COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

January 17, 2024

Mr. Phillip Courtney
Martin Marietta Materials, Inc.
1627 Cole Boulevard, Suite 200
Lakewood, CO 80401

Re: Thunderbird Sand and Gravel, File No. M-2023-032, 112 Construction Materials Reclamation Permit Application, Preliminary Adequacy Review

Dear Mr. Courtney:

The Division of Reclamation, Mining and Safety (Division) completed its preliminary adequacy review of your 112 Construction Materials Reclamation Permit Application submitted for Thunderbird Sand and Gravel in Pueblo County. The Division called the application "complex" on October 31, 2023, in accordance with Rule 1.4.1(7), thereby extending the application decision date 60 days beyond the usual 90-day period. The current decision date for the application is set for March 2, 2024.

The Division's review consisted of comparing the application content with the requirements of the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials. The Division has identified the following adequacy items in the application which require clarification or additional information:

Rule 6.2.1(2)(e) General Requirements – Maps and Exhibits

1) The Exhibits C and F maps do not meet the scale requirements that "the acceptable range of map scales shall not be larger than 1 inch = 50 feet nor smaller than 1 inch = 660 feet". The Division found the scale for these maps to be approximately 1 inch = 900 feet. Please reformat these maps to meet the scale requirements.

Rule 6.4 Specific Exhibit Requirements – 112c Reclamation Operation

<u>Rule 6.4.1 Exhibit A – Legal Description</u>

2) An "Exhibit A Map" is referenced under the "Mining Permit Boundary" section, but there is no Exhibit A Map provided with the application. Please provide an Exhibit A Map that meets the requirements of Rule 6.4.1(2).

Rule 6.4.2 Exhibit B – Index Map

3) The mine entrance coordinates provided in the application (including on the Index Map) plot to the north of the Excelsior Ditch, at the northwestern corner of the proposed permit boundary. However, on the Index Map, the site entrance is shown to be located south of the Excelsior Ditch, at the southwestern corner of the proposed permit boundary. Please correct this discrepancy by ensuring the mine entrance coordinates correlate with the location depicted on site maps, including the Index Map. If the main site entrance were to change after the permit is issued, this change could be incorporated into the permit through a Technical Revision.

4) Please clearly label all roads and other access to the area on this map. For example, the label for Baxter Road appears to be mislocated.

Rule 6.4.3 Exhibit C – Pre-mining and Mining Plan Map(s) of Affected Lands

Exhibit C1 Map:

5) Please show the owner's name, type of structures, and location of all significant, valuable, and permanent man-made structures contained on the area of affected land and within 200 feet of the affected land, per Rule 6.4.3(g). Some structures are accounted for such as Pueblo County's Baxter Road, Black Hills Energy's overhead electric, and Arkansas Groundwater and R. Assoc.'s Excelsior Ditch. However, there are structure owners identified in the table, including Premier Auto Body Repair LLC and Meadowbrook MHP LLC for which, the type of structure(s) owned by these entities (e.g., building, road, fence) are not labeled on the map. Additionally, in looking at recent aerial imagery of the site in Google Earth, there appear to be other structures located on and within 200 feet of the proposed permit area, such as fencing, buildings, roads, above ground utilities, and two small ponds (described in Exhibit G as "unnamed ponds") which are not labeled on the map. Please be advised, all existing structures must be identified on the map in accordance with Rule 6.4.3(g), including those owned by the applicant.

6) Please ensure all existing wells located on and within 200 feet of the proposed affected land are identified on this map. If any of the existing wells located on the proposed affected land will be utilized by the operation in any way, these wells should also be labeled on the Exhibit C2 map.

7) The location of some of the existing structures, such as roads and above ground utilities, are difficult to identify on the map. This could be due to the thin lines used to delineate them being marked over a satellite image of the site, making it difficult to differentiate these lines from the background. The satellite image provided is very helpful in showing pre-mining conditions; however, the Division will require a map where the items listed in the Legend are clearly delineated. Perhaps altering the scale of the map, changing the line style/thickness, and/or

providing a black/white satellite map would correct this issue. Please revise this map to ensure that all required features are legibly portrayed.

Exhibit C2 Map:

8) Please identify all proposed locations for topsoil storage, overburden storage, and mined material storage on this map.

9) Please ensure this map shows the anticipated location of all features of the proposed mining operation, including but not limited to, all roads, excavation areas, processing areas, stockpile areas, equipment storage areas, parking areas, facilities/buildings, stormwater management structures, monitoring wells, water diversions, water impoundments, and discharge points.

10) Please delineate the proposed maximum disturbed area on this map (as was done with the proposed affected area). Please ensure the maximum disturbed area includes all lands to be disturbed in some way by the operation, and that it correlates with the proposed mining and reclamation plans and cost estimate.

11) This map shows "screening berms" will be placed along the northwestern edges of the proposed permit area. However, it is not clear how this portion of the permit area will be accessed by the operation. The map shows a minimum 80-foot buffer will be maintained from the Excelsior Ditch which crosses this portion of the permit area, and the proposed mine entrance is located on the south side of this ditch. Please ensure this map shows how all proposed disturbance areas (including lands disturbed by the screening berms) will be accessed by the operation.

12) In the Notes section at the bottom of this map, Item #2 states "River bank location will be evaluated with pending survey". The application does not discuss a pending survey. Please clarify what type of survey will be performed and when it is expected to be completed.

Exhibit C1 and C2 Maps:

13) Please refer to Item #1 above regarding the map scale.

14) Please ensure the proposed mine entrance location and coordinates are accurate. As with the index map, the coordinates provided on these maps (which plot at the northwestern corner of the proposed permit area) do not correlate with the location shown (at the southwestern corner of the proposed permit area).

15) The proposed affected area shown on these maps appears to be set equal to the proposed permit area of 543.5 acres. However, based on the proposed disturbances described in the application and depicted on the Exhibit C2 map, the eastern half of the proposed permit area,

as well as portions in the northwestern and southern areas will not be disturbed by the operation. Please clarify whether the applicant is proposing an affected area set equal to the permit area, as depicted on these maps. If this is not the case, then please revise the maps accordingly.

Rule 6.4.4 Exhibit D – Mining Plan

16) This exhibit states under section (a) that "Lined cells may be lined with slurry walls, clay liners, or a combination thereof". The Division will require the applicant to commit to a method for lining the cells, whether it is by slurry wall, clay liner, or a combination thereof. The Exhibit C2 map indicates a slurry wall liner will be used in conjunction with a clay liner on each of the two proposed mining cells. Please provide a detailed description in this exhibit of how the mined cells will be lined and ensure this plan correlates with the Exhibit C2 map. The description should include all information needed to calculate the required financial warranty for the operation, such as the approximate dimensions of the proposed liner system(s), materials used, approximate volumes, installation methods, and equipment. For a slurry wall liner, this exhibit should also include the approximate total linear length of each enclosure and the depths to which the system will be keyed into bedrock.

17) Please provide a detailed description of all proposed mine facilities/structures that will require demolition or removal for reclamation so that an appropriate financial warranty can be calculated. For example, this exhibit mentions that a parking area will be constructed adjacent to the plant area. Will this parking area be surfaced in any way (e.g., graveled, paved)? If so, please describe the type of surfacing, an approximate surface area (in acres), and an approximate depth of placement. Additionally, please ensure that any such features are included on the Exhibit C2 map and a reclamation plan for these features is included in Exhibit E.

18) Please address how the northwestern portion of the proposed permit area, north of the Excelsior Ditch, will be accessed to place the proposed screening berms and to reclaim this area. The Exhibit C2 map shows that a minimum 80-foot buffer will be maintained from the ditch, indicating that no crossings will be installed. However, no additional access to this area is proposed off Baxter Road. Therefore, it is not clear how the applicant plans to access this area.

19) This exhibit states that topsoil and overburden will be stripped from a given phase and placed in stockpiles. Please commit to storing the topsoil and overburden in separate stockpiles.

20) Please describe how the existing Thunderbird Lake will be utilized by the operation. Will this lake be used or disturbed in any way?

21) This exhibit states that siltation ponds will be utilized in the operation. Please clarify how they will be utilized (e.g., process water, dust mitigation). Will water from the plant site be pumped to the siltation ponds? Will water from the siltation ponds be pumped to a discharge point along the river? What infrastructure (e.g., ditches, pipelines) will be needed? Please ensure that all proposed infrastructure is shown on the Exhibit C2 map.

22) This exhibit states under section (a) Mining - Phase 1 that "Excess overburden may also be sold for use offsite". If the overburden may be needed for reclamation backfill, the applicant must commit to keeping all salvaged overburden on site until reclamation is completed.

23) This exhibit states under section (a) Mining - Phase 2 that "Mining may encroach to 200 feet of the top of river bank" and that "These encroachments will be backfilled to a distance 400 feet from the top of river bank". Please provide additional details on how this plan will be implemented, including an estimated timeline for the proposed backfilling with respect to mining and liner installation. The applicant should be aware, the plan to mine within 400 feet of the river without proposing any floodplain protection measures for the pits (e.g., bank stabilization, inlet/outlet structures) may not comply with the Division's floodplain protection standards for new sand and gravels pits adjacent to rivers and perennial streams. Please refer to the enclosed adequacy review letter from Rob Zuber for further information on this topic.

