FREEPORT-MCMORAN

Tyrone Operations
P.O. Box 571
Tyrone, NM 88065

July 26, 2023

Via Electronic Mail

Carmen Rose
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Program
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Ms. Rose:

Re: Response to Comments on the Closure/Closeout Plan,
Tyrone Mine Emma Expansion Project, Revision 21-1, Permit No. GR010RE

Freeport-McMoRan Tyrone Inc. (Tyrone) submitted an application for an expansion to the Tyrone Mine for the Emma Project on October 22, 2021 and Closure/Closeout Plan (CCP) on November 12, 2021. In letters dated April 8, 2022 and April 25, 2023, Mining and Minerals Division (MMD) provided comments on the application and CCP respectively. Tyrone provided responses to the application comments on May 23, 2022 and the CCP comments on June 9, 2022.

On August 16, 2022, a public hearing was held for Revision 21-1, and MMD received written post-hearing comments from the Gila Resources Information Project (GRIP) and members of the public. In a letter dated October 21, 2022, MMD requested that Tyrone respond to the post hearing public comments. Tyrone responded to the public comments on November 21, 2022. MMD also sent these post-hearing comments to the New Mexico Office of the State Engineer (NMOSE) and the New Mexico Environment Department (NMED) on October 21, 2022 and received comments back from both agencies. MMD provided additional comments on the Emma CCP in a letter dated June 13, 2023. This letter is written in response to these comments.

Below are the agency comments in italics followed by Tyrone's responses.

MMD Comments
CCP (November 12, 2021)

1. *Section 3.2, EMW Waste Stockpile, page 16 does not include discussion on stormwater controls with respect to run-off into Oak Grove Wash. Please explain how run-off will be controlled to minimize erosion into Oak Grove Wash during operations.*

   Operational stormwater controls were presented in the applications (both in the Permit Revision Application for Emma Expansion Project, October 22, 2021 {Mining Act Application} and in the Discharge Permit 396 Renewal and Modification for the Emma Expansion Project, October 22, 2021 {DP-396 Application, which is incorporated by reference and is therefore part of the Mining Act Application for appropriate issues addressing Hydrologic Balance}). The DP-396 Application was provided to MMD in a response letter dated May 23, 2022. Post-closure stormwater controls are part of the CCP.

   Mining Act Application Description of Stormwater Controls
   Please refer to Attachment 2 of the application, Page 7 of 19 – mid page you will find a description of stormwater BMPs associated with the EMW Waste Stockpile.

   DP-396 Application
   The use of BMPs is also described in the DP-396 Water Management Plan prepared by Golder, dated October 22, 2021, and included as Attachment IID-1 to the DP-396 Application. A copy of this plan is attached for convenience.

   The EMW Waste stockpile will not be a discharging facility for purposes of the Water Quality Control Commission Ground Water Discharge Permit Regulations. It will be constructed of NPAG waste rock from the Emma Pit in accordance with the Material Characterization and Handling Plan.

2. *Section 3.4, Soil Stockpile, page 17 describes the use of BMPs such as silt berms and created from grubbed brush and rock to capture sediment and reduce soil loss from the stockpile... As described in the MMD Soil and Cover Material Suitability Guidelines, MMD will require mulching of the soil stockpile (either from the grubbed vegetation or commercially available certified weed-free straw or wood mulch) after seeding with the interim seed mix.*

   Comment noted.

3. *Section 5.1.2.2, Conditionally Waived Area, page 25 states that approximately 5.9 acres of the 6HW Waste Stockpile will be located within the conditionally waived area and will*

not be subject to meeting a PMLU or self-sustaining ecosystem. MMD will require that the 6HW Waste Stockpile be reclaimed where feasible from a safety standpoint within the conditionally waived area. As previously discussed in a comment letter from Tyrone dated June 9, 2022, pursuant to Condition 9.E of Revision 09-1 to the Tyrone Mine Permit No. GR010RE, Tyrone will update the Conditional Waiver Area annually during the construction of the 6HW Waste Stockpile.

Per 19.10.5.507 NMAC, Tyrone will reclaim areas that do not meet the criteria for a conditional waiver from meeting the post-mining land use and self-sustaining ecosystem criteria, such as where it is technically feasible and environmentally sound to reclaim.

4. *Section 5.2.2, Planned Closure/Closeout Activities, page 26, discusses the planned reclamation activities within the Emma Pit. Drawing 004 in Appendix A-1 shows flat areas within the Main North Area that are not planned to have any cover material placed. Please provide a map depicting the predicted areas with PAG pit walls and benches at closure.*

   Please see Figure 3-2 (page 91 of 676 in the pdf) of the CCP which shows the areas of the pit predicted to contain PAG. Tyrone has also attached here, Figure 4 from the *Water Quality Predictions for the Emma Pit: Emma Project* report included as Attachment IA-3, to the DP-396 Application dated October 22, 2021.

   As this Permit Revision 21-1 proposes to develop a New Unit open pit subject to §19.10.5.508 NMAC requirements, MMD requests that Tyrone provides additional information on best management practices and most appropriate technologies that could be used to reclaim the Emma Pit. Specifically, MMD will require that Tyrone provide a feasibility analysis for covering exposed PAG material in the haul road and relatively flat areas in the Main North pit at reclamation prior to approval of the Closeout Plan. Tyrone must demonstrate that reclamation of the open pit will assure protection of wildlife to the extent possible using best management practices and most appropriate technologies, pursuant to §19.10.5.508.A and §19.10.5.508.B(2) NMAC, which includes restricting access of wildlife from harmful material as a result of mining.

   Tyrone agrees with the objectives of the rules reiterated in the last sentence of this comment. Tyrone has accomplished this in the proposed CCP with the various components of open pit closeout activities.

   Tyrone met with MMD on July 6, 2023 to discuss this proposed evaluation and gain clarity on the objectives of covering the PAG material. After the discussion, MMD sent a follow-up letter dated July 19, 2023, which stated "*MMD will draft a permit condition based on comment number 4 rather than be required as an additional submittal prior to the Closure/Closeout Plan being deemed technically approvable*." Tyrone agrees that

the permit condition approach will allow more time to understand objectives and criteria to be used in evaluating the MMD's new request.
It is still not clear to Tyrone what the objectives are and how to evaluate the idea because the proposed post mining land use (PMLU) for this portion of the pit is water management, not wildlife habitat. Tyrone has questions about the objectives and whether they are attainable or even desirable in this environment.

5. *Table 7-1, Proposed Interim Seed Mix includes yellow bluestem, a non-native species to North America. As was done with Revision 20-1 to the Little Rock Mine, Permit No. GR007RE, MMD requests that this species be removed from the seed mix, along with any other non-native species to the southwest US region.*

   Yellow bluestem has been removed as an alternate plant species for the seed mix. This change will be made in the final version of this CCP Update.

6. *MMD has met with Tyrone several times to discuss the reclamation cover material to be used at the Emma Pit Expansion project and has provided written comments on the NPAG overburden to be excavated from the Emma Pit in a previous comment letter dated April 25, 2021.*

   For the purpose of this Revision 21-1, MMD will require that Tyrone provide a plan and financial assurance (FA) to address placing a minimum of 6 inches of salvaged soil and 6 inches of Gila Conglomerate reclamation cover material over reclaimed areas exempt from meeting the requirements of the Copper Mine Rule (i.e. NPAG waste rock backfill within the Emma Pit and the EMW waste stockpile). A minimum of three feet of Gila Conglomerate will be required on the 6HW waste stockpile at closure as this stockpile covers PAG material. MMD will require that Tyrone provide the approximate volume of the salvage soil stockpile annually to verify that there is enough material available at reclamation.

   In hopes of expediting approval of the applications and CCP, Tyrone proposed to place 1 foot of salvaged soil over the top of these reclaimed areas at Emma, for FA purposes only, though there is sufficient evidence that shows it is not necessary for reclamation success. Tyrone agrees, for FA purposes only, to place 1 foot of additional cover (which may consist of salvaged soil, Gila Conglomerate, or a combination of both) over reclaimed areas at Emma and this is reflected in the Emma CCP and FA proposal as it stands now. Tyrone suggests that MMD rephrase the requirement wording to say "... *over reclaimed areas exempt from meeting the requirements of the Copper Mine Rule (i.e., NPAG waste rock backfill within the Emma Pit and the EMW and 6HW Waste stockpiles) which may consist of 1 foot of salvaged soil, Gila Conglomerate or a combination of Gila and salvaged soil from the Emma permit area.*".

