	b. tank	_gal. capacit	У			
c. Gravity Flow		c. Electric Power	c. channel	lengt	h			
d. Other		Consumption	d.X other TBD					
u. Other		d. Other						
	,							
14. Months of Appropriation		opropriation ("X" one						
	a. Continuous		ays/momo./yr.		* Rental Agreement MUST B	e Submitted		
	b.☐ Seasonal	\rangle Beginning date T	3D	17. Discha	rge To and Quantity			
□FEB □ AUG	c. Temporary	End date TBD		a. Strea	m, Ditch or River		() MGY
□MAR □SEP	16 Total Annual	Use (Gallons per Ye		1	m, Ditch or River (name and, Lake or	•)		
□APR □OCT			•		undment(name)		() MGY
□MAY □NOV	V	on gallons per y		c. Sewe			() MGY
□JUN □DEC	(maximum	annual pumpir	ng)	d. X Other	Flotation Tailings Basin			(1,000) MGY
18. Discharge Poin	t TBD	19. Means of Disch	arge and Rate		20. Additional Requirement	ts:		
a1/4 of		a station	nary numn(s) at	anm ea	a. Map or Air Photo whice	ch shows:		
(no.)				anm ea	1) Point of Taking or			f Duan anti-
b. Section No b. ☐ portable pump(s) at c. Township No c. ☐ Gravity Flow at			pamp(s) at	apm/ofc	Test Hole Location Controlled and Are	a of Use) Disc	harge Point
		d. X Other TBD			b. 🛛 \$150 Minimum Appli	cation Fee w	ill be b	illed after
d. Range No.		u. M Other 130		gpm/cfs (circle one)	receipt of application c. X Statement of Justification		ive So	urces
e. County					d. X Additional Document	s Required		

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22. Date
Bol prone	7/11/16



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.	
	Date(s) Served
☐ SWCD_	
□WSD _	
CITY _	

NOTICE OF WARNING: All information provided on this form is considered to be public information in accordance with the Minnesota Data Privacies Act (M.S. 15.1611 to 15.1698).

SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

1. Applicant Name (landown		⁻)	2	2. Business Name PolyMot Mining Corp (parent company)				
Poly Met Mining, I				PolyMet Mining Corp. (parent company) 4. Phone Numbers (with area codes)				
3. Authorized Agent (if applic	cable)		4		•			
Brad Moore				(218) 47 5. City, State,				
5. Mailing Address PO Box 475			0	-	kes, MN 55750			
7. Purpose (Explain what the	- wotor will	ha used for	Dublic Motor Cumb			LavalM	aintenance	
Pollution Containmer		Temporary (1			vvater	Level IVI	aintenance 	
8. Source of Water ("X" one	and compl	ete) PAdditi	onal information MUST be	9. Point	of Taking/Pumping Site		:	
a. ☐ One well	,	suppi Refer	ied for each source. to instructions (8 & 9) for	a.	1/4 of1/4 of1/4			
b.□ manifold	ded wells	requir	rements.	b.	Section No. 3			
c. ☐ Stream, ditch, or river	(name)			с.	Township No. 59			
d.☐ Wetland, lake, or impo	oundment (name)		d.	Range No. 13			
e.X Other Central Pit: o				ıg e.	County St. Louis			
10. Means of Taking and Ra	te	11. Method of Measurement	12. Means of Dist	ribution	13. Legal Description-Land Owned/			
a. X Stationary Pump(s) at	TBD gpm		a. ☐ pipe diar		140. 140. Oction		ctional Sect. Bov't. Lots	
b. Portable Pump at	gpm	b. Timing Device	b.⊡ tank	•				
c. ☐ Gravity Flow at	_gpm/cfs	c. Electric Power	c. channel	length			:	
d. Other	_ apm/cfs	Consumption	d.⊠ other <u>TBD</u>					
		d. Other						
14. Months of 15. Sch	edule of A	ppropriation ("X" one	and complete)			•		
	-	hrs./dayda	•					
□JAN □JUL b.□ Se	\	Beginning date TI		Spirit of property and property	* Rental Agreement MUST Be Submitted			
□FFR □ AUG	mporary /	End date TBD		• • • • • • • • • • • • • • • • • • • •				
□MAR □SEP	• •			a. Stream, Ditch or River () MGY	
□APR □OCT 16. T	otal Annua	l Use (Gallons per Ye	ear)		nd, Lake or undment	() MGY	
□MAY □NOV 700) million	gallons per ye	ar	c. Sewe	(name)	. ,) MGY	
	aximum	annual pumpin	g)	d. ☑ Other Flotation Tailings Basin)		`	(700) MGY	
18. Discharge Point T	BD	19. Means of Disch	narge and Rate	.l	20. Additional Requirements:			
a1/4 of1/4 of	1/4	a. statio	narv pump(s) at	gom ea.	a. X Map or Air Photo which shows:			
a1/4 of1/4 of1/4 a. □stationary pump(s) at b. Section No portable pump(s) at				gpm ea.	 Point of Taking or Pumping S Test Hole Location 3) Bour 		f Property	
c. Township No c. Gravity Flow at					Controlled and Area of Use	4) Disc	harge Point	
d. Range No.		d. X Other TBD		gpm/cfs	b. ⊠ \$150 Minimum Application Fee receipt of application.	will be bi	lled atter	
e. County_				(circle one)	c. X Statement of Justification/Altern		urces	
or county			_		d. X Additional Documents Required			

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22.	Date
Sof Mine		217/17



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.	
	Date(s) Served
SWCD.	2.00
☐ WSD	

NOTICE OF WARNING: All information provided on this form is considered to be public information in accordance with the Minnesota Data Privacies Act (M.S. 15.1611 to 15.1698).

SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

Applicant Name (landowner or renter) Poly Met Mining, Inc.		2	2. Business Name Poly Met Mining, Inc.				
3. Authorized Agent (if applicable)	4		mbers (with area codes)				
Brad Moore		(218)4	71-2150				
5. Mailing Address		6	. City, State			44500	
PO Box 475			Hoyt La	kes, MN 55750			
7. Purpose (Explain what the water will be	and the second s			Commercial/Industrial		Level N	Maintenance
Pollution Containment	☐ Temporary (1						
8. Source of Water ("X" one and complete	suppli	onal information MUST be ied for each source.	01101111	of Taking/Pumping Site	-6 4/4		
a. One well		to instructions (8 & 9) for rements.			011/4		
b manifolded wells				Township No. 59			
c. Stream, ditch, or river (name)		hap to the same of		Range No. 13			
d. Wetland, lake, or impoundment (na e. X Other West Pit: overburden		nit dewatering		County St. Louis		-	
	11. Method of	12. Means of Dist		13. Legal Description-L		ontod	*
10. Means of Taking and Rate	Measurement	a. pipediar		,	and Owned/N		actional Sect.
a. 🛛 Stationary Pump(s) at <u>TBD</u> gpm a	a. X Flow Meter	b.	_	No. No.	Section		Gov't. Lots
b. Portable Pump at gpm b	o. Timing Device	c. channel	=				
c. Gravity Flow at gpm/cfs c	c. Electric Power Consumption	d. X other TBD	ieriga		PART		
d. Other gpm/cfs	,	d. M other					
(circle one)	d. Other						
14. Months of 15. Schedule of App	propriation ("X" one	and complete)				-	
Appropriation a. \(\times \) Continuous\	hrs./da <u>y</u> da	ays/momo./yr.		* Rental Agreement MUST	Be Submitted	-	
	Beginning date Te	3D	17. Discha	rge To and Quantity			
	End date TBD		a. Stream	m, Ditch or River	ne)	() MGY
MAR SEP 16. Total Annual U	lea (Gallone per Ve	oar)		nd, Lake or	ne)		
LIAPR LIGHT		,		undment(name)		() MGY
	n gallons per y		c. Sewe	r System		() MGY
□JUN □DEC (maximum	n annual pump	oing)	d. X Other	Flotation Tailigs Basin)			(800) MGY
18. Discharge Point TBD 1	19. Means of Disch	arge and Rate		20. Additional Requireme	nts:		
	astation	nary pump(s) at	gpm ea.	a. Map or Air Photo wh			
b. Section No b	table pump(s) at	gpm ea.	 Point of Taking o Test Hole Location 			of Property	
b. Section No b portable pump(s) at c. Township No c. ☐ Gravity Flow at			gpm/cfs	Controlled and A b. X \$150 Minimum App	rea of Use	4) Disc	harge Point
d. Range No d	d. X Other TBD		- Sp	receipt of application	n.		
e. County			(circle one)	c. X Statement of Justifid. X Additional Document		itive Sc	ources
	- 00 - 10 - 10 - 10 - 10 - 10 - 10 - 10						

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22. Date
Bot More	7/11/16



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.	
	Date(s) Served
☐ SWCD_	
□WSD	
CITY	

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SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

			2. Business Name							
Poly Met Mining, Inc.			PolyM	Met Mining Corp. (parent company)						
3. Authorized Agent (if applicable)			4. Phone N	Phone Numbers (with area codes)						
Brad Moore				(218) 471-2150						
5. Mailing Address			(6. City, Sta	te, Zip	p Code				
PO Box 475										
7. Purpose (Explain			Public Water Suppl	-					_evel M	aintenance
☐ Pollution Co	KATAST 09-902-96 (#1945099981), 2-48	Temporary (1								
8. Source of Water	("X" one and comple	suppli	onal information MUST be ied for each source.						appli	cation text
a. One well			to instructions (8 & 9) for rements.							
b				1						
c. ☐ Stream, ditch	. ,					y No. No. Section Gov. Lois				
		name)				Ü				
	Site Infrastruct									
10. Means of Taking	g and Rate	11. Method of Measurement	12. Means of Dist					ind Owned/R		
a. X Stationary Pur	mp(s) at <u>TBD</u> gpm	a. Flow Meter	a. pipe dia		9""_			Section		
b. ☑ Portable Pump at TBD gpm b. ☐ Timing Device b. ☐ tank										
c. Gravity Flow a	atgpm/cfs	c. Electric Power	c. channel	len	gth					
d. ☐ Other gpm/cfs				- -						
		d. Otherapplication	n n							
14. Months of	15. Schedule of Ap	ppropriation ("X" one	and complete)	156.00					-	
Appropriation	a.X Continuous	hrs./dayda	ays/momo./yr.		*	* Rental Agree	ement MUST B	le Submitted		
IJAN ∑JUL	b. ☐ Seasonal	Beginning date TI		17 Disch	charge To and Quantity					
☑FEB ☑ AUG	c. ☐ Temporary /	End date TBD) MOV
⊠MAR ⊠SEP				-			er(name	e)	() MGY
⊠APR ⊠OCT	16. Total Annual	Use (Gallons per Ye	ear)		b. Wetland, Lake or Impoundment () MGY) MGY	
⊠MAY ⊠NOV	1,200 i	million gallons	per year	(name) c. ☐ Sewer System						
INJUN IN DEC (maximum annual pumping)							see applica	tion text		(various) MGY
18. Discharge Poin	Discharge Point Various 19. Means of Discharge and Rate			J	-		l Requiremen			
a1/4 of					_		Air Photo whi			
b. Section No.		(no.)								
		b por	table pump(s) at	gpm ea			Hole Location rolled and Are			
c. Township No		c. ☐ Gravity Flow atd. ☒ Other _TBD			b.	.⊠ \$150 N	linimum Appli	ication Fee v	vill be b	lled after
d. Range No		u. [A] Other 150	- X	gpm/cf (circle one	s) c.	receipt . X Statem	of application ent of Justific	ı. cation/Alterna	ative So	urces
e. County							nal Documen			
	200									

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22 . Date	
Bod More	4110117	



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.		
	Date(s) Served	
☐ SWCD_		
□WSD _		
□ CITY _		

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SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

,			2. Business Name					
Poly Met Mining, Inc.			-	et Mining Corp. (parent company)				
3. Authorized Agent (if applicable)				mbers (with area co	des)			
Brad Moore								
5. Mailing Address		6	. City, State,					
PO Box 475				^				
7. Purpose (Explain what the water wil						Level	Maintenance	
Pollution Containment	☐ Temporary (1							
8. Source of Water ("X" one and comp	suppli	ional information MUST be ied for each source.	9. Point	of Taking/Pumping	Site Various, se	ee app	olication text	
a. ☐ One well	Refer requir	to instructions (8 & 9) for rements.						
b manifolded wells								
c. ☐ Stream, ditch, or river (name)				kes, MN 55750 Commercial/Industrial				
d. Wetland, lake, or impoundment	· · · · · · · · · · · · · · · · · · ·			•				
e. Other Plant Site Infrastruc			_ е.	1			-	
10. Means of Taking and Rate	11. Method of Measurement	12. Means of Distr	ribution					
a. Stationary Pump(s) atgpm	a. Flow Meter	a. pipe diar	mlengtl			F		
b. 🛛 Portable Pump at TBD gpm		b.⊡ tank						
c. Gravity Flow atgpm/cfs c. Electric Power c. channel			length	ו				
Consumption d. X other TBD								
(circle one)	various, se d. 🛛 Otherapplicatio	e						
	appropriation ("X" one		200	 				
Appropriation								
□.IAN □.JUL	hrs./dayda							
b.∟ Seasonal	Beginning date TI	BD	1	7. Discharge To and Quantity				
□ MAR □ SEP c. ☑ Temporary /	End date TBD		a. Stream	m, Ditch or River	(name)	_ () MGY	
16 Total Appua	l Use (Gallons per Ye	ear)	b . Wetla	etland, Lake or				
C7F :-:!!:-:				undment	name)	. () MGY	
(maximum	75 million gallons per year naximum annual pumping)		c. Sewer	Sewer System) MGY	
DEC DEC	annaar pamping	97	d. X Other	Various, see a	oplication text		(various) MGY	
18. Discharge Point Various	19. Means of Disch	narge and Rate		20. Additional Req	uirements:			
a1/4 of	astatio	nary pump(s) at	gpm ea.	The same and the same and the same	hoto which shows:			
b. Section No.	b por	table pump(s) at	gpm ea.	1) Point of T 2) Test Hole	aking or Pumping Si Location 3) Bour	ite idaries	of Property	
c. Township No	c. Gravity Flow at		gpm/cfs	Controlled	d and Area of Use	4) Dis	charge Point	
d. Range No.	d. X Other TBD		gpm/cfs	receipt of ap	um Application Fee opplication.	wiii be	billed after	
e. County			(circle one)	c. X Statement o	f Justification/Altern ocuments Required		ources	
,				u. (X) Additional D	ocuments Required			

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22. Date
B. S. More	4/10/17



Permit Application for Appropriation of Waters of the State NON-IRRIGATION

P.A. No.
Date(s) Served
□ SWCD
□WSD
CITY
CITY

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SEE INSTRUCTIONS...TYPE OR PRINT CLEARLY

Applicant Name (landowner or renter) Poly Met Mining, Inc.			2. Business I	Name et Mining Corp. (parent company)					
3.			•						
Brad Moore			4. Phone Numbers (with area codes)						
5. Mailing Address				(218) 471-2150 6. City, State, Zip Code					
PO Box 475				-	kes, MN 55750				
		be used for)	Public Water Supply		Commercial/Industrial	□ Water I	evel M:	aintenance	
Pollution Co		☐ Temporary (1			·				
8. Source of Water	("X" one and comple	ete) P Additi	onal information MUST be led for each source.		of Taking/Pumping Site				
a. ☐ One well		Refer	to instructions (8 & 9) for rements.		<u>SE_</u> 1/4 of <u>SE_</u> 1/4				
b. 🗆	manifolded wells	, - 1			Section No. 6				
c. □ Stream, ditch	, or river (name)			I	c. Township No58				
d .□ Wetland, lake	e, or impoundment (ı	name)			Range No. 14	•			
e.🛛 Other Colby	Lake			e.	e. County St. Louis				
10. Means of Taking	g and Rate	11. Method of Measurement	12. Means of Dist	ribution	13. Legal Description-	_and Owned/R	er Level Maintenance I/4 d/Rented * Fractional Sect. Gov't. Lots ed () MGY () MGY (1,800) MGY Site on Agent of Property 4) Discharge Point we will be billed after emative Sources		
a. ⊠ Stationary Pu	mp(s) at TBD gpm		a.⊠ pipe <u>36 in</u> diar	m <u>5.5 m</u> ilengt	h Township Range No. No.	Section			
a. ☒ Stationary Pump(s) at TBD gpm a. ☒ Flow Meter b. ☐ Portable Pump at gpm b. ☐ Timing Device b. ☐ tank			b. tank	_gal. capacit					
		c. Electric Power	c. 🗌 channel	lengt	n				
c. Gravity Flow atgpm/cfs c. Electric Power Consumption d. Othergpm/cfs			-						
a. U Other	(circle one)	d. Other				,			
				L caracteria neck o		-			
14. Months of Appropriation		opropriation ("X" one				· 			
□JAN □JUL		hrs./dayda			* Rental Agreement MUST	Be Submitted			
☐FEB ☐ AUG	b.☐ Seasonal	> Beginning date T		1	rge To and Quantity				
	c. ☐ Temporary	End date <u>TBD</u>		a. 🗆 Strea	m, Ditch or River		() MGY	
	16. Total Annu	al Use (Gallons per \	/ear)	b . 🗌 Wetla	and, Lake or	ille)			
□APR □OCT		ion gallons per			undment(name)		() MGY	
□MAY □NOV		n annual pump	•	c. Sewe	r System		() MGY	
□JUN □DEC	(maximum	ii aiiiidai puilip		d. X Other	Plant Reservoir			(1,800) MGY	
18. Discharge Poin	t	19. Means of Disch	narge and Rate		20. Additional Requirement	ents:			
a. <u>SW</u> 1/4 of <u>SV</u>	<u>V 1/4</u> of1/4	astatio	nary pump(s) at	gpm ea.	a. X Map or Air Photo w				
b. Section No. 9		b por_	table pump(s) at	gpm ea.	1) Point of Taking (2) Test Hole Locat			f Property	
c . Township No	59	c. Gravity Flow at	<u> </u>	gpm/cfs	Controlled and A	ء Area of Úse	4) Disch	narge Point	
d. Range No. 14		d. 🛛 Other TBD		gpm/cfs	receipt of applicati		iii de di	neu aner	
e. County				(circle one)				ırces	
<u>L </u>		 							

I hereby make application pursuant to Minnesota Statutes Chapter 103G.261 and all supporting rules for a permit to appropriate water in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

21. Signature of Landowner or Authorized Agent	22. Date
Bol proce	2/7/17

Appendix B

Notification to Local Government Officials



100 King Street West, Suite 5700, Toronto, Ontario, Canada, M5X 1C7 Tel: +1 (416) 915-4149

444 Cedar Street, St. Paul, MN 55101, Tel: +1 (651) 389-4100

6500 County Road 666, Hoyt Lakes, MN 55750-0475 Tel: +1 (218) 471-2150 / Fax: +1 (218) 225-4429

www.polymetmining.com

April 14, 2017

Charles Bainter, Secretary of the Board North St. Louis Soil and Water Conservation District Northland Office Building 307 1st Street South, Suite 114 Virginia, MN 55792

RE: Poly Met Mining, Inc.'s Updated Water Appropriation Permit Application (Version 5) for the NorthMet Project

Dear Mr. Bainter:

Poly Met Mining, Inc.'s (PolyMet) submitted an updated consolidated application to the Minnesota Department of Natural Resources (MDNR) for individual water appropriation permits (Updated Application) for its NorthMet Project (Project). This Updated Application was submitted as Version 5, because it includes revisions associated with agency review and discussion.

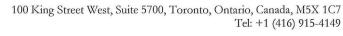
We are notifying you of this Updated Application, pursuant to Minnesota Rules 6115.0660, subpart 3(D), as the Project is in North St. Louis County, with portions of the Project outside of municipal boundaries. PolyMet does not expect these appropriations to have an impact on available water supply or area water resources, as described in the FEIS and this Updated Application. The Updated Application will be posted on MDNR's website, and they will be notifying you when it is ready for your review in electronic form. We will be providing you with an updated hard copy late next week to replace your original hard copy (dated July 11, 2016).

This Updated Application is based primarily on the extensive data collection and technical analyses conducted as part of the development of the Final Environmental Impact Statement (FEIS) for the NorthMet Project and Land Exchange. When necessary for the water appropriation permitting process, the Updated Application expands upon such information.

If any questions or concerns arise during your review of this Updated Application, please do not hesitate to contact me at 218-461-7746 or ckearney@polymetmining.com.

Sincerely,

Christie M. Kearney, P.E.





444 Cedar Street, St. Paul, MN 55101, Tel: +1 (651) 389-4100 6500 County Road 666, Hoyt Lakes, MN 55750-0475

Tel: +1 (218) 471-2150 / Fax: +1 (218) 225-4429

www.polymetmining.com

April 14, 2017

Mayor Andrea Zupancich City of Babbitt 71 South Drive Babbitt, MN 55706

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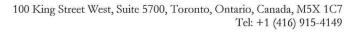
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April 14, 2017

Mayor Mark Skelton City of Hoyt Lakes Municipal Building 206 Kennedy Memorial Drive Hoyt Lakes, MN 55750

RE: Poly Met Mining, Inc.'s Updated Water Appropriation Permit Application (Version 5) for the NorthMet Project

Dear Mayor Skelton:

Poly Met Mining, Inc.'s (PolyMet) submitted an updated consolidated application to the Minnesota Department of Natural Resources (MDNR) for individual water appropriation permits (Updated Application) for its NorthMet Project (Project). This Updated Application was submitted as Version 5, because it includes revisions associated with agency review and discussion.

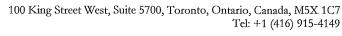
We are notifying you of this Updated Application, pursuant to Minnesota Rules 6115.0660, subpart 3(D), as a portion of the Project is within the Hoyt Lakes municipal boundary. PolyMet does not expect these appropriations to have an impact on your municipal water supply or area water resources, as described in the FEIS and this Updated Application. The Updated Application will be posted on MDNR's website, and they will be notifying you when it is ready for your review in electronic form. We will be providing you with an updated hard copy late next week to replace your original hard copy (dated July 11, 2016).

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Sincerely,

Christie M. Kearney, P.E. Environmental Site Director





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February 7, 2017

Charles Bainter, Secretary of the Board North St. Louis Soil and Water Conservation District Northland Office Building 307 1st Street South, Suite 114 Virginia, MN 55792

RE: Poly Met Mining, Inc.'s Updated Water Appropriation Permit Application (Version 2) for the NorthMet Project

Dear Mr. Bainter:

Poly Met Mining, Inc.'s (PolyMet) submitted an updated consolidated application to the Minnesota Department of Natural Resources (MDNR) for individual water appropriation permits (Updated Application) for its NorthMet Project (Project). This Updated Application was submitted as Version 2, because it includes a request for an additional water appropriation permit, an appropriation of water from Colby Lake.

We are notifying you of this Updated Application, pursuant to Minnesota Rules 6115.0660, subpart 3(D), as the Project is in North St. Louis County, with portions of the Project outside of municipal boundaries. PolyMet does not expect these appropriations to have an impact on available water supply or area water resources, as described in the FEIS and this Updated Application. The Updated Application will be posted on MDNR's website, and they will be notifying you when it is ready for your review.

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If any questions or concerns arise during your review of this Updated Application, please do not hesitate to contact me at 218-461-7746 or ckearney@polymetmining.com.

Sincerely.

Christie M. Kearney, P.E.



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www.polymetmining.com

February 7, 2017

Mayor Mark Skelton City of Hoyt Lakes Municipal Building 206 Kennedy Memorial Drive Hoyt Lakes, MN 55750

RE: Poly Met Mining, Inc.'s Updated Water Appropriation Permit Application (Version 2) for the NorthMet Project

Dear Mayor Skelton:

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Sincerely,

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February 7, 2017

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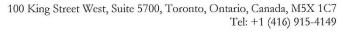
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VIA HAND DELIVERY (HARD COPY)

July 11, 2016

Charles Bainter, Secretary of the Board North St. Louis Soil and Water Conservation District Northland Office Building 307 1st Street South, Suite 114 Virginia, MN 55792

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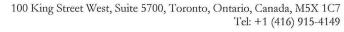
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- Five separate applications for individual water appropriation permits; and
- Supporting figures, tables, and technical information.

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VIA HAND DELIVERY (HARD COPY)

July 11, 2016

Mayor Mark Skelton City of Hoyt Lakes Municipal Building 206 Kennedy Memorial Drive Hoyt Lakes, MN 55750

RE: Poly Met Mining, Inc.'s Water Appropriation Permit Application for the NorthMet Project

Dear Mayor Skelton:

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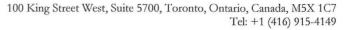
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Christie M. Kearney, P.E.



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VIA HAND DELIVERY (HARD COPY)

July 11, 2016

POLYMET

Mayor Andrea Zupancich City of Babbitt 71 South Drive Babbitt, MN 55706

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Sincerely,

Christie M. Kearney, P.E.

Environmental Site Director

Appendix C

Additional Detail on Pumping Rate Estimates

Technical Memorandum

To: Christie Kearney (Poly Met Mining, Inc.)

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation

Individual Permit Applications

Date: 4/11/17

Project: 23690862.12 200

c: Keith Hanson, Tina Pint (Barr Engineering Co.)

This memorandum provides additional detail on the estimated pumping rates presented in the Poly Met Mining, Inc. (PolyMet) Water Appropriation Consolidated Permit Application (Permit Application) version 5, submitted in April 2017. Specifically, it summarizes information on contributing flows to support Table 5-4, Table 5-5, and Figure 8-1 of the Permit Application.

- Table C-1 explains the Mine Site Infrastructure Maximum Daily pumping rate shown on Table 5-3 of the Permit Application. It lists the date of the maximum flow rate, the flows that contribute on that date, the uncertainty factors applied to each flow, and the rounding that was applied.
- Table C-2 explains the Mine Site Infrastructure Maximum Monthly pumping rate shown on Table 5-3 of the Permit Application. It lists the month of the maximum flow rate, the flows that contribute in that month, the uncertainty factors applied to each flow, and the rounding that was applied.
- Table C-3 explains the Plant Site Infrastructure Maximum Daily pumping rate shown on Table 5-3 of the Permit Application. It lists the date of the maximum flow rate, the flows that contribute on that date, the uncertainty factors applied to each flow, and the rounding that was applied.
- Table C-4 explains the Plant Site Infrastructure Maximum Monthly pumping rate shown on
 Table 5-3 of the Permit Application. It lists the month of the maximum flow rate, the flows that
 contribute in that month, the uncertainty factors applied to each flow, and the rounding that was
 applied.
- Table C-5 explains the Total Volume values for each installation included in the Mine Site Infrastructure Permit shown on Table 5-4 of the Permit Application. It lists the average monthly pumping rate of the installation, the number of months the installation will be active, the calculated total, and the rounding that was applied.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Date: 4/11/ **Page:** 2

• Table C-6 explains the Total Volume values for each installation included in the Plant Site Infrastructure Permit shown on Table 5-5 of the Permit Application. It lists the average monthly pumping rate of the installation, the number of months the installation will be active, the calculated total, and the rounding that was applied.

This memorandum also provides additional detail on the planned pumping schedules for the individual water appropriation permits. These schedules are complicated for many reasons, including the timing of various short-term dewatering activities during construction and operations, and seasonal variation in pumping of water that originates as precipitation. Figure C-1 through Figure C-5 illustrate the pumping schedules and provide additional detail on the timing of the contributing flows for the individual water appropriation permits for the Mine Site Infrastructure, Plant Site Infrastructure, East Pit, Central Pit, and West Pit.

- Figure C-1 shows the Mine Site Infrastructure estimated monthly appropriation schedule and amounts. Pumping for operation of the Category 1 Groundwater Containment System, which is the largest contributor, follows an annual climatic pattern with lower rates in the winter.
- Figure C-2 shows the Plant Site Infrastructure estimated monthly appropriation schedule and amounts.
- Figure C-3 shows the East Pit estimated monthly appropriations. Pumping from the East Pit is reduced after Mine Year 10.5 to accommodate the backfilling of the pit with waste rock and simultaneous flooding. Between approximately Mine Years 10.5 and 12.5 the pumping rate varies in order to maintain an approximately 5-foot separation between the backfill rock surface and the water level. Beginning at approximately Mine Year 12.5, the water level in the pit is held constant to maintain safe working conditions in the nearby Central Pit, and pumping resumes at a relatively high rate. Once Central Pit mining is complete in the early part of Mine Year 16, the East Pit is flooded as quickly as possible and pumping is only needed for brief periods to maintain an approximately 5-foot separation between the backfill rock surface and the water level.
- Figure C-4 shows the Central Pit estimated monthly appropriation schedule and amounts.
- Figure C-5 shows the West Pit estimated monthly appropriation schedule and amounts.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Page: 3

Table C-1 Mine Site Infrastructure Maximum Daily Pumping Rate

Installation Flows on Date of Maximum Daily Pumping Rate (Mine Year 6, May)	Flow Rate Estimate ⁽¹⁾ (gpm)	Uncertainty Factor ⁽²⁾	Flow rate with Uncertainty (gpm)
Mine Water Pond construction groundwater	103.5	1.6(3)	168.7
Mine Water Pond construction precipitation	5.1	1.5	7.7
Category 2/3 Waste Rock Stockpile construction groundwater	669.3	1.5 ⁽³⁾	1,022.2
Category 2/3 Waste Rock Stockpile construction precipitation	84.6	1.5	126.9
Category 1 Waste Rock Stockpile construction groundwater	2,010.4	1.6 ⁽³⁾	3,156.3
Category 1 Waste Rock Stockpile construction precipitation	8.4	1.5	12.7
Category 1 Stockpile Groundwater Containment System construction groundwater	34.0	5.5 ⁽³⁾	186.4
Category 1 Stockpile Groundwater Containment System construction precipitation	1.1	1.5	1.7
Category 1 Stockpile Groundwater Containment System operation	14,400 ⁽⁴⁾	1.0	14,400
Category 2/3 Waste Rock Stockpile liner mine water drainage (collected precipitation)	430 ⁽⁴⁾	1.0	430
Category 2/3 Waste Rock Stockpile underdrain operation, if needed	2.2	6.0	13.5
Category 4 Waste Rock Stockpile liner mine water drainage (collected precipitation)	130 ⁽⁴⁾	1.0	130
Category 4 Waste Rock Stockpile underdrain operation, if needed	1.3	6.0	7.8
Ore Surge Pile liner mine water drainage (collected precipitation)	80 ⁽⁴⁾	1.0	80
Ore Surge Pile underdrain operation, if needed	1.3	6.0	7.8
Haul Roads, OSLA and RTH mine water runoff (collected runoff and precipitation)	470 ⁽⁴⁾	1.0	470
Lined ponds (Equalization Basins and Construction Mine Water Pond – collected precipitation)	19.5	1.5	29.2
Total			20,250.9
Rounded			20,250

⁽¹⁾ Flow rate estimate provided based on calculation or modeling without rounding.

⁽²⁾ Rationale for uncertainty factors is presented in Large Table 1 of the Permit Application.

⁽³⁾ Uncertainty factor is a weighted combination of 1.5 (initial porewater dewatering) and 6.0 (groundwater flow into excavation); the weighted uncertainty factor shown in this table is rounded to two significant digits.

⁽⁴⁾ Flow rate estimate based on design pump capacity (Section 5.3.1.3 of the Permit Application). Because the maximum daily rate for the Mine Site Infrastructure permit application occurs during the month of May, maximum daily flow rates based on design pump capacity were included for installations that collect precipitation, because of the potential for both snowmelt and rain during the spring.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Date: 4/11/ Page: 4

Table C-2 Mine Site Infrastructure Maximum Monthly Pumping Rate

Installation Flows in Month of Maximum Monthly Pumping Rate (Mine Year 6, May)	Flow Rate Estimate ⁽¹⁾ (gpm)	Uncertainty Factor ⁽²⁾	Flow rate with Uncertainty (gpm)
Mine Water Pond construction groundwater	48.2	1.6(3)	78.5
Mine Water Pond construction precipitation	2.4	1.5	3.6
Category 2/3 Waste Rock Stockpile construction groundwater	492.9	1.5 ⁽³⁾	752.8
Category 2/3 Waste Rock Stockpile construction precipitation	62.3	1.5(3)	93.5
Category 1 Waste Rock Stockpile construction groundwater	111.2	1.6(3)	174.6
Category 1 Waste Rock Stockpile construction precipitation	0.5	1.5	0.7
Category 1 Stockpile Groundwater Containment System construction groundwater	34.0	5.5 ⁽³⁾	186.4
Category 1 Stockpile Groundwater Containment System construction precipitation	1.1	1.5	1.7
Category 1 Stockpile Groundwater Containment System Operations	527.8	1.0	527.8
Category 2/3 Waste Rock Stockpile liner mine water drainage (collected precipitation)	162.9	1.0	162.9
Category 2/3 Waste Rock Stockpile underdrain, if needed	2.2	6.0	13.5
Category 4 Waste Rock Stockpile liner mine water drainage (collected precipitation)	63.6	1.0	63.6
Category 4 Waste Rock Stockpile underdrain operation, if needed	1.3	6.0	7.8
Ore Surge Pile liner mine water drainage (collected precipitation)	34.0	1.0	34.0
OSP underdrain operation, if needed	1.3	6.0	7.8
Haul Roads, OSLA and RTH mine water runoff (collected runoff and precipitation)	107.5	1.0	107.5
Lined ponds (Equalization Basins and Construction Mine Water Pond – collected precipitation)	19.5	1.5	29.2
Total			2,246.0
Rounded			2,250

⁽¹⁾ Flow rate estimate provided based on calculation or modeling without rounding.

⁽²⁾ Rationale for uncertainty factors is presented in Large Table 1 of the Permit Application.

⁽³⁾ Uncertainty factor is a weighted combination of 1.5 (initial porewater dewatering) and 6.0 (groundwater flow into excavation); the weighted uncertainty factor shown in this table is rounded to two significant digits.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Date: 4/11 **Page:** 5

Table C-3 Plant Site Infrastructure Maximum Daily Pumping Rate

Installation Flows on Date of Maximum Daily Pumping Rate (Construction Year 1, September)	Flow Rate Estimate ⁽¹⁾ (gpm)	Uncertainty Factor ⁽²⁾	Flow rate with Uncertainty (gpm)
Flotation Tailings Basin (FTB) Seepage Containment System construction surface water	29.8	2.0	59.5
FTB Seepage Containment System construction precipitation	94.2	1.0	94.2
FTB Seepage Containment System construction groundwater	1,000.0	3.2 ⁽³⁾	3,174.4
Colby Lake Pipeline construction groundwater	200.0	1.5	300.0
Miscellaneous construction groundwater	100.0	1.0	100.0
Total			3,728.2
Rounded			3,750

⁽¹⁾ Flow rate estimate provided based on calculation or modeling without rounding.

Table C-4 Plant Site Infrastructure Maximum Monthly Pumping Rate

Installation Flows in Month of Maximum Monthly Pumping Rate (Mine Year 1, July)	Flow Rate Estimate ⁽¹⁾ (gpm)	Uncertainty Factor ⁽²⁾	Flow rate with Uncertainty (gpm)
Hydrometallurgical Residue Facility (HRF) Seepage Collection construction surface water	42.6	2.0	85.1
HRF Seepage Collection construction precipitation	46.4	1.0	46.4
HRF Seepage Collection construction groundwater	181.5	6.0	1088.7
HRF Wick Drains operation, if needed	14.6	2.0	29.1
Miscellaneous construction groundwater	9.5	1.0	9.5
Lined and concrete ponds (WWTS, Sewage Treatment System, Plant Reservoir – collected precipitation)	6.4	1.5	9.7
Total			1,268.5
Rounded			1,300

⁽¹⁾ Flow rate estimate provided based on calculation or modeling without rounding.

⁽²⁾ Rationale for uncertainty factors is presented in Large Table 1 of the Water Appropriation Permit Application.

⁽³⁾ Uncertainty factor is a weighted combination of 3.0 (initial porewater dewatering) and 6.0 (groundwater flow into excavation); the weighted uncertainty factor shown in this table is rounded to two significant digits.

⁽²⁾ Rationale for uncertainty factors is presented in Large Table 1 of the Permit Application.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Date: 4/11/

Page: 6

Table C-5 Mine Site Infrastructure Total Volumes by Installation

Installation	Average Monthly Rate ⁽¹⁾ (gpm)	Months Operational ⁽²⁾	Total Volume (MG)	Rounded Total Volume ⁽³⁾ (MG)
Ore Surge Pile foundation, sumps, and overflow ponds construction	91.8	7	28.2	30
Construction of new buildings	23.6	1	1.0	5
Mine water pond construction	95.1	9	37.5	40
Stormwater pond construction	393.9	2	34.5	35
Category 4 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	139.9	8	49.0	50
Category 2/3 Waste Rock Stockpile foundation, sumps, and overflow ponds construction	765.5	4	134.2	135
Category 1 Waste Rock Stockpile foundation construction	230.7	4	40.4	45
Category 1 Stockpile Groundwater Containment System construction	195.9	9	77.3	80
Category 1 Stockpile Groundwater Containment System operation	294.7	241	3,111.3	3,115
Category 2/3 Waste Rock Stockpile liner mine water drainage (collected precipitation)	105.6	240	1,110.2	1,115
Category 2/3 Waste Rock Stockpile underdrain operation, if needed	17.8	235	183.5	185
Category 4 Waste Rock Stockpile liner mine water drainage (collected precipitation)	39.7	132	229.5	230
Category 4 Waste Rock Stockpile underdrain operation, if needed	6.8	130	38.8	40
Ore Surge Pile liner mine water drainage (collected precipitation)	24.1	241	254.1	255
Ore Surge Pile underdrain operation, if needed	7.8	245	83.8	85
Haul Roads, Overburden Storage and Laydown Area and Rail Transfer Hopper mine water runoff (collected runoff and precipitation)	75.5	240	793.5	795
Lined ponds (Equalization Basins and Construction Mine Water Pond – collected precipitation)	26.0	240	273.5	280
Miscellaneous construction dewatering	19.0	24	20.0	20
Total	N/A ⁽⁴⁾			6,550 ⁽⁵⁾

⁽¹⁾ Average monthly pumping rate with uncertainty factor applied without rounding.

⁽²⁾ Includes months following construction but prior to beginning of operations for lined facilities (runoff from liner assumed collected)

⁽³⁾ Rounded up to nearest 5 MG.

⁽⁴⁾ Pumping occurs in different time periods. Pumping rates cannot be summed.

⁽⁵⁾ Total volume rounded up to the nearest 25 MG.

From: Melisa Pollak and Peter Hinck (Barr Engineering Co.)

Subject: Additional Detail on Pumping Rate Estimates for NorthMet Water Appropriation Individual Permit Applications

Date: 4/11/1 **Page:** 7

Table C-6 Plant Site Infrastructure Total Volumes by Installation

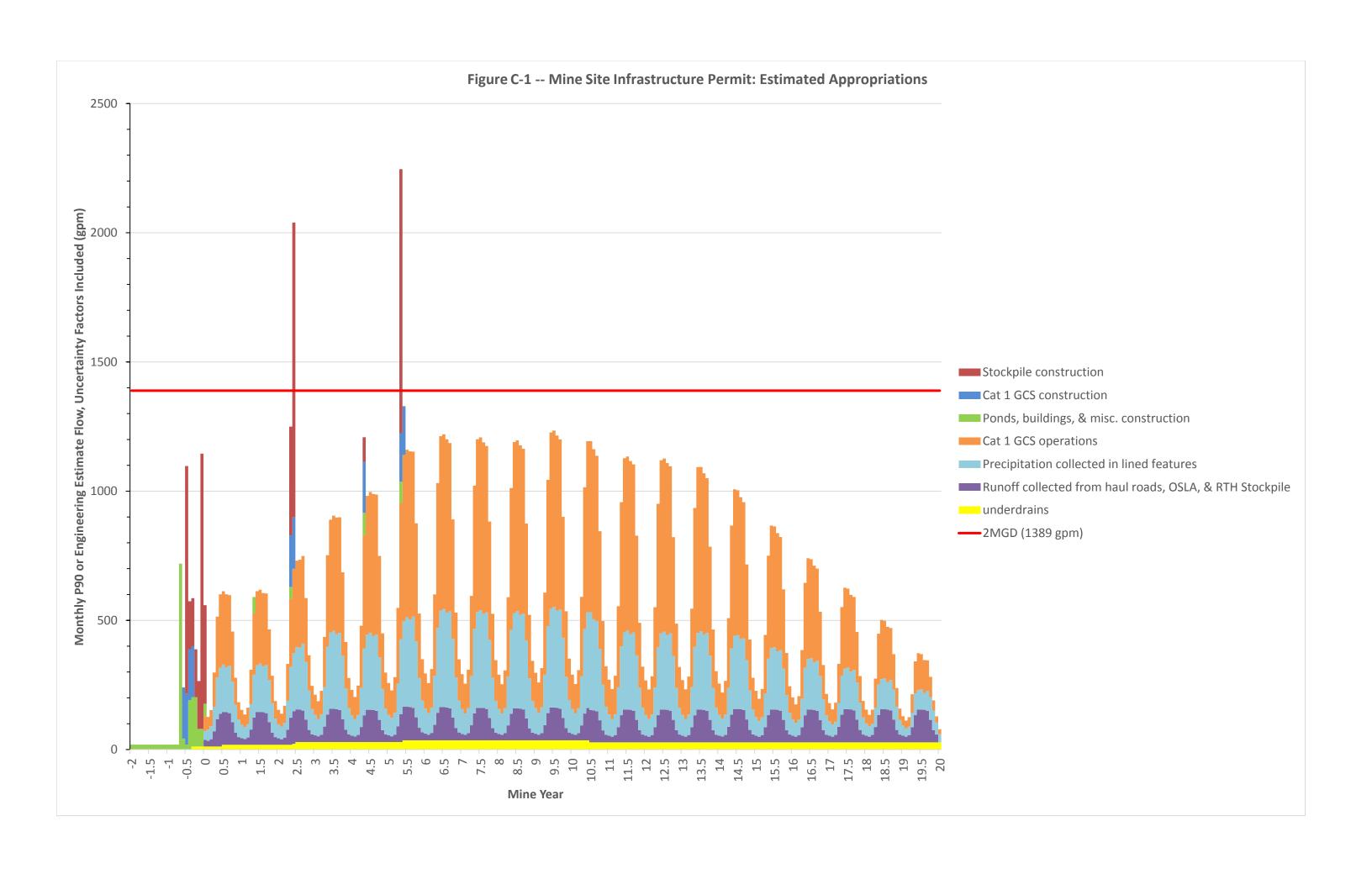
Installation	Average Monthly Rate ⁽¹⁾ (gpm)	Months Operational	Total Volume (MG)	Rounded Total Volume ⁽²⁾ (MG)
Flotation Tailings Basin (FTB) Seepage Containment System construction dewatering	390.3	390.3 17		295
Sewage Treatment System construction dewatering	2.5	2.5 1		5
Hydrometallurgical Residue Facility (HRF) construction dewatering, if needed	915.1	3	120.3	125
HRF liner (collected precipitation)	90.4	204	808.4	810
HRF wick drain operation, if needed	3.0	223	29.4	30
Lined and concrete ponds (Waste Water Treatment System, Sewage Treatment System, Plant Reservoir – collected precipitation)	14.6	252	160.8	165
Colby Lake pipeline upgrades (construction dewatering)	300.0	1	13.1	15
Miscellaneous construction dewatering	9.5	36	15.0	15
Total	N/A ⁽³⁾			1,475 ⁽⁴⁾

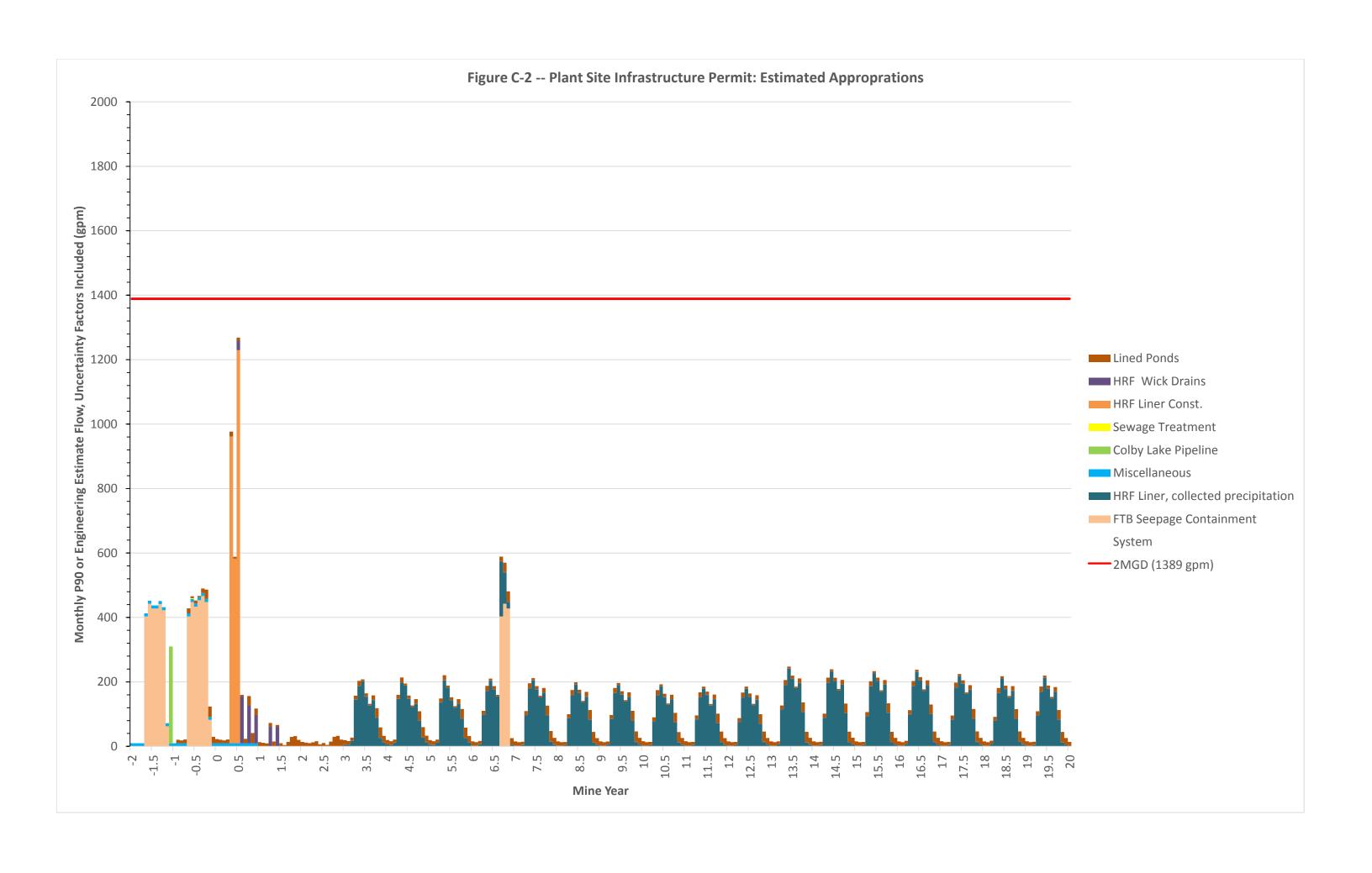
⁽¹⁾ Average monthly pumping rate with uncertainty factor applied without rounding.

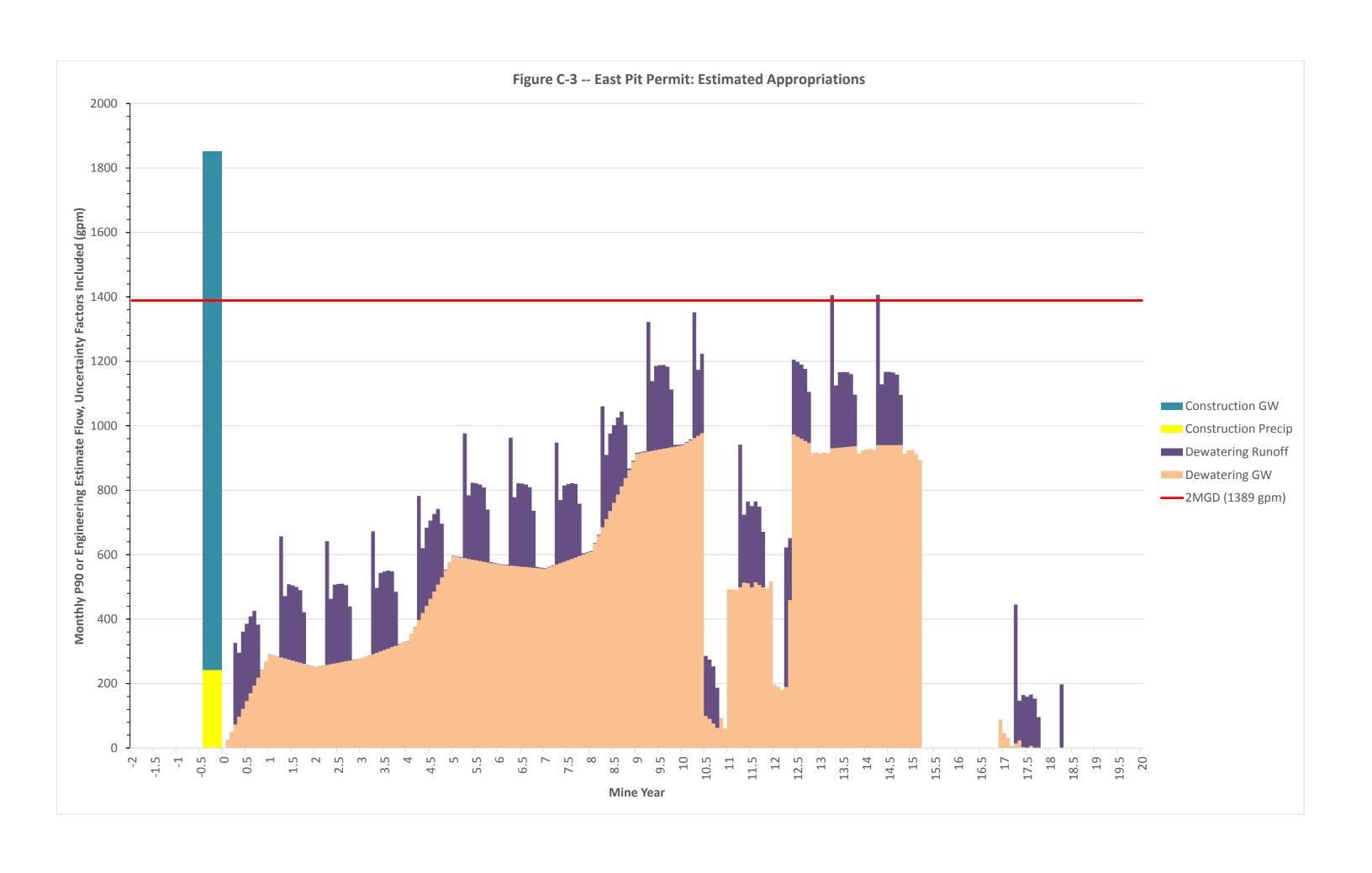
⁽²⁾ Rounded up to nearest 5 MG.

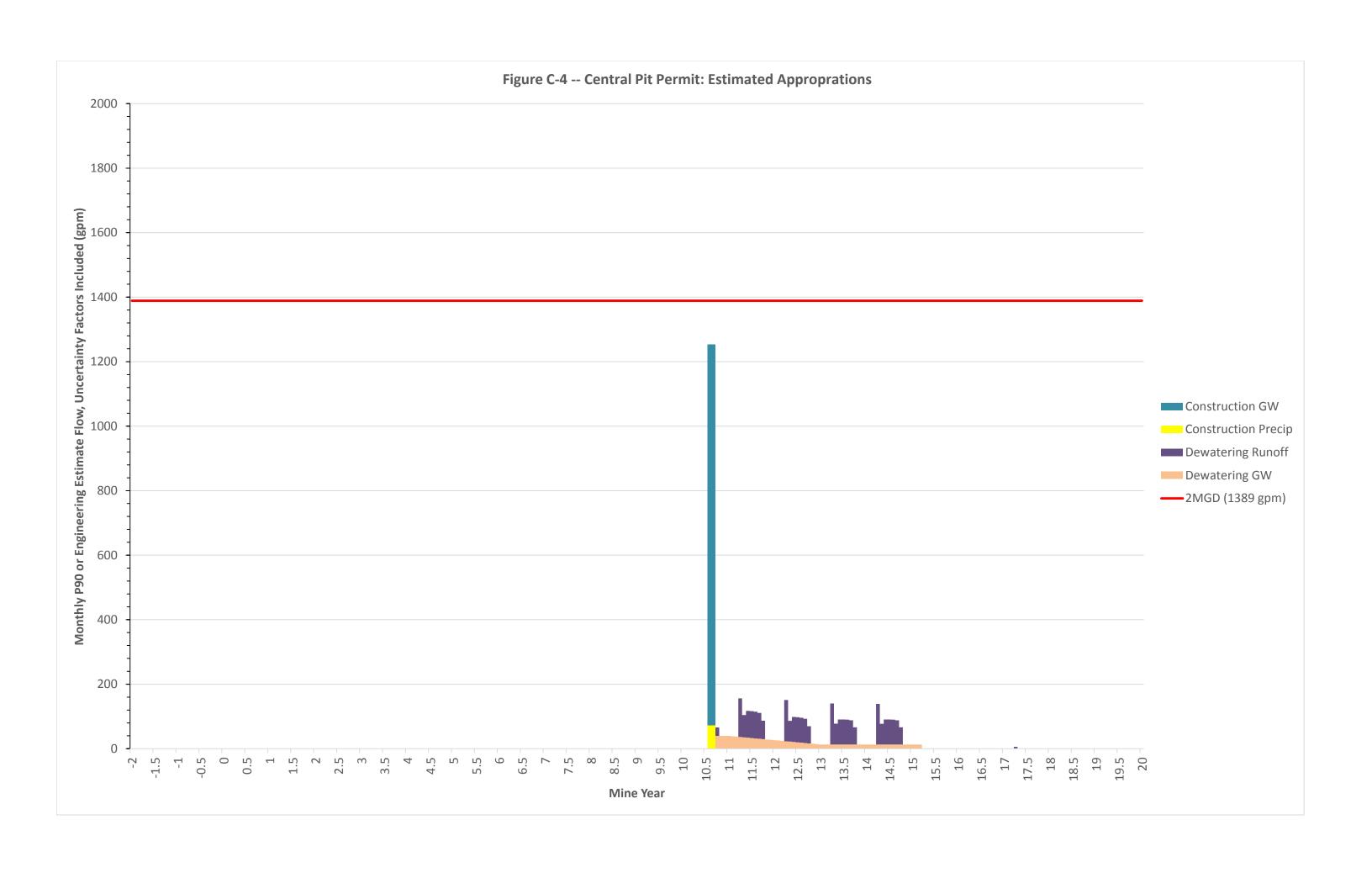
⁽³⁾ Pumping occurs in different time periods. Pumping rates cannot be summed.

⁽⁴⁾ Total volume rounded up to the nearest 25 MG.











Appendix D

Permit Application Support Drawings

Mine Site and Dunka Road Earthwork

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

Permit Application Support Drawings: Mine Site and Dunka Road Earthwork July 2016 (version 2)

Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".
EW-003	Temporary sedimentation basins or stormwater infiltration basins may be added to meet construction stormwater requirements along Dunka Road. These construction stormwater features require additional site-specific data and will be evaluated in final design.

POLY MET MINING, INC. NORTHMET PROJECT

---1000----

PROPOSED

PROPOSED OTHER FACILITY

OTHER FACILITY PROPOSED CONTOUR - MAJOR

OTHER FACILITY PROPOSED CONTOUR - MINOR

PROPOSED CONTOUR - MAJOR ---1000----PROPOSED CONTOUR - MINOR PROPOSED ROADS

+++++++++ EXISTING RAILROAD

EXISTING

⊗ EXISTING POWER POLE

----- WATER EDGE/CREEK CENTER LINE

EXISTING CONTOUR - MINOR

EXISTING ROAD ---- EXISTING TRAIL

____ EXISTING UNIMPROVED TRAIL

----R/W--- RIGHT OF WAY PROPERTY LINE

--- MINE SITE BOUNDARY

EXISTING STRUCTURES

TREE LINE WETLAND BOUNDARY

--- OE --- EXISTING OVERHEAD ELECTRIC

--- UE --- EXISTING UNDERGROUND ELECTRIC

M EXISTING VALVE

>--- EXISTING CULVERT PROPOSED MINE DRAINAGE CULVERT

NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE,
- 2. ELEVATIONS ARE BASED ON MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.

ABBREVIATIONS

CATEGORY 1 STOCKPILE - CATEGORY 1 WASTE ROCK STOCKPILE CATEGORY 2/3 STOCKPILE - CATEGORY 2/3 WASTE ROCK STOCKPILE

 EARTHWORK EW

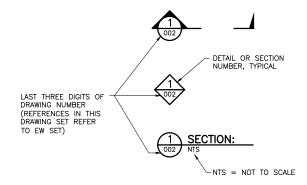
SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS

EW-001 LOCATION MAP AND SITE MAP
EW-002 LEGEND AND SHEET INDEX
EW-003 DUNKA ROAD UPGRADE GENERAL LAYOUT
EW-004 DUNKA ROAD UPGRADE TYPICAL SECTION
EW-005 HAUL ROADS GENERAL LAYOUT – MINE YEAR 11
EW-006 HAUL ROADS TYPICAL SECTIONS AND DETAILS
EW-007 HAUL ROADS TYPICAL SECTIONS AND DETAILS
EW-008 PRE-STRIPPING PIT TYPICAL SECTION
EW-009 OVERBURDEN STORAGE AND LAYDOWN AREA GRADING PLAN
EW-010 HAUL ROAD CLOSURE PLAN MINE YEARS 1-11
EW-011 HAUL ROAD CLOSURE PLAN MINE YEARS 11-20

DRAWING NUMBERING



PLANT DRAWING NUMBER:

POLYME

MINE SITE & DUNKA ROAD EARTHWORK LEGEND AND SHEET INDEX

BARR

EW-002

POLY MET MINING, INC. NORTHMET PROJECT

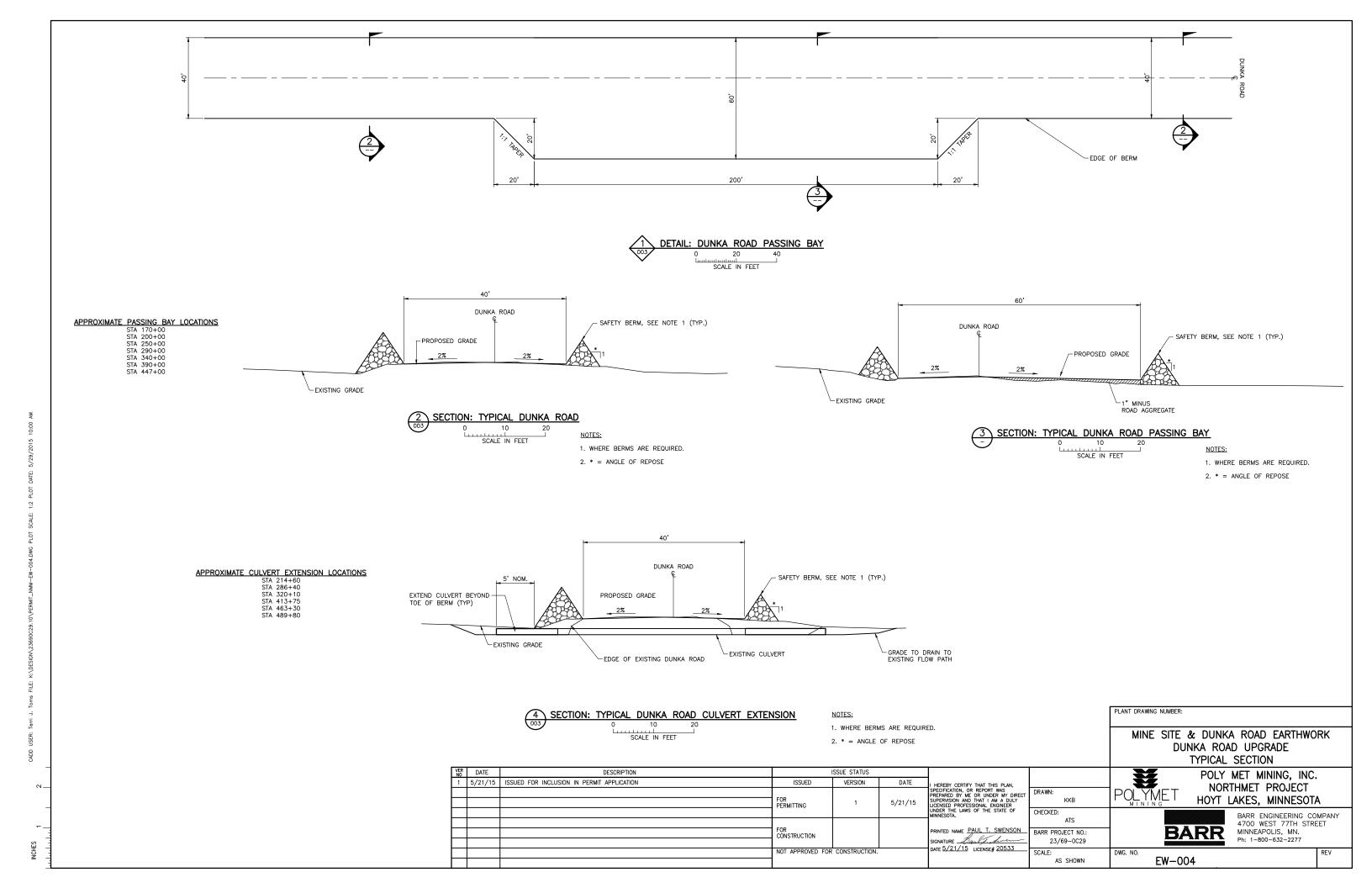
HOYT LAKES, MINNESOTA

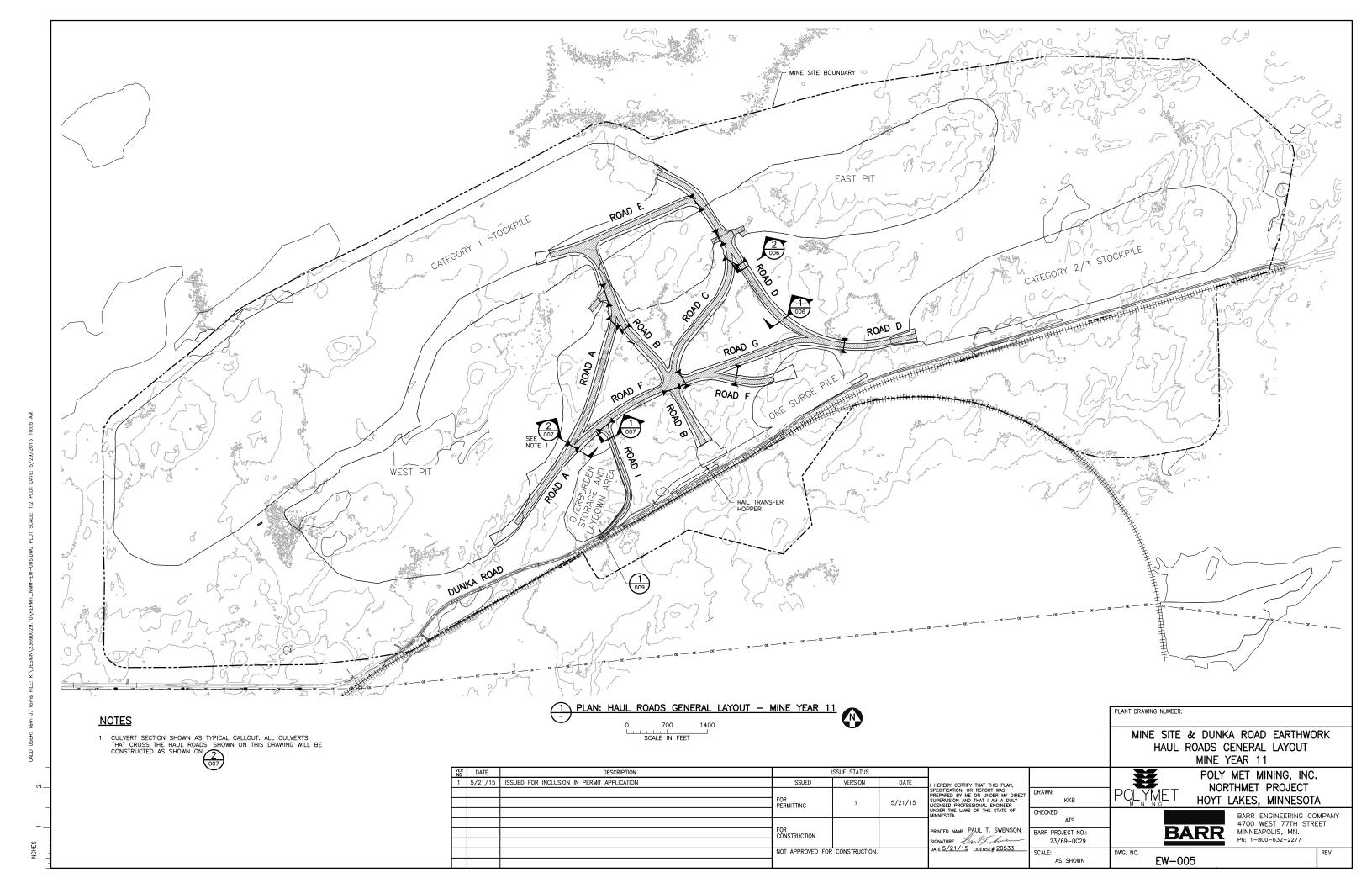
MINNEAPOLIS, MN.

Ph: 1-800-632-2277

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET

VER NO	DATE	DESCRIPTION		ISSUE STATUS			
1	5/21/15	ISSUED FOR INCLUSION IN PERMIT APPLICATION	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
			FOR PERMITTING	1	5/21/15	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	DRAWN: KKB
			T EXAMPLE TO			UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
			l				ATS
			FOR CONSTRUCTION		l	PRINTED NAME PAUL T. SWENSON	BARR PROJECT NO.:
						SIGNATURE DATE 5/21/15 LICENSE# 20533	23/69-0029
			NOT APPROVED FOR	CONSTRUCTION.		DATE 3/21/13 LICENSE# 20533	SCALE:
			1				AS SHOWN

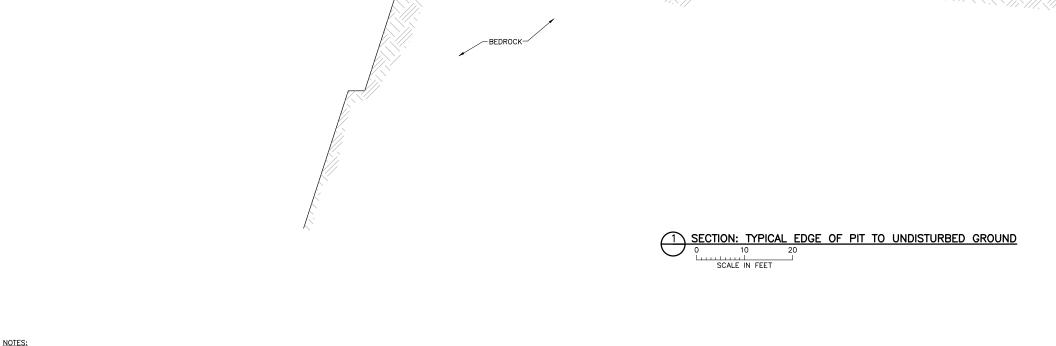




40' ACCESS ROAD







EXISTING GROUND

20' MINIMUM

_EXISTING BEDROCK

PROPOSED FINISHED GRADE WITHIN PRE-STRIPPING AREA REFLECTS BEDROCK DATA PROVIDED BY POLYMET.

2. CONSTRUCT EXCLUSION DIKE AROUND PIT PERIMETER TO DIVERT SURFACE RUNOFF AWAY FROM PIT.

PRE-STRIPPING

MINING

- FINAL PIT SLOPES SHALL ADHERE TO CHAPTER 6132.23 OVERBURDEN PORTION OF PITWALLS OF MINNESOTA DNR STANDARDS.
- 4. SLOPES IN AREAS WHERE ORGANIC SOILS AND WETLANDS ARE PRESENT MAY BE SLOPED AS NECESSARY TO MAINTAIN A STABLE SLOPE.
- 20' BENCH SHALL BE ESTABLISHED FROM THE TOE OF THE OVERBURDEN TO THE FUTURE CREST OF ROCK IN ACCORDANCE WITH MINNESOTA DNR SIDEWALL DESIGN STANDARDS.
- CONTRACTOR SHALL LEAVE TEMPORARY HAUL ROADS WITHIN PRE-STRIPPING LIMITS IN PLACE FOR OWNER'S ACCESS.
- CONTRACTOR SHALL STOCKPILE OVERBURDEN IN LOCATIONS AND AT QUANTITIES TO BE APPROVED BY OWNER.

VER NO	DATE	DESCRIPTION		ISSUE STATUS			
1	5/21/15	ISSUED FOR INCLUSION IN PERMIT APPLICATION	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
			FOR PERMITTING	1	5/21/15	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	DRAWN: KKB
						UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
							ATS
			FOR CONSTRUCTION			PRINTED NAME PAUL T. SWENSON SIGNATURE Baulf Lourn DATE 5/21/15 LICENSE# 20533	BARR PROJECT NO.: 23/69-0C29
			NOT APPROVED FOR	CONSTRUCTION.		DATE 5/21/15 LICENSE# 20533	SCALE:
			1				AS SHOWN

EXCLUSION DIKE, SEE NOTE 2

UNDISTURBED_ OVERBURDEN

MINE SITE & DUNKA ROAD EARTHWORK PRE-STRIPPING PIT TYPICAL SECTION

POLYMET KKB ATS

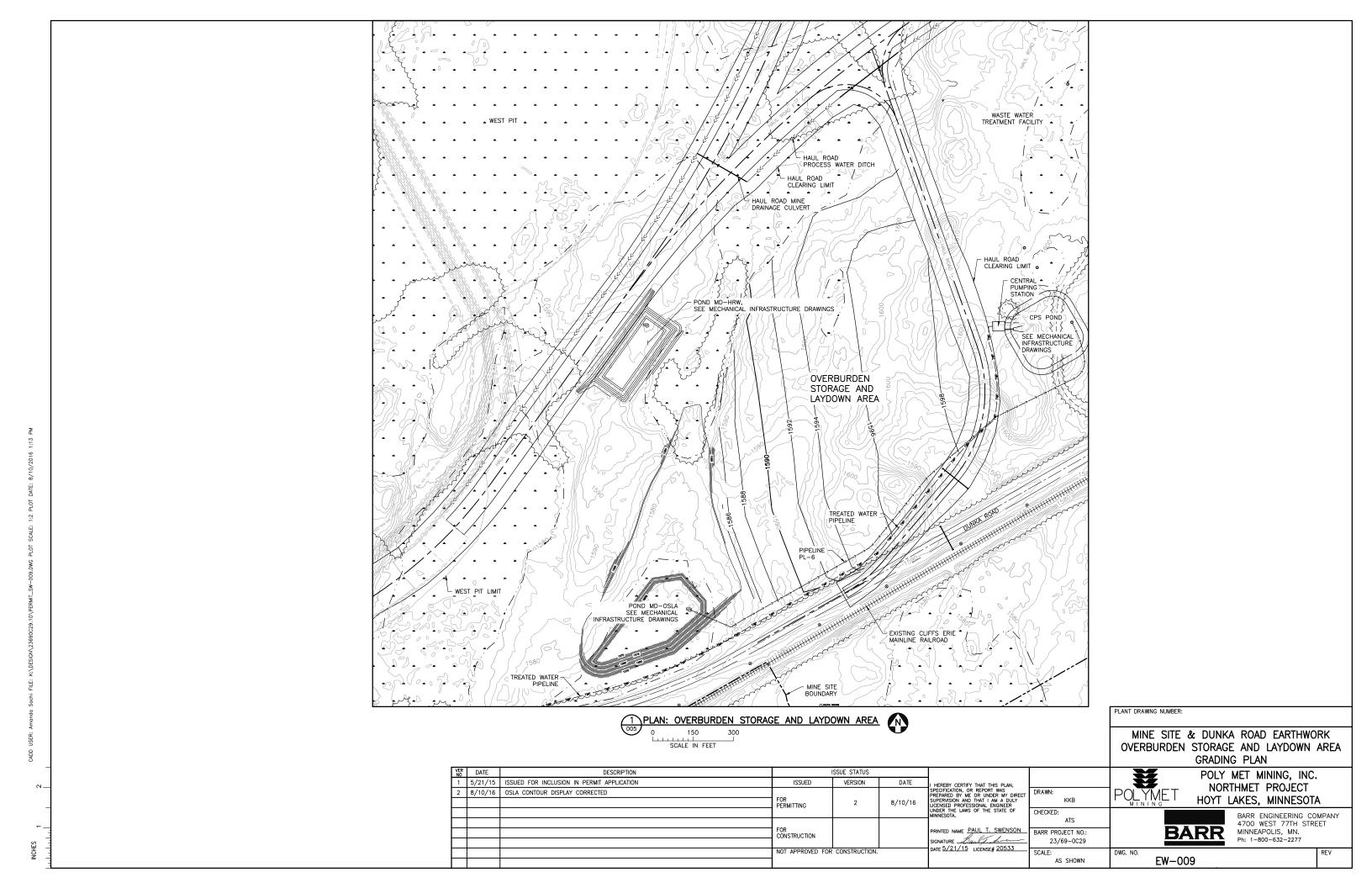
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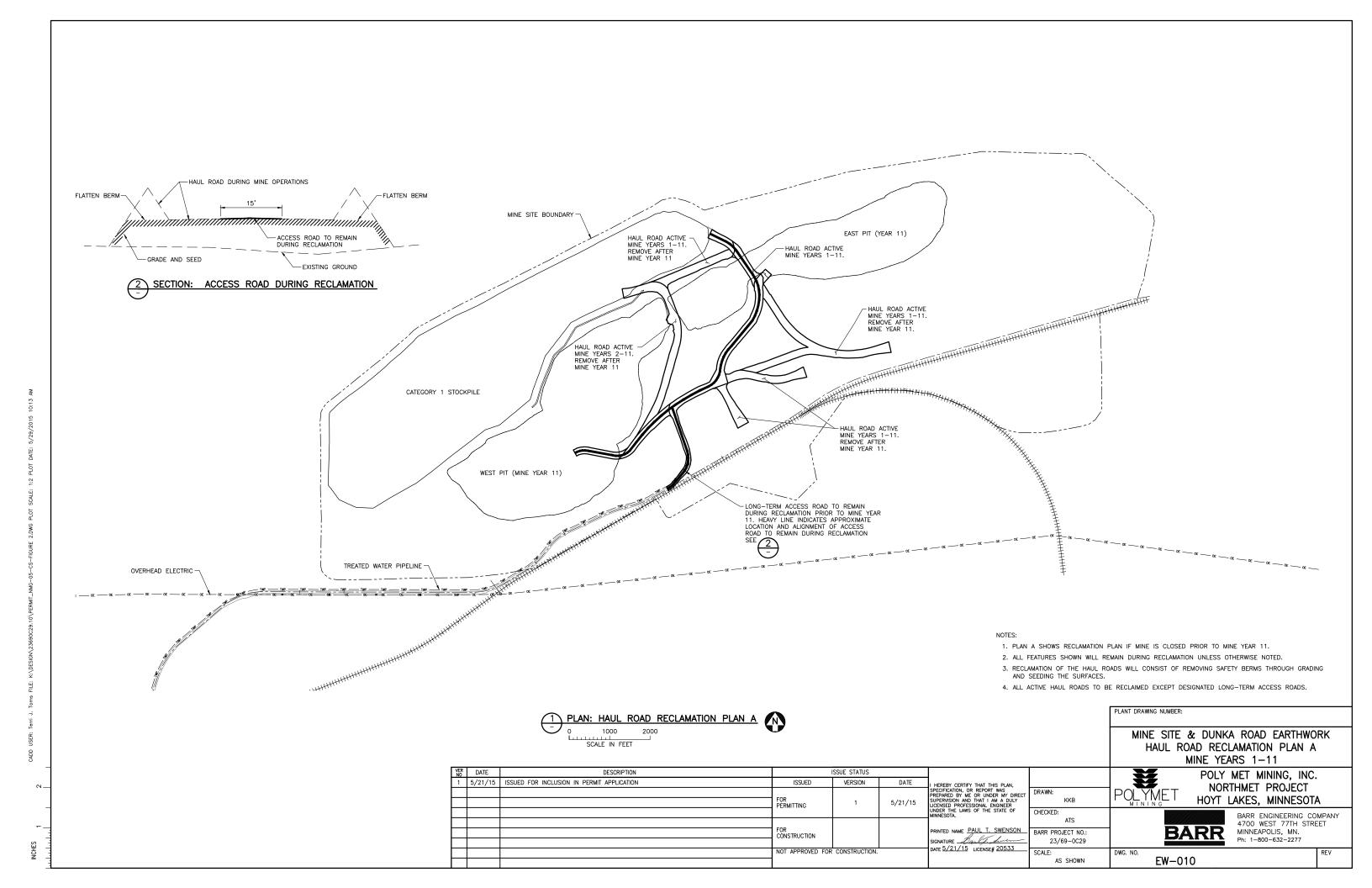
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

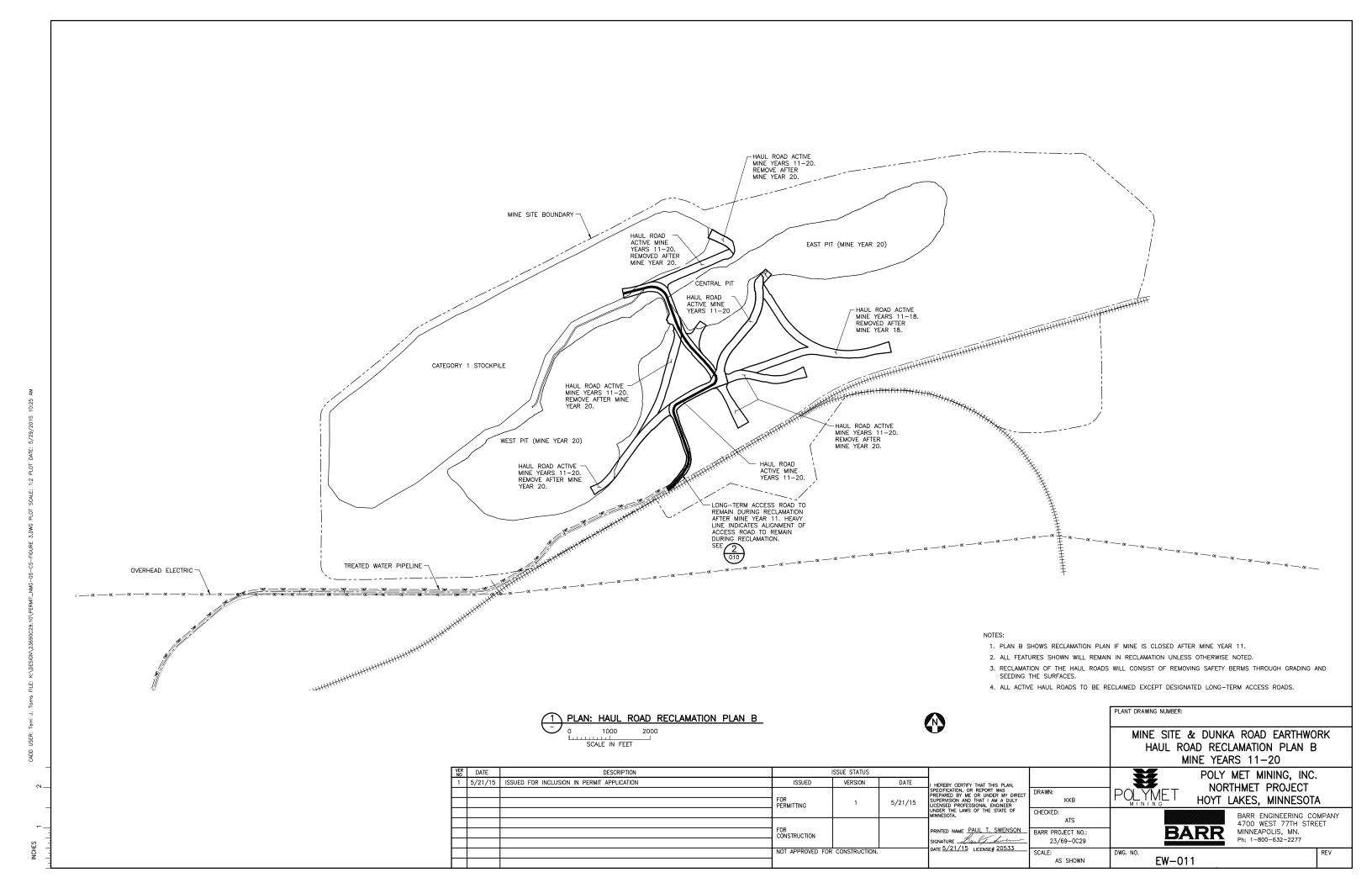
BARR

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

EW-008







Category 1, 2/3, and 4 Waste Rock Stockpiles and Ore Surge Pile

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

Permit Application Support Drawings: Categories 1, 2/3, and 4 Stockpiles and Ore Surge Pile Design

July 2016 (version 2)

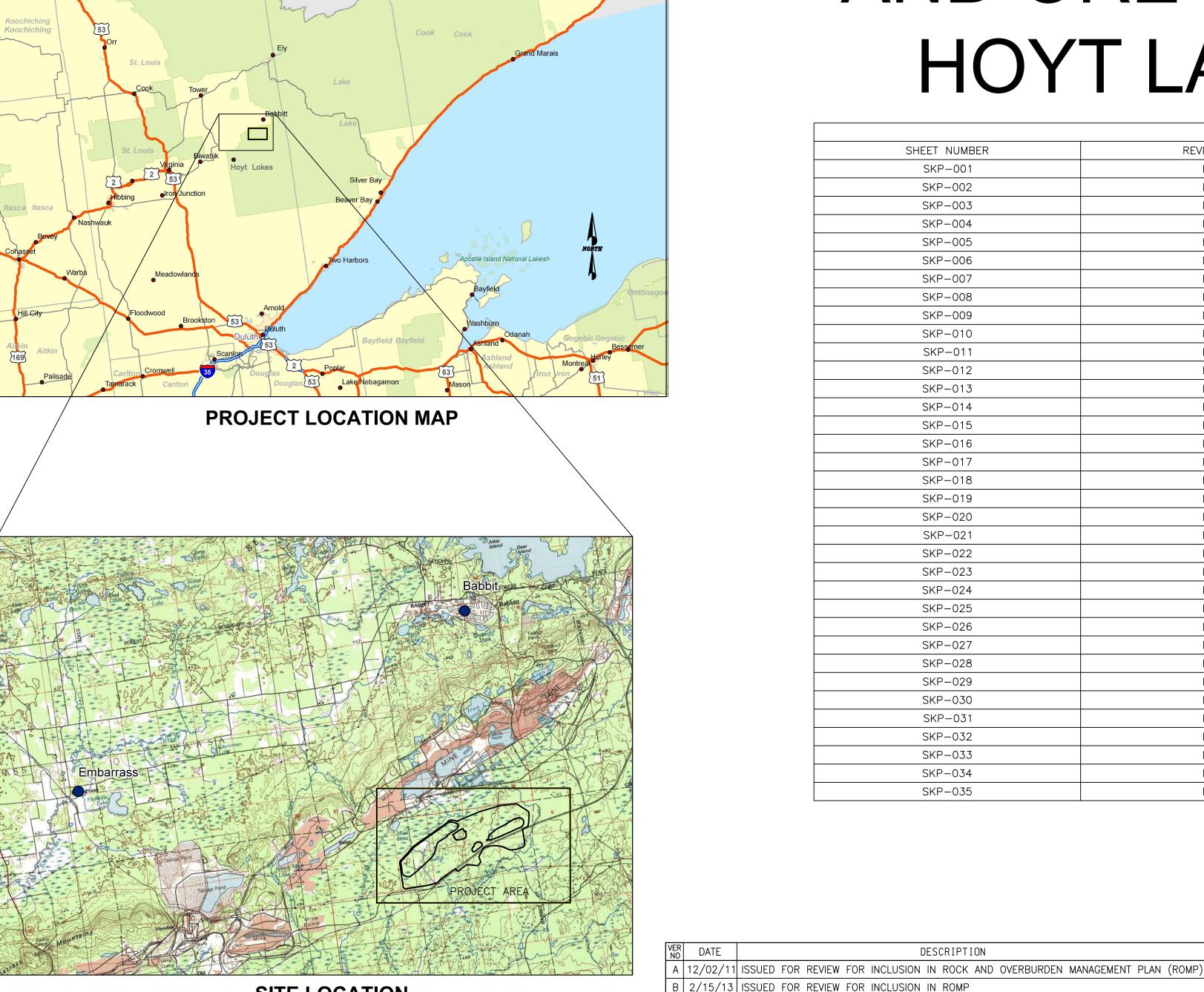
Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".