24) This exhibit states under section (a) Processing that "All material mined under this proposed application will be transported by conveyor or haul truck to the processing area". Will this conveyor have any permanent components that will require removal/demolition for reclamation, such as concrete footings? If so, please provide approximate dimensions for the conveyor and all associated components requiring removal/demolition.

25) This exhibit mentions under section (a) Import Material that material may be imported to the site, and that if any of this material will be used as backfill, a notarized letter will be submitted to the Division indicating the materials are inert in accordance with Rule 3.1.5(9). Please commit to submitting a Technical Revision with all information required by Rule 3.1.5(9) for any proposal to import material to the site for use in reclamation. This revision should include revised mining and reclamation plans and maps and a revised bond estimate, as appropriate.

26) This exhibit states under section (b) Earthmoving that "All phases will be mined at a 0.5:1 slope or flatter". First, please specify the horizontal and vertical components of the proposed slope gradient (for example, 0.5H:1V). Additionally, please specify the anticipated maximum length of the active highwall to occur at any time, prior to grading the slope to its final configuration for reclamation.

27) This exhibit states under section (d) that "The Operator may mine multiple stages concurrently in order to obtain a range of material for production" and "Since multiple stages will be worked at any one time, the approximate combined size of the areas being worked at any one

time may range from 25 acres to 131 acres". The Division understands the applicant is proposing to mine multiple stages at any time. However, the applicant must commit to a maximum amount of disturbance so that an appropriate financial warranty amount can be calculated for the proposed operation. Therefore, please specify a maximum disturbance amount (in acres). Please also make sure this disturbance amount is reflected on the Exhibit C2 map (or a separate mining plan map). Please be advised, the maximum disturbance amount must include all lands disturbed by the operation, regardless of the reclamation status of these lands. Note that after permit issuance, the maximum disturbance amount can be increased at any time through a Technical Revision submittal.

28) According to the information provided in section (f)(i) of this exhibit, 2-22 feet of overburden exists at the site and the overburden overlies approximately 5-27 feet of sand and gravel deposit. Based on these ranges, the Division estimates a maximum depth of approximately 49 feet (plus topsoil) may be mined. Please specify the maximum mining depth for the operation.

29) This exhibit states under section (g) that gold may be extracted as a secondary commodity. Please describe how the gold will be recovered, specifically, what chemicals if any will be used in the recovery process?

30) Per Rule 6.4.4(j), please specify the dimensions of any existing or proposed roads that will be used for the mining operation, and describe any improvements necessary on existing roads and the specifications to be used in the construction of new roads. Additionally, please describe any associated drainage and runoff conveyance structures to include sufficient information to evaluate structure sizing.

Rule 6.4.5 Exhibit E – Reclamation Plan

31) Please include a detailed description in this exhibit of the proposed liner system(s) to be installed for reclamation, and the timing of installation with respect to mining.

32) Please include a detailed description of the proposed backfill activities for reclamation, including the type of backfill material to be used, where this material will be derived, approximate material volumes, how this material will placed, and the anticipated timing of backfilling activities with respect to mining.

33) In section (a) of this exhibit, it's estimated that approximately 6 acres will be mined to create fresh water and silt ponds. The Exhibit C2 map shows 4 proposed siltation ponds that will each be approximately 2 acres in size, giving a total of 8 acres. Please make sure the text in this section correlates with what is shown on the maps.

34) Please describe how any planned disturbances to the existing Thunderbird Lake will be reclaimed. Please clarify if this lake is the "fresh water" pond referred to in this exhibit.

35) In section (a) of this exhibit, it is mentioned that bermed topsoil and overburden *may* be used in final reclamation. Please change "may be used" to "will be used" since all salvaged topsoil and overburden must be used in final reclamation, as needed to fulfill all components of the reclamation plan. Any excess materials that remain after reclamation is completed can then be taken off-site or sold.

36) In section (a) of this exhibit, the proposed topsoil, overburden, and clay stockpiles are referenced as being shown on Figure C-2; however, no stockpiles, other than "screening berms" were labeled on this map. Please ensure that all proposed stockpiling areas are shown on the Exhibit C2 map.

37) Given the proposed mining operation is located adjacent to the Arkansas River, the applicant will need to provide a detailed stormwater management plan for the site describing what measures will be taken to prevent impacts to the river during mining and reclamation. This plan can be provided in this exhibit, Exhibit D, or Exhibit G. In this exhibit, please describe how any proposed stormwater structures/features will be reclaimed.

38) In section (c) of this exhibit, it states "Drill or auger holes that are part of the mining operation shall be plugged with non-combustible material, which shall prevent harmful or polluting drainage. Any test pits, soils boring holes, or monitoring wells not located within the mine excavation limits will be plugged as soon as it can be confirmed that they are no longer needed for the operation.". The Division could not find a Notice of Intent approved by our office for the exploration activities described. Therefore, please provide a detailed description of all existing exploration-related disturbances (e.g., boreholes, test pits, wells), including the approximate number and dimensions of each type of feature, and how these features will be reclaimed.

39) Since wildlife habitat is part of the proposed post-mining land use for the site, has the applicant contacted Colorado Parks and Wildlife to see if any unique opportunities are available to enhance habitat and/or benefit wildlife which could be accomplished within the framework of the reclamation plan and costs, per Rule 3.1.8(2)?

40) According to the Exhibit C2 map, a scale and scale house will be located along the main access road. However, this exhibit does not include a plan for reclaiming these structures. Please provide a description of all proposed structures/facilities (e.g., scale, scale house, utilities, conveyor, roads) that will require reclamation, specifically any permanent features such as concrete foundations or footings that will require demolition/removal for reclamation.

41) Section (c) of this exhibit includes a seed mixture for stabilizing topsoil stockpiles that remain in place for more than 180 days. However, a seed mixture was not included in this exhibit for disturbed areas to be revegetated for reclamation. Please provide the reclamation seed

mixture(s), including the seeding/planting rate for each species (in pounds of PLS per acre), and the expected time(s) of seeding/planting.

42) Please provide a description of the size and location of each area to be reclaimed during each phase as required by Rule 6.4.5(2)(e)(ii). Please break down the acreages by type of disturbance, such as reservoirs, reservoir shorelines, ponds, stockpile areas, facility areas, roads, etc.

43) Please state the total amount of acres at the site that will be retopsoiled and revegetated for reclamation. Additionally, please break this acreage amount down by reclamation phase and area, such as the reservoir slopes above waterline for each pit and disturbed areas outside of the pits.

44) In section (c) of this exhibit, it states "The permit area will be marked by signage and fencing on the north side of the river. Because no mining will occur south of the river, the permit area will be marked by signage and existing fences will remain." Please commit to marking the boundaries of the entire affected area by monuments or other markers that are clearly visible and adequate to delineate such boundaries, as required by Rule 3.1.12(2).

<u>Rule 6.4.6 Exhibit F – Reclamation Plan Map</u>

45) Please show the approximate locations of any proposed bank stabilization and/or inlet/outlet structures to be installed for reclamation.

46) What will be the fate of any existing or proposed wells on site? Please show on the map any wells that will remain after reclamation. If any monitoring wells (not owned by the applicant) are to be converted for domestic use, please include a notarized letter from the landowner acknowledging their desire to keep these wells for that purpose.

47) Please ensure that all other structures/features proposed to remain for reclamation (e.g., utility lines, roads, fences, stormwater management structures) are shown on this map.

48) Please revise this map to ensure that all required features are legibly portrayed (refer to item #7 above).

49) Please show on this map the proposed final slope gradient (in horizontal:vertical) for all disturbed lands to be reclaimed.

50) Please show on this map all areas that will be revegetated for reclamation.

51) Please show the proposed final land use (e.g., developed water resource, wildlife habitat) for each portion of the affected lands.

52) Please state on this map the average or range of thickness of replaced overburden and topsoil by reclamation area or phase.

53) Please ensure the reclamation plan for all proposed disturbances (e.g., scale, scale house, roads, stockpile areas, parking/equipment storage areas, stormwater structures, conveyor areas) is depicted on this map.

Rule 6.4.7 Exhibit G – Water Information

54) Please describe how this operation will directly affect surface and/or groundwater systems.

55) Section (a) of this exhibit mentions the existing Thunderbird Lake and two unnamed ponds in the southwestern portion of the proposed permit area. While Thunderbird Lake is identified on the Exhibit C maps, the two unnamed ponds are not identified. It is not clear how Thunderbird Lake will be utilized by the operation, but it appears the two unnamed ponds will be mined through during Phase 3. Please describe how these 3 existing water features will be affected by the proposed mining operation.

56) Due to the close proximity of the proposed mining operation to the Arkansas River, please provide a detailed plan describing how water from dewatering operations or from runoff from disturbed areas, piled material and operating surfaces will be managed to protect against pollution of either surface or groundwater both during and after the operation.

57) Please describe any proposed infrastructure or other features associated with dewatering.

