

**Addendum to Acid Generating Rock Mitigation Plan, Trunk Highway 1/169 Improvement Project (Eagles Nest Lake Area), dated August 9, 2016.**

1. Page 10, Section 5.0. In paragraph 3, the words “a hand-held XRF” are replaced with “a portable hand-held X-Ray Fluorescence (XRF) spectrometry instrument or by appropriate laboratory analytical methods”.

2. Page 11, Section 5.1.1. The second-to-last sentence in this paragraph is changed as follows:

“...secondary fill areas are shown on Figures 1 through 6. These areas will be used for placement of non-PAG rock or common embankment fill materials only. If there is a need to use any of these areas for additional PAG rock fill, and a fault has been identified crossing the area, a 50-foot buffer zone will be established on either side of the fault, as described below for the primary fill areas. It is not appropriate at this point...”

3. Page 14, Section 5.1.2. In paragraph 10, the word “roofs” is replaced with “shingles”.

4. Page 14, Section 5.1.2. New text is added after paragraph 11, as follows:

“12. In sections of the roadway which have been excavated into PAG rock, a minimum 2-inch-thick layer of limestone will be placed over the final subgrade surface prior to constructing the remaining roadway section. This material will minimize the potential for generation of acid drainage at this surface and will also fill in low areas on the uneven blasted rock surface.

13. To limit the potential for producing ARD during construction, the contractor will be allowed to drill the PAG rock at any time, but will be required to excavate, mix with limestone/agricultural lime and place the material in the PAG fill area within four weeks from the date of blasting.”

5. Page 15, Section 5.1.4. Replace the paragraph in its entirety with the following:

“A 40-mil-thick non-reinforced flexible polypropylene (fPP) material will be used for the geomembrane. This material has high resistance to chemicals and weathering. It also has favorable mechanical properties to accommodate settlement and irregular surface geometries, as well as provide flexibility at low temperatures.”

6. Page 15, Section 5.2. In paragraph 4, the words “hand held XRF” are replaced with “hand held XRF or appropriate laboratory analytical methods”.

7. Page 15, Section 5.2. New text is added after paragraph 4, as follows:

“5. The 4-week time limit between PAG rock excavation and placement in the PAG fill area, as described above for roadway excavation, will also apply to the exposed rock cut faces, including initial excavation, scaling loose rock, and installation of BMPs.”

8. Page 15, Section 5.2. In the final sentence of this section, the word “removed” is replaced with “scaled”.

9. Page 16, Section 6.1. The second bullet is modified as follows:

“▪ A portable XRF or appropriate laboratory analytical testing will be used to measure the sulfur content of the drill cuttings.”

10. Page 16, Section 6.2. In the first sentence, replace “XRF” with “sulfur content”.

11. Page 16, Section 6.2. In the first sub-bullet under the first bullet, the sentence is modified to read:

“...no sampling for sulfur content analysis will be performed...”

12. Page 16, Section 6.2. The fourth main bullet is revised as follows:

- “▪ Samples will be analyzed for sulfur content using the portable XRF according to the procedure outlined in Section 6.3 or by appropriate laboratory analytical methods.”

13. Page 19, Section 6.4. The first sentence is modified as follows:

“The results of the sulfur content analysis will be used...”

14. Page 19, Section 6.4.1. In the first sentence of this section, the word “XRF” is replaced with “sulfur content”.

15. Page 19, Section 6.4.1. The first sentence under the first bullet is modified as follows:

“The average sulfur content will be calculated from the XRF or laboratory results...”

16. Page 20, Section 6.5. The existing paragraph in this section is modified as follows:

“In addition to inspecting and sampling bedrock materials recovered from the blast holes, the Qualified Professional will also inspect saturated non-organic overburden materials (i.e., the fine-grained portion of glacial till and residual soils) for the presence of sulfide minerals, iron staining, salt formation, or other indicators of low-pH seepage. The saturated materials will be inspected for both primary and secondary sulfide minerals. Secondary sulfide minerals would most likely occur in chemically reducing conditions, which may be identified by signs of biological activity, a distinct sulfide odor, and \ or black staining on the sediments.

A portable XRF instrument or appropriate laboratory analytical testing will be used to conduct operational monitoring of saturated non-organic overburden for sulfur during construction, as warranted based on the visual identification of sulfur described above. If overburden materials contain sulfur in excess of 0.11%, the median sulfur content of Duluth complex pebbles reported in permit documents prepared for the NorthMet mining project (Christie and Wenigmann 2009), they will be treated the same way as excavated PAG rock, including mixing with limestone, placement in a designated PAG fill site, and covering with a geomembrane.”

17. Page 21, Section 7: Replace the first paragraph in its entirety with the following:

“7.1 Surface Water Monitoring

MnDOT proposes to monitor pH and total sulfate at the three locations identified in Appendix D of the Environmental Assessment (Culvert #1 West Hwy 1; Culvert #2 East Hwy 1; and Six-Mile Lake). This monitoring will be a continuation of the testing that was started in 2011 and that has been performed twice annually since that time. The samples will be collected by MnDOT and the analysis will continue to be performed by the Minnesota Department of Health (MDH) laboratory in St. Paul.

The results will be provided to the Minnesota Pollution Control Agency (MPCA) for evaluation. They will perform an evaluation of the data and provide feedback to MnDOT if there are concerns with surface water quality.

The surface water monitoring program will be performed for ten years following the year of construction. After the initial 10-year period, MnDOT will determine, with assistance from the MPCA, the need for further monitoring, based on all pertinent information collected to date.

7.2 Drinking Water Monitoring

Prior to the start of construction, MDH will conduct baseline sampling of nearby private drinking water wells and surface water drinking water systems for sulfate, arsenic, antimony, copper, nickel, selenium, and zinc.

After construction has been completed, MDH will sample residential wells annually for the first five years. After that time, MDH will evaluate the sampling results in consultation with MPCA and MnDNR to establish a monitoring program for the following 10 to 15 years, with the sampling frequency and analysis to be determined based on the initial 5-year sampling results.

After the total 15 to 20 year monitoring period described above, MDH will re-evaluate whether additional private well monitoring is required.

### 7.3 Groundwater Monitoring

Prior to the start of construction, MnDOT will install two downgradient monitoring wells, one at each PAG fill site, to monitor groundwater quality. The following parameters and analytes will be monitored: general water chemistry (pH, Eh, specific conductance, temperature), sulfate, arsenic, antimony, copper, nickel, selenium, and zinc. MnDOT will collect samples from the groundwater wells and provide them to the MDH for testing in their laboratory.

The groundwater wells will be sampled annually for the first five years. After that time, MDH will evaluate the sampling results in consultation with MPCA and MnDNR in order to establish a monitoring program for the following 10 to 15 years, with the sampling frequency and analytes \ parameters to be determined based on the initial 5-year sampling results.

After the total 15 to 20 year monitoring period described above, MDH will re-evaluate whether additional groundwater well monitoring is required.

### 7.4 PAG Rock Fill Monitoring”

18. Page 23, Section 9: Add the following reference at the beginning of the list:

“Kearney, C. and K. Wenigmann. 2009. *Technical Memorandum: NorthMet Waste Management and Modeling Assumptions for Overburden Material*. GC10. Barr Engineering Company. Memo to Stuart Arkley, MnDNR. March 24.”