

Memorandum

To: Bill Johnson, Minnesota DNR
From: Greg Williams
Subject: Summary of Project Impacts to Partridge River Average Annual Hydrology
Date: March 24, 2015
Project: 23-69-0862.00-042-001
c: Jennifer Saran (PolyMet)

This memorandum summarizes the estimated average annual hydrologic impacts to the Partridge River resulting from the NorthMet project. Impacts are estimated using the XP-SWMM hydrologic and hydraulic model described in the Mine Site Water Modeling Data Package. The XP-SWMM model representing the Partridge River watershed upstream of Colby Lake excludes the watersheds tributary to the Peter Mitchell Pit and the West Pit. In the XP-SWMM model representing long-term closure (i.e., after the pit is filled in approximately Mine Year 55), a constant discharge from the Mine Site wastewater treatment facility is added at location SW004a; the quantity of the discharge is 0.7 cfs (310 gpm), as described in the Water Modeling Data Package – Mine Site. Discharge from the Peter Mitchell Pit is not added to the XP-SWMM model results presented in this memorandum.

The average annual flows calculated at locations SW002, SW003, SW004, SW004a, SW005, and SW006 are shown in Table 1 for the following periods:

- Existing conditions
- Mine Year 1
- Mine Year 2
- Mine Year 11
- Mine Year 20
- West Pit filling (Mine Years 21 through 54)
- Long-term closure (Mine Years 55+)

The estimated average annual flows are presented in Table 1. Table 2 values are presented as a percent changed from estimated existing conditions. The data shown in Table 2 is visually represented in Figure 1.

Table 1 Estimated Average Annual Future Flows (cfs) in the Partridge River

Period	Modeled Average Annual Flow (cfs) by Location					
	SW002	SW003	SW004	SW004a	SW005	SW006
Existing Conditions	6.1	7.4	14.0	38.3	74.8	78.9
Mine Year 1	5.8	7.3	13.5	37.7	74.4	78.6
Mine Year 2	5.8	7.3	13.5	37.6	73.8	78.5
Mine Year 11	5.8	7.2	13.4	36.7	73.3	77.5
Mine Year 20	6.1	7.5	13.7	37.3	74.0	78.2
West Pit Filling	6.1	7.5	14.1	37.1	73.8	78.0
Long-term Closure	6.1	7.5	14.1	38.7 ¹	75.3 ¹	79.6 ¹

¹ Includes 0.7 cfs from Mine Site WWTF

Table 2 Estimated Future Average Annual Flows in the Partridge River (as a percent change from existing conditions)

Period	Change in Average Annual Flow (%) by Location					
	SW002	SW003	SW004	SW004a	SW005	SW006
Existing Conditions	0%	0%	0%	0%	0%	0%
Mine Year 1	-5%	-1%	-4%	-2%	-1%	0%
Mine Year 2	-5%	-1%	-4%	-2%	-1%	-1%
Mine Year 11	-5%	-3%	-4%	-4%	-2%	-2%
Mine Year 20	0%	1%	-2%	-3%	-1%	-1%
West Pit Filling	0%	1%	1%	-3%	-1%	-1%
Long-term Closure	0%	1%	1%	1% ¹	1% ¹	1% ¹

¹ Includes 0.7 cfs from Mine Site WWTF

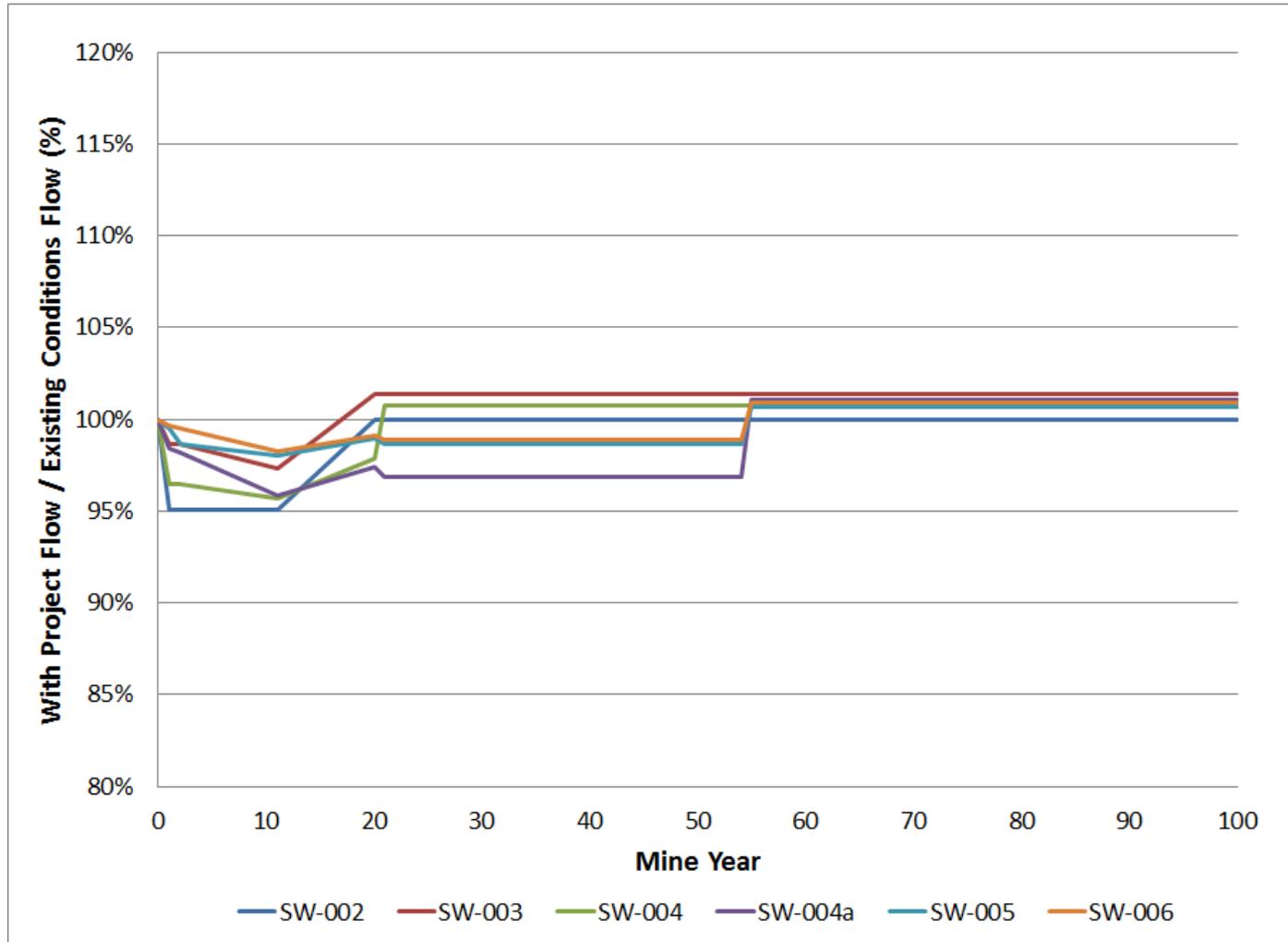


Figure 1 Estimated Future Average Annual Flows in the Partridge River (as a percent change from Existing Conditions)