POLY MET MINING, INC. NORTHMET PROJECT PERMIT APPLICATION SUPPORT DRAWINGS CATEGORIES 1, 2/3, AND 4 STOCKPILES

AND ORE SURGE PILE DESIGN HOYT LAKES, MINNESOTA

		DRAWING LIST			
SHEET NUMBER	REVISION	SHEET TITLE			
SKP-001	E	TITLE SHEET AND LOCATION MAP			
SKP-002	E	LEGEND, GENERAL NOTES AND SPECIFICATIONS			
SKP-003	E	STOCKPILE LAYOUTS - MINE YEAR 1 LIMITS			
SKP-004	E	STOCKPILE LAYOUTS - MINE YEAR 2 LIMITS			
SKP-005	E	STOCKPILE LAYOUTS - MINE YEAR 11 LIMITS			
SKP-006	E	STOCKPILE LAYOUTS - MINE YEAR 21 LIMITS CLOSURE CONFIGURATION			
SKP-007	E	EXISTING SITE CONDITIONS			
SKP-008	E	SITE LAYOUT AND LOCATION OF FIELD INVESTIGATIONS			
SKP-009	E	DEPTH TO BEDROCK ISOPACH MAP			
SKP-010	E	CATEGORY 1 STOCKPILE SUBGRADE EXCAVATION PLAN			
SKP-011	E	CATEGORY 1 STOCKPILE MINE YEAR 1 CONTINGENCY CLOSURE CONFIGURATION			
SKP-012	E	CATEGORY 1 STOCKPILE FINAL GRADES AND SUB-BASIN DELINEATION			
SKP-013	E	CATEGORY 1 STOCKPILE DESIGN SECTIONS			
SKP-014	E	CATEGORY 2/3 STOCKPILE SUBGRADE EXCAVATION PLAN			
SKP-015	E	CATEGORY 2/3 STOCKPILE FOUNDATION GRADING PLAN - MINE YEAR 1 AND MAXIMUM			
SKP-016	E	CATEGORY 2/3 STOCKPILE UNDERDRAIN PIPING PLAN - MINE YEAR 1 AND MAXIMUM			
SKP-017	E	CATEGORY 2/3 STOCKPILE OVERLINER DRAINAGE PIPING PLAN - MINE YEAR 1 AND MAXIMUM			
SKP-018	E	CATEGORY 2/3 STOCKPILE MAXIMUM CAPACITY CONFIGURATION			
SKP-019	E	CATEGORY 2/3 STOCKPILE DESIGN SECTIONS			
SKP-020	E	CATEGORY 4 STOCKPILE SUBGRADE EXCAVATION PLAN			
SKP-021	E	CATEGORY 4 STOCKPILE FOUNDATION GRADING PLAN — MINE YEAR 1 AND MAXIMUM			
SKP-022	E	CATEGORY 4 STOCKPILE UNDERDRAIN PIPING PLAN — MINE YEAR 1 AND MAXIMUM CATEGORY 4 STOCKPILE UNDERDRAIN PIPING PLAN — MINE YEAR 1 AND MAXIMUM			
SKP-023	E	CATEGORY 4 STOCKPILE OVERLINER DRAINAGE PIPING PLAN - MINE YEAR 1 AND MAXIMUM			
SKP-024	E	CATEGORY 4 STOCKPILE MAXIMUM CAPACITY CONFIGURATION			
SKP-025	E	CATEGORY 4 STOCKPILE DESIGN SECTIONS			
SKP-026	E	ORE SURGE PILE SUBGRADE EXCAVATION PLAN			
SKP-027	E	ORE SURGE PILE FOUNDATION GRADING PLAN			
SKP-028	E	ORE SURGE PILE UNDERDRAIN PIPING PLAN			
SKP-029	E	ORE SURGE PILE OVERLINER DRAINAGE PIPING PLAN			
SKP-030	E	ORE SURGE PILE TYPICAL CONFIGURATION			
SKP-031	E	ORE SURGE PILE DESIGN SECTIONS			
SKP-032	E	CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER - MANAGEMENT DETAILS - SHEET 1 OF 2			
SKP-033	E	CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER - MANAGEMENT DETAILS - SHEET 2 OF 2			
SKP-034	E	CATEGORY 1 STOCKPILE PHASED COVER DESIGN			
SKP-035	E	CONSTRUCTION DETAILS			



SITE LOCATION

DATE

C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP

E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

D | 1/14/14 | ISSUED FOR AGENCY REVIEW

DESCRIPTION

TITLE SHEET AND LOCATION MAP POLY MET MINING, INC. NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA

PLANT DRAWING NUMBER:

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

SKP-001

GOLDER PROJECT NO.: F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON 113-2209 DATE <u>5/22/15</u> LICENSE # 46492 NOT APPROVED FOR CONSTRUCTION. AS SHOWN

ISSUED

PERMITTING

ISSUE STATUS

VERSION

DATE

HFREBY CERTIFY THAT THIS PLAN,

SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT

CHECKED:

SUPERVISION AND THAT I AM A DULY

ICENSED PROFESSIONAL ENGINEER

IINNESOTA.

JNDER THE LAWS OF THE STATE OF

SLOPE DIRECTION

MAJOR FEATURE

EXISTING GROUND TOPOGRAPHY (SEE NOTE 2)

PROPOSED FINISHED GRADE TOPOGRAPHY

- CROSS SECTION IDENTIFIER SHEET WHERE SECTION IS LOCATED SLOPE

> HAUL ROADS MINE SITE BOUNDARY

> > PIT BOUNDARY

 MINE YEAR 1 ORE, WASTE ROCK STOCKPILE LIMITS — — — — MAXIMUM ORE, WASTE ROCK STOCKPILE LIMITS GEOMEMBRANE BARRIER LAYER

SOIL LINER 1

PREPARED SUBGRADE

SOIL LINER 2

STRUCTURAL FILL

WASTE ROCK OR ORE

GRANULAR DRAINAGE MATERIAL 1 COMMON FILL 1

RIPRAP

DRAIN ROCK

RANDOM FILL

OVERBURDEN MATERIAL

VERTICAL PERCOLATION LAYER (USCS - ML)

LATERAL DRAINAGE LAYER (USCS - SP OR SM)

TERTIARY COLLECTION PIPING

4-INCH

6-INCH

10-INCH 12-INCH

PRIMARY AND SECONDARY COLLECTION PIPING _____ 4-INCH

_____ 8-INCH

LIST OF ABBREVIATIONS

ABOVE MEAN SEA LEVEL CUBIC YARD CY DIAMETER DIA. ELEVATION

FEET HIGH DENSITY POLYETHYLENE INSIDE DIAMETER

MAX. AMERICAN ENGINEERING TESTING, INC. MIN.

SHALLOW MARSH

SHRUB SWAMP

BOREHOLES (2010)

CONIFEROUS SWAMP

GOLDER ASSOC. TEST PIT (2006)

BARR ENGINEERING BOREHOLES (2005)

BARR ENGINEERING BOREHOLES (2008)

HARDWOOD SWAMP

CONIFEROUS BOG

GATP-06-7-

SB-05-01

RS-11-

SEDGE MEADOW

OPEN BOG

EVAPOTRANSPIRATION

LINEAR LOW DENSITY POLYETHYLENE LEAK COLLECTION AND RECOVERY SYSTEM LCRS MAXIMUM

MINIMUM N.T.S. NOT TO SCALE OUTSIDE DIAMETER OD SQUARE YARD

TYP. **TYPICAL** ROMP ROCK AND OVERBURDEN MANAGEMENT PLAN USCS UNIFIED SOIL CLASSIFICATION SYSTEM PERFORATED CORRUGATED POLYETHYLENE CPEP

GENERAL NOTES:

- THIS DRAWING SET REPRESENTS THE DESIGN FOR PERMITTING FOR CATEGORY 1 STOCKPILE, CATEGORY 2/3 STOCKPILE. CATEGORY 4 STOCKPILE AND ORE SURGE PILE FOR THE POLYMET NORTHMET PROJECT IN HOYT LAKES, MINNESOTA, PREPARED IN SUPPORT OF A PERMIT TO MINE. THE DRAWING SET ONLY INCLUDES INFRASTRUCTURE ASSOCIATED WITH THE MOVEMENT OF ROCK (STOCKPILES, PITS, HAUL ROADS, AND RAIL TRANSFER HOPPER) AND NOT OTHER SUPPORT FACILITIES.
- 2. BASE TOPOGRAPHY PROVIDED BY BARR ENGINEERING IN AUGUST 2011.
- 3. GOLDER ASSOCIATES INC. (GOLDER) IS RESPONSIBLE FOR STOCKPILE DESIGNS WITH BATTERY LIMITS DEFINED BY THE PERIMETER/LINER BERMS AND THE UNDERDRAIN SUMPS.
- 4. AT THE BASIC ENGINEERING LEVEL, LIMITED GEOTECHNICAL DATA EXISTS, PARTICULARLY IN LOWLAND AREAS. ADDITIONAL DATA WILL BE OBTAINED FROM THESE AREAS AFTER THE PERMIT TO MINE IS APPROVED. SUBGRADE EXCAVATION PLANS WERE DEVELOPED USING AVAILABLE INFORMATION, AND WILL BE UPDATED FOR FINAL DESIGN BASED ON RESULTS OF PHASE II GEOTECHNICAL INVESTIGATION.
- 5. EARTHWORK QUANTITIES BASED ON NEAT LINE (I.E., NET CUT/ FILL SHRINKAGE FACTOR = 1.0).
- PREPARED SUBGRADE, AS DEFINED ON THE DRAWINGS, INCLUDES CLEARING, GRUBBING, TOPSOIL REMOVAL, REMOVAL OF GEOTECHNICALLY-UNSUITABLE MATERIALS, MOISTURE CONDITIONING, AND SUBGRADE COMPACTION AS DEFINED IN THE SPECIFICATIONS.
- 7. FOUNDATION PREPARATION ASSUMES THE FOLLOWING GENERAL CONSTRUCTION SEQUENCE: (I) EXCAVATE TO BEDROCK WITHIN LOWLAND AREAS ASSUMING A MAXIMUM DEPTH OF OVER-EXCAVATION OF 20 FEET, OR UNTIL REACHING GEOTECHNICALLY-SUITABLE FOUNDATION SOILS AS DETERMINED BY THE PHASE II GEOTECHNICAL INVESTIGATION. STOCKPILE ORGANIC SOILS AND TILL MATERIAL SEPARATELY FOR FUTURE USE AS RECLAMATION SOILS AND STRUCTURAL FILL; (II) PLACE STRUCTURAL FILL AS REQUIRED TO MEET THE FOUNDATION GRADE REQUIREMENTS WITH GRANULAR SOILS, E.G., CATEGORY 1 WASTE ROCK MATERIAL; (III) ESTABLISH FOUNDATION DRAINAGE AS REQUIRED TO PREVENT EXCESS PORE PRESSURES DURING OPERATION; AND (IV) CONSTRUCT LINER SYSTEM DEPENDENT UPON THE REACTIVITY CATEGORY OF THE STOCKPILE MATERIAL.
- AREAS WITH UNSUITABLE SOILS (LOWLAND AREAS) ARE ASSUMED TO COINCIDE WITH THE PREVIOUSLY IDENTIFIED WETLAND AREAS. HORIZONTAL AND VERTICAL EXTENTS OF LOWLAND AREAS ARE EXPECTED TO BE REVISED BASED ON RESULTS OF PHASE II GEOTECHNICAL INVESTIGATION.
- 9. POST-CONSOLIDATION STOCKPILE SETTLEMENTS WERE ESTIMATED BASED ON LIMITED INFORMATION ON THE CONSOLIDATION PROPERTIES OF SUBGRADE MATERIALS. HENCE, FOUNDATION EXCAVATION AND GRADING PLANS ARE ANTICIPATED TO UNDERGO MINOR MODIFICATIONS BASED ON THE RESULTS OF THE PHASE II GEOTECHNICAL INVESTIGATION TO ENSURE SUFFICIENT DRAINAGE.
- 10. CATEGORY 1 WASTE ROCK STOCKPILE WILL BE RECLAIMED BY PLACEMENT OF A GEOMEMBRANE COVER AT CLOSURE. PRIOR TO CLOSURE, WASTE ROCK CATEGORY 2, 3 AND 4 WILL BE USED TO BACKFILL EAST PIT.
- 11. LIMITS OF DISTURBANCE (I.E., CLEARING LIMITS) ASSUMED TO BE 40 FEET FROM THE FACILITY

SPECIFICATIONS:

- 1. FOR EARTHWORKS COMPONENTS OF THE STOCKPILE DESIGN, REFER TO SECTION 2300 OF THE PROJECT SPECIFICATIONS.
- 2. FOR GEOSYNTHETIC AND PIPING COMPONENTS OF THE STOCKPILE DESIGN, REFER TO SECTION 2272 FOR GEOTEXTILE, 2273 FOR POLYETHYLENE GEOMEMBRANE LINERS, AND SECTION 2610

DATE <u>5/22/15</u> LICENSE # 46492

- 3. QUALITY ASSURANCE REQUIREMENTS FOR STOCKPILE CONSTRUCTION ARE DEFINED IN THE CONSTRUCTION QUALITY ASSURANCE PLAN.
- 4. SPECIFICATION SECTION NUMBERING IS PRELIMINARY.

PLANT DRAWING NUMBER:

SKP-002

LEGEND, GENERAL NOTES AND SPECIFICATIONS

ISSUE STATUS DATE DESCRIPTION A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) ISSUED VERSION DATE HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS
PREPARED BY ME OR UNDER MY DIRECT B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP DRAWN: SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING JNDER THE LAWS OF THE STATE OF D 1/14/14 ISSUED FOR AGENCY REVIEW CHECKED: MINNESOTA. E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS SIGNATURE Allronson GOLDER PROJECT NO.: F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON

NOT APPROVED FOR CONSTRUCTION.

芸 POLYMET Golder

DWG. NO.

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SCALE:

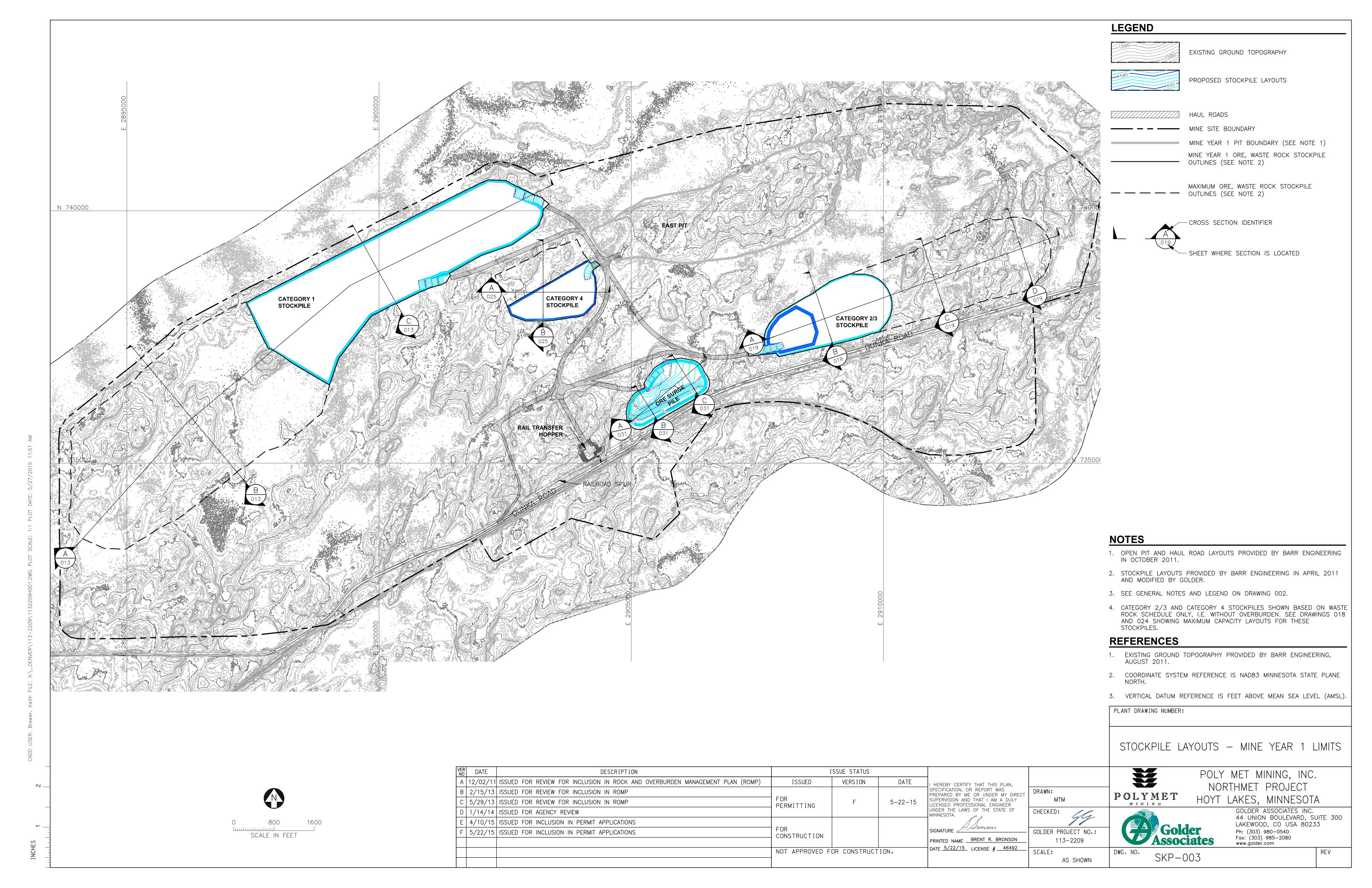
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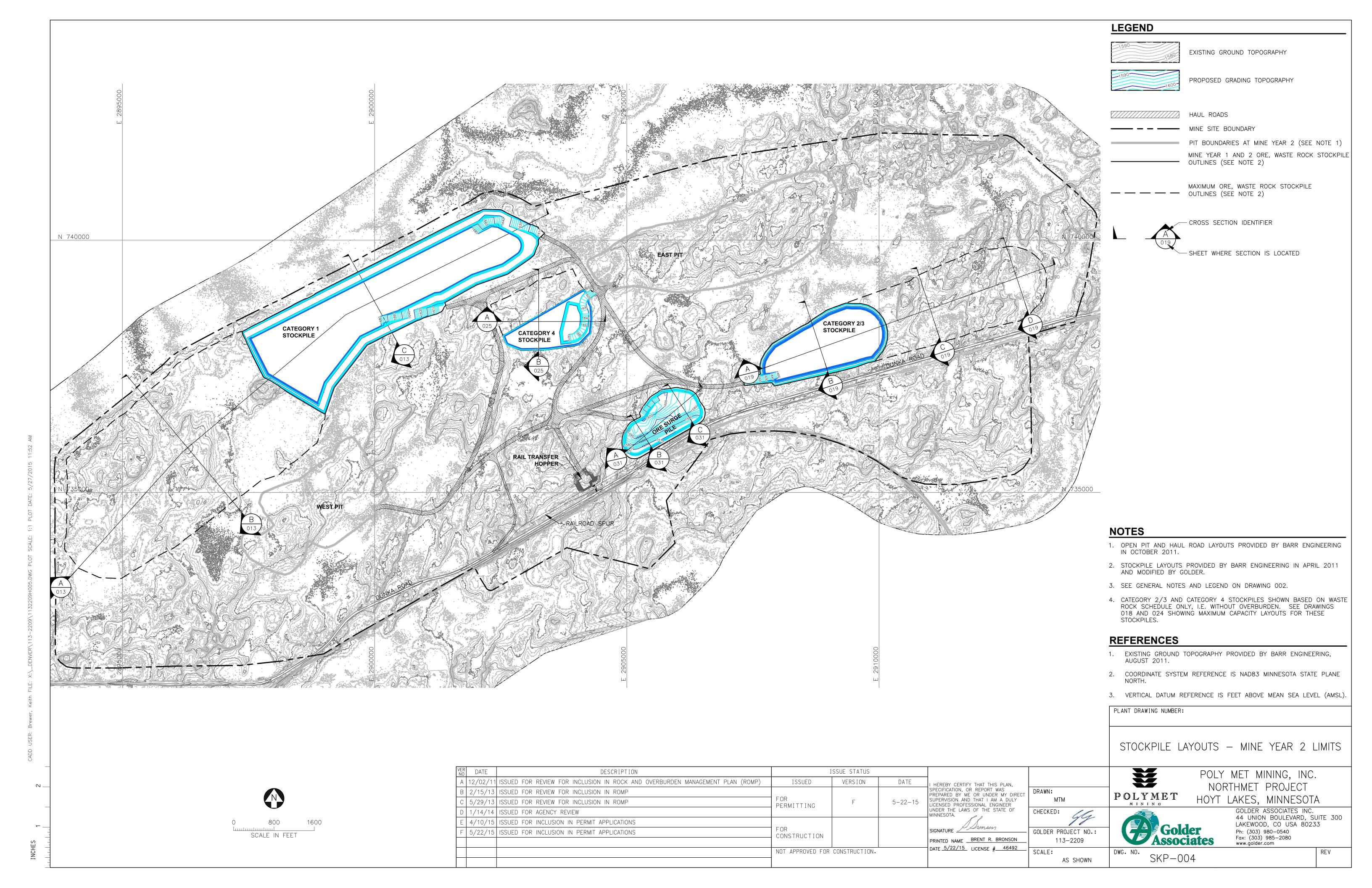
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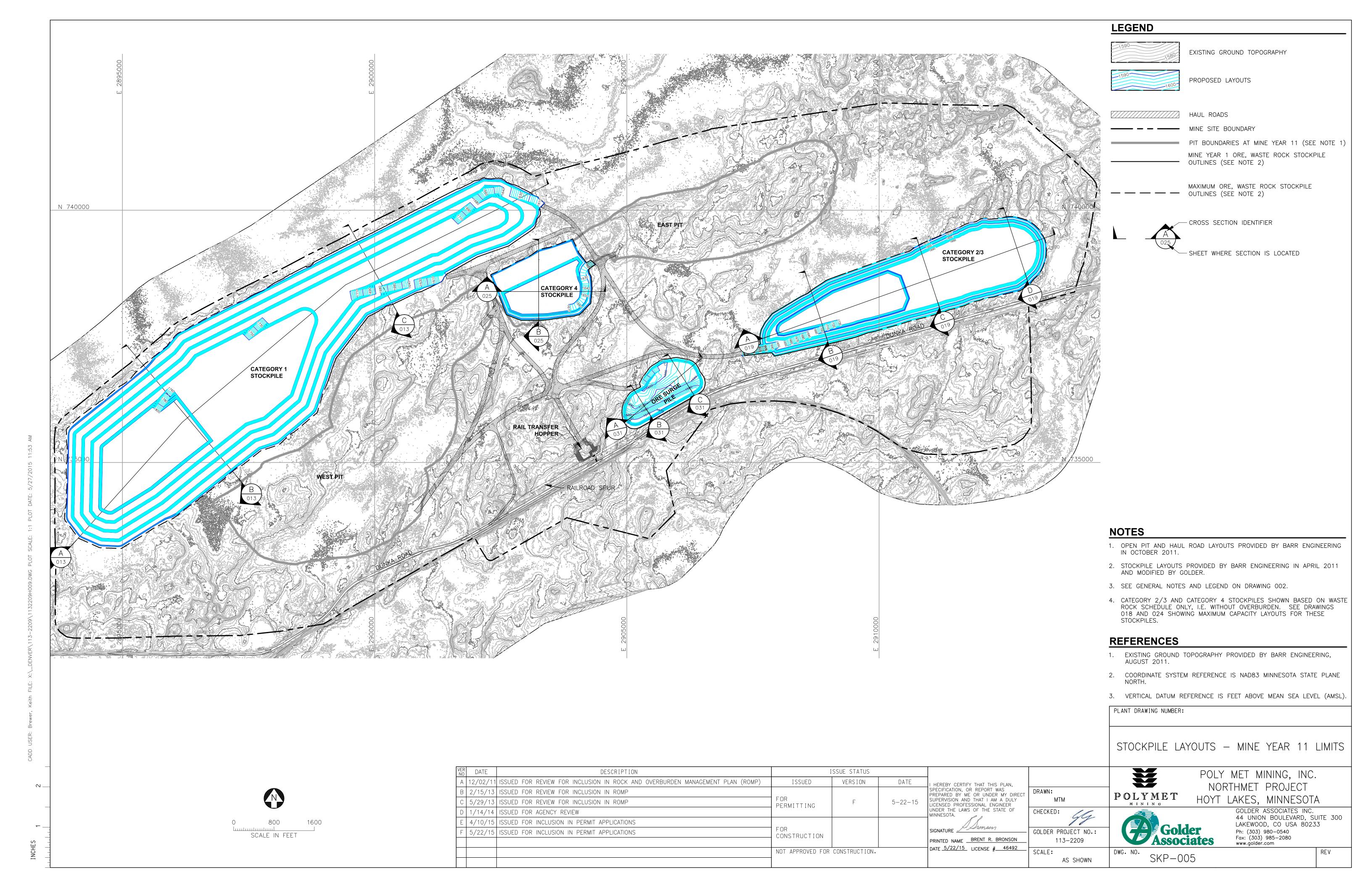
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

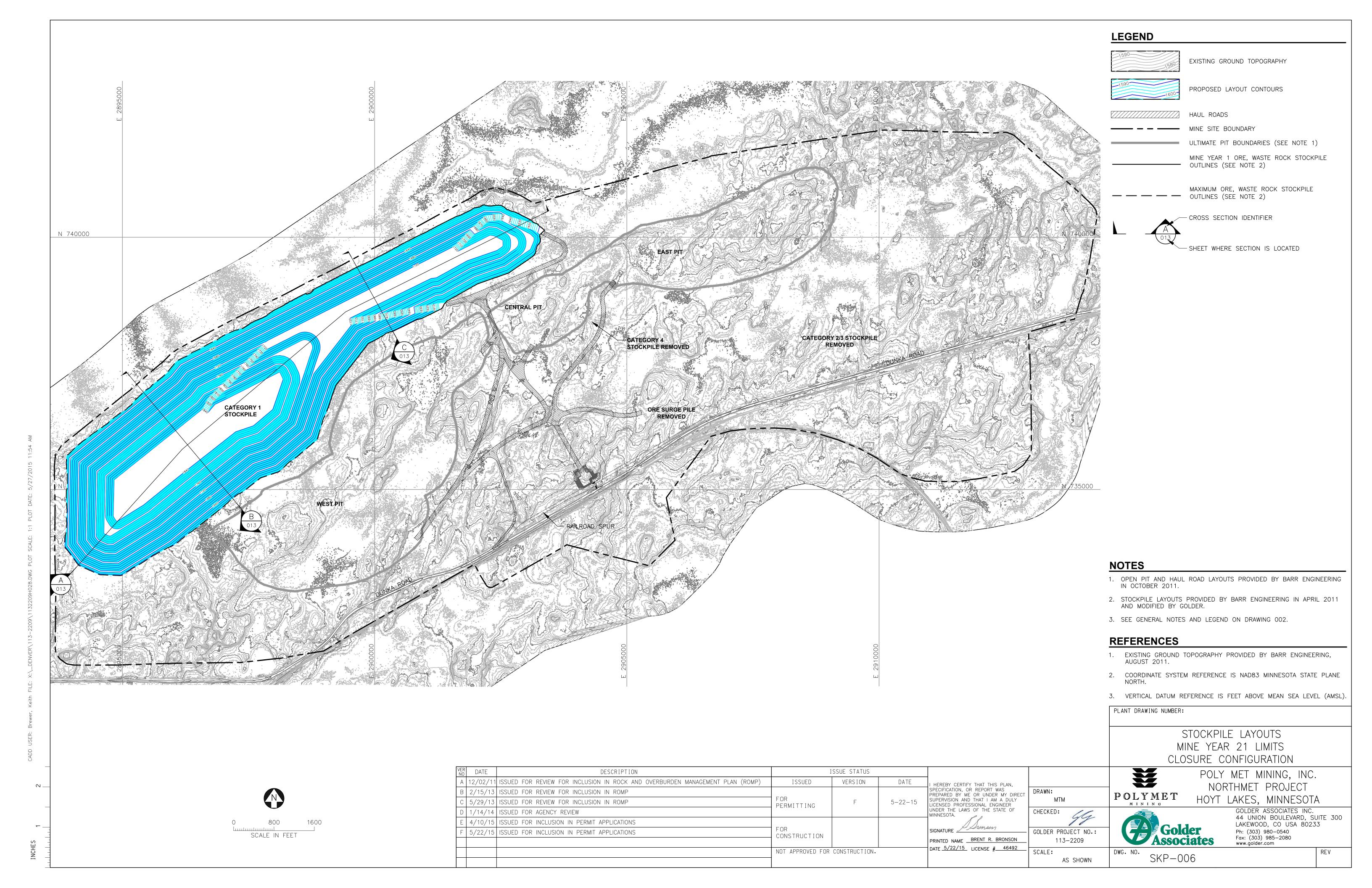
GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 Associates www.golder.com

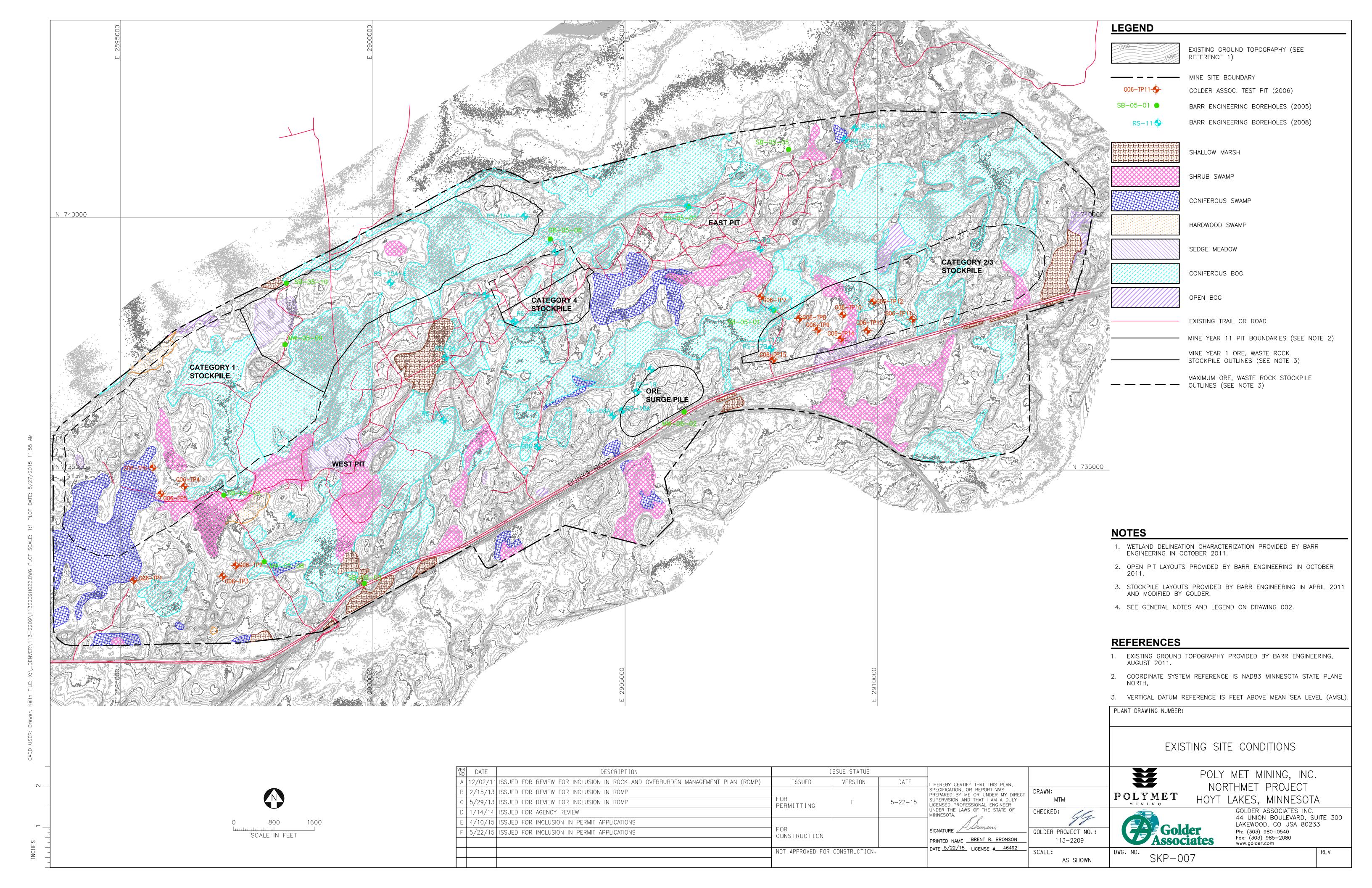
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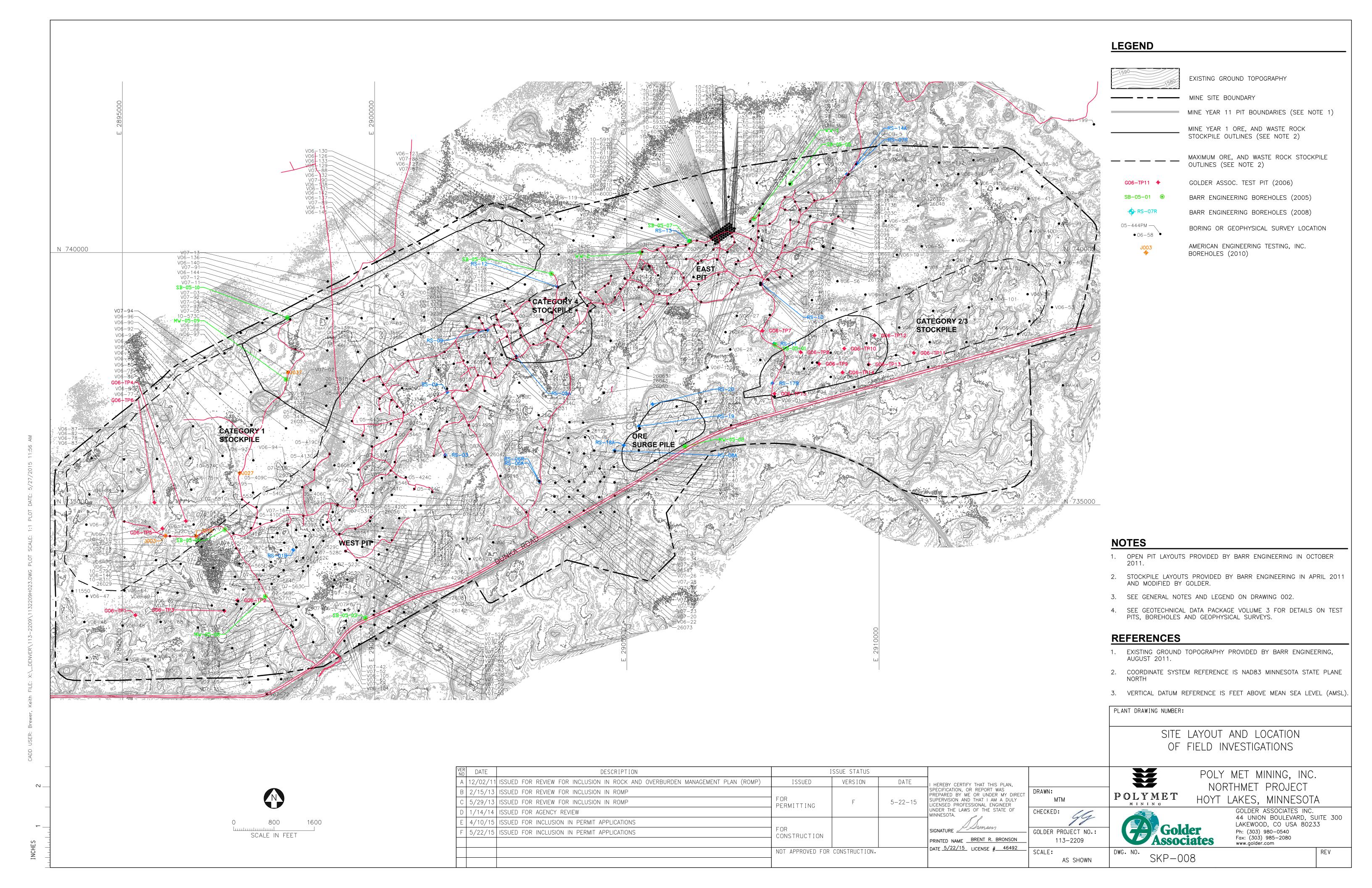


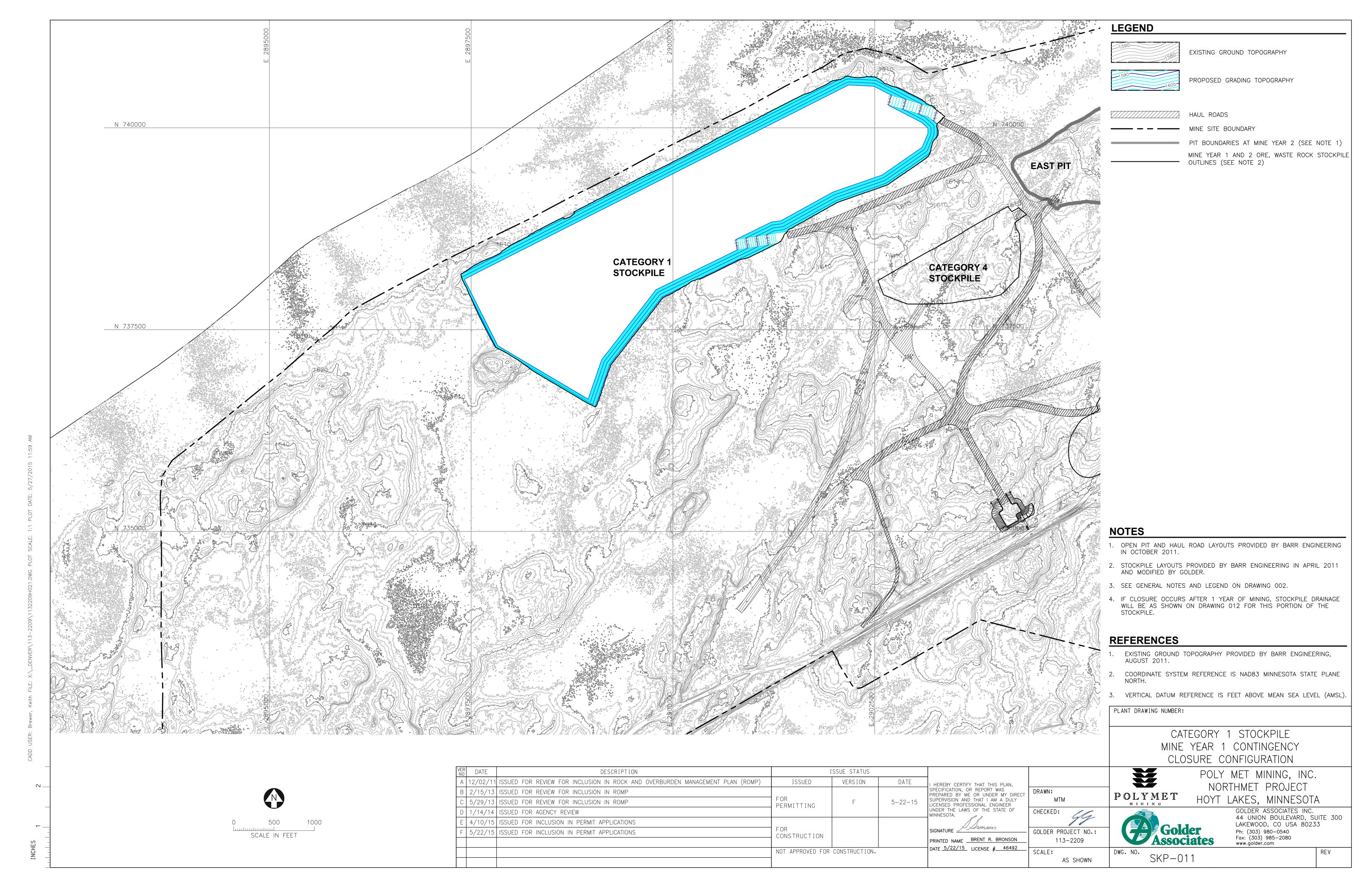


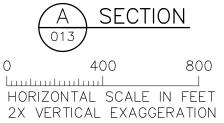


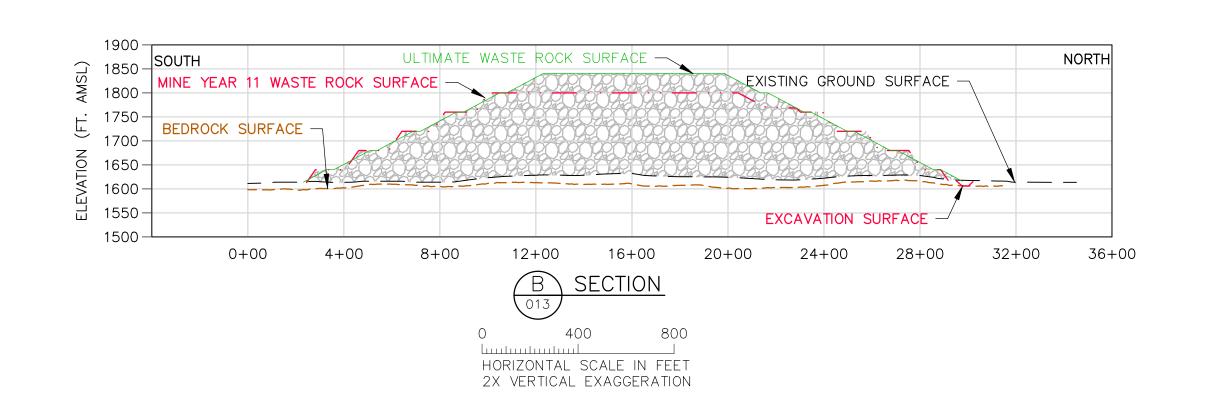


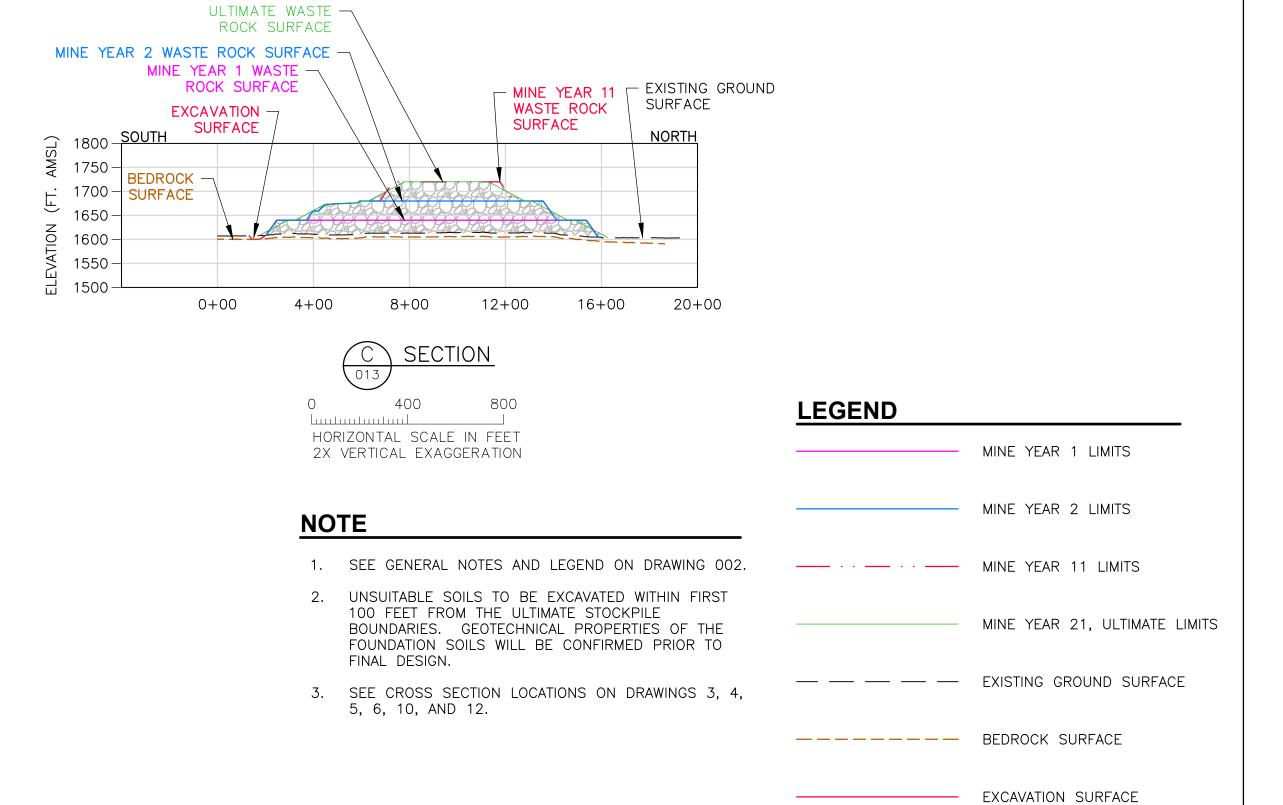












CATEGORY 1 STOCKPILE DESIGN SECTIONS POLY MET MINING, INC.

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

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PLANT DRAWING NUMBER:

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	3 2/15/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:	POLYMET	
	5/29/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP	T FOR PERMITTING	F	5-22-15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	MTM	MINING	HOYT
	1/14/14	ISSUED FOR AGENCY REVIEW				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:		
	E 4/10/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS				Dronsen	77	E A COL	1
	5/22/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	TFOR CONSTRUCTION			SIGNATURE 2	GOLDER PROJECT NO.:	GOL	ier
						PRINTED NAME BRENT R. BRONSON	113-2209	ASSOC ASSOC	iates
			NOT APPROVED FOR	CONSTRUCTION.		DATE <u>5/22/15</u> LICENSE # 46492	SCALE:	DWG. NO. SKP-O	1 7
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SKP-014

AS SHOWN

EXISTING GROUND TOPOGRAPHY (SEE

REFERENCE 1) PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY

PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY

MINE SITE BOUNDARY

CROSS SECTION IDENTIFIER

- SHEET WHERE SECTION IS LOCATED

MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)

MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROADS

MINE DRAINAGE SUMP/POND (SEE NOTE 3)

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE FOUNDATION GRADING PLAN MINE YEAR 1 AND MAXIMUM

POLY MET MINING, INC. NORTHMET PROJECT

POLYMET

HOYT LAKES, MINNESOTA GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

REV

Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com Associates

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MINNESOTA. ISSUED VERSION DATE B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP DRAWN: C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING D 1/14/14 ISSUED FOR AGENCY REVIEW E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS SIGNATURE Librarsen F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON

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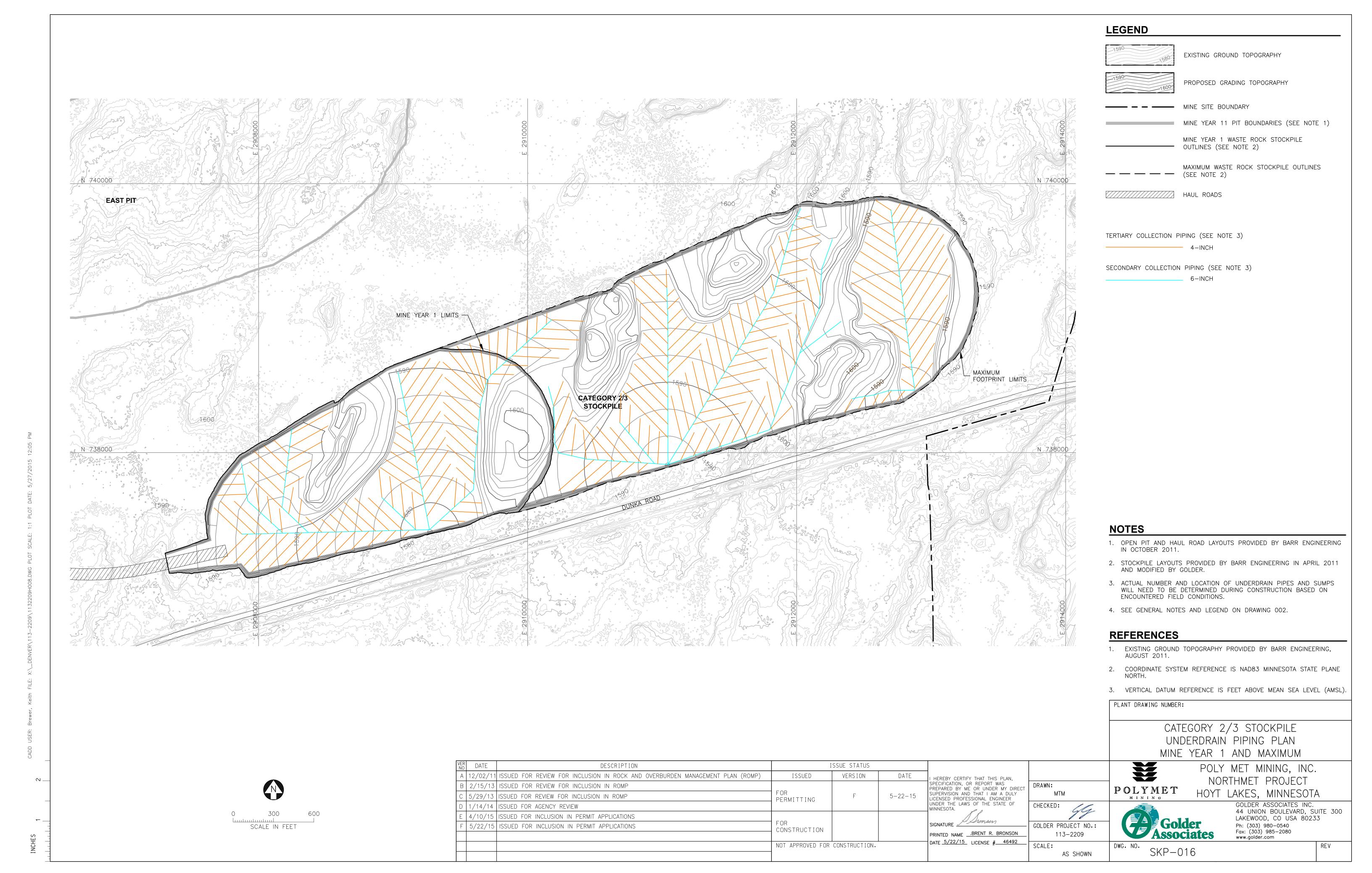
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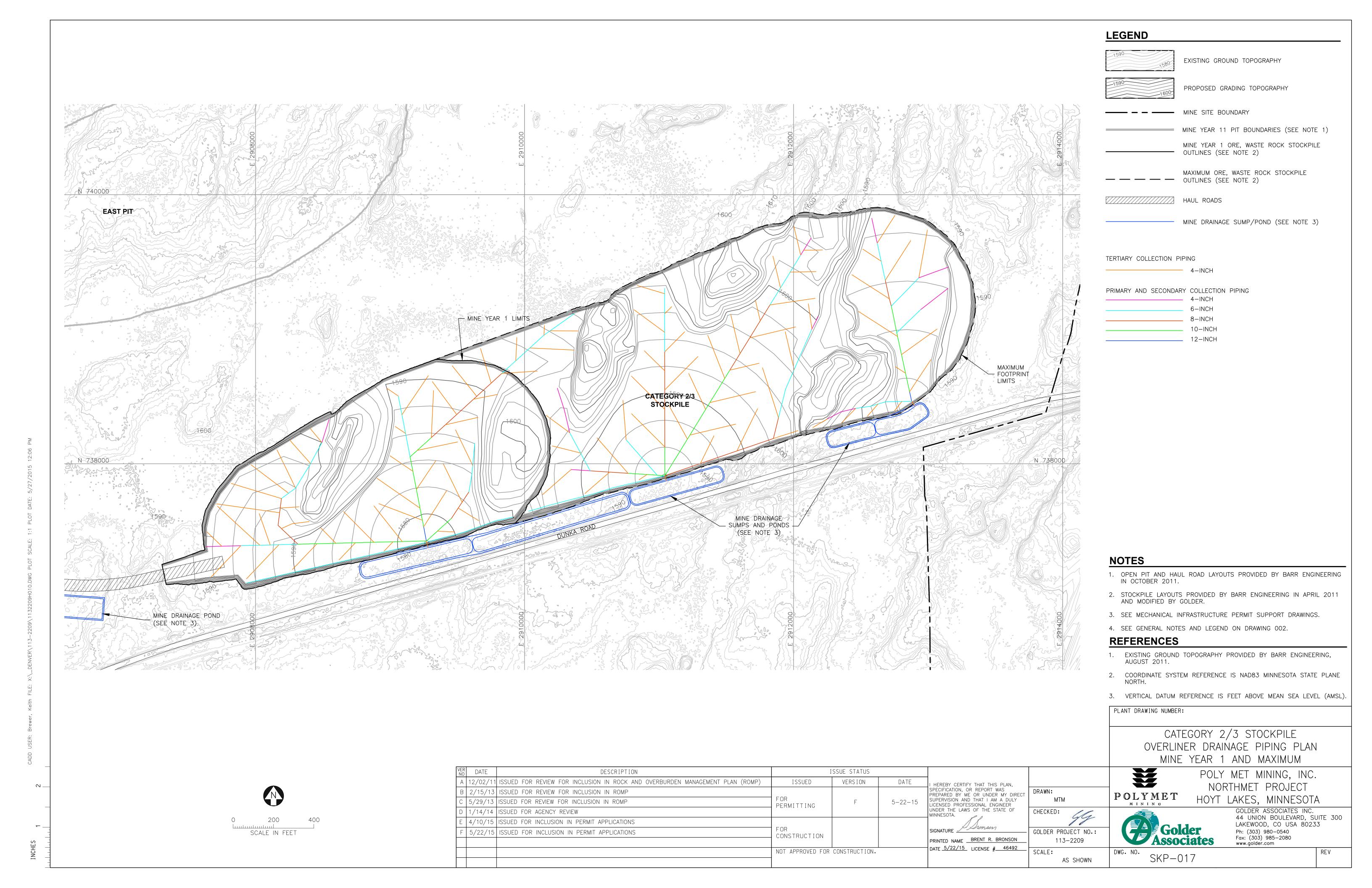
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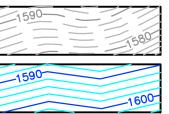
AS SHOWN

DWG. NO. SKP-015

発







EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)

PROPOSED MAXIMUM GRADING TOPOGRAPHY

MINE SITE BOUNDARY

CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

PROPOSED HAUL ROAD

MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE MAXIMUM CAPACITY CONFIGURATION

P O L Y M E T

POLY MET MINING, INC. NORTHMET PROJECT

HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

SKP-018

SCALE IN FEET

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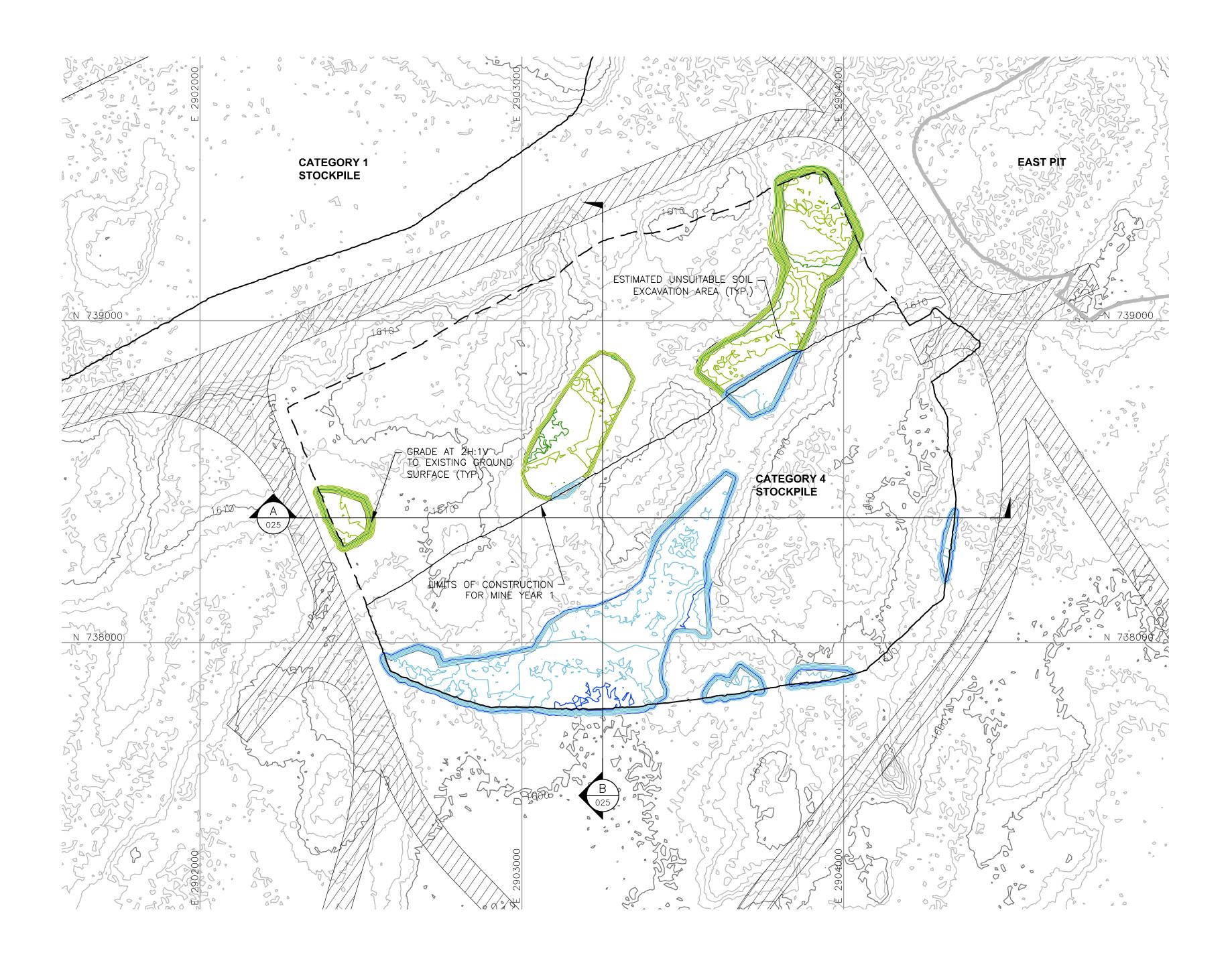
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UNDER THE LAWS OF THE STATE OF DRAWN: CHECKED: MINNESOTA. Densen SIGNATURE 🚄

GOLDER PROJECT NO.: PRINTED NAME BRENT R. BRONSON 113-2209 DATE <u>5/22/15</u> LICENSE # 46492 SCALE:

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DESCRIPTION

A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)

VER DATE

NOTES

LEGEND

EXISTING GROUND TOPOGRAPHY (SEE

MINE YEAR 1 WASTE ROCK STOCKPILE

MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)

- SHEET WHERE SECTION IS LOCATED

— CROSS SECTION IDENTIFIER

MAXIMUM WASTE ROCK STOCKPILE

PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY

PROPOSED MAXIMUM FOOTPRINT EXCAVATION

REFERENCE 1)

TOPOGRAPHY

OUTLINES (SEE NOTE 2)

— OUTLINES (SEE NOTE 2)

- - MINE SITE BOUNDARY

HAUL ROADS

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

CATEGORY 4 STOCKPILE SUBGRADE EXCAVATION PLAN

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DRAWN:

CHECKED:

SCALE:

MTM

GOLDER PROJECT NO.:

113-2209

AS SHOWN

PLANT DRAWING NUMBER:

POLY MET MINING, INC. NORTHMET PROJECT

HOYT LAKES, MINNESOTA

DWG. NO.

SKP-020

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MINNESOTA. B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING D 1/14/14 ISSUED FOR AGENCY REVIEW E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS SIGNATURE Librarsen F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE # 46492 NOT APPROVED FOR CONSTRUCTION.

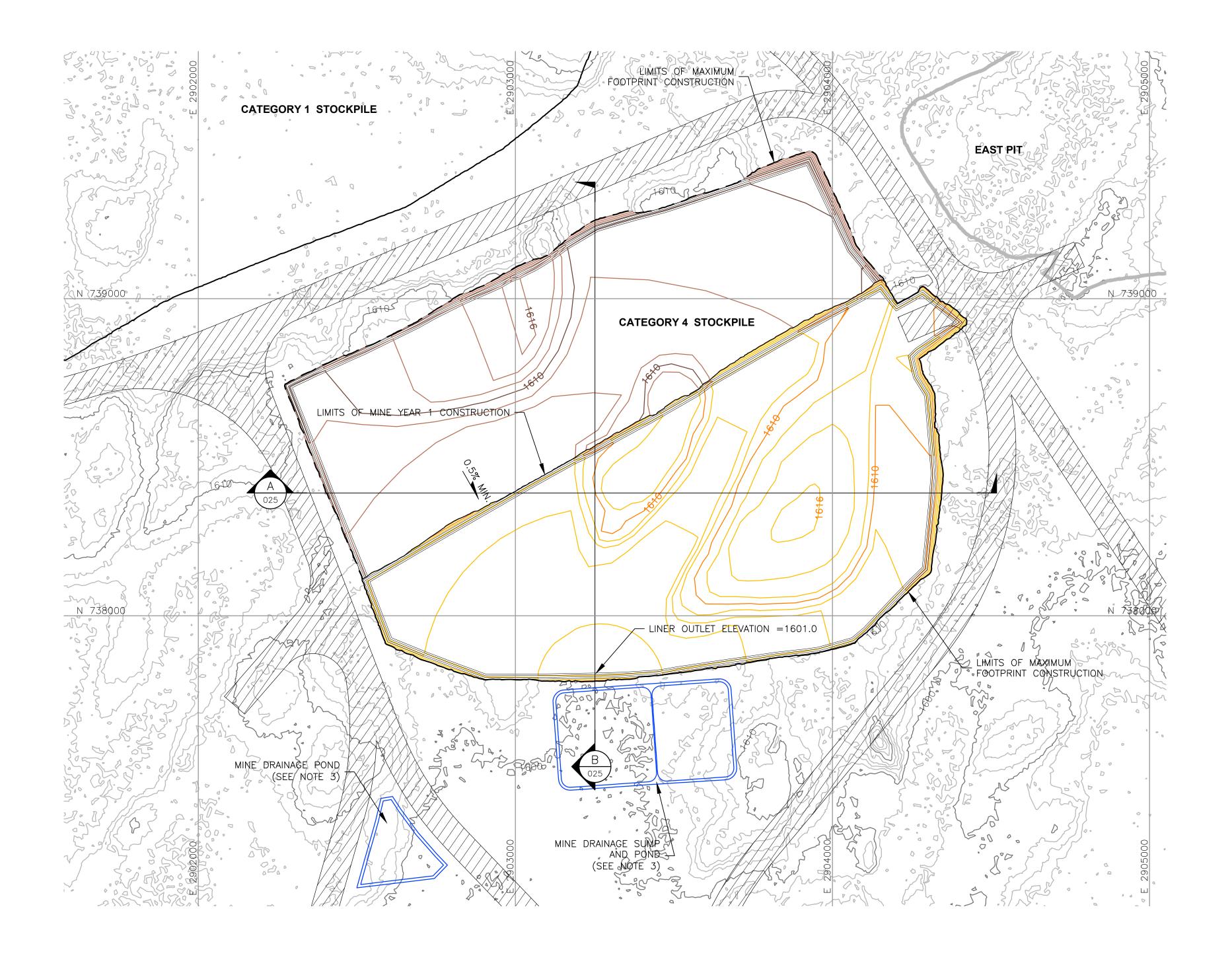
ISSUE STATUS

VERSION

DATE

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SCALE IN FEET



DESCRIPTION

A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)

B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

D 1/14/14 ISSUED FOR AGENCY REVIEW

VER DATE

LEGEND

EXISTING GROUND TOPOGRAPHY (SEE

REFERENCE 1)

PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY

PROPOSED MAXIMUM FOOTPRINT GRADING

- MINE SITE BOUNDARY

- CROSS SECTION IDENTIFIER

TOPOGRAPHY

- SHEET WHERE SECTION IS LOCATED

SLOPE

MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROAD

MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)

MINE DRAINAGE SUMP/POND (SEE NOTE 3)

NOTES

OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.

2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011

- AND MODIFIED BY GOLDER.
- 3. SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE FOUNDATION GRADING PLAN MINE YEAR 1 AND MAXIMUM

POLY MET MINING, INC. NORTHMET PROJECT

POLYMET

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HOYT LAKES, MINNESOTA GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

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UNDER THE LAWS OF THE STATE OF
MINNESOTA. CHECKED: SIGNATURE Librarsen GOLDER PROJECT NO.: PRINTED NAME BRENT R. BRONSON 113-2209 DATE <u>5/22/15</u> LICENSE # 46492 SCALE:

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ISSUE STATUS

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PERMITTING

CONSTRUCTION

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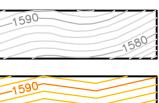
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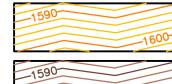
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VER DATE

LEGEND



EXISTING GROUND TOPOGRAPHY



PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY

PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY

----- MINE SITE BOUNDARY

MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)

MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROADS

TERTIARY COLLECTION PIPING (SEE NOTE 3)

4-INCH

SECONDARY COLLECTION PIPING (SEE NOTE 3)

6-INCH

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. ACTUAL NUMBER AND LOCATION OF UNDERDRAIN PIPES AND SUMPS WILL NEED TO BE DETERMINED DURING CONSTRUCTION BASED ON ENCOUNTERED FIELD CONDITIONS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

MTM

113-2209

AS SHOWN

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE UNDERDRAIN PIPING PLAN

MINE YEAR 1 AND MAXIMUM POLY MET MINING, INC.

¥ NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080

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www.golder.com DWG. NO. SKP-022

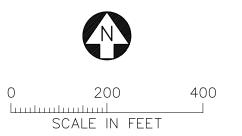
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SUPERVISION AND THAT I AM A DULY
LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF
MINNESOTA. DATE ISSUED VERSION B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP DRAWN: C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING D 1/14/14 ISSUED FOR AGENCY REVIEW CHECKED: E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS Klonson SIGNATURE 🚄 GOLDER PROJECT NO.: F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE # 46492 NOT APPROVED FOR CONSTRUCTION. SCALE:

DESCRIPTION

ISSUE STATUS

EAST PIT CATEGORY 4 STOCKPILE MINE DRAINAGE POND (SEE NOTE 3)



VER NO	DATE	DESCRIPTION	I	SSUE STATUS			
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С	5/29/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP	FOR PERMITTING	F		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	
D	1/14/14	ISSUED FOR AGENCY REVIEW	- I LIKWII I I IIVO			UNDER THE LAWS OF THE STATE OF MINNESOTA.	
Ε	4/10/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS				Densen	
F	5/22/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION			SIGNATURE SIGNATURE	
			CONSTRUCTION			PRINTED NAME BRENT R. BRONSON	
			NOT APPROVED FOR		•	DATE <u>5/22/15</u> LICENSE # 46492	
			- CONSTRUCTION.				

LEGEND

1590	EXISTING GROUND TOPOGRAPHY
1590	PROPOSED MINE YEAR 1 GRADING TOPOGRAP
	PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY
	MINE SITE BOUNDARY
	MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)
	SLOPE
	MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
	MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
	HAUL ROADS
	MINE DRAINAGE SUMP/POND (SEE NOTE 3)
MINE YEAR 1 — TERTIAI	RY COLLECTION PIPING - 4-INCH
MINE YEAR 1 — PRIMAR	AND SECONDARY COLLECTION PIPING 4-INCH 6-INCH 8-INCH 10-INCH 12-INCH

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE OVERLINER DRAINAGE PIPING PLAN MINE YEAR 1 AND MAXIMUM



DRAWN:

CHECKED:

SCALE:

GOLDER PROJECT NO.:

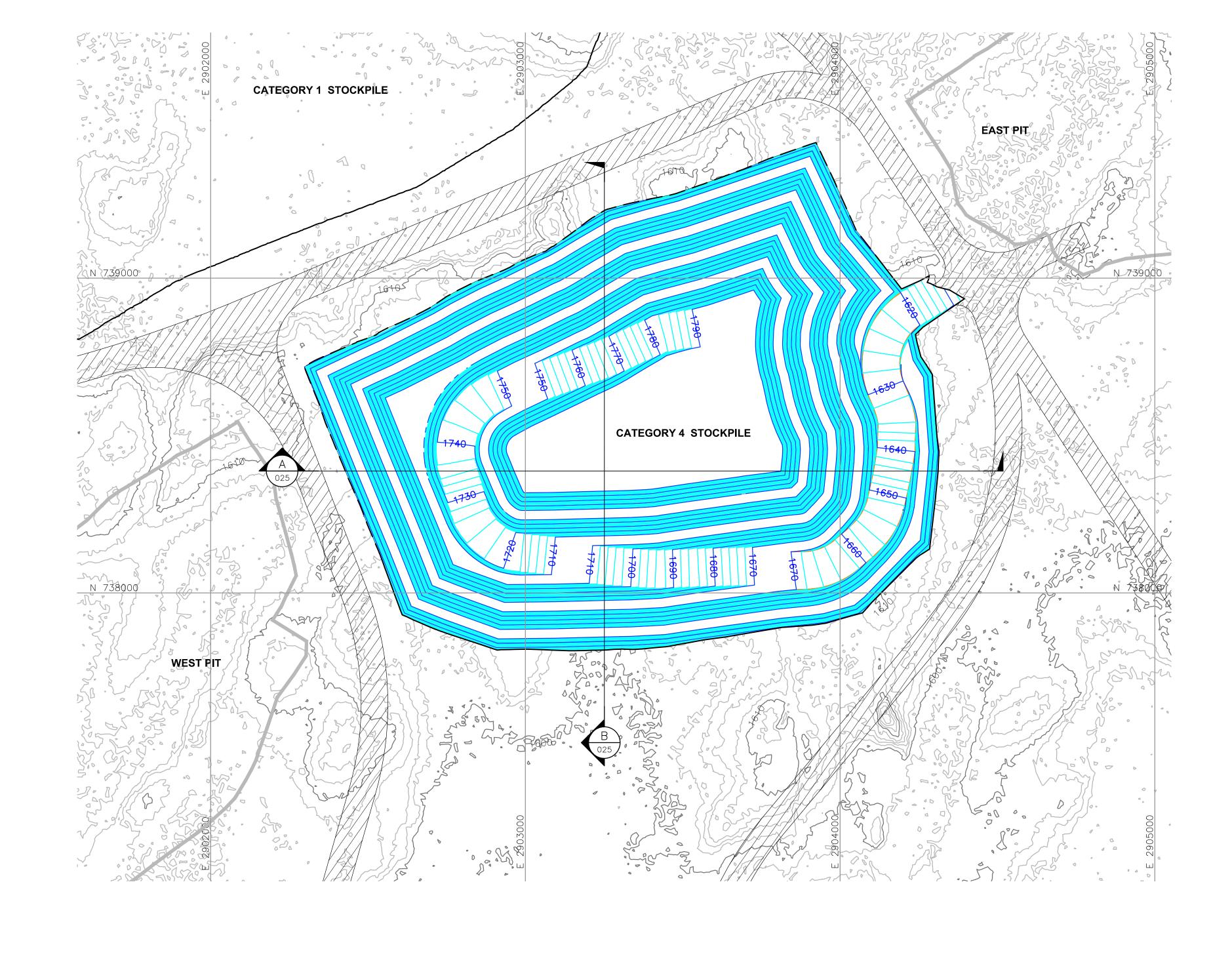
113-2209

AS SHOWN

POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
Fax: (303) 985-2080
www.golder.com

SKP-023



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LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF MINNESOTA. Dronson SIGNATURE ___

CHECKED: PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE # 46492 SCALE:

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POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA



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SKP-024

NOTES

LEGEND

EXISTING GROUND TOPOGRAPHY

- CROSS SECTION IDENTIFIER

MINE YEAR 1 WASTE ROCK STOCKPILE LIMIT (SEE NOTE 1)

- SHEET WHERE SECTION IS LOCATED

- MAXIMUM WASTE ROCK STOCKPILE LIMIT

MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)

PROPOSED MAXIMUM GRADING TOPOGRAPHY

(SEE REFERENCE 1)

MINE SITE BOUNDARY

PROPOSED HAUL ROAD

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

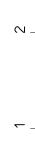
PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE STOCKPILE MAXIMUM CAPACITY CONFIGURATION

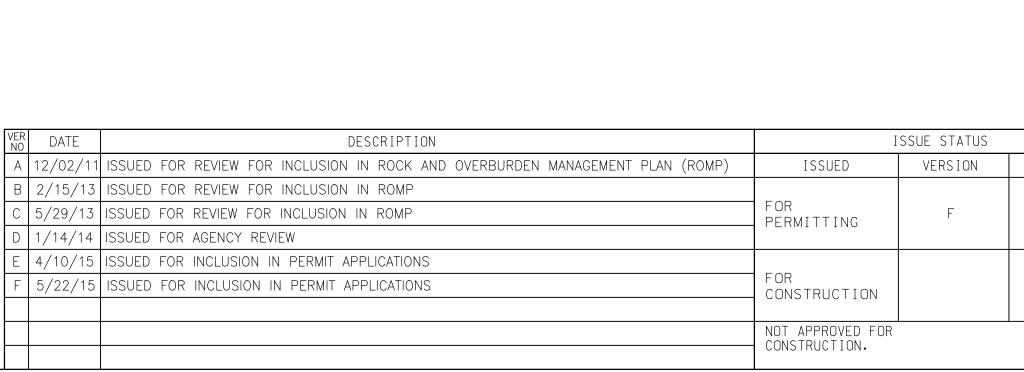
 $\mathbb{P} \underset{\scriptscriptstyle{M}}{\mathsf{OL}} \underset{\scriptscriptstyle{K}}{\mathsf{Y}} \underset{\scriptscriptstyle{K}}{\mathsf{M}} \underset{\scriptscriptstyle{K}}{\mathsf{E}} \mathbb{T}$

AS SHOWN

1850 WEST



SCALE IN FEET



LIMITS OF LINER CONSTRUCTION

ORE SURGE PILE

RAILROAD SPUR

BEDROCK EXCAVATION AREA -

LIMITS OF EXCAVATION

LIMITS OF BEDROCK

DATE 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 5-22-15 MINNESOTA. SIGNATURE & Shonson PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE #<u>46492</u>

DRAWN: MTM CHECKED: GOLDER PROJECT NO.: 113-2209

SCALE:

NORTHMET PROJECT HOYT LAKES, MINNESOTA GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

CATEGORY 2/3

STOCKPILE BOUNDARY

NOTES

LEGEND

EXISTING GROUND TOPOGRAPHY (SEE

MINE YEAR 1 ORE STOCKPILE

- CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

OUTLINES (SEE NOTE 2)

PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY

REFERENCE 1)

-- MINE SITE BOUNDARY

HAUL ROADS

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

ORE SURGE PILE SUBGRADE EXCAVATION PLAN

 $\mathbb{P} \underset{\scriptscriptstyle{M}}{\mathsf{OL}} \underset{\scriptscriptstyle{X}}{\mathsf{Y}} \underset{\scriptscriptstyle{N}}{\mathsf{M}} \underset{\scriptscriptstyle{G}}{\mathsf{E}} \mathbb{T}$

POLY MET MINING, INC.

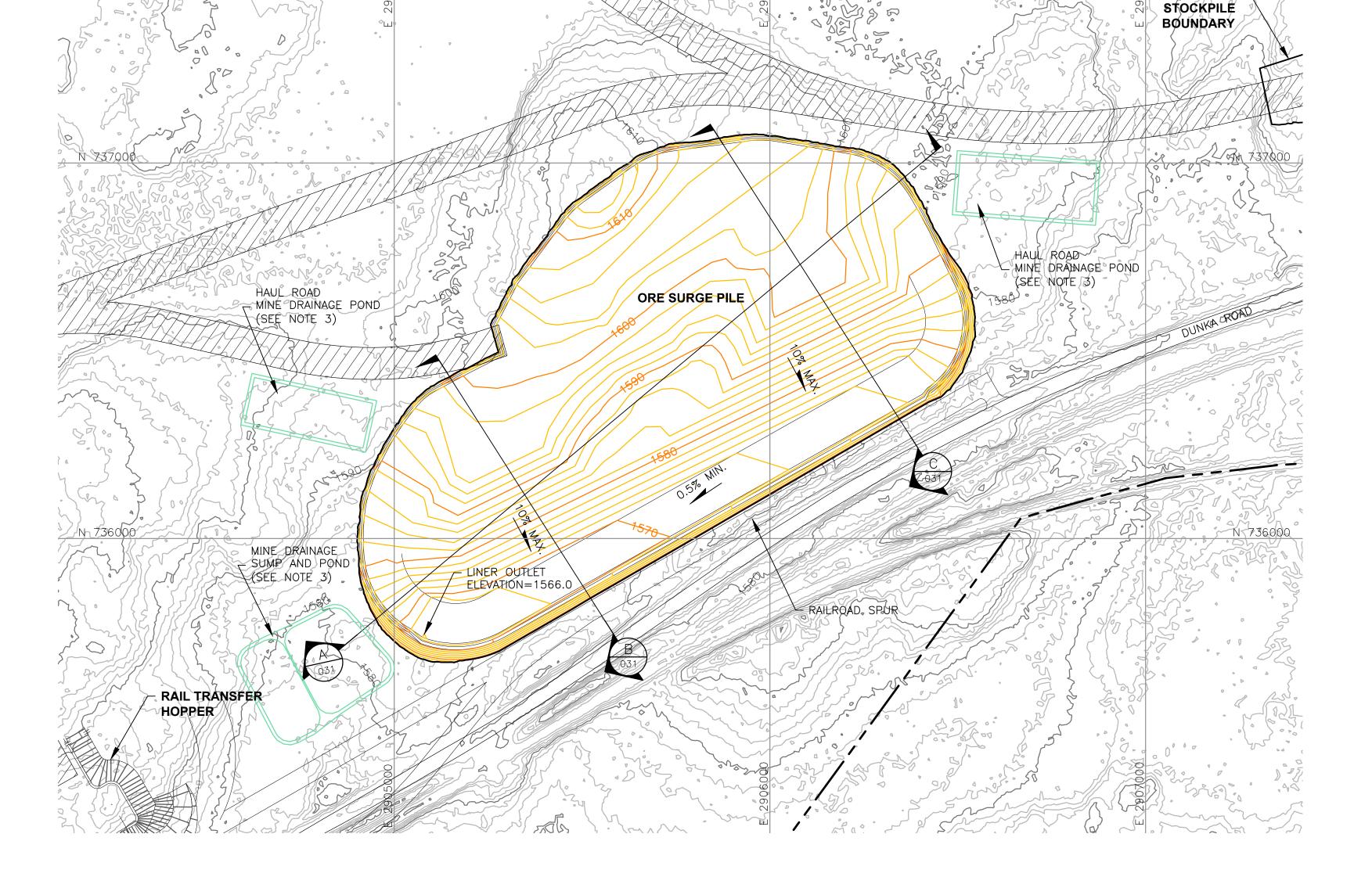
SKP-026 AS SHOWN

RAIL TRANSFER

HOPPER



SCALE IN FEET



DESCRIPTION

A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)

B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

5/22/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

D 1/14/14 ISSUED FOR AGENCY REVIEW

LEGEND

EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)

PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY

MINE SITE BOUNDARY

- CROSS SECTION IDENTIFIER - SHEET WHERE SECTION IS LOCATED

SLOPE

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROADS

CATEGORY 2/3 -

ISSUE STATUS

VERSION

DATE

5-22-15

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SPECIFICATION, OR REPORT WAS
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SUPERVISION AND THAT I AM A DULY
LICENSED PROFESSIONAL ENGINEER

UNDER THE LAWS OF THE STATE OF

PRINTED NAME BRENT R. BRONSON

DATE <u>5/22/15</u> LICENSE # 46492

SIGNATURE Monsen

MINNESOTA.

DRAWN:

CHECKED:

SCALE:

MTM

GOLDER PROJECT NO.:

113-2209

AS SHOWN

ISSUED

PERMITTING

CONSTRUCTION

NOT APPROVED FOR CONSTRUCTION.

MINE DRAINAGE SUMP/POND (SEE NOTE 3)

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS MINNESOTA STATE PLANE.
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

ORE SURGE PILE FOUNDATION GRADING PLAN



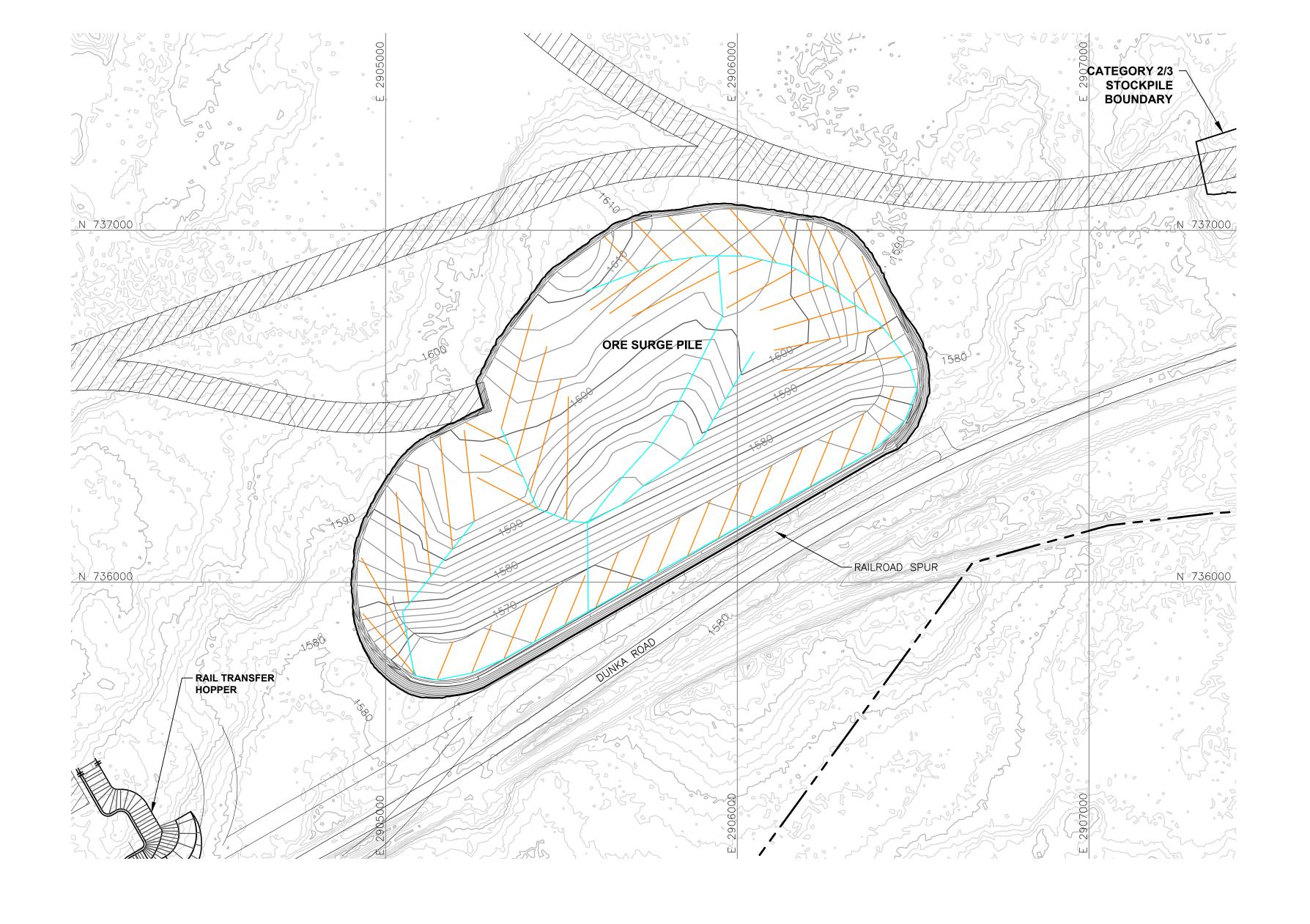
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540

DWG. NO.