Per 20.6.7.33.F NMAC, Tyrone has FA for the placement of 36 inches of cover over PAG material located at 6C Leach stockpile (outside pit waiver and OPSDA area) which will be partially covered by the 6HW Waste stockpile. In other words, apart from the 1 foot of cover discussed above, in the current approved Tyrone CCP, there is already 3 feet of cover accounted for over the majority of the 6HW area. However, Tyrone's view is that when the 6HW is constructed in accordance with the approved material handling plan, it will replace the cover currently in the CCP for that area and Tyrone expects it would be accounted for as part of the cover. Tyrone disagrees with the rationale for proposing 3 feet of Gila or salvaged soil over any NPAG stockpile regardless of where it is located.

a. *Please note that Emma Pit overburden is not approved reclamation cover material at this time, and MMD does not consider it the same as Little Rock Precambrian granite overburden until Tyrone has adequately demonstrated its similarly through testing and analysis to MMD. MMD is currently processing two applications (Modifications 22-1) to approve Little Rock Precambrian Granite overburden as reclamation cover material at the Little Rock (Permit No. GR007RE) and Tyrone (Permit No. GR010RE) Mines. MMD will assess the Emma Pit overburden material as reported through the Materials Characterization and Handling Plan (see comment 9 below) to help determine cover material suitability. While data reported from the operational reclamation materials handling plan may provide supporting evidence that the material may be suitable as cover material, it does not necessarily forego the need for a test plot program. MMD will not require Tyrone to construct a test plot program for the Emma Pit overburden material at this time pending evaluation of the material suitability data to be collected by Tyrone. However, during the May 11, 2023 virtual meeting with Tyrone, Tyrone suggested developing a demonstration plot for testing Emma overburden materials as reclamation cover material. Please provide proposed plans for developing a demonstration or test plot program of the Emma overburden material.*

   Tyrone has responded previously that the existing habitat at Emma demonstrates that our proposed reclamation plan (relying on the same geologic materials) will support a self-sustaining ecosystem however, Tyrone agrees to provide a work plan for a demonstration plot. Tyrone will submit the work plan for the demonstration plot within 180 days of the Emma Permit being approved.

Hydrogeologic Report (October 22, 2021)

7. *Pages 9-11, Section 4.2.2 and Table 4, Pumping Tests and Hydraulic Properties. The text provides estimates of drawdown and pumping rates during aquifer tests for three wells. Well 396-2021-02 appears to have incorrectly cited drawdown of 81 feet when*

Appendix C drawdown shows about 59.4 feet at 69 minutes. Given the relatively short duration of the aquifer tests with only one well with a steady flow rate (MB-44), this information may be evaluated as a specific capacity test (Heath, 1983, USGS Water-Supply Paper 2220, Basic Ground-Water Hydrology). Evaluating the transmissivity using a specific capacity relationship, the three wells have similar, relatively low transmissivities at approximately 9.8 ft2/d, 16.5 ft2/d and 15.8 ft2/d. Consider evaluating the field data using specific capacity.

The total drawdown value for well 396-2021-02 is correctly cited. The value is 81 feet and was determined from the transducer data not manual water level data presented in DBS&A (2021) Appendix C because a manual water level was not recorded at the end of the pumping period (69th minute). The next recorded manual value is 383.90 feet. This value was taken 9 minutes after the pump was shut off (78th minute) and the water level had recovered approximately 21 feet.

Issues with applying the specific capacity approach, like the one presented in Heath (1989), are the assumptions used to simply the Theis equation. The assumptions include values for transmissivity, storage coefficient, well radius, and pumping duration. For instance, Heath (1989) assumes a transmissivity value of 11,000 ft^2/d. The assumptions are made to solve the well function in the Theis equation, greatly simplifying it to a relationship where transmissivity is equal to the product of a constant and specific capacity (ratio of pumping rate to total drawdown). The specific capacity approach can be useful when pumping test data are not available but limited drawdown and pumping data are (such as data collected during well construction and development). However, at Emma, pumping test data are available because pumping tests were conducted to determine the hydraulic properties of the water-bearing igneous rocks at different locations. DBS&A analyzed the recovery portion of the pumping test data using a Theis method. This method is more robust and provides better estimates of hydraulic properties than a specific capacity approach.

DBS&A checked the transmissivity values calculated by MMD using the specific capacity approach. DBS&A obtained similar transmissivity estimates as MMD. However, the pumping test analysis and results presented in DBS&A (2021) are still considered more thorough and accurate.

8. *Page 23, References. Consider adding recent publication by New Mexico Tech Aquifer Mapping Project on the Mimbres Basin water levels, which show relatively little change in the area of the Emma Project over several decades: https://geoinfo.nmt.edu/geoscience/research/documents/96/MimbresFactSheet_Nov201.pdf.*

Thank you for bringing this publication to Tyrone's attention. As MMD states, the publication shows little to no change in groundwater levels in the vicinity of Tyrone, which is consistent with water level trends observed at Emma monitor wells. Tyrone has installed a monitor well network at Emma to collect site-specific water level and water quality data. Tyrone is also voluntarily monitoring the water level at a domestic supply well in Apache Mound.

Materials Handling Plan (October 21, 2021)

9. *Life Cycle Geo LLC produced a Material Characterization and Handling Plan for Tyrone as part of the renewal and modification application for DP-396 on October 21, 2021. As the overburden materials for this project are being considered for use as reclamation cover material at mine closure, MMD and NMED have agreed that it would be appropriate for joint-agency review and approval of this plan to incorporate MMD soil suitability criteria for preemptive sampling of materials slated for future use as reclamation cover material. MMD and Tyrone also discussed this during an in-person meeting on March 23, 2023, and the virtual meeting on May 11, 2023. MMD has reviewed the Material Characterization and Handling Plan and provides the following comments:*

    a. *Section 2.1 Geology on page 7 describes the major overburden components consisting of approximately 65% Precambrian Granite, 20% tertiary monzonite porphyry, and 1% other relatively minor lithologies including aplite, hornfels, and diabase dikes. Please explain how differences in these materials will be identified and handled during operations to ensure that materials to be used as reclamation cover material will be separated from materials not suitable for reclamation cover material.*

       The segregation of PAG and NPAG materials is based on the total sulfur content (threshold of 0.2 wt. %) irrespective of lithology. Figure 2 in Section 2.1 shows that the three lithologies that will make up over 90% of waste generated from the Emma Pit (Precambrian granite, Tertiary monzonite porphyry and Aplite) can each have both NPAG and PAG material types. This is based entirely on their sulfur content. There are no discernible differences in environmental behavior among the various lithologies, therefore it is not necessary to segregate/handle materials based on their lithologic classifications; their mineral content is broadly similar (predominantly feldspars and quartz- see Section 3.2.1 of Geochemical Characterization of Emma Waste Rock Materials).

    b. *Please add a section to discuss how overburden will be sampled for MMD cover material suitability criteria (see MMD Soil and Cover Material Suitability Guidelines). MMD will require that Tyrone sample, at a minimum, pH, EC,*

saturation percentage, texture, rock fragment, organic matter, macronutrients, ABA, % base saturation, cation exchange capacity, and extractable metals.

Tyrone agrees that it is of interest to collect data related to texture and chemistry after material is blasted while the stockpile is being constructed and will add a section to the plan to sample suitable overburden materials that are segregated and stockpiled for the parameters listed. Tyrone proposes to collect samples at a similar frequency as the blasthole sampling described in response to MMD Comment 9c (below) at a rate of 1 sample to represent approximately 250,000 tons of waste from the surface of the stockpile during construction. Tyrone anticipates approximately 30 to 40 samples will be collected as part of this program.

c. *Section 5.1 Monitoring Frequency, page 16, states that Tyrone is proposing to submit one random blasthole sample every 250,000 tons of waste rock material. Considering that 20% of this pile is expected to be PAG materials (Section 2.3.7.1 of the November 12, 2021 CCP), please discuss how this sampling frequency was determined and if this frequency will effectively segregate PAG from NPAG materials.*

It is important to distinguish between the confirmatory sampling that is being conducted for compliance purposes vs. operational assaying that is conducted for purposes of material segregation:

- Operational sampling is conducted for essentially every production blast hole. Each production blast hole is assayed for sulfur and other elements. The sulfur content is used to segregate PAG and NPAG materials using the proposed site segregation threshold of 0.2 wt. %.

