NI 43-101 Technical Report

Feasibility Study

Alacran Project, in Colombia

(Department of Córdoba in Colombia)

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1 EXECUTIVE SUMMARY

1.1 Introduction

Following positive economic results from a previous Prefeasibility Study (PFS), Cordoba Minerals Corp. (Cordoba, or the Company) retained the following companies (collectively referred to as the Consultants) to provide Qualified Persons (QPs) to prepare a Canadian National Instrument 43-101 (NI 43-101) Technical Report (Technical Report) for the Feasibility Study (FS) for the Alacran Project (the Project), a copper-gold-silver project located within Cordoba's San Matías exploration area in Colombia, South America:

- Austra Mining Solutions (Austra),
- BBA Engineering Ltd. (BBA),
- Blue Coast Research Ltd. (Blue Coast Research),
- DRA Global Ltd. (DRA),
- INTERA Geoscience & Engineering Solutions (INTERA),
- Knight Piésold Ltd. (Knight Piésold).

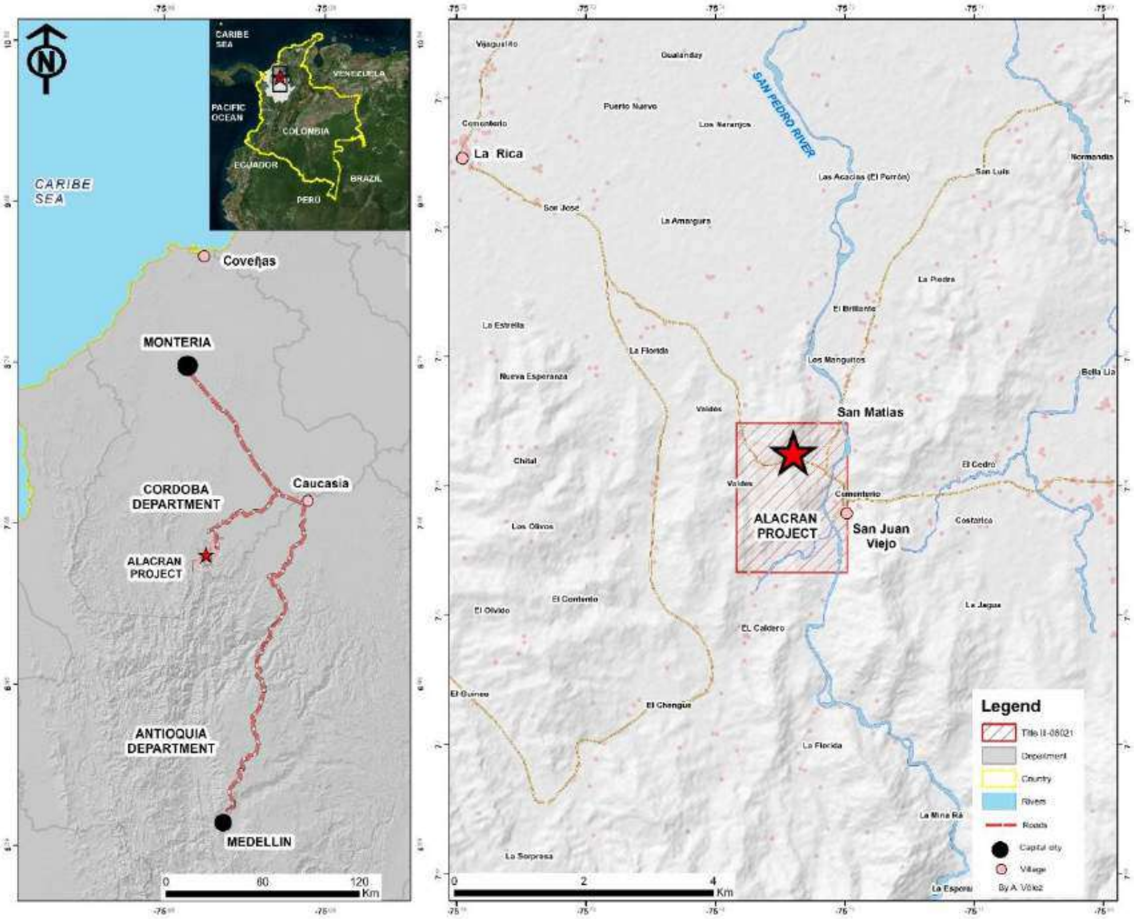
The purpose of the FS is to define the optimum configuration for the mine and processing facilities based on the latest available metallurgical test work and Mineral Resource Estimates (MREs), to produce concentrates of copper with significant gold and silver credits. The FS provides engineering definition of the mine and process design, Project infrastructure, and optimized operations descriptions.

