AMADOR COUNTY, CALIFORNIA

SGI IONE QUARRY EXPANSION PROJECT

FINAL ENVIRONMENTAL IMPACT REPORT

State Clearinghouse No. 2021090273

AUGUST | 2025

Lead Agency
Amador County Planning Department

BENCHMARK RESOURCES

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Lead Agency
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1—INTRODUCTION

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1—INTRODUCTION

1.1 OVERVIEW

This Final Environmental Impact Report (Final EIR; FEIR) has been prepared by Amador County (County), the lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code [PRC], Section 21000 et seq.; California Code of Regulations [CCR] Title Section 15000 et seq. [CEQA Guidelines]) pursuant to 14 CCR Section 15162, to evaluate the potentially significant environmental effects associated with Specialty Granules (Ione) LLC's (SGI's) proposal to amend its existing conditional use permit to expand the existing footprint and depth of Ione Quarry to access additional rock reserves and to amend its existing Reclamation Plan to accommodate the expansion, which collectively constitute the proposed project. Under CEQA, the County must identify and consider the potentially significant environmental effects of the actions proposed before making a final decision to approve the proposed project. This Final EIR will be used in the planning and decision-making process by the County and other responsible and trustee agencies.

A Draft EIR for the proposed project was circulated for public review and comment between August 6, 2024, and September 19, 2024 (State Clearinghouse Number 2021090273). The Draft EIR is incorporated herein by reference. Appendix A, "Comments Received on the Draft EIR," of this Final EIR includes comments on the Draft EIR that were received by the County. Chapter 2, "Response to Comments," of this Final EIR includes the County's responses to comments on the Draft EIR, and Chapter 3, "Revisions to Draft EIR," of this Final EIR provides errata (revisions) made to the text of the Draft EIR to clarify and amplify information in response to comments on the Draft EIR or as otherwise deemed necessary as described in Chapter 3.

1.2 PROJECT SUMMARY

SGI operates Ione Quarry, an approximately 330-acre hard rock mining operation within the unincorporated area of Amador County, approximately three miles west of the city of Ione (see Figure 1-1, "Regional Location," and Figure 1-2, "Site Location"). SGI and SGI's predecessors have been continuously mining for hard rock at the Ione Quarry (project site) since the site was permitted for mining, processing, and offsite shipment in 1989.

SGI proposes to expand the existing footprint and depth of Ione Quarry to access additional rock reserves. This expansion requires an amended Conditional Use Permit (CUP) and an amended Reclamation Plan that allows for the expanded proposed mining

area and additional stockpiling area(s). The project does not propose an increase in the current rates of production at the quarry or changes to other operations. With approval of the requested expansion, the quarry's total approved surface disturbance would increase from approximately 56 acres to approximately 136 acres, the maximum approved depth of mining would increase from approximately 325 feet above mean sea level (msl) to approximately 280 feet below msl. The total surface disturbance associated with the operation's stockpile area would be approximately 86 acres with a maximum elevation of 560 feet msl.

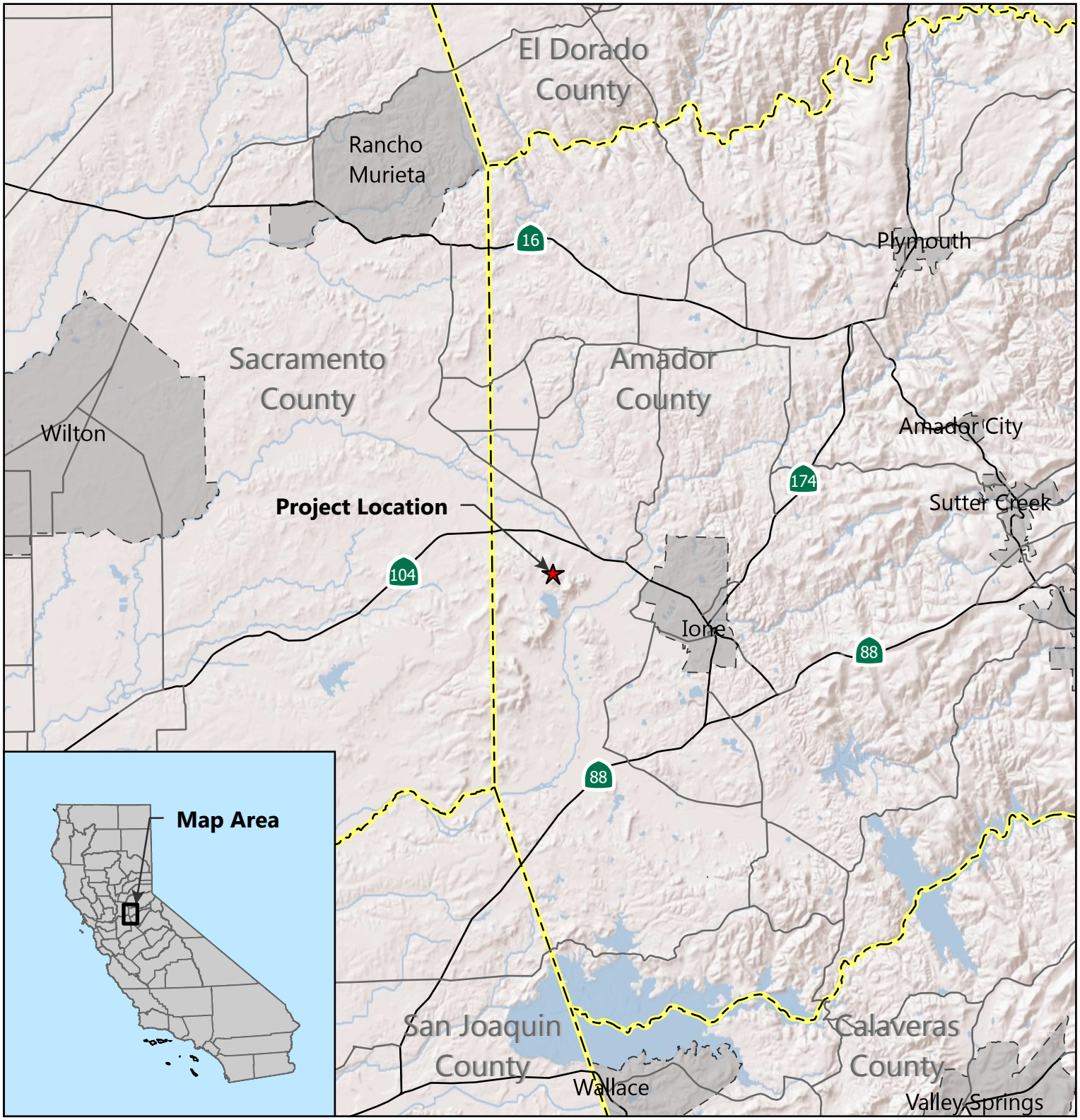
The Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code [PRC], Sections 2710–2796.5) and its implementing regulations (California Code of Regulations [CCR], Title 14, Section 3500 et seq.) requires mines to be reclaimed to a usable condition that is readily adaptable for a productive alternative land use that creates no danger to public health or safety. A reclamation plan amendment has been submitted as part of the application materials in compliance with SMARA regulations. The proposed project serves to adjust reclamation boundaries and contours, enhance drainage and water conveyance facilities, and provide reclamation measures to achieve current SMARA standards. The reclamation plan amendment proposes post-mining land uses of grazing, open water, and open space.

A complete description of the proposed project is provided in Chapter 2, "Project Description," of the Draft EIR, which is available on the County Planning Department website at:
https://www.amadorgov.org/departments/planning/current-projects

1.3 FINAL EIR REQUIREMENTS

This Final EIR provides responses to comments received on the Draft EIR. Section 15132 of the CEQA Guidelines requires that the Final EIR consist of:

- the draft EIR or a revision of the draft EIR;
- comments and recommendations received on the draft EIR either verbatim or in summary;
- a list of persons, organizations, and public agencies commenting on the draft EIR;
- the responses of the Lead Agency to significant environmental points raised in the review and consultation process; and
- any other information added by the Lead Agency.



SOURCES: ESRI World Shaded Relief accessed Aug. 2023, ESRI World Streetmap 2023; compiled by Benchmark Resources in 2023

Project Location
State Route Highway
City or Urbanized Area
Street
County Boundary

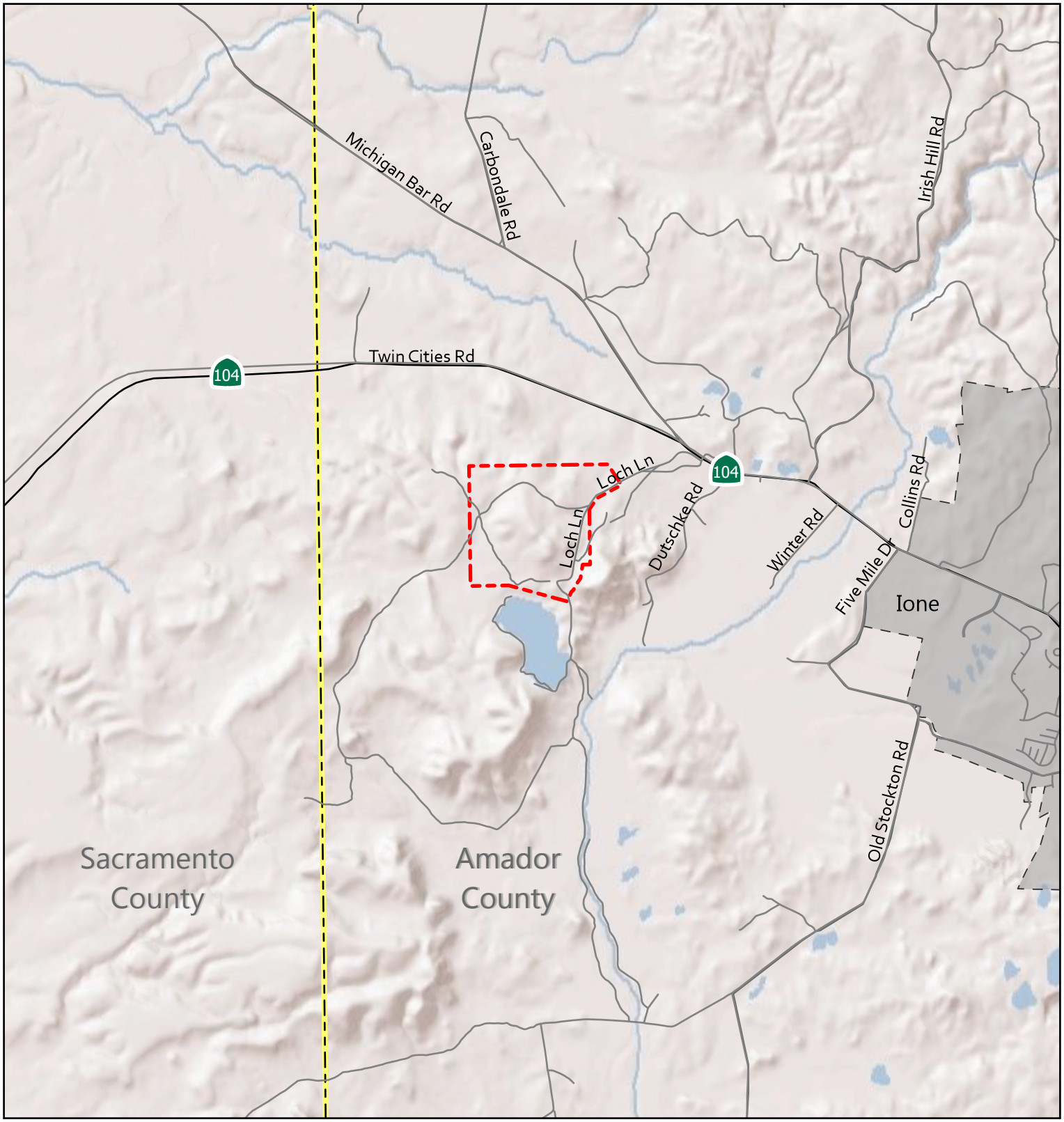
Regional Location
IONE QUARRY EXPANSION PROJECT
FINAL EIR
Figure 1-1

BENCHMARK RESOURCES

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SOURCES: ESRI World Shaded Relief accessed Aug. 2023, ESRI World Streetmap; compiled by Benchmark Resources in 2023

Project Boundary
City or Urbanized Area
County Boundary
State Route Highway
Street
Waterbodies

BENCHMARK RESOURCES

N

0 0.5 1 2 Miles

Site Location
IONE QUARRY EXPANSION PROJECT
FINAL EIR
Figure 1-2

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This Final EIR for the proposed project has been prepared to provide responses to comments received on the Draft EIR and is to be used in conjunction with, rather than in place of, the Draft EIR. Therefore, the information in this Final EIR, which incorporates the Draft EIR and its appendices, fulfills California and County CEQA requirements for a complete EIR.

Chapter 3 of this Final EIR provides revisions for clarification or amplification of information in the record. In no instances do the errata provide substantial new information or indicate a new impact or increase in the severity of an impact identified in the Draft EIR.

1.4 USE OF THE EIR IN THE DECISION-MAKING PROCESS

The EIR is an information document designed to inform the public of the significant environmental effects of a project, identify possible ways to minimize or mitigate the significant effects, and describe reasonable alternatives to the project.

The County will use the EIR, together with economic, social, and technical information, to decide whether to approve the discretionary entitlements being requested. The County will make this Final EIR available prior to hearings on proposed project approval or denial to provide an opportunity for agency and public review of the complete EIR before decisions are made. As required by CEQA, the County will provide responses to comments on the Draft EIR a minimum of ten days prior to the first public hearing at which County decision makers will consider certification of the Final EIR.

The EIR (consisting of this Final EIR and the Draft EIR which is incorporated by reference) reviews the environmental consequences of the proposed project, as described in Chapter 3, "Environmental Analysis," of the Draft EIR.

Before rendering decisions on the discretionary actions, the County must certify that:

- the EIR has been completed in compliance with CEQA,
- the EIR was presented to the decision-making body of the Lead Agency,
- the information in the EIR was reviewed and considered before approving the project, and
- the EIR reflects the Lead Agency's independent judgment and analysis.

Should the County approve the proposed project, a statement of findings would be adopted for each significant environmental impact of the proposed project, accompanied by a brief explanation of the rationale for each finding.

The possible findings are:

- changes or alterations have been required in, or incorporated into the project to avoid or substantially lessen the significant environmental effects as identified in the Final EIR;
- such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency; and/or
- specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or project alternatives identified in the Final EIR.

The County must adopt, in conjunction with the findings, a program for reporting or monitoring the changes that it has either required in the project or made a condition of approval to avoid or substantially lessen impacts (CEQA Guidelines Section 15091[d]). These measures must be fully enforceable through conditions of approval, agreements, or other measures. A Mitigation Monitoring and Reporting Program (MMRP) incorporating the mitigation measures identified in the EIR will be prepared in advance of a public hearing on the proposed project.

1.5 CEQA PUBLIC REVIEW PROCESS

1.5.1 Purpose of Public Review

CEQA Guidelines Section 15201 states:

> Public participation is an essential part of the CEQA process. Each public agency should include provisions in its CEQA procedures for wide public involvement, formal and informal, consistent with its existing activities and procedures, in order to receive and evaluate public reactions to environmental issues related to the agency's activities. Such procedures should include, whenever possible, making environmental information available in electronic format on the Internet, on a web site maintained or utilized by the public agency.

CEQA (California Public Resources Code [PRC] Section 21082.2(e)) explains that "[s]tatements in an environmental impact report and comments concerning an environmental impact report shall not be determinative of whether the project may have a significant effect on the environment." According to CEQA, it is the responsibility of the lead agency decision makers to "determine whether a project may have a significant

effect on the environment based on substantial evidence in the record." Substantial evidence is defined as facts, fact-related reasonable assumptions, and expert opinion. "Substantial evidence" does not include arguments, speculation, unsubstantiated opinion or narrative, clearly erroneous evidence, or socioeconomic impacts not related to the physical environment (PRC Section 21080(e), 21082.2(a), 21082.2(c), and CEQA Guidelines Section 15384).

1.5.2 Public Review Period and Notifications

In accordance with both the specific requirements and the intent of CEQA, the environmental review process for the proposed project has included substantial opportunities for public and agency review and comment on the environmental evaluations. The public review process for the project EIR has included the following opportunities:

- September 15, 2021, to October 5, 2021: Notice of Preparation of EIR and Early Consultation Review Period
- October 5, 2021: Planning Commission public scoping session to take public comments on the potential environmental impacts to be analyzed in the Draft EIR
- August 6, 2024, to September 19, 2024: 45-day Draft EIR public review period
- September 10, 2024: Planning Commission hearing for public review and comment on the Draft EIR

This Final EIR or notices of its availability will be provided to commenting agencies, organizations, and individuals at least ten days prior to County decision maker hearings regarding certification of the Final EIR and consideration of project approval, and this Final EIR will be available to the public prior to such hearings on the County's Internet website at: https://www.amadorgov.org/departments/planning/current-projects

1.5.3 Summary of Comments on Draft EIR and County Responses

Comments on the Draft EIR were submitted by five (5) public agencies, one (1) organization, and four (4) individuals or groups of individuals. Each comment set (i.e., letter or e-mail) is included in Appendix A, of this Final EIR. A list of the agencies, organizations, and individuals who submitted comments is provided in Chapter 2 of this Final EIR where the text of each comment letter is restated followed by the County's responses to each comment.

Comments on the Draft EIR addressed a range of issues, including the content and analysis of the Draft EIR and addressing topics including:

- air quality,
- biological resources,
- hydrology and water quality,
- noise,
- transportation, and
- cumulative effects.

Comments are responded to in Chapter 2 of this Final EIR with the level of detail appropriate to the comment and issue. In some cases, the County decided that it was appropriate to revise information in the Draft EIR to correct, clarify, or amplify information. These revisions are presented as errata in Chapter 3 of this Final EIR.

1.6 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 1-1, "Summary of Project Impacts and Mitigation Measures," provides a summary of the project impacts and mitigation measures identified in the Draft EIR with revisions to certain mitigation measures as presented in errata in Chapter 3 of this Final EIR. The table also identifies the impact significance both without and with mitigation measures applied. As shown in Table 1-1, several impacts are found to be less than significant and do not require mitigation. All remaining impacts would be significant or potentially significant prior to the implementation of mitigation measures but would be reduced to less than significant with mitigation measures applied. No project impacts are found to be significant and unavoidable.

TABLE 1-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
AESTHETICS			
Impact 3.1-1: Potential to Result in a Substantial Adverse Effect on a Scenic Vista	LS	None required.	LS
Impact 3.1-2: Potential for Substantial Damage to Scenic Resources, Including but Not Limited to, Trees, Rock Outcroppings, and Historic Buildings Within a State Scenic Highway	NI	None required.	NI
Impact 3.1-3: Potential to Substantially Degrade the Existing Visual Character or Quality of Public Views (i.e., Views Experienced from Publicly Accessible Vantage Points) of the Site and its Surroundings	LS	None required.	LS
Impact 3.1-4: Potential to Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area	LS	None required.	LS
AIR QUALITY			
Impact 3.2-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan	LS	None required.	LS
Impact 3.2-2: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for Which the Project Region is Non-Attainment Under an Applicable Federal or State Ambient Air Quality Standard	LS	None required.	LS
Impact 3.2-3: Expose Sensitive Receptors to Substantial Pollutant Concentrations	LS	None required.	LS
Impact 3.2-4: Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People	LS	None required.	LS

NI = No Impact; **LS** = Less than Significant; **PS** = Potentially Significant; **S** = Significant; **SU** = Significant and Unavoidable

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
BIOLOGICAL RESOURCES			
Impact 3.3-1: Have a Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on any Species Identified as a Candidate, Sensitive, or Special-Status Species Due to Activities Associated with Mining, Stockpiling, and Reclamation	PS	**Mitigation Measure 3.3-1a:** *Conduct Botanical Surveys, Avoid Special-Status Plant Species if Feasible, Obtain CDFW Authorization and Replace CESA-Listed Impacted Plants at a Minimum Ratio of 1:1* *Prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities, a qualified botanist or biologist shall conduct an appropriately timed preconstruction survey for special-status rare plant species when the plant species are blooming and readily identifiable. The surveys shall occur within one year prior to commencement of ground-disturbing activities. If special-status plant surveys result in negative findings, then no impact would occur and no additional mitigation is ~~would be~~ required.* *If a ~~special-status~~ CESA-listed plant species is detected, and the plant(s) cannot be avoided, a mitigation plan identifying appropriate mitigation ratios at a minimum ratio of 1:1 shall be developed in consultation with, and approved by, the County prior to disturbance of the identified plant(s). ~~regulatory agencies will be notified as required by applicable permits.~~ Additionally, i~~I~~f ~~rare~~ CESA-listed plant species are detected ~~found~~, and avoidance is not feasible, then the Operator shall notify and consult with CDFW and obtain necessary approvals. Such approvals may include requiring the Operator to obtain and comply with the conditions of an CDFW Incidental Take Permit (ITP). ~~i~~Impacted special-status plants shall ~~will~~ be mitigated ~~at a~~ by establishing replacement plants at a minimum ratio of 1:1 ~~ratio~~ (number of plants established:number of plants impacted) or at a higher ratio and/or other conditions as may be determined through consultation with the County or CDFW if a CESA-listed plant is detected during the surveys and avoidance is not feasible. The subject special-status plants to be impacted may ~~will~~ be relocated to suitable habitat areas if feasible, or seeds may~~will~~ be collected ~~and~~for reestablishing~~ed~~ plants within*	LS

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		permanently preserved, suitable habitat areas prior to removal of individual plants. ***Mitigation Measure 3.3-1b:*** *Northwestern Pond Turtle* *Prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas prior to the next mining expansion phase, a qualified biologist shall conduct a preconstruction survey for northwestern pond turtle no more than 7 days prior to proposed disturbance within 325 feet of perennial pond features located on and adjacent to the project site. If northwestern pond turtle is not detected during the pre-construction survey, no additional measures are required. If a northwestern pond turtle is identified in the work area, it should be allowed to leave the work area.* *If an active pond turtle nest is found during the pre-construction survey, a non-disturbance buffer shall be established by a qualified biologist based on the location of the nest until all eggs have hatched and the juveniles have dispersed out of the proposed impact area, or the nest otherwise becomes inactive.* *If northwestern pond turtle are confirmed to be present on-site and pending the outcome of the jurisdictional determination by the Corps as to the Waters of the United States within the project site, consultation with the USFWS may be needed. As a candidate for listing, incidental take permits and compensatory mitigation are not required, however this may change depending on listing status at the time discretionary permits are issued.* ***Mitigation Measure 3.3-1c****: Golden Eagles* *Within 45 days of commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas during the breeding bird season prior to the next mining expansion phase, a qualified biologist shall conduct a protocol survey in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols; and Other*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Recommendations (USFWS 2010) to avoid take of golden eagles. This survey protocol is intended to standardize procedures to inventory and monitor golden eagles within the direct and indirect impact areas of planned or ongoing projects where disturbance or lethal take from otherwise permitted human activities is possible. *If an active eagle nest is identified within the expansion project site, consultation with USFWS and CDFW shall be conducted. A minimum of a 660-foot buffer shall be established per the National Bald Eagle Management Guidelines (USFWS 2007). No disturbance shall occur within the buffer until the monitoring biologist has determined that the young have fledged and are independent of the nest. For a positive occurrence, the qualified biologist shall fill out the GEWG Golden Eagle Database Submission Template (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=108214& inline) and submit the occurrence data to kate.keiser@wildlife.ca.gov so it may be added to the Golden Eagle Database.* ***Mitigation Measure 3.3-1d:** Burrowing Owl* *Two surveys conducted with the first occurring three days prior, and a second conducted within 24 hours prior to the onset of disturbance of previously undisturbed annual grassland, a pre-construction survey shall be conducted by a qualified biologist. The survey will be conducted in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012). If burrowing owl is determined to be present, avoidance buffers of up to 500 feet may be instituted around occupied burrows. The restricted activities and setback distances will follow CDFW guidance provided in the 2012 Staff Report. No ground disturbance should occur within the buffer areas of the occupied burrows until it is determined that the owl is no longer present.* *Occupied burrows will not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist verifies that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the*	

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		occupied burrows are foraging independently and capable of independent survival. *If burrowing owl is detected within the disturbance area during the non-nesting season and the burrow cannot be avoided, burrowing owl exclusion shall be implemented. At least 1 week will be allowed to accomplish this and allow the owls to acclimate to alternate burrows. The results of all preconstruction surveys for burrowing owl shall be provided in a written report to agencies when required by applicable permits and survey protocols.* ***Mitigation Measure 3.3-1e:*** *Swainson's Hawk* *Prior to the commencement of ground disturbing activities (which include tree removal, vegetation clearing, grubbing, or grading) in previously undisturbed areas during the breeding bird season for the next mining phase, protocol level surveys for Swainson's hawk shall be conducted by a qualified biologist. Surveys shall be completed for least two survey periods immediately prior to commencement of ground disturbing activities, which include a minimum of four visits if initiated March 20th ~~and~~ to April 20th (Periods II and III) or a minimum of six visits if initiated June 10th to ~~and~~ July 30th (Period V)~~to avoid impacts to nesting Swainson's hawks~~. Surveys shall not be conducted between April 21 to June 10 (Period IV) due to the difficulty of detecting nests at this time of year. If ground disturbance is scheduled to begin during this time period three surveys shall be completed between April 5 to April 20 (Period III) and three surveys between June 10 to July 30 (Period V).The survey shall be conducted within a 0.25-mile radius around the planned disturbance area following the CDFW guidelines entitled: Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). ~~These surveys are phasic, and are required to begin prior to the nesting period. Protocol surveys require up to 9 surveys to complete (CDFG 2000).~~ If work is beginning before March 20th, or after September 1st,*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		a single preconstruction nesting bird survey as described in 3.3-1g is sufficient to avoid impacts to Swaison's hawk. *If an active nest is identified within 0.25 miles of the proposed disturbance, protective buffers will be established and maintained until such time that the Swainson's hawks have completed their nesting cycle as determined by a qualified biologist. If the proposed Project could impact an active Swainson's hawk nest, the applicant shall obtain an Incidental Take Permit ~~would be required~~ under Section 2081 of CFGC and administered by the CDFW. The applicant shall comply with all permit requirements, including the preparation of a Swainson's Hawk Monitoring and Habitat Management Plan. Removal of known Swainson's hawk nest trees shall be mitigated by replanting trees at a 3:1 ratio; and trees must be species which provide suitable nest structure such as oak trees.* **Mitigation Measure 3.3-1f:** *Tricolored Blackbird* *Within 14 days prior to the commencement of ground disturbing activities that must occur in a previously undisturbed mining phase within 300 feet of suitable breeding habitat (including detention basins with emergent vegetation) during the breeding season (March 1-July 31), pre-construction surveys for tricolored blackbird shall be conducted. If an active nesting colony is discovered during pre-construction surveys, a 300-foot temporary buffer will be established around the nesting colony until the young have fledged. The nesting habitat will be avoided by project activities until it is determined by a qualified biologist that the site is no longer used by the species as a nesting site.* ***Mitigation Measure 3.3-1g****: Special-Status and Other Nesting Bird Species* *Within 14 days prior to the commencement of ground disturbing activities (including tree removal, vegetation clearing, grubbing, or grading) for the next mining phase that must occur in previously undisturbed areas during the nesting season (February 1 through August 31)~~March 1 through July 31)~~, pre-*	

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		construction surveys for avian species shall be conducted for project activities during the nesting bird season ~~March 1 through July 31~~). If active nests (containing eggs, chicks or young) are discovered during pre-construction surveys, a qualified biologist ~~would~~shall establish a species-specific no-work buffer around the active nest sufficient to ensure project activities do not adversely affect the nesting birds. Project activities ~~would~~shall be ~~postponed~~precluded within the no-work buffer until the conclusion of the nesting season, or ~~the~~a qualified biologist performs a follow-up ~~checks~~survey and ~~to~~determines ~~whether~~ the nest is no longer~~still~~ active. ***Mitigation Measure 3.3-1h:*** *Special-Status Bat Species and other Roosting Bats* *To the extent feasible, trees should be removed between September 1 and April 14, which is considered to be outside of the maternity roosting season. Prior to tree removals or the disturbance of other potential roost habitat, a bat habitat assessment will be performed by a qualified biologist within 30 days of commencement of ground disturbing activities (including tree removal, vegetation clearing, grubbing, or grading) for the next mining phase.* *1) <12-in with no habitat potential: If a tree or snag is less than 12-inches diameter at breast height (DBH) and has no potential to support foliage roosting bat species, the tree may be felled using the two-phase cut method. The carcass of the tree shall remain on the ground for at least one night to allow for any torpid bats to escape before the tree is processed, foliage or wood is chipped, or otherwise off-hauled.* *2) >12-in with no habitat potential: If a tree or snag is greater than 12-inches DBH and has no potential to support roosting bats (e.g., no large basal cavities, exfoliating bark, interstitial spaces, or suitable foliage), the tree may be felled using the two-phase cut method.* *3) >12-in with habitat potential (outside maternity season): If a tree or snag is greater than 12-inches DBH and has potential to support*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		roosting bats (e.g., large basal cavities, exfoliating bark, interstitial spaces, or suitable foliage), and the work is being performed outside the maternity roosting season, a qualified biologist shall conduct an emergence survey to determine if the tree supports an active roost. If the roost is active, the qualified biologist shall prepare an exclusion plan utilizing non-lethal means to evict any remaining bats prior to felling the tree using the two-phase cut method. If the roost is inactive, the tree may be felled within 14 days using the two-phase cut. If more than 30 days elapse, the emergence survey shall be repeated. 4) *>12-in with habitat potential (maternity season): If a tree or snag is greater than 12-inches in diameter at breast height and has potential to support roosting bats (e.g., large basal cavities, exfoliating bark, interstitial spaces, or suitable foliage), and the work is being performed during the maternity roosting season, the qualified biologist shall conduct an emergence survey to determine if the tree supports an active roost.* a) *If the roost is inactive, the tree may be felled within 14 days using the two-phase cut. If more than 14 days elapses, the emergence survey shall be repeated.* b) *If the tree is determined to support an active roost a no-work buffer shall be established around the roost (typically 250 feet) and remain in place until September 1. A second emergence survey should occur to determine whether the roost has been vacated.* c) *If the roost remains active, the qualified biologist shall prepare an exclusion plan utilizing non-lethal means to evict any remaining bats prior to felling the tree using the two-phase cut method.* ***Mitigation Measure 3.3-1i:*** *California Tiger Salamander and Western Spadefoot*	

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Protocol-level surveys shall be completed by a biologist that holds a valid 10(a)(1)(A) recovery permit in accordance with USFWS protocol, prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities for the next mining phase. ~~At the project site aquatic sampling during two~~ Three aquatic surveys shall be performed in potentially suitable aquatic breeding habitats present at the project site. These surveys would occur during the spring months (generally in March, April, and May) for two consecutive breeding seasons. ~~and a~~A drift fence study shall occur in the intervening winter ~~should be conducted~~ in order to support a negative finding. If California tiger salamander are determined to be absent by way of protocol-level surveys, no additional mitigation would be required. *If California tiger salamander are confirmed to be present on-site, a 2081 Incidental Take Permit from CDFW would be required. Additionally, if California tiger salamander are confirmed on-site, and pending the outcome of the jurisdictional determination by the Corps as to the Waters of the United States within the project site, a USFWS Biological Opinion under Section 7 of the ESA, or a Section 10 Habitat Conservation Plan would be required, or both. ~~Additionally, c~~Compensatory mitigation for loss of habitat would be required.* *If California tiger salamander are confirmed to be present ~~found on site~~, compensatory mitigation for loss of California tiger salamander upland habitat ~~will~~ shall be provided via on-site creation, off-site preservation, the purchase of credits from a mitigation bank, or some combination of the aforementioned options at a minimum of a 1:1 ratio or at a higher ratio as may be determined through consultation with USFWS and CDFW.* *Protocol-level surveys for California Tiger Salamander will be sufficient for the determination of presence or absence of western*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		spadefoot toad. Avoidance, minimization and mitigation for California Tiger Salamander would be sufficient to reduce the level of effect for the California Tiger Salamander and the western spadefoot toad to a less than significant level. ***Mitigation Measure 3.3-1j:*** *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp* *Prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas for the next mining phase, protocol-level surveys shall be conducted in potentially suitable aquatic features by a biologist that holds a valid 10(a)(1)(A) recovery permit in accordance with the Survey Guidelines for the Listed Large Branchiopods (USFWS 2015) to determine if vernal pool branchiopods are present within the project site. If vernal pool branchiopods are determined to be absent by way of protocol-level surveys, no additional mitigation would be required. These survey results would be considered valid for up to five years.* *If vernal pool branchiopods are confirmed to be present on-site, take authorization pursuant to the FESA shall be acquired prior to commencement of project activities. If habitat compensation is required, compensatory mitigation for loss of vernal pool branchiopod habitat shall be provided via on-site creation, off-site preservation, the purchase of credits from a mitigation bank, or some combination of the aforementioned options, as approved by USFWS. Mitigation in the form of creation of vernal pool habitat shall occur at a minimum of a 1:1 ratio. Mitigation in the form of preservation shall occur at a minimum 2:1 ratio. Implementation of this mitigation measure would reduce impacts to vernal pool fairy shrimp and vernal pool tadpole shrimp to levels considered less than significant.* ***Mitigation Measure 3.3-1k:*** *Crotch's Bumble Bee*	

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Protocol-level surveys shall be conducted to determine presence of the species following guidelines of the Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species (CDFW 2023). Surveys for Crotch bumble bee will be conducted during the peak flight season (approximately April to August). Surveys will consist of one hour of active search time per three acres of suitable habitat. Each survey will be spaced 2 to 4 weeks apart, to account for variability in resource utilization and host plant bloom times throughout suitable habitat. If no Crotch's bumblebee individuals are encountered during these surveys, it can be assumed that project activity is unlikely to impact this species and no further measures would be required. These survey results would be considered valid for up to five years. *If potential Crotch's bumble bees are detected during the survey, a 2081 Incidental Take Permit from CDFW would be required. As a candidate species, no compensatory mitigation is, as of yet, required; however, if Crotch's bumble bee becomes CESA-listed, it is probable that compensatory mitigation at a minimum ratio of 1:1 will be required. If the bumble bee occurs on-site a management plan will additionally be prepared to maximize both nesting and foraging resources on mitigation lands. Implementation of this mitigation measure would reduce impacts to Crotch's bumble bee to levels considered less than significant.*	
Impact 3.3-2: Have a Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on any Species Identified as a Candidate, Sensitive, or Special-Status Species After the Completion of Reclamation	PS	Implement Mitigation Measures 3.8-3a and -3b (see Impact 3.8-3).	LS
Impact 3.3-3: Have a Substantial Adverse Effect on Any Riparian Habitat, Federally Protected Wetland, or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service	PS	***Mitigation Measure 3.3-3a:*** *Protection of Oak Woodlands* *The operator of the Ione Quarry shall develop an Oak Woodland Conservation Plan that details the actions required to offset the loss of sensitive oak woodland habitat on the project site. The actions required shall include one or more of the following:*	LS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		• *Conservation of oak woodlands, through the use of conservation easements at a 3:1 ratio for a maximum of 47.73 acres.* • *Restoration of former oak woodlands or establishment of new oak woodlands through planting an appropriate number of replacement trees, including maintenance, monitoring, and replacement of failed plantings for a period of five years. This mitigation requirement cannot account for more than one half of the mitigation pursuant to the California Oak Woodland Conservation Act.* • *Contribution of funds to the Oak Woodlands Conservation Fund, as established under subdivision (a) of Section 1363 of the FGC.* *The Oak Woodland Conservation Plan shall be submitted to Amador County prior to the start of any activities that will disturb oak woodland habitat on the project site.* ***Mitigation Measure 3.3-3b:** Protection of State or Federally Protected Wetlands and Other Areas Regulated by Section 404 and 401 of the Clean Water Act* *The operator of the Ione Quarry shall obtain all required resource agency permit approvals prior to beginning work within potentially jurisdictional waters and wetlands and shall comply with any specific conditions of those approvals. Permit approvals may include a Section 404 Permit from the USACE, Section 1602 Lake and Streambed Alteration Agreement from the CDFW, and Section 401 Water Quality Certification from the RWQCB.* *Impacts to jurisdictional wetlands and non-wetland waters features typically require compensatory mitigation at a minimum 1:1 ratio on a functions and values basis ("no net loss"); however, the final wetland mitigation requirements are determined by the regulatory agencies during the permitting process. Required mitigation ratios can be met by creating wetlands on-site or off-site (may require a higher than 1:1 replacement to impacts ratio) or purchasing*	

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		wetland credits (1:1 ratio) from a wetland mitigation bank. In certain cases, preservation-only mitigation is allowed based on a watershed analysis.	
Impact 3.3-4: Interfere Substantially with the Movement of any Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors, or Impede the Use of Native Wildlife Nursery Sites	LS	None required.	LS
Impact 3.3-5: Conflict with Any Local Policies or Ordinances Protecting Biological Resources, Such as a Tree Preservation Policy or Ordinance	PS	Implement Mitigation Measures 3.3-1a through 3.3-1k (see Impact 3.3-1) and Mitigation Measures 3.3-3a and 3.3-3b (see Impact 3.3-3).	LS
Impact 3.3-6: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat Conservation Plan	NI	None required.	NI
CULTURAL RESOURCES			
Impact 3.4-1: Result in a Substantial Adverse Change in the Significance of a Historical Resource or Archaeological Resource Pursuant to 14 CCR Section 15064.5	PS	***Mitigation Measure 3.4-1a:*** *Cultural Resources Awareness Training* *The quarry operator shall retain a qualified archaeologist to prepare a Cultural Resources Awareness Training for all personnel who may be involved in ground-disturbing activities within the project site. The training shall focus on the recognition of the types of cultural resources that could be encountered during ground-disturbing activities to facilitate worker recognition and avoidance of these resources. The training will also specify procedures for the immediate notification of the qualified archaeologist for further evaluation and action should a cultural resource be encountered. The training also shall outline penalties for unauthorized artifact collecting or intentional disturbance of archaeological resources. The archaeologist shall conduct the Cultural Resources Awareness Training prior to the start of ground-disturbing activities of undisturbed land for all personnel that may become involved in these activities. Documentation of the training shall be kept on-site and shall be made available to the County upon request.*	LS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Mitigation Measure 3.4-1b: *Inadvertent Discovery of Archaeological and Tribal Cultural Resources* *If prehistoric or historic-era cultural resources are encountered during project activities, all ground-disturbing activities within 50 feet of the find shall cease and the County shall be notified within 24-hours. A qualified archaeologist shall evaluate the significance of the resources and recommend appropriate treatment measures. If the cultural resources are prehistoric or Native American in nature Amador County shall consult with appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources. Per CEQA Guidelines Section 15126.4(b)(3)(A), project redesign and preservation in place shall be the preferred means to avoid impacts to significant archaeological sites. Consistent with CEQA Guidelines Section 15126.4(b)(3)(C), if it is demonstrated that resources cannot be avoided, the qualified archaeologist shall develop additional treatment measures in consultation with Amador County and the appropriate Native American representatives, which may include data recovery or other measures. These additional treatment measures should be determined within 60 days of the resource being discovered. Archaeological or tribal cultural materials recovered during any investigation shall be curated at an accredited curational facility or as recommended by the Native American representative. The qualified archaeologist shall prepare a report documenting evaluation and/or additional treatment of the resource. A copy of the report shall be provided to Amador County, the Native American representatives, and the North Central Information Center. Mining and reclamation activities can recommence within 30 days of the archaeologist's report based on direction of the qualified archaeologist and with concurrence from the County.*	
Impact 3.4-2: Disturb Human Remains, Including Those Interred Outside of Formal Cemeteries	PS	***Mitigation Measure 3.4-2:*** *Inadvertent Discovery of Unmarked Burials* *If human remains are uncovered during project activities, the project operator shall immediately halt work within 50 feet of the find, contact the Amador*	LS

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		County Coroner to evaluate the remains, and follow the procedures and protocols set forth in CEQA Guidelines Section 15064.4 (e)(1). If the County Coroner determines that the remains are Native American in origin, the NAHC will be notified, in accordance with Health and Safety Code Section 7050.5(c) and PRC 5097.98 (as amended by Assembly Bill 2641). The NAHC shall designate a Most Likely Descendent for the remains per PRC Section 5097.98, and the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in PRC Section 5097.98, with the Most Likely Descendent regarding their recommendations for the disposition of the remains, taking into account the possibility of multiple human remains.	
ENERGY			
Impact 3.5-1: Result in a Potentially Significant Environmental Impact Due to Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources, During Project Construction or Operation	LS	None required.	LS
Impact 3.5-2: Conflict with or Obstruct a State or Local Plan for Renewable Energy or Energy Efficiency	LS	None required.	LS
GEOLOGY AND SOILS			
Impact 3.6-1: Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, as a Result of Rupture of a Known Fault	NI	None required.	NI
Impact 3.6-2: Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, as a Result of Strong Seismic Ground Shaking	LS	None required.	LS
Impact 3.6-3: Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss,	LS	None required.	LS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
Injury, or Death, as a Result of Seismically Induced Liquefaction, Lateral Spreading, Subsidence, or Settlement			
Impact 3.6-4: Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, as a Result of Landslides	LS	None required.	LS
Impact 3.6-5: Result in Substantial Soil Erosion or the Loss of Topsoil	LS	None required.	LS
Impact 3.6-6: Be Located on a Geologic Unit or Soil That Is Unstable, or That Would Become Unstable as a Result of the Quarry Expansion	PS	***Mitigation Measure 3.6-6a:*** *Periodic Inspection of the Quarry Slopes* *The operator of the Ione Quarry (Operator) shall retain a County-approved qualified engineering geologist or geotechnical engineer with at least 10 years of experience with rock slopes and assessing rock slope stability to conduct annual slope inspections. The annual slope inspection should be completed for slopes at their final design slope angle following the excavation of each bench face. An annual inspection is not required if final slopes are not completed within a calendar year. The inspection shall address the rock mass quality, rock mass structures, and observed groundwater or seepage conditions and whether these observed characteristics are consistent with the conditions and assumptions described in the slope stability analysis report completed for the revised reclamation plan by Golder Associates Inc. [Golder] in 2020 ("Slope Stability Analyses for the Proposed Quarry Expansion, Specialty Granules (Ione) LLC Ione Quarry"). The results of the inspection and any recommendations by the engineering geologist or geotechnical engineer shall be documented and submitted to the County within 30 days following the inspection. The slope stability analysis report shall be appended to the Mitigation Monitoring and Reporting Program and shall be incorporated into the conditions of approval for the project. If the conditions vary from the slope stability analysis report, the engineering geologist or geotechnical engineer shall evaluate whether the changes have an adverse impact on slope stability, and, if so, provide feasible recommendations to mitigate the slope stability*	LS

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		concerns to achieve a minimum static factor of safety of 1.5 and a minimum pseudo-static factor of safety of 1.0. Recommendations shall be implemented within 6 months by the Operator, if feasible, otherwise as soon as practicable thereafter, upon approval by the County. ***Mitigation Measure 3.6-6b:*** *Flatten the Upper Slopes in the Northeast Corner of the Quarry or Complete a Geotechnical investigation of the Valley Springs Formation* *A small portion of the northeast corner of the proposed quarry is expected to be excavated into the Valley Springs Formation, which would be exposed in approximately the upper 25 feet of the quarry slopes. If slopes steeper than 2.5H:1V, including a 10-foot step out at the base of the formation, are planned for the quarry, the following investigation and analyses shall be implemented:* • *Prior to mining within 200 feet of the planned quarry limit in the northeast corner, a geotechnical evaluation shall be completed to assess the stability of excavation slopes in the Valley Springs Formation. This 200-foot offset distance will allow flattening the upper quarry slopes if necessary.* • *The geotechnical evaluation shall address the material types encountered in the Valley Springs Formation and their shear strengths, the groundwater conditions, and slope stability analyses for the proposed final slopes in this portion of the quarry. The recommendations for the development of the quarry shall meet a minimum static factor of safety of 1.5 and a minimum pseudo-static factor of safety of 1.0. The geotechnical evaluation shall be summarized in a report stamped by a qualified California certified engineering geologist, geotechnical engineer, or registered civil engineer. The geotechnical evaluation shall be submitted to the County for review and approval prior to the start of mining in the Valley Spring Formation.*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
Impact 3.6-7: Be Located on a Geologic Unit or Soil That Is Unstable, or That Would Become Unstable as a Result of the Stockpile Expansion	PS	***Mitigation Measure 3.6-7:*** *Stockpile Subgrade Preparation* *The future stockpile shall be founded on firm subgrade with particular attention paid to the outermost 50 feet of the stockpile footprint. Subgrade preparation consisting of the removal of vegetation, topsoil or other loose, saturated or unsuitable soils should be completed prior to placement of the stockpile. Accordingly, a qualified geologist, engineering geologist or registered civil engineer shall be retained by the operator of the Ione Quarry (Operator) to inspect the outer 50 feet of the stockpile limits to verify that vegetation, topsoil or other loose, saturated or unsuitable soils have been removed prior to placement of the stockpile. This inspection shall be documented in a report and include an as-built survey for the portion of the stockpile footprint that was inspected. Any recommendations shall be implemented by the Operator prior to the placement of waste rock in the inspected area. The subgrade preparation inspection may occur in phases as mining progresses. The results of the inspection and any recommendations by the qualified professional shall be documented and submitted to the County within 30 days following the inspection.*	LS
Impact 3.6-8: Be Located on Expansive Soil, as Defined in Table 18-1-B of the Uniform Building Code (1994), Creating Substantial Risks to Life or Property	PS	Implement Mitigation Measure 3.6-7.	LS
Impact 3.6-9: Directly or indirectly Destroy a Unique Geological Feature	NI	None required.	NI
Impact 3.6-10: Directly or indirectly Destroy a Unique Paleontological Resource	NI	None required.	NI
GREENHOUSE GAS EMISSIONS			
Impact 3.7-1: Generate GHG Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment	LS	None required.	LS

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
Impact 3.7-2: Conflict with Any Applicable Plan, Policy or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of GHGs	LS	None required.	LS
HYDROLOGY AND WATER QUALITY			
Impact 3.8-1: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality During Mining Operations	PS	***Mitigation Measure 3.8-1:*** *Water Quality Management and Monitoring Program* *The operator of the Ione Quarry (Operator) shall implement a program to monitor and, if applicable water quality standards are exceeded, treat quarry water prior to any off-site discharge. Prior to the first quarry water sampling event, five samples will be collected from the core obtained from geotechnical borings IO-18-01 and IO-18-02 (10 samples total). The sample depths were selected to include areas of observed sulfide mineralization and carbonate veins. The total number of samples and the sampling interval are based upon the 2014 Global Acid Rock Drainage Guide.* *The sample depths are as follows:* • *IO-18-01: 174.9 ft, 267.5 ft, 454.8 ft, 551.6 ft, and 686 ft.* • *IO-18-02: 88.6 ft, 132.3 ft, 185.8 ft, 273.6 ft, and 461.0 ft.* *The samples will be submitted to a California-licensed analytical laboratory for static testing using the waste extraction test methodology using deionized water (DI-WET) to mimic rainfall conditions. The leachate from each sample will be analyzed for general mineral parameters and metals. The rock samples shall also be evaluated for sulfide speciation and acid-base accounting analysis, including acid generation potential, acid neutralization potential, and net generation or neutralization potential, as appropriate. This analytical program for the initial samples is consistent with the recommendations in Section 4.3.2.3 of the 2014 Global Acid Rock Drainage Guide. Use of the DI-WET methodology with a 48-hour contact time exceeds the recommendations in the 2014 Global*	LS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Acid Rock Drainage Guide, which discusses 24-hour batch tests using deionized water. *The leachate testing data from the samples described above shall be evaluated using the statistical procedures described in Chapter Nine in the USEPA SW-846 manual (USEPA, accessed June 29, 2020), or other appropriate statistical guidance, to determine the appropriate quarry water sampling program. The statistical analysis shall be used to identify the number of samples to be collected each sampling round. Water sampling shall be initiated prior to the start of any pumping from the water ponded in the quarry that could require off-site discharge. An additional round of sampling shall be conducted anytime pumping for off-site discharge ceases for a period of 12-months. Field measurements shall be conducted for the field parameters listed below during the collection of grab water samples. The field parameters are general indicators of water quality. The field measurements shall be taken at each location from which a grab water sample is to be collected, based on the statistical analysis. Action levels are based on Basin Plan Standards and Maximum Contaminant Levels or on conditions that could reverse oxidation-reduction (redox) reactions.* • *Field parameters and action levels:* – *pH: >8.5* – *Conductivity: >900 umhos/cm* – *Dissolved oxygen: <5.5 mg/L or <50% of saturation* – *Oxidation-reduction potential: <0* *The grab water samples shall be submitted to a California-licensed analytical laboratory for analysis of constituents identified in the NPDES permit. If any of the action levels for the field parameters or thresholds for the NPDES discharge permit are exceeded, a second set of grab water samples shall be collected to confirm the exceedance. If the exceedance is verified, then a plan of*	

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		action will be developed and implemented to correct the exceedances. Specific corrective actions would depend on the nature of the underlying exceedance. *The following changes in best practices regarding blasting agents could be implemented should nitrate levels in quarry water that is to be discharged off site exceed the NPDES permit threshold:* 1. *Handling of all blasting agents shall be limited to qualified and licensed blasting contractors at all times.* 2. *All blasting products shall be stored only in approved containers, specifically designed for the safe keeping of explosives.* 3. *Any spillage of blasting agents shall be immediately cleaned up, and properly disposed of in strict accordance with the project's SPCC Plan and applicable state and federal regulations.* 4. *The type of blasting agent selected shall be appropriate for the specific environmental conditions.* 5. *Blast designs and loading controls shall be prepared by qualified blasting contractors or other experts to ensure complete detonation.* 6. *A current inventory of the types and quantities of blasting agents, along with Material Safety Data Sheets, shall be maintained onsite by qualified personnel.* 7. *Relevant information shall be included in the site's pollution prevention plans, including the Spill Prevention, Control, and Countermeasures Plan, the Hazardous Materials Business Plan, and the Stormwater Pollution Prevention Plan.* *The following treatment measures could be implemented should any of water quality parameters, including nitrate, exceed the NPDES permit thresholds:* 1. *sedimentation tanks,* 2. *inline filtration, or*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		3. *reverse osmosis.* *The treatment measures described above are established technologies that are feasible to implement. Additional feasible technologies (e.g., future improvements in water treatment technology) could also be deployed. The effectiveness of the treatment measures shall be confirmed by the collection and analysis of treated-water samples in accordance with the monitoring program in the NPDES permit.* *Monitoring results shall be reported to the County and RWQCB on an annual basis, or more frequently if required by the NPDES permit. The annual report shall also describe any additional measures that have been or are planned to be taken based on the monitoring results. The Operator shall document when no off-site discharge is required in a given year and shall make the record available to the County for review upon request.*	
Impact 3.8-2: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality During Final Reclamation	LS	None required.	LS
Impact 3.8-3: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality Post-Reclamation	PS	***Mitigation Measure 3.8-3a:*** *Adaptive Management Program for Quarry Water* *The leachate testing data collected through the implementation of Mitigation Measure 3.8-1 will be evaluated using the statistical procedures described in Chapter Nine in the USEPA SW-846 manual (USEPA, accessed June 29, 2020), or other appropriate statistical guidance, to determine the appropriate quarry water sampling program once mining ceases and water partially fills the reclaimed quarry. The statistical analysis will be used to identify the number of samples to be collected each sampling round. Every six months, based on seasonal changes in runoff and evaporation from the quarry pond, field measurements would be conducted for the parameters listed below and grab water samples would be collected. The field parameters are general indicators of*	LS

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Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		water quality. The field measurements will be taken at each location from which a grab water sample is to be collected, based on the statistical analysis. *Action levels are based on conditions that could affect aquatic life or on conditions that could reverse oxidation-reduction (redox) reactions.* • *Field parameters and action levels:* – *pH: >8.5* – *Conductivity: >900 umhos/cm* – *Dissolved oxygen: <5.5 mg/L or <50% of saturation* – *Oxidation-reduction potential: <0* *The grab water samples will be submitted to a California-licensed analytical laboratory for analysis of general mineral parameters and metals. The primary focus of the data review would be calcium, magnesium, sulfate, and any metals identified as exceeding water quality standards applicable at the time mining ceases. If for two successive monitoring events (1) any field parameter data exceed the action levels, or any of the concentrations measured in the grab water samples exceed the standards established in the U.S. EPA Aquatic Life Criteria, or (2) are statistically different than baseline surface water chemistry defined in Appendix G-1, an action plan shall be developed to implement corrective measures to address the exceedances.* *Specific corrective actions shall depend on the nature of the underlying exceedance.* 1. *Exceedance related to pH, dissolved oxygen, or oxidation-reduction potential (ORP): possible corrective actions may include aeration or mechanical circulation of the water in the quarry pond could be used to neutralize the pH and/or increase the dissolved oxygen and ORP levels.*	

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		2. *Exceedance of baseline surface water TDS levels or individual ions or metals concentrations: the quarry water would be treated using a range of available filtration or treatment technologies, such as ion exchange. The exact treatment technology would be selected based on the specific parameter(s) that exceeds their standards, including new technologies that may be developed between now and the time corrective action would be triggered.* 3. *If specific areas or volumes of wall rock are identified as being problematic, the corrective measures could include removal of the rock mass or sealing of the rock mass with grout or other materials.* 4. *If only U.S. EPA Aquatic Life Criteria are exceeded, then measures to repel wildlife may be implemented, in lieu of water quality treatment (e.g., sound repellers, visual bird scares).* *The corrective measures described above are established technologies that are feasible to implement. Additional feasible technologies (e.g., future improvements in water treatment technology) if any that may be developed between the time this adaptive management program was prepared and the monitoring data indicate an exceedance could also be deployed.* *Monitoring results shall be reported to the County on an annual basis. The annual report shall also describe any additional measures that have been or are planned to be taken based on the monitoring results. If the triggers described above to implement corrective measures are exceeded for two monitoring rounds, then the annual report shall also describe the corrective actions that have been or are planned to be implemented under the adaptive management program.* *Geochemical conditions within the water ponded in the quarry water and the quarry walls will likely ultimately reach an equilibrium state. If monitoring for four successive years (i.e., eight sampling events total) indicates that water quality conditions have stabilized at a level below U.S. EPA Aquatic Life*	

NI = No Impact; **LS** = Less than Significant; **PS** = Potentially Significant; **S** = Significant; **SU** = Significant and Unavoidable

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
		Criteria standards or that are consistent with baseline surface water conditions defined in Appendix G-1 (for example, by using a Mann-Kendall trend test or similar non-parametric statistical analysis), then the water quality monitoring program shall cease with written notification to the County along with a final annual report. ***Mitigation Measure 3.8-3b:*** *Funding Mechanism* *Prior to the completion of mining, the Operator shall establish a funding mechanism to provide a permanent funding source for implementation of the quarry water quality adaptive management program required above. The funding mechanism shall be sufficient to provide for the monitoring, evaluation, and implementation of measures that may be necessary to remediate quarry water quality and/or prevent waterfowl access based on reasonably foreseeable water quality conditions anticipated as having the potential to occur. The funding mechanism shall be managed by a third party approved by the Operator and County. The Operator shall submit for County review and approval, a proposed funding mechanism and cost basis. The funding mechanism and cost basis shall define the reasonably foreseeable water quality conditions anticipated as having the potential to occur. If the water quality monitoring is allowed to cease per mm 3.8-3a, then the funding mechanism can be terminated.*	
Impact 3.8-4: Violate Groundwater Quality Standards or Otherwise Substantially Degrade Groundwater Quality During Mining, Final Reclamation, or Post-Reclamation	LS	None required.	LS
Impact 3.8-5: Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge such that the Project May Impede Sustainable Groundwater Management of the Basin	LS	None required.	LS
Impact 3.8-6: Substantially Alter Drainage Patterns in a manner which would result in Erosion or Siltation; in Off-Site Flooding, Exceed the Capacity of the Existing Storm Drainage System, or Impede or Redirect Flood Flows	LS	None required.	LS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
Impact 3.8-7: Release of Pollutants in Flood Hazard, Tsunami, or Seiche Zones Due to Project Inundation	LS	None required.	LS
Impact 3.8-8: Conflict with or Obstruct Implementation of a Water Quality Control Plan	PS	Implement Mitigation Measure 3.8-1 (see Impact 3.8-1)	LS
Impact 3.8-9: Conflict with or Obstruct Implementation of a Sustainable Groundwater Management Plan	LS	None required.	LS
LAND USE			
Impact 3.9-1: Physically Divide an Established Community	NI	None required.	NI
Impact 3.9-2: Conflict with Land Use Plans, Policies, and Regulations Adopted for the Purpose of Avoiding or Mitigating an Environmental Effect	LS	None required.	LS
NOISE			
Impact 3.10-1: Generation of a Substantial Temporary or Permanent Increase in Ambient Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies	LS	None required.	LS
Impact 3.10-2: Generation of a Substantial Temporary Increase in Ambient Noise Levels from Blasting	LS	None required.	LS
Impact 3.10-3: Generate Substantial Groundborne Vibration or Groundborne Noise from Mining Operations and Reclamation Activities (Excluding Blasting)	LS	None required.	LS
Impact 3.10-4: Generate Substantial Groundborne Vibration or Airborne Vibration as a Result of Blasting	LS	None required.	LS
TRANSPORTATION			
Impact 3.11-1: Conflict with a Program, Plan, Ordinance, or Policy Addressing the Circulation System, Including Transit, Roadway, Bicycle and Pedestrian Facilities	LS	None required.	LS

NI = No Impact; **LS** = Less than Significant; **PS** = Potentially Significant; **S** = Significant; **SU** = Significant and Unavoidable

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation[1]
Impact 3.11-2: Conflict with or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b)	LS	None required.	LS
Impact 3.11-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment)	LS	None required.	LS
Impact 3.11-4: Result in Inadequate Emergency Access	NI	None required.	NI
TRIBAL CULTURAL RESOURCES			
Impact 3.12-1: Result in a Substantial Adverse Change in the Significance of a Tribal Cultural Resource Listed or Eligible for Listing in the California Register of Historical Resources, or in a Local Register of Historical Resources as Defined in Public Resources Code Section 5020.1(K), or by the Lead Agency Pursuant to Criteria Set Forth in Public Resources Code Section 5024.1(c)	PS	Implement Mitigation Measures 3.4-1a, 3.4-1b (see Impact 3.4-1), and 3.4-2 (see Impact 3.4-2)	LS

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2—RESPONSE TO COMMENTS

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2—RESPONSE TO COMMENTS

2.1 INTRODUCTION

This chapter of the Final EIR for the SGI Ione Quarry Expansion Project (project) provides specific responses to each issue raised in comments on the Draft EIR. Comment letters are ordered as received from agencies, organizations, and individuals. Each comment letter has been assigned a number and the individual comments/issues within each letter are assigned sequential subnumbers (e.g., 1-1, 1-2). An index that lists each commenter and the number assigned to the comment letter is provided on the following pages.

The text of each comment/issue is reproduced using `courier new font` and is followed by the County's response numbered to correspond with each respective comment. All comment letters are also provided in the original form in Appendix A, "Comments Received on the Draft EIR," where the comment letters are numbered in the upper right corner of the first page to correspond to the numbering used in this chapter. Note that the reproduction of comments in this chapter is intended to reflect the text of the comment letters. Formatting; font emphases (e.g., underline, bold, all capital); and graphics, tables, and other attachments are not necessarily reflected in the reproduced text here and are noted in brackets in certain instances in this chapter. The County has reviewed all original comment letters on the EIR with original formatting, font emphasis, graphics, tables, and other attachments. Reviewers interested in the content of a specific comment letter should see Appendix A for a reproduction of the original letter.

The County has provided a response to all comments received during public circulation of the Draft EIR. In every instance, each comment was carefully considered for its contribution of information regarding environmental impacts and other issues relevant to the County's CEQA review of the project. In general, all comments concerning an environmental issue pertaining to analysis in the Draft EIR receive a response that either (1) summarizes the information provided in the EIR and directs the commenter to the chapter/section(s) of the EIR providing that information or (2) provides additional clarifying information concerning the environmental issue raised by the commenter.

In some instances, information in consideration of comments has been incorporated into the Final EIR through errata presented in Chapter 3, "Revisions to Draft EIR," of this Final EIR to amplify the impact analysis or mitigation measures, or to otherwise clarify the information presented. In none of these instances did the additional information incorporated into this Final EIR result in identifying a new significant impact or an increase in the severity of a significant impact identified in the Draft EIR. Thus, while these revisions amplify and clarify information based on certain comments, these

revisions do not result in requiring the County to recirculate the EIR for public review and comment before certification.

If the comment did not address an environmental issue (e.g., opposition or support of the project), a response is provided noting that this comment does not pertain to an environmental issue. All comments will be considered by County decision makers for the EIR deliberations in approval or denial of the entitlements requested for the project.

2.2 COMMENT LETTERS

Table 2-1, "Comment Letters," lists the comment letters and provides the numbering and order used to organize the comment letters received.

TABLE 2-1
COMMENT LETTERS

Comment Letter No.	Commenter	Date
AGENCIES		
1	California Department of Transportation (Caltrans)	September 9, 2024
2	Regional Water Quality Control Board, Central Valley Region (RWQCB)	September 17, 2024
3	California Department of Fish and Wildlife (CDFW)	October 4, 2024
4	California Department of Conservation, Division of Mine Reclamation (DMR)	October 7, 2024
5	Amador Water Agency	September 16, 2024
ORGANIZATIONS		
6	Foothill Conservancy	September 19, 2024
INDIVIDUALS		
7	Willam May	August 27, 2024
8	Sondra West-Moore	September 9, 2024
9	Carina and Elia Bassin	September 10, 2024
10	John, Gianni, and Kathleen Muschetto	September 26, 2024 (received October 1, 2024)

2.3 AGENCIES

Comment Letter 1. California Department of Transportation (Caltrans). September 9, 2024.

Comment 1-1

The Department of Transportation (Caltrans) appreciates the opportunity to review and respond to the Ione Quarry Expansion Project Environmental Impact Report. This project proposes

expanding the footprint and depth of Ione Quarry to access additional rock reserves. This expansion requires an amended Conditional Use Permit and an amended Reclamation Plan. The project involves the following major components:

- Extending the Use Permit expiration date from December 31, 2075, to December 31, 2175, at current annual production rates
- Enlarging the quarry's total surface disturbance from +/-56 acres to +/-136 acres
- Increasing the quarry's floor depth from +/-325 feet above sea to +/-280 feet below sea level
- Expanding overburden storage stockpiles on-site from +/-34 acres to +/-86 acres and increasing elevation from +/-350 feet above sea level to +/-560 feet above sea level

The proposed project is located at 1900 State Route (SR) 104, approximately three (3) miles west of the City of Ione, in unincorporated Amador County. The project site is within the Assessor's Parcel Number (APN) 005-080-020-000. Access to the site is via a private driveway off SR 104, just south of where Michigan Bar Road meets SR 104.

Caltrans at this time has the following comments:

Response 1-1

The comment provides a summary of the proposed project and does not address the adequacy of the Draft EIR.

Comment 1-2

Environmental

If there are any physical construction activities that will encroach into State right of way (ROW) as a result of the expansion. The project proponent must apply for an Encroachment Permit with the Caltrans District 10 Encroachment Permit Office. All California Environmental Quality Act (CEQA) documentation, with supporting technical studies, must be submitted with the Encroachment Permit Application. These studies will include an analysis of potential impacts to any cultural sites, historic properties, biological resources, hazardous waste locations, scenic highways, and/or other environmental resources within State ROW at the project site(s). Evidence of consultation with local Native American tribes and interested parties will need to be presented within the technical documents for approval of encroachment in the State ROW.

Response 1-2

The County notes the Encroachment Permit requirements described in the comment. The Draft EIR discusses that California Street and Highway Code requires permits from Caltrans for any roadway encroachment during truck transportation and delivery, includes regulations for the care and protection of State and County highways and provisions for the issuance of written permits, and requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways. (Draft EIR p. 3.11-5.)

The site is currently accessed from a driveway and access road off Michigan Bar Road (State Route [SR] 104), just southeast of where Michigan Bar Road merges with Twin Cities Road (SR 104) and becomes Michigan Bar Road (SR 104). (Draft EIR pg. 3.11-1) Operations under the proposed project would continue to use the existing access driveway with no increase in vehicle trips. Although the project would increase the duration of mining operations, the project would not increase daily truck trips relative to existing conditions. No improvements to SR 104 are proposed or identified as necessary for the project. Thus, the proposed project would not require physical modification to the State Highway System and an encroachment permit for the proposed project is not anticipated to be necessary.

Comment 1-3

Caltrans considers the nesting season to be February 1 through September 30 of any given year. If work will occur within State ROW, between February 1 and September 30, a pre-construction bird survey must be conducted by a qualified biologist within 14 days prior to the start of any construction related activities. If an active nest is observed, a protective buffer must be established around the nest per California Department of Fish and Wildlife (CDFW) guidelines. No work is allowed within the protective buffer limits until the young have fledged and until authorized by the Caltrans District 10 Environmental Office. Results of the pre-construction bird survey(s) must be provided to the Caltrans District 10 Environmental Office prior to the start of construction. If there are impacts to protected water resources within State ROW. Caltrans will need to see the correspondence with the permitting authorities CDFW, United States Army Corps of Engineers, Regional Water Quality Control Board) and/or be provided copies of any required permits prior to the start of any construction in State ROW.

Response 1-3

The proposed project does not involve any work within the State right-of-way, thus, pre-construction nesting bird surveys, nesting bird protection measures, and permitting for impacts to protected waters within the State right-of-way are not applicable to the proposed project. Note, however, that the Draft EIR identifies protective measures for nesting birds and for regulated waters and wetlands as specified in Mitigation Measures 3.3-1g and 3.3-3b, respectively. (Draft EIR pp. 3.3-43, 3.3-51 – 3.3-52)

Comment 1-4

How will the County ensure that Specialty Granules (Ione) LLC (SGI) continues to comply with local, state, and federal environmental laws throughout the life of the extended conditional use permit (CUP) through 2075? Environmental laws change often, so will the County have the opportunity to re-evaluate the project activities on a regular basis to ensure compliance with current laws is continually maintained?

Response 1-4

The County's review of the proposed project under CEQA necessarily considers environmental laws and regulations in effect at the time of the assessment. The County recognizes that environmental laws and regulations change over time, and SGI's operations are and will continue to be subject to applicable environmental laws and regulations, such as the California Surface Mining and Reclamation Act's required annual inspections pursuant to California Public Resources Code Sections 2207(a)(8) and 2772.1(b)(7)(B). Pursuant to CEQA Guidelines Section 15162(c), "[o]nce a project has been approved, the lead agency's role in project approval is completed, unless further discretionary approval on that project is required. Information appearing after an approval does not require reopening of that approval. …" Compliance with mitigation measures adopted through the CEQA process will be monitored by the County through a mitigation monitoring and reporting program as discussed in the Draft EIR (Draft EIR p. 1-10). Under CEQA, only issues within a responsible agency's expertise must be responded to by the lead agency. (14 CCR Section 15096(d)).

Comment 1-5

Hydrology

The supporting documents below, previously requested in our September 28, 2021, letter, have not been received. The comments below are still applicable. Additional review will be required once the project development plans, including but not limited to,

Drainage and Grading Plans and drainage calculations are submitted.

We request to review the pre- and post-construction runoff calculations; drainage plans to understand the flow patterns. The developer needs to ensure that the existing State drainage facilities will not be significantly impacted by the project. If historical undeveloped topography shows drainage from this site flowed into the State ROW, it may continue to do so with the conditions that peak flows may not be increased from the pre-construction quantity and the site runoff be treated to meet present storm water quality standards. If historical undeveloped topography shows drainage from this site does not flow into the State ROW, then it will not be allowed to flow into the State ROW at this time.

Based on existing topography, a portion of the project site runoff flows towards state ROW. Additional review will be done once drainage plans and calculations are submitted.

Response 1-5

With regard to pre- and post-construction runoff calculations, the "*Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project*" (EMKO, 2023b) included as Appendix B of this Final EIR (see Final EIR Chapter 3, Errata 6 for additional explanation), includes an evaluation of existing and with-project stormwater runoff and other potential surface water discharges associated with the proposed project. Information from that study is included in Draft EIR Section 3.8, "Hydrology and Water Quality," with evaluation of stormwater runoff addressed at Draft EIR Impact 3.8-6. As discussed at Draft EIR Impact 3.8-6, under the proposed project, "[m]ost areas currently draining off-site from the quarry footprint would drain towards the quarry, and therefore volumes and rates of stormwater runoff from the project site to surrounding off-site areas would remain similar to existing conditions or decrease." Surface water runoff at the project site is primarily directed to the quarry or to a series of sediment basins that mostly drain towards Loch Lane Lake, and during mining as well as after reclamation, this drainage condition would be maintained. The project would not increase runoff rates and volumes occurring on the site. (Draft EIR p. 3.8-49)

Comment 1-6

Caltrans suggests Amador County Planning Department continue to consult with Caltrans to identify and address potential cumulative transportation impacts that may occur from this project and other developments on or near this location. This will assist Caltrans in ensuring that traffic safety and quality standards are

maintained for the traveling public on existing and future state transportation facilities.

Response 1-6

The comment's suggestion for continued consultation between the County and Caltrans is noted. Draft EIR Section 3.11, "Transportation," assesses potential transportation impacts of the proposed project and determines that, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) Additionally, Draft EIR Chapter 4, "Cumulative Impacts," provides an evaluation of potential cumulative impacts of the proposed project in consideration of other projects in Amador County identified as having potential relation to the setting or conditions of the proposed project and are either completed, currently under construction or implementation or beginning construction or implementation, proposed and under environmental review, or reasonably foreseeable. The Draft EIR's analysis of cumulative transportation impacts concludes that the project's potential to contribute to cumulative impacts would be less than significant as the project would not generate new daily automobile or truck trips. (Draft EIR p. 4-19)

Comment 1-7

Encroachment Permits

If any future project activities encroach into Caltrans ROW, the project proponent must submit an application for an Encroachment Permit to the Caltrans District 10 Encroachment Permit Office. Appropriate environmental studies must be submitted with this application. These studies will include an analysis of potential impacts to any cultural sites, biological resources, hazardous waste locations, and/or other resources within State ROW at the project site(s). For more information, please visit the Caltrans Website at:

https://dot.ca.gov/programs/traffic-operations/ep/applications

Response 1-7

The County notes the information provided in the comment regarding encroachment permit requirements and process. As discussed at Response 1-2, above, the proposed project would not require physical modification to the State Highway System and an encroachment permit for the proposed project is not anticipated to be necessary.

Comment 1-8

If you have any question or would like to discuss these comments, please contact Paul Bauldry at (209) 670-9488 (email: paul.bauldry@dot.ca.gov) or me at (209) 483-7234 (email: Gregoria.Ponce@dot.ca.gov).

Response 1-8

The comment provides contact information and does not address the adequacy of the Draft EIR. The County appreciates the review and input provided by Caltrans.

Comment Letter 2. Regional Water Quality Control Board, Central Valley Region (RWQCB). September 17, 2024.

Comment 2-1

Regional Water Quality Control Board (Central Valley Water Board) has reviewed the Request for Review for the Draft Environmental Impact Report for the Ione Quarry Expansion Project 2021 (Amended Use Permit and Reclamation Plan), located in Amador County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Response 2-1

This is an introductory comment that does not address the adequacy of the Draft EIR and requires no further response.