- Confirmatory sampling for compliance purposes is conducted by way of a random blasthole sample taken for approximately 250,000 tons of rock (approximately 1 in every 100 blast holes). These samples are sent to an outside lab and evaluated for acid-base accounting characteristics (acid generation potential, acid neutralization potential). The objective of this sampling is to confirm the findings of the original Emma characterization program. These samples are described further in the next paragraph.

Designated sampling frequency reflects previous agreements between Tyrone and NMED that have yielded sufficient samples to confirm the overall success of the material handling plan (Characterization and handling plan for 9A stockpile). Section 5.1 indicates that as much as 10 million tons of waste rock could be generated over the five-year Emma mine life. An approximate

250,000-ton frequency indicates that approximately 40 confirmatory blasthole samples will be collected over life of mine (mine plans, tonnages mined, and actual number of samples will vary based on economics). With roughly 20% projected to be PAG, this implies approximately eight PAG samples and approximately 32 NPAG samples. Life Cycle Geo deems this number sufficient to confirm the waste characterization program documented in the Emma Material Characterization and Handling Plan, which also included approximately 40 samples.

d. *Section 5.2 Reporting and Notification Process, page 17. MMD will require that Tyrone report the results of the reclamation materials handling plan to MMD biannually.*

Comment noted.

December 12, 2022 NMOSE Comment Letter

10. *Refer to NMOSE's comment at the top of page two of their comment letter: "Freeport's response to the New Mexico Department of Game and Fish (NMDG&F) on page 7 states that "it is environmentally unsound to backfill the pit to the point that is does not function as a hydraulic sink" and that "[p]umping will be required beyond 100-years" (Freeport, 2022). These statements indicate that water right applications transferred into the Emma Pit will likely need to be evaluated for a 40-year drawdown effects to wells of other ownership and a 100-year effects to surface water bodies."*
Pursuant to 19.10.5.508.B(4), MMD is requesting that Tyrone submit a copy of these evaluations to MMD concurrently with their submittal to NMOSE.

Tyrone has reviewed the NMOSE comments, and they primarily discuss the analyses the Hydrology Bureau of NMOSE will perform as part of Tyrone's water right application and the protest process. Tyrone has already submitted a 40-year drawdown analysis (which has been provided to MMD) as part of the Mining Act and Water Quality Act applications for Emma. There are no surface water bodies in the area to evaluate. As stated in a response to NMED on a related comment (Tyrone's response to NMED dated December 5, 2022), the springs that GRIP referenced on an old USGS map do not exist and are not represented on the most recent USGS map of that area.

Tyrone Response Letter to Post-Hearing Comments

11. *Page 8 of Tyrone's response to post hearing comments letter, dated November 21, 2022, states that a pit water management sump must remain in place post-mining for water management and treatment purposes. Tyrone's plan does utilize partial backfilling to promote water flow and minimize the size of the pit water management sump. Tyrone*

has in fact, proposed to eliminate the small remaining area of exposed water surface at the pit water management sump, by covering it with a floating barrier.

MMD has received comments from the New Mexico Department of Game & Fish (March 11, 2022) and GRIP (September 15, 2022) regarding feasibility studies for partially or fully backfilling the pit to eliminate a pit lake that has the potential to expose wildlife to harmful water. NMED also requested this information in a letter dated October 6, 2022 as part of the DP-396 Renewal and Modification process, suggesting that Tyrone consider a feasibility study of installing a buried vertical turbine well to capture and treat water below the level of backfill at mine closure.

MMD requests that Tyrone provides a feasibility study that considers eliminating the pit lake altogether to stop the risk of wildlife coming into contact with contaminated water. Other mine sites have been able to successfully treat impacted water for partially backfilled pits using best management practices (buried pump sumps), and while Tyrone has not used these techniques for current operations, most appropriate technologies and best management practices must be considered for New Units, pursuant to §19.10.5.508 NMAC.

As stated previously stated, Tyrone has not proposed to allow a pit lake to form and request that agencies and others utilize proper terminology when referring to Tyrone's closure plan to avoid confusion. Tyrone has eliminated a pit lake in its operational and closeout plan already. Now MMD is asking Tyrone to evaluate a different option to achieve the result Tyrone's proposal already achieves. As MMD points out, Tyrone has responded to a similar comment from GRIP, New Mexico Department of Game and Fish, and NMED. Tyrone's responses to those comments remain appropriate but will not be repeated here.

Tyrone met with MMD on July 6, 2023 and communicated that this condition already exists in Discharge Permit 1341 (Condition C110.D). MMD also addressed this in the follow-up letter dated July 19, 2023, stating "*MMD will work with the New Mexico Environment Department (NMED) to jointly review this site-wide feasibility analysis submitted to NMED on September 20, 2022, titled Open Pit Highwall Risk Analysis Work Plan – Tyrone (workplan).*" Tyrone appreciates the agency's review of this workplan which is proposed to include the Emma Project in the analysis.

MMD states that other mine sites have eliminated pit water by backfilling and pumping from below the backfill. Tyrone requests the list of mine sites that MMD referred to so that contact can be made with them to understand why this method was deployed in those cases vs other available technologies. Tyrone also has extensive experience with the technique of pumping from underneath fills. Tyrone will evaluate this method with respect to pit water management at closure in the feasibility study required in DP-1341.

The current plan is to have a small water management sump, as defined in Copper Rule 20.6.7.7.B(8) NMAC at the bottom of the pit that will cover an area of approximately 0.62 acres under normal operating conditions. Additionally, this small water surface is proposed to be eliminated altogether using a floating barrier. Tyrone's proposal is a best management practice and is also a most appropriate technology for use at Emma.

12. *Page 8 of Tyrone's response to post hearing comments letter, dated November 21, 2022, describes covering the entirety of the remaining pit lake surface with a floating barrier. Elaborate on what sort of floating barrier will be used, including life span and financial assurance to account for replacement over the minimum 100-year monitoring period.*

    Tyrone is proposing to cover the exposed water surface with floating plastic devices such as spheres or other geometric shapes to prevent birds from being attracted/exposed to the water surface. As stated before, Tyrone has about two decades of experience utilizing floating barriers like this and has great success in protecting wildlife in this manner. Tyrone will provide additional information as requested in this comment related to useful life, anticipated replacement, and financial assurance at a later date, after the scope of work for the closure cost estimate is close to being finalized.

13. *Page 11 of Tyrone's response to post hearing comments letter, dated November 21, 2022, states that Tyrone will continue to use best management practices that have shown to be effective at other operational sites with respect to lighting, noise, and viewshed concerns. Please summarize what these best management practices are.*

    As stated at the hearing and previous responses, the most important best management practice for these topics is listening to neighbor concerns and following up with neighbors on concerns raised. Tyrone fully implements this key best management practice and will continue to do so. There is no other BMP to discuss for viewshed, however, the following describes some practices that will be implemented at Emma.

    <u>Nighttime Lighting:</u>

    Tyrone provided a map of typical nighttime stationary lighting to be utilized at the Emma project. The light plant locations in that illustration will not be directly visible to most neighbors because they will be below the rim of the pit or blocked by the natural ridge to the south of the project. Tyrone reiterates that the study indicated that the Emma project will not change the night sky classification for any of its neighbors. The light plants on the stockpiles will at times, be visible from vehicles passing by on Highway 90. The following are best management practices that will be used to minimize impacts to our neighbors from nighttime lighting and have been successful in the past, while maintaining safety for Tyrone employees:

- Safety berms at the stockpile crest help block the view of the light source by neighbors
- Directing the light plant away from neighbor residences
- Tyrone has implemented modified shielding for lighting and will consider it at Emma as needed

Noise:

As stated in the Noise Study and Tyrone's CCP comment response letter to MMD dated June 9, 2022, it is unlikely for the Emma project to generate noise related nuisances however, Tyrone will implement the following best management practices regardless and will continue to work with the community to address concerns if they arise:

- Safety berms along haul roads and at the stockpile crest that also work to deflect sound waves
- Eliminate loading equipment horn honking at night to indicate truck is full
- Blasting during daylight hours only

NMED Air Quality Bureau Comments

Tyrone has approved Title V and NSR air permits for Emma that required air dispersion modeling to demonstrate compliance with existing New Mexico and EPA health-based particulate matter standards, the development and implementation of a fugitive dust control plan, limitations on operations and activities to minimize fugitive dust, and visible emissions monitoring measures.