Following the completion of the engineering deliverables, capital and operating cost estimates were prepared as well as a subsequent economic evaluation to determine the Project's viability. The definitions are followed by estimation and confirmation of Project economics. The FS is based on a Class 3 type estimate as per the Association for the Advancement of Cost Engineering (AACE) Recommended Practice 47R-11 with a target accuracy of -15% to +20%.

1.2 Property Description and Location

The Project hosts the El Alacrán, Costa Azul, Montiel East, and Montiel West deposits across various mining titles. The Project is located in the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá (capital and largest city of Colombia) by air, 160 km north of Medellín (capital of department of Antioquia and second largest city of Colombia) by air, and 112 km south of Montería (capital of the department of Córdoba) by air. The property location is depicted in Figure 1.1.

Figure 1.1 – Location of Project within Colombia



Source: Cordoba, 2023

1.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Project is accessible via a 70 km paved road from the city of Caucasia to Puerto Libertador and then via a 21 km partially unsurfaced road to the exploration camp. The Project core shack is located within the camp. The Project can be accessed by air on daily scheduled flights from Medellín to Montería, and from Montería to the site by road.

The Project is in the northern foothills of the Western Cordillera and the southern side of the Caribbean lowlands. Altitudes in the property area range between about 100 m and 350 m above sea level. The climate allows for mineral exploration and drilling year-round. The physiography of the Project area is favorable for open pit mining with sufficient room for a processing plant, waste management storage, ore stockpiles, and other mine infrastructure. The district is expected to be able to supply the basic workforce for any future mining operation. Cordoba will need to acquire additional surface rights to support a mining operation if one were to proceed.

1.4 History

Exploration was carried out on the El Alacrán deposit by Dual Resources, a Canadian junior mineral exploration company, in 1987-1989 in conjunction with the Colombian consulting company Geotec Ltd. Exploration is described in reports by Vargas (2010, 2011). The Dual Resources exploration programs included pit, trenches, rock sampling, underground sampling, geological mapping, and a ground magnetic survey, followed by fifteen diamond drill holes totaling 2,584.0 m in length (holes SJ 1 to SJ 19). Dual Resources held the mineral title until 1994. The El Alacrán area was staked in 1995 by *Sociedad Ordinaria de Minas Santa Gertdis* and *Sociedad Minera Alacrán S.O.M.*, both private Colombian companies. No significant exploration work was carried out between 1995 and 2009. A Concession Agreement was granted in 2009 to OMNI and was optioned in 2010 to Ashmont, a private mineral exploration company based in Vancouver. Ashmont carried out geological mapping at 1:2,000 scale, underground mapping, and sampling, a ground magnetic survey, and two (2) programs of diamond drilling. Ashmont earned a 90% interest in the Concession Agreement which it held through Ashmont Omni S.A.S., ownership of which reverted to OMNI on termination of the option, and it was renamed *Compañía Minera Alacrán S.A.S.* in 2014.

Cordoba acquired the Property and completed drill holes as follows:

Cordoba acquired the Property and completed:

- 2015 3 diamond drill holes;
- 2016 40 diamond drill holes;
- 2017 39 diamond drill holes;
- 2019 2 diamond drill holes;
- 2021 9 diamond drill holes;
- 2022 134 diamond drill holes; and
- 2023 79 diamond drill holes.

Cordoba completed a number of engineering and scientific studies leading to the completion of this FS, including:

- Mineralogy;
- Structural geology;
- Resource estimations;
- Rock mechanics;
- Hydrogeology;
- Hydrology;
- Metallurgical recoveries; and
- Metal leaching and acid rock drainage.