SKP-027

Fax: (303) 985-2080 www.golder.com



EXISTING GROUND TOPOGRAPHY



PROPOSED GRADING TOPOGRAPHY

- MINE SITE BOUNDARY

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROADS

TERTIARY COLLECTION PIPING (SEE NOTE 3)

4-INCH

SECONDARY COLLECTION PIPING (SEE NOTE 3) 6-INCH

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. ACTUAL NUMBER OF UNDERDRAIN PIPES AND SUMPS WILL NEED TO BE DETERMINED DURING CONSTRUCTION BASED ON ENCOUNTERED FIELD
- 2. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

PLANT DRAWING NUMBER:

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

ORE SURGE PILE UNDERDRAIN PIPING PLAN

POLY MET MINING, INC.



MTM

GOLDER PROJECT NO.:

113-2209

AS SHOWN

CHECKED:

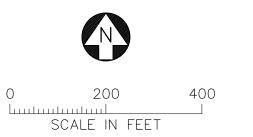
SCALE:

NORTHMET PROJECT HOYT LAKES, MINNESOTA

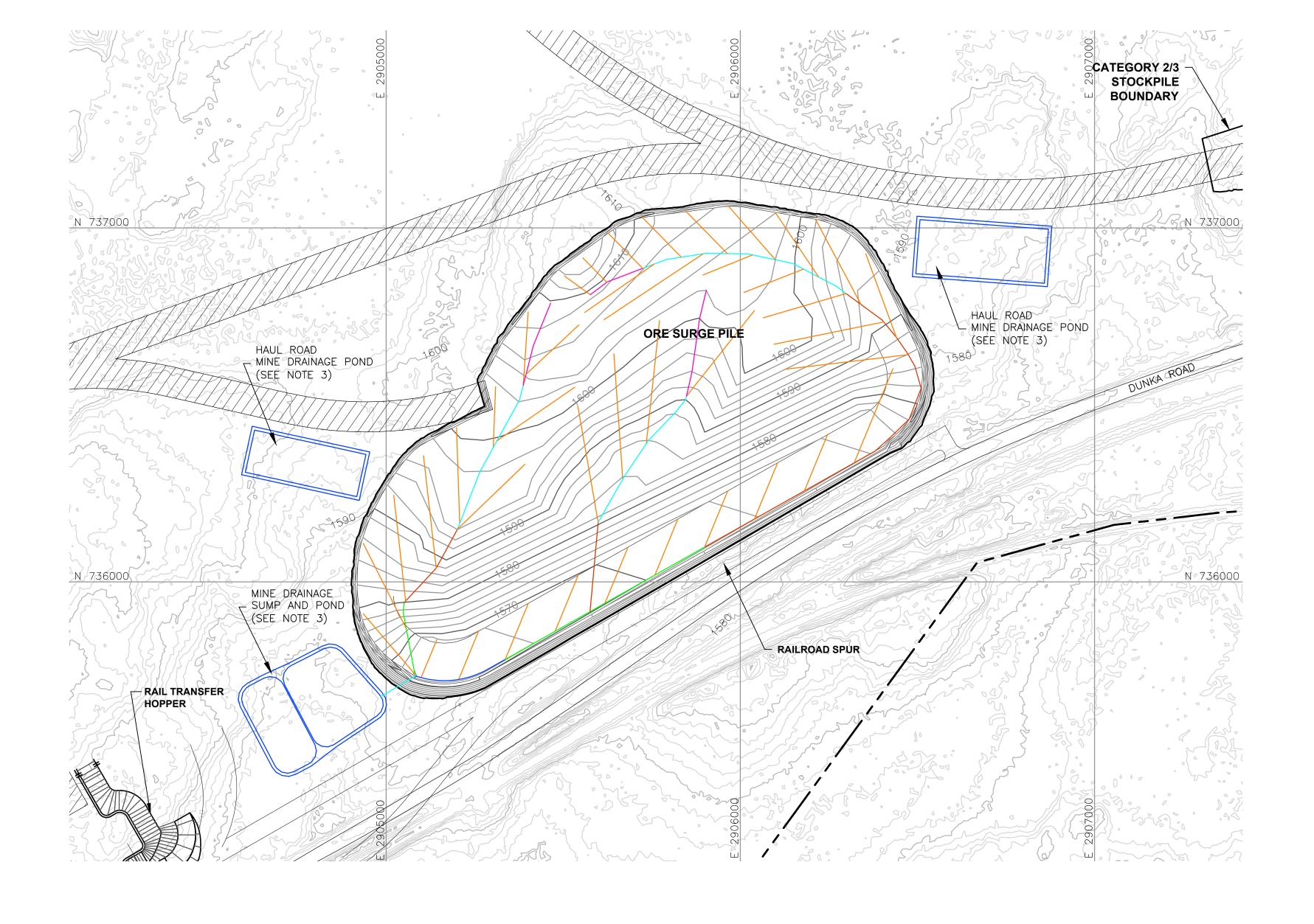
GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

DWG. NO. SKP-028

Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com REV



ISSUE STATUS VER DATE DESCRIPTION A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) I HEREBY CERTIFY THAT THIS PLAN,
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UNDER THE LAWS OF THE STATE OF
MINNESOTA. ISSUED VERSION DATE B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP DRAWN: C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING D 1/14/14 ISSUED FOR AGENCY REVIEW E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS SIGNATURE Manson F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE # 46492 NOT APPROVED FOR CONSTRUCTION.



EXISTING GROUND TOPOGRAPHY

PROPOSED GRADING TOPOGRAPHY

- MINE SITE BOUNDARY

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

HAUL ROADS

MINE DRAINAGE SUMP/POND (SEE NOTE 3)

MINE YEAR 1 - TERTIARY COLLECTION PIPING

4-INCH

MINE YEAR 1 - PRIMARY AND SECONDARY COLLECTION PIPING

─ 4-INCH 6-INCH ____ 8-INCH

— 10−INCH ___ 12-INCH

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- 4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

PLANT DRAWING NUMBER:

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

ORE SURGE PILE

OVERLINER DRAINAGE PIPING PLAN

ISSUE STATUS VER DATE DESCRIPTION A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) ISSUED VERSION B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP FOR C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING D 1/14/14 ISSUED FOR AGENCY REVIEW E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

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UNDER THE LAWS OF THE STATE OF
MINNESOTA. MTM CHECKED: SIGNATURE Manson GOLDER PROJECT NO.: PRINTED NAME BRENT R. BRONSON

DATE <u>5/22/15</u> LICENSE # 46492

DRAWN:

SCALE:

DATE

CONSTRUCTION

NOT APPROVED FOR CONSTRUCTION.

113-2209

AS SHOWN

吾 POLY MET MINING, INC. NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

REV

Associates DWG. NO. SKP-029

SCALE IN FEET

DESCRIPTION

A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)

B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP

E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

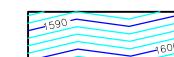
F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

D 1/14/14 ISSUED FOR AGENCY REVIEW

VER DATE

LEGEND

EXISTING GROUND TOPOGRAPHY



PROPOSED STOCKPILE LAYOUTS

HAUL ROADS

---- MINE SITE BOUNDARY

MINE YEAR 1 PIT BOUNDARY (SEE NOTE 1) MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM ORE, WASTE ROCK STOCKPILE — — OUTLINES (SEE NOTE 2)



- CROSS SECTION IDENTIFIER

- SHEET WHERE SECTION IS LOCATED

NOTES

- 1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- 2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- 3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

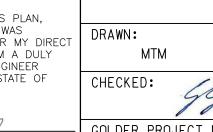
REFERENCES

- 1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- 2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE
- 3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

ORE SURGE PILE

TYPICAL CONFIGURATION



A POLY MET MINING, INC. NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

Associates DWG. NO.

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LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF
MINNESOTA. SIGNATURE Manson PRINTED NAME BRENT R. BRONSON DATE <u>5/22/15</u> LICENSE # 46492 SCALE:

ISSUE STATUS

VERSION

DATE

ISSUED

PERMITTING

CONSTRUCTION

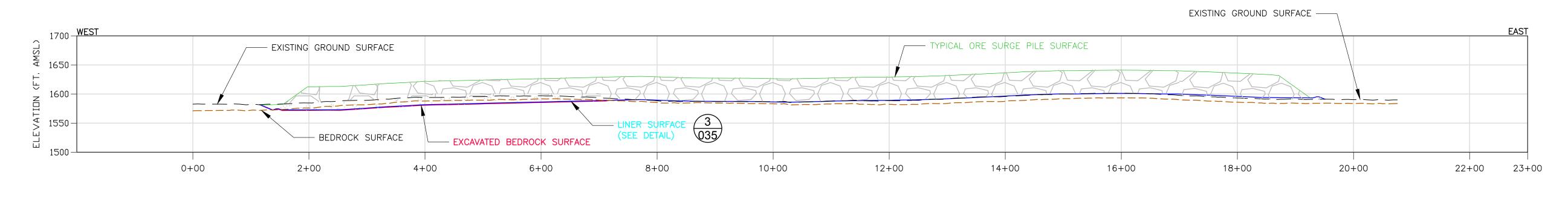
NOT APPROVED FOR CONSTRUCTION.

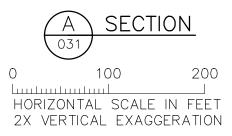
GOLDER PROJECT NO.: 113-2209

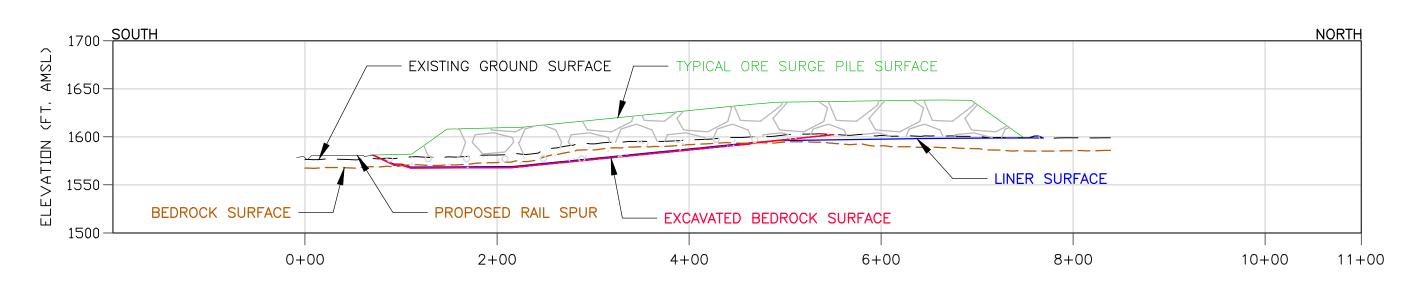
AS SHOWN

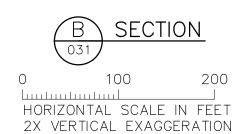
Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

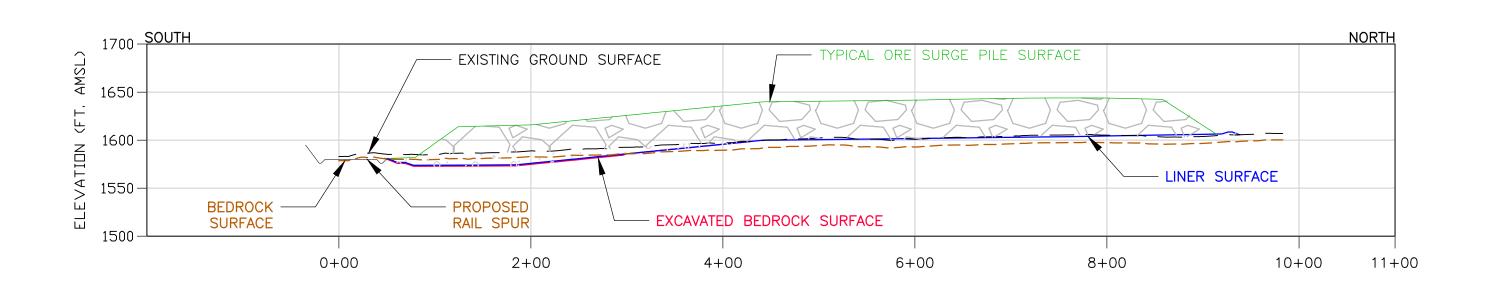
SKP-030

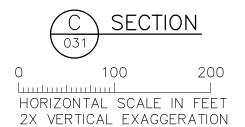












VER NO	DATE	DESCRIPTION		ISSUE STATUS			
Α	1	ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN,	
В	2/15/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
С	5/29/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP	FOR PERMITTING	F	5-22-15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	MTM
D	1/14/14	ISSUED FOR AGENCY REVIEW				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
Ε	4/10/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS				J.Same	77
F	5/22/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION			SIGNATURE SIGNATURE	GOLDER PROJECT NO.:
			- 00110111011			PRINTED NAME BRENT R. BRONSON	113–2209
			NOT APPROVED FOR CONSTRUCTION.			DATE <u>5/22/15</u> LICENSE # <u>46492</u>	SCALE:
							AS SHOWN

LEGEND ORE LIMITS AT TYPICAL CAPACITY LINER SURFACE — — — EXISTING GROUND SURFACE OVERBURDEN SOIL AND BEDROCK EXCAVATION SURFACE ---- BEDROCK SURFACE

NOTES

DWG. NO.

SKP-031

PLANT DRAWING NUMBER:

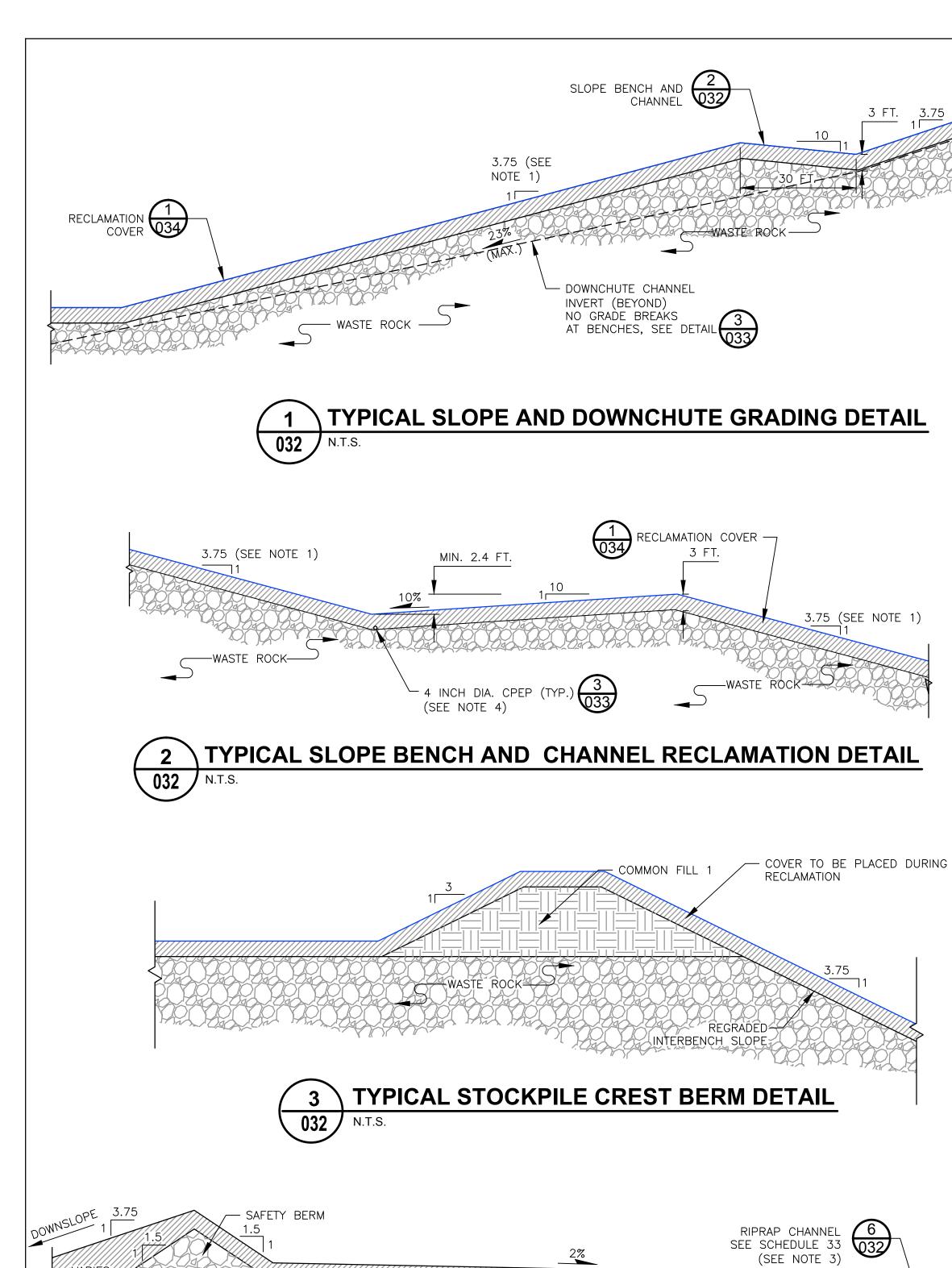
- 1. STOCKPILE SIDE SLOPES AT ANGLE OF REPOSE.
- 2. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
- 3. SEE CROSS SECTION LOCATIONS ON DRAWINGS 3, 4, 5, 26, AND 27

DESIGN SECTIONS 餐 POLY MET MINING, INC. NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA

ORE SURGE PILE

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

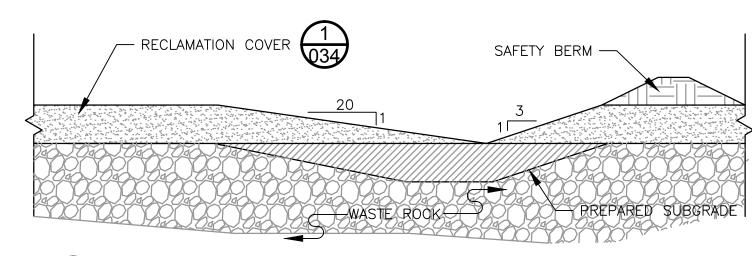
Golder Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com Associates REV



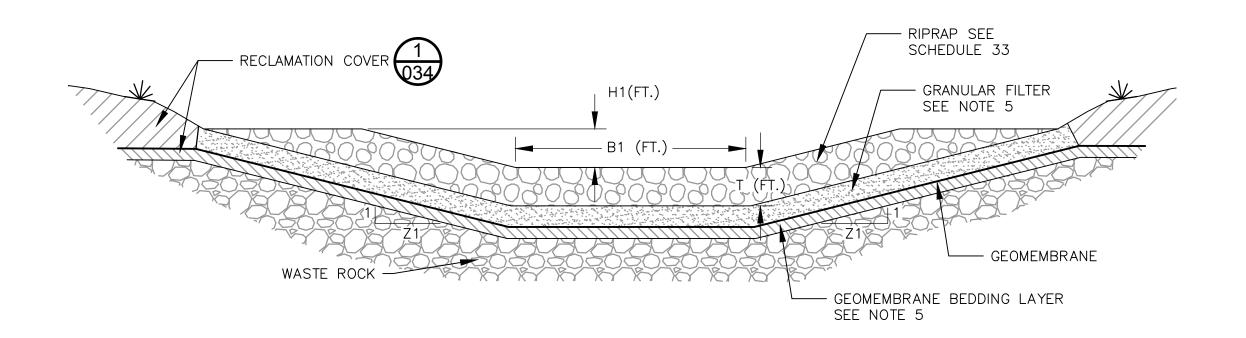
COVER TO BE PLACED WHEN

STOCKPILE OPERATIONS ARE COMPLETE

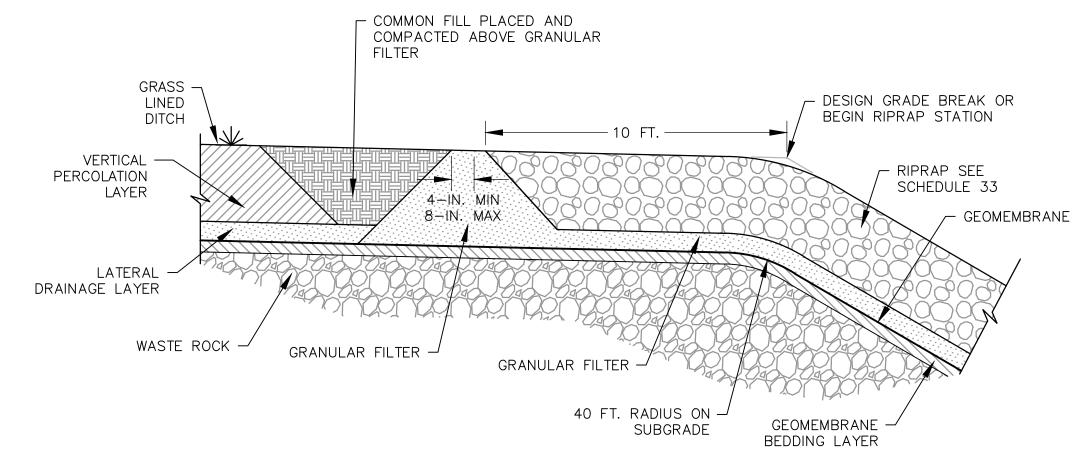
STOCKPILE RAMP TYPICAL DETAIL



TYPICAL TOP SURFACE CHANNEL SECTION



TYPICAL RIPRAP-LINED CHANNEL AND DOWNCHUTE N.T.S. (SEE SCHEDULE 33 FOR DIMENSIONS - SKP-033)



UPSTREAM END OF RIPRAP CHANNEL 032 N.T.S.

NOTES

- 1. THE MAXIMUM SLOPE GRADES ARE 3.75H:1V FOR RECLAIMED STOCKPILE
- 2. ASSUME 1.4H:1V INTERBENCH SLOPES FOR ACTIVE AREAS (EQUAL TO NOMINAL ANGLE OF REPOSE FOR WASTE ROCK MATERIAL). REGRADE PRIOR TO PLACEMENT OF RECLAMATION COVER.
- 3. SEE SCHEDULE 33 ON DRAWING SKP-033.
- 4. AT BASE OF COVER SYSTEM GRANULAR DRAINAGE LAYER PLACE DRAIN PIPE AT SLOPE-BENCH INTERSECTION. PIPE TO BE CONTINUOUS ALONG BENCHES BETWEEN DOWNCHUTE CHANNELS.
- 5. RIPRAP-LINED CHANNEL AND DOWNCHUTE DETAILS REPRESENT PRELIMINARY DESIGNS. DETAILED DIMENSIONS AND TECHNICAL SPECIFICATIONS TO BE PROVIDED PRIOR TO CONSTRUCTION, I.E. AS A PART OF FINAL DESIGN.
- 6. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

Associates

SKP-032

PLANT DRAWING NUMBER:

POLYMET

DWG. NO.

AS SHOWN

CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER

MANAGEMENT DETAILS - SHEET 1 OF 2 芸 POLY MET MINING, INC.

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233

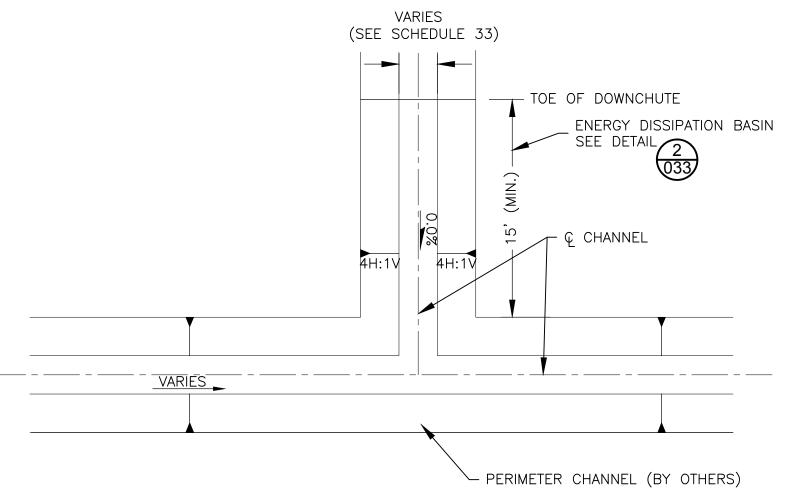
REV

VEF	DATE	DESCRIPTION]	ISSUE STATUS			
А	12/02/11	ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP)	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN,	
В	2/15/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
С	5/29/13	ISSUED FOR REVIEW FOR INCLUSION IN ROMP] FOR Permitting	F	5-22-15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	MTM
D	1/14/14	ISSUED FOR AGENCY REVIEW				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
E	4/10/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS				15	77
F	5/22/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION	TRUCTION		SIGNATURE Monsey	GOLDER PROJECT NO.:
			- 001131110011011			PRINTED NAME BRENT R. BRONSON	113-2209
			NOT APPROVED FOR	CONSTRUCTION.		DATE <u>5/22/15</u> LICENSE # 46492	SCALE:

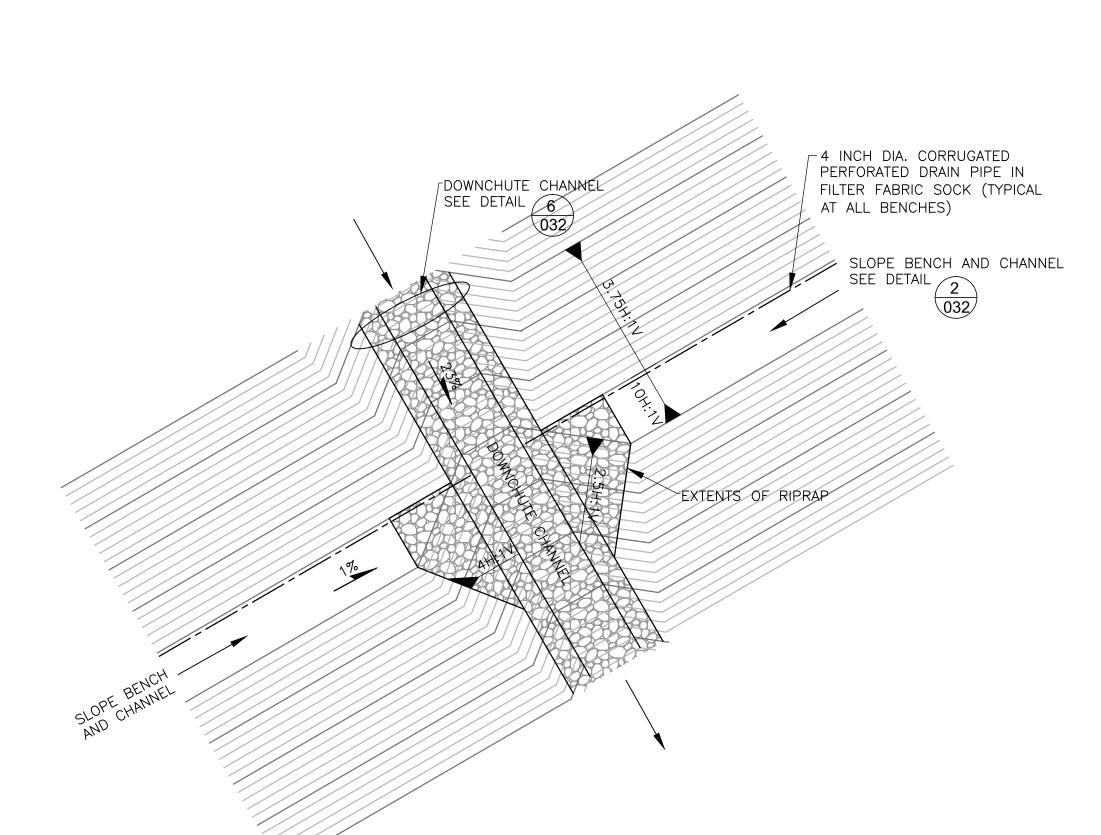
VARIES 1

RIPRAP TO BE PLACED

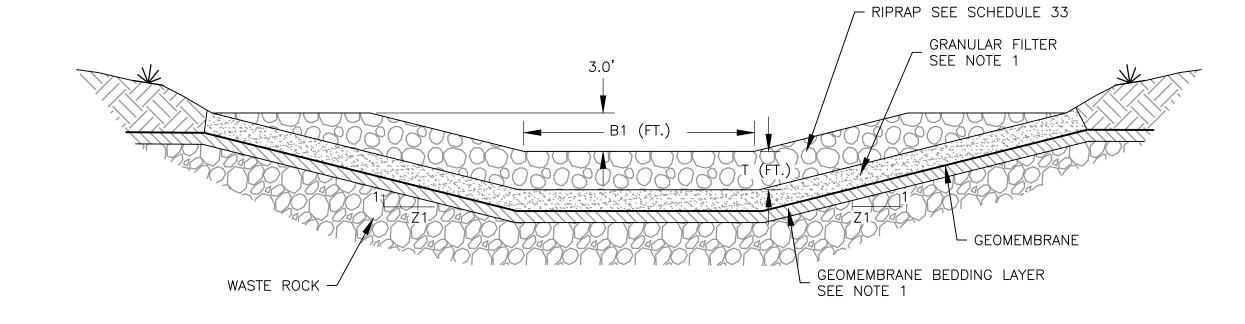
DURING RECLAMATION



DOWNCHUTE CHANNEL CONFLUENCE DETAIL **033** N.T.S.



3 SLOPE BENCH AND CHANNEL TO DOWNCHUTE TRANSITION



TYPICAL ENERGY DISSIPATION BASIN (SEE SCHEDULE 33 FOR DIMENSIONS) **033** N.T.S.

SCHEDULE 33: RIPRAP-LINED CHANNEL DIMENSIONS

CHANNEL ID	BOTTOM WIDTH, B1 (FT)	SIDE SLOPE, Z1 (H:1V)	MIN. DEPTH, H1 (FT)	RIPRAP SIZE, D ₅₀ (IN)	RIPRAP LAYER THICKNESS, T (FT)	MAX SLOPE, (FT/FT)
DC1-A	20	4	3	12	2	0.23
DC1-B	20	4	3	12	2	0.23
DC1-C	25	4	3	12	2	0.23
DC1-D	20	4	3	12	2	0.23
DC1-E	25	4	3	12	2	0.23
DC1-F	20	4	3	9	1.5	0.23
DC1-G	20	4	3	12	2	0.23
DC1-HRE	8	4	3	9	1.5	0.06
DC1-H	20	4	3	9	1.5	0.23
DC1-HRS	8	4	3	9	1.5	0.06
DC1-HRU	8	4	3	9	1.5	0.07
DC1-I	20	4	3	12	2	0.23
DC1-J	20	4	3	18	3	0.23
DC1-K	25	4	3	12	2	0.23
DC1-L	25	4	3	12	2	0.23

NOTES

- ENERGY DISSIPATION BASIN DETAIL REPRESENTS PRELIMINARY DESIGN. DETAILED DIMENSIONS AND TECHNICAL SPECIFICATIONS TO BE PROVIDED PRIOR TO CONSTRUCTION, I.E. AS A PART OF FINAL DESIGN.
- 2. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER MANAGEMENT DETAILS - SHEET 2 OF 2

VER DATE DESCRIPTION ISSUE STATUS A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) ISSUED I HEREBY CERTIFY THAT THIS PLAN,
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UNDER THE LAWS OF THE STATE OF
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¥ POLYMETGOLDER PROJECT NO.: 113-2209

DWG. NO.

AS SHOWN

PLANT DRAWING NUMBER:

NORTHMET PROJECT HOYT LAKES, MINNESOTA

POLY MET MINING, INC.

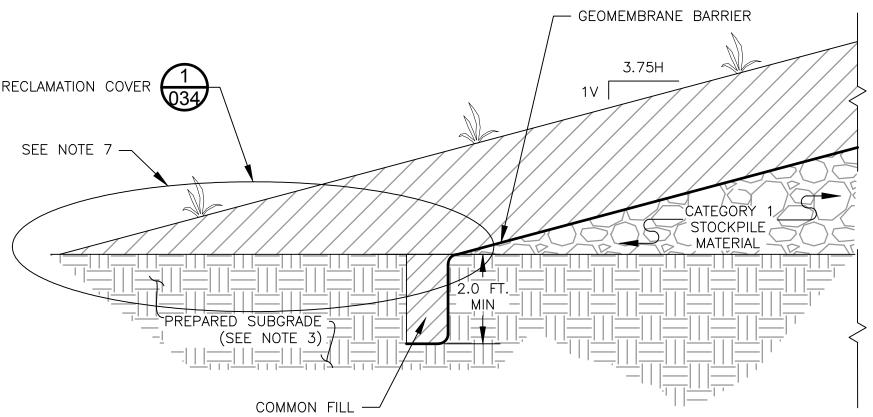
GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

REV SKP-033

F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

RECLAMATION COVER GEOMEMBRANE -BARRIER

RECLAMATION TO OPERATIONAL AREA TIE IN DETAIL



5 GEOMEMBRANE COVER ANCHOR TRENCH DETAIL

- 1. TEMPORARY SLOPE BENCH CHANNEL SHOULD BE CONSTRUCTED WITH MINIMUM DEPTH OF 2.4 FT. ON THE BENCHES BY GRADING CHANNEL SIDE SLOPES TO 10H:1V ON 30 FT. WIDE BENCHES.
- 2. STOCKPILE GEOMETRY DURING OPERATIONS BASED ON ASSUMED WASTE ROCK ANGLE OF REPOSE OF 35.5
- 3. GEOTECHNICALLY UNSUITABLE SOILS TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL WITHIN 100 FT. OF CATEGORY 1 STOCKPILE PERIMETER LIMITS.
- 4. ON TOP OF STOCKPILE ON 1% SLOPE AREAS, PLACE 4 INCH DIAMETER PERFORATED CORRUGATED POLYETHYLENE PIPE (CPEP) WITH FILTER FABRIC SOCK AT 75 FOOT SPACING TO FACILITATE DRAINAGE OF GRANULAR DRAINAGE LAYER TO TOP SURFACE CHANNEL. PIPE LOCATION TO BE FIELD FIT.
- 5. AT STOCKPILE BENCHES, PLACE 4 INCH PERFORATED CPEP DRAIN PIPE WITH FILTER FABRIC SOCK AT BASE OF COVER SYSTEM GRANULAR DRAINAGE LAYER AT SLOPE-BENCH INTERSECTION WITH OUTFLOW DIRECTED
- 7. 7EDGE OF LINER TO TIE IN TO CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM.

DWG. NO.

8. REFER TO UNIFIED SOIL CLASSIFICATION SYSTEM FOR COVER SOIL DESCRIPTION.

GOLDER PROJECT NO.:

SCALE:

113-2209

AS SHOWN

Dronson

PRINTED NAME BRENT R. BRONSON

DATE <u>5/22/15</u> LICENSE # 46492

Signature 🚄

CONSTRUCTION

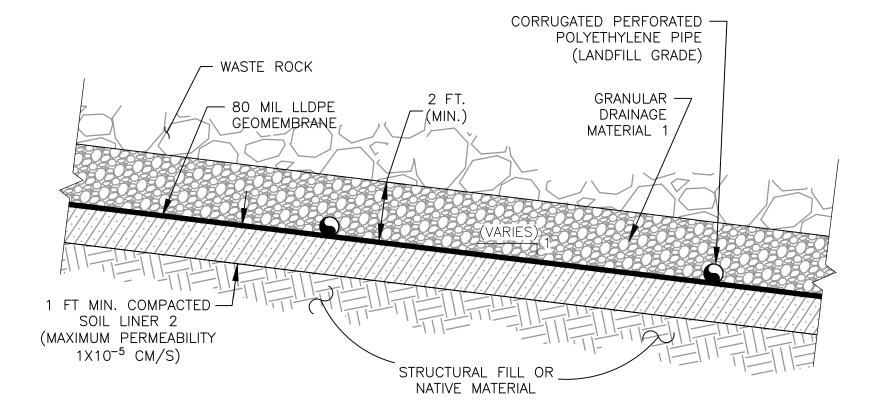
NOT APPROVED FOR CONSTRUCTION.

CATEGORY 1 STOCKPILE PHASED COVER DESIGN ¥ POLY MET MINING, INC. NORTHMET PROJECT POLYMET HOYT LAKES, MINNESOTA GOLDER ASSOCIATES INC.

Golder

44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080

Associates www.golder.com REV SKP-034

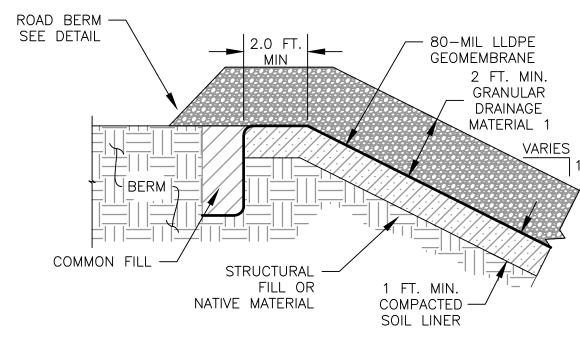


2 FT. MIN. CORRUGATED PERFORATED — GRANULAR POLYETHYLENE PIPE DRAINAGE (LANDFILL GRADE) WASTE ROCK MATERIAL MATERIAL 1 -80 MIL LLDPE GEOMEMBRANE 1 FT MIN. SOIL LINER 1 (MAXIMUM PERMEABILITY 1X10 6 CM/S) NATIVE MATERIAL

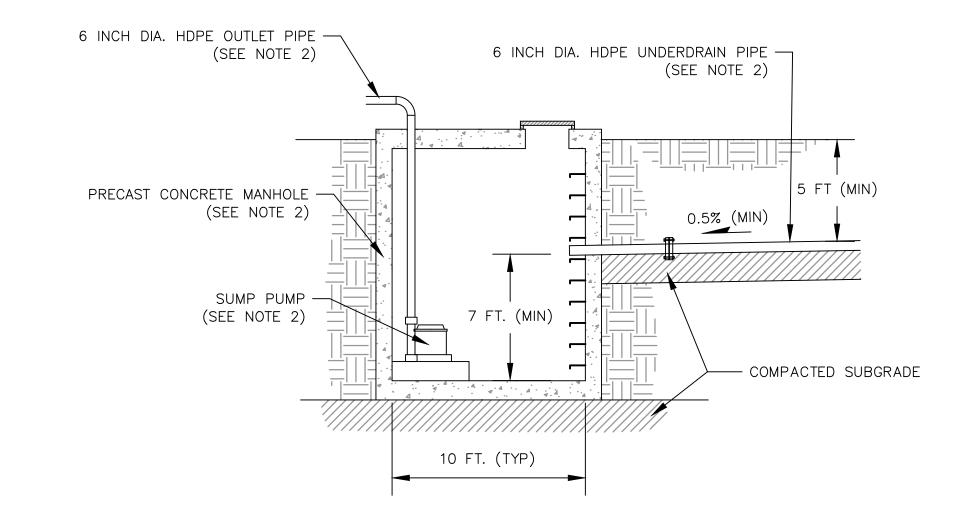
> **CATEGORY 4 STOCKPILE AND ORE SURGE PILE LINER 035** N.T.S.

TYPICAL FOUNDATION UNDERDRAIN 035 N.T.S.

CATEGORY 2/3 STOCKPILE LINER



GEOMEMBRANE LINER ANCHOR TRENCH DETAIL 035

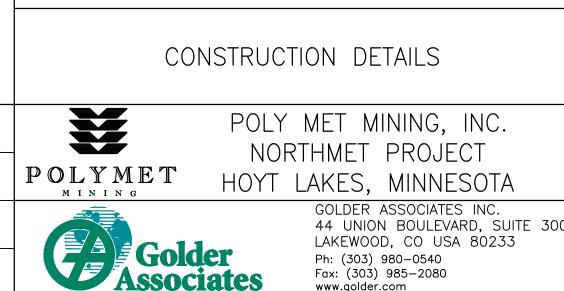


5 UNDERDRAIN SUMP MANHOLE

NOTES

1. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

2. UNDERDRAIN SUMP MANHOLE DIMENSIONS, SUMP PUMP CAPACITY AND PIPE DIMENSIONS ARE PRELIMINARY AND WILL BE SIZED BASED ON ENCOUNTERED FIELD CONDITIONS.



PLANT DRAWING NUMBER:

ISSUE STATUS VER DATE DESCRIPTION A 12/02/11 ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) 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. ISSUED VERSION DATE B 2/15/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP DRAWN: FOR MTM C 5/29/13 ISSUED FOR REVIEW FOR INCLUSION IN ROMP PERMITTING GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 D 1/14/14 ISSUED FOR AGENCY REVIEW CHECKED: E 4/10/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS Dronson SIGNATURE 🚄 GOLDER PROJECT NO.: F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS CONSTRUCTION Associates PRINTED NAME BRENT R. BRONSON 113-2209 www.golder.com DATE <u>5/22/15</u> LICENSE # 46492 NOT APPROVED FOR CONSTRUCTION. SCALE: REV DWG. NO. SKP-035 AS SHOWN

Mine Site Mechanical Infrastructure

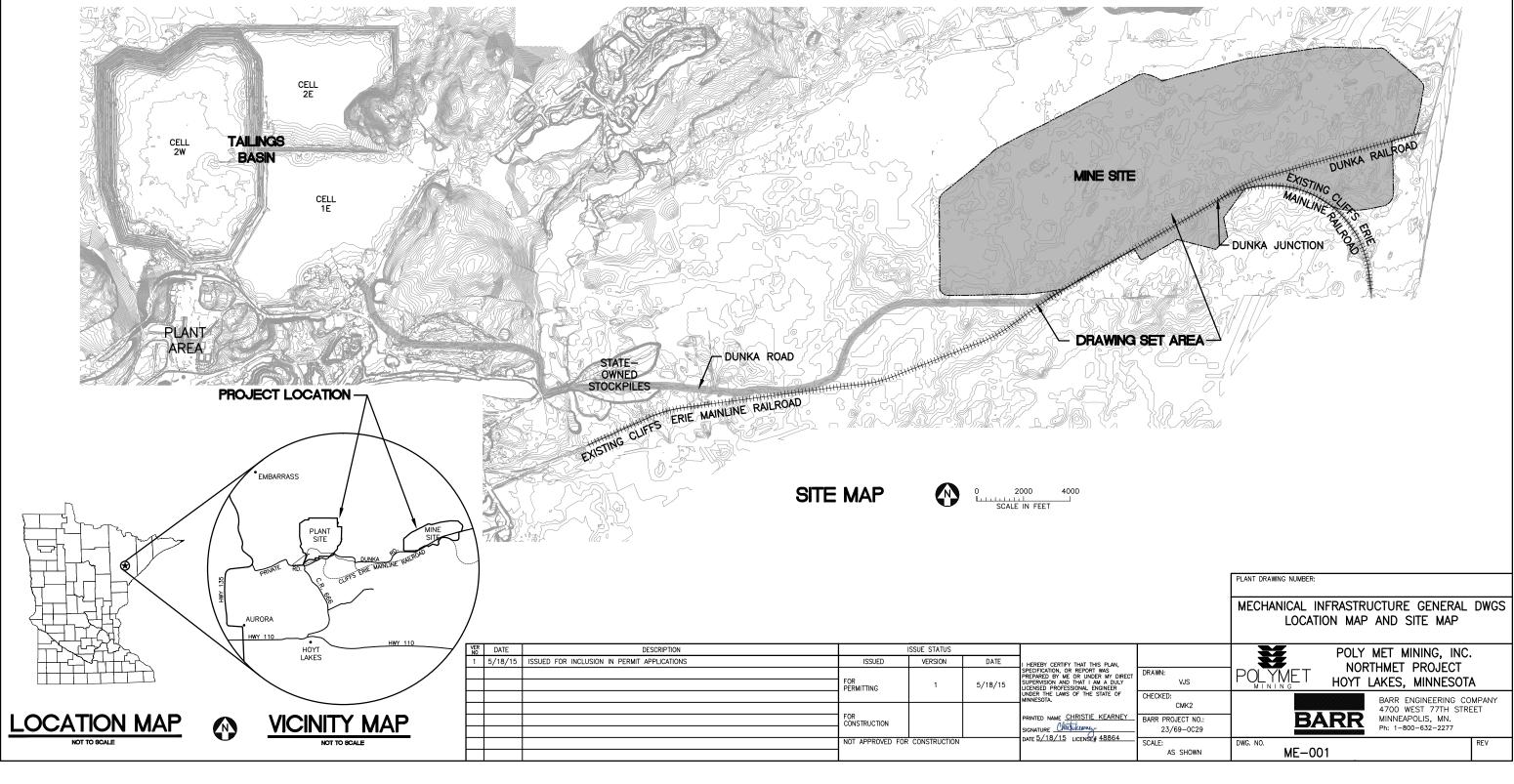
Errata Sheet

Poly Met Mining, Inc. NorthMet Project

Permit Application Support Drawings: Mechanical Infrastructure July 2016 (version 2)

Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".
TWP-009	The berm over the TWP will be revised to match the contours of the road where it crosses the proposed access road near the CPS.
TWP-010	The option of 1" minus rock as the top berm surface was eliminated to minimize additional impervious surfaces. Remove "or 1" minus rock" text on Sections 1, 2, 4, & 5.
MD-001	An access road will be added adjacent to a Mine Water pipe for construction and maintenance purposes. This access road will follow the Mine Water pipe that connects the Category 1 Stockpile and Haul Road F (in a general north-south orientation).
MD-003	The grading for the access road from the Fueling and Maintenance Facility to Pond MD-SOSP & Sump SOSP will be revised to optimize drainage.



MECHANICAL INFRASTRUCTURE LEGEND

CENTRAL PUMPING STATION

PROPOSED MINE DRAINAGE PIPE

PROPOSED MINE DRAINAGE PIPE

PROPOSED SUMP MANHOLE

PROPOSED MINE DRAINAGE CULVERT

PROPOSED TREATED WATER PIPELINE

PROPOSED HAUL ROAD MINE DRAINAGE DITCH

PROPOSED STOCKPILE LINER OUTLET PIPE

PROPOSED MINE DRAINAGE WATERSHED

MINE DRAINAGE

TOP OF DIKE BENCH

GENERAL

PROPOSED TREATED WATER PIPELINE EXISTING CONTOUR - MAJOR EXISTING CONTOUR - MINOR PROPOSED CULVERT (NON-MINE DRAINAGE) ---1000----PROPOSED CONTOUR - MAJOR PROPOSED CONTOUR - MINOR ---1000----

OTHER FACILITY PROPOSED CONTOUR - MAJOR OTHER FACILITY PROPOSED CONTOUR - MINOR PROPOSED RAILROAD EXISTING RAILROAD

PROPOSED ACCESS ROADS EXISTING ROAD MINE SITE BOUNDARY (<u>*</u> WETLAND BOUNDARY

+/+/+HAUL ROAD

TREATED WATER PIPELINE

FXISTING POWER POLE EXISTING TRAIL EXISTING UNIMPROVED TRAIL ----R/W---RIGHT OF WAY EXISTING STRUCTURES TRFF LINE EXISTING OVERHEAD ELECTRIC EXISTING UNDERGROUND ELECTRIC PROPOSED TREATED WATER PIPELINE PROPOSED CULVERT (NON-MINE DRAINAGE) PROPOSED MINE DRAINAGE PIPE

NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH

SHEET INDEX

SHEET NO. TITLE

MECHANICAL INFRASTRUCTURE GENERAL DRAWINGS

ME-001 LOCATION MAP AND SITE MAP
ME-002 LECEND & SHEET INDEX
ME-003 MINE SITE - MINE DRAINAGE FLOW DIAGRAM
ME-004 MINE SITE - SUMP, POND AND PIPE DETAIL TABLES

TREATED WATER PIPELINE DRAWINGS

TWP-001 GENERAL LAYOUT AND SHEET INDEX TWP-002 PLAN & PROFILE STATION 113+70 TO 130+00 TWP-003 PLAN & PROFILE STATION 130+00 TO 190+00 TWP-004 PLAN & PROFILE STATION 190+00 TO 250+00 TWP-005 PLAN & PROFILE STATION 250+00 TO 310+00 | TWP-005 | PLAN & PROFILE SIATION 250+00 | 10 310+00 | TWP-006 | PLAN & PROFILE STATION 370+00 | TO 430+00 | TWP-008 | PLAN & PROFILE STATION 430+00 | TO 490+00 | TWP-009 | PLAN & PROFILE STATION 430+00 | TO 490+00 | TWP-010 | PLAN & PROFILE STATION 490+00 | TO 512+50 | TWP-011 | DETAILS | TWP-012 | DETAILS | TWP-013 | DETAILS | TWP-014 | TWP-015 | DETAILS | TWP-015 | DETAILS | TWP-016 | TWP-017 | DETAILS | TWP-017 | TWP-017 | DETAILS | TWP-018 | TWP-019 | DETAILS | TWP-019 | TWP-TWP-011 DETAILS IN CLOSURE

CENTRAL PUMPING STATION (CPS) DRAWINGS

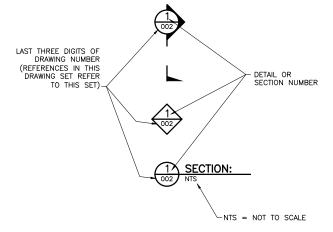
CPS-001 SITE PLAN
CPS-002 PUMP STATION PLAN
CPS-003 PROCESS FLOW DIAGRAM

SHEET NO. TITLE

MINE DRAINAGE DRAWINGS

MD-001 YEAR 1 GENERAL LAYOUT
MD-002 YEAR 11 GENERAL LAYOUT
MD-003 SUMP SOSP & MD-SOSP GRADING PLAN
MD-004 SUMP S4 & MD-S4 GRADING PLAN
MD-005 SUMP S23-1 & MD-S23-1 GRADING PLAN
MD-006 SUMP S23-2 GRADING PLAN
MD-007 SUMP S23-3 & MD-S23-3 GRADING PLAN
MD-008 POND MD-05LA GRADING PLAN
MD-009 POND MD-0TH GRADING PLAN
MD-009 POND MD-NTH GRADING PLAN MD-014 SUMP/POND TYPICAL DETAILS
MD-015 PIPE TYPICAL DETAILS MD-016 CLOSURE PLAN

DRAWING NUMBERING



ABBREVIATIONS

ACRE-FEET AVERAGE CATEGORY CENTERLINE AVE CAT € CMP CORRUGATED METAL PIPE CPS DIP DV DWG CENTRAL PUMPING STATION DUCTILE IRON PIPE DRAIN VALVE DRAWING ELEVATION
GALLONS
GEOSYNTHETIC CLAY LINER

EL.
GAL
GCL
GPM
HDPE
HRE
HRE
HRN
HRW
INV
LF
MD
MG
MH
MIL
MIN
MnDOT GALLONS PER MINUTE
HIGH-DENSITY POLYETHYLENE
HAUL ROAD CENTRAL
HAUL ROAD EAST HAUL ROAD NORTH HAUL ROAD WEST INVERT LINEAR FEET
MINE DRAINAGE
MILLION GALLONS

MEASUREMENT OF LINER THICKNESS; A MIL IS A THOUSANDTH OF AN INCH

MEASUREMENT OF LINER THICKNESS; A MIL IS MINIMUM MINNESOTA DEPARTMENT OF TRANSPORTATION OVERBURDEN STORAGE AND LAYDOWN AREA ORE SURGE PILE PIPELINE POUNDS PER SQUARE INCH

OSLA OSP PL PSI RTH SDR STA RAIL TRANSFER HOPPER STANDARD DIMENSION RATIO STATION
WASTE ROCK STOCKPILE STOCKPILE-TDH TWP TYP TOTAL DESIGN HEAD TREATED WATER PIPELINE VACUUM/AIR RELIEF V/A

WASTE WATER TREATMENT FACILITY

PLANT DRAWING NUMBER:

MECHANICAL INFRASTRUCTURE GENERAL DWGS LEGEND AND SHEET INDEX

ER IO	DATE	DESCRIPTION		SSUE STATUS			
ı	5/18/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
			FOR PERMITTING	1	5/18/15	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	DRAWN: VJS
						UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
			500			aubierie werburg	CMK2
			FOR CONSTRUCTION			PRINTED NAME CHRISTIE KEARNEY SIGNATURE Christianus	BARR PROJECT NO.: 23/69-0C29
			NOT APPROVED FOR	CONSTRUCTION		DATE 5/18/15 LICENSE# 48864	SCALE:
			HOT ATTROVED TOR	331131110011014		, and the second	AS SHOWN

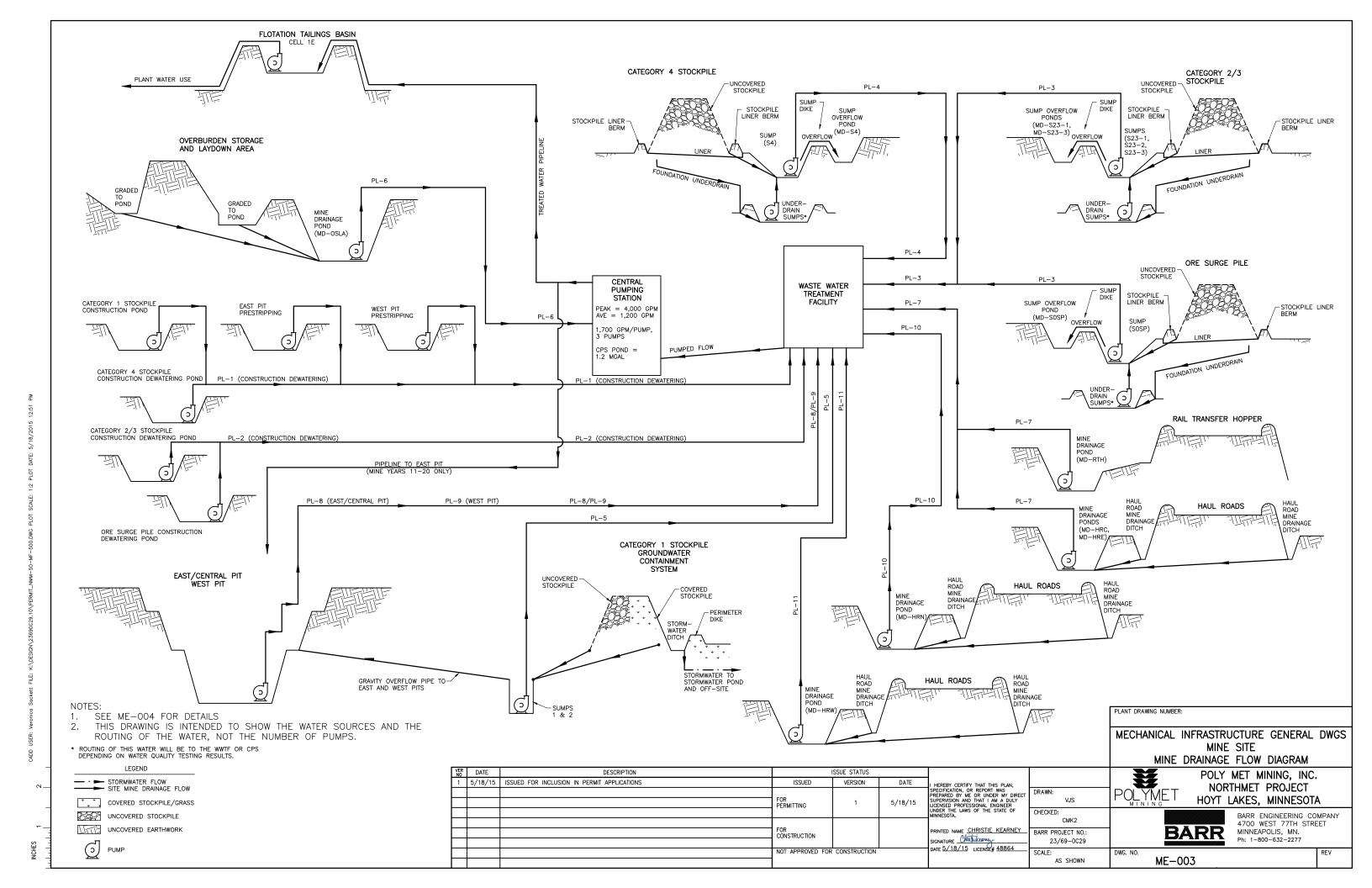
POLYME

POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR

ME-002

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277



SUMPS - TEMPORARY

				DESIGN	APPROXIM/ CAPA			ACTUAL		
ID	DESCRIPTION	OBJECTIVES	MINE YEARS	VOLUME* (GAL)	GPM	TDH (FT)	LINER TYPE	VOLUME* (GAL)	OVERFLOWS TO	SHOWN ON SHEET #
S23-1	CATEGORY 2/3 STOCKPILE SUMP	PROVIDE RUNOFF STORAGE FOR THE 10 YEAR 24 HOUR EVENT	1–19	4,855,000	190	210	MINE DRAINAGE SUMP LINER	4,855,000	MD-S23-1	MD-005
S23-2	CATEGORY 2/3 STOCKPILE SUMP	PROVIDE RUNOFF STORAGE FOR THE 10 YEAR 24 HOUR EVENT	3–17	3,878,000	150	230	MINE DRAINAGE SUMP LINER	3,910,000	MD-S23-1	MD-006
S23-3	CATEGORY 2/3 STOCKPILE SUMP	PROVIDE RUNOFF STORAGE FOR THE 10 YEAR 24 HOUR EVENT	6-16	2,151,000	90	270	MINE DRAINAGE SUMP LINER	2,151,000	MD-S23-3	MD-007
S4	CATEGORY 4 STOCKPILE SUMP	PROVIDE RUNOFF STORAGE FOR THE 10 YEAR 24 HOUR EVENT	1-11	3,291,000	130	50	MINE DRAINAGE SUMP LINER	4,073,000	MD-S4	MD-004
SOSP	ORE SURGE PILE SUMP	PROVIDE RUNOFF STORAGE FOR THE 10 YEAR 24 HOUR EVENT	1-20	2,770,000	80	90	MINE DRAINAGE SUMP LINER	2,835,000	MD-SOSP	MD-003

^{*} DESIGN VOLUME REFLECTS THE VOLUME REQUIRED BASED ON THE DESIGN NEEDS; WHEREAS ACTUAL VOLUME REFLECTS THE VOLUME SHOWN IN THE ATTACHED DRAWING SET. ACTUAL VOLUME DOES NOT INCLUDE ADDITIONAL VOLUME FROM 3 FEET OF FREEBOARD

MINE PIT SUMPS

				INITIAL SUMP		APPROXIMATE P - INITIAL YEAR YEA		
ID	DESCRIPTION	OBJECTIVES	MINE YEARS	CAPACITY (AC-FT)	MAXIMUM SUMP CAPACITY (AC-FT)	GPM	TDH (FT)	OVERFLOWS TO
WP-W	WEST PIT — WEST SUMP	*COLLECTION IN PIT	2-20	6.6	14.0	YEAR 2: 820 YEAR 20: 1,590	YEAR 2: 120 YEAR 20: 740	NONE
WP-E	WEST PIT — EAST SUMP	*COLLECTION IN PIT	10-20	4.7	9.4	YEAR 10: 530 YEAR 20: 1,050	YEAR 10: 110 YEAR 20: 350	NONE
EP	EAST PIT	*COLLECTION IN PIT	1-20	11.6	19.5	YEAR 1: 1,520 YEAR 11: 2,340	YEAR 1: 120 YEAR 11: 750	NONE
CP	CENTRAL PIT	*COLLECTION IN PIT	11-20	3.8	3.8	YEAR 11: 440 YEAR 16: 440	YEAR 1: 60 YEAR 16: 390	NONE

^{*} PIT COLLECTION IS BASED ON 40% OF THE AVERAGE ANNUAL SNOW MELT OCCURRING WITHIN ONE DAY AND THE PUMP CAPACITY DESIGNED TO REMOVE THAT SNOW MELT EVENT WITHIN 3 DAYS

SUMPS - PERMANENT

				MINIMUM		APPROXIMATE PUMP CAPACITY			
ID	DESCRIPTION	OBJECTIVES	MINE YEARS	CAPACITY (GAL)	GPM	TDH (FTI)	LINER TYPE	OVERFLOWS TO	SHOWN ON SHEET #
SUMP 1	CATEGORY 1 STOCKPILE SUMP – EAST	COLLECTION FOR GROUNDWATER CONTAINMENT SYSTEM	1-20+	NA – MANHOLE	7,200	50	NA - MANHOLE	EAST PIT	SEE CATEGORY 1 STOCKPILE
SUMP 2	CATEGORY 1 STOCKPILE SUMP – WEST	COLLECTION FOR GROUNDWATER CONTAINMENT SYSTEM	1-20+	NA – MANHOLE	7,200	50	NA - MANHOLE	WEST PIT	CONTAINMENT SYSTEM DRAWING SET

NOTES:

- 1. ACTUAL PUMP, PIPE, AND POND SIZES WILL BE OPTIMIZED IN FINAL DESIGN

- 1. ACTOAL POWP, PIPE, AND POND SIZES WILL BE OPTIMIZED IN FINAL DESIGN
 2. STANDARDIZED PUMP SIZE TO BE DETERMINED DURING FINAL DESIGN
 3. SOIL LINER 2 IS SHOWN IN DETAIL 2 ON SHEET CPS-002
 4. MINE DRAINAGE SUMP LINER IS SHOWN IN DETAIL 1 ON SHEET MD-014
 5. MINE DRAINAGE POND LINER IS SHOWN IN DETAIL 2 ON SHEET MD-014
 6. ALL PUMP CAPACITY FLOWS AND TDH VALUES HAVE BEEN ROUNDED

MINE DRAINAGE PONDS

				DESIGN		IATE PUMP		ACTUAL		
ID	DESCRIPTION	OBJECTIVES	MINE YEARS	VOLUME* (GAL)	GРM	TDH (FT)	LINER TYPE	VOLUME* (GAL)	OVERFLOWS TO	SHOWN ON SHEET #
CPS	CENTRAL PUMPING STATION POND	STORE WATER FOR CPS CONVEYANCE	1-20+	1,200,000	4,000	450	SOIL LINER 2	1,200,000	NONE	CPS-001
MD-S23-1	CATEGORY 2/3 STOCKPILE SUMP OVERFLOW POND	PROVIDE SUMP OVERFLOW STORAGE UP TO THE 100 YEAR 24 HOUR EVENT	1-19	6,973,000	NA	NA	MINE DRAINAGE POND LINER	7,006,000	NONE	MD-005/ MD-006
MD-S23-3	CATEGORY 2/3 STOCKPILE SUMP OVERFLOW POND	PROVIDE SUMP OVERFLOW STORAGE UP TO THE 100 YEAR 24 HOUR EVENT	6-16	1,727,000	NA	NA	MINE DRAINAGE POND LINER	1,727,000	NONE	MD-007
MD-S4	CATEGORY 4 STOCKPILE SUMP OVERFLOW POND	PROVIDE SUMP OVERFLOW STORAGE UP TO THE 100 YEAR 24 HOUR EVENT	1-11	2,639,000	NA	NA	MINE DRAINAGE POND LINER	3,226,000	NONE	MD-004
MD-SOSP	ORE SURGE PILE SUMP OVERFLOW POND	PROVIDE SUMP OVERFLOW STORAGE UP TO THE 100 YEAR 24 HOUR EVENT	1-20	1,564,000	NA	NA	MINE DRAINAGE POND LINER	1,727,000	NONE	MD-003
MD-HRC	HAUL ROAD RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 100 YEAR 24 HOUR EVENT AND REDUCE TSS	1-20	1,988,000	40	80	MINE DRAINAGE POND LINER	2,248,000	NONE	MD-011
MD-HRE	HAUL ROAD RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 100 YEAR 24 HOUR EVENT AND REDUCE TSS	1-20	3,487,000	70	110	MINE DRAINAGE POND LINER	3,487,000	NONE	MD-010
MD-HRW	HAUL ROAD RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 100 YEAR 24 HOUR EVENT AND REDUCE TSS	2-20	1,206,000	30	70	MINE DRAINAGE POND LINER	1,303,000	NONE	MD-012
MD-HRN	HAUL ROAD RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 100 YEAR 24 HOUR EVENT AND REDUCE TSS	2-20	1,434,000	30	110	MINE DRAINAGE POND LINER	1,499,000	NONE	MD-013
MD-RTH	RAIL TRANSFER HOPPER RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 100 YEAR 24 HOUR EVENT AND REDUCE TSS	1-20	228,000	200	60	MINE DRAINAGE SUMP LINER	228,000	NONE	MD-009
MD-OSLA	OVERBURDEN STORAGE & LAYDOWN AREA RUNOFF POND	PROVIDE FLOOD STORAGE UP TO THE 25 YEAR 24 HOUR EVENT AND REDUCE TSS	1-20	3,487,000	100	90	NONE	4,725,000	NONE	MD-008
TEMP (VARIOUS)	STOCKPILE CONSTRUCTION RUNOFF PONDS AND PIT STRIPPING	TEMPORARY POND TO COLLECT RUNOFF DURING CONSTRUCTION	VARIES	VARIES	VARIES	VARIES	NONE	VARIES	NONE	NONE

^{*}DESIGN VOLUME REFLECTS THE VOLUME REQUIRED BASED ON THE DESIGN NEEDS; WHEREAS ACTUAL VOLUME REFLECTS THE VOLUME SHOWN IN THE ATTACHED DRAWING SET. ACTUAL VOLUME DOES NOT INCLUDE ADDITIONAL VOLUME FROM 3 FEET OF FREEBOARD (1 FOOT FOR MD-RTH)

<u>PIPING</u>

ID	DESCRIPTION	OBJECTIVES	WATER SOURCE	NOMINAL PIPI SIZES* (IN)
TWP	TREATED WATER PIPELINE	TRANSPORT WATER FROM THE CPS TO FLOTATION TAILINGS BASIN	CPS	20
PL-1	PIPELINE NUMBER 1	TRANSPORT CONSTRUCTION WATER TO THE WWTF	TEMP — CAT 1, CAT 4, EAST PIT & WEST PIT	2 TO 8
PL-2	PIPELINE NUMBER 2	TRANSPORT CONSTRUCTION WATER TO THE WWTF	TEMP - CAT 2/3 + OSP	2 TO 8
PL-3	PIPELINE NUMBER 3	TRANSPORT MINE DRAINAGE TO THE WWTF	CAT 2/3 & OSP	3 TO 8
PL-4	PIPELINE NUMBER 4	TRANSPORT MINE DRAINAGE TO THE WWTF	CAT 4	4
PL-5	PIPELINE NUMBER 5	TRANSPORT MINE DRAINAGE TO THE WWTF	CAT 1	28 TO 42
PL-6	PIPELINE NUMBER 6	TRANSPORT MINE DRAINAGE TO THE CPS	OSLA	3
PL-7	PIPELINE NUMBER 7	TRANSPORT MINE DRAINAGE TO THE WWTF	RTH, MD-HRE & MD-HRC	2 TO 6
PL-8	PIPELINE NUMBER 8	TRANSPORT MINE DRAINAGE TO THE WWTF	EAST PIT & CENTRAL PIT	12 TO 20
PL-9	PIPELINE NUMBER 9	TRANSPORT MINE DRAINAGE TO THE WWTF	WEST PIT	10 TO 22
PL-10	PIPELINE NUMBER 10	TRANSPORT MINE DRAINAGE TO THE WWTF	MD-HRN	2
PL-11	PIPELINE NUMBER 11	TRANSPORT MINE DRAINAGE TO THE WWTF	MD-HRW	2

PLANT DRAWING NUMBER:

MECHANICAL INFRASTRUCTURE GENERAL DWGS MINE SITE SUMP, POND AND PIPE DETAIL TABLES

R	DATE	DESCRIPTION	ISSUE STATUS				
	5/18/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN,	
			FOR PERMITTING	1			DRAWN: VJS
							CHECKED: CMK2
			FOR CONSTRUCTION			PRINTED NAME CHRISTIE KEARNEY SIGNATURE	BARR PROJECT NO.: 23/69-0C29
			NOT APPROVED FOR CONSTRUCTION		DATE 5/18/15 LICENSE# 48864	SCALE:	



AS SHOWN

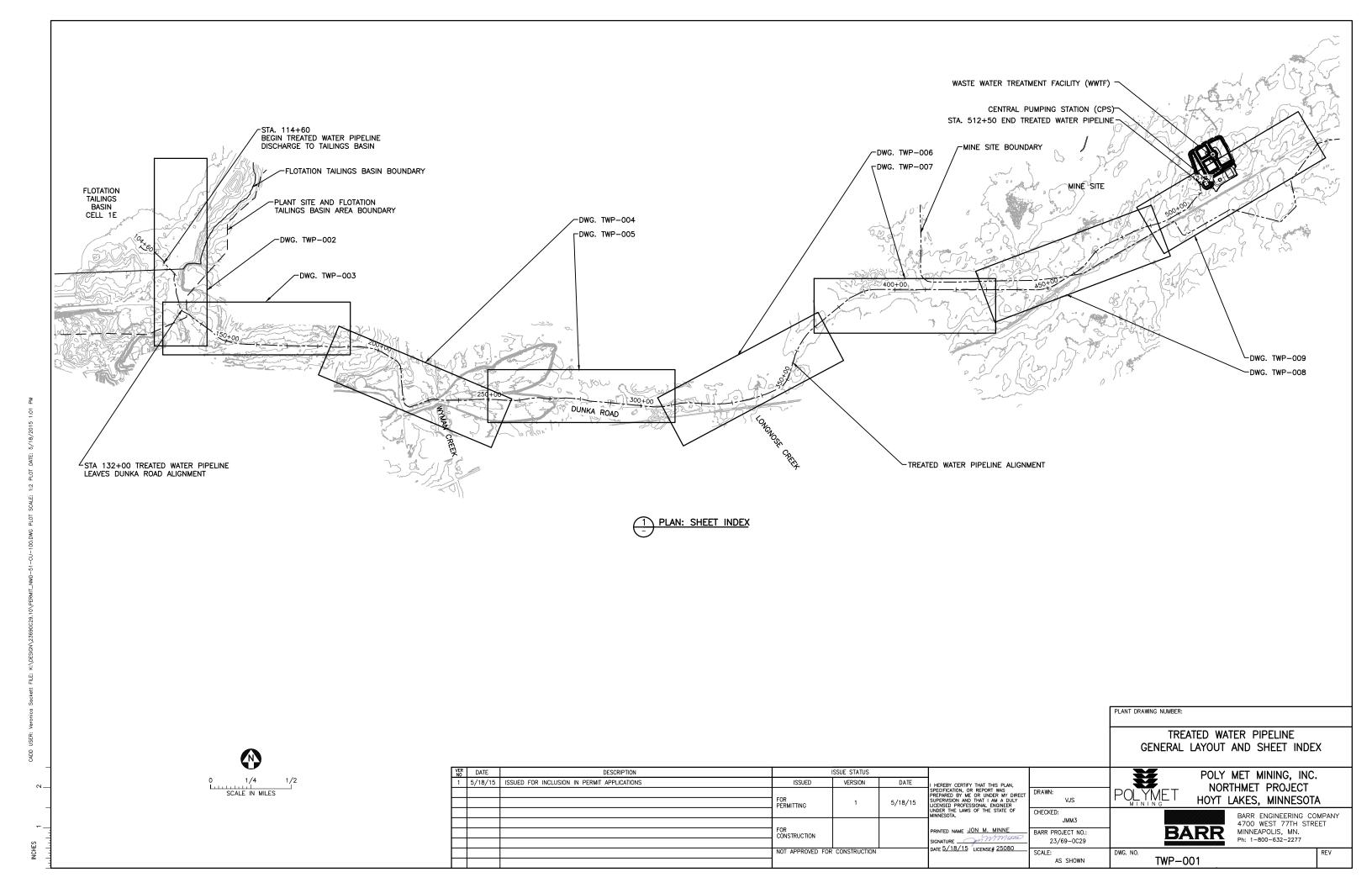
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

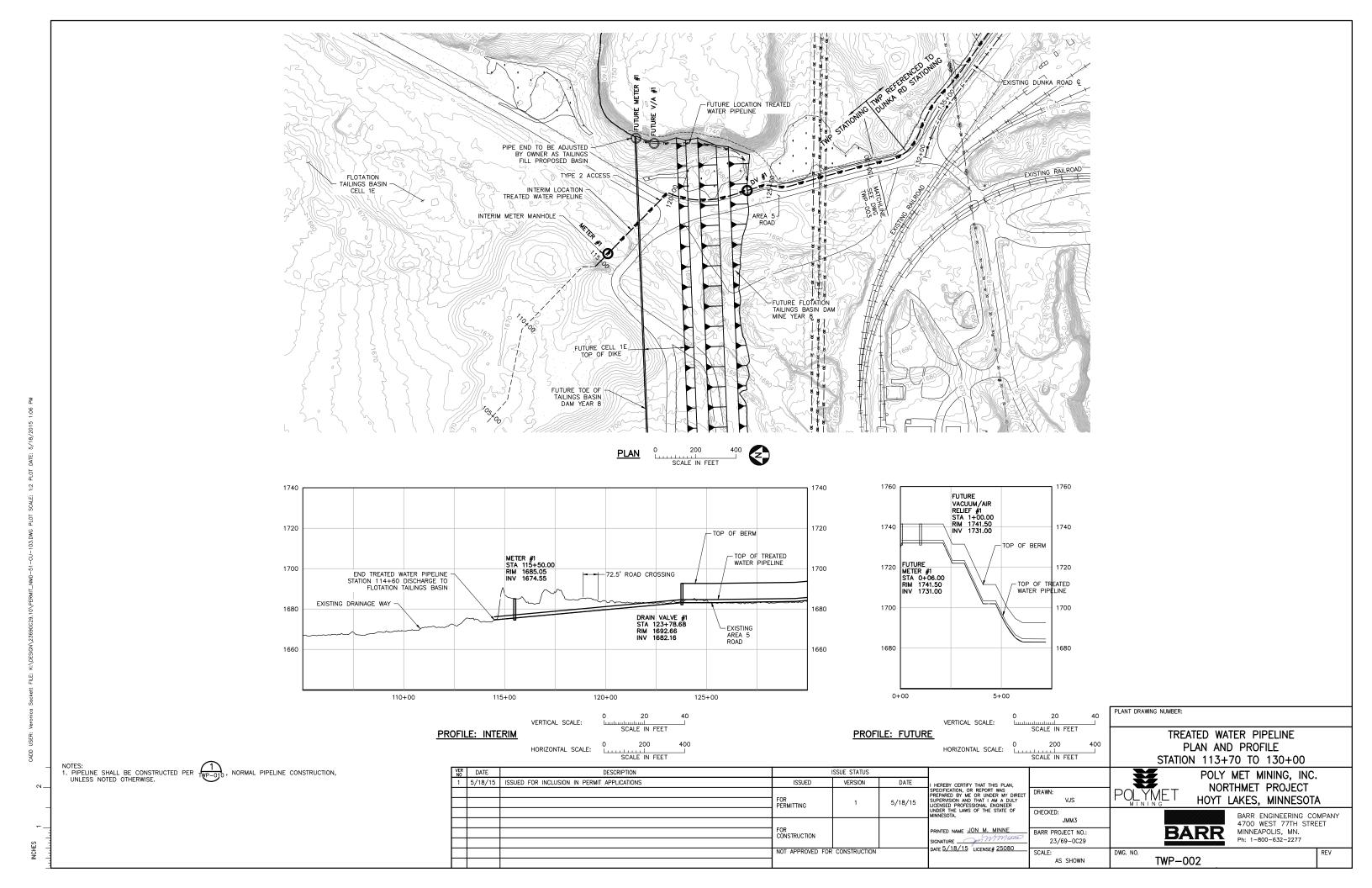
BARR

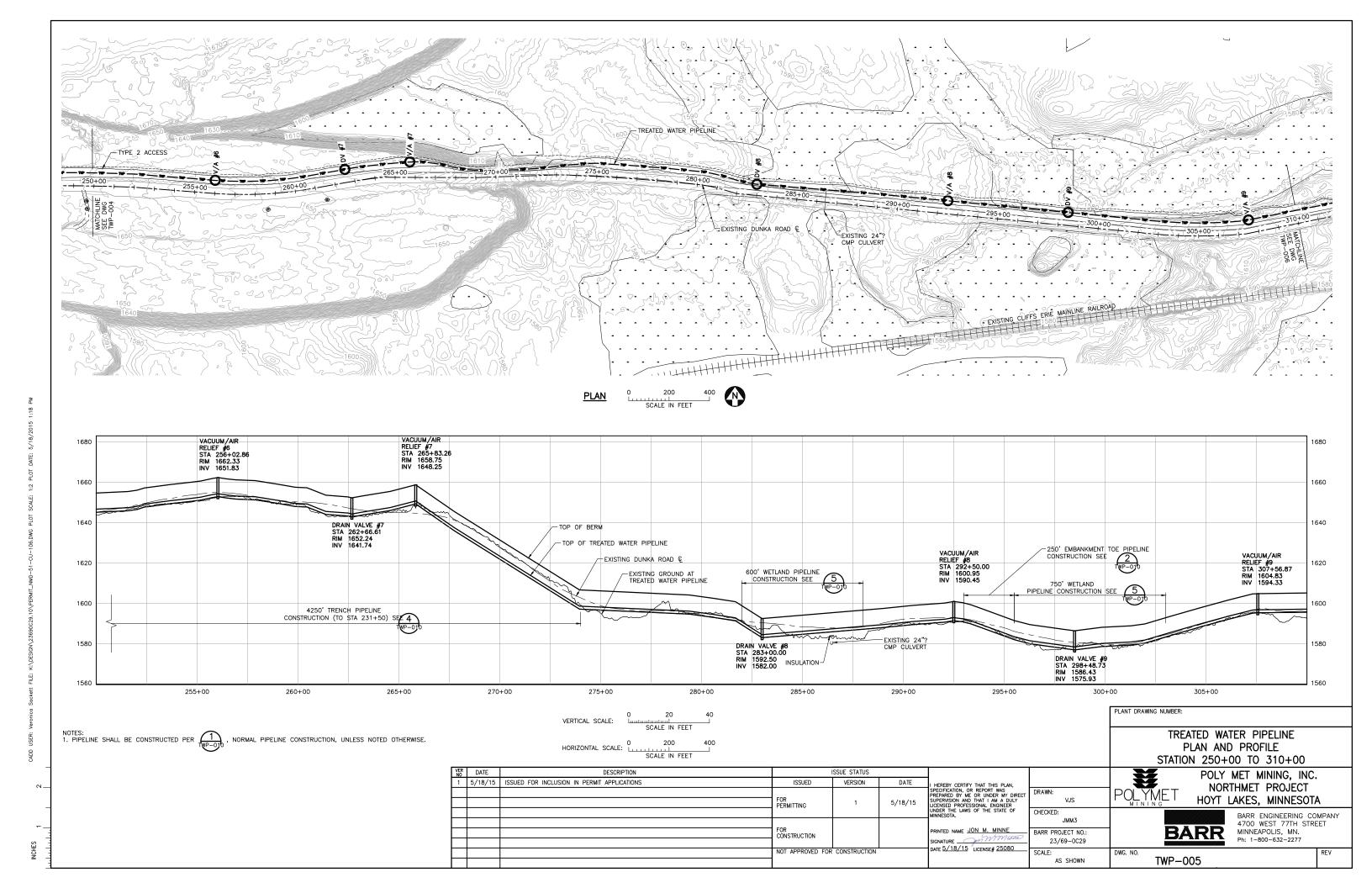
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