Tyrone already has a Fugitive Dust Control Plan in place, which includes control measures and methods to minimize fugitive dust during drilling, blasting, hauling, and material handling. The control measures and methods listed in the Plan are in line with NMED's September 12, 2022 comments related to the Emma pit expansion project.

Tyrone and NMED ensure compliance with the Dust Control Plan and requirements of the permit through a combination of monitoring, recordkeeping, and reporting requirements, including the observation of visible emissions. Furthermore, NMED conducts periodic inspections of Tyrone, which includes the review of records as well as examining key equipment and locations.

Freeport maintains a Community Information and Grievance Line (phone number) that has been in place for many years and has been well-communicated to the public. As part of Tyrone's on-going outreach efforts, this number is continually shared with community members and they are encouraged to call if they have any concerns about operations, including dust related matters. If community dust complaints are received in the future, whether via that phone number or through other means, Tyrone will determine the source of the dust and respond accordingly. It is important to note that the air dispersion modeling that was conducted in support of Tyrone's air permits shows that operations at the facility will not exceed any particulate matter ambient air quality standards and public health is protected.

Please contact Ms. Raechel Roberts at (575) 956-3290 if you have questions.

Sincerely,

Thomas L. Shelley
Environmental Services Manager

TLS:rmr
20230726-100

c. DJ Ennis – MMD
Anne Maurer – NMED
Brad Reid – NMED

GOLDER
MEMBER OF WSP

REPORT

DP-396 Water Management Plan

Freeport-McMoRan Tyrone, Inc.

Submitted to:

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Freeport-McMoRan Tyrone Inc.
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Tyrone, New Mexico 88065

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October 22, 2021

Table of Contents

TABLES

FIGURES

1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this updated Water Management Plan (Plan) for discharge permit 396 (DP-396) on behalf of Freeport-McMoRan Tyrone Inc. (Tyrone). This updated Plan incorporates the Emma Expansion area and other facilities associated with the Emma Expansion (Emma) that is currently being proposed to be incorporated into DP-396 as part of a permit renewal and modification application. This Plan updates DP-396 specific sections of the *Sitewide Water Management Plan Tyrone Mine* submitted to the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) on May 28, 2021 (Daniel B. Stephens & Associates, Inc. [DBS&A] 2021a). It has been prepared to satisfy the requirements of 20.6.7.30.K NMAC (Interim Emergency Water Management Plan), 20.6.7.17.C(4) NMAC (Stormwater Management Plan), and 20.6.7.24.C NMAC (Mine Operation Water Management Plan).

1.1 Purpose

The purpose of this updated Plan is to describe water management systems within DP-396 and the proposed expanded area associated with Emma. The Plan incorporates requirements specified in the following subsections of 20.6.7 NMAC:

- *20.6.7.30.K NMAC: Requires permittees to submit an interim emergency water management plan that provides information on how process water systems, interceptor wells, seepage collection systems, and stormwater management systems are operated and maintained to prevent discharges. The plan must include process water flow chart(s) and provide electrical system requirements.*
- *20.6.7.17.C(4) NMAC: Requires permittees to submit stormwater management plans and specifications to limit run-on of stormwater and manage impacted stormwater in a manner that prevents water pollution that may cause an exceedance of the applicable standards. The plan must consider the amount, intensity, duration, and frequency of precipitation, as well as watershed and runoff characteristics.*
- *20.6.7.24.C NMAC: Requires permittees to submit a mine operation water management plan that specifies management practices for water generated from within the perimeter of the open pit and pit dewatering activities.*

1.2 Plan Organization

Portions of the information in this Plan specific to the existing DP-396 facilities have been reproduced from the document *Sitewide Water Management Plan Tyrone Mine* (DBS&A 2021a), as well as the document *Freeport-McMoRan Tyrone Inc. Stormwater Handling Plan/Emergency Response Plan for Tyrone and Little Rock Mine Areas* (Tyrone 2015). The remaining subsections in Section 1 describe specifics of the Tyrone Mine, including the mine power system, mine pipelines, and site maintenance. Section 2.1 details the interim emergency water management plan for the existing DP-396 area and the proposed Emma area to meet the requirements of 20.6.7.30.K NMAC. Section 2.2 outlines the stormwater management plan for DP-396 in accordance with 20.6.7.17.C(4) NMAC, including estimates of stormwater runoff volumes calculated from the National Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) curve number (CN) method (SCS-CN method) (NRCS 2004) and the various rainfall events. The stormwater runoff calculations for the Emma area are detailed in the *Hydrogeologic Report for Proposed Open Pit at Emma Exploration Project* recently submitted to the NMED in support of the DP-396 permit revision and modification application (DBS&A 2021b). The final section of this report (Section 2.3) provides specific information regarding open pit water management associated with the proposed Emma Pit in accordance with 20.6.7.24.C NMAC.

1.3 General Tyrone Mine Site Description

Figure 1 identifies the Tyrone Mine area, including the proposed DP-396 boundary and the perimeter of the proposed Emma Pit. In general, Tyrone inspects relevant stormwater impoundments, conveyance channels, and collection ponds outside the operational open pit surface drainage area on a quarterly basis, and as soon as practical following precipitation events exceeding 1 inch in 24 hours as determined by the nearest appropriate rain gauge(s).

1.4 Tyrone Mine Power System

As described in the *Sitewide Water Management Plan Tyrone Mine* (DBS&A 2021a), under normal operating conditions, the power system for the Tyrone Mine is a radial 15 kV feed from the local utility, which originates at the utility's Turquoise substation. The 115 kV line enters the Tyrone Mine at Tyrone's Y substation (Y-Sub). If power is interrupted, the following steps are typically taken:

- Tyrone Operations personnel contact the Tyrone Electrical Department to evaluate the problem.
- If the problem is determined to be internal to Tyrone, the Tyrone Electrical Department will address the problem and call out additional support as needed.
- If the outage is not Tyrone related, Tyrone will contact the utility to determine the cause of the outage and the anticipated time to restore power.

Tyrone's primary fluid management and containment facilities have contingencies and are designed to contain the 100-year, 24-hour storm event and contain 24 hours of operational inflow when empty. The standard operating condition of any one containment facility is to use some of the design capacity for operations; therefore, the process containments may have slightly less than 24 hours before reaching capacity under a continual flow condition when no power is available. If the outage is extended, the Tyrone Electrical Department will implement emergency power procedures. Secondary to operational safety, environmental protection from a potential release of process fluids (particularly pregnant leach solution [PLS] and raffinate) will have the highest priorities in case of an extended power outage. Most of Tyrone's operations reside within the surface water drainage areas (OPSDA) of the various mine pits. Thus, the highest risk of an environmental release is from the containments surrounding the leach stockpiles that are outside of the operational open pit surface drainage areas. Upset conditions associated with each containment in DP-396 are described in Section 2.1.

In an unplanned power outage, Tyrone's Electrical Department will prioritize restoring power to:

- PLS containment facilities that (1) cannot be safely drained by gravity and (2) are projected to release the most PLS beyond secondary containment (this may or may not be the containments that are most full, depending on the operational status of the facility).
- Contact stormwater ponds that have the highest likelihood of overtopping and releasing the greatest amount of process water.

Tyrone's backup generator system has the capacity to provide approximately 22 MW of power, and that power could be routed to the main circuit of the identified priority systems.