1.5 Geological Setting, Mineralization, and Deposit Types

The Project is located in an accreted oceanic terrane of the Western Cordillera, described as the Calima Terrane by Restrepo & Toussaint (1988). The host rocks likely belong to the Upper Cretaceous Cañasgordas Group, which is subdivided into the Barroso Formation of basalts, and the Penderisco Formation of turbidites, chert, and limestone. The Project area comprises three primary lithological domains: intrusive rocks (including porphyries) in the El Alacrán, Montiel East, and Costa Azul deposits; volcanic rocks in the Montiel West deposit; and volcaniclastic rocks in the El Alacrán deposit. Volcaniclastic rocks are also present in the El Alacrán Norte and William Prospect areas. The volcanics and volcaniclastics likely belong to the early Cretaceous-age Barroso formation.

The El Alacrán deposit Cu-Au-Ag mineralization is hosted by a west-dipping Cretaceous succession comprising mafic volcanic rocks overlain by a calcareous volcaniclastic sequence and capped by pre- to syn-mineral, sill-like diorite, and felsic sub-volcanic bodies. The sequence is approximately 550 m thick, and the diorites are about 200 m thick. Cu-Au-Ag mineralization occurs throughout the volcaniclastic package at El Alacrán, except within the lower mafic units. It is most strongly developed in the calcareous volcaniclastic sequence. Several different deposit models have been proposed for the El Alacrán deposit, including Volcanogenic Massive Sulphide (VMS), Skarn, Carbonate Replacement Deposit (CRD), and Iron Oxide Copper-Gold (IOCG). To better understand the El Alacrán deposit formation, thesis-based research was completed with the Mineral Deposit Research Unit (MDRU) at the University of British Columbia (UBC), in partnership with the Company. The thesis results (Manco, 2020) in combination with previous work suggest a hybrid model between IOCG-style and a CRD that is associated with a porphyry source can best explain the El Alacrán deposit mineralization.

The Montiel East porphyry is located near the San Matías Village 2.5 km northeast El Alacrán deposit in the eastern side of the San Pedro River Lineament. The shallow parts of the Montiel East deposit display surface dimensions of approximately 100 m x 70 m and a vertical extent of 100 m. Montiel East deposit is porphyry Cu-Au-Ag mineralization associated with a series of tonalite porphyry stocks and sills that intrude basaltic andesitic volcanic rocks and host a strong stockwork of quartz-magnetite-chalcopyrite-bornite veins. Based on cross-cutting relationships, alteration assemblages, and compositions, four different phases have been identified within the Montiel East porphyry suite, three of which are hornblende porphyries and one of which is a quartz feldspar porphyry.

The Montiel West deposit is located approximately 2 km northeast of the El Alacrán deposit in the eastern margin of the San Pedro River Lineament, and less than 1 km west of the Montiel East deposit. Diamond drill holes intersected high-density zones of both sheeted and multi-directional quartz-magnetite- chalcopyrite-bornite veining that are hosted in mafic and intermediate volcanic rocks, but no intrusive rocks. This style of wall rock Cu-Au-Ag mineralization is interpreted to be porphyry-related, as seen at both the Montiel East and Costa Azul prospects. The veinlets are generally narrower than those observed at Montiel East, possibly suggesting that there is no direct relationship between the two prospects. Alteration appears to be sodic-calcic, defined by albite, actinolite, and possible diopside.

The Costa Azul porphyry deposit is located approximately 2 km southeast of the El Alacrán deposit in the eastern side of the San Pedro River Lineament. The Costa Azul porphyry is a shallow dipping, holocrystalline, Cretaceous porphyry diorite intrusion dominated by phenocrysts, euhedral plagioclase and anhedral to subhedral hornblende, intergrown with primary magnetite, and biotite.

The Montiel East, Montiel West, and Costa Azul deposits can all be broadly classified as Cu-Au porphyry systems as defined by Sillitoe (2000). Cu-Au porphyries are typically associated with I-type magnetite- series intrusive rocks and typically contain significant hydrothermal magnetite, indicating the host intrusions are highly oxidized and sulphur-poor members of this series of magmas. The porphyry stocks in these types of rocks span a range of compositions from diorites, quartz diorite, and tonalite through to quartz monzonite, monzonite, and syenite. The porphyry deposits of the Project area are of low- potassium, calc-alkaline dioritic, and tonalitic composition.