Comment 2-2

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the

National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the Water Quality Control Plan for the Sacramento and San Joaquin River Basins, please visit our website:

http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Response 2-2

This comment provides an overview of the process for preparation and approval of Basin Plans for areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. The comment does not address the adequacy of the Draft EIR and requires no further response.

Comment 2-3

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:

https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the

highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

Response 2-3

This comment provides an overview of requirements for wastewater discharges under the State Water Board's Antidegradation Policy and Antidegradation Implementation Policy. The comment does not address the adequacy of the Draft EIR. Note that Draft EIR Section 3.8, "Hydrology and Water Quality," discusses the potential for offsite discharges of dewatering water at Impacts 3.8-1, 3.8-2, and 3.8-3. As discussed there, water pumped from the quarry during dewatering would be used on-site and any excess water would either be discharged to the stormwater ponds on-site and managed in accordance with the treatment and discharge requirements for those ponds under Ione Quarry's Industrial General Permit or would be directly discharged off-site. Prior to any direct off-site discharges of quarry water, the Operator would submit a Report of Waste Discharge to the RWQCB and receive an NPDES permit. The NPDES permit would specify constituent concentration limits that must be met prior to any off-site discharge, along with the appropriate location of the discharge.

Comment 2-4

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to

restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Response 2-4

This comment provides an overview of requirements for stormwater discharges during construction. The comment does not address the adequacy of the Draft EIR. As discussed in the Draft EIR at Impact 3.8-1, mining and processing operations under the proposed project would continue to be subject to all applicable local, state, and federal water quality and hazardous materials management requirements including the Industrial General Permit and the site-specific stormwater pollution prevention plan (SWPPP) for the project site. Under Industrial General Permit requirements, the Operator must periodically review and update the SWPPP to ensure it addresses site-specific conditions, and the SWPPP would be updated as necessary during mining operations. (Draft EIR p. 3.8-35) As discussed in the Draft EIR at Impact 3.8-2, final reclamation activities for the proposed project would need to comply with the NPDES program either by incorporating coverage under the Industrial General Permit through an amendment to the existing site-specific industrial activities SWPPP or by filing a Notice of Intent and SWPPP for compliance under the Construction General Permit. Similar to the Industrial General Permit SWPPP, the Construction General Permit SWPPP would identify BMPs and direct inspections and monitoring to protect stormwater runoff, prevent unauthorized discharges, and ensure the avoidance of substantial degradation of water quality during final reclamation. (Draft EIR p. 3.8-41)

Comment 2-5

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean

Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

Response 2-5

This comment provides an overview of requirements for compliance with and coverage under Clean Water Act Section 404. The comment does not address the adequacy of the Draft EIR. Impact 3.3-3 of the Draft EIR discusses that the proposed project would result in the direct loss of seasonal wetlands (1.59 acres), vernal pools (0.16 acre), and freshwater marsh habitat (0.34 acre) on the project site. (Draft EIR Table 3.3-5). These aquatic features are identified as within the jurisdiction of the USACE under Section 404 of the CWA, and within the jurisdiction of the RWQCB under Section 401 of the CWA and the State Wetland Policy. The Draft EIR analysis concludes that impacts to these aquatic features would constitute a substantial adverse effect on these communities and is a potentially significant impact. The Draft EIR also finds that the implementation of Mitigation Measure 3.3-3b, which may require permit approvals regarding a Section 404 Permit, Section 1602 Lake and Streambed Alteration Agreement, and Section 401 Water Quality Certification from regulatory agencies and associated implementation of mitigation requirements prior to the disturbance of aquatic features on the project site, would reduce the impact to less than significant. (Draft EIR pp. 3.3-47 – 3.3-52)

Comment 2-6

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

Response 2-6

This comment provides an overview of requirements for compliance with and coverage under Clean Water Act Section 401. The comment does not address the adequacy of the

Draft EIR. Please see Response 2-5, above, regarding the Draft EIR's discussion of Clean Water Act Section 401 and Section 404 requirements, analysis of potential impacts to aquatic resources, and mitigation requirements to reduce impacts to less than significant. In addition, the referenced Section 9 and 10 permits do not apply to this project.

Comment 2-7

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources Control Board website at:

https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Response 2-7

This comment provides an overview of requirements for compliance with the California Porter-Cologne Water Quality Control Act in the event of a determination that only non-federal waters of the State are present and would be affected by the project. The comment does not address the adequacy of the Draft EIR. The DEIR documents that the jurisdictional waters on the project site are under federal jurisdiction, however, in the event it is determined that these are non-federal waters, the County understands that the project would require a Waste Discharge Permit for discharges to waters of the State. Please see Response 2-5, above, regarding the Draft EIR's discussion of Clean Water Act

Section 401 and Section 404 requirements, analysis of potential impacts to aquatic resources, and mitigation requirements to reduce impacts to less than significant.

Comment 2-8

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Response 2-8

This comment provides information associated with application for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085 for construction or groundwater dewatering discharges to land. These coverage requirements are noted and do not address the adequacy of the Draft EIR. See Response 2-9 regarding anticipated discharge to waters and coverage.

Comment 2-9

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

Response 2-9

This comment provides information associated with application for coverage Limited Threat General NPDES Permit for discharges to waters of the United States. These coverage requirements are noted and do not address the adequacy of the Draft EIR. Note that the Draft EIR analysis at Impact 3.8-1 anticipates that water pumped from the quarry during dewatering would be used on site and any excess water would either be discharged to the stormwater ponds onsite and managed in accordance with the treatment and discharge requirements for those ponds under Ione Quarry's Industrial General Permit. As an option, the excess water would be directly discharged off-site to Loch Lane Lake but subject to an NPDES permit, as discussed in Response 8-4.

Comment 2-10

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/help/permit/

Response 2-10

This comment provides information associated with application for a WDR and NPDES Permit for discharges to waters of the United States. These coverage requirements are noted and do not address the adequacy of the Draft EIR. Note that the Draft EIR analysis at Impact 3.8-1 anticipates that water pumped from the quarry during dewatering would be used on site and any excess water would either be discharged to the stormwater ponds onsite and managed in accordance with the treatment and discharge requirements for those ponds under Ione Quarry's Industrial General Permit or would be directly discharged off-site only after receiving an NPDES permit, as discussed in Response 8-4.

Comment 2-11

If you have questions regarding these comments, please contact me at (916) 464-4684 or Peter.Minkel2@waterboards.ca.gov.

Response 2-11

The County appreciates the review and input from the Regional Board.

Comment Letter 3. California Department of Fish and Wildlife (CDFW). October 4, 2024.

Comment 3-1

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Availability of a DEIR from Amador County for the Ione Quarry Expansion Project (Project) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish, wildlife, native plants, and their habitat. Likewise, CDFW appreciates the opportunity to provide comments regarding those aspects of the Project that, by law, may need to exercise its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW,

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Fish & G. Code, § 1802.) Similarly for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW may also act as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

Response 3-1

This is an introductory comment that does not address the adequacy of the Draft EIR and requires no further response.

Comment 3-2

PROJECT DESCRIPTION SUMMARY

The Project site is located at approximately Latitude: 38.370518 and Longitude:

-121.002217 (WGS 84 datum, decimal degrees), in Amador County.

The proposed Project consists of expanding the quarry and stockpile areas and extending operations for an additional 100 years (to 2175). Material mined under the proposed project would remain the same as existing conditions (primarily meta-andesite). The total anticipated amount of material mined would be 67,800,000 cubic yards (157,975,000 tons).

The Project description should include the whole action as defined in the CEQA Guidelines section 15070 and should include appropriate detailed exhibits disclosing the Project area including temporary impacted areas such as equipment staging areas, spoils areas, adjacent infrastructure development, and access and haul roads if applicable.

Response 3-2

The comment provides a summary of the proposed project and a description of what the project description should include, but does not address the adequacy of the Draft EIR. Draft EIR Chapter 2, "Project Description," provides a detailed description of the proposed project. Among other project attributes, Draft EIR Chapter 2 describes the specific project location and site characteristics, discusses existing site uses and operations under existing entitlements, identifies areas of proposed quarry expansion with description and illustration of proposed quarry, stockpiles and operational areas, and provides other pertinent details of proposed operational and site reclamation activities and conditions. The Draft EIR project description presents the whole of the proposed project and sufficiently describes and illustrates the proposed project consistent with CEQA and CEQA Guidelines. Additionally, Appendix B of the Draft EIR, "Surface Mining and Reclamation Plan," provides additional detail of the proposed mine plan and reclamation plan presented in Draft EIR Chapter 2.

Comment 3-3

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist Amador County in adequately identifying and, where appropriate, mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Based on the potential for the Project to have a significant impact on biological resources, CDFW concludes that an Environmental Impact Report is appropriate for the Project.

Response 3-3

The comment is introductory to specific comments presented and responded to below. The comment notes that CDFW concludes that an environmental impact report is appropriate for the project. The County previously determined that an environmental impact report is appropriate for the project and, accordingly, prepared and circulated the Draft EIR for review and comment, and has prepared this Final EIR that includes responses to comments on the Draft EIR and will be considered for certification by County decision makers.

Comment 3-4

COMMENT 1: Mitigation Measure 3.3-1a: Conduct Botanical Surveys, Summary of Project Impacts and Mitigation Measures, ES-16

Issue: Mitigation Measure 3.3-1a does not reduce impacts to a less than significant level, as it does not indicate appropriate next

steps if a CESA listed species is detected in the floristic surveys. Additionally, the proposed mitigation ratio of 1:1 for identified rare plant communities is not sufficient to ensure no net loss of habitat.

Recommendation or Recommended Mitigation Measure: This measure should require consultation with CDFW and compliance with CESA if a CESA listed species is identified on site. Where impacts to CESA listed species cannot be fully avoided, CDFW recommends acquiring an Incidental Take Permit (ITP). Applicants are encouraged to consult with CDFW early to ensure there are no unaccounted-for project delays due to processing the ITP. To ensure there is no net loss of habitat after project completion, CDFW recommends a ratio of at least 3:1, based on habitat quality, to ensure impacts are fully mitigated.

Response 3-4

Draft EIR Impact 3.3-1 identifies that the proposed project would have the potential to impact special-status plant species should such species become established in currently undisturbed areas that would be subject to disturbance as a result of the proposed project. Mitigation Measure 3.3-1a provides for pre-disturbance special-status plant surveys within one year of disturbance and mitigation of special-status plants that cannot be avoided at a ratio of 1:1 (number of plants established : number of plants impacted). The Draft EIR analysis concludes that the potential impact to special-status plant species would be less than significant with implementation of Mitigation Measure 3.3-1a. The comment does not provide evidence that the Draft EIR analysis is insufficient or that Draft EIR Mitigation Measure 3.3-1a is insufficient. However, in consideration of CDFW's recommendation, and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1a is revised in this Final EIR as shown below and as presented in Errata 1 in Chapter 3. The revisions provide additional specificity regarding the requirements of Mitigation Measure 3.3-1a to require consultation with CDFW in the event that a CESA-listed plant is detected during surveys and cannot be avoided, and to clarify that the stated 1:1 mitigation ratio is a minimum ratio that may be increased through consultation with CDFW for CESA-listed plants.

> **Mitigation Measure 3.3-1a:** *Conduct Botanical Surveys, Avoid Special-Status Plant Species if Feasible, Obtain CDFW Authorization and Replace CESA-Listed Impacted Plants at a Minimum Ratio of 1:1*
>
> *Prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities, a qualified botanist or biologist shall conduct an appropriately*

timed preconstruction survey for special-status rare plant species when the plant species are blooming and readily identifiable. The surveys shall occur within one year prior to commencement of ground-disturbing activities. If special-status plant surveys result in negative findings, then no impact would occur and no additional mitigation is ~~would be~~ required.

If a ~~special-status~~ CESA-listed plant species is detected, and the plant(s) cannot be avoided, a mitigation plan identifying appropriate mitigation ratios at a minimum ratio of 1:1 shall be developed in consultation with, and approved by, the County prior to disturbance of the identified plant(s). ~~regulatory agencies will be notified as required by applicable permits.~~ Additionally, i~~If~~ ~~rare~~ CESA-listed plant species are detected ~~found~~, and avoidance is not feasible, then the Operator shall notify and consult with CDFW and obtain necessary approvals. Such approvals may include requiring the Operator to obtain and comply with the conditions of an CDFW Incidental Take Permit (ITP). ~~i~~Impacted special-status plants shall ~~will~~ be mitigated ~~at a~~ by establishing replacement plants at a minimum ratio of 1:1 ~~ratio~~ (number of plants established:number of plants impacted) or at a higher ratio and/or other conditions as may be determined through consultation with the County or CDFW if a CESA-listed plant is detected during the surveys and avoidance is not feasible. The subject special-status plants to be impacted may ~~will~~ be relocated to suitable habitat areas if feasible, or seeds may~~will~~ be collected ~~and~~for reestablishing~~ed~~ plants within permanently preserved, suitable habitat areas prior to removal of individual plants.

Comment 3-5

COMMENT 2: Mitigation Measure 3.3-1c: Golden Eagle, Summary of Project Impacts and Mitigation Measures, ES-17

Issue: Measure 3.3-1c does not reduce project impacts to a less than significant level, as it does not include required consultation with CDFW if occupied Golden Eagle (*Aquila chrysaetos*) nests or individuals are identified. The Golden Eagle is a fully protected species in California, and fully protected species may only be "taken" with authorization from CDFW and only under special circumstances.

Recommendation or Recommended Mitigation Measure: This mitigation measure should require consultation with CDFW prior to initiating or reinitiating project activities to ensure the species and any active nests are fully avoided. For a positive occurrence, the measure should require the qualified biologist to fill out the GEWG Golden Eagle Database Submission Template

(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=108214&inline), and submit the occurrence data to kate.keiser@wildlife.ca.gov so it may be added to the Golden Eagle Database.

Response 3-5

Draft EIR Impact 3.3-1 identifies that golden eagle has a moderate potential to occur on the project site and that project activities would have potential to impact golden eagle nests if tree removal or ground disturbance is initiated during the breeding bird season (February 1 through August 31), finding that direct destruction of nests or indirect disturbance resulting in nest abandonment could result in substantial adverse impacts to golden eagles on or near the project site. Draft EIR Mitigation Measure 3.3-1c provides for pre-disturbance golden eagle surveys within 45 days of commencement of disturbance with surveys in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (USFWS 2010) to avoid the taking of golden eagles. The Draft EIR analysis concludes that the potential impact to golden eagle would be less than significant with implementation of Mitigation Measure 3.3-1c. Although the comment does not provide evidence that the Draft EIR analysis is insufficient, or that Draft EIR Mitigation Measure 3.3-1c would not be sufficiently effective, the County concurs with the comment's recommendation that consultation with CDFW, in addition to USFWS, be specified as a requirement in the mitigation measure. In consideration of CDFW's recommendation, and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1c is revised in this Final EIR as shown below and as presented in Errata 2 in Chapter 3.

> **Mitigation Measure 3.3-1c**: *Golden Eagles*
>
> *Within 45 days of commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas during the breeding bird season prior to the next mining expansion phase, a qualified biologist shall conduct a protocol survey in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (USFWS 2010) to avoid take of golden eagles. This survey protocol is intended to standardize procedures to inventory and monitor golden eagles within the direct and indirect impact areas of planned or ongoing projects where disturbance or lethal take from otherwise permitted human activities is possible.*
>
> *If an active eagle nest is identified within the expansion project site, consultation with USFWS and CDFW shall be conducted. A minimum of a 660-foot buffer shall be established per the National Bald Eagle Management Guidelines (USFWS 2007). No disturbance shall occur within the buffer until the monitoring biologist has determined that the young have fledged and are independent of the nest. For a*

positive occurrence, the qualified biologist shall fill out the GEWG Golden Eagle Database Submission Template (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=108214& inline) and submit the occurrence data to kate.keiser@wildlife.ca.gov so it may be added to the Golden Eagle Database.

Comment 3-6

COMMENT 3: Mitigation Measure 3.3-1e: Swainson's Hawk, Summary of Project Impacts and Mitigation Measures, ES-18 & ES-19

Issue: Mitigation Measures 3.3-1e states that surveys will follow the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). However, the measure also states that, "If work is beginning before March 20th, or after September 1st, a single preconstruction nesting bird survey as described in 3.3-1g is sufficient to avoid impacts to Swainson's hawk." CDFW believes this will not reduce project impacts to a less than signification level, as it will not be sufficient to meet the recommendations in Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000) and therefore will risk missing identification of a nest. Without multiple visits, surveyors inadvertently miss key signs of active Swainson's Hawk nesting. During certain phases of nesting, the female Swainson's Hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible if surveys are initiated late in the spring. At this stage, following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site.

Recommendation or Recommended Mitigation Measure: To meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation, which should include a minimum of four visits if initiated in Period I or a minimum of six visits if initiated in Periods II or III. The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks. Completing the surveys within the survey periods in accordance with the recommended timing and visit frequency maximizes the likelihood of detecting an active Swainson's Hawk nest. CDFW recommends initiating surveys in Period I and continuing surveys and observations throughout the nesting

season due to the high likelihood of encountering an active nest. This will allow surveyors the best chance to observe nests from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories and most effectively monitor nesting stages throughout the breeding season. To meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete three surveys in Period III and three surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. Surveys should not be conducted in Period IV.

Response 3-6

Draft EIR Impact 3.3-1 identifies that Swainson's hawk was observed within the project site during a site visit in May 2019 and the potential impacts to this species from the proposed project include direct destruction of nests, indirect disturbance resulting in nest abandonment, and the loss of foraging habitat. Draft EIR Mitigation Measure 3.3-1e provides for pre-disturbance Swainson hawk surveys pursuant to *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*. However, in consideration of CDFW's recommendation and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1e is revised in this Final EIR as shown below and as presented in Errata 3 in Chapter 3.

> ***Mitigation Measure 3.3-1e:*** *Swainson's Hawk*
>
> *Prior to the commencement of ground disturbing activities (which include tree removal, vegetation clearing, grubbing, or grading) in previously undisturbed areas during the breeding bird season for the next mining phase, protocol level surveys for Swainson's hawk shall be conducted by a qualified biologist. Surveys shall be completed for least two survey periods immediately prior to commencement of ground disturbing activities, which include a minimum of four visits if initiated March 20th ~~and~~ to April 20th (Periods II and III) or a minimum of six visits if initiated June 10th to ~~and~~ July 30th (Period V)~~to avoid impacts to nesting Swainson's hawks~~. Surveys shall not be conducted between April 21 to June 10 (Period IV) due to the difficulty of detecting nests at this time of year. If ground disturbance is scheduled to begin during this time period three surveys shall be completed between April 5 to April 20 (Period III) and three surveys between June 10 to July 30 (Period*

V).The survey shall be conducted within a 0.25-mile radius around the planned disturbance area following the CDFW guidelines entitled: Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). ~~These surveys are phasic, and are required to begin prior to the nesting period. Protocol surveys require up to 9 surveys to complete (CDFG 2000).~~ If work is beginning before March 20th, or after September 1st, a single preconstruction nesting bird survey as described in 3.3-1g is sufficient to avoid impacts to Swaison's hawk.

If an active nest is identified within 0.25 miles of the proposed disturbance, protective buffers will be established and maintained until such time that the Swainson's hawks have completed their nesting cycle as determined by a qualified biologist. If the proposed Project could impact an active Swainson's hawk nest, the applicant shall obtain an Incidental Take Permit ~~would be required~~ under Section 2081 of CFGC and administered by the CDFW. The applicant shall comply with all permit requirements, including the preparation of a Swainson's Hawk Monitoring and Habitat Management Plan. Removal of known Swainson's hawk nest trees shall be mitigated by replanting trees at a 3:1 ratio; and trees must be species which provide suitable nest structure such as oak trees.

Comment 3-7

COMMENT 4: Mitigation Measure 3.3-1g, Special-Status and Other Nesting Bird Species, ES-19 & ES-20

Issue: Mitigation Measure 3.3-1g states that nesting bird surveys will be conducted 14 days prior to ground disturbing activities, if those activities take place during the nesting season. However, CDFW believes the March 1 through July 31 period may not sufficiently capture the nesting season; therefore, this measure does not reduce project impacts to a less than significant level.

Recommendation or Recommended Mitigation Measure: CDFW recommends the nesting season be adjusted to span from February 1 through August 31.

Response 3-7

As noted in the comment, Draft EIR Mitigation Measure 3.3-1g specifies the relevant nesting season as March 1 through July 31. In consideration of CDFW's recommendation and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1g is revised in this Final EIR as shown below and as presented in Errata 4 in Chapter 3.

***Mitigation Measure 3.3-1g**: Special-Status and Other Nesting Bird Species*

Within 14 days prior to the commencement of ground disturbing activities (including tree removal, vegetation clearing, grubbing, or grading) for the next mining phase that must occur in previously undisturbed areas during the nesting season (February 1 through August 31)~~March 1 through July 31)~~, pre-construction surveys for avian species shall be conducted for project activities during the nesting bird season ~~March 1 through July 31~~). If active nests (containing eggs, chicks or young) are discovered during pre-construction surveys, a qualified biologist ~~would~~shall establish a species-specific no-work buffer around the active nest sufficient to ensure project activities do not adversely affect the nesting birds. Project activities ~~would~~shall be ~~postponed~~precluded within the no-work buffer until the conclusion of the nesting season, or ~~the~~a qualified biologist performs a follow-up ~~checks~~survey and ~~to~~determines ~~whether~~ the nest is no longer~~still~~ active.

Comment 3-8

COMMENT 5: Mitigation Measure 3.3-1i, California Tiger Salamander and Western Spadefoot, ES-21 & ES-22

Issue: Mitigation Measure 3.3-1i states compensatory mitigation will be set at a 1:1 ratio if "take" coverage is obtained for California tiger salamander (*Ambystoma californiense*). This mitigation ratio will not reduce impacts to a less than significant level, nor is it adequate to ensure there is no net loss of habitat after all Project activities.

Recommendation or Recommended Mitigation Measure: CDFW recommends the proposed mitigation ratio be increased to ensure that occupied habitat is protected in perpetuity, and Project related impacts are fully mitigated. CDFW recommends a compensatory mitigation ratio of at least 3:1, to ensure impacts are fully mitigated.

Response 3-8

Draft EIR Impact 3.3-1i identifies that the project could result in substantial adverse impacts to California tiger salamander and western spadefoot due to direct injury or mortality of individuals, creation of an attractive nuisance, and loss of habitat, if present. Draft EIR Mitigation Measure 3.3-1i provides for protocol-level surveys and, if occupied CTS habitat exists in the disturbance footprint, then an Incidental Take Permit and compensatory mitigation at a *minimum* ratio of 1:1. There is currently no evidence that the project site includes occupied CTS habitat. However, in consideration of CDFW's recommendation and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1i is revised in this Final EIR as shown below and as

presented in Errata 5 in Chapter 3. As clarified in Errata 5, compensation would be at a minimum ratio of 1:1 but could be increased to a higher ratio if determined necessary through consultation with USFWS and CDFW.

Mitigation Measure 3.3-1i: *California Tiger Salamander and Western Spadefoot*

Protocol-level surveys shall be completed by a biologist that holds a valid 10(a)(1)(A) recovery permit in accordance with USFWS protocol, prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities for the next mining phase. ~~At the project site aquatic sampling during two~~ Three aquatic surveys shall be performed in potentially suitable aquatic breeding habitats present at the project site. These surveys would occur during the spring months (generally in March, April, and May) for two consecutive breeding seasons. ~~and a~~A drift fence study shall occur in the intervening winter ~~should be conducted~~ in order to support a negative finding. If California tiger salamander are determined to be absent by way of protocol-level surveys, no additional mitigation would be required.

If California tiger salamander are confirmed to be present on-site, a 2081 Incidental Take Permit from CDFW would be required. Additionally, if California tiger salamander are confirmed on-site, and pending the outcome of the jurisdictional determination by the Corps as to the Waters of the United States within the project site, a USFWS Biological Opinion under Section 7 of the ESA, or a Section 10 Habitat Conservation Plan would be required, or both. ~~Additionally,~~ ~~c~~Compensatory mitigation for loss of habitat would be required.

If California tiger salamander are confirmed to be present ~~found on-site~~, compensatory mitigation for loss of California tiger salamander upland habitat ~~will~~ shall be provided via on-site creation, off-site preservation, the purchase of credits from a mitigation bank, or some combination of the aforementioned options at a minimum of a 1:1 ratio or at a higher ratio as may be determined through consultation with USFWS and CDFW.

Protocol-level surveys for California Tiger Salamander will be sufficient for the determination of presence or absence of western spadefoot toad. Avoidance, minimization and mitigation for California Tiger Salamander would be sufficient to reduce the level of effect for the California Tiger Salamander and the western spadefoot toad to a less than significant level.

Comment 3-9

COMMENT 6: Mitigation Measure 3.3-3a, Protection of Oak Woodlands, ES-24 & ES-25

Issue: The DEIR describes the acreage of oak woodland on site but does not define a quantitative baseline for the existing oak trees; therefore, this measure does not reduce project impacts to a less than significant level

Recommendation or Recommended Mitigation Measure: CEQA guidelines Section 15125 states that "an EIR must include a description of the physical environmental conditions within the vicinity of the project. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." CDFW's review of historic satellite imagery of the proposed project site identified substantial oak tree density decline over the last ten (10) years. In order to accurately assess the significance of further oak tree loss as a result of project activities, CDFW recommends the document include a quantitative baseline for the oak woodland on site and analyze potential baseline factors that may be exacerbating tree mortality in the vicinity of the project site.

Response 3-9

The comment references Mitigation Measure 3.3-3a as presented in the Draft EIR Executive Summary and the comment asserts that the Draft EIR does not provide quantitative baseline for existing oak trees on the site. However, Draft EIR Impact 3.3-3 (Draft EIR pp. 3.3-47 – 3.3-52) provides a comprehensive and quantified discussion of on-site habitats, including oak woodland, and also provides a quantified estimate of the number of oak trees within the project site. As presented in Draft EIR Table 3.3-5, the project site contains 37.44 acres of blue oak woodland and 4.46 acres of interior live oak woodland, with project disturbance impacts of 12.05 acres and 3.86 acres, respectively. The Draft EIR further quantifies that of the project site's total estimated 1,827 oak trees, 724 oak trees (constituting 38 percent of the canopy cover) would be lost as a result of the project. (See Draft EIR p. 3.3-48.) The oak woodlands habitat areas are illustrated in the Draft EIR on Figure 3.3-3, "Biological Community Conversion."

Although tree mortality factors may be resulting in a decline in the number of oak trees and amount of oak woodland at the project site and in surrounding areas, this decline is not attributable to the proposed project. Additionally, although the decline may result in a loss of oak trees over time with or without the project, the impact analysis conservatively compares the project's impact to the existing conditions baseline, and includes Mitigation Measure 3.3-3a to provide an Oak Woodland Conservation Plan

sufficient to offset the loss of sensitive oak woodland habitat. The mitigation measure provides options for actions required under the measure, with each action including sufficient performance standards to ensure the efficacy of the mitigation.

Comment 3-10

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data.
The completed form can be submitted online or mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov.

Response 3-10

The comment requests that special-status species and natural communities detected during project surveys be reported to the California Natural Diversity Database (CNDDB). The County will coordinate with project biologists to ensure that any relevant required reporting is submitted to the CNDDB. The comment does not address the adequacy of the Draft EIR, and no further response is required.

Comment 3-11

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

Response 3-11

The comment advises of the filing fee required, and the County will ensure payment of the appropriate fees upon making a final determination for certification of the Final EIR and filing of a notice of determination for the project. The comment does not address the adequacy of the Draft EIR, and no further response is required.

Comment 3-12

CONCLUSION

Pursuant to Public Resources Code § 21092 and § 21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the proposed project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670 or emailed to R2CEQA@wildlife.ca.gov.

CDFW appreciates the opportunity to comment on the DEIR for the Ione Quarry Expansion Project to assist Amador County in identifying and mitigating Project impacts on biological resources. CDFW personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts. Questions regarding this letter or further coordination should be directed to Zach Kearns, Environmental Scientist at (916) 358-1134 or zachary.kearns@wildlife.ca.gov.

Response 3-12

The County will provide appropriate notification of project actions and pending decisions as requested in the comment. The County appreciates the review and input provided by CDFW.

Comment Letter 4. California Department of Conservation, Division of Mine Reclamation (DMR). October 7, 2024.

Comment 4-1

Thank you for including the Department of Conservation's Division of Mine Reclamation (DMR) in the environmental review process for the Ione Quarry Expansion Project (Proposed Project) draft Environmental Impact Report (EIR). The EIR indicates Amador County (County), as lead agency under the California Environmental Quality Act (CEQA).

The draft EIR describes the Proposed Project, which aims to amend the existing use permit and reclamation plan (RP) for the Ione Mine (CA Mine ID# 91-03-0011). This would expand the mining area from about 56 acres to approximately 136 acres and increase the mining depth by 605 feet, allowing mining to reach 280 feet below mean sea level (MSL) instead of the current limit of 325 feet above MSL. Additionally, the total surface disturbance area for stockpiles would grow from 34 acres to around 86 acres, with a maximum elevation of 560 feet above MSL.

DMR has reviewed the subject draft EIR and provides the following comment.

Response 4-1

This is an introductory comment that does not address the adequacy of the Draft EIR and requires no further response. Please see below for responses to individual comments.

Comment 4-2

Comment 1:

DMR's review of imagery available on Google Earth notes substantial changes to oak woodland habitat within the footprint of the proposed mine site expansion area between the dates of August 2018 and June 2020 (see images below). The 2024 Biological Resource Assessment (BRA) prepared by WRA Environmental Consultants, included with the EIR, describes that a biologist conducted site visits to the study area in September 2018, and April, May, and June of 2020. The BRA does not describe tree or shrub mortality, or removal within the proposed mine site expansion area.

DMR suggests that the historical surveys for previous environmental documents be reviewed and considered along with the 2024 BRA for this proposed project, and that baseline data (Pursuant to California Code of Regulations (CCR) Section 3705(m)) be collected from nearby reference areas of undisturbed oak woodland, if appropriate. This data will provide a more accurate representation of the site's pre-disturbance conditions. Additionally, DMR recommends enhanced restoration measures and increased replacement ratios to effectively address oak woodland habitat if species removal occurred prior to the 2024 BRA surveys.

SMARA Citations: Performance Standards for Revegetation CCR Section 3705(m):

> "Success of revegetation shall be judged based upon the effectiveness of the vegetation for the approved end use, and by comparing the quantified measures of vegetative cover, density, and species-richness of the reclaimed mined-lands to similar parameters of naturally occurring vegetation in the area. Either baseline data or data from nearby reference areas may be used as the standard for comparison. Quantitative standards for success and the location(s) of the reference area(s) shall be set forth in the approved reclamation plan. Comparisons shall be made until performance standards are met provided that, during the last two years, there has been no human intervention, including, for example, irrigation,

> fertilization, or weeding. Standards for success shall be based on expected local recovery rates. Valid sampling techniques for measuring success shall be specified in the approved reclamation plan. Sample sizes must be sufficient to produce at least an 80 percent confidence level. There are standard statistical methods in commonly available literature for determining an 80 percent confidence level on a site-by-site basis. Examples of such literature include, but are not limited to, D. Mueller-Dombois and H. Ellenberg, 1974, "Aims and Methods of Vegetation Ecology", John Wiley and Sons, Inc., or C. D. Bonham, 1988, "Measurements for Terrestrial Vegetation", John Wiley and Sons, Inc., and are available at many university libraries. The texts are also available at some local libraries through the Inter-Library Loan Program."

[Google Earth imagery presented in comment letter is not included here. See Appendix A of this Final EIR for a full reproduction of the comment letter, including figures/imagery.]

Response 4-2

The comment pertains to determining site oak tree coverage under baseline conditions for the purposes of reclamation and revegetation requirements under the State Surface Mining and Reclamation Act (SMARA). The CEQA baseline related to project impacts is as of the date the Notice of Preparation was issued on September 14, 2021. (14 CCR Section 15125(a)). The EIR used that proper baseline for oak tree impacts. Draft EIR Impact 3.3-3 (Draft EIR pp. 3.3-47 – 3.3-52) provides a comprehensive and quantified discussion of on-site habitats, including oak woodland, and also provides a quantified estimate of the number of oak trees within the project site. As presented in Draft EIR Table 3.3-5, the project site contains 37.44 acres of blue oak woodland and 4.46 acres of interior live oak woodland, with project disturbance impacts of 12.05 acres and 3.86 acres, respectively. The Draft EIR further quantifies that of the project site's total estimated 1,827 oak trees, 724 oak trees (constituting 38 percent of the canopy cover) would be lost as a result of the project. The oak woodlands habitat areas are illustrated in the Draft EIR on Figure 3.3-3, "Biological Community Conversion." The impact analysis properly compares the project's impact to the existing conditions baseline, and includes Mitigation Measure 3.3-3a to provide an Oak Woodland Conservation Plan sufficient to offset the loss of oak woodland habitat. The mitigation measure provides options for actions required under the measure, with each action including sufficient performance standards to ensure the efficacy of the mitigation.

The SGI Ione Quarry Expansion Project Reclamation Plan (reclamation plan) was included as Draft EIR Appendix B-2. The reclamation plan includes a revegetation plan

(see Reclamation Plan Appendix G) and discusses site revegetation criteria in Section 4.3. The commenter does not identify any specific deficiencies with the revegetation plan, or revegetation approach provided in the reclamation plan, therefore no further response is warranted.

Comment 4-3

DMR requests to be included on the distribution list for this Proposed Project. Additionally, the DMR requests that any subsequent project documents as well as a copy of the certified final EIR, be sent to the DMR at DMR-Submittals@conservation.ca.gov or the mailing address on the bottom of page 1 of this letter. If you have any questions, please contact me at (916) 616-1558.

Response 4-3

The County will provide project documents, including this Final EIR, as requested in the comment. The County appreciates the review and input provided by DMR. This comment does not address the adequacy of the Draft EIR and requires no further response.

Comment Letter 5. Amador Water Agency. September 16, 2024.

Comment 5-1

The Amador Water Agency (AWA or Agency) received the Notice of Availability of a Draft Environmental Impact Report for the lone Quarry Expansion Project, dated July 31, 2024. AWA respectfully requests to be copied on all project notices, publications, meetings and similar correspondence for the project.

Response 5-1

The County will provide project notices, publications, meetings and similar correspondence for the project as requested in the comment. The County appreciates the review and input provided by Amador Water Agency. This comment does not address the adequacy of the Draft EIR and requires no further response.

Comment 5-2

As a condition of the Ione Quarry (SGI) Expansion Project (Project), the Project will be required to obtain a "Water Will Serve Commitment" from the Amador Water Agency, and make corrective actions to usage or pay the appropriate fees for the current and projected potable water usage. The Ione Quarry will be required to maintain its usage within the permitted potable water capacity acquired and allotted to the premises.

Response 5-2

Current operations at the Ione Quarry do not use water from a public water system and the proposed project would not use water from a public water system. The existing and future water supply for operations at the project site will be provided by stormwater runoff that accumulates in the quarry and adjacent retention ponds and from an existing groundwater supply well. Therefore, no "Water Will Serve Commitment" or other authorization associated with Amador Water Agency potable water service is required for the project. Please see Draft EIR Appendix G-2, "Water Supply Assessment for the Ione Quarry Expansion Project," (EMKO, 2023) for a detailed discussion of the projects water demand and supply.

Comment 5-3

Please contact me with any questions.

Response 5-3

The County will contact Amador Water Agency with any questions the County may have and the County appreciates the review and input provided by Amador Water Agency. This comment does not address the adequacy of the Draft EIR and requires no further response.

2.4 ORGANIZATIONS

Comment Letter 6. Foothill Conservancy. September 19, 2024.

Comment 6-1

Attached are Foothill Conservancy's comments on the currently circulating draft Environmental Impact Report for the proposed expansion of the SGI Mine Quarry located outside the City of Ione.

Response 6-1

This is an introductory comment that does not address the adequacy of the Draft EIR and requires no further response. Please see below for responses to individual comments.

Comment 6-2

Project Timeline

We wish to renew our objection to the length of the project timeline. Given the ever-changing nature of technology and the environment, to grant this mining permit out to the year 2175 is untenable. Even the fifty-year timeline in the original project strains our ability to reasonably analyze the environmental impacts of this project. If this permit, with this timeline, was

issued in 1875 it would have analyzed the impacts from pick and shovel mining and still have been good until the present day. Think of the technological and social changes over that time. The nearby city of Ione grew from 600 to 6,000 residents in that time. Also given the nature of our changing climate, analysis with regard to water, air quality, and biology have the potential to change massively over a 150 year time period. The length of the permit also undermines the purpose of the reclamation plan, as it puts its implantation at the end of mining operations into the distant future. We recommend that the project be given a 25 year timeline before requiring a review of the project by the County, so that the permit conditions can be updated to keep pace with any changes in technology or conditions near the site.

Response 6-2

The comment's objection to the length of the project timeline and recommendation for a permit authorization of a shorter duration are noted and will be considered by County decision makers during project approval deliberations. In addition, in a letter dated April 22, 2025, the applicant agreed to reduce its extension term request from 100 years to an additional 50 years. The Draft EIR evaluates project operations and reclamation based on current conditions and anticipated future conditions with the project, and provides for sufficient disclosure of potential impacts and mitigation requirements in compliance with CEQA.

Comment 6-3

Air Quality

The analysis for the Air Quality section relies on questionable assumptions. First, the baseline air quality levels are based on data from monitoring stations in Jackson and San Andreas, located ten and twenty miles from the project site, respectively, while the City of Ione and its residents are just two miles away. The project's impact to air quality in Ione is not captured by a baseline set from a location five times the distance as the real area of concern. The private crowd-sourced website Purple Air shows that air quality readings can be quite different for sensors in Jackson compared to those in Ione.

The analysis also assumes that the quarry operation will use more fuel- and emission-efficient vehicles and equipment in the future as the fleet is replaced and that the project will conform with a host of established federal, state and local air quality regulations. These assumptions are in fact mitigation measures that should be incorporated into the EIR as such to ensure that they are identified and enforced.

To ensure effectiveness of the measures described in the EIR, air quality monitoring should be installed by the applicant at the quarry site and in the City of Ione to ensure that air quality is not being compromised.

Response 6-3

Draft EIR Section 3.2, "Air Quality," presented data from air quality monitoring stations in Jackson and San Andreas as the nearest monitoring stations to the site and most representative of air quality conditions in the project vicinity. However, the monitoring station data does not serve as a basis for evaluating the significance of the project's air quality impacts. As discussed at Draft EIR Impact 3.2-2, the analysis considers emissions associated with existing operations at the project site and predicted emissions associated with proposed operations. The difference between existing emissions and predicted project emissions is then compared to quantified daily emissions thresholds to assess whether the project would exceed the thresholds resulting in a significant impact. As shown in Draft EIR Table 3.2-7 (Draft EIR pp. 3.2-32 – 3.2-33), as compared to existing operations, the project is predicted to generate lower criteria pollutant emissions for all pollutants with the exception of oxides of sulfur (SO_x) for which the project is predicted to result in no change and coarse particulate matter (PM_{10}) for which the project is predicted to result in a 0.88 pounds/day increase above existing operations. The increase in PM_{10} emissions of 0.88 pounds/day is well below the 82 pounds/day significance criteria promulgated by the nearby Placer County Air Pollution Control District (Draft EIR pp. 3.2-21 – 3.2-22) and, thus, is considered to represent a less-than-significant impact.

As noted in the Draft EIR (p. 3.2-33), the majority of criteria air pollutant emissions associated with project operations would result in a net reduction compared to existing operations (with the exception of SO_x and PM_{10} as discussed above), primarily associated with more stringent emissions standards for off-road equipment and on-road vehicle engines in the future. The comment asserts that the assumption of compliance with air quality regulations, including fleet emissions standards, constitutes mitigation that should be incorporated to the EIR. However, "[a]n agency may rely on generally applicable regulations to conclude an environmental impact will not be significant and therefore does not require mitigation." (*San Francisco Beautiful v. City and County of San Francisco* (2014) 226 Cal.App.4th 1012, 1033, citing *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912, 932-934.) Here, the Draft EIR's air quality analysis accounts for regulations that have been adopted and are accounted for in the analysis on the reasonable assumption that the regulations will remain in effect and that operations under the proposed project will be conducted in compliance with such regulations.

With regard to the comment's suggestion that air quality monitoring be installed to ensure that air quality is not being compromised, the Draft EIR presents substantial evidence and analysis supporting the conclusion that the project would not result in significant air quality impacts. The comment does not provide any evidence that air quality monitoring at the project site, or in the City of Ione, is necessary as a measure to reduce or avoid a significant air quality impact of the project.

Comment 6-4

Water

As was expressed by nearby residents, concerns persist that the mining operation at the quarry could fracture the rock basin and drain groundwater supplies in the area. The EIR should include analysis of the water table and possible impacts therein by the quarry.

Response 6-4

As discussed in Draft EIR Impact 3.8-5 and the "*Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project*" (EMKO, 2023b) included as Appendix B of this Final EIR (see Final EIR Chapter 3, Errata 6 for additional explanation) the transmissivity of the metavolcanic bedrock at the project site is more than one million times less than the transmissivity measured in the adjacent Valley Springs Formation aquifer units. Therefore, any increase in the inflow of groundwater into the expanded quarry through fractures in the bedrock, or any related lowering of the groundwater elevation in the bedrock, would have no measurable effect on groundwater conditions within the adjacent Valley Springs Formation and the Cosumnes subbasin. Thus, the potential for the proposed project's quarry to decrease groundwater supplies in the adjacent Cosumnes subbasin in a manner that could impede the sustainable groundwater management of the basin would be less than significant. (Draft EIR p. 3.8-48)

Comment 6-5

Noise

We object to the characterization of 80 blasting events per year as "infrequent" as it represents an event over 20% of all days of the year, or a blast every 4 and a half days. If measures are taken to minimize the impacts from blasting and other mining activities, they should be included in the EIR as mitigation measures.

Response 6-5

Draft EIR Impact 3.10-2 presents an evaluation of noise impacts associated with blasting (Draft EIR pp. 3.10-25 – 3.10-26) and Draft EIR Impact 3.10-4 presents an evaluation of potential groundborne and airborne vibration impacts associated with blasting (Draft EIR p. 3.10-28). The Impact analyses assumes that blasting would occur a maximum of 80 times per year. Draft EIR Impact 3.10-2 concluded that blasting A-weighted sound pressure levels would be below 50dBA L_{max} at 3,000 feet during a single blast event. This noise level is below the County daytime noise and average daytime maximum ambient noise standard and therefore this impact was considered less than significant. Draft EIR Impact 3.10-4 concluded a blast event would generate vibration levels of 0.09 inches per second PPV at 3,000 feet. This vibration level is 0.05 inches per a second PPV greater than the barely perceptible transient vibration threshold but 0.14 inches per a second PPV less than the distinctly perceptible transient vibration threshold. Given blasting at peak production could occur up to 20% of the days in a single year and would only occur during daytime hours, these impacts were considered less than significant.

Comment 6-6

Aesthetics

The DEIR analysis fails to engage with the largest visual impact of the project, specifically the expanded stockpile area, which will increase to an elevation of 560 feet (200 feet higher than existing conditions) and cover 86 acres. This huge pile of rock and soil is not included in the photo simulations and not sufficiently addressed in the written analysis. Mitigation measures should be introduced to address the appearance of the stockpile, specifically the grading of slopes, placement of topsoil, and the planting of vegetation so the stockpile has the appearance of a natural hillside, rather than a scarred industrial landscape. This restoration work should commence before the 150 years pass before the end of the mining permit.

Response 6-6

Draft EIR Impact 3.1-1 addresses the potential for the project to adversely affect views from scenic vistas and Draft EIR Impact 3.1-3 addresses the potential for the project to substantially degrade the character of existing views or the quality of public views of the site and its surroundings. As referenced in the introduction of Draft EIR Section 3.1, "Aesthetics," the analysis is supported by Draft EIR Appendix C, "Ione Quarry Expansion Project Aesthetics Technical Study." The analyses in Draft EIR Impacts 3.1-1 and 3.1-3, as well as the Aesthetics Technical Study (Draft EIR Appendix C), consider the full range of proposed project activities and landscape modifications, including the

proposed stockpile and its visibility from surrounding viewpoints. Draft EIR Figures 3.1-2 through 3.1-7 present photographs from six representative view locations and photographic simulations of the project's visibility from each location (with the exception of Viewpoint 3 from which the project would not be visible). The effects of the proposed project on the quality of public views are addressed for each representative viewpoint with an assessment of viewer sensitivity, the quality of the existing view, the change in the view associated with the project, and the significance of the impact. (Draft EIR pp. 3.1-27 – 3.1-28)

The SGI Ione Quarry Expansion Project Reclamation Plan (reclamation plan) was included as Draft EIR Appendix B-2. The reclamation plan includes anticipated reclamation of disturbed areas resulting from mining, stockpiling of material, and ancillary activities. The reclamation plan includes a revegetation plan (see Reclamation Plan Appendix G) and discusses site revegetation criteria in Section 4.3. Revegetation of disturbed areas will occur as feasible to an open space condition.

Comment 6-7

Please feel free to contact us to discuss any of the comments submitted. We are pleased to work with your staff and the community to work toward a better future for Amador County.

Response 6-7

The County appreciates the review and input provided by Foothill Conservancy. This comment does not address the adequacy of the Draft EIR and requires no further response.

2.5 INDIVIDUALS

Comment Letter 7. Willam May. August 27, 2024.

Comment 7-1

Planning Commissioners and Staff should send the purported DEIR back to SGI marked dead on arrival. What is the name of the individual or firm that prepared the DEIR?

Response 7-1

Draft EIR Chapter 7, "List of Preparers," identifies County staff and the consulting firms involved in the preparation of the EIR. This comment does not address the adequacy of the Draft EIR and requires no further response.

Comment 7-2

SGI claims in the DEIR there will not be any impact on groundwater, air quality, wastewater, noise, oak woodlands nor threaten endangered fish, birds and other wildlife. How much was the DEIR Consultant paid to lie?

Response 7-2

With regard to groundwater, the Draft EIR identifies that the proposed project could have a potentially significant impact regarding groundwater quality and the Draft EIR identifies mitigation to reduce the potential impact to less than significant. (See Draft EIR Section 3.8, "Hydrology and Water Quality," for a presentation of the analysis; See also Impacts 3.8-4 and 3.8-5, Draft EIR pp. 3.8-47 – 3.8-49 for further analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of groundwater impacts, and no further response to the comment regarding groundwater impacts is required.

With regard to air quality, the Draft EIR provides a quantitative evaluation of air pollutant emissions under existing operations and the proposed project, and concludes based on the existing CEQA baseline conditions, substantial evidence, and analysis that the project would have less than significant impacts to air quality. (See Draft EIR Section 3.2, "Air Quality," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of air quality impacts, and no further response to the comment regarding air quality impacts is required.

With regard to wastewater, Draft EIR Appendix A-3, "Initial Study," concluded that the proposed project would not include the use of septic tanks or changes to the existing wastewater disposal systems and, therefore, that the project would not have an impact associated with wastewater treatment or disposal. The Draft EIR provides a detailed evaluation of potential water quality impacts and identifies that the proposed project would have a potentially significant impact associated with potential offsite discharges of quarry water and identifies mitigation to implement water quality monitoring and treatment as necessary prior to discharge of quarry water. (See Draft EIR Section 3.8, "Hydrology and Water Quality," Impact and Mitigation Measure 3.8-1 and Impact and Mitigation Measure 3.8-3.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of wastewater impacts, and no further response to the comment regarding wastewater impacts is required.

With regard to noise, the Draft EIR provides a detailed assessment of potential noise and vibration impacts associated with the proposed project, and concludes based on the existing CEQA baseline, substantial evidence, and analysis that the project would have

less than significant noise and vibration impacts. (See Draft EIR Section 3.10, "Noise," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of noise impacts, and no further response to the comment regarding noise impacts is required.

With regard to biological resources issues raised in the comment (oak woodlands and threatened or endangered fish, birds, and other wildlife), the Draft EIR provides a detailed assessment of potential impacts associated with loss of oak woodlands (see Draft EIR Impact 3.3-3 and Mitigation Measure 3.3-3a which provides for development of an oak woodland conservation plan) and potential effects on special-status wildlife species (see Draft EIR Impact 3.3-1 and Mitigation Measures 3.3-1a – 3.3-1k which provide for mitigation of potential impacts to northwestern pond turtle, golden eagle, burrowing owl, Swainson's hawk, tricolored blackbird, special-status and other nesting bird species, special-status and other roosting bat species, California tiger salamander and western spadefoot, vernal pool fairy shrimp and vernal pool tadpole shrimp, and Crotch's bumble bee) and concludes based on substantial evidence and analysis that with implementation of the identified mitigation measures, the project would have a less than significant impact on biological resources. The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of biological resources, and no further response to the comment regarding biological resources impacts is required.

The Draft EIR was prepared based on factual evidence and analysis with clearly described methodology and substantiated supporting data and documentation for many impacts including noise, traffic, and air quality there are only nominal or no increases compared to existing conditions and thus no cognizable impact under CEQA. The comment does not identify any errant, incorrect, or misleading information in the Draft EIR, and no further response is required.

Comment 7-3

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The DEIR consultant says that it will have no impact on local
traffic. Another lie.
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Response 7-3

With regard to traffic, the Draft EIR provides a detailed assessment of potential transportation-related impacts associated with the proposed project, and concludes based on the CEQA baseline, substantial evidence, and analysis that the project would have less than significant impacts associated with transportation. (See Draft EIR Section 3.11, "Transportation," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of transportation-related impacts and provides no evidence that the project would have an impact on local traffic

that requires evaluation under CEQA, and no further response to the comment regarding transportation or traffic impacts is required.

Comment 7-4

No air quality baseline of current air quality exists so how does SGI know that there are no significant issues to mitigate?

Response 7-4

As discussed at Draft EIR Impact 3.2-2, the air quality impact analysis considers emissions associated with existing operations at the project site (the baseline emissions) and predicted emissions associated with proposed operations. The difference between existing emissions (the baseline emissions) and predicted project emissions is then compared to quantified daily emissions thresholds to assess whether the project would exceed the thresholds resulting in a significant impact.

Comment 7-5

There are many cancer causing and other health threatening issues in mining dust.

Response 7-5

Draft EIR Section 3.2, "Air Quality," considers human health risks associated with air pollutant emissions resulting from the project and incorporates the findings of the Health Risk Assessment Model (Dudek, 2023) prepared for the project and included as Appendix D-2 of the Draft EIR. As presented in Draft EIR Impact 3.2-3, the existing and with-project potential cancer and noncancer health impacts associated with toxic air contaminant emissions were estimated using exposure periods that represent emission increases during operation (9-, 30-, 70-, and 100-years). The analysis concludes that the project would result in a lower cancer risk than the existing baseline in all exposure scenarios, with the exception of the 100-year exposure scenario which shows a slight increase in cancer risk from the project compared to the existing baseline, mainly due to the longer period of exposure of the project compared to the baseline. The net change in cancer and non-cancer health risk would not exceed applicable significance thresholds of 10 in one million for cancer health risk and of 1.0 hazard index for non-cancer health risk, and therefore the impact is found to be less than significant. (Draft EIR pp. 3.2-33 – 3.2-37) Also as presented in Draft EIR Impact 3.2-3, health effects associated with criteria pollutant emissions were found to be less than significant. With regard to the comment's reference to mining dust, the analysis concludes that operation of the project would not exceed the threshold for PM_{10} and would not contribute to exceedances of National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) nor would the project obstruct the Mountain Counties Air Basin from coming

into attainment for PM_{10}. The project would be required to comply with Amador Air District Rule 218, which limits the amount of fugitive dust generated. As the project would result in a minimal net increase in PM_{10} and $PM_{2.5}$ during operations, the project would not result in potential health effects related to particulate matter. (Draft EIR pp. 3.2-37 – 3.2-39) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of air pollutant emissions health risk impacts, and no further response is required.

Comment 7-6

SGI did no noise testing yet claimed neighbors would not be impacted by noise. Another lie.

Response 7-6

The Draft EIR provides a detailed assessment of potential noise and vibration impacts associated with the proposed project and concludes based on the existing baseline conditions, substantial evidence, and analysis that the project would have less than significant noise and vibration impacts. (See Draft EIR Section 3.10, "Noise," for a presentation of the analysis.) The analysis specifically assessed ambient noise levels within the project area, as presented in Draft EIR Table 3.10-2, "Ambient Noise Environment in the Vicinity of the Project Site," and at the locations shown on Draft EIR Figure 3.10-1. Also, see Response 6-5. The comment is factually incorrect.

Comment 7-7

They erroneously state that there would not be any increase in truck traffic.

Response 7-7

As discussed at Draft EIR Impact 3.11-2, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." The comment provides no evidence for its assertion that the Draft EIR is erroneous with regard to truck trip generation or traffic, and no further response is required.

Comment 7-8

Home values and quality of life will be adversely impacted.

Response 7-8

The comment provides no evidence or explanation for how the project would adversely impact home values or quality of life, and no further response is required. However, it

should be noted that according to CEQA statute, guidelines, and case law, economic impacts are not CEQA issues. (*Porterville Citizens for Responsible Hillside Development v. City of Porterville* (2007) 157 Cal.App.4th 885, 903 ["CEQA is not an economic protection statute"]; see also *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1120.) Therefore, assertions or evidence of economic impacts are beyond the scope of CEQA and do not pertain to the adequacy of the EIR.

Comment 7-9

In summary, this Proposal should be deemed DEAD ON ARRIVAL.

I reserve the right to submit additional comments prior to or at the September 10 Planning Commission Meeting.

Response 7-9

The commenter's preferred disposition of the proposed project is noted and will be considered by County decision makers during project approval deliberations.

Comment Letter 8. Sondra West-Moore. September 9, 2024.

Comment 8-1

The Ione Amador Quarry (SGI) on Highway 104, just 3 miles east of Ione, and less than 1000 from several generational farms and ranches on Dutschke Road, is requesting an expanded Use Permit that will extend 151 years from now.

Response 8-1

The comment is introductory and does not address the adequacy of the Draft EIR, and no further response is required. On April 22, 2025, the applicant submitted a letter agreeing to reduce the extension request from 100 years to 50 years.

Comment 8-2

The Draft Environmental Impact Report (DEIR) claims there will be no impact on groundwater, air quality, wastewater, noise, oak woodlands and threatened or endangered fish, birds and other wildlife, local traffic and more.

Response 8-2

With regard to groundwater, the Draft EIR identifies that the proposed project could have a potentially significant impact regarding groundwater quality and the Draft EIR identifies mitigation to reduce the potential impact to less than significant. (See Draft EIR Section 3.8, "Hydrology and Water Quality," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's

evaluation of groundwater impacts, and no further response to the comment regarding groundwater impacts is required.

With regard to air quality, the Draft EIR provides a quantitative evaluation of air pollutant emissions under existing operations and the proposed project, and concludes based on the existing CEQA baseline conditions, substantial evidence, and analysis that the project would have less than significant impacts to air quality. (See Draft EIR Section 3.2, "Air Quality," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of air quality impacts, and no further response to the comment regarding air quality impacts is required.

With regard to wastewater, Draft EIR Appendix A-3, "Initial Study," concluded that the proposed project would not include the use of septic tanks or changes to the existing wastewater disposal systems and, therefore, that the project would not have an impact associated with wastewater treatment or disposal. The Draft EIR provides a detailed evaluation of potential water quality impacts and identifies that the proposed project would have a potentially significant impact associated with potential off-site discharges of quarry water and identifies mitigation to implement water quality monitoring and treatment as necessary prior to discharge of quarry water. (See Draft EIR Section 3.8, "Hydrology and Water Quality," Impact and Mitigation Measure 3.8-1 and Impact and Mitigation Measure 3.8-3.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of wastewater impacts, and no further response to the comment regarding wastewater impacts is required.

With regard to noise, the Draft EIR provides a detailed assessment of potential noise and vibration impacts associated with the proposed project, and concludes based on the existing CEQA baseline conditions, substantial evidence, and analysis that the project would have less than significant noise and vibration impacts. (See Draft EIR Section 3.10, "Noise," for a presentation of the analysis.) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of noise impacts, and no further response to the comment regarding noise impacts is required.

With regard to biological resources issues raised in the comment (oak woodlands and threatened or endangered fish, birds and other wildlife), the Draft EIR provides a detailed assessment of potential impacts associated with loss of oak woodlands (see Draft EIR Impact 3.3-3 and Mitigation Measure 3.3-3a which provides for development of an oak woodland conservation plan) and potential effects on special-status wildlife species (see Draft EIR Impact 3.3-1 and Mitigation Measures 3.3-1a – 3.3-1k which provide for mitigation of potential impacts to northwestern pond turtle, golden eagle, burrowing owl, Swainson's hawk, tricolored blackbird, special-status and other nesting bird species,

special-status and other roosting bat species, California tiger salamander and western spadefoot, vernal pool fairy shrimp and vernal pool tadpole shrimp, and Crotch's bumble bee) and concludes based on substantial evidence and analysis that with implementation of the identified mitigation measures, the project would have a less-than-significant impact on biological resources. The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of biological resources, and no further response to the comment regarding biological resources impacts is required.

With regard to local traffic, as discussed at Draft EIR Impact 3.11-2, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of transportation and does not present evidence regarding traffic impacts, and no further response to the comment regarding transportation and traffic is required.

Comment 8-3

They want to expand the quarry to 280 feet below sea level (from 325 feet above today), enlarge from 56 acres to 136 acres and go up another 200 feet for stockpiles.

Response 8-3

The comment is a general statement regarding the project and does not address the adequacy of the EIR, and no further response is required.

Comment 8-4

The rock in this area has proven to be fractured, as documented in the Newman Ridge lawsuits against the developer and the County, so this fractured rock has proven that this will affect local groundwater availability as the mine goes where it has not gone before, far below sea level, and groundwater will flow into the pit.

The DEIR also states that wastewater will flow to a local fishing lake called Loch Lane. We object to both of those situations involving water, as we are in a very constrained groundwater area with proven fractured rock. Draining the local groundwater will negatively affect the entire Ione agricultural community. We all depend on wells which will clearly be impacted by this expansion.

Response 8-4

As discussed at Draft EIR Impact 3.8-1, with regard to pre- and post-construction runoff calculations, the "*Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project*" (EMKO, 2023b) included as Appendix B of this Final EIR (see Final EIR Chapter 3, Errata 6 for additional explanation), recognizes that groundwater is present within fractures in the bedrock, but that the volume is very low, with 20 acre-feet per year total inflow into the quarry at full depth (Draft EIR p. 3.8-48). Of the total volume of water that would accumulate in the expanded and deepened quarry, only about 8 percent would be due to groundwater inflow through fractures in the bedrock. Additionally, as discussed at Draft EIR Impact 3.8-5, the transmissivity of the metavolcanic bedrock at the project site is more than one million times less than the transmissivity measured in the adjacent Valley Springs Formation aquifer units, meaning that groundwater in the fractured bedrock flows at rates that are one million times slower than groundwater would flow in the adjacent aquifer units under the same conditions. Based on available data and information from the US Geological Survey and the California Department of Water Resources, groundwater supply wells in the vicinity of the Project obtain groundwater from alluvial formations such as the Valley Springs Formation that are part of the Cosumnes groundwater subbasin. There are no documented supply wells completed within the bedrock that makes up the Carabas Paleo-Ridge, in which the mine is located. Therefore, any increase in the inflow of groundwater into the expanded quarry through fractures in the bedrock, or any related lowering of the groundwater elevation in the bedrock, would have no measurable effect on groundwater conditions within local groundwater wells completed within the alluvial formations within the Cosumnes subbasin because the rate of flow through the bedrock is minuscule. Thus, the potential for the proposed project's quarry to decrease groundwater supplies in the adjacent Cosumnes subbasin in a manner that could impede the sustainable groundwater management of the basin would be less than significant. (Draft EIR pp. 3.8-48 – 3.8-49.)

Any water discharged to Loch Lane Lake would have to meet applicable water quality standards. Compliance with those standards would be enforced through the issuance of a National Pollutant Discharge Elimination System (NPDES) permit from the Central Valley Regional Water Quality Control Board. The NPDES permit would require monitoring and submittal of reports to the Water Board to verify compliance with the water quality standards. Implementation of Mitigation Measure 3.8-1 would prevent the discharge of water from the site that could impact water quality. (Draft EIR, pp. 3.8-38 to 41) Since Loch Lane Lake primarily overlies the more permeable alluvial aquifers of the Cosumnes subbasin (see Draft EIR, Figure 3.8-4), discharge to the lake would increase recharge to the aquifers.

Comment 8-5

They want to continue operations as they are today, with blasting during the day and the deafening conveyer belt, plant and rock crusher allowed to operate all night. This is currently very bad for neighbors and can be heard clearly up to 3 miles away. There is no indication they did noise testing during night rock crushing.

Response 8-5

The comment's concern regarding noise associated with existing operations at the project site is noted. However, existing noise levels within the project vicinity, including noise generated from ongoing operations at the project site, reflect the "baseline" condition against which project-related noise is compared under CEQA in order to assess the impacts of the proposed project. Because no changes to any fundamental activities or facilities associated with the existing operation (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation) are proposed, the Draft EIR noise impact analysis focuses on noise generated by mining, stockpiling, and blasting activities that would result from the change of location from the existing quarry area into the proposed expansion areas. (Draft EIR p. 3.10-19)

Draft EIR Section 3.10, "Noise," describes that existing operations at the project site include material stripping, drilling, blasting, breaking, crushing, transporting, storage, loading, and stockpiling of material mined from the active quarry and that operating hours occur 24 hours a day, 7 days a week, with blasting limited to between 9 a.m. and 6 p.m. Monday through Saturday for a maximum of 80 times per year. (Draft EIR p. 3.10-1) To quantify the existing ambient noise environment, long-term noise level measurements were conducted at four locations (see Draft EIR Figure 3.10-1) during a 5-day period spanning Thursday, October 3 through Monday, October 7, 2019. During the survey period, mining operations within the project site occurred during the weekday noise monitoring periods (Thursday, Friday, and Monday), but no quarrying operations occurred during the weekend period of the ambient noise survey (Saturday and Sunday). (Draft EIR p. 3.10-2)

In consideration of ambient noise levels and predicted noise levels associated with operation of the proposed project, the Draft EIR analysis concludes that noise generated by excavation and stockpiling in the expansion areas would be below both the Amador County noise standards at the nearest residences and would not result in a substantial increase in ambient noise levels at those residences. Therefore, the project's noise impact is considered less than significant for the purposes of the County's CEQA review. (Draft EIR p. 3.10-23 – 3.10-25)

Comment 8-6

There are many cancer causing and health threatening toxic contaminants in mining dust, including PM10s, TACs, CARBs detailed in the EIR.

Response 8-6

Draft EIR Section 3.2, "Air Quality," considers human health risks associated with air pollutant emissions resulting from the project and incorporates the findings of the Health Risk Assessment Model (Dudek, 2023) prepared for the project and included as Appendix D-2 of the Draft EIR. As presented in Draft EIR Impact 3.2-3, the existing and with-project potential cancer and noncancer health impacts associated with toxic air contaminant emissions were estimated using exposure periods that represent emission increases during operation (9-, 30-, 70-, and 100-years). The analysis concludes that the project would result in a lower cancer risk than the existing baseline in all exposure scenarios, with the exception of the 100-year exposure scenario which shows a slight increase in cancer risk from the project compared to the existing baseline, mainly due to the longer period of exposure of the project compared to the baseline. The net change in cancer and non-cancer health risk would not exceed applicable significance thresholds of 10 in one million for cancer health risk and of 1.0 hazard index for non-cancer health risk, and therefore the impact is found to be less than significant. (Draft EIR pp. 3.2-33 – 3.2-37) Also as presented in Draft EIR Impact 3.2-3, health effects associated with criteria pollutant emissions were found to be less than significant. With regard to the comment's reference to mining dust, the analysis concludes that operation of the project would not exceed the threshold for PM_{10} and would not contribute to exceedances of National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) nor would the project obstruct the Mountain Counties Air Basin from coming into attainment for PM_{10}. The project would be required to comply with Amador Air District Rule 218, which limits the amount of fugitive dust generated. As the project would result in a minimal net increase in PM_{10} and $PM_{2.5}$ during operations and would not result in potential health effects related to particulate matter. (Draft EIR pp. 3.2-37 – 3.2-39) The comment does not provide evidence addressing the adequacy of the Draft EIR's evaluation of air pollutant emissions health risk impacts, and no further response to the comment regarding health risk impacts is required.

Comment 8-7

They say these are not an issue because Amador County has air monitors, which are in Jackson (10 miles away, upcountry) and Calaveras County (15 miles away, upcountry). Using air monitoring systems up country and miles away does not reflect the air quality in Ione.

Amador Country continues to refuse to put air monitors in Ione, near all this activity, which would correctly monitor the Air Quality for those most impacted nearby. Why is the County refusing? Isn't Public health important?

Response 8-7

Draft EIR Section 3.2, "Air Quality," presents data from air quality monitoring stations in Jackson and San Andreas as the nearest monitoring stations to the site and most representative of air quality conditions in the project vicinity. However, the monitoring station data does not serve as the basis for evaluating the significance of the project's air quality impacts. The Draft EIR provides a detailed evaluation of the project's potential air quality impacts, including the existing CEQA baseline, potential health risk impacts, and concludes that the project would not result in significant air quality or health risk impacts. The comment does not address the adequacy of the Draft EIR's air quality evaluation and the comment does not provide evidence or argument that an air quality monitoring station in Ione is necessary for evaluation of the project's air quality impacts under CEQA.

Comment 8-8

Additionally, no air quality baseline of current air quality exists. Without that baseline, they claim there are no significant issues to mitigate. That is the same as saying because the Level of Service in Ione for traffic is terrible, 100 more truck trips a day can't make it any more terrible. Illogical and again not looking after the Public Health or Welfare, which is the duty of the Board of Supervisors.

Response 8-8

Draft EIR Section 3.2, "Air Quality," presents data from air quality monitoring stations in Jackson and San Andreas as the nearest monitoring stations to the site and most representative of existing (baseline) air quality conditions in the project vicinity. However, as discussed at Draft EIR Impact 3.2-2, the impact analysis is based on the predicted net emissions over the existing baseline associated with the project compared to quantified daily emission thresholds to assess whether the project would exceed the thresholds resulting in a significant impact. Additionally, Draft EIR Section 3.11, "Transportation," assesses potential transportation impacts of the proposed project and determines that, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) The comment does not provide evidence or argument to support the incorrect assertion of

"100 more truck trips a day" associated with truck traffic, and no further response is required.

Comment 8-9

We know (from SMARA) that the winds blow West to East, so the dust, toxins and noise will blow directly into Ione and settle the surrounding areas, just as smoke remains for days at the bottom of the foothills, where Ione is located.

Response 8-9

The health risk assessment prepared for the Draft EIR utilized air dispersion modeling performed using the EPA's American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) Version 22112 modeling system. AERMOD-specific meteorological data for the Stockton air monitoring station (#23237) was used for the dispersion modeling. While the Stockton monitoring station (34.5 miles) is not the closest to the project site, it is considered most representative based on the predominant wind direction. (Draft EIR Appendix D-2, p. 1) The comment does not provide evidence or argument supporting the comment's assertions regarding wind direction dust, toxins, and noise movement and does not explain how these factors relate to the adequacy the Draft EIR's air quality, health risk, or noise analyses.

Comment 8-10

They have not considered the cumulative effects of other existing or planned mining or major construction projects planned close by: Newman Ridge mine - 1 mile from the city of Ione, scheduled to begin in 2025, Jackson Valley Quarry - recently expanded, US Mines in Ione, Mule Creek Prison expansion construction, ongoing.

Response 8-10

Draft EIR Chapter 4, "Cumulative Impacts," provides an evaluation of potential cumulative impacts of the proposed project in consideration of other projects in Amador County identified as having potential relation to the setting or conditions of the proposed project and are either completed, currently under construction or implementation or beginning construction or implementation, proposed and under environmental review, or reasonably foreseeable. CEQA requires that the impact must be cumulatively considerable, meaning that incremental effects of an individual project are significant when viewed in connection with the effects of past, other current, and probable future projects. (14 CCR Section 15065(a)(3) and 15130.) If an impact is nominal it does not require detailed cumulative analysis, e.g. cumulative air and traffic impacts. "Where a lead agency is examining a project with an incremental effect that is not 'cumulatively

considerable,' a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable." (14 CCR Section 15130(a).) "When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR." (14 CCR Section 15130(a)(2).) The Draft EIR did that here in Chapter 4. The projects provided by the commenter are approved projects that were considered part of the environmental baseline condition (i.e., Newman Ridge, U.S. Mines) or included in Table 4-1, "Projects Considered in Cumulative Impacts Analysis" (i.e., Jackson Valley Quarry). Draft EIR Chapter 4, "Cumulative Impacts," has been revised to include those projects provided by the commentor that were not summarized in Table 4-1. These changes are summarized in Chapter 3, and the revised Chapter 4, section is provided as Chapter 4, "Cumulative Impacts Errata," of this Final EIR.

Comment 8-11

They claim there will be no additional truck traffic, despite the bigger numbers they will be allowed.

Response 8-11

Draft EIR Section 3.11, "Transportation," assesses potential transportation impacts of the proposed project and determines that, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) The comment does not provide evidence or argument to support the assertion of "bigger numbers" associated with truck traffic, and no further response is required.

Comment 8-12

The reclamation plan would not begin until the quarry is done, 151 years from now.

Response 8-12

The comment is a general statement regarding the project and does not address the adequacy of the EIR, and no further response is required.

Comment 8-13

One Alternative (#2) is to reduce the size of the mine and limit operations. We would also like the permit to be a much smaller

term, so cumulative effects can be measured and permitting determined. 10 years would be fair.

Response 8-13

The comment's preferences for a reduced size alternative and reduced permit duration are noted and will be considered by County decision makers during project approval deliberations. This comment does not address the adequacy of the Draft EIR and no further response is required.

Comment 8-14

We would like a clear statement about the air monitors to be installed and how and when readings will be taken. We want to know what happens to mining operations during flood events, which happen routinely here in the winter. We would like reassurance that County mine inspections happen when the full mine and plant are running, not on Sundays when it is not running.

Response 8-14

The comment does not provide evidence or argument that an air quality monitoring station in Ione is necessary for evaluation of the project's air quality impacts under CEQA. Please see Responses 8-7 and 8-10, above, regarding monitoring station data relevance to the project's air quality analysis.

Regarding operations during flood events, Draft EIR Impact 3.8-6 evaluates the potential of the project to cause or contribute to offsite flooding. As discussed there, the proposed project would not add impervious surfaces to the project site. Additionally, the proposed project would expand the overall quarry footprint from approximately 56 acres to 136 acres. Most undisturbed areas of the site currently drain off-site away from the existing quarry footprint. As the quarry expansion is developed these surface waters would fall within the active quarry or drain towards the quarry, and therefore volumes and rates of stormwater runoff from the project site to surrounding off-site areas would remain similar to existing conditions or decrease. For these reasons, the proposed project would not have the potential to result in off-site flooding or exceedance of any off-site storm drainage system. (Draft EIR p. 3.8-49)

Regarding the comment's request for County mine inspections during full operations, the comment does not provide evidence or argument for this suggestion as pertains to the Draft EIR. Mine inspections do not occur on Sundays. Mitigation measures adopted for the project will be included in a mitigation monitoring and reporting program that will specify, among other requirements, timing for monitoring as necessary to ensure implementation of required mitigation.

