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Memorandum

To: Stuart Arkley, David Blaha
From: Cheryl Feigum
Subject: TB-12 Pipeline Route Habitat/Wetland Analysis for Tailings Basin Alternative
Date: July 8, 2009
C: Jim Scott, John Borovsky

Purpose: Prepare a typical cross-section diagram for a potential surface water discharge pipeline from the Tailings Basin to the Partridge River downstream of Colby Lake and complete a habitat/wetland impact analysis. It was assumed the discharge pipeline would be placed adjacent to the existing plant water supply pipeline within an existing easement. This easement exists from the Tailings Basin to the CN railroad tracks just north of Colby Lake. PolyMet has agreement from Minnesota Power that an easement will be granted for the segment from the CN tracks to the discharge point. Existing data sources were reviewed to determine the acreage of upland and wetland habitat present within the utility easement. It was assumed that all habitat and wetlands located within the utility easement would be impacted.

Corridor: The total length of the corridor will be 8.4 miles. The width of the construction corridor is 50 feet, measured from the centerline of the existing plant water supply pipeline to the outside edge of the corridor (Figure 1). The total area of the construction corridor is 50.6 acres (Figure 2). The entire corridor will be cleared during construction. After construction, the entire corridor would be maintained free of woody vegetation.

Easements/Rights-of-Way: The pipeline would begin at the Tailings Basin (Mile 0.0), follow the Tailings Basin for 1.9 miles to the Plant Site (Mile 1.9), cross the Plant Site for 0.3 miles to the existing plant water supply pipeline (Mile 2.2), follow the supply pipeline for 0.3 miles to the edge of the plant site (Mile 2.5), continue to follow the supply pipeline for 4.9 miles to the south edge of the CN railroad right-of-way (Mile 7.4), follow the CN railway right-of-way west for 0.9 miles (Mile 8.3), and turn south for 0.1 miles to the Partridge River discharge site (Mile 8.4). The 8.4-mile corridor is within or adjacent to existing easements or right-of-ways for the entire length of the pipeline (including the Tailings Basin site, Plant Site, roads, existing plant water supply pipeline, CN railway and Minnesota Power).

Pipeline: The maximum flow rate of the discharge pipeline will be 3,000 gpm, requiring a 14 to 16 inch pipeline. Figure 1 shows a typical pipeline cross section with the 16-inch pipeline placed at a minimum distance of 6 feet away from the existing 36-inch plant water supply pipeline. The proposed berm extension is shown continuous with the existing berm. There is one stream crossing (Second Creek) and one railroad crossing (CN Railroad) that will require horizontal directional drilling (HDD).

Pipeline Construction: The existing plant water supply pipeline was buried to a depth of 3 feet and covered with a 4 foot high berm (Figure 1). It was assumed the pipeline was only buried to a depth of 3 feet because it was shallow to bedrock, large boulders prevented excavation, or there was a high water table. A high water table would have required dewatering for installation of the pipeline. Since the pipeline was installed to a shallow depth, a 4 foot berm was placed as protection from freezing during the winter months.

Based on the construction assumptions for the existing pipeline, it was assumed that construction of the discharge pipeline would encounter the same issues since it is located within the existing easement. Therefore, in the upland areas, it is assumed that the discharge pipeline would be buried to a depth of 3

feet and covered by a 4 foot berm. During construction, soil borings would be conducted just in advance of placement of pipeline sections to determine if the pipeline section could be placed deeper in the ground with a reduced berm or no berm. In the wetland areas, if the underlying bedrock does not limit the pipeline placement, HDD or open trench construction would be used with a reduced berm or no berm. Open trench construction would require short term dewatering to place the pipeline section in the wetland. For purposes of this evaluation, it was assumed the depth to bedrock was shallow and a berm would be required, which provides a conservative (worst case) estimate for wetland impacts.