1.6 Exploration and Drilling

Cordoba completed 1:2,000 scale geological mapping, rock channel sampling, a 74-line km 100.0 m spaced ground magnetic survey, and a 50.0 m x 100.0 m spaced soil survey that identified a 1,300.0 m by 800.0 m wide Cu and Au soil anomaly within the Project area.

Cordoba carried out a 5,700-line km helicopter-borne magnetic and radiometric survey and a 1,293-line km induced polarization survey over the Project area.

Diamond drilling at the El Alacrán deposit consists of 82,894 m in 357 HQ and NQ diameter holes completed between 1987 and 2023. Cordoba drilled 306 HQ/NQ diameter diamond drill holes between 2015 and 2023. Dual Resources drilled 15 NQ diameter diamond drill holes in 1987, and 52 HQ diameter diamond drill holes were drilled by Ashmont in 2011-2012. The holes drilled by Dual Resources were not used in the mineral resource estimate since the holes were not surveyed.

At the Costa Azul deposit, Cordoba completed a total of 4,995.9 m of drilling in 118 holes, including 3,305.0 m of small diameter reverse circulation drilling in 112 holes and 1,690.9 m of diamond drilling in six holes between 2014 and 2017. At the Montiel East deposit, Cordoba completed 11,056.7 m of drilling in 78 holes, including 1,681.0 m in 48 reverse circulation (RC) holes and 9,375.7 m in 30 diamond drill holes between 2013 and 2017. At the Montiel West deposit, Cordoba completed 4,055.9 m in 93 holes including 2,032.0 m in 85 RC holes and 2,023.9 m in eight diamond drill holes between 2013 and 2017.

In 2022 and 2023, Cordoba completed a total of 509 surface-collared hand-augured drilled holes, totalling 1,455.1 m in length in the historic tailings area. There are a total of 1,517 assay sample records in the El Alacrán Historical Tailings database. The samples were used to develop the maiden mineral resource estimate of the historic tailings.

1.7 Sample Preparation, Analyses, and Security

Ashmont drill core samples were prepared by ALS Minerals in Medellín, Colombia and analyzed for Au by fire assay and for Cu and 32 other elements by four-acid digestion Inductively Coupled Plasma Atomic Emission Spectrometry ("ICP-AES") methods at ALS Minerals labs in Chile, Peru, and Canada. The assaying was monitored using standards, blanks, duplicates, and check samples inserted into the sample stream by Ashmont personnel.

Cordoba drill core samples were prepared by ALS Minerals and SGS Peru in Medellín. The pulps were analyzed for Au by fire assay and for Cu and 32 other elements by four-acid digestion Inductively Coupled Plasma Atomic Emission Spectrometry ("ICP-AES") methods at ALS Minerals labs in Peru, and at SGS Peru in Peru. The assaying was monitored using standards, blanks, duplicates, and check samples inserted into the sample stream by Cordoba personnel.

1.8 Data Verification

A site investigation to the Project was carried out July 25 to July 28, 2022, by Mr. Todd McCracken, P. Geo., QP for Mineral Resources. The QP reviewed the surface geology, artisanal miner workings, drill core geology, geological procedures, chain of custody of drill core, sample pulps, and density measurements. Data verification included a survey spot check of drill collars, a spot check comparison of Cu, Au, and Ag assays from the drill hole database against original assay records (lab certificates), spot check of drill core lithologies recorded in the database versus the core located in the core storage shed and a review of QA/QC performance of the drill programs.

1.9 Mineral Processing and Metallurgical Testing

To support the FS a detailed geometallurgical testwork program was conducted based on 81 variability composites from the El Alacrán deposit and five (5) zone composites from the historical tailings area. The work evaluated the application of conventional unit operations including semi-autogenous grinding (SAG) and ball mills, gravity concentration, and froth flotation to recover copper, gold, and silver from the El Alacrán deposit.

Grindability testing confirmed that the material is above average in hardness and resistance to breakage both in terms of Bond Ball Work Index (averaging 17.8 kWh/t), and SAG Mill Comminution testing (Axb averaging 32.2). In contrast, Abrasion Index testing indicated that the material is only mildly abrasive compared to other projects.