Comment 8-15

They claim this project will provide tax income to the County. The greenrock is shipped wholesale out of the County, so no benefit occurs except to the mine operator.

Response 8-15

A project objective identified in the Draft EIR is, "[c]ontinue to provide property and sales tax revenue to the County." Although stated as a project objective, tax revenue is not a factor utilized in the Draft EIR impact analysis. According to CEQA statute, guidelines, and case law, economic impacts are not CEQA issues. (*Porterville Citizens for Responsible Hillside Development v. City of Porterville* (2007) 157 Cal.App.4th 885, 903 ["CEQA is not an economic protection statute."]; See also *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1120.) Therefore, the project's tax revenue potential is beyond the scope of CEQA and does not pertain to the adequacy of the EIR.

Comment 8-16

They claim no scenic vistas will be affected, but they avoid showing the massive tailing piles, 60+ feet high, just west of the end of Dutschke Road, on the west horizon.

Response 8-16

Draft EIR Impact 3.1-1 addresses the potential for the project to adversely affect views from scenic vistas and Draft EIR Impact 3.1-3 addresses the potential for the project to substantially degrade the character of existing views or the quality of public views of the site and its surroundings. Note that the Narco pit and the stockpile near Dutschke Road are not owned by SGI and are not located on the project site. The analyses in Draft EIR Impacts 3.1-1 and 3.1-3, as well as the Aesthetics Technical Study (Draft EIR Appendix C), consider the full range of proposed project activities and landscape modifications, including the proposed stockpile and its visibility from surrounding viewpoints, and the analysis utilizes six representative view locations and photographic simulations of the project's visibility from each location (with the exception of Viewpoint 3 from which the project would not be visible). Viewpoint 6 is a publicly accessible point along Dutschke Road. (See Figures 3.1-1 – 3.1-7, which provide photographs of Viewpoints 1-6.) The location referenced in the comment, "west of the end of Dutschke Road," appears to be private property not accessible to the general public and with no evidence that this location is readily accessible to a substantial number of viewers. Therefore, the location referenced in the comment is not considered to represent a scenic vista for the purposes of CEQA analysis (i.e., "a view that possesses visual and aesthetic qualities of high value to the community").

Comment 8-17

Home values and quality of life are affected by mining. The only ones who profit from these vast and unending projects are the mining operators, who give nothing to the community but noise, toxins, dust, depletion of water and heavy truck traffic.

What does the developer propose to help the community it will affect, to offset these things?

Response 8-17

The comment provides no evidence or explanation for how the project would adversely impact home values or quality of life, and no further response is required. However, it should be noted that according to CEQA statute, guidelines, and case law, economic impacts are not CEQA issues. (*Porterville Citizens for Responsible Hillside Development v. City of Porterville* (2007) 157 Cal.App.4th 885, 903 ["CEQA is not an economic protection statute."]; See also *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1120.) Assessing or identifying economic or other benefits to the community is also outside of the scope of the County's CEQA review of the project.

Comment 8-18

This DEIR is defective on these points and should be addressed. Its time for the Amador BOS to hold the operator responsible, and to represent and protect the Public.

Response 8-18

Responses to comments pertaining to environmental issues are provided in responses above. County decision makers will consider the concerns raised by the commenter during deliberations of project approvals.

Comment Letter 9. Carina and Elia Bassin. September 10, 2024.

Comment 9-1

As a neighbor for much of the past two decades, we generally appreciate locally sourcing our materials. However, we feel the EIR is deficient and due to the following deficiencies, and current actions by the applicant, the approved use should not be allowed for more than 5 years at a time. Due to the failure in the past, in the following three points, the damages should be corrected first, or only a limited 5 year approval be granted.

Response 9-1

Please see responses below addressing specific concerns raised in the comment letter. The comment's preference for a reduced permit duration is noted and will be considered by County decision makers during project approval deliberations.

Comment 9-2

Noise: The quarry is trying to only look at the quarry but the noise of the things leaving the quarry are owned by the same owner and have significant effects before leaving the site.

The EIR mentions "backup alarms" being required per OSHA. But the EIR does not measure the sounds of the backup alarms. When used, those backup alarms have been measured well over 100 db between 10pm and 4am, on neighboring properties. If OSHA requires these alarms, then a proper mitigation would be for no backing up to be permitted between 10 pm to 6am.

The EIR must exactly measure the dump trucks and semi trucks completing backup functions during the night.

The same is true for the rock roller/paint/crushing things and the train loading, all which occur at night and all vastly exceed nighttime General Plan guidelines and have been a takings of neighboring properties.

If this application is approved for more than 5 years, it must be limited to 6am to 9pm operations.

Response 9-2

The comment's concern regarding noise associated with existing operations at the project site is noted. However, existing noise levels with the project vicinity, including noise generated from ongoing operations at the project site, reflect the "baseline" condition against which project-related noise is compared in order to assess the impacts of the proposed project. Because no changes to any fundamental activities or facilities associated with the existing operation (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation) are proposed, the Draft EIR noise impact analysis focuses on noise generated by mining, stockpiling, and blasting activities that would result from the change of location from the existing quarry area into the proposed expansion areas. (Draft EIR p. 3.10-19) The comment raises specific concerns about back-up alarms. Such existing noise sources are also part of the baseline condition.

To quantify the existing ambient noise environment, long-term noise level measurements were conducted at four locations (see Draft EIR Figure 3.10-1) during a 5-day period

spanning Thursday, October 3 through Monday, October 7, 2019. During the survey period, mining operations within the project site occurred during the weekday noise monitoring periods (Thursday, Friday, and Monday), but no quarrying operations occurred during the weekend period of the ambient noise survey (Saturday and Sunday). (Draft EIR p. 3.10-2) The analysis specifically assessed ambient noise levels within the project area, as presented in Draft EIR Table 3.10-2, "Ambient Noise Environment in the Vicinity of the Project Site," and at the locations shown on Draft EIR Figure 3.10-1.

Draft EIR Section 3.10, "Noise," describes that existing operations at the project site include material stripping, drilling, blasting, breaking, crushing, transporting, storage, loading, and stockpiling of material mined from the active quarry and that operating hours occur 24 hours a day, 7 days a week, with blasting limited to between 9 a.m. and 6 p.m. Monday through Saturday. (Draft EIR p. 3.10-1) In consideration of ambient noise levels and predicted noise levels associated with operation of the proposed project, the Draft EIR analysis concludes that noise generated by excavation and stockpiling in the expansion areas would be below both the Amador County noise standards at the nearest residences and would not result in a substantial increase in ambient noise levels at those residences. Therefore, the project's noise impact is considered less than significant for the purposes of the County's CEQA review. (Draft EIR p. 3.10-23 – 3.10-24)

The comment requests a limitation on hours of operation; however, the noise analysis does not identify project impacts that indicate a need for limitation of hours of operation or other measures to mitigate noise impacts. The comment's concern regarding the existing noise environment is noted and will be considered by County decision makers during project approval deliberations.

Comment 9-3

Dust: The EIR only "models" dust. The models assume the applicant is using proper dust mitigation. There is significant poisonous dust that clouds off the trucks when they leave the property and which is blown east towards all the residents of Ione. This needs to be exactly measured, not estimated. I have photographic evidence of the current use permit not being maintained due to insignificant dust control.

Response 9-3

Draft EIR Section 3.2, "Air Quality," considers human health risks associated with air pollutant emissions resulting from the proposed project and incorporates the findings of the Health Risk Assessment Model (Dudek, 2023) prepared for the project and included as Appendix D-2 of the Draft EIR. The comment expresses concern with regard to dust emissions from trucks departing the property. As discussed in the Draft EIR, "[n]either

the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) The Draft EIR health risk assessment accounts for health risk associated with emissions associated with project operations at the project site, however, because the project would not generate new daily truck trips, the project would not increase the potential for dust emissions from trucks departing the facility as compared to baseline conditions.

Comment 9-4

Traffic Safety

I am not personally affected, but I think for the public's sake, the EIR traffic studies look at traffic counts, but ignore the actual issue here. The issue is thousands of slow moving semi trucks a year leave the property, enter a highway with 99% of vehicles going 56-80mph. These trucks have no egress and instead egress on the gravel side road pulling damaging rocks onto the roadway and creating a dangerous interaction with incredibly fast moving prison commuters and other vehicles. For the EIR to adequately look at the relevant issue, it should include the speed of vehicles on Highway 104 and note the space for the quarry trucks to make left hand turns and merge with traffic. I did not see these issues identified and I fear for other people's lives due to this lifetime approval of mining activities with no egress.

Response 9-4

Draft EIR Section 3.11, "Transportation," assesses potential transportation impacts of the proposed project and determines that, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) The comment raises concerns with regard to traffic/vehicle safety associated with existing conditions, however, the comment does not provide evidence or argument for how the project would exacerbate these existing conditions in light of the fact that the project would not generate new trips and no further response is required.

Comment Letter 10. John, Gianni, and Kathleen Muschetto. September 26, 2024 (Received October 1, 2024).

Comment 10-1

We are John, Gianni and Kathleen Muschetto who wish to express our concerns over the environmental impact of expanding the Special

Granules lone Quarry. We are located at 10930 and 10980 Dutschke Road, lone. We are one of the closest properties to the quarry and have two residences affected by this expansion.

Response 10-1

The comment is introductory and does not address the adequacy of the Draft EIR and no further response is required. Please see responses below regarding specific concerns raised in the comment letter.

Comment 10-2

In reviewing the Draft EIR, it has been stated that with the expansion of the footprint of the quarry, the depth of the quarry floor and expansion of the stockpiles, there will be little significant impact on the air quality. Therefore, there will be no mitigations made forth is large expansion. As it stands now, dust and particles are not being properly mitigated. As trucks come out of the quarry, they spew dust in the air while dirt falls from them and gets dragged for miles down Highway 104 and into lone. There is no watering down the areas of the quarry creating the dust nor are there water trucks to wet down the roads. Currently the air quality is not being properly monitored. It is being monitored by two very distant sensors, one in Jackson (10 miles away) and the other in Calaveras County (15 miles away). We would like to see sensors placed close to the Ione area so we can have more accurate monitoring of our air quality.

Response 10-2

Draft EIR Section 3.2, "Air Quality," presents data from air quality monitoring stations in Jackson and San Andreas as the nearest monitoring stations to the site and most representative of existing (baseline) air quality conditions in the project vicinity. However, as discussed at Draft EIR Impact 3.2-2, the impact analysis is based on the predicted net emissions over the existing CEQA baseline associated with the project compared to quantified daily emission thresholds to assess whether the project would exceed the thresholds resulting in a significant impact.

The request for an air quality monitoring station in Ione is noted, however, such a station is not required for evaluation of the proposed project.

Comment 10-3

It has also been stated in the Draft EIR that there will be little significance in decreasing the groundwater supply or interruption to the recharge of groundwater. A large amount of groundwater will be needed to support such an expansion and sustain it for another

century. SGI draws its water from wells connected to the Cosumnes Sub-basin, an extremely overdrawn aquifer. We are concerned about their increased water usage and how it will affect our wells as well as the neighboring ranches and residents' water supply. Our wells are already struggling. We are also extremely concerned about the deep mining pit that will draw groundwater into it and away from the underground waterways that feed our wells. Our two wells are fed directly from seasonal creeks that come from the property owned by SGI. How can you not acknowledge that they will be compromised by such an expansion? Loss of water will affect all the residential water supplies, the ranch operations, the livestock and livelihoods of all the people residing southeast of SGI.

Response 10-3

As discussed in Draft EIR Impact 3.8-5 and the "*Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project*" (EMKO, 2023b) included as Appendix B of this Final EIR (see Final EIR Chapter 3, Errata 6 for additional explanation), the future Project water demand of 60 to 65 acre-feet per year is comparable to the current baseline water use at the site. The future Project water supply would come primarily from rainfall and runoff that would accumulate in the expanded quarry, and the rainfall and runoff in excess of the Project water demand (see EIR Appendix G-1, p. 30) would be discharged to the local stormwater ponds where any overflow would enter the local creeks and Loch Lane, which would contribute to recharge of the underlying alluvial aquifers in the Cosumnes subbasin.

As noted in Draft EIR Appendix G-2, "Water Supply Assessment" (EMKO, 2023), the California Department of Water Resources does not classify the Cosumnes subbasin as a high priority or overdrafted groundwater basin. The Groundwater Sustainability Plan (GSP) for the subbasin (EKI, 2021 as cited in Appendix G-2) determined that the Amador County portion of the subbasin has a net positive water balance, with recharge exceeding groundwater pumping by 800 acre-feet per year to 1,300 acre-feet per year, including during multi-year drought scenarios. As noted in Draft EIR Appendix G-2 (p. 22), the groundwater pumping that may occur from the Project supply well during an extremely dry year would only be 1.2 percent to 1.9 percent of the net positive water budget for the Amador County area of the subbasin. Thus, the Project would not cause or contribute to any overdraft such that the potential for the proposed project's quarry to decrease groundwater supplies in the adjacent Cosumnes subbasin in a manner that could impede the sustainable groundwater management of the basin would be less than significant. (Draft EIR p. 3.8-48)

On a local basis, it should be noted that the project supply well is located to the west of the project site, on the west side of the Carabas Paleo-Ridge. Due to the extremely low transmissivity (i.e., permeability) of the fractured bedrock (see Draft EIR Impact 3.8-5 and Response 8-4), any pumping on the west side of the bedrock Paleo-Ridge would not have any effect on residential water supplies, ranch operations, livestock, or other facilities located to the southeast of the Project site, on the east side of the Paleo-Ridge. Furthermore, as shown on Figure 4 of the Water Supply Assessment (Draft EIR Appendix G-2), the groundwater aquifers on the east side of the bedrock Paleo-Ridge are within a different geologic formation (i.e., the Ione Formation) than the aquifers on the west side of the bedrock Paleo-Ridge (i.e., the Valley Springs Formation). Based on the extent and relationships of the geologic formations shown in Figure 4 of the Water Supply Assessment (Draft EIR Appendix G-2), the Valley Springs Formation is not present east of the bedrock Paleo-Ridge and, therefore, pumping within that formation in the west side of the ridge could not have any effect on groundwater aquifers on the east side of the ridge, including those to the southeast of the Project site.

Comment 10-4

Noise has also been deemed as having little significance, with no mitigation in this expansion project. Really?! This plant currently emits the noise of excavating, blasting, crushing rocks, running conveyor belts, loud hammering on the silos, trucks driving in and out, honking and diesel train engines arriving late at night, blasting their airhorns and banging train cars together. Expanding the quarry will only bring more noise. Hours of operation should be mitigated.

Response 10-4

The comment's concern regarding noise associated with existing operations at the project site is noted. However, existing noise levels within the project vicinity, including noise generated from ongoing operations at the project site, reflect the baseline condition under CEQA against which project-related noise is compared, in order to assess the impacts of the proposed project. Because no changes to any fundamental activities or facilities associated with the existing operation (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation) are proposed, the Draft EIR noise impact analysis focuses on noise generated by mining, stockpiling, and blasting activities that would result from the change of location from the existing quarry area into the proposed expansion areas. (Draft EIR p. 3.10-19) The comment raises particular concerns with regard to rail operations (honking and diesel train engines, blasting airhorns, banging train cars together). Such existing noise sources are also part of the baseline condition, and it should be noted that these operations associated with the separately

permitted granules plant located to the northeast of the project site. While noise associated with the granules plant is part of the existing baseline noise environment, the proposed project does not involve any alterations to the granules plant permit or operations.

Draft EIR Section 3.10, "Noise," describes that existing operations at the project site include material stripping, drilling, blasting, breaking, crushing, transporting, storage, loading, and stockpiling of material mined from the active quarry and that operating hours occur 24 hours a day, 7 days a week, with blasting limited to between 9 a.m. and 6 p.m. Monday through Saturday. (Draft EIR p. 3.10-1) In consideration of ambient noise levels and predicted noise levels associated with operation of the proposed project, the Draft EIR analysis concludes that noise generated by excavation and stockpiling in the expansion areas would be below both the Amador County noise standards at the nearest residences and would not result in a substantial increase in ambient noise levels at those residences. Therefore, the project's noise impact is considered less than significant for the purposes of the County's CEQA review. (Draft EIR p. 3.10-23 – 3.10-26)

The comment requests a limitation on hours of operation; however, the noise analysis does not identify project impacts that indicate a need for limitation of hours of operation or other measures to mitigate noise impacts. The comment's concern regarding the existing noise environment is noted and will be considered by County decision makers during project approval deliberations.

Comment 10-5

Under transportation, there is no mitigation for the amount of traffic that this expansion will produce. The Draft EIR claims there will be little significance. Downtown Ione is extremely congested with all types of traffic and the trucks from SGI add so much more to the congestion backed up on Main Street. Currently there are no bypasses or other options but to drive right through the middle of town. At the entrance to SGI, the trucks entering and leaving are creating a hazardous situation as there is no left-hand turn lane on Highway 104 as they slow down to enter the plant. A distracted or speeding driver can easily drive into the back of a truck as it stops for oncoming traffic. The narrow dirt shoulder that exists currently is a dangerous choice for drivers skirting around the right side of these trucks. Trucks leaving SGI are also a hazard. As they are loaded with heavy gravel, they have been pulling out slowly in front of traffic heading in both directions on Highway 104. This expansion will only increase truck traffic so the EIR should mitigate traffic relief for the town of lone and turn lanes at the SGI entrance.

Response 10-5

Draft EIR Section 3.11, "Transportation," assesses potential transportation impacts of the proposed project and determines that, "[n]either the operation or reclamation phases of the project would increase SGI's daily mining output and no changes to the existing operation are proposed that would alter traffic patterns along local area roadways and generate new daily automobile or truck trips." (Draft EIR Impacts 3.11-1 and 3.11-2; pp. 3.11-13 – 3.11-14) The comment raises concerns with regard to traffic/vehicle safety associated with existing baseline conditions, however, the comment does not provide evidence or argument for how the project would exacerbate these existing baseline conditions in light of the fact that the project would not generate new trips.

Comment 10-6

Lastly, this Draft EIR has ignored the cumulative effects on Air Quality, Energy, Geology, Greenhouse Gas Emissions, Water Quality and Hydrology, Noise and Transportation by stating that there will be little significant impact to these environmental elements. Currently, the Irish Hill Quarry operates about one mile from SGI, US Mines operates next to the city of lone, Jackson Valley Rock Quarry operates about 3 miles from SGI, and Mule Creek State Prison operates about one mile from SGI. There will be more cumulative effects in the near future when the recently approved Newman Ridge Project is developed and begins operations and who knows what industrial manufacturing operations will develop in the newly designated industrial park located just two miles from SGI. This EIR study must recognize that there are cumulative effects existing already and must mitigate for these current effects as well as for future effects.

Response 10-6

Draft EIR Chapter 4, "Cumulative Impacts," provides an evaluation of potential cumulative impacts of the proposed project in consideration of other projects in Amador County identified as having potential relation to the setting or conditions of the proposed project and are either completed, currently under construction or implementation or beginning construction or implementation, proposed and under environmental review, or reasonably foreseeable. The projects provided by the commenter are approved projects that were considered part of the environmental baseline condition (i.e., Irish Hill Quarry, U.S. Mines) or included in Table 4-1, "Projects Considered in Cumulative Impacts Analysis" (i.e., Jackson Valley Quarry). Draft EIR Chapter 4, "Cumulative Impacts," has been revised to include those projects provided by the commentor that were not previously summarized in Table 4-1. These changes are summarized in Chapter 3,

"Revisions to Draft EIR," and the revised Chapter 4, "Cumulative Impacts Errata," section is provided as Chapter 4, of this Final EIR.

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3—REVISIONS TO DRAFT EIR

3.1 INTRODUCTION

In reviewing and responding to comments on the Draft EIR, the County determined that revisions to portions of the Draft EIR text are warranted to correct, clarify, or amplify certain information. CEQA Guidelines Section 15088 provides that where the response to comments makes important changes in the information contained in the text of the Draft EIR, the lead agency should either revise the text in the body of the EIR or include marginal notes showing that the information is revised in the response to comments.

Section 3.2 provides revisions to the Draft EIR deemed necessary by the County in consideration of comments on the Draft EIR or as otherwise deemed necessary by the County to clarify or amplify information presented in the Draft EIR. Revisions to the Draft EIR text are shown as *errata*, consisting of an excerpt of the Draft EIR text with changes represented with added text shown in underline (example) and deleted text show in strikethrough (~~example~~).

The County has considered the errata in Section 3.2 and determined that none identify a new significant impact or a substantial increase in the severity of a previously identified significant impact. The errata clarify and amplify analysis of impacts presented in the Draft EIR, provide minor corrections, and enhance mitigation measures to further address and reduce impacts identified in the Draft EIR. The errata are appropriately included in this Final EIR and do not require recirculation prior to the County's certification of the Final EIR.

3.2 REVISIONS TO DRAFT EIR

3.2.1 Mitigation Measure 3.3-1a

In comments on the Draft EIR, the California Department of Fish and Wildlife (CDFW) provided input regarding Mitigation Measure 3.3-1a (see Comment 3-4 in Chapter 2 of this Final EIR). As discussed in the County's response (see Response 3-4 in Chapter 2 of this Final EIR), in consideration of CDFW recommendations and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1a is revised in this Final EIR as shown in Errata 1, below.

ERRATA 1

Mitigation Measure 3.3-1a: *Conduct Botanical Surveys, Avoid Special-Status Plant Species if Feasible, Obtain CDFW Authorization and Replace CESA-Listed Impacted Plants at a Minimum Ratio of 1:1*

Prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities, a qualified botanist or biologist shall conduct an appropriately timed preconstruction survey for special-status rare plant species when the plant species are blooming and readily identifiable. The surveys shall occur within one year prior to commencement of ground-disturbing activities. If special-status plant surveys result in negative findings, then no impact would occur and no additional mitigation is ~~would be~~ required.

If a ~~special-status~~ CESA-listed plant species is detected, and the plant(s) cannot be avoided, a mitigation plan identifying appropriate mitigation ratios at a minimum ratio of 1:1 shall be developed in consultation with, and approved by, the County prior to disturbance of the identified plant(s). ~~regulatory agencies will be notified as required by applicable permits.~~ Additionally, i~~f~~ ~~rare~~ CESA-listed plant species are detected ~~found~~, and avoidance is not feasible, then the Operator shall notify and consult with CDFW and obtain necessary approvals. Such approvals may include requiring the Operator to obtain and comply with the conditions of an CDFW Incidental Take Permit (ITP). ~~i~~Impacted special-status plants shall ~~will~~ be mitigated ~~at a~~ by establishing replacement plants at a minimum ratio of 1:1 ~~ratio~~ (number of plants established:number of plants impacted) or at a higher ratio and/or other conditions as may be determined through consultation with the County or CDFW if a CESA-listed plant is detected during the surveys and avoidance is not feasible. The subject special-status plants to be impacted may ~~will~~ be relocated to suitable habitat areas if feasible, or seeds may~~will~~ be collected ~~and~~for reestablish~~ed~~ plants within permanently preserved, suitable habitat areas prior to removal of individual plants.

END OF ERRATA 1

3.2.2 Mitigation Measure 3.3-1c

In comments on the Draft EIR, CDFW provided input regarding Mitigation Measure 3.3-1c (see Comment 3-5 in Chapter 2 of this Final EIR). As discussed in the County's response (see Response 3-5 in Chapter 2 of this Final EIR), in consideration of CDFW recommendations and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1c is revised in this Final EIR as shown in Errata 2, below.

ERRATA 2

Mitigation Measure 3.3-1c*: Golden Eagles*

Within 45 days of commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas during the breeding bird season prior to the next mining expansion phase, a qualified biologist shall conduct a protocol survey in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (USFWS 2010) to avoid take of golden eagles. This survey protocol is intended to standardize procedures to inventory and monitor golden eagles within the direct and indirect impact areas of planned or ongoing projects where disturbance or lethal take from otherwise permitted human activities is possible.

If an active eagle nest is identified within the expansion project site, consultation with USFWS and CDFW shall be conducted. A minimum of a 660-foot buffer shall be established per the National Bald Eagle Management Guidelines (USFWS 2007). No disturbance shall occur within the buffer until the monitoring biologist has determined that the young have fledged and are independent of the nest. For a positive occurrence, the qualified biologist shall fill out the GEWG Golden Eagle Database Submission Template (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=108214& inline) and submit the occurrence data to kate.keiser@wildlife.ca.gov so it may be added to the Golden Eagle Database.

END OF ERRATA 2

3.2.3 Mitigation Measure 3.3-1e

In comments on the Draft EIR, CDFW provided input regarding Mitigation Measure 3.3-1e (see Comment 3-6 in Chapter 2 of this Final EIR). As discussed in the County's response (see Response 3-6 in Chapter 2 of this Final EIR), in consideration of CDFW recommendations and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1e is revised in this Final EIR as shown in Errata 3, below.

ERRATA 3

Mitigation Measure 3.3-1e: *Swainson's Hawk*

Prior to the commencement of ground disturbing activities (which include tree removal, vegetation clearing, grubbing, or grading) in previously undisturbed

areas during the breeding bird season for the next mining phase, protocol level surveys for Swainson's hawk shall be conducted by a qualified biologist. Surveys shall be completed for least two survey periods immediately prior to commencement of ground disturbing activities, which include a minimum of four visits if initiated March 20th ~~and~~ to April 20th(Periods II and III) or a minimum of six visits if initiated June 10th to ~~and~~ July 30th(Period V)~~to avoid impacts to nesting Swainson's hawks~~. Surveys shall not be conducted between April 21 to June 10 (Period IV) due to the difficulty of detecting nests at this time of year. If ground disturbance is scheduled to begin during this time period three surveys shall be completed between April 5 to April 20 (Period III) and three surveys between June 10 to July 30 (Period V).The survey shall be conducted within a 0.25-mile radius around the planned disturbance area following the CDFW guidelines entitled: Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). ~~These surveys are phasic, and are required to begin prior to the nesting period. Protocol surveys require up to 9 surveys to complete (CDFG 2000).~~ If work is beginning before March 20th, or after September 1st, a single preconstruction nesting bird survey as described in 3.3-1g is sufficient to avoid impacts to Swaison's hawk.

If an active nest is identified within 0.25 miles of the proposed disturbance, protective buffers will be established and maintained until such time that the Swainson's hawks have completed their nesting cycle as determined by a qualified biologist. If the proposed Project could impact an active Swainson's hawk nest, the applicant shall obtain an Incidental Take Permit ~~would be required~~ under Section 2081 of CFGC and administered by the CDFW. The applicant shall comply with all permit requirements, including the preparation of a Swainson's Hawk Monitoring and Habitat Management Plan. Removal of known Swainson's hawk nest trees shall be mitigated by replanting trees at a 3:1 ratio; and trees must be species which provide suitable nest structure such as oak trees.

END OF ERRATA 3

3.2.4 Mitigation Measure 3.3-1g

In comments on the Draft EIR, CDFW provided input regarding Mitigation Measure 3.3-1g (see Comment 3-7 in Chapter 2 of this Final EIR). As discussed in the County's response (see Response 3-7 in Chapter 2 of this Final EIR), in consideration of CDFW recommendations and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1g is revised in this Final EIR as shown in Errata 4, below.

ERRATA 4

***Mitigation Measure 3.3-1g**: Special-Status and Other Nesting Bird Species*

Within 14 days prior to the commencement of ground disturbing activities (including tree removal, vegetation clearing, grubbing, or grading) for the next mining phase that must occur in previously undisturbed areas during the nesting season (February 1 through August 31)~~March 1 through July 31)~~, pre-construction surveys for avian species shall be conducted for project activities during the nesting bird season ~~March 1 through July 31~~). If active nests (containing eggs, chicks or young) are discovered during pre-construction surveys, a qualified biologist ~~would~~shall establish a species-specific no-work buffer around the active nest sufficient to ensure project activities do not adversely affect the nesting birds. Project activities ~~would~~shall be ~~postponed~~precluded within the no-work buffer until the conclusion of the nesting season, or ~~the~~a qualified biologist performs a follow-up ~~checks~~survey and ~~to~~determines ~~whether~~ the nest is no longer~~still~~ active.

END OF ERRATA 4

3.2.5 Mitigation Measure 3.3-1i

In comments on the Draft EIR, CDFW provided input regarding Mitigation Measure 3.3-1i (see Comment 3-8 in Chapter 2 of this Final EIR). As discussed in the County's response (see Response 3-8 in Chapter 2 of this Final EIR), in consideration of CDFW recommendations and to provide clarification and amplify the efficacy of the mitigation measure, Mitigation Measure 3.3-1i is revised in this Final EIR as shown in Errata 5, below.

ERRATA 5

***Mitigation Measure 3.3-1i:** California Tiger Salamander and Western Spadefoot*

Protocol-level surveys shall be completed by a biologist that holds a valid 10(a)(1)(A) recovery permit in accordance with USFWS protocol, prior to the commencement of ground disturbing activities (which include clearing, grubbing, or grading) in previously undisturbed areas over the duration of phased mining activities for the next mining phase. ~~At the project site aquatic sampling during two~~ Three aquatic surveys shall be performed in potentially suitable aquatic breeding habitats present at the project site. These surveys would occur during the spring months (generally in March, April, and May) for two consecutive breeding seasons. ~~and a~~A drift fence study shall occur in the intervening winter ~~should be conducted~~ in order to support a negative finding. If California tiger salamander are

determined to be absent by way of protocol-level surveys, no additional mitigation would be required.

If California tiger salamander are confirmed to be present on-site, a 2081 Incidental Take Permit from CDFW would be required. Additionally, if California tiger salamander are confirmed on-site, and pending the outcome of the jurisdictional determination by the Corps as to the Waters of the United States within the project site, a USFWS Biological Opinion under Section 7 of the ESA, or a Section 10 Habitat Conservation Plan would be required, or both. ~~Additionally, c~~Compensatory mitigation for loss of habitat would be required.

If California tiger salamander are confirmed to be present ~~found on site~~, compensatory mitigation for loss of California tiger salamander upland habitat ~~will~~ shall be provided via on-site creation, off-site preservation, the purchase of credits from a mitigation bank, or some combination of the aforementioned options at a minimum of a 1:1 ratio or at a higher ratio as may be determined through consultation with USFWS and CDFW.

Protocol-level surveys for California Tiger Salamander will be sufficient for the determination of presence or absence of western spadefoot toad. Avoidance, minimization and mitigation for California Tiger Salamander would be sufficient to reduce the level of effect for the California Tiger Salamander and the western spadefoot toad to a less than significant level.

END OF ERRATA 5

3.2.6 Hydrology and Water Quality Analysis Report

The hydrology and water quality assessment in the Draft EIR utilizes information from studies listed in Draft EIR Section 3.8, "Hydrology and Water Quality," including a January 2023 *Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project* prepared by EMKO Environmental, Inc. (2023 Hydrology Report) The 2023 Hydrology Report was correctly identified in Draft EIR Section 3.8 and information from the 2023 report was used during preparation of the Draft EIR. However, Draft EIR Chapter 8, "References and Resources," inadvertently listed a September 2020 version of the Hydrology Report and Appendix G-1 of the Draft EIR inadvertently included the 2020 version of the report instead of the 2023 version. Chapter 8 of the Draft EIR is revised as shown in Errata 6 below and Appendix G-1 of the Draft EIR is replaced with the 2023 *Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project* (EMKO, 2023b) as included in Appendix B of this Final EIR.

ERRATA 6

EMKO (EMKO Environmental, Inc.). ~~2020 (September)~~ 2023b (January). Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project, Amador County, California. (see Final EIR, Appendix B, "Appendix G-1 Replacement, January 2023, Hydrology and Water Quality Analysis Report, Ione Quarry Expansion Project")

END OF ERRATA 6

3.2.7 Water Supply Assessment Reference

Draft EIR Section 3.8, "Hydrology and Water Quality," references a *Water Supply Assessment for the Ione Quarry Expansion Project, Amador County, California*, prepared by EMKO Environmental, Inc. (Water Supply Assessment) and included as Appendix G-2 of the Draft EIR. As listed on Draft EIR page 3.8-1, the Water Supply Assessment is inadvertently identified with a date of January 2023. However, the Water Supply Assessment included as Appendix G-2 of the Draft EIR and used in preparing the Draft EIR is dated February 10, 2023. Errata 7 below revises Draft EIR page 3.8-1 as shown to correct the referenced date of the Water Supply Assessment.

ERRATA 7

Water Supply Assessment for the Ione Quarry Expansion Project, Amador County, California (Water Supply Assessment). Prepared by EMKO Environmental, Inc. (EMKO). ~~January 2023~~February 10, 2023. (Appendix G-2, "Water Supply Assessment")

END OF ERRATA 7

3.2.8 Water Supply Assessment Citation

The Draft EIR contains citations to "EMKO 2023" which is a citation to the *Water Supply Assessment for the Ione Quarry Expansion Project, Amador County, California*, prepared by EMKO Environmental, Inc. (Water Supply Assessment) and included as Appendix G-2 of the Draft EIR. A full reference for the EMKO 2023 citation was inadvertently omitted from the Draft EIR Chapter 8, "References and Resources." Errata 8 below adds the citation to Chapter 8.

ERRATA 8

EMKO (EMKO Environmental, Inc.). 2023 (February 10). *Water Supply Assessment for the Ione Quarry Expansion Project, Amador County, California.*

END OF ERRATA 8

3.2.9 Cumulative Impact Analysis

Chapter 4, "Cumulative Impacts," of the Draft EIR is revised to include additional approved projects near the project site including Irish Hill Quarry, Ione Sand Pit, Newman Ridge Project, and the Mule Creek State Prison Expansion. Chapter 4 is included in Chapter 4 of the Final EIR in its entirety with revisions shown in underline/strikethrough format. No new significant impacts or a substantial increases in the severity of a previously identified significant impact are identified.

ERRATA 9

See Final EIR Chapter 4, "Cumulative Impacts Errata."

END OF ERRATA 9

4—CUMULATIVE IMPACTS ERRATA

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4—CUMULATIVE IMPACTS ERRATA

In consideration of comments on the Draft EIR, additional information has been incorporated into this "Chapter 4, Cumulative Impacts Errata," prepared to accompany the Final EIR. This Cumulative Impacts Errata is a full reproduction of Draft EIR Chapter 4 with revisions made using underline format for added text (example) and strikethrough format (~~example~~) for deleted text as referenced in Final EIR Chapter 3, "Revisions to Draft EIR." The revisions herein clarify and amplify the analysis, but do not substantially modify the Draft EIR, do not identify any new significant project-specific or cumulative impacts, and do not identify a substantial increase in the severity of previously identified significant impacts.

The California Environmental Quality Act (CEQA) Guidelines Section 15130 requires that an Environmental Impact Report (EIR) discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." A cumulative impact consists of an impact which is created because of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.

The CEQA Guidelines clarify several issues with respect to cumulative impacts, as follows.

- An EIR should not discuss cumulative impacts to which the project would not contribute.
- If the combined cumulative impact (impacts from other projects combined with the impact from the proposed project) is not significant, then the EIR should briefly indicate why the impact is not significant, and no further evaluation is necessary.
- If the combined cumulative impact is significant, the EIR discussion must reflect the severity of the impact and the likelihood of its occurrence.
- If the combined cumulative impact is significant, the EIR also must indicate whether the project's contribution to that significant cumulative impact will or will not be cumulatively considerable.
- An EIR may determine that the project's contribution is rendered less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact (CEQA Guidelines 15130[a][3]).

This EIR identifies potentially significant environmental impacts associated with implementation of the proposed project, which are addressed by resource topic in Chapter 3, "Environmental Analysis," of the Draft EIR. This EIR did not identify any

significant and unavoidable impacts. ~~These issues, and others that could~~ The potential for impacts of the proposed project to contribute considerably to cumulatively significant effects, are discussed below in the context of cumulative development.

4.1 GEOGRAPHIC SCOPE AND TEMPORAL SCOPE

The CEQA Guidelines allow for the use of two methods to determine the scope of related projects for the cumulative impact analysis (CEQA Guidelines Section 15130):

- **List method:** A list of past, present, and reasonably anticipated future projects producing related or cumulative impacts, including those projects outside the control of the agency.
- **Regional growth projections method:** A summary of projections contained in an adopted general plan or related planning document that is designed to evaluate regional or areawide conditions.

Due to the localized nature and specific land use of the proposed project, this EIR uses the list method, which allows for a project-based cumulative analysis within the defined geographic area of the proposed project.

The following factors were used to determine an appropriate list of individual projects to be considered in this cumulative analysis:

- **Similar Environmental Impacts.** A relevant project contributes to effects on resources that are also affected by the proposed project. A relevant future project is defined as one that is "reasonably foreseeable," such as a proposed project for which an application has been filed with the approving agency or has approved funding.
- **Geographic Scope and Location.** A relevant project is located within the geographic area within which effects could be combined. The geographic scope varies on a resource-by-resource basis. For example, the analysis of some air quality impacts is based on regional-scale growth; thus, a regional perspective must be used to assess cumulative air quality impacts. In the case of aesthetic impacts, given the localized impact area of concern, a smaller more localized area surrounding the immediate project area would be appropriate for consideration.
- **Timing and Duration of Implementation.** Effects associated with activities for a relevant project (e.g., short-term construction or demolition or long-term operations) would likely coincide in timing with the related effects of the proposed project.

A summary of the projects identified at or near the project site is provided in Table 4-1, "Projects Considered in Cumulative Impact Analysis," and shown in Figure 4-1, "Cumulative Projects." This is not intended to be an all-inclusive list of projects in the region, but rather a list of projects in Amador County that have some relation to the setting or conditions of the project and are: (1) completed, (2) currently under construction or implementation or beginning construction or implementation, (3) proposed and under environmental review, ~~or~~ (4) reasonably foreseeable, and/or (5) were noted in comments on the Draft EIR and for which the County has added herein for the purposes of comprehensive evaluation and disclosure and to respond to public comments received on the Draft EIR.

TABLE 4-1
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No.	Project Name	Description of Project	Location	Jurisdiction~~/ Landowner~~	Status
1	Jackson Valley Quarry Extended Hours of Operation Project	Amend Condition of Approval (COA) #15 of the Jackson Valley Quarry Use Permit to extend the hours of operation for operational / reclamation activities (e.g., excavation, processing, load-out, and hauling) to 24 hours per day Monday through Friday ~~. The current~~ changed from previous hours of operation ~~for operational/reclamation activities are from~~ formerly limited to 6:00 a.m. to 6:00 p.m. Monday through Friday. No change to the approved hours of operation for site preparation activities or blasting ~~are requested~~.	South side of Highway 88 approximately ½ mile east of the most westerly junction of Jackson Valley Road and Highway 88 in the Ione area of Amador County.	Amador County~~/The Reed Leasing Company~~	~~Under environmental review.~~ Approved December 12, 2023.
2	Ione Band of Miwok Indians Casino Project (Acorn Ridge Casino)	Develop a casino with total floor area of approximately 57,000 square feet (25,000 sf of gaming space). Reduced in size and scope from previously proposed project. ~~Develop a casino with 120,000 square feet of gaming space, and include a restaurant, sports bar, and buffet. A second phase of the project would develop a 250-room hotel and conference center.~~	South of the City of Plymouth.	U.S. Department of the Interior, federal trust land ~~228 acres of tribal-owned land.~~	Under construction, projected opening in Spring of 2026. ~~Final federal approval granted in April 2020, and final state approval granted in August 2020. Continued legal challenges.~~
3	Goose Hill Recreational Vehicle Park Project	Operation of a recreational vehicle (RV) park at the location of the 105-acre Goose Hill construction aggregate mine. The project proposes that 40 acres of the property would be	6080 Jackson Valley Road, Ione	Amador County~~/105 acres of~~	Under environmental review.

Project No.	Project Name	Description of Project	Location	Jurisdiction~~/ Landowner~~	Status
		occupied by ~~recreational vehicle facilities~~ RV park uses including showers/restrooms, clubhouse/managers residence, office, meeting hall, convenience store, and restaurant, and the remaining 65 acres would be agricultural open space and wildlife habitat.		~~privately owned land~~	
4	Gardens of Noor Cemetery Project	Development of a cemetery with facilities that include 50,000 grave sites, parking for up to 100 cars, and a proposed 3,000 square foot worship building. The 46-acre parcel is zoned R1A, Single-family Residential and Agriculture and has an MRZ, Mineral Resource Zone General Plan Designation.	857 Carbondale Road, Ione	Amador County~~/46 acres of privately owned land~~	Under environmental review.
5	Wicklow Way Specific Plan	The Wicklow Way Specific Plan establishes a regulatory framework for the development of a 201-acre site located within the Martell Regional Service Center in Amador County. The purpose of the Specific Plan is to provide a planning document that includes a mix of retail, commercial, public, and higher-density housing uses.	The County-owned Wicklow Way site is located west of the City of Jackson and south of State Route 88, one mile west of the intersection with Highway 49, within the Martell Regional Service Center (RSC).	Amador County~~/ 201 acres owned by Amador County~~	Under environmental review. Draft EIR issued June 2024.
6	Irish Hill Quarry (CA Mine ID#91-03-0019)	Existing surface mine on 90 acres of land for extraction of sand and gravel from dredge tailings adjacent to Dry Creek. Approximately 32 acres of disturbance with limited to no production in recent years. As of 2023, new operator indicated no intention to mine the land at this time. Reclamation efforts largely entail allowing vegetation time for growth.	Approximately 3 ½ miles northwest of the City of Ione; one mile north of State Route 104 on the east side of Irish Hill Road in unincorporated Amador County.	Amador County	Mining operations are inactive; passive revegetation ongoing.

Project No.	Project Name	Description of Project	Location	Jurisdiction~~/ Landowner~~	Status
7	Ione Sand Pit (CA Mine ID# 91-03-0004)	Existing surface mining operation involving extraction of silica sand and white clay material. The operation consists of the removal of overburden (primarily via scrapers) to extract glass sand from the site. Raw sand is mixed with surface water and the resulting slurry product is pumped to the plant for further processing. Mined-out pits are utilized for disposal of fines and full ponds reclaimed by grading and reseeding for end use of grazing land and water storage.	South of the City of Ione, bordered by Dave Brubeck Road to the west; State Route 88 to the southeast; and State Route 124 to the east.	Amador County	Mining and reclamation activities are ongoing, with no identified planned change in operations.
8	Newman Ridge Project	The Newman Ridge Project involves approvals by the County in 2015 allowing for the development of 1) the Newman Ridge Quarry on approximately 216 acres and 2) the Edwin Center North aggregate processing site on approximately 136 acres. Newman Ridge Quarry is permitted for production of up to 5 million tons of aggregate per year, of which up to 250,000 tons may be transported offsite via truck and the remainder of which must be transported by rail. Material from the quarry would be processed at the on-site processing facilities and then trucked and/or conveyed from the quarry along an existing haul road for further processing at the Edwin Center North site and/or transport off-site via haul truck or by rail, using an existing rail siding. The operational life of the quarry is projected to be approximately 50 years. The Edwin Center North site is permitted to be developed with various aggregate processing facilities, including	The Newman Ridge Quarry site is located south of SR 104 at the end of Dutschke Road (identified as project *8a* on Figure 4-1). The Edwin Center North site is located on the south side of SR 104 just west of the Michigan Bar Road junction (identified as project *8b* on Figure 4-1).	Amador County / Vulcan Materials Company (Operator)	Aggregate production at Newman Ridge Quarry has not been initiated.

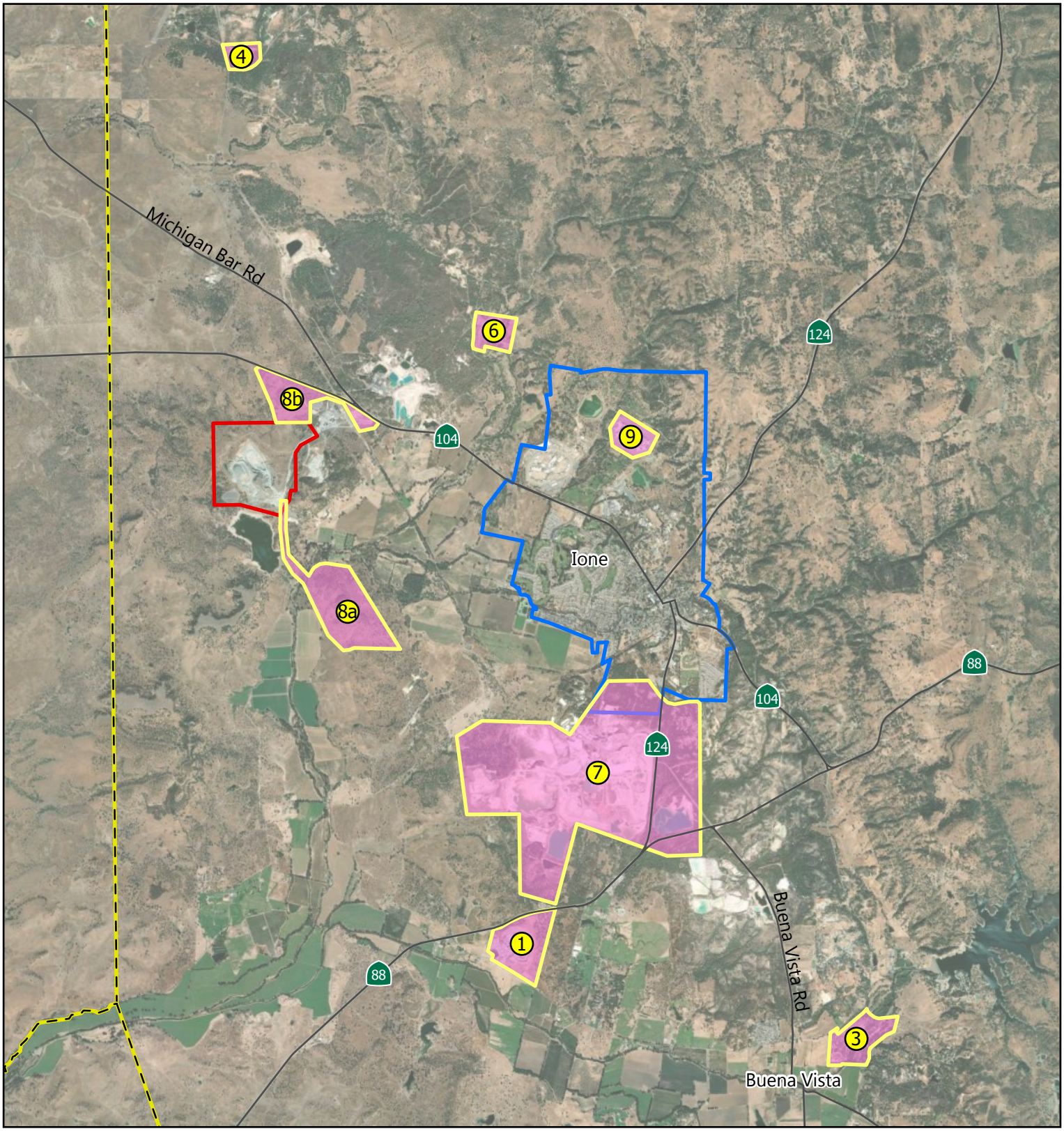
Project No.	Project Name	Description of Project	Location	Jurisdiction~~/ Landowner~~	Status
		an aggregate plant, an asphalt concrete (AC) plant, ready-mix concrete plant, an asphalt and concrete recycling plant, a rail loadout facility for finished product, an administration building, a maintenance building, a control booth, a quality control lab, an employee support building, two 5,000 gallon above-ground diesel-fuel storage tanks within a secondary concrete containment structure, two truck scales, a fuel island with two fuel pumps, and a steel or concrete tank for fresh water storage.			
9	Mule Creek State Prison Expansion	The Mule Creek Infill Complex added 550,000 square feet of buildings within an approximately 80 percent portion of the existing state prison.	Within the northern boundary of the City of Ione, northeast of existing prison facilities.	City of Ione/ California Department of Corrections and Rehabilitation	Construction completed in 2016.

Sources: ~~500 Nation 2023; Amador County 2022, 2023a, and 2023b; Beatty, pers. comm., 2023; Bollard Acoustical Consultants 2023; California Casinos 2023; Data compiled by Benchmark Resources in 2023.~~

1. CEQA Initial Study and Subsequent Mitigated Negative Declaration, Amendment to Use Permit (UP-06; 9-2) to Allow for Modified Hours of Operation, George Reed, Inc. Jackson Valley Quarry (CA Mine ID No. 91-03-0020). Amador County, June 2023.
2. Tribal Initial Study/Mitigated Negative Declaration. Ione Band of Miwok Indians, Ione Plymouth Casino Project. January 2024.
3. Notice of Preparation of a Draft Environmental Impact Report and Notice of Scoping Meeting – Goose Hill RV Park Project. January 29, 2024.
4. Erly Consultation Application Referral for Use Permit Application UP-22; 2-3 for Gardens of Noor Cemetery. Amador County Community Development Agency, May 18, 2023.
5. Draft Environmental Impact Report, Wicklow Way Specific Plan Project. June 2024.
6. Notice of Completion of Inspection (April 10, 2024) and Surface Mining Inspection Report (October 5, 2023, inspection) for Irish Hill Sand and Gravel, CA Mine ID #91-03-0019.
7. Notice of Completion of Inspection (April 10, 2024) and Surface Mining Inspection Report (October 2, 2023, inspection) for Ione Sand Pit, CA Mine ID #91-03-0004.
8. Reclamation Plan for the Newman Ridge Quarry (CA Mine ID: 91-03-0033), July 2012. Newman Ridge Project Staff Report for the March 24, 2015, Amador County Board of Supervisors Meeting, including Staff Report Attachment B, "Findings of Fact and Statement of Overriding Considerations." Notice of Completion of Inspection (April 10, 2024) and Surface Mining Inspection Report (October 6, 2023, inspection) for Newman Ridge Quarry, CA Mine ID #91-03-0033.
9. Hensel-Phelps Mule Creek Infill Complex webpage. Accessed January 10, 2025.

Notes: Cumulative project locations are shown in Figure 4-1, with the exception of 2 and 5 which are outside of the figure area of coverage.

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Sources: Map compiled by Benchmark Resources, 2025. See Final EIR Table 4-1 for project information sources.

Map Key	Project Name
1	Jackson Valley Quarry - Extended Hours of Operation Project
2	Ione Band of Miwok Indians Casino Project (outside of map area)
3	Goose Hill Recreational Vehicle Park Project
4	Gardens of Noor Cemetary Project
5	Wicklow Way Specific Plan (outside of map area)
6	Irish Hill Quarry
7	Ione Sand Pit
8a	Newman Ridge Project - Newman Ridge Quarry
8b	Newman Ridge Project - Edwin Center North
9	Mule Creek State Prison Expansion Project

Project Boundary
City Boundary
Cumulative Projects
County Boundary
Major Roads

BENCHMARK RESOURCES

N

0 0.75 1.5 3 Miles

Cumulative Projects
IONE QUARRY EXPANSION PROJECT
FINAL EIR
Figure 4-1

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4.2 CUMULATIVE IMPACTS EVALUATION

Each resource section below provides a summary listing the less than significant and potentially significant impacts identified for the proposed project in each resource section (Sections 3.1 through 3.12) of the Draft EIR, and is followed by a discussion of the potential for these project impacts to contribute to cumulative impacts in consideration the cumulative projects listed in Table 4-1. Consistent with the CEQA Guidelines, impacts to which the project would not contribute are not included in this analysis.

4.2.1 Aesthetics

Project impacts pertaining to aesthetics, as described in Section 3.1, "Aesthetics and Visual Resources," of the Draft EIR are as follows:

- Impact 3.1-1: Potential to Result in a Substantial Adverse Effect on a Scenic Vista (less than significant);
- Impact 3.1-3: Potential to Substantially Degrade the Existing Visual Character or Quality of Public Views (i.e., Views Experienced from Publicly Accessible Vantage Points) of the Site and Its Surroundings (less than significant); and
- Impact 3.1-4: Potential to Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area (less than significant).

Potential effects to aesthetic conditions are primarily local- and community-level issues. The project site is located in the foothills of the Sierra Nevada Mountain range and is surrounded by topography consisting of undulating hillslopes and swales with slopes of 3 to 30 percent. The western region of the County consists of rolling hills dotted with mature oaks, oak woodlands, and annual grasslands; agricultural land (e.g., field crops, vineyards, and livestock); conifer forests; rivers; lakes; and historic structures, which contribute to the visual character found in the County. Due to the nature of terrain and vegetation, cumulative effects that could adversely affect a scenic vista, degrade the visual character or quality of public views, or create substantial light or glare would only occur if projects are located in relatively close proximity or along the same public roadways (as described in Section 3.1, public roadways are the primary public viewpoint locations in the vicinity of the project site). The cumulative project nearest the project site is the Newman Ridge Project (Project No. 8 in Table 4-1), with the Newman Ridge Quarry site located immediately to the southeast of the proposed project site and the Edwin Center North site located immediately to the northwest (see Final EIR, Figure 4-1, sites 8a and 8b). The nearest other cumulative projects to the project site are the Ione Sand Pit (Project No. 7 in Table 4-1) located approximately 3 miles southeast of the proposed project site, the Jackson Valley Quarry Extended Hours of Operation Project (Project No.

1 in Table 4-1), located approximately 3 miles east of the project site, and the Gardens of Noor Cemetery Project (Project No. 4 in Table 4-1), located approximately 3 miles northwest of the project site. The furthest projects are located approximately 10 miles from the project site. At these distances, with the exception of the Newman Ridge Project (discussed further below), none of the other cumulative projects would be visible from the same local roadways, or at the same time as the proposed project, and light and glare would also not be visible concurrently. ~~The remaining cumulative projects are located further away and are also not part of the same viewshed.~~

In its 2015 approval, the County determined that the Newman Ridge Project would result in significant and unavoidable impacts related to substantial degradation of the existing visual character or quality of the project site and/or the site's surroundings. The County's significant and unavoidable finding was associated with visual impacts of the Newman Ridge Quarry component of the Newman Ridge Project, as the County found that development of facilities at the Edwin Center North site would result in a less than significant visual impact. (Amador County, March 24, 2015, Staff Report for Newman Ridge Project, Appendix B, "Findings of Fact and Statement of Overriding Considerations." Staff Report, pp. 35-36.) The Edwin Center North site is adjacent to the proposed project site. Visual impacts associated with the proposed project would not substantially contribute to cumulative impacts associated with the Newman Ridge Project. No view locations have been identified from which a substantial number of viewers would have views of disturbances or activities associated with both New Ridge Quarry and the proposed project. Although there are view locations from which future facilities developed on the Edwin Center North site and disturbance associated with the proposed project would be visible, the visual effects of the Edwin Center North and the visual effects of the proposed project are both considered less than significant in part due to the existing baseline mining and processing facilities and activities within the area. Thus, the proposed project would not result in a cumulatively considerable adverse visual impacts when considered with the Newman Ridge Project.

For these reasons, the potential for a significant cumulative aesthetic impact to occur because of development of the proposed project and cumulative projects would be less than significant.

4.2.2 Air Quality

Project impacts pertaining to air quality, as described in Section 3.2, "Air Quality," are as follows:

- Impact 3.2-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan (less than significant);

- Impact 3.2-2: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Project Region is Non-Attainment Under an Applicable Federal or State Ambient Air Quality Standard (less than significant);
- Impact 3.2-3: Expose Sensitive Receptors to Substantial Pollutant Concentrations (less than significant); and
- Impact 3.2-4: Result in Other Emissions (Such as those Leading to Odors) Adversely Affecting a Substantial Number of People (less than significant).

Air quality analysis is inherently cumulative because it relies on local and regional data. As described in Section 3.2, the EPA and CARB have designated Amador County as "marginal nonattainment" for the federal 8-hour O3 standard (EPA 2022b) and "nonattainment" for the state O3 standard (CARB 2022), respectively. Amador County is designated as unclassified or attainment by the EPA and CARB for all other criteria air pollutants. Therefore, there is an existing cumulative air quality impact within Amador County, which is part of the Mountain Counties Air Basin.

In developing thresholds of significance for air pollutants, the Placer County Air Pollution Control District (PCAPCD)[1] considered the emission levels for which a project's individual emissions would be significant and the levels at which the project's emission would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in a significant adverse air quality impact to the region's existing air quality conditions. Therefore, if the project's emissions are below the applied thresholds, then the project would not result in a cumulatively considerable increase of any criteria air pollutant. As described under Impact 3.2-2, the results of the analysis of criteria air pollutants shows that the maximum daily change in emissions from the proposed project would not exceed project-level or cumulative-level thresholds. Therefore, the proposed project's contribution to the cumulative levels of criteria air pollutants for which the project region is in on-attainment would be less than cumulatively considerable.

Regarding health impacts from exposure of the public to Toxic Air Contaminants (which are described in detail under Impact 3.2-3), the Health Risk Assessment completed for the proposed project shows that the project would result in a lower cancer risk than the existing baseline in all exposure scenarios, with the exception of the 100-year exposure

[1] The Amador Air District has not promulgated any thresholds of significance for criteria air pollutants or TACs but recommended the use of thresholds from a neighboring air district, specifically the Sacramento Metropolitan Air Quality Management District (SMAQMD) or Placer County Air Pollution Control District (PCAPCD) (Perry 2022). As O_3 is the only criteria air pollutant that Amador County is in nonattainment and the PCAPCD thresholds for O_3 precursors are more stringent than SMAQMD, and since Placer County is topographically more like Amador County based on the mountainous regions therein, the PCAPCD thresholds have been applied to this analysis. See section 3.2.3.2, "Significance Thresholds," of the Air Quality Draft EIR section.

scenario. The results for the 100-year exposure scenario (shown in Table 3.2-12) show an increase in cancer risk from the project compared to the existing baseline of 0.1 per million. The significant threshold is 10.0 per million. Assuming cumulative projects in Amador County could result in an increase in cancer risk of 10.0 per million, the project's contribution to any significant cumulative effect of Toxic Air Contaminants would account 1 percent of such an increase only after 100-years of exposure. With regard to the Newman Ridge Project, the County determined that the maximum incremental cancer risk to sensitive receptors in the project area would be below the significance threshold of 10 in one million and the chronic hazard index from exposure to TACs would be well below the significance threshold of 1.0. Therefore, the project's contribution to health risks from Toxic Air Contaminants would be less than cumulatively considerable.

With regard to health impacts from exposure of the public to Criteria Air Pollutants (which are described in detail under Impact 3.2-3), the PCAPCD thresholds for Criteria Air Pollutants are based on levels that the Mountain Counties Air Basin can accommodate without affecting the attainment date for the national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS), and because the NAAQS and CAAQS are established to protect public health and welfare, it is anticipated that projects with emissions below the PCAPCD thresholds would have a less than cumulatively considerable contribution to adverse impacts on human health. the project would not result in health effects associated with criteria air pollutants and the impact would be less than significant. As described above, the proposed project would not exceed project-level or cumulative-level thresholds for Criteria Air Pollutants. Therefore, the proposed project's contribution to cumulative impacts on human health from Criteria Air Pollutants would be less than cumulatively considerable.

Regarding other emissions, such as odor, the proposed project and the cumulative projects listed in Table 4-1 do not involve installation or operation of any of the land use categories that might be expected to generate substantial odors or significantly impact sensitive receptors as a result of substantial odors. With regard to the cumulative project nearest the proposed project (i.e., the Newman Ridge Project), the County's evaluation concluded the Newman Ridge Project would result in less than significant impacts associated with odors. Furthermore, based on the distances between the proposed project and the other cumulative projects, it is not feasible that any odors that might be generated from the proposed project (such as diesel exhaust) would be noticeable in the same areas as odors generated by the other cumulative projects, which are all located approximately three miles or more from the project site.

Therefore, the potential for a cumulative odor impact to occur would be less than significant.

4.2.3 Biological Resources

Project impacts pertaining to biological resources, as described in Section 3.3, "Biological Resources," are as follows:

- Impact 3.3-1: Have a Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on any Species Identified as a Candidate, Sensitive, or Special-Status Species Due to Activities Associated with Mining, Stockpiling, and Reclamation (less than significant with mitigation);
- Impact 3.3-2: Have a Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on any Species Identified as a Candidate, Sensitive, or Special-Status Species After the Completion of Reclamation (less than significant with mitigation);
- Impact 3.3-3: Have a Substantial Adverse Effect on Any Riparian Habitat, Federally Protected Wetland, or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service (less than significant with mitigation);
- Impact 3.3-4: Interfere Substantially with the Movement of any Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors, or Impede the Use of Native Wildlife Nursery Site (less than significant); and
- Impact 3.3-5: Conflict with Any Local Policies or Ordinances Protecting Biological Resources, Such as a Tree Preservation Policy or Ordinance (less than significant with mitigation).

The geographic scope of the cumulative analysis for biological resources includes the area encompassing the project site and the cumulative projects shown in Figure 4-1. Historic and ongoing land uses within this area, such as residential development, grazing and other agricultural activities, and other land disturbing activities, including mining, have directly impacted special-status species and reduced the quantity and quality of wildlife habitats, riparian habitats, and wetlands through the disturbance of undeveloped grassland, chaparral, and oak woodland. The development and operation of the proposed project and cumulative projects listed in Table 4-1 would have the potential if insufficiently mitigated to ~~further~~ directly impact special-status species and ~~would~~ degrade wildlife habitats, riparian habitats, and wetlands, thereby also leading to potential indirect impacts on special-status species. Such unmitigated impacts could represent ~~This is~~ a significant cumulative impact on biological resources.

The project-specific impacts identified in Section 3.3 and listed above have each been considered in terms of their potential to contribute to cumulative biological resources impacts. The proposed project would expand the existing 155-acre area of disturbance within the project site to 290 acres through primarily the expansion of the quarry and stockpile area. The proposed expansion would result in displacement of special-status species, vegetation and tree removal, loss of habitat, and impacts to wetlands. This habitat loss could contribute to the regional cumulative loss of wildlife habitat, including foraging and nesting habitat for the identified special-status species. Therefore, without mitigation, the project's contribution to adverse effects on special-status species and degradation of wildlife habitats, riparian habitats, and wetlands within the projects surface disturbance footprints would be cumulatively considerable.

The following mitigation measures are proposed to provide species-specific protection and provide for the replacement of trees and habitats pursuant to regulatory agency requirements:

- Mitigation Measure 3.3-1a: Conduct Botanical Surveys
- Mitigation Measure 3.3-1b: Northwestern Pond Turtle
- Mitigation Measure 3.3-1c: Golden Eagles
- Mitigation Measure 3.3-1d: Burrowing Owl
- Mitigation Measure 3.3-1e: Swainson's Hawk
- Mitigation Measure 3.3-1f: Tricolored Blackbird
- Mitigation Measure 3.3-1g: Special-Status and Other Nesting Bird Species
- Mitigation Measure 3.3-1h: Special-Status Bat Species and other Roosting Bats
- Mitigation Measure 3.3-1i: California Tiger Salamander and Western Spadefoot
- Mitigation Measure 3.3-1j: Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp
- Mitigation Measure 3.3-1k: Crotch's Bumble Bee
- Mitigation Measure 3.3-3a: Protection of Oak Woodlands
- Mitigation Measure 3.3-3b: Protection of Seasonal Wetlands, Ephemeral Streams, and Vernal Pools

These biological resources mitigation measures would serve to avoid and/or minimize the project's impacts through a comprehensive list of actions specific to special-status species and the habitats within the project expansion area and consistent with all applicable regulatory requirements. Therefore, with implementation of these comprehensive and project-specific measures, the project would not cause a cumulatively considerable contribution to significant biological resources following mitigation.

4.2.4 Cultural Resources

Project impacts pertaining to cultural resources, as described in Section 3.4, "Cultural Resources," are as follows:

- Impact 3.4-1: Result in a Substantial Adverse Change in the Significance of a Historical Resource or Archaeological Resource Pursuant to 14 CCR Section 15064.5 (less than significant with mitigation); and
- Impact 3.4-2: Disturb Human Remains, Including Those Interred Outside of Formal Cemeteries (less than significant with mitigation).

The geographic scope of the cumulative analysis for cultural resources is Amador County. As described in the *Amador County General Plan Environmental Impact Report* (Amador County 2016a), past and ongoing development has likely resulted in the cumulative loss and degradation of historic and archaeological resources in Amador County. The cultural resources study completed for the project site (Golder 2020) revealed that two known tribal cultural resources (P-03-180 and Golder T-1) are located within the project boundary. However, both resources are located at least one hundred feet outside the proposed disturbance area and therefore would not be adversely changed by the proposed project. The cultural resources study acknowledges that additional, currently unknown cultural resources and unmarked burials may be located within the proposed disturbances. Unmitigated, t~~T~~he proposed project ~~could~~ would have the potential to result in ~~cause~~ a cumulatively considerable contribution to the cumulative impacts of development on cultural resources through the inadvertent disturbance of currently unknown cultural resources. The following project-specific mitigation measures are proposed to train quarry personal in the recognition of the type of cultural resources that could be encountered during ground-disturbing activities and to ensure the notification of the County and Native American representatives, as appropriate, in the event of the discovery of prehistoric or historic-era cultural resources or unmarked burials on the project site:

- Mitigation Measure 3.4-1a: Cultural Resources Awareness Training
- Mitigation Measure 3.4-1b: Inadvertent Discovery of Archaeological and Tribal Cultural Resources
- Mitigation Measure 3.4-2: Inadvertent Discovery of Unmarked Burials

The implementation of these measures would increase the likelihood of the recognition of cultural resources by workers and would ensure the implementation of appropriate actions and notification to protect such resources and to avoid the disturbance of human remains. This would reduce the project's contribution to the cumulative loss of cultural resources to less than cumulatively considerable.

4.2.5 Energy

Project impacts pertaining to energy use, as described in Section 3.5, "Energy," are as follows:

- Impact 3.5-1: Result in a Potentially Significant Environmental Impact Due to Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources, During Project Construction or Operation (less than significant); and
- Impact 3.5-2: Conflict with or Obstruct a State or Local Plan for Renewable Energy or Energy Efficiency (less than significant).

The geographic scope of the cumulative analysis for energy is the state of California. In the past, projects in the state of California have often led to the wasteful, inefficient, and unnecessary consumption of energy resources, which is a significant cumulative impact. Commercial equipment, truck fleets, and passenger cars are now required to meet statewide fuel efficiency standards which, over time, increase fuel efficiency and reduce fuel use by the proposed project and by projects throughout the state. Enforcement of these existing regulations would reduce the contribution of the proposed project to the cumulative energy use impact over time. Further, renewable energy (i.e., solar) is currently used on the project site, and would be maintained as feasible, thereby minimizing the unnecessary consumption of non-renewable energy resources. Once the project site is reclaimed as open space, the associated energy use would be negligible. For these reasons, the project's contribution to cumulative energy consumption would be less than cumulatively considerable.

4.2.6 Geology and Soils

Project impacts pertaining to geology, soils, and paleontological resources, are described in Section 3.6, "Geology and Soils." Potential effects to geologic and soil conditions and to paleontological resources are typically considered site specific. Therefore, the geographic scope of the cumulative analysis for geology and soils is limited to the project site and adjacent properties. Because of the limited extent of the geographic scope for these resource topics, only ~~n~~one of the projects listed in Table 4-1 (the Newman Ridge Project) is ~~would be~~ relevant to this analysis, as the other ~~none of the~~ listed projects are not in close proximity ~~on~~ or adjacent to the proposed project site~~s~~. Portions of the Newman Ridge Project are adjacent or in close proximity to the project site. In evaluating and approving the Newman Ridge Project, the County considered the potential for that project to result in significant impacts associated with soils and geology, and found that with mitigation the Newman Ridge Project's potentially significant soils or geology-related impacts would be less than significant. The County subsequently adopted the

necessary mitigation when approving the Newman Ridge Project. Thus, there would be no cumulative geologic, soils, or paleontological resource impacts.

4.2.7 Greenhouse Gas Emissions

Project impacts pertaining to greenhouse gas (GHG) emissions, as described in Section 3.7, "Greenhouse Gas Emissions," are as follows:

- Impact 3.7-1: Generate GHG Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment (less than significant); and
- Impact 3.7-2: Conflict with Any Applicable Plan, Policy or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of GHGs (less than significant).

GHG analysis is inherently a cumulative issue as it relies on statewide policy guidance. The State of California, through AB 32, has acknowledged that GHG emissions are a statewide impact. Therefore, the geographic scope of the cumulative analysis of GHG emissions is the state of California.

As discussed in Impact 3.7-1, the project would not result in a potentially significant impact associated with GHG emissions. In fact, the estimated GHG emissions associated with project operations would be a net reduction, primarily due to more stringent emissions standards for off-road equipment and on-road vehicle engines in the future. Therefore, change in GHG emissions associated with the proposed project would not exceed the PCAPCD's de minimis GHG threshold of 1,100 MT CO_2e per year and the project would not generate GHG emissions, either directly or indirectly, that are cumulatively considerable or that may have a significant impact on the environment. Therefore, this impact would be less than significant.

4.2.8 Hydrology and Water Quality

Project impacts pertaining to hydrology and water quality, as described in Section 3.8, "Hydrology and Water Quality," are as follows:

- Impact 3.8-1: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality During Mining Operations (less than significant with mitigation);
- Impact 3.8-2: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality During Final Reclamation (less than significant);

- Impact 3.8-3: Violate Water Quality Standards, Waste Discharge Requirements, or Otherwise Substantially Degrade Surface Water Quality Post-Reclamation (less than significant with mitigation);
- Impact 3.8-4: Violate Groundwater Quality Standards or Otherwise Substantially Degrade Groundwater Quality During Mining, Final Reclamation, or Post-Reclamation (less than significant);
- Impact 3.8-5: Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge such that the Project May Impede Sustainable Groundwater Management of the Basin (less than significant);
- Impact 3.8-6: Substantially Alter Drainage Patterns in a manner which would result in Erosion or Siltation; in Off-Site Flooding, Exceed the Capacity of the Existing Storm Drainage System, or Impede or Redirect Flood Flows (less than significant);
- Impact 3.8-7: Release of Pollutants in Flood Hazard, Tsunami, or Seiche Zones Due to Project Inundation (less than significant);
- Impact 3.8-8: Conflict with or Obstruct Implementation of a Water Quality Control Plan (less than significant with mitigation); and
- Impact 3.8-9: Conflict with or Obstruct Implementation of a Sustainable Groundwater Management Plan (less than significant).

Cumulative Surface Water Drainage and Water Quality Impacts

The geographic scope of cumulative water quality and drainage impacts are assessed both at a local level and a broader watershed level. The local-scale cumulative setting is important for impacts of specific projects, but because of the nature of water resources, many impacts extend beyond a local level and have the potential to affect a more extensive area.

~~At the local level~~With the exception of the Newman Ridge Project, the proposed project is located at least three miles from the cumulative projects listed in Table 4-1. Based on this distance, and that those proposed land uses do not require substantial alterations to creeks or rivers or off-site discharge likely to contain substantial pollutants, it is unlikely that potential surface water drainage and water quality impacts would combine to result in cumulative surface water drainage or water quality impacts at the local level. With regard to the Newman Ridge Project, the County determined that potential hydrology and water quality-related project-specific and cumulative impacts of the Newman Ridge Project would be less than significant with mitigation. With mitigation, the proposed project would not contribute adverse local hydrology or water quality that would

contribute to the less than significant impacts of the Newman Ridge Project in a manner that would be cumulatively considerable.