Ph: 1-800-632-2277

ME-004







- PROPOSED CENTRAL PUMPING STATION 5

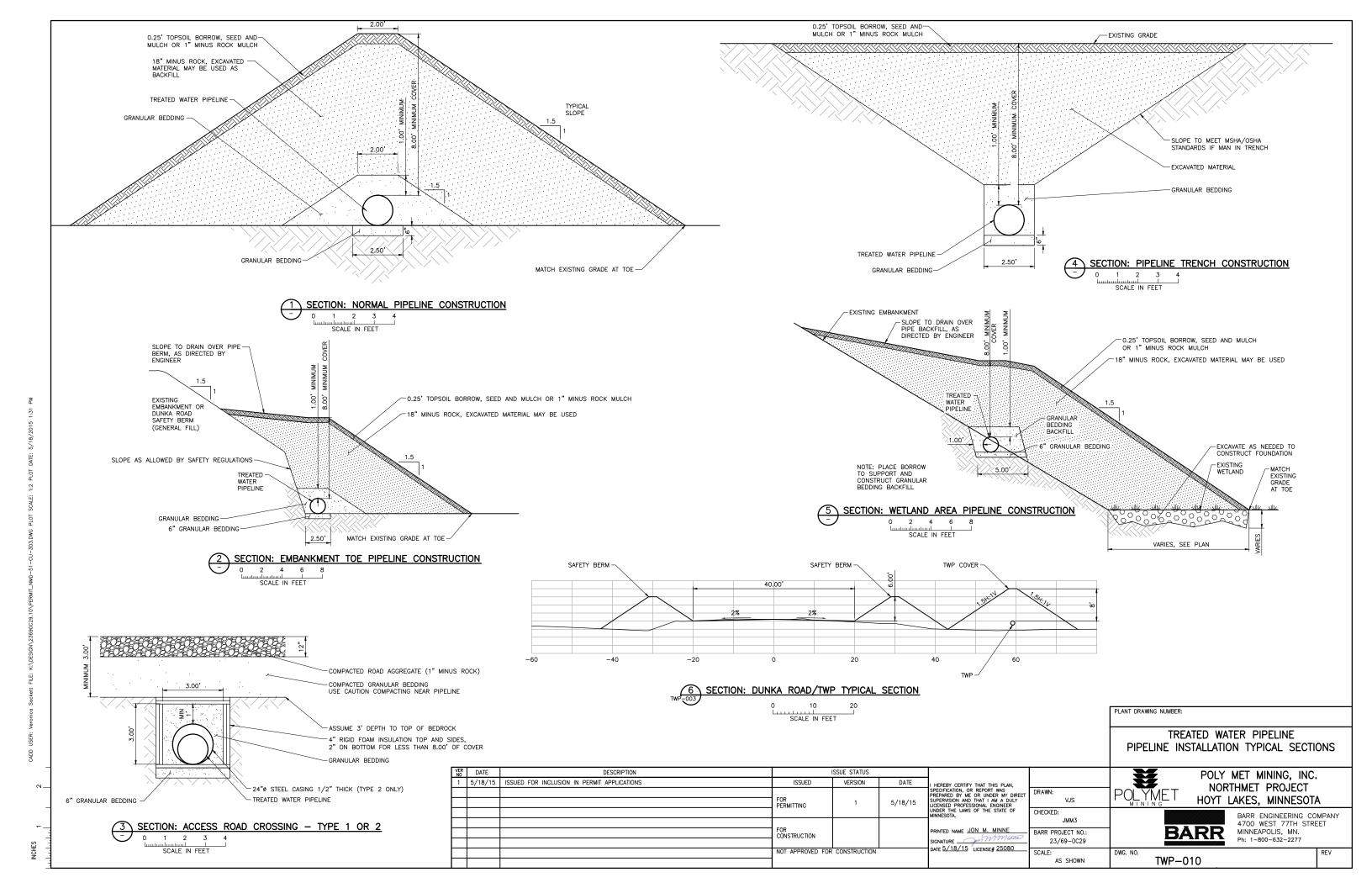
PIPE FROM CONSTRUCTION WATER BASIN

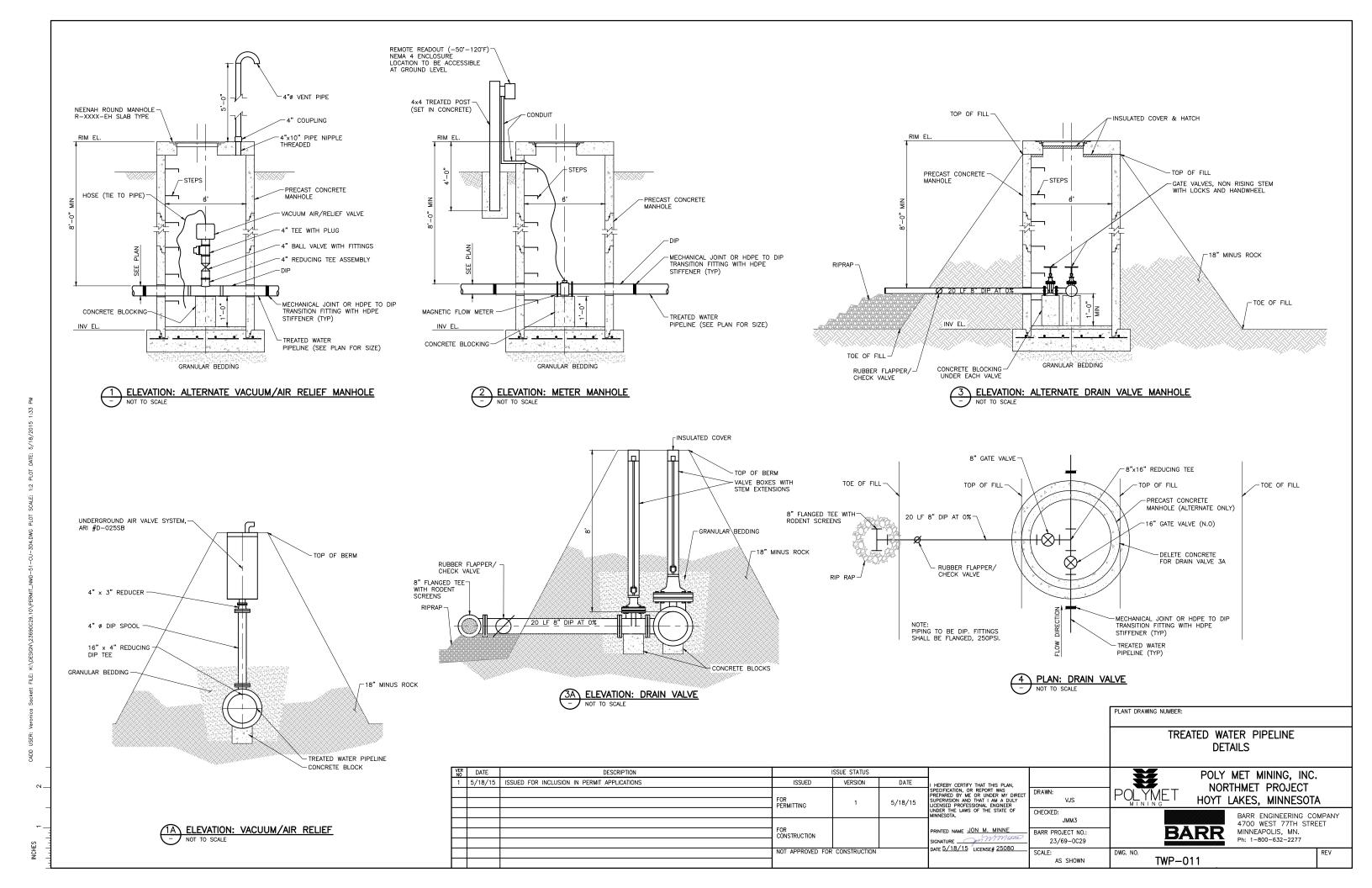
WASTE WATER TREATMENT FACILITY

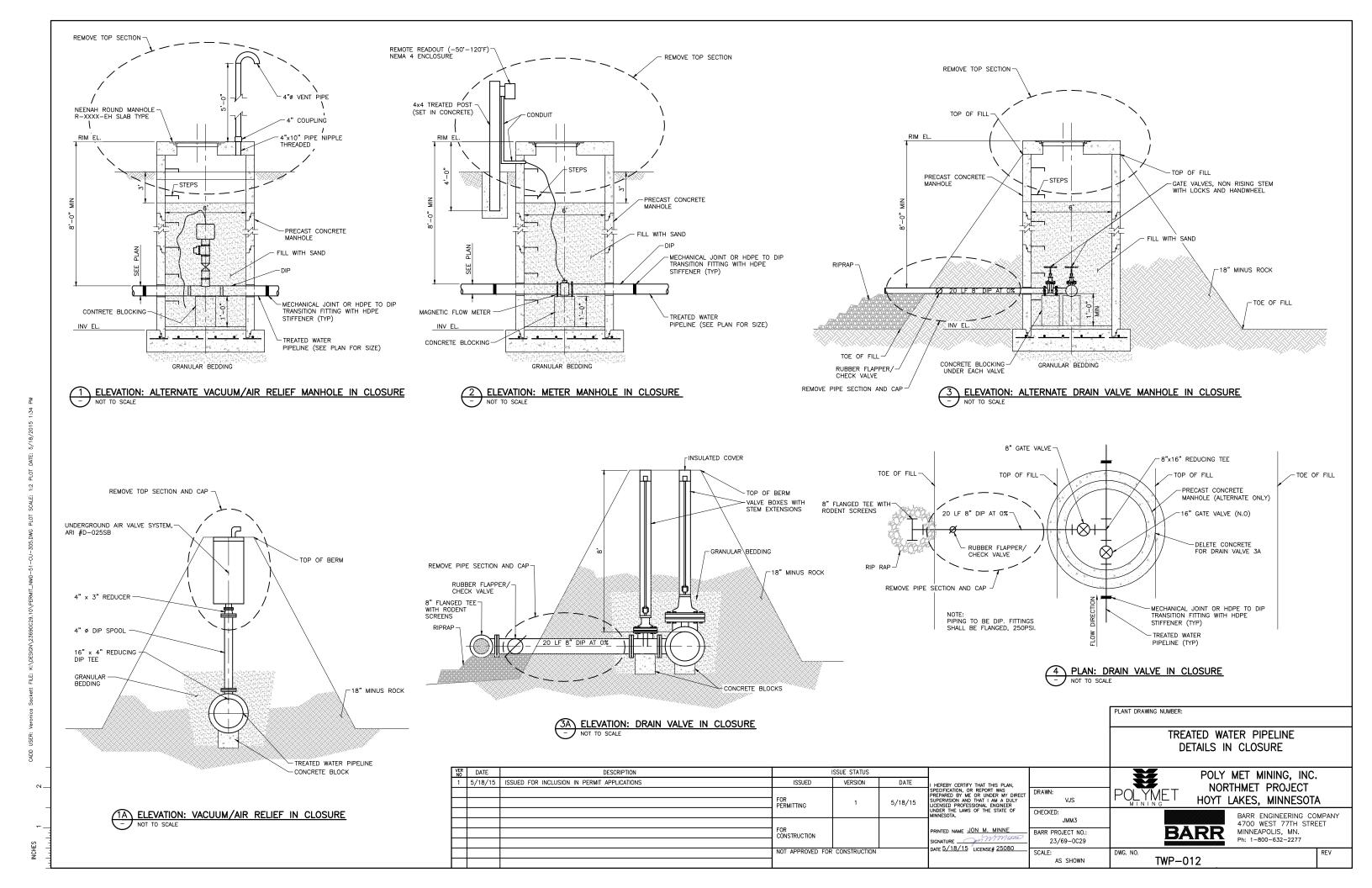
(CPS) SEE SHEET CPS-001

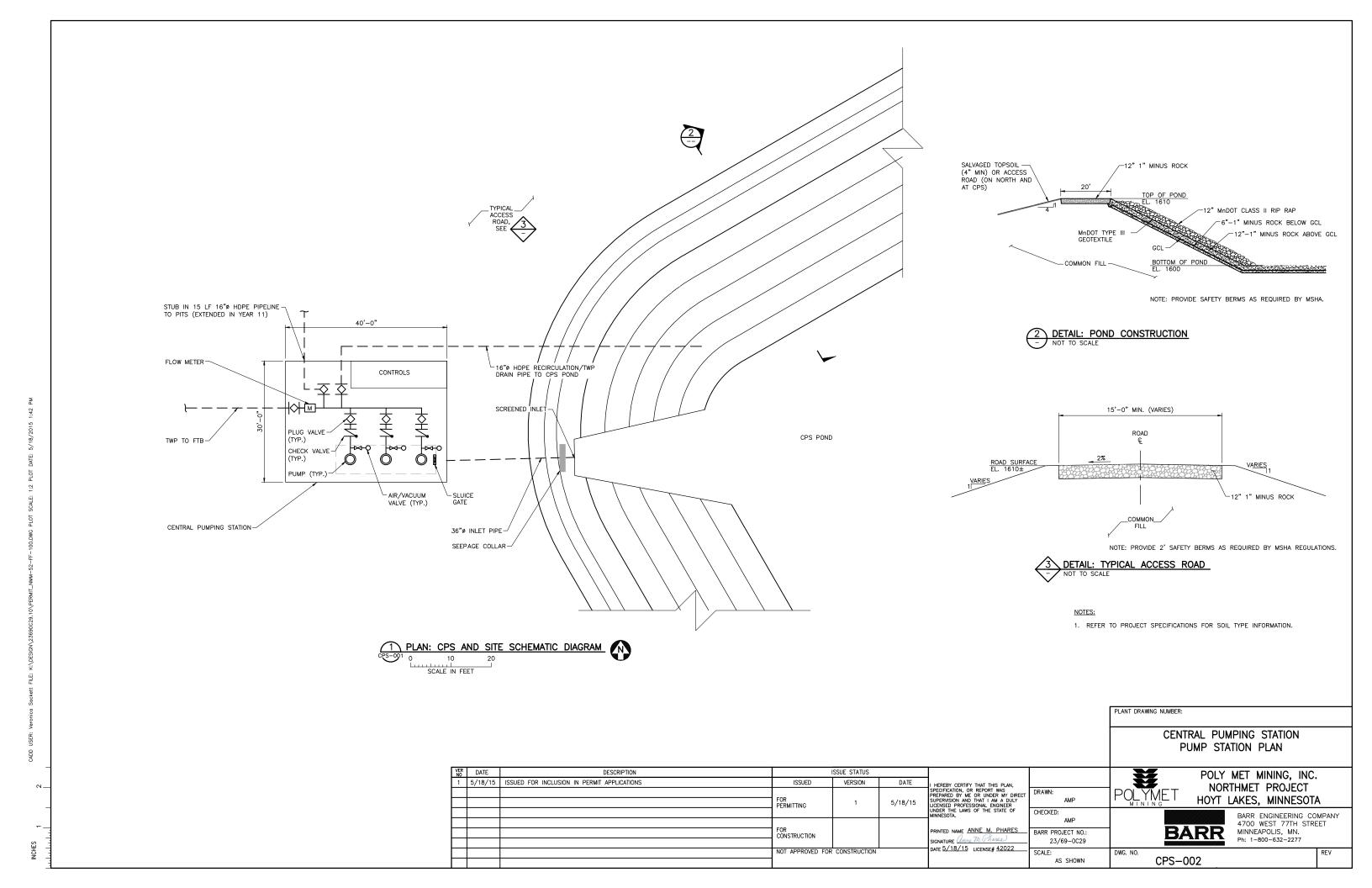
CONNECT TO CPS -DISCHARGE PIPE

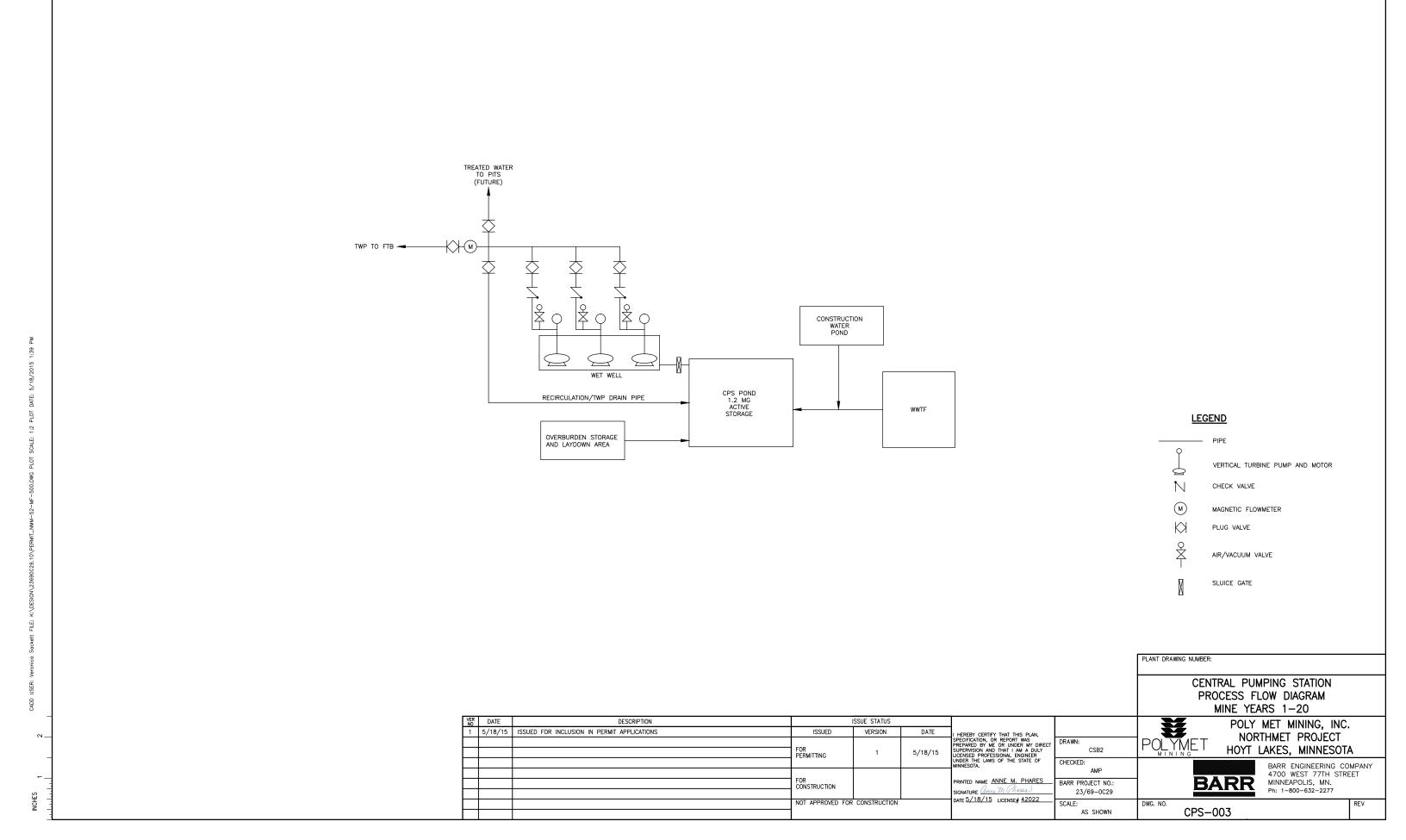
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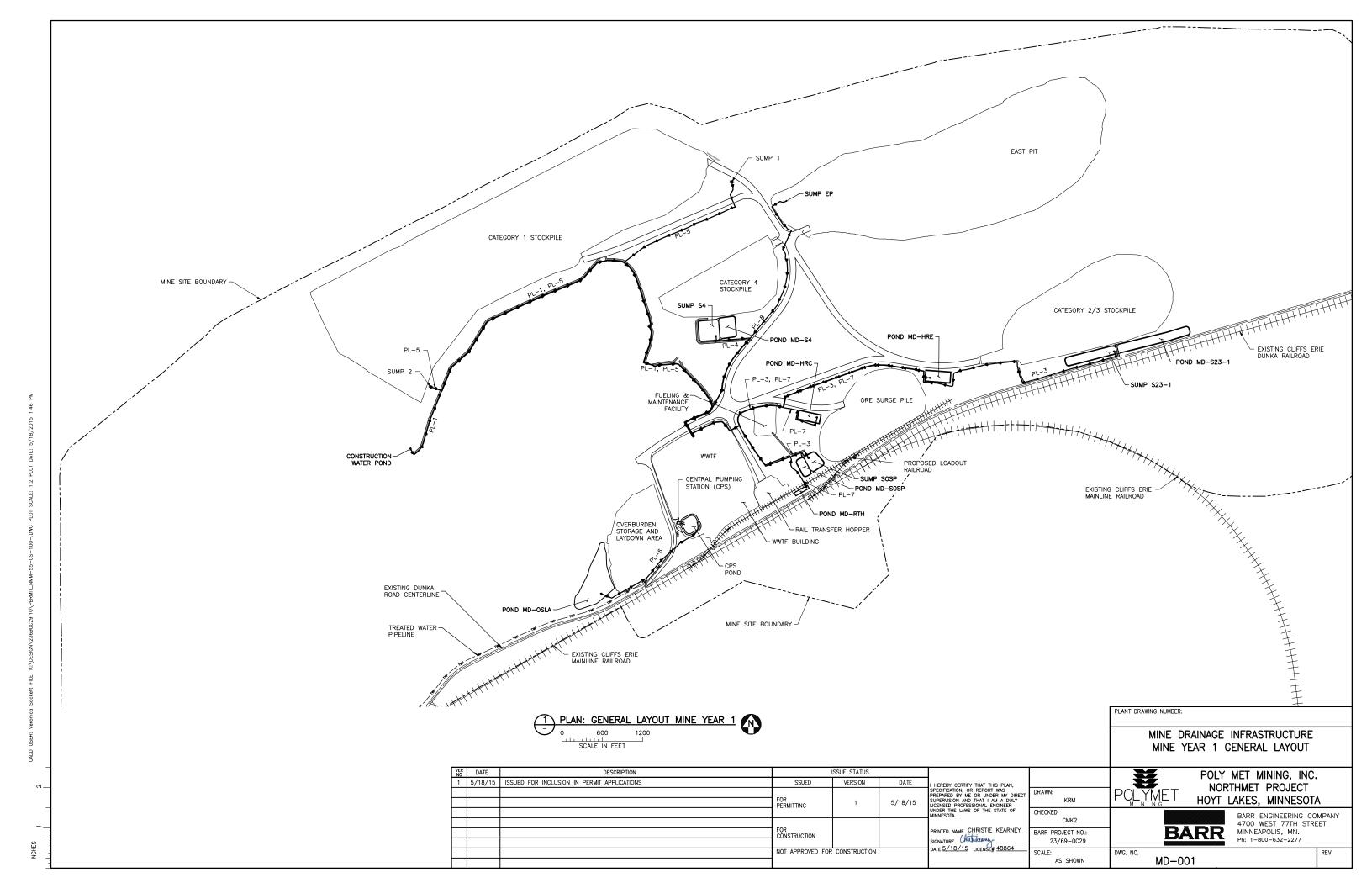


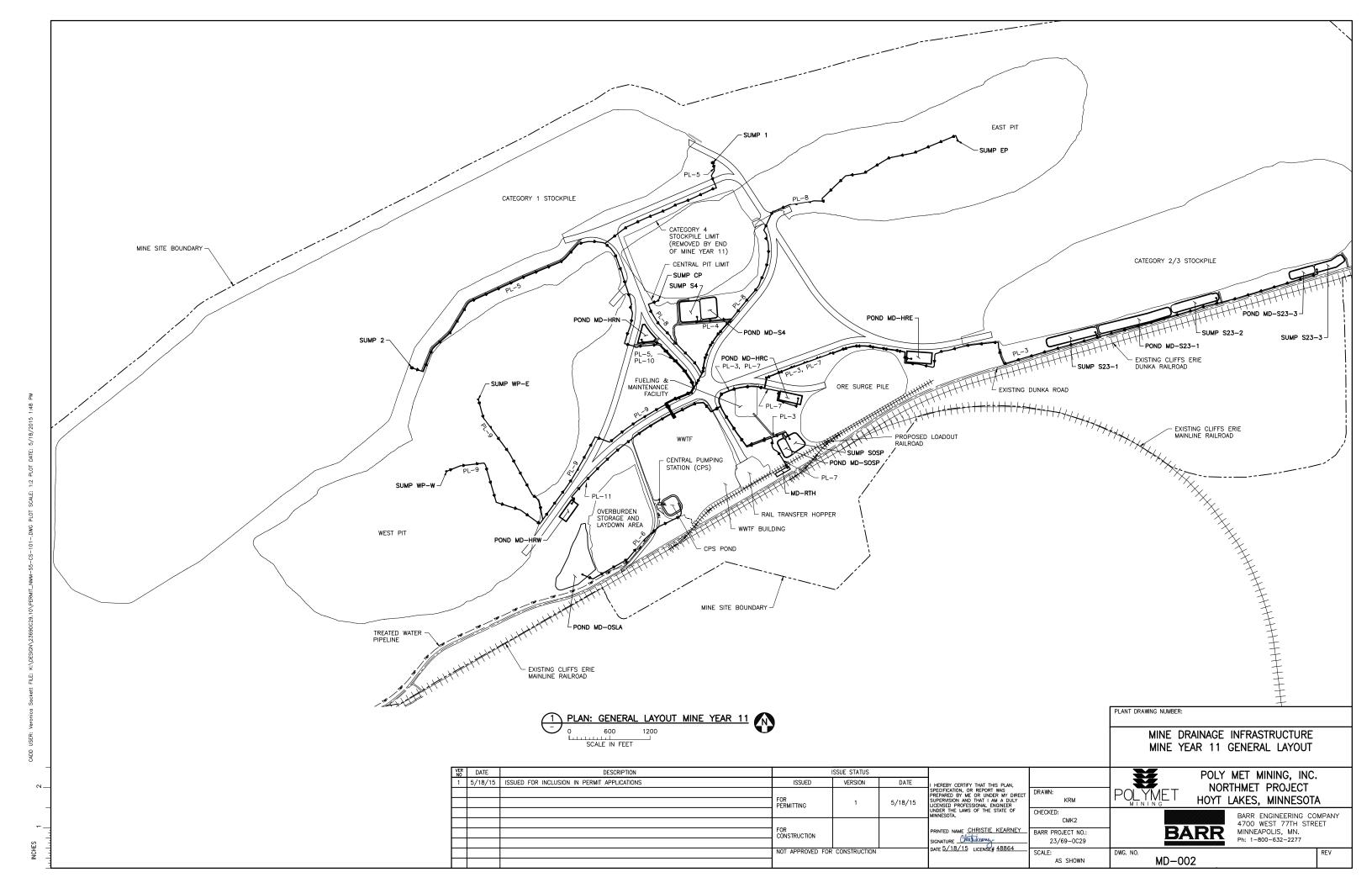


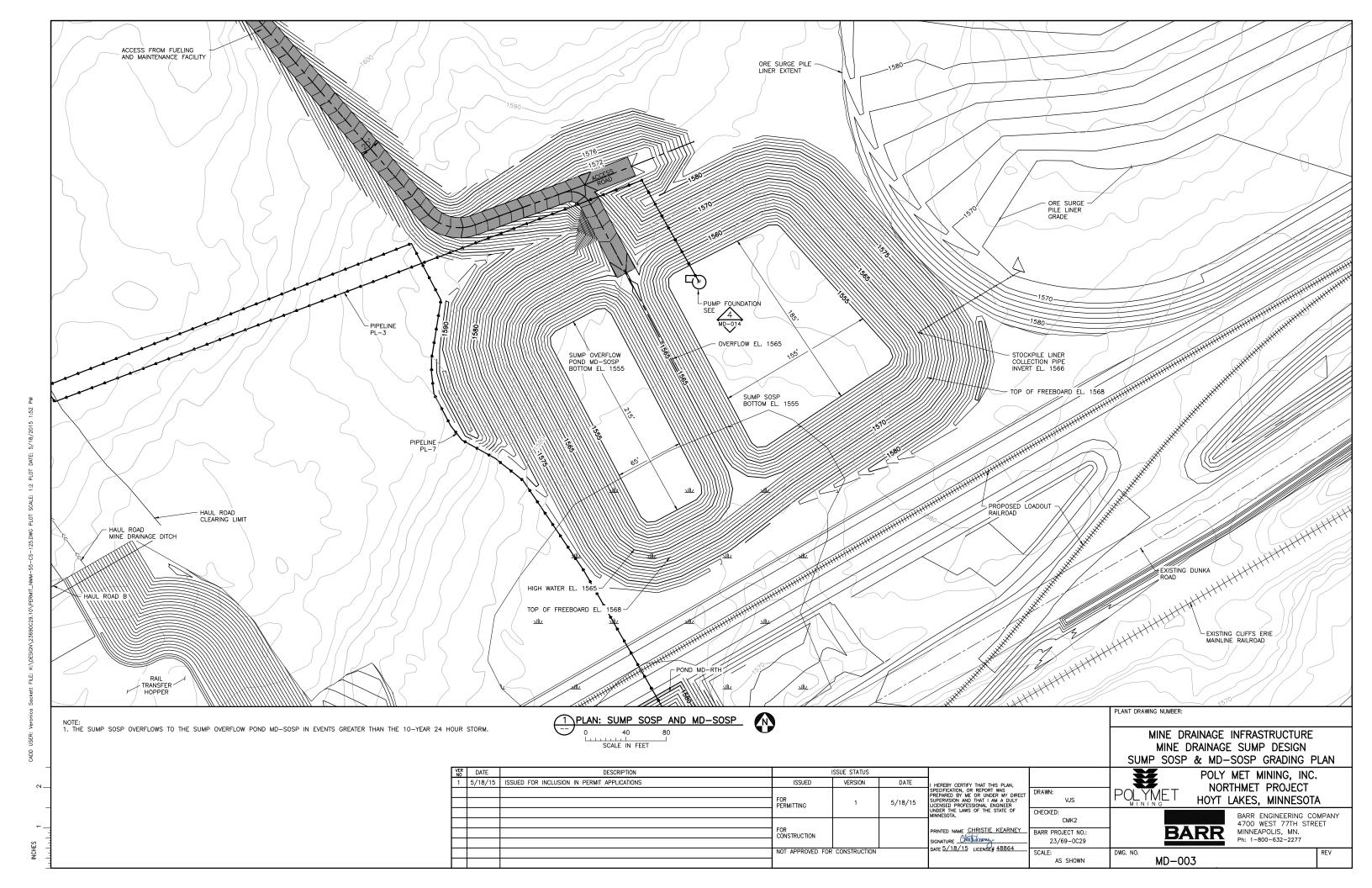


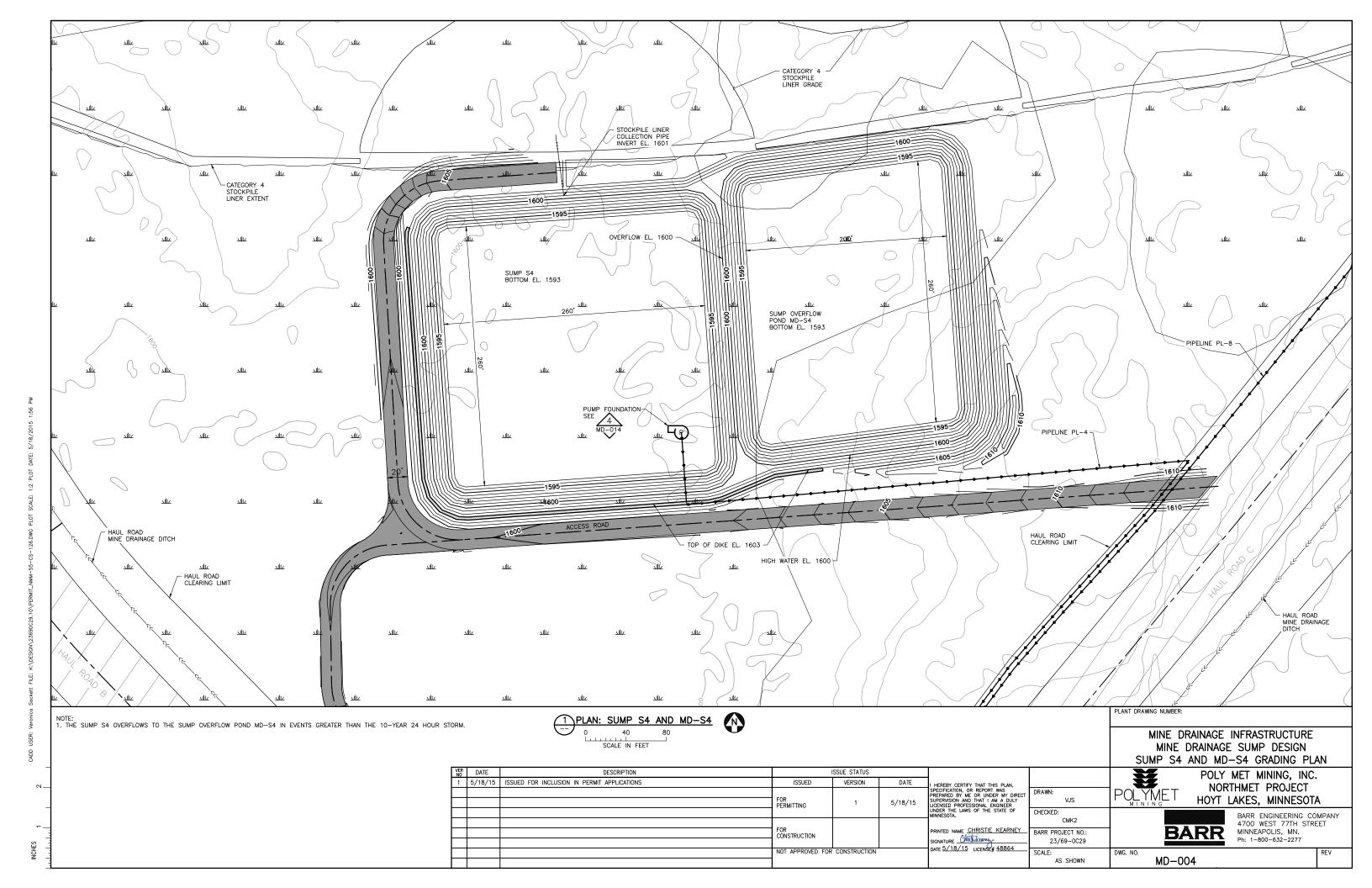


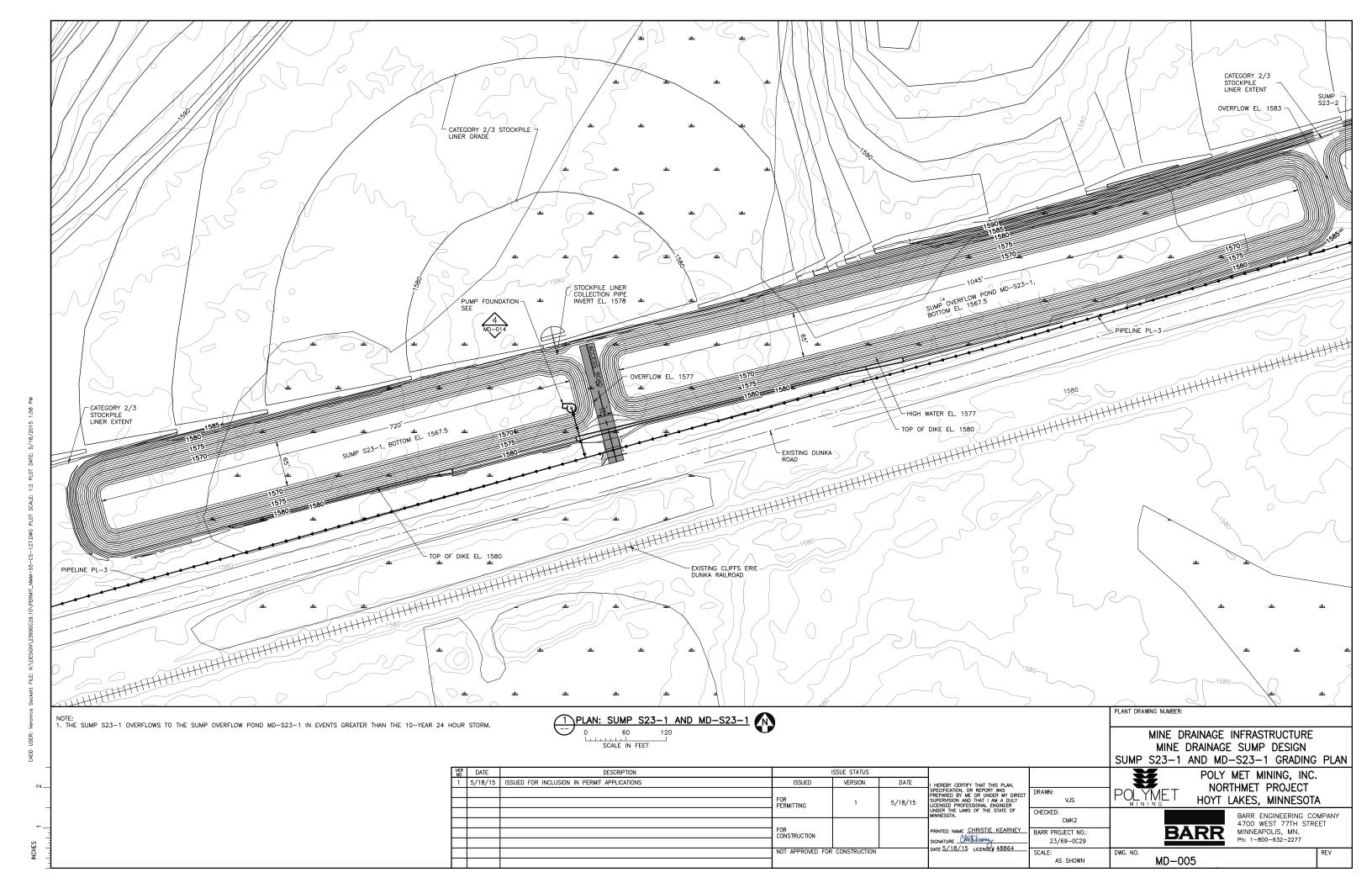


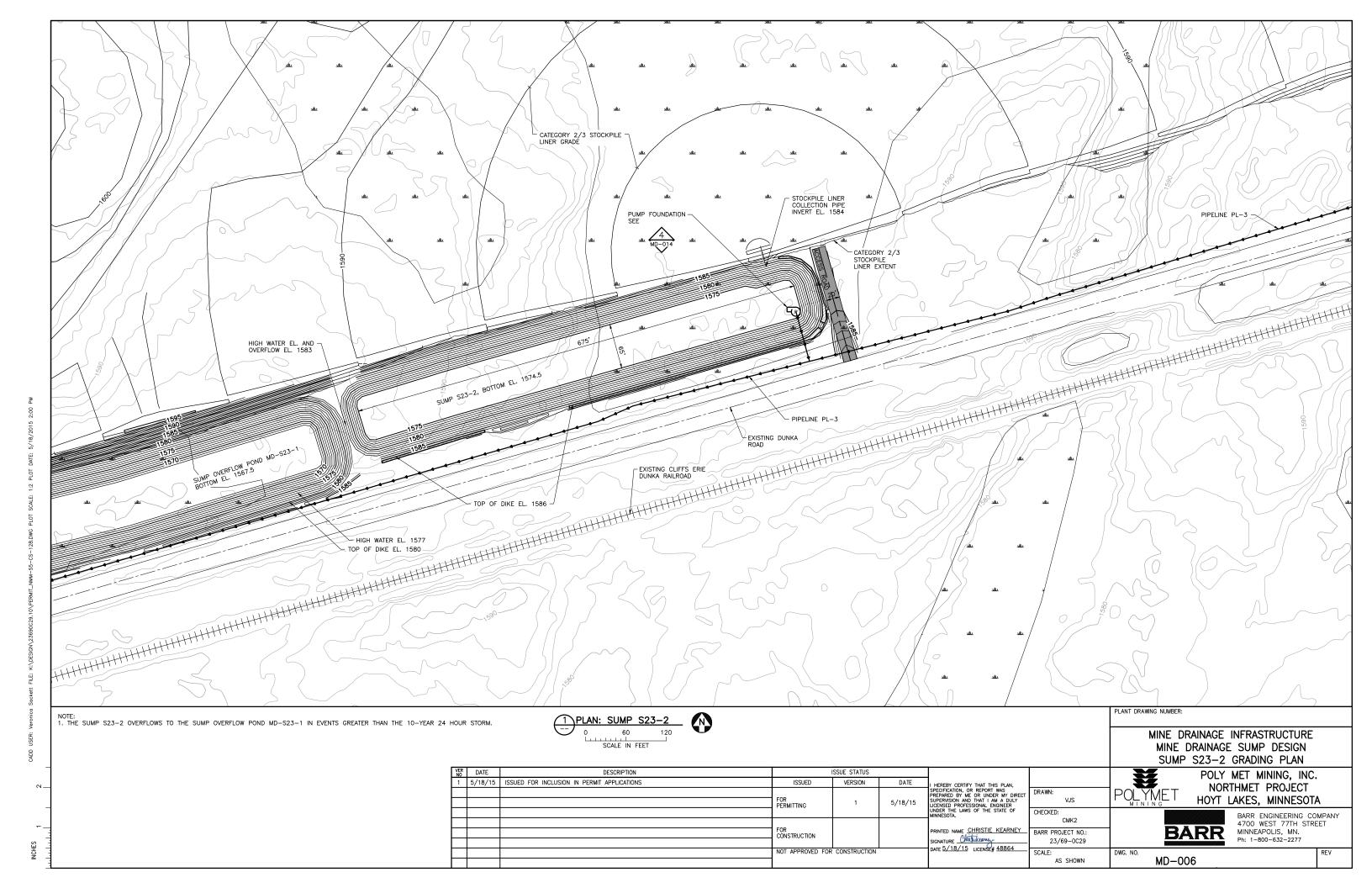


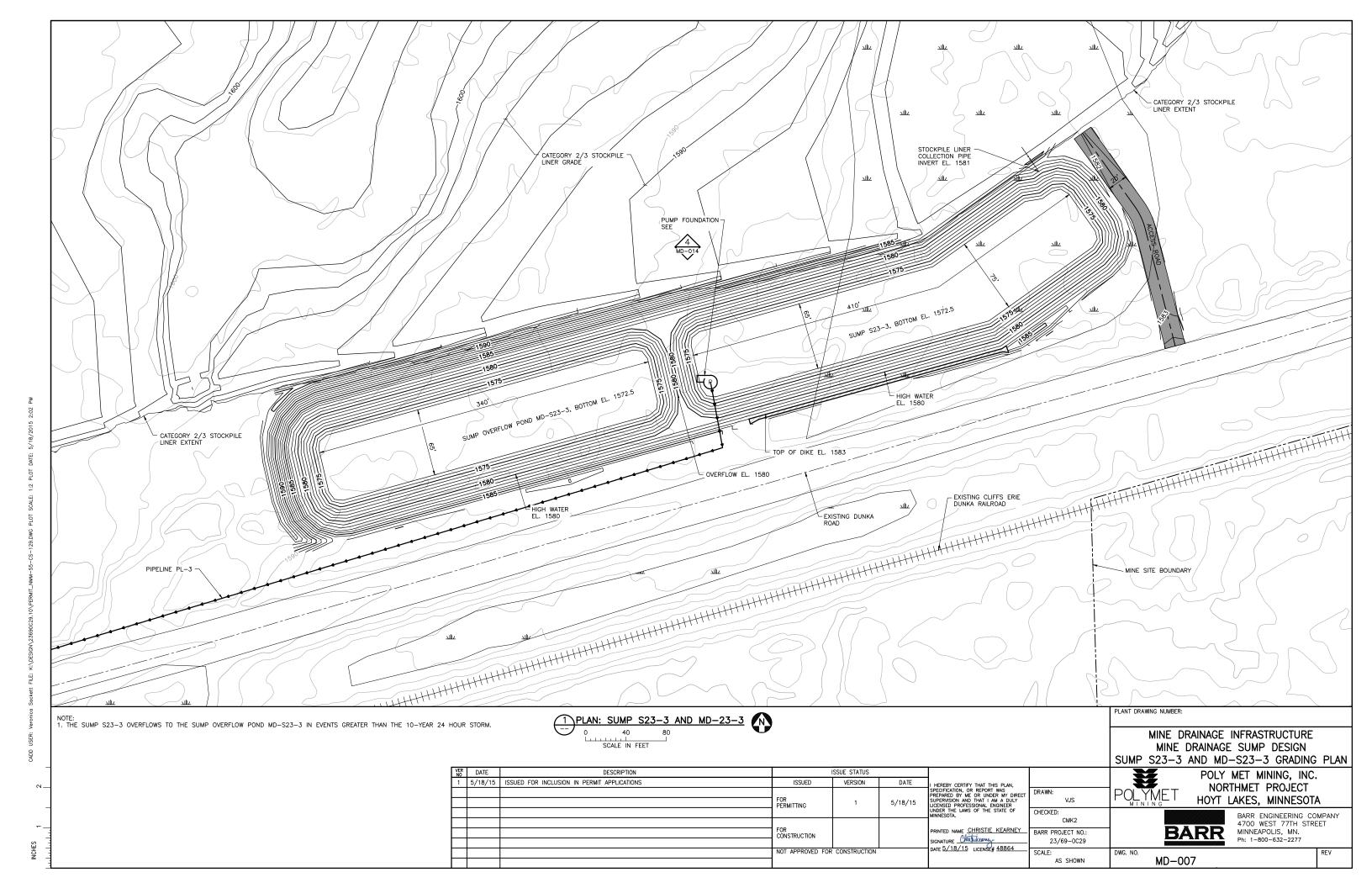


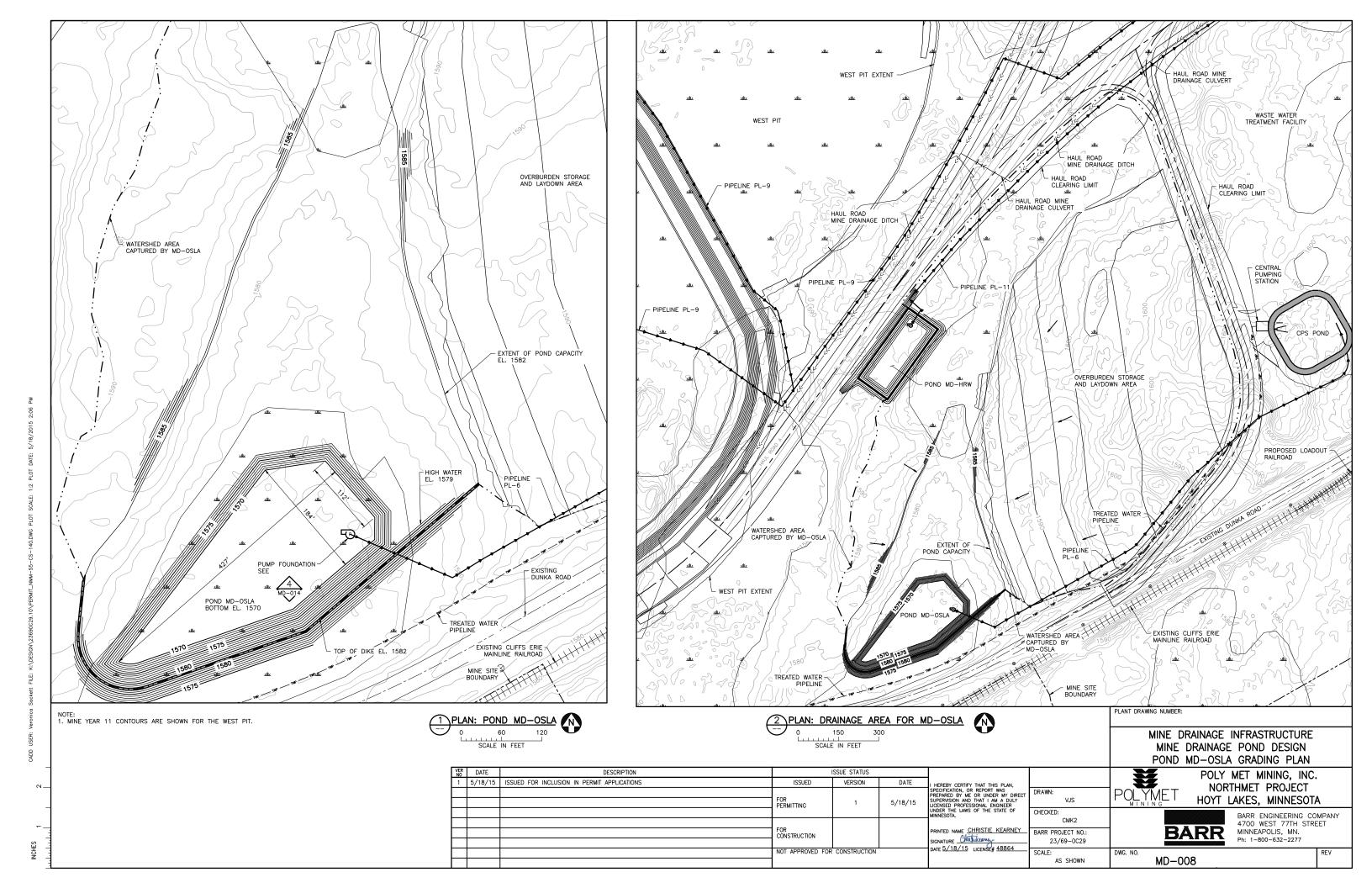


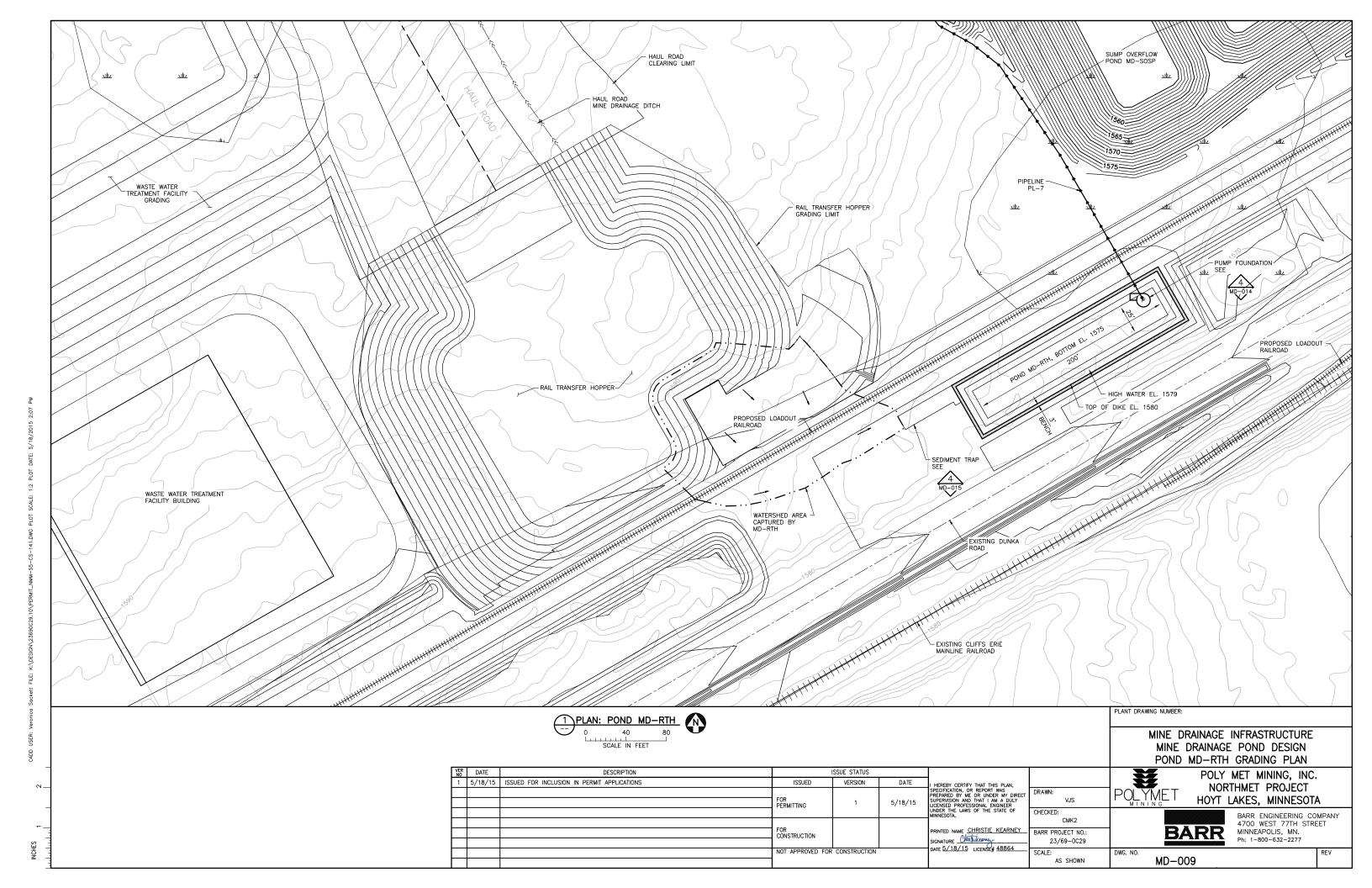


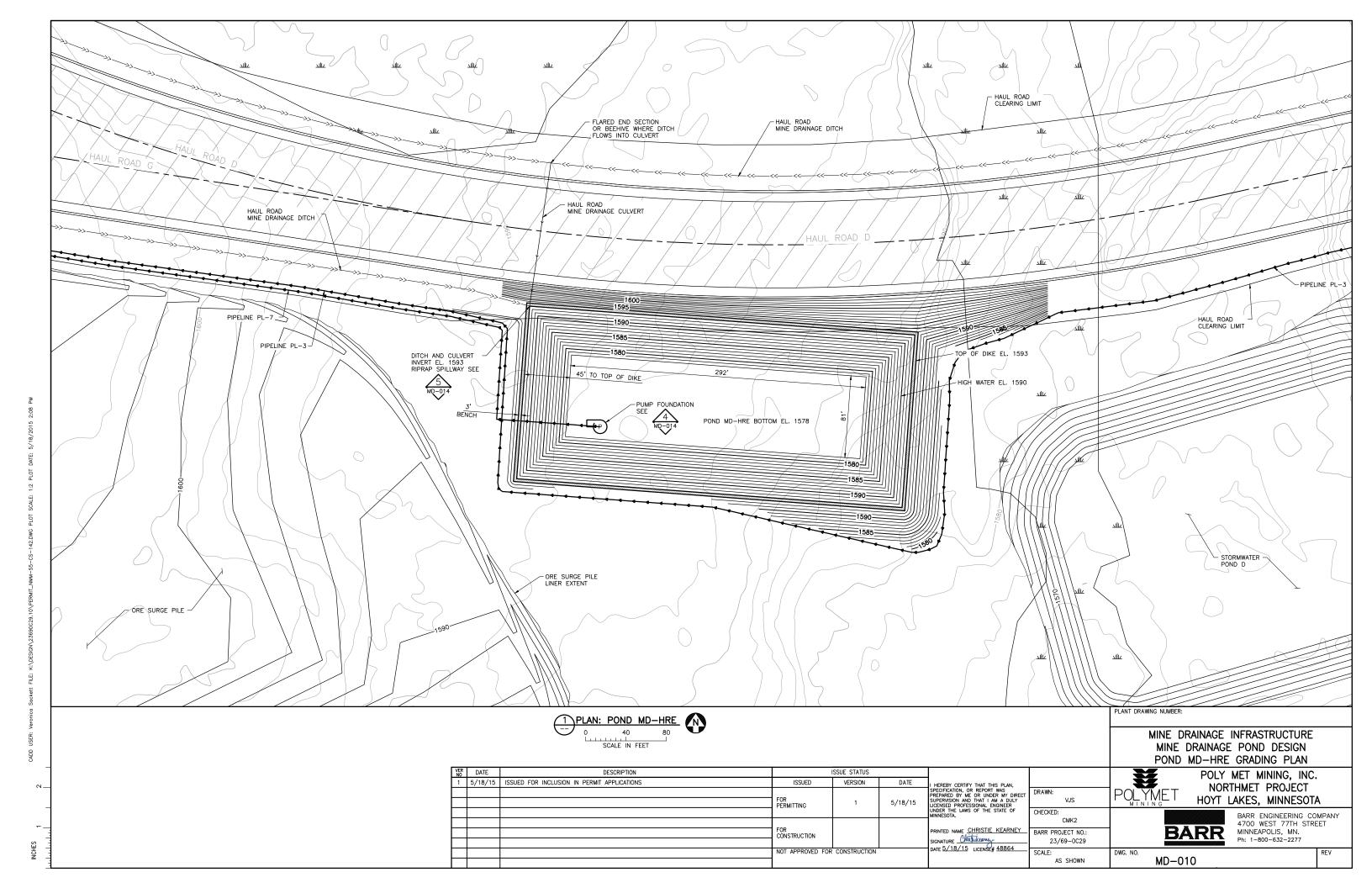


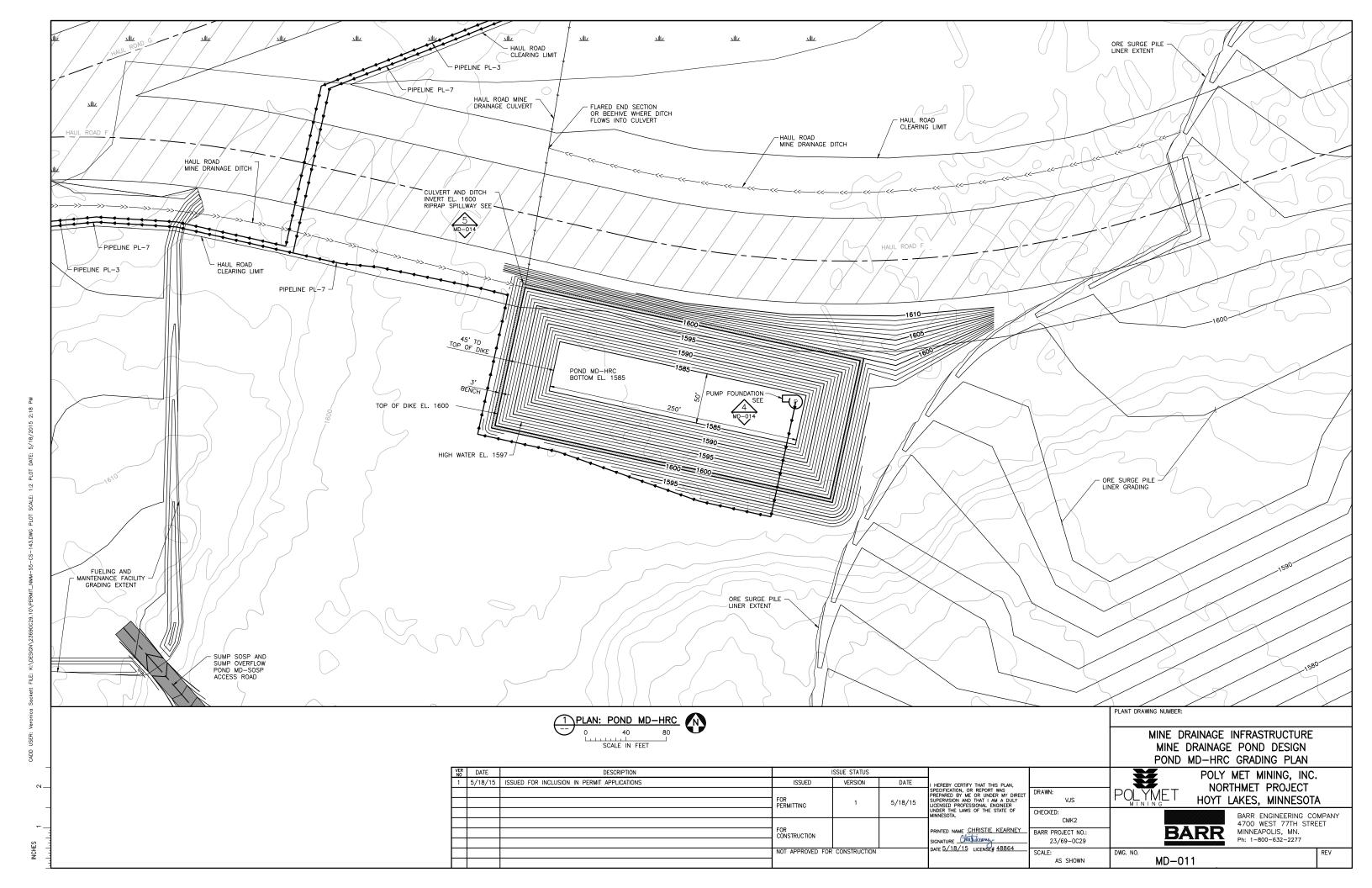


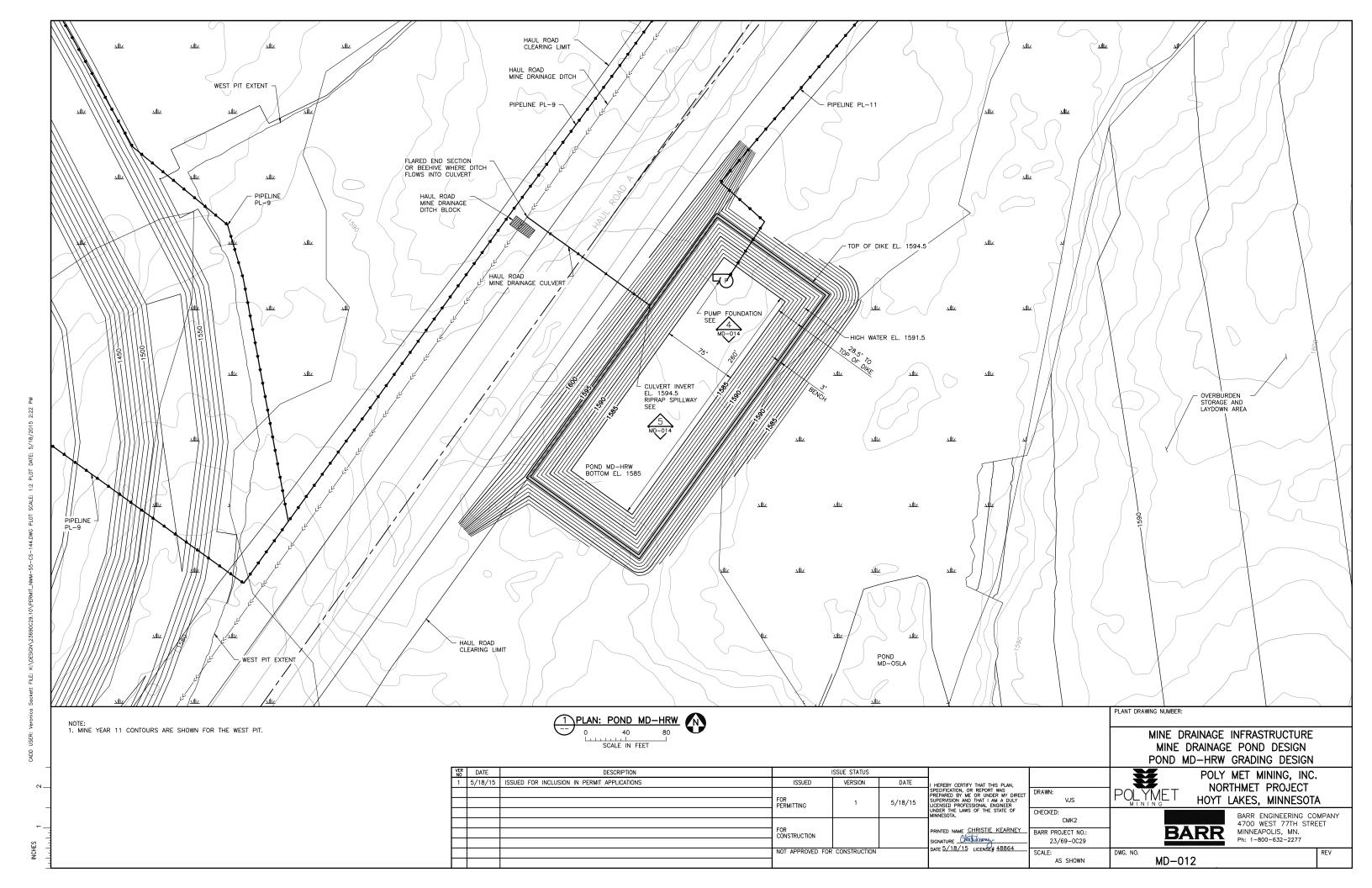


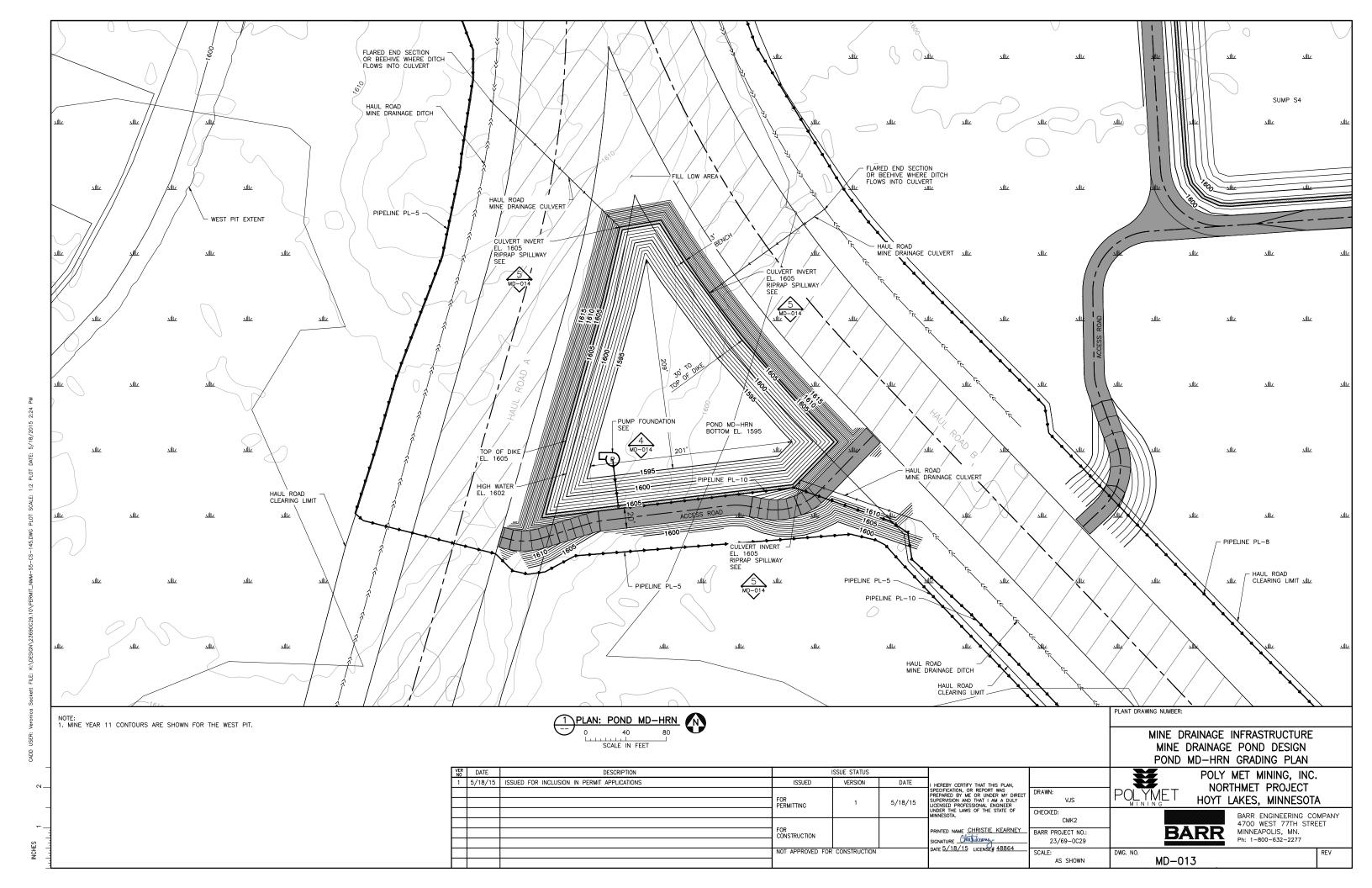


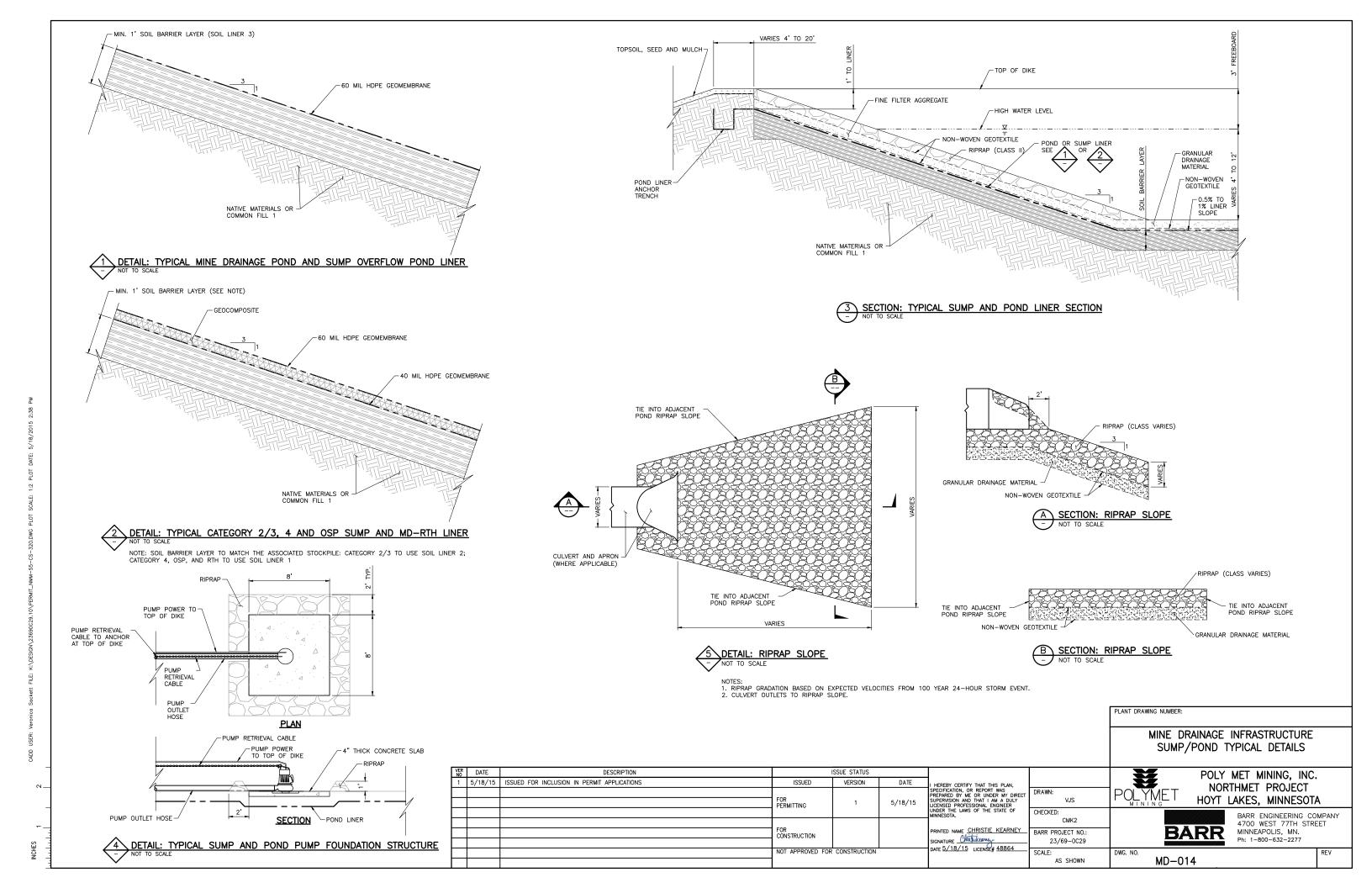


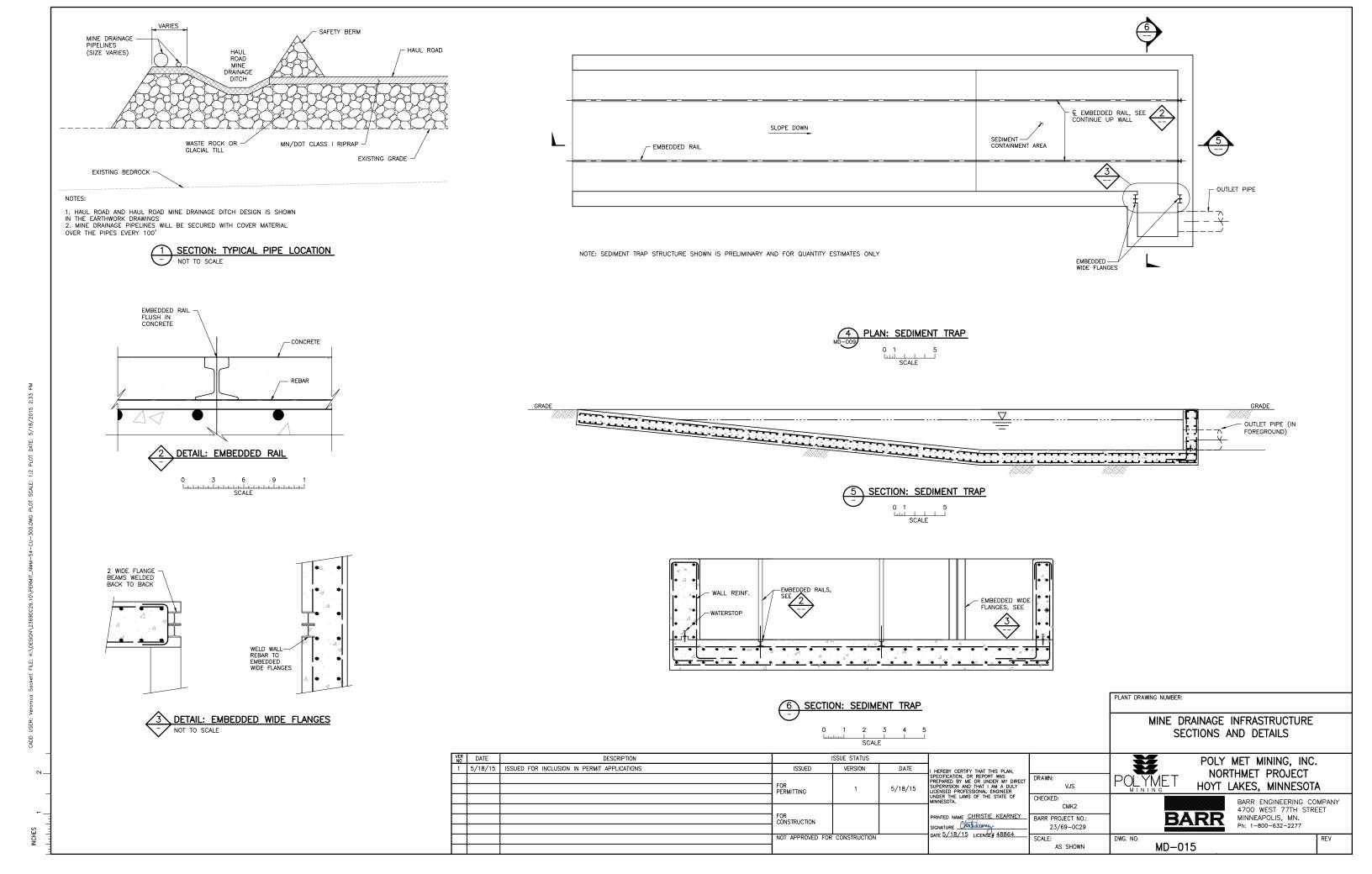


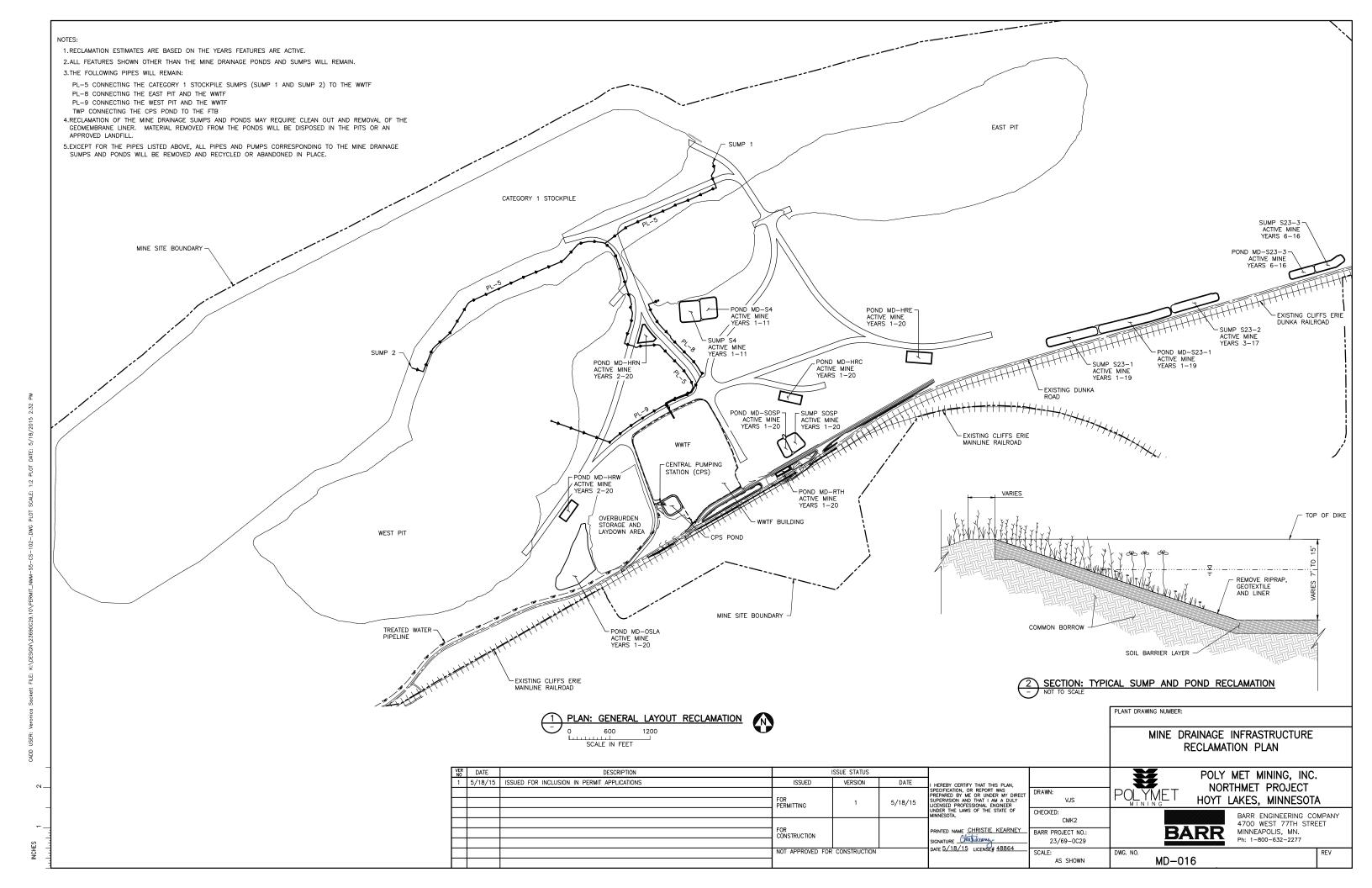












Mine Site Stormwater

NorthMet Project NPDES/SDS Permit Application Update - November 2016

Errata Sheet

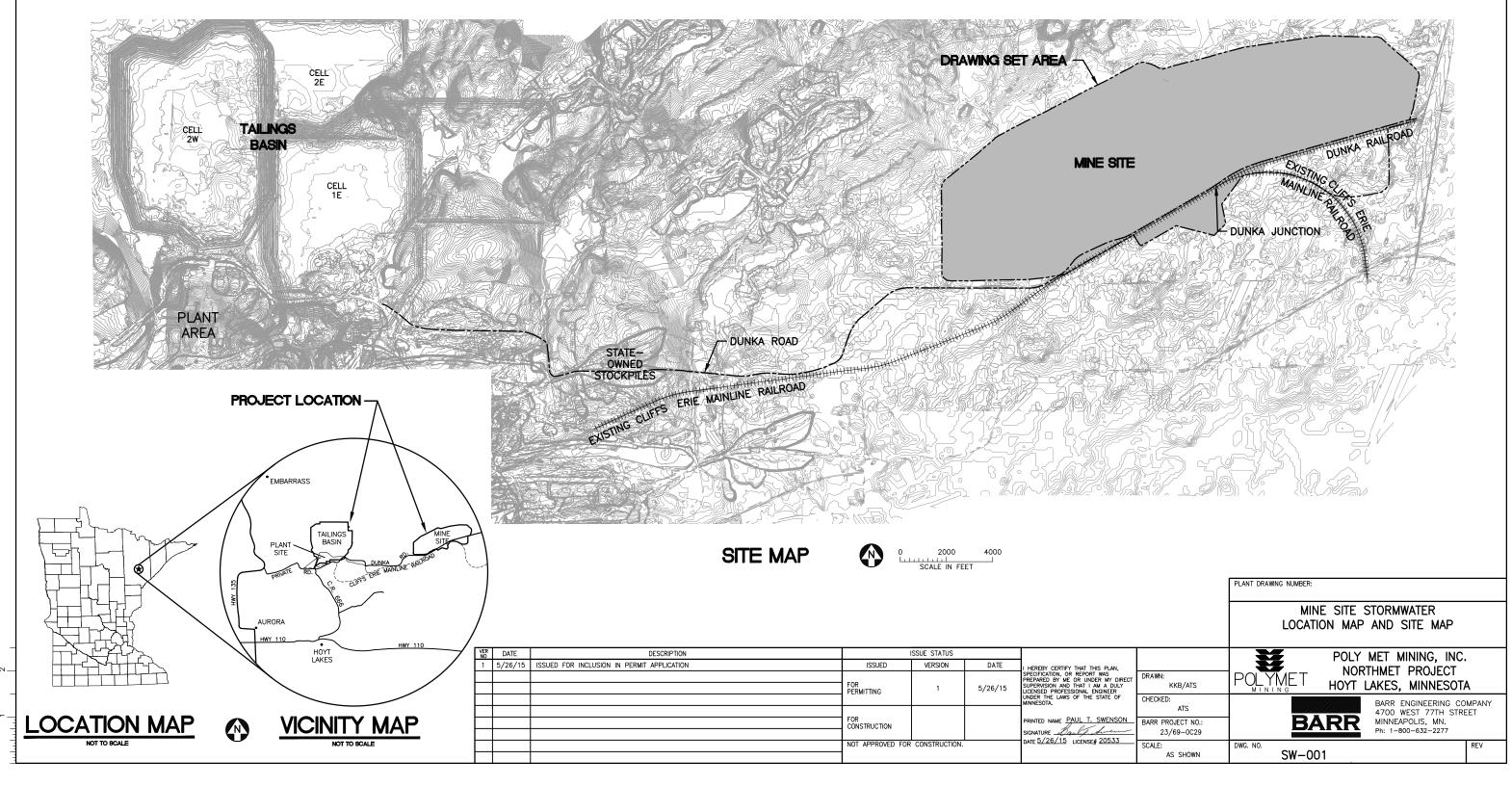
Poly Met Mining, Inc. NorthMet Project

Permit Application Support Drawings: Mine Site Stormwater July 2016 (version 2)

Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change			
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".			
SW-003, SW-004, SW-005, SW-006, SW-031	Temporary sedimentation basins or stormwater infiltration basins may be added to meet construction stormwater requirements. There is currently an infiltration basin shown on the Waste Water Treatment Facility drawings between the Ore Surge Pile and the Rail Transfer Hopper that is not shown on this Mine Site Stormwater drawing set. These construction stormwater features require additional site-specific data and will be evaluated in final design.			

POLY MET MINING, INC. NORTHMET PROJECT PERMIT APPLICATION SUPPORT DRAWINGS MINE SITE STORMWATER HOYT LAKES, MINNESOTA



---1000----

----- WATER EDGE/CREEK CENTER LINE

EXISTING ROAD

----R/W--- RIGHT OF WAY

---- MINE SITE BOUNDARY

EXISTING STRUCTURES

- PROPERTY LINE

WETLAND BOUNDARY

 $-\!\!\!-\!\!\!-$ OE $-\!\!\!\!-\!\!\!-$ EXISTING OVERHEAD ELECTRIC

--- UE --- EXISTING UNDERGROUND ELECTRIC

> EXISTING CULVERT

PROPOSED MINE DRAINAGE CULVERT

PROPOSED CONTOUR - MAJOR PROPOSED CONTOUR - MINOR

PROPOSED ACCESS ROADS

PROPOSED STORMWATER DRAIN

SURFACE DRAINAGE

NOTES

COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.

2. ELEVATIONS ARE BASED ON MEAN SEA LEVEL (MSL), NAVD88.

3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON

4. CULVERT DIMENSIONS ARE PRELIMINARY. FINAL DIMENSIONS SHALL BE DETERMINED DURING FINAL DESIGN.

5. THE BEDROCK PROFILES SHOWN ON THESE DRAWINGS REPRESENT THE BEST AVAILABLE INFORMATION FOR PLANNING PURPOSES. THE BEDROCK SURFACE FROM WHICH THE PROFILES ARE EXTRACTED IS A THREE—DIMENSIONAL, MODELED SURFACE THAT RESULTED FROM DEDUCTING THE DEPTH TO BEDROCK IDENTIFIED ON LOGS OF BORINGS CONDUCTED AT THE MINE SITE FROM THE LIDAR TOPOGRAPHIC GROUND SURFACE MODEL. THE RESULTING DATA WAS THEN MODELED IN GIS SOFTWARE TO DEVELOP A THREE—DIMENSIONAL BEDROCK SURFACE. THE PROFILES SHOW SIGNIFICANT DETAIL IN LOCAL ELEVATIONS, WHICH MAY OR MAY NOT ACTUALLY EXIST. THE BEDROCK SURFACE PROFILES SHOULD BE TAKEN AS REPRESENTATIVE, BUT NOT NECESSARILY PRECISE.