Rougher flotation testing evaluated the response of the three (3) geometallurgical units to standardized conditions. Good recoveries were achieved from samples from the fresh zone, whereas transition zone composites exhibited moderate recoveries. Poor flotation was achieved with a saprolite composite due to the absence of sulphide mineralization, which led to the decision to build a wash plant to recover gold and silver contained in the saprolite by gravity concentration. Subsequent cleaner flotation testing optimized certain process parameters including primary grind size, collector and depressant addition, and flotation time. Confirmatory locked cycle testing of the optimized flowsheet indicated good stability and metallurgical performance. In addition, the potential for gold and silver recoveries to a gravity concentrate were also evaluated and it was confirmed that a separate gravity concentrate could be generated in the grinding circuit, prior to flotation.

Metallurgical testwork was also conducted on samples collected from the historical tailings area. Flotation testwork revealed that some of the contained copper could be recovered to a final concentrate, but overall recovery was poor and reagent additions were high. Alternatively, a portion of the gold and a small percentage of the silver were found to be amenable to gravity concentration.

Metal recovery algorithms were generated to estimate copper, gold, and silver recoveries to gravity and flotation concentrates for material from the fresh and transition zones. Recovery estimates were made for gold and silver recovery by a separate gravity-only wash plant for both the saprolite zone and the historical tailings.

1.10 Mineral Resource Estimates

Mineral Resource Estimates (MREs) were completed for the Alacran Project using industry standard best practices. Diamond drilling and assay sampling were used to generate 3D geological and mineralization domains, with the appropriate compositing and grade capping applied. Estimations were completed with a multi-pass estimation strategy using Ordinary Kriging (OK) methodology. The mineral resources were constrained with pit shells using appropriate parameters to be considered as reasonable prospect for eventual economic extraction. The QP completed a resource estimation with an effective date of December 18, 2023. Table 1.1 summarizes the MRE. Table 1.2 summarizes the pit constrained in-situ contained metal.

Table 1.1 – El Alacrán Deposit and Satellite Deposits Resource Summary

Classification	Deposit	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	El Alacrán	96,700,000	0.42	0.24	2.69
	Historical Tailings	2,756,000	-	0.28	0.89
	Costa Azul	-	-	-	-
	Montiel East	-	-	-	-
	Montiel West	-	-	-	-
	Total	**99,456,000**	**0.41**	**0.24**	**2.65**
Inferred	El Alacrán	1,572,000	0.09	0.18	3.86
	Historical Tailings	-	-	-	-
	Costa Azul	10,421,000	0.23	0.18	0.62
	Montiel East	9,335,000	0.31	0.23	1.13
	Montiel West	10,511,000	0.09	0.36	1.14
	Total	**31,839,000**	**0.20**	**0.25**	**1.10**

Table 1.2 – El Alacrán Deposit and Satellite Deposits In-Situ Pit-Constrained Metal Content

Classification	Deposit	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	El Alacrán	96,700,000	904,532,300	740,300	8,394,100
	Historical Tailings	2,756,000	-	25,100	78,400
	Costa Azul	-	-	-	-
	Montiel East	-	-	-	-
	Montiel West	-	-	-	-
	Total	**99,456,000**	**904,532,300**	**765,400**	**8,472,500**
Inferred	El Alacrán	1,572,000	3,183,800	9,100	168,000
	Historical Tailings	-	-	-	-
	Costa Azul	10,421,000	53,782,000	58,800	209,200
	Montiel East	9,335,000	63,548,000	67,800	338,500
	Montiel West	10,511,000	20,583,900	123,300	385,200
	Total	**31,839,000**	**141,097,700**	**259,000**	**1,100,900**

1.11 Mineral Reserve Estimates

The Mineral Reserve Estimate for the Project conforms to industry best practices and is reported using the May 10, 2014, Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

Mineral Reserves are based on the engineering and economic analysis described in Section 13 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

- Metal prices;
- Interpretations of mineralization geometry and continuity of mineralization zones;
- Grade and geology estimation assumptions;
- Geomechanical and hydrogeological assumptions;
- Ability of the mining operation to meet the annual production rate;
- Operating cost assumptions;
- Process plant recoveries;
- Mining loss and dilution;
- Ability to meet and maintain permitting and environmental licence conditions; and
- Historical mining depletion.