At the broader watershed level, as described in Section 3.8.1.3, "Site Drainage," the project site drains to the Cosumnes River Watershed via Laguna Creek and to the Mokelumne River Watershed via Dry Creek. As shown in Table 3.8-3, "Water Quality Impairments," the Cosumnes River, Mokelumne River, and Laguna Creek, are listed as impaired for indicator bacteria, invasive species, dissolved oxygen, toxicity, copper, mercury, and/or zinc. Furthermore, development within these watersheds over time has increased impervious surfaces and altered drainage patterns. Thus, there have been significant cumulative impacts to surface water drainage and water quality within the watersheds where the project site is located. The alteration of stormwater drainage patterns on the project site and the management of ponded water and surface water on the site could result in impacts related to hydrology and water quality if not properly managed. Thus, the project could result in a cumulatively considerable contribution to the existing cumulative impact. Stormwater regulations have become progressively more stringent since the passing of the federal Clean Water Act, and current regulations now require new developments to manage and treat all significant sources of stormwater pollutants. As described in Section 3.8.2, "Regulatory Setting," the proposed project and cumulative projects within these watersheds, depending on their specific activities, must comply with the Federal Water Pollution Control Act, Porter-Cologne Water Quality Control Act, State Water Resources Control Board (SWRCB), and Central Valley Regional Water Quality Control Board National Pollutant Discharge Elimination System permits (NPDES), California Surface Mining and Reclamation Act, *Amador County General Plan* (Amador County 2016b), Amador County Consolidated Hazardous Materials Program, and Amador County Surface Mining and Reclamation Ordinance, which help to minimize the potential for impacts related to hydrology and water quality impacts. In addition to compliance with the extensive surface water drainage and water quality regulatory framework, the project would be required to implement the following mitigation measures that have been developed to address specific water quality concerns that could arise during mining and after reclamation under the proposed project:

- Mitigation Measure 3.8-1: Water Quality Management and Monitoring Program
- Mitigation Measure 3.8-3a: Adaptive Management Program for Quarry Water
- Mitigation Measure 3.8-3b: Funding Mechanism

Compliance with existing regulations and implementation of project-specific mitigation measures would reduce the project's contribution to the cumulative loss of cultural resources to less than cumulatively considerable.

Cumulative Groundwater Impacts

The geographic scope of cumulative water quality and drainage impacts consists of both the Gopher Ridge Volcanic Formation within which the quarry would be excavated and of the Cosumnes subbasin of the San Joaquin Valley groundwater basin, within which the Ione Quarry operates an offsite well that supplements quarry operations during the dry season.

Regarding potential impacts related to groundwater within the Gopher Ridge Volcanic Formation, as described under the "Project Site Groundwater Conditions" subsection of Section 3.8, the transmissivity of the Gopher Ridge Volcanic Formation greenstone, within which the quarry would be excavated, is more than one million times less than that measured in the adjacent Valley Springs Formation. Thus, the flow out water from the project site into surrounding aquifers would be practically immeasurable and the water ponded in the quarry would effectively remain within the project site. With regard to the Newman Ridge Project, the County determined that potential groundwater related project-specific and cumulative impacts of the Newman Ridge Project would be less than significant with mitigation. With mitigation, the proposed project would not contribute groundwater depletion in the Gopher Ridge Volcanic Formation that would contribute to the less than significant impacts of the Newman Ridge Project in a manner that would be cumulatively considerable. For these reasons, the potential for cumulative impacts to groundwater within the Gopher Ridge Volcanic would be less than significant.

Regarding potential impacts related to groundwater within the Cosumnes subbasin, the Cosumnes subbasin is a medium priority basin that is not critically over drafted. Because the subbasin is a medium priority basin, some groundwater overdraft has occurred which is a significant cumulative impact. The Sustainable Groundwater Management Act will require the basin to be managed in a manner that will halt groundwater overdraft and bring the basin into balanced levels of pumping and recharge. As described under Impact 3.8-5, under most water-year types, the proposed project would not increase annual production volumes and the volume of groundwater use would remain the same as under existing conditions, or would decrease due to additional available stormwater in the quarry. "The Water Supply Assessment" (Appendix G-2) for the proposed project indicates that a relatively minor increase in the use of groundwater at the project site could occur. The increase would be equivalent to 1.25 percent to 0.8 percent of the net positive water budget of the foothill area of the groundwater basin. Consistent with the requirements of Sections 10910-10915 of the Water Code, along with SB 610 and SB 1262, the Water Supply Assessment concluded that there will be sufficient water available for existing and anticipated future water uses in the Cosumnes subbasin along with the project water demand during normal, single dry year, and multiple dry year periods for

the anticipated life of the project. For these reasons, the project's continued use of the existing water supply well in the Cosumnes subbasin would not make a cumulatively considerable contribution to the existing cumulative impact to groundwater within this subbasin.

4.2.9 Land Use and Planning

Project impacts pertaining to land use and planning, as described in Section 3.7, "Land Use and Planning," are as follows:

- Impact 3.9-2: Conflict with Land Use Plans, Policies, and Regulations adopted for the Purpose of Avoiding or Mitigating an Environmental Effect (less than significant).

The geographic scope for land use and planning is Amador County. Amador County's General Plan establishes land use goals and policies and evaluates proposed projects for compatibility with these goals and policies. Compatibility with existing adjacent uses is not an additive effect. For these reasons, cumulative impacts to land use policies are generally not a potential issue unless one or more cumulative projects would change applicable land use plans, which is not the case with the proposed project. Therefore, there are no significant land use consistency impacts where the project, in combination with impacts from other projects, could contribute to a cumulative land use impact. Potential cumulative issues related to the proposed use, which involves the expansion of an existing mining operations footprint, such as those related to noise, traffic, or air quality, are addressed within the appropriate resource sections of this EIR. Therefore, the potential for a cumulative land use and planning impact to occur is less than significant.

4.2.10 Noise

Project impacts pertaining to noise and vibration, as described in Section 3.10, "Noise," are as follows:

- Impact 3.10-1: Generation of a Substantial Temporary or Permanent Increase in Ambient Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies (less than significant);
- Impact 3.10-2: Generation of a Substantial Temporary Increase in Ambient Noise Levels from Blasting (less than significant);
- Impact 3.10-3: Generate Substantial Groundborne Vibration or Groundborne Noise from Mining Operations and Reclamation Activities (Excluding Blasting) (less than significant); and

- Impact 3.10-4: Generate Substantial Groundborne Vibration or Airborne Vibration as a Result of Blasting (less than significant).

Noise and vibration dissipate rapidly with distance. Therefore, the geographic scope for cumulative stationary noise impacts is generally limited to projects adjacent or near the project site from which project noise could be audible and which could generate noise that in combination with project noise could exceed applicable noise standards. Only Project No. 1, Jackson Valley Quarry Extended Hours of Operation Project, and Project No. 8, Newman Ridge Project, has the potential to contribute to cumulative noise and vibration impacts due to the location of sensitive residential receptors located approximately ~~halfway~~ between the Ione Quarry, ~~and~~ Jackson Valley Quarry, and Newman Ridge Quarry. From the project site, Jackson Valley Quarry is approximately 4.3 miles southeast of the project site and Newman Ridge Quarry is approximately ¾ miles southeast of the project site. These residential receptors are located a minimum of approximately 1 ½ miles from ~~either~~ these quarries~~y~~. In addition, topography and vegetation, which reduce noise levels when interrupting line of sight between the noise source and receptor, exists between all three quarries and surrounding receptors. Impact 3.10-1 identified that the proposed project would not increase SGI's daily mining output and would not substantially increase noise levels at surrounding receptors beyond the project's existing baseline noise levels. Consequently, the project's contribution to a potential significant cumulative increase in noise levels would be less than cumulatively considerable. ~~The additive properties of noise levels from these two quarries could combine to increase noise levels at the residential receptors beyond what would occur from the operation of a single quarry.~~

No cumulative impacts would result from blasting at the project site, ~~and~~ Jackson Valley Quarry, and Newman Ridge Quarry ~~site~~ because the frequency and hours of blasting would not change relative to existing conditions at ~~either~~ any of the quarries~~y~~. Similarly, no cumulative impacts would occur as a result of noise generated by truck traffic, as the proposed project and Jackson Valley Quarry do not ~~neither project~~ proposes a change in production and Newman Ridges impacts were considered less than significant.

~~With regard to cumulative noise impacts, t~~The noise technical study~~ies~~ for the proposed project ~~and Jackson Valley Quarry~~ indicates that potential noise impacts would not extend beyond a half-mile distance from either quarry (Appendix H; Bollard Acoustical Consultants 2023). Assuming a similar distance for potential noise impacts at all quarries, given the Jackson Valley Quarry's distance of ~~The quarries are located~~ approximately 3 miles and Newman Ridge Quarry approximately ¾ miles, ~~apart. Therefore,~~ the potential noise impact areas of the ~~two~~ quarries do not overlap and the potential for noise

generated by the combined operations of both quarries to result in a significant cumulative noise impact on any given sensitive receptor is less than significant.

4.2.11 Transportation

Project impacts pertaining to transportation, as described in Section 3.11, "Transportation," are as follows:

- Impact 3.11-1: Conflict with a Program, Plan, Ordinance, or Policy Addressing the Circulation System, Including Transit, Roadway, Bicycle and Pedestrian Facilities (less than significant);
- Impact 3.11-2: Conflict with or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) (less than significant); and
- Impact 3.11-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment) (less than significant).

The geographic scope of the cumulative analysis for transportation includes the area encompassing the project sites and the cumulative projects shown in Figure 4-1.

The cumulative projects in Table 4-1 do not propose land uses that are likely to conflict with a program, plan, ordinance, or policy addressing the circulation system. Similarly, the projects ~~due~~ do not propose features that would increase hazards to do geometric designs or incompatible uses. The potential for cumulative impacts related to these criteria is less than significant.

Vehicle miles travelled (VMT) generally increase with cumulative development, which is a potentially significant cumulative impact. However, as described under Impact 3.11-2, the proposed project would not increase SGI's daily mining output and would not alter traffic patterns along local area roadways or generate new daily automobile or truck trips. Consequently, the project's contribution to a potential significant cumulative increase in VMT would be less than cumulatively considerable.

4.2.12 Tribal Cultural Resources

Project impacts pertaining to tribal cultural resources, as described in Section 3.12, "Tribal Cultural Resources," are as follows:

- Impact 3.12-1: Result in a Substantial Adverse Change in the Significance of a Tribal Cultural Resource Listed or Eligible for Listing in the California Register of Historical Resources, or in a Local Register of Historical Resources as Defined in Public Resources Code Section 5020.1(K), or by the Lead Agency Pursuant to

Criteria Set Forth in Public Resources Code Section 5024.1(c) (less than significant with mitigation)

The cultural resources study completed for the project (Golder 2020) indicates that the project site lies within lands once held by the Miwok, a Native American group originally composed of the Eastern (Sierra), Lake, and Coast divisions. The Eastern Miwok occupied the foothills and wooded mountains of the Sierra Nevada. Lowland occupation of California by the Eastern Miwok began as early as 2,000 years ago, while occupation of the Sierra Nevada is approximately 500 years old. This is considered the geographic scope of potential cumulative impacts.

Based on the long history of the Miwok in these areas, ongoing development has likely resulted in the cumulative loss and degradation of tribal cultural resources in Amador County. The cultural resources study completed for the project site (Golder 2020) revealed that two known tribal cultural resources (P-03-180 and Golder T-1) are located within the project boundary. However, both resources are located at least one hundred feet outside of the proposed area of disturbance and therefore would not be adversely changed by the proposed project. The cultural resources study acknowledges that additional, currently unknown tribal cultural resources and unmarked burials may be located within the proposed disturbances. The proposed project could cause a cumulatively considerable contribution to the cumulative impacts of development on tribal cultural resources through the inadvertent disturbance of currently unknown tribal cultural resources or Native American burials. The following mitigation measures are proposed to train quarry personal in the recognition of the type of cultural resources that could be encountered during ground-disturbing activities and to ensure the notification of the County and Native American representatives, as appropriate, in the event of the discovery of prehistoric or historic-era tribal cultural resources or unmarked burials on the project site:

- Mitigation Measure 3.4-1a: Cultural Resources Awareness Training
- Mitigation Measure 3.4-1b: Inadvertent Discovery of Archaeological and Tribal Cultural Resources
- Mitigation Measure 3.4-2: Inadvertent Discovery of Unmarked Burials

The implementation of these measures would increase the likelihood of the recognition of tribal cultural resources by workers and would ensure the implementation of appropriate actions and notification to protect such resources and to avoid the disturbance of Native American burials. This would reduce the project's contribution to the cumulative loss of tribal cultural resources to less than cumulatively considerable.

5—LIST OF PREPARERS

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µg	micrograms
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
3D	Three-dimensional
AAD	Amador Air District
AB	assembly bill
ACC	Advanced Clean Cars
ACTC	ammonium nitrate fuel oil
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
ANFO	ammonium nitrate fuel oil
APN	Assessor Parcel Number
ATCM	Airborne Toxic Control Measure
BACT	best available control technology
bgs	below ground surface
BMPs	best management practices
BO	biological opinion
°C	Celsius
CAAQS	California ambient air quality standards
CalEEMod	California Emissions Estimator Model
Cal/OSHA	California Occupational Safety and Health Administration
CALGreen	California's Green Building Standards
Caltrans	California Department of Transportation
CAFE	corporate average fuel economy

CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBD	Central Business Districts
CCR	California Code of Regulations
CDFG	California Department of Fish and Game (former)
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCG	California Fish and Game Code
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CNEL	community noise exposure level
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2E	carbon dioxide equivalent
County	Amador County
COVID-19	coronavirus
CPUC	California Public Utilities Commission
CUP	conditional use permit

CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DBH	diameter at breast height
DOC	California Department of Conservation
DPM	diesel particulate matter
DPS	District Population Segment
DSoD	California Department of Water Resources Division of Safety of Dams
DWR	California Department of Water Resources
EAP	Energy Action Plan
EIA	United States Energy Information Administration
EIR	environmental impact report
EISA	Energy Independence and Security Act of 2007
EMFAC	Emission Factor
EO	Executive Order
EPA	U.S. Environmental Protection Agency
°F	Fahrenheit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FICON	Federal Interagency Commission on Noise
FIRM	flood insurance rate map
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
GHG	greenhouse gases

gpd/ft	gallons per day per foot
gpm	gallons per minute
GPS	Global Positioning System
gr/dscf	grains per dry standard cubic foot of gas
GVWR	Gross Vehicle Weight Rating
GWP	global warming potential
H_2O	water vapor
HCP	Habitat Conservation Plan
HFCs	Hydrofluorocarbons
HMBP	hazardous materials business plan
hp	horsepower
HRA	health risk assessment
HWCL	Hazardous Waste Control Law
IAQ	Indoor Air Quality
IDA	International Dark-Sky Association
in/sec	inches per second
IPCC	Intergovernmental Panel on Climate Change
ISTEA	Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991
kWh	kilowatt hours
LAMP	local area management plan
LEV	Low-Emission Vehicle
LDAMDV	light duty auto – medium duty vehicle
LDL	Larson Davis Laboratories
LDT	light duty truck
L_{dn}	day-night average noise level

L_{eq}	equivalent noise level
LOS	level of service
MBTA	Migratory Bird Treaty Act
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MMT	million metric tons
MMT CO_2E	million metric tons of CO_2E
mph	miles per hour
MPO	Metropolitan Planning Organizations
MRZ	Mineral Resource Zone
MSHA	Federal Mine Safety and Health Act of 1977
msl	above mean sea level
MT	metric tons
MTY	million tons per year
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCIS	North Central Information Center
NEHRP	National Earthquake Hazards Reduction Program
NF_3	nitrogen trifluoride
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide

NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NOA	notice of availability
NOAA	National Oceanic and Atmospheric Administration
NOC	notice of completion
NOP	notice of preparation
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	National Society of Professional Surveyors
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor's Office of Planning and Research
ORP	oxidation-reduction potential
OSHA	Occupational Health and Safety Act
PaveM	Pavement Management System
Pb	lead
PCAPCD	Placer County Air Pollution Control District
PCC	Portland Cement Concrete
PFCs	perfluorocarbons
PG&E	Pacific Gas and Electric Company
pH	potential of hydrogen
PM_{10}	respirable particulate matter
$PM_{2.5}$	particulate matter

ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
R	Range
R1A	Single Family Residential-Agriculture
RFS	Renewable Fuel Standard
RMS	root mean square
ROAR	Responsible Official Affirmation of Reporting
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RSC	Regional Service Center
RTP	Regional Transit Plan
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SCS	sustainable communities strategy
SF_6	hexafluoride
SGI	Specialty Granules (Ione) LLC
SGMA	Sustainable Groundwater Management Act
SIC	Standard Industrial Classification
SLCP	Short-Lived Climate Pollutant
SMAQMD	Sacramento Metropolitan Air Quality District
SMARA	Surface Mining and Reclamation Act
SO_x	oxides of sulfur
SOI	sphere of influence

SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
SR	state route
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	township
TACs	toxic air contaminants
TDS	total dissolved solids
TMDL	Total maximum Daily Load
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USACE	U.S. Army of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
VDECS	Verified Diesel Emission Control Strategies
VOCs	Volatile Organic Compounds
VMT	vehicle-miles traveled
WDR	waste discharge requirement
Wh	Watt-hours
WOTUS	Waters of the United States
WRCC	Western Regional Climate Center
ZEV	zero emission vehicle

APPENDICES

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APPENDIX A
COMMENTS RECEIVED ON THE DRAFT EIR

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California Department of Transportation

OFFICE OF THE DISTRICT 10 RURAL PLANNING
P.O. BOX 2048 | STOCKTON, CA 95201
(209) 948-7325 | FAX (209) 948-7164 TTY 711
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September 9, 2024

Mr. Chuck Beatty
Planning Director
Amador County Planning Department
810 Court Street
Jackson, CA 95642

AMA-104-PM 2.145 Ione Quarry Expansion Project Environmental Impact Report (EIR) SCH 2021090273

Dear Mr. Beatty:

Comment 1-1

The Department of Transportation (Caltrans) appreciates the opportunity to review and respond to the Ione Quarry Expansion Project Environmental Impact Report. This project proposes expanding the footprint and depth of Ione Quarry to access additional rock reserves. This expansion requires an amended Conditional Use Permit and an amended Reclamation Plan. The project involves the following major components:

- Extending the Use Permit expiration date from December 31, 2075, to December 31, 2175, at current annual production rates
- Enlarging the quarry's total surface disturbance from +/-56 acres to +/-136 acres
- Increasing the quarry's floor depth from +/-325 feet above sea to +/-280 feet below sea level
- Expanding overburden storage stockpiles on-site from +/-34 acres to +/-86 acres and increasing elevation from +/-350 feet above sea level to +/-560 feet above sea level

The proposed project is located at 1900 State Route (SR) 104, approximately three (3) miles west of the City of Ione, in unincorporated Amador County. The project site is within the Assessor's Parcel Number (APN) 005-080-020-000. Access to the site is via a private driveway off SR 104, just south of where Michigan Bar Road meets SR 104.

Caltrans at this time has the following comments:

Comment 1-2

Environmental

If there are any physical construction activities that will encroach into State right of way (ROW) as a result of the expansion. The project proponent must apply for an Encroachment Permit with the Caltrans District 10 Encroachment Permit Office. All California Environmental Quality Act (CEQA) documentation, with supporting technical studies, must be submitted with the Encroachment Permit Application. These studies will include an analysis of potential impacts to any cultural sites, historic properties, biological resources, hazardous waste locations, scenic highways, and/or other environmental resources within State ROW at the project site(s). Evidence of consultation with local Native American tribes and interested parties will need to be presented within the technical documents for approval of encroachment in the State ROW.

Comment 1-3

Caltrans considers the nesting season to be February 1 through September 30 of any given year. If work will occur within State ROW, between February 1 and September 30, a pre-construction bird survey must be conducted by a qualified biologist within 14 days prior to the start of any construction related activities. If an active nest is observed, a protective buffer must be established around the nest per California Department of Fish and Wildlife (CDFW) guidelines. No work is allowed within the protective buffer limits until the young have fledged and until authorized by the Caltrans District 10 Environmental Office. Results of the pre-construction bird survey(s) must be provided to the Caltrans District 10 Environmental Office prior to the start of construction. If there are impacts to protected water resources within State ROW. Caltrans will need to see the correspondence with the permitting authorities CDFW, United States Army Corps of Engineers, Regional Water Quality Control Board) and/or be provided copies of any required permits prior to the start of any construction in State ROW.

Comment 1-4

How will the County ensure that Specialty Granules (Ione) LLC (SGI) continues to comply with local, state, and federal environmental laws throughout the life of the extended conditional use permit (CUP) through 2075? Environmental laws change often, so will the County have the opportunity to re-evaluate the project activities on a regular basis to ensure compliance with current laws is continually maintained?

Hydrology

Comment 1-5

The supporting documents below, *previously requested in our September 28, 2021, letter, have not been received*. The comments below are still applicable. Additional review will be required once the project development plans, including but not limited to, Drainage and Grading Plans and drainage calculations are submitted.

Comment 1-5 Cont.

We request to review the pre- and post-construction runoff calculations; drainage plans to understand the flow patterns. The developer needs to ensure that the existing State drainage facilities will not be significantly impacted by the project. If historical undeveloped topography shows drainage from this site flowed into the State ROW, it may continue to do so with the conditions that peak flows may not be increased from the pre-construction quantity and the site runoff be treated to meet present storm water quality standards. If historical undeveloped topography shows drainage from this site does not flow into the State ROW, then it will not be allowed to flow into the State ROW at this time.

Based on existing topography, a portion of the project site runoff flows towards state ROW. Additional review will be done once drainage plans and calculations are submitted.

Comment 1-6

Caltrans suggests Amador County Planning Department continue to consult with Caltrans to identify and address potential cumulative transportation impacts that may occur from this project and other developments on or near this location. This will assist Caltrans in ensuring that traffic safety and quality standards are maintained for the traveling public on existing and future state transportation facilities.

Encroachment Permits

Comment 1-7

If any future project activities encroach into Caltrans ROW, the project proponent must submit an application for an Encroachment Permit to the Caltrans District 10 Encroachment Permit Office. Appropriate environmental studies must be submitted with this application. These studies will include an analysis of potential impacts to any cultural sites, biological resources, hazardous waste locations, and/or other resources within State ROW at the project site(s). For more information, please visit the Caltrans Website at: https://dot.ca.gov/programs/traffic-operations/ep/applications

Comment 1-8

If you have any question or would like to discuss these comments, please contact Paul Bauldry at (209) 670-9488 (email: paul.bauldry@dot.ca.gov) or me at (209) 483-7234 (email: Gregoria.Ponce@dot.ca.gov).

Sincerely,

Gregoria Ponce

Gregoria Ponce'
Deputy District Director (Acting)
Planning, Local Assistance and Environmental

cc: State Clearinghouse

Central Valley Regional Water Quality Control Board

17 September 2024

Krista C Ruesel
County of Amador Planning Department
810 Court Street
Jackson, CA 95642-2132
kruesel@amadorgov.org

COMMENTS TO REQUEST FOR REVIEW FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, IONE QUARRY EXPANSION PROJECT 2021 (AMENDED USE PERMIT AND RECLAMATION PLAN), SCH#2021090273, AMADOR COUNTY

Pursuant to the State Clearinghouse's 6 August 2024 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Draft Environmental Impact Report* for the Ione Quarry Expansion Project 2021 (Amended Use Permit and Reclamation Plan), located in Amador County. Comment 2-1

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

Comment 2-2

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has

adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Comment 2-2 Cont.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

Comment 2-3

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Comment 2-4

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the

State Water Resources Control Board website at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Comment 2-4 Cont.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

Comment 2-5

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

Comment 2-6

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

Comment 2-7

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources

Control Board website at:
https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Comment 2-7 Cont.

Dewatering Permit

Comment 2-8

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at:
https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Limited Threat General NPDES Permit

Comment 2-9

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

NPDES Permit

Comment 2-10

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

If you have questions regarding these comments, please contact me at (916) 464-4684 or Peter.Minkel2@waterboards.ca.gov.

Comment 2-11

Peter G. Minkel
Engineering Geologist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

Docusign Envelope ID: 77DDBC90-6A3B-4756-AF00-499C437F6E51

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670-4599
916-358-2900
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

October 4, 2024

Chuck Beatty
Planning Director
Amador County
810 Court Street
Jackson, CA 95642
planning@amadorgov.org

Subject: Ione Quarry Expansion Project
DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
SCH No. 2021090273

Dear Chuck Beatty:

Comment 3-1

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Availability of a DEIR from Amador County for the Ione Quarry Expansion Project (Project) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish, wildlife, native plants, and their habitat. Likewise, CDFW appreciates the opportunity to provide comments regarding those aspects of the Project that, by law, may need to exercise its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Fish & G. Code, § 1802.) Similarly for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

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CDFW may also act as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

Comment 3-1 Cont.

PROJECT DESCRIPTION SUMMARY

Comment 3-2

The Project site is located at approximately Latitude: 38.370518 and Longitude: -121.002217 (WGS 84 datum, decimal degrees), in Amador County.

The proposed Project consists of expanding the quarry and stockpile areas and extending operations for an additional 100 years (to 2175). Material mined under the proposed project would remain the same as existing conditions (primarily meta-andesite). The total anticipated amount of material mined would be 67,800,000 cubic yards (157,975,000 tons).

The Project description should include the whole action as defined in the CEQA Guidelines section 15070 and should include appropriate detailed exhibits disclosing the Project area including temporary impacted areas such as equipment staging areas, spoils areas, adjacent infrastructure development, and access and haul roads if applicable.

COMMENTS AND RECOMMENDATIONS

Comment 3-3

CDFW offers the comments and recommendations below to assist Amador County in adequately identifying and, where appropriate, mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Based on the potential for the Project to have a significant impact on biological resources, CDFW concludes that an Environmental Impact Report is appropriate for the Project.

COMMENT 1: Mitigation Measure 3.3-1a: Conduct Botanical Surveys, Summary of Project Impacts and Mitigation Measures, ES-16

Comment 3-4

Issue: Mitigation Measure 3.3-1a does not reduce impacts to a less than significant level, as it does not indicate appropriate next steps if a CESA listed species is detected in the floristic surveys. Additionally, the proposed mitigation ratio of 1:1 for identified rare plant communities is not sufficient to ensure no net loss of habitat.

Recommendation or Recommended Mitigation Measure: This measure should require consultation with CDFW and compliance with CESA if a CESA listed species is identified on site. Where impacts to CESA listed species cannot be fully avoided, CDFW recommends acquiring an Incidental Take Permit (ITP). Applicants are encouraged to consult with CDFW early to ensure there are no unaccounted-for project delays due to

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processing the ITP. To ensure there is no net loss of habitat after project completion, CDFW recommends a ratio of at least 3:1, based on habitat quality, to ensure impacts are fully mitigated. Comment 3-4 Cont.

COMMENT 2: Mitigation Measure 3.3-1c: Golden Eagle, Summary of Project Impacts and Mitigation Measures, ES-17 Comment 3-5

Issue: Measure 3.3-1c does not reduce project impacts to a less than significant level, as it does not include required consultation with CDFW if occupied Golden Eagle (*Aquila chrysaetos*) nests or individuals are identified. The Golden Eagle is a fully protected species in California, and fully protected species may only be "taken" with authorization from CDFW and only under special circumstances.

Recommendation or Recommended Mitigation Measure: This mitigation measure should require consultation with CDFW prior to initiating or reinitiating project activities to ensure the species and any active nests are fully avoided. For a positive occurrence, the measure should require the qualified biologist to fill out the GEWG Golden Eagle Database Submission Template (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=108214&inline), and submit the occurrence data to kate.keiser@wildlife.ca.gov so it may be added to the Golden Eagle Database.

COMMENT 3: Mitigation Measure 3.3-1e: Swainson's Hawk, Summary of Project Impacts and Mitigation Measures, ES-18 & ES-19 Comment 3-6

Issue: Mitigation Measures 3.3-1e states that surveys will follow the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (CDFG 2000). However, the measure also states that, "If work is beginning before March 20th, or after September 1st, a single preconstruction nesting bird survey as described in 3.3-1g is sufficient to avoid impacts to Swainson's hawk." CDFW believes this will not reduce project impacts to a less than signification level, as it will not be sufficient to meet the recommendations in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (CDFG 2000) and therefore will risk missing identification of a nest. Without multiple visits, surveyors inadvertently miss key signs of active Swainson's Hawk nesting. During certain phases of nesting, the female Swainson's Hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible if surveys are initiated late in the spring. At this stage, following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site.

Recommendation or Recommended Mitigation Measure: To meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation, which should include a minimum of four visits if initiated in Period I or a minimum of six visits if initiated in Periods II or III. The survey

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periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks. Completing the surveys within the survey periods in accordance with the recommended timing and visit frequency maximizes the likelihood of detecting an active Swainson's Hawk nest. CDFW recommends initiating surveys in Period I and continuing surveys and observations throughout the nesting season due to the high likelihood of encountering an active nest. This will allow surveyors the best chance to observe nests from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories and most effectively monitor nesting stages throughout the breeding season. To meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete three surveys in Period III and three surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. Surveys should not be conducted in Period IV.

Comment 3-6 Cont.

COMMENT 4: Mitigation Measure 3.3-1g, Special-Status and Other Nesting Bird Species, ES-19 & ES-20

Comment 3-7

Issue: Mitigation Measure 3.3-1g states that nesting bird surveys will be conducted 14 days prior to ground disturbing activities, if those activities take place during the nesting season. However, CDFW believes the March 1 through July 31 period may not sufficiently capture the nesting season; therefore, this measure does not reduce project impacts to a less than significant level.

Recommendation or Recommended Mitigation Measure: CDFW recommends the nesting season be adjusted to span from February 1 through August 31.

COMMENT 5: Mitigation Measure 3.3-1i, California Tiger Salamander and Western Spadefoot, ES-21 & ES-22

Comment 3-8

Issue: Mitigation Measure 3.3-1i states compensatory mitigation will be set at a 1:1 ratio if "take" coverage is obtained for California tiger salamander (*Ambystoma californiense*). This mitigation ratio will not reduce impacts to a less than significant level, nor is it adequate to ensure there is no net loss of habitat after all Project activities.

Recommendation or Recommended Mitigation Measure: CDFW recommends the proposed mitigation ratio be increased to ensure that occupied habitat is protected in perpetuity, and Project related impacts are fully mitigated. CDFW recommends a compensatory mitigation ratio of at least 3:1, to ensure impacts are fully mitigated.

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COMMENT 6: Mitigation Measure 3.3-3a, Protection of Oak Woodlands, ES-24 & ES-25

Comment 3-9

Issue: The DEIR describes the acreage of oak woodland on site but does not define a quantitative baseline for the existing oak trees; therefore, this measure does not reduce project impacts to a less than significant level

Recommendation or Recommended Mitigation Measure: CEQA guidelines Section 15125 states that "an EIR must include a description of the physical environmental conditions within the vicinity of the project. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." CDFW's review of historic satellite imagery of the proposed project site identified substantial oak tree density decline over the last ten (10) years. In order to accurately assess the significance of further oak tree loss as a result of project activities, CDFW recommends the document include a quantitative baseline for the oak woodland on site and analyze potential baseline factors that may be exacerbating tree mortality in the vicinity of the project site.

ENVIRONMENTAL DATA

Comment 3-10

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be submitted online or mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov.

FILING FEES

Comment 3-11

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

Comment 3-12

Pursuant to Public Resources Code § 21092 and § 21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the proposed project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670 or emailed to R2CEQA@wildlife.ca.gov.

Docusign Envelope ID: 77DDBC90-6A3B-4756-AF00-499C437F6E51

CDFW appreciates the opportunity to comment on the DEIR for the Ione Quarry Expansion Project to assist Amador County in identifying and mitigating Project impacts on biological resources. CDFW personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts. Questions regarding this letter or further coordination should be directed to Zach Kearns, Environmental Scientist at (916) 358-1134 or zachary.kearns@wildlife.ca.gov.

Comment 3-12 Cont.

Sincerely,

DocuSigned by:
Morgan Kilgour
C3A86764C0AD4F6...

Morgan Kilgour, PhD
Regional Manager

ec: Tanya Sheya, Environmental Program Manager
Billie Wilson, Senior Environmental Scientist (Supervisory)
Zach Kearns, Environmental Scientist
Department of Fish and Wildlife

Office of Planning and Research, State Clearinghouse, Sacramento

October 7, 2024

Chuck Beatty
Amador County
Planning Department
810 Court Street
Jackson, CA 95642-2132

Copy sent via email: planning@amadorgov.org

SUBJECT: DRAFT ENVIRONMENTAL IMPACT REPORT (EIR)
IONE QUARRY EXPANSION PROJECT (SCH# 2021090273)
CA MINE ID# 91-03-0011

Dear Mr. Beatty:

Thank you for including the Department of Conservation's Division of Mine Reclamation (DMR) in the environmental review process for the Ione Quarry Expansion Project (Proposed Project) draft Environmental Impact Report (EIR). The EIR indicates Amador County (County), as lead agency under the California Environmental Quality Act (CEQA). Comment 4-1

The draft EIR describes the Proposed Project, which aims to amend the existing use permit and reclamation plan (RP) for the Ione Mine (CA Mine ID# 91-03-0011). This would expand the mining area from about 56 acres to approximately 136 acres and increase the mining depth by 605 feet, allowing mining to reach 280 feet below mean sea level (MSL) instead of the current limit of 325 feet above MSL. Additionally, the total surface disturbance area for stockpiles would grow from 34 acres to around 86 acres, with a maximum elevation of 560 feet above MSL.

DMR has reviewed the subject draft EIR and provides the following comment.

Comment 1:
DMR's review of imagery available on Google Earth notes substantial changes to oak woodland habitat within the footprint of the proposed mine site expansion area between the dates of August 2018 and June 2020 (see images below). The 2024 Biological Resource Assessment (BRA) prepared by WRA Environmental Consultants, included with the EIR, describes that a biologist conducted site visits to the study area in September 2018, and April, May, and June of 2020. The BRA does not describe tree or shrub mortality, or removal within the proposed mine site expansion area. Comment 4-2

DMR suggests that the historical surveys for previous environmental documents be reviewed and considered along with the 2024 BRA for this proposed project, and that baseline data (Pursuant to California Code of Regulations (CCR) Section 3705(m)) be collected from nearby reference areas of undisturbed oak woodland, if appropriate. This data will provide a more accurate representation of the site's pre-disturbance

conditions. Additionally, DMR recommends enhanced restoration measures and increased replacement ratios to effectively address oak woodland habitat if species removal occurred prior to the 2024 BRA surveys.

Comment 4-2 Cont.

SMARA Citations

Performance Standards for Revegetation CCR Section 3705(m):
"Success of revegetation shall be judged based upon the effectiveness of the vegetation for the approved end use, and by comparing the quantified measures of vegetative cover, density, and species-richness of the reclaimed mined-lands to similar parameters of naturally occurring vegetation in the area. Either baseline data or data from nearby reference areas may be used as the standard for comparison. Quantitative standards for success and the location(s) of the reference area(s) shall be set forth in the approved reclamation plan. Comparisons shall be made until performance standards are met provided that, during the last two years, there has been no human intervention, including, for example, irrigation, fertilization, or weeding. Standards for success shall be based on expected local recovery rates. Valid sampling techniques for measuring success shall be specified in the approved reclamation plan. Sample sizes must be sufficient to produce at least an 80 percent confidence level. There are standard statistical methods in commonly available literature for determining an 80 percent confidence level on a site-by-site basis. Examples of such literature include, but are not limited to, D. Mueller-Dombois and H. Ellenberg, 1974, "Aims and Methods of Vegetation Ecology", John Wiley and Sons, Inc., or C. D. Bonham, 1988, "Measurements for Terrestrial Vegetation", John Wiley and Sons, Inc., and are available at many university libraries. The texts are also available at some local libraries through the Inter-Library Loan Program."



1 *Google Earth image dated August 16, 2018*



2 *Google Earth Image dated June 16, 2020*

DMR requests to be included on the distribution list for this Proposed Project. Additionally, the DMR requests that any subsequent project documents as well as a copy of the certified final EIR, be sent to the DMR at DMR-Submittals@conservation.ca.gov or the mailing address on the bottom of page 1 of this letter. If you have any questions, please contact me at (916) 616-1558.

Comment 4-3

Sincerely,

DocuSigned by:
Amy Gomes
C64262A45B474A8...

Amy M. Gomes
Environmental Scientist
SMARA Technical Unit

cc: State Clearinghouse, state.clearinghouse@opr.ca.gov

Department of Conservation, Office of Legislative and Regulatory Affairs, OLRA@conservation.ca.gov

A Public Agency

12800 Ridge Road, Sutter Creek, CA 95685-9630 • www.amadorwater.org • Office: (209) 223-3018

September 16, 2024

Amador County
Chuck Beatty, Planning Director
810 Court St.
Jackson, CA 95642
Telephone: (209) 223-6380
Email: planning@amadorgov.org

Re: Draft Environmental Impact Report for the Ione Quarry Expansion Project
Property: 1900 Hwy 104, Ione, CA 95640
APN: 005-080-020
Acct No.: 007093-000

Mr. Beatty:

The Amador Water Agency (AWA or Agency) received the Notice of Availability of a Draft Environmental Impact Report for the Ione Quarry Expansion Project, dated July 31, 2024. AWA respectfully requests to be copied on all project notices, publications, meetings and similar correspondence for the project. Comment 5-1

As a condition of the Ione Quarry (SGI) Expansion Project (Project), the Project will be required to obtain a "Water Will Serve Commitment" from the Amador Water Agency, and make corrective actions to usage or pay the appropriate fees for the current and projected potable water usage. The Ione Quarry will be required to maintain its usage within the permitted potable water capacity acquired and allotted to the premises. Comment 5-2

Please contact me with any questions. Comment 5-3

Sincerely,

Sincerely,
Brandt Cook
Amador Water Agency, Direct: (209) 257-5206
12800 Ridge Road, Sutter Creek, CA 95685
*Rates and fees subject to change.

CC: SGI-Specialty Granules Inc.

Foothill Conservancy
Since 1990

September 19, 2024

Amador County
Chuck Beatty, Planning Director
810 Court St. Jackson, CA 95642

RE: SGI Quarr Expansion Draft EIR Comments

Dear Mr. Beatty,

Comment 6-1

Attached are Foothill Conservancy's comments on the currently circulating draft Environmental Impact Report for the proposed expansion of the SGI Mine Quarry located outside the City of Ione.

Project Timeline

Comment 6-2

We wish to renew our objection to the length of the project timeline. Given the ever-changing nature of technology and the environment, to grant this mining permit out to the year 2175 is untenable. Even the fifty-year timeline in the original project strains our ability to reasonably analyze the environmental impacts of this project. If this permit, with this timeline, was issued in 1875 it would have analyzed the impacts from pick and shovel mining and still have been good until the present day. Think of the technological and social changes over that time. The nearby city of Ione grew from 600 to 6,000 residents in that time. Also given the nature of our changing climate, analysis with regard to water, air quality, and biology have the potential to change massively over a 150 year time period. The length of the permit also undermines the purpose of the reclamation plan, as it puts its implantation at the end of mining operations into the distant future. We recommend that the project be given a 25 year timeline before requiring a review of the project by the County, so that the permit conditions can be updated to keep pace with any changes in technology or conditions near the site.

Air Quality

Comment 6-3

The analysis for the Air Quality section relies on questionable assumptions. First, the baseline air quality levels are based on data from monitoring stations in Jackson and San Andreas, located ten and twenty miles from the project site, respectively, while the City of Ione and its residents are just two miles away. The project's impact to air quality in Ione is not captured by a baseline set from a location five times the distance as the real area of concern. The private crowd-sourced website Purple Air shows that air quality readings can be quite different for sensors in Jackson compared to those in Ione.

The analysis also assumes that the quarry operation will use more fuel- and emission-efficient vehicles and equipment in the future as the fleet is replaced and that the project will conform with a host of established federal, state and local air quality regulations. These assumptions are in fact mitigation measures that should be incorporated into the EIR as such to ensure that they are identified and enforced.

To ensure effectiveness of the measures described in the EIR, air quality monitoring should be installed by the applicant at the quarry site and in the City of Ione to ensure that air quality is not being compromised.

Water

Comment 6-4

As was expressed by nearby residents, concerns persist that the mining operation at the quarry could fracture the rock basin and drain groundwater supplies in the area. The EIR should include analysis of the water table and possible impacts therein by the quarry.

Noise

Comment 6-5

We object to the characterization of 80 blasting events per year as "infrequent" as it represents an event over 20% of all days of the year, or a blast every 4 and a half days. If measures are taken to minimize the impacts from blasting and other mining activities, they should be included in the EIR as mitigation measures.

Aesthetics

Comment 6-6

The DEIR analysis fails to engage with the largest visual impact of the project, specifically the expanded stockpile area, which will increase to an elevation of 560 feet (200 feet higher than existing conditions) and cover 86 acres. This huge pile of rock and soil is not included in the photo simulations and not sufficiently addressed in the written analysis. Mitigation measures should be introduced to address the appearance of the stockpile, specifically the grading of slopes, placement of topsoil, and the planting of vegetation so the stockpile has the appearance of a natural hillside, rather than a scarred industrial landscape. This restoration work should commence before the 150 years pass before the end of the mining permit.

Please feel free to contact us to discuss any of the comments submitted. We are pleased to work with your staff and the community to work toward a better future for Amador County.

Comment 6-7

Sincerely,



Craig Baracco, Executive Director

Chuck Beatty <cbeatty@amadorgov.org>

SGI Expansion

2 messages

William May <billshrc@gmail.com> Tue, Aug 27, 2024 at 7:39 PM
To: Chuck Beatty <cbeatty@amadorgov.org>

Evening Chuck

Comment (s)

Planning Commissioners and Staff should send the purported DEIR back to SGI marked dead on arrival. What is the name of the individual or firm that prepared the DEIR ? 7-1

SGI claims in the DEIR there will not be any impact on groundwater , air quality , wastewater , noise , oak woodlands nor threaten endangered fish , birds and other wildlife . How much was the DEIR Consultant paid to lie ? 7-2

The DEIR consultant says that it will have no impact on local traffic . Another lie . 7-3

No air quality baseline of current air quality exists so how does SGI know that there are no significant issues to mitigate ? 7-4

There are many cancer causing and other health threatening issues in mining dust . SGI did no noise testing yet claimed neighbors would not be impacted by noise . Another lie . 7-5

They erroneously state that there would not be any increase in truck traffic . 7-6, 7-7

Home values and quality of life will be adversely impacted . 7-8

In summary , this Proposal should be deemed DEAD ON ARRIVAL .

Comment

I reserve the right to submit additional comments prior to or at the September 10 Planning Commission Meeting . 7-9

Bill May
Ione

Chuck Beatty <CBeatty@amadorgov.org> Wed, Aug 28, 2024 at 8:20 AM
To: William May <billshrc@gmail.com>

Comments received, thank you.
[Quoted text hidden]
--

Chuck Beatty, AICP
Planning Director
Amador County
209-223-6380
www.amadorgov.org

Planning Department <planning@amadorgov.org>

Objection to SGI expansion

Sondra West-Moore <swestmoore@gmail.com> Mon, Sep 9, 2024 at 8:58 PM
To: planning@amadorgov.org

Planning Department,
Please ensure each supervisor reads this letter ahead of the meeting tomorrow at 7 pm.

--

Sondra West-Moore
office: 209-274-9917
cell: 818 681-4182
swestmoore@gmail.com

SGI mine expansion and extension of permit letter to BOS Sept 9 2024 re DEIR.docx
799K

To: Amador County Board of Supervisors September 8th, 2924

The Ione Amador Quarry (SGI) on Highway 104, just 3 miles east of Ione, and less than 1000 from several generational farms and ranches on Dutschke Road, is requesting an expanded Use Permit that will extend 151 years from now. Comment 8-1

The Draft Environmental Impact Report (DEIR) claims there will be no impact on groundwater, air quality, wastewater, noise, oak woodlands and threatened or endangered fish, birds and other wildlife, local traffic and more. Comment 8-2

They want to expand the quarry to 280 feet below sea level (from 325 feet above today), enlarge from 56 acres to 136 acres and go up another 200 feet for stockpiles. Comment 8-3

The rock in this area has proven to be fractured, as documented in the Newman Ridge lawsuits against the developer and the County, so this fractured rock has proven that this will affect local groundwater availability as the mine goes where it has not gone before, far below sea level, and groundwater will flow into the pit.

The DEIR also states that wastewater will flow to a local fishing lake called Loch Lane. We object to both of those situations involving water, as we are in a very constrained groundwater area with proven fractured rock. Draining the local groundwater will negatively affect the entire Ione agricultural community. We all depend on wells which will clearly be impacted by this expansion. Comment 8-4

They want to continue operations as they are today, with blasting during the day and the deafening conveyer belt, plant and rock crusher allowed to operate all night. This is currently very bad for neighbors and can be heard clearly up to 3 miles away. There is no indication they did noise testing during night rock crushing. Comment 8-5

There are many cancer causing and health threatening toxic contaminants in mining dust, including PM10s, TACs, CARBs detailed in the EIR. Comment 8-6

They say these are not an issue because Amador County has air monitors, which are in Jackson (10 miles away, upcountry) and Calaveras County (15 miles away, upcountry). Using air monitoring systems up country and miles away does not reflect the air quality in Ione. Comment 8-7

Amador Country continues to refuse to put air monitors in Ione, near all this activity, which would correctly monitor the Air Quality for those most impacted nearby. Why is the County refusing? Isn't Public health important?

Additionally, no air quality baseline of current air quality exists. Without that baseline, they claim there are no significant issues to mitigate. That is the same as saying because the Level of Service in Ione for traffic is terrible, 100 more truck trips a day can't make it any more terrible. Illogical and again not looking after the Public Health or Welfare, which is the duty of the Board of Supervisors. Comment 8-8

We know (from SMARA) that the winds blow West to East, so the dust, toxins and noise will blow directly into Ione and settle the surrounding areas, just as smoke remains for days at the bottom of the foothills, where Ione is located. Comment 8-9

They have not considered the cumulative effects of other existing or planned mining or major construction projects planned close by: Newman Ridge mine - 1 mile from the city of Ione, scheduled Comment 8-10

to begin in 2025, Jackson Valley Quarry - recently expanded, US Mines in Ione, Mule Creek Prison expansion construction, ongoing.

Comment 8-10 Cont.

They claim there will be no additional truck traffic, despite the bigger numbers they will be allowed.

Comment(s) 8-11, 8-12

The reclamation plan would not begin until the quarry is done, 151 years from now.

One Alternative (#2) is to reduce the size of the mine and limit operations. We would also like the permit to be a much smaller term, so cumulative effects can be measured and permitting determined. 10 years would be fair.

Comment 8-13

We would like a clear statement about the air monitors to be installed and how and when readings will be taken. We want to know what happens to mining operations during flood events, which happen routinely here in the winter. We would like reassurance that County mine inspections happen when the full mine and plant are running, not on Sundays when it is not running.

Comment 8-14

They claim this project will provide tax income to the County. The greenrock is shipped wholesale out of the County, so no benefit occurs except to the mine operator.

Comment 8-15

They claim no scenic vistas will be affected, but they avoid showing the massive tailing piles, 60+ feet high, just west of the end of Dutschke Road, on the west horizon.

Comment 8-16



Home values and quality of life are affected by mining. The only ones who profit from these vast and unending projects are the mining operators, who give nothing to the community but noise, toxins, dust, depletion of water and heavy truck traffic.

Comment 8-17

What does the developer propose to help the community it will affect, to offset these things?

This DEIR is defective on these points and should be addressed. Its time for the Amador BOS to hold the operator responsible, and to represent and protect the Public.

Comment 8-18

Sincerely,

Sondra West-Moore, Westhaven Ranch

10300 Dutschke Road, Ione, CA 95649

Planning Department <planning@amadorgov.org>

Public Comment: Draft EIR for the Ione Quarry Expansion Project

Elia B <elia7272@gmail.com> Tue, Sep 10, 2024 at 6:43 PM
To: "planning@amadorgov.org" <planning@amadorgov.org>

As a neighbor for much of the past two decades, we generally appreciate locally sourcing our materials. However, we feel the EIR is deficient and due to the following deficiencies, and current actions by the applicant, the approved use should not be allowed for more than 5 years at a time. Due to the failure in the past, in the following three points, the damages should be corrected first, or only a limited 5 year approval be granted. Comment 9-1

Noise: The quarry is trying to only look at the quarry but the noise of the things leaving the quarry are owned by the same owner and have significant effects before leaving the site. Comment 9-2

The EIR mentions "backup alarms" being required per OSHA. But the EIR does not measure the sounds of the backup alarms. When used, those backup alarms have been measured well over 100 db between 10pm and 4am, on neighboring properties. If OSHA requires these alarms, then a proper mitigation would be for no backing up to be permitted between 10 pm to 6am.

The EIR must exactly measure the dump trucks and semi trucks completing backup functions during the night.

The same is true for the rock roller/paint/crushing things and the train loading, all which occur at night and all vastly exceed nighttime General Plan guidelines and have been a takings of neighboring properties.

If this application is approved for more than 5 years, it must be limited to 6am to 9pm operations.

Dust:
The EIR only "models" dust. The models assume the applicant is using proper dust mitigation. There is significant poisonous dust that clouds off the trucks when they leave the property and which is blown east towards all the residents of Ione. This needs to be exactly measured, not estimated. I have photographic evidence of the current use permit not being maintained due to insignificant dust control. Comment 9-3

Traffic Safety

I am not personally affected, but I think for the public's sake, the EIR traffic studies look at traffic counts, but ignore the actual issue here. The issue is thousands of slow moving semi trucks a year leave the property, enter a highway with 99% of vehicles going 56-80mph. These trucks have no egress and instead egress on the gravel side road pulling damaging rocks onto the roadway and creating a dangerous interaction with incredibly fast moving prison commuters and other vehicles. For the EIR to adequately look at the relevant issue, it should include the speed of vehicles on Highway 104 and note the space for the quarry trucks to make left hand turns and merge with traffic. I did not see these issues identified and I fear for other people's lives due to this lifetime approval of mining activities with no egress.

Comment 9-4

Thank you for your time and consideration,
Carina and Elia Bassin
2700 State Hwy 104, Ione CA 95640

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AMADOR COUNTY
PLANNING DEPARTMENT

IONE QUARRY EXPANSION PROJECT 2024

We are John, Gianni and Kathleen Muschetto who wish to express our concerns over the environmental impact of expanding the Special Granules Ione Quarry. We are located at 10930 and 10980 Dutschke Road, Ione. We are one of the closest properties to the quarry and have two residences affected by this expansion. Comment 10-1

In reviewing the Draft EIR, it has been stated that with the expansion of the footprint of the quarry, the depth of the quarry floor and expansion of the stockpiles, there will be little significant impact on the air quality. Therefore, there will be no mitigations made for this large expansion. As it stands now, dust and particles are not being properly mitigated. As trucks come out of the quarry, they spew dust in the air while dirt falls from them and gets dragged for miles down Highway 104 and into Ione. There is no watering down the areas of the quarry creating the dust nor are there water trucks to wet down the roads. Currently the air quality is not being properly monitored. It is being monitored by two very distant sensors, one in Jackson (10 miles away) and the other in Calaveras County (15 miles away). We would like to see sensors placed close to the Ione area so we can have more accurate monitoring of our air quality. Comment 10-2

It has also been stated in the Draft EIR that there will be little significance in decreasing the groundwater supply or interruption to the recharge of groundwater. A large amount of groundwater will be needed to support such an expansion and sustain it for another century. SGI draws its water from wells connected to the Cosumnes Sub-basin, an extremely overdrawn aquifer. We are concerned about their increased water usage and how it will affect our wells as well as the neighboring ranches and residents' water supply. Our wells are already struggling. We are also extremely concerned about the deep mining pit that will draw groundwater into it and away from the underground waterways that feed our wells. Our two wells are fed directly from seasonal creeks that come from the property owned by SGI. How can you not acknowledge that they will be compromised by such an expansion? Loss of water will affect all the residential water supplies, the ranch operations, the livestock and livelihoods of all the people residing southeast of SGI. Comment 10-3

Noise has also been deemed as having little significance, with no mitigation in this expansion project. Really?! This plant currently emits the noise of excavating, blasting, crushing rocks, running conveyor belts, loud hammering on the silos, trucks driving in and out, honking and diesel train engines arriving late at night, blasting their airhorns and banging train cars together. Expanding the quarry will only bring more noise. Hours of operation should be mitigated. Comment 10-4

Under transportation, there is no mitigation for the amount of traffic that this expansion will produce. The Draft EIR claims there will be little significance. Downtown Ione is extremely congested with all types of traffic and the trucks from SGI add so much more to the congestion backed up on Main Street. Currently there are no bypasses or other options but to drive right through the middle of town. At the entrance to SGI, the trucks entering and leaving are creating a hazardous situation as there is no left-hand turn lane on Highway 104 as they slow down to enter the plant. A distracted or speeding driver can easily drive into the back of a truck as it stops for oncoming traffic. The narrow dirt shoulder that exists currently is a dangerous choice for drivers skirting around the right side of these trucks. Trucks leaving SGI are also a hazard. As they are loaded with heavy gravel, they have been pulling out slowly in front of traffic heading in both directions on Highway 104. This expansion will only increase truck traffic so the EIR should mitigate traffic relief for the town of Ione and turn lanes at the SGI entrance.

Comment 10-5

Lastly, this Draft EIR has ignored the cumulative effects on Air Quality, Energy, Geology, Greenhouse Gas Emissions, Water Quality and Hydrology, Noise and Transportation by stating that there will be little significant impact to these environmental elements. Currently, the Irish Hill Quarry operates about one mile from SGI, US Mines operates next to the city of Ione, Jackson Valley Rock Quarry operates about 3 miles from SGI, and Mule Creek State Prison operates about one mile from SGI. There will be more cumulative effects in the near future when the recently approved Newman Ridge Project is developed and begins operations and who knows what industrial manufacturing operations will develop in the newly designated industrial park located just two miles from SGI. This EIR study must recognize that there are cumulative effects existing already and must mitigate for these current effects as well as for future effects.

Comment 10-6

Muschetto
PO Box 221
Ione, CA 95640

SACRAMENTO CA 957
26 SEP 2024 PM 3 L



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AMADOR COUNTY
PLANNING DEPARTMENT

Amador Co. Planning Dept.
Ione Quarry Expansion Project
810 Court Street
Jackson, CA 95642

95642-21321D

APPENDIX B
APPENDIX G-1 REPLACEMENT, JANUARY 2023, HYDROLOGY AND WATER QUALITY ANALYSIS REPORT, IONE QUARRY EXPANSION PROJECT

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Hydrology and Water Quality Analysis Report
Ione Quarry Expansion Project
Amador County, California



Prepared by:
EMKO Environmental, Inc.
551 Lakecrest Drive
El Dorado Hills, California 95762

February 2023



Dr. Andrew A. Kopania
California Professional Geologist #4711
California Certified Hydrogeologist #HG 31

Hydrology and Water Quality Analysis Report
Ione Quarry Expansion Project
Amador County, California

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Hydrology and Water Quality Analysis Report
Ione Quarry Expansion Project
Amador County, California

1.0 Introduction

This report provides data and analyses to support the evaluation of potential impacts related to hydrology and water quality in accordance with the California Environmental Quality Act (CEQA) for the Specialty Granules (Ione) LLC (SGI) Ione Quarry Expansion Project (the "proposed project", or "project"). SGI proposes to expand the existing footprint and depth of Ione Quarry in Amador County to access additional rock reserves. Bedrock from the Gopher Ridge Volcanics geologic formation is mined at the Ione Quarry to produce granules for roofing products at an adjacent but separately permitted facility. The regional location of the proposed project is shown on Figure 1. The site location is shown on Figure 2.

The proposed expansion requires an amended Conditional Use Permit (CUP) and amended Reclamation Plan that allows for the expanded mining area and additional stockpiling area(s) for additional overburden soils and cap rock generated during mining operations. The quarry will be expanded by approximately 130 acres and the depth will increase by 605 feet. The maximum slope height would be 710 feet in the central part of the southwest wall. The final quarry bottom elevation will be -280 feet msl[1]. Rock reserves will be removed through a combination of drilling, blasting, and excavation, consistent with existing operations. Weathered rock near the ground surface, referred to as cap rock, will continue to be removed and stockpiled near the quarry. Some cap rock is processed and sold for construction aggregates. No changes in the current rates of production or other operations are proposed. The proposed project could extend operations to the year 2175 and provide an estimated 100 years of additional reserves (compared to the current permit) at current annual production rates.

The cap rock stockpile area will expand by approximately 87 acres and increase in height by approximately 44 feet (at its largest increase). The stockpile area will have a final elevation of up to 560 feet msl and an estimated volume of 10.3 million cubic yards. The stockpile will be set back from the quarry by a minimum of 25 feet. The regraded slopes will be covered with topsoil (if available) or overburden soils (if available) and revegetated.

The project site consists of undisturbed land; an active quarry; materials stockpiles; a plant for processing aggregate (i.e., cap rock) and material for granules production; a scale; equipment, fuel storage, maintenance, and storage building; constructed drainage ditches and stormwater containment; and access roads. Figure 3 shows the location of the project site features.

[1] Elevations are provided in feet relative to mean sea level (ft msl) at the reference benchmark location for the vertical control datum used (i.e., North American Vertical Datum of 1988 [NAVD 88]).



SOURCES: ESRI World Shaded Relief accessed Jan. 2020, ESRI World Topographic Map accessed Jan. 2020; ESRI World Streetmap, 2009

Project Location
City Boundary
County Boundary
Major Highway
Highway

N
0 2.5 5 10 Miles

Regional Location
IONE QUARRY EXPANSION PROJECT
Figure 1

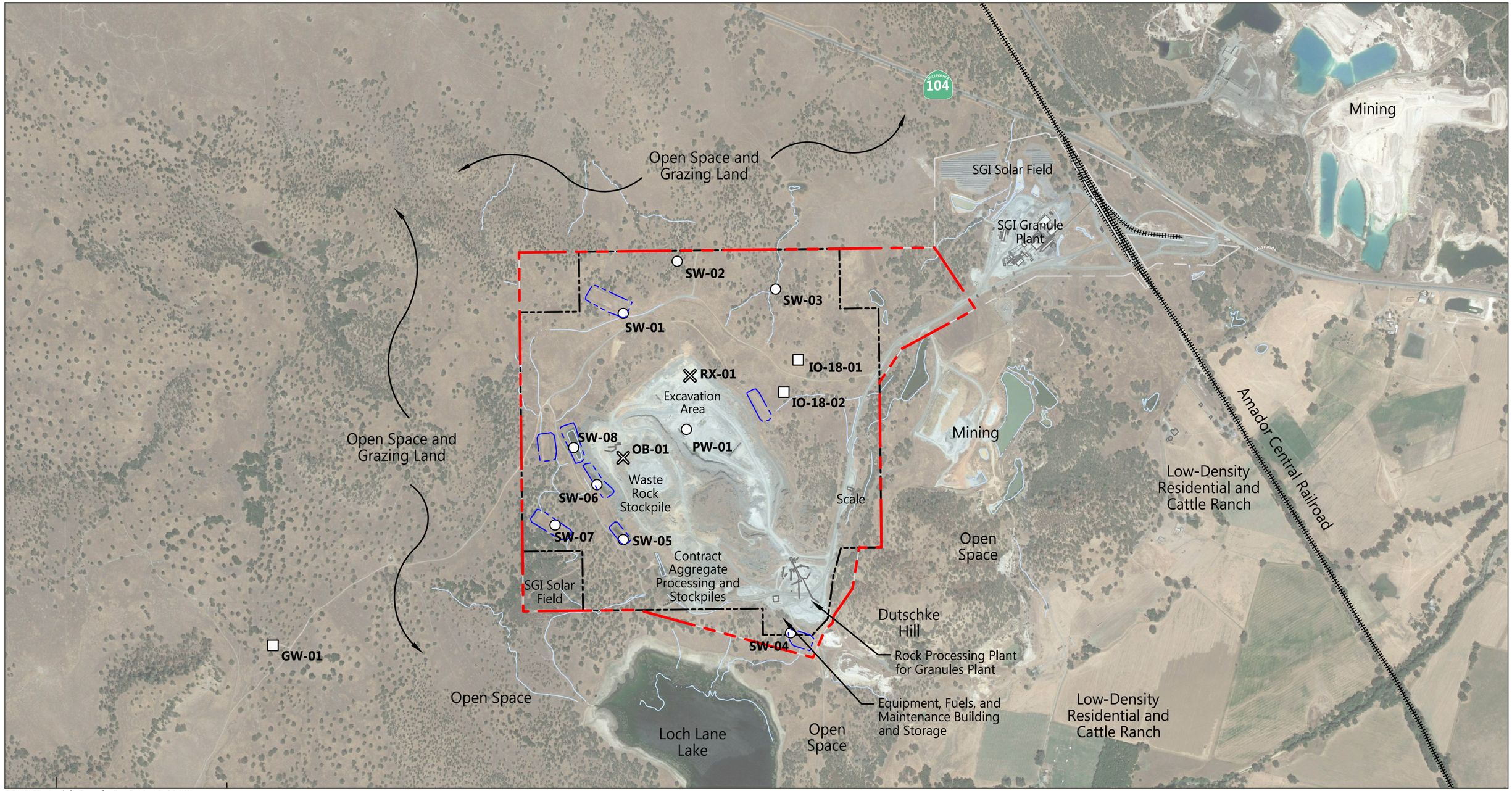


SOURCES: ESRI World Shaded Relief accessed Jan. 2020, ESRI World Topographic Map accessed May 2019; ESRI World Streetmap, 2009; City Boundary–Nevada County Open Data - GIS Division, accessed Jan. 2020

Project Boundary
City Boundary
County Boundary
State Route
Street
Waterway

N
0 1,000 2,000 4,000 Feet

Site Location
IONE QUARRY EXPANSION PROJECT
Figure 2



SOURCE: Aerial–Google Earth (8-19-2018)

Project Boundary
Parcel 005-080-020-000
Parcel 005-080-016-502
Railroad
Settling Pond

Surface Water Samples
Groundwater Samples
Rock Samples

N
0 500 1,000 2,000 Feet

Existing Conditions , Surrounding Land Uses, and Sample Locations
IONE QUARRY EXPANSION PROJECT
Figure 3

The Surface Mining and Reclamation Act (SMARA) requires mines to be reclaimed to a usable condition that is readily adaptable for a productive alternative land use that creates no danger to public health or safety. A Reclamation Plan has been submitted as part of the application materials in compliance with SMARA regulations (CCR Title 14, Div. 2, Ch. 8). The plan provides for a site that is suitable for open water, grazing, and open space. No revegetation of the quarry benches is proposed. The quarry will gradually fill with rainfall, surface runoff, and some groundwater to create an open water area. The final elevation of the open water surface is anticipated to be 105 feet msl, resulting in a quarry lake that will be almost 400 feet deep. Revegetation of the stockpile and ancillary disturbance areas will occur consistent with the revegetation plan. All recommended plant species included in the revegetation plan are consistent with the site's existing vegetation communities and support the end uses of open space and grazing. Appropriate stormwater control systems (e.g., ponds, sediment traps, ditches) will be maintained until the revegetation efforts are completed. The stormwater control systems would then be reclaimed for grazing and open space uses.

This report has been prepared as part of the application package for the proposed project. The discussions and analyses presented in this report assume that the reader has reviewed and is familiar with the information in the Project Description (Benchmark Resources, 2020a), the Mining Plan (Golder Associates, 2020c), the Reclamation Plan (Benchmark Resources, 2020b), the geotechnical report (Golder Associates, 2020a), and the Water Supply Assessment (EMKO, 2023).

2.0 Existing Environmental Setting

Conditions that are currently present at the site are part of the existing environmental setting. The existing environmental setting defines the baseline conditions to which project-related effects (Section 3) are compared relative to the CEQA evaluation criteria presented in Section 4.

2.1 Surface Water Conditions

Existing surface water conditions in the region and at the project site are described in the subsections below.

2.1.1 Regional Surface Water Setting

The Ione Quarry is located along the eastern edge of the San Joaquin Valley, adjacent to the western edge of the Sierra Nevada foothills. Runoff from rainfall and snowmelt is transported by streams and major rivers from the Sierra Nevada mountains and the foothills into the valley. The project site sits on the divide between the Cosumnes River watershed to the north and the Mokelumne River watershed to the south. As indicated on Figure 2, surface runoff from the northeast, north and west parts of the project site flow toward Laguna Creek and Willow Creek, which join the Cosumnes River approximately 20 miles west of the project location. Surface runoff from the south part of the project site flows into Loch Lane, a water storage reservoir for local agricultural use. Surface runoff from the east part of the project site, along with discharges from Loch Lane, flow into Dry Creek, as shown on Figure 2. Dry Creek joins the Mokelumne River approximately 25 miles southwest of the project location.

2.1.2 Local Surface Water Setting

The average annual rainfall at the project site is approximately 21.5 inches (EMKO, 2023). Golder Associates (2020b) report that the rainfall for a 25-year, 1-hour storm is approximately 0.9 inches while the rainfall for a 25-year, 24-hour storm is approximately 3.75 inches. A 100-year, 24-hour storm event would have a rainfall total of approximately 4.6 inches, approximately 25 percent greater than that from a 25-year, 24-hour storm. Stormwater runoff from the area around the quarry and the existing overburden stockpile is directed to a series of retention ponds, generally near the perimeter of the project site, as shown on Figure 3.

Runoff to the retention basins is estimated to be approximately 17.5 acre-feet during a 25-year, 24-hour storm event (i.e., the design storm event for the Project, see Golder Associates, 2020b). Using the same parameters used by Golder Associates (2020b), the total annual runoff to the retention ponds during an average rainfall year is estimated to be approximately 90 acre-feet. However, the retention basins currently have a total capacity of approximately 18 acre-feet, so 72 acre-feet would overflow the retention ponds and runoff downstream.

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the area demonstrate that the project site is not located within a flood hazard area, also referred to as the 100-year flood plain (FEMA, 2020), as shown on Figure 4.

2.1.3 Surface Water Quality

Surface water samples were collected from several natural drainages and existing stormwater retention ponds at the project site on January 25, 2019. Sampling locations are shown on Figure 3. Samples SW-02 and SW-03 were collected from natural drainages on the north side of the project site. The SW-02 and SW-03 natural drainages do not receive any runoff from disturbed areas associated with the existing quarry or overburden stockpile. Samples SW-1 and SW-4 through SW-8 were collected from existing stormwater retention ponds. There was no discharge observed at any of the ponds at the time the samples were collected, thus, the samples collected from the ponds are representative of the static, retained water, and are not representative of water quality conditions in any discharge that might leave the site. The samples were submitted to California Laboratory Services in Rancho Cordova, a California-certified analytical laboratory, under appropriate chain-of-custody protocol. The surface water quality data are reported in Table 1. Laboratory analytical data sheets are included in Appendix B.

The water quality standards listed in Table 1 (and other tables below) include primary and secondary maximum contaminant levels (MCLs) and California Department of Public Health (CA DPH) notification levels for drinking water supplies. The MCLs and notification levels are also often equivalent to the limits included in National Pollutant Discharge Elimination System (NPDES) permits in California for discharge to surface water. Those discharge standards are based on the Water Quality Control Plan for the Sacramento and San Joaquin Valleys (Basin Plan), prepared by the Central Valley Regional Water Quality Control Board (RWQCB).

Table 1 indicates that most parameters meet typical water quality standards, with the following exceptions:

- Fluoride from pond SW-7;

- Nitrate from pond SW-6;
- pH in the two natural drainage samples SW-2 and SW-3;
- Specific conductance from pond SW-7;
- Total Dissolved Solids (TDS) from pond SW-7;
- Aluminum in all samples;
- Boron from pond SW-7;
- Iron in all samples; and
- Manganese in pond samples SW-6 and SW-8.

The sample data from the ponds represent pre-treatment concentrations. They are not representative of any potential discharge from the ponds. As discussed in Section 5.0, compliance with the Stormwater Pollution Prevention Plan (SWPPP), including implementation of BMPs, would address potential water quality exceedances as part of the Proposed Project. Mitigation Measures to address potential water quality issues are provided in Section 6.0.

The laboratory analytical data indicates that low pH occurs in the natural runoff sampled at SW-02 and SW-03, but not in the water that accumulates in the stormwater ponds. Elevated aluminum and iron concentrations occur at all locations sampled. The SW-7 stormwater pond sample has multiple parameters that exceed water quality standards. This pond receives the overflow from several other ponds and may be located on the Ione Formation sedimentary deposits, in contrast with the other ponds that are primarily located on the Gopher Ridge Volcanics bedrock formation.

Additional evaluation of the general mineral parameters is based on graphical data presentation and interpretation methods such as Piper Diagrams and Stiff Diagrams. Piper Diagrams and Stiff Diagrams are common graphical tools used to present the general mineral chemistry of water samples. They are standard methods for interpretation of the chemical characteristics of water (Hem, 1989). These graphical interpretation tools are based on the variations in the anions (negatively charged ions such as chloride, bicarbonate, and sulfate) and cations (positively charged ions such as calcium, magnesium, sodium and potassium) that make up the TDS in the water.