1.5 Tyrone Mine Site Maintenance

As described in the *Sitewide Water Management Plan Tyrone Mine* (DBS&A 2021a), maintenance associated with normal operating conditions of the SX/EW Plant and Tyrone Mine area pumps, reservoirs, and ponds is performed by Tyrone's Maintenance Department. The Maintenance Department is responsible for maintaining the pumps and keeps spare parts in inventory for critical units to balance parts availability with the likelihood of required repairs. The Maintenance Department also keeps records of the routine and preventive pump maintenance. The preventive maintenance schedule for the pumps maintained by the Maintenance Department varies from weekly to monthly. Tyrone Operations personnel inspect the critical pumps regularly to ensure that they are in proper operating order. This information is recorded on the Off-Site Checklist. It is the responsibility of the Operations Department shift supervisor to report any pump maintenance issues immediately to the Maintenance Department.

Routine inspections provide information on spills and containment levels. If a sudden loss of pressure/flow occurs (indicating a possible pipeline leak), related pumps are shut down to isolate flows, and an investigation is initiated to determine if a pipeline has failed and what repairs may be needed.

1.6 Tyrone Mine Pipelines

Figure C-1 in Appendix C of the current *Sitewide Water Management Plan* (DBS&A 2021a) shows the general flow of Tyrone's process waters. Process waters are transferred via pipeline. Aboveground pipelines are routinely visually inspected. Process water pipeline flows and pressures are centrally monitored. In the event of a detected pipeline leak, necessary pumps are shut down to initiate repairs. The nature and location of the leak, along with appropriate follow-up actions to contain, pump, or transfer fluids into the mine process water circuit, are implemented. Failed components are repaired or replaced as soon as possible. If process waters are released to an unauthorized area with a reasonable probability of reaching surface water or groundwater (in such quantity that it may, with reasonable probability, injure or be detrimental to property, human health, or animal or plant life, or may unreasonably interfere with the public welfare or use of the property), Tyrone will follow state reporting procedures as outlined in 20.6.2.1203 NMAC.

2.0 DP-396 WATER MANAGEMENT PLAN

DP-396 currently consists of the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles and additional supporting infrastructure including the 1C Seepage Collection Systems, the 7A Seepage Collection Systems, the Oak Grove Pond, and the 1C Stormwater Pond. Tyrone is seeking authorization to construct new facilities in DP-396, including the proposed Emma Pit and dewatering system, EMW Waste stockpile, 6HW Waste stockpile, new Northern Emma Haul Road, new Southern Emma Haul Roads, and supporting infrastructure.

In accordance with Tyrone's 2021 Multi-Sector General Permit (MSGP), the Tyrone Storm Water Pollution Prevention Plan (SWPPP) mandates the implementation of Best Management Practices (BMPs) during construction, such as berms, catchment basins, road grading, and wattles. These BMPs will be implemented for new facilities being constructed as part of the Emma project. The SWPPP also mandates stormwater management and control during operations. The SWPPP establishes monitoring and inspection requirements, control measures, and BMPs to stormwater discharges. Acid and other toxic substances will not be used on the Emma facilities.

2.1 Interim Emergency Water Management Plan

The following subsections detail the facilities associated with DP-396 and the Emma area.

2.1.1 Open Pit

The proposed Emma Pit is anticipated to encompass approximately 118 acres of private land (**Figure 2**). Tyrone has included an additional "pit buffer" area to allow for slight deviations in the pit configuration that may occur in actual construction and minor mine management utilities. This pit buffer area is referred to as the "Proposed Emma Open Pit Boundary" on **Figure 2**. The total area within the Proposed Emma Open Pit Boundary is approximately 200 acres (including the pit itself). The open pit will be mined in 50-foot benches, creating a terraced/benched pit wall that will ultimately extend to a depth of approximately 5,700 feet above mean sea level (ft amsl) and have one or more flat bottoms. Approximately 6.3 acres of the northern portion of the pit will be covered over with the EMW Waste stockpile. It is anticipated that regional groundwater will be encountered as the pit is advanced from a level of approximately 6,000 ft amsl to a level of approximately 5,700 ft amsl.

2.1.2 Stockpiles

DP-396 currently includes the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles. Additionally, Tyrone is proposing to construct two new non-discharging waste rock stockpiles using waste rock from Emma Pit. The proposed stockpiles are identified as the EMW Waste and 6HW Waste stockpiles, and will be constructed in accordance with the Material Characterization and Handling Plan for Two Non-Discharging Facilities (Life Cycle Geo, LLC [LCG] 2021b), that is included as Attachment IID-2 of the DP-396 permit renewal and modification application. The proposed EMW Waste and 6HW Waste stockpiles will not be discharging facilities for purposes of the Water Quality Control Commission Ground Water Discharge Permit Regulations because they will be constructed of non-potentially acid generating (NPAG) waste rock. The proposed EMW Waste stockpile will occupy approximately 54 acres during operations (**Figure 2**). The proposed 6HW Waste stockpile will also occupy approximately 54 acres during operations (**Figure 2**).

2.1.3 Haul Roads

DP-396 currently includes portions of the operational haul road that runs along the northern boundary of the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles. Additionally, as part of Emma, new haul roads will be constructed, the Northern Emma Haul Road and the Southern Emma Haul Roads (**Figure 2**). The proposed Northern Emma Haul Road will be situated north of the existing Tyrone Road/Burro Mountain Road, and will be constructed as a non-discharging unit. Although the haul road will be constructed in a non-discharging fashion, portions of it will be located on top of the existing reclaimed 7A Waste stockpile. Some haul road areas on the reclaimed 7A Waste stockpile will require cuts into the existing cover material to establish proper grade for the haul road. These cuts will temporarily expose potentially acid generating (PAG) materials. Tyrone will manage haul road construction to ensure that PAG materials are capped with at least 3 feet of approved cover material to prevent discharges of impacted water. Additionally, Tyrone will salvage and reuse approximately the top 2 feet of existing approved cover material from the cut areas of the reclaimed 7A Waste stockpile to cap any exposed PAG materials. Remaining portions of the Northern Emma Haul Road will be constructed using native materials from the Upper Oak Grove area and materials that have previously been approved as reclamation cover from the CSG Waste and 5A Waste stockpiles.

All capping and fill materials intended for construction of Northern Emma Haul Road have been demonstrated to be non-acid-generating, as follows:

- Twelve samples from Mohawk Area in-situ benches (eight) and Gila cover material (four) stockpiled at the base of the 5A Waste stockpile were collected and characterized by Golder (2019) to assess their long-term acid rock drainage (ARD) potential. No visible sulfides were observed in all 12 samples, and

sample surface pH values ranged from 6.5 to 7 indicating none were currently acid generating. More importantly, all 12 samples had total sulfur concentrations near the lower detection limit, ranging from 0.02 to 0.05 wt. %. The samples have extremely low sulfur concentrations and will never become acid generating.

- Four samples representing native Upper Oak Grove materials were collected by Tyrone in 2021 to quantify their ARD potential. Sample locations and total sulfur concentrations are provided below in **Figure 3**. All four samples have low total sulfur concentrations (0.02 to 0.16 wt. %), below the total sulfur threshold proposed for segregating acid from non-acid generating materials (LCG 2021a), indicating that native Upper Oak Grove materials have no ARD potential.

Figure 3: Locations and Total Sulfur Concentrations of Native Upper Oak Grove Samples Collected in 2021

In the area where the Northern Emma Haul Road crosses Upper Oak Grove Wash, culverts and fill will be installed to allow stormwater to flow beneath the haul road. Sources of fill material will include only materials that were previously approved as reclamation cover originating from the CSG Waste or 5A Waste stockpiles or native materials from Upper Oak Grove. The conceptual designs for the Oak Grove Wash Crossing are included in Appendix A of the *Emma Expansion Project Closure Closeout Plan* that is included as Attachment IIF-1 of the DP-396 permit renewal and modification application.

2.1.4 Process Water Management

The following process water management facilities and associated infrastructure are related to DP-396 (including the proposed Emma Expansion area):

- 1C Seepage and 7A Seepage Collection Systems: The 1C Seepage and 7A Seepage Collection Systems are located along the toes of the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles, generally along

the southeastern perimeter of the Tyrone Mine. They collect seepage and impacted groundwater and convey it to the 1A PLS Collection Tank in DP-363. From there, the fluids are pumped into Tyrone's process water circuit. The two systems are equipped with a series of concrete and plastic vaults for solids settling. Sediments may be removed from the vaults with a vacuum truck as needed and transported to a permitted leach stockpile for disposal.