BBA prepared a Mineral Reserve Estimate for the Project using Deswik mining software packages and modules for estimating the economic pit limit for the open pit and block model interrogation.

The Mineral Reserve Estimate for the El Alacrán deposit is based on the resource block model estimated by BBA as described in Section 14. The block model contained both Indicated and Inferred Mineral Resources; however, only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, which includes the Run-of-Mine (ROM) stockpiles.

Following the detailed design of the final pit and a Life-of-Mine (LOM) scheduling with the cut-off values, a total of 97.9 Mt of diluted ore is estimated inside the mine design. The detailed pit design is discussed in Section 15 while the production plan is discussed in Section 16.

The 2023 Mineral Reserve Estimate for the Project includes 97.9 Mt of Probable Reserve grading 0.41% Cu, 0.23 g/t Au, and 2.63 g/t Ag at cut-off values of:

- US$2.07/t for saprolite material;
- US$2.58/t for historical tailings material; and
- US$10.26/t for transition and fresh material.

1.12 Mining Methods

Conventional open pit mining methods will be used to extract a portion of the El Alacrán deposit. This method was selected considering the El Alacrán deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the open pit material within the designed pit to meet the mine production schedule.

Open pit mining will include conventional drilling and blasting with a combination of a backhoe type excavator and front-end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpile, or waste management facility (WMF) depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

The open pit mine production period covers the extraction of material from the Not Potentially Acid Generating (NPAG) borrow area, historical tailings area, and the El Alacrán open pit over with two (2) years of pre-production (prior to process plant start-up), approximately 14.02 years of production, which includes approximately six (6) months of stockpile reclaim. The ordering of long lead items occurs for approximately 3 months prior to the pre-production period.

The open pit was designed to provide sufficient suitable waste rock material for the WMF embankment progression requirements. It was manually adjusted from the open pit limit analysis pit shell results. An external borrow pit area was incorporated into the design to provide a quantity of the required NPAG waste rock for the WMF embankment progression.

During pre-production, the ore material excavated from the pit and historical tailings area will be hauled to designated stockpiles. The historical tailings ore material will be stockpiled near the gravity wash plant but separate from the saprolite material. The saprolite ore material will be stockpiled near the gravity wash plant. The fresh and transition ore material will be hauled to stockpiling areas near the pit exit for reclaiming during Years 1 and 2 of production.

During production, fresh and transition feed material will be hauled either directly to the primary crusher and direct tipped into the crusher or stockpiled temporarily at the ROM stockpile, located to the south of the primary crusher. To meet the NPAG waste rock requirements for the WMF embankment progression, a large amount of fresh and transition ore may be required to be stockpiled in order to release the NPAG waste rock from the pit.

1.13 Recovery Methods

The El Alacrán deposit consists of three (3) principal zones of economically treatable material dictated by the degree of exposure to atmospheric weathering, namely the fresh, transition, and saprolite zones. Historical tailings that have been discarded by small-scale miners will also be processed to recover contained gold and silver.

The processing plant for the fresh and transition ores as well as the processing of saprolite and historical tailings uses conventional and proven technologies. The processing of fresh and transition ores will take place in a concentrator using a conventional SABC (SAG mill - Ball mill – Pebble Crusher) comminution circuit flowsheet followed by a hybrid tank cell and Jameson cell sulphide flotation circuit utilizing a regrind stage to produce a copper-gold-silver concentrate for sale. Conventional batch centrifugal concentrators will be installed in the grinding and concentrate flotation circuits to recover free gold in the form of a separate high grade gravity gold concentrate.

The processing plant for fresh and transition ores is designed to process at 17,600 tpd of ore at an average availability of 92% which equates to an annual feed rate of 6.4 Mtpa. The beneficiation plant will operate a planned 365 days per year and produce separate Cu-Au-Ag and Au-Ag concentrates to be sold on the open market.