SOURCES: Flood Hazard Zone–FEMA National Flood Hazard Layer (data created in 5-19-2010); Aerial–Vivid (8-4-2019)

NOTES:

1. FEMA = Federal Emergency Manaement Agency

Project Boundary

1% Annual Chance Flood Hazard

N

0 1,000 2,000 4,000 Feet

FEMA 100-Year Flood Inundation Area

IONE QUARRY EXPANSION PROJECT

Figure 4

TABLE 1
SURFACE WATER QUALITY DATA
SGI Ione Quarry
All Samples Collected January 25, 2019

Parameter	Units	Sample ID								Regulatory Standards	
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-08	Value	Basis
GENERAL MINERALS											
Bicarbonate as CaCO3	mg/L	34	18	8.2	80	46	87	290	110		
Calcium	mg/L	3.9	3.6	3.3	57	9.9	27	28	21		
Carbonate as CaCO3	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Chloride	mg/L	37	6	4.9	35	14	22	36	41	250-500	CA Secondary MCL
Fluoride	mg/L	<0.10	<0.10	<0.10	1.3	0.34	0.63	8.6	0.84	2	CA Primary MCL
Hardness as CaCO3	mg/L	23	21	16	240	62	180	150	150		
Hydroxide as CaCO3	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Magnesium	mg/L	32	2.8	1.9	23	9	27	19	25		
MBAS	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Nitrate as N	mg/L	0.76	0.89	1.5	6.2	5.4	35	5.4	5.6	10	CA Primary MCL
pH	std units	7.33	6.35	6.03	7.77	7.00	7.03	8.15	7.50	6.5-8.5	USEPA Secondary MCL
Potassium	mg/L	1.6	1.9	1.4	2.2	2.8	2.3	3.9	1	30	USEPA Advisory Level
Sodium	mg/L	33	8.5	5.7	59	22	38	150	22		
Specific Conductance	umhos/cm	240	82	75	760	260	700	960	440	900-1600	CA Secondary MCL
Sulfate as SO4	mg/L	7.4	5.8	5.2	110	28	93	110	10	250-500	CA Secondary MCL
Total Alkalinity	mg/L	34	18	8.2	80	46	87	290	110		

Parameter	Units	Sample ID								Regulatory Standards	
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-08	Value	Basis
Total Dissolved Solids	mg/L	170	100	87	500	190	500	670	270	500-1000	CA Secondary MCL
METALS											
Aluminum	ug/L	540	1200	450	430	760	820	2000	1200	1000/200	CA Primary/Secondary MCL
Antimony	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	6	CA Primary MCL
Arsenic	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	10	CA Primary MCL
Barium	ug/L	130	100	150	<100	100	<100	<100	150	1000	CA Primary MCL
Beryllium	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4	CA Primary MCL
Boron	ug/L	<100	<100	<100	370	<100	110	1400	<100	1000	CA DPH Notification Level
Cadmium	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5	CA Primary MCL
Chromium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	50	CA Primary MCL
Copper	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	1300	CA Primary MCL
Iron	ug/L	860	1600	560	560	900	920	1600	1700	300	CA Secondary MCL
Lead	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15	CA Primary MCL

Parameter	Units	Sample ID								Regulatory Standards	
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-08	Value	Basis
Manganese	ug/L	<20	25	<20	49	27	52	40	91	50	CA Secondary MCL
Mercury	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	CA Primary MCL
Nickel	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	100	CA Primary MCL
Selenium	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	50	CA Primary MCL
Silver	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	100	CA Secondary MCL
Thallium	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	CA Primary MCL
Vanadium	ug/L	<3.0	4.3	<3.0	6.5	<3.0	3.3	18	7.6	50	CA DPH Notification Level
Zinc	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	5000	CA Secondary MCL

Exceeds Primary MCL or high range Secondary MCL
Exceeds low range Secondary MCL or Notification Level

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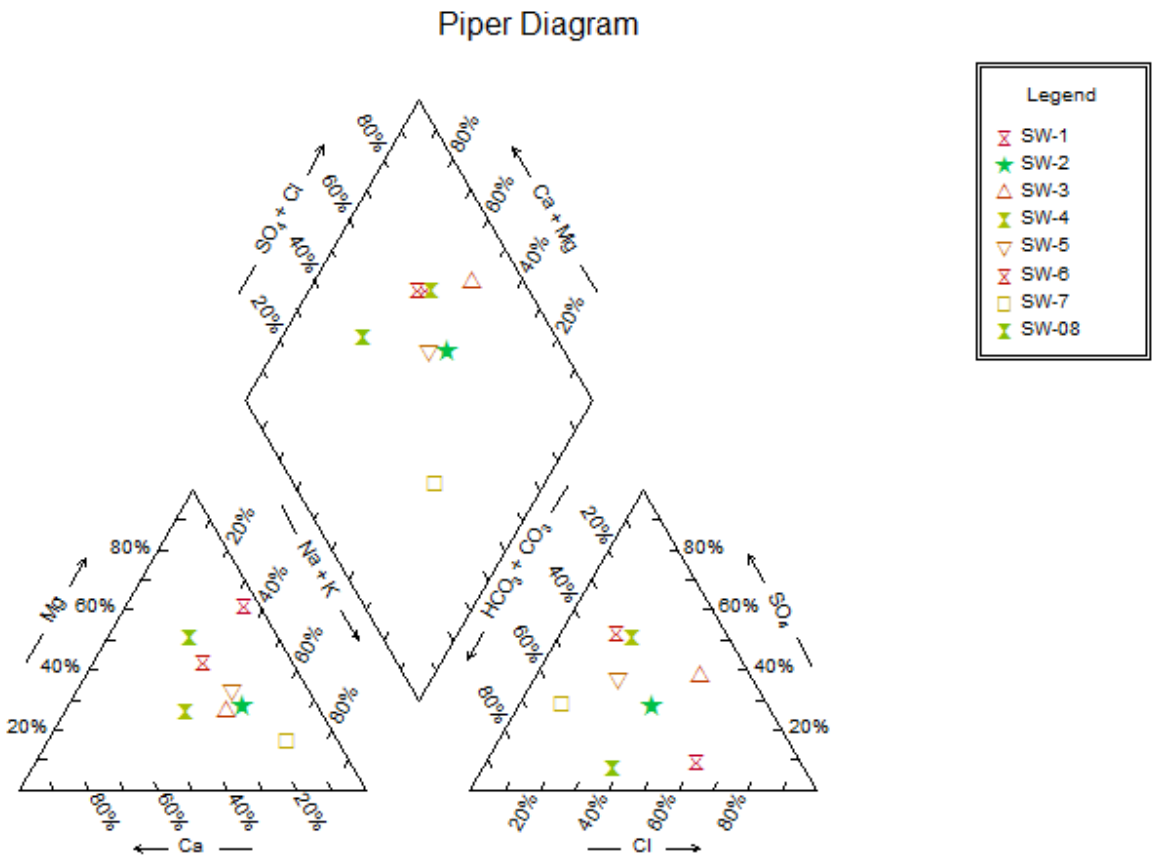
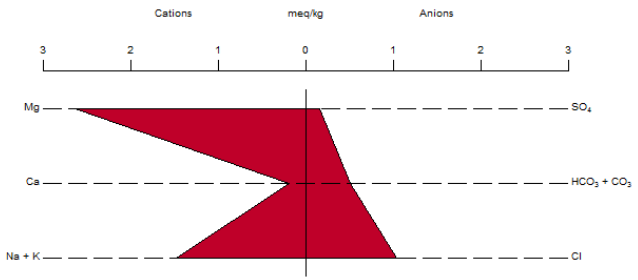


Figure 5. Piper Diagram of Surface Water Sample General Mineral Data

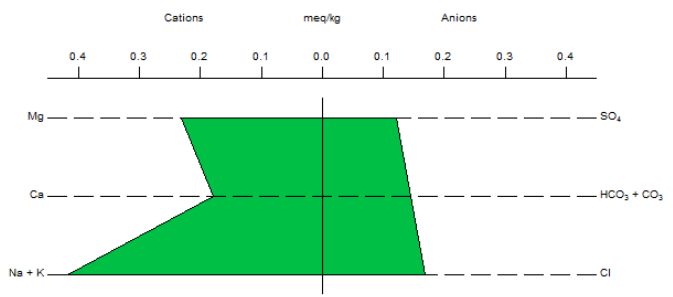
Figure 5 is a Piper Diagram based on the general mineral data for the surface water samples. The Piper Diagram indicates that there is appreciable variability in the mineral content of the water between different samples Stiff Diagrams show the variation in the "shape" of the general mineral signature for different samples. Figure 6 is a compilation of the Stiff Diagrams for the surface water samples. The water from the natural drainages (SW-2 and SW-3) is predominantly a sodium-chloride water with some minor variation in the relative proportions of magnesium and sulfate. For the pond samples, the water types are highly variable. SW-1, from the northwest side of the project site, is a magnesium chloride water type with secondary sodium. The sample from SW-4, in the southeast corner of the project site, is a calcium-sulfate water type.

The pond samples for SW-5 through SW-8 are from the southwest side of the project site. SW-5, SW-6, and SW-8 receive runoff from the existing overburden stockpile. SW-7 receives overflow from the other three ponds in this area of the project site. SW-5 is a sodium-magnesium-bicarbonate water type. SW-6 is a magnesium-sodium-sulfate water type. SW-7 is a sodium-bicarbonate water type. SW-8 is a magnesium-bicarbonate water type. Except for SW-4, the surface water samples are generally deficient in calcium compared to the other cations (magnesium and sodium). On the north side of the project site, the predominant anion is chloride. On the south side of the project site, the predominant anion varies between sulfate and bicarbonate, with chloride typically being much less prevalent.

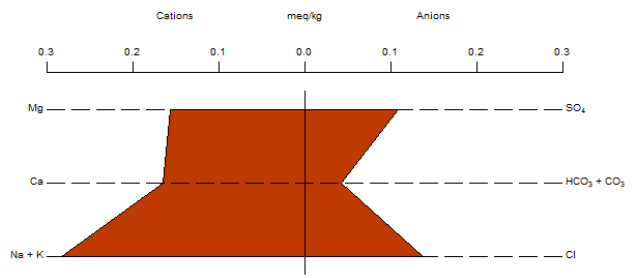
SW-1 Stiff



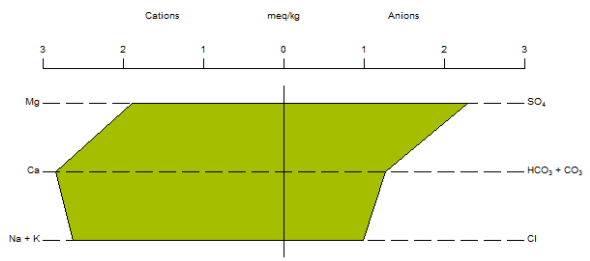
SW-2 Stiff



SW-3 Stiff



SW-4 Stiff



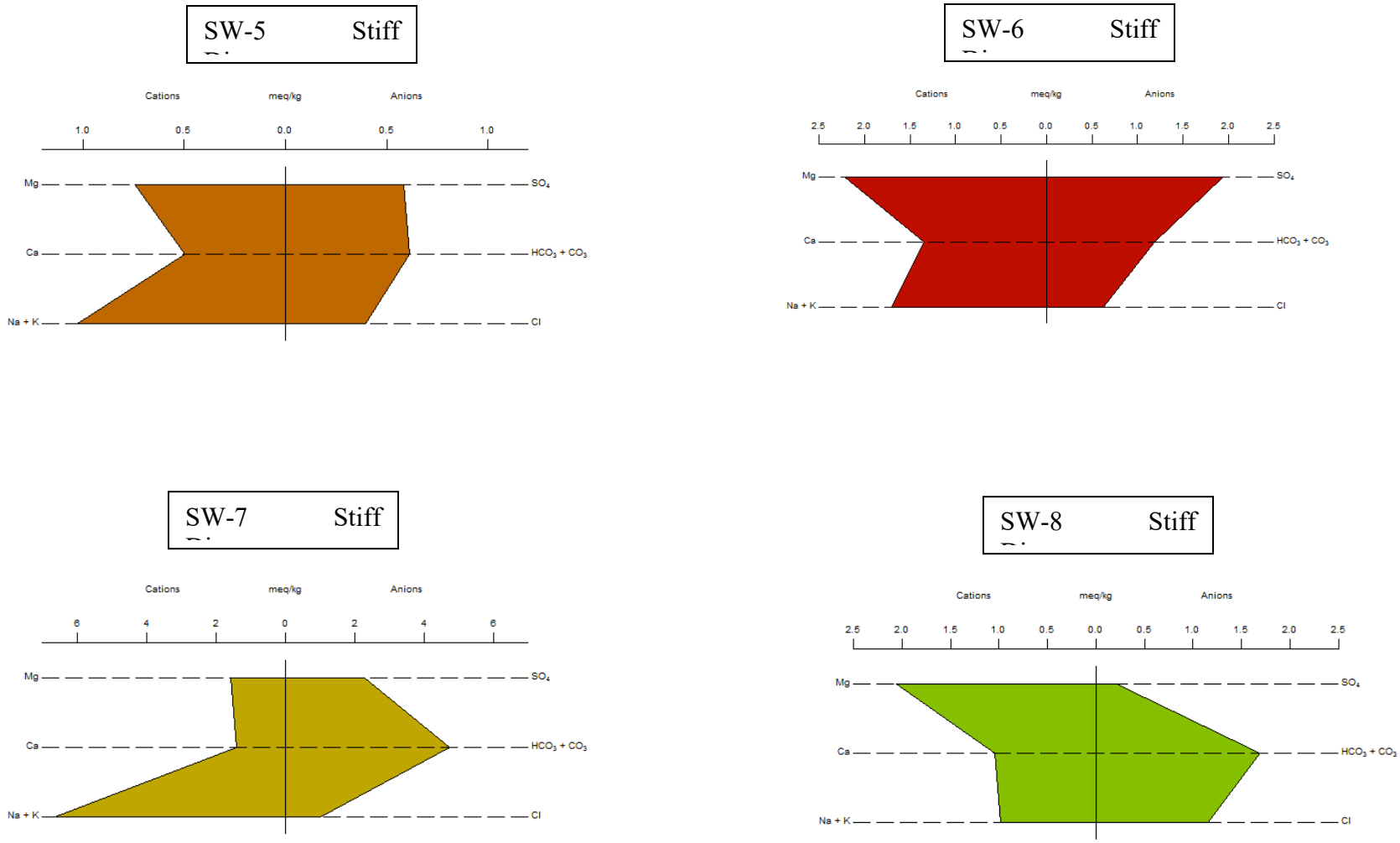


Figure 6. Compilation of Stiff Diagrams for Surface Water Sample General Mineral Data

2.2 Groundwater Conditions

Existing groundwater conditions in the region and at the project site are described in the subsections below.

2.2.1 Regional Groundwater Setting

Within Amador County, hydrogeologic conditions vary considerably from east to west in terms of aquifer characteristics and water chemistry. Most of the county is underlain by granitic and metamorphic bedrock, with sporadic occurrences of groundwater in fractured intervals. In the western part of the County, in the vicinity of Ione, groundwater may be present locally in sandy units within the Ione Formation. West of the project site, groundwater may occur in alluvial deposits of the Valley Springs Formation.

The outcrops of the Valley Springs Formation and the Ione Formation represent the eastern fringe of the Cosumnes subbasin of the San Joaquin Valley Groundwater Basin (Basin) (Department of Water Resources [DWR] Basin No. 5-22.16). The Basin is a medium priority basin that is not critically overdrafted (DWR, 2020a) according to the Sustainable Groundwater Management Act (SGMA) of 2014.

Seven Groundwater Sustainability Agencies (GSAs) have been established within the Basin, each acting as the exclusive GSA in their respective areas. The seven GSAs form the Cosumnes Subbasin SGMA Working Group (Working Group). The Amador County Groundwater Management Authority (ACGMA) is the exclusive GSA for all areas of the Basin within Amador County. The Working Group developed a single coordinated GSP (EKI, 2021) to meet SGMA regulatory requirements and preserve local control over management of the groundwater resource.

To help evaluate sustainable use of groundwater in the Basin, the GSP (EKI, 2021) includes a water budget evaluation. The water budget was calibrated to past conditions over a 20-year horizon from water years[2] 1999-2018, which includes water years with normal rainfall, below normal rainfall, and multi-year periods of below normal rainfall. On a basin-wide basis, the water budget indicates that under current conditions, groundwater inflows to the Basin total 148,000 acre-feet per year while groundwater outflows total 155,300 acre-feet per year, with an annual loss of groundwater in storage of 7,400 acre-feet per year (Table WB-1 in EKI, 2021). Groundwater inflows include leakage from surface water features (streams and reservoirs), percolation of rainfall and applied irrigation water, and lateral flows from adjacent groundwater basins. Groundwater outflows include seepage to surface water features, groundwater pumping, and lateral flows to adjacent groundwater basins. Of the 148,000 acre-feet per year of current inflows, approximately 105,000 acre-feet per year are from percolation of rainfall and applied irrigation water. Of the 155,300 acre-feet per year of current outflows, approximately 133,000 acre-feet per year are due to groundwater pumping. (Table WB-5, EKI, 2021).

The water budget values discussed above are for the entire Basin. If the water budget components are separated into the foothill area of the Basin (primarily within Amador County) and the valley

[2] In California, a water year is defined as the period from October 1 of a calendar year through September 30 of the subsequent calendar year. A water year is designated by the year in which it ends. For example, the period from October 1, 2006 through September 30, 2007 is referred to as the 2007 water year. Due to the nature of weather patterns in the state, a water year better represents hydrologic conditions related to wet and dry periods than does a calendar year.

plain area of the Basin, the modeled values indicate that the foothill area accounts for about one-third of the percolation but only about 1.5 percent of the groundwater pumping. Based on the hydrogeologic information presented in the GSP, groundwater within the Valley Springs Formation in the foothill area does not appear to be connected to groundwater in any of the shallower geologic formations that provide water in the valley plain area of the Basin (EKI, 2021).

The DWR SGMA Data Viewer (DWR, 2023) includes water level data from two wells near the project site that are likely completed in the Valley Springs Formation. The well at Station 383549N1210248W001 is located approximately 1.5 miles southwest of the project site. This well is an irrigation well at a surface elevation of 363 ft msl that produces water from an interval from 84 feet to 184 feet below ground surface (ft bgs). From November 2014 to May 2021, the water level in this well varied by no more than 1.4 feet, with an average depth to groundwater of 112 ft bgs and an average groundwater surface elevation of 250 ft msl. The water levels in this well do not exhibit any trends of increasing or decreasing elevation over time.

The well at Station 383267N1210085W001 is located approximately 3.0 miles south of the project site. This well is an irrigation well at a surface elevation of 244 ft msl that produces water from two intervals that range from 128 ft bgs to 148 ft bgs and 188 ft bgs to 228 feet bgs. From November 2014 to February 2022, the water level in this well varied by no more than 7.75 feet, with an average depth to groundwater of 50 ft bgs and an average groundwater surface elevation of 190 ft msl. The water levels in this well do not exhibit any trends of increasing or decreasing elevation over time.

Hydrographs prepared by DWR (2023c) for wells 383549N1210248W001 and 383267N1210085W001 are provided in the Water Supply Assessment (EMKO, 2023).

The State Water Resources Control Board's GeoTracker website (SWRCB, 2020) and the California Environmental Protection Agency's Department of Toxic Substances Control EnviroStor website (DTSC, 2020) do not identify the presence of any toxic cleanup sites within at least 2.5 miles of the project site.

2.2.2 Local Groundwater Setting

Groundwater has been observed in the fractured bedrock at and adjacent to the existing quarry. In addition, part of the project water supply is provided by a well located approximately one mile southwest of the project site. Within the project area, groundwater occurs within the Valley Springs Formation west of an ancient bedrock ridge that trends from the northwest to the southeast, referred to as the Carabas Paleo-Ridge (EKI, 2021). The Ione Quarry is located on and produces material from the metamorphic bedrock that makes up this paleo-ridge. The bedrock in the Carabas Paleo-Ridge is not considered to be part of the groundwater Basin (EKI, 2021). Existing groundwater conditions at the quarry site and at the supply well are described below.

QUARRY SITE

Groundwater has been observed seeping into the walls of the existing quarry during field sampling and reconnaissance work on January 25, 2019. Figure 7 is a photograph showing the seepage into the quarry, near the southwest corner of the existing excavation. Seepage was observed occurring at multiple locations along the south, west, and north walls of the quarry at that time. Based on

current topographic maps of the quarry, the elevation of the upper range of the seepage face is estimated to have been approximately 385 ft msl at the time of the observations. Seepage rates were relatively small (see additional discussion below).

Groundwater is also present in two geotechnical borings that were drilled north of the existing quarry and converted to piezometers. Boring IO-18-01 is located approximately 950 feet northeast of the north edge of the existing quarry. It was drilled from a surface elevation of approximately 415 ft msl to a total depth of 727 ft bgs, at an angle of approximately 70 degrees from horizontal (20 degrees from vertical) toward the north. Based on the surface elevation and inclination, the bottom of the boring reached an elevation of approximately -270 ft msl.

Boring IO-18-02 is located approximately 600 feet northeast of the north edge of the existing quarry. It was drilled from a surface elevation of approximately 403 ft msl to a total depth of 715 ft bgs, at an angle of approximately 70 degrees from horizontal (20 degrees from vertical) toward the east. Based on the surface elevation and inclination, the bottom of the boring reached an elevation of approximately -270 ft msl.

In both boreholes, metamorphosed andesite, referred to locally as greenstone, was present throughout the entire depth drilled. The greenstone is part of the Gopher Ridge Volcanics geologic formation. This is the same rock that is currently mined at the existing quarry to produce granules. The core logs prepared by Golder Associates (2020a) note the presence of fractured and brecciated zones, abundant carbonate veins, and the occasional presence of sulfide minerals, primarily pyrite. The core logs are provided in Appendix A.

Golder Associates (2019) conducted packer tests within the geotechnical borings IO-18-01 and IO-18-02. Within unfractured intervals in IO-18-01 and in all intervals measured in IO-18-02, the transmissivity and hydraulic conductivity of the greenstone bedrock was very low, as indicated in Table 2. In IO-18-01, within fractured and brecciated zones, often associated with minor faulting, the greenstone exhibited low to moderate transmissivity and hydraulic conductivity values, as indicated in Table 2.

TABLE 2
PERMEABILITY MEASUREMENTS FROM PACKER TESTS

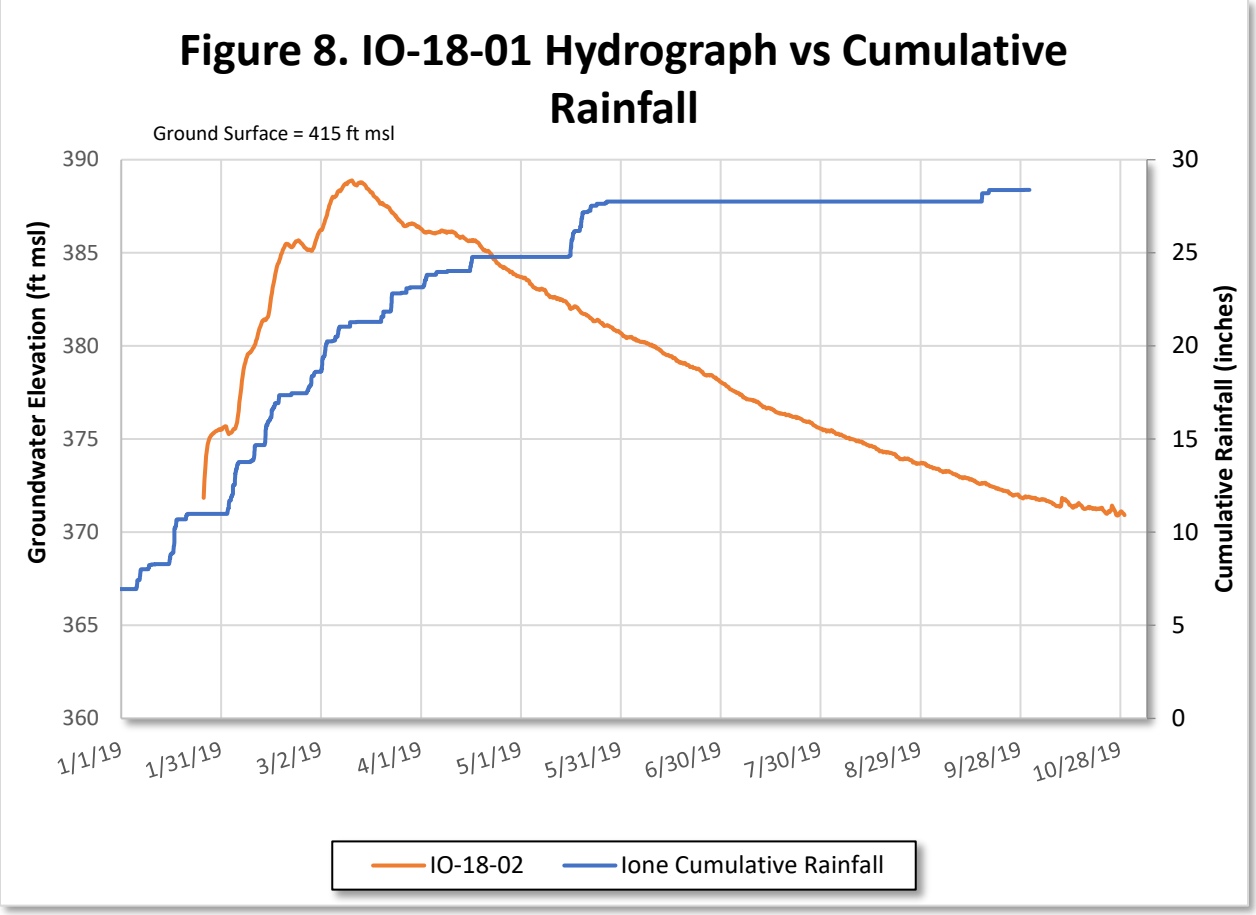
Borehole	Transmissivity		Hydraulic Conductivity	
	Maximum	Minimum	Maximum	Minimum
IO-18-01	2.7E-5 m^2/day	1.5E-8 m^2/day	4.4E-5 cm/sec	2.5E-7 cm/sec
	2.9E-4 ft^2/day	1.6E-7 ft^2/day	0.12 ft/day	7.1 E-4 ft/day
	2.2E-3 gpd/ft	1.2E-6 gpd/ft		
IO-18-02	NM	NM	NM	<2.5E-7 cm/sec
	NM	NM	NM	<7.1E-4 ft/day

Notes:
m2/day = square meters per day
ft2/day = square feet per day
gpd/ft = gallons per day per foot
cm/sec = centimeters per second
ft/day = feet per day
NM = Not measurable



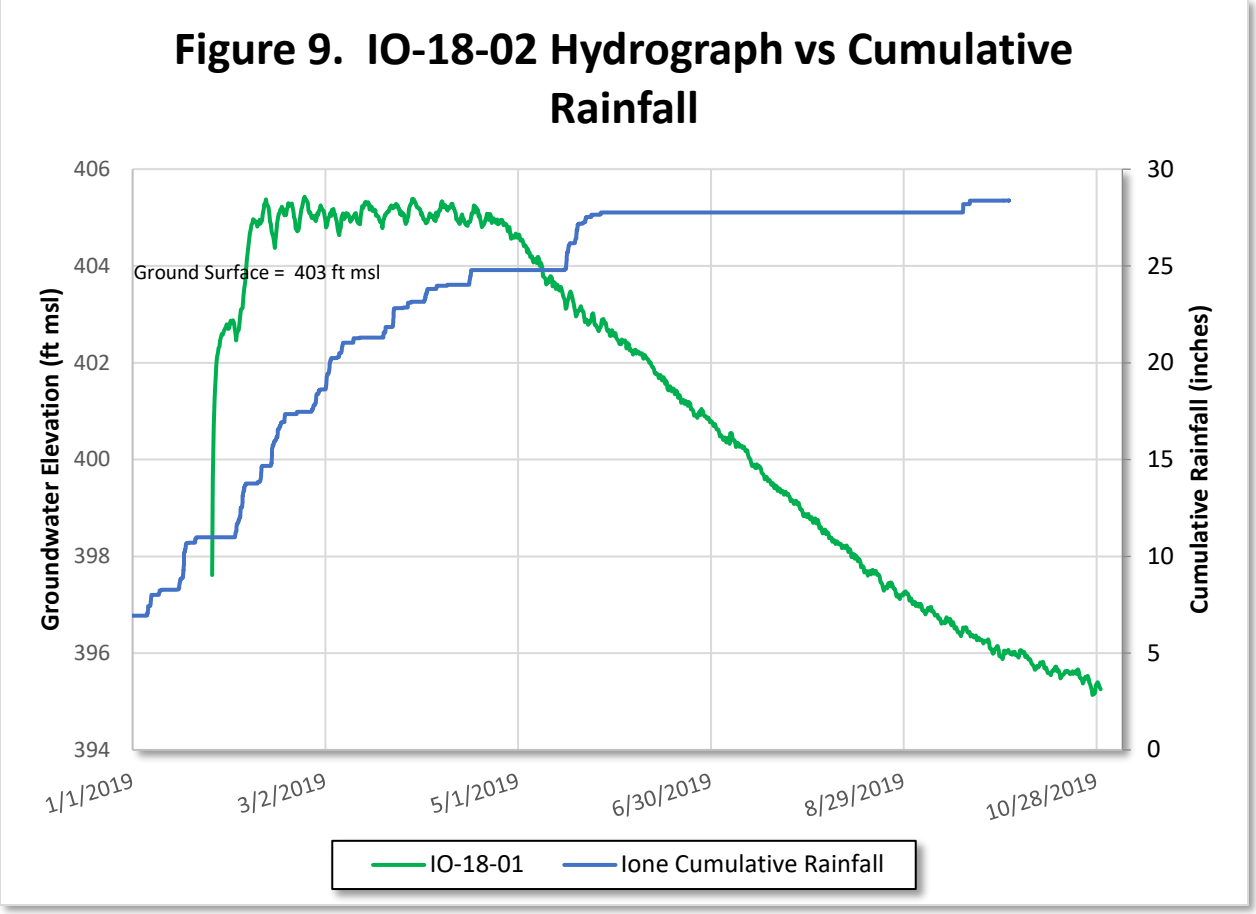
Figure 7. Seepage in Quarry Wall, January 2019.

Downhole pressure transducers with dataloggers were installed in IO-18-01 and IO-18-02 in January 2019. Water level measurements were recorded from January 2019 through October 2019. Figure 8 shows the water level hydrograph for IO-18-01 along with cumulative rainfall for the town of Ione, California, located approximately four miles east/southeast of the project site. Rainfall data were obtained from the Western Region Climate Center (2019). Figure 9 shows the water level hydrograph for IO-18-02 along with cumulative rainfall for Ione, California. In both piezometers, the groundwater level rises rapidly in late January and February in response to rainfall. In IO-18-01, the water level rises rapidly, in unison with the winter rainfall. The total increase in the groundwater level is over 15 feet, peaking at an elevation of approximately 389 ft msl in March 2019 before steadily decreasing about 16 feet through the end of October 2019.



In IO-18-02, the groundwater level rises approximately 18 feet before being truncated at an elevation of approximately 405 ft msl. As noted on Figure 9, the ground surface elevation at IO-18-02 is approximately 403 ft msl. The piezometer at that location rises approximately two feet above the ground surface, to 405 ft msl. Thus, during the rainy season in early 2019, the water level in the fractures encountered by IO-18-02 became artesian, with the piezometric, or pressure, head in the fractures rising above the ground surface. Beginning in May 2019, after the rains had ceased, the water level in IO-18-02 steadily decreased, falling about 25 feet by the end of October 2019.

Based on the elevations observed on January 25, 2019, the water level around the perimeter of the existing quarry was at an elevation of 365 ft msl while the water level at IO-18-02 was at an elevation of approximately 298 ft msl. The distance between the nearest exposed point at an elevation of 365 ft msl in the quarry and IO-18-02 is approximately 800 feet. A water level decrease of 32 feet over that distance indicates that the hydraulic gradient between that borehole location and the current quarry is approximately 0.04 foot per foot. The average hydraulic conductivity measured at IO-18-01 and IO-18-02, based on Table 2, is approximately $1.4X10^{-2}$ ft/day.



The average groundwater flow velocity is defined by the equation (Domenico and Schwartz, 1990):

$$q = (k \times i)/n$$

where:

q = the groundwater flow velocity
k = the hydraulic conductivity
i = the hydraulic gradient
n = the porosity

Assuming a porosity of one percent for the fractured greenstone, the groundwater flow velocity from the area of IO-18-02 is approximately 0.056 ft/day, or 20 ft/year.

The estimated inflow of groundwater into the quarry is defined by Darcy's Law, which is (Domenico and Schwartz, 1990):

$$Q = k \times i \times A$$

where:

Q = the groundwater inflow volume
k = the hydraulic conductivity
i = the hydraulic gradient
A = the cross-sectional area of groundwater inflow

The north, west, and south faces of the quarry where seepage was observed are each about 400 feet long, with a height to the top of the seepage face of about 35 feet. Thus, each face has a seepage area of about 14,000 square feet. The groundwater inflow for each seepage face is approximately 7.8 ft^3/day, or about 60 gallons per day. On an annual basis, the total inflow into the quarry is approximately 8,540 ft^3/year, or 0.2 acre-feet/year.

If the maximum hydraulic conductivity reported in Table 2 is used in the above calculations, then the average groundwater flow velocity toward the quarry is approximately 0.5 ft/day or about 175 ft/year. The total inflow into the quarry would be approximately 73,200 ft^3/year, or 1.7 acre-feet per year.

As noted above, the groundwater within the bedrock at the project site is not part of the groundwater Basin (EKI, 2021).

SUPPLY WELL

For several decades, SGI has supplemented its onsite water supply for the quarry using an offsite supply well to provide part of the water needed for quarry operations. The supply well is located approximately one mile southwest of the project site on land that is not owned by SGI (location GW-1 on Figure 3). In February 2020, SGI replaced the existing well due to a casing collapse at a depth of approximately 145 ft bgs. The new well was drilled approximately 50 feet south of the existing well. The project supply well is interpreted to be completed within the Valley Springs Formation within the groundwater Basin.

The new well was drilled to a total depth of 360 ft bgs. Silty and clayey sands were encountered to a depth of 115 ft bgs. A thick clay layer was present from 115 ft bgs to 260 ft bgs. From 260 ft bgs to the bottom of the depth drilled, intermixed poorly-graded medium sand, silty and clayey sands, and clay layers were identified. These sedimentary units are interpreted to be part of the Valley Springs Formation, as described above. Based on the information discussed below, the clay layer from 115 ft bgs to 260 ft bgs acts as an aquitard between an upper aquifer zone and a deeper aquifer zone that are present at the well location.

First-encountered water occurred at about 115 ft bgs in the new well. Screened intervals were installed from 70-90 ft bgs, 110-130 ft bgs, and from 283-343 ft bgs. A geologic log showing the subsurface conditions and well completion details is provided in Appendix A. After completion and well development, the static depth to water in the new well was 260 ft bgs on February 21, 2020. Water could be heard cascading into the well from the upper screen segments.

In late February 2020, the new well was pumped for approximately 42 hours, producing approximately 330,000 gallons, for an average pumping rate of 130 gallons per minute (gpm). The total drawdown during this pumping period was approximately 60 feet, resulting in a specific capacity of about 2.15 gpm/ft. Empirical relationships have been developed to estimate the transmissivity of an aquifer based on the specific capacity (Thomasson et al., 1960). For site conditions, these relationships suggest that the transmissivity should be approximately 1.2 times greater than the specific capacity, or a transmissivity of 2.5 gpm/ft, which is equivalent to 3,600 gpd/ft or 480 ft^2/day. Comparing these values with the measured transmissivity of the greenstone bedrock shown in Table 2 indicates that the alluvial sediments of the Valley Springs Formation are at least $1x10^6$ (one million) times more permeable than the fractured greenstone in the project site.

SGI reports that on May 1, 2020, the new well was pumped for 2.5 hours to 3.0 hours and yielded 21,500 gallons of water. The average pumping rate was approximately 130 gpm, consistent with that which was achieved shortly after the well was initially installed.

The depth to groundwater in the old well was measured at 141 feet below the top of casing (ft btc) on October 29, 2019, at 90 ft btc on February 13, 2020, and at about 92.5 ft btc on February 21, 2020. These depths are much shallower than the water level measured in the new well, at 260 ft btc. Thus, the old well is interpreted to be representative of groundwater conditions in a shallow aquifer zone present above the thick clay aquitard layer encountered during drilling, while the new well is representative of groundwater conditions in a deeper aquifer, below the clay aquitard layer.

On February 15, 2020, a 1.5-inch diameter PVC temporary casing was installed above the collapsed section of the steel casing in the old well. The temporary casing included a screened section from 136.5 ft btc to 146.5 ft btc. A downhole pressure transducer and datalogger were installed in the temporary casing on February 21, 2020 and water levels were recorded every minute until March 20, 2020. Figure 10 shows the water level data that were recorded by the datalogger, converted to depth to the groundwater surface in ft btc. Figure 10 also shows local rainfall data over the same period. The groundwater level decreased about 0.5 feet over the period from February 21 to March 20, 2020. The groundwater level did not show any response to the 42-hour pumping in the new well or to a 3.4-inch rainfall event in mid-March.

2.2.3 Groundwater Quality

Groundwater samples were collected on January 25, 2019 from the old pumping well described above, from within the current quarry excavation, and from the two piezometers installed in the geotechnical borings drilled north of the existing quarry. The samples were submitted to California Laboratory Services in Rancho Cordova, a California-certified analytical laboratory, under appropriate chain-of-custody protocol. Table 3 summarizes the groundwater quality data in the project vicinity. Laboratory analytical data sheets are provided in Appendix B.

Sample GW-1 from the old pumping well is representative of conditions in the alluvial aquifers of the Valley Springs Formation. The sample from the current quarry excavation, PW-1, likely represents both seepage of groundwater into the quarry and rainfall runoff from the quarry walls and benches exposed to the atmosphere. The piezometer samples (IO-18-01 and IO-18-02) represent groundwater from deep fractures in the bedrock that is not in direct contact with the atmosphere and, thus, may be deficient in oxygen.

Figure 10. Groundwater Level in Old Supply Well

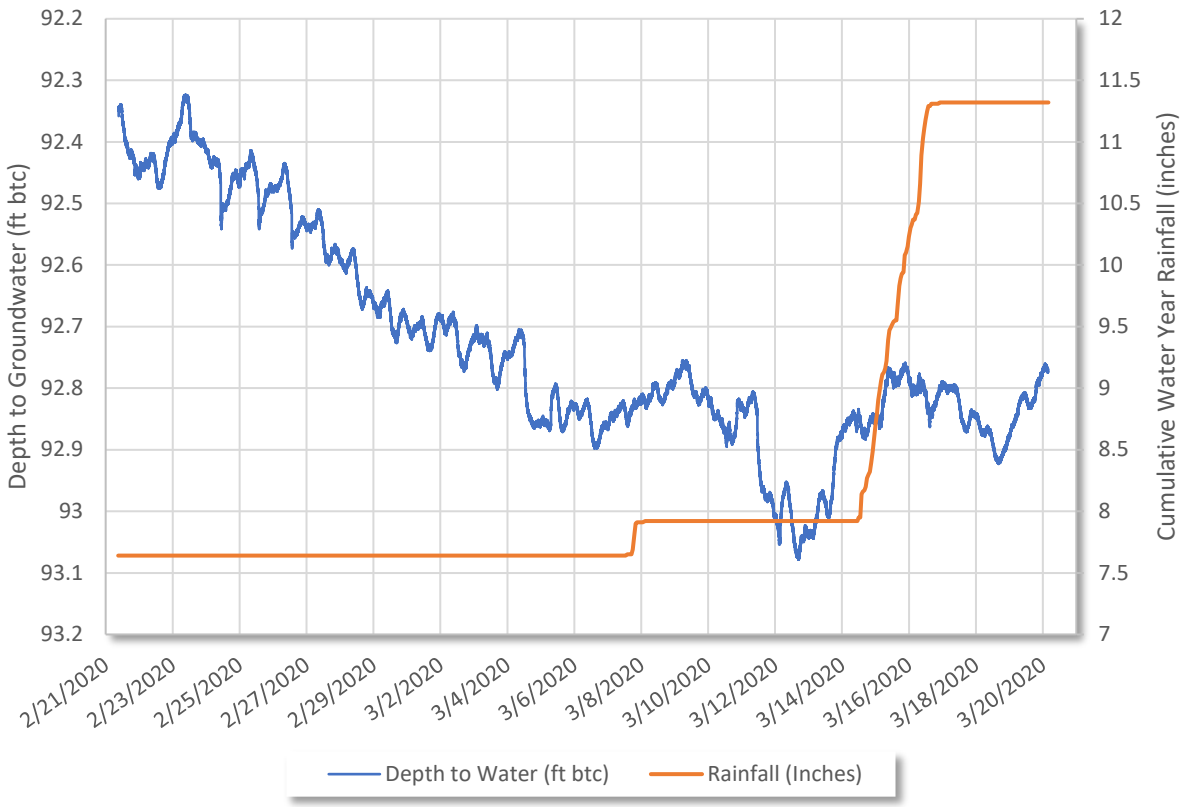


TABLE 3
GROUNDWATER QUALITY DATA
SGI Ione Quarry
All Samples Collected January 25, 2019

Parameters	Units	Sample ID				Regulatory Standards	
		GW-1	PW-1	IO-18-01	IO-18-02	Value	Basis
GENERAL MINERALS							
Bicarbonate as CaCO3	mg/L	51	71	450	320		
Calcium	mg/L	30	30	60	30		
Carbonate as CaCO3	mg/L	<5.0	<5.0	<5.0	<5.0		
Chloride	mg/L	11	11	190	150	250-500	CA Secondary MCL
Fluoride	mg/L	0.53	0.58	0.35	0.47	2	CA Primary MCL
Hardness as CaCO3	mg/L	120	110	300	170		
Hydroxide as CaCO3	mg/L	<5.0	<5.0	<5.0	<5.0		
Magnesium	mg/L	10	9.5	35	22		
MBAS	mg/L	<0.10	<0.10	<0.10	<0.10		
Nitrate as N	mg/L	15	13	1	1.6	10	CA Primary MCL
pH	std units	6.93	8.05	7.39	7.35	6.5-8.5	USEPA Secondary MCL
Potassium	mg/L	2.5	2.1	7.4	9.5	30	USEPA Advisory Level
Sodium	mg/L	31	32	160	190		
Specific Conductance	umhos/cm	430	410	1500	1300	900-1600	CA Secondary MCL
Sulfate as SO4	mg/L	68	52	45	110	250-500	CA Secondary MCL
Total Alkalinity	mg/L	51	71	450	320		
Total Dissolved Solids	mg/L	280	270	830	770	500-1000	CA Secondary MCL
METALS							
Aluminum	ug/L	1100	130	69	<50	1000/200	CA Primary/Secondary MCL
Antimony	ug/L	<4.0	<4.0	<4.0	<4.0	6	CA Primary MCL
Arsenic	ug/L	2	2.6	<2.0	<2.0	10	CA Primary MCL
Barium	ug/L	<100	<100	180	<100	1000	CA Primary MCL

Parameters	Units	Sample ID				Regulatory Standards	
		GW-1	PW-1	IO-18-01	IO-18-02	Value	Basis
Beryllium	ug/L	<1.0	<1.0	<1.0	<1.0	4	CA Primary MCL
Boron	ug/L	190	200	400	850	1000	CA DPH Notification Level
Cadmium	ug/L	1.3	1.4	<1.0	<1.0	5	CA Primary MCL
Chromium	ug/L	<10	<10	<10	<10	50	CA Primary MCL
Copper	ug/L	71	<50	<50	<50	1300	CA Primary MCL
Iron	ug/L	2200	170	380	370	300	CA Secondary MCL
Lead	ug/L	<5.0	<5.0	<5.0	<5.0	15	CA Primary MCL
Manganese	ug/L	51	<20	1000	230	50	CA Secondary MCL
Mercury	ug/L	<1.0	<1.0	<1.0	<1.0	2	CA Primary MCL
Nickel	ug/L	<10	<10	16	<10	100	CA Primary MCL
Selenium	ug/L	5.3	<5.0	<5.0	<5.0	50	CA Primary MCL
Silver	ug/L	<10	<10	<10	<10	100	CA Secondary MCL
Thallium	ug/L	<1.0	<1.0	<1.0	<1.0	2	CA Primary MCL
Vanadium	ug/L	4	11	<3.0	<3.0	50	CA DPH Notification Level
Zinc	ug/L	360	<50	<50	<50	5000	CA Secondary MCL

Exceeds Primary MCL or high range Secondary MCL

Exceeds low range Secondary MCL or Notification Level

California State Water Resources Control Board, A Compilation of Water Quality Goals
https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/
accessed July 14, 2020

Table 3 indicates that most parameters meet typical water quality standards, with the following exceptions:

- Nitrate from GW-1 and PW-1;
- Specific conductance from IO-18-01 and IO-18-02;
- TDS from IO-18-01 and IO-18-02;
- Aluminum in GW-1;
- Iron in GW-1, IO-18-01, and IO-18-02; and
- Manganese in GW-1, IO-18-01, and IO-18-02.

The presence of nitrate at GW-1 may be due to historic agricultural activities, including cattle grazing, in the area of the supply wells. The presence of nitrate at PW-1 may be due to nearby cattle grazing, use of water from GW-1, or blasting residues. Low oxygen conditions can mobilize iron and manganese in water, which may explain the elevated iron and manganese levels in GW-1 and the samples from the two deep piezometers. Elevated specific conductance and TDS occur only in the samples from the two deep piezometers.

Figure 11 is a Piper Diagram based on the general mineral data for the groundwater samples. The Piper Diagram indicates that there are key differences between each sample, but that there are similarities between GW-1 and PW-1, and between the two deep piezometer samples.

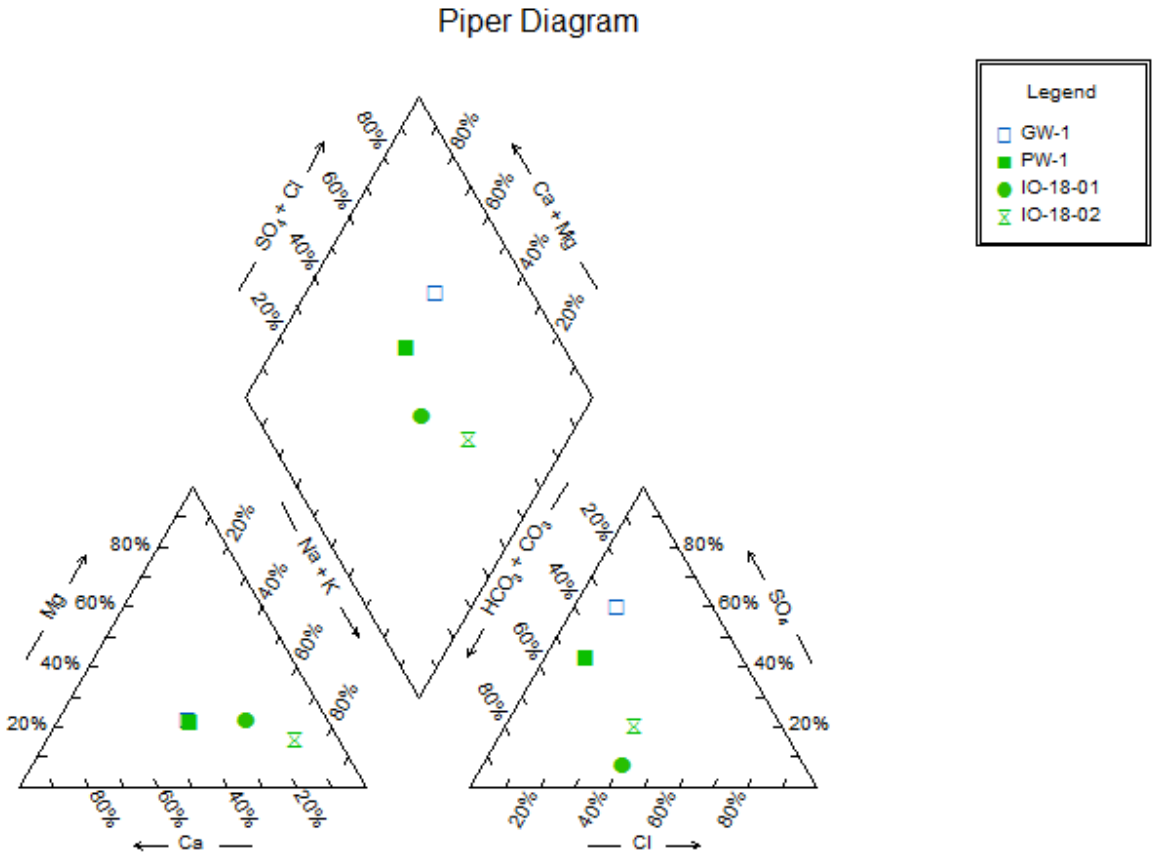


Figure 11. Piper Diagram of Groundwater Sample General Mineral Data

Figure 12 is a compilation of the Stiff Diagrams for the groundwater samples. Sample GW-1, representative of the groundwater from the Valley Springs Formation, is a calcium-bicarbonate water with secondary sodium. The water from within the existing quarry, PW-1, is a calcium-bicarbonate water with secondary sodium and sulfate. These two samples have identical cation signatures but have opposite predominant and secondary anions.

The water samples from the two deep piezometers are both a sodium-bicarbonate water type with secondary chloride. IO-18-02 has a higher proportion of sulfate and lower proportion of calcium than does IO-18-01, which accounts for their differences on the Piper Diagram (Figure 11).

Surface water sample SW-4 has a very similar water chemistry to the GW-1 groundwater sample. The water chemistry of surface water sample SW-7 is similar to that of the deep piezometer samples. Otherwise, there are no appreciable similarities between the surface water and groundwater samples in terms of general mineral water quality.

2.2.4 Existing Water Use

Water at the project site is used for dust control and ancillary processing of the overburden by a third-party contractor to produce construction aggregates. When available, water that accumulates in the quarry is used as the primary water supply source. Water trucks used for dust control on haul roads may also be filled from ponds at the separately permitted granule plant area or from other nearby former mining ponds, outside of the project boundary. During the dry season, water from the supply well located southwest of the project site is also used to fill a 30,000-gallon tank and provide water for quarry area needs.

Approximately 41 acres of the existing quarry is sloped so that it drains internally. Assuming that approximately 90 percent of the annual average rainfall of 20 inches runs off of the highwalls and hardrock benches, accumulating at the bottom of the mining excavation, the average annual runoff into the quarry is approximately 61 acre-feet per year. According to DWR (1979), the total Class A pan evaporation in the project area is about 60 inches per year, with about one-third of that occurring from October through April. Based on field reconnaissance conducted in January 2019, water accumulation in the winter may cover up two acres of the bottom of the quarry. Based on the evaporation rate for October through April, when the ponded water is typically present, three to four acre-feet of rainfall accumulation may be lost to evaporation. Thus, the average annual available water supply in the existing quarry is approximately 60 acre-feet per year.

The average annual inflow of groundwater into the quarry of 0.2 acre-feet per year, as discussed in Section 2.2.2, does not provide a measurable contribution to the net water accumulation.

SGI reports that water use from the tank, during the dry season, averages approximately 60,000 gallons per week. Assuming that the tank is used from May through October (i.e. six months each year), the total volume of water pumped from the Valley Springs Formation within the groundwater Basin for existing uses at the project site is approximately five acre-feet per year.

Based on the above analysis, the current water use within the project site is about 60 to 65 acre-feet per year, plus the volume that may be provided from offsite ponds in the granule plant area and former mining ponds.

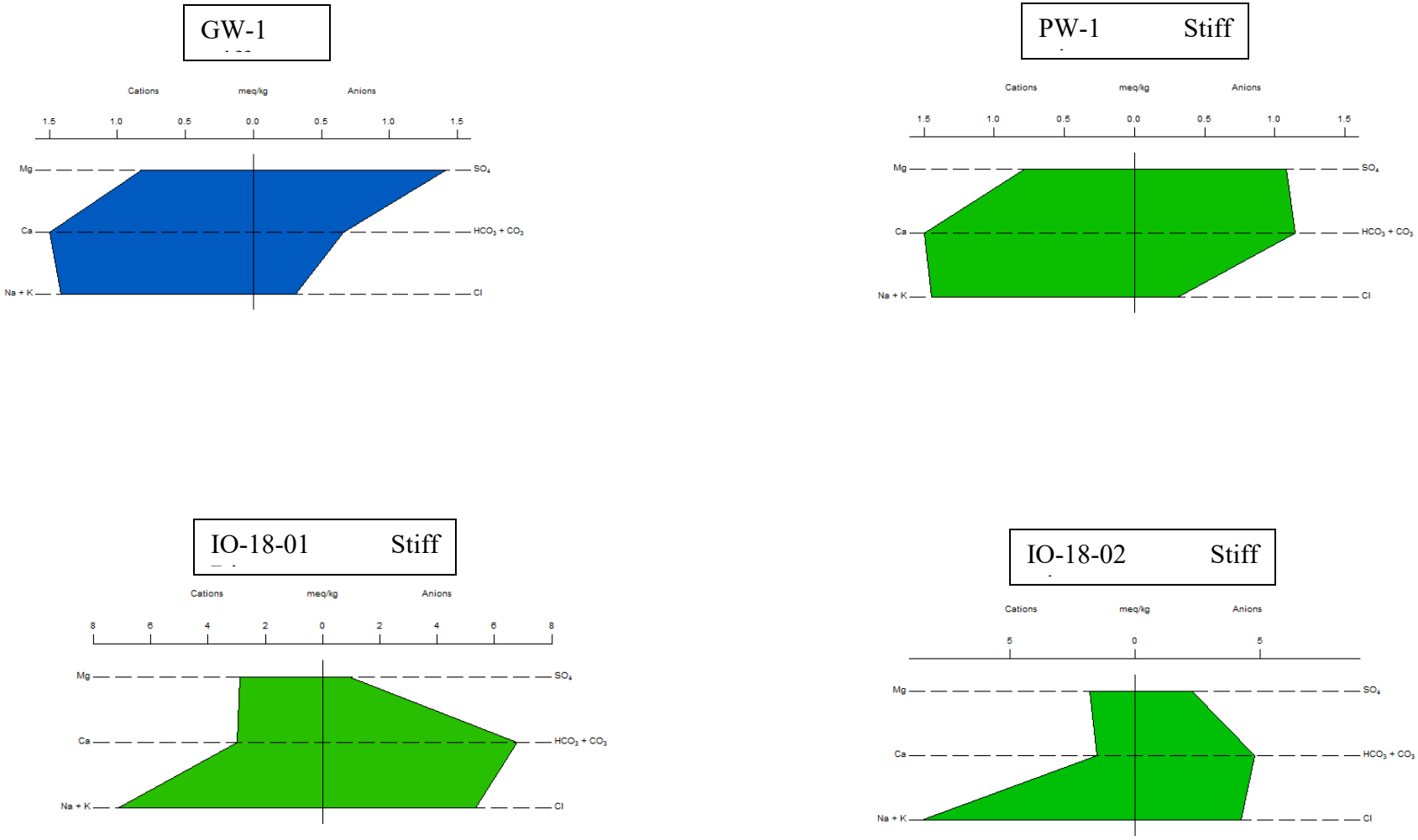


Figure 12. Compilation of Stiff Diagrams for Groundwater Sample General Mineral Data

3.0 Project Effects

Under the proposed project, the quarry would be mined to a total depth of 710 ft bgs with a final quarry bottom elevation of -280 ft msl. The overall quarry footprint would expand from approximately 41 acres to 135 acres. The overburden pile would expand from 52 acres to 86 acres.

3.1 Surface Water

Runoff within the quarry footprint is currently retained onsite. This practice would continue during mining and after the site is reclaimed. Expansion of the quarry would result in an area of approximately 135 acres that would drain internally and capture rainfall, increasing the overall amount of water that would accumulate in the quarry. In addition, the reclamation plan indicates that runoff from the north side of the overburden stockpile would also contribute to the water that accumulates in the quarry.

Table 4 presents a water budget for the final reclaimed quarry for direct precipitation, runoff into the quarry, and evaporation. The potential groundwater inflow is discussed in Section 3.2. The rate of direct precipitation and runoff into the quarry would remain relatively constant over time as the quarry fills, at approximately 244 acre-feet per year. The rate of evaporation from the quarry would increase over time as the surface area of the quarry pond increases, as indicated in Table 4. The water budget indicates that water would accumulate in the pond over time until the rate of rainfall and runoff equilibrate with the rate of evaporation from the quarry pond surface. Based on the water budget in Table 4, the water level in the reclaimed quarry would equilibrate at an elevation of approximately 105 ft msl, or about 300 feet below the surrounding land surface resulting in a quarry lake that is almost 400 feet deep. The quarry pond would have a surface area of approximately 53 acres. Based on current rainfall and evaporation rates, as discussed in Section 2.2.4, it would take over 300 years for the quarry pond to reach equilibrium. Incrementally, it would take approximately 30 years for the water level to rise from an elevation of -280 ft msl to -60 ft msl, an additional 90 years to rise from -60 ft msl to 10 ft msl, approximately 115 years to rise from 10 ft msl to 80 ft msl, and an additional 80 years to rise the final 25 feet from 80 ft msl to the equilibration level of 105 ft msl.

Golder Associates (2020b) prepared a drainage analyses of reclaimed conditions for the overburden stockpile. The drainage analysis was prepared for a 25-year, 24-hour storm, consistent with Amador County guidelines. The drainage analysis also documents that the runoff from the 25-year, 24-hour event exceeds that of the 20-year, 1-hour storm. Thus, the drainage analysis exceeds the requirements of the SMARA regulations related to runoff and erosion control (14CCR, Section 3706.d). The information below is summarized from the Golder Associates (2020b) drainage analysis.

Runoff from several subareas of the overburden pile would be directed either to the quarry or to six perimeter stormwater basins, using a series of benches and downdrains. Peak runoff rates would range from approximately seven to 38 cubic feet per second (cfs) from the design storm event. Peak flow velocities within conveyance structures would be up to 2.1 feet per second (ft/sec). Runoff from the 25-year, 24-hour storm event to the six retention basins would range from one acre-foot to 3.89 acre-feet. The runoff would be equivalent to 71 percent to 82 percent of the available storage capacity of each retention basin, not including two feet of freeboard.

Runoff from the overburden stockpile into the quarry would be 3.86 acre-feet from the design storm event.

3.2 Groundwater

As mining progresses to greater depths and the quarry footprint is enlarged, a greater volume of groundwater would be anticipated to flow into the quarry. Once mining is completed, the total cross-sectional area around the perimeter of the quarry (i.e., the surface area of the vertical component of the steep quarry highwalls around the perimeter of the quarry) through which groundwater could enter the excavation would be approximately 100 acres (based on an average face width of 1,650 feet, and average water column height of 665 feet [from 385 ft msl to -280 ft msl], times four sides). Based on the equations described in Section 2.2.2 (Domenico and Schwartz, 1990), the total inflow into the quarry at full depth would be 20 acre-feet per year. This volume is less than 10 percent of the 244 acre-feet per year of rainfall and surface runoff volume that would enter the expanded quarry each year. Thus, future groundwater inflow into the quarry would remain a small percentage of the total water within the quarry excavation.

As the quarry becomes deeper and more groundwater flows into the excavation, the elevation of the groundwater surface around the quarry may decrease. The decrease in the groundwater elevation would result in a proportional decrease in the cross-sectional area through which groundwater would flow into the quarry. However, the decrease in the groundwater surface elevation would also proportionally increase the hydraulic gradient, or slope of the groundwater surface, toward the quarry, which would increase the rate at which groundwater flows toward the quarry face through the surrounding fractured bedrock. Thus, any additional drawdown, or decrease in the groundwater surface elevation, around the quarry perimeter would not result in any appreciable change in groundwater inflow to the quarry because the reduced area would be offset by the increased gradient.

As the quarry is expanded, the amount of rainfall and surface runoff that enters the quarry would exceed the annual water needs at the project site. Thus, it is likely that some dewatering would be required during mining, especially at the end of the wet season to allow mining to progress at the bottom of the quarry. Water pumped from the quarry during dewatering would most likely be directed to Loch Lane so that it could be used for other beneficial purposes. Once the full footprint of the quarry has been reached, the dewatering requirement could be in the range of 180 acre-feet per year (244 acre-feet per year of accumulation minus 60 to 65 acre-feet per year of water usage).

TABLE 4
WATER BUDGET
SGI Ione Quarry
Reclaimed Conditions

INPUT PARAMETERS		
Total Area:	152	acres
Pit Watershed Boundary:	135	acres
North Side OB Pile:	17	acres
Spill-point Elevation	400	ft msl
Rainfall:	1.67	ft/yr
Runoff Coefficients:	Water Surface	1
	High Walls	0.98
	Watershed	0.75
Lake Evaporation:	4.65	ft/yr

INCREMENTAL ANALYSIS BY ELEVATION RANGES							
1. PIT BOTTOM -280 FT MSL							
Total Area				**Inputs**			
	Water Surface	13	ac		Pit	21.7	AF/yr
	Pit Wall	122	ac		High Walls	199.7	AF/yr
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	**152**	**ac**			**242.7**	**AF/yr**
				Outputs			
					Pit Evap	60.5	AF/yr
				NET		182.2	AF/yr

INCREMENTAL ANALYSIS BY ELEVATION RANGES							
						14.0	ft/yr rise
1.A Midway Between -280 ft msl and -60 msl							
Total Area				**Inputs**			
	Water Surface	20.5	ac		Pit	34.2	AF/yr
	Pit Wall	114.5	ac		High Walls	187.4	AF/yr
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	**152**	**ac**			**242.9**	**AF/yr**
				Outputs			
					Pit Evap	95.3	AF/yr
				NET		147.6	AF/yr
						7.2	ft/yr rise
						30.6	yrs/220 ft
2. AT -60 MSL							
Total Area				**Inputs**			
	Water Surface	28	ac		Pit	46.8	AF/yr
	Pit Wall	107	ac		High Walls	175.1	AF/yr
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	152	ac			243.2	AF/yr

INCREMENTAL ANALYSIS BY ELEVATION RANGES							
				Outputs			
					Pit Evap	130.2	AF/yr
				NET		113.0	AF/yr
						4.0	ft/yr rise
2.A Midway Between -60 ft msl and 215 msl							
Total Area				**Inputs**			
	Water Surface	46	ac		Pit	76.8	AF/yr
	Pit Wall	89	ac		High Walls	145.7	AF/yr
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	**152**	**ac**			**243.8**	**AF/yr**
				Outputs			
					Pit Evap	213.9	AF/yr
				NET		29.9	AF/yr
						0.6	ft/yr rise
						254	yrs/165 ft
2.B 60% Between -60 ft msl and 215 msl							
Total Area				**Inputs**			
	Water Surface	53	ac		Pit	87.7	AF/yr
	Pit Wall	82.5	ac		High Walls	135.0	AF/yr

INCREMENTAL ANALYSIS BY ELEVATION RANGES							
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	**152**	**ac**			**244.0**	**AF/yr**
				Outputs			
					Pit Evap	244.1	AF/yr
				NET		-0.1	AF/yr
						0.0	ft/yr rise
3. AT 215 MSL							
Total Area				**Inputs**			
	Water Surface	81	ac		Pit	135.3	AF/yr
	Pit Wall	54	ac		High Walls	88.4	AF/yr
	North Side OB Pile	17	ac		Watershed	21.3	AF/yr
	TOTAL	**152**	**ac**			**244.9**	**AF/yr**
				Outputs			
					Pit Evap	376.7	AF/yr
				NET		-131.7	AF/yr
						-1.6	ft/yr rise

3.3 Future Water Demand

As stated in Section 1.0, no changes in the current rates of production or other operations are proposed. Thus, the water usage would not change in any appreciable manner as a result of the project. However, as discussed in Section 3.2, excess rainfall and runoff may be present in the quarry as it is expanded, which would reduce and potentially eliminate the need for groundwater from the Valley Springs Formation as the project progresses. However, as discussed in the Water Supply Assessment (EMKO, 2023), on an occasional basis during extremely dry years, pumping from the project supply well may be as high as 15 acre-feet per year to make up for the loss of retained stormwater due to lack of precipitation.

The GSP presents six different future water budget scenarios based on various assumptions about the effects of climate change and the implementation of various project and management actions identified in the GSP (Table WB-10, EKI, 2021). For the entire Basin, the future water budget scenarios identify potential changes in groundwater storage ranging from a loss of 18,600 acre-feet per year under extreme climate change assumptions with no projects or management actions implemented to a gain of up to 7,100 acre-feet per year with implementation of the projects and management actions identified in the GSP (Table WB-10, EKI, 2021). In contrast, the foothills area has a net positive future water budget, ranging from 800 acre-feet per year to 1,300 acre-feet per year (Table WB-11, EKI, 2021). As noted above, the hydrogeologic information presented in the GSP indicates that groundwater within the Valley Springs Formation in the foothill area does not appear to be connected to groundwater in any of the geologic formations that provide water in the valley plain area of the Basin (EKI, 2021).4.0 CEQA Evaluation Criteria

This section outlines the evaluation criteria related to Hydrology and Water Quality from Section X, Appendix G of the CEQA Guidelines (CCR Title 14, Division 6, Chapter 3). Section 5.0 of this report evaluates the proposed project based on the CEQA evaluation criteria for Hydrology and Water Quality. On December 28, 2018, revisions to the CEQA Guidelines were published. The revised CEQA Guidelines now list Hydrology and Water Quality as Section X of the Environmental Checklist and include substantial changes to the evaluation criteria. The five CEQA criteria address whether a Project would:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
c) Substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    i. Result in substantial erosion or siltation on- or off-site;
    ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site;
    iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

iv. Impede or redirect flood flows?

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

4.0 Evaluation of Potential Impacts

Evaluation of the potential impacts of the proposed project is presented below based on the five CEQA evaluation criteria for Hydrology and Water Quality.

a) Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

The potential for the project to affect water quality is evaluated below for:

a. Conditions and activities that would occur during the active mining period (i.e., until the year 2175);
b. Actions that would occur to reclaim the project site; and
c. Conditions that would exist after the site is reclaimed.

In addition, potential effects are considered separately for surface water and for groundwater.

Surface Water

Potential Effects During Mining

Equipment fueling and maintenance does not occur within the quarry area. Thus, the potential for fuels and maintenance chemicals to affect water quality is minimal and would be the same under the proposed project as under existing conditions. Additionally, the continued implementation of programs developed under Storm Water Pollution Prevention Plans, a Hazardous Materials Business Plan, a Spill Prevention Control and Countermeasure Plan, and use of Best Management Practices would prevent impacts to water quality from mining operations.

Other mining-related activities that could affect water quality are evaluated below, for those actions that could affect surface water quality outside of the quarry and excavation and those that could affect water quality within the quarry.

Outside Quarry Excavation

Mining and processing operations under the proposed project would be identical to those currently occurring at the site, and would occur at the same rates and volumes that exist now. The proposed project would continue to be subject to all applicable local, state, and federal water quality and hazardous materials management requirements, including the Hazardous Materials Business Plan, the Spill Prevention, Control, and Countermeasures Plan, and the Industrial General Stormwater Permit. The proposed project would not increase the rate of production and therefore would not require the storage and use of greater quantities of

hazardous materials on the site. The proposed project would not alter existing activities and therefore would not require the use of new hazardous materials on the site.

Site drainage patterns would not be altered during mining, except that the expansion of the quarry footprint would result in more direct rainfall and stormwater being retained within the quarry and not running off the site. Sedimentation basins would be expanded and new basins constructed, as needed, along the perimeter of the stockpile and quarry as those features are expanded. For stockpile drainage, the total combined capacity of the sediment basins would be proportionately increased to accommodate the increased surface area of the stockpile.

The Industrial General Stormwater Permit is required to be updated to address changes in the site as the stockpile and quarry areas expand. Such changes may include enlarging or adding additional sedimentation and stormwater detention basins and related conveyance ditches. Continued compliance with Industrial General Stormwater Permit requirements and implementation of the proposed stormwater drainage infrastructure would reduce the potential of mining-period activities to violate water quality standards or waste discharge requirements or result in substantial degradation of surface water in areas outside of the quarry pit. Thus, any potential impacts related to surface runoff and stormwater management outside the perimeter of the quarry excavation would be less than significant and no mitigation would be required.

Within Quarry Excavation

During mining, water quality within the quarry could be affected by two mechanisms. The first is the use of blasting agents while the second is the potential leaching of certain minerals from the metavolcanic bedrock within the mine.

Mining under the proposed project would continue to require the use of blasting agents in the same quantities and frequencies in which they are currently used. Blasting agents typically used for mining include both an oxidizer and an accelerant. Oxidizers are generally nitrate-based compounds, such as ammonium nitrate. Accelerants are generally flammable liquids such as fuel oil or mineral oils. One of the most common blasting agents is ammonium nitrate/fuel oil, commonly referred to as ANFO. If not managed properly, the use of blasting agents has the potential to allow nitrates and other chemicals, such as petroleum hydrocarbons, to accumulate in the rainfall and stormwater that accumulates in the bottom of the quarry. Mechanisms that can result in release of nitrates to the environment from blasting agents include:

- Spillage during transport across the site or storage onsite
- Poor placement of blasting agents into blast holes or overfilling of blast holes;
- Dissolution (leaching) of blasting agents in “wet” blast holes; and
- Undetonated explosives agents remaining in the rock following the blast.

As discussed in Section 2.2.3, above, nitrate levels currently exceed water quality standards in the sampled from the groundwater supply well and from the quarry pit excavation. The presence of elevated nitrate levels in the quarry pit excavation sample may be due to cattle grazing or the use of water from the groundwater supply well. However, the elevated nitrate

level in the existing quarry pit water could also be the result of the use of blasting agents during mining operations. If dewatering and discharge of the quarry pit water to the land surface outside of the quarry perimeter becomes necessary in the future, as discussed in Section 3.2, above, the discharge would require a National Pollutant Discharge Elimination System (NPDES) permit issued by the Regional Water Quality Control Board. Exceedance of the water quality standards and concentration limits specified in the NPDES permit would be a violation of the permit requirements and would be a potentially significant impact under CEQA. Potential mitigation measures are discussed in Section 6.0, below.

As described in Section 3.2 above, as a result of mining, the greenstone on the quarry walls would be exposed to the atmosphere, with more oxidizing conditions than those that likely occur at depth in the intervals that were encountered in IO-18-01 and IO-18-02 under existing conditions. Sulfide mineralization (e.g. pyrite) was identified at several depth intervals in each of the two deep geotechnical borings. Localized oxidation could generate acid rock drainage (ARD). However, carbonate veins are also present as part of the mineralization, such that the calcareous minerals (e.g. calcite, dolomite) would neutralize the oxidized sulfates, resulting in the formation of soluble sulfate, calcium, and magnesium. The following chemical equation defines the reaction (Gomo, 2018):

$$FeS_2 + CaMg(CO_3)_2 + 3.75O_2 + 1.5H_2O \leftrightarrow Fe(OH)_3 + 2(SO_4)^{2-} + Ca^{2+} + Mg^{2+} + 2CO_2$$

The reaction indicates that oxidation of pyrite in the presence of water and limestone or dolomite results in insoluble ferric (Fe^{3+}) oxide, dissolved ions of sulfate, calcium and magnesium, and carbon dioxide. Such a reaction would result in elevated concentrations of sulfate, calcium, and magnesium along with elevated TDS levels in the water that runs over or percolates through the exposed quarry benches and faces. However, based on existing data, the potential for a future impact to water quality due to the presence of sulfide mineralization and carbonate veins is unknown. Thus, any potential impact to water quality would be addressed through an adaptive management strategy, as described in Section 6.0, below.

Potential Effects During Final Reclamation

After mining is completed in 2175, final reclamation activities would be conducted. Final reclamation would consist of final grading of the stockpile slopes, removal of structures and equipment that support mining, stripping and decompaction of roads that would not be used for post-mining access, abandonment of wells, and revegetation.

Outside Quarry Excavation

Final reclamation activities would have the potential to degrade surface water quality through mechanisms such as erosion and sedimentation due to land disturbances; uncontained material and equipment storage areas; improper handling of hazardous materials; leaking oils and grease from heavy equipment; and release of pollutants in a quarry pit. Final reclamation activities would need to comply with the NPDES program either by incorporating coverage under the Industrial General Stormwater Permit through an amendment to the existing site-specific industrial activities SWPPP or by filing a Notice of Intent and SWPPP for compliance under the Construction General Stormwater Permit. Similar to the Industrial General Stormwater Permit SWPPP, the Construction General Stormwater Permit SWPPP would identify BMPs and direct inspections and monitoring to

protect stormwater runoff, prevent unauthorized discharges, and ensure the avoidance of substantial degradation of water quality during final reclamation.

Compliance with NPDES program requirements through SWPPP implementation under either the Industrial or Construction General Stormwater Permit would ensure that water quality impacts during the implementation of final reclamation activities would be less than significant. Any waste discharge requirements that would have been issued for the proposed project would be rescinded at the time reclamation is completed.

Inside Quarry Excavation

Upon completion of mining, blasting agents would no longer be used and, therefore, would not have the potential to impact water quality within the quarry. However, the leaching of minerals from the bedrock could still occur as the quarry begins to fill with water, based on the same mechanism described above. Dewatering and discharge would no longer occur, so there would be no potential to violate water quality standards associated with an NPDES permit. However, water quality conditions could develop that may pose a threat to wildlife that may vist the quarry lake and come in contact with the pit lake water, or injest the water and/or surrounding vegetation. As above, the extent, magnitude, and even the potential for the occurrence of a significant impact is uncertain. Therefore, the adaptive management plan described in Section 6.0 would provide the appropriate monitoring, trigger levels, and potential corrective actions to address exceedances of applicable water quality standards, if they occur.

Potential Effects Due to Conditions that Would Exist After the Site is Reclaimed

Reclamation would convert the site to open space, open water, and grazing land uses. Revegetated areas would be monitored to assure that standards are adequately achieved. The quarry pit would gradually fill with rainfall, stormwater runoff from the pit highwalls, and a limited amount of groundwater to create a pit lake. The final elevation of the water surface is anticipated to be 105 feet msl, or about 300 feet below the surrounding land surface.

