



September 2, 2022

Jim Doody
Grand Junction Pipe & Supply Co.
556 Struthers Avenue
Grand Junction, CO 81501

**Re: Delta Paving Gravel Pit, File No. M-1998-105,
Amendment Application (AM-01) – Geotechnical Adequacy Review**

Mr. Doody:

The Division of Reclamation, Mining and Safety (Division/DRMS/Office) reviewed the contents of the AM-01 application for the Delta Paving Gravel Pit, File No. M-1998-105, and submitted preliminary comments on August 30, 2022. The following memorandum is an additional review, focusing on the geotechnical stability exhibit. Please respond to this memorandum with your response to my previous review letter.

Sincerely,

Robert D. Zuber
Environmental Protection Specialist

Enclosure

Copied via e-mail: Michael Cunningham, DRMS
Ben Langenfeld, Lewicki & Associates





Date: September 2, 2022

To: Rob Zuber; Division of Reclamation, Mining & Safety

From: Peter Hays; Division of Reclamation, Mining & Safety

**Re: Review of Geotechnical Stability Exhibit, Grand Junction Pipe & Supply Co.,
Delta Paving Gravel Pit, File No. M-1998-105, AM1**

The Division of Reclamation, Mining and Safety (Division/DRMS) staff reviewed the geotechnical stability exhibit included with the Delta Paving Gravel Pit 112c permit amendment application (AM1), File No. M-1998-105. The following list describes the information used by the Division as presented in the permit amendment application to evaluate slope stability for the site. Please review the list and confirm the list is accurate.

- The sand and gravel deposit averages fifteen (15) feet in depth.
- The alluvial deposit is overlain by approximately five (5) inches of topsoil and three (3) feet of overburden.
- The perimeter slopes will be mined at a 2H:1V grade.
- The mining highwall will be mined at a near vertical slope to the halfway point of the final mining slope.
- The upper highwall will be knocked down to the final mining slope with a dozer after mining is complete in the area.
- The mining slopes adjacent to the previously reclaimed groundwater lake in the west of the Phase 1 Pit will be mined at a 3H:1V grade.
- The depth to groundwater is approximately five (5) feet below the ground surface.
- The pits will be dewatered using pumps to allow mining excavation.
- The proposed post-mining land uses are recreation and wildlife habitat with multiple groundwater lakes surrounded by rangeland and wetlands.
- All mining slopes will be backfilled and graded to a maximum 3H:1V slope from the mining crest to 10 feet below the groundwater elevation during reclamation.
- The reclaimed slopes will be compacted for stabilization and to prevent erosion.
- The Applicant utilized the backfill material type of sand and gravel, mixed grain size from Table 2.5 in the SME Mining Reference Handbook for the stability analysis calculation.
- An internal angle of friction of approximately 45 degrees with no cohesion was used in the stability exhibit calculation.
- An analysis was performed using the formula; Factor of Safety (FOS) = Tangent of Internal Angle of Friction / Tangent of Actual Angle of Failure Surface. Using a friction



angle of 45 degrees and an 18.4 degree slope angle, a 3.0 factor of safety was calculated by the Applicant.

- No laboratory strength tests were performed on the soils at the site.
 - No borehole data was submitted with the permit amendment application.
1. The Factor of Safety calculation provided by the Applicant is not sufficient to elevate the slope stability for the amendment application. Please perform stability analysis models on the critical slope configurations during the mining and reclamation for the site.
 2. The required stability analysis models must include surcharge loads from structures, roads topsoil and overburden stockpiles/berms and any other appropriate loads.
 3. The Applicant states in the Mining Plan, the perimeter slopes will be mined at a 2H:1V grade, the mining highwall will be mined at a near vertical slope to the halfway point of the final mining slope and the upper highwall will be knocked down to the final mining slope with a dozer after mining is complete in the area.

Detail 1 on the Exhibit C-3 indicates the mining slope will be mined at a 2H:1V slope from the ground surface to the final depth of the excavation. Please explain this discrepancy and revise the Mining Plan and/or Exhibit C-3 accordingly. The Division recommends all perimeter slopes are mined to the final reclamation slope of 3H:1V.

4. The Applicant state in the Reclamation Plan, all mining slopes will be backfilled and graded to a maximum 3H:1V slope from the mining crest to 10 feet below the groundwater elevation during reclamation.

Detail 1 on the Exhibit C-3 indicates the reclaimed slope at a 3H:1V slope from the ground surface to the final depth of the excavation. Please explain this discrepancy and revise the Reclamation Plan and/or Exhibit C-3 accordingly.

5. The Applicant states the reclaimed slopes will be compacted for stabilization and to prevent erosion. Please describe the earthmoving techniques to be used during the placement and compaction of the backfill material. Additionally, please provide the source of the backfill material to construct the 3H:1V reclamation slope if the entire mining slope is mined at a 2H:1V grade as depicted in Detail 1 on Exhibit C-3.
6. Please update the list of structure in Exhibit S to include the minimum distance between the structures to the excavation limit boundary. Please update the Exhibit C map(s) to indicate the offset distances.
7. Please provide geotechnical borehole data, if available, for the site for Division review.

8. Please provide soil property lab data, if available, for the site for Division review.
9. Please provide the Division with the slope stability monitoring plan to be used during mining and reclamation activities at the site.

The Division will verify the Applicant's stability analysis models using Clover Technology's Galena v7.2 slope stability software following the Applicant's response to this letter.

If you have any questions, please contact me at peter.hays@state.co.us or (303) 866-3567 Ext. 8124.