ABBREVIATIONS

CATEGORY 1 WASTE ROCK STOCKPILE
CATEGORY 2/3 WASTE ROCK STOCKPILE
CENTERLINE
CENTRAL PUMPING STATION
THE MEDIAN PARTICLE DIAMETER OF A PARTICLESIZE
DISTRIBUTION; THE SIZE AT WHICH 50% OF THE
PARTICLES IN THE MATERIAL PARTICLE SIZE
DISTRIBUTION CURVE ARE SMALLER
ELEVATION
INVERT CATEGORY 1 STOCKPILE CATEGORY 2/3 STOCKPILE

CL CPS D50

III, IV, V

EL
INV
I, I, I
kV
LF
MP
NWL
RCP
O.C.
OSLA
PVI
SWPPP
TWP INVERI
ROMAN NUMERALS FOR RIPRAP CLASSIFICATION
KILOVOLT
LINEAR FEET
MINNESOTA POWER
NORMAL WATER LEVEL
REINFORCED CONCRETE PIPE
ON CENTER
OVERBURDEN STORAGE AND LANDOWN AREA

ON CENTER
OVERBURDEN STORAGE AND LAYDOWN AREA
POINT OF VERTICAL
STORMWAITER POLLUTION PREVENTION PLAN
TREATED WATER PIPELINE
WASTE WATER TREATMENT FACILITY

WWTF

(E) (W) EAST

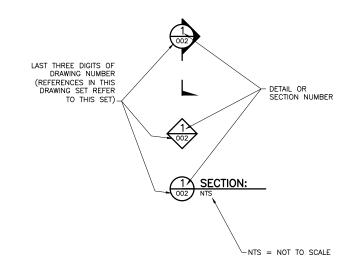
SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS

SW-001 STORMWATER LOCATION MAP AND SITE MAP						
SW-002 STORMWATER LEGEND AND SHEET INDEX						
SW-003 STORMWATER SITE DRAINAGE PLAN MINE YEAR 1						
SW-004 STORMWATER SITE DRAINAGE PLAN MINE YEAR 11						
SW-005 STORMWATER SITE DRAINAGE PLAN MINE YEAR 20						
SW-006 STORMWATER SHEET LOCATION MAP	SHEET LOCATION MAP					
SW-007 STORMWATER TYPICAL DIKES AND DITCHES CROSS SECTIONS						
SW-008 STORMWATER SEDIMENTATION POND A GRADING PLAN AND DETAILS	SEDIMENTATION POND A GRADING PLAN AND DETAILS					
SW-009 STORMWATER SEDIMENTATION POND B GRADING PLAN AND DETAILS						
SW-010 STORMWATER SEDIMENTATION POND C-EAST GRADING PLAN AND DETAILS						
SW-011 STORMWATER SEDIMENTATION POND C-WEST GRADING PLAN AND DETAILS						
SW-012 STORMWATER SEDIMENTATION POND D GRADING PLAN AND DETAILS						
SW-013 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 10+00N - 38+50N						
SW-014 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 38+50N - 66+50N						
SW-015 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 66+50N - 94+00N						
SW-016 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 94+00N - 122+00N						
SW-017 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 122+00N - 144+00I						
SW-018 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 146+00N - 162+00I						
SW-019 STORMWATER NORTH DIKE AND DITCH PLAN AND PROFILE STATION 162+00N - 183+00I	4					
SW-020 STORMWATER SOUTH DIKE AND DITCH PLAN AND PROFILE STATION 10+00S - 22+95S						
SW-021 STORMWATER DITCH B PLAN AND PROFILE STATION 0+00B - 17+50B						
SW-022 STORMWATER DITCH B PLAN AND PROFILE STATION 17+50B - 35+00B						
SW-023 STORMWATER DITCH C(E) PLAN AND PROFILE STATION 0+00C(E) - 19+64C(E)						
SW-024 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 0+00C(W) - 18+00C(W)						
SW-025 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 18+00C(W) - 34+50C(W)						
SW-026 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 35+00C(W) - 55+00C(W)						
SW-027 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 55+00C(W) - 75+00C(W)						
SW-028 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 75+00C(W) - 94+60C(W)						
SW-029 STORMWATER DITCH C(W) PLAN AND PROFILE STATION 95+00C(W) - 124+35C(W)						
SW-030 STORMWATER DITCH D PLAN AND PROFILE STATION 0+00D - 27+00D						
SW-031 STORMWATER DIKES, DITCHES, AND PONDS CLOSURE PLAN						

DRAWING NUMBERING



MINE SITE STORMWATER

PLANT DRAWING NUMBER:

POLYME

LEGEND AND SHEET INDEX

)	DATE	DESCRIPTION	ISSUE STATUS				i
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			FOR PERMITTING	1		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	DRAWN: KKB/ATS
						UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED: ATS
			FOR CONSTRUCTION			PRINTED NAME PAUL T. SWENSON SIGNATURE Baulf Sum	BARR PROJECT NO.: 23/69-0C29
			NOT APPROVED FOR CONSTRUCTION.		DATE 5/26/15 LICENSE# 20533		SCALE:
							AS SHOWN

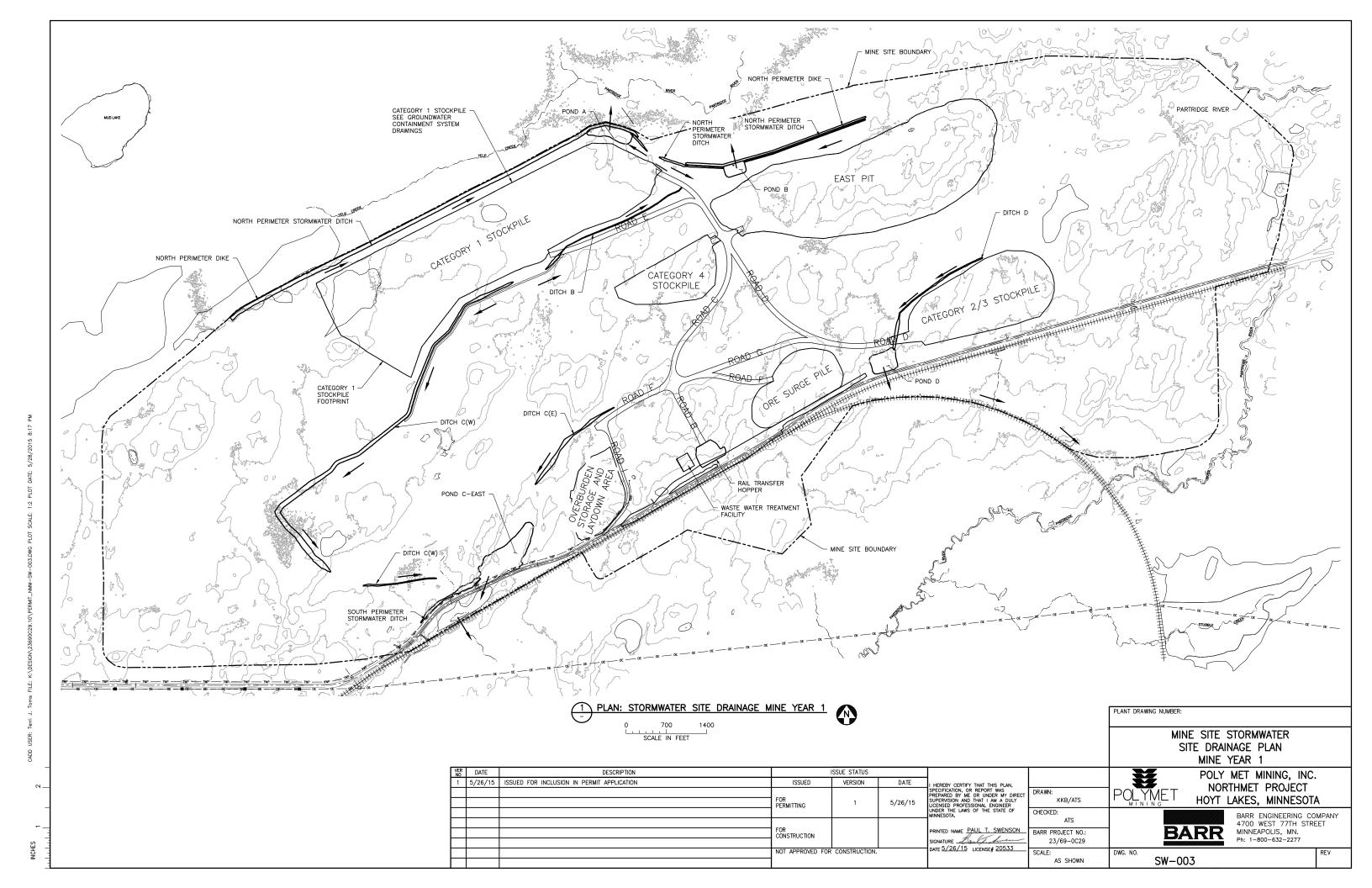
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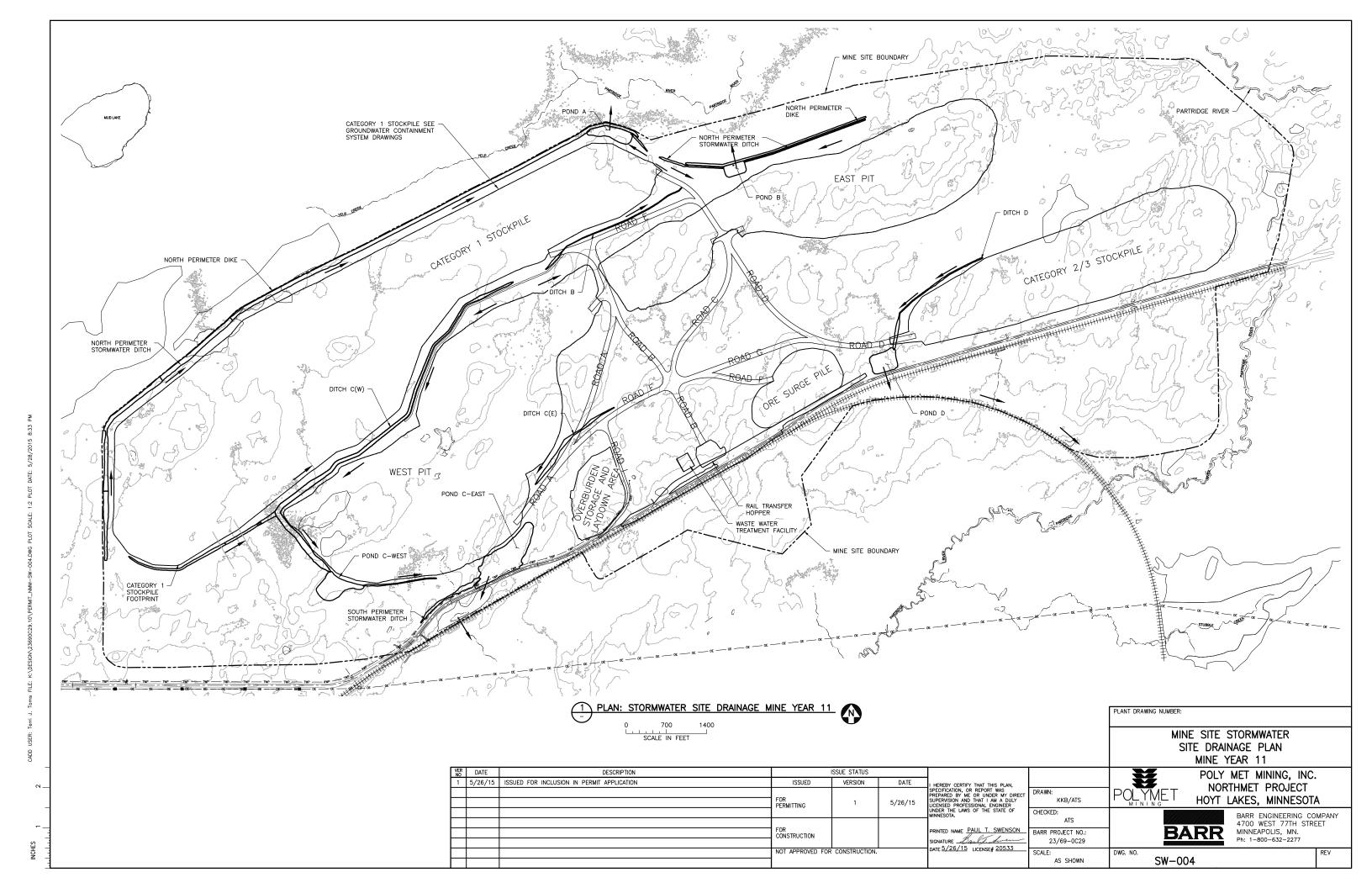
POLY MET MINING, INC. NORTHMET PROJECT

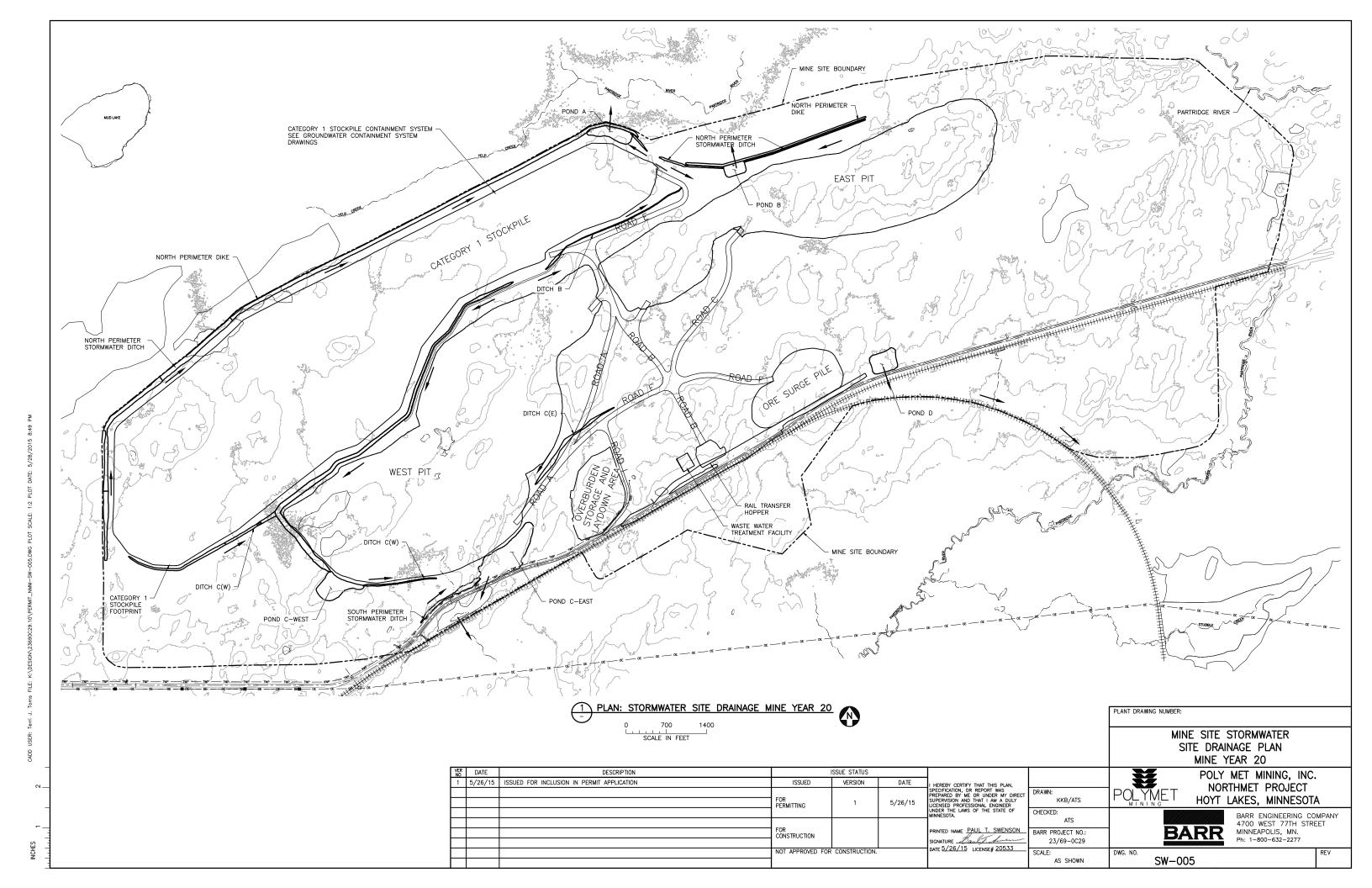
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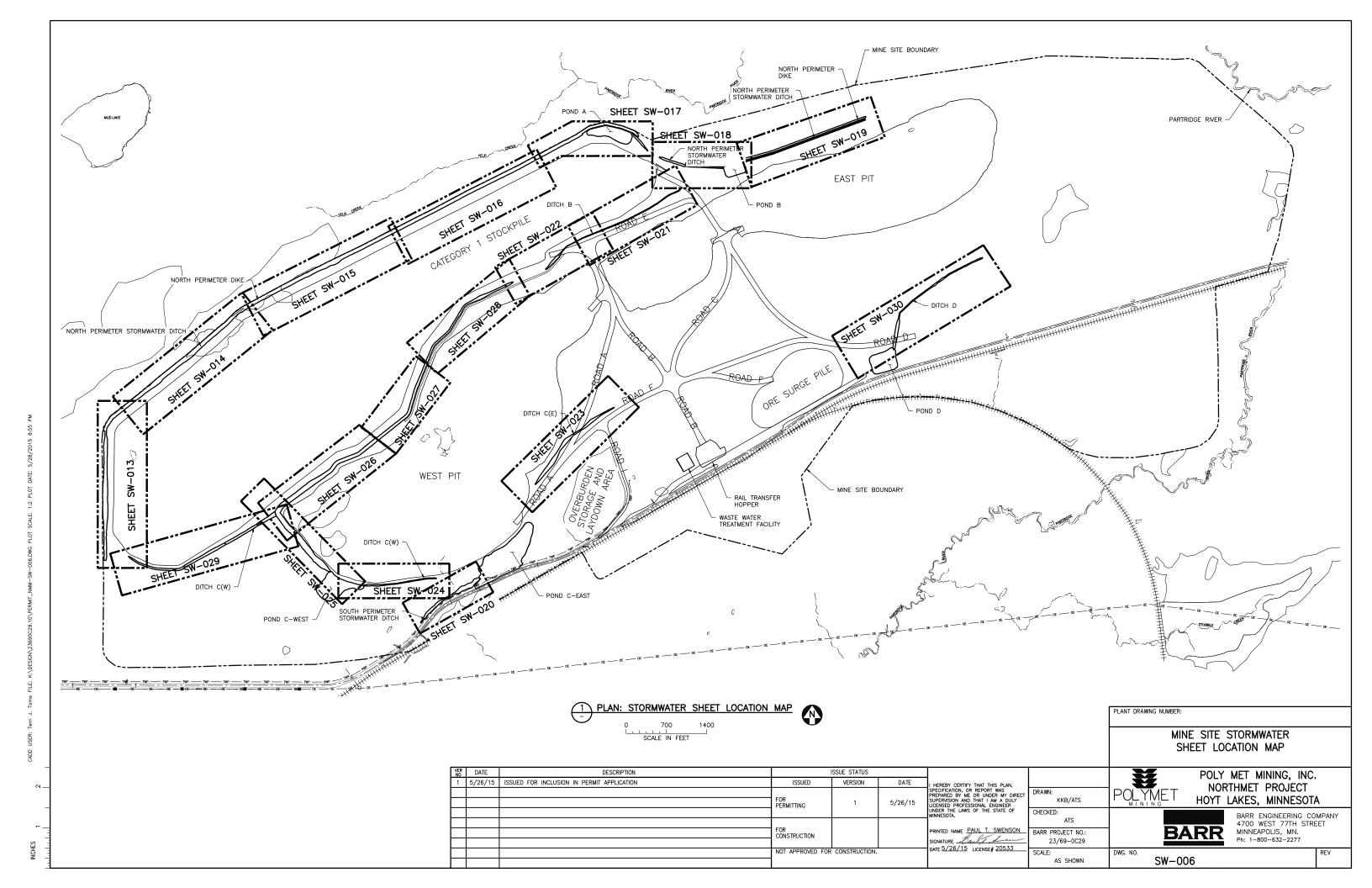
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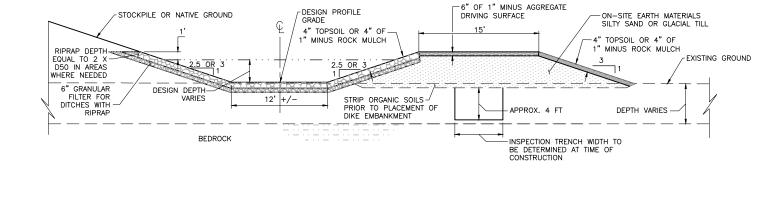
SW-002

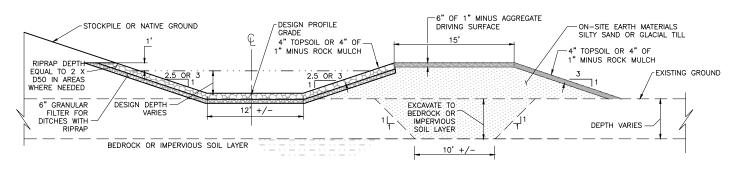






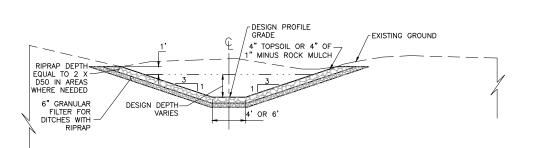






SECTION: TYPICAL PERIMETER DIKE AND DITCH WITHOUT SEEPAGE CUTOFF TRENCH





3 SECTION: TYPICAL INTERIOR DITCH

SCALE IN FEET

- 1. DITCHES NOT REQUIRING RIPRAP WILL BE CONSTRUCTED WITH NATIVE SOILS AND EITHER 4" TOPSOIL OR 4" OF 1" MINUS ROCK MULCH TO DESIGN PROFILE GRADE.
- 2. RESTORE ALL DISTURBED AREAS NOT STABILIZED WITH RIPRAP IN ACCORDANCE WITH THE SWPPP.
- 3. DESIGN DEPTH ESTABLISHED IN FINAL DESIGN OR IN FIELD. TOP OF DIKE TO FLOWLINE OF DITCH SHALL PROVIDE 1 FOOT OF FREEBOARD FROM DESIGN DEPTH.
- 4. INSPECTION TRENCH TO BE CONSTRUCTED ALONG ENTIRE LENGTH OF PERIMETER DIKES WHERE NON-ORGANIC
- 5. PERIMETER DITCH AND DIKE ALONG THE NORTH SIDE OF THE CATEGORY 1 STOCKPILE (STATION 10+00 TO 143+53) SHALL HAVE 2.5H:1V SIDE SLOPES. ALL OTHER DITCHES AND DIKES SHALL HAVE SIDE SLOPES OF 3H:1V.

MINE SITE STORMWATER TYPICAL DIKES AND DITCHES CROSS SECTIONS

BARR

SW-007

POLY MET MINING, INC. NORTHMET PROJECT

HOYT LAKES, MINNESOTA

MINNEAPOLIS, MN.

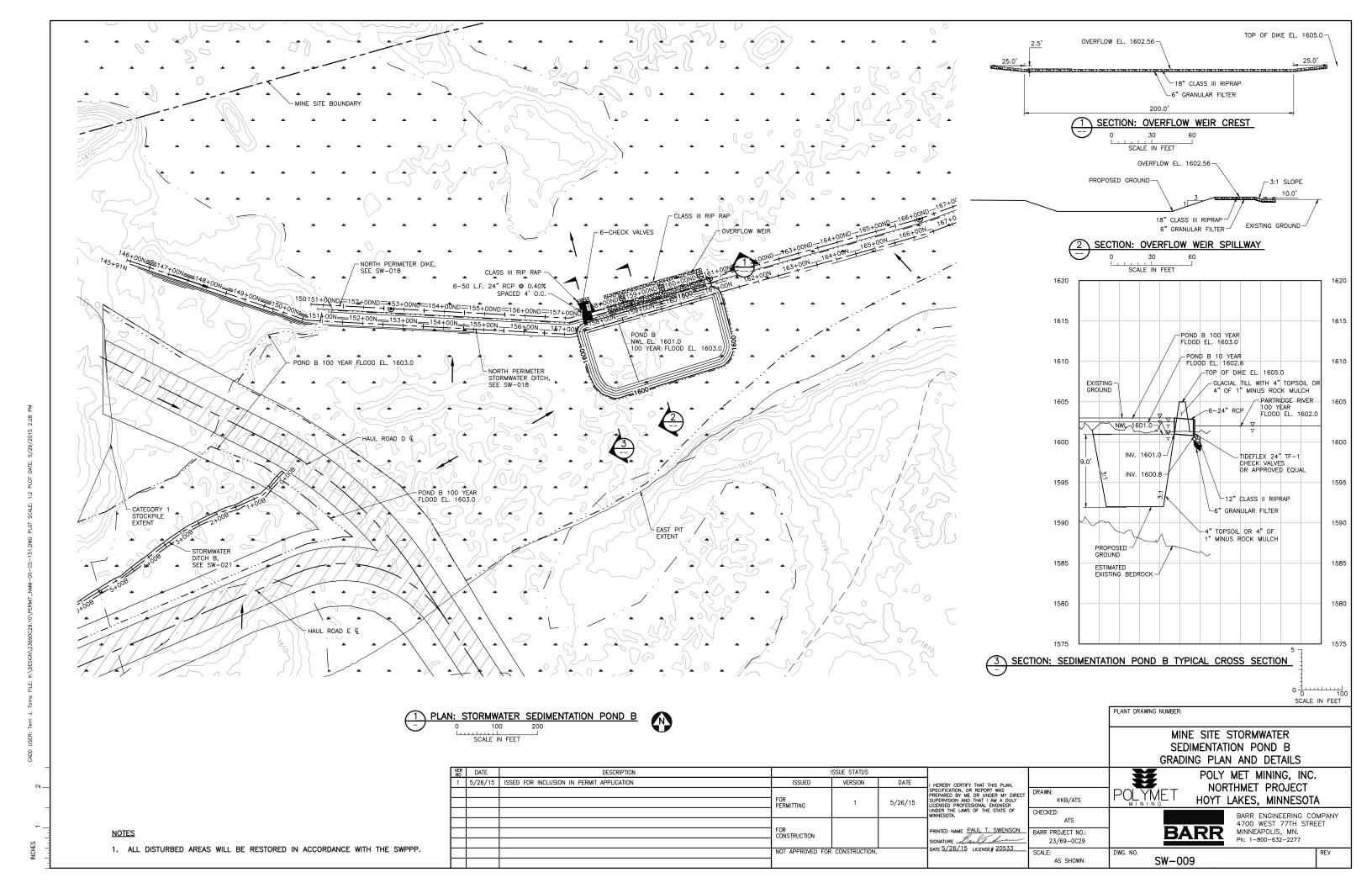
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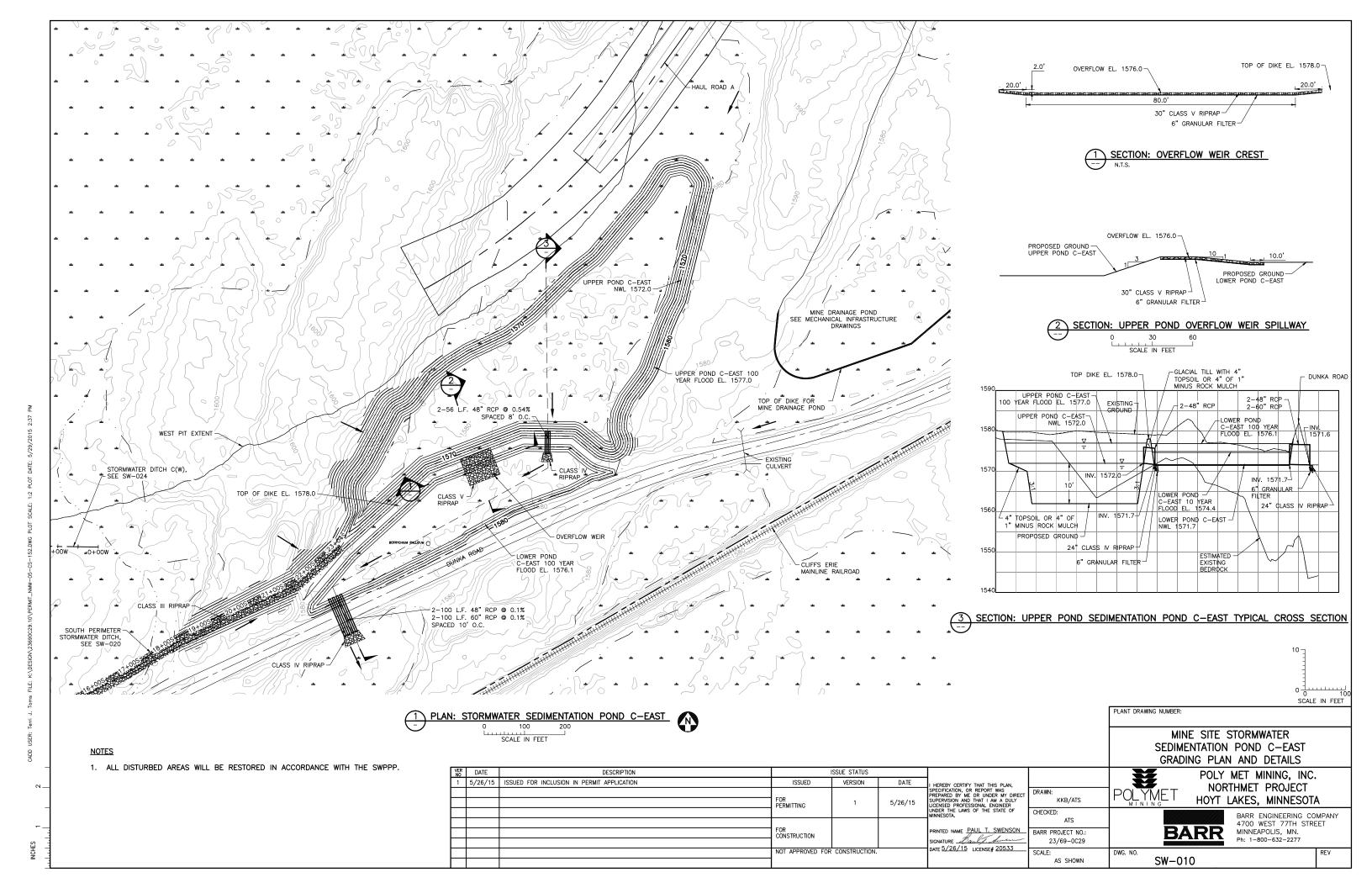
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET

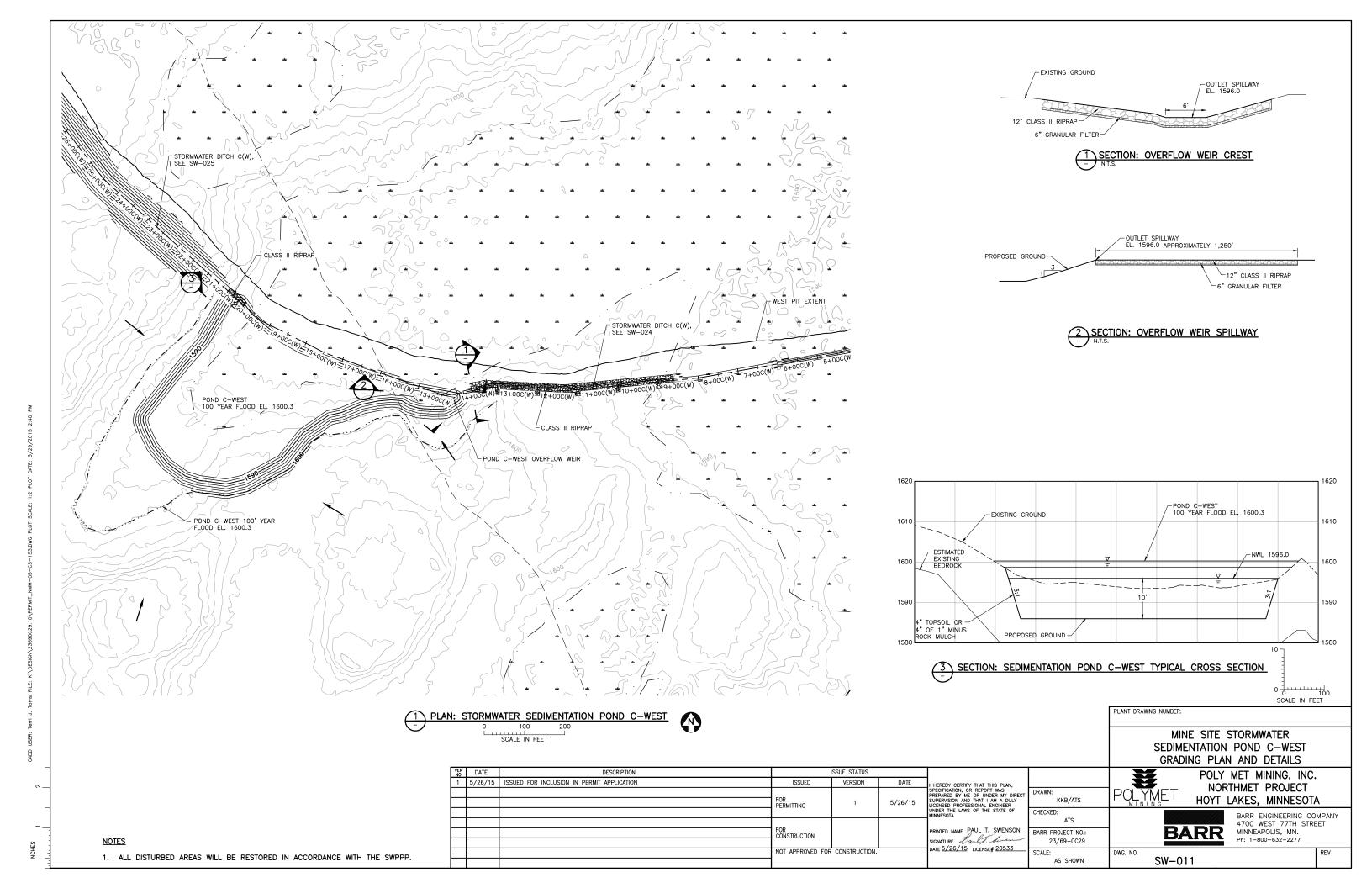
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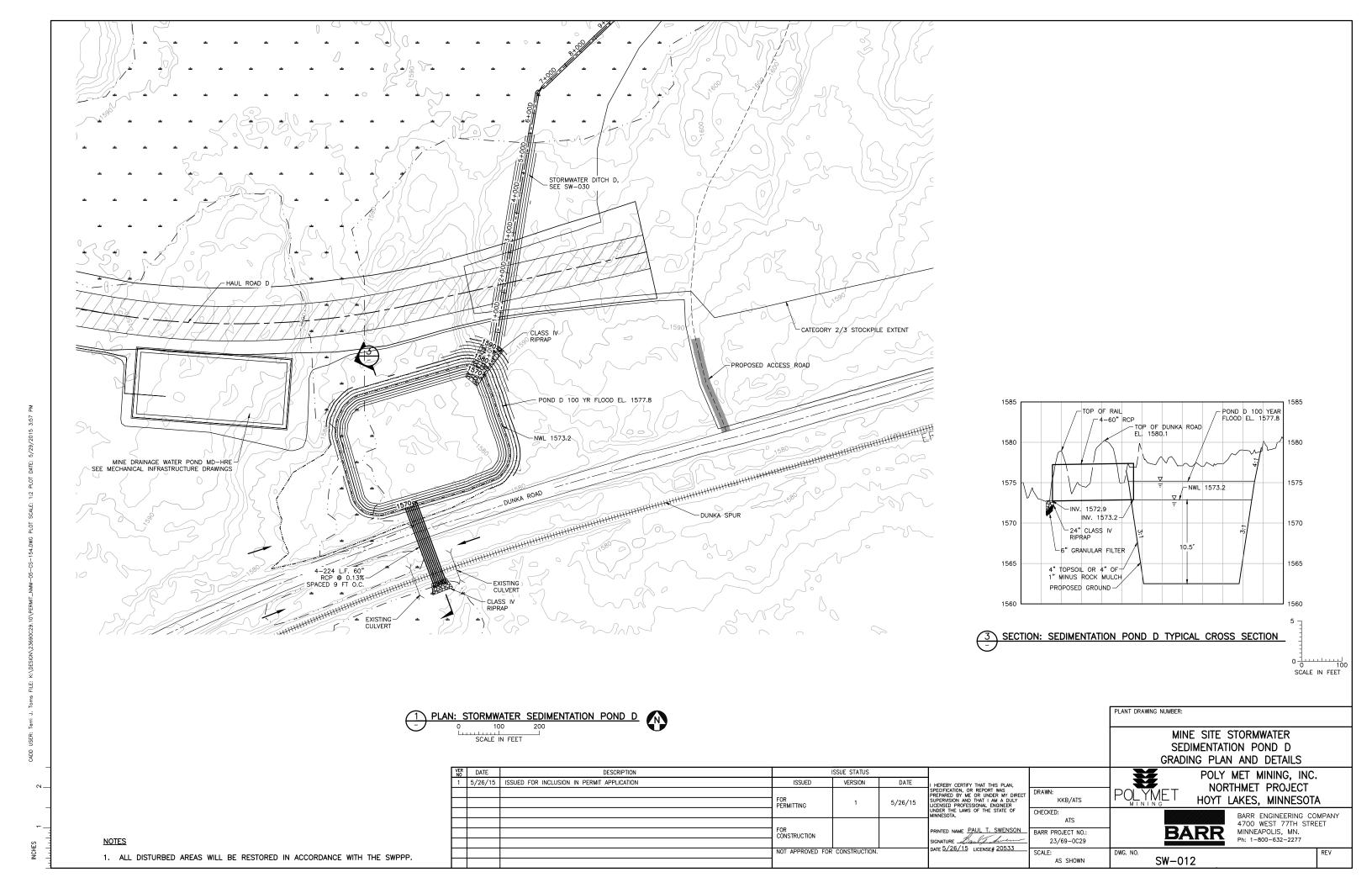
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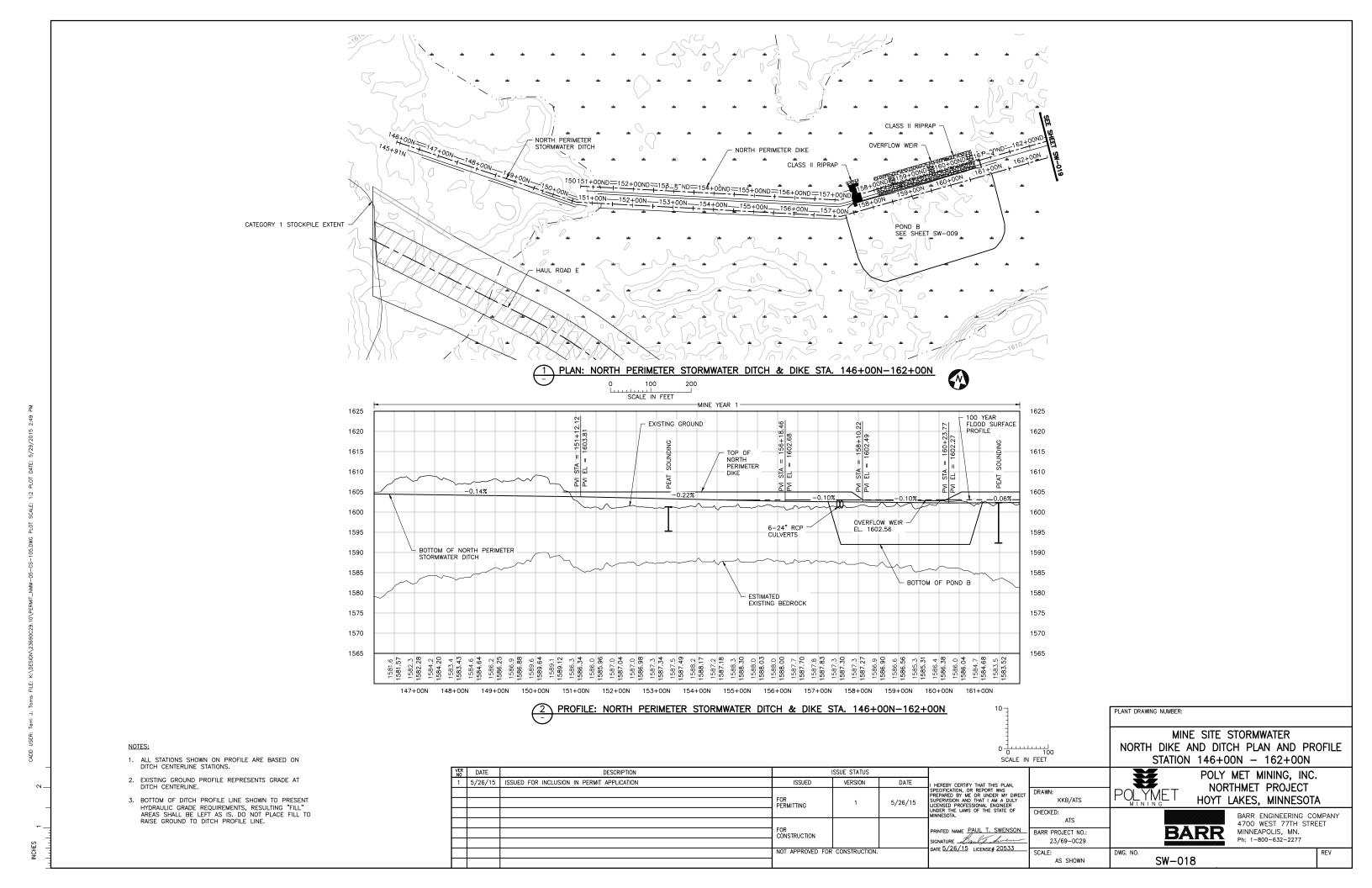
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			- TERMITTING				CHECKED:	
]				ATS	
			FOR CONSTRUCTION	CONSTRUCTION			PRINTED NAME PAUL T. SWENSON SIGNATURE Sould Survey DATE 5/26/15 LICENSE# 20533	BARR PROJECT NO.:
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			NOT APPROVED FOR CONSTRUCTION.			DATE 3/20/13 LICENSE# 20533	SCALE:	
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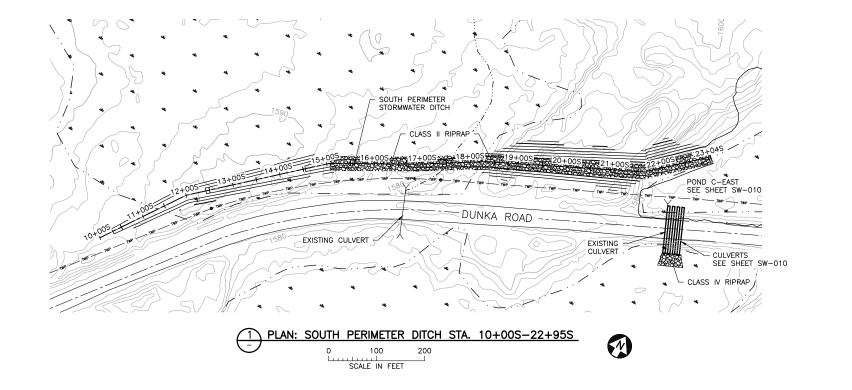


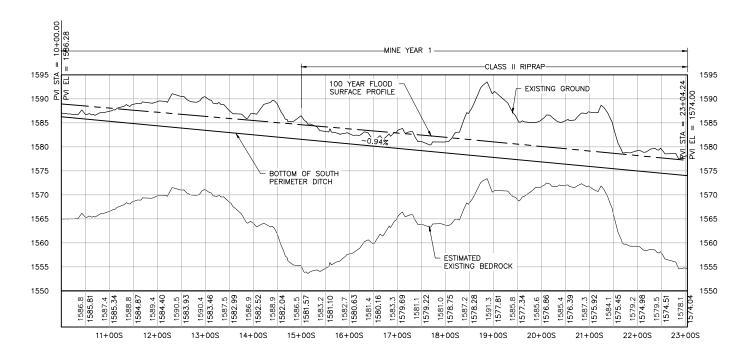












NOTES:

- ALL STATIONS SHOWN ON PROFILE ARE BASED ON DITCH CENTERLINE STATIONS.
- 2. EXISTING GROUND PROFILE REPRESENTS GRADE AT DITCH CENTERLINE.

PROFILE: SOUTH PERIMETER DITCH STA. 10+00S-22+95S

SCALE IN FEET

_									
Γ	VER D	DATE	DESCRIPTION	ISSUE STATUS					
Γ	1 5/	²⁶ /15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	ISSUED	VERSION	DATE	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 ENSINEER UNDER THE LAWS OF THE STATE OF MINNESOTA		
F				FOR PERMITTING	1	E /00 /1E		DRAWN: KKB/ATS	
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L							SIGNATURE <u>Daulf</u> <u>Suum</u> DATE 5/26/15 LICENSE# 20533	23/69-0C29	
				NOT APPROVED FOR CONSTRUCTION.			DATE 3/20/13 LICENSE# 20333	SCALE:	
Г								AS SHOWN	

MINE SITE STORMWATER SOUTH DIKE AND DITCH PLAN AND PROFILE STATION 10+00S - 22+95S

POLYME1

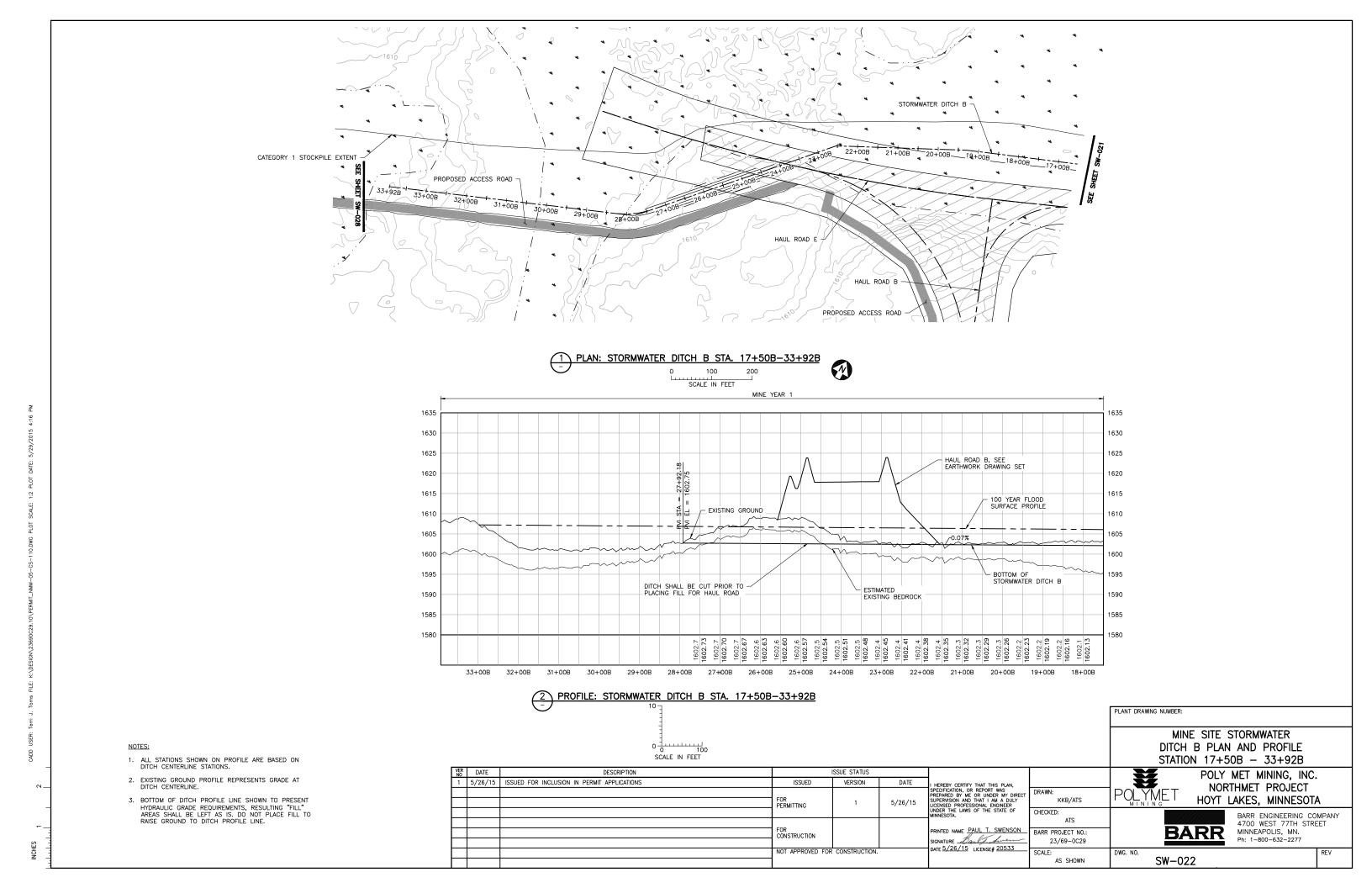
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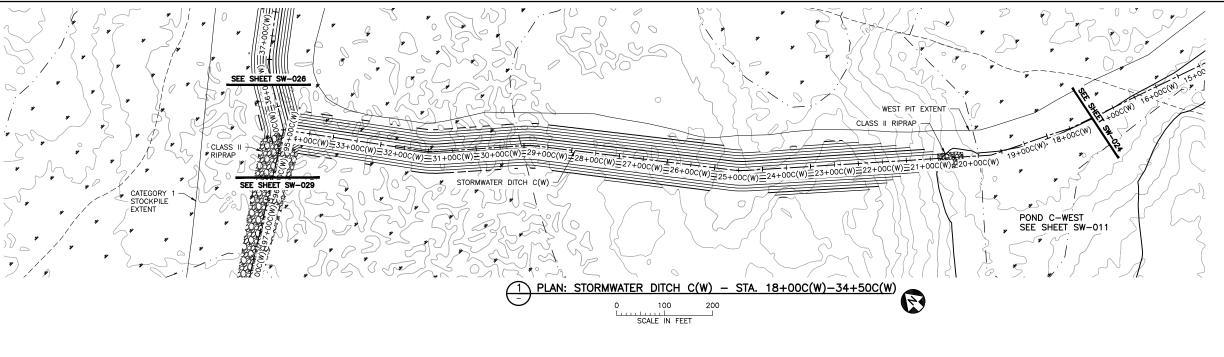
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

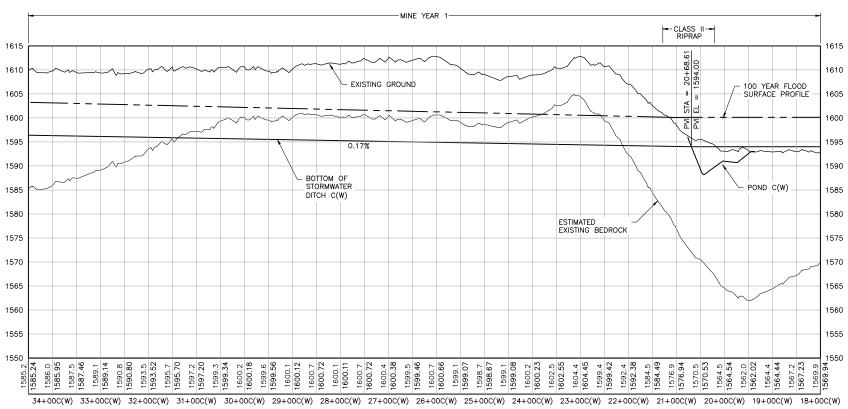
BARR

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

Ph: 1-800-632-2277 SW-020







PROFILE: STORMWATER DITCH C(W) - STA. 18+00C(W)-34+50C(W)

SCALE IN FEET

MINE SITE STORMWATER DITCH C(W) PLAN AND PROFILE STATION 18+00C(W) - 34+50C(W)

VER DATE DESCRIPTION ISSUE STATUS 5/26/15 ISSUED FOR INCLUSION IN PERMIT APPLICATION HEREBY CERTIFY THAT THIS PLAN, PECIFICATION, OR REPORT WAS REPARED BY ME OR UNDER MY DIRECT UPERVISION AND THAT I AM A DULY ICENSED PROFESSIONAL ENGINEER INDER THE LAWS OF THE STATE OF INNERSTATE. ISSUED VERSION DATE FOR PERMITTING 5/26/15 CHECKED: FOR CONSTRUCTION RINTED NAME PAUL T. SWENSON BARR PROJECT NO .: SIGNATURE Bault Swen DATE 5/26/15 LICENSE# 20533 NOT APPROVED FOR CONSTRUCTION.

POLY MET MINING, INC. NORTHMET PROJECT POLYME HOYT LAKES, MINNESOTA

PLANT DRAWING NUMBER:

KKB/ATS

23/69-0029

AS SHOWN

BARR

SW-025

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

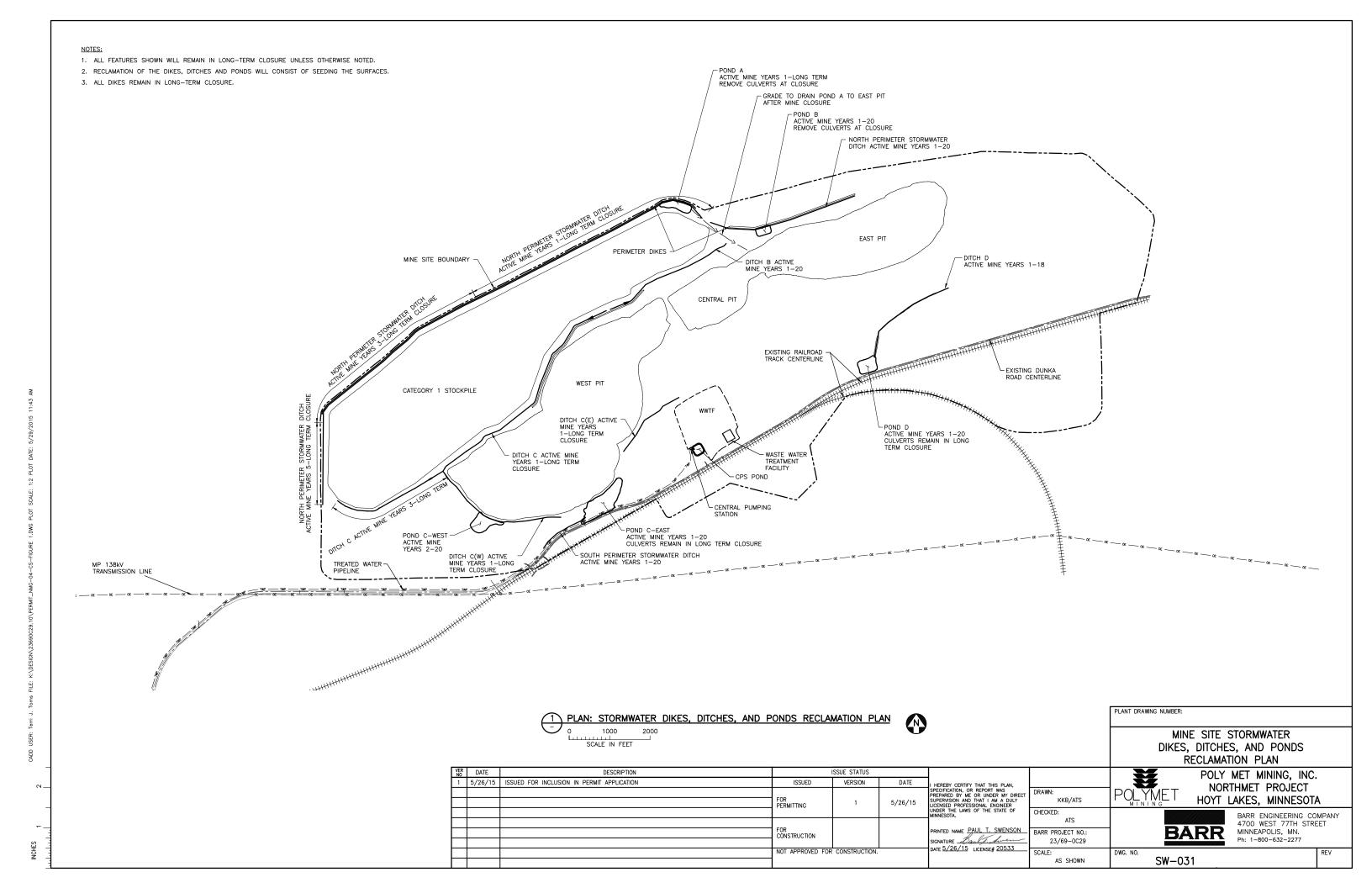
NOTES:

ALL STATIONS SHOWN ON PROFILE ARE BASED ON DITCH CENTERLINE STATIONS.

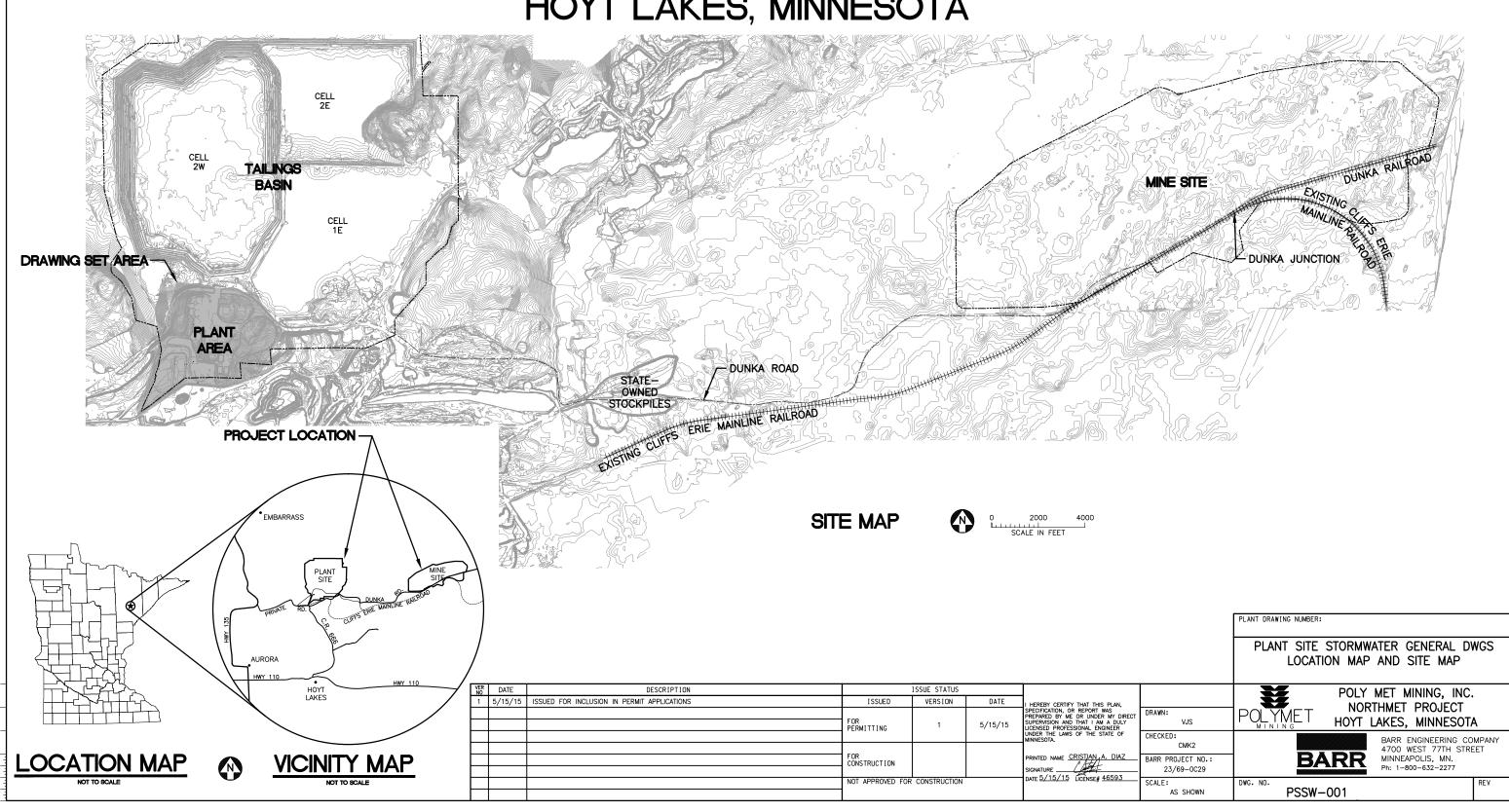
2. EXISTING GROUND PROFILE REPRESENTS GRADE AT DITCH CENTERLINE.

3. BOTTOM OF DITCH PROFILE LINE SHOWN TO PRESENT

HYDRAULIC GRADE REQUIREMENTS, RESULTING "FILL"
AREAS SHALL BE LEFT AS IS. DO NOT PLACE FILL TO
RAISE GROUND TO DITCH PROFILE LINE.



Plant Site Stormwater



PLANT SITE STORMWATER LEGEND

EXISTING PROPOSED ---1000----PROPOSED CONTOUR - MAJOR 5' EXISTING CONTOUR - MINOR 2' PROPOSED CONTOUR - MINOR 1' ++++++ EXISTING RAILROAD PROPOSED CENTERLINE STATIONING 1+00X ----- WATER EDGE/CREEK CENTER LINE PROPOSED CULVERT (STORMWATER) EXISTING ROAD PROPOSED PIPE EXISTING STRUCTURES 0 PROPOSED MANHOLE/CATCH BASIN TREE LINE PROPOSED RIPRAP EXISTING MANHOLE/CATCH BASIN PROJECT AREA BOUNDARY > EXISTING CULVERT FLOW PATH ----X--- EXISTING FENCE PROPOSED OTHER FACILITY WETLAND BOUNDARY PROPOSED STRUCTURES PROPOSED RAILROAD

NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH

SHEET INDEX

SHEET NO. TITLE

PLANT SITE STORMWATER DRAWINGS

PSSW-001 PSSW-002 PSSW-003 PSSW-004 TO PSSW-015 LOCATION MAP & SITE MAP LEGEND & SHEET INDEX GENERAL LAYOUT & SHEET INDEX MAP GRADING PLANS GRADING PROFILES

ABBREVIATIONS

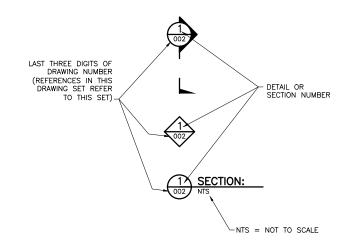
AC-FT AVE CB Q CMP DS DV DWG ACRE-FEET AVERAGE
CATCH BASIN
CENTERLINE
CORRUGATED METAL PIPE DOWNSTREAM DOWNSTREAM
DRAIN VALVE
DRAWING
ELEVATION
FLOTATION TAILINGS BASIN

GALLONS
GALLONS PER MINUTE
HIGH—DENSITY POLYETHYLENE

INVERT LINEAR FEET MANHOLE

EL. FTB GAL GPM HDPE INV LF MH MIN NWL PSSW SDR STA TYP US MINIMUM NORMAL WATER LEVEL PLANT SITE STORMWATER STANDARD DIMENSION RATIO

DRAWING NUMBERING



PLANT SITE STORMWATER GENERAL DWGS LEGEND AND SHEET INDEX

PLANT DRAWING NUMBER:

POLYME

VER NO	DATE	DESCRIPTION		ISSUE STATUS			
1	5/15/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN,	
			FOR PERMITTING	1	5/15/15	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL BRIGHEER UNDER THE LAWS OF THE STATE OF MINISTOSION. PRINTED NAME CRISTIAN A. DIAZ SIGNATURE	DRAWN: VJS
			1 2111111				CHECKED: CMK2
			FOR CONSTRUCTION				BARR PROJECT NO.: 23/69-0C29
			NOT APPROVED FOR CONSTRUCTION		DATE <u>5/15/15</u> LICENSE# <u>46593</u>	SCALE: AS SHOWN	

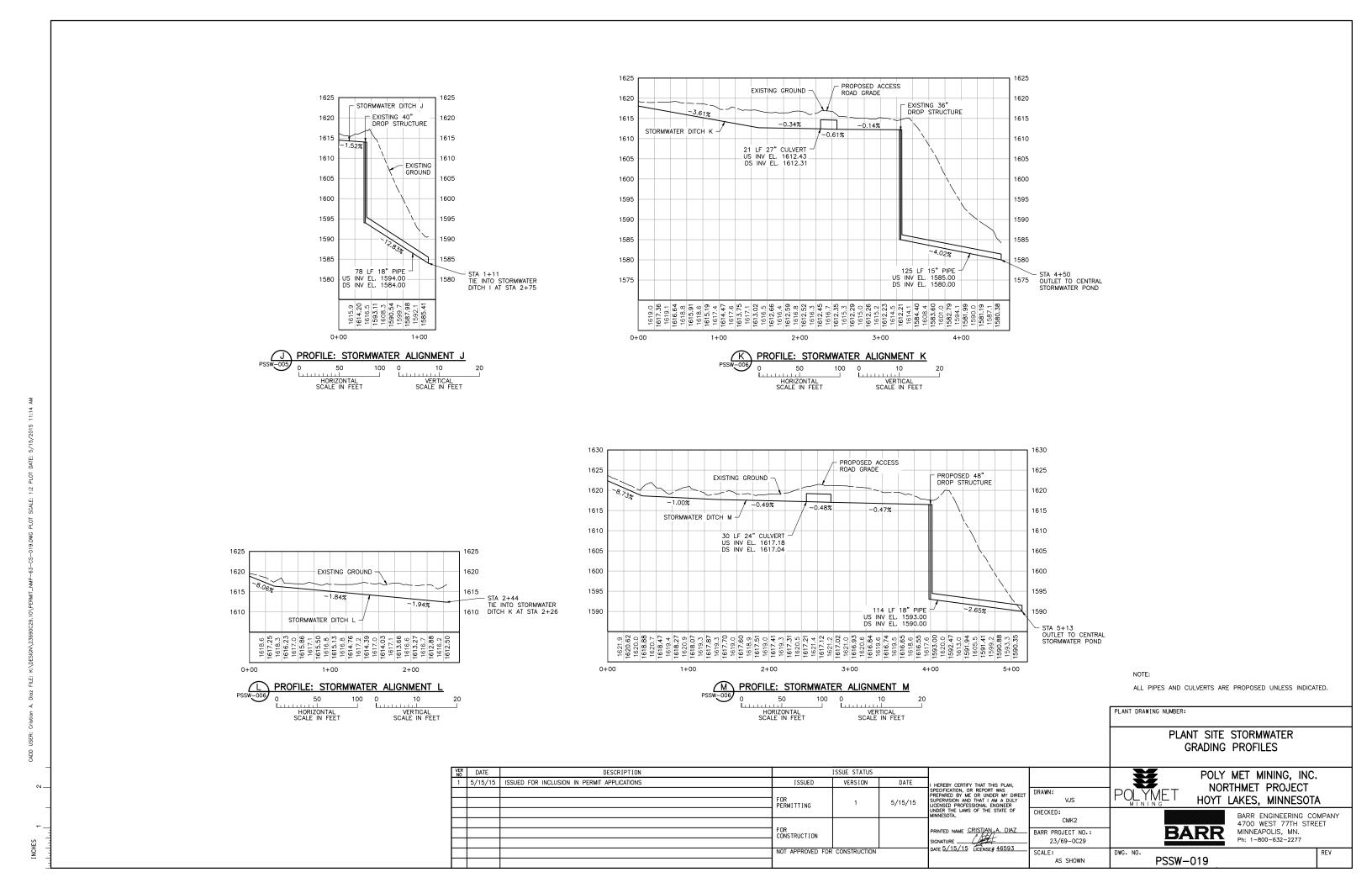
BARR Ph: 1-800-632-2277 PSSW-002

POLY MET MINING, INC. NORTHMET PROJECT

HOYT LAKES, MINNESOTA

MINNEAPOLIS, MN.

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET



PROPOSED CB #2 -

1585 1580

1575

1570

(REPLACE EXISTING) RIM EL. 1578.40 INV EL. 1569.24

1590

1585

1580

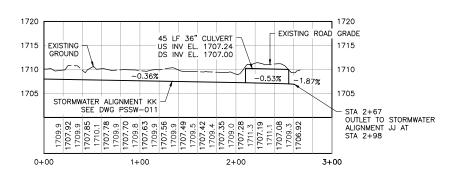
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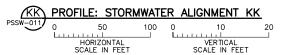
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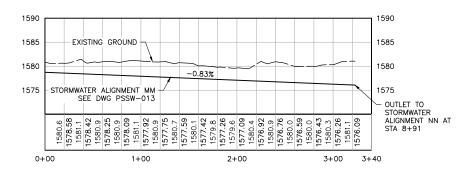
EXISTING GROUND -

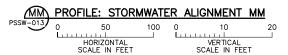
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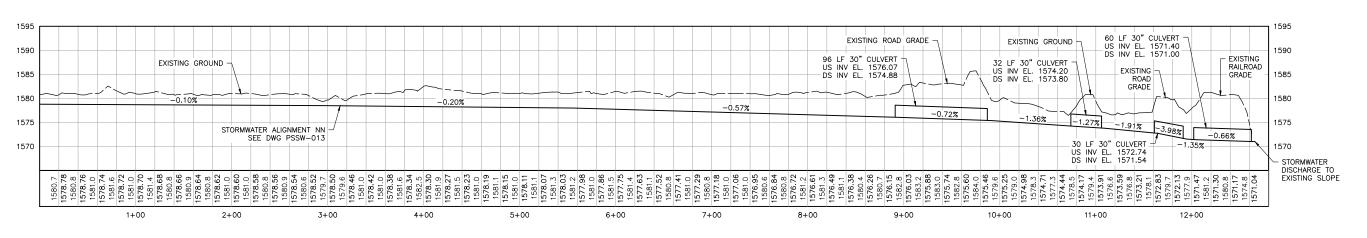
STORMWATER ALIGNMENT Q











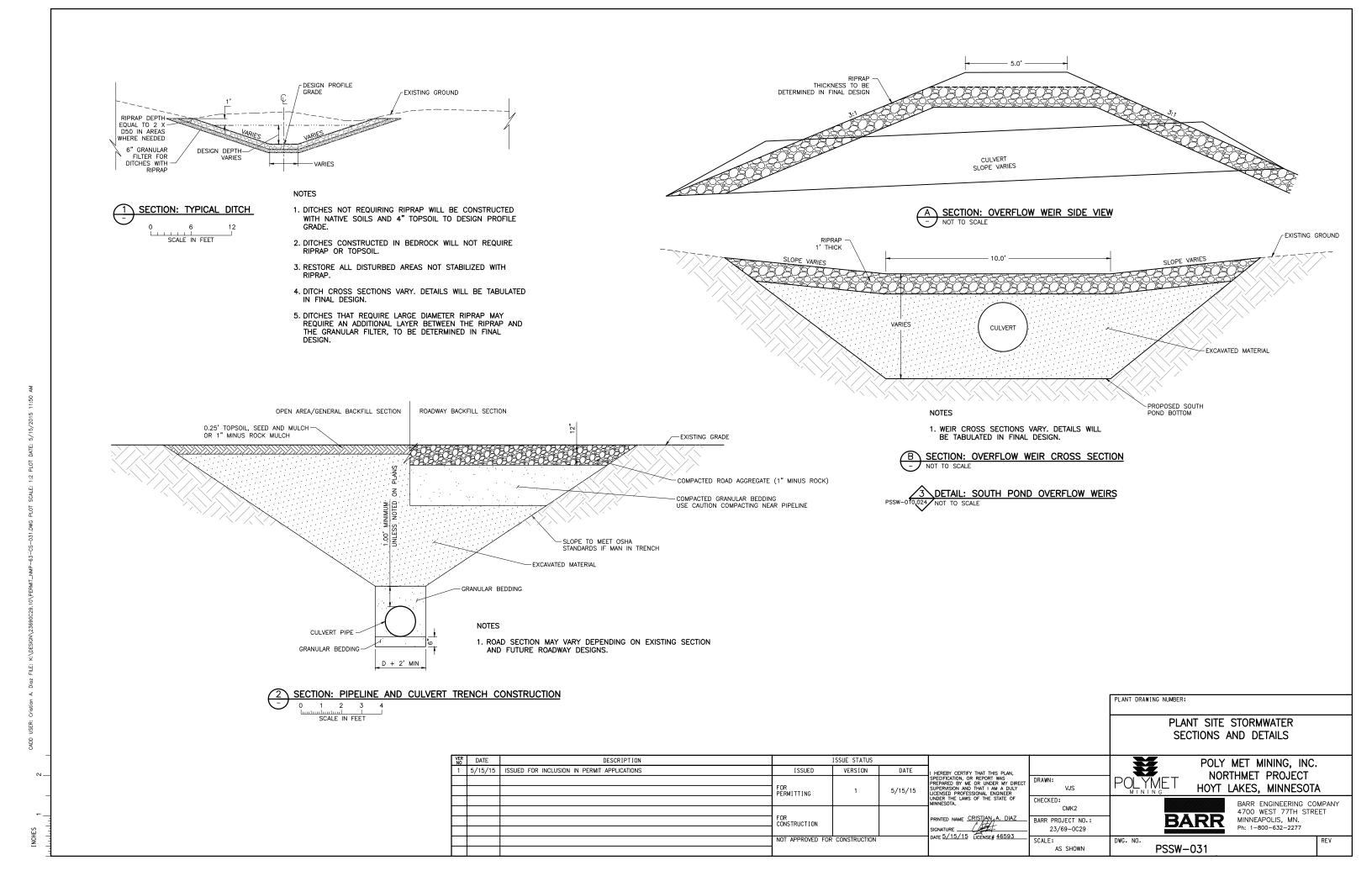
NN PROFILE: STORMWATER ALIGNMENT NN 50 HORIZONTAL SCALE IN FEET VERTICAL SCALE IN FEET

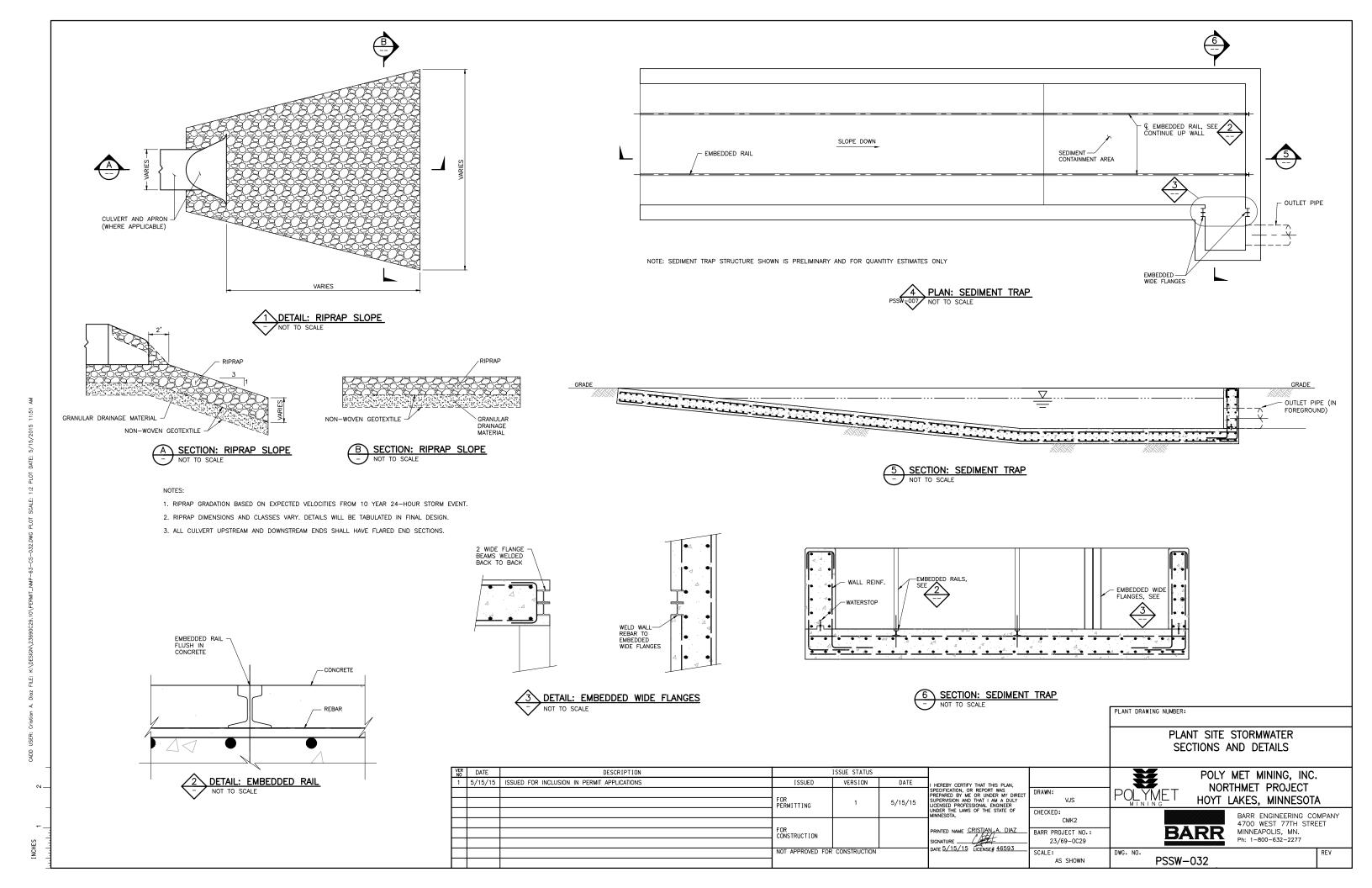
NOTE:

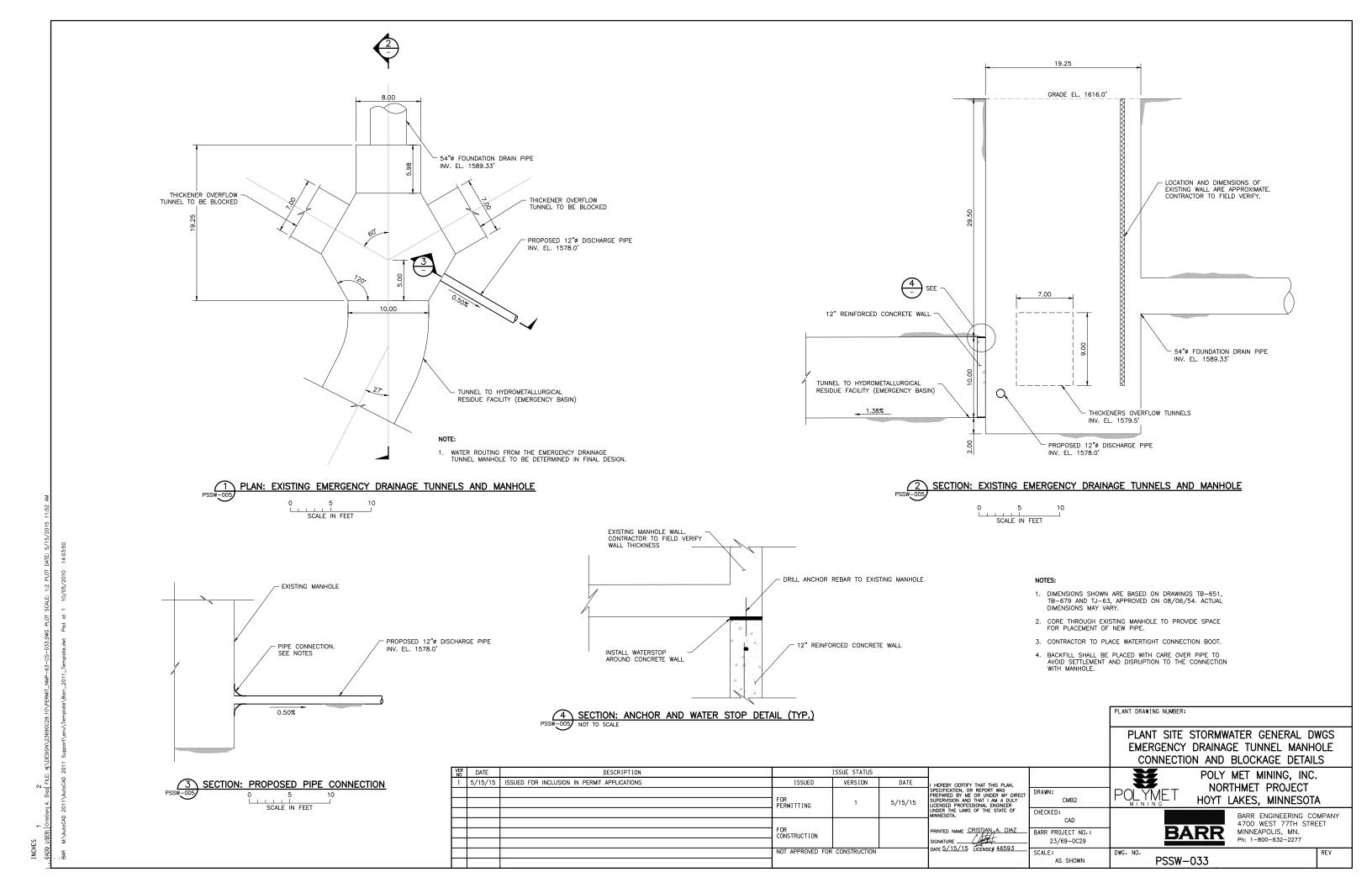
PLANT DRAWING NUMBER:

ALL PIPES AND CULVERTS ARE PROPOSED UNLESS INDICATED.