58) Please provide the approximate groundwater levels that exist within the proposed affected lands.

59) Please describe how the operation intends to prevent any impacts to the Excelsior Ditch during mining and reclamation.

60) Please describe any expected impacts by the operation to existing wetlands identified within the proposed affected lands (if authorized by the USACE).

61) This exhibit indicates there will be a total of 6.6 acres of water surface at any time, including a 2-acre freshwater pond, 4 acres of siltation ponds, and 0.6 acre of dewatering trench. However, these estimates do not correlate with what is shown on the Exhibit C2 map. The Exhibit C2 map shows two primary siltation ponds, approximately 2 acres each, and two secondary siltation ponds, also 2 acres each. The estimated acreages for the freshwater pond and dewatering trenches are not shown on this map. Based on the estimates

shown on the map, the 4 proposed siltation ponds alone would cover approximately 8 acres, which exceeds the total water surface estimate of 6.6 acres. Assuming the estimates provided in this exhibit for the freshwater pond and dewatering trenches are accurate, the Division estimates the total water surface at the site will be 10.6 acres. Please ensure the water surface estimates provided in this exhibit correlate with what is shown on the Exhibit C2 map.

62) Section (d) of this exhibit states that "Annually the total evaporative and operational losses from mining activities (open water surface evaporation, water retained in the aggregate product, dust suppression) totals 33.0 acre-feet of depletion which must be augmented". Please make any necessary corrections to the projected total depletions based on any changes made to the proposed total water surface.

63) Please indicate the projected amount from each of the sources of water to supply the project water requirements for the mining operation. Stating that this information will be provided in the Substitute Water Supply Plan obtained from the Division of Water Resources is not sufficient, as Rule 6.4.7(4) requires this information be submitted with the permit application.

64) Please provide an estimate of the water requirements, if any, for the reclamation phases of the project, and indicate the projected amount from each of the sources of water to supply these requirements.

65) This exhibit states under the Mining Plan section of the Groundwater Sampling and Analysis Plan that "Three (3) mine cells are currently planned at the site". Two mine cells are evident based on the mining and reclamation plan maps submitted. However, it is not clear where the 3rd mine cell is located. Please describe the proposed 3rd mine cell and ensure it is clearly identified on the appropriate maps and discussed in the mining and reclamation plans.

66) The applicant should be aware, the Groundwater Sampling and Analysis Plan provided in this exhibit may not comply with the Division's standards for groundwater monitoring plans. Please refer to the enclosed adequacy review letter from Eric Scott for further information on this topic.

Rule 6.4.8 Exhibit H – Wildlife Information

67) This exhibit includes a Biological Resources Report prepared by Pinyon Environmental, Inc. for the Thunderbird property (heretofore referred to as "Report"), dated September 22, 2020. According to the Report, the site evaluation occurred on August 11-13, 2020, which was more than three years ago. Page 14 of the Report states "Soil, hydrologic, vegetation, biological, and ecological conditions typically vary even over short distances, by season, by elevation, and by meteorological conditions. Thus, the nature and extent of variations outside this biological investigation may not become evident except through further investigation. It is possible that

ecological conditions may change from those observed, particularly over time." Please confirm that information provided in the Report accurately represents existing conditions at the site.

68) Throughout section 3.4 of the Report, it is stated that portions of the proposed affected lands are occasionally or frequently flooded. Please explain how installing lined reservoirs will affect the flood hydraulics at this site. This information can be included in Exhibit E or G.

69) Section 4.1.2.1 of this Report recommends that additional Bald Eagle nesting surveys be performed prior to the commencement of operations, and that if new (unmapped) Bald Eagle nests are noted, coordination with the U.S. Fish and Wildlife Service (USFWS) and/or Colorado Parks and Wildlife (CPW) may be warranted. Please commit to this recommendation.

70) Section 4.2 of this Report recommends the operation comply with the Migratory Bird Treaty Act (MBTA) at all times, as well as follow recommended guidelines set by CPW for nesting raptors. If active raptor nests are confirmed to occur within a 0.5-mile buffer of the project area prior to the onset of construction, it is recommended that a qualified wildlife biologist coordinate with the USFWS and/or CPW to identify appropriate actions to ensure that project activities do not disrupt nesting activities. It is also recommended that nesting surveys be completed for non-raptor species prior to construction if the project activities occur during the nesting season (generally April-August). Please commit to these recommendations.

71) This Report describes 12 wetlands that were identified in the study area, including along the Arkansas River, the Excelsior Ditch, Thunderbird Lake, and Unnamed Pond 1, as well as two isolated wetlands. In Section 4.3, it states "The project will submit a request for a Jurisdictional Determination to the USACE to determine areas under the jurisdiction of the USACE. Prior to the beginning of work and after design is complete, impacts to WUS will be determined. If impacts to WUS are anticipated to occur, Section 404 permitting would be required. The type of permitting (Nationwide Permit or Individual Permit) will be dependent on the amount and type of impacts to WUS. If no impacts to WUS are anticipated, then no further action is required." The Division has the following items regarding the wetlands:

    a. Please provide an estimate of when the request for a Jurisdictional Determination (JD) will be submitted to the U.S. Army Corps of Engineers (USACE).

    b. Please commit to providing a copy of the JD request to the Division after it is submitted.

    c. Please commit to not conducting any activities at the site that could impact the wetlands until a determination from USACE has been made.

d. Please commit to providing a copy of the USACE determination letter to the Division once it is received.

e. In the event the USACE determines that Section 404 permitting is required, please commit to submitting a Technical Revision to update Exhibit M accordingly and to make any necessary changes to the mining and reclamation plans and maps.

Rule 6.4.10 Exhibit J – Vegetation Information

72) This exhibit includes an Aquatic Resource Concurrence letter issued by the USACE on May 6, 2022 for the Thunderbird site. The Division has the following items regarding this letter:

a. The letter indicates that USACE's concurrence with the aquatic resource delineation for the site is based on available information and a site visit conducted on July 1, 2021. Please confirm the information submitted to USACE with the request for verification included the information provided in the Report submitted in Exhibit H of this application.

b. The letter refers to an enclosed aquatic resource drawing. Please provide a copy of this drawing.

c. The letter states "This verification letter does not constitute a jurisdictional determination (JD). A JD is not required to process an application for a Department of the Army (DOA) permit." The applicant stated (in Exhibit H) that a request for a JD will be submitted to the USACE. Please state if the applicant intends to submit an application for a DOA permit prior to requesting a JD.

Rule 6.4.11 Exhibit K – Climate

73) Please provide the average wind speeds for the area.

Rule 6.4.12 Exhibit L – Reclamation Costs

74) Please ensure the approximate dimensions and material volumes are included in this estimate for all structures/facilities to be demolished and/or removed for reclamation.

75) Are there any other proposed structures requiring demolition and/or removal for reclamation (e.g., conveyor system, water infrastructure)? If so, please ensure costs are included in this estimate for reclaiming these structures.

76) This estimate includes costs for reclaiming 4 acres of silt ponds. However, the Exhibit C2 map shows a total of 8 acres of siltation ponds are proposed. Please revise this task accordingly.

77) This estimate includes a task in sections C and D for "Reclamation Slope and Backfill Fill" for the Phase 2 and 3 pits. Based on the information provided in Exhibits E and F, the Division believes this task is meant to include grading pit slopes from 0.5H:1V to 3H:1V and also backfilling the southern edge of each pit to 400 feet from the top of river bank. Please split this item into two separate tasks for each phase, including one for pit slope backfill/grading, and one for the proposed southern pit backfill areas, with the estimated material volumes and push/haul distances.

78) The retopsoil tasks provided in this estimate are for replacing 12 inches of topsoil. However, the proposed reclamation plan calls for replacing 6 inches of topsoil on disturbed lands. Please clarify if the applicant wishes to replace 6 or 12 inches of topsoil for reclamation, and revise either Exhibit E or this estimate, as needed.

79) The costs provided for the Phase 2 and Phase 3 slurry wall installations ($1,729,000.00 and $1,085,500.00 respectively) are less than the Division's estimates ($1,734,378.75 and $1,091,376.00) based on the lineal feet and average depth provided for each enclosure, at $6.50/SF. This is a discrepancy of over $11,000. Please revise these costs accordingly.

80) In Exhibit D, the Division is asking the applicant to commit to a method for lining the cells, whether it is by slurry wall, clay liner, or a combination thereof. If the applicant commits to installing both slurry walls and clay liners (as indicated on the Exhibit C2 map) or a clay liner only, please revise this estimate accordingly.

81) Please ensure all reclamation areas identified in this estimate, including areas to be retopsoiled and revegetated along reservoir shorelines and outside of the reservoirs, correlate with the Exhibit F map.

<u>Rule 6.4.13 Exhibit M – Other Permits and Licenses</u>

82) Does the applicant plan to conduct a class III cultural resource survey prior to the start of this project, as recommended by History Colorado in their comment letter received on October 26, 2023?

83) If the applicant will be seeking a JD and possibly a Section 404 permit with USACE for the proposed operation, please add these items to this exhibit.