The 7A Seepage Collection System is comprised of several individual seepage collection facilities including the 7R1A, 7R1B, 7R2A, 7R3A, and 7R4A Seepage Collection Systems. The 7R2B Seepage Collection System also connects to the 7A Seepage Collection System, but is monitored and regulated pursuant to DP-455. Seepage collected in the 7A Seepage Collection System can be diverted into the Oak Grove Pond if needed during upset conditions. The Oak Grove Pond is described below.

The 1C Seepage Collection System is comprised of the 1C-1, 1C-2, 1C-3, 1C-3A, 1C-3B, 1C-3C, 1C-3D, 1C-3E, and 1C-4 seepage collection trenches. These facilities are described in greater detail in the *Sitewide Water Management Plan Tyrone Mine* dated May 28, 2021 (DBS&A 2021a).

- *Oak Grove Pond*: The synthetically lined Oak Grove Pond is located in Upper Oak Grove Wash, south of the reclaimed 7A Waste Rock Stockpile. It has a capacity of approximately 380,000 gallons. Seepage from the 7A Seepage Collection System can be diverted into the Oak Grove Pond if needed during upset conditions. The Oak Grove Pond is equipped with a submersible pump that Tyrone operates with generators, as needed, to remove water from the pond. During normal operating conditions, seepage from these systems gravity flows past the pond and on to the 1A PLS Collection Tank in DP-363. A mobile generator is used to operate the submersible pump, as no other power source is available nearby. The pond is monitored regularly by Tyrone Mine personnel or other contracted support.
- *1C Stormwater Pond*: The 1C Stormwater Pond is located at the base of the reclaimed 1C Stockpile and southwest of the 1A PLS Overflow Pond. It has a capacity of approximately 9,744,000 gallons. Stormwater in this pond is conveyed to the 1A PLS Overflow Pond. System details related to the existing DP-396 process water facilities are summarized in Table D-5 of the *Sitewide Water Management Plan* (DBS&A 2021a).
- *Emma Pit Sump*: A dewatering system will be installed near the bottom of the Emma Pit that will pump surface water and ground water that accumulates within the pit sump during operations, which will allow the mine to operate during normal activities within the open pit and during rain events. During operation and throughout the post-closure period collected waters will be pumped from the pit sump and conveyed to the existing 1C Seepage and 7A Seepage Collection Systems via a new 4-inch diameter DR-11 HDPE Pipeline (the Emma pipeline). From the 1C Seepage and 7A Seepage Collection Systems, the collected water is conveyed to the 1A PLS Collection Tank and then used in the Tyrone Mine process water management system during operations. During the post-closure period, the conveyed water will be incorporated into the Tyrone Mine closure water management and treatment system (Golder 2020). It is anticipated that the Emma Pit sump will be equipped with a floating barge pump. Pump operations will be automated and monitored remotely at the SX Control Room.

2.2 Stormwater Management

Tyrone is designing the Emma haul roads as non-discharging facilities. During construction, Tyrone will clear and grub the proposed haul road route. As described in Section 2.1.3, portions of the Northern Emma Haul Road will be located on top of the existing Reclaimed 7A Waste stockpile. The north portion of the Northern Emma Haul Road (station 28+00 to 40+00, approximately) may require cut into the Reclaimed 7A Waste stockpile. This cut

operation may expose potentially acid generating (PAG) material during construction. Tyrone will open a repository for the excavated PAG material on the top surface of the Reclaimed 7A Waste stockpile, to the east of the cut area. Tyrone will salvage and store up to two feet of the existing cover from the cut sections and the PAG repository nearby to be re-used as cover. They will haul any additional cover needed from approved areas of the CSG Waste stockpile or 5A Waste stockpile.

Tyrone will manage haul road construction to ensure that PAG materials are capped with approved cover material to prevent discharges of impacted water. To ensure that no discharge occurs during construction of this portion of the road Tyrone commits to:

- Construct road and place cover from station 28+00 to 40+00 ONLY during dry weather
- Cover exposed PAG cut sections of the haul road with a minimum of three feet of cover prior to any wet weather event
- Expose no more than 200 feet of the road segment at a given time
- Stockpile sufficient volume of cover for at least 200 feet of road segment with three feet of cover adjacent to the project site at all times while working from station 28+00 to 40+00
- Document and retain, for quality assurance review, a daily record of weather conditions and construction activities (including a record of station segments with exposed PAG) between Stations 28+00 to 40+00.

Tyrone is also designing the EMW Waste and 6HW Waste stockpiles as non-discharging facilities. They will be constructed of NPAG waste rock from the Emma Pit in accordance with the *Material Characterization and Handling Plan For Two Non-Discharging Facilities: Emma Project* (LCG 2021b). This Plan is included as Attachment IID-2 to the DP-396 permit renewal and modification application.

Potential sediment releases from DP-396 and Emma facilities will be managed during construction, throughout operations, and throughout the closure and post-closure periods in accordance with Tyrone's MSGP and SWPPP. Stormwater BMPs may include, but are not limited to, berms, catchment basins, sediment basins, road grading, and wattles. Recent experience associated with the Cobre haul road construction project have provided additional proven methods of reducing sediment loads in stormwater runoff waters. The method involves the placement of slash and rock piles associated with initial clearing and grubbing operations at the downstream toes of constructed facilities. These methods will also be employed at Emma as a stormwater BMP.

2.2.1 Precipitation Events

A drainage divide exists between the Gettysburg Pit and Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles (Figure 6 in Appendix B1 of the *Sitewide Water Management Plan* (DBS&A 2021a). Stormwater flow from the design event on the north side of this divide is captured and contained by the Gettysburg and other open pits. South of the divide, the design storm would fall entirely on the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles. The storm volume resulting from the design storm (3.75 inches) was estimated by Telesto for the DP-396 area (Appendix B2 of the *Sitewide Water Management Plan* (DBS&A 2021a). As shown in **Table 1**, the Reclaimed 1C Waste and Reclaimed 7A Waste stockpiles could generate approximately 27.2 acre-feet of stormwater. The catchment upgradient of Oak Grove Pond could generate approximately 0.4 acre-feet from the design storm. The storm volume resulting from the design storm was also recently estimated by Daniel B. Stephens & Associates, Inc. (DBS&A) for the Emma Pit (DBS&A 2021b), and these estimates are provided below in **Table 1** and discussed in Section 2.3

Table 1: DP-396 Facility Stormwater Runoff Estimates and Collection Areas

Sub-Basin (Reporting to)	Area (acres)	Projected Runoff (acre-feet)
1C Waste Rock Stockpile	68.9	6.9
7A Waste Rock Stockpile	201.6	20.3
Oak Grove Pond	4.4	0.4
Emma Pit Main North (Pit Sump)	116.3	32.4

2.2.2 Upset Conditions

Seepage water from the four westernmost collection systems (7R1A, 7R1B, 7R2A, and 7R2B [DP-455]) can be discharged into Oak Grove Pond if needed during upset conditions. Oak Grove Pond is HDPE lined (60-mil) and has a capacity of approximately 380,000 gallons (1.2 acre-feet). Flow from Oak Grove Pond is pumped via pipeline to the 1A PLS Collection Tank. The Oak Grove Pond has enough capacity to contain the design storm runoff from the contributing watershed. A generator is located at the pond used to operate the pump, so it is not susceptible to a prolonged power outage during a heavy rain. The 1C Stormwater Pond collects stormwater from the reclaimed 7A Waste Rock Stockpile and non-disturbed contributing areas to Oak Grove Wash. Stormwater runoff from the non-discharging EMW Waste stockpile, Northern Emma Haul Road and Southern Emma Haul Roads once they are constructed will be directed to the nearest stormwater management BMP and then to the nearest natural drainage. Stormwater runoff from the non-discharging 6HW Waste stockpile will either be contained at the stockpile toe due to natural topography (e.g., hills and depressions) or will ultimately be captured in the Gettysburg Pit, which has more than adequate capacity to contain the runoff volume generated.