Habitat Data: The 50-ft construction corridor was overlain on aerial photography including the Farm Services Administration (FSA) Natural Color and Color Orthophotos 2008 and the FSA 2008 Digital Orthophoto obtained from the Land Management Information Center (LMIC) Web Map Services at http://www.lmic.state.mn.us/chouse/wms/wms_image_server_description.html. Habitat data utilized for the area was the shapefile for the Level 3 GAP Land Cover was obtained from the Minnesota DNR Data Deli. An office review of the Level 3 GAP habitat polygons was conducted and polygons were adjusted using the data sources cited above. Habitat type and acreage was identified for each wetland habitat polygon. For the upland, only a list of the habitat types present within the corridor was compiled.

Wetland Data: The 50-ft construction corridor was overlain on aerial photography including the Farm Services Administration (FSA) Color Natural Color and Color Orthophotos 2008 and the FSA 2003 Digital Orthophoto obtained from the Land Management Information Center (LMIC) Web Map Services at http://www.lmic.state.mn.us/chouse/wms/wms_image_server_description.html. Wetland data utilized for the area included the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory and the Barr Wetlands (dated 12/16/2008) shapefile previously provided to ERM. An office review of the NWI and Barr wetland polygons and Level 3 GAP habitat polygons was conducted and polygons were adjusted using the data sources cited above. Table 1 identifies the acreage of each wetland polygon and the wetland type using Circular 39, Level 3 GAP Habitat data, and the dominant Eggers & Reed community type.

Results: The discharge pipeline is located within the 8.4-mile, 50-ft wide, 50.6-acre construction corridor (Figures 1 and 2). The habitat and wetland shapefiles were overlain on the aerial photographs and an office review was conducted to determine the upland and wetland habitat present within the corridor. Figure 2 shows the location of the construction corridor, existing plant water supply pipeline, discharge pipeline, and upland and wetland habitat within the corridor. There are 45.4 acres of upland habitat and 5.2 acres of wetland habitat in the corridor. Using the Level 3 GAP habitat data, the upland habitat types includes Aspen/White Birch, Barren, Developed, Grassland, Upland Deciduous, Upland Shrub and Upland Conifer Deciduous Mix. Using the Circular 39 wetland classification system (the Level 3 GAP habitat data and dominant Eggers & Reed Community types), Table 1 identifies the wetland habitat including Type 2 (Marsh, Wet Meadow), Type 3 (Marsh, Shallow Marsh), Type 5 (Aquatic, Open Water) and Type 6 (Lowland Shrub, Shrub Carr).

Pipeline Corridor Analysis
July 8, 2009

Table 1. Wetland data within the pipeline corridor.

Circular 39	GAP Level 3 Habitat Type	Dominant Eggers & Reed Community Type	Acreage
Type 2	Marsh	Wet meadow	0.51
Type 3	Marsh	Shallow marsh	0.07
Type 5	Aquatic	Open water	0.16
Type 6	Lowland Shrub	Shrub carr	4.49
TOTAL			5.23