										NT SITE STORMWATER PROFILES	
	VER DA	ATE	DESCRIPTION	ISSUE STATUS					***	POLY MET MINING, INC	
	1 5/1	5/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	ISSUED	VERSION	DATE	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		NODTLINET DOOLEGE		
E				FOR PERMITTING	MITTING 1	5/15/15		DRAWN: PRT		HOYT LAKES, MINNESOT	`A
							UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:		BARR ENGINEERING CO	YNAPMC
L				500				CMK2		4700 WEST 77TH STR	EET
L				CONSTRUCTION			1 Att	BARR PROJECT NO.:	l BA	MINNEAPOLIS, MN. Ph: 1-800-632-2277	
L							SIGNATURE	23/69-0C29		Pri: 1-800-632-2277	
╁				NOT APPROVED FOR	CONSTRUCTION		DATE ST. ST. S LICENSE# TOOSO	SCALE: AS SHOWN	DWG. NO. PSSW-	029	REV







Category 1 Stockpile Groundwater Containment System

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

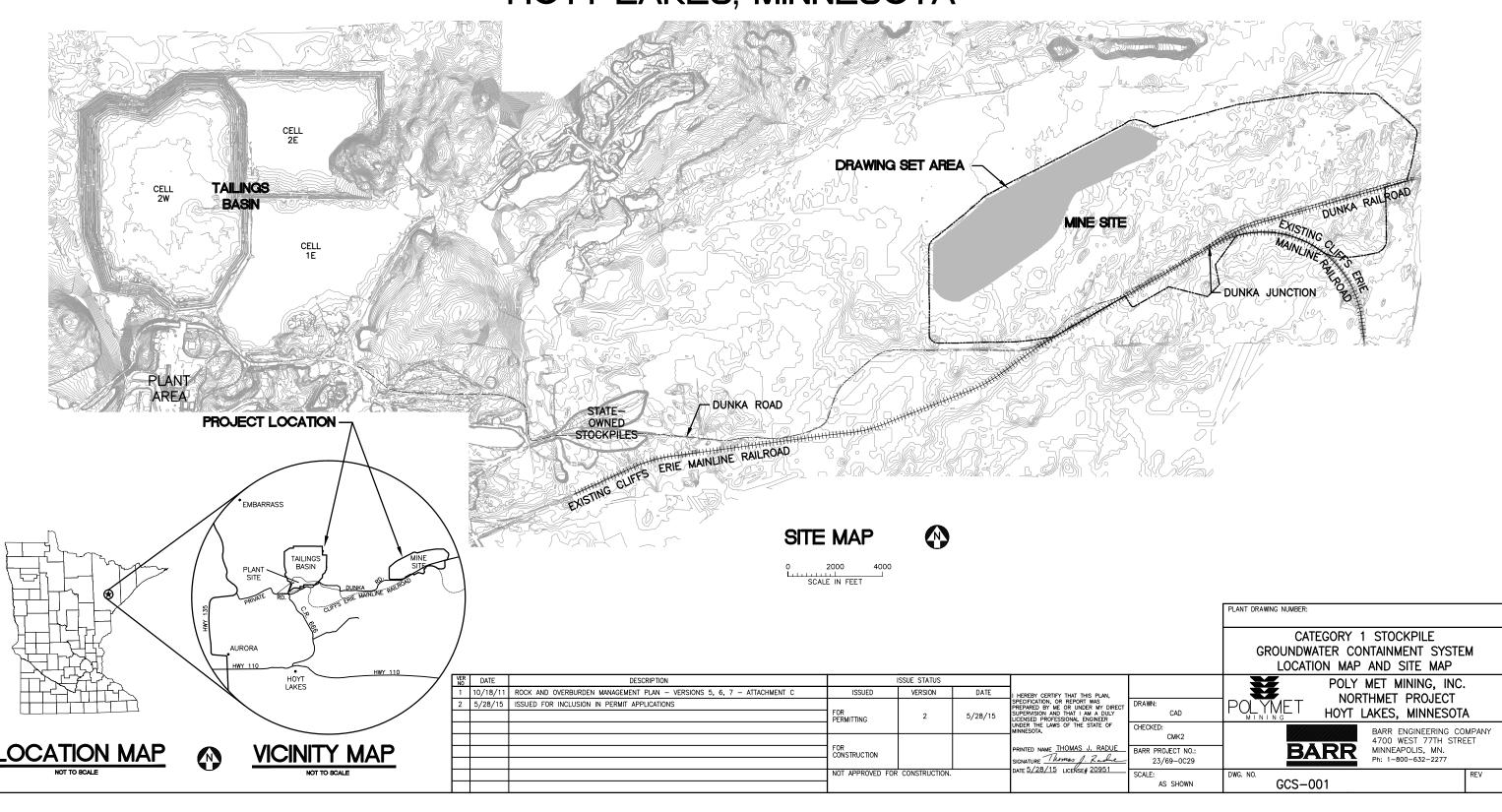
Permit Application Support Drawings: Category 1 Stockpile Groundwater Containment System

July 2016 (version 2)

Engineering design is currently in progress. The table below lists changes that have been identified todate and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change				
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".				
GCS-003	To meet construction stormwater requirements, a temporary berm will be added on the west side of the Mine Year 0 Category 1 Stockpile footprint to control mine water runoff as the stockpile is built out.				

POLY MET MINING, INC. NORTHMET PROJECT PERMIT APPLICATION SUPPORT DRAWINGS CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM HOYT LAKES, MINNESOTA



GENERAL LEGEND

-----1000----- EXISTING CONTOUR - MAJOR EXISTING CONTOUR - MINOR ---- MINE SITE BOUNDARY ----- OF ------ PROPOSED SUMP OVERFLOW PIPE PROPOSED MINE DRAINAGE PIPE (PUMPED FLOW) PROPOSED MINE DRAINAGE PIPE (GRAVITY FLOW) PROPOSED SUMP MANHOLE PROPOSED ACCESS ROADS HAUL ROAD

ABBREVIATIONS

CAT CATEGORY DWG DRAWING EL ELEVATION

 GROUNDWATER CONTAINMENT SYSTEM GCS

МН MANHOLE

NTS NOT TO SCALE

PVI PROFILE VERTICAL INTERSECTION

STA STATION

WWTF - WASTE WATER TREATMENT FACILITY

DESCRIPTION

1 10/18/11 ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C

2 5/28/15 ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS

GENERAL DRAWINGS

GCS-001 LOCATION MAP AND SITE MAP
GCS-002 LEGEND AND SHEET INDEX
GCS-003 MINE YEAR 0 LAYOUT
GCS-004 MINE YEAR 2 LAYOUT
GCS-005 MINE YEAR 3 LAYOUT
GCS-006 MINE YEAR 3 LAYOUT
GCS-007 MINE YEAR 6 LAYOUT
GCS-008 MINE YEAR 6 LAYOUT
GCS-009 CLOSURE CONFIGURATION
GCS-010 TYPICAL CROSS SECTIONS
GCS-011 TYPICAL CROSS SECTIONS
GCS-012 NORTH PROFILES
GCS-013 SOUTH PROFILES
GCS-014 DISCHARGE PROFILES

DRAWING NUMBERING

ISSUE STATUS

VERSION

DATE

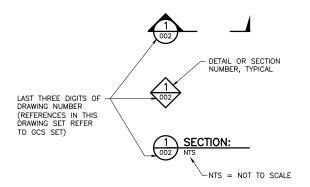
5/28/15

ISSUED

FOR PERMITTING

FOR CONSTRUCTION

NOT APPROVED FOR CONSTRUCTION.



I HEREBY CERTIFY THAT THIS PLAN,
SPECIFICATION, OR REPORT WAS
PREPARED BY ME OR UNDER MY DIRECT
SUPERVISION AND THAT I AM A DULY
JCENSED PROFESSIONAL ENGINEER
INDER THE LAWS OF THE STATE OF
INNESOTA.

PRINTED NAME <u>THOMAS J. RADUE</u> SIGNATURE Thomas J. Radue

DATE 5/28/15 LICENSE# 20951

DRAWN:

CHECKED:

CAD

BARR PROJECT NO.:

23/69-0029

AS SHOWN

CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM LEGEND AND SHEET INDEX

POLYMET

POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

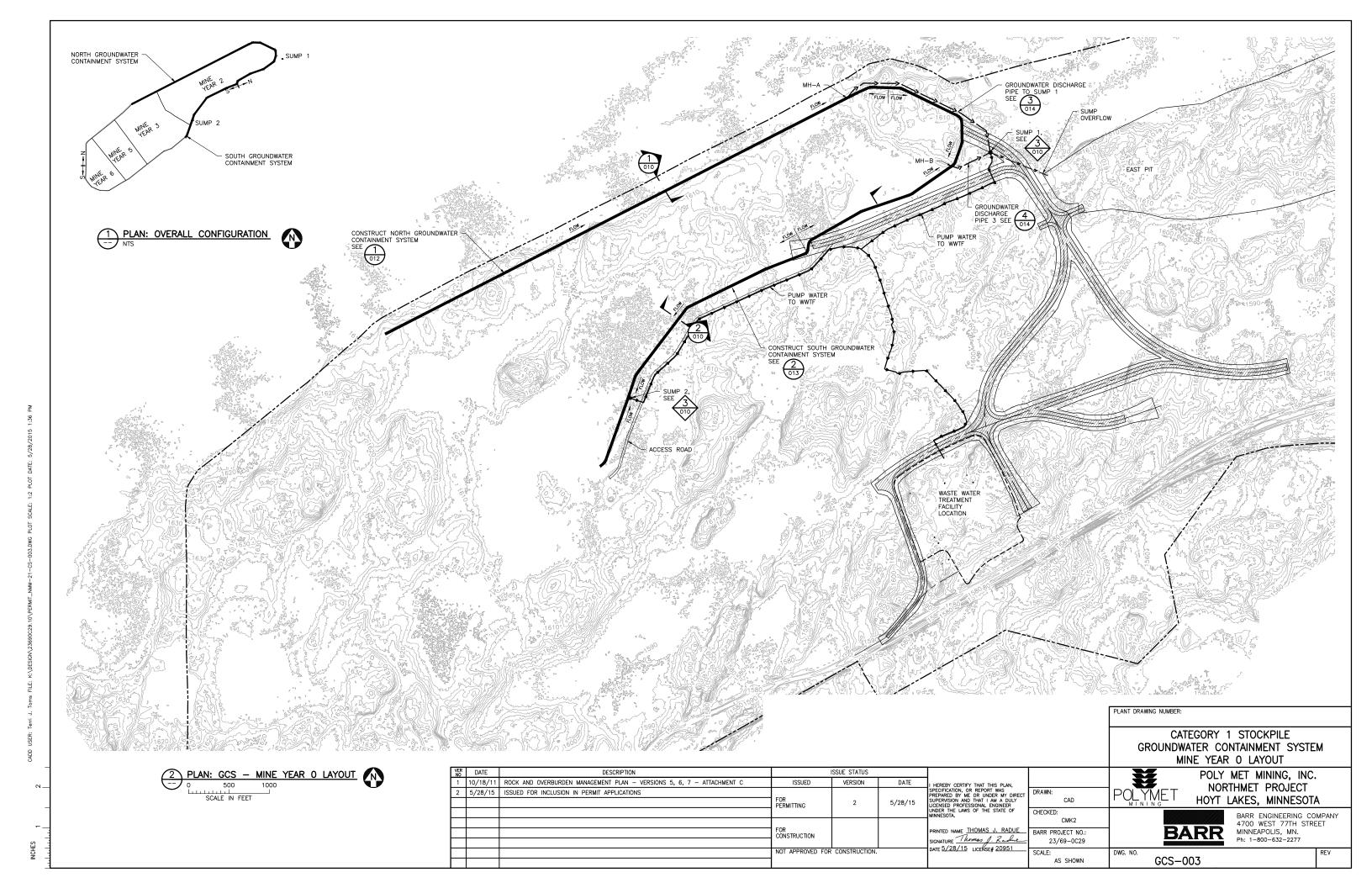
BARR

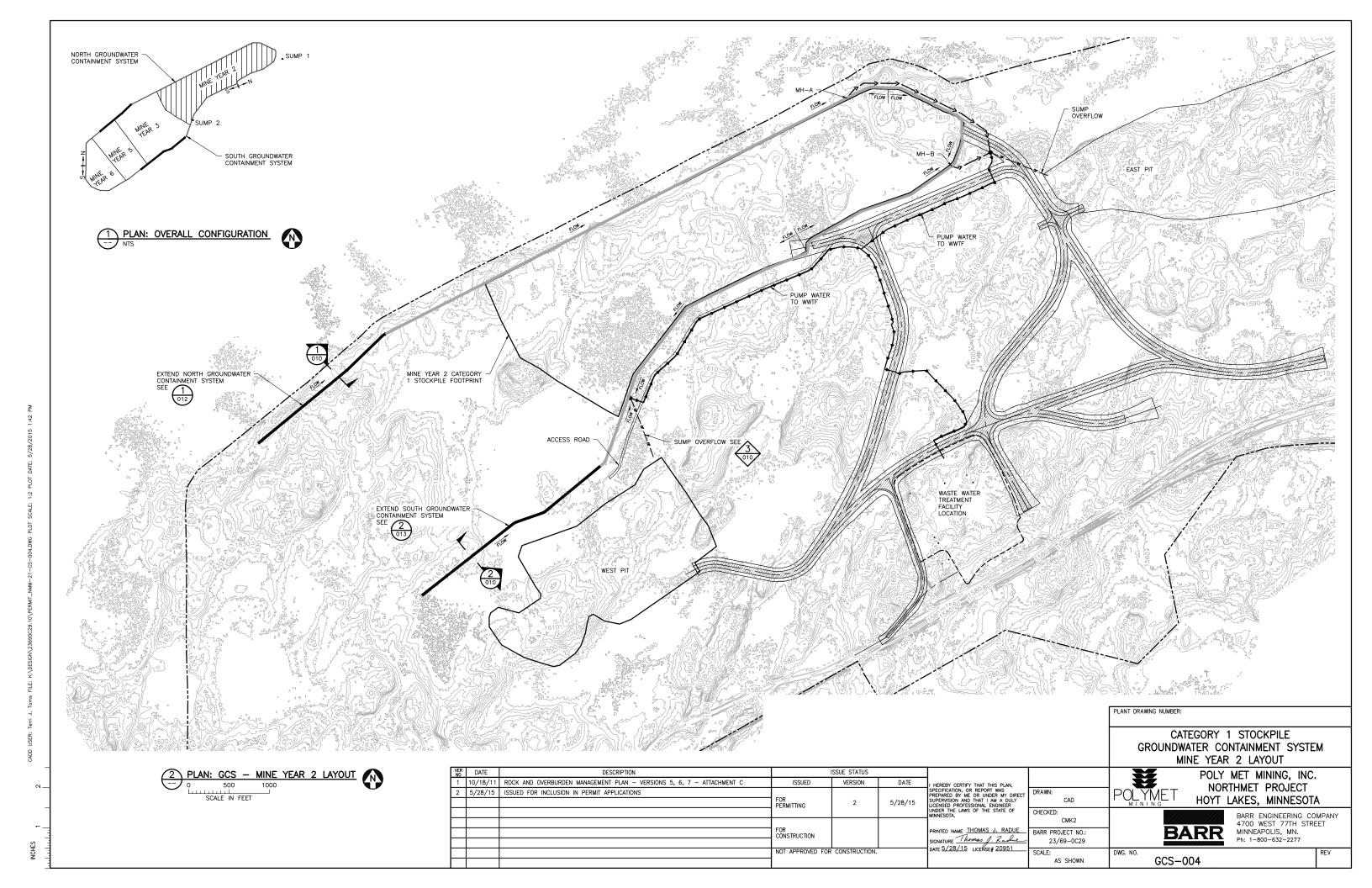
GCS-002

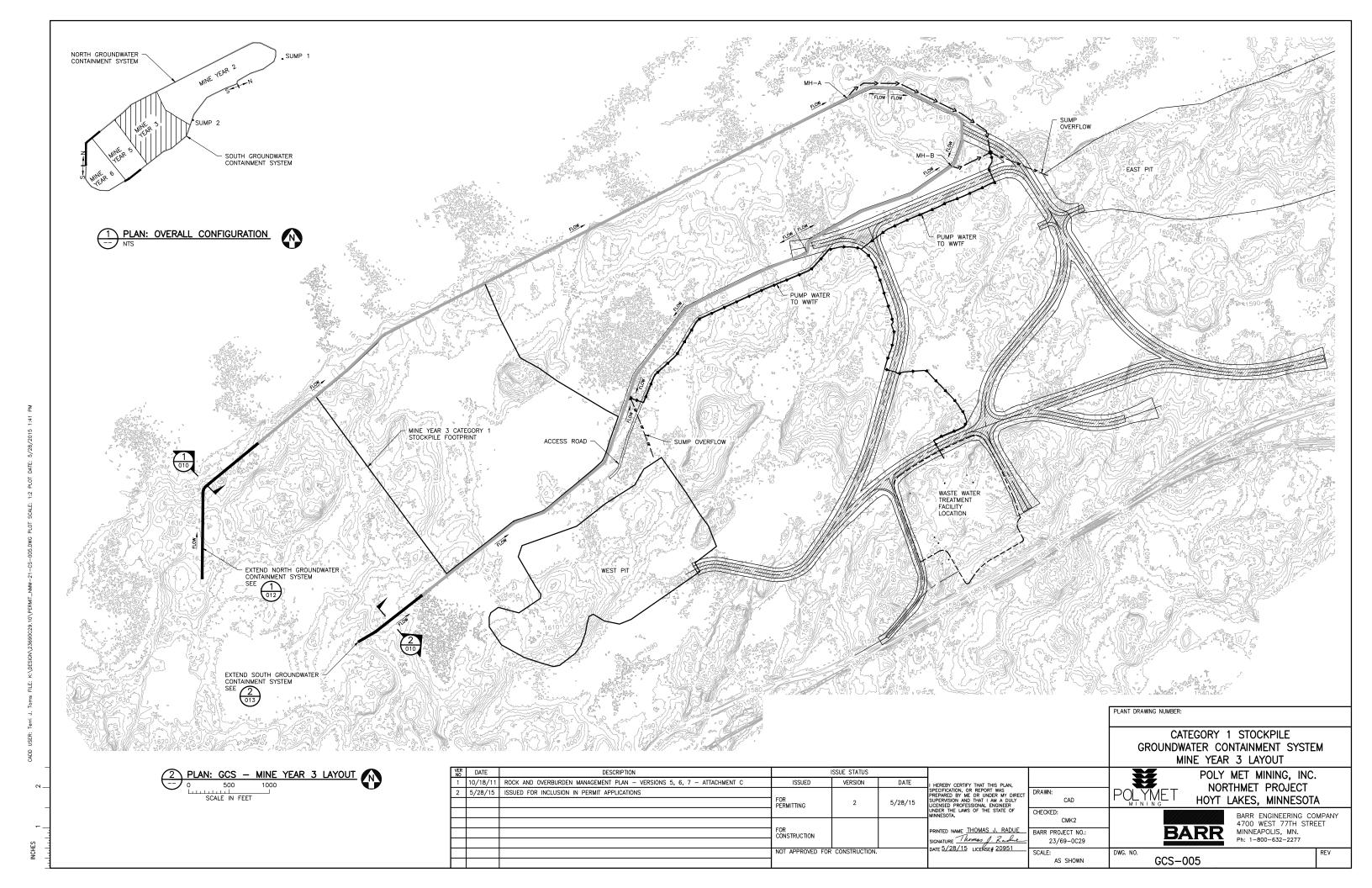
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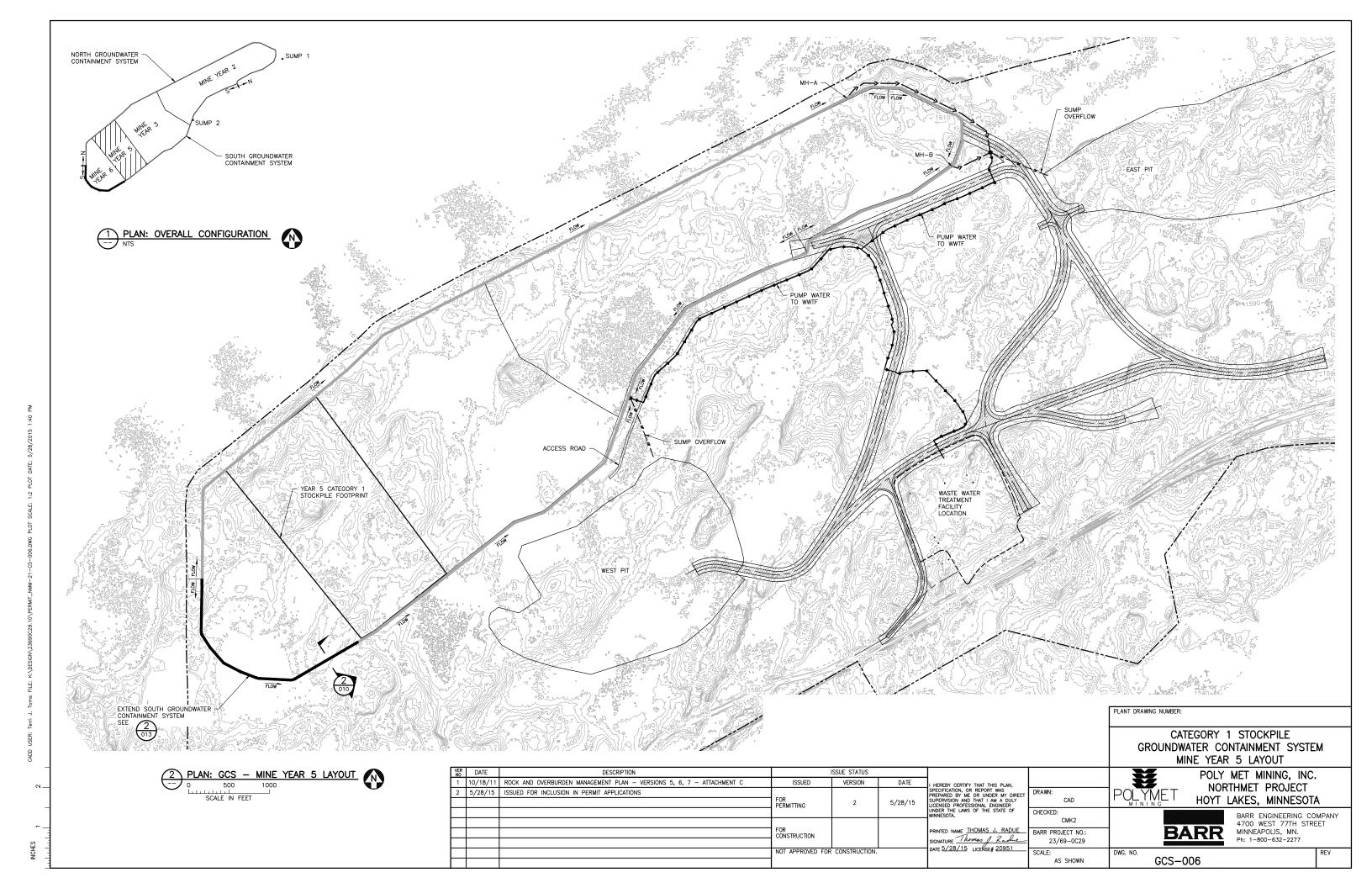
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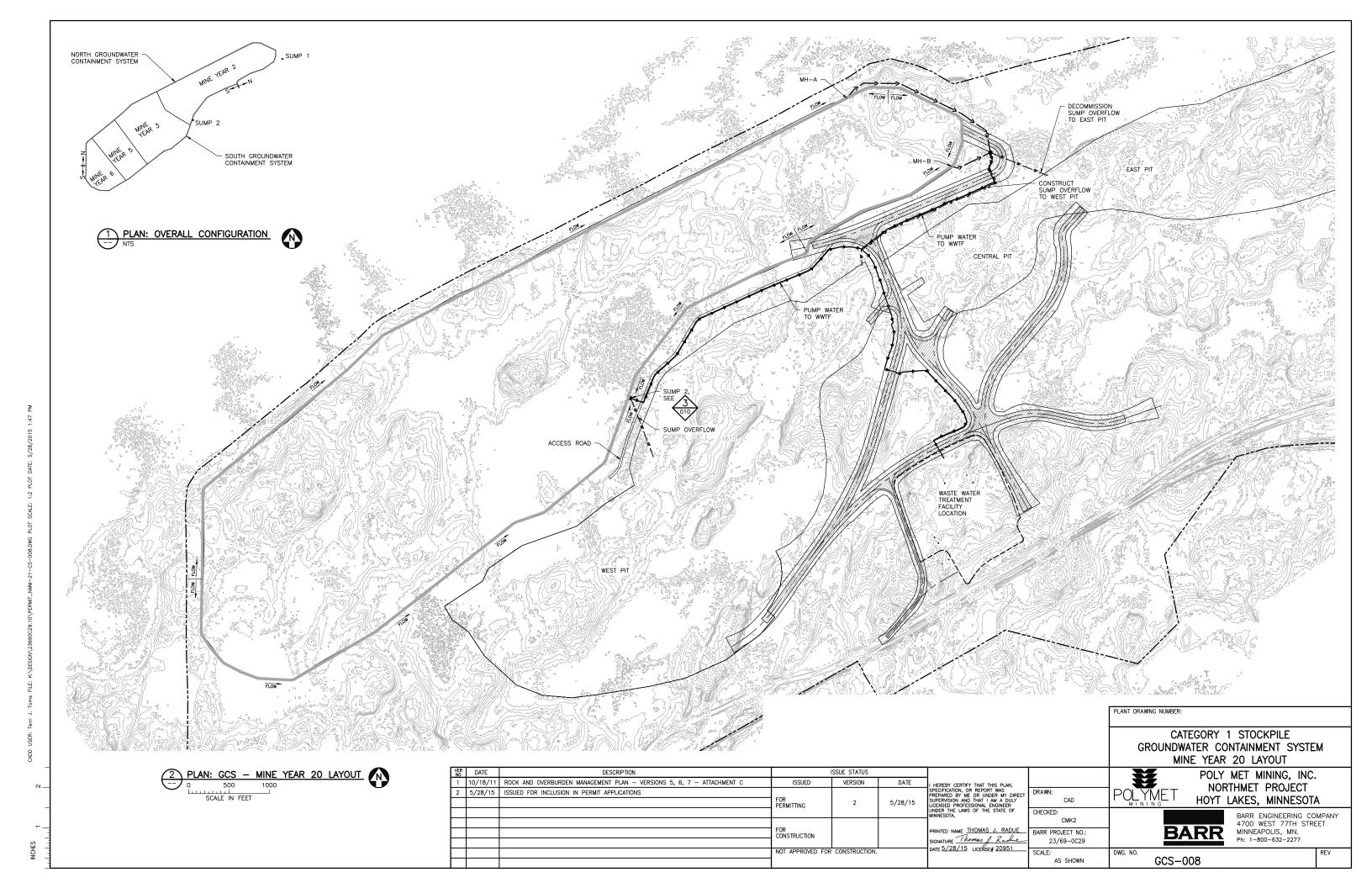
- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.

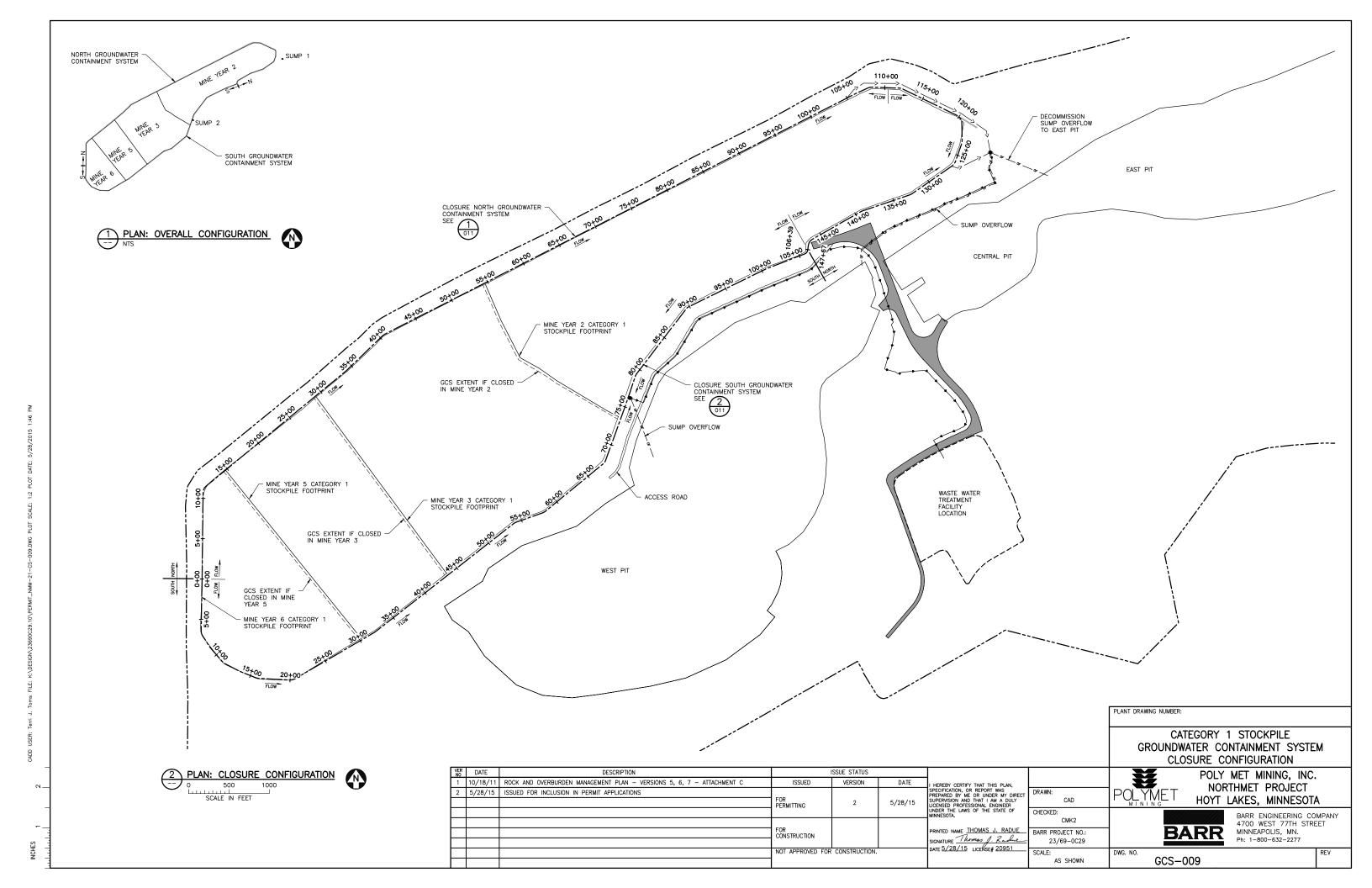


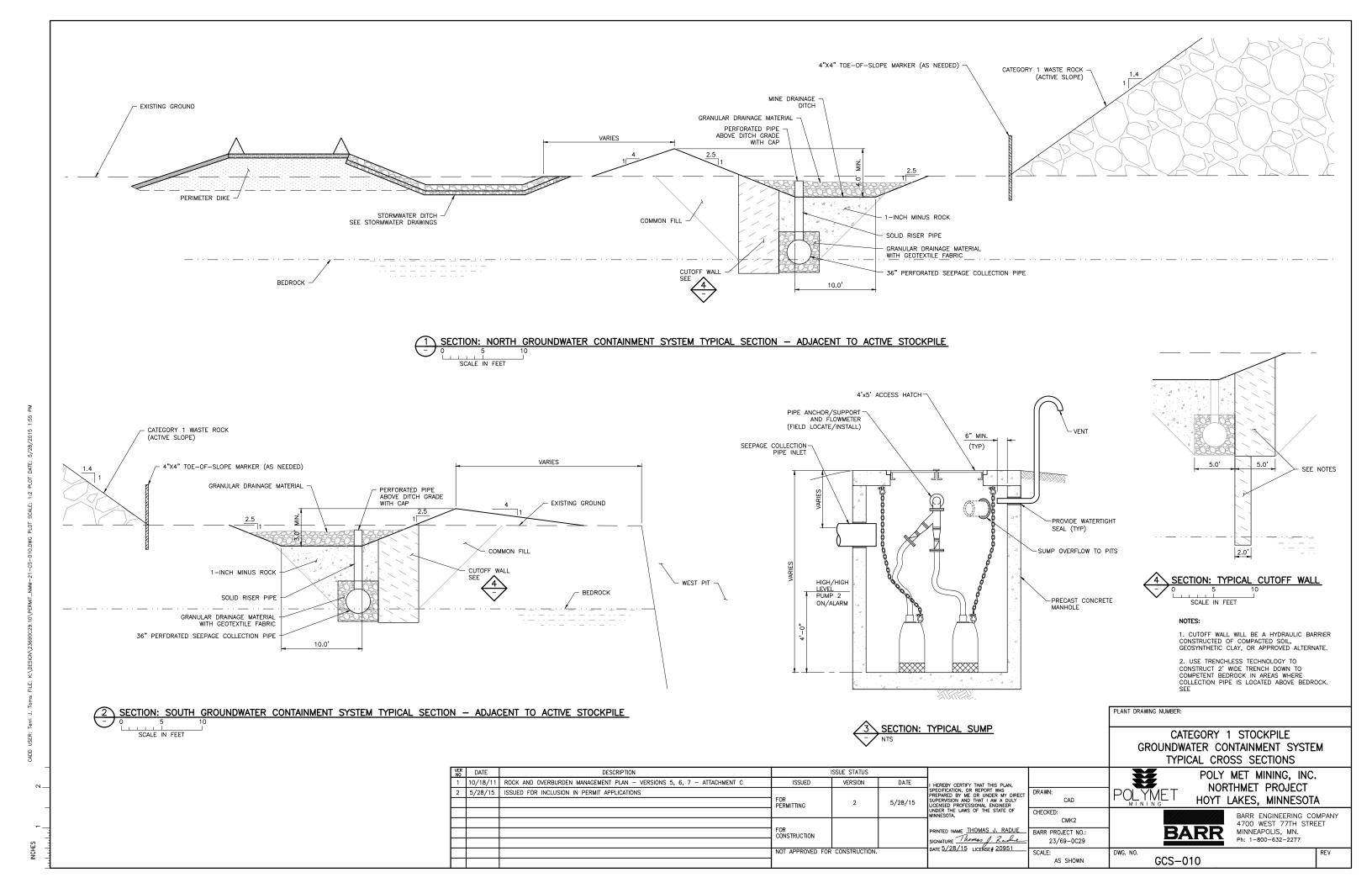












- EXISTING GROUND

CATEGORY 1 WASTE ROCK REGRADED TO FINAL GRADE

STOCKPILE COVER SEE STOCKPILE DRAWINGS

EXTEND SOLID PIPE TO FINISHED GROUND -MOVE CAP TO TOP OF PIPE

DRAIN ROCK TOE DRAIN -OVER GEOTEXTILE

VARIES

GEOMEMBRANE SEE STOCKPILE DRAWINGS

─ WEST PIT

CATEGORY 1 STOCKPILE

POLY MET MINING, INC.

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

Ph: 1-800-632-2277

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

AS SHOWN

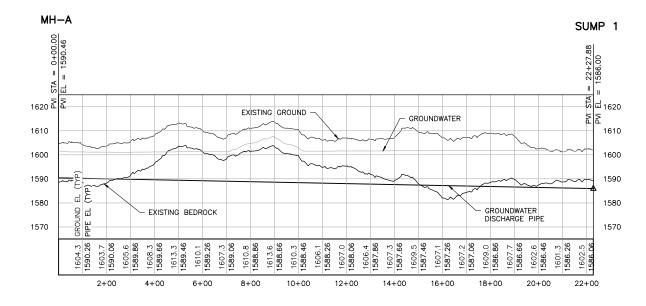
GCS-013

GROUNDWATER

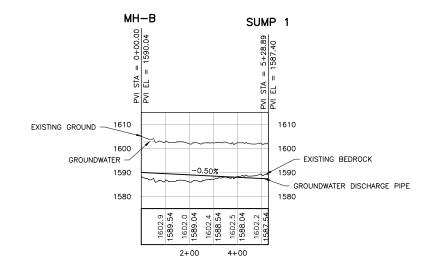
STA = 0+00.00 EL = 1612.02

1630

- EXISTING GROUND



PROFILE: MANHOLE A GROUNDWATER DISCHARGE PIPE TO SUMP 1



AS SHOWN

ALL GROUNDWATER AND BEDROCK PROFILES SHOWN ARE APPROXIMATE.

PROFILE: MANHOLE B GROUNDWATER DISCHARGE PIPE TO SUMP 1

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
DISCHARGE PROFILES

DISCHARGE PROFILES POLYMET POLY MET MINING, INC.

VER NO	DATE	DESCRIPTION	ISSUE STATUS									
1	10/18/11	ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.						
2	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS]		l	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:					
			FOR PERMITTING							3/26/13 L	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	CAD
						UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:					
							CMK2					
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:					
						SIGNATURE Thomas J. Radue DATE 5/28/15 LICENSE# 20951	23/69-0C29					
			NOT APPROVED FOR	CONSTRUCTION.		DATE 5/28/13 LICENSE# 20951	SCALE:					
			1				AS SHOWN					

HOYT LAKES, MINNESOTA **BARR**

PLANT DRAWING NUMBER:

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

GCS-014

NORTHMET PROJECT

FTB Seepage Containment and Stream Augmentation Systems

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

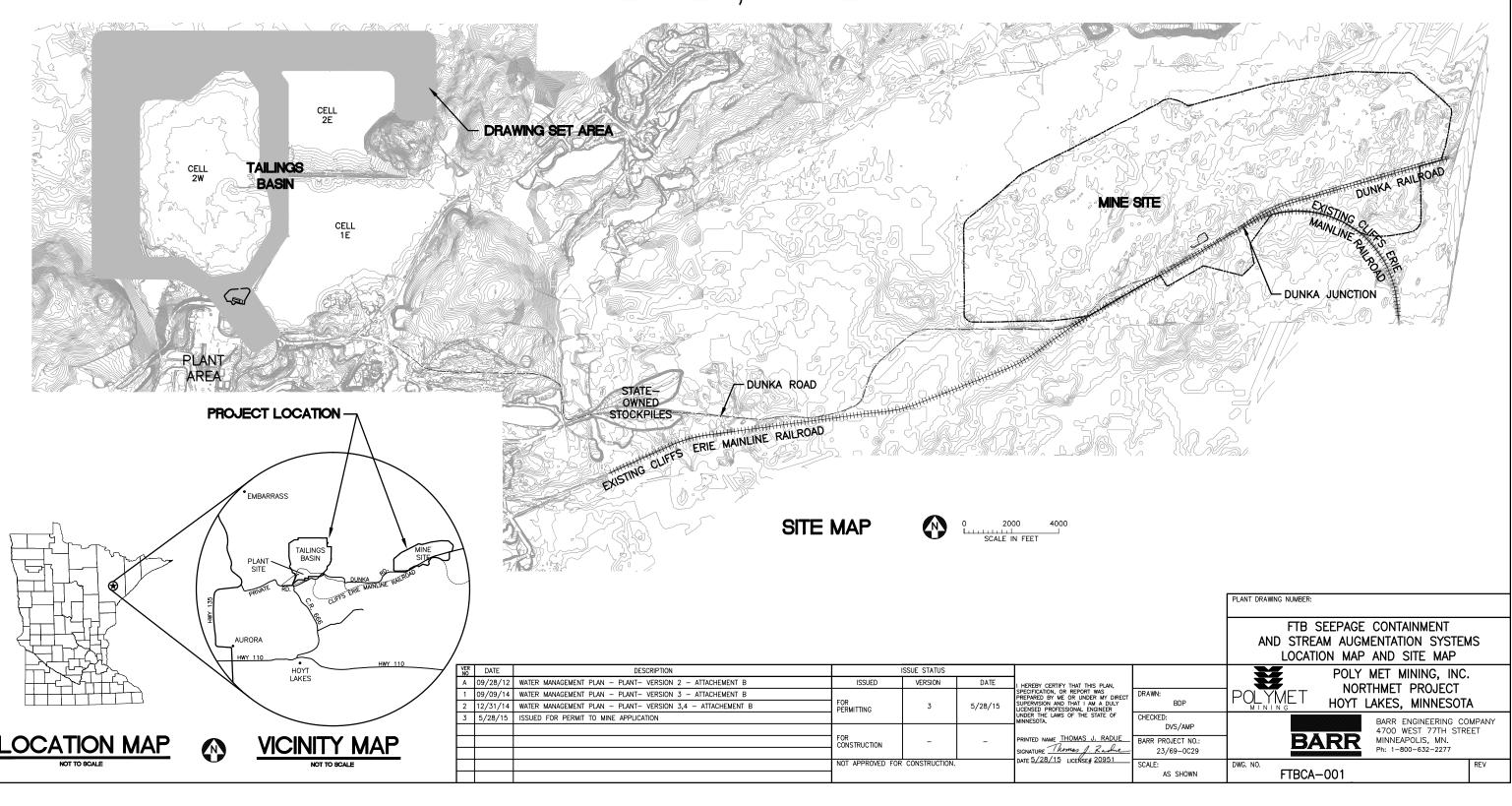
Permit Application Support Drawings: FTB Seepage Containment and Stream Augmentation Systems

July 2016 (version 2)

Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change
FTBCA-002	A note 5 will be added to say: The term "stream augmentation" in this drawing set is synonymous with "surface water discharge"; these terms are used in the Water Appropriations Consolidated Permit Application and the NPDES/SDS Permit Application, respectively.
FTBCA-013, FTBCA-015	The cross slope on the perimeter access road surface will be revised so that it slopes entirely towards the FTB, instead of being crowned in the center.
FTBCA-013, FTBCA-015	To eliminate additional fill in wetlands, the monitoring wells located outside of the perimeter access road will be moved to within the road embankment.
FTBCA-004 through FTBCA-010	The final location and number of discharge locations to Unnamed Creek and Trimble Creek will be determined in permitting and final design.

POLY MET MINING, INC. NORTHMET PROJECT FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS HOYT LAKES, MINNESOTA



GENERAL LEGEND

EXISTING CONTOUR - MAJOR EXISTING CONTOUR - MINOR -----1000 ----- PROPOSED CONTOUR - MAJOR PROPOSED CONTOUR - MINOR FXISTING POWER POLE EXISTING RAILROAD EXISTING ROAD __ _ _ EXISTING TRAIL ______ EXISTING UNIMPROVED TRAIL EXISTING STRUCTURES TREE LINE <u>₩</u> } WETLAND BOUNDARY EXISTING CULVERT EXISTING PIPELINE + - + CUTOFF WALL ALIGNMENT ----- OVERHEAD ELECTRIC SURFACE DRAINAGE PROPOSED DEWATERING PIPE PROPOSED DISCHARGE PIPELINE PROPOSED RETURN PIPELINE PROPOSED CULVERT (NON-MINE DRAINAGE) PROPOSED SEEPAGE COLLECTION DRAIN PROPOSED STORMWATER DRAIN 0 PROPOSED MANHOLE PROPOSED RIP RAP • ROTASONIC BORING ◉ ROTASONIC BORING WITH PIEZOMETER \triangle SPT BORING SPT BORING WITH PACKER M FLOW METER

ABBREVIATIONS

APPROX.	-	APPROXIMATE
CDSM	-	CEMENT DEEP SOIL MIX
CMP	-	CORRUGATED METAL PIPE
CPEP	-	CORRUGATED POLYETHYLENE PIPE
CY	-	CUBIC YARD
DR	-	DIMENSION RATIO
DWG	-	DRAWING
EL.	-	ELEVATION
ø	_	DIAMETER
FTB	-	FLOTATION TAILINGS BASIN
GCL	_	GEOSYNTHETIC CLAY LINER
HDPE	-	HIGH DENSITY POLYETHYLENE
HRF	-	HYDROMETALLURGICAL RESIDUE FACILITY
LDPE	-	LOW DENSITY POLYETHYLENE
LF	-	LINER FEET
LTVSMC	-	LTV STEEL MINING COMPANY
MCY	-	MILLION CUBIC YARDS
mil	-	one thousandth of an inch
MIN	-	MINIMUM
MSL	-	MEAN SEA LEVEL
NTS	-	NOT TO SCALE
SCH.	-	SCHEDULE
DR	-	DIMENSION RATIO
TYP	-	TYPICAL
N-MH-XX	-	NORTH SECTION MANHOLE
NW-MH-XX	-	NORTHWEST SECTION MANHOLE
W-MH-XX	-	WEST SECTION MANHOLE
N-MH/PS-XX	-	NORTH SECTION MANHOLE/PUMP STATION
NW-MH/PS-XX	-	NORTHWEST SECTION MANHOLE

- WEST SECTION MANHOLE/PUMP STATION

W-MH/PS-XX

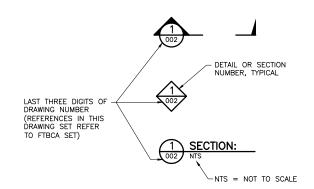
SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS

FTBCA-001	LOCATION MAP AND SITE MAP
FTBCA-002	LEGEND AND SHEET INDEX
FTBCA-003	PLAN SHEET LAYOUT
FTBCA-004	PLAN AND PROFILE - STATION 0+00 TO STATION 30+94
FTBCA-005	PLAN AND PROFILE - STATION 30+94 TO STATION 61+88
FTBCA-006	PLAN AND PROFILE - STATION 61+88 TO STATION 92+82
FTBCA-007	PLAN AND PROFILE - STATION 92+82 TO STATION 123+76
FTBCA-008	PLAN AND PROFILE- STATION 123+76 TO STATION 154+70
FTBCA-009	PLAN AND PROFILE - STATION 154+70 TO STATION 185+64
FTBCA-010	PLAN AND PROFILE- STATION 185+64 TO STATION 216+58
FTBCA-011	PLAN AND PROFILE - STATION 216+58 TO STATION 240+17
FTBCA-012	EAST SECTION PLAN & PROFILE STATION 0+00 TO STATION 25+43
FTBCA-013	DETAILS
FTBCA-014	DETAILS
FTBCA-015	DETAILS

DRAWING NUMBERING



GIGNATURE Thomas J. Radie

DATE 5/28/15 LICENSE# 20951

NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.
- 4. EXISTING TOPOGRAPHIC INFORMATION WAS UPDATED FOR AREAS SOUTH EAST OF COAL ASH LANDFILL AND EAST OF OUTCROP BETWEEN CELLS 1E AND 2E USING CONTOURS FROM DATA COLLECTED IN 1999.

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS LEGEND AND SHEET INDEX

DESCRIPTION ISSUE STATUS A 09/28/12 WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B VERSION HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS REPEARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED POFFESSIONAL ENGINEER NUBER THE LAWS OF THE STATE OF ISSUED DATE 1 09/09/14 WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B DRAWN: FOR PERMITTING 2 12/31/14 WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B 5/28/15 3 5/28/15 ISSUED FOR PERMIT TO MINE APPLICATION CHECKED: RINTED NAME THOMAS J. RADUE FOR CONSTRUCTION BARR PROJECT NO.:

NOT APPROVED FOR CONSTRUCTION.

POLTMET

BDP

DVS/AMP

23/69-0029

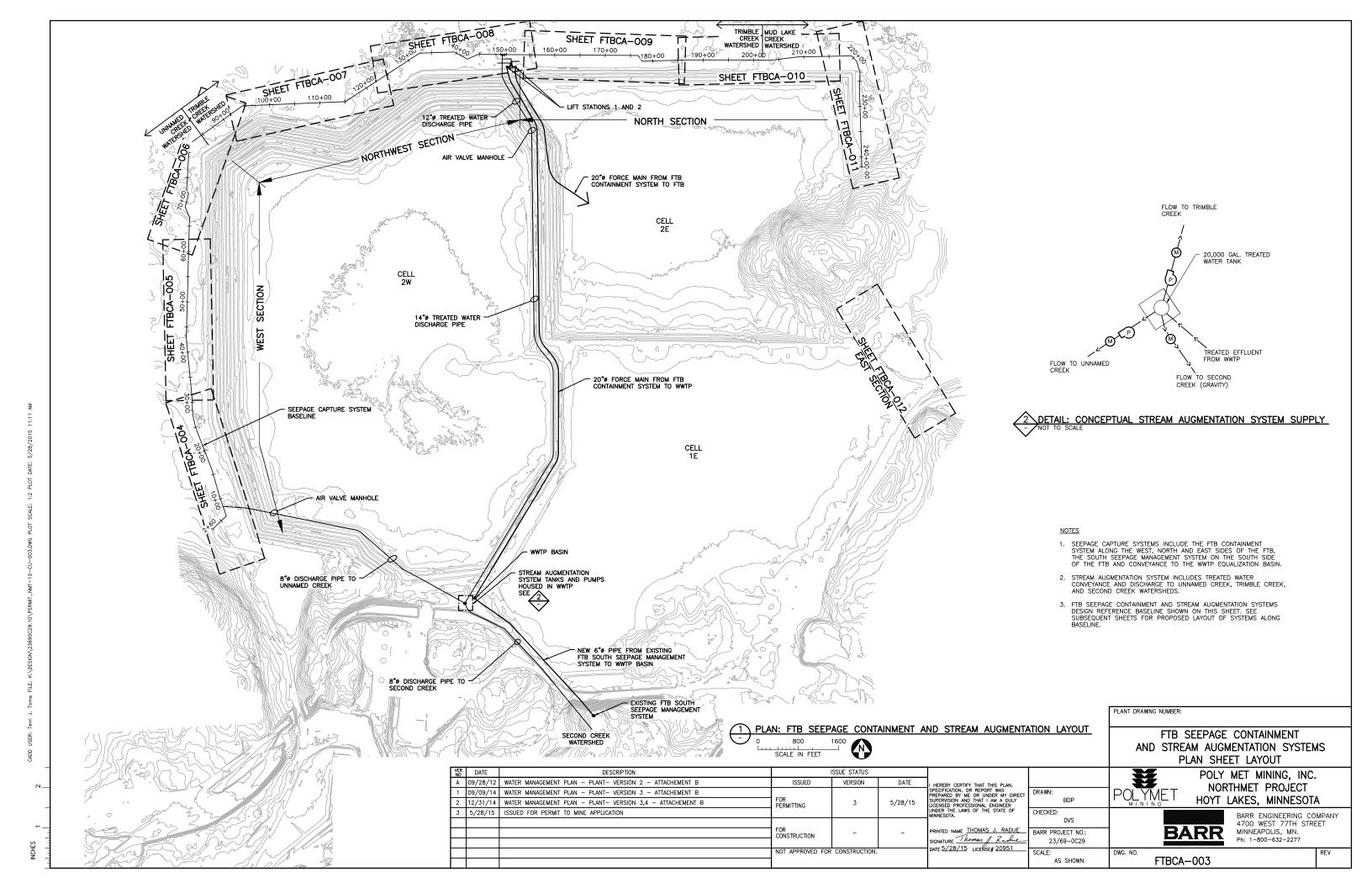
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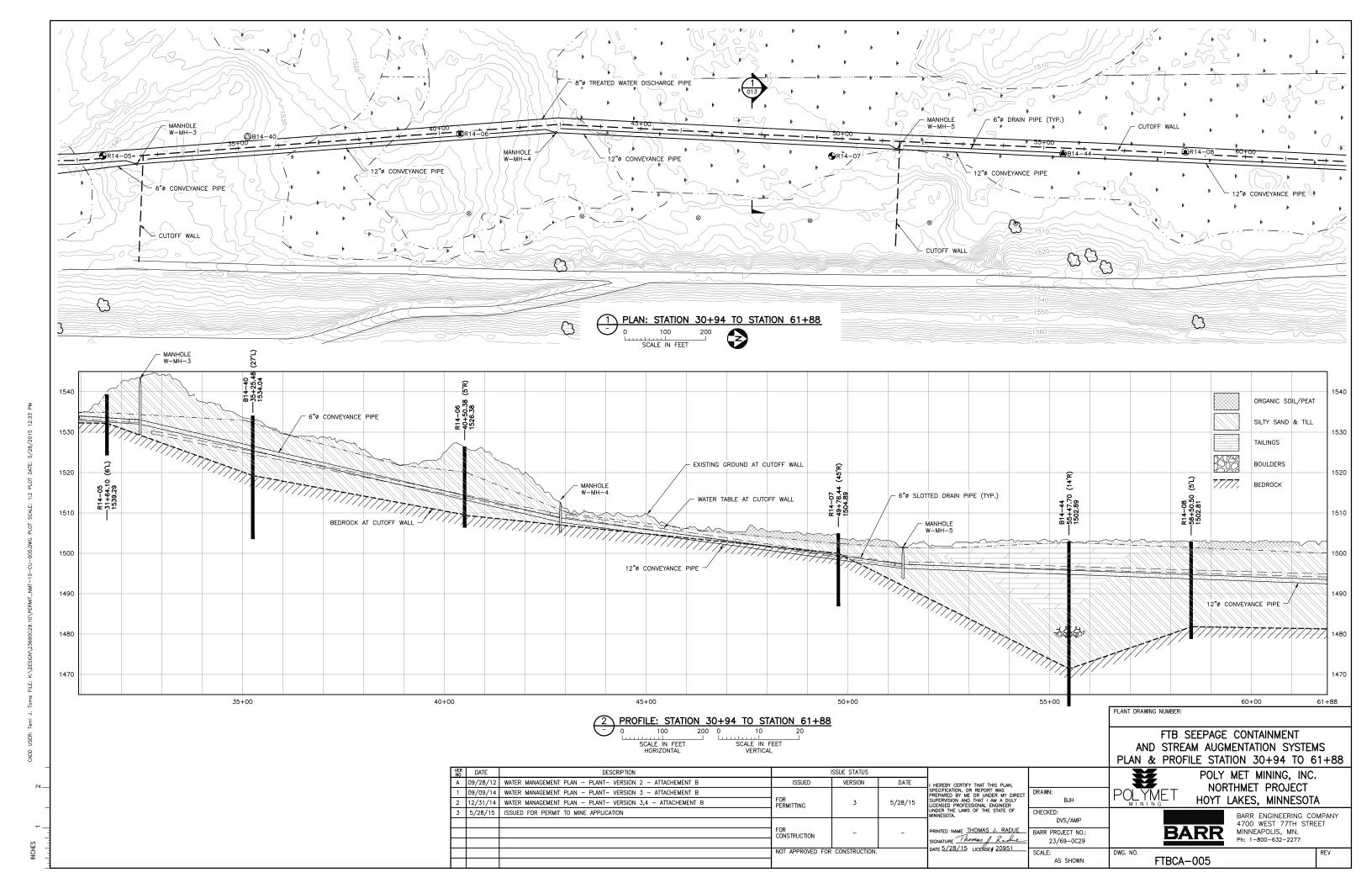
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

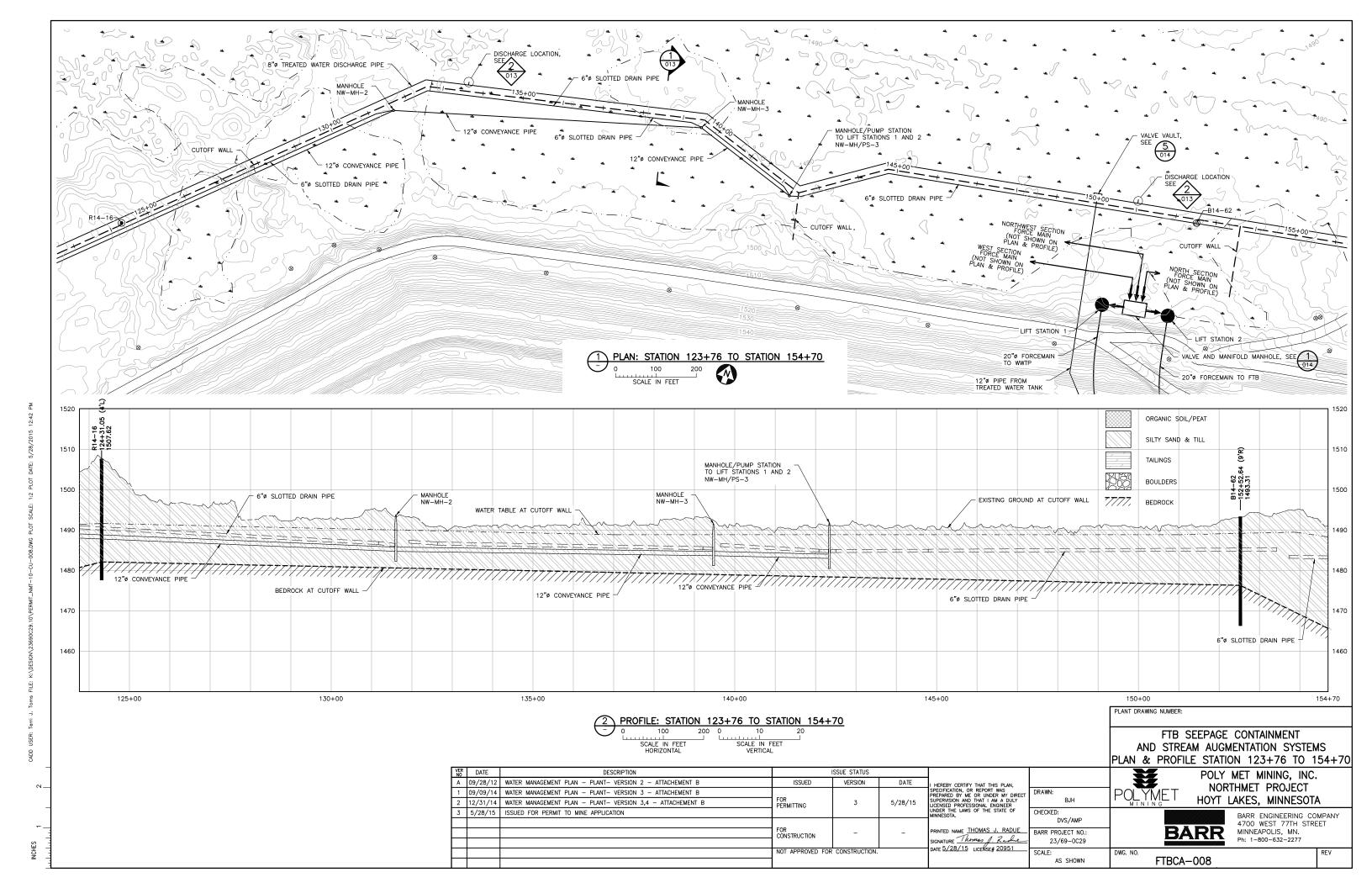


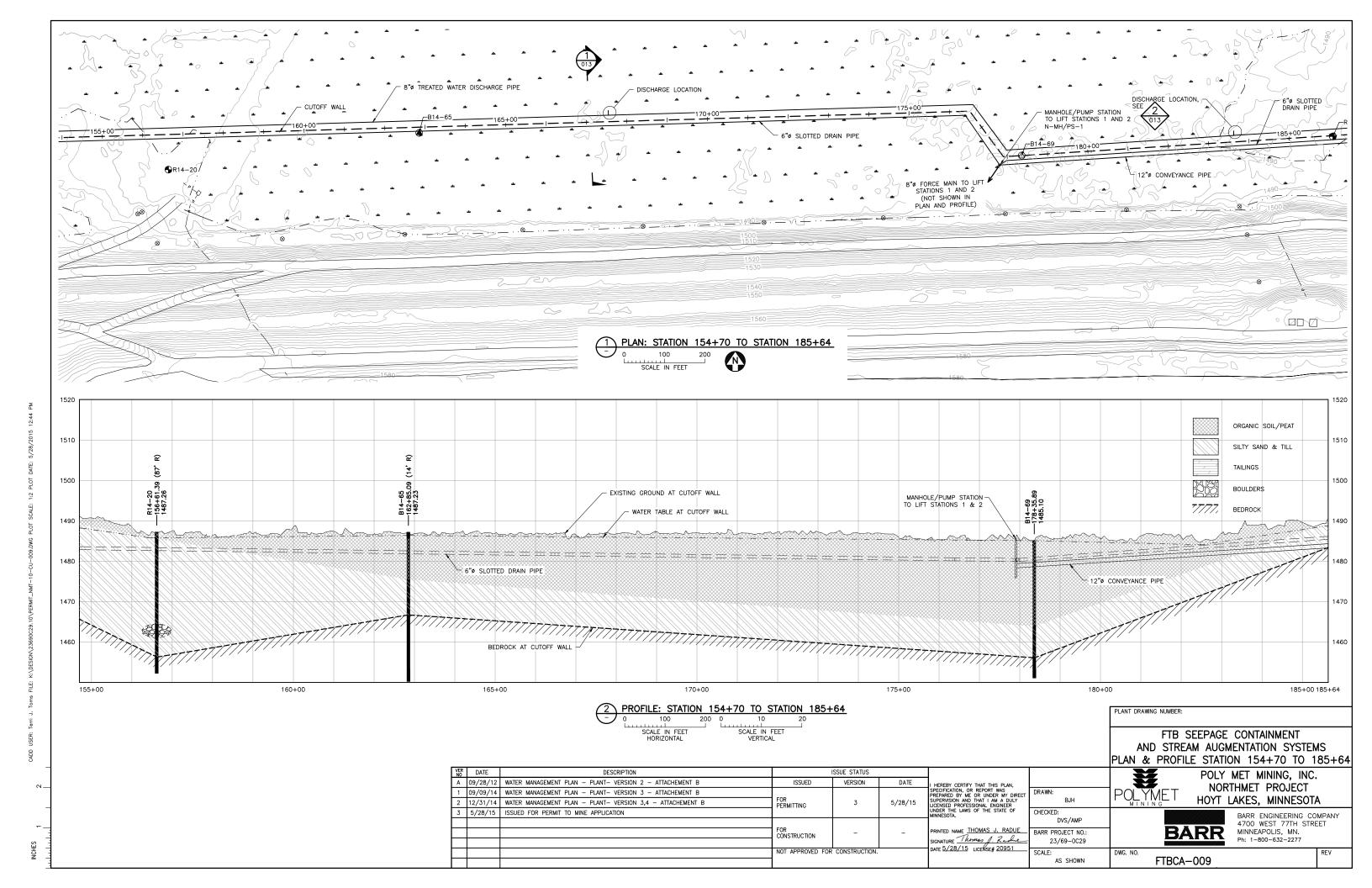
FTBCA-002

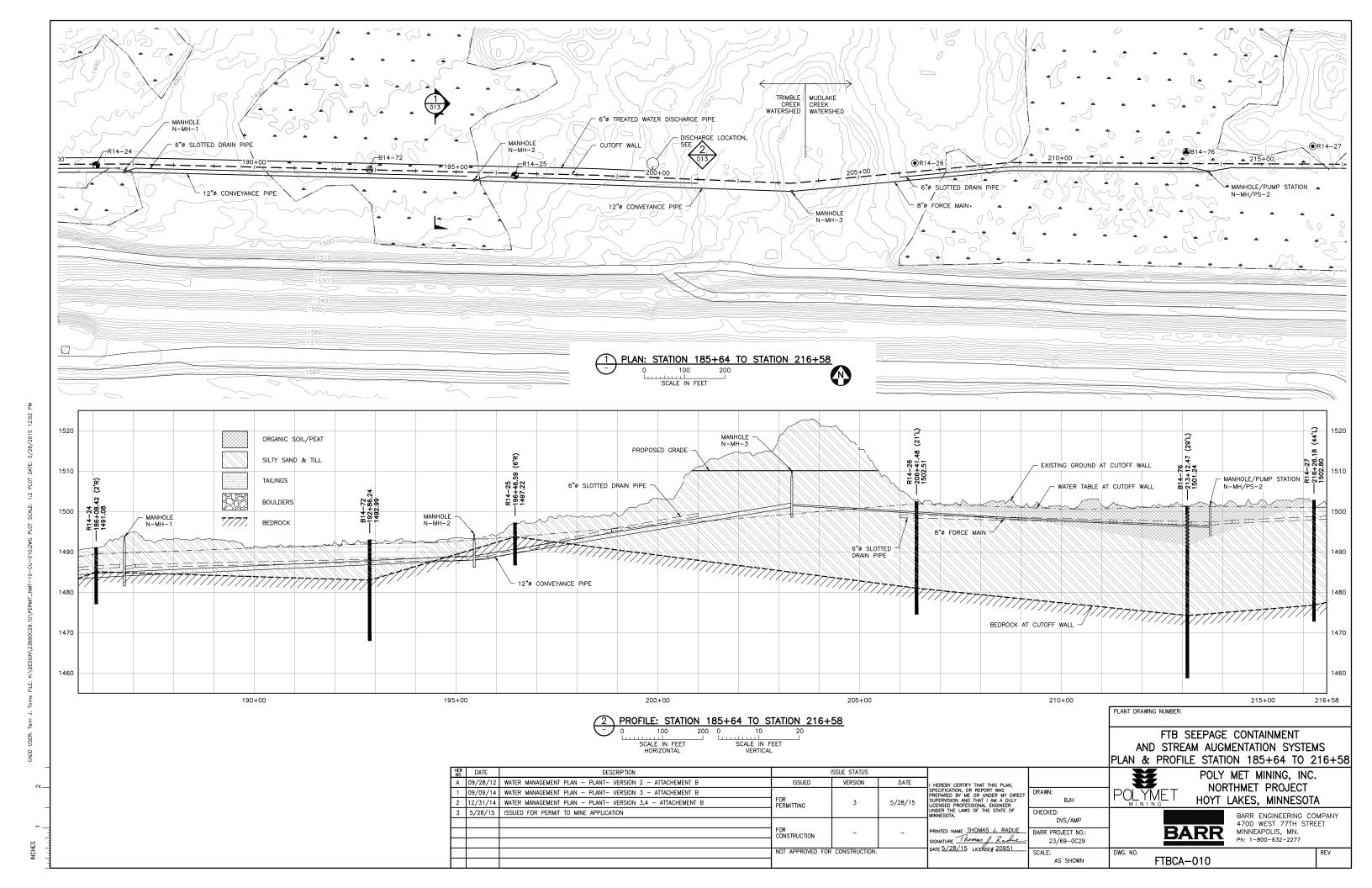
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

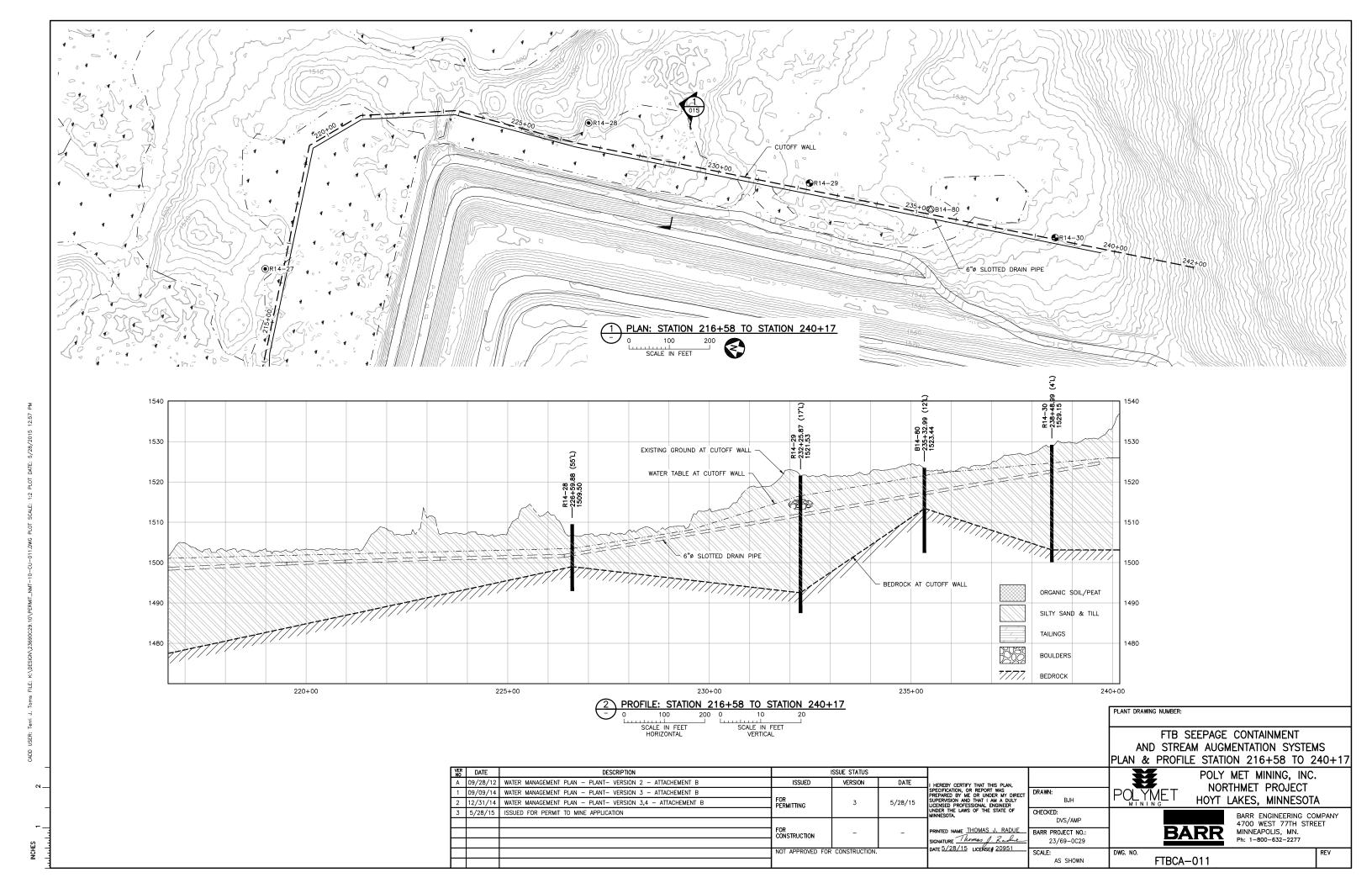


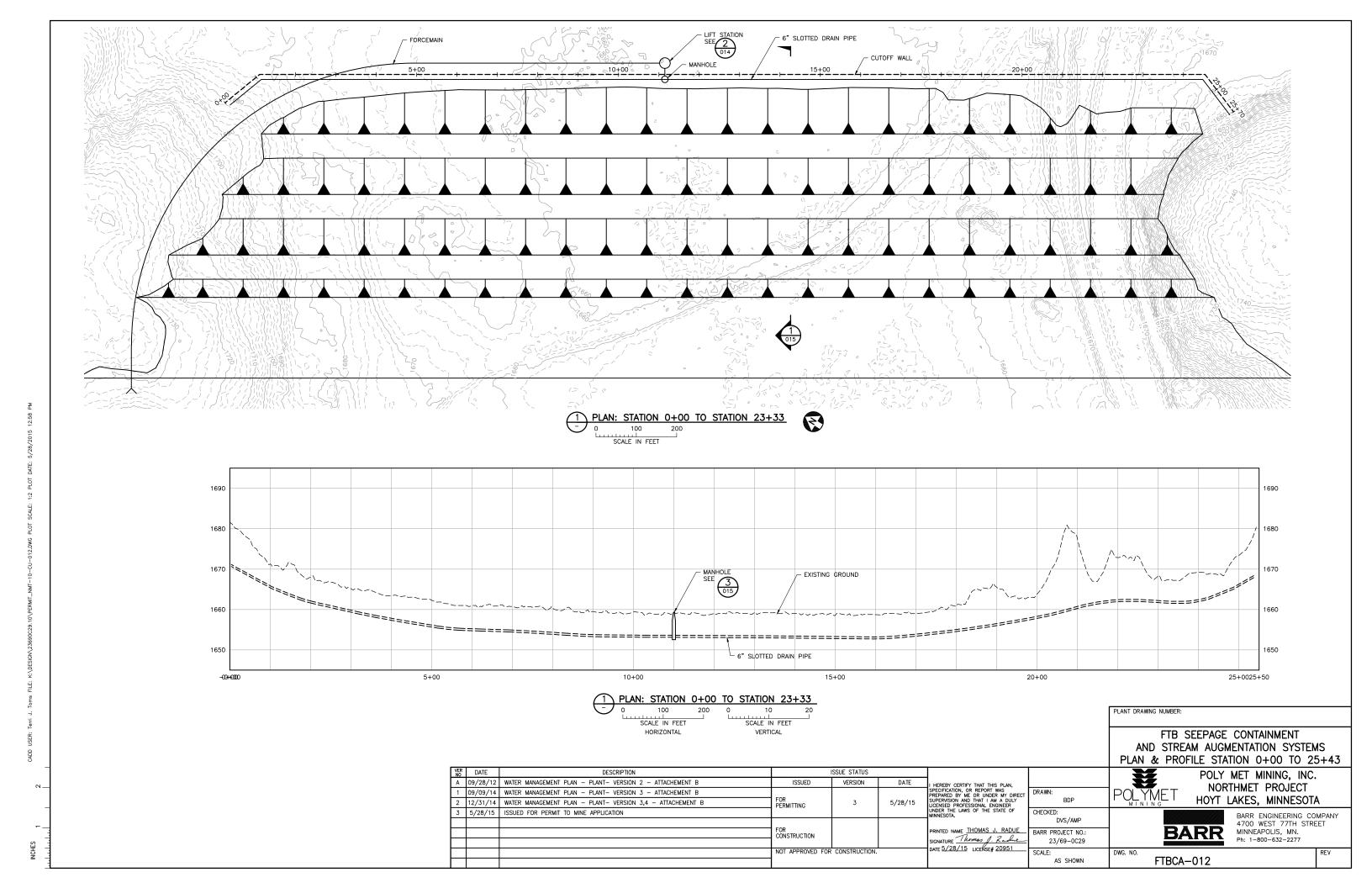


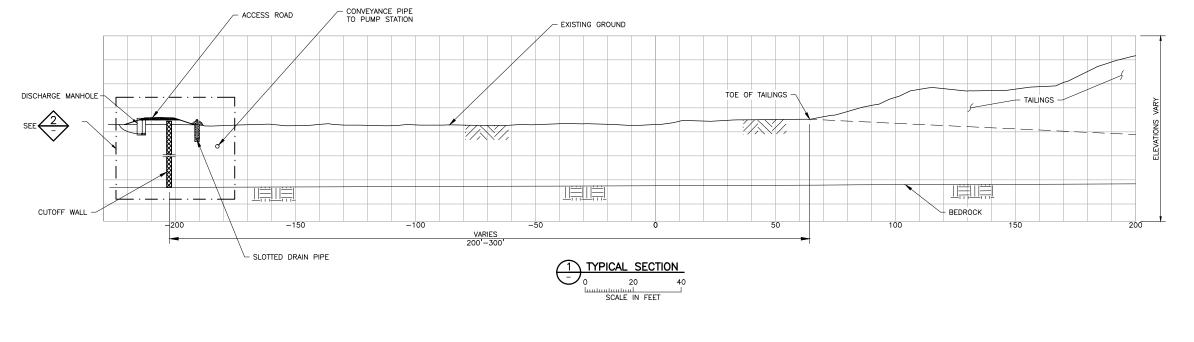


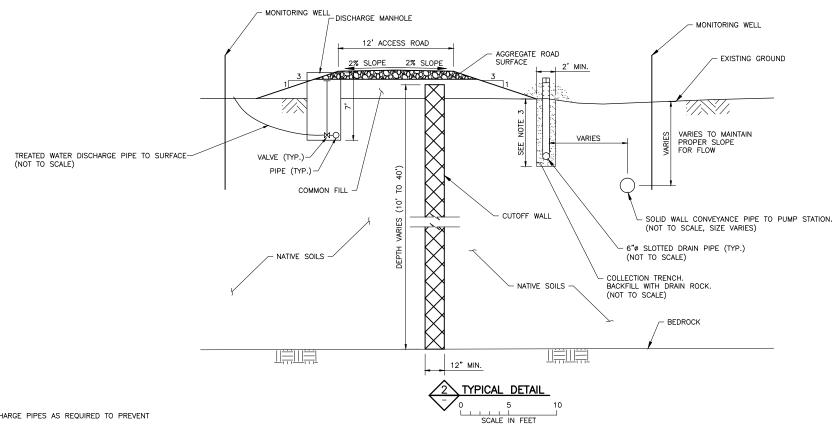












- 1. DIFFUSER TO BE INSTALLED ON DISCHARGE PIPES AS REQUIRED TO PREVENT EROSION.
- 2. CUTOFF WALL MAXIMUM DESIGN HYDRAULIC CONDUCTIVITY = 1×10^{-6} CM/SEC
- 3. 7' TYPICAL BUT MAY BE LESS IN AREAS WITH SHALLOW BEDROCK

PLANT DRAWING NUMBER:

AS SHOWN

FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS **DETAILS**

						_	
VER NO	DATE	DESCRIPTION	ISSUE STATUS				
Α	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
2	12/31/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B	FOR PERMITTING	3	3/26/13	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	BDP
3	5/28/15	ISSUED FOR PERMIT TO MINE APPLICATION	1 2.1			UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
							DVS/AMP
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
]			SIGNATURE Thomas J. Radie	23/69-0029
			NOT APPROVED FOR	CONSTRUCTION.		DATE 5/28/15 LICENSE# 20951	SCALE:

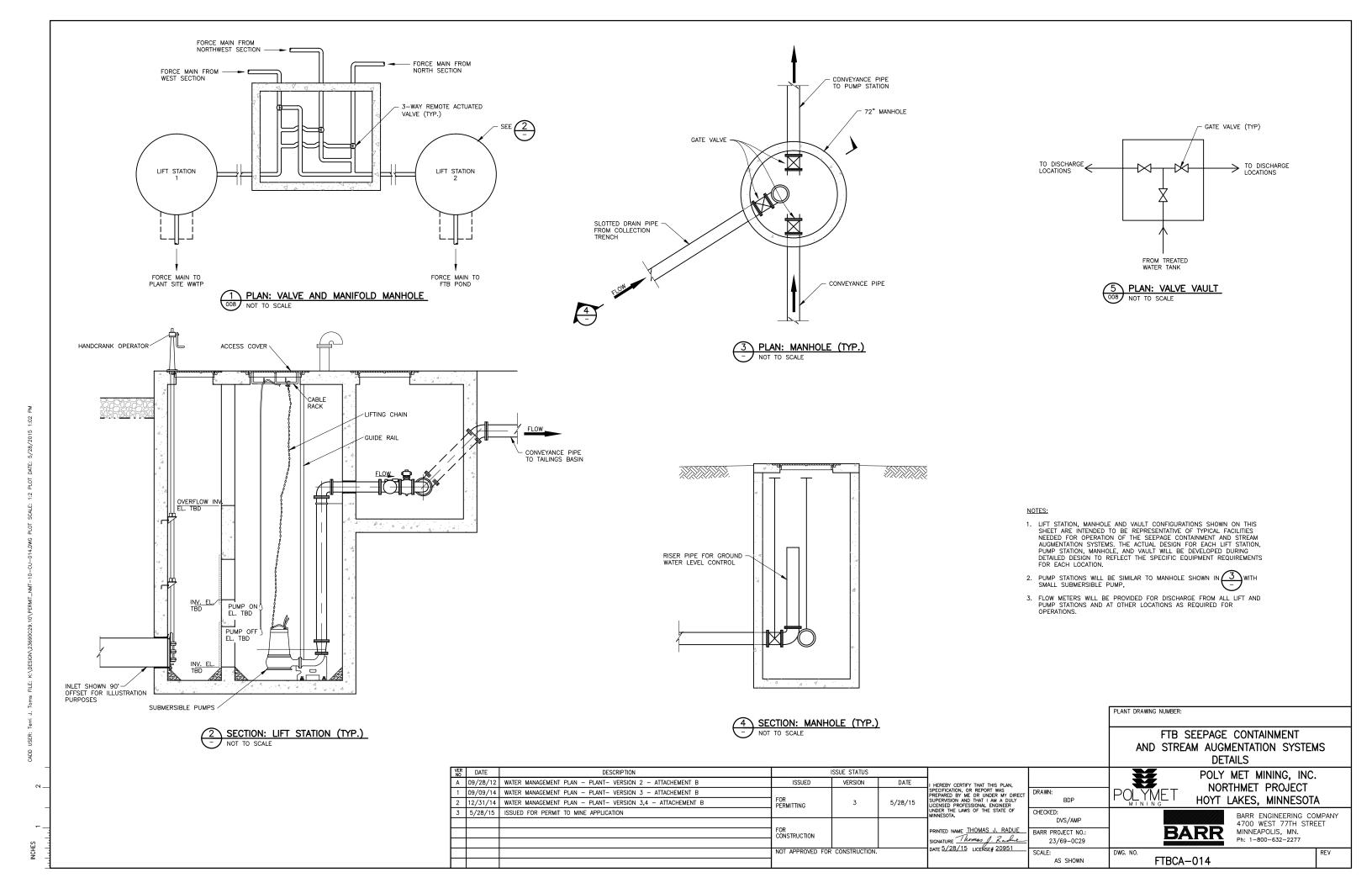
POLYMET **BARR**

HOYT LAKES, MINNESOTA

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

POLY MET MINING, INC. NORTHMET PROJECT

FTBCA-013



1700

1690

1680

1670

1660

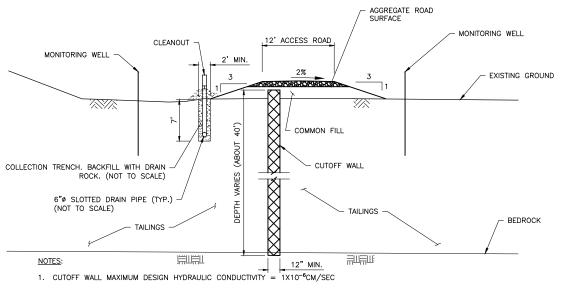
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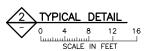
1640

1630

1620

7+010+15





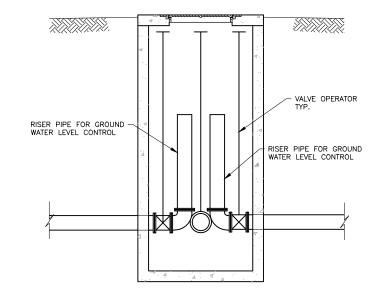
72" MANHOLE GATE VALVE -SLOTTED DRAIN PIPE SLOTTED DRAIN PIPE $^{oldsymbol{\perp}}$

PLAN: MANHOLE (TYP.)

NOT TO SCALE

CONVEYANCE PIPE TO LIFT STATION

- 1. LIFT STATION, MANHOLE AND VAULT CONFIGURATIONS SHOWN ON THIS SHEET ARE INTENDED TO BE REPRESENTATIVE OF TYPICAL FACILITIES NEEDED FOR OPERATION OF THE SEEPAGE CONTAINMENT SYSTEM. THE ACTUAL DESIGN FOR EACH LIFT STATION, PUMP STATION, MANHOLE, AND VAULT WILL BE DEVELOPED DURING DETAILED DESIGN TO REFLECT THE SPECIFIC EQUIPMENT REQUIREMENTS FOR EACH LOCATION.
- FLOW METERS WILL BE PROVIDED FOR DISCHARGE FROM ALL LIFT AND PUMP STATIONS AND AT OTHER LOCATIONS AS REQUIRED FOR OPERATIONS.