Outside Quary Excavation

The primary facility or infrastructure to remain post-reclamation would be accessing roads for monitoring and maintenance. After the site is successfully revegetated, stormwater control structures (e.g., basins, down drains, ditches) would no longer be necessary. Since the final reclaimed condition does not include any active land uses, there would be no potential for the release of pollutants (e.g., landscaping fertilizers, pesticides and herbicides, and trash) after revegetation is established.

The overall drainage patterns of the site after the completion of final reclamation would remain similar to the existing conditions and conditions under the proposed mine expansion design, except that stormwater conveyance ditches and sedimentation basins would no longer be necessary due to the final grading and revegetation. As a result, runoff would leave the site primarily as sheet flow and there would be no potential for degradation of surface water quality or violation of water quality standards. Any waste discharge requirements that would have been issued for the proposed project would have been rescinded at the time reclamation was completed.

Inside Quarry Excavation

Potential effects on water quality within the quarry excavation after reclamation is completed would be identical to those described above during final reclamation. The adaptive management plan described in Section 6.0 would provide the appropriate monitoring, trigger levels, and potential corrective actions to address exceedances of applicable water quality standards, if they occur.

Groundwater

The mechanisms by which groundwater quality could be impacted are the same during active mining, during reclamation, and after reclamation is completed. Groundwater quality can be impacted through activities that would put contaminants into contact with groundwater (e.g., drilling of deep wells, release of pollutants in a quarry pit that then come into contact with groundwater). The project does not propose to install any additional groundwater wells or other deep borings that could be conduits for contamination.

As discussed in Sections 2.2.2 and 3.2, the water level in the quarry would always be lower than the adjacent groundwater surface elevation in the surrounding greenstone bedrock. Thus, groundwater would always flow from the bedrock into the quarry pit. As a result, groundwater quality in the surrounding bedrock could not be affected by the water in the quarry pit lake.

Furthermore, there is little or no connectivity between groundwater in the fractured bedrock and groundwater in the Valley Springs Formation due to the million-fold difference between the transmissivities of these two different geologic units, as discussed under the "Supply Well" heading in Section 2.2.2, above. Thus, the proposed project could not affect groundwater quality in the Cosumnes Groundwater Basin.

b) Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

At the project site, groundwater is present in the greenstone of the Gopher Ridge Volcanics geologic formation. This bedrock unit is not a part of a defined groundwater basin. The Sustainable Groundwater Management Act and related requirements for sustainable groundwater management only apply to groundwater basins defined by DWR. In any case, there is very little groundwater present within the greenstone, with only 0.2 acre-feet per year currently entering the quarry and up to 20 acre-feet per year that would enter the quarry at its maximum depth. There are also no known users of groundwater from the greenstone bedrock.

To the west of the project site, groundwater is present within the Valley Springs Formation, which is part of the Cosumnes subbasin of the San Joaquin Valley groundwater basin. Water from the Valley Springs Formation has been used for many decades to supplement project site water supplies during the dry season. As part of the proposed project, use of groundwater from the Valley Springs Formation would continue to occur. The volume of groundwater use would remain the same as current use but could also decrease due to additional available stormwater in the expanded quarry. However, during occasional extremely dry years, water use from the supply well could temporarily increase from five acre-feet per year to as much as 15 acre-feet per year to offset reduced surface water availability that year.

The foothill area of the groundwater Basin is anticipated to have a net positive water budget of 800 acre-feet per year to 1,300 acre-feet per year, according to the GSP. Furthermore, groundwater in the Valley Springs Formation in the foothill area does not appear to be hydrogeologically connected to groundwater in any of the other geologic formations in the Basin. The average groundwater use of 5 acre-feet per year from the supply well is equivalent to the existing baseline groundwater use at the project site. The occasional use of up to 15 acre-feet per year during extremely dry years represents only 1.9 percent to 1.2 percent of the net positive water budget for the foothills area of the Basin. Furthermore, the net increase in groundwater use of 10 acre-feet per year above the existing baseline groundwater use is only 1.25 percent to 0.8 percent of the net positive water budget for the foothills area of the Basin.

In addition, the transmissivity of the greenstone is at least $1x10^6$ (one million) times less than that measured in the adjacent Valley Springs Formation. Thus, additional inflow of water into the expanded quarry or any related lowering of the groundwater elevation in the greenstone bedrock would have no measurable effect on recharge to the Cosumnes groundwater subbasin.

Based on the above analysis, the proposed project would not substantially decrease groundwater supplies, would not interfere substantially with groundwater recharge, and would not have any effect on sustainable management of any identified groundwater basin. Therefore, the proposed project would have No Impact on groundwater supplies.

c) Would the Project substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

- **i. Result in substantial erosion or siltation on- or off-site;**
- **ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site;**
- **iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or**
- **iv. Impede or redirect flood flows?**

Cap rock stockpiles are typically constructed by placing the rock in a temporary angle-of-repose slope inclination and then later regrading the slope to flatten the slopes to the final grade. This re-grading will be completed as each bench is completed. In addition, the regraded slopes, if sufficient growth medium or overburden soils are present, may be revegetated. The cap rock is not prone to erosion and those areas with overburden soil would be revegetated, helping to reduce erosion and sedimentation transport associated with the stockpile.

Surface runoff is currently routed to onsite stormwater retention ponds. During mining and after reclamation, this drainage condition will be maintained. Stormwater conveyance channels on benches and downdrains would be designed to convey runoff of design storm events without erosion or overflow. The Drainage Analysis (Golder Associates, 2020b) demonstrates that the peak flow velocities in the conveyance channels would be below those that typically result in erosion (i.e., less than six cfs).

As a result of these measures, the proposed project would not result in substantial erosion or siltation onsite and would not result in any change in runoff offsite. In addition, the proposed project would not increase the rate or amount of surface runoff in a manner that would result in flooding. Overall, there would be no change in the rate or amount of surface runoff compared to existing baseline conditions. There would be no discharge of runoff water to any existing or planned stormwater drainage systems. Implementation of BMPs and other requirements mandated by the SWPP would prevent discharge of polluted runoff. Since the site is not within a designated floodplain or floodway, the proposed project would not impede or re-direct flood flows. Therefore, any potential impacts related to drainage and surface runoff would be less than significant.

d) In flood hazard, tsunami, or seiche zones, would the Project risk release of pollutants due to project inundation?

The project site is not located in a flood hazard zone. It is also not located near the ocean. Thus, it is not subject to inundation by a tsunami.

A seiche is an oscillating wave that forms within an enclosed water body, such as a lake or a pond, due to prolonged winds or an earthquake. If the height of the oscillating wave exceeds the freeboard of the enclosed water body, then surrounding properties could be inundated. The freeboard in the quarry after the water level in the excavation equilibrates would be several hundred feet. The freeboard in the stormwater retention basins would exceed two feet after a design storm event. Based on the relatively small size and shallow depth of the retention basins, potential impacts related to a release of pollutants due to project inundation from a seiche in the stormwater retention basins is considered to be less than significant.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The proposed project would operate consistent with applicable water quality control plans issued by RWQCB. SGI may be required to prepare a Report of Waste Discharge for submittal to RWQCB. Staff would then determine whether the quarry, stormwater ponds, or other components of the Project where process water is discharged would require a Waste Discharge Requirements permit (WDRs) from RWQCB. The WDRs would ensure that the Project would be consistent with, and not conflict with or obstruct implementation of, the Water Quality Control Plan for the Sacramento and San Joaquin Valleys (also referred to as the Basin Plan).

As discussed in Item **b)**, above, the proposed project would not impede sustainable groundwater management of the Cosumnes subbasin, such that any potential impacts would be less than significant.

5.0 Mitigation

Under CEQA, mitigation is only required for potentially significant impacts. Based on the evaluations presented in Section 5.0, the Project may result in two potentially significant impacts related to Hydrology and Water Quality. Mitigation measures to address these potentially significant impacts are described below.

Impact H-1: As mining progresses to greater depths, the greenstone on the quarry walls will be exposed to the atmosphere, with more oxidizing conditions than currently exist at the depths to be mined. Localized oxidation of pyrite could generate ARD. However, carbonate veins are also present as part of the mineralization, such that the calcareous minerals (e.g. calcite, dolomite) would neutralize the oxidized sulfates, resulting in the formation of soluble sulfate, calcium, and magnesium. Such a reaction would result in elevated concentrations of sulfate, calcium, and magnesium along with elevated TDS levels in the water that runs over or percolates through the exposed quarry benches and faces. However, based on existing data, the potential for a future impact to water quality due to the presence of sulfide mineralization and carbonate veins is unknown. Thus, any potential impact to water quality would be addressed through an adaptive management strategy.

Mitigation Measure H-1: *To be implemented as an adaptive management strategy to assess whether the proposed project would have the potential to cause acid rock drainage or a violation of water quality standards for sulfate, calcium, magnesium, and/or TDS in the reclaimed quarry lake within the former mining excavation and actions to take if an impact is verified.*

This potential impact would be addressed through an adaptive management strategy that includes monitoring, comparison of monitoring results with action levels, and subsequent implementation of mitigation measures if the action levels are exceeded.

Based on the logs from geotechnical borings IO-18-01 and IO-18-02, five samples will be collected from the core obtained from each boring (10 samples total). The sample depths were selected to include areas of observed sulfide mineralization and carbonate veins. The total number of samples and the sampling interval are based upon information and guidance prepared by the International Network for Acid Prevention (2014).

The proposed sample depths are:

IO-18-01	IO-18-02
174.9 ft	88.6 ft
267.5 ft	132.3 ft
454.8 ft	185.8 ft
551.6 ft	273.6 ft
686 ft	461.0 ft

The samples will be submitted to a California-licensed analytical laboratory for static testing using the waste extraction test methodology using deionized water (DI-WET) to mimic rainfall conditions. The leachate from each sample will be analyzed for general mineral parameters and metals. The rock samples will also be evaluated for sulfide speciation and acid-base accounting analysis, including acid generation potential, acid neutralization potential, and net generation or neutralization potential, as appropriate. This analytical program for the initial samples is consistent with the recommendations in Section 4.3.2.3 of the 2014 Global Acid Rock Drainage Guide. Use of the DI-WET methodology with a 48-hour contact time exceeds the recommendations in the 2014 Global Acid Rock Drainage Guide, which discusses 24-hour batch tests using deionized water.

The leachate testing data from the samples described above will be evaluated using the statistical procedures described in Chapter Nine in the USEPA SW-846 manual (USEPA, accessed June 29, 2020), or other appropriate statistical guidance, to determine the appropriate quarry lake water sampling program once mining ceases and water partially fills the reclaimed quarry. The statistical analysis will be used to identify the number of samples to be collected each sampling round. Every six months, based on seasonal changes in runoff and evaporation from the quarry pond, field measurements would be conducted for the parameters listed in Table 5 below and grab water samples would be collected. The field parameters are general indicators of water quality. The field measurements will be taken at each location from which a grab water sample is to be collected, based on the statistical analysis.

TABLE 5
SEMIANNUAL FIELD INDICATOR PARAMETERS

Parameter	Action Level
pH	>8.5
Conductivity	>900 umhos/cm
Dissolved oxygen (DO)	<5.5 mg/L or <50% of saturation
Oxidation-reduction potential (ORP)	<0

Action levels are based on regulatory standards listed in Tables 1 and 3 or conditions that could reverse oxidation-reduction (redox) reactions.

The grab groundwater samples will be submitted to a California-licensed analytical laboratory for analysis of general mineral parameters (to include nitrate – see Mitigation Measure H-2, below) and metals. The primary focus of the data review would be calcium, magnesium, sulfate, and any metals identified as exceeding water quality standards applicable at the time mining ceases. The water quality data will also be compared with USEPA ecotoxicity thresholds (USEPA, 1996) to ensure that waterfowl, amphibians, and other biota that may come in contact with the quarry pond are not affected. If any of the action levels shown in Table 1 for the field data, or any MCL, NPDES limit or Ecotoxicity threshold for the laboratory analysis, are exceeded for two successive monitoring events, then an action plan would be developed to implement corrective measures to address the exceedances.

Specific corrective actions would depend on the nature of the underlying exceedance.

1. If pH, dissolved oxygen, or ORP levels fall outside of the limits in Table 1, aeration or mechanical circulation of the water in the quarry pond could be used to neutralize the pH and/or increase the dissolved oxygen and ORP levels.
2. If TDS levels or individual ions or metals exceed their standards, then the quarry pond water could be treated using a range of available filtration or treatment technologies, such as ion exchange, prior to any future discharge from the quarry lake. The exact treatment technology would be selected based on the specific parameter(s) that exceeds their standards, including new technologies that may be developed between now and the time corrective action would be triggered.

3. If specific areas or volumes of wall rock are identified as being problematic, the corrective measures could include removal of the rock mass or sealing of the rock mass with grout or other materials.

The corrective measures described above are established technologies that are feasible to implement. Additional feasible technologies (e.g., future improvements in water treatment technology) if any that may be developed between the time this adaptive management strategy was prepared and the monitoring data indicate an exceedance could also be deployed.

Monitoring results would be reported to the County on an annual basis. The annual report would also describe any additional measures that have been or are planned to be taken based on the monitoring results. If the triggers described above to implement corrective measures are exceeded for two monitoring rounds, then the annual report would also describe the corrective actions that have been or are planned to be implemented under the adaptive management program.

It is important to note that geochemical conditions on the quarry walls and in the quarry pond are likely to change over time. Thus, if monitoring for four successive years (i.e., eight sampling events total) indicates that water quality conditions have stabilized, then the water quality monitoring program would cease.

Impact H-2. Potential environmental effects associated with the use of blasting agents are influenced by the type of soil, the depth of the groundwater, presence of surface water, and the amount and infiltration rates of precipitation (Degnan et al., 2016). Mechanisms that can result in release of nitrates to the environment from blasting agents include:

1) Spillage during transport;
2) Poor placement of blasting agents into blast holes or overfilling of blast holes;
3) Dissolution (leaching) of blasting agents in "wet" blast holes; and
4) Undetonated explosives agents remaining in the rock following the blast.

Although the current presence of elevated nitrate levels at PW-1 may be due to cattle grazing or the use of water from well W-1, the use of blasting agents and other hazardous materials during mining operations in the future could pose a potential threat to water quality. Potential impacts to water quality would be addressed through an adaptive management strategy.

Mitigation Measure H-2: *To be implemented as an adaptive management strategy to minimize potential water quality impacts associated with blasting.*

Semiannual sampling conducted as part of the adaptive management strategy for Mitigation Measure H-1 will include testing for nitrate. If the concentration of nitrate exceeds the MCL of 45 mg/L as nitrate for two successive monitoring rounds, then additional testing of influent waters will be conducted. This additional testing will include the water from well W-1 (if the well is in use at the time) and seepage from any fractures located near areas where cattle grazing recently occurred. If the nitrate level in any of the influent water samples is comparable to the level in the water accumulated within the quarry, then no further action would be required and monitoring would continue. However, if the nitrate level is higher in the water within the quarry, such that

the nitrate level would be below the MCL but for the quarry water, then the following corrective actions would be implemented:

1. Handling of all blasting agents shall be limited to qualified and licensed blasting contractors at all times.
2. All blasting products shall be stored only in approved containers, specifically designed for the safe keeping of explosives.
3. Any spillage of blasting agents shall be immediately cleaned up, and properly disposed of in strict accordance with the project's Spill Prevention, Control, and Countermeasures (SPCC) Plan and applicable state and federal regulations.
4. The type of blasting agent selected shall be appropriate for the specific environmental conditions.
5. Blast designs and loading controls shall be prepared by qualified blasting contractors or other experts to ensure complete detonation.
6. A current inventory of the types and quantities of blasting agents, along with Material Safety Data Sheets, shall be maintained onsite by qualified personnel.
7. Relevant information shall be included in the site's pollution prevention plans, including the Spill Prevention, Control, and Countermeasures Plan, the Hazardous Materials Business Plan, and the Stormwater Pollution Prevention Plan.

Implementation of these corrective measures would reduce the impact to water quality from blasting to less than significant.

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APPENDIX A
BOREHOLE LOGS

REPORT OF BOREHOLE: New Well

CLIENT:	SGI Ione	COORDINATES: 38.365208°, -121.019576°		SHEET: 1 OF 4	
PROJECT:	New Production Well	ELEVATION: 293 ft		DRILL RIG: T-650WII, Air Rotary, 8.625"	
LOCATION:	Ione, CA	DATUM: WGS84		LOGGED: JHC	DATE: 2/12/2020
PROJECT NO.:	1781618	NOTE: Logged from cuttings.		CHECKED: LA	DATE: 8/12/2020

Drilling						Sampling		Material Description			PID (ppm)	MONITORING WELL DETAILS
METHOD	SUPPORT	DRILL TIME	WATER (bgs)	DEPTH feet	LAYER ELEVATION	SAMPLE NO., FIELD TEST, BLOWS PER FOOT NOTES	SAMPLE TYPE	GRAPHIC LOG	USCS	(SYMBOL) SOIL NAME, particle size, gradation, shape, minor components; color, contamination; behaviour, moisure, density/consistency		TOC ELEVATION: Not surveyed
AIR ROTARY				0					SM	Silty SAND with gravel, light yellowish brown; fine to coarse sand, fine to coarse subrounded gravel; non-plastic fines; non-cohesive, dry.		7-Sack Grout
				20								Bentonite Chips
				40								6.625-inch Diameter Stainless Steel Blank Casing
												Pea Gravel
					238.0							
					55.0				SC	Clayey SAND, bluish gray; fine to coarse sand, some fine subrounded to subangular gravel; low-plasticity fines; non-cohesive, dry to moist.		
				60								
				80						Increase in clay content. Becomes moist.		1/8"-inch Milled Stainless Steel Screen
				100								

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Report of borehole must be read in conjunction with accompanying notes and abbreviations

REPORT OF BOREHOLE: New Well

CLIENT:	SGI Ione	COORDINATES: 38.365208°, -121.019576°		SHEET: 2 OF 4	
PROJECT:	New Production Well	ELEVATION: 293 ft		DRILL RIG: T-650WII, Air Rotary, 8.625"	
LOCATION:	Ione, CA	DATUM: WGS84		LOGGED: JHC	DATE: 2/12/2020
PROJECT NO.:	1781618	NOTE: Logged from cuttings.		CHECKED: LA	DATE: 8/12/2020

Drilling						Sampling		Material Description			PID (ppm)	MONITORING WELL DETAILS
METHOD	SUPPORT	DRILL TIME	WATER (bgs)	DEPTH feet	LAYER ELEVATION	SAMPLE NO., FIELD TEST, BLOWS PER FOOT NOTES	SAMPLE TYPE	GRAPHIC LOG	USCS	(SYMBOL) SOIL NAME, particle size, gradation, shape, minor components; color, contamination; behaviour, moisure, density/consistency		
AIR ROTARY			▽ First encountered during drilling	100					SC			
					178.0							
					115.0				CL	Silty CLAY with sand, bluish gray; low plasticity fines, fine to coarse sand, trace fine gravel; cohesive, wet.		
				120								1/8"-inch Milled Stainless Steel Screen
				140						Sandy silty CLAY with gravel, bluish gray; low plasticity fines, fine to coarse sand, fine subrounded to subangular gravel; cohesive, wet.		
				160								
				180								
				200								

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REPORT OF BOREHOLE: New Well

CLIENT:	SGI Ione	COORDINATES: 38.365208°, -121.019576°		SHEET: 3 OF 4	
PROJECT:	New Production Well	ELEVATION: 293 ft		DRILL RIG: T-650WII, Air Rotary, 8.625"	
LOCATION:	Ione, CA	DATUM: WGS84		LOGGED: JHC	DATE: 2/12/2020
PROJECT NO.:	1781618	NOTE: Logged from cuttings.		CHECKED: LA	DATE: 8/12/2020

Drilling						Sampling		Material Description			PID (ppm)	MONITORING WELL DETAILS
METHOD	SUPPORT	DRILL TIME	WATER (bgs)	DEPTH feet	LAYER ELEVATION	SAMPLE NO., FIELD TEST, BLOWS PER FOOT NOTES	SAMPLE TYPE	GRAPHIC LOG	USCS	(SYMBOL) SOIL NAME, particle size, gradation, shape, minor components; color, contamination; behaviour, moisure, density/consistency		
AIR ROTARY				200					CL			
				220								
				240								
				260	33.0 260.0				SP SC	Poorly graded SAND with clay, bluish gray; fine to coarse sand but mostly medium sand, trace fine gravel; low-plasticity fines; non-cohesive, wet.		
				280						Same as above but sand becomes mostly coarse-grained. Increase in gravel content.		
				300								

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Report of borehole must be read in conjunction with accompanying notes and abbreviations

REPORT OF BOREHOLE: New Well

CLIENT:	SGI Ione	COORDINATES: 38.365208°, -121.019576°		SHEET: 4 OF 4	
PROJECT:	New Production Well	ELEVATION: 293 ft		DRILL RIG: T-650WII, Air Rotary, 8.625"	
LOCATION:	Ione, CA	DATUM: WGS84		LOGGED: JHC	DATE: 2/12/2020
PROJECT NO.:	1781618	NOTE: Logged from cuttings.		CHECKED: LA	DATE: 8/12/2020

Drilling						Sampling		Material Description			PID (ppm)	MONITORING WELL DETAILS
METHOD	SUPPORT	DRILL TIME	WATER (bgs)	DEPTH feet	LAYER ELEVATION	SAMPLE NO., FIELD TEST, BLOWS PER FOOT NOTES	SAMPLE TYPE	GRAPHIC LOG	USCS	(SYMBOL) SOIL NAME, particle size, gradation, shape, minor components; color, contamination; behaviour, moisure, density/consistency		
AIR ROTARY				300					SP SC	Same as above but sand becomes mostly medium-grained. Decrease in gravel content.		1/8"-inch Milled Stainless Steel Screen
				320	-27.0 320.0				CL	Sandy silty CLAY with gravel, bluish gray; low plasticity fines, fine to coarse sand, fine subrounded to subangular gravel; cohesive, wet.		
					-37.0 330.0				SM	Silty SAND, bluish gray; fine to medium sand but mostly fine sand; non-plastic fines; non-cohesive, wet.		Sluff
				340								
				360	-67.0 360.0					Bottom of hole at approximately 360 feet below ground surface.		

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Report of borehole must be read in conjunction with accompanying notes and abbreviations

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-01
Drilling Method Diamond Core

Drill Rig
Azimuth 0
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD+RK
Date 10/10/2018-10/31/2018

GOLDER

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Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
HQ3	Overburden	1	0.0	5.2	0.4	NA	NA	NA	R0	HW	NA																Sandy silt with occasional angular gravels
↓	Overburden	2	5.2	10.5	2.8	NA	NA	NA	R0	CW	NA																Large visible frag of andesite 1-5cm in a sandy silt matrix
↓	Overburden	3	10.5	12.9	1.2	NA	NA	NA	R0	CW	NA																Mix of highly weathered rock and soil. Last 0.2 ft of run soil is silty clay with angular frags.
↓	Overburden	4	12.9	16.1	1.7	NA	NA	NA	R0	HW	NA																Silty clay; last 0.4 ft of run in fragmented qtz vein.
to TD	Overburden	5	16.1	18.0	1.7	NA	NA	NA	R1	CW	NA																
	Cap Rock (Weathered Greenstone)	5	18.0	20.1	2.1	2.1	2.1	1	R1	HW	20	19.2	J2	1	35	UN	R	-	-	6	20						Joint is in highly weathered, medium-grained meta-andesite with 1-2cm flow bands.
	Cap Rock (Weathered Greenstone)	6	20.1	23.1	3.0	2.9	2.9	1	R2	HW	20	21.5	J2	1	23	UN	R	Ox	-	12	20						Highly fragmented rock
	Cap Rock (Weathered Greenstone)	7	23.1	25.8	2.7	2.7	2.6	1	R2	HW	0	23.7	F1	1	70	UN	R	Gouge+ Gravel	30	20	0						Matrix between fragments is soft and parts easily
	Cap Rock (Weathered Greenstone)	8	25.8	29.2	3.4	3.4	3.4	0	R2	HW	20																Rock is still highly weathered
	Cap Rock (Weathered Greenstone)	9	29.2	31.1	1.9	1.9	1.9	0	R2	HW	20																Medium grained weathered meta-andesite
	Cap Rock (Weathered Greenstone)	10	31.1	34.1	3.0	3.0	2.4	3	R3	MW	23	32.7	FB	1	45	UN	R	-	-	14	23						
												33.4	J2	1	47	UN	R	-	-	12	23						
												33.7	J2	1	45	UN	R	-	-	14	23						
	Cap Rock (Weathered Greenstone)	11	34.1	34.4	0.0	0.0	NA	NA	NA	NA	NA																0.3 ft lost core @ end of run; rods almost got stuck
	Cap Rock (Weathered Greenstone)	12	34.4	35.0	0.7	0.7	NA	NA	R1	HW	NA																HW meta-andesite and 0.2 ft of silty clay
	Cap Rock (Weathered Greenstone)	12	35.0	35.8	0.8	0.8	0.8	0	R3	SW	23																Contact btwn silty clay soil and bedded meta-sandstone is closed. Bedding at ~ 45 deg.
	Cap Rock (Weathered Greenstone)	13	35.8	38.9	3.1	3.1	1.0	5	R3	SW	20	38.0	J2	1	32	UN	SM	Ox	-	4	20						Rock is slightly to moderately weathered; 0.2 ft of broken core
	Cap Rock (Weathered Greenstone)	14	38.9	41.6	2.5	2.5	1.0	5	R3	SW	20	39.6	J1	1	40	UN	SM	Ox	-	4	20						
												39.9	J1	1	10	UN	SM	Ox	<1	4	20						Complete coating
												40.2	J2	1	60	UN	R	-	-	6	23						
												40.8	J1	2	33	UN	SM	Ox	<1	4	20						Complete coating
	Cap Rock (Weathered Greenstone)	15	41.6	44.2	2.6	2.6	1.2	4	R3	SW	20	41.8	J2	1	60	UN	R	Ox	-	6	20						
												42.1	J1	1	60	UN	SM	Ox	-	4	20						
												42.6	J1	1	10	UN	SM	Ox	-	2	20						Fracture didn't cross cut core
												43.0	J1	1	40	UN	R	Ox	-	6	20						Lower contact w/silty clay soil is closed and about @ 60 degrees
	Cap Rock (Weathered Greenstone)	16	44.2	46.5	2.3	1.4	0.5	3	R2	HW	12	45.0	F1	1	45	UN	R	Gouge/ Ox	10	8	0	44.9	45.3		44.2	44.7	
												45.5	J1	1	57	UN	R	Ox	-	8	20						Weathered meta-andesite more massive after this joint
												45.7	J1	1	10	UN	SM	Gouge/ Ox	-	4	20						
	Cap Rock (Weathered Greenstone)	17	46.5	51.6	5.1	5.1	0.7	10	R3	SW	12	46.9	F1	1	60	UN	R	Ox	30	10	0						Gouge and fragments in fault
												47.2	J1	2	56	UN	R	Ox	<1	8	12						

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-01
Drilling Method Diamond Core

Drill Rig
Azimuth 0
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD+RK
Date 10/10/2018-10/31/2018

GOLDER

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Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												47.6	J1	1	40	UN	R	Ox	<1	10	12						
												48.1	J1	2	60	UN	R	Ox	-	6	20						
												48.8	J1	1	10	UN	R	Ox	-	8	20						Low core angle; 0.9ft long joint
												49.6	J1	1	60	UN	R	Ox	-	10	20						
												49.9	J1	1	65	UN	R	Ox	-	14	20						
												50.4	J1	1	30	UN	R	Ox	-	10	20						Contact @ 51 ft. Agglomerate or volcanic breccia w/altered matrix.
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	18	51.6	54.1	2.5	2.5	1.4	1	R4	FR	23	52.4	J1	1	25	UN	R	Ox	-	14	23						90% Fragments 1mm- 8cm
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	19	54.1	57.9	3.8	3.8	3.8	0	R5	FR	25																From 56-57.9 ft ~50% fragments, matrix supported, 1mm- 8cm occasional felsic frags
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	20	57.9	63.1	5.2	5.2	5.2	3	R5	FR	14	61.0	V1	1	10	UN	R	Qtz/Carb	1	16	15						
												62.6	V2	1	45	UN	SM	Carb	<1	4	12						Complete coating
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	21	63.1	66.7	3.6	3.6	3.3	1	R5	FR	15	64.3	V1	1	10	UN	SM	Carb	1	4	15						Epidote infill
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	22	66.7	70.5	3.8	3.8	3.8	0	R5	FR	25																From 69.8 ft on the breccia is weaker with less epidote
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	23	70.5	74.2	3.7	3.7	3.7	0	R5	FR	25																
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	24	74.2	79.3	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	25	79.3	84.4	5.1	5.1	4.6	4	R5	FR	16	82.0	J1	2	65	UN	R	Ox	-	10	20						
												82.5	J1	1	47	UN	R	Ox	-	10	20						
												82.8	J1	1	20	UN	R	Ox	-	16	20						
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	26	84.4	89.3	4.9	4.9	4.9	1	R5	FR	6	86.5	J1	1	40	UN	R	Ox	-	14	6						
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	27	89.3	94.0	4.7	4.7	4.7	0	R5	FR	25																Rock is less brecciated/fragmented; Similar to fragmental andesite in IO-18-02
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	28	94.0	99.0	5.0	5.0	5.0	1	R5	FR	12	96.5	V1	1	8	UN	R	Carb	1	16	12						Joint from 95.6-97.1 ft has low angle to core axis; pinkish carb infill complete coating
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	29	99.0	104.0	5.0	5.0	3.3	1	R5	FR	6	103.3	V1	1	0	UN	R	Carb	1	12	6						102.3- 104 ft. - Joint parallel to core
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	30	104.0	109.1	5.1	5.1	0.8	3	R5	FR	18	105.7	V1	1	0	UN	R	Carb	-	12	6						104- 107.3 ft. - Joint parallel to core
												107.7	J1	1	25	UN	R	-	-	12	25						
												108.8	J1	1	7	UN	R	-	-	12	25						Joint at 108.3 crosscut by joint at 107.7
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	31	109.1	114.0	4.6	4.1	3.5	3	R5	SW	6	110.5	F	1	50	ST	VR	FH+Bx+Go	0.4ft	12	0	110.5	111				
												111.3	V1	1	52	UN	R	Carb	<1	6	12						
												111.8	V1	1	55	UN	R	Carb/Ox	<1	8	12						0.5 ft of fault gouge at about 50 deg.
	Fault	32	114.0	115.3	1.3	0.0	0.0	13	R5	HW	0											114	115.3	Flt Bx	114.0	115.3	0.3 ft of lost core probably at start of run # 32.
	Greenstone (Meta-andesite, agglomerate or volcanic bx)	32	115.3	117.8	2.5	2.5	2.5	1	R5	FR	20	115.5	V1	1	47	UN	R	Carb	-	18	20						
	Greenstone (Meta-andesite)	33	117.8	121.3	3.5	3.5	3.5	0	R5	FR	25																No sharp contact between agglomerate/breccia and meta-andesite

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	34	121.3	123.6	2.3	2.3	2.3	0	R5	FR	25																
	Greenstone (Meta-andesite)	35	123.6	128.7	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	36	128.7	131.3	2.6	2.6	2.6	0	R5	FR	25																
	Greenstone (Meta-andesite)	37	131.3	135.2	4.1	4.1	1.8	4	R5	FR	12	134.4	V1	4	5	UN	R	Carb	<1	10	12						Joint set at low angle to core axis
	Greenstone (Meta-andesite)	38	135.2	140.0	4.8	4.8	3.8	2	R5	FR	9	136.9	V1	1	35	UN	SM	Carb	<1	4	12						Partial coating
												137.3	V1	1	15	UN	SM	Carb	1	4	6						Joint at 137.3 ft crosscut by joint at 136.9 ft
	Greenstone (Meta-andesite)	39	140.0	142.7	2.7	2.7	2.5	2	R5	FR	12	142.4	V2	2	30	UN	R	Carb	<1	14	12						Partial coating
	Greenstone (Meta-andesite)	40	142.7	147.7	5.0	5.0	5.0	1	R5	FR	0	143.0	F	1	55	UN	SM	Frag	10	4	0						No fault gouge. Probably washed out by drilling. Abundant angular gravel in fault.
	Greenstone (Meta-andesite)	41	147.2	152.3	5.1	5.1	5.1	1	R5	FR	22	148.9	V2	1	33	UN	VR	Cal	<1	12	22						Run start @ 147.7 by Chris' count; switched to drillers' depths
	Greenstone (Meta-andesite)	42	152.3	157.4	5.1	5.1	5.1	1	R5	FR	20	154.6	V2	1	43	UN	VR	Cal	<1	10	20						Andesite is fragmental (agglomerate? volcanic breccia?) but well-healed. Phenocrysts (plag? & bio?) ≤ 1mm. Patchy clay(?)
	Greenstone (Meta-andesite)	43	157.4	162.4	4.7	4.7	4.7	0	R5	FR	25																alteration, healed fxs and veins locally. Dark to light green.
	Greenstone (Meta-andesite)	44	162.4	167.2	5.2	5.3	5.3	1	R5	FR	24	163.5	V2	1	50	P	VR	Cal	<1	14	24						Beginning of run doesn't match end of previous run very well; recoved 0.3 ft of previous run
	Greenstone (Meta-andesite)	45	167.2	172.4	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	46	172.4	177.3	4.9	4.8	3.8	8	R5	FR	12	172.9	V1	1	32	P	R	Cal	<1	4	18						174.9-176.1 shear zone filled w/cal
												174.6	V1	1	31	P	SM	Cal	<1	2	18						Some fxs anastamosing & discontinuous
												174.9	V1	1	70	P	SM	Cal	2	2	12						
												175.0	F	1	50	UN	SM	Cal+Gouge	3	2	4						
												175.4	V1	1	58	UN	SM	Cal	1	4	16						Some cal (?) or clay (?) is pink
												176.0	V1	3	47	P	R	Cal+Talc	2	4	8						
	Greenstone (Meta-andesite)	47	177.3	182.3	5.1	5.1	5.1	2	R5	FR	20	177.9	J2	1	39	UN	VR	-	-	14	24						
												179.0	V1	1	51	P	VR	Cal+Talc	<1	10	18						
	Greenstone (Meta-andesite)	48	182.3	187.4	5.0	4.7	4.7	6	R5	FR	4	183.9	S	1	44	UN	VR	Cal+Talc	3	16	4						
												184.0	S	1	42	C	VR	Cal+Talc	2	10	4						
												185.7	V1	1	56	UN	VR	Cal	<1	16	18						
												185.8	V1	1	74	C	VR	Cl	2	12	4						
												186.5	V1	1	76	P	R	Cal+Cl	3	6	4						Some pink cal/clay
												187.3	V2	1	90	IR	VR	Cal+Cl	<1	16	18						
	Greenstone (Meta-andesite)	49	187.4	187.8	0.4	0.4	0.0	2	R5	FR	20	187.4	V1	1	74	P	R	Cal	1	8	16						
												187.6	V1	1	67	UN	R	Cal	<1	6	20						
												187.8	V2	1	63	P	VR	Cal	<1	16	22						

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Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	50	187.8	190.3	2.5	2.5	2.0	6	R5	FR	12	188.0	F	1	65	P	VR	Cl+Bx+ Cal	10	18	0						
	@190 begins to look											188.2	V1	1	77	C	VR	Cl	3	14	4						
	very weakly silicified											189.0	V1	1	52	UN	VR	Cal+Cl	1	12	12						
	w/rare py cubes											189.5	V2	1	10	UN	VR	Cal	<1	16	22						Not throughgoing, probably opened by drilling
												189.8	V1	1	35	C	VR	Cal	<1	16	22						
												190.2	V1	1	28	P	VR	Cal	<1	10	22						
	Greenstone (Meta-andesite)	51	190.3	192.3	2.0	2.0	1.4	4	R5	FR	14	191.2	V1	1	58	C	VR	Cal+Talc	1	12	16						
												191.5	V1	1	32	UN	VR	Cal+Talc	2	16	10						Some talc (?) or calcite (?) is pink
												191.6	V1	1	56	P	SM	Cal+Talc	1	2	16						
												191.8	V1	1	53	UN	VR	Cal+Talc	2	12	14						
	Greenstone (Meta-andesite)	52	192.3	195.8	3.5	3.5	1.6	9	R5	FR	10	193.1	V1	1	72	IR	VR	Cl	1	20	12						Cl is CH
												193.3	V1	1	58	UN	R	Cl	1	8	8						Cl is CH
												193.7	V1	1	32	UN	R	Cl	1	10	10						Cl is CH
												194.0	V1	1	30	IR	R	Cl	3	10	4						Cl is CH
												194.3	V1	1	50	P	R	Cl+Talc	3	10	4						Cl is CH; Cl or Talc is pink
												194.5	V1	1	80	IR	VR	Cl	1	20	18						Cl is CH
	weakly silicified											194.9	V1	1	43	P	VR	Cl+Talc	2	10	14						
	starting at ~209 ft											195.3	V1	1	60	IR	VR	Cl	2	20	18						
												195.6	V1	1	31	C	VR	Cal+Cl	2	12	14						
	Greenstone (Meta-andesite)	53	195.8	200.7	5.2	5.2	5.2	1	R5	FR	22	197.2	J2	1	48	P	VR	-	-	10	22						
	Greenstone (Meta-andesite)	54	200.7	204.0	3.4	3.4	3.4	2	R5	FR	18	202.0	V1	1	50	P	VR	Cal+Cl	1	12	14						
												202.5	V1	1	66	P	VR	Cal+Cl	<1	16	22						
	Greenstone (Meta-andesite)	55	204.0	209.0	4.8	4.8	4.8	0	R5	FR	25																
	Greenstone (Meta-andesite)	56	209.0	214.0	5.1	5.1	5.1	1	R5	FR	20	210.0	V2	1	60	ST	R	Cal	<1	16	22						
	Greenstone (Meta-andesite)	57	214.0	219.0	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	58	219.0	224.0	5.1	5.1	4.9	1	R5	FR	22	219.2	V1	1	33	ST	R	Cal	<1	16	22						219-220 ft hematite blebs in matrix
	Greenstone (Meta-andesite)	59	224.0	229.0	5.1	5.1	5.1	1	R5	FR	22	228.6	V2	1	34	P	VR	Cal	<1	10	22						
	Greenstone (Meta-andesite)	60	229.0	234.0	5.0	5.0	5.0	1	R5	FR	22	230.1	V2	1	34	P	VR	Cal	<1	10	22						231-234 hem blebs
	Greenstone (Meta-andesite)	61	234.0	239.0	5.1	5.1	4.8	5	R5	FR	22	234.6	V2	1	55	P	VR	Cal	<1	16	22						
												236.2	V2	1	72	C	VR	Cal	<1	10	22						

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Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												236.8	V2	1	71	P	VR	Cal	<1	10	22						
												237.1	V2	1	58	C	VR	Cal	<1	14	22						
												237.5	V2	1	41	C	VR	Cal	<1	8	20						
	Greenstone (Meta-andesite)	62	239.0	244.0	5.0	5.0	5.0	4	R5	FR	18	240.0	V2	1	52	UN	VR	Cal	<1	12	22						240-243 hem blebs
												241.3	V1	1	66	UN	VR	Cal	<1	10	20						
												242.2	V2	1	80	C	R	Cal	1	8	16						~242-273 ft increased density of veins, particularly at low angle to core axis.
												243.3	V1	1	10	P	VR	Cal+Talc	1	8	14						
	Greenstone (Meta-andesite)	63	244.0	248.3	4.3	4.3	4.3	2	R5	FR	20	246.2	V1	1	50	IR	VR	Cal+Cl	1	16	18						
												246.9	V1	1	75	C	VR	Calc	<1	14	22						
	Greenstone (Meta-andesite)	64	248.3	253.2	4.9	4.9	4.9	2	R5	FR	0	249.5	S	1	47	U	VR	Cal+Talc	4	12	0						
												250.8	V2	1	68	C	VR	Cal	<1	12	22						253.6-255 ft zone of anastomosing veins at low angle to core axis. Nothing throughgoing to log. Core parts readily along veins.
	Greenstone (Meta-andesite)	65	253.2	255.0	1.8	1.8	0.4	14	R5	FR	8	253.6	V1	14	-	IR	VR	Cal+Talc	<3	16	8						
	Greenstone (Meta-andesite)	66	255.0	258.4	3.4	3.4	3.4	2	R5	FR	17	255.9	V2	1	16	P	SM	Cal+Talc	<1	4	18						From 257 ft on occasional hematite blebs locally
												258.2	V2	1	25	P	SM	Talc	<1	4	16						
	Greenstone (Meta-andesite)	67	258.4	263.4	5.2	5.2	5.1	6	R5	FR	16	258.5	V1	1	19	P	VR	Talc+Cal	<1	14	20						
												259.2	V2	2	30	C	VR	Talc+Cal	<1	10	20						
												259.8	V2	1	25	IR	VR	Talc+Cal	<1	18	22						
												260.4	V2	1	15	ST	SM	Talc+Cal	1	6	10						
												262.2	V1	1	6	UN	R	Talc+Cal	1	10	12						
	Greenstone (Meta-andesite)	68	263.4	268.6	5.1	5.1	5.1	2	R5	FR	22	266.8	V2	1	86	IR	VR	Cal	<1	18	22						Intact vein sub-parallel to core axis for most of run.
												267.5	V2	1	8	UN	VR	Cal	<1	14	22						264.5-273 ft color change to purple
	Greenstone (Meta-andesite)	69	268.6	272.5	4.0	4.0	4.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	70	272.5	277.7	5.3	5.3	5.3	3	R5	FR	18	273.3	V2	1	24	ST	VR	Cal+Talc	<1	10	18						
												275.9	V2	1	52	P	R	Cal	<1	2	18						
												276.4	V2	1	78	UN	VR	Cal+Cl	1	12	16						
	Greenstone (Meta-andesite)	71	277.7	282.9	5.1	5.1	5.1	0	R5	FR	25																~281 ft silicification becomes stronger locally; local mod. silicification.
	Greenstone (Meta-andesite)	72	282.9	287.9	5.0	5.0	5.0	2	R5	FR	8	283.4	V1	1	18	ST	R	Talc	1	16	8						
												285.6	V2	1	82	UN	VR	Cal	<1	12	22						
	Greenstone (Meta-andesite)	73	287.9	293.0	5.0	5.0	5.0	1	R5	FR	16	292.3	V2	1	71	ST	VR	Cal	1	14	16						
	Greenstone (Meta-andesite)	74	293.0	298.0	5.1	5.1	4.8	3	R5	FR	18	293.7	J2	1	56	ST	R	-	-	6	22						

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DRAFT

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												295.6	V2	1	77	UN	R	Cal	<1	10	22						
												295.9	V2	1	37	UN	VR	Hbx*	-	18	18						*Joint is along a 4cm patch of healed bx
	Greenstone (Meta-andesite)	75	298.0	303.1	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	76	303.1	308.3	5.1	5.1	5.1	0	R6	FR	25																
	Greenstone (Meta-andesite)	77	308.3	311.3	3.1	3.1	2.8	2	R5	FR	6	310.3	V2	1	86	ST	VR	Cal	<1	14	20						
												310.6	V1	1	25	UN	VR	Talc	3	10	6						
	Greenstone (Meta-andesite, agglomerate or bx)	78	311.3	314.0	2.7	2.7	2.7	0	R5	FR	25																311-327 matrix of original volcanic breccia is clay altered.
		79	314.0	319.0	5.0	5.0	5.0	0	R5	FR	25																Bx is competent and does not part along fragments.
	Greenstone (Meta-andesite, agglomerate or bx)	80	319.0	324.0	5.0	5.0	5.0	1	R5	FR	20	319.8	V1	1	43	UN	R	Carb-Talc	<1	10	20						
	Greenstone (Meta-andesite, agglomerate or bx)	81	324.0	329.0	5.0	5.0	5.0	0	R5	FR	25																327 ft. less brecciated
	Greenstone (Meta-andesite, agglomerate or bx)	82	329.0	334.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite, agglomerate or bx)	83	334.0	339.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	84	339.0	344.0	5.0	5.0	5.0	2	R5	FR	20	341.4	V2	1	28	UN	R	Carb	<1	8	20						
												342.0	V2	1	22	UN	R	Carb	<1	8	20						
	Greenstone (Meta-andesite)	85	344.0	349.0	5.0	5.0	5.0	4	R5	FR	16	345.3	V1	1	28	UN	R	Talc	10	16	0						
												347.0	V1	1	35	UN	R	Carb+Talc	<1	14	20						Partial coating
												347.2	V1	1	33	UN	R	Talc	5	8	6						
												347.4	V2	1	33	UN	R	Talc+Carb	<1	18	20						Partial coating
	Greenstone (Meta-andesite)	86	349.0	352.7	3.7	3.7	3.7	1	R5	FR	0	350.2	V1	1	45	UN	R	Talc+Carb	15	16	0						
	Greenstone (Meta-andesite)	87	352.7	358.0	5.3	5.3	5.3	2	R5	FR	10	354.0	V1	1	52	UN	SM	Carb	<1	5	20						Complete Coating
												354.7	V2	1	44	UN	R	Carb	<1	10	2						
	Greenstone (Meta-andesite)	88	358.0	363.0	5.0	5.0	5.0	7	R5	FR	6	360.3	V1	5	55	UN	R	Carb+Talc	0-1 mm	8	0						
												360.6	V1	1	49	UN	SM	Carb	<1	2	20						Complete Coating
												361.4	V1	1	54	UN	R	Carb	<1	6	20						Complete Coating
	Greenstone (Meta-andesite)	89	363.0	368.2	5.2	5.2	5.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	90	368.2	373.4	5.2	5.2	5.2	1	R5	FR	6	373.1	V1	1	30	UN	R	Carb	1	8	6						
	Greenstone (Meta-andesite)	91	373.4	378.6	5.2	5.2	5.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	92	378.6	383.8	5.2	5.2	5.2	1	R5	FR	12																
	Greenstone (Meta-andesite)	93	383.8	388.9	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	94	388.9	394.0	5.1	5.1	5.1	0	R5	FR	25																

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	95	394.0	399.0	5.0	5.0	5.0	1	R5	FR	25	396.0	J2	1	36	UN	R	-	-	10	25						
	Greenstone (Meta-andesite)	96	399.0	404.0	5.0	5.0	5.0	4	R5	FR	20	399.5	V2	1	42	UN	R	Carb	<1	8	20						Complete coating
												402.3	V1	2	43	UN	R	Carb	<1	10	20						Complete coating
												402.8	V2	1	42	UN	SM	Talc	<1	2	20						Partial Coating
	Greenstone (Meta-andesite)	97	404.0	409.0	5.0	5.0	5.0	1	R5	FR	20	404.9	V2	1	55	UN	R	Carb	<1	8	20						Complete coating
	Greenstone (Meta-andesite)	98	409.0	414.0	5.0	5.0	5.0	1	R5	FR	20	410.2	V2	1	42	UN	R	Carb	<1	20	20						Partial Coating
	Greenstone (Meta-andesite)	99	414.0	419.0	5.0	5.0	5.0	1	R5	FR	20	416.2	V2	1	65	UN	R	Carb	<1	8	20						Partial Coating
	Greenstone (Meta-andesite)	100	419.0	424.0	5.0	5.0	5.0	1	R5	FR	20	420.3	V2	1	58	UN	R	Carb+Talc	<1	8	20						Partial Coating
	Greenstone (Meta-andesite)	101	424.0	429.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	102	429.0	434.0	5.0	5.0	5.0	1	R5	FR	20	433.9	V2	1	56	UN	R	Carb	<1	12	20						Complete Coating
	Greenstone (Meta-andesite)	103	434.0	439.0	5.0	5.0	5.0	1	R5	FR	20	437.2	V2	1	54	UN	R	Carb	<1	10	20						
	Greenstone (Meta-andesite)	104	439.0	444.0	5.0	5.0	5.0	1	R5	FR	20	441.2	V2	1	32	UN	R	Carb	<1	18	20						Partial coating
	Greenstone (Meta-andesite)	105	444.0	449.0	5.0	5.0	4.4	5	R5	FR	12	447.7	V1	5	25	ST	R	Carb+Talc	1	16	12						5 Open joins @ 0.6ft.
	Greenstone (Meta-andesite)	106	449.0	454.0	5.0	5.0	2.8	5	R5	FR	14	452.6	V1	1	30	UN	R	Carb	<1	12	20						Complete coating
												452.9	V1	3	43	ST	R	Carb	1	18	6						
												453.8	V2	1	30	UN	R	Carb	<1	8	20						Complete coating
	Greenstone (Meta-andesite)	107	454.0	458.8	4.8	4.8	2.1	10	R5	SW	14	454.8	V1	1	56	UN	SM	Carb+Epidote	<1	2	20						Numerous Carb joints/ veins < 1mm
												456.0	V1	1	30	UN	R	Carb+Talc	<1	6	20						
												456.1	V1	1	38	ST	R	Talc+Carb	<1	8	20						
												456.4	V1	2	32	UN	SM	Talc	1	4	6						
												456.6	V1	1	53	ST	R	Talc+Carb	<1	14	20						Complete Coating
												457.1	J2	1	52	ST	R	-	<1	8	25						
												457.9	V1	1	62	P	R	Talc+Carb	<1	8	20						
												458.0	V1	1	65	P	R	Talc+Carb	<1	8	20						
												458.7	V2	1	48	ST	R	Talc+Carb	<1	14	20						
	Greenstone (Meta-andesite)	108	458.8	463.9	5.1	5.1	4.2	6	R5	SW	16	460.4	V1	1	64	ST	R	Carb	<1	12	20						Partial coating
												460.9	V1	2	55	UN	R	Carb	<1	10	20						Complete coating
												461.8	V1	2	51	UN	SM	Carb	<1	4	12						Complete coating
												463.1	V2	1	44	UN	R	Carb	<1	10	20						Complete coating
	Greenstone (Meta-andesite)	109	463.9	469.0	5.1	5.1	2.6	10	R5	SW	14	464.4	V1	1	38	UN	SM	Carb	<1	4	20						Complete coating

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												464.7	V2	1	69	UN	R	Carb	1	10	6						
												464.9	V1	1	46	UN	R	Carb+Talc	<1	6	12						Compete coating
												465.3	V1	1	34	UN	R	Talc+Carb	1	6	6						
												467.0	V2	1	60	ST	R	Carb	<1	10	20						Compete coating
												467.9	V1	2	56	UN	SM	Carb	1	4	6						
												468.3	V1	1	36	ST	R	Carb	<1	10	20						
												468.4	J1	1	67	P	R	-	-	8	25						
												468.6	V1	1	60	P	R	Carb	<1	6	20						Partial coating
	Greenstone (Meta-andesite)	110	469.0	474.0	4.1	4.1	4.1	1	R5	FR	0	469.6	F1	1													Fault infill washed away
	Greenstone (Meta-andesite)	111	474.0	479.0	5.0	5.0	4.3	6	R5	FR	14	474.7	J2	1	66	UN	R	-	-	10	25						
												475.6	V2	1	42	ST	R	Carb	<1	10	20						Partial coating
												476.5	F	1	46	UN	R	Carb	20	6	0						
												477.4	V2	1	45	ST	R	Carb	<1	8	20						Partial coating
												478.1	V1	1	51	UN	SM	Carb	1	4	6						
												478.3	V2	1	54	P	R	Carb	<1	6	12						Partial coating
	Greenstone (Meta-andesite)	112	479.0	483.6	4.6	4.6	3.9	9	R5	FR	6	479.8	V1	1	65	UN	SM	Carb	1	4	6						
												480.4	V1	1	49	UN	SM	Carb	<1	4	12						Complete coating
												481.1	V1	1	20	ST	R	Carb+Epidote+Talc	1	18	6						
												482.2	V1	1	36	ST	R	Carb	15	14	0						
												482.3	V1	1	23	ST	R	Carb	1	14	6						
												482.4	J1	1	52	C	SM	-	-	2	25						
												482.6	F	3	32	UN	SM	Carb	5	4	0						
	Greenstone (Meta-andesite)	113	483.6	488.7	5.1	5.1	4.5	7	R4	SW	6	484.1	V1	2	45	ST	R	Carb	1	8	6						SW by numerous stockwork carb veins
												484.5	V1	1	53	ST	R	Carb	1	8	6						
												485.0	V1	1	53	P	SM	Carb	1	4	6						
												486.1	V1	1	25	UN	R	Carb	1	6	6						
												486.2	V1	1	30	UN	R	Carb	<1	6	12						
												487.4	V1	1	45	ST	R	Carb	1	18	6						
	Greenstone (Meta-andesite)	114	488.7	493.7	5.0	5.0	5.0	1	R4	SW	12	489.8	V1	1	53	C	R	Carb	<1	12	12						SW by numerous stockwork carb veins
	Greenstone (Meta-andesite)	115	493.7	498.8	5.1	5.1	3.9	5	R4	SW	12	495.2	J2	1	50	ST	R	-	-	10	25						

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												496.9	V2	1	50	ST	R	Carb	<1	14	20						
												497.8	V1	1	18	UN	R	Carb	1	12	6						
												498.0	V1	1	25	UN	R	Carb	<1	12	12						Joint intersection at 497.8 ft
												498.6	F	1	45	ST	R	Carb	50	20	0	498.6	598.9	Flt Bx			Fault zone 498.6 ft- 598.9 ft. Some intact rock between faults.
	Greenstone (Meta-andesite)	116	498.8	503.9	5.1	5.1	4.9	5	R4	SW	6	498.9	F	1	40	ST	R	Carb	20	18	0						
												499.7	V1	1	28	UN	R	Carb	1	18	6						
												501.0	V2	1	58	UN	R	Carb	<1	8	12						
												501.9	V1	1	28	UN	R	Carb	1	16	6						
												502.8	V1	1	26	ST	R	Carb	1	16	6						
	Greenstone (Meta-andesite)	117	503.9	508.9	5.0	5.0	4.7	3	R4	SW	6	506.8	V1	1	36	UN	R	Carb	1	6	6						
	Greenstone (Meta-andesite)	118	508.9	514.0	5.1	5.1	4.8	5	R4	SW	6	507.8	V1	1	20	UN	R	Carb	2	8	6						
												508.0	V1	1	36	ST	R	Carb	1	18	6						
												510.5	V1	1	36	ST	R	Carb	1	18	6						
												510.7	V1	1	41	UN	R	Carb	<1	12	12						Complete coating
												513.4	V1	1	8	UN	R	Carb	1	10	6						SW by the numerous carb veins
	Greenstone (Meta-andesite)	119	514.0	519.0	5.0	5.0	5.0	1	R4	SW	12	515.0	V2	1	88	ST	R	Carb	<1	10	12						Stockwork like previous runs
	Greenstone (Meta-andesite)	120	519.0	524.0	5.0	5.0	5.0	1	R4	SW	12	523.6	V2	1	53	UN	R	Carb	<1	12	12						Less weathered from 520.8- 524 ft
	Greenstone (Meta-andesite)	121	524.0	529.0	5.0	4.7	3.1	10	R4	SW	6	525.2	F	1	50	UN	R	Gouge	0.3ft	12	0	525.2	525.5				0.3 ft of gouge @ 50 degrees
												526.6	V2	1	66	C	R	Carb	<1	12	20						
												526.8	V2	1	39	ST	R	Carb	<1	18	20						
												527.6	V1	1	40	UN	R	Carb+T alc	<1	8	12						
												527.8	V1	1	52	UN	R	Carb	1	4	6						
												528.2	V1	2	52	UN	R	Carb	<1	16	20						
												528.5	V1	1	66	UN	R	Carb	1	8	6						
												528.8	V1	1	60	UN	R	Carb	1	18	6						
												528.9	V1	1	56	UN	R	Carb	2	16	6						
	Greenstone (Meta-andesite)	122	529.0	534.0	5.0	5.0	4.3	4	R4	SW	8	530.4	V1	1	33	UN	R	Carb+T alc	1	18	6						
												530.6	V1	1	6	UN	R	Carb+T alc	1	18	6						
												532.1	V1	1	58	P	SM	Carb	1	2	6						
												532.7	V1	1	50	P	SM	Carb	<1	2	12						

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	123	534.0	539.0	5.0	4.7	4.3	5	R4	SW	12	534.2	V1	1	65	UN	R	Carb	<1	12	12				538.7	539.0	Complete coating
												535.4	V1	1	36	UN	R	Carb	<1	12	12						
												537.4	V1	1	56	C	R	Carb	<1	10	12						
												537.7	V2	1	58	C	R	Carb	<1	14	12						
												538.5	V2	1	12	UN	R	Carb	<1	16	12						
	Greenstone (Meta-andesite)	124	539.0	544.0	5.0	5.0	5.0	3	R4	SW	12	539.5	V2	1	50	IR	R	Carb+Talc	1	14	6						
												540.2	V1	1	54	P	SM	Carb	4	4	20						
												542.5	V1	1	47	C	SM	Carb	1	4	6						
	Greenstone (Meta-andesite)	125	544.0	549.0	5.0	5.0	5.0	2	R4	SW	6	543.2	V1	1	54	ST	R	Carb	1	18	6						
												547.9	V1	1	26	UN	R	Carb	1	12	6						
	Greenstone (Meta-andesite)	126	549.0	554.0	5.0	5.0	5.0	1	R3	MW	12	551.6	V1	1	44	P	R	Carb	1	6	12						MW from abundant stockwork carb veins
	Greenstone (Meta-andesite)	127	554.0	559.0	5.0	5.0	4.8	4	R4	SW	12	554.5	V1	1	71	ST	R	Carb	1	20	12						
												555.6	V2	1	79	ST	R	Carb	<1	20	12						MW from 554-555.6 ft (R3)
												555.8	V1	1	42	ST	R	Carb	<1	12	12						Fractures are easily opened by hand
												557.9	V1	1	65	ST	R	Carb	<1	16	12						563.4-563.7 ft very weak zone
	Greenstone (Meta-andesite)	128	559.0	564.0	5.0	5.0	3.3	11	R3	MW	10	559.7	F	1	56	UN	R	Carb+Gouge	<1	14	12						Abundant amount of stockwork carb veins
												560.1	V1	1	74	ST	R	Carb	<1	18	12						
												560.6	V2	1	68	UN	R	Carb	<1	12	12						
												561.3	F	1	50	P	SM	Carb+Gouge	<1	4	6						
												561.8	V2	1	57	ST	R	Carb	1	20	12						
												562.2	V1	1	50	P	SM	Carb	<1	4	6						
												562.7	V1	1	58	ST	R	Carb	<1	6	12						
												562.9	V1	1	55	ST	R	Carb	1	6	12						
												563.0	F	1	70	ST	R	Carb+Gouge	<1	18	6						
												563.1	V1	1	74	ST	R	Carb	<1	20	12						
												563.2	F	1	74	ST	R	Carb+Gouge	<1	20	12						
	Greenstone (Meta-andesite)	129	564.0	569.0	5.0	4.3	3.7	2	R3	MW	12	565.3	V2	1	87	ST	R	Carb	<1	20	12	564.8	565.1	Gouge+rock frags	564.0	564.4	Abundant amount of stockwork carb veins which caused broken core
	Greenstone (Meta-andesite)	130	569.0	574.0	5.0	4.6	4.6	1	R2	HW	9											569	569.4				Weak rock; abundant stockwork vein
	Greenstone (Meta-andesite)	131	574.0	579.0	5.0	4.9	4.6	3	R2	HW	6	576.5	F	1	65	C	SM	Gouge+Cab	1	4	6						
												576.7	F	1	25	UN	R	Gouge	50	14	0	576.7	579				Breccia to fault contact

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												577.5	F	1	25	UN	R	Carb+Gouge	2	14	0						
	Greenstone (Meta-andesite)	132	579.0	580.3	1.3	1.3	1.3	1	R3	MW	0	580.3	F	1	70	ST	R	Gouge	5	20	0						Lower contact with andesite is not open
	Greenstone (Meta-andesite)	132	580.3	584.0	3.7	3.7	3.7	1	R2	MW	12	583.4	F	1	40	C	R	Carb+Gouge	<1	8	12						
	Greenstone (Meta-andesite)	133	584.0	585.7	1.7	1.7	1.7	1	R2	MW	12	585.7	F	1	28	ST	R	Gouge	<1	8	12						Sharp contact btw MW meta-andesite and SW meta-andesite - photo 169
	Greenstone (Meta-andesite)	133	585.7	589.0	3.3	3.3	3.0	4	R2	HW	10	586.5	F	1	44	UN	R	Carb+Gouge	<1	6	12						
												587.7	F	1	31	P	SM	Cab+Gouge	1	4	6						
												588.3	V1	1	33	UN	R	Carb	<1	6	12						
												588.7	V2	1	26	UN	R	Carb	<1	10	12						
	Greenstone (Meta-andesite)	134	589.0	594.0	5.0	5.0	4.7	3	R2	MW	16	592.0	J2	1	58	ST	R	-	-	16	20						
												593.0	J2	1	58	ST	R	-	-	16	20						
												593.2	V2	1	52	P	R	Carb	<1	8	12						
	Greenstone (Meta-andesite)	135	594.0	599.0	5.0	5.0	5.0	3	R3	SW	20	595.7	J2	1	32	ST	R	-	-	20	20						
												597.3	J2	1	32	ST	R	-	-	8	20						
												598.4	J2	1	30	ST	R	-	-	8	20						
	Greenstone (Meta-andesite)	136	599.0	604.0	5.0	5.0	4.7	6	R3	SW	18	600.4	J2	1	51	ST	R	-	-	16	20						
												600.9	J2	1	58	ST	R	-	-	18	20						
												601.7	J2	1	44	P	SM	-	-	4	20						
												602.1	J1	1	32	P	SM	-	-	4	20						
												602.6	J2	1	58	UN	R	-	-	8	20						
												603.5	V2	1	22	UN	R	Carb	<1	8	12						
	Greenstone (Meta-andesite)	137	604.0	606.0	2.0	2.0	2.0	0	R3	SW	23																Run blocked
	Greenstone (Meta-andesite)	138	606.0	611.0	5.0	5.0	4.8	3	R3	SW	18	609.6	J2	1	58	ST	R	-	-	10	20						
												610.4	J2	1	61	UN	R	-	-	6	20						
												610.7	V2	1	32	P	SM	Carb	<1	2	12						
	Greenstone (Meta-andesite)	139	611.0	614.0	3.0	3.0	3.0	0	R3	SW	23																
	Greenstone (Meta-andesite)	140	614.0	619.0	5.0	5.0	4.8	5	R3	SW	12	614.2	V1	1	46	P	SM	Carb	<1	2	12						
												615.5	V1	1	40	UN	R	Carb	2	6	6						
												615.7	V1	1	41	UN	R	Carb	1	6	6						
												616.8	V1	1	28	UN	R	Carb	<1	6	12						
												618.3	J1	1	63	UN	R	-	-	8	20						

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-01
Drilling Method Diamond Core

Drill Rig
Azimuth 0
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD+RK
Date 10/10/2018-10/31/2018

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	141	619.0	624.0	5.0	5.0	5.0	0	R5	FR	25																Weakly silicified
	Greenstone (Meta-andesite)	142	624.0	629.2	5.2	5.2	5.2	1	R5	FR	18	628.8	J1	4	44	P	SM	-	-	4	23						
												628.8	V2	1	27	UN	SM	Carb	<1	4	12						
	Greenstone (Meta-andesite)	143	629.2	634.0	4.8	4.8	2.8	0	R5	FR	25																
	Greenstone (Meta-andesite)	144	634.0	639.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	145	639.0	644.0	5.0	5.0	5.0	2	R5	FR	9	639.9	V1	1	42	P	SM	Carb	1	4	6						
												642.5	V1	1	38	P	SM	Carb	<1	4	12						
	Greenstone (Meta-andesite)	146	644.0	649.0	5.0	5.0	5.0	2	R5	FR	13	645.1	V1	1	28	C	SM	Carb	1	4	6						
												647.8	J2	1	51	UN	SM	-	-	4	20						
	Greenstone (Meta-andesite)	147	649.0	654.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	148	654.0	659.0	5.0	5.0	5.0	1	R5	FR	12	655.5	V2	1	56	C	R	Carb	<1	10	12						Partial coating
	Greenstone (Meta-andesite)	149	659.0	664.0	5.0	5.0	5.0	1	R5	FR	20	663.3	J1	1	22	UN	SM	-	-	2	20						
	Greenstone (Meta-andesite)	150	664.0	669.0	5.0	5.0	5.0	1	R4	FR	12	668.5	V1	1	14	ST	R	Carb	<1	10	12						
	Greenstone (Meta-andesite)	151	669.0	674.0	5.0	5.0	5.0	0	R5	FR	25								-								
	Greenstone (Meta-andesite)	152	674.0	679.0	5.0	5.0	5.0	1	R5	FR	12	675.0	J1	1	22	ST	R	-	-	18	12						Contact w/ minuscule run of breccia
	Greenstone (Meta-andesite)	153	679.0	683.8	4.4	4.8	4.8	0	R5	FR	25																
	Greenstone (Meta-andesite)	154	683.8	689.0	5.2	5.2	5.2	2	R5	FR	10	685.2	J1	1	24	UN	SM	-	-	4	20						
												686.0	F	1	16	UN	R	Gouge	30	12	0						Gouge and fragments present in fault
	Greenstone (Meta-andesite)	155	689.0	693.9	4.9	4.9	4.9	2	R5	FR	20	689.8	J2	1	29	ST	R	-	-	16	20						
												690.9	J2	1	53	ST	R	-	-	8	20						
	Greenstone (Meta-andesite)	156	693.9	699.0	5.1	5.1	5.1	2	R5	FR	10	693.8	F	1	34	UN	R	Gouge	30	12	0						
												697.8	J1	1	20	UN	R	-	-	6	20						
	Greenstone (Meta-andesite)	157	699.0	704.1	5.1	5.1	5.1	3	R5	FR	16	699.8	J1	1	40	UN	SM	-	-	4	20						
												702.1	V1	1	36	UN	R	Carb	1	10	6						
												702.9	J2	1	32	UN	SM	-	-	4	20						
	Greenstone (Meta-andesite)	158	704.1	709.2	5.1	5.1	5.1	1	R5	FR	20	706.8	J1	1	27	UN	R	-	-	18	20						
	Greenstone (Meta-andesite)	159	709.2	713.8	4.6	4.6	4.6	0	R5	FR	25																
	Greenstone (Meta-andesite)	160	713.8	719.0	5.2	5.2	5.2	3	R5	FR	6	715.0	V1	1	28	UN	R	Carb	2	12	6						
												717.2	V1	1	26	UN	R	Carb	2	8	6						
												717.4	V1	1	50	ST	R	Carb	1	18	6						

SGI/Ione Expansion Permitting/CA

Project No.	1781618 Phase 0200 Task 201	**Drill Rig**		**Elevation**		**Sheet**	1 of 1
Borehole ID	IO-18-01	**Azimuth**	0	**Easting**		**Logged by**	CD+RK
Drilling Method	Diamond Core	**Inclination**	-70	**Northing**		**Date**	10/10/2018-10/31/2018

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	161	719.0	724.0	5.0	4.1	4.1	20	R5	FR	10	722.7	J1	1	45	UN	R	-	-	18	20	723.1	724	Fault			0.9 ft fault at end of run; 1mm-5cm fragments with gouge; contact at 50 deg. Photo 194
	Greenstone (Meta-andesite)	162	724.0	726.9	3.9	3.9	3.9	2	R5	FR	0	724.1	F	1	25	UN	R	-	-	12	0						End fault, contact form previous run
												725.9	F	1	58	UN	R	Gouge	10	12	0						**TD@726.9 ft**

Note: Max fracture count is 10 X Recovery (ft)

Discontinuity Type		Shape	Roughness			Infill Character (thickness<1mm	
J :Joint **B**: Bedding	Modifiers:	**P**: Planar	**K**: Slickensided	**Lm**: Limonite	**CL**: Clay **GM**: Silty Gravel	Clean	--
V: Vein **BT**: Bedding Trace	**1** = natural discontinuity	**C**: Curved	**PO**: Polished	**FeOx**: Iron Oxide	**ML**: Silt **GC**: Clayey Gravel	Staining Only	**ST**
S: Shear **FB**: Flow banding	**2** = origin unknown	**UN**: Undulating	**SM**: Smooth	**C**: Carbon	**CH**: Plas **SM**: Silty Sand	Slightly Altered	**SA**
F: Fault **Fol**: Foliation		**ST**: Stepped	**R**: Rough	**Gr**: Graphite	**MH**: Pla **SC**: Clayey Sand	Complete Coating < 1 mm	**CC**
C: Contact		**IR**: Irregular	**VR**: Very Rough			Partial Coating < 1 mm	**PC**

Joint Condition Rating (JCR):	Value
Fractures not continuous or no separation, hard fresh rock.	25
Separation < 1mm Hard joint wall rock	20
Separation < 1mm Soft joint wall rock	12
1-5 mm infill OR slickensided surfaces	6
Soft gouge > 5 mm thick OR separation > 5 mm	0

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-02
Drilling Method Diamond Core

Drill Rig
Azimuth 100
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD/RK
Date 9/27/18 - 10/9/18

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Overburden	1	0.0	6.0	5.3	N/A	N/A	N/A	R0	HW	N/A																First 1.5 ft. silty clay then weathered gravel in silty clay matrix
	Overburden	2	6.0	7.0	0.9	N/A	N/A	N/A	N/A	HW	N/A																Run blocked. 6 to 7 ft. same as previous. Fine fraction washed away. Fragments from 0.5 mm to 5 cm. Epidote infill between fractures. Pervasive silicification; no magnetite. Fine grained.
	Greenstone (Meta-andesite)	3	7.0	11.1	4.2	4.2	4.2	1	R5	Fresh	25	8.6	J1	1	42	UN	R	-	-	10	25						
	Greenstone (Meta-andesite)	4	11.1	12.9	1.4	1.4	1.1	1	R5	Fresh	25	12.3	J2	1	25	UN	R	Ox	-	10	25						Run blocked at 12.9 ft, same rock as above.
	Greenstone (Meta-andesite)	5	12.9	17.9	5.0	5.0	5.0	3	R5	Fresh	17	14.5	J2	1	50	UN	R	-	-	9	25						
												15.4	J2	1	30	UN	R	-	-	12	25						
												17.9	F	1	30	UN	R	Gouge	20	8	0						Same lithology, moderately hematized infill between fragments
	Greenstone (Meta-andesite)	6	17.9	21.0	3.1	3.1	2.6	3	R5	Fresh	15	18.0	J2	1	26	UN	R	-	-	10	25						Run blocked at 21 ft - in a fault
												19.3	V1	1	40	UN	R	Carb	2	15	15						
												20.9	F	1	38	UN	SM	Gouge	10	4	0						
	Greenstone (Meta-andesite)	7	21.0	24.0	2.8	2.8	2.8	0	R5	Fresh	25																0.3 ft lost is probably gouge from fault at 20.9 ft.
	Greenstone (Meta-andesite)	8	24.0	28.9	4.9	4.9	4.9	0	R5	Fresh	25																Fewer fragments 25 - 27 ft
	Greenstone (Meta-andesite)	9	28.9	33.8	4.9	4.9	4.9	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	10	33.8	38.7	4.9	4.9	4.9	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	11	38.7	39.5	0.5	0.5	0.0	0	R5	Fresh	25																0.3 ft lost core due to restart of drilling. Gravel fell to bottom of hole.
	Greenstone (Meta-andesite)	12	39.5	44.0	4.5	4.5	4.5	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	13	44.0	49.0	5.0	5.0	5.0	0	R5	Fresh	25																Moderately to strongly silicified with epidote infill between fragments
	Greenstone (Meta-andesite)	14	49.0	54.0	5.0	5.0	5.0	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	15	54.0	54.6	0.6	0.6	0.6	0	R5	Fresh	25																Sand fell into the hole
	Greenstone (Meta-andesite)	16	54.6	57.0	2.4	2.4	2.4	1	R5	Fresh	25	54.9	V1	1	57	UN	R	Carb	-	6	25						
	Greenstone (Meta-andesite)	17	57.0	61.9	4.9	4.9	4.9	6	R5	Fresh	12	57.2	V1	1	40	UN	SM	Carb	-	4	25						Part of the fault gouge at 60.7 ft. was washed out
												58.2	J1	1	37	UN	SM	-	-	4	25						
												59.1	V1	1	40	ST	R	Qtz	10	10	20						
												60.2	F	1	40	UN	R	Qtz/Carb/Gouge	15	10	15						
												60.5	V1	1	30	ST	R	Carb	3	10	6						
												60.7	F	1	N/A	ST	R	Gouge	20	15	0						Not possible to measure angle of fault
	Greenstone (Meta-andesite)	18	61.9	62.7	0.8	0.8	0.8	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	19	62.7	67.8	5.1	5.1	5.1	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	20	67.8	73.0	5.2	5.2	5.2	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	21	73.0	78.2	5.2	5.2	5.2	2	R5	Fresh	23	75.8	J1	1	76	ST	R	-	-	8	25						