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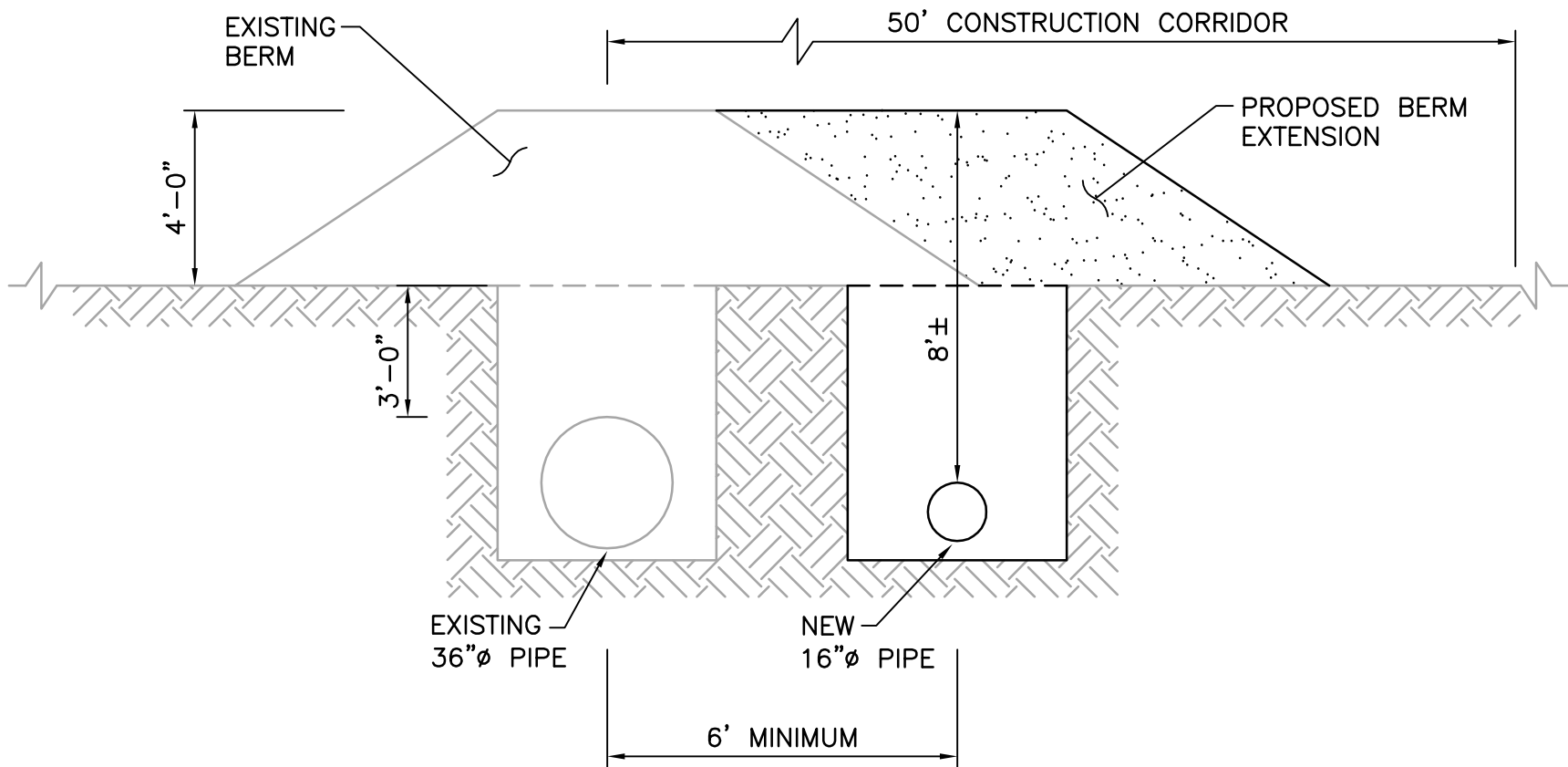
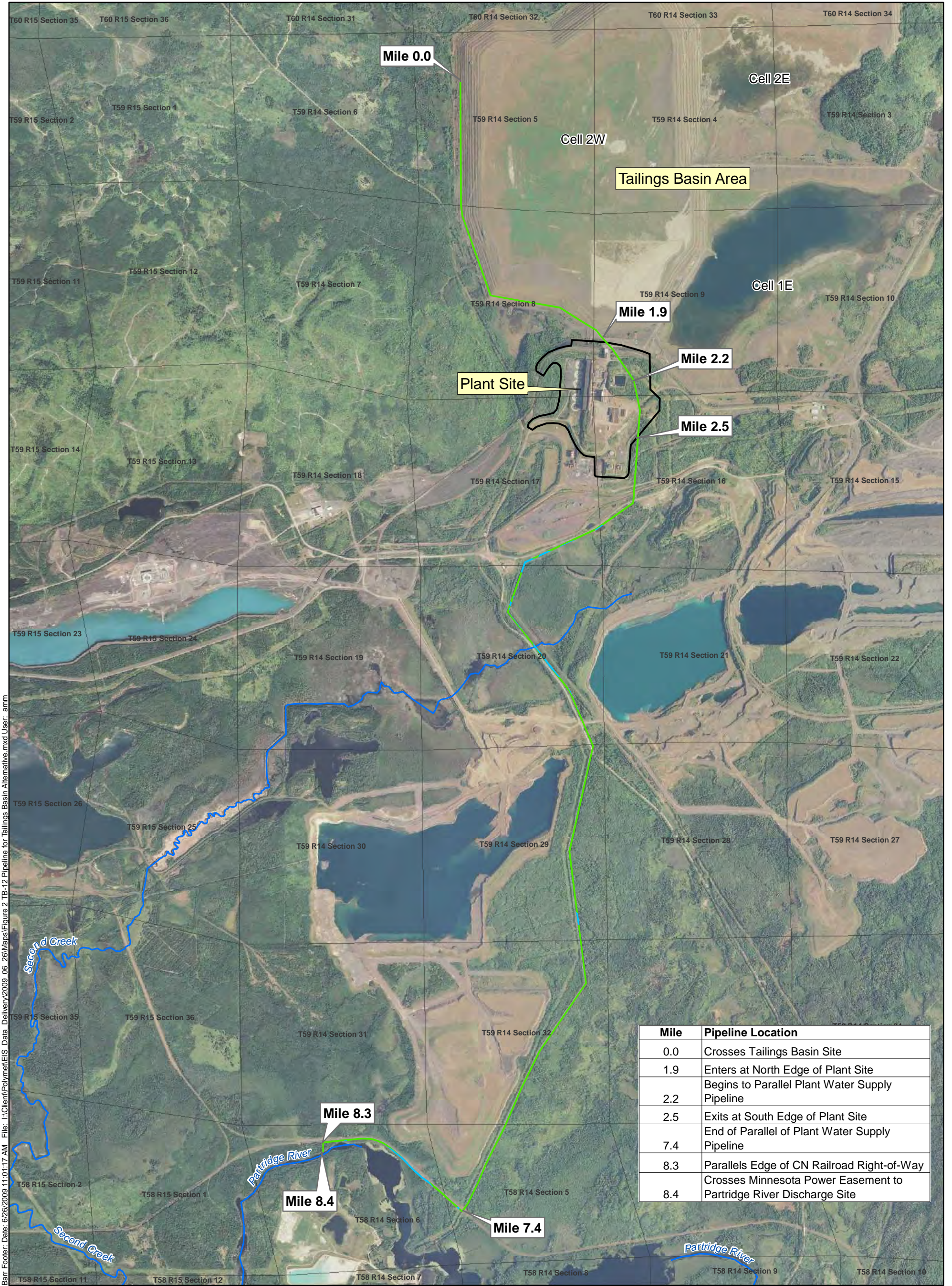