<u>Rule 6.4.18 Exhibit R – Proof of Filing with County Clerk and Recorder</u>

84) Please note that future notices to the county clerk and recorder should remove the word "amendment" since this is a new permit application (not an amendment application), and

should also include the file number (M-2023-032) since one has been assigned to this application now.

Rule 6.4.19 Exhibit S – Permanent Man-made Structures

85) Please provide a complete list in this exhibit of all permanent man-made structures (e.g., buildings, fences, above or below ground utilities, irrigation ditches, roads, wells, water storage structures, discharge and conveyance structures) located on or within 200 feet of the proposed affected lands and the structure owner(s). Please ensure this list correlates with what is shown on the Exhibit C1 map.

86) In this exhibit, the applicant provided certified mail numbers for mailings to Premier Auto Body Repair, LLC, Arkansas Groundwater and Reservoir Association, Pueblo County Public Works, Meadowbrook MHP LLC, and Black Hills Energy, which are structure owners identified on the Exhibit C1 map. The Division has the following items regarding the attempted structure agreements:

    a. Please include copies of the structure agreement forms listing out the applicable structures and with the Certification and Notary for Permit Applicant sections filled out and notarized by the applicant, which were sent to each structure owner. (A blank structure agreement form is enclosed for reference.)

    b. Please provide proof of delivery for all attempted structure agreements, which may be in the form of return receipts of a Certified Mailing or proof of personal service.

    c. Please provide any structure agreements that have been obtained since the application was submitted.

87) If any of the existing (non-applicant owned) structures will be moved or removed during the proposed operation (e.g., utility lines, roads, ponds), please provide a notarized letter from the structure owner acknowledging these proposed impacts to their structure(s). This acknowledgement can be part of the notarized structure agreement obtained by the structure owner, rather than a separate letter. Some examples of existing structures the operation appears to be proposing to move or remove include utility lines and two unnamed ponds located within the proposed mining area.

88) In this exhibit, the applicant provided a Geotechnical Stability Analysis prepared by Gary Linden, P.G., a Senior Engineering Geologist (presumably with Martin Marietta Materials). This analysis appears to only address 3 of the many structures located on and within 200 feet of the proposed affected lands (Excelsior Ditch, Overhead transmission lines, and Baxter Road). The Division has the following items regarding this analysis:

a. Please ensure the information presented in this analysis correlates with the proposed mining and reclamation plans (e.g., slope gradients, liner type, mining depths, setbacks).

b. Per Rule 6.4.19(b), where a structure agreement cannot be reached, the engineering evaluation must demonstrate that such structure shall not be damaged by activities occurring at the mining operation. Therefore, please ensure this analysis addresses, at a minimum, all structures (not owned by the applicant), for which, structure agreements are not obtained.

c. Please be advised, the Division cannot accept the engineering evaluation provided until sufficient proof has been submitted (see above requirements) demonstrating that structure agreements have been attempted for all (non-applicant owned) permanent, man-made structures located on and within 200 feet of the proposed affected lands.

Additional Items:

89) The Division received agency comments on the application from History Colorado and the Colorado Division of Water Resources. Copies of these comment letters were emailed to the Applicant as they were received by the Division and are also enclosed. Please respond to any concerns or issues identified in these letters and revise the permit application accordingly. No objections to the permit application were received during the public comment period.

90) Please review and respond to the adequacy items provided by Eric Scott, DRMS (see enclosed letter, dated November 29, 2023).

91) Please review and respond to the adequacy items provided by Rob Zuber, DRMS (see enclosed letter, dated November 30, 2023).

92) Please review and respond to the adequacy items provided by Zach Trujillo, DRMS (see enclosed letter, dated November 30, 2023).

93) Pursuant to Rule 1.6.2(e), please submit proof of the notice sent to all owners of record of the surface and mineral rights of the affected land and the owners of record of all land surface within 200 feet of the boundary of the affected lands (including all easement owners located on the affected land and within 200 feet of the boundary of the affected lands). Proof of notice may be by submitting return receipts of a Certified Mailing or by proof of personal service.

94) Pursuant to Rule 1.6.2(1)(c) and (2), any changes or additions to the application on file in our office must also be reflected in the public review copy which was placed with the local County Clerk and Recorder. Pursuant to Rule 6.4.18, you must provide our office with an affidavit or

receipt indicating the date on which the revised application/adequacy response was placed with the local County Clerk and Recorder.

This concludes the Division's preliminary adequacy review of your application. The application decision date is currently set for March 2, 2024. Please ensure the Division has sufficient time to complete its review process by responding to these adequacy items no later than two weeks prior to the decision date, by **February 16, 2024**. If additional time is needed to respond, you must submit an extension request to our office prior to the decision date. Please note, your application may be determined as inadequate, and the application may be denied on March 2, 2024, unless the above-mentioned adequacy items are addressed to the satisfaction of the Division.

If you require additional information or have questions or concerns, please feel free to contact me by phone at (303) 866-3567, ext. 8147, or by email at joel.renfro@state.co.us.

Sincerely,

Joel Renfro
Environmental Protection Specialist

Encl(s): DRMS Structure Agreement form
Comment letter from History Colorado, received on October 26, 2023
Comment letter from Division of Water Resources, received on December 5, 2023
Adequacy review letter from Eric Scott, DRMS, dated November 29, 2023
Adequacy review letter from Rob Zuber, DRMS, dated November 30, 2023
Adequacy review letter from Zach Trujillo, DRMS, dated November 30, 2023

Cc: Eric Scott, DRMS
Rob Zuber, DRMS
Zach Trujillo, DRMS
Amy Eschberger, DRMS

An example Structure Agreement which meets the requirements of the Statutes is shown below.
****

Structure Agreement

This letter has been provided to you as the owner of a structure on or within two hundred (200) feet of a proposed mine site. The State of Colorado, Division of Reclamation, Mining and Safety ("Division") requires that where a mining operation will adversely affect the stability of any significant, valuable and permanent man-made structure located within two hundred (200) feet of the affected land, the Applicant shall either:

a) Provide a notarized agreement between the Applicant and the Person(s) having an interest in the structure, that the Applicant is to provide compensation for any damage to the structure; or

b) Where such an agreement cannot be reached, the Applicant shall provide an appropriate engineering evaluation that demonstrates that such structure shall not be damaged by activities occurring at the mining operation; or

c) Where such structure is a utility, the Applicant may supply a notarized letter, on utility letterhead, from the owner(s) of the utility that the mining and reclamation activities, as proposed, will have "no negative effect" on their utility. (*Construction Materials Rule 6.3.12 and Rule 6.4.19 & Hard Rock/Metal Mining Rule 6.3.12 and Rule 6.4.20)*

The Colorado Mined Land Reclamation Board ("Board") has determined that this form, if properly executed, represents an agreement that complies with Construction Materials Rule 6.3.12(a), Rule 6.4.19(a), and C.R.S. § 34-32.5-115(4)(e) and with Hard Rock/Metal Mining Rule 6.3.12(a), Rule 6.4.20(a), and C.R.S. § 34-32-115(4)(d). This form is for the sole purpose of ensuring compliance with the Rules and Regulations and shall not make the Board or Division a necessary party to any private civil lawsuit to enforce the terms of the agreement or create any enforcement obligations in the Board or the Division.

The following structures are located on or within 200 feet of the proposed affected area:

1. _____
2. _____
3. _____
4. _____
5. _____

(*Please list additional structures on a separate page*)

CERTIFICATION

The Applicant, _____(print applicant/company name), by_____(print representative's name), as_____(print representative's title), does hereby certify that _____(structure owner) shall be compensated for any damage from the proposed mining operation to the above listed structure(s) located on or within 200 feet of the proposed affected area described within Exhibit A, of the Reclamation Permit Application for _____ (operation name), File Number M-____-____.

This form has been approved by the Colorado Mined Land Reclamation Board pursuant to its authority under the Colorado Land Reclamation Act for the Extraction of Construction Materials and the Colorado Mined Land Reclamation Act for Hard Rock, Metal, and Designated Mining Operations. Any alteration or modification to this form shall result in voiding this form.

NOTARY FOR PERMIT APPLICANT

ACKNOWLEGED BY:

Applicant _____ Representative Name _____

Date _____ Title _____

STATE OF _____)
) ss.
COUNTY OF_____)

The foregoing was acknowledged before me this____ day of _____, 20___, by _____ as _____ of _____.

_____ My Commission Expires:_____
Notary Public

NOTARY FOR STRUCTURE OWNER

ACKNOWLEGED BY:

Structure Owner _____ Name _____

Date _____ Title _____

STATE OF _____)
) ss.
COUNTY OF_____)

The foregoing was acknowledged before me this____ day of _____, 20___, by _____ as _____ of _____.

_____ My Commission Expires:_____
Notary Public

STATE OF COLORADO

Renfro - DNR, Joel <joel.renfro@state.co.us>

Thunderbird Sand and Gravel_File No. M-2023-032 - History Colorado # 83676

Mckee-Huth - HC, Holly <holly.mckee@state.co.us> Thu, Oct 26, 2023 at 1:42 PM
To: Joel Renfro - DNR <joel.renfro@state.co.us>

From: History Colorado, Office of Archaeology and Historic Preservation

Dear Mr. Renfro:

Attached is our letter on the subject matter in Adobe PDF format.