2.3 Open Pit Water Management

Mining operations will be conducted in accordance with the Emma Project material characterization and handling plan recently completed by LCG (2021b). As part of the Emma Pit water management plan, NPAG waste rock mined from the Emma Pit will be placed within the upper bench areas of the pit (Upper North, Upper South and Upper East areas) and within accessible portions of the South Main area during mine operations to promote surface water runoff toward the pit sump. The remaining portion of the South Main area will be backfilled with NPAG waste rock from the EMW Waste stockpile at closure and then all backfill areas (Upper North, Upper South, Upper East, and South Main) will be graded to drain toward the Emma Pit sump. A one-foot thick layer of soil material from the Soil Stockpile will be placed over all pit backfill areas surfaces to enhance the seedbed at the surface and then the areas will be revegetated in accordance with Appendix C of the MMD Permit GR010RE and applicable modifications. An operational sump with a barge pump will be maintained at the bottom of the Emma Pit during operations and in the closure/post-closure period, where stormwater runoff and groundwater inflow will be collected and ultimately conveyed to the No. 1A PLS Collection Tank (DP-363) for processing.

DBS&A (2021b) developed a water balance model for the proposed Emma Pit, using the GoldSim simulation software package. The purpose of the water balance model was to determine whether a pit lake would form within the Emma Pit at closure if Tyrone were to stop dewatering and to estimate water inflow rates and potential pit lake volumes under this scenario. The Main North area of the Emma Pit is the is located in the deepest portion of the open pit, which will be below the pre-mining groundwater level elevation (i.e., groundwater inflow is expected). This are is where the Emma Pit sump is located and the area that would have the greatest potential to form a pit

lake if dewatering was not conducted The catchment area of for the Emma Pit is approximately 116.3 acres (**Table 1**).

The water balance model predicts that a pit lake would form within the North Main area in the absence of any dewatering. The average simulated pit lake water level elevation is 5,714 ft amsl, with a maximum simulated elevation of 5,720 ft amsl. The simulated pit lake covers approximately 2.5 acres and is up to 20 feet deep. The pit lake, if allowed to form, would be expected to be a terminal sink, as the simulated water level elevation of the lake (5,720 ft amsl) would be below the interpolated groundwater level elevation along the east side of Emma (5,780 ft amsl).

As previously noted, an operational sump with a barge pump will be maintained at the bottom of the proposed Emma Pit, where storm water runoff and groundwater inflow will be collected and ultimately conveyed to the 1A PLS Collection Tank (DP-363) for processing. The average annual total inflow (surface water and groundwater) rate to the Emma Pit sump is estimated at approximately 20 gallons per minute (gpm), and the estimated maximum annual total inflow rate is approximately 35 gpm (DBS&A 2021b). For planning purposes, Tyrone has assumed that an average of 20 gpm of water from the Emma Pit would be conveyed to the 1A PLS Collection Tank for processing to allow for the management of stormwater pulses that may occur. The dewatering system will be sized to handle flows up to 40 gpm to manage larger stormwater runoff events that may occur.

The upper bench areas of the Emma Pit (Upper North, Upper South and Upper East areas) will receive surface water runoff during certain storm events. As shown in **Figure 2**, the Upper East and Upper South areas are higher in elevation and upstream of the Main South area. Therefore, any surface water flows from the Upper East and Upper South areas is expected to flow toward the Main South area. The Upper North and Main South areas are higher in elevation and upstream of the Main North (pit sump) area. Therefore, any surface water flows from the Upper North or Main South areas is expected to report to the pit sump in the Main North area.

3.0 REFERENCES

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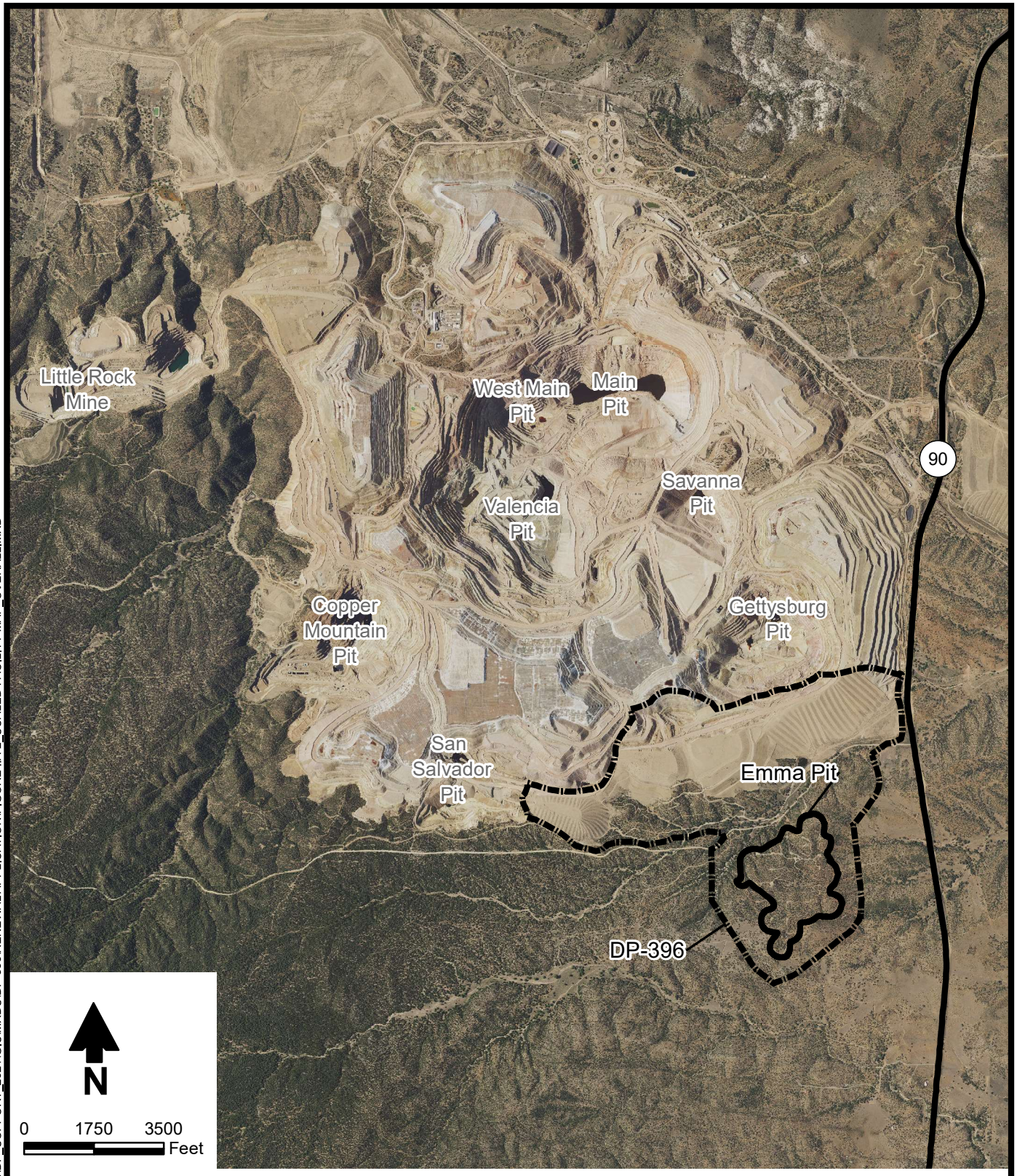
Figures



Source: Aerial imagery (NAIP, 2020)

Explanation

DP-396 boundary

Proposed Emma Pit boundary

FREEPORT-MCMORAN

TYRONE MINE

Scaled Facility Map: Overall Tyrone Mine

Figure 1

DBS&A

Daniel B. Stephens & Associates, Inc.