The ROM ore will be crushed in a single jaw crusher. The grinding circuit will feature a pebble crusher arrangement with the SAG mill in an open circuit and ball mill (SABC) operating in closed circuit with hydrocyclones. The hydrocyclone overflow with a grind size P_{80} of 150 µm will be sent to the rougher flotation circuit. A batch gravity concentrator fitted to the cyclone underflow stream will process up to 30% of the underflow stream and will produce a high-grade gold-silver concentrate.

The flotation process circuit will consist of four-stages: rougher, cleaner scalper, cleaner scavenger, and recleaner. In addition to these stages, a regrinding stage for the concentrate is included between the rougher flotation and cleaner scalper stages and a gravity concentrator that will be fed by the tailings from the cleaner scavenger.

The final concentrate produced from the cleaner scalper and recleaner stages will be sent to a thickener, and the thickened concentrate will be sent to a pressure filter to produce the final concentrate.

The final tailings produced in the rougher and cleaner scavenger stage flotation (after passing through the gravity concentrator) will be sent to the tailings thickener, and subsequently to the WMF.

A separate gravity wash plant is considered for the treatment of saprolite since the saprolite ore has an impact by reducing copper flotation grades and recoveries for the fresh and transition ores. The plant will recover gold and silver into a high-grade concentrate using batch centrifugal gravity concentrators. This plant will also be used to recover the precious metals from historical tailings.

The stand-alone modular gravity wash plant for the treatment of saprolite and historical tailings will have a capacity of 2,400 tpd. It is expected that this plant will be initially fed with saprolite and then with historical tailings.

1.14 Project Infrastructure

The main Project offsite and onsite infrastructure components include:

- External (off-site) and internal access roads;
- Port (off-site) facilities;
- Mine and process plant supporting infrastructure, including site accommodation facilities;
- Power supply and distribution;
- Services and utilities;
- Water management; and
- Waste Management Facility (WMF).

The amount of engineering completed for these items is consistent with the level of detail required for this FS, but may be subject to change as more detailed information becomes available in future Project phases.

1.14.1 ROADS

The Project requires roads to connect the various elements on the site and form a transport network that can be traversed by all required traffic. The rugged terrain of the site necessitated a suitable road design criteria to ensure roads are optimally sized for the required traffic. Design for all roads is completed to an FS level, including major stability works estimation.

The Property is accessible by road from Puerto Libertador on a 21 km hard-packed, gravel road passing through the town of La Rica. The main access road from La Rica to the site gate is of a lower quality, currently only wide enough for one vehicle and with sharp turns and abrupt grade changes. The road system from La Rica to the site will be upgraded and widened to allow two-way traffic and transport trucks.

1.14.2 PORT

The Caribbean coastal Port of Tolú in the department of Sucre will be used by the Project to ship concentrates produced at site. This is the closest port with capacity to handle bulk concentrates for export. Tolú is approximately 274 km by road from the site, and is accessible through various roads.

The primary copper-gold-silver concentrate will be delivered by truck to the port in a 20-ft ISO tipping container. The container will be received, inspected and unloaded from the truck trailer and stored uncovered on a concrete pad in a secure, guarded and fenced container storage area.

A new gated storage facility will be required at Tolú to house the concentrate material before being loaded onto ships. This facility has been sized and sufficient space exists at the port to build it. If required, additional concentrate storage capacity is available on site.

1.14.3 ON-SITE INFRASTRUCTURE

On-site infrastructure for the Project consists of numerous facilities which are required to support the mining and processing activities which will take place. Buildings and/or facilities which were identified and located on the site general arrangement are:

- Concentrator plant;
- Primary crusher;
- Truck scale and helipad;
- Camp and change room;
- Training centre and emergency response transport building;
- Main office and laboratories;
- Concentrator plant shop and warehouse;
- Concentrate stockpile and loadout building;
- Truck shop; and
- Explosives magazines and emulsion storage.

Details of all of these facilities were developed for the FS, and are described in Section 18.5.

1.14.4 POWER SUPPLY AND DISTRIBUTION

The estimated total connected plant load is 42.6 MW / 48.4 MVA, while the maximum demand is approximately 38.4 MW / 43.4 MVA, accounting for the site's power requirements, including the process plant, tailings, and general infrastructure. The operating demand is expected to be around 34 MW, based on typical plant operation. Considering the planned plant availability, the annual energy consumption is estimated to be around 200,000 MWh.