Please contact me at the below information if you have any questions.

Sincerely,

Holly McKee-Huth

Holly McKee-Huth

GIS Manager | Section 106 and Cultural Resource Information Specialist, Archaeology

Pronouns: she/her/hers

History Colorado | Office of Archaeology and Historic Preservation

303/866-4670 | holly.mckee@state.co.us

History Colorado Center |1200 Broadway | Denver, Colorado 80203 | HistoryColorado.org

We acknowledge that the land currently known as Colorado has been the traditional homelands of Indigenous peoples since time immemorial. We are grateful to work in partnership with the 48 sovereign nations who continue to call this land home. Together, we plan exhibits; collect, preserve, and interpret artifacts; do archaeological work; and create educational programs to share the history of Colorado.

HC_83676_DRMS_Thunderbird Sand and Gravel_File No. M-2023-032.pdf
212K

History Colorado

Joel Renfro
Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, Colorado 80203

Re: Thunderbird Sand and Gravel, File No. M-2023-032 (HC#83676)

Dear Mr. Renfro:

Thank you for your correspondence dated and received by our office on September 26, 2023 initiating consultation with our office on the subject action pursuant to the Colorado State Register Act – Colorado Revised Statute (CRS) 24-80.1 et. seq.

Based on the information provided, including the maps provided on October 4, 2023, a search of our database indicates 6 sites and 0 surveys were located in or near the search area provided. Although no National or State Register listed or nominated properties were identified within the permit area, the Emily Hartley Homestead site (5PE.7992) as well as the Excelsior Ditch (5PE.7993) are both eligible for listing to the National and/or State Register, and are located within the proposed permit area. As most of Colorado and the proposed permit area has not been inventoried for cultural resources, our files contain incomplete information. Consequently, there is the possibility that as yet unidentified cultural resources exist within the proposed permit area. As such, we recommend that a class III cultural resource survey is conducted, by a qualified contractor, in your area prior to the start of this project.

Please note that the requirements under CRS 24-80 part 13 apply and must be followed if human remains are discovered during ground disturbing activities. In addition, our comments should not be interpreted as concurrence under the National Historic Preservation Act or any other environmental law or regulation. It is the responsibility of any federal agency involved to meet the requirements of Section 106 as set forth in 36 CFR Part 800 titled "Protection of Historic Properties". This includes not only reasonable and good faith identification efforts of any historic properties located within the area of potential effects, but determining whether the undertaking will have an effect upon such properties. The State Historic Preservation Office, Native American tribes, representatives of local governments, and applicants for federal permits are entitled to consultative roles in this process.

As a reminder, the State Register Act gives the SHPO 30 calendar days to provide a response to the state agency. If the response is to ask for additional information to be able to render a comprehensive and accurate response, the 30-day 'clock' will pause and restart at zero when the SHPO receives the information it requested. Additionally, consultation under the State Register Act also requires that a file search is conducted through our office prior to consultation. You can find more information about the file search request at https://www.historycolorado.org/file-access#filesearch.

Our office invites the Division of Reclamation, Mining and Safety to further consult with our office regarding the agency's compliance obligations under the State Register Act and other state laws that may apply to future state actions.

History Colorado

If you have any questions or if we may be of further assistance, please contact Holly McKee-Huth, Cultural Resource Information/Section 106 Compliance Specialist at (303) 866-4670 or holly.mckee@state.co.us.

Sincerely,

Patrick A. Eidman Digitally signed by Patrick A. Eidman
Date: 2023.10.26 10:27:30 -06'00'

Dawn DiPrince
State Historic Preservation Officer

COLORADO
Division of Water Resources
Department of Natural Resources

Response to Reclamation Permit Conversion Application Consideration

DATE: December 5, 2023

TO: Joel Renfro

CC: Division 2 Office; District 14 Water Commissioner

FROM: Ivan Franco, P.E.

RE: Thunderbird Pit, File No. M-2023-005
Operator: Martin Marietta Materials
Contact: Phillip Courtney, (303) 612-6232
Sec. 31 & 32, Twp. 20S, Rng. 63W, 6th P.M., Pueblo County

CONDITIONS FOR APPROVAL

☒ The proposed operation does anticipate having to dewater the site during mining operations. Therefore, the site will require a substitute water supply plan and/or court approved plan for augmentation to begin operating.

☒ If storm water is contained on-site, the applicant should be aware that, unless the storm water detention structures can meet the requirements of a "storm water detention and infiltration facility" as defined in section 37-92-602(8), Colorado Revised Statutes, the structure may be subject to administration by this office. The applicant should review DWR's *Administrative Statement Regarding the Management of Storm Water Detention Facilities and Post-Wildland Fire Facilities in Colorado* (available at: http://water.state.co.us/DWRIPub/Documents/DWR%20Storm%20Water%20Statement.pdf) to ensure that the notification, construction and operation of the proposed structure meets statutory and administrative requirements. The applicant is encouraged to use *Colorado Stormwater Detention and Infiltration Facility Notification Portal*, located online at: https://maperture.digitaldataservices.com/gvh/?viewer=cswdif, to meet the notification requirements.

☒ Other: All water used on-site shall be a legal supply of water provided by an appropriate supplier. The applicant shall confirm the legality of any proposed source of water supply with the Division of Water Resources prior to use in the operation.

COMMENTS: The local Water Commissioner, Dan Henrichs, may be contacted at (719) 269-2900 or Dan.Henrichs@state.co.us regarding legal water supplies in the area. Per review of the records of this office, it does not appear that an SWSP has been approved or requested to date.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

To: Joel Renfro
From: Eric Scott
Date: November 29, 2023
Re: **Summary of Preliminary Adequacy Questions/Issues for Thunderbird Sand and Gravel (M2023-032) Exhibit G Review**

This review was conducted based on the original application materials for M2023-032 found in the site file, and limited to issues related to compliance with applicable groundwater standards and minimization of impacts to the hydrologic balance with respect to groundwater. The comments provided may be utilized or modified based on the discretion of the DRMS site specialist as needed.

1) The existing unlined groundwater ponds (in addition to Thunderbird Lake) referred to in several places in the application need to be identified on the existing conditions/mining plan/reclamation maps as well as the figure provided with Ex G.

2) Locations/existence of wells listed and/or shown in Exhibit G should be field verified if possible and included on the appropriate figures. All wells within the proposed permit or within 200' (minimum) should be shown on the existing conditions map. Well construction information for all existing wells located within the permit and within 200'of the permit should be provided if available. Does the applicant now own all wells shown within the proposed permit area?

3) No groundwater level, flow direction, or groundwater quality data has been provided, despite several wells shown within or near the proposed permit. Is any historic GW level or quality data available that could be considered in a "baseline" data analysis? Will any of the existing wells on site be utilized for groundwater monitoring, and if so, what are the construction details.

4) Based on the proximity to the Arkansas River, and the several areas of exposed groundwater currently located within or near the permit, DRMS expects the depth to static groundwater to be very shallow (<5 feet b.g.s.) with a flow direction largely parallel to the river. However, no GW level data has been provided to document depth to GW or GW flow direction for the proposed permit area. In addition, no groundwater modelling has been done to estimate predicted impacts to GW flow or elevations due to dewatering during mining, or resulting from the installation of the proposed lined cells in close proximity to the river. No designs for a French drain or other means of minimizing impacts to the prevailing hydrologic balance (groundwater levels, or irrigation return flow timing) from the lined cells have been provided. The general statement that minimal mounding and shadowing of a few feet is expected is insufficient.

   DRMS will require a modelling demonstration to predict and illustrate the maximum groundwater drawdown impacts from dewatering during mining, potential impacts to nearby wells, as well as any post-mining mounding and shadowing impacts due to the construction of impermeable or low permeability mine cells. The model should provide GW drawdown/mounding contour maps based on, and verified against all available site setting and geologic information, current and historic water level data, and the predicted size and location of mining cells

Unless sufficient demonstration can be made that they will not be not required, designs for French drains or other means of maintaining groundwater flow levels and timing around the lined cells should be required to mitigate impacts to the prevailing hydrologic balance. These measures should be approved prior to, and installed concurrently with, the proposed slurry walls.

5) The application as submitted is inconsistent in stating when the slurry walls will be installed relative to mining of the cells to be lined. The applicant must commit to the timing of installation of the proposed slurry walls (prior to, or after mining of the cell) and make sure the application is consistent throughout. (The fact that the slurry walls are shown as completed partially within backfill along the river would seem to indicate that they are intended to be installed after mining and backfill has been completed). DRMS should consider bonding for backfill to two feet above static water level for areas of exposed groundwater until slurry walls are installed and provisionally approved by SEO.

6) The application as submitted indicates that the proposed cells will be mined to within 200' of the riverbank, then backfilled to a minimum of 400' from the riverbank (presumably to avoid the requirement for installation of flood control measures such as pit-wall armoring or inlet/outlet structures, which should be discussed with the DRMS Surface Water group). The reclamation plan shows the slurry wall for the lined cells to be installed within and across this minimum of 200' wide backfill area located on the south sides of the lined cells.
What will the backfill material requirements and installation/compaction process and criteria be for these areas? What QA/QC will be conducted and submitted to verify that this fill material is competent for the purposes of installing a slurry wall? (Consultation with the DRMS Geotechnical group is advised for this item as well as to determine if a stability assessment for this area will be required.)