Figure 1
TYPICAL PIPELINE CROSS SECTION
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, Minnesota



Bar Footer: Date: 6/26/2009 11:01:17 AM File: I:\Client\Polymet\EIS_Data_Delivery\2009_06_26\Maps\Figure 2_TB-12 Pipeline for Tailings Basin Alternative.mxd User: anmm

Mile	Pipeline Location
0.0	Crosses Tailings Basin Site
1.9	Enters at North Edge of Plant Site Begins to Parallel Plant Water Supply Pipeline
2.2	Exits at South Edge of Plant Site
2.5	End of Parallel of Plant Water Supply Pipeline
7.4	Parallels Edge of CN Railroad Right-of-Way Crosses Minnesota Power Easement to Partridge River Discharge Site
8.3	
8.4	

- Wetland within Corridor
- Upland within Corridor
- Streams
- Section Lines

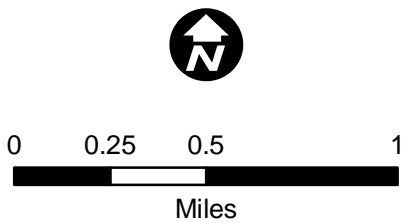


Figure 2
 POTENTIAL TB-12 PIPELINE ROUTE
 NorthMet Project
 PolyMet Mining, Inc.
 Hoyt Lakes, Minnesota