10/12/2021

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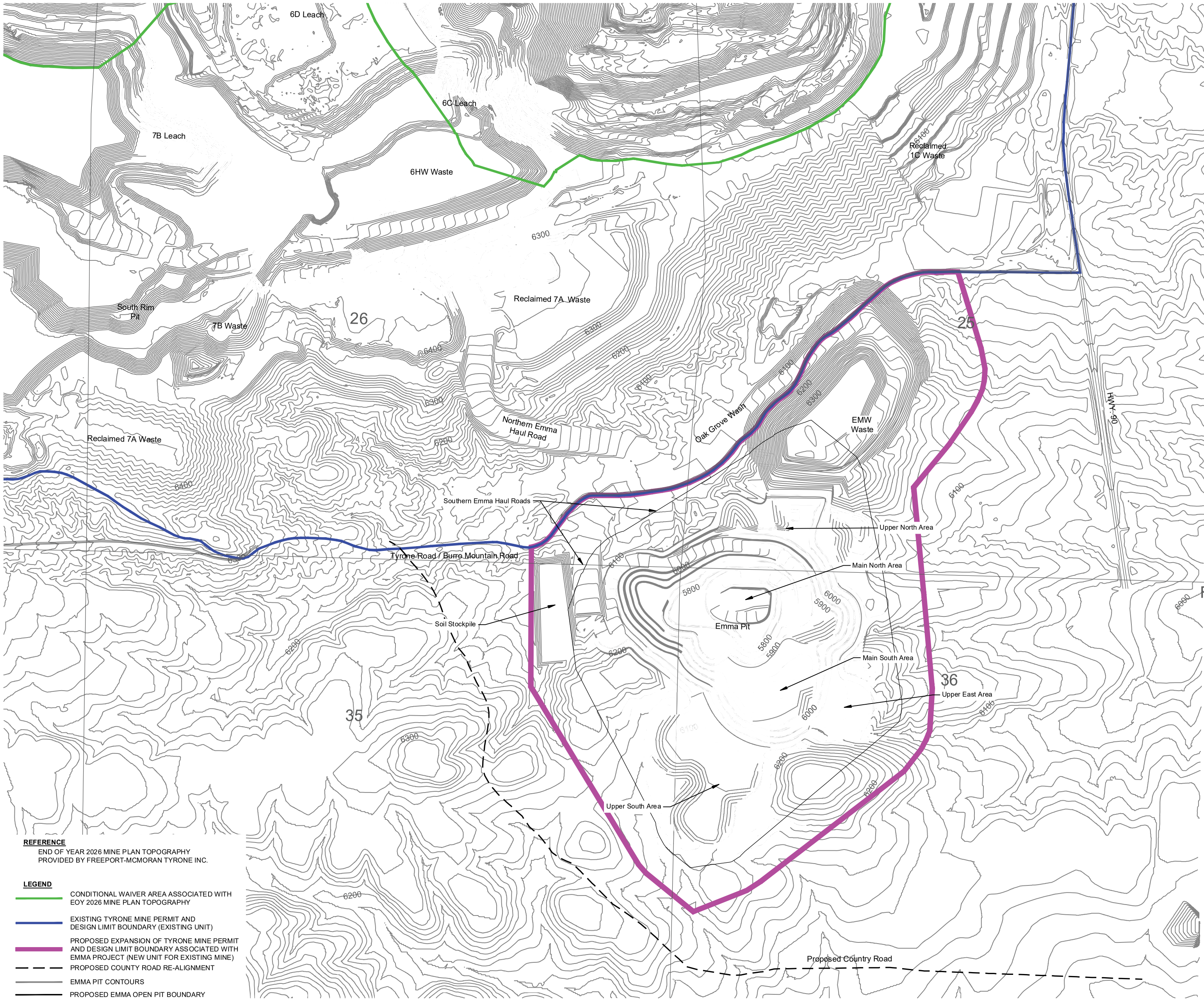

REFERENCE
END OF YEAR 2026 MINE PLAN TOPOGRAPHY PROVIDED BY FREEPORT-MCMORAN TYRONE INC.

LEGEND
- CONDITIONAL WAIVER AREA ASSOCIATED WITH EOY 2026 MINE PLAN TOPOGRAPHY
- EXISTING TYRONE MINE PERMIT AND DESIGN LIMIT BOUNDARY (EXISTING UNIT)
- PROPOSED EXPANSION OF TYRONE MINE PERMIT AND DESIGN LIMIT BOUNDARY ASSOCIATED WITH EMMA PROJECT (NEW UNIT FOR EXISTING MINE)
- PROPOSED COUNTY ROAD RE-ALIGNMENT
- EMMA PIT CONTOURS
- PROPOSED EMMA OPEN PIT BOUNDARY

REV.	MM/DD/YY	DESCRIPTION	DESIGN	CADD	CHECK	REVIEW
0	2021-10-04	-		SIB		

SEAL

CLIENT
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PROJECT
EMMA EXPANSION PROJECT

TITLE
LAYOUT OF EMMA FACILITY AT THE END OF YEAR 2026

PROJECT NO. 21-476949 | REV. 0 | of | FIGURE 2

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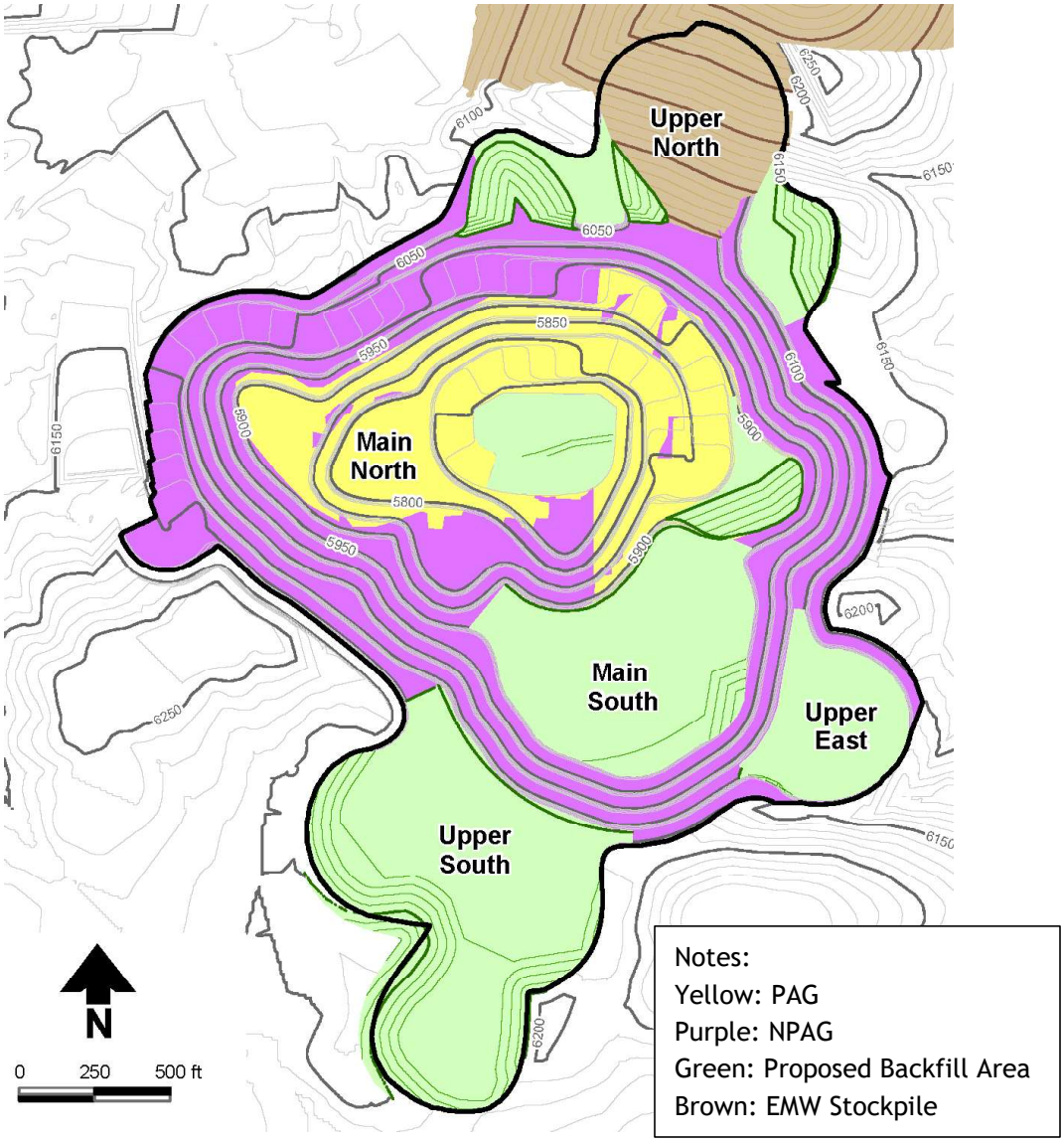

Figure 4: Proportion of NPAG and PAG material in the Emma Pit at closure (adapted from DBS&A 2021)