4 SECTION: MANHOLE (TYP.)

NOT TO SCALE

PLANT DRAWING NUMBER:

AS SHOWN

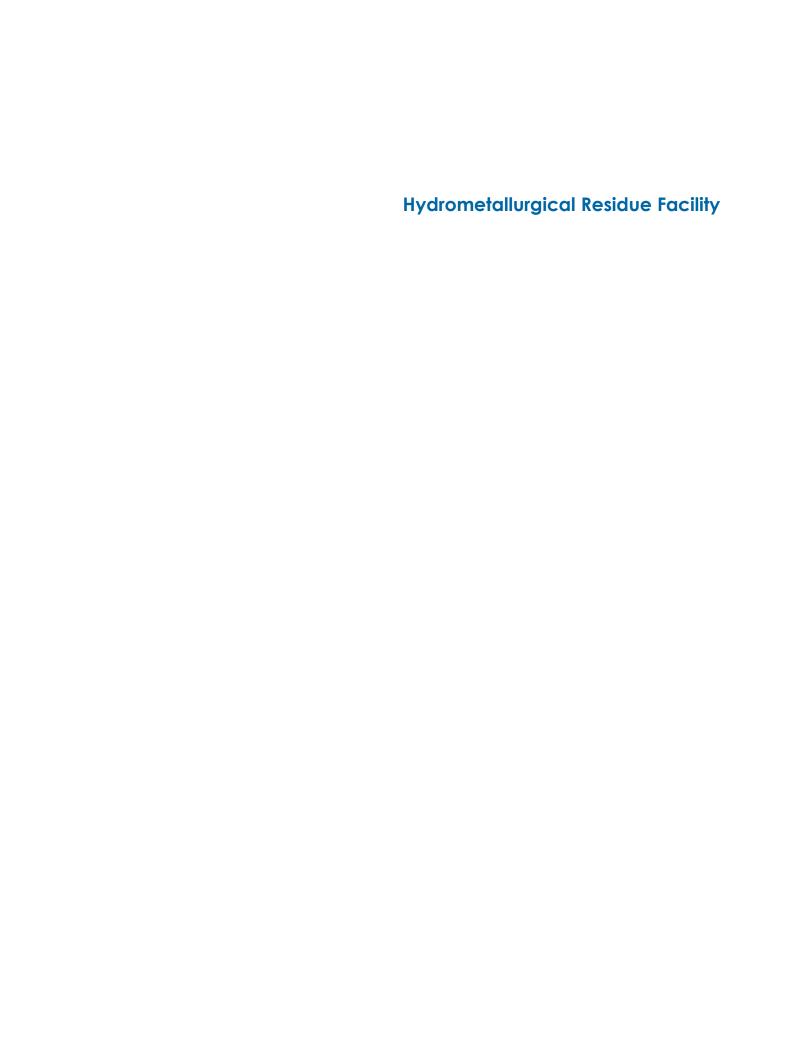
FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
DETAILS

POLY MET MINING, INC. NORTHMET PROJECT

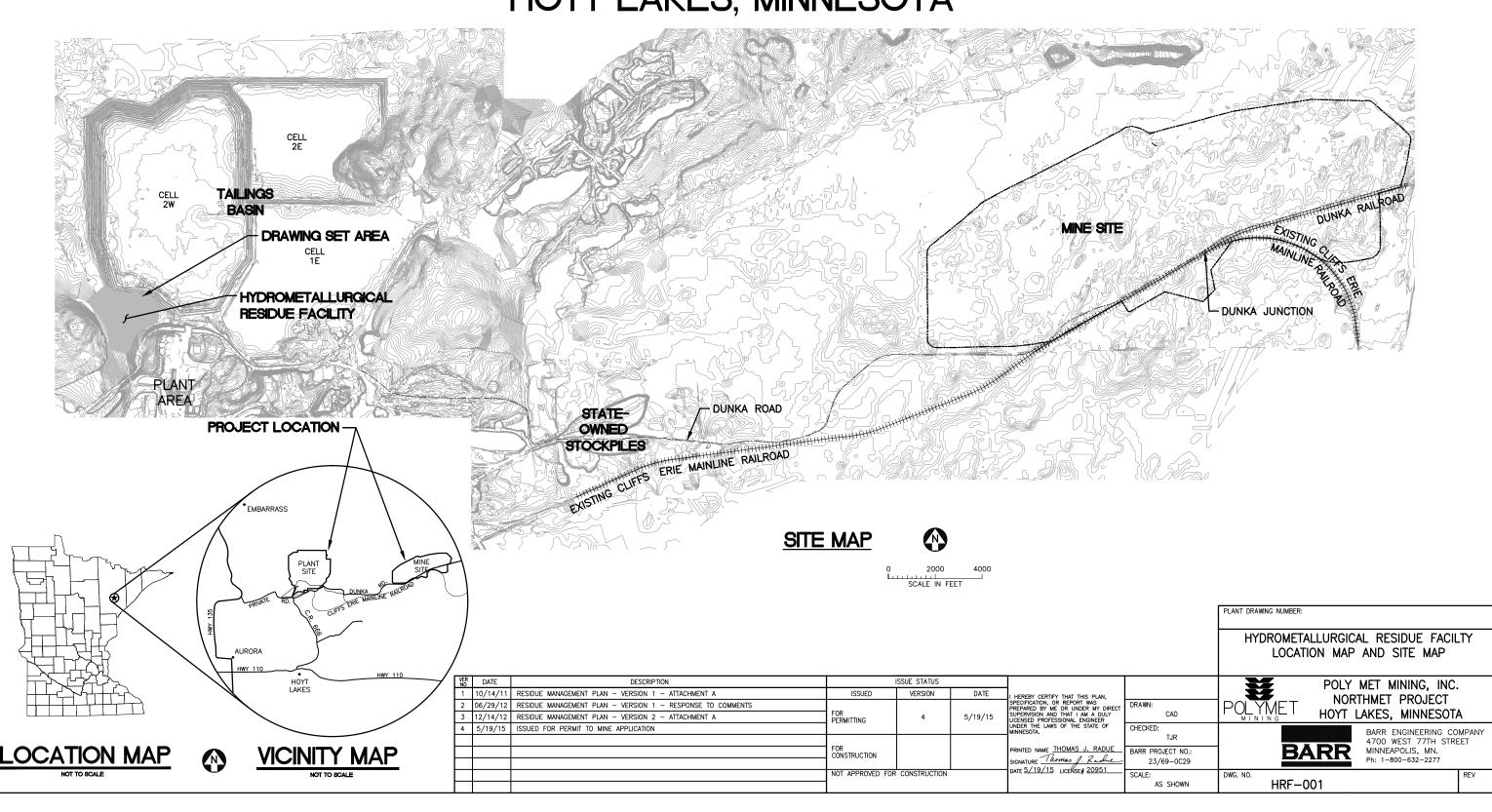
VER NO	DATE	DESCRIPTION		ISSUE STATUS			l
Α	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
2	12/31/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B	FOR PERMITTING	3	5/28/15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	BDP
3	5/28/15	ISSUED FOR PERMIT TO MINE APPLICATION				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
							DVS/AMP
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
			Contoniconon			SIGNATURE Thomas J. Radie	23/69-0C29
			NOT APPROVED FOR	CONSTRUCTION.		DATE 5/28/15 LICENSE# 20951	SCALE:
			1				IAMOHS SV

POLYMET HOYT LAKES, MINNESOTA BARR ENGINEERING COMPANY 4700 WEST 77TH STREET **BARR** MINNEAPOLIS, MN. Ph: 1-800-632-2277

FTBCA-015



POLY MET MINING, INC. NORTHMET PROJECT PERMIT SUPPORT DRAWINGS HYDROMETALLURGICAL RESIDUE FACILITY HOYT LAKES, MINNESOTA



GENERAL LEGEND

EXISTING CONTOUR - MAJOR EXISTING CONTOUR - MINOR —1000 — PROPOSED CONTOUR - MAJOR — PROPOSED CONTOUR – MINOR EXISTING POWER POLE +++++++ EXISTING RAILROAD EXISTING ROAD ---- EXISTING TRAIL EXISTING UNIMPROVED TRAIL EXISTING STRUCTURES TREE LINE <u>14</u> WETLAND BOUNDARY EXISTING CULVERT EXISTING PIPELINE —ое— OVERHEAD ELECTRIC DISCHARGE POINT DEWATERING OUTLET POINT RETURN PUMP PAD DEWATERING PUMP SURFACE DRAINAGE DRAINAGE COLLECTION STRUCTURE AND PIPE DRAINAGE AREA BOUNDARY — PROPOSED DAMS PROPOSED DEWATERING PIPE ----- PROPOSED DISCHARGE PIPELINE PROPOSED RETURN PIPELINE PROPOSED CULVERT (NON-MINE DRAINAGE) PROPOSED SEEPAGE COLLECTION DRAIN -<- PROPOSED STORMWATER DRAIN 0 PROPOSED MANHOLE ---- PROPOSED WICK DRAIN LATERAL PIPE PROPOSED RIP RAP FILL SLOPE — CUT SLOPE

ABBREVIATIONS

APPROX. - APPROXIMATE CDSM - CEMENT DEEP SOIL MIX CMP - CORRUGATED METAL PIPE CPEP CORRUGATED POLYETHYLENE PIPE CUBIC YARD CY

DR DIMENSION RATIO DWG DRAWING EL. ELEVATION

 DIAMETER FTB FLOTATION TAILINGS BASIN

 GEOSYNTHETIC CLAY LINER GCL HDPE - HIGH DENSITY POLYETHYLENE HRF - HYDROMETALLURGICAL RESIDUE FACILITY

LDPE - LOW DENSITY POLYETHYLENE

LF LINER FEET

TYP.

LTVSMC - LTV STEEL MINING COMPANY MCY - MILLION CUBIC YARDS mil - one thousandth of an inch

 MINIMUM MIN MSL MEAN SEA LEVEL NOT TO SCALE SCH. - SCHEDULE DR DIMENSION RATIO

TYPICAL

SHEET INDEX

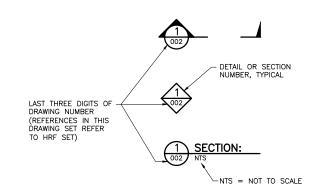
SHEET NO. TITLE

GENERAL DRAWINGS

GENERAL DRAWINGS

HRF-001 LOCATION MAP AND SITE MAP
HRF-002 LEGEND AND SHEET INDEX
HRF-003 EXISTING CONDITIONS
HRF-004 RESIDUE FACILITY LAYOUT - MINE YEAR 20
HRF-005 EMERGENCY BASIN EXCAVATIONS AND REMOVALS
HRF-006 SUBGRADE IMPROVEMENT AND SEEPAGE COLLECTION DRAIN LAYOUT
HRF-007 EMERGENCY BASIN PRELOAD
HRF-008 PHASE 1 LAYOUT
HRF-009 PHASE 2 LAYOUT
HRF-010 PHASE 2 LAYOUT
HRF-011 CROSS SECTIONS
HRF-011 CROSS SECTIONS
HRF-013 SUMP AND SIDE WALL RISER PLAN LAYOUT
HRF-014 SUMP AND SIDE WALL RISER SECTIONS
HRF-015 SUMP AND DIDE WALL RISER SECTIONS
HRF-016 TYPICAL SECTIONS AND DETAILS
HRF-017 PIPING PLAN AND PROFILE
HRF-018 PIPING DETAILS HRF-017 PIPING PLAN AND PROFILE
HRF-018 PPING DETAILS
HRF-019 RETURN WATER PUMP RAFT
HRF-020 CLOSURE PREPARATION PLAN
HRF-021 TEMPORARY COVER AND FINAL COVER GRADING
HRF-022 FINAL CLOSURE GRADING AND DEAINAGE
HRF-023 CLOSURE SECTIONS AND DETAILS
HRF-024 GEOTECHNICAL INSTRUMENTATION DETAILS

DRAWING NUMBERING



NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.

PLANT DRAWING NUMBER:

POLYMET

HYDROMETALLURGICAL RESIDUE FACILTY LEGEND AND SHEET INDEX

BARR

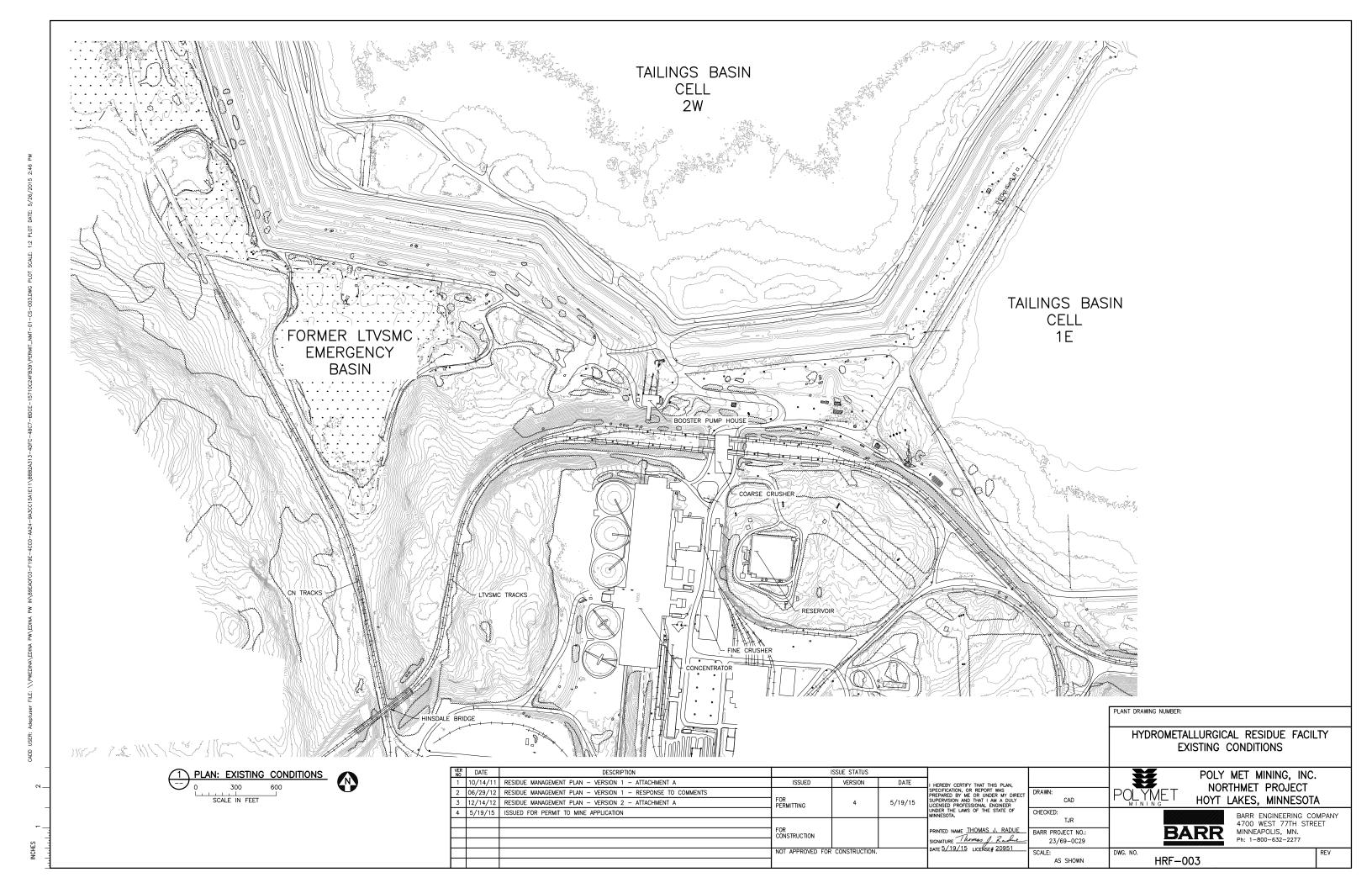
HRF-002

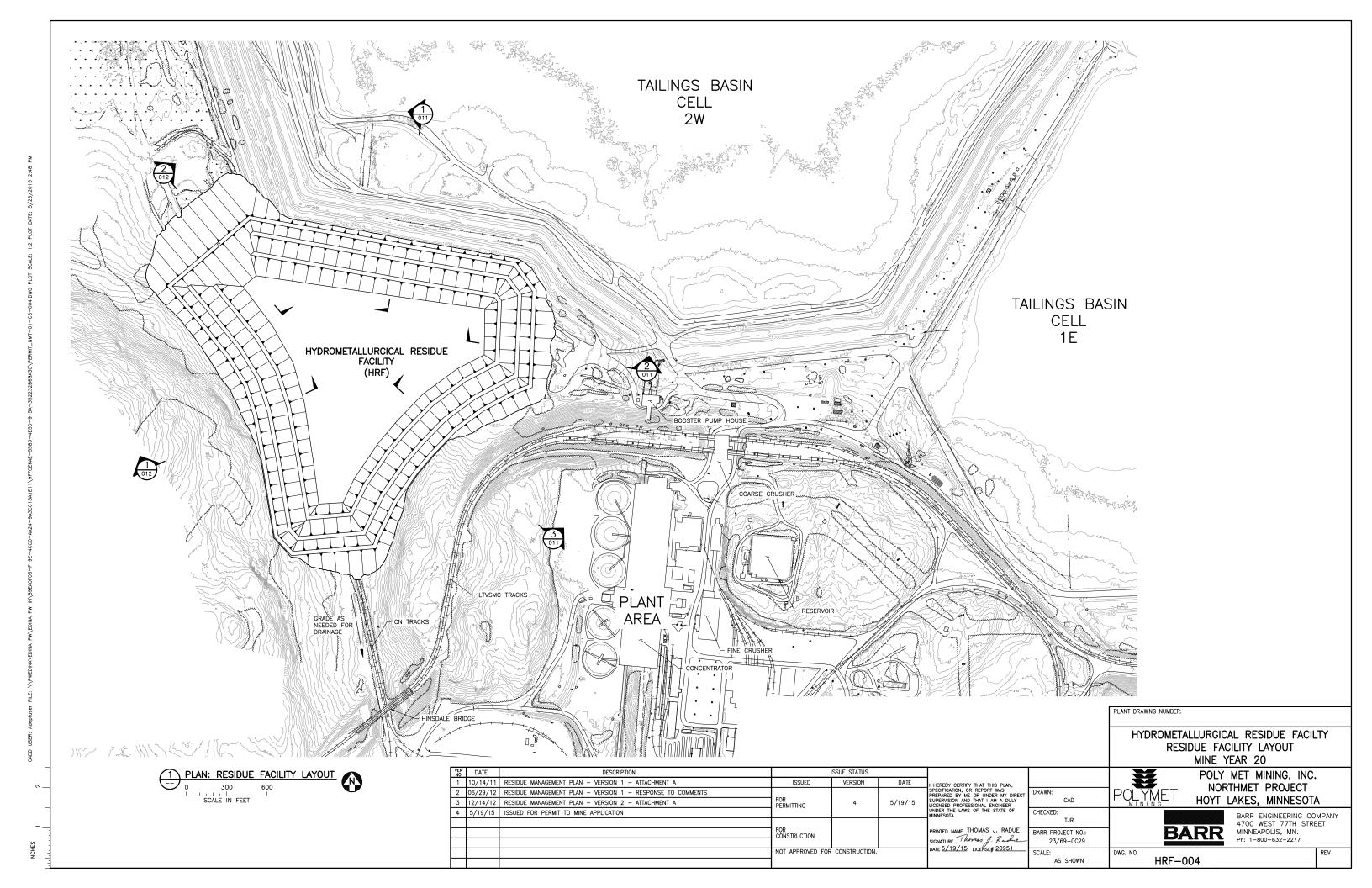
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2	06/29/12	RESIDUE MANAGEMENT PLAN - VERSION 1 - RESPONSE TO COMMENTS				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:				
3	12/14/12	RESIDUE MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING			FOR PERMITTING		4 5,	5/19/15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	CAD
4	5/19/15	ISSUED FOR PERMIT TO MINE APPLICATION				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:				
						1	TJR				
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:				
]			SIGNATURE Thomas J. Radie	23/69-0029				
			NOT APPROVED FOR	CONSTRUCTION.	-	DATE 5/19/15 LICENSE# 20951	SCALE:				
			1				AS SHOWN				

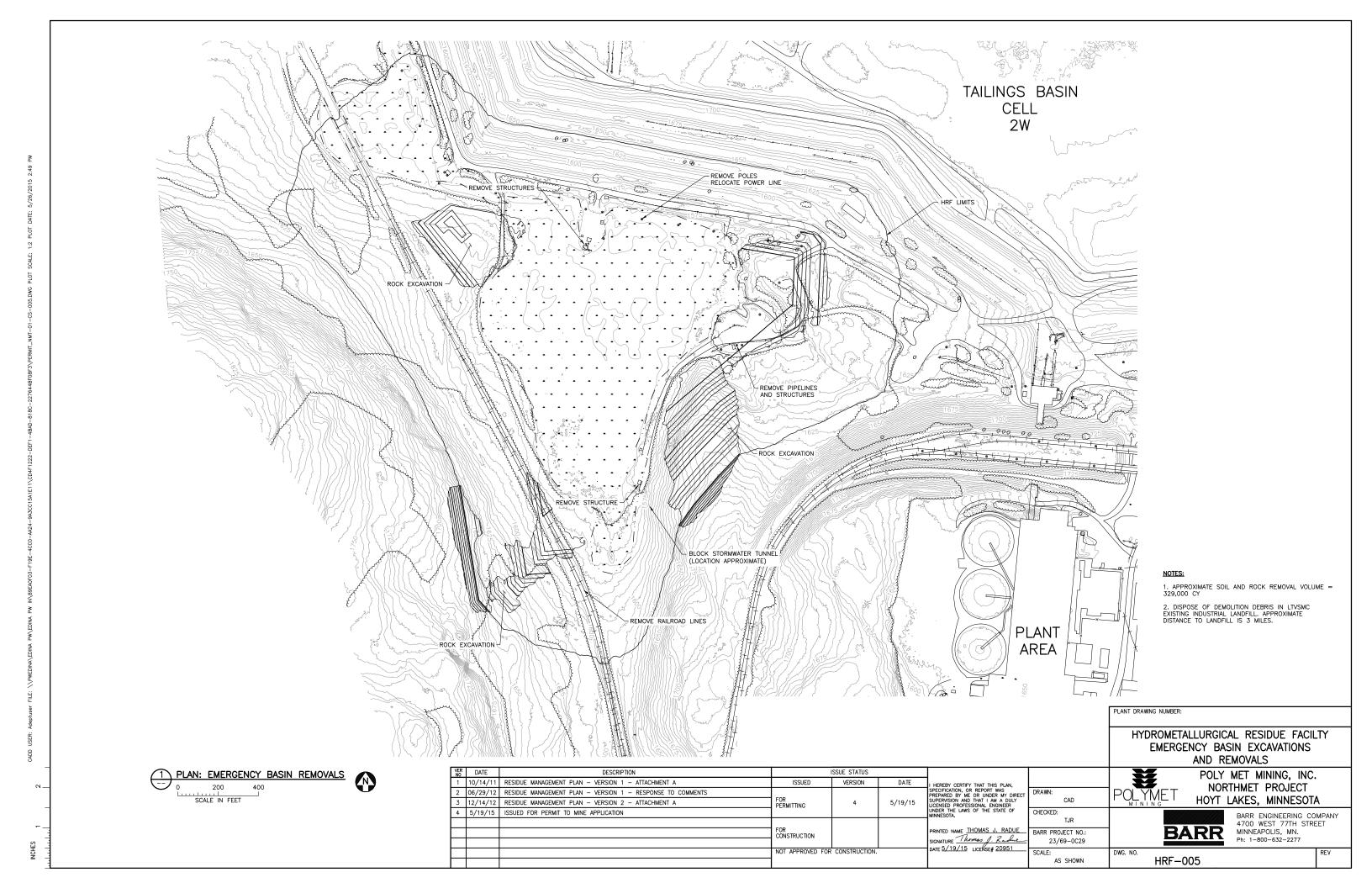
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

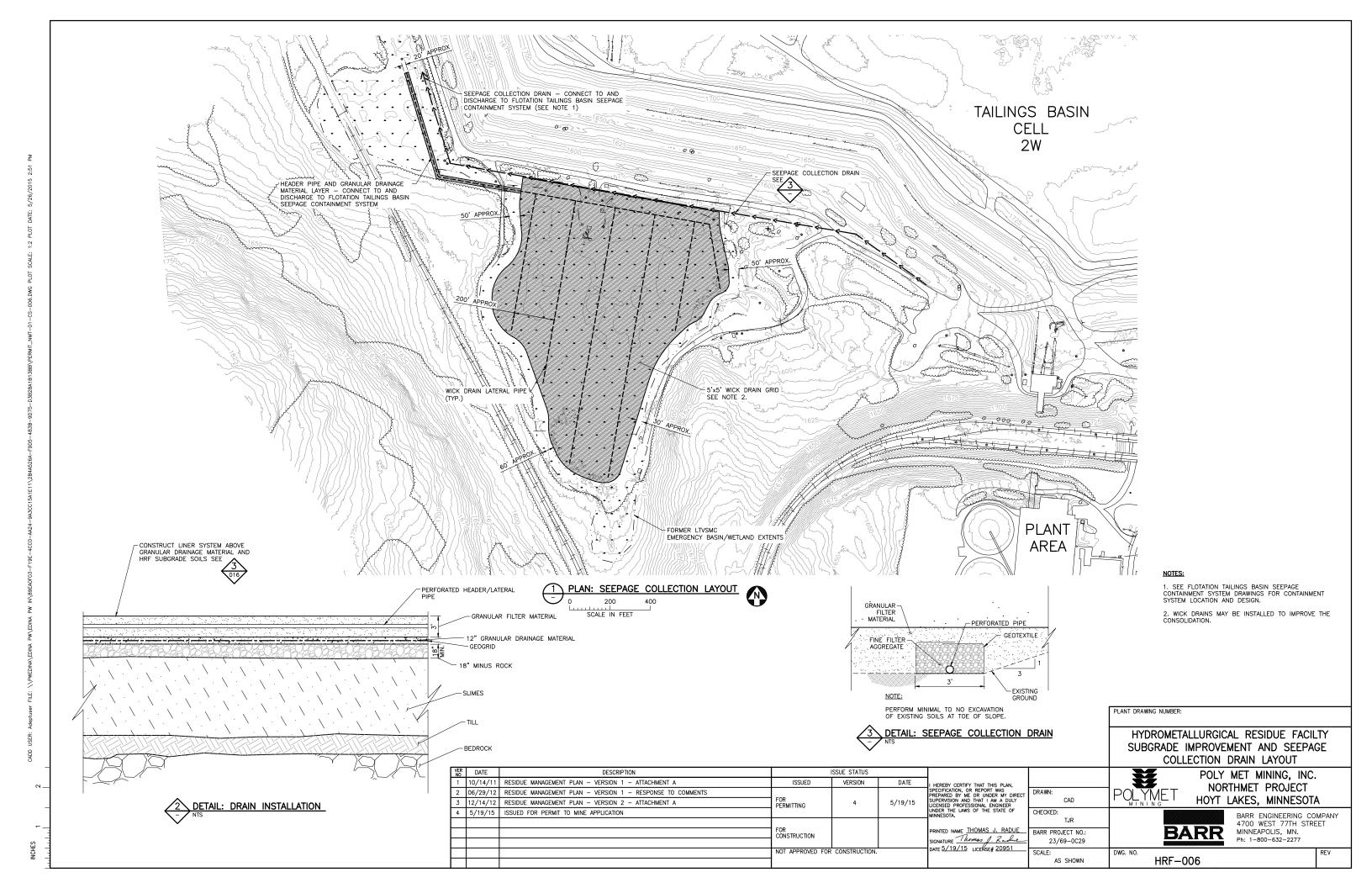
POLY MET MINING, INC. NORTHMET PROJECT

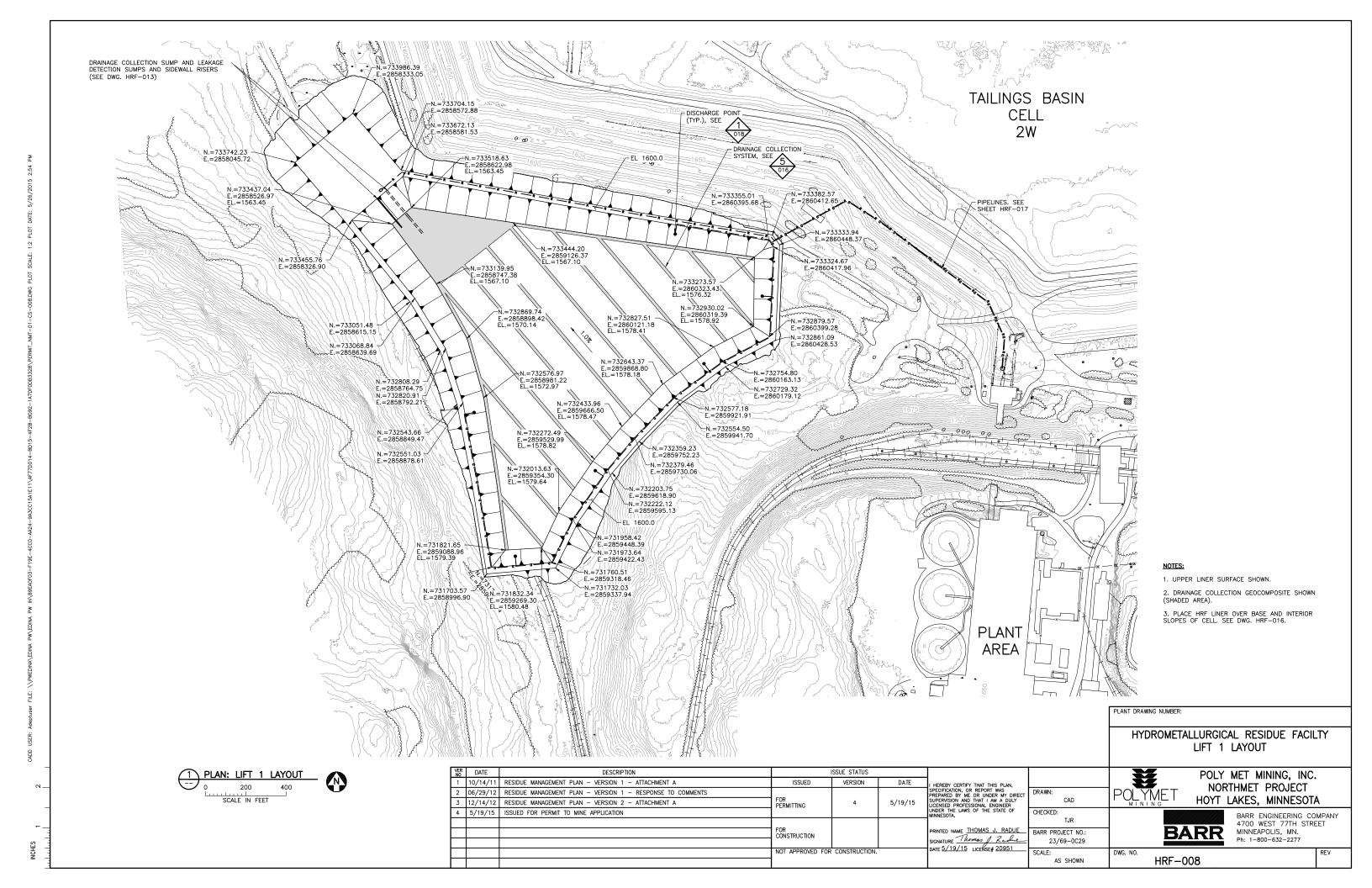
HOYT LAKES, MINNESOTA

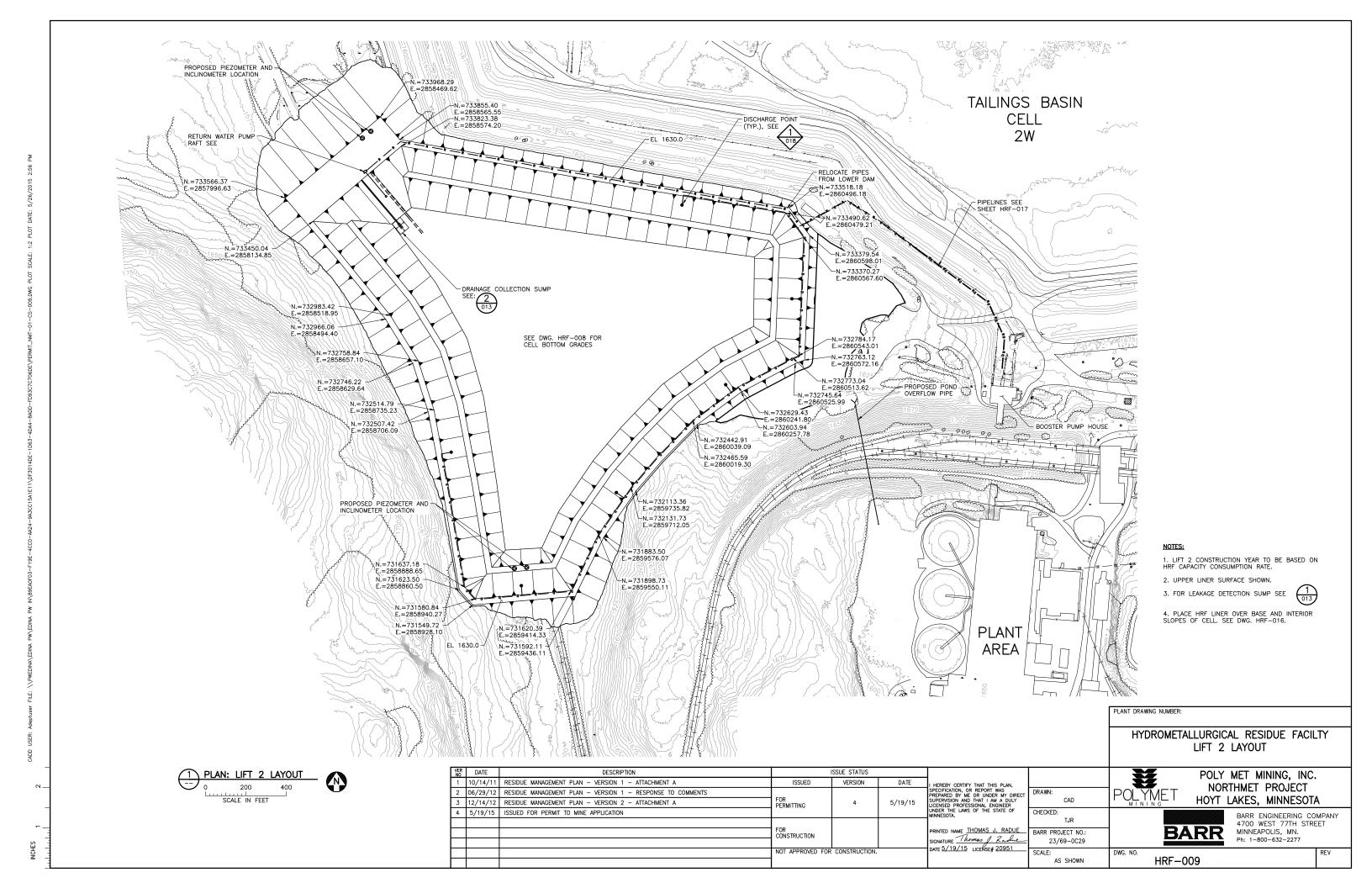


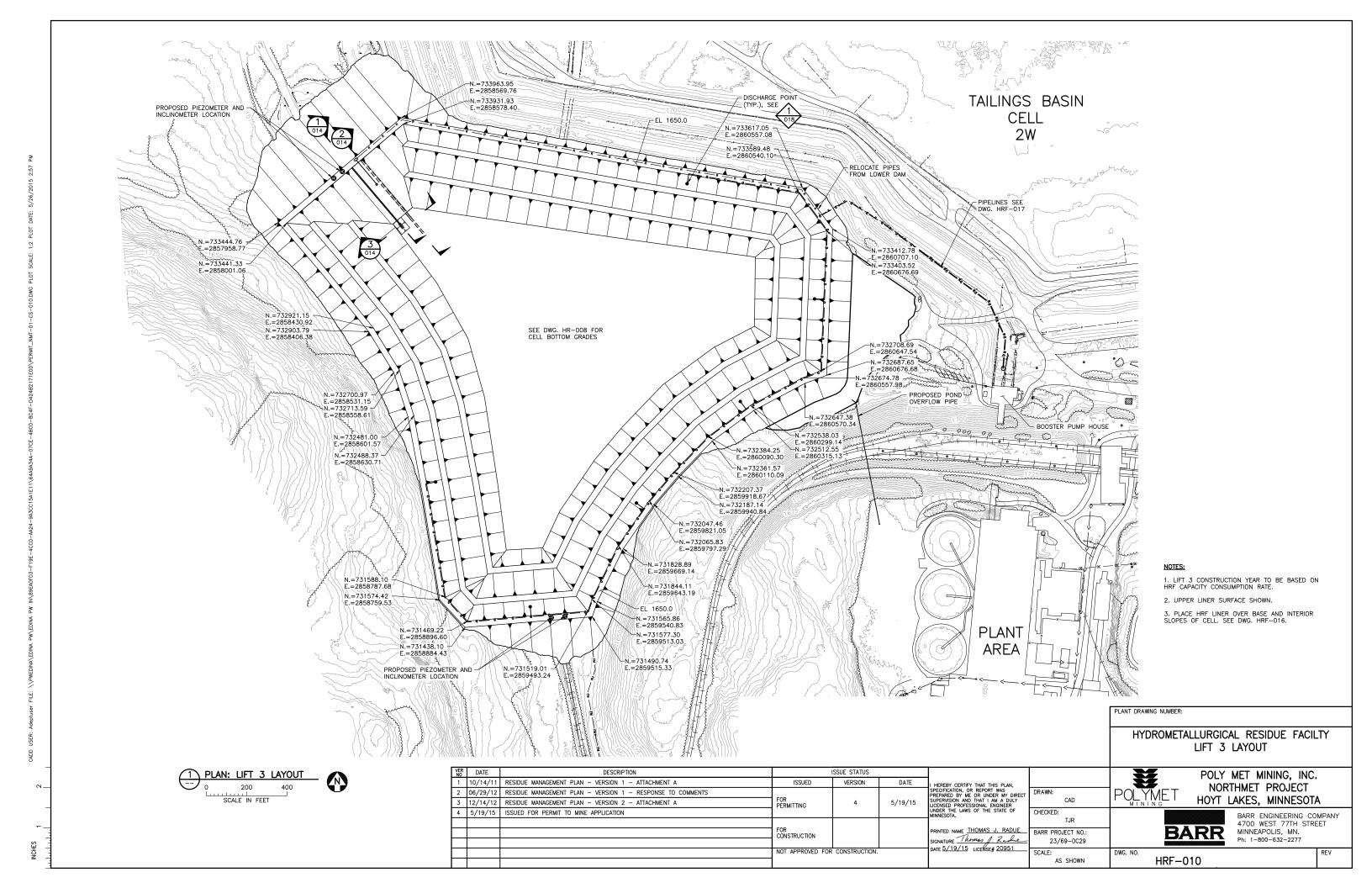


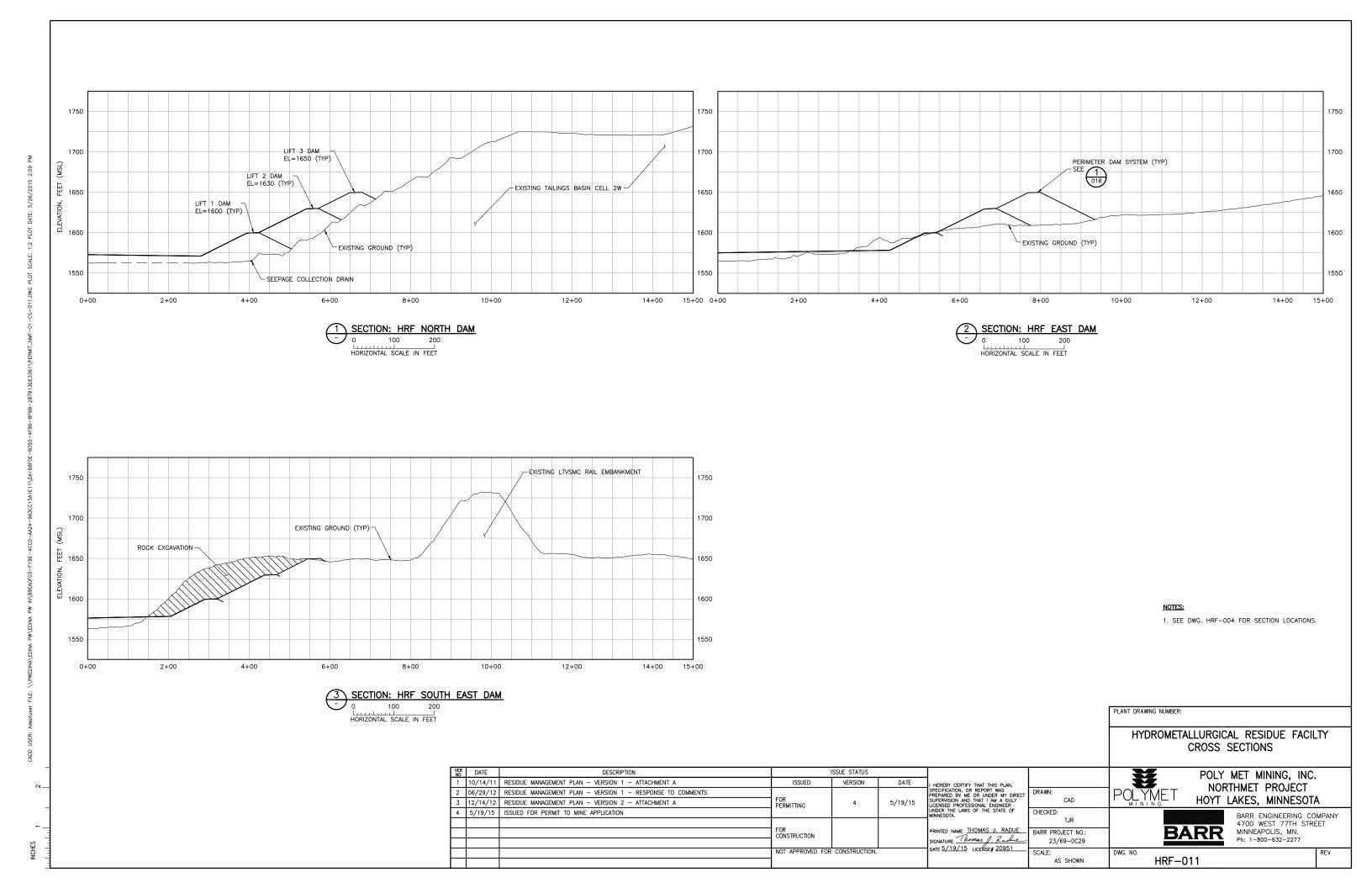


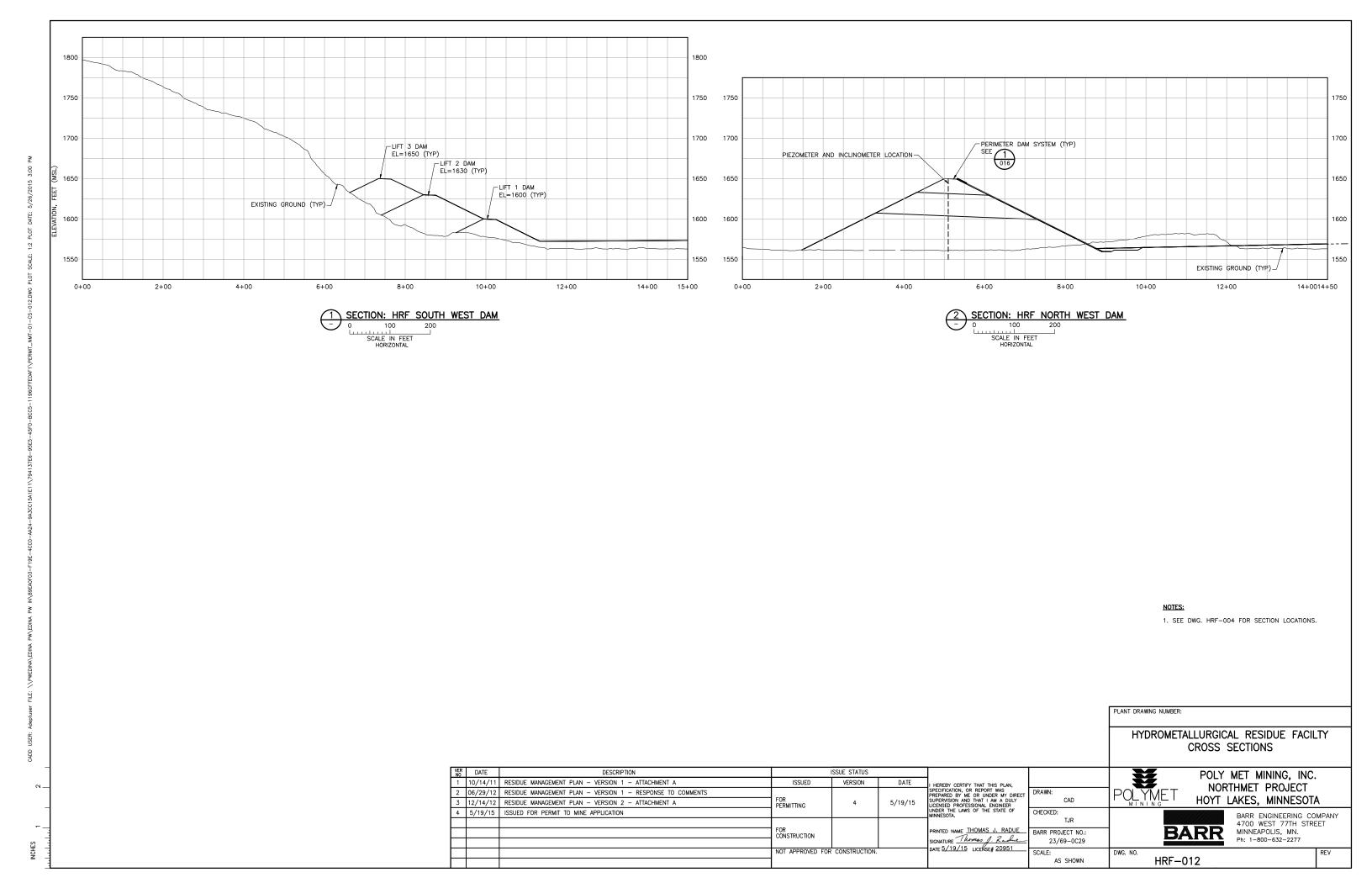


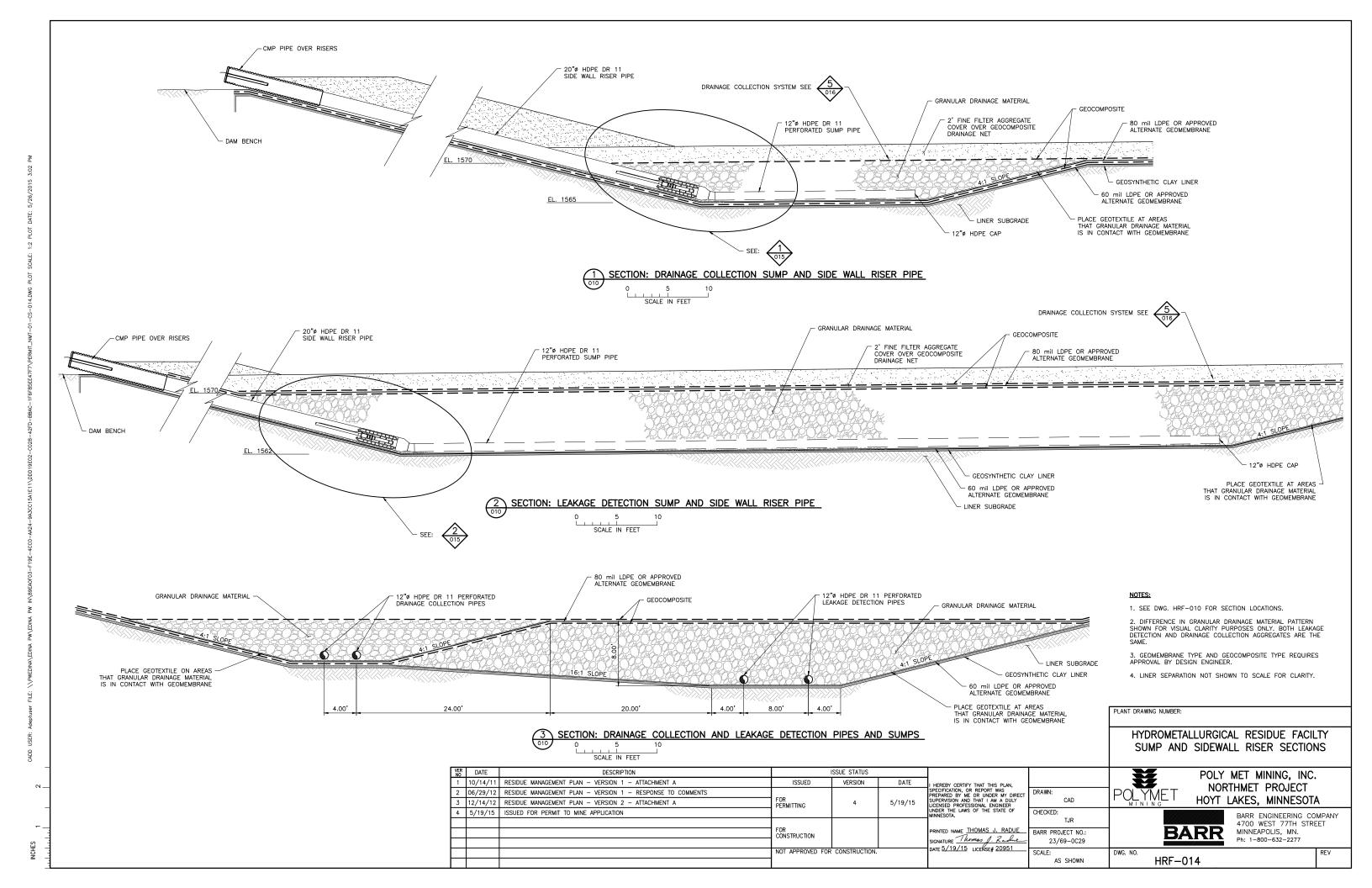


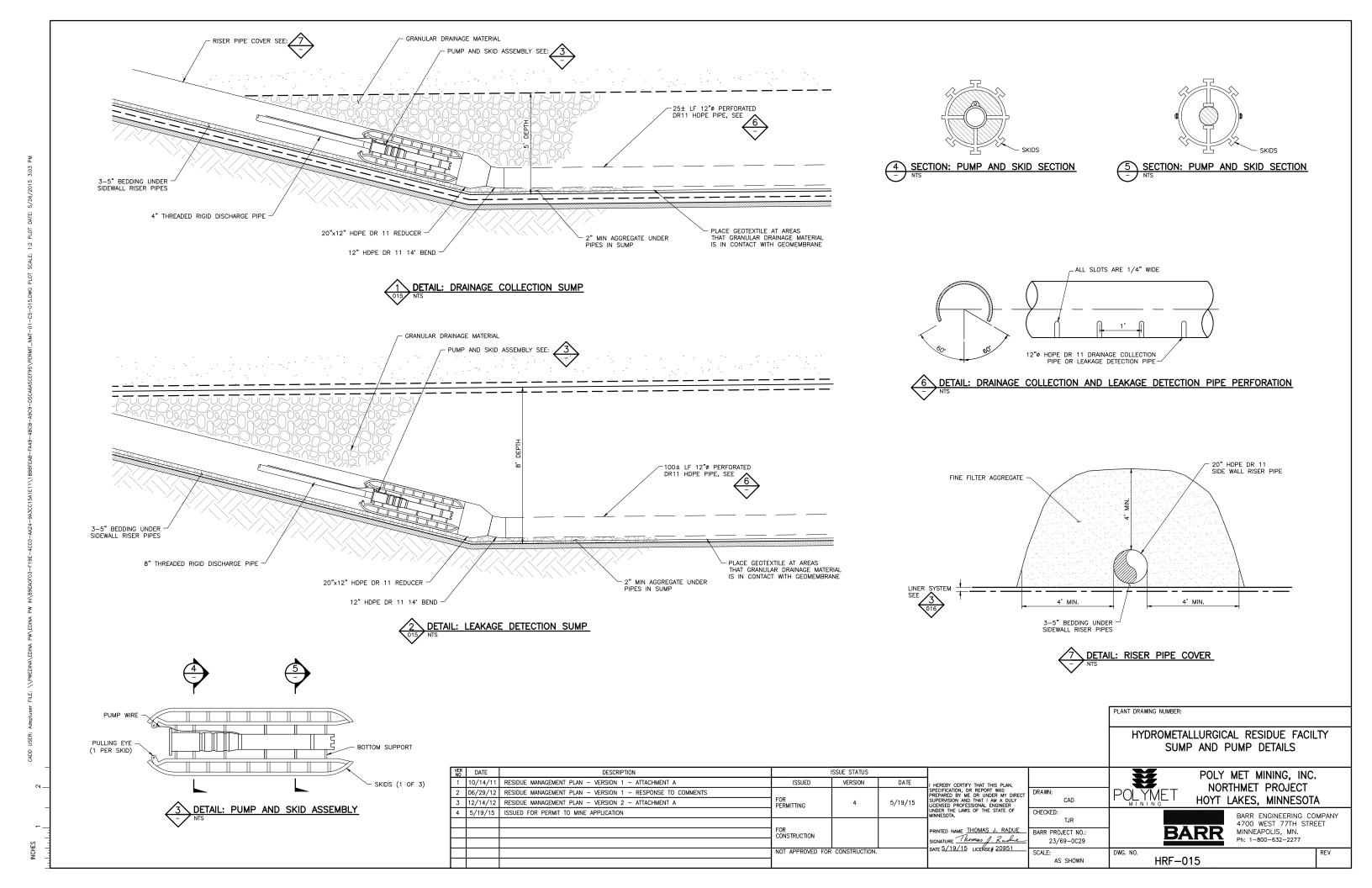


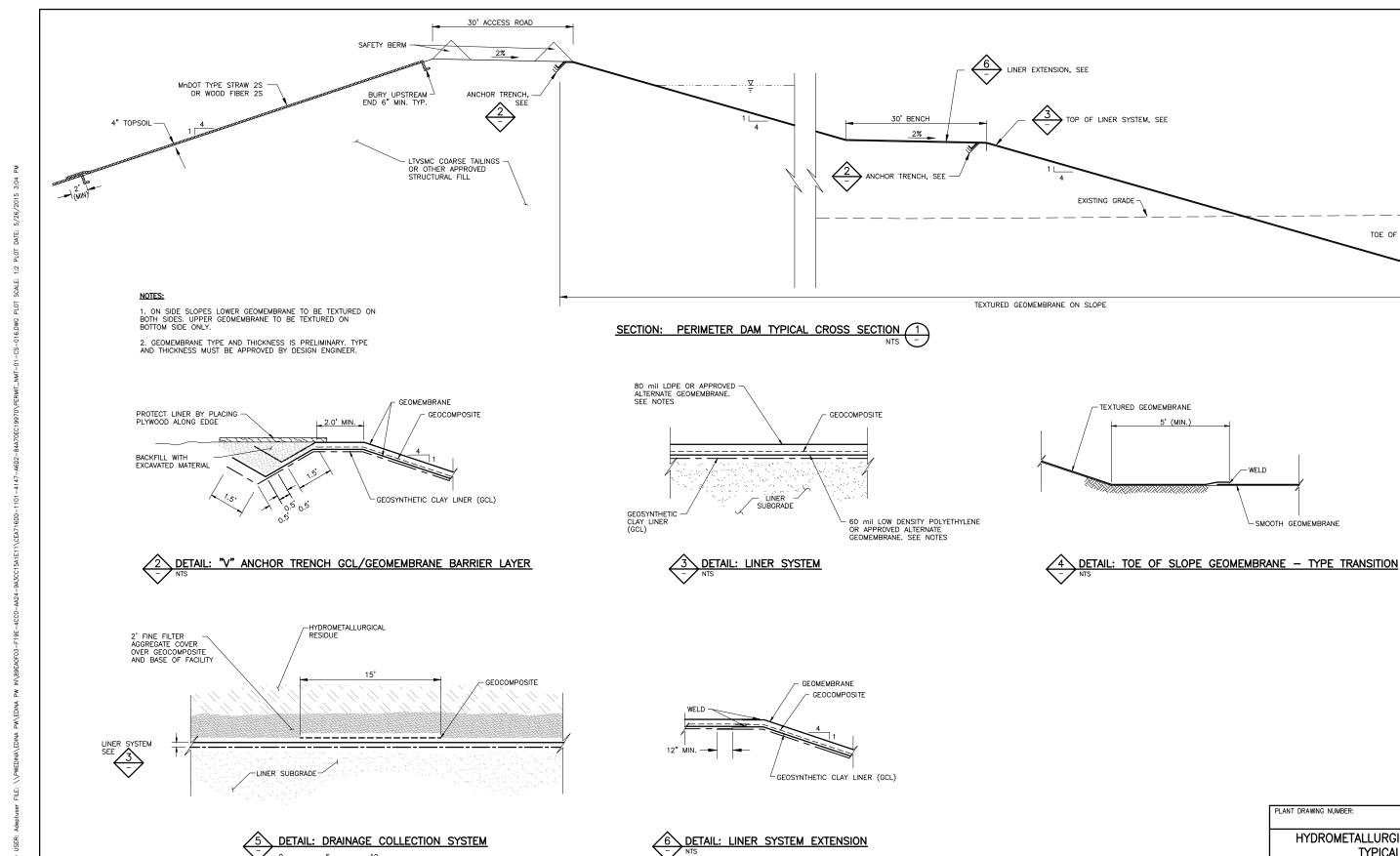












PLANT DRAWING NUMBER:

POLYMET

HRF-016

CAD

TJR

23/69-0029

AS SHOWN

HYDROMETALLURGICAL RESIDUE FACILTY TYPICAL SECTIONS AND DETAILS

TOE OF SLOPE TRANSITION

SMOOTH GEOMEMBRANE

DESCRIPTION ISSUE STATUS HEREBY CERTIFY THAT THIS PLAN,
PECIFICATION, OR REPORT WAS
REPARED BY ME OR UNDER MY DIRECT
UPERVISION AND THAT I AM A DULY
CICRISCD PROFESSIONAL ENGINEER
NOER THE LAWS OF THE STATE OF
INDERSTATE OF
INDERSTAND
INDERSTAND 1 10/14/11 RESIDUE MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A ISSUED VERSION DATE 2 06/29/12 RESIDUE MANAGEMENT PLAN - VERSION 1 - RESPONSE TO COMMENTS DRAWN: FOR PERMITTING 3 12/14/12 RESIDUE MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A 4 5/19/15 ISSUED FOR PERMIT TO MINE APPLICATION CHECKED: PRINTED NAME <u>THOMAS J. RADUE</u> SIGNATURE *Thomas J. Radue* FOR CONSTRUCTION BARR PROJECT NO.: DATE 5/19/15 LICENSE# 20951 NOT APPROVED FOR CONSTRUCTION.

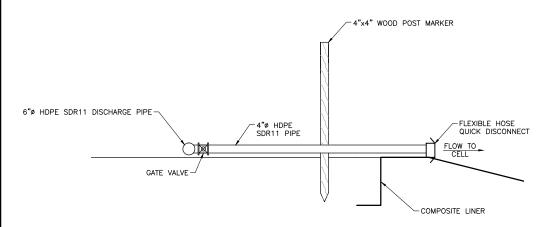
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET **BARR** MINNEAPOLIS, MN. Ph: 1-800-632-2277

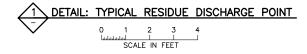
POLY MET MINING, INC.

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

SCALE IN FEET





1. PIPE SIZES ARE PRELIMINARY.

PLANT DRAWING NUMBER:

HYDROMETALLURGICAL RESIDUE FACILTY PIPING DETAILS

VER NO	DATE	DESCRIPTION	ISSUE STATUS				
1	10/14/11	RESIDUE MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
2	06/29/12	RESIDUE MANAGEMENT PLAN - VERSION 1 - RESPONSE TO COMMENTS			l	SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
3	12/14/12	RESIDUE MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING	4		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
4	5/19/15	ISSUED FOR PERMIT TO MINE APPLICATION					CHECKED:
							TJR
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
			CONSTRUCTION			SIGNATURE Thomas J. Radie	23/69-0029
			NOT APPROVED FOR	CONSTRUCTION.		DATE 5/19/15 LICENSE# 20951	SCALE:
			1				AS SHOWN

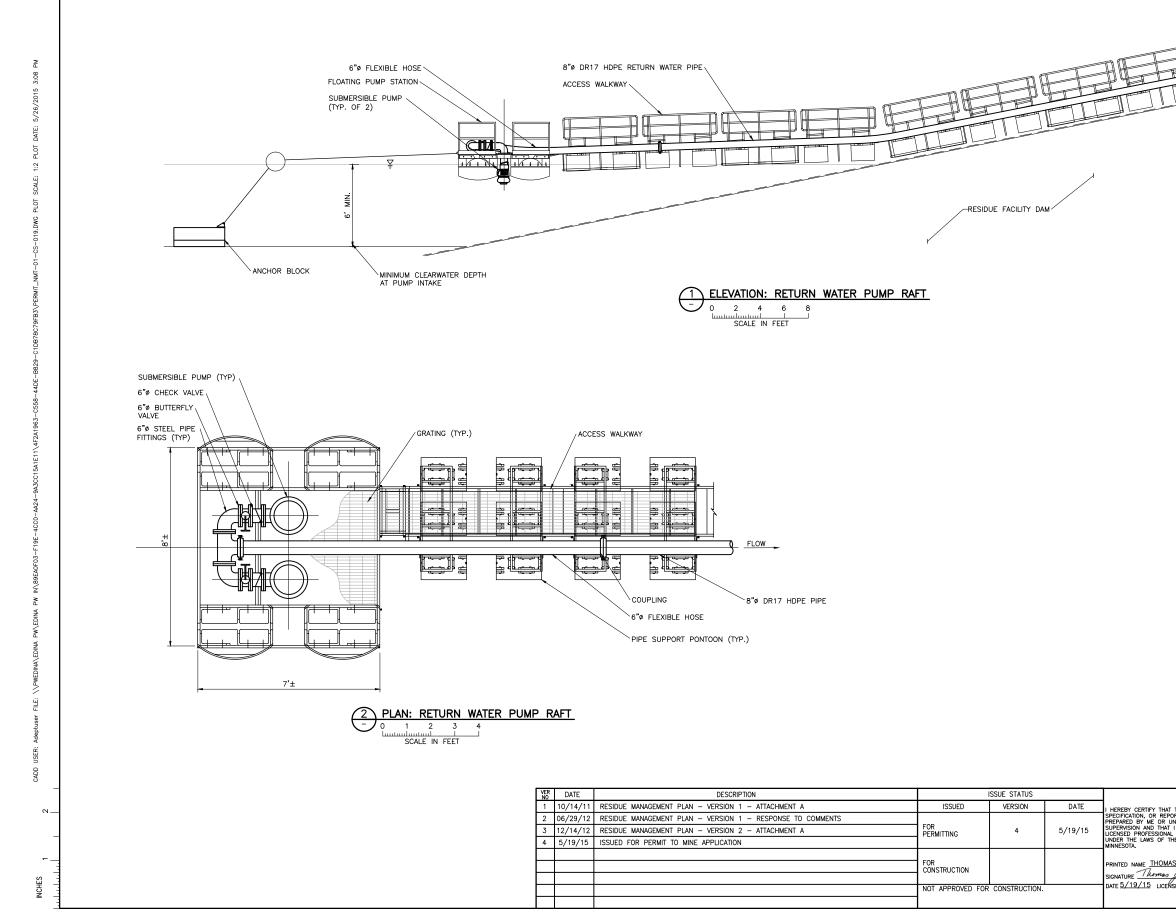
POLYMET MINING

AS SHOWN

POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

HRF-018



RETURN FLOW TO HYDROMET PLANT ANCHOR BLOCK - PROTECT LINER BY PLACING GEOTEXTILE UNDER PONTOONS

PLANT DRAWING NUMBER:

POLYMET

HYDROMETALLURGICAL RESIDUE FACILTY RETURN WATER PUMP RAFT

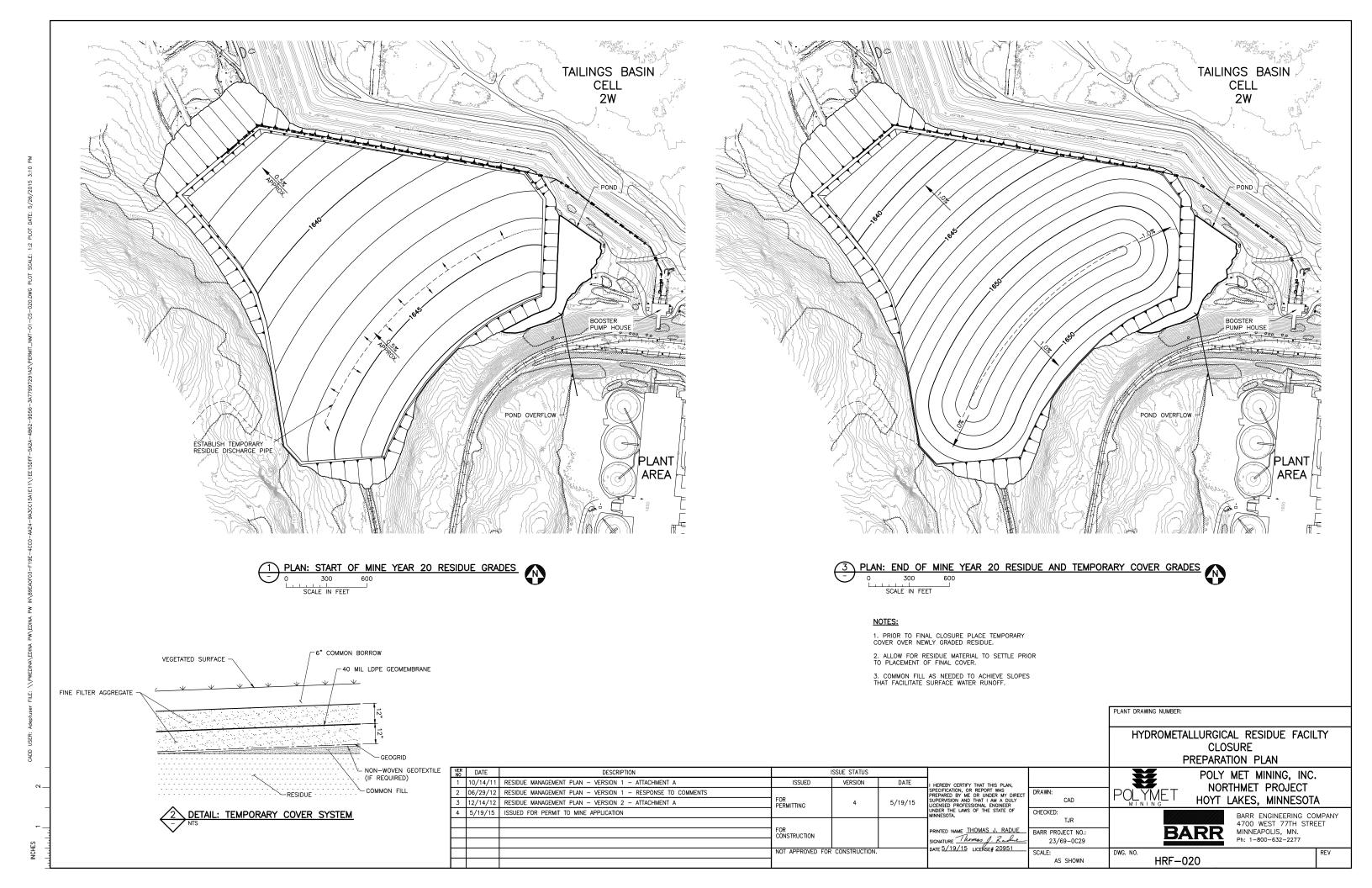
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2	06/29/12	RESIDUE MANAGEMENT PLAN - VERSION 1 - RESPONSE TO COMMENTS				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
3	12/14/12	RESIDUE MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING	4		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
4	5/19/15	ISSUED FOR PERMIT TO MINE APPLICATION					CHECKED:
						1	TJR
			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
			001131110011011			SIGNATURE Thomas J. Radie	23/69-0C29
			NOT APPROVED FOR	ED FOR CONSTRUCTION.		DATE 5/19/15 LICENSE# 20951	SCALE:
			1				AS SHOWN

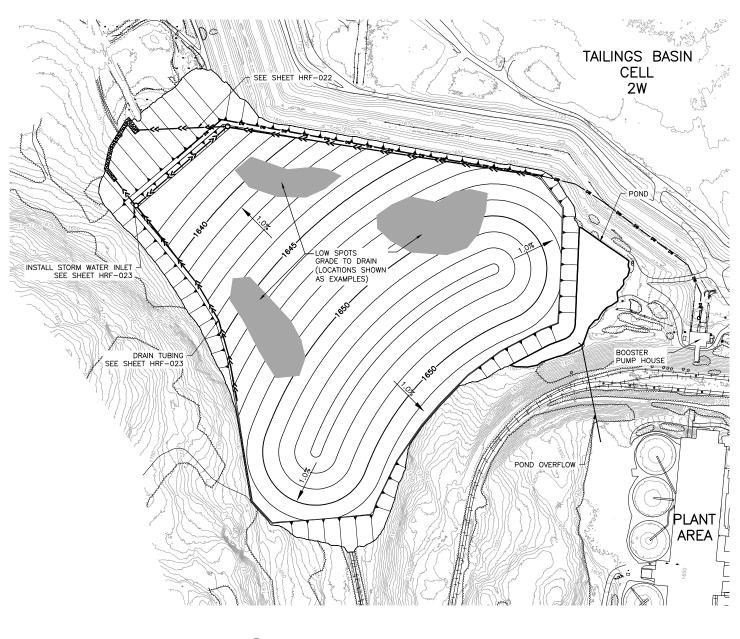
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277 **BARR**

HRF-019

POLY MET MINING, INC. NORTHMET PROJECT

HOYT LAKES, MINNESOTA





TAILINGS BASIN CELL POND OVERFLOW PLANT AREA PLAN: FINAL COVER GRADES

O 300 600
SCALE IN FEET

PLAN: TEMPORARY COVER REGRADING

O 300 600

SCALE IN FEET

NOTES:

1. PRIOR TO FINAL CLOSURE GRADE ANY LOW SPOTS CREATED DURING SETTLEMENT ALLOTMENT TIME.

2. INSTALL DRAIN TUBING AND SURFACE WATER INLETS.

PLANT DRAWING NUMBER:

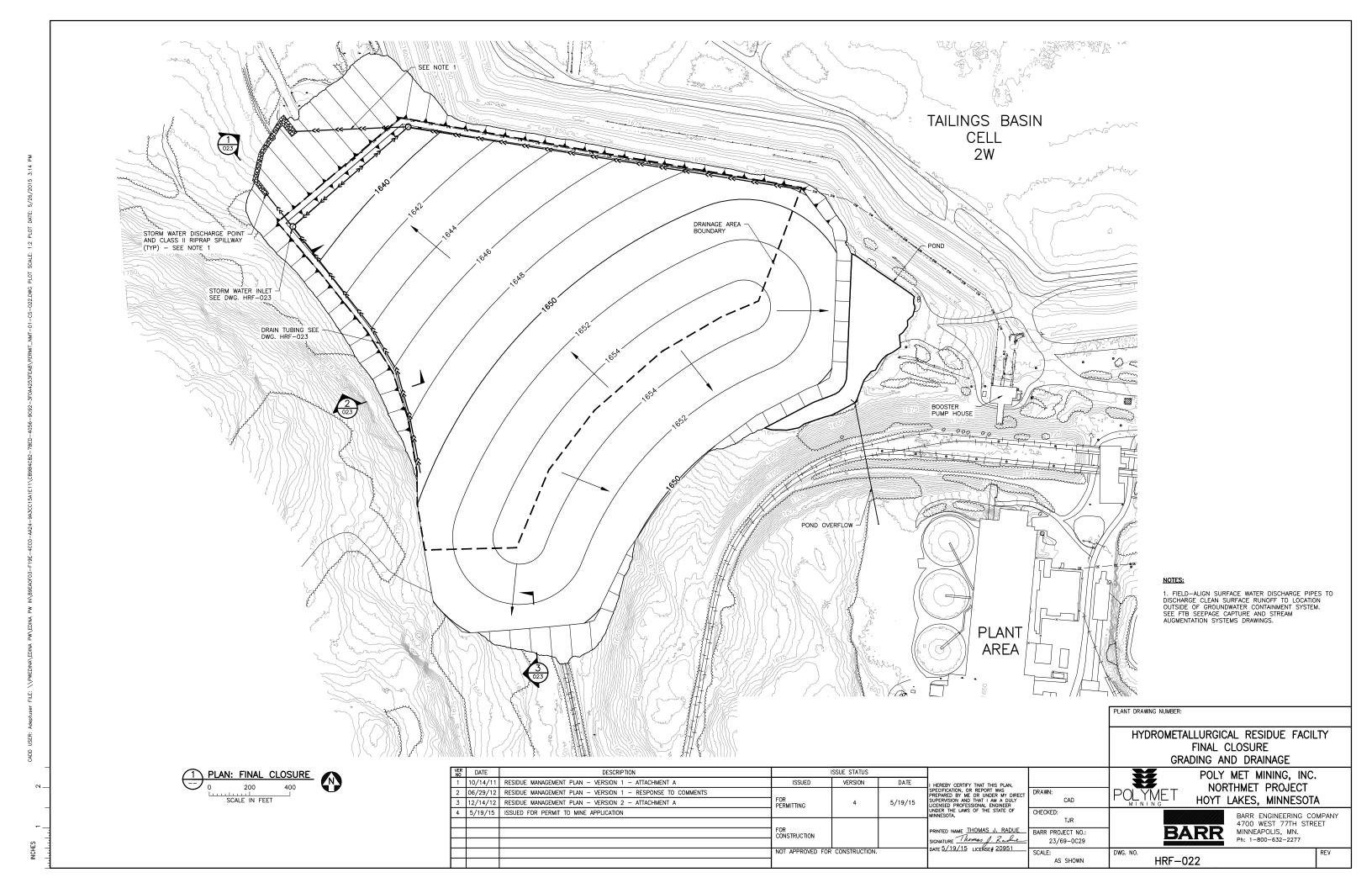
HYDROMETALLURGICAL RESIDUE FACILTY TEMPORARY COVER AND FINAL COVER GRADING

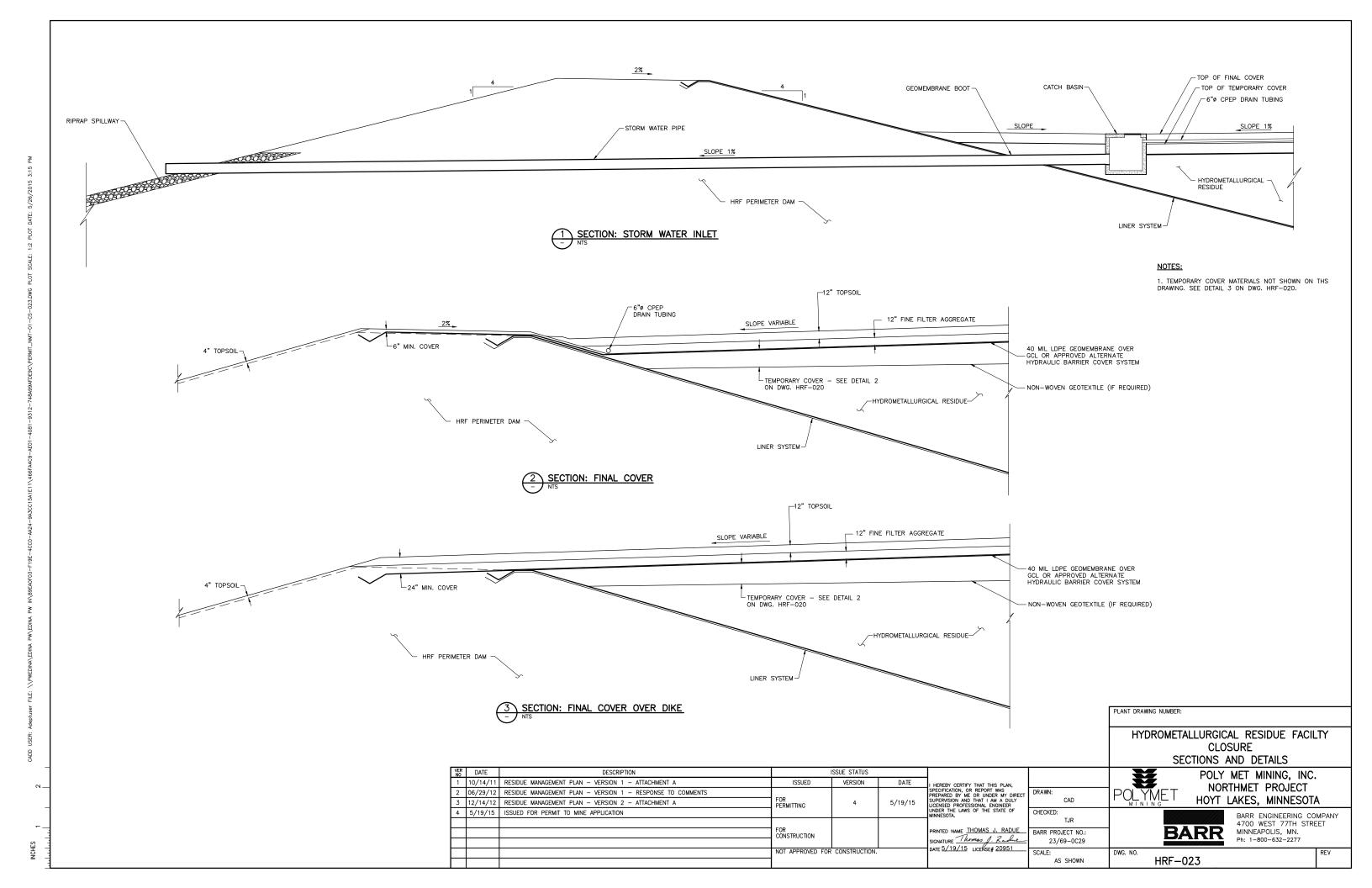
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	06/29/12	RESIDUE MANAGEMENT PLAN - VERSION 1 - RESPONSE TO COMMENTS				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
[12/14/12	RESIDUE MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING	4		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
	5/19/15	ISSUED FOR PERMIT TO MINE APPLICATION					CHECKED:
						1	TJR
Г			FOR CONSTRUCTION			PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
Г			CONSTRUCTION			SIGNATURE Thomas J. Radie	23/69-0C29
Г			NOT APPROVED FOR CONSTRUC			DATE 5/19/15 LICENSE# 20951	SCALE:
			1				AS SHOWN

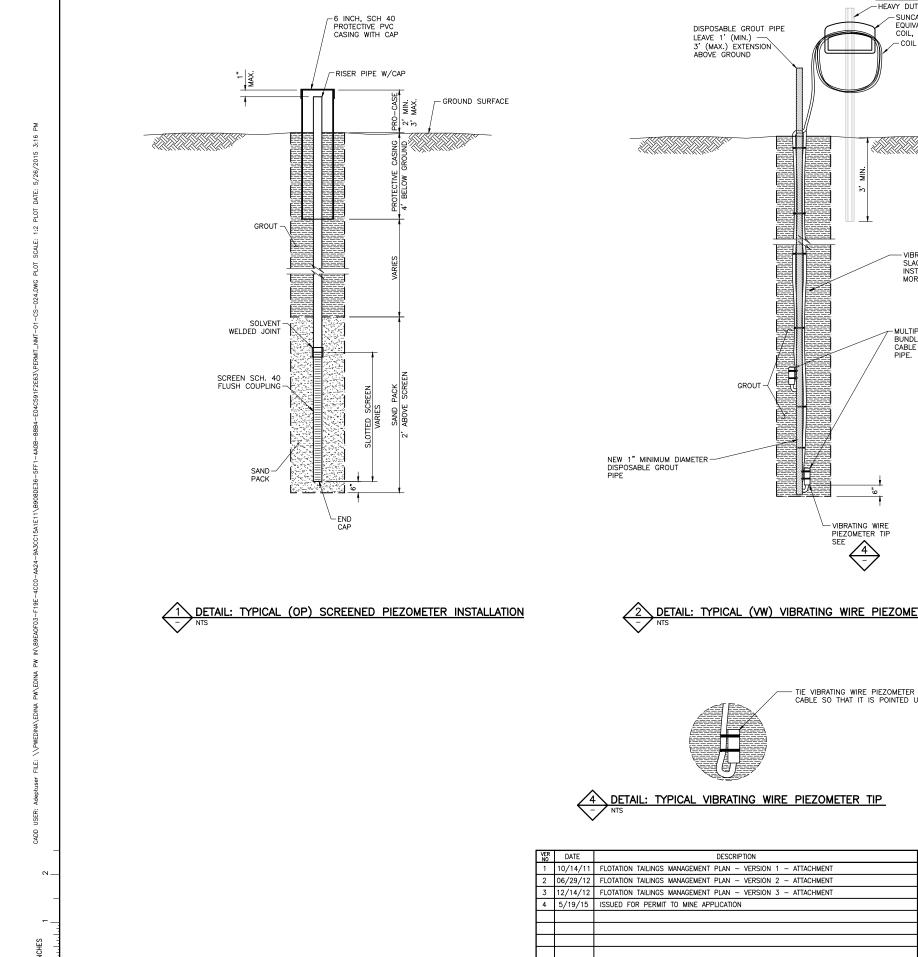
POLYMET POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

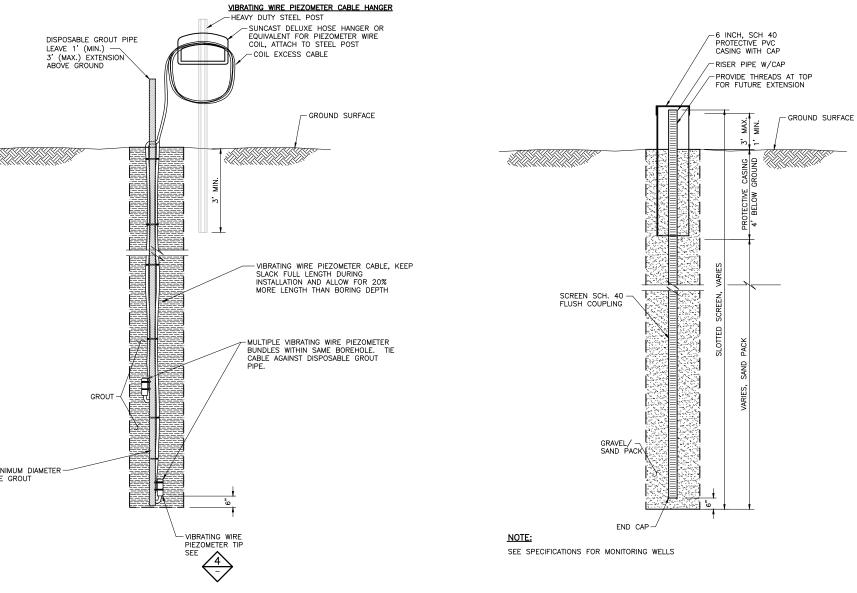
BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277 BARR

HRF-021









ISSUE STATUS

VERSION

DATE

5/19/15

ISSUED

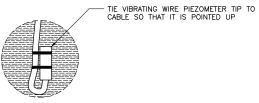
FOR PERMITTING

FOR CONSTRUCTION

NOT APPROVED FOR CONSTRUCTION.

DETAIL: TYPICAL (VW) VIBRATING WIRE PIEZOMETER INSTALLATION

DETAIL: TYPICAL (MW) FULLY SCREENED PIEZOMETER INSTALLATION



PLANT DRAWING NUMBER:							
HYDROMETALLURGICAL RESIDUE FACILTY							
GEOTECHNICAL							

INSTRUMENTATION DETAILS POLY MET MINING, INC.

HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS SPECIFICATION, OR REPORT WAS UPERVISION AND THAT I AM A DULY ICENSED PROFESSIONAL ENGINEER INDER THE LAWS OF THE STATE OF JUNISTRATE. DRAWN: CAD CHECKED: TJR PRINTED NAME <u>THOMAS J. RADUE</u> SIGNATURE *Thomas J. Radue* BARR PROJECT NO.: 23/69-0029 DATE 5/19/15 LICENSE# 20951

AS SHOWN

POLYMET **BARR**

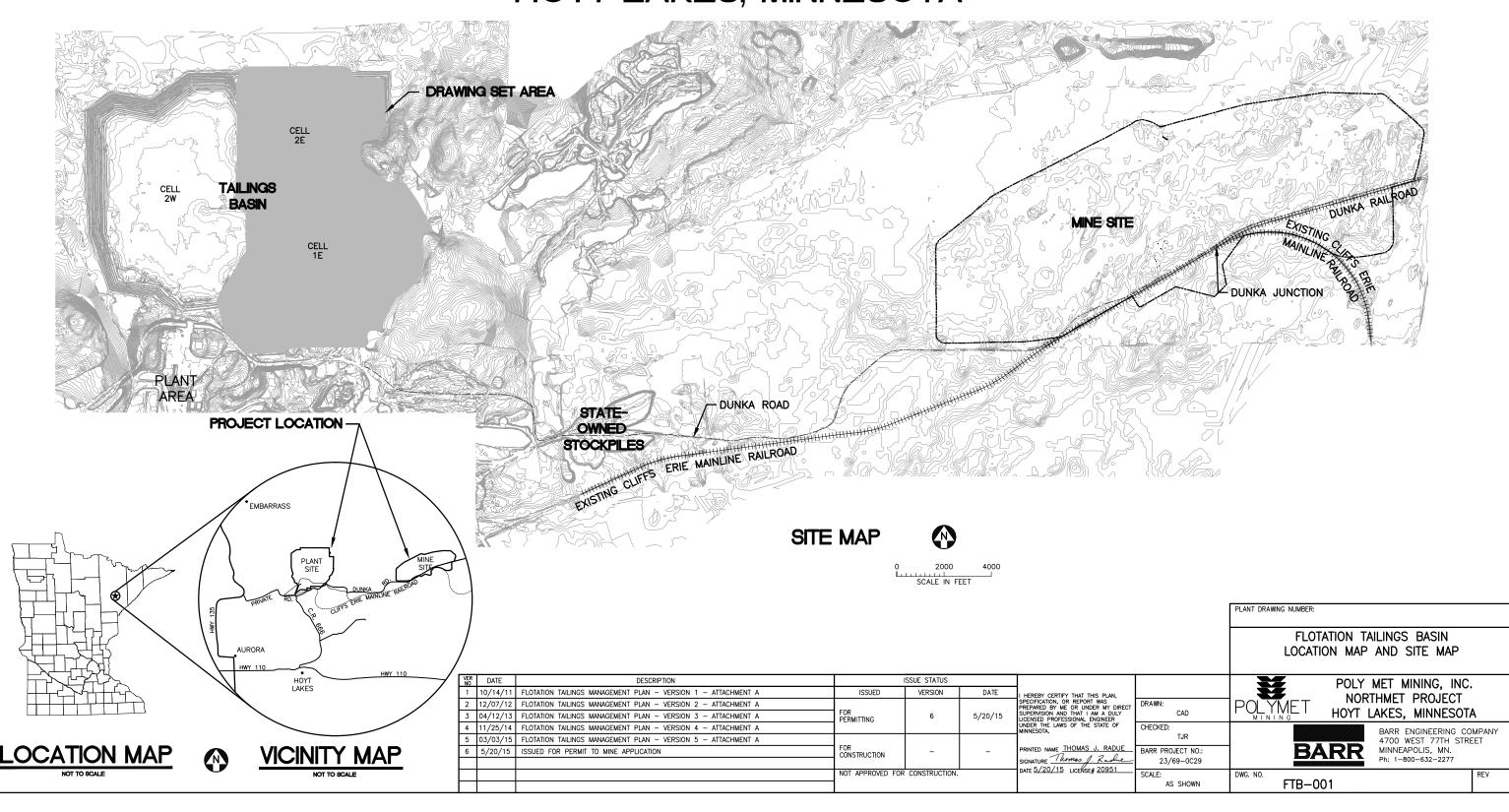
HRF-024

NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

Flotation Tailings Basin

POLY MET MINING, INC. NORTHMET PROJECT PERMIT SUPPORT DRAWINGS FLOTATION TAILINGS BASIN HOYT LAKES, MINNESOTA



GENERAL LEGEND

—1000 — EXISTING CONTOUR - MAJOR EXISTING CONTOUR - MINOR PROPOSED CONTOUR - MINOR EXISTING POWER POLE ----- EXISTING RAILROAD EXISTING ROAD ---- EXISTING TRAIL ====== EXISTING UNIMPROVED TRAIL EXISTING STRUCTURES $\sim\sim$ TREE LINE <u>علد</u> WETLAND BOUNDARY EXISTING CULVERT EXISTING PIPELINE -0E---OVERHEAD ELECTRIC DISCHARGE POINT DEWATERING OUTLET POINT RETURN PUMP PAD DEWATERING PUMP SURFACE DRAINAGE DRAINAGE COLLECTION STRUCTURE PROPOSED DAMS - DW ----- PROPOSED DEWATERING PIPE D —— PROPOSED DISCHARGE PIPELINE PROPOSED RETURN PIPELINE PROPOSED CULVERT (NON-MINE DRAINAGE) PROPOSED SEEPAGE COLLECTION DRAIN **-<<----**PROPOSED STORMWATER DRAIN 0 PROPOSED MANHOLE ---- PROPOSED WICK DRAIN LATERAL PIPE PROPOSED RIP RAP FILL SLOPE CUT SLOPE

ABBREVIATIONS

APPROX. - APPROXIMATE CDSM - CEMENT DEEP SOIL MIX CMP - CORRUGATED METAL PIPE CPEP - CORRUGATED POLYETHYLENE PIPE CY - CUBIC YARD

DR DIMENSION RATIO DWG DRAWING EL. ELEVATION F DIAMETER

FTB - FLOTATION TAILINGS BASIN GCL - GEOSYNTHETIC CLAY LINER HDPE - HIGH DENSITY POLYETHYLENE

HRF - HYDROMETALLURGICAL RESIDUE FACILITY

LDPE - LOW DENSITY POLYETHYLENE

LF - LINER FEET

LTVSMC - LTV STEEL MINING COMPANY

MCY - MILLION CUBIC YARDS - one thousandth of an inch mil

MIN MINIMUM MSL - MEAN SEA LEVEL

NTS - NOT TO SCALE SCH - SCHEDULE

DR - DIMENSION RATIO TYP. TYPICAL

SHEET INDEX

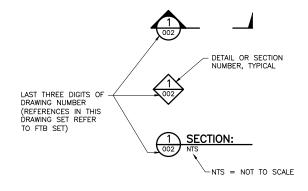
SHEET NO. TITLE

GENERAL DRAWINGS

GENERAL DRAWINGS

FTB-001 LOCATION MAP AND SITE MAP
FTB-002 LEGEND AND SHET INDEX
FTB-003 EXISTING CONDITIONS
FTB-004 LAYOUT MINE YEAR 20
FTB-005 LAYOUT MINE YEAR 1
FTB-006 LAYOUT MINE YEAR 1
FTB-006 LAYOUT MINE YEAR 7
FTB-008 NORTH DAM - MINE YEAR 7
FTB-009 NORTH DAM - TYPICAL CROSS SECTION
FTB-010 NORTH DAM - TYPICAL CROSS SECTION
FTB-011 EAST AND WEST DAMS - MINE YEAR 20 LAYOUT
FTB-015 EAST AND WEST DAMS - TYPICAL CROSS SECTIONS AND DRAINAGE SWALE
FTB-013 SOUTH DAM - MINE YEAR 20 LAYOUT
FTB-016 EAST AND WEST DAMS - TYPICAL CROSS SECTION
FTB-017 SOUTH DAM - MINE YEAR 20 LAYOUT
FTB-018 SOUTH DAM - TYPICAL CROSS SECTION
FTB-019 SOUTH DAM - TYPICAL CROSS SECTION
FTB-019 SOUTH DAM - TYPICAL CROSS SECTION
FTB-019 EMERGENCY OVERFLOW CHANNEL - LAYOUT
FTB-019 EMERGENCY OVERFLOW CHANNEL - SECTIONS
FTB-019 EMERGENCY OVERFLOW CHANNEL - SECTIONS
FTB-019 PIPING LAYOUT CELL 1/2E FTB-020 PIPING LAYOUT CELL 1/2E FTB-021 DETAILS FTB-022 TRANSFER PUMP RAFT FTB-023 TAILINGS DISPOSAL DIFFUSER RAFT FTB-024 CLOSURE PLAN

DRAWING NUMBERING



NOTES

- 1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- 2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- 3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.
- 4. EXISTING TOPOGRAPHIC INFORMATION WAS UPDATED FOR AREAS SOUTH EAST OF COAL ASH LANDFILL AND EAST OF OUTCROP BETWEEN CELLS 1E AND 2E USING CONTOURS FROM DATA COLLECTED IN 1999.
- 5. FLOATATION TAILINGS BASIN DESIGN WAS BASED ON CONTOURS FROM DATA COLLECTED IN 1999. PROPOSED DAM LAYOUTS MAY NOT EXACTLY MATCH THE EXISTING TOPOGRAPHY FROM 2010 LIDAR.

FLOTATION TAILINGS BASIN LEGEND AND SHEET INDEX POLY MET MINING, INC.

BARR

FTB-002

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

MINNEAPOLIS, MN.

Ph: 1-800-632-2277

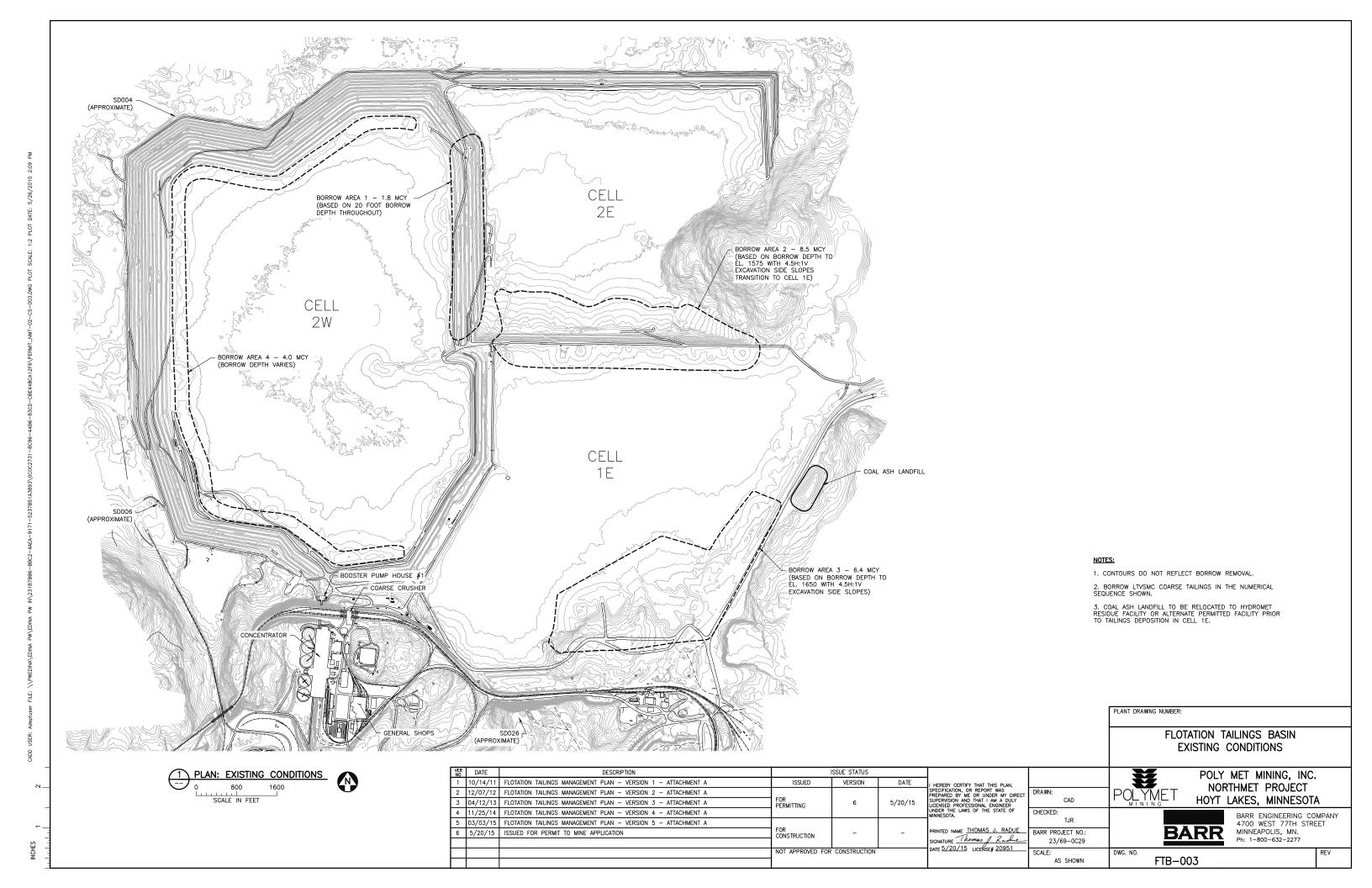
BARR ENGINEERING COMPANY

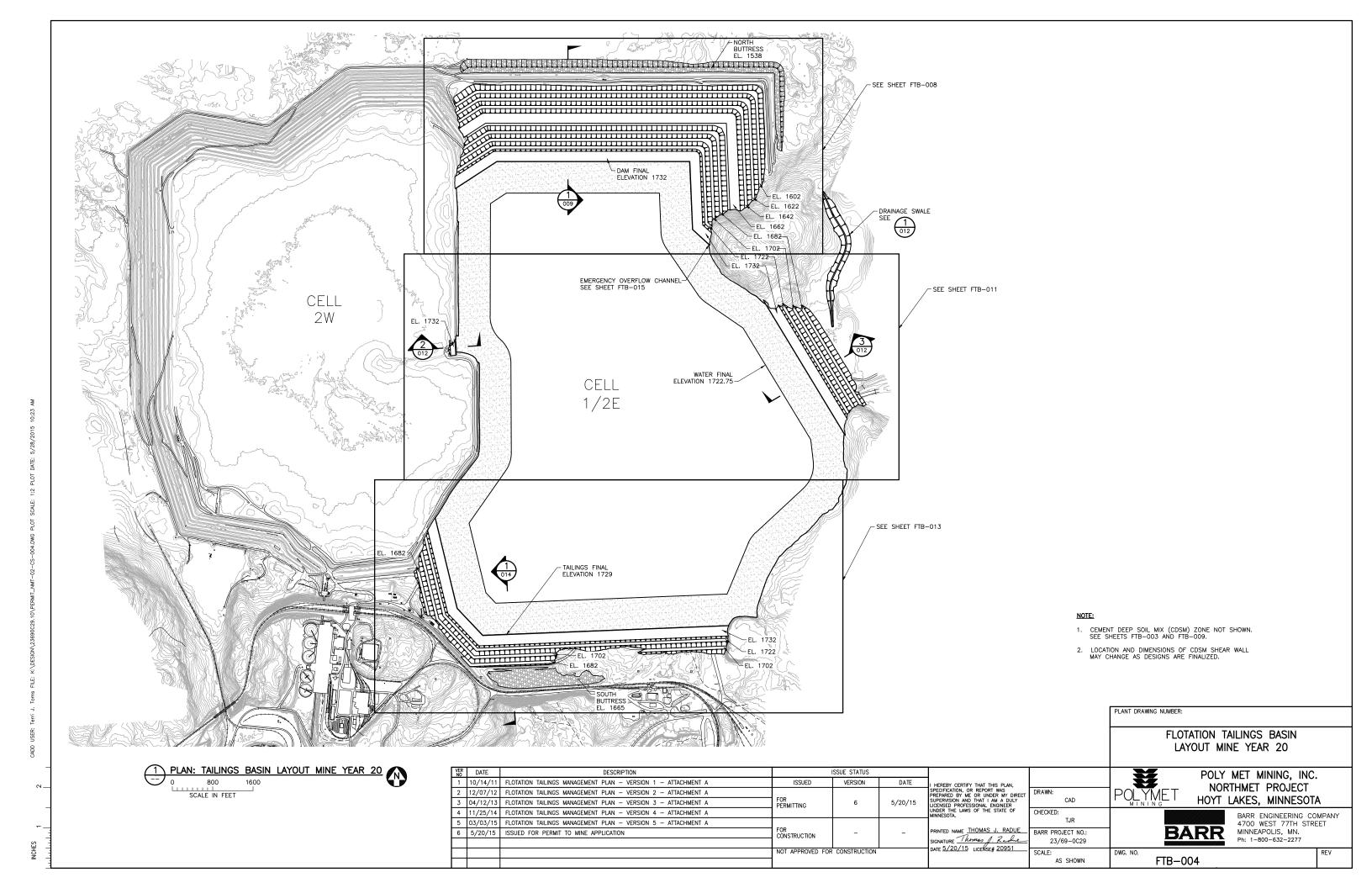
4700 WEST 77TH STREET

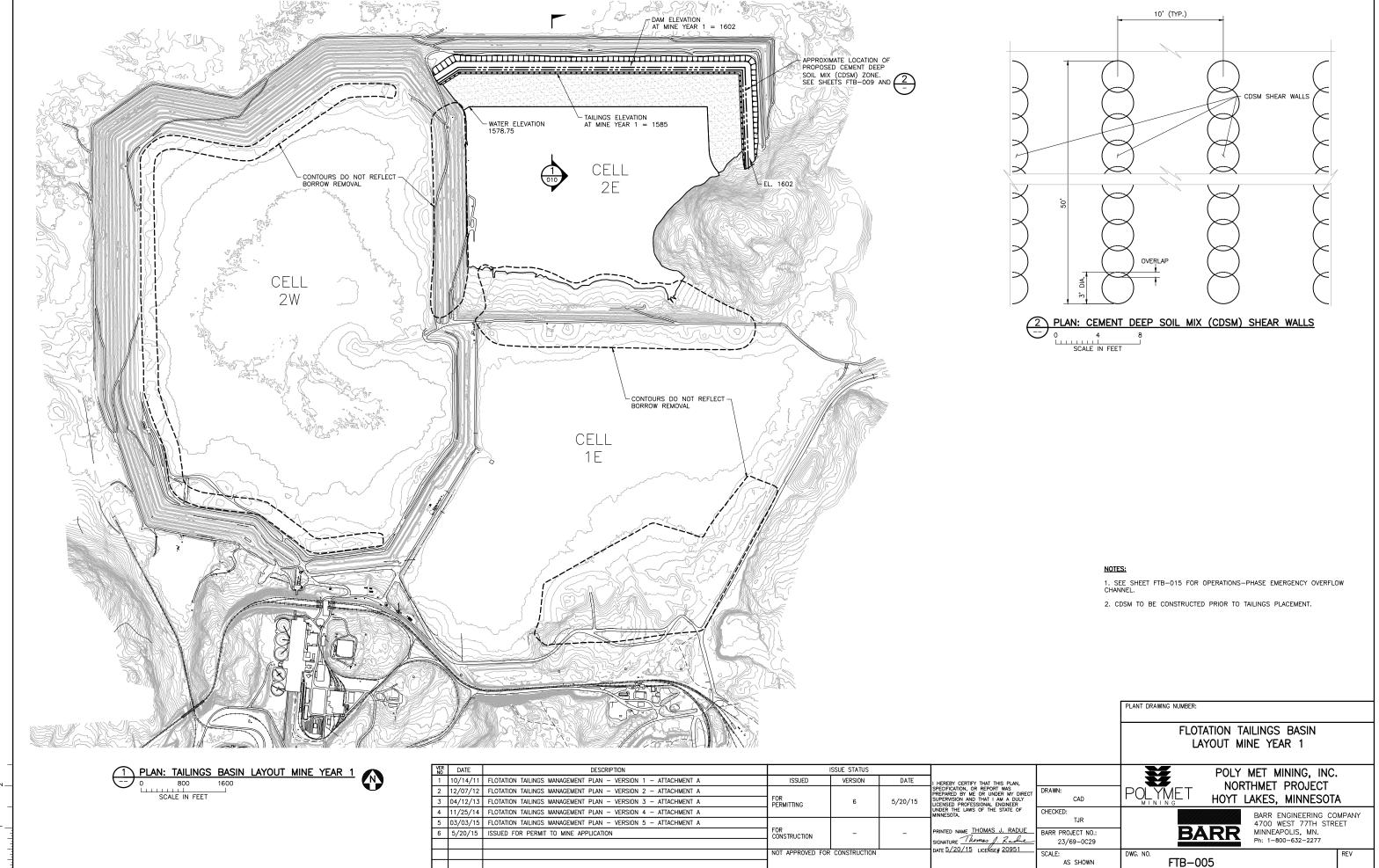
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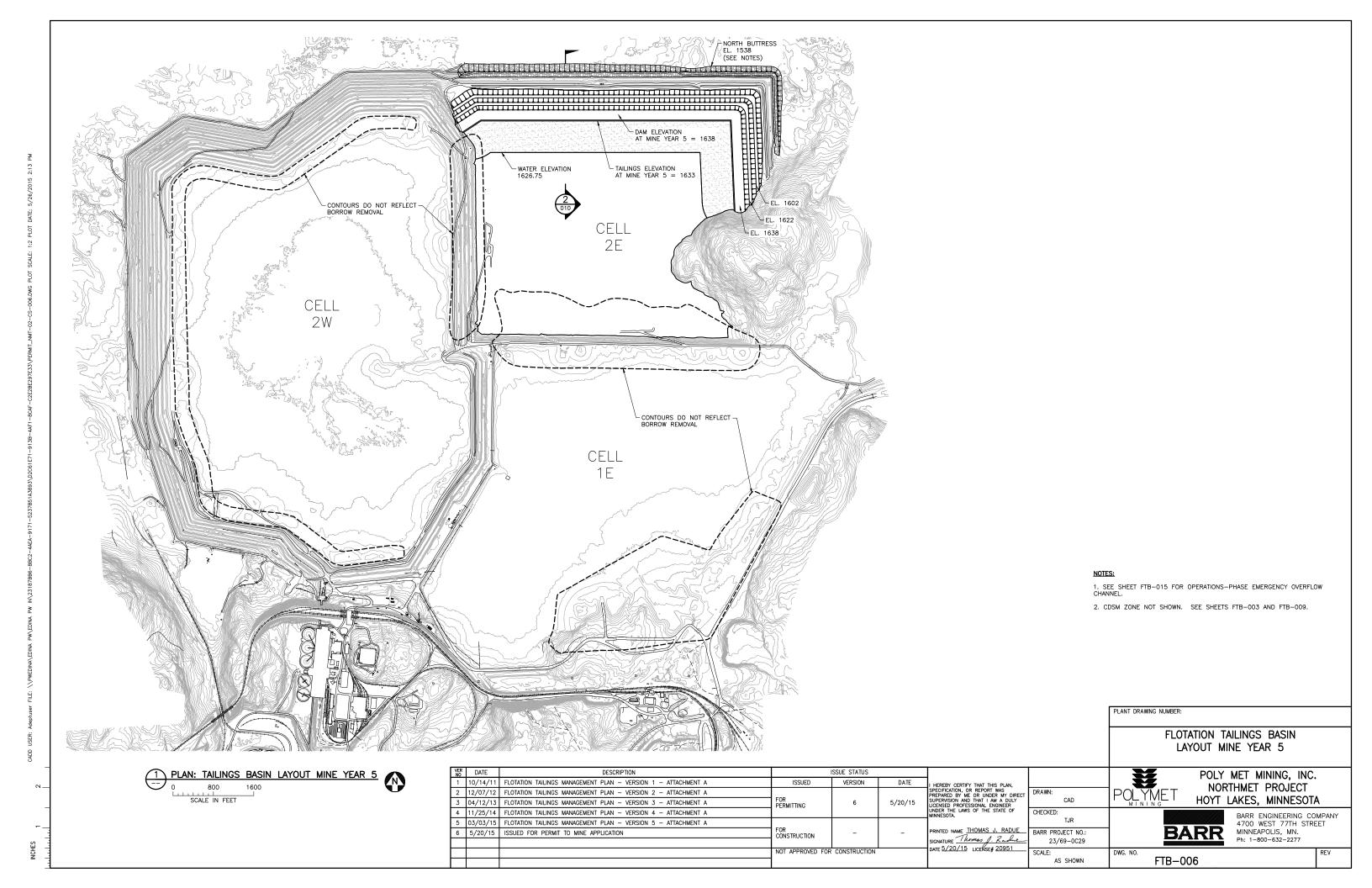
POLYMET

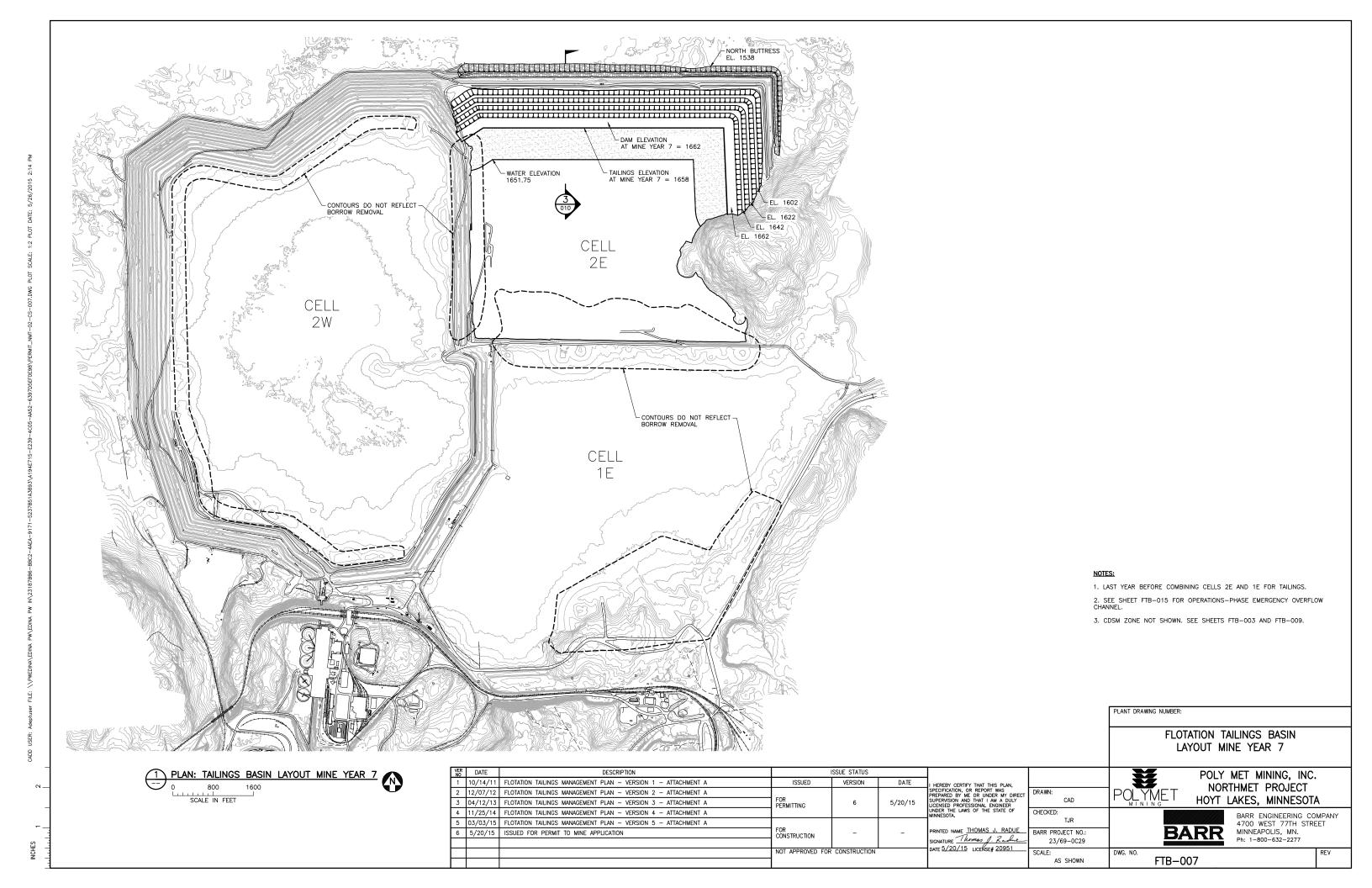
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		FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-		PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
						SIGNATURE Thomas J. Radie	23/69-0C29
			NOT APPROVED FOR CONSTRUCTION		DATE 5/20/15 LICENSE# 20951	SCALE:	
			1				AS SHOWN

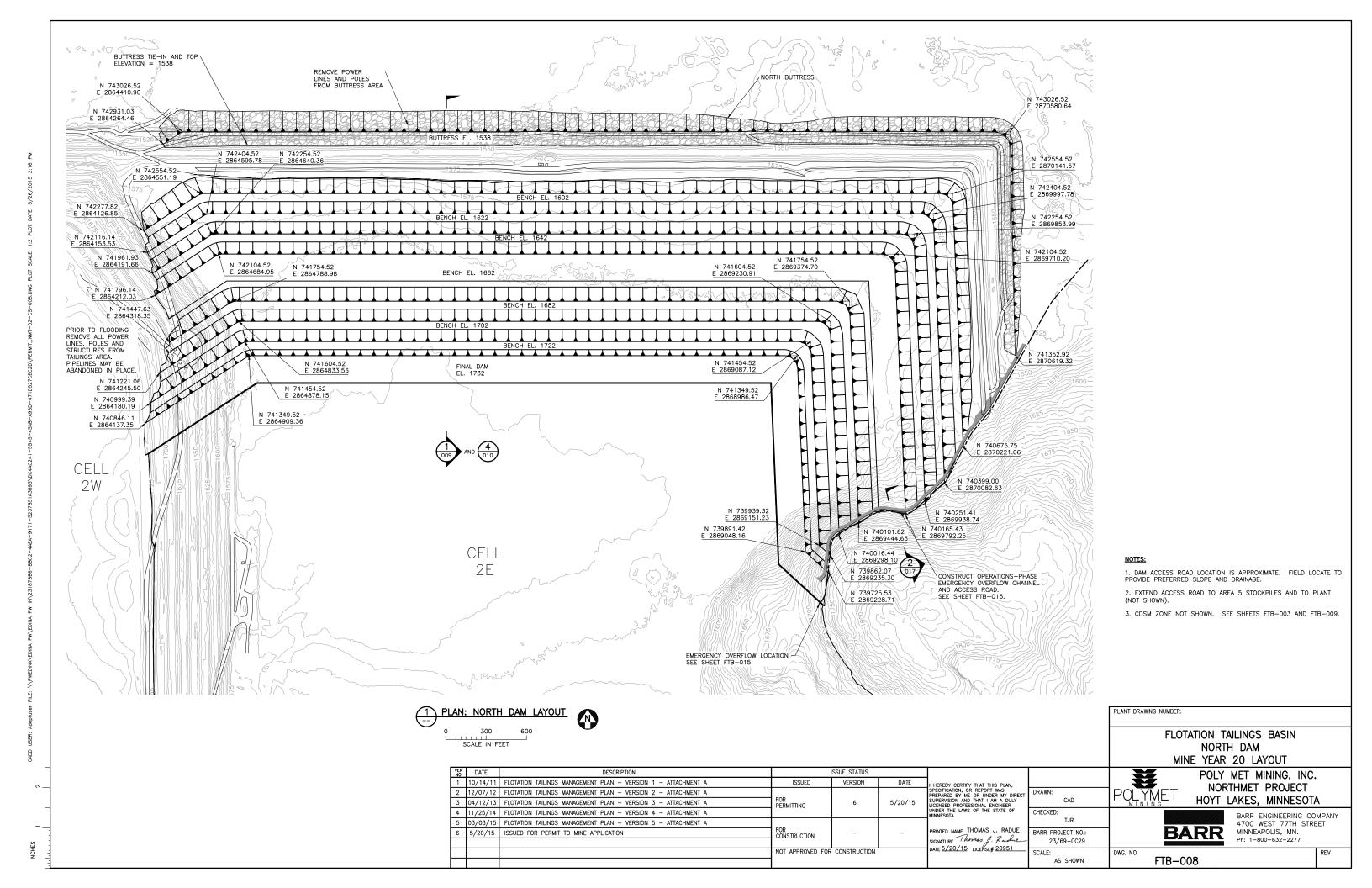


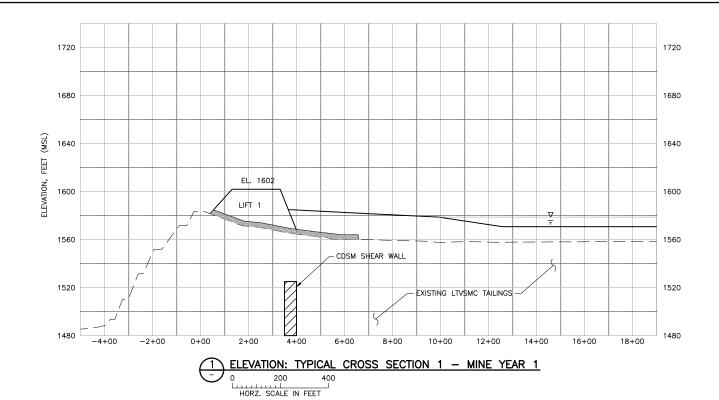


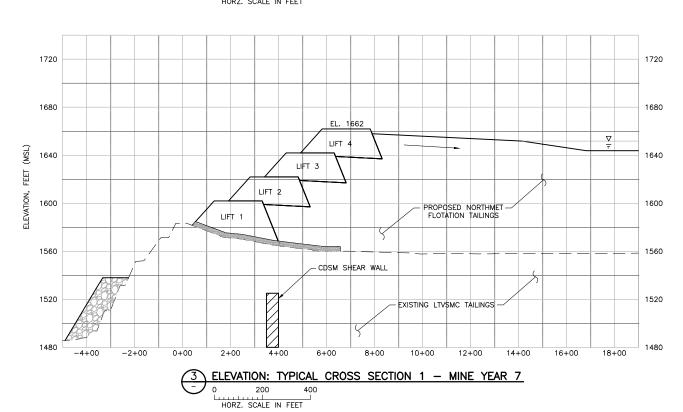


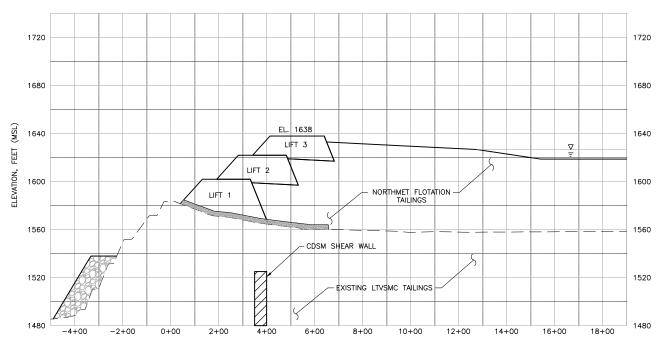


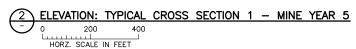


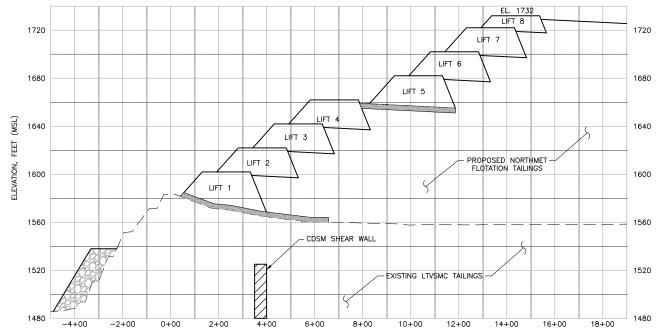












ELEVATION: TYPICAL CROSS SECTION 1 - MINE YEAR 20 HORZ. SCALE IN FEET

NOTE:

1. DAM AND BUTTRESS DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE DAM STABILITY PERFORMANCE DATA.

2. PLACE BENTONITE AMENDED SOIL COVER ON OUTSIDE FACE OF NEW DAMS.

	VER NO	DATE	DESCRIPTION	ISSUE STATUS				
	1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
	2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
	3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
	4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
	5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
	6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-		PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
				CONCINCONON			SIGNATURE Thomas J. Radie	23/69-0029
ſ				NOT APPROVED FOR CONSTRUCT			DATE 5/20/15 LICENSE# 20951	SCALE:
ſ				1				AS SHOWN

FLOTATION TAILINGS BASIN NORTH DAM STAGED CONSTRUCTION

POLYMET

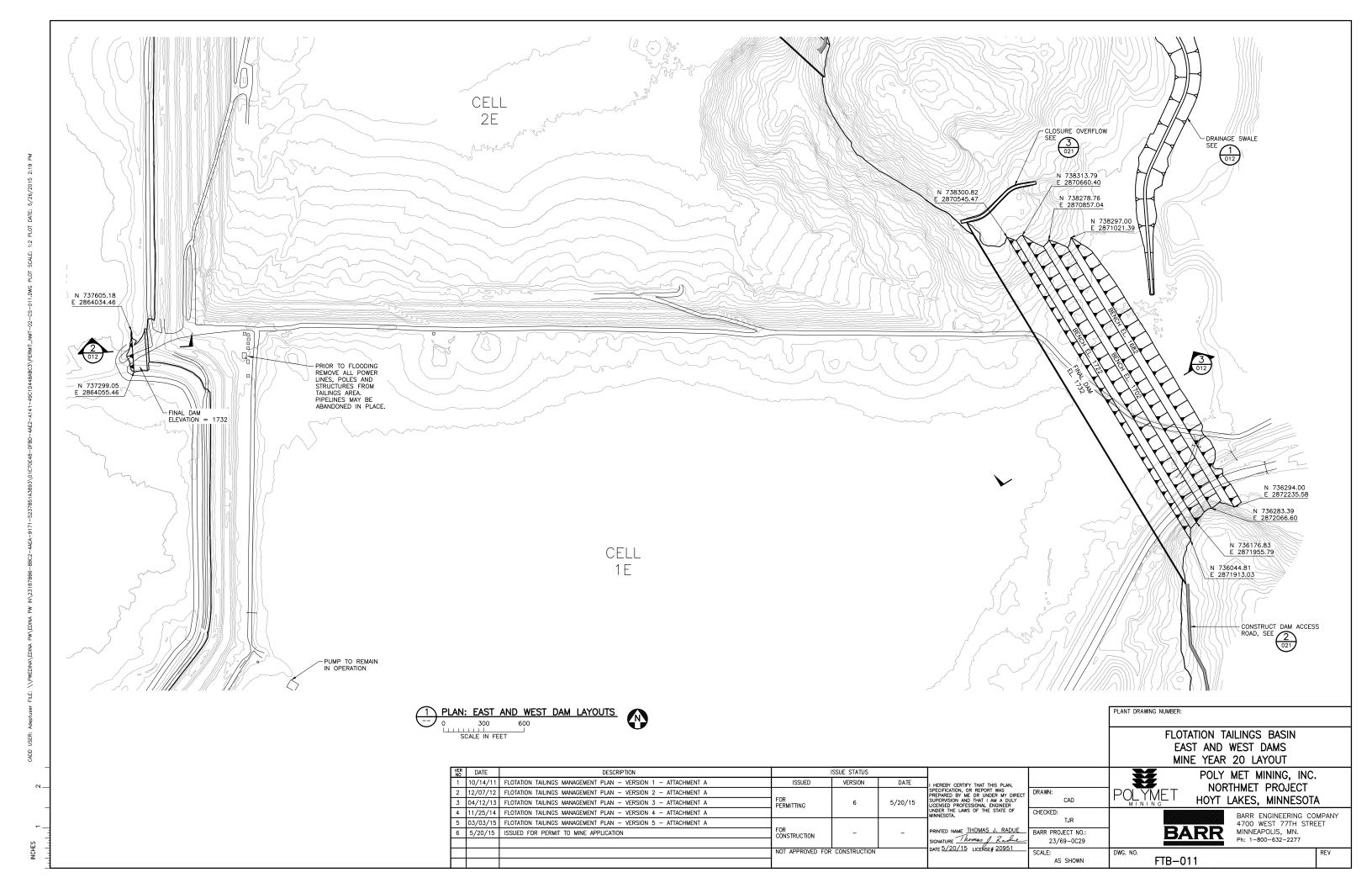
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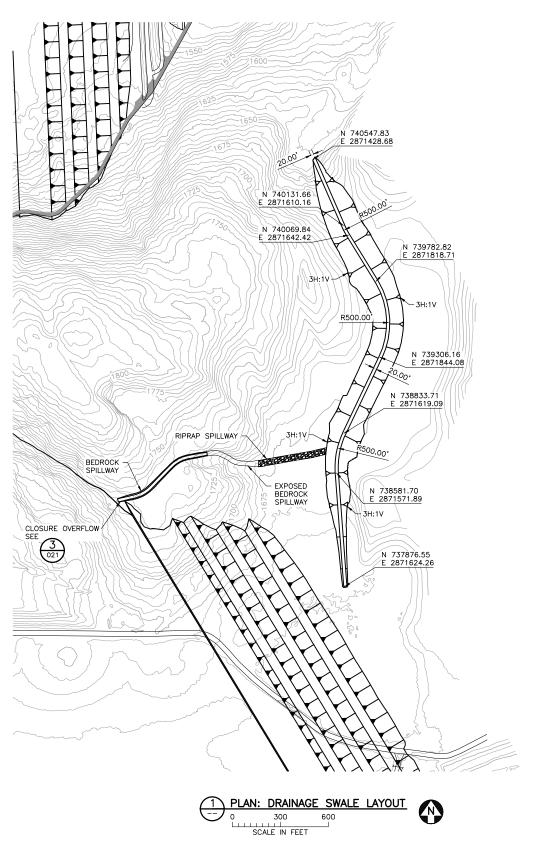
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

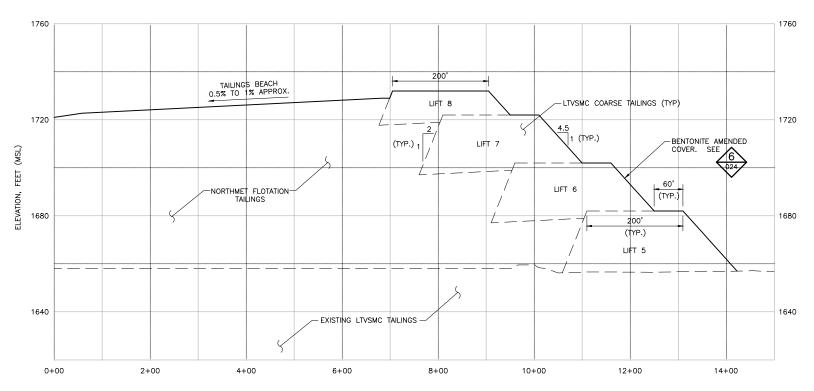
FTB-010





1760 1760 LTVSMC COARSE TAILINGS 1720 1720 `— EXISTING LTVSMC T∳ILINGS -1680 1680 4+00 0+00 2+00

HORZ. SCALE IN FEET



100 200

HORZ. SCALE IN FEET

1.CLOSURE OVERFLOW IS FOR EMERGENCY OVERFLOW ONLY UNTIL POND WATER QUALITY MEETS DISCHARGE WATER QUALITY REQUIREMENTS.

2. DAM DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE DAM STABILITY PERFORMANCE DATA.

VER NO	DATE	DESCRIPTION	ISSUE STATUS				
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
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3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A		6			CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-		PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
						SIGNATURE Thomas J. Radie	23/69-0029
			NOT APPROVED FOR CONSTRUCTION			DATE 5/20/15 LICENSE# 20951	SCALE:
			1				AS SHOWN

FLOTATION TAILINGS BASIN EAST AND WEST DAMS TYPICAL CROSS SECTIONS AND DRAINAGE SWALE

POLYMET

PLANT DRAWING NUMBER:

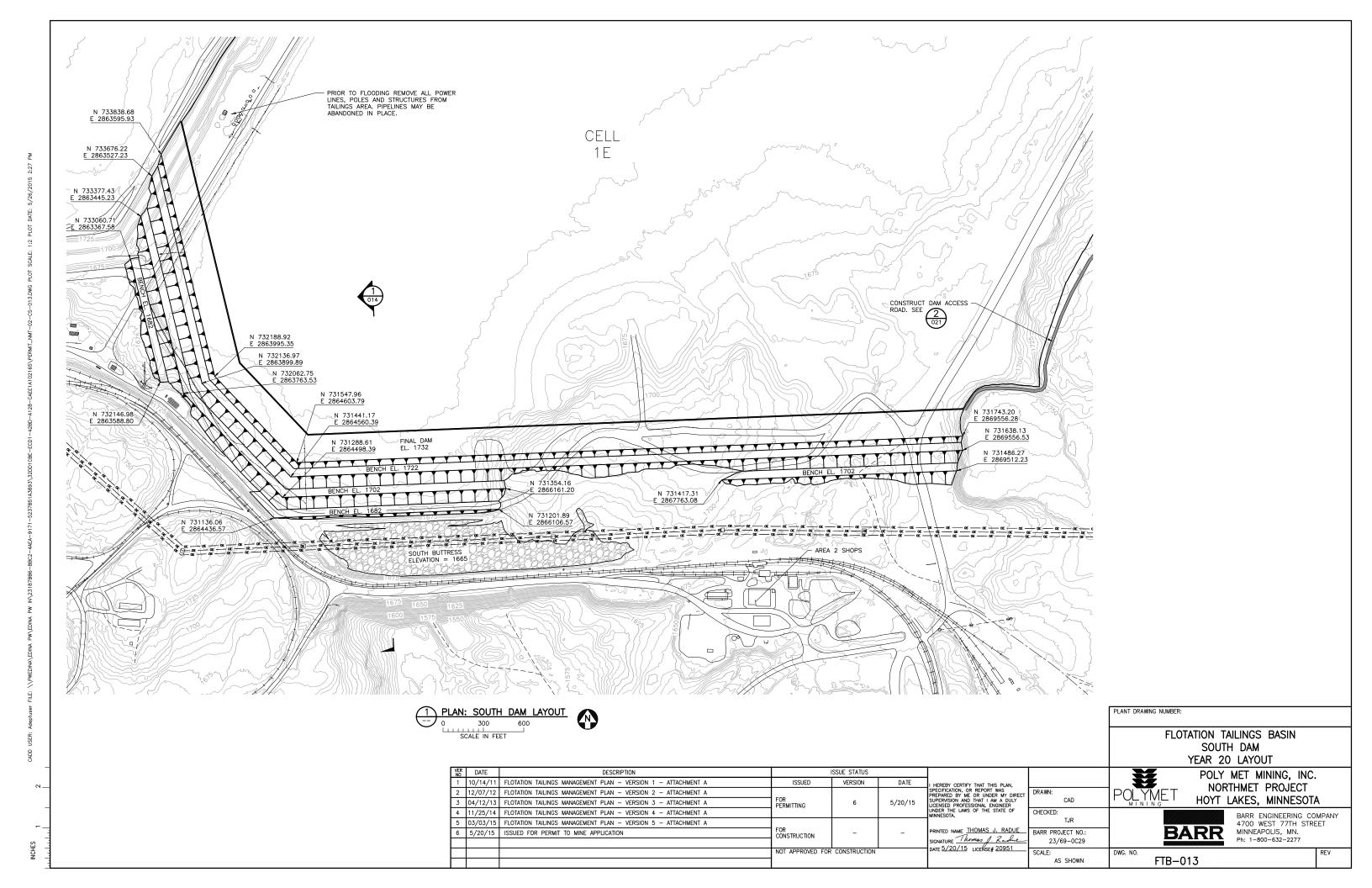
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

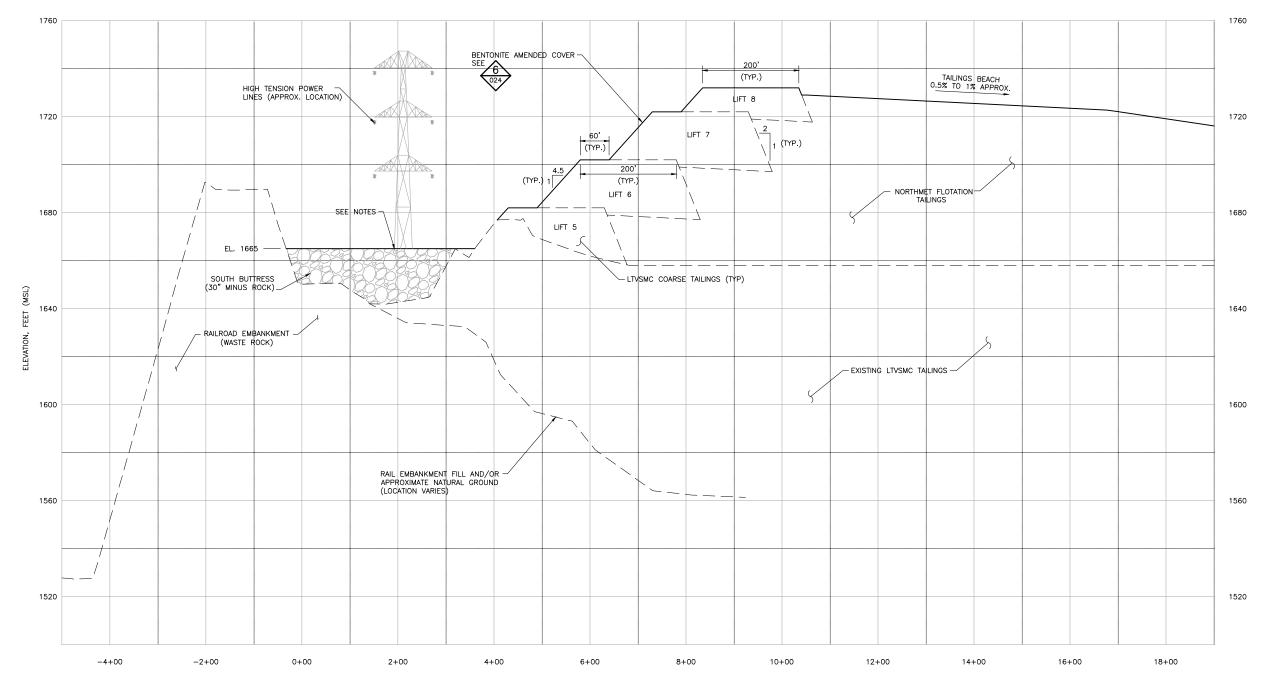
BARR

FTB-012

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

Ph: 1-800-632-2277





HORZ. SCALE IN FEET

1. DAM DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE PERFORMANCE DATA.

2. HIGH TENSION POWER LINES SHOWN FOR REFERENCE. TOWER FOUNDATIONS ARE LOCATED OUTSIDE OF THE AREA COVERED BY THE BUTTRESS.

FLOTATION TAILINGS BASIN
SOUTH DAM
TYPICAL CROSS SECTIONS
POLY MET MINING, INC.
POLYMET NORTHMET PROJECT
HOYT LAKES, MINNESOTA

BARR

FTB-014

Ph: 1-800-632-2277

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

PLANT DRAWING NUMBER:

VER NO	DATE	DESCRIPTION	ISSUE STATUS				
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6		SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-		PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
						SIGNATURE Thomas J. Radie	23/69-0029
			NOT APPROVED FOR CONSTRUCTION			DATE 5/20/15 LICENSE# 20951	SCALE:
			1			1	AS SHOWN

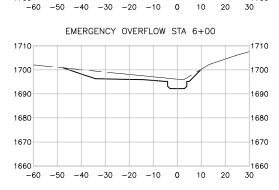
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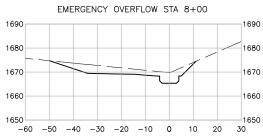
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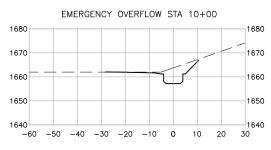
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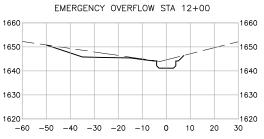
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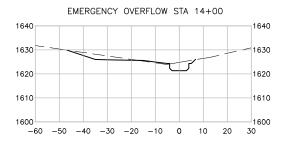
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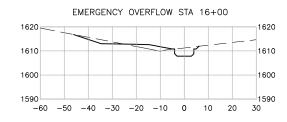


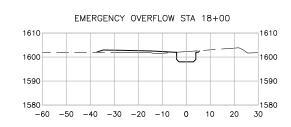


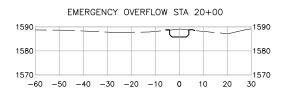


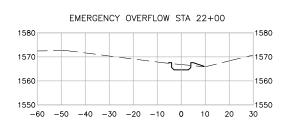


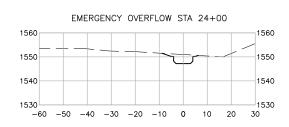


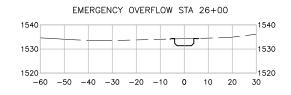


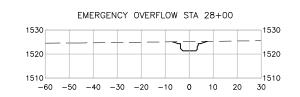


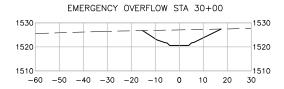


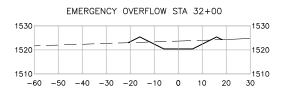


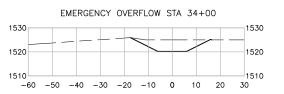


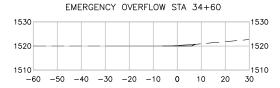












\bigcirc	SECTIONS	: EME	RGENCY	OVERFLOW	CHANNEL
<u> </u>	0 2	Ĭ.	40		_
	SCALE	IN FEET			

						_	
VER NO	DATE	DESCRIPTION		ISSUE STATUS			
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.	
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A				1	TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-		PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:
			Contoniconon			SIGNATURE Thomas J. Radie	23/69-0029
			NOT APPROVED FOR	CONSTRUCTION		DATE 5/20/15 LICENSE# 20951	SCALE:
			7				AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN **EMERGENCY OVERFLOW CHANNEL SECTIONS**

POLYMET

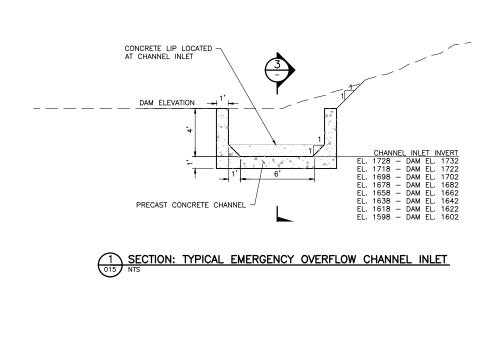
POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

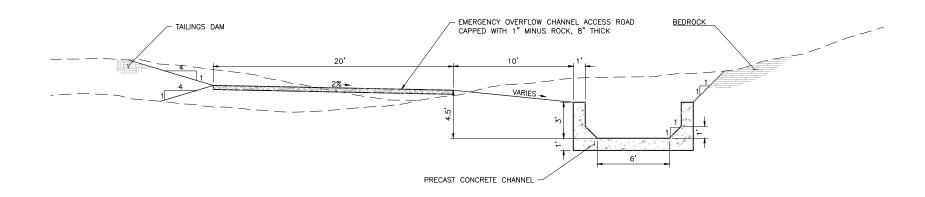


FTB-016

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

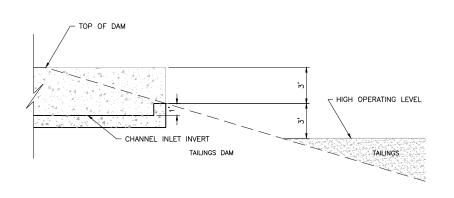


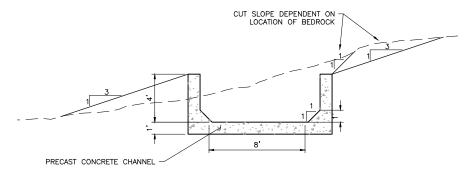


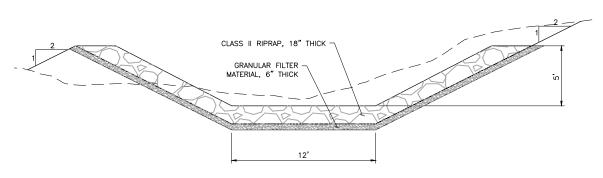


 $\underbrace{ ^2_{015} }_{\text{NTS}} \underbrace{ \text{SECTION: EMERGENCY OVERFLOW CHANNEL} }_{\text{NTS}}$

NOTE:
INCREASE EMERGENCY OVERFLOW CHANNEL DEPTH TO 4' WHEN CHANNEL SLOPE IS 0%







3 DETAIL: EMERGENCY OVERFLOW CHANNEL INLET

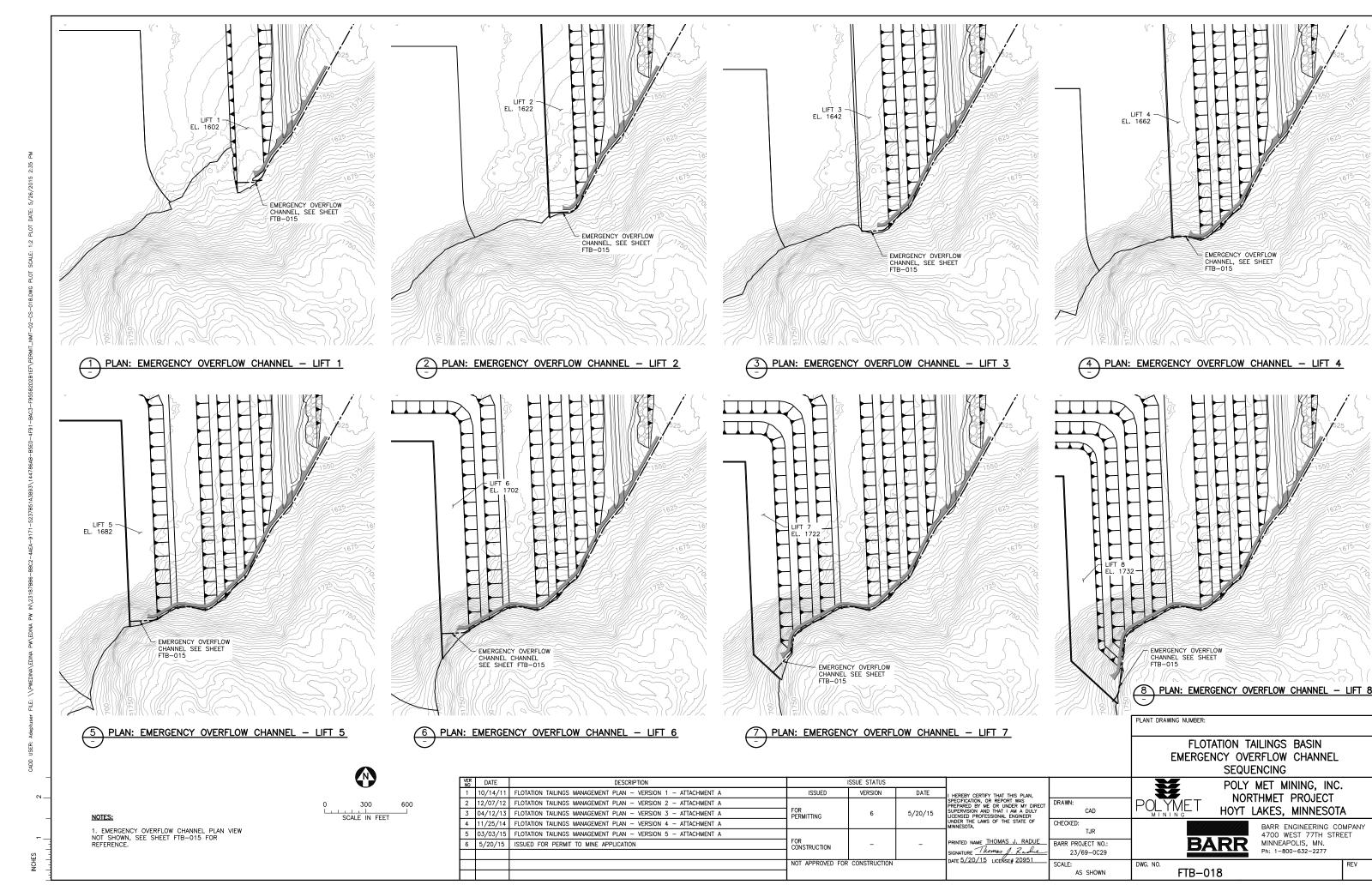
5 SECTION: RIPRAP OVERFLOW CHANNEL ENERGY DISSIPATOR - STA. 30+10 - 34+60

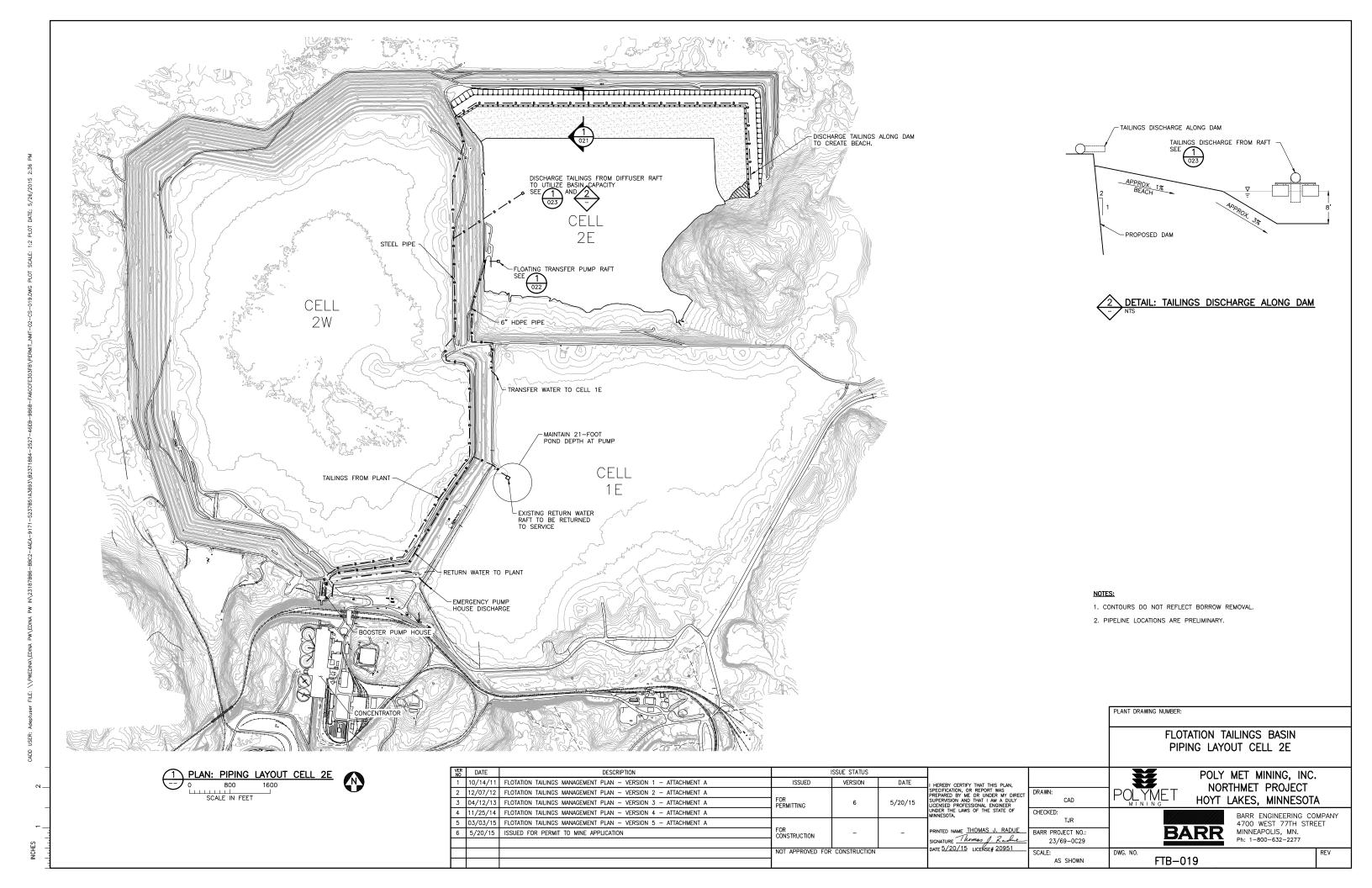
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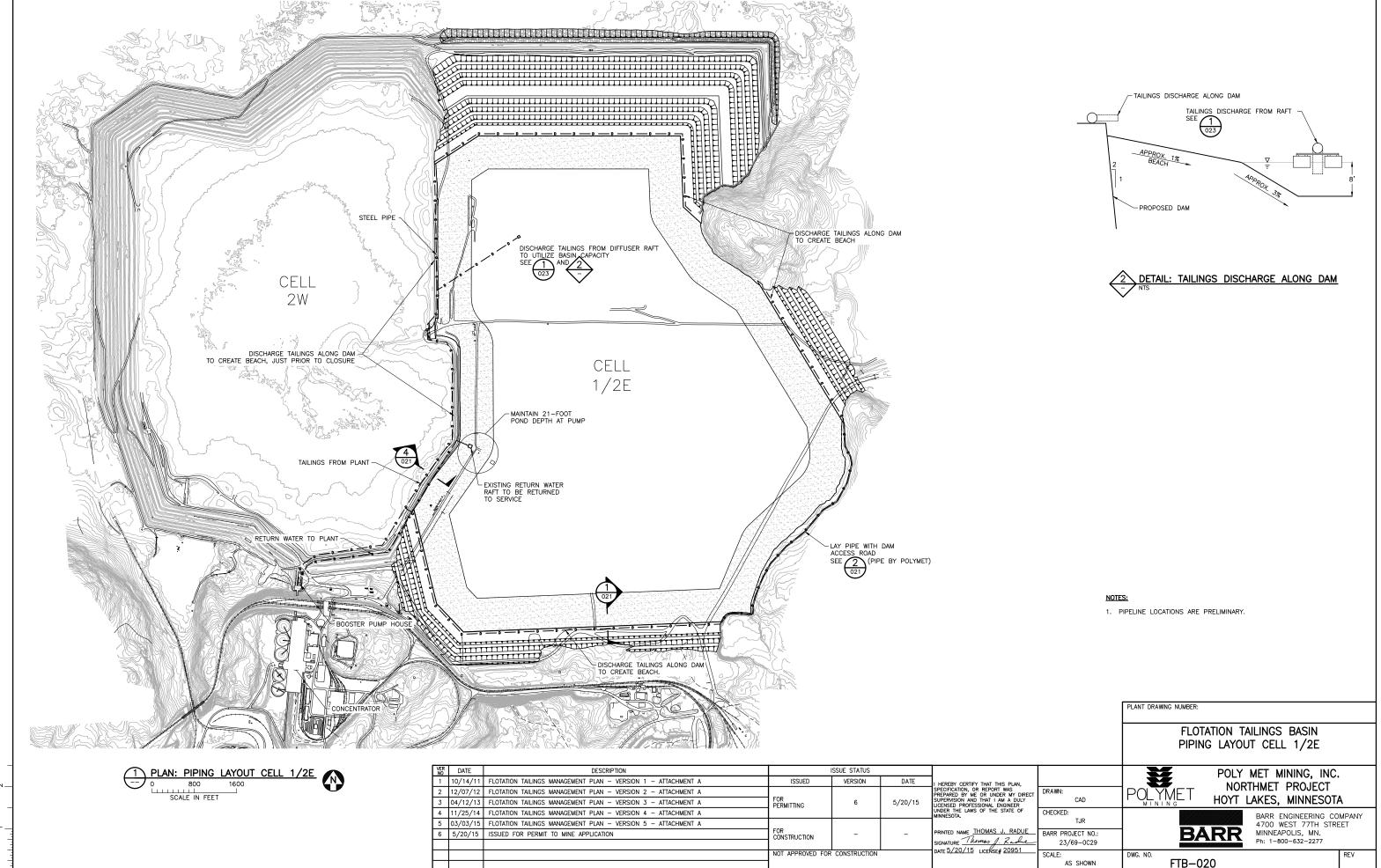
FLOTATION TAILINGS BASIN

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

								EMERGE	NCY OVERFLOW CHANNEL DETAILS
VER NO	DATE	DESCRIPTION		ISSUE STATUS				***	POLY MET MINING, INC.
1 1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE	I HEREBY CERTIFY THAT THIS PLAN.		3	NORTHMET PROJECT
2 1	2/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A				SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT	DRAWN:	1POLYMET	
3 0)4/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15	SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER	CAD	MINING	HOYT LAKES, MINNESOTA
4 1	1/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A				UNDER THE LAWS OF THE STATE OF MINNESOTA.	CHECKED:		BARR ENGINEERING COMPA
5 0	3/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A				1	TJR		4700 WEST 77TH STREET
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	-	_	PRINTED NAME THOMAS J. RADUE	BARR PROJECT NO.:	1 B /	ARR MINNEAPOLIS, MN.
			- Contoniconon			SIGNATURE Thomas J. Radie	23/69-0029		Ph: 1-800-632-2277
			NOT APPROVED FO	R CONSTRUCTION	ı İ	DATE 5/20/15 LICENSE# 20951	SCALE:	DWG. NO.	REV
							AS SHOWN	FTB-0)17

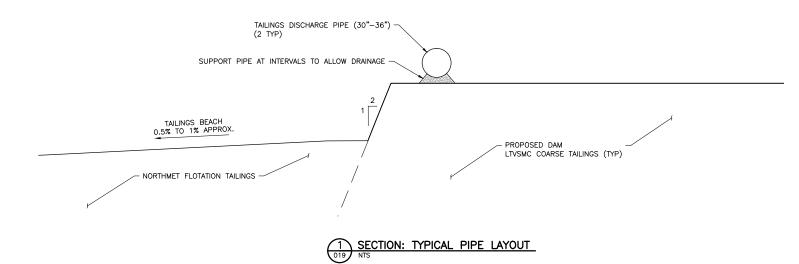


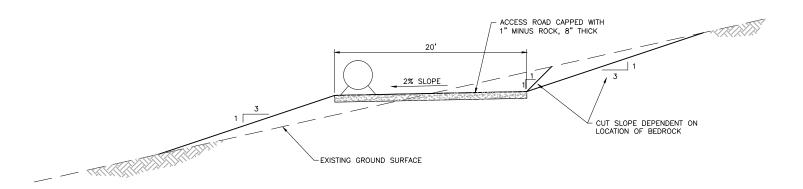


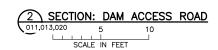


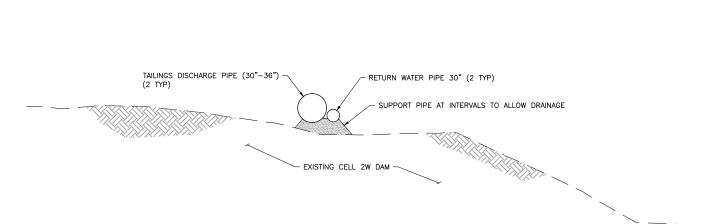
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SCALE IN FEET

_BEDROCK

BEDROCK -

4 SECTION: TYPICAL RETURN PIPE LAYOUT

PLANT DRAWING NUMBER:

POLYMET

FLOTATION TAILINGS BASIN DETAILS

BARR

FTB-021

POLY MET MINING, INC.

NORTHMET PROJECT

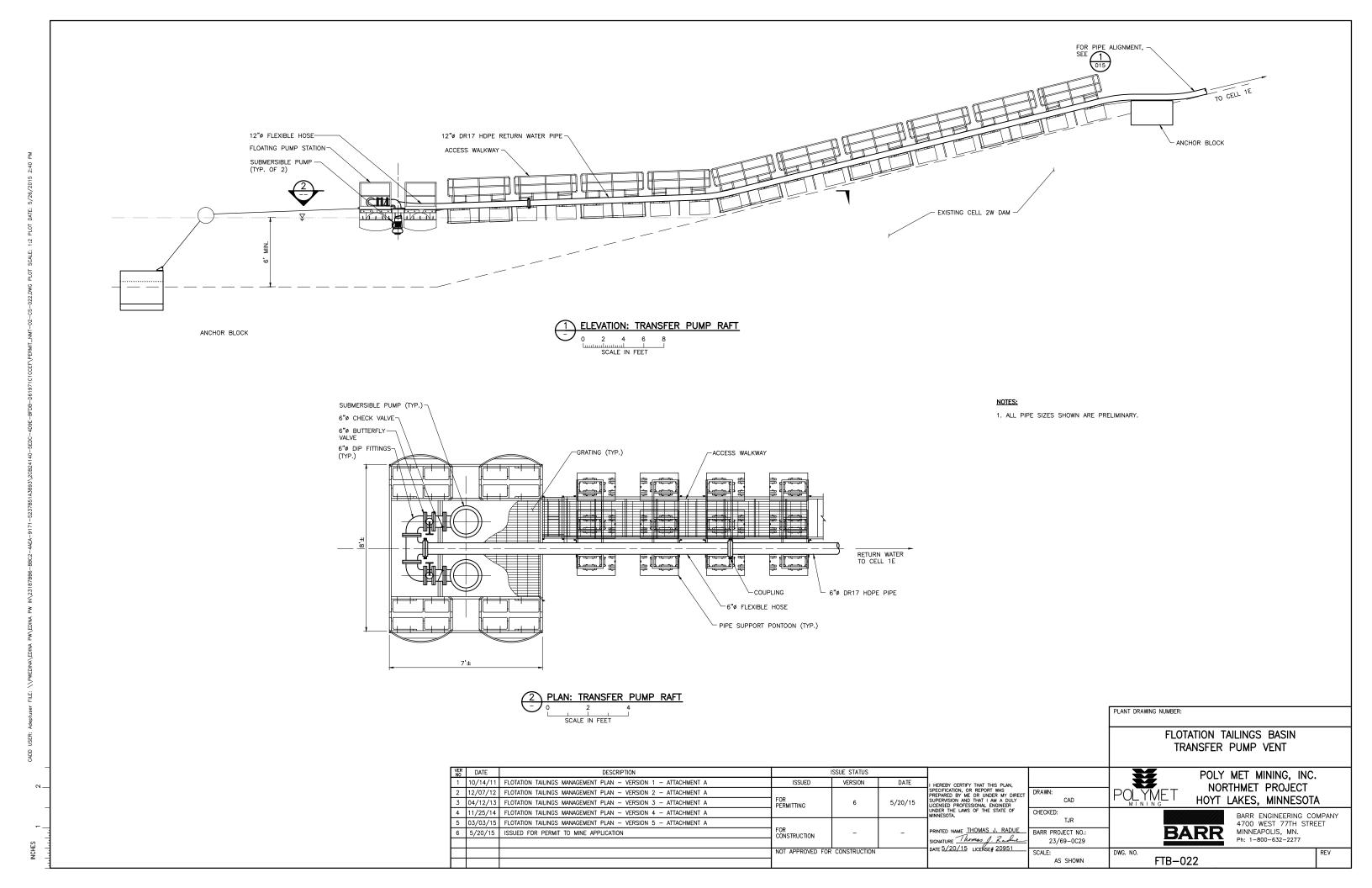
HOYT LAKES, MINNESOTA

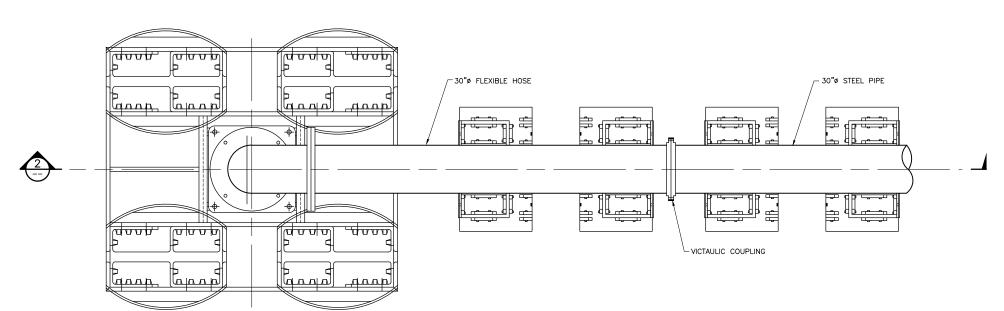
Ph: 1-800-632-2277

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN.

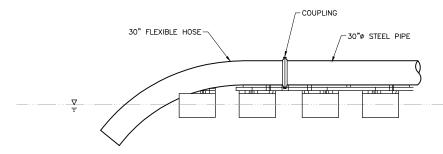
- 1. EMERGENCY OVERFLOW SIZING AND CONFIGURATION IS PRELIMINARY.
- 2. PIPELINE INFORMATION IS PRELIMINARY.
- 3. CONSTRUCT CLOSURE EMERGENCY OVERFLOW AT CLOSURE. OPERATIONS—PHASE EMERGENCY OVERFLOW TO BE MAINTAINED OR REMOVED AT OWNER'S DETERMINATION.
- 4. ALL PIPE SIZES SHOWN ARE PRELIMINARY.

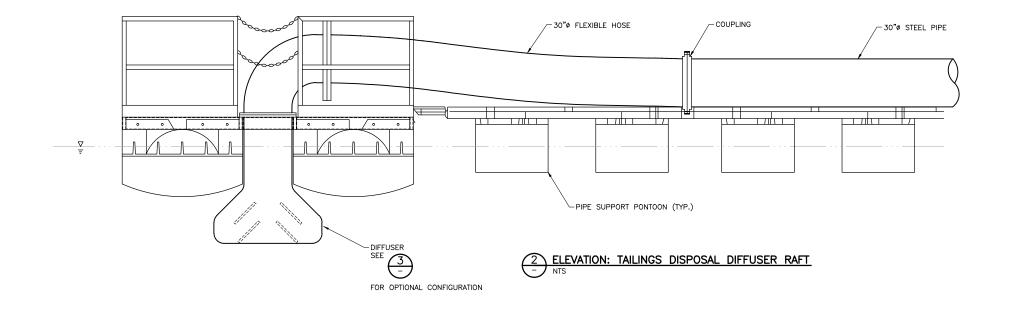
VER NO	DATE	DESCRIPTION	ISSUE STATUS				
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3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A		6	6 5/20/15		CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	JCTION -	-	PRINTED NAME THOMAS J. RADUE SIGNATURE Thomas J. Radue	BARR PROJECT NO.:
							23/69-0029
			NOT APPROVED FOR CONSTRUCTION			DATE 5/20/15 LICENSE# 20951	SCALE:
							AS SHOWN





1 PLAN: TAILINGS DISPOSAL DIFFUSER RAFT
NTS





3 ELEVATION: PIPE OPEN END OPTION
NTS

PLANT DRAWING NUMBER:

NOTES:

1. ALL PIPE SIZES SHOWN ARE PRELIMINARY.

FLOTATION TAILINGS BASIN

TAILINGS DISPOSAL DIFFUSER RAFT

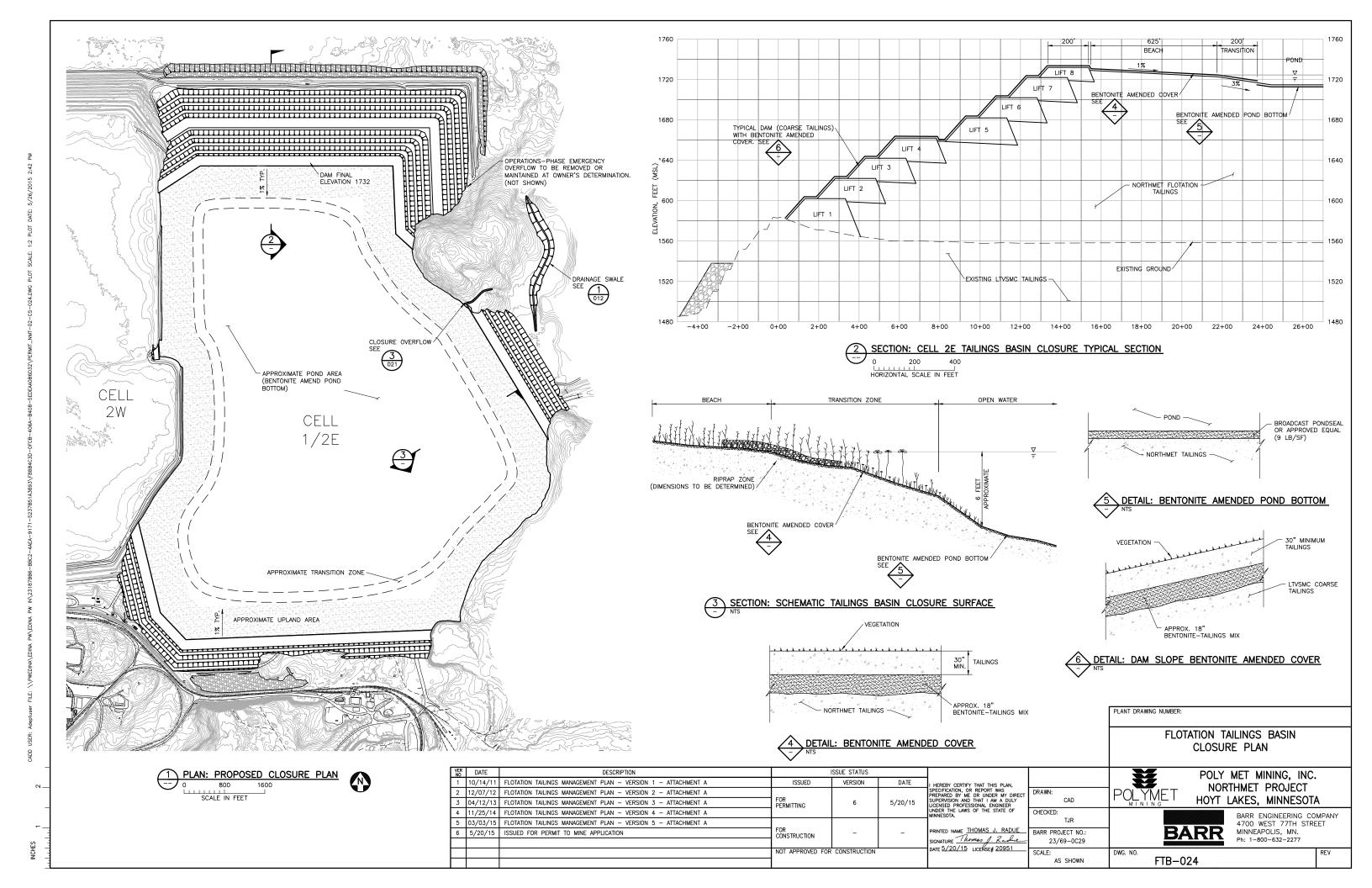
VER NO	DATE	DESCRIPTION	ISSUE STATUS				
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3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A			5/20/15		CAD
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A					CHECKED:
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A					TJR
6	5/20/15	ISSUED FOR PERMIT TO MINE APPLICATION	FOR CONSTRUCTION	RUCTION -	_	PRINTED NAME THOMAS J. RADUE SIGNATURE Thomas J. Radue	BARR PROJECT NO.:
							23/69-0C29
			NOT APPROVED FOR CONSTRUCTION			DATE 5/20/15 LICENSE# 20951	SCALE:
						l	AS SHOWN

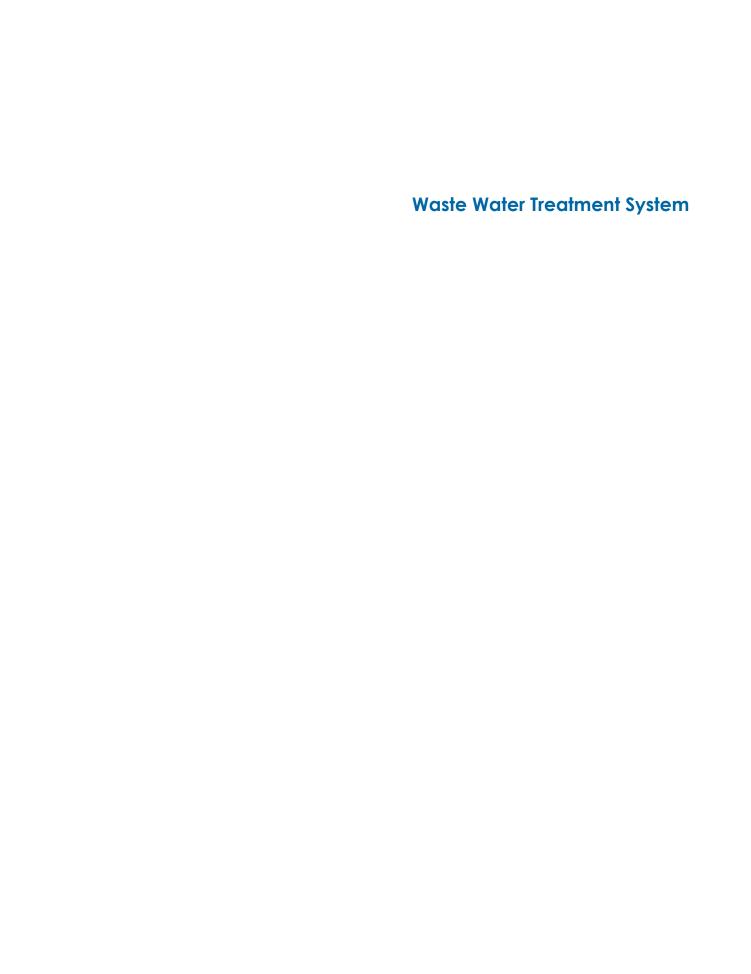
POLYMET MINING POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

FTB-023

BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277

BARR





Appendix E

NorthMet Water Monitoring Locations: Water Appropriation Permits and NPDES/SDS Permit