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-02
Drilling Method Diamond Core

Drill Rig
Azimuth 100
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD/RK
Date 9/27/18 - 10/9/18

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												77.6	J2	1	37	UN	SM	Ox	-	4	20						
	Greenstone (Meta-andesite)	22	78.2	83.3	5.1	5.1	5.1	2	R5	Fresh	16	79.9	V1	1	50	UN	R	Carb	1	8	12						
												80.4	V1	1	32	UN	R	Carb	-	6	20						
	Greenstone (Meta-andesite)	23	83.3	87.7	4.4	4.4	4.2	2	R5	Fresh	16	83.3	J1	1	69	ST	R	-	-	12	20						Crosscut by the joint at 84.8
												84.8	V1	1	35	UN	R	Carb	1	10	12						
	Greenstone (Meta-andesite)	24	87.7	91.7	4.0	4.0	4.0	1	R5	Fresh	25	88.6	J1	1	27	UN	R	Ox	-	6	25						Trace of disseminated pyrite 1-2 %. Amygdules 1 mm.
	Greenstone (Meta-andesite)	25	91.7	96.8	5.1	5.1	5.1	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	26	96.8	102.0	5.2	5.2	5.2	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	27	102.0	107.1	5.1	5.1	5.1	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	28	107.1	112.0	4.9	4.9	4.9	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	29	112.0	117.2	5.2	5.2	4.9	2	R5	Fresh	0	112.4	V1	1	30	UN	SM	Carb	3	4	6						
												112.9	V1	1	40	UN	SM	Carb	30	4	0						
	Greenstone (Meta-andesite)	30	117.2	122.3	5.1	5.1	5.1	1	R5	Fresh	25	123.0	J1	1	60	UN	R	-	-	10	25						Epidote patchy
	Greenstone (Meta-andesite)	31	122.3	127.4	5.1	5.1	5.1	1	R5	Fresh	3	126.0	V1	1	5	UN	R	Carb	10	12	3						Low core angle joint with carbonate infill
	Greenstone (Meta-andesite)	32	127.4	132.4	5.0	5.0	5.0	1	R5	Fresh	0	132.3	F	1	44	UN	SM	Carb/Gouge	50	4	0						Fault at end of run; filled with carbonates and gouge
	Greenstone (Meta-andesite)	33	132.4	137.2	4.8	4.8	4.8	0	R5	Fresh	25																132.4 ft contact of fault in previous run
	Greenstone (Meta-andesite)	34	137.2	142.4	5.2	5.2	5.2	0	R5	Fresh	25																
	Greenstone (Meta-andesite)	35	142.4	147.3	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	36	147.3	152.4	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	37	152.4	157.5	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	38	157.5	162.5	5.0	5.0	5.0	1	R5	FR	22	159.9	V1	1	31	P	SM	Carb	<1	4	22						Partial coating
	Greenstone (Meta-andesite)	39	162.5	167.6	5.1	5.1	5.1	0	R5	FR	25																First run of 10/02/18 strongly silicified and moderately epidotized
	Greenstone (Meta-andesite)	40	167.6	172.7	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	41	172.7	177.5	4.9	4.9	4.9	2	R5	FR	14	171.1	J2	1	40	UN	R	-	-	10	25						
												177.5	F	1	27	UN	R	Carb	2	10	3						End of run in a fault
	Greenstone (Meta-andesite)	42	177.5	182.6	5.1	5.1	5.1	1	R5	FR	15	180.4	V1	1	20	UN	R	Carb	<1	12	15						Start of run in lower contact of fault at 177.5
	Greenstone (Meta-andesite)	43	182.6	187.7	5.1	5.1	5.1	0	R5	FR	25																Strong breccia texture from 184.7 to 185.8 ft. Then fragmental andesite (massive) from 185.8 to 186.8 ft. See photo 0053-0054 for close up on breccia texture. Andesite at 185.8 to 186.8 ft. could be the host rock or big fragment in the breccia.
	Greenstone (Meta-andesite)	44	187.7	192.6	4.9	4.9	4.9	0	R5	FR	25																More massive Andesite with breccia. Fragments supported in epidote matrix; trace of disseminated pyrite.
	Greenstone (Meta-andesite)	45	192.7	197.7	5.1	5.1	5.1	0	R5	FR	25																

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-02
Drilling Method Diamond Core

Drill Rig
Azimuth 100
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD/RK
Date 9/27/18 - 10/9/18

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	46	197.7	202.8	5.1	5.1	4.8	2	R5	FR	12	200.4	V1	2	30	UN	SM	Carb	2	5	12						Breccia with ~ 50% fragments from 1 mm to 10 cm. Epidote infill. Fragment sub-angular.
	Greenstone (Meta-andesite)	47	202.8	207.7	4.9	4.9	4.9	0	R5	FR	25																Some breccia with mostly mafic fragments.
	Greenstone (Meta-andesite)	48	207.7	212.7	5.0	5.0	5.0	2	R5	FR	20	208.7	J1	1	26	UN	SM	-	-	4	20						
												209.9	V1	1	36	UN	R	Carb	<1	6	20						Less brecciated from 207 to 211
	Greenstone (Meta-andesite)	49	212.7	217.7	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	50	217.7	222.7	5.0	5.0	5.0	1	R5	FR	10	224.0	V1	1	34	UN	R	Carb	1	8	10						
	Greenstone (Meta-andesite)	51	222.7	227.8	5.1	5.1	5.1	2	R5	FR	20	225.7	V1	1	20	UN	R	Carb	<1	14	20						
												227.5	V1	1	18	UN	R	Carb	<1	14	20						
	Greenstone (Meta-andesite)	52	227.8	232.9	5.1	5.1	5.1	0	R5	FR	25																Intensity of breccia decreasing
	Greenstone (Meta-andesite)	53	232.9	237.9	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	54	237.9	242.9	5.0	5.0	5.0	0	R5	FR	25																Occasional veins < 1 mm thick, not fractured. Rock less brecciated than previously.
	Greenstone (Meta-andesite)	55	242.9	247.9	5.0	5.0	5.0	1	R5	FR	12	243.4	V1	1	27	ST	VR	Carb	1	18	12						
	Greenstone (Meta-andesite)	56	247.9	253.0	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	57	253.0	258.2	5.2	5.2	5.2	3	R5	FR	10	254.6	J1	1	34	UN	R	-	-	10	25						
												255.3	F	1	17	UN	R	Gouge	25	8	0						
												258.0	V2	1	17	ST	R	Carb	1	18	6						
	Greenstone (Meta-andesite)	58	258.2	263.2	5.0	5.0	5.0	0	R5	FR	25																Brecciated from 262 to 263.2; no sharp contact between the fragmental andesite and the breccia
	Greenstone (Meta-andesite)	59	263.2	268.3	5.1	5.1	5.1	2	R5	FR	0	267.0	F	1	35	UN	R	Gouge	30	16	0						This run mostly brecciated with ~ 3 ft. of rock less brecciated
												268.2	F	1	40	UN	R	Gouge	20	14	0						
	Greenstone (Meta-andesite)	60	268.3	273.2	4.9	4.9	4.4	5	R5	FR	5	269.0	V1	1	20	UN	SM	Carb	2	4	6						First run of 10/03/18 + 1% of carbonate stock work veins 2 mm
												271.1	V1	1	20	UN	SM	Carb	2	4	6						
												272.3	V1	2	55	UN	SM	Carb	1	4	6						
												272.6	F	1	47	UN	R	Gouge	20	18	0						
	Greenstone (Meta-andesite)	61	273.2	278.3	5.1	5.1	5.1	2	R5	FR	6	273.6	V1	1	35	P	R	Carb/Qtz	1	10	6						Purple alteration starts at 277 ft. Massive andesite from 277 ft. to the end of the run.
												274.9	V1	1	13	UN	R	Carb/Qtz	1	12	6						
	Greenstone (Meta-andesite)	62	278.3	283.4	5.1	5.1	5.1	0	R5	FR	25																Purple andesite with occassional fragments of mafics
	Greenstone (Meta-andesite)	63	283.4	288.4	5.0	5.0	5.0	0	R5	FR	25	287.4	J1	1	32	UN	R	-	-	18	25						Purple alteration ends at 287.8 ft. One carb vein with 2 mm infill, not separated, @284.5 ft.
	Greenstone (Meta-andesite)	64	288.4	293.3	4.9	4.9	4.9	0	R5	FR	25																Purple infill alteration
	Greenstone (Meta-andesite)	65	293.3	298.5	5.2	5.2	5.2	0	R5	FR	20	296.0	V1	1	45	UN	R	Carb/Epidote	<1	10	20						Purple infill alteration
	Greenstone (Meta-andesite)	66	298.5	303.4	4.9	4.9	4.9	0	R5	FR	25																Purple infill alteration

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GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	67	303.4	308.6	5.2	5.2	5.2	2	R5	FR	0	304.4	F	1	65	UN	R	Gouge	20	14	0						
												305.6	F	1	55	UN	R	Gouge/ Carb	10	12	0						
	Greenstone (Meta-andesite)	68	308.6	313.8	5.2	5.2	5.2	0	R5	FR	25																Breccia texture from 309 ft. to 313 ft. purple infill
	Greenstone (Meta-andesite)	69	313.8	318.9	5.1	5.1	5.1	1	R5	FR	20	318.2	V1	1	37	P	R	Carb	<1	6	20						
	Greenstone (Meta-andesite)	70	318.9	323.7	4.8	4.8	4.8	1	R5	FR	20	323.7	V1	1	51	UN	R	Carb	<1	8	20						
	Greenstone (Meta-andesite)	71	323.7	328.8	5.1	5.1	4.8	5	R5	FR	14	324.5	J1	1	50	UN	R	-	-	8	25						
												325.4	J1	1	70	UN	R	-	-	18	25						
												326.6	F	1	40	UN	R	Gouge	10	6	0						
												327.8	F	1	25	UN	R	Gouge	40	12	0						
												328.2	V1	1	54	UN	SM	Carb/Epi dote	4	4	20						
	Greenstone (Meta-andesite)	72	328.8	333.8	5.0	5.0	5.0	2	R5	FR	13	331.7	V1	1	42	ST	R	Carb	<1	8	20						
												333.0	V2	1	70	UN	SM	Carb	1	3	6						Partial coating
	Greenstone (Meta-andesite)	73	333.8	338.9	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	74	338.9	342.8	3.9	3.9	3.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	75	342.8	348.0	5.2	5.2	4.8	3	R5	FR	12	344.4	V1	1	33	UN	R	Carb	<1	14	12						
												344.8	F	1	37	ST	R	Gouge	15	20	0						
												349.2	V1	1	48	ST	R	Carb	<1	14	20						
	Greenstone (Meta-andesite)	76	348.0	353.1	5.1	5.1	5.1	1	R5	FR	23	350.5	V1	1	33	UN	R	Carb	<1	14	23						Occassional carb veins ~ 1 mm, not fractured
	Greenstone (Meta-andesite)	77	353.1	358.3	5.2	5.2	5.2	4	R5	FR	16	353.5	V1	1	35	UN	R	Carb/Epi dote/Qtz	<1	16	16						
												354.4	V1	1	38	UN	R	Carb/Epi dote/HEM	<1	16	20						
												355.7	V1	1	33	ST	R	Carb/Qtz	1	12	6						
												358.5	V1	1	50	P	SM	Carb	<1	2	20						
	Greenstone (Meta-andesite)	78	358.3	363.4	5.1	5.1	5.1	1	R5	FR	0	362.7	F	1	30	UN	R	Gouge	30	12	0						
	Greenstone (Meta-andesite)	79	363.4	366.6	3.2	3.2	3.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	80	366.6	370.6	4.0	4.0	4.0	1	R5	FR	20	366.9	V1	1	18	UN	R	Carb/Epi dote	<1	8	20						
	Greenstone (Meta-andesite)	81	370.6	374.2	3.6	3.6	3.6	1	R5	FR	20	374.2	V1	1	28	UN	R	Carb/Epi dote	<1	14	20						
	Greenstone (Meta-andesite)	82	374.2	379.0	4.8	4.8	4.8	1	R5	FR	20	377.2	V1	1	35	UN	SM	Carb	<1	4	20						
	Greenstone (Meta-andesite)	83	379.0	384.1	5.1	5.1	5.1	2	R5	FR	16	381.8	V1	1	32	UN	SM	Carb	<1	8	20						
												382.7	V2	1	40	ST	R	Carb	<1	20	12						
	Greenstone (Meta-andesite)	84	384.1	389.1	5.0	5.0	5.0	1	R5	FR	20	387.0	V1	1	26	UN	R	Carb	<1	8	20						Partial coating

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	85	389.1	394.1	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	86	394.1	399.2	5.1	5.1	5.1	1	R5	FR	20	397.2	V1	1	42	UN	R	Carb/Epidote/Qtz	<1	8	20						
	Greenstone (Meta-andesite)	87	399.2	404.0	4.8	4.8	4.8	4	R5	FR	10	400.3	V1	1	38	UN	R	Carb/Epidote	<1	8	20						
												400.7	F	1	30	UN	R	Gouge	30	14	0						
												401.1	F	1	40	UN	R	Gouge/ Carb	10	12	0						
												401.6	V1	1	45	UN	R	Carb	<1	8	20						
	Greenstone (Meta-andesite)	88	404.0	408.5	4.5	4.5	4.5	1	R5	FR	0	404.4	F	1	30	UN	R	Gouge/ Carb/Qtz	20	12	0						First run of 10/04/18
	Greenstone (Meta-andesite)	89	408.5	413.6	5.1	5.1	5.1	0	R5	FR	25																Fault with fragments of rock in the gouge
	Greenstone (Meta-andesite)	90	413.6	418.6	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	91	418.6	423.6	5.0	5.0	4.5	4	R4	SW	0	418.9	V1	1	20	ST	SM	Carb/Qtz	1	2	6						3 to 5% stockwork carb + qtz vein; 1 mm to 1 cm infill. Strong carb + qtz veins from 420 ft. to 422.6 ft. Core in run has lowest
												420.5	V1	2	15	ST	R	Carb/Qtz	10	6	0						rock strength so far. Too many veins to do a PLT.
												421.2	F	1	30	ST	R	Gouge/ Carb/Qt	25	8	0						
	Greenstone (Meta-andesite)	92	423.6	428.5	4.4	4.4	4.1	4	R5	FR	4	424.8	V1	1	20	UN	SM	Carb	1	4	6						Breccia texture locally
												425.0	V1	1	60	UN	SM	Carb	1	4	6						
												427.2	V1	1	56	UN	R	Carb	1	8	6						
												427.6	V1	1	25	UN	R	Carb	10	6	0						
	Greenstone (Meta-andesite)	93	428.5	433.5	5.0	5.0	4.1	6	R4	SW	6	430.6	V1	1	25	UN	SM	Carb	1.5	4	6						Breccia texture locally
												430.9	V1	1	33	UN	SM	Carb	1	3	6						
												431.1	V1	1	55	UN	R	Carb	2	10	6						
												431.8	V1	3	45	UN	R	Carb	1	6	6						
	Greenstone (Meta-andesite)	94	433.5	438.4	4.9	4.9	4.9	1	R5	FR	12	434.9	V1	1	42	UN	SM	Carb	<1	3	12						Weakly brecciated locally
	Greenstone (Meta-andesite)	95	438.4	443.4	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	96	443.4	448.6	5.2	5.2	5.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	97	448.6	453.8	5.2	5.2	4.7	3	R5	FR	8	449.7	V1	1	43	UN	SM	Carb	<1	4	12						
												452.0	V1	1	41	UN	SM	Carb	<1	4	12						
												452.4	V1	2	36	UN	R	Carb	10	9	0						
	Greenstone (Meta-andesite)	98	453.8	459.0	5.2	5.2	5.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	99	459.0	463.9	4.9	4.9	4.9	2	R5	FR	20	459.9	V2	1	65	UN	R	Carb	<1	9	20						Epidote alteration patchy
												461.0	V1	1	33	UN	R	Carb	<1	6	20						
	Greenstone (Meta-andesite)	100	463.9	469.1	5.2	5.2	5.2	0	R5	FR	25																Epidote alteration patchy

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DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	101	469.1	474.2	5.1	5.1	5.1	0	R5	FR	25																Epidote alteration patchy
	Greenstone (Meta-andesite)	102	474.2	479.0	4.8	4.8	4.8	2	R5	FR	9	474.8	V1	1	53	UN	R	Carb	<1	7	18						
												476.3	F	1	36	UN	SM	Gouge	15	2	0						Fault gouge and fragments of andesite
	Greenstone (Meta-andesite)	103	479.0	484.0	5.0	5.0	5.0	1	R5	FR	12	483.9	V1	1	32	UN	R	Carb	<1	10	12						
	Greenstone (Meta-andesite)	104	484.0	488.7	4.7	4.7	4.7	0	R5	FR	25																
	Greenstone (Meta-andesite)	105	488.7	493.8	5.1	5.1	5.1	2	R5	FR	22	490.0	J1	1	47	UN	SM	-	-	4	25						
												490.7	V1	1	45	UN	R	Carb	<1	18	20						
	Greenstone (Meta-andesite)	106	493.8	498.7	4.9	4.9	4.9	0	R5	FR	25																Breccia texture
	Greenstone (Meta-andesite)	107	498.7	503.7	5.0	5.0	5.0	2	R5	FR	20	500.3	V1	1	49	UN	R	Carb	<1	10	20						Breccia texture
												502.2	V1	1	20	UN	R	Carb	<1	10	20						
	Greenstone (Meta-andesite)	108	503.7	508.2	4.5	4.5	4.5	1	R5	FR	20	503.3	V1	1	59	C	SM	Carb	<1	4	20						~ 0.5 ft. of core stayed in the bottom of the hole
	Greenstone (Meta-andesite)	109	508.2	509.2	1.0	1.0	1.0	1	R5	FR	25	508.3	J1	1	24	UN	R	-	-	10	25						Core dropped through shoe
	Greenstone (Meta-andesite)	110	509.2	511.3	2.1	2.1	2.1	0	R5	FR	25																Core slipped through shoe again then redrilled.
	Greenstone (Meta-andesite)	111	511.3	514.0	2.7	2.7	2.7	0	R5	FR	25																
	Greenstone (Meta-andesite)	112	514.0	519.0	5.0	5.0	5.0	3	R5	FR	20	514.5	V1	1	38	P	SM	Carb	<1	2	20						
												515.2	V1	1	38	P	SM	Carb	<1	3	20						
												516.3	V1	1	26	UN	SM	Carb	<1	4	20						
	Greenstone (Meta-andesite)	113	519.0	524.0	5.0	5.0	5.0	1	R5	FR	20	518.0	V1	1	12	P	SM	Carb	<1	4	20						
	Greenstone (Meta-andesite)	114	524.0	528.9	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	115	528.9	534.0	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	116	534.0	539.0	5.0	5.0	5.0	1	R5	FR	0	535.6	F	1	37	UN	R	Gouge	20	12	0						Gouge and angular rock fragments in the fault
	Greenstone (Meta-andesite)	117	539.0	544.2	5.2	5.2	5.2	0	R5	FR	25																First run of 10/08/18
	Greenstone (Meta-andesite)	118	544.2	549.2	5.0	5.0	5.0	0	R5	FR	25																Mechanical fracture along carb vein parallel to core axis from 546.5ft to the end of the run
	Greenstone (Meta-andesite)	119	549.2	554.2	5.0	5.0	5.0	0	R5	FR	25																Mechanical fracture along carb vein parallel to core axis continues to 552.2 ft.
	Greenstone (Meta-andesite)	120	554.2	559.2	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	121	559.2	564.1	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	122	564.1	569.2	5.1	5.1	5.1	0	R5	FR	25																Mechanical fracture along carb vein parallel to core axis from 566.3ft to the end of the run
	Greenstone (Meta-andesite)	123	569.2	574.1	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	124	574.1	579.0	4.9	4.9	4.9	0	R5	FR	25																
	Greenstone (Meta-andesite)	125	579.0	583.9	4.9	4.9	4.9	0	R5	FR	25																

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GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
	Greenstone (Meta-andesite)	126	583.9	589.0	5.1	5.1	5.1	0	R5	FR	25																From 586.8 ft. the epidotized patchy alteration is only visible on one side of the core
	Greenstone (Meta-andesite)	127	589.0	594.1	5.1	5.1	5.1	2	R5	FR	18	592.7	V2	1	40	UN	R	Carb	<1	6	12						
												592.9	J2	1	40	UN	R	-	-	6	25						Partial coating
	Greenstone (Meta-andesite)	128	594.1	599.1	5.0	5.0	5.0	5	R5	FR	14	597.0	V1	1	43	UN	R	Carb	<1	8	12						Complete coating
												597.8	V1	1	43	UN	R	Carb/Ox	<1	8	12						Complete coating
												598.0	V1	2	32	UN	R	Carb	<1	8	12						Partial coating
												598.4	V1	1	33	P	SM	Carb	<1	4	20						
	Greenstone (Meta-andesite)	129	599.1	603.8	4.7	4.7	4.7	1	R5	FR	20	603.8	V1	1	50	ST	R	Carb	<1	16	20						
	Greenstone (Meta-andesite)	130	603.8	609.0	5.2	5.2	5.2	3	R5	FR	12	604.0	V1	1	33	UN	R	Carb/Ox	<1	8	12						Complete coating
												606.6	V1	1	35	UN	R	Carb	<1	8	12						Partial coating
												606.7	V1	1	45	UN	R	Carb	<1	6	12						Partial coating
	Greenstone (Meta-andesite)	131	609.0	613.8	4.8	4.8	4.8	1	R5	FR	20	610.0	V1	1	28	UN	R	Carb	<1	16	20						
	Greenstone (Meta-andesite)	132	613.8	618.9	5.1	5.1	5.1	2	R5	FR	16	616.7	V1	1	37	UN	R	Carb	<1	8	12						Partial coating
												617.7	V1	1	28	P	SM	Carb	<1	3	20						
	Greenstone (Meta-andesite)	133	618.9	624.1	5.2	5.2	5.2	3	R5	FR	20	619.6	J1	1	23	UN	R	-	-	6	25						
												620.0	J1	1	30	UN	R	-	-	12	25						
												621.8	V1	1	22	UN	SM	Carb	<1	3	12						Partial coating
	Greenstone (Meta-andesite)	134	624.1	629.0	4.9	4.9	4.9	3	R5	FR	6	624.3	V1	1	36	ST	R	Carb/Ox	1	14	6						Lost 0.1 ft - broken by hammer used to remove from shoe
												624.6	V1	1	35	ST	R	Carb/Ox	1	14	6						
												628.4	V2	1	23	UN	SM	Carb	1	4	6						
	Greenstone (Meta-andesite)	135	629.0	633.9	4.9	4.9	2.9	10	R3	SW	8	629.8	V1	1	20	UN	R	Carb	<1	14	12						Complete coating
												630.2	V2	3	13	UN	SM	Carb	<1	4	12						Complete coating
												631.7	V1	3	30	UN	R	Carb	1	10	6						
												632.0	V1	1	32	UN	R	Carb	<1	10	12						Complete coating
												632.7	V1	1	22	UN	R	Carb	1	10	6						
												633.0	V1	1	35	ST	R	Carb	<1	16	6						Weak run. Numerous carb veins at ~ 30 degrees to core axis make the rock weak and break easily.
	Greenstone (Meta-andesite)	136	633.9	638.9	5.0	5.0	3.8	11	R5	SW	8	634.1	V1	2	20	ST	R	Carb	<1	14	12						Partial coating
												635.5	V1	4	33	UN	R	Carb	1	10	6						
												636.4	F	1	45	UN	R	Gouge	15	10	0						Gouge + angular fragments
												636.8	V1	1	15	UN	R	Carb	<1	12	12						Partial coating

SGI/Ione Expansion Permitting/CA

Project No. 1781618 Phase 0200 Task 201
Borehole ID IO-18-02
Drilling Method Diamond Core

Drill Rig
Azimuth 100
Inclination -70

Elevation
Easting
Northing

Sheet 1 of 1
Logged by CD/RK
Date 9/27/18 - 10/9/18

GOLDER

DRAFT

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	COMMENTS (SAMPLES COLLECTED, ETC.)
												638.5	V2	1	10	UN	R	Carb	10	10	0						
												639.5	V1	2	22	UN	R	Carb/Ox	<1	10	20						
	Greenstone (Meta-andesite)	137	638.9	644.0	5.1	5.1	5.0	4	R5	SW	8	640.6	V1	2	37	UN	R	Carb	1	10	6						Numerous stockwork carb veins with < 1 to 5 mm infill along the run; one qtz carb vein of 1 cm at 641.3.
												643.4	V2	1	22	UN	R	Carb	1	14	6						
												644.1	V1	1	26	UN	R	Carb/Ox	<1	12	20						
	Greenstone (Meta-andesite)	138	644.0	649.0	5.0	5.0	5.0	1	R5	FR	12	647.9	V1	1	30	UN	R	Carb	<1	14	12						Partial coating
	Greenstone (Meta-andesite)	139	649.0	654.0	5.0	5.0	5.0	1	R5	FR	6	649.8	V1	1	30	UN	R	Carb/Ox	1	10	6						First run of 10/09/18
	Greenstone (Meta-andesite)	140	654.0	659.2	5.2	5.2	4.4	7	R4	SW	6	655.0	V1	3	32	UN	R	Carb	1	12	6						3 open fractures between 654.7 ft to 655.3 ft; numerous carb veins with < 1 mm to 1 mm infill along the run.
												656.1	V1	1	60	UN	SM	Carb	<1	4	20						
												657.4	V1	1	60	UN	R	Carb	10	10	0				656.3	656.9	
												658.4	V1	2	40	UN	R	Carb	1	14	6						
	Greenstone (Meta-andesite)	141	659.2	664.2	5.0	5.0	5.0	3	R5	FR	22	659.3	V1	1	70	UN	R	Carb	<1	10	20						
												661.6	J1	1	54	C	R	-	-	14	25						
												663.6	V1	1	39	UN	R	Carb	<1	12	20						
	Greenstone (Meta-andesite)	142	664.2	669.2	5.0	5.0	5.0	3	R5	FR	10	666.7	V1	2	32	ST	R	Carb	<1	14	12						Flow banding between 664.7 and 666.3 ft.
												667.7	V1	1	42	ST	R	Carb	1	18	6						Joint complete coating
	Greenstone (Meta-andesite)	143	669.2	674.0	4.8	4.8	4.8	2	R5	FR	16	670.6	V1	1	34	ST	R	Carb	<1	16	12						
												671.6	V1	1	59	UN	R	Carb	<1	6	20						
	Greenstone (Meta-andesite)	144	674.0	679.0	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	145	674.0	684.1	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	146	684.1	689.0	4.9	4.9	4.9	0	R5	FR	25																Moderately brecciated from 685.8 to 688.3ft
	Greenstone (Meta-andesite)	147	689.0	694.1	5.1	5.1	5.1	0	R5	FR	25																
	Greenstone (Meta-andesite)	148	694.1	699.0	4.9	4.9	4.9	1	R5	FR	12	695.5	V1	1	13	UN	R	Carb	<1	14	12						Partial coating. Moderately brecciated texture from 695.5 to 697.7 ft.
	Greenstone (Meta-andesite)	149	699.0	704.0	5.0	5.0	5.0	5	R4	SW	6	700.1	V2	2	20	UN	R	Carb	<1	12	12						Complete coating
												700.8	V2	1	32	UN	R	Carb	<1	12	12						Complete coating
												701.3	F	1	46	UN	R	Gouge	10	10	0						
												702.6	F	1	32	UN	R	Gouge/ Ox	20	18	0						Gouge, rock fragments and oxidation in the fault
	Greenstone (Meta-andesite)	150	704.0	709.2	5.2	5.2	5.2	0	R5	FR	25																
	Greenstone (Meta-andesite)	151	709.2	714.2	5.0	5.0	5.0	0	R5	FR	25																
	Greenstone (Meta-andesite)	152	714.2	715.2	1.0	1.0	1.0	0	R5	FR	25																TD @ 715.2 ft.

SGI/Ione Expansion Permitting/CA

Project No.	1781618 Phase 0200 Task 201	**Drill Rig**		**Elevation**		**Sheet**	1 of 1
Borehole ID	IO-18-02	**Azimuth**	100	**Easting**		**Logged by**	CD/RK
Drilling Method	Diamond Core	**Inclination**	-70	**Northing**		**Date**	9/27/18 - 10/9/18

GOLDER

Core Diameter	ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft)	To (ft)	Recovery (ft)	Solid Core Recovery (ft)	RQD (ft)	Natural Fract. Count	Strength Index: ISRM Strength Index	Weathering/ Alt. Index	JCR: Average	Detailed Discontinuity Data: Depth	Type	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC (Rough. Coeff.)	JCR (Cond. Rating)	Rubble and Gouge: Fault Breccia/Gouge: From (ft)	To (ft)	Type and USCS Group Symbol	Broken Core: From (ft)	To (ft)	DRAFT / COMMENTS (SAMPLES COLLECTED, ETC.)

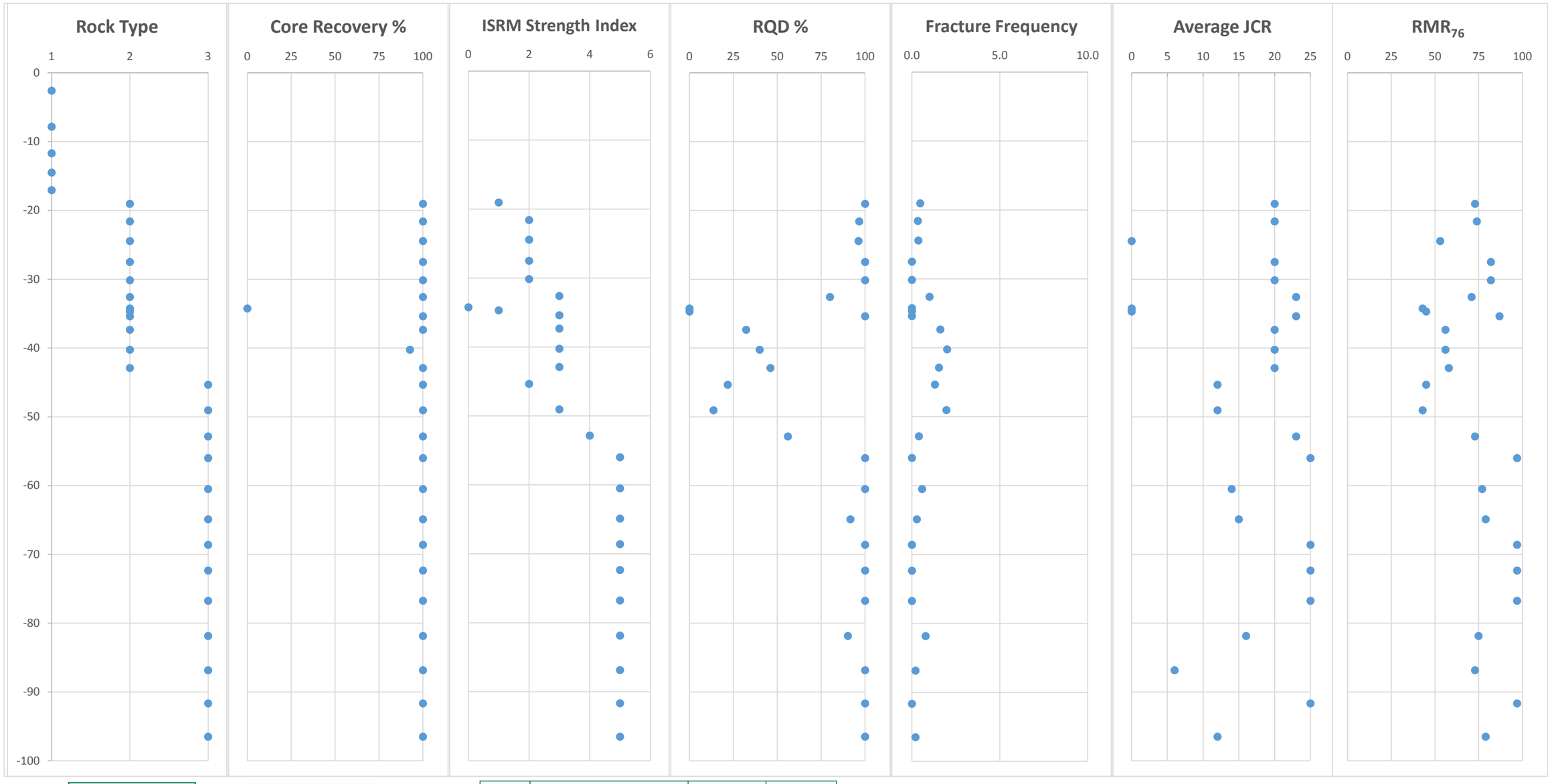
Note: Max fracture count is 10 X Recovery (ft)

Discontinuity Type		Shape	Roughness			Infill Character (thickness<1mm)		Joint Condition Rating (JCR):	Value
J :Joint **B**: Bedding	Modifiers:	**P**: Planar	**K**: Slickensided	**Lm**: Limonite	**CL**: Clay **GM**: Silty Gravel	Clean	--	Fractures not continuous or no separation, hard fresh rock.	25
V: Vein **BT**: Bedding Trace	**1** = natural discontinuity	**C**: Curved	**PO**: Polished	**FeOx**: Iron Oxide	**ML**: Silt **GC**: Clayey Gravel	Staining Only	**ST**	Separation < 1mm Hard joint wall rock	20
S: Shear **FB**: Flow banding	**2** = origin unknown	**UN**: Undulating	**SM**: Smooth	**C**: Carbon	**CH**: Plas **SM**: Silty Sand	Slightly Altered	**SA**	Separation < 1mm Soft joint wall rock	12
F: Fault **FoI**: Foliation		**ST**: Stepped	**R**: Rough	**Gr**: Graphite	**MH**: Pla **SC**: Clayey Sand	Complete Coating < 1 mm	**CC**	1-5 mm infill OR slickensided surfaces	6
C: Contact		**IR**: Irregular	**VR**: Very Rough			Partial Coating < 1 mm	**PC**	Soft gouge > 5 mm thick OR separation > 5 mm	0

IO-18-01

DRAFT

Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft.
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

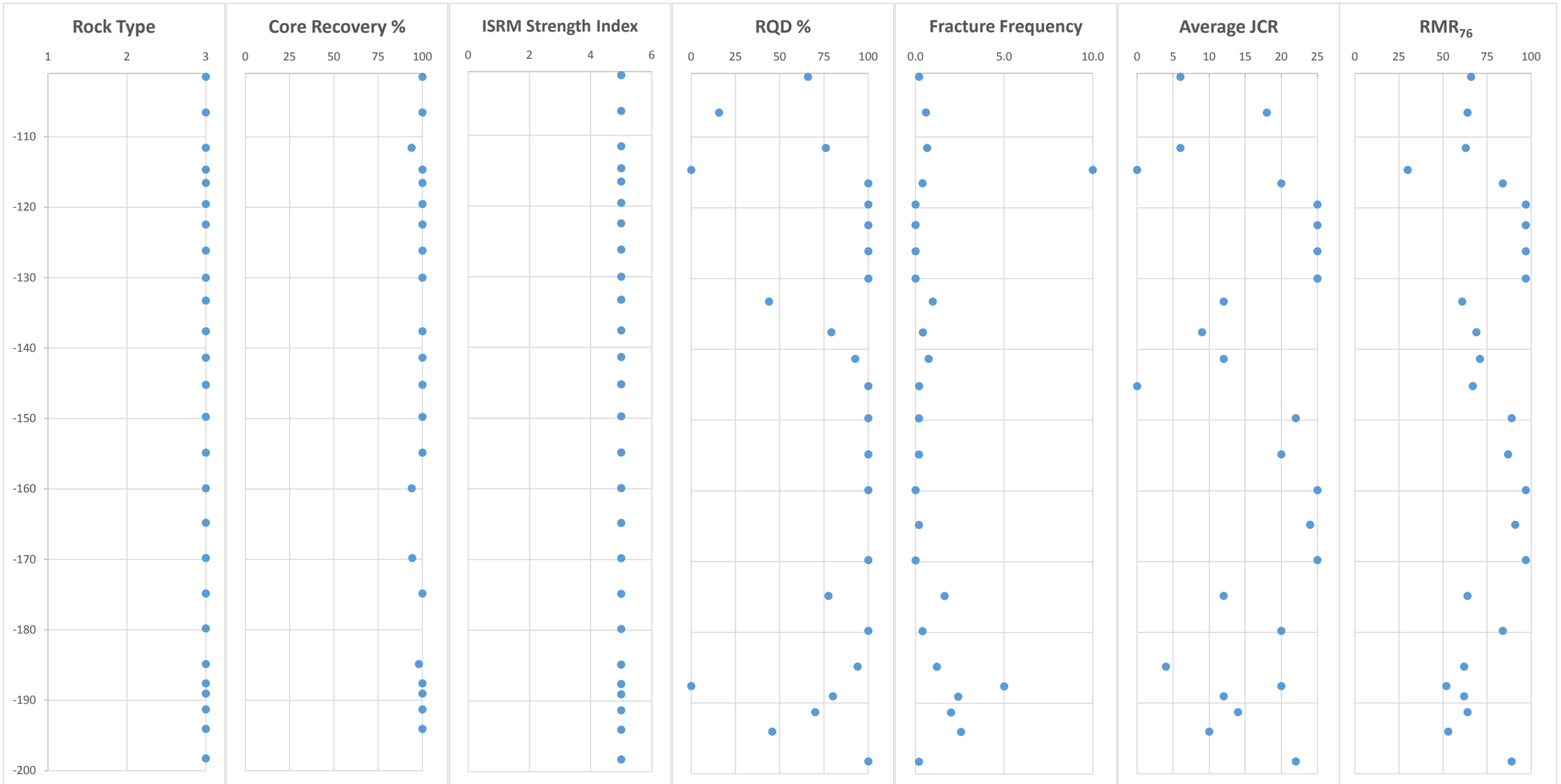
GOLDER

APPENDIX C

IO-18-01

DRAFT

Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft.
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

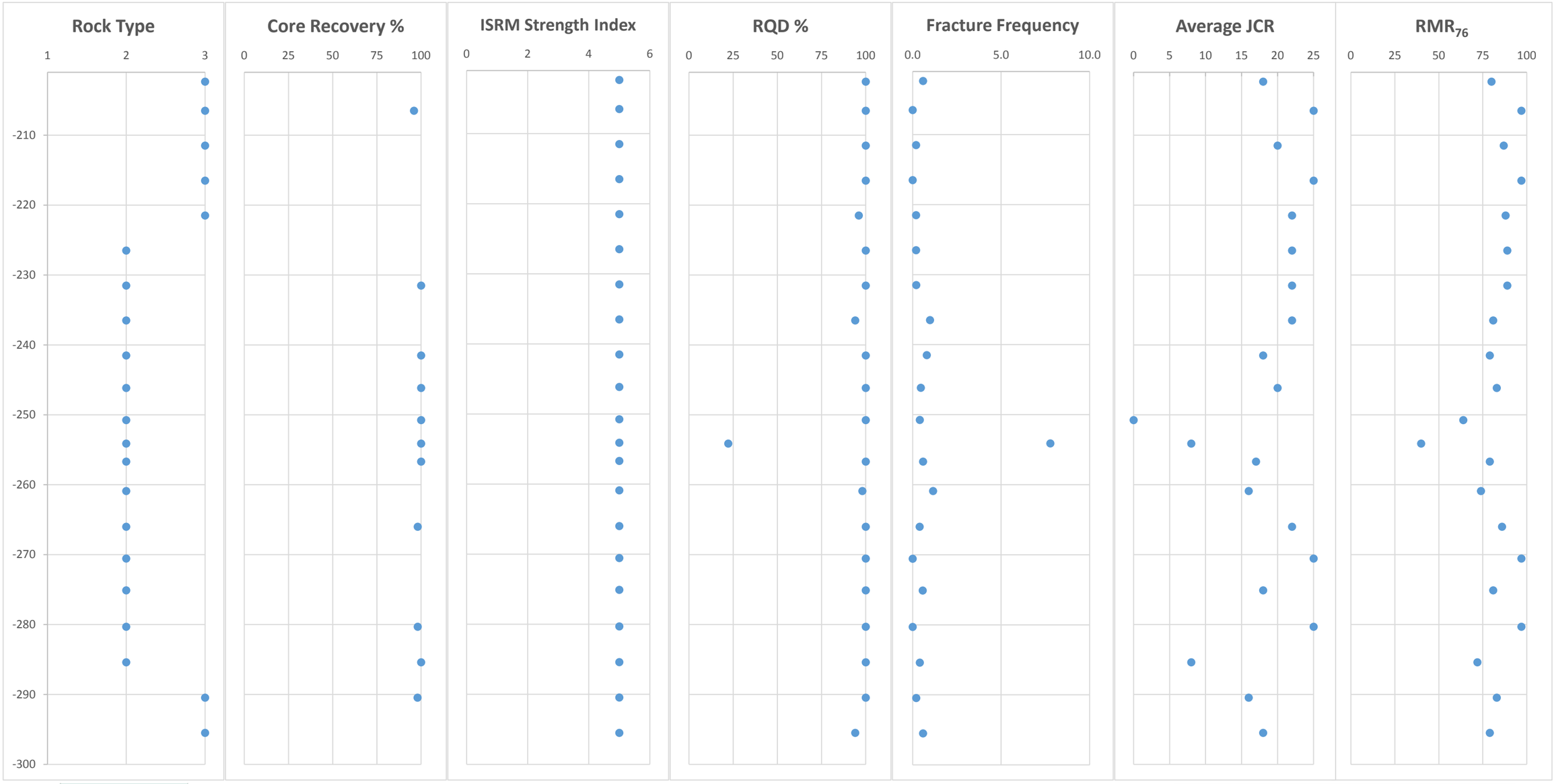
NOTE: Vertical Axis is depth below collar using 10 ft intervals.

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

IO-18-01



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

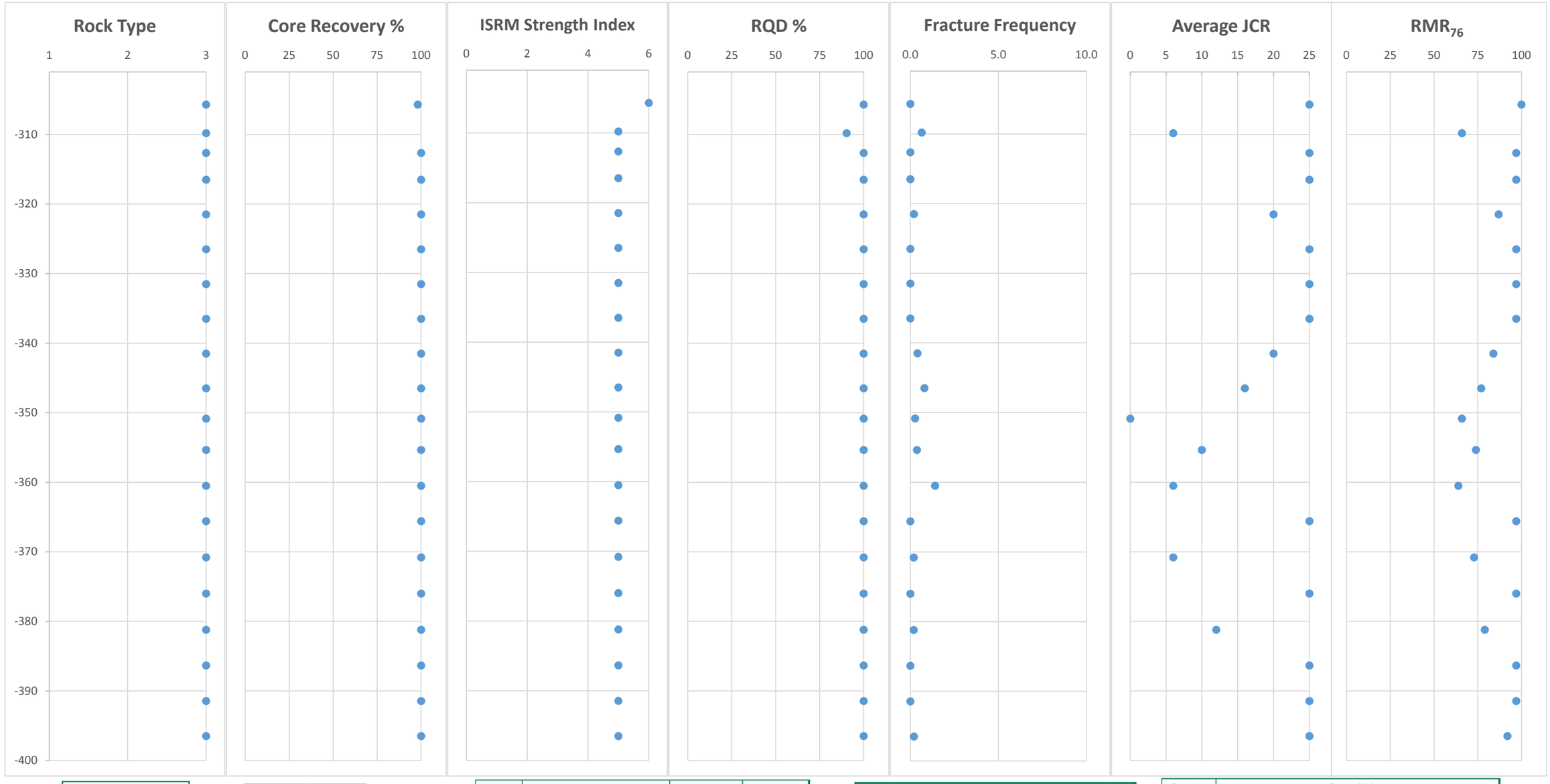
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R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

IO-18-01



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
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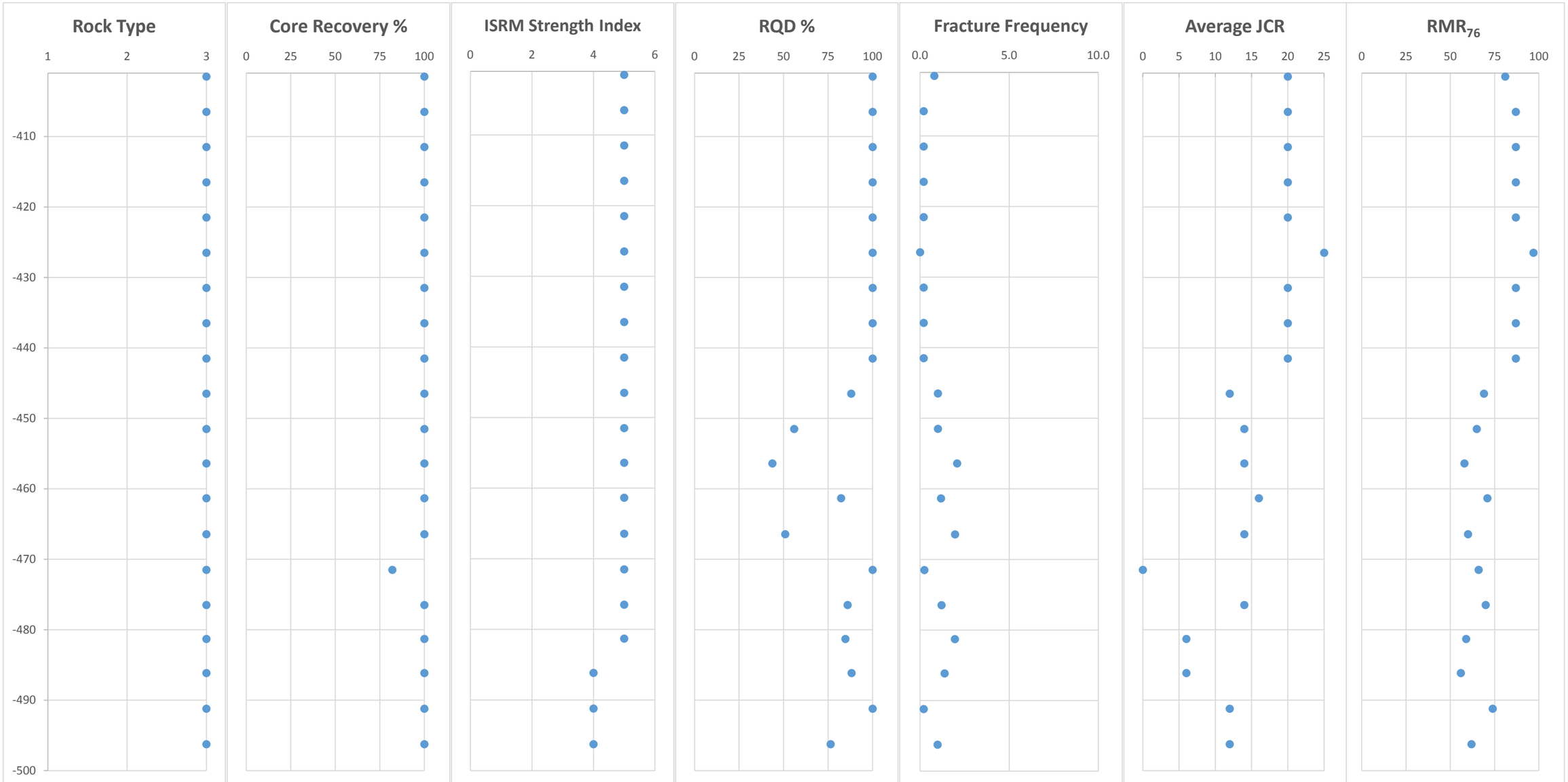
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Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
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Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
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Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

IO-18-01

DRAFT

Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
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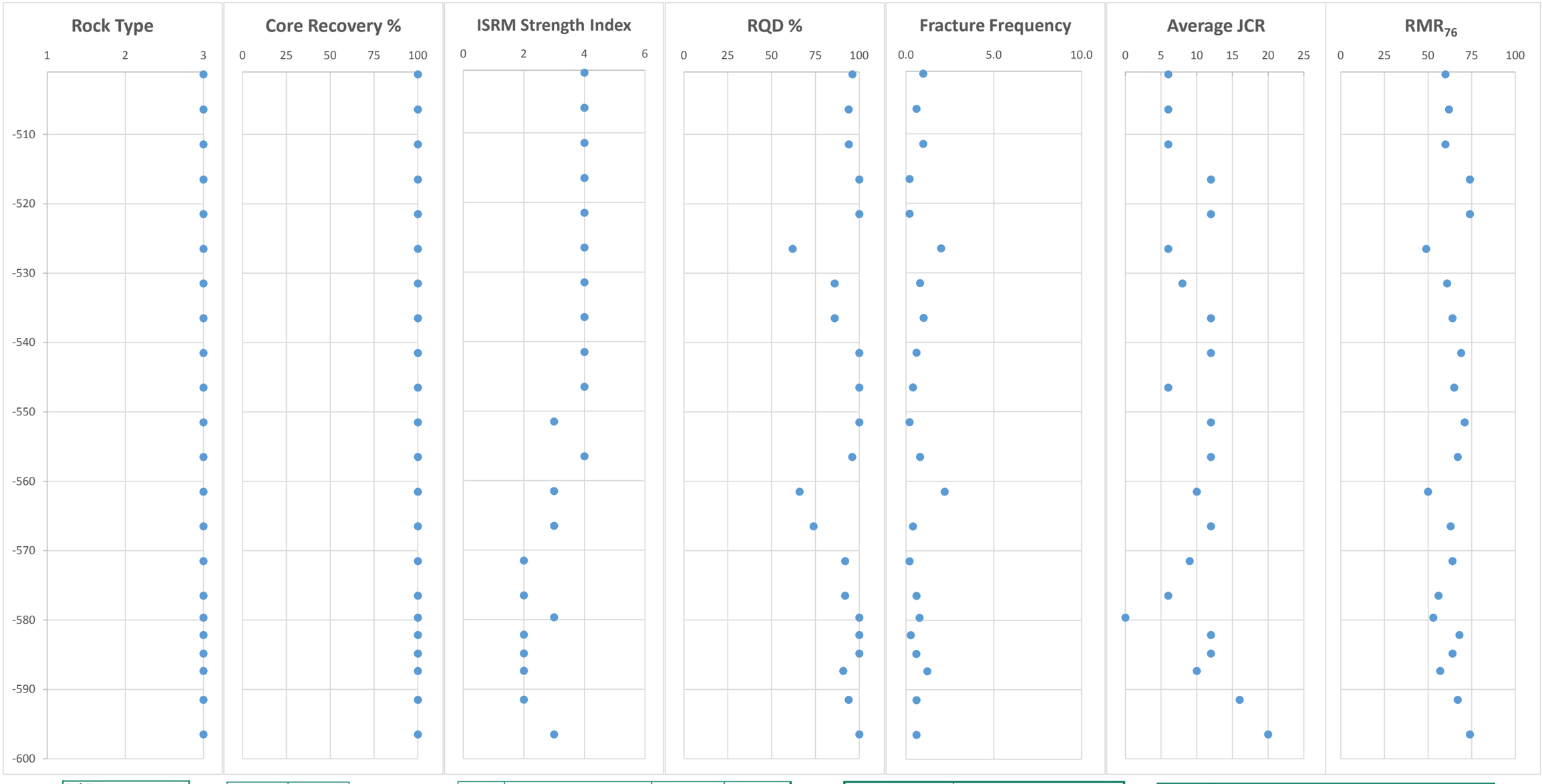
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Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-01

DRAFT Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

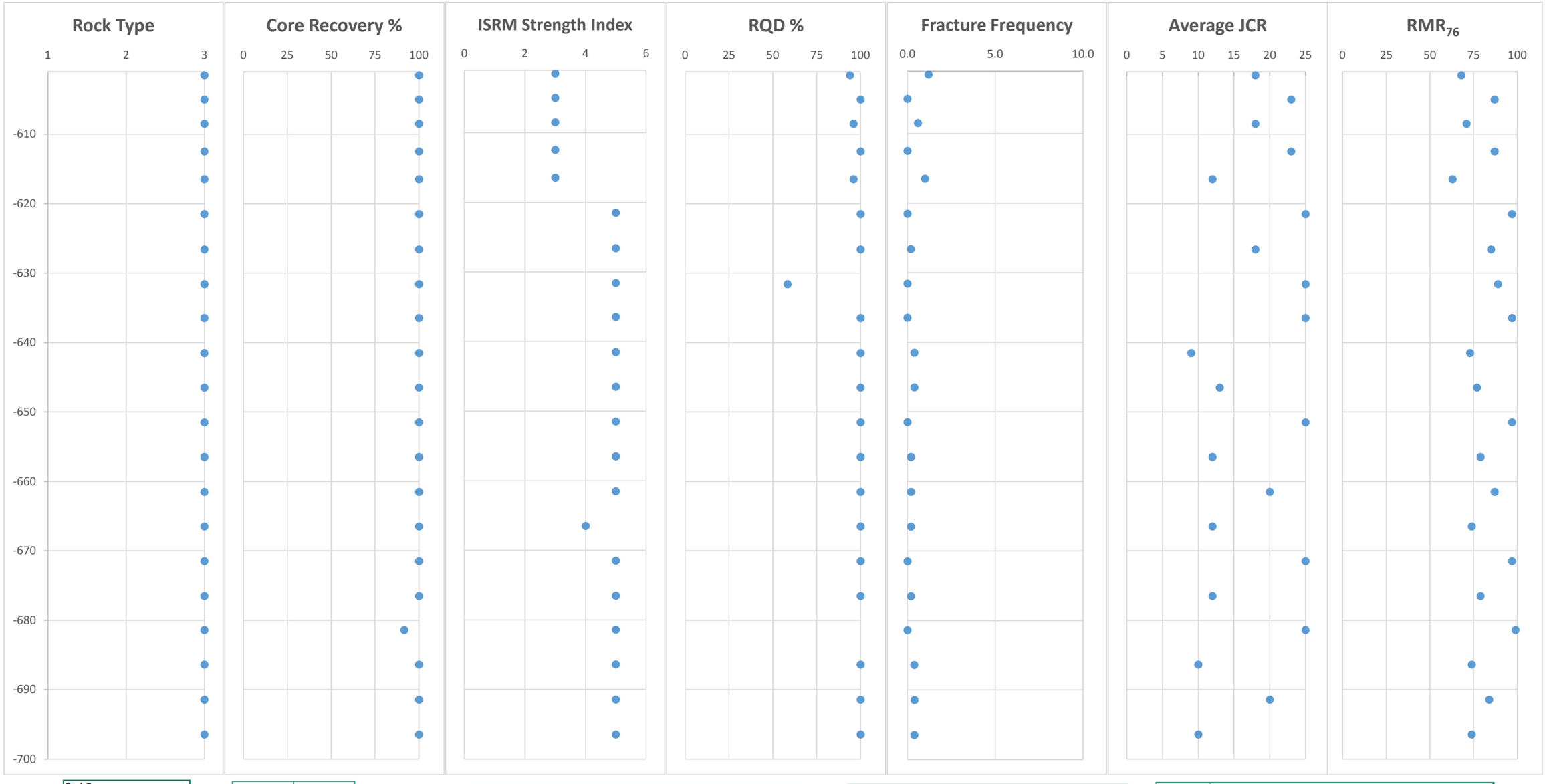
Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-01

DRAFT Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

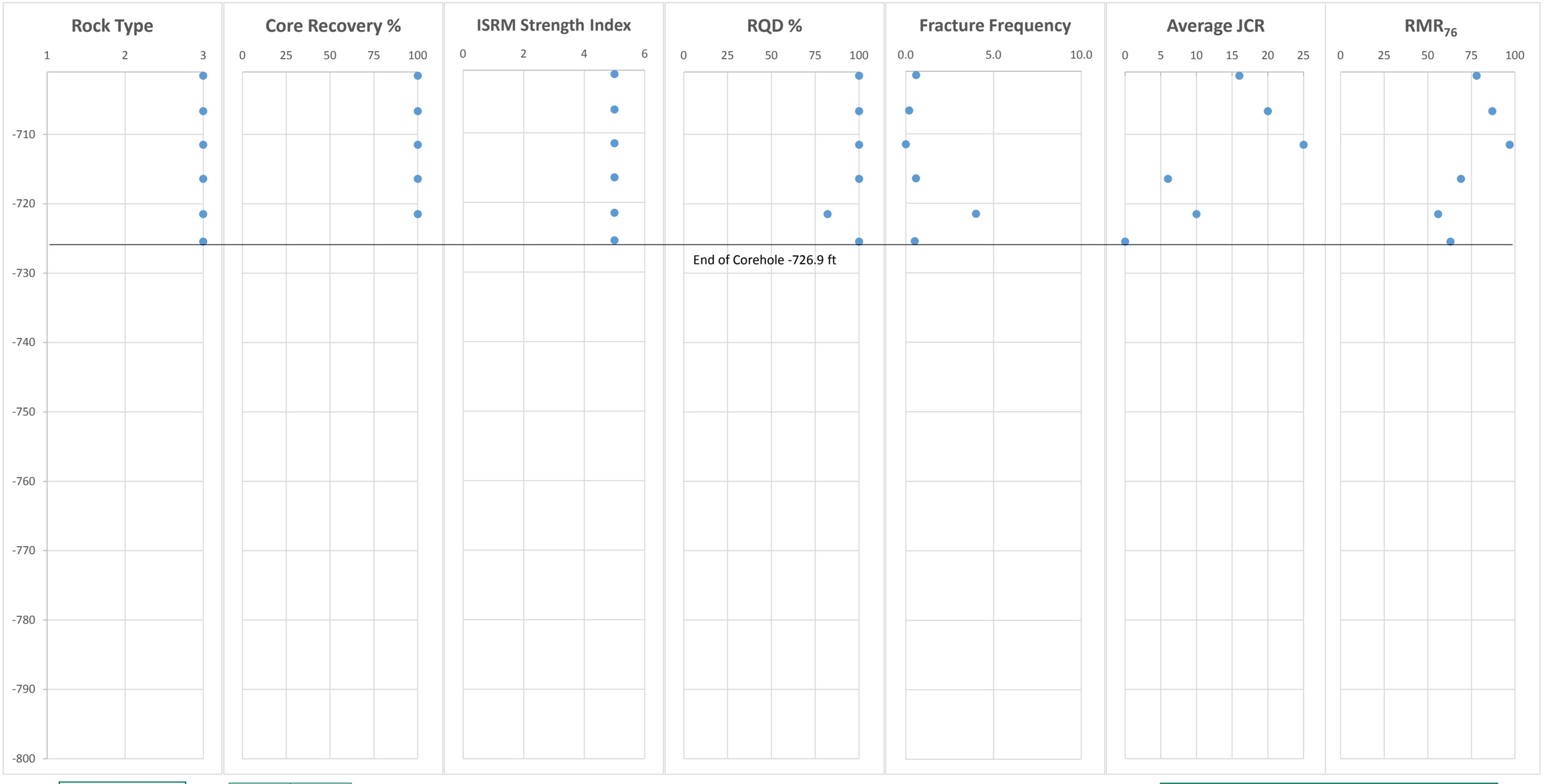
Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-01

DRAFT

Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

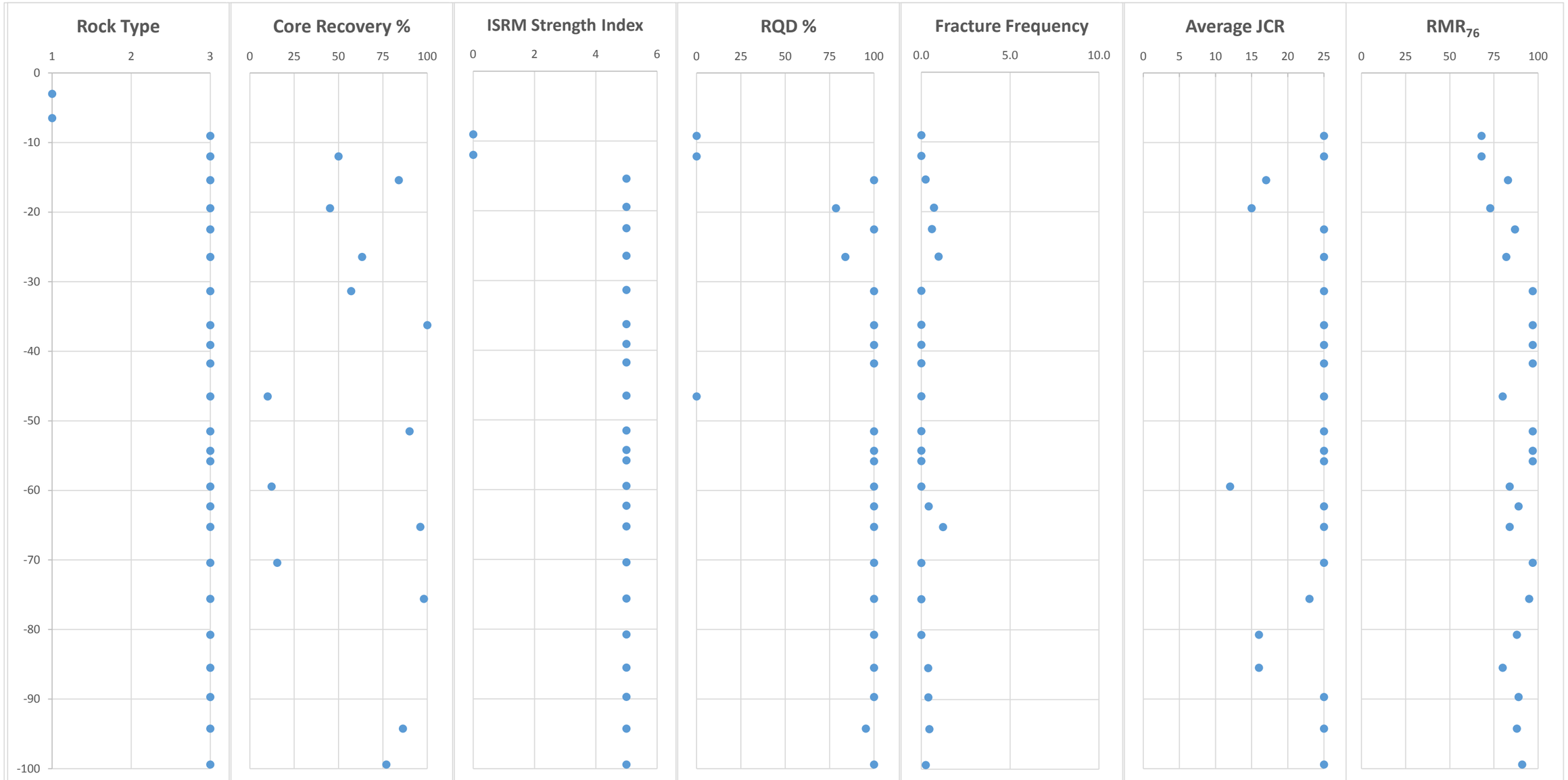
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R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
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6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft.
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

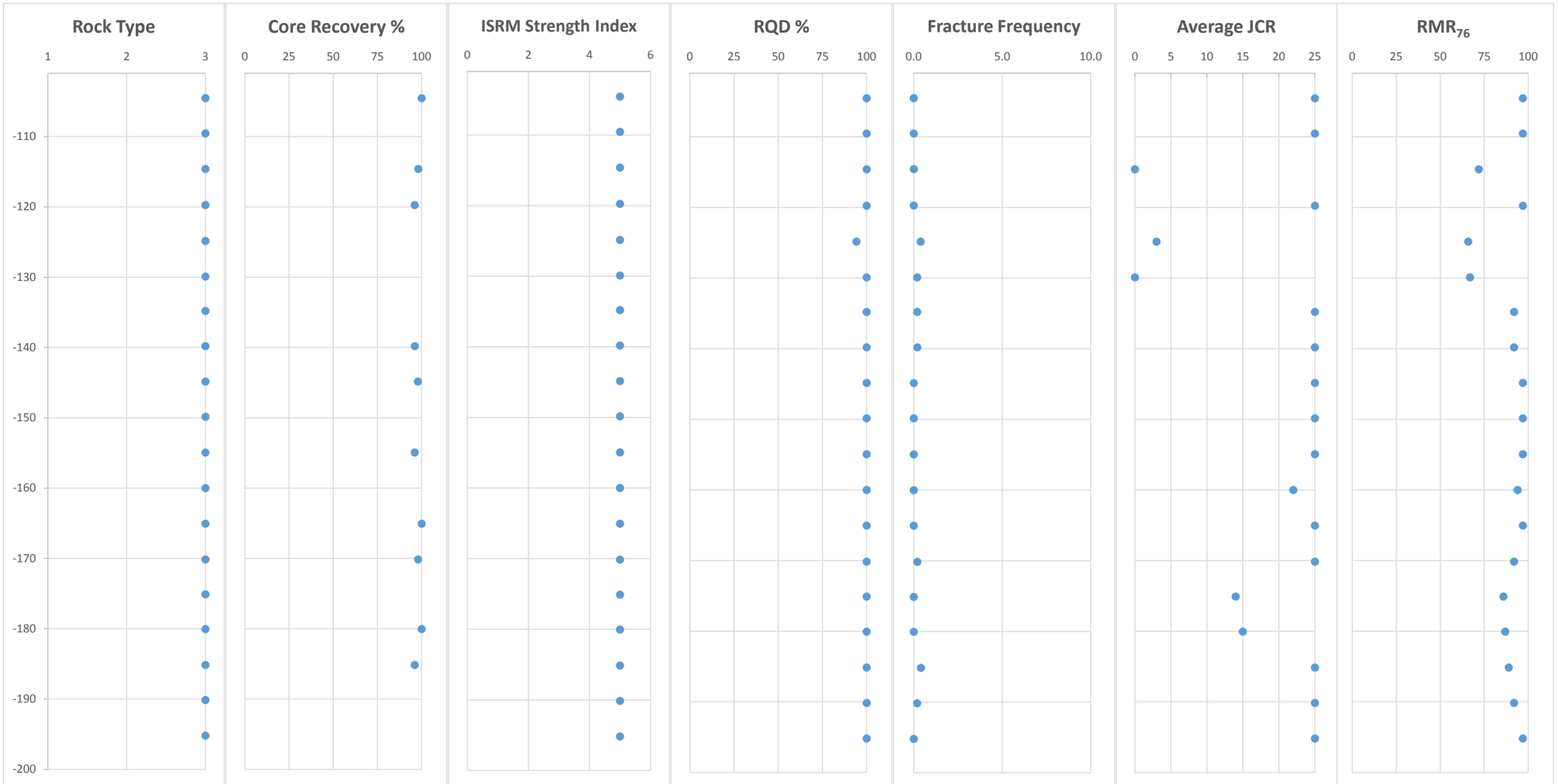
NOTE: Vertical Axis is depth below collar using 10 ft intervals.