7) Specific criteria and conditions need to be established for the proposed mining and backfill activity within 200' of the river bank. For example: "No more than "X" feet excavation will be allowed within 200' of the river prior to backfill; all excavation and backfill within 200' of the river will take place outside of flood season between the months of "x" and "y"; and no excavated area(s) within 200' of the river will remain un-backfilled for more than one flood season". The provided mining plan should be updated accordingly.

8) No baseline water level data, groundwater flow direction, or groundwater quality data have been provided with the application. The applicant will need to commit to not exposing groundwater until <u>at least 5 consecutive quarters</u> of baseline groundwater level and analytical data have been provided to the Division for review. Well permit and SWSP will also need to be obtained prior to GW exposure.

9) The provided mitigation plan states that "in the event of a well owner compliant within 600' of the affected area" the permittee will submit a report to DRMS within 30 days. DRMS does not restrict the radius of impact to 600' and therefore will require the permittee to commit to reporting any complaints by well owners to DRMS within 48 hrs or less. In the event that a well owner reports that their well has become unusable, the permittee will be required to implement mitigation measures <u>immediately (as soon as practically possible).</u> The permittee will be required

to initiate an investigation into the complaint immediately, and submit the results, as well as any proposed remediation or rationale for discontinuing mitigation, to DRMS for evaluation within 30 days.

10) The provided Groundwater Sampling and Analysis Plan is incomplete/inconsistent. For example, the Groundwater Quality Monitoring Plan provided states that "Operations at the site will take place inside of lined cells…" however the mining plan seems to contradict this at this time. The provided Mitigation Plan also states that "Martin Marietta intends to install monitoring wells at the site prior to exposing groundwater" however, no information as to the number and locations of these wells is given – only the location of a single proposed compliance well. It is likely that based on the proximity to the river, and location of the unlined excavations proposed, that additional compliance point(s) will be required.

    The provided Groundwater Sampling and Analysis Plan, and the information it currently contains, should be re-submitted in accordance with the "DRMS Groundwater Monitoring Sampling and Analysis Plan Guidance for Construction Materials and Hard Rock Sites" dated September 2023, along with the additional specific information required by that document. If the applicant believes that a requirement or topic within the guidance document is not applicable to this site, a rationale for not including it should be provided. A PDF copy of the September 2023 Guidance Document has been included with these comments.

11) All baseline water level data, water quality data, as well as any proposed modifications to the analyte list, sampling intervals, or Table Value Standards benchmark values should be submitted to DRMS as a subsequent TR for review and approval.

    As always, more information/clarification may be required as additional information is submitted during the application review process.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

Groundwater Monitoring: Sampling and Analysis Plan Guidance Construction Materials and Hard Rock Sites

September 2023

Contents

Introduction

This document is intended to provide guidance to permittees of Construction Materials or Hard Rock mines, on the typical requirement of a groundwater sampling and analysis plan, where the proposed operation has the potential to adversely impact the prevailing hydrologic balance of the affected land and of the surrounding area, with respect to the quantity and quality of water in groundwater systems. It is intended to supplement the Groundwater Monitoring and Protection Technical Bulletin of November 19, 2019, and is an attempt to provide more detailed and specific guidance to permittees in an area where the Division has found approaches to compliance have varied widely.

Sites where mining will not expose groundwater, e.g., dry sites or sites where mining will not be near the water table, are not required to submit a groundwater sampling and analysis plan.

A Sampling and Analysis Plan should be tailored to the specific site to which it applies, but this guidance document does not take site-specific factors into account.

The remaining sections of this document are organized under the same headings that the Division would expect to see in a typical groundwater sampling and analysis plan.

Hyperlinks are included in the document text for convenience, and a full list of references is given at the end.

1 Background Information

1.1. Site Description

The Site Description should include the following:

- Name of the site or sampling area. Also include the name or abbreviation (e.g., "the Site"), if any, that will be used throughout the plan.

- A general description of the region in which the site or sampling area is located. Include the street address, city, state, and postal code, if appropriate.

- A detailed description of the physical geography of the site or sampling area. Include a description of the topography, land use/surface cover, any relevant physical features, past and present activities, existing structures. Give the area in acres.

- A description of the geology of the area, including lithology and stratigraphy. Give the composition, thickness and extent of each formation. Identify any faults or other major structural features in the area. Diagrams are often a helpful addition to a geologic description.

- A description of the hydrogeology of the area. Identify each aquifer underlying the site. Characterize each aquifer (hydraulic conductivity, isotropy, confined/unconfined, recharge zones, groundwater flow direction) and describe how the characterization was made. Identify aquitards/confining layers.

- At least two maps:
  - A vicinity map that shows the permit area within its geographic region.

  - A Monitoring Well Location map that shows the sampling sites or sampling areas within the local area. Scale criteria need not be followed for this map. The map should include a layer of projected potentiometric contour lines for each identified aquifer, or a groundwater directional flow arrow (if appropriate). All permitted wells within the map extent should be shown – this information is available from the Division of Water Resources (DWR). All sampling locations (historic, active and planned) should be shown. All springs and seeps should be shown. The outcrop of any geologic formations should be shown. Other physical features and man-made structures may be included for clarity.

  All maps should include a title, legend, North arrow, scale bar, date, and section lines/marks. All maps must be prepared and signed by a registered land surveyor, professional, engineer, or other qualified person.

1.2. Baseline Groundwater Characterization

A Sampling and Analysis Plan will be informed by a baseline characterization of groundwater at the site, but may also need to include a plan to collect the data that will allow the initial characterization to be made. Applicants are encouraged to utilize information available from the public domain literature

and private sector data in developing their baseline groundwater characterization. These data sources will not require a Notice of Intent (Rule 5) to perform exploration operations. Private sector sources will likely include environmental site assessments performed as part of land acquisition.

Baseline sampling should be sufficient to allow the Division to assess the impacts of the future mining operation on the prevailing hydrologic balance. Sampling locations should be established upgradient and downgradient of the proposed operation, the number of sampling locations is not specified since it depends greatly on the site, (a minimum of three data points are needed to establish groundwater flow direction). Unless otherwise approved by the Division, all groundwater monitoring wells should be within the permit area. The screened intervals of groundwater monitoring wells should be sufficient to monitor each identified aquifer. Samples should be taken with sufficient frequency to capture site-specific temporal variability. The duration of the sampling period should be sufficient to identify seasonal trends. The minimum sample location, frequency and duration requirements for baseline groundwater characterization are summarized below:

- Upgradient and downgradient sampling locations in each identified aquifer
- Samples taken quarterly
- Five consecutive quarters of data

A table should be included with a row for each sampling location. Each point should have a unique identifier. The table should include the location (Lat/Long), land surface elevation, top of casing elevation, total depth, screened interval, and completion date. The latitude/longitude could be shown in decimal degrees showing five places to the right of decimal, e.g., 39.73934, -104.98486.

Upon request the Division is available for consultation during development of a Sampling and Analysis Plan.

1.2.1. Monitoring Well Installation

All monitoring wells should be:

- Permitted with the State Engineer's Office (SEO) Division of Water Resources (DWR); and
- Constructed (and later abandoned) according to the required SEO standards (see 2 CCR 402-2 Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction)

The well construction standards are designed to protect aquifer integrity and to ensure that constructed wells serve their purpose; in this case to provide representative, defensible data. Failure to follow the applicable permitting and well construction rules could result in unacceptable data; and failure to adequately protect groundwater resources could result in subsequent enforcement action as deemed appropriate by DRMS or the SEO.

All wells should be installed by a licensed contractor, as required by SEO. Site specific well placement and construction details should be recorded and approved by a qualified professional,

before being submitted to DRMS.

1.2.2. Baseline Groundwater Quantity

Baseline water level data should be recorded in a table, and a narrative description of how the data was collected should be provided. A graph of the water level against time at each monitoring point should also be included. In most cases a static water level can be measured using a depth gauge from the top of the casing, however if the aquifer is under confined conditions, and the pressure is such that the well is flowing, an alternative method will be necessary (for example: https://www.usgs.gov/media/videos/measuring-water-levels-a-flowing-well).

The potentiometric head at the well can be readily derived from the depth to water measurement and the casing elevation. Head measurements from three or more points may be interpolated to give a groundwater flow direction and an approximation of the potentiometric surface in the aquifer. In many cases it will be necessary to collect more data points to adequately characterize the pre-mining conditions.