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft.
JCR – Joint Condition Rating, Bieniawski (1976)
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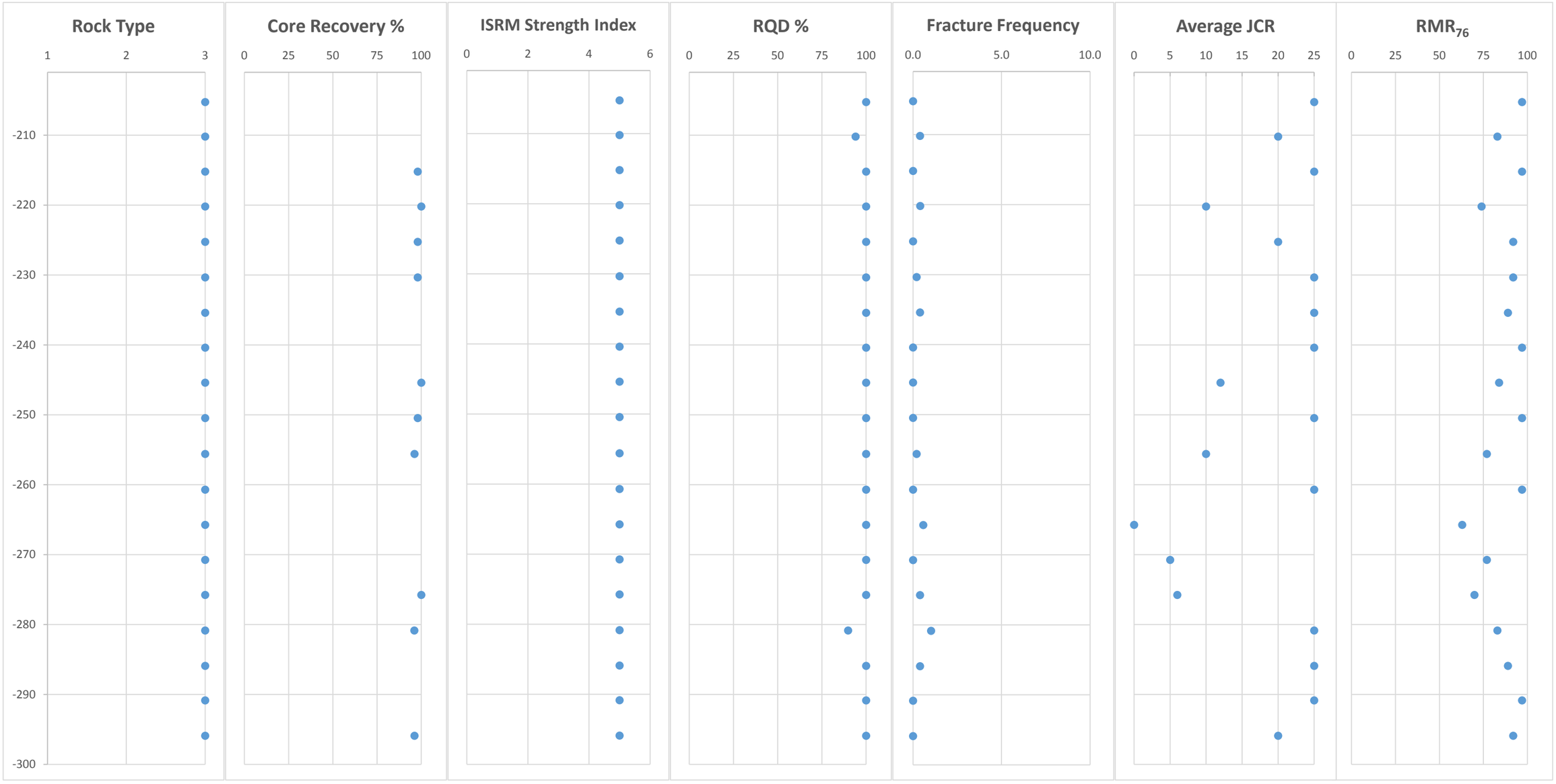
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ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
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R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
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Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
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Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
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50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
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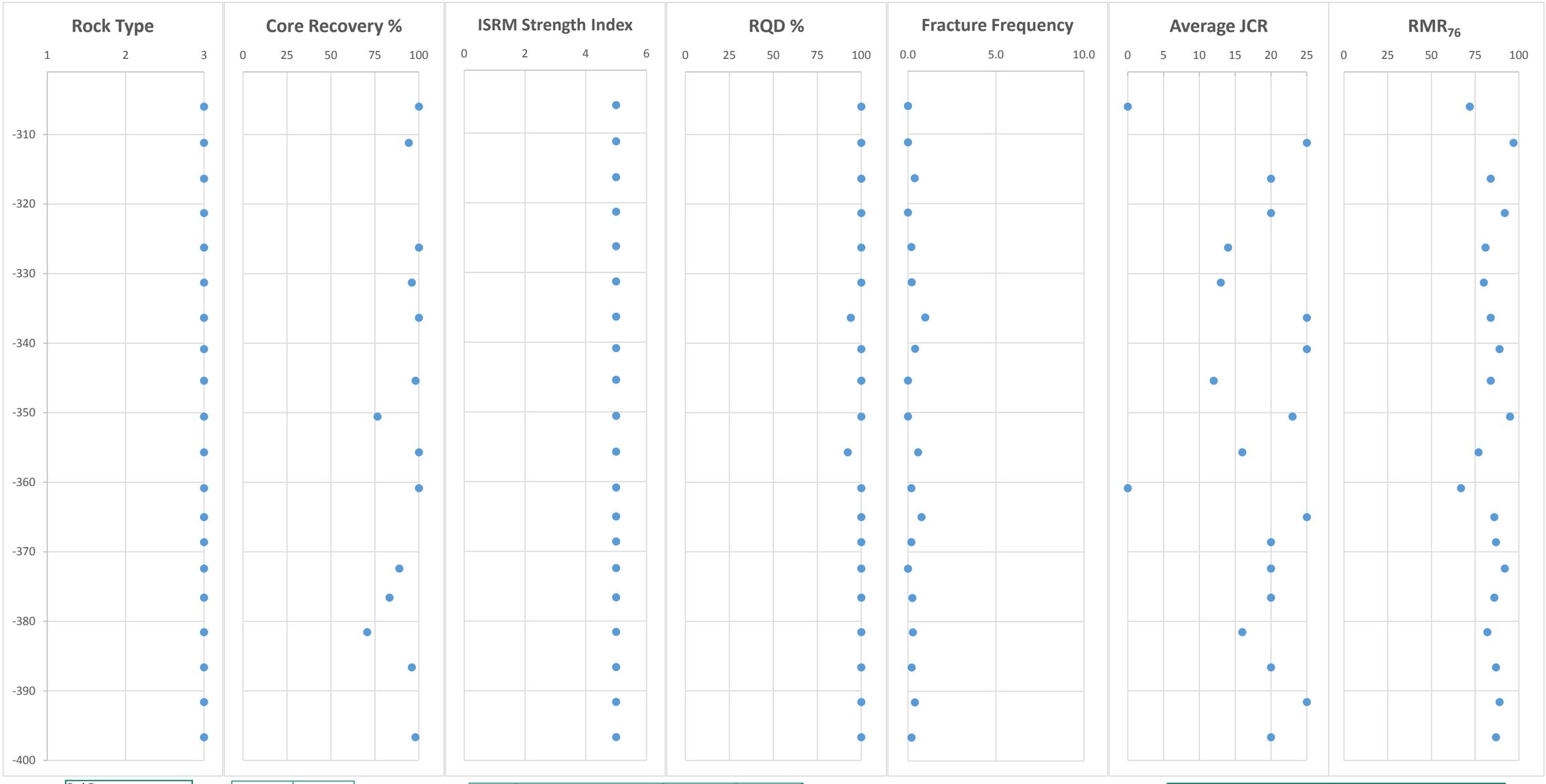
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ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
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R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
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Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
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Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
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IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
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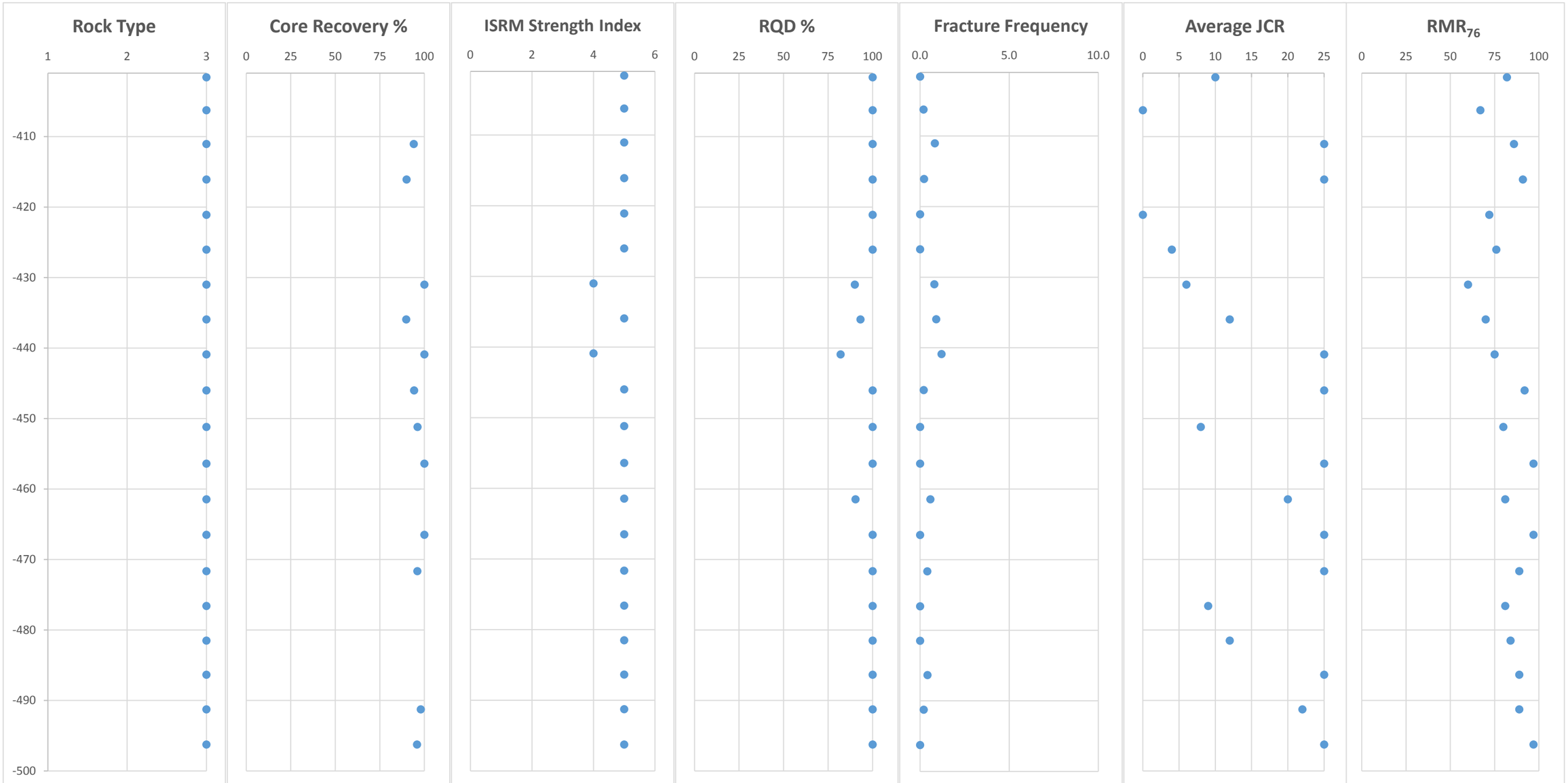
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Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

Downhole Plot of Geotechnical Logging Data

IO-18-02

DRAFT Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
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90 to 100	Excellent

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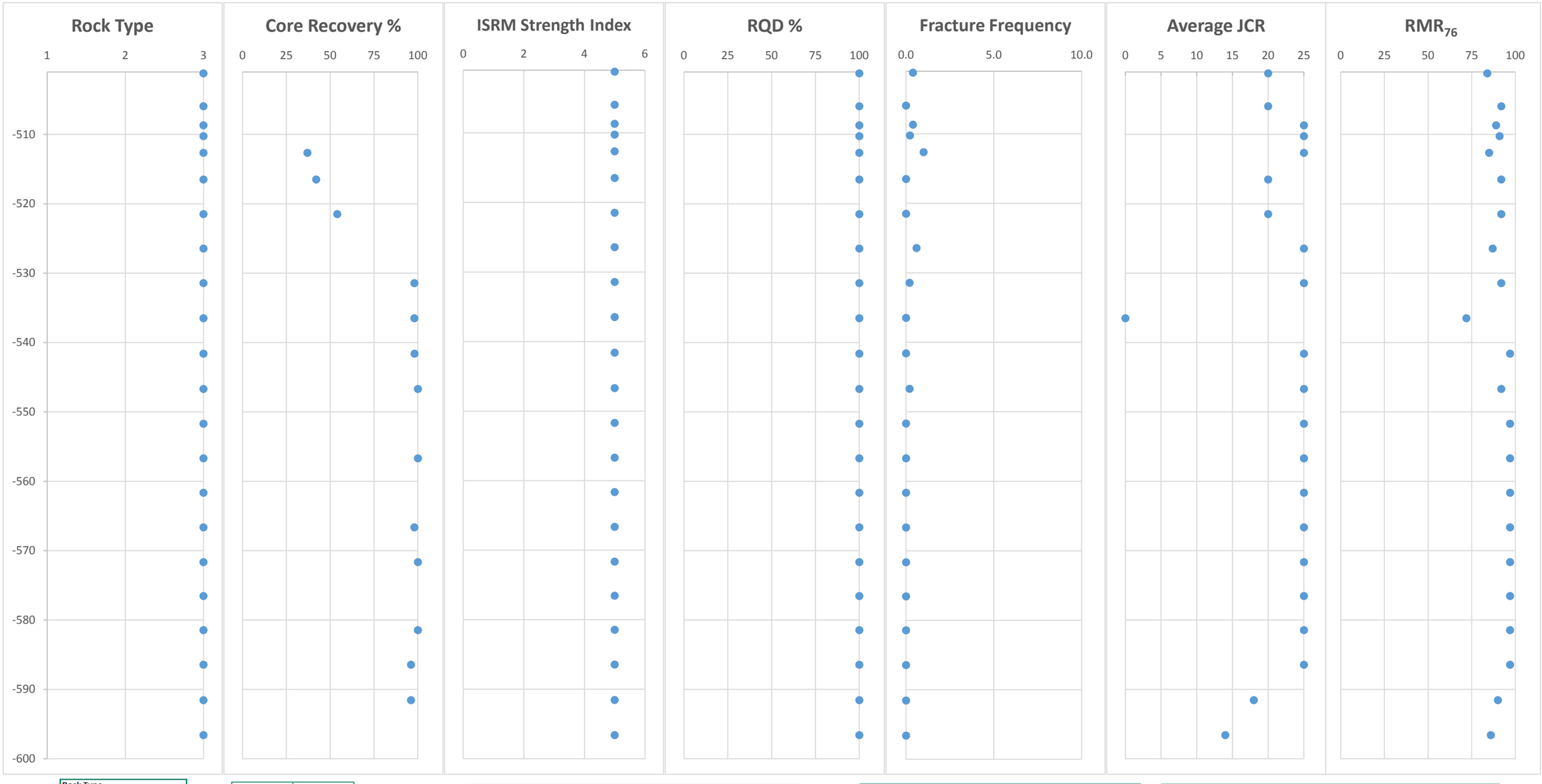
Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

GOLDER

APPENDIX C

IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

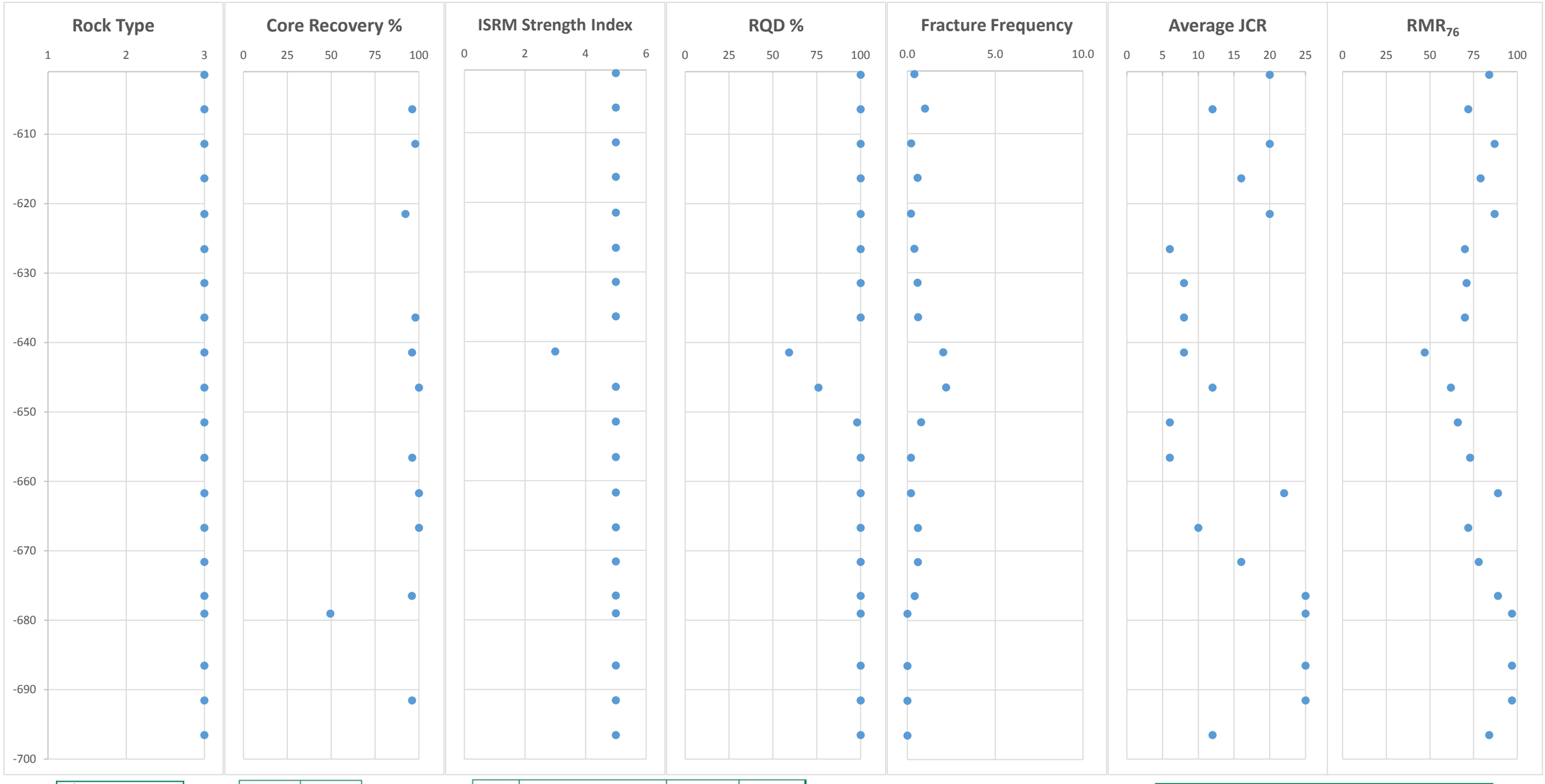
ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-02



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

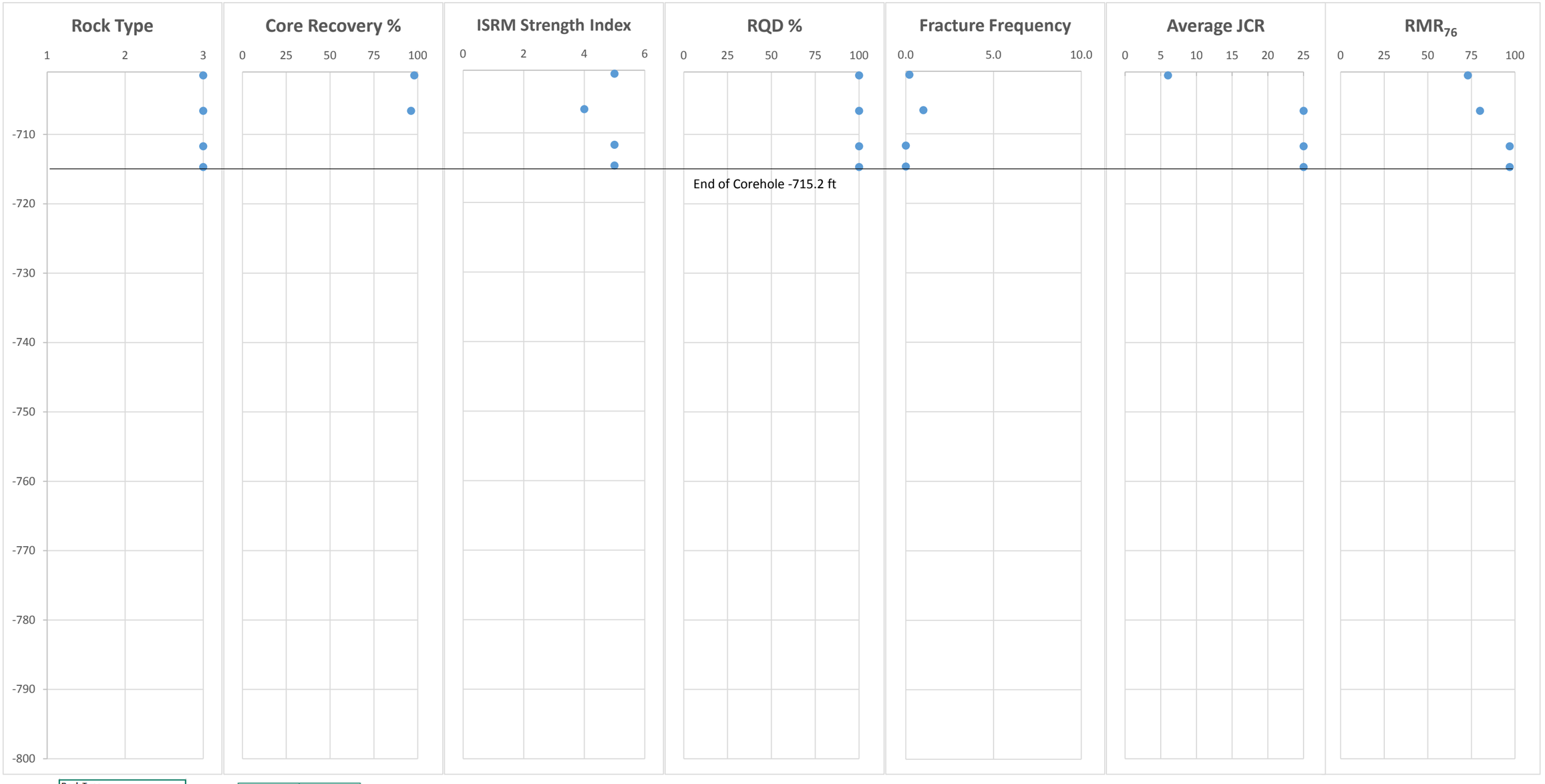
Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

IO-18-02

DRAFT Job No. 1781618.0200.201



Rock Type
1 - Soil
2 - Cap Rock
3 - Greenstone (Meta-andesite)

RQD % Range	Rock Quality
0 to 25	Very Poor
25 to 50	Poor
50 to 75	Fair
75 to 90	Good
90 to 100	Excellent

Definition: Fracture Frequency (FF) - is number of fractures in solid core per foot, with maximum value of 10 fractures/ft.
JCR – Joint Condition Rating, Bieniawski (1976)
RMR_{76} – Rock Mass Rating system, Bieniawski (1976)

ISRM Strength (R)	Field Identification	Classification	Approximate Range of UCS (psi)
R0	Indented with thumbnail	Extremely weak	35-150
R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	Very weak	150-725
R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geological hammer	Weak	725-3,500
R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	Medium strong	3,500-7,500
R4	Specimen requires more than one blow of geological hammer to fracture it	Strong	7,500-15,000
R5	Specimen requires many blows of geological hammer to fracture it	Very strong	15,000-35,000
R6	Specimen can only be chipped with geological hammer	Extremely strong	>35,000

Rating	Joint Condition
25	Very rough surfaces, not continuous, no separation, fresh (hard) joint wall rock.
20	Slightly rough surfaces, separation <1mm, slightly weathered (hard) joint wall rock.
12	Slightly rough surfaces, separation <1mm, highly weathered (soft) joint wall rock
6	Slickensided surfaces – or – gouge <5mm thick – or – separation 1-5mm, continuous
0	Soft gouge >5 mm thick – or – separation >5mm , continuous

Parameter	Range of Values						
UCS (psi) Rating	>30,000 *(15)*	15,000-30,000 *(12)*	7,500-15,000 *(7)*	3,500-7,500 *(4)*	1,500-3,500 *(2)*	<450-1,500 *(1)*	150-450 *(0)*
RQD Rating	90-100% *(20)*	75-90% *(17)*	50-75% *(13)*	25-50% *(8)*	<25% *(3)*		
Joint Spacing Rating	>10 feet *(30)*	3-10 feet *(25)*	1-3 feet *(20)*	0.2-1 feet *(10)*	<0.2 feet *(5)*		
Joint Condition Rating	Very rough No separation Hard wall rock *(25)*	Slightly rough Separation<1mm Hard wall rock *(20)*	Slightly rough Separation<1mm Soft wall rock *(12)*	Slickensides, Separation or gouge <5mm *(6)*	Soft gouge or Separation >5mm *(0)*		
Groundwater Rating	Completely Dry *(10)*		Moist *(7)*	Mod. Pressure *(4)*	Severe *(0)*		
Total RMR_{76} Value (Sum of Ratings for 5 Items) = 0 to 100							
Rating	*100 – 81*	*80 – 61*	*60 – 41*	*40 – 21*	*20 – 0*		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

NOTE: Vertical Axis is depth below collar using 10 ft intervals.

APPENDIX B
LABORATORY ANALYTICAL REPORTS

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

March 06, 2019

CLS Work Order #: 19A1326
COC #: 195549, 195550, 102707

Dr. Andrew Kopania
EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762

Project Name: SGI Ione

Enclosed are the results of analyses for samples received by the laboratory on 01/25/19 15:56. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

email results to: akopania@sbcglobal.net 1 of 3

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

CHAIN OF CUSTODY

CLS ID No.: 19A1326 LOG № 195550

REPORT TO:

NAME AND ADDRESS: EMKO Environmental, Inc
551 Lakecrest Dr.
El Dorado Hills, CA 95762
PROJECT MANAGER: Andy Kopania PHONE#: 916-718-5511
PROJECT NAME: SGT Ione
SAMPLED BY: AK
JOB DESCRIPTION:
SITE LOCATION: Ione

CLIENT JOB NUMBER:

DESTINATION LABORATORY:
☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA.
95742
☐ OTHER

GEOTHRACKER:
EDF REPORT ☐ YES ☒ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☒ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

TURN AROUND TIME: 1 DAY | 2 DAY | 3 DAY | 5 DAY

SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	General Minerals	EDA 200 - Suites Metals (drinking water)	5 DAY	SPECIAL INSTRUCTIONS
1-25-19	9:09	GW-01	W	1	1L plastic	3	X		X	Email results only, no hard copy.
1-25-19	9:09	GW-01	W	1	250mL	2		X		
1-25-19	9:49	PW-01	W	1	1L	3	X			
1-25-19	9:49	PW-01	W	1	250mL	2		X		
1-25-19	10:52	SW-04	W	1	1L	3	X			
1-25-19	10:52	SW-04	W	1	250mL	2		X		
1-25-19	11:06	SW-05	W	1	1L	3	X			
1-25-19	11:06	SW-05	W	1	250mL	2		X		
1-25-19	11:16	SW-06	W	1	1L	3	X			INVOICE TO:
1-25-19	11:16	SW-06	W	1	250mL	2		X		
1-25-19	11:35	SW-07	W	1	1L	3	X			
1-25-19	11:35	SW-07	W	1	250mL	2		X		P.O. #
										QUOTE #

SUSPECTED CONSTITUENTS

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Andrew A. Kopania / EMKO	1-25-19 / 15:45		

RECD AT LAB BY: GR DATE / TIME: 1/28/19 1550 CONDITIONS / COMMENTS: 4.8

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER AIR BILL #

White-Lab file copy/Terms and conditions Yellow-Lab file copy/Terms and Conditions Pink - Project Mgr./Field Samples/Terms and conditions Gold-Project Mgr./Field Samples/Terms and conditions

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

email results to: akypania@sbcglobal.net

2 of 3

CHAIN OF CUSTODY

CLS ID No.: 19A1326

LOG № 195549

REPORT TO:	CLIENT JOB NUMBER
NAME AND ADDRESS: EMKO Environmental, Inc. 551 Lakecrest Dr. El Dorado Hills, CA 95762	DESTINATION LABORATORY: ☒ CLS (916) 638-7301 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER
PROJECT MANAGER: Andrew Kypania PHONE#: 916-718-5511	
PROJECT NAME: SGI Lone	
SAMPLED BY: AK	
JOB DESCRIPTION:	
SITE LOCATION: Lone	

GEOTHRACKER: EDF REPORT ☐ YES ☒ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☒ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Acid Generation Potential	DI-Leach - Gen. Min	DI-Leach - 200 Series	drinking wtr. Metals	General Minerals	EPA 200 Series drinking water metals
1-25-19	10:13	RX-01	soil	1	glass	3		X	X			
1-25-19	10:13	RX-01	soil	1	glass	3	X					
1-25-19	10:36	OB-01	soil	1	glass	3		X	X			
1-25-19	10:36	OB-01	soil	1	glass	3	X					
1-25-19	12:02	IO-18-01	W	1	1 L	3					X	
1-25-19	12:02	IO-18-01	W	1	250 mL	2						X
1-25-19	13:10	SW-08	W	1	1 L	3					X	
1-25-19	13:10	SW-08	W	1	250mL	2						X
1-25-19	13:29	IO-18-02	W	1	1 L	3					X	
1-25-19	13:29	IO-18-02	W	1	250mL	2						X
1-25-19	14:07	SW-01	W	1	1 L	3					X	
1-25-19	14:07	SW-01	W	1	250 mL	2						X

SUSPECTED CONSTITUENTS

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

TURN AROUND TIME: 1 DAY ☐ 2 DAY ☐ 3 DAY ☐ 5 DAY ☒

SPECIAL INSTRUCTIONS OR ALT. ID:

INVOICE TO:

P.O. #

QUOTE #

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Andrew A. Kypania/EMKO	1-25-19 / 15:52		

RECD AT LAB BY: DH DATE / TIME: 1/25/19 1556 CONDITIONS / COMMENTS: 4°C

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER AIR BILL #

White-Lab/Terms and conditions Yellow-Lab file copy/Terms and Conditions Pink-Client/Terms and Conditions Gold-Project Mgr Blue-Sampler/Terms and conditions

email results to : akoganis@sbcglobal.net

3 of 3

CLS - Labs

CHAIN OF CUSTODY

CLS ID No.: 19A1326

LOG NO. 102707

REPORT TO:

NAME AND ADDRESS: EMKO Environmental, Inc.
5511 Lakecrest Dr.
El Dorado Hills, CA 95762

PROJECT MANAGER: Andrew Koganis PHONE#: 916-718-5511

PROJECT NAME: SGI Ione

SAMPLED BY: AK

JOB DESCRIPTION:

SITE LOCATION: Ione

CLIENT JOB NUMBER:

DESTINATION LABORATORY:

☒ CLS (916) 638-7301
3249 FITZGERALD RD
RANCHO CORDOVA, CA

☐ OTHER

ANALYSIS REQUESTED

EDF 200 drinking water Metals

Cam 17 Metals

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE											
1-25-19	14:25	SW-02	W	1	1 L	1	X								X	
1-25-19	14:25	SW-02	W	1	250 mL	2		X							|	
1-25-19	14:41	SW-03	W	1	1 L	3	X								|	
1-25-19	14:41	SW-03	W	1	250 mL	4		X							|	

GEOTRACKER:

EDF REPORT ☐ YES ☒ NO

GLOBAL ID:

COMPOSITE:

FIELD CONDITIONS:

TURN AROUND TIME

1 DAY | 2 DAY | ☒ 5 DAY | 10 DAY

SPECIAL INSTRUCTIONS

OR

ALT. ID:

INVOICE TO:

P.O. #

QUOTE #

SUSPECTED CONSTITUENTS

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Andrew A. Koganis / EMKO	1-25-19 / 15:56		

RECD AT LAB BY: [signature] DATE / TIME: 1/25/19 1556

CONDITIONS / COMMENTS: 4.8

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER AIR BILL #

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GW-01 (19A1326-01) Water Sampled: 01/25/19 09:09 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**51**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**30**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**11**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.53**	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**120**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**10**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**15**	4.0	"	10	1900660	01/25/19	01/28/19	EPA 300.0	HT-4
pH	**6.93**	0.01	pH Units	1	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**2.5**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**31**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**430**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**68**	5.0	mg/L	10	1900660	01/25/19	01/28/19	EPA 300.0	
Total Alkalinity	**51**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**280**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
PW-01 (19A1326-02) Water Sampled: 01/25/19 09:49 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**71**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**30**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**11**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.58**	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**110**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**9.5**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**13**	4.0	"	10	1900660	01/25/19	01/28/19	EPA 300.0	HT-4
pH	**8.05**	0.01	pH Units	1	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**2.1**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PW-01 (19A1326-02) Water Sampled: 01/25/19 09:49 Received: 01/25/19 15:56									
Sodium	**32**	1.0	mg/L	1	1900696	"	02/04/19	200.7/2340B	
Specific Conductance (EC)	**410**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**52**	5.0	mg/L	10	1900660	01/25/19	01/28/19	EPA 300.0	
Total Alkalinity	**71**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**270**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
SW-04 (19A1326-03) Water Sampled: 01/25/19 10:52 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**80**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**57**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**35**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**1.3**	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**240**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**23**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**6.2**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.77**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**2.2**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**59**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**760**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**110**	5.0	mg/L	10	1900660	01/25/19	01/28/19	EPA 300.0	
Total Alkalinity	**80**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**500**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-05 (19A1326-04) Water Sampled: 01/25/19 11:06 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**46**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**9.9**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**14**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.34**	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**62**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**9.0**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**5.4**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.00**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**2.8**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**22**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**260**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**28**	0.50	mg/L	"	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**46**	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**190**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
SW-06 (19A1326-05) Water Sampled: 01/25/19 11:16 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**87**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**27**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**22**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.63**	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**180**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**27**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**35**	4.0	"	10	1900660	01/25/19	01/28/19	EPA 300.0	HT-4
pH	**7.03**	0.01	pH Units	1	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**2.3**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-06 (19A1326-05) Water Sampled: 01/25/19 11:16 Received: 01/25/19 15:56									
Sodium	**38**	1.0	mg/L	1	1900696	"	02/04/19	200.7/2340B	
Specific Conductance (EC)	**700**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**93**	5.0	mg/L	10	1900660	01/25/19	01/28/19	EPA 300.0	
Total Alkalinity	**87**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**500**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
SW-07 (19A1326-06) Water Sampled: 01/25/19 11:35 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**290**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**28**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**36**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**8.6**	1.0	"	10	"	"	01/28/19	"	
Hardness as CaCO3	**150**	1.0	"	1	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**19**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**5.4**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**8.15**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**3.9**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**150**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**960**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**110**	5.0	mg/L	10	1900660	01/25/19	01/28/19	EPA 300.0	
Total Alkalinity	**290**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**670**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RX-01 (19A1326-07) Soil Sampled: 01/25/19 10:13 Received: 01/25/19 15:56									
Acid Producing Potential	ND	5.0	lb CaCO3 equ/1000 lb	1	1900915	02/04/19	02/04/19	EPA 670/2-74-070	
Bicarbonate as CaCO3	**14**	5.0	mg/L	"	1900833	01/31/19	01/31/19	SM2320B	
Calcium	**2.8**	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	
Carbonate as CaCO3	ND	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Chloride	ND	5.0	"	"	1900772	01/30/19	01/30/19	EPA 300.0	
Fluoride	ND	1.0	"	"	"	"	"	"	
Hardness as CaCO3	**7.0**	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	
Hydroxide as CaCO3	ND	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Magnesium	ND	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900847	01/31/19	01/31/19	SM5540 C	
Nitrate as N	ND	5.0	"	"	1900772	01/30/19	01/30/19	EPA 300.0	
pH	**9.39**	1.00	pH Units	"	1900775	01/30/19	01/30/19	EPA 9045C	
Potassium	ND	1.0	mg/L	"	1900880	02/01/19	02/04/19	EPA 200.7	
Sodium	**1.1**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**31**	1.0	µmhos/cm	"	1900841	01/31/19	01/31/19	EPA 120.1	
Sulfate as SO4	ND	10	mg/L	"	1900772	01/30/19	01/30/19	EPA 300.0	
Total Alkalinity	**14**	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Total Dissolved Solids	ND	10	"	"	1900796	01/30/19	01/31/19	SM2540C	
OB-01 (19A1326-08) Soil Sampled: 01/25/19 10:36 Received: 01/25/19 15:56									
Acid Producing Potential	ND	5.0	lb CaCO3 equ/1000 lb	1	1900915	02/04/19	02/04/19	EPA 670/2-74-070	
Bicarbonate as CaCO3	**22**	5.0	mg/L	"	1900833	01/31/19	01/31/19	SM2320B	
Calcium	**3.2**	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	
Carbonate as CaCO3	ND	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Chloride	**6.1**	5.0	"	"	1900772	01/30/19	01/30/19	EPA 300.0	
Fluoride	ND	1.0	"	"	"	"	"	"	
Hardness as CaCO3	**14**	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	
Hydroxide as CaCO3	ND	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Magnesium	**1.3**	1.0	"	"	1900880	02/01/19	02/04/19	EPA 200.7	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OB-01 (19A1326-08) Soil Sampled: 01/25/19 10:36 Received: 01/25/19 15:56									
MBAS as LAS, mol wt 340	ND	0.10	mg/L	1	1900847	01/31/19	01/31/19	SM5540 C	
Nitrate as N	**6.4**	5.0	"	"	1900772	01/30/19	01/30/19	EPA 300.0	
pH	**7.05**	1.00	pH Units	"	1900775	01/30/19	01/30/19	EPA 9045C	
Potassium	**1.0**	1.0	mg/L	"	1900880	02/01/19	02/04/19	EPA 200.7	
Sodium	**1.4**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**42**	1.0	µmhos/cm	"	1900841	01/31/19	01/31/19	EPA 120.1	
Sulfate as SO4	**15**	10	mg/L	"	1900772	01/30/19	01/30/19	EPA 300.0	
Total Alkalinity	**22**	5.0	"	"	1900833	01/31/19	01/31/19	SM2320B	
Total Dissolved Solids	**240**	10	"	"	1900796	01/30/19	01/31/19	SM2540C	
IO-18-01 (19A1326-09) Water Sampled: 01/25/19 12:02 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**450**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**60**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**190**	5.0	"	10	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.35**	0.10	"	1	"	"	01/25/19	"	
Hardness as CaCO3	**300**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**35**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**1.0**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.39**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**7.4**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**160**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**1500**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**45**	5.0	mg/L	10	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**450**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**830**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-08 (19A1326-10) Water Sampled: 01/25/19 13:10 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**110**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**21**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**41**	5.0	"	10	1900660	01/25/19	01/28/19	EPA 300.0	
Fluoride	**0.84**	0.10	"	1	"	"	01/25/19	"	
Hardness as CaCO3	**150**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**25**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**5.6**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.50**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**1.0**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**22**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**440**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**10**	0.50	mg/L	"	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**110**	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**270**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
IO-18-02 (19A1326-11) Water Sampled: 01/25/19 13:29 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**320**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**30**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**150**	5.0	"	10	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	**0.47**	0.10	"	1	"	"	01/25/19	"	
Hardness as CaCO3	**170**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**22**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**1.6**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.35**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**9.5**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
IO-18-02 (19A1326-11) Water Sampled: 01/25/19 13:29 Received: 01/25/19 15:56									
Sodium	**190**	1.0	mg/L	1	1900696	"	02/04/19	200.7/2340B	
Specific Conductance (EC)	**1300**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**110**	5.0	mg/L	10	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**320**	5.0	"	1	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**770**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
SW-01 (19A1326-12) Water Sampled: 01/25/19 14:07 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**34**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**3.9**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**37**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	ND	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**23**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**3.2**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**0.76**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**7.33**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**1.6**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**33**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**240**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**7.4**	0.50	mg/L	"	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**34**	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**170**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-02 (19A1326-13) Water Sampled: 01/25/19 14:25 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**18**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**3.6**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**6.0**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	ND	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**21**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**2.8**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**0.89**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**6.35**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**1.9**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	
Sodium	**8.5**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**92**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**5.8**	0.50	mg/L	"	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**18**	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**100**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	
SW-03 (19A1326-14) Water Sampled: 01/25/19 14:41 Received: 01/25/19 15:56									
Bicarbonate as CaCO3	**8.2**	5.0	mg/L	1	1900724	01/28/19	01/29/19	SM2320B	
Calcium	**3.3**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Carbonate as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Chloride	**4.9**	0.50	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
Fluoride	ND	0.10	"	"	"	"	"	"	
Hardness as CaCO3	**16**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
Hydroxide as CaCO3	ND	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Magnesium	**1.9**	1.0	"	"	1900696	01/28/19	02/04/19	200.7/2340B	
MBAS as LAS, mol wt 340	ND	0.10	"	"	1900677	01/25/19	01/25/19	SM5540 C	QC-2H
Nitrate as N	**1.5**	0.40	"	"	1900660	01/25/19	01/25/19	EPA 300.0	
pH	**6.03**	0.01	pH Units	"	1900662	01/25/19	01/25/19	SM4500-H B	HT-F
Potassium	**1.4**	1.0	mg/L	"	1900696	01/28/19	02/04/19	200.7/2340B	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-03 (19A1326-14) Water Sampled: 01/25/19 14:41 Received: 01/25/19 15:56									
Sodium	**5.7**	1.0	mg/L	1	1900696	"	02/04/19	200.7/2340B	
Specific Conductance (EC)	**75**	1.0	µmhos/cm	"	1900693	01/28/19	01/28/19	EPA 120.1	
Sulfate as SO4	**5.2**	0.50	mg/L	"	1900660	01/25/19	01/25/19	EPA 300.0	
Total Alkalinity	**8.2**	5.0	"	"	1900724	01/28/19	01/29/19	SM2320B	
Total Dissolved Solids	**87**	10	"	"	1900699	01/28/19	01/29/19	SM2540C	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RX-01 (19A1326-07) Soil Sampled: 01/25/19 10:13 Received: 01/25/19 15:56									
Aluminum	**0.62**	0.050	mg/L	1	1900951	02/05/19	02/05/19	EPA 6020	
Antimony	**0.0054**	0.0040	"	"	"	"	02/07/19	"	
Arsenic	ND	0.0020	"	"	"	"	02/05/19	"	
Barium	**0.037**	0.010	"	"	"	"	"	"	
Beryllium	ND	0.0010	"	"	"	"	"	"	
Boron	ND	0.050	"	"	1900880	02/01/19	02/04/19	EPA 6010B	
Cadmium	ND	0.0010	"	"	1900951	02/05/19	02/05/19	EPA 6020	
Chromium	ND	0.0050	"	"	"	"	"	"	
Copper	ND	0.050	"	"	"	"	"	"	
Iron	ND	0.10	"	"	"	"	"	"	
Lead	ND	0.0050	"	"	"	"	"	"	
Manganese	ND	0.020	"	"	"	"	"	"	
Mercury	ND	0.0010	"	"	1900882	02/01/19	02/04/19	EPA 7470A	
Nickel	ND	0.010	"	"	1900951	02/05/19	02/05/19	EPA 6020	
Selenium	ND	0.0050	"	"	"	"	"	"	
Silver	ND	0.010	"	"	"	"	"	"	
Thallium	ND	0.0010	"	"	"	"	"	"	
Vanadium	ND	0.0030	"	"	"	"	"	"	
Zinc	ND	0.050	"	"	"	"	"	"	
OB-01 (19A1326-08) Soil Sampled: 01/25/19 10:36 Received: 01/25/19 15:56									
Aluminum	**0.071**	0.050	mg/L	1	1900951	02/05/19	02/05/19	EPA 6020	
Antimony	ND	0.0040	"	"	"	"	02/07/19	"	
Arsenic	ND	0.0020	"	"	"	"	02/05/19	"	
Barium	**0.025**	0.010	"	"	"	"	"	"	
Beryllium	ND	0.0010	"	"	"	"	"	"	
Boron	ND	0.050	"	"	1900880	02/01/19	02/04/19	EPA 6010B	
Cadmium	ND	0.0010	"	"	1900951	02/05/19	02/05/19	EPA 6020	
Chromium	ND	0.0050	"	"	"	"	"	"	
Copper	ND	0.050	"	"	"	"	"	"	
Iron	ND	0.10	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OB-01 (19A1326-08) Soil Sampled: 01/25/19 10:36 Received: 01/25/19 15:56									
Lead	ND	0.0050	mg/L	1	1900951	"	02/05/19	EPA 6020	
Manganese	ND	0.020	"	"	"	"	"	"	
Mercury	ND	0.0010	"	"	1900882	02/01/19	02/04/19	EPA 7470A	
Nickel	ND	0.010	"	"	1900951	02/05/19	02/05/19	EPA 6020	
Selenium	ND	0.0050	"	"	"	"	"	"	
Silver	ND	0.010	"	"	"	"	"	"	
Thallium	ND	0.0010	"	"	"	"	"	"	
Vanadium	ND	0.0030	"	"	"	"	"	"	
Zinc	ND	0.050	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GW-01 (19A1326-01) Water Sampled: 01/25/19 09:09 Received: 01/25/19 15:56									
Aluminum	**1100**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	**2.0**	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**190**	100	"	"	"	"	"	"	
Cadmium	**1.3**	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	**71**	50	"	"	"	"	"	"	
Iron	**2200**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**51**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	**5.3**	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	02/05/19	EPA 200.8	
Vanadium	**4.0**	3.0	"	"	"	"	01/29/19	"	
Zinc	**360**	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
PW-01 (19A1326-02) Water Sampled: 01/25/19 09:49 Received: 01/25/19 15:56									
Aluminum	**130**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	**2.6**	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**200**	100	"	"	"	"	"	"	
Cadmium	**1.4**	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**170**	100	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PW-01 (19A1326-02) Water Sampled: 01/25/19 09:49 Received: 01/25/19 15:56									
Lead	ND	5.0	µg/L	1	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	ND	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	02/05/19	EPA 200.8	
Vanadium	**11**	3.0	"	"	"	"	01/29/19	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-04 (19A1326-03) Water Sampled: 01/25/19 10:52 Received: 01/25/19 15:56									
Aluminum	**430**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**370**	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**560**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**49**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	**6.5**	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-05 (19A1326-04) Water Sampled: 01/25/19 11:06 Received: 01/25/19 15:56									
Aluminum	**760**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**100**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	ND	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**900**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**27**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	ND	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-06 (19A1326-05) Water Sampled: 01/25/19 11:16 Received: 01/25/19 15:56									
Aluminum	**820**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**110**	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**920**	100	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-06 (19A1326-05) Water Sampled: 01/25/19 11:16 Received: 01/25/19 15:56									
Lead	ND	5.0	µg/L	1	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**52**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	**3.3**	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-07 (19A1326-06) Water Sampled: 01/25/19 11:35 Received: 01/25/19 15:56									
Aluminum	**2000**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**1400**	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**1600**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**40**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	**18**	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
IO-18-01 (19A1326-09) Water Sampled: 01/25/19 12:02 Received: 01/25/19 15:56									
Aluminum	**69**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**180**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**400**	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**380**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**1000**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	**16**	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	ND	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-08 (19A1326-10) Water Sampled: 01/25/19 13:10 Received: 01/25/19 15:56									
Aluminum	**1200**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**150**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	ND	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**1700**	100	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-08 (19A1326-10) Water Sampled: 01/25/19 13:10 Received: 01/25/19 15:56									
Lead	ND	5.0	µg/L	1	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**91**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	**7.6**	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
IO-18-02 (19A1326-11) Water Sampled: 01/25/19 13:29 Received: 01/25/19 15:56									
Aluminum	ND	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	ND	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	**850**	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**370**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**230**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	ND	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-01 (19A1326-12) Water Sampled: 01/25/19 14:07 Received: 01/25/19 15:56									
Aluminum	**540**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**130**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	ND	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**860**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	ND	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	ND	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-02 (19A1326-13) Water Sampled: 01/25/19 14:25 Received: 01/25/19 15:56									
Aluminum	**1200**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**100**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	ND	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**1600**	100	"	"	"	"	"	"	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-02 (19A1326-13) Water Sampled: 01/25/19 14:25 Received: 01/25/19 15:56									
Lead	ND	5.0	µg/L	1	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	**25**	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	**4.3**	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
SW-03 (19A1326-14) Water Sampled: 01/25/19 14:41 Received: 01/25/19 15:56									
Aluminum	**450**	50	µg/L	1	1900696	01/28/19	02/04/19	EPA 200.7	
Antimony	ND	4.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Arsenic	ND	2.0	"	"	"	"	"	"	
Barium	**150**	100	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Beryllium	ND	1.0	"	"	"	"	"	"	
Boron	ND	100	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Chromium	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Copper	ND	50	"	"	"	"	"	"	
Iron	**560**	100	"	"	"	"	"	"	
Lead	ND	5.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Manganese	ND	20	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Mercury	ND	1.0	"	"	1900757	01/29/19	01/30/19	EPA 245.1	
Nickel	ND	10	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	10	"	"	1900696	01/28/19	02/04/19	EPA 200.7	
Thallium	ND	1.0	"	"	1900695	01/28/19	01/29/19	EPA 200.8	
Vanadium	ND	3.0	"	"	"	"	"	"	
Zinc	ND	50	"	"	1900696	01/28/19	02/04/19	EPA 200.7	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900660 - General Prep										
Blank (1900660-BLK1)				Prepared & Analyzed: 01/25/19						
Chloride	ND	0.50	mg/L							
Sulfate as SO4	ND	0.50	"							
Fluoride	ND	0.10	"							
Nitrate as N	ND	0.40	"							
LCS (1900660-BS1)				Prepared & Analyzed: 01/25/19						
Sulfate as SO4	4.96	0.50	mg/L	5.00		99	80-120			
Fluoride	2.02	0.10	"	2.00		101	80-120			
Chloride	4.99	0.50	"	5.00		100	80-120			
Nitrate as N	1.97	0.40	"	2.00		98	80-120			
Matrix Spike (1900660-MS1)		**Source: 19A1287-02**		Prepared & Analyzed: 01/25/19						
Fluoride	2.18	0.10	mg/L	2.00	0.276	95	80-120			
Chloride	14.0	0.50	"	5.00	8.87	102	80-120			
Sulfate as SO4	21.5	0.50	"	5.00	16.6	99	80-120			
Nitrate as N	2.81	0.40	"	2.00	0.978	92	80-120			
Matrix Spike Dup (1900660-MSD1)		**Source: 19A1287-02**		Prepared & Analyzed: 01/25/19						
Fluoride	2.18	0.10	mg/L	2.00	0.276	95	80-120	0.4	20	
Chloride	14.0	0.50	"	5.00	8.87	103	80-120	0.2	20	
Sulfate as SO4	21.5	0.50	"	5.00	16.6	99	80-120	0.1	20	
Nitrate as N	2.83	0.40	"	2.00	0.978	93	80-120	0.7	20	
Batch 1900662 - General Preparation										
Duplicate (1900662-DUP1)		**Source: 19A1287-01**		Prepared & Analyzed: 01/25/19						
pH	7.80	0.01	pH Units		7.79			0.128	20	

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900677 - General Preparation										
Blank (1900677-BLK1)				Prepared & Analyzed: 01/25/19						
MBAS as LAS, mol wt 340	ND	0.10	mg/L							
LCS (1900677-BS1)				Prepared & Analyzed: 01/25/19						
MBAS as LAS, mol wt 340	0.430	0.10	mg/L	0.500		86	80-120			
LCS Dup (1900677-BSD1)				Prepared & Analyzed: 01/25/19						
MBAS as LAS, mol wt 340	0.431	0.10	mg/L	0.500		86	80-120	0.2	20	
Matrix Spike (1900677-MS1)		**Source: 19A1287-01**		Prepared & Analyzed: 01/25/19						
MBAS as LAS, mol wt 340	0.440	0.10	mg/L	0.500	ND	88	75-125			
Matrix Spike Dup (1900677-MSD1)		**Source: 19A1287-01**		Prepared & Analyzed: 01/25/19						
MBAS as LAS, mol wt 340	0.423	0.10	mg/L	0.500	ND	85	75-125	4	25	
Batch 1900693 - General Preparation										
Blank (1900693-BLK1)				Prepared & Analyzed: 01/28/19						
Specific Conductance (EC)	ND	1.0	µmhos/cm							
Duplicate (1900693-DUP1)		**Source: 19A1287-01**		Prepared & Analyzed: 01/28/19						
Specific Conductance (EC)	612	1.0	µmhos/cm		622			1.62	20	
Batch 1900696 - EPA 200 Series										
Blank (1900696-BLK1)				Prepared: 01/28/19 Analyzed: 02/04/19						
Calcium	ND	1.0	mg/L							
Hardness as CaCO3	ND	1.0	"							
Magnesium	ND	1.0	"							
Potassium	ND	1.0	"							
Sodium	ND	1.0	"							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900696 - EPA 200 Series										
LCS (1900696-BS1)				Prepared: 01/28/19 Analyzed: 02/04/19						
Calcium	4.86	1.0	mg/L	5.00		97	85-115			
Magnesium	4.73	1.0	"	5.00		95	85-115			
Potassium	4.72	1.0	"	5.00		94	85-115			
Sodium	4.81	1.0	"	5.00		96	85-115			
Matrix Spike (1900696-MS1)		**Source: 19A1326-01**		Prepared: 01/28/19 Analyzed: 02/04/19						
Calcium	34.2	1.0	mg/L	5.00	30.5	74	70-130			
Magnesium	14.3	1.0	"	5.00	10.2	83	70-130			
Potassium	6.98	1.0	"	5.00	2.52	89	70-130			
Sodium	35.8	1.0	"	5.00	31.5	87	70-130			
Matrix Spike (1900696-MS2)		**Source: 19A1326-14**		Prepared: 01/28/19 Analyzed: 02/04/19						
Calcium	8.28	1.0	mg/L	5.00	3.32	99	70-130			
Magnesium	6.72	1.0	"	5.00	1.89	97	70-130			
Potassium	6.13	1.0	"	5.00	1.43	94	70-130			
Sodium	10.4	1.0	"	5.00	5.74	94	70-130			
Batch 1900699 - General Preparation										
Blank (1900699-BLK1)				Prepared: 01/28/19 Analyzed: 01/29/19						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (1900699-DUP1)		**Source: 19A1326-01**		Prepared: 01/28/19 Analyzed: 01/29/19						
Total Dissolved Solids	281	10	mg/L		280			0.4	20	
Batch 1900724 - General Preparation										
Blank (1900724-BLK1)				Prepared: 01/28/19 Analyzed: 01/29/19						
Total Alkalinity	ND	5.0	mg/L							
Bicarbonate as CaCO3	ND	5.0	"							
Carbonate as CaCO3	ND	5.0	"							
Hydroxide as CaCO3	ND	5.0	"							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900724 - General Preparation										
Duplicate (1900724-DUP1)		**Source: 19A1287-01**		Prepared: 01/28/19 Analyzed: 01/29/19						
Total Alkalinity	216	5.0	mg/L		225			4	20	
Bicarbonate as CaCO3	216	5.0	"		225			4	20	
Carbonate as CaCO3	ND	5.0	"		ND				20	
Hydroxide as CaCO3	ND	5.0	"		ND				20	
Batch 1900772 - General Preparation										
Blank (1900772-BLK1)				Prepared & Analyzed: 01/30/19						
Chloride	ND	5.0	mg/L							
Fluoride	ND	1.0	"							
Nitrate as N	ND	5.0	"							
Sulfate as SO4	ND	10	"							
LCS (1900772-BS1)				Prepared & Analyzed: 01/30/19						
Chloride	52.0	5.0	mg/L	50.0		104	75-125			
Fluoride	20.1	1.0	"	20.0		100	75-125			
Nitrate as N	20.7	5.0	"	20.0		104	75-125			
Sulfate as SO4	51.3	10	"	50.0		103	75-125			
LCS Dup (1900772-BSD1)				Prepared & Analyzed: 01/30/19						
Chloride	53.6	5.0	mg/L	50.0		107	75-125	3	25	
Fluoride	21.7	1.0	"	20.0		108	75-125	8	25	
Nitrate as N	21.4	5.0	"	20.0		107	75-125	3	25	
Sulfate as SO4	53.0	10	"	50.0		106	75-125	3	25	
Matrix Spike (1900772-MS1)		**Source: 19A1326-07**		Prepared & Analyzed: 01/30/19						
Chloride	51.3	5.0	mg/L	50.0	3.20	96	75-125			
Fluoride	20.6	1.0	"	20.0	ND	103	75-125			
Nitrate as N	20.1	5.0	"	20.0	1.03	95	75-125			
Sulfate as SO4	52.8	10	"	50.0	4.48	97	75-125			

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900772 - General Preparation										
Matrix Spike Dup (1900772-MSD1)	**Source: 19A1326-07**			Prepared & Analyzed: 01/30/19						
Chloride	50.9	5.0	mg/L	50.0	3.20	95	75-125	0.8	30	
Fluoride	18.7	1.0	"	20.0	ND	94	75-125	10	30	
Nitrate as N	19.9	5.0	"	20.0	1.03	95	75-125	0.9	30	
Sulfate as SO4	52.4	10	"	50.0	4.48	96	75-125	0.7	30	
Batch 1900796 - General Prep										
Blank (1900796-BLK1)				Prepared: 01/30/19 Analyzed: 01/31/19						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (1900796-DUP1)	**Source: 19A0869-06**			Prepared: 01/30/19 Analyzed: 01/31/19						
Total Dissolved Solids	596	10	mg/L		594			0.3	20	
Batch 1900833 - General Preparation										
Blank (1900833-BLK1)				Prepared & Analyzed: 01/31/19						
Total Alkalinity	ND	5.0	mg/L							
Bicarbonate as CaCO3	ND	5.0	"							
Carbonate as CaCO3	ND	5.0	"							
Hydroxide as CaCO3	ND	5.0	"							
Batch 1900841 - General Preparation										
Blank (1900841-BLK1)				Prepared & Analyzed: 01/31/19						
Specific Conductance (EC)	ND	1.0	µmhos/cm							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900847 - General Preparation										
Blank (1900847-BLK1)				Prepared & Analyzed: 01/31/19						
MBAS as LAS, mol wt 340	ND	1.0	mg/L							
LCS (1900847-BS1)				Prepared & Analyzed: 01/31/19						
MBAS as LAS, mol wt 340	4.00	1.0	mg/L	3.75		107	80-120			
LCS Dup (1900847-BSD1)				Prepared & Analyzed: 01/31/19						
MBAS as LAS, mol wt 340	4.13	1.0	mg/L	3.75		110	80-120	3	20	
Matrix Spike (1900847-MS1)		**Source: 19A1326-07**		Prepared & Analyzed: 01/31/19						
MBAS as LAS, mol wt 340	2.30	1.0	mg/L	3.75	0.00300	61	75-125			QM-5
Matrix Spike Dup (1900847-MSD1)		**Source: 19A1326-07**		Prepared & Analyzed: 01/31/19						
MBAS as LAS, mol wt 340	2.09	1.0	mg/L	3.75	0.00300	56	75-125	10	20	QM-5
Batch 1900880 - 6010A/No Digestion										
Blank (1900880-BLK1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Calcium	ND	1.0	mg/L							
Hardness as CaCO3	ND	1.0	"							
Magnesium	ND	1.0	"							
Potassium	ND	1.0	"							
Sodium	ND	1.0	"							
LCS (1900880-BS1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Calcium	10.1	1.0	mg/L	10.0		101	75-125			
Magnesium	9.74	1.0	"	10.0		97	75-125			
Potassium	9.69	1.0	"	10.0		97	75-125			
Sodium	9.90	1.0	"	10.0		99	75-125			

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900880 - 6010A/No Digestion										
Matrix Spike (1900880-MS1)		**Source: 19A1326-07**		Prepared: 02/01/19 Analyzed: 02/04/19						
Calcium	12.8	1.0	mg/L	10.0	2.81	100	75-125			
Magnesium	10.3	1.0	"	10.0	0.501	98	75-125			
Potassium	10.3	1.0	"	10.0	0.659	97	75-125			
Sodium	11.0	1.0	"	10.0	1.05	100	75-125			
Matrix Spike Dup (1900880-MSD1)		**Source: 19A1326-07**		Prepared: 02/01/19 Analyzed: 02/04/19						
Calcium	13.1	1.0	mg/L	10.0	2.81	103	75-125	2	30	
Magnesium	10.6	1.0	"	10.0	0.501	101	75-125	3	30	
Potassium	10.5	1.0	"	10.0	0.659	98	75-125	1	30	
Sodium	11.3	1.0	"	10.0	1.05	102	75-125	2	30	
Batch 1900915 - General Prep										
Blank (1900915-BLK1)				Prepared & Analyzed: 02/04/19						
Acid Producing Potential	ND	5.0	lb CaCO3 equ/1000 lb							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900880 - 6010A/No Digestion										
Blank (1900880-BLK1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Boron	ND	0.050	mg/L							
LCS (1900880-BS1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Boron	1.89	0.050	mg/L	2.00		95	75-125			
Matrix Spike (1900880-MS1)	**Source: 19A1326-07**			Prepared: 02/01/19 Analyzed: 02/04/19						
Boron	1.91	0.050	mg/L	2.00	0.00964	95	75-125			
Matrix Spike Dup (1900880-MSD1)	**Source: 19A1326-07**			Prepared: 02/01/19 Analyzed: 02/04/19						
Boron	1.97	0.050	mg/L	2.00	0.00964	98	75-125	3	30	
Batch 1900882 - EPA 7471A										
Blank (1900882-BLK1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Mercury	ND	0.0010	mg/L							
LCS (1900882-BS1)				Prepared: 02/01/19 Analyzed: 02/04/19						
Mercury	0.00583	0.0010	mg/L	0.00500		117	75-125			
Matrix Spike (1900882-MS1)	**Source: 19A1326-07**			Prepared: 02/01/19 Analyzed: 02/04/19						
Mercury	0.00755	0.0010	mg/L	0.00500	ND	151	75-125			QM-7
Matrix Spike Dup (1900882-MSD1)	**Source: 19A1326-07**			Prepared: 02/01/19 Analyzed: 02/04/19						
Mercury	0.00613	0.0010	mg/L	0.00500	ND	123	75-125	21	25	
Batch 1900951 - LUFT-DHS Metals										
Blank (1900951-BLK1)				Prepared & Analyzed: 02/05/19						
Beryllium	ND	0.0010	mg/L							
Aluminum	ND	0.050	"							
Vanadium	ND	0.0030	"							
Chromium	ND	0.0050	"							
Iron	ND	0.10	"							
Manganese	ND	0.020	"							
Nickel	ND	0.010	"							
Copper	ND	0.050	"							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900951 - LUFT-DHS Metals										
Blank (1900951-BLK1)				Prepared & Analyzed: 02/05/19						
Zinc	ND	0.050	mg/L							
Arsenic	ND	0.0020	"							
Selenium	ND	0.0050	"							
Silver	ND	0.010	"							
Cadmium	ND	0.0010	"							
Barium	ND	0.010	"							
Antimony	ND	0.0040	"							
Thallium	ND	0.0010	"							
Lead	ND	0.0050	"							
LCS (1900951-BS1)				Prepared & Analyzed: 02/05/19						
Beryllium	0.100	0.0010	mg/L	0.100		100	75-125			
Aluminum	0.542	0.050	"	0.500		108	75-125			
Vanadium	0.0983	0.0030	"	0.100		98	75-125			
Chromium	0.103	0.0050	"	0.100		103	75-125			
Iron	0.505	0.10	"	0.500		101	75-125			
Manganese	0.103	0.020	"	0.100		103	75-125			
Nickel	0.0997	0.010	"	0.100		100	75-125			
Copper	0.0990	0.050	"	0.100		99	75-125			
Zinc	0.100	0.050	"	0.100		100	75-125			
Arsenic	0.0959	0.0020	"	0.100		96	75-125			
Selenium	0.0982	0.0050	"	0.100		98	75-125			
Silver	0.0952	0.010	"	0.100		95	75-125			
Cadmium	0.0994	0.0010	"	0.100		99	75-125			
Barium	0.0956	0.010	"	0.100		96	75-125			
Antimony	0.0944	0.0040	"	0.100		94	75-125			
Thallium	0.0957	0.0010	"	0.100		96	75-125			
Lead	0.0976	0.0050	"	0.100		98	75-125			

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900951 - LUFT-DHS Metals										
Matrix Spike (1900951-MS1)		**Source: 19A1326-07**		Prepared & Analyzed: 02/05/19						
Beryllium	0.112	0.0010	mg/L	0.100	0.000570	111	75-125			
Aluminum	1.40	0.050	"	0.500	0.623	156	75-125			QM-4X
Vanadium	0.0900	0.0030	"	0.100	0.000770	89	75-125			
Chromium	0.108	0.0050	"	0.100	0.000770	107	75-125			
Iron	0.423	0.10	"	0.500	ND	85	75-125			
Manganese	0.111	0.020	"	0.100	0.00227	109	75-125			
Nickel	0.107	0.010	"	0.100	ND	107	75-125			
Copper	0.107	0.050	"	0.100	0.00201	105	75-125			
Zinc	0.113	0.050	"	0.100	ND	113	75-125			
Arsenic	0.0966	0.0020	"	0.100	0.000320	96	75-125			
Selenium	0.0916	0.0050	"	0.100	0.00149	90	75-125			
Silver	0.0876	0.010	"	0.100	ND	88	75-125			
Cadmium	0.0997	0.0010	"	0.100	ND	100	75-125			
Barium	0.125	0.010	"	0.100	0.0368	88	75-125			
Antimony	0.0956	0.0040	"	0.100	0.00540	90	75-125			
Thallium	0.105	0.0010	"	0.100	0.000120	105	75-125			
Lead	0.0941	0.0050	"	0.100	ND	94	75-125			

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900695 - EPA 200 Series										
Blank (1900695-BLK1)				Prepared: 01/28/19 Analyzed: 01/29/19						
Antimony	ND	4.0	µg/L							
Arsenic	ND	2.0	"							
Cadmium	ND	1.0	"							
Lead	ND	5.0	"							
Nickel	ND	10	"							
Selenium	ND	5.0	"							
Vanadium	ND	3.0	"							
Thallium	ND	1.0	"							
LCS (1900695-BS1)				Prepared: 01/28/19 Analyzed: 01/29/19						
Antimony	96.6	4.0	µg/L	100		97	85-115			
Arsenic	102	2.0	"	100		102	85-115			
Cadmium	107	1.0	"	100		107	85-115			
Lead	102	5.0	"	100		102	85-115			
Nickel	99.6	10	"	100		100	85-115			
Selenium	107	5.0	"	100		107	85-115			
Vanadium	102	3.0	"	100		102	85-115			
Thallium	98.3	1.0	"	100		98	85-115			
Matrix Spike (1900695-MS1)	**Source: 19A1326-01**			Prepared: 01/28/19 Analyzed: 01/29/19						
Antimony	97.9	4.0	µg/L	100	1.96	96	70-130			
Arsenic	107	2.0	"	100	2.03	105	70-130			
Cadmium	110	1.0	"	100	1.25	109	70-130			
Lead	106	5.0	"	100	4.21	102	70-130			
Nickel	95.7	10	"	100	ND	96	70-130			
Selenium	118	5.0	"	100	5.27	113	70-130			
Vanadium	102	3.0	"	100	4.03	98	70-130			
Thallium	101	1.0	"	100	ND	101	70-130			

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900695 - EPA 200 Series										
Matrix Spike (1900695-MS2)	**Source: 19A1326-14**			Prepared: 01/28/19 Analyzed: 01/29/19						
Antimony	98.1	4.0	µg/L	100	ND	98	70-130			
Arsenic	107	2.0	"	100	ND	107	70-130			
Cadmium	110	1.0	"	100	ND	110	70-130			
Lead	106	5.0	"	100	ND	106	70-130			
Nickel	102	10	"	100	ND	102	70-130			
Selenium	111	5.0	"	100	ND	111	70-130			
Vanadium	102	3.0	"	100	1.70	100	70-130			
Thallium	102	1.0	"	100	ND	102	70-130			
Batch 1900696 - EPA 200 Series										
Blank (1900696-BLK1)				Prepared: 01/28/19 Analyzed: 02/04/19						
Aluminum	ND	50	µg/L							
Barium	ND	100	"							
Boron	ND	100	"							
Beryllium	ND	1.0	"							
Chromium	ND	10	"							
Copper	ND	50	"							
Iron	ND	100	"							
Manganese	ND	20	"							
Silver	ND	10	"							
Zinc	ND	50	"							
LCS (1900696-BS1)				Prepared: 01/28/19 Analyzed: 02/04/19						
Aluminum	4360	50	µg/L	5000		87	85-115			
Barium	980	100	"	1000		98	85-115			
Boron	927	100	"	1000		93	85-115			
Beryllium	975	1.0	"	1000		98	85-115			
Chromium	985	10	"	1000		98	85-115			
Copper	1010	50	"	1000		101	85-115			
Iron	956	100	"	1000		96	85-115			
Manganese	984	20	"	1000		98	85-115			
Silver	1190	10	"	1000		119	85-115			QM-1

EMKO Environmental, Inc.	Project:	SGI Ione	
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El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900696 - EPA 200 Series										
LCS (1900696-BS1)				Prepared: 01/28/19 Analyzed: 02/04/19						
Zinc	874	50	µg/L	1000		87	85-115			
Matrix Spike (1900696-MS1)		**Source: 19A1326-01**		Prepared: 01/28/19 Analyzed: 02/04/19						
Aluminum	5610	50	µg/L	5000	1140	89	70-130			
Barium	1060	100	"	1000	68.8	99	70-130			
Boron	1120	100	"	1000	188	94	70-130			
Beryllium	998	1.0	"	1000	ND	100	70-130			
Chromium	979	10	"	1000	ND	98	70-130			
Copper	1050	50	"	1000	71.2	98	70-130			
Iron	3100	100	"	1000	2190	91	70-130			
Manganese	1020	20	"	1000	50.6	97	70-130			
Silver	1260	10	"	1000	ND	126	70-130			
Zinc	1220	50	"	1000	364	85	70-130			
Matrix Spike (1900696-MS2)		**Source: 19A1326-14**		Prepared: 01/28/19 Analyzed: 02/04/19						
Aluminum	5200	50	µg/L	5000	453	95	70-130			
Barium	1160	100	"	1000	149	101	70-130			
Boron	974	100	"	1000	16.1	96	70-130			
Beryllium	1020	1.0	"	1000	ND	102	70-130			
Chromium	1020	10	"	1000	ND	102	70-130			
Copper	1050	50	"	1000	6.19	104	70-130			
Iron	1600	100	"	1000	562	104	70-130			
Manganese	1030	20	"	1000	14.2	102	70-130			
Silver	1190	10	"	1000	ND	119	70-130			
Zinc	903	50	"	1000	ND	90	70-130			
Batch 1900757 - EPA 7470A										
Blank (1900757-BLK1)				Prepared: 01/29/19 Analyzed: 01/30/19						
Mercury	ND	1.0	µg/L							

EMKO Environmental, Inc.	Project:	SGI Ione	
551 Lakecrest Dr.	Project Number:	[none]	**CLS Work Order #: 19A1326**
El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1900757 - EPA 7470A										
LCS (1900757-BS1)				Prepared: 01/29/19 Analyzed: 01/30/19						
Mercury	6.74	1.0	µg/L	5.00		135	85-115			QC-4H
Matrix Spike (1900757-MS1)	**Source: 19A1299-01**			Prepared: 01/29/19 Analyzed: 01/30/19						
Mercury	6.08	1.0	µg/L	5.00	ND	122	70-130			
Matrix Spike (1900757-MS2)	**Source: 19A1326-06**			Prepared: 01/29/19 Analyzed: 01/30/19						
Mercury	5.74	1.0	µg/L	5.00	ND	115	70-130			

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El Dorado Hills, CA 95762	Project Manager:	Dr. Andrew Kopania	COC #: 195549, 195550, 102707

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
QM-1	The spike recovery was outside acceptance limits for the LCS or LCSD. The batch was accepted based on acceptable MS/MSD recoveries & RPD's.
QC-4H	The percent recovery of LCS or LCSD was above the upper control limit; however, all analytes in the associated sample were ND; therefore, a reanalysis was not performed.
QC-2H	The recovery of one CCV was greater than the acceptance limit. However, all analytes in the associated samples were ND; therefore a reanalysis was not performed.
HT-F	This is a field test method and it is performed in the lab outside holding time.
HT-4	Sample was originally analyzed within holding time. Due to high concentration of the analyte, the sample was reanalyzed with a dilution outside of the EPA recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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