Often a numerical model (for example: Modflow) will be an appropriate tool to characterize the hydrogeology of the site. In other cases, the Division acknowledges, routine one-dimensional groundwater equations may be appropriate to evaluate potential offsite hydrologic impacts. If a numerical model is used, it should be thoroughly documented, with all assumptions explicitly stated. The documentation should include:

- An explanation of the conceptual model, with assumptions explicitly stated
- A detailed description of the model grid, with figures
- A list of parameter values for boundary conditions and initial conditions
- Details of the model calibration

1.2.3. Baseline Groundwater Quality

A table should be provided with a complete list of water quality parameters to be measured. This will comprise both field parameters and laboratory analytes. The full parameter list should be based on Tables 1-4 from Regulation 41: The Basic Standards for Groundwater (Reg. 41). Parameters from these tables have been compiled in Appendix A for Construction Materials sites and Appendix B for Hard Rock sites.

The Division will entertain variances from the Reg. 41 list on a case-by-case basis, but any proposed variance must be justified.

Baseline groundwater quality data should be recorded in a table, with the sampling date. Minimum, maximum and average values for each parameter should be given.

2 Predicted Impacts to Hydrologic Balance

Following the characterization of baseline conditions a prediction should be made as to the possible impacts of the proposed mining operation on groundwater quantity and quality.

The prediction of likely impacts to groundwater quantity should include a prediction of the maximum spatial extent of drawdown caused by dewatering, or of mounding caused by impermeable cell liners/slurry walls, and the time-scale over which it will be observed. The extent and time to recovery to a steady-state following reclamation should also be predicted.

The prediction of impacts to groundwater quality should include a discussion of water quality parameters that may be elevated as a result of the proposed operation, and the likely spatial and temporal extent of the impact. It is noted here that HB 19-1113, which applies to Hard Rock Sites only and was signed into law on April 4, 2019, requires most reclamation plans to demonstrate, by substantial evidence, a reasonably foreseeable end date for any water quality treatment necessary to ensure compliance with applicable water quality standards.

If a numerical model is used to inform any of the hydrologic predictions the model should be thoroughly documented, as discussed in Section 1.2.2.

3 Groundwater Monitoring Plan

A monitoring plan sufficient to verify the predictions of hydrologic impacts should be proposed. The locations of sampling points, and the frequency at which they will be sampled should be specified. A complete list of groundwater quality parameters to be sampled for should be given. A description of sampling methods should be included in sufficient detail to ensure that the procedure can be replicated throughout the life of the permit (Sampling Methods are discussed in more detail below).

A commitment should be made as to how the monitoring data will be reported to the Division. Typically monitoring data will be compiled into a report, to be submitted by a specified date, e.g. annually or quarterly.

The groundwater monitoring report will include:

- Tabulated data for all parameters
- Graphs/plots for selected parameters
- A narrative analysis of the data, with trends and anomalies identified
- A comparison of the observed data to the predictions **and** to the groundwater quality standards (see below)

The requirements of the groundwater monitoring plan may continue to apply until final bond release and termination of jurisdiction. Changes to the groundwater monitoring plan will require a Technical Revision to the permit.

3.1. Groundwater Points of Compliance

It is likely that one or more Groundwater Points of Compliance (POC) will be established, these are locations at which compliance with the applicable standard will be assessed. Detailed guidance on POCs has been given in the Groundwater Monitoring and Protection Technical Bulletin of November 19, 2019, and will not be repeated here. POCs should be identified in the groundwater monitoring plan.

3.2. Groundwater Quality Standards

As is discussed in detail in the Groundwater Monitoring and Protection Technical Bulletin of November 19, 2019, the Division does not have the authority to set groundwater quality standards, but it does have both the authority and the obligation to apply the standards set by the Water Quality Control Commission, (in practice, this often involves the determination of how the Interim Narrative Standard from Reg. 41 should be applied at a site). For the sake of clarity, the numerical values for groundwater quality parameters that represent the applicable standard should be agreed and recorded in a table at the same time the POCs are established.

4 Sampling Methods

The goal of sampling is to make accurate, repeatable field measurements and to collect representative groundwater samples for laboratory analysis. There is no single correct method to conduct groundwater sampling, however there many incorrect methods. Follow accepted best industry practices to ensure that a representative sample is collected and analyzed. Applicable references include those from the US Environmental Protection Agency, and the US Geological Survey.

It is likely that the contracted analytical laboratory will supply detailed instructions for sample collection and handling.

Best practices for sampling:

- Details of sampling events should be recorded – documentation is critical for Quality Assurance
- All samples should be collected on the same day, if possible
- Sampling should occur in a progression from upgradient to downgradient wells
- Depth to water should be measured first
- Field instruments should be calibrated according to manufacturer's specifications prior to use
- Field parameters (temperature, pH, conductivity, dissolved oxygen) should be measured and recorded before and after each purge of the well
- A well should be purged at least three times before samples are collected for lab analysis; if field parameters vary by >10% between consecutive purges, purging should continue up to six times

- Samples should be collected in the appropriate container and handled in a manner appropriate for the analysis
- Manufacturer's instructions for the correct use and disposal of equipment should be followed
- Ship samples well before the holding time is up; ideally, within 24 hours of sample collection
- Do not leave sampling devices in monitoring wells for reuse

References

DRMS Groundwater Monitoring and Protection Technical Bulletin: November 19, 2019
https://drive.google.com/file/d/121Uc_KmuAx7xhc8heQcROPnK_u-kcG-J/view?pli=1

Well Construction Rules
https://dwr.colorado.gov/services/well-construction-inspection

Modflow Documentation
https://www.usgs.gov/mission-areas/water-resources/science/modflow-and-related-programs

Water Quality Control Commission regulations
https://cdphe.colorado.gov/water-quality-control-commission-regulations

EPA Groundwater Sampling Methodology
https://www.epa.gov/sites/default/files/2015-06/documents/Groundwater-Sampling.pdf

USGS National Field Manual for the Collection of Water-Quality Data
https://www.usgs.gov/mission-areas/water-resources/science/national-field-manual-collection-water-quality-data-nfm#overview

HB 19-1113: Protect Water Quality Adverse Mining Impacts
https://leg.colorado.gov/bills/hb19-1113

Appendix A: Full parameter list for Construction Material Sites (with Table Value Standards) from Regulation 41, Tables 1-4

Analyte	Table Value Standard (mg/L, unless other units given)	Reg. 41 Table Reference (1-4)
pH Field (pH unit)	6.50 - 8.50	2 and 3
TDS	400 mg/L, or 1.25X background	4
Chloride - Dissolved	250	2
Fluoride - Dissolved	2	3
Nitrate (NO3)	10	1
Nitrite (NO2)	1.0	1
Nitrite + Nitrate as Nitrogen	10	1
Sulfate - Dissolved	250	2
Aluminum - Dissolved	5	3
Antimony - Dissolved	0.006	1
Arsenic - Dissolved	0.01	1
Barium - Dissolved	2	1
Beryllium - Dissolved	0.004	1
Boron - Dissolved	0.75	3
Cadmium - Dissolved	0.005	1
Chromium - Dissolved	0.1	1 and 3
Cobalt - Dissolved	0.05	3
Copper - Dissolved	0.2	3
Iron - Dissolved	0.3	2
Lead - Dissolved	0.05	1
Lithium - Dissolved	2.5	3
Manganese - Dissolved	0.05	2
Mercury - Dissolved	0.002	1
Molybdenum - Dissolved	0.21	1
Nickel - Dissolved	0.1	1
Selenium - Dissolved	0.02	3
Silver - Dissolved	0.05	1
Thallium - Dissolved	0.002	1
Uranium - Dissolved	0.0168 to 0.03	1
Vanadium - Dissolved	0.1	3
Zinc - Dissolved	2	3

- These analytes, at a minimum, will be tested for during the five (5) quarters of baseline monitoring. It will be up to the Operator/Permittee to submit a Technical Revision with proper justification to reduce the analyte list.

Appendix B: Full parameter list for Hard Rock Sites (with Table Value Standards) from Regulation 41, Tables 1-4

Analyte	Table Value Standard (mg/L, unless other units given)	Reg. 41 Table Reference (1-4)
pH Field (pH unit)	6.50 - 8.50	2 and 3
TDS	400 mg/L, or 1.25X background	4
Chloride - Dissolved	250	2
Fluoride - Dissolved	2	3
Nitrate (NO3)	10	1
Nitrite (NO2)	1.0	1
Nitrite + Nitrate as Nitrogen	10	1
Sulfate - Dissolved	250	2
Aluminum - Dissolved	5	3
Antimony - Dissolved	0.006	1
Arsenic - Dissolved	0.01	1
Barium - Dissolved	2	1
Beryllium - Dissolved	0.004	1
Boron - Dissolved	0.75	3
Cadmium - Dissolved	0.005	1
Chromium - Dissolved	0.1	1 and 3
Cobalt - Dissolved	0.05	3
Copper - Dissolved	0.2	3
Iron - Dissolved	0.3	2
Lead - Dissolved	0.05	1
Lithium - Dissolved	2.5	3
Manganese - Dissolved	0.05	2
Mercury - Dissolved	0.002	1
Molybdenum - Dissolved	0.21	1
Nickel - Dissolved	0.1	1
Selenium - Dissolved	0.02	3
Silver - Dissolved	0.05	1
Thallium - Dissolved	0.002	1
Uranium - Dissolved	0.0168 to 0.03	1
Vanadium - Dissolved	0.1	3
Zinc - Dissolved	2	3
Cyanide - Free	0.2	1
Beta and Photon emitters	4 mrem/yr	1
Gross Alpha	15 pCi/L	1

- These analytes, at a minimum, will be tested for during the five (5) quarters of baseline monitoring. It will be up to the Operator/Permittee to submit a Technical Revision with proper justification to reduce the analyte list.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

Memorandum

To: Joel Renfro, DRMS
From: Rob Zuber, DRMS
Cc: Amy Eschberger, Michael Cunningham
Date: November 30, 2023
Subject: 112c Application for Thunderbird Sand and Gravel (File No. M-2023-032), Review of Surface Water Control and Protection of the Hydrologic Balance

I reviewed the 112c permit application submitted for Thunderbird Sand and Gravel, and I have the following adequacy items.

1. The text and maps in the application indicate the existence of water bodies within the permit boundary. These include Excelsior Ditch, Thunderbird Lake, and two unnamed ponds. Exhibit G should discuss these features, namely:

    a) Their current use
    b) If/how they will be utilized in the operation
    c) If/how they will be protected from impacts of the mining and reclamation operations.

    If no protection is planned for these features, an explanation must be provided.

2. The Division acknowledges that the application includes a plan to mine within 200 feet of the Arkansas River. However, Division requirements are more stringent, and one of (or a combination of) the following options must be performed by the applicant.

    a) Provide a detailed analysis of the 100-year flow in the river during the worst-case conditions of the proposed mining and reclamation scenarios. This analysis must sufficiently demonstrate that the proposed pit banks during mining and after reclamation will not be significantly eroded by the runoff event. This should be done using the appropriate hydrology and hydraulics model(s) (for example, the U.S. Army Corps of Engineers HEC-RAS and HEC-HMS models).

    b) Propose an appropriate mining setback from the banks of the Arkansas River. The minimum width of this setback is based on guidelines developed by the Mile High Flood District (MHFD) and listed in Table 1 below. *The MHFD guidelines are available upon request.* Note that in the scenario where no bank protection is provided, the minimum allowable setback from the river is 400 feet.

Table 1 - Minimum River Setback Requirements (Based on MHFD Guidelines)

Area Stabilized	Minimum Setback (ft)
None	400
Pitside Bank Only	300
Riverbank Only	250
Riverbank and Pitside Bank	150

c) Provide detailed designs of structures (e.g., side-channel spillways) that will be installed on riverside banks and/or pit banks to allow water to flow safely in and out of the pit during the 100-year, 24-hour storm event and prevent significant erosion of the banks. The design for these structures can be based on bank protection designs presented in Pueblo County drainage criteria documents, the MHFD guidelines, or other applicable documents. Note that in the scenario where both riverbank and pitside bank protection is provided, the minimum allowable setback from the river is 150 feet.

Please do not hesitate to ask me questions about my review.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

Date: **November 30, 2023**

To: **Joel Renfro**

CC: **Amy Eschberger**

From: **Zach Trujillo**

RE: **Thunderbird Sand and Gravel Application, DRMS File No. M-2023-006**
Exhibit S - Stability Report Review

Joel,

As requested I have reviewed the provided Exhibit S and geotechnical stability analysis (Report), conducted by Civil Resources, LLC (CR) on behalf of Martin Marietta Materials, Inc. (MMM) regarding the proposed 112c application for the Thunderbird Sand and Gravel (Mine). The purpose of this memo is to summarize CR's Report methodologies and analyses in relation to the Rules and requirements of the Division. Questions and comments regarding the Report to ensure all Rules and requirements are satisfied will be summarized at the end of this memo.

Per Rule 6.4.19(b), "[w]here the affected lands are within two hundred (200) feet of any significant, valuable and permanent man-made structure, the application shall… …provide an appropriate engineering evaluation that demonstrates that such structure shall not be damaged by activities occurring at the mining operation." Based on the proposed Exhibit S and Exhibit C-1 of the application, there are three identified permanent, man-made structures identified within 200 feet of the proposed permit area. The structures identified in the Report are the Excelsior Ditch, Baxter Road, and the Black Hills Energy Transmission Lines. In order to satisfy Rule 6.14.19, CR has performed an engineering analyses for each of the noted structures under the proposed Exhibit S.

Site Conditions

Site conditions were characterized in the Report based on site investigations performed by other parties as stated by CR. This included drill logs as well as data from historic Division of Water Resource (DWR) well information. Generally, the site consists of three material profiles which has been designated as overburden, sand and gravel, and bedrock. Depths of these profiles were determined by borings however, the number, location and logs of the boreholes were not provided in the Report or in the application for the Division's review. While no groundwater was intercepted by the discussed drill logs, historic DWR well data has reported groundwater depths ranging from five to seven feet below ground surface in the area of the Mine. Due to the presence of groundwater, CR has implemented a slurry wall as part of the design for portions of the mine and is included within the provided stability analyses.

Based on this general information, CR assigned material strength properties to the material profiles. The material strength properties were based on the professional experience of CR and not from the results of

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Jared S. Polis, Governor | Dan Gibbs, Executive Director | Virginia Brannon, Director

site specific testing. Per Section 30 of the Policies of the Mined Land Reclamation Board (Section 30), for generalized, assumed, or single test measurements for critical structures, the minimum recommended FOS is 1.5 for static conditions and 1.3 for seismic conditions. After reviewing the assigned material strength properties to the associated profiles, all material strength properties are within generally accepted ranges for the assigned profiles.

Stability Analyses

A total of 10 stability analyses were performed within the proposed Exhibit S. Results and general descriptions of the analyses are outlined on Table 1 – Slope Stability Results and Setbacks within the Report. The stability analyses are based on the critical cross sections for the mining phase in relation to the critical, man-made structure at its nearest point within the 200 foot limit under static and pseudo-static conditions. As noted earlier in this memo, a total of three critical structures were identified.

In order to determine the stability of the proposed mined slopes and resulting factors of safety (FOS), CR built two dimensional profiles of the Mine's site conditions based on the results of the drill logs, DWR well data and critical sections within the slope stability program GALENA. Material strength properties discussed above were assigned to the profiles along with groundwater elevations and the inclusion of the slurry wall based on the proposed mining phase and location. A pseudo-static load of 0.0847g is also applied to the scenarios to model seismic conditions. The pseudo-static load is based on published values from the U.S.G.S specific to the site location with an acceptable return period which is used in standard engineering practices.

The results of each stability analyses exceeded the minimum FOS requirements of Section 30 for generalized, assumed, or single test measurements for critical structures, of 1.5 for static conditions and 1.3 for seismic conditions. Results of each stability analysis can be found summarized on Table 1 – Slope Stability Results and Setbacks within the Report.

While all FOS requirements were met by the provided stability analyses, it is unclear on whether the slurry wall is accurately reflected in GALENA within some of the scenarios as a result of the material profile layering. When reviewing the slope stability result visuals provided by GALENA for the scenario "Phase 3 Cell with slurry wall" (GALENA file – Thunderbird Mine/Excelsior Ditch) for both static and seismic condition, it appears that the slurry wall does not extend from the surface down to the bedrock profile. Instead, the slurry wall appears to get cut off at the intersection of the Overburden profile and the Sand and Gravel profile. Upon reviewing the material profile coordinates of each material layer, it was observed that a second Sand and Gravel profile (Profile 6 in GALENA) was created in these two slope stability scenarios. While the x-coordinates of these two Sand and Gravel profiles differ slightly, based on the position of these two profile's overall coordinates in relation to the defined slope within GALENA, they appear to create the same effective Sand and Gravel profile which may act as an unnecessary double overlaying profile. As a result this may also have created the visual break of the slurry wall presentation within the GALENA result based on the defined order of the profiles. Additionally, it is unclear on whether the "doubled-up" Sand and Gravel profiles impacts the overall FOS results for the two scenarios within GALENA.

Summary – Division Comments and/or Questions

The following is a summary of the Division's comments/questions discussed and observed during the previous sections of this Memo:

Site Conditions

- Please have MMM provide the borehole drill logs that were discussed and used within CR's Report as well as their location in relation to the Mine for the Division's review.

- Please have MMM provided the DWR well data used in CR's Report and stability analyses for the Division's review.

Stability Analyses

- Please have CR ensure that the slurry wall is accurately reflected in the slope stability models, specifically within "Phase 3 Cell with slurry wall" (GALENA file – Thunderbird Mine/Excelsior Ditch) for both static and seismic conditions.

- Please have CR provide additional rational regarding the second Sand and Gravel profile included in the Phase 3 Cell with slurry wall" (GALENA file – Thunderbird Mine/Excelsior Ditch) GALENA Models.

- Please have CR provide updated GALENA analyses along with the associated resulting FOS as necessary based upon the comments above.

This concludes my review for the requested Exhibit S and geotechnical stability analysis conducted by Civil Resources, LLC on behalf of Martin Marietta Materials, Inc. regarding the proposed 112c application for the Thunderbird Sand and Gravel (Mine). If you have any questions or comments, feel free to reach out.

Sincerely,

Zach Trujillo
Environmental Protection Specialist
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Zach.Trujillo@state.co.us