Electrical power to the Project will be supplied via a new 41 km long, 110 kV transmission line connecting the existing Cerro Matoso substation (which will be expanded) to the site substation. A planned routing has been established for this transmission line.

The site primary power distribution will operate nominally at 13.8 kV which is supplied by two (2) 110 kV/13.8 kV step down transformers installed in a prefabricated electrical building.

A site wide overhead line will feed the north and south side infrastructure from two separate 13.8 kV overhead line feeders.

- The **north power line** will supply: camp, main gate, helipad, potabilization plant, saprolite and historical tailings plant, water collection, and pumping stations.
- The **south power line** will supply: open pit, primary crusher, truck shop, explosives magazines, WMF, and south side water collection and treatment.

13.8 kV to 4.16 kV and 600 V distribution step-down transformers will be installed in strategic locations to service site loads. Smaller, suitably rated pole mounted transformers will service remote loads along the 13.8 kV pole line routes.

Back-up power for critical infrastructure at the site will be provided from a 1000 kVA diesel-powered generator set. Additional back up power will be supplied by a 500 kVA diesel generator located at the camp and a 300 kVA diesel generator located at the gate house.

1.14.5 SERVICES AND UTILITIES

Other services and utilities identified and designed for the site, and as detailed in 18.7, are as follows:

- Fuel;
- Water;
- Domestic effluent treatment plant;
- Gate house / security; and
- Communications.

1.14.6 WATER MANAGEMENT

A thorough water management strategy for the Project was developed during the FS, and considers the following aspects, all of which are developed in Section 18.8:

- Site-wide water balance;
- Surface water management; and
- WMF storm water management.

The strategy includes contact water from the WMF, water management pond (WMP), open pit mine, ore stockpiles, and plant site infrastructure.

The primary objectives for the site water management strategy include:

- Provide sufficient water supply to support milling under a range of potential climate conditions over the entire mine operating life.
- Manage seepage and contact water to minimize direct discharge to downstream watersheds.
- Maintain stormwater inflow capacity within the WMF and WMP, and limit water build-up within the WMF.
- Provide best management practices (BMPs) for erosion and sediment control.
- Safely convey the Inflow Design Flood (IDF) through spillways.

Process water will be sourced from the WMP, via a barge pump collecting clear water, and will be pumped to the mill via pipeline. Freshwater to supply buildings and the fire suppression distribution system will be provided from Run-off Collection Pond 4.

Key results from the water balance analysis are summarized below.

- The WMP will be able to manage water under most conditions during operations. Additional make-up water may be required under certain hydrological conditions.
- The site will operate with a net water surplus under all hydrological conditions. Pumps will discharge excess water from ponds and the WMP to the environment during operations.
- The water transfer system is sized for 1,300 m^3/h and the WMP discharge pump is sized for 1,850 m^3/h.
- The open pit fills over about 4 years under 95% hydrological conditions, and over about 5 years under 5% and median hydrological conditions. Flow then passes through the open pit spillway and to the San Pedro River.

1.14.7 WASTE MANAGEMENT FACILITY

The extracted material from the Open Pit will use conventional crushing, flotation, re-grinding, and gravity concentration. Thickened potentially acid generating (PAG) tailings will be delivered to the

WMF at a design solids content of approximately 55% by mass. PAG and Uncertain waste rock from open pit development will be hauled to the WMF. PAG and Uncertain waste rock excavated from Open pit development will be used for a portion of embankment construction, and the remainder will be placed within the WMF basin and covered with tailings during operations. Saprolite and NPAG waste rock from Open Pit mine development will be primarily used to construct the WMF embankments and downstream buttresses. Saprolite and NPAG waste rock not needed for embankment construction will be placed and compacted in a waste stockpile adjacent to the downstream slope of the WMF Main Embankment. Materials in the waste stockpile will be used at closure to cover the WMF basin surface.

The WMF will consist of a valley type impoundment to provide permanent storage for PAG tailings and PAG/uncertain waste rock. The impoundment will be developed by constructing embankments around the perimeter of the valley. The West, Main, and Northeast Embankments will be raised using the downstream construction method and the South Embankment will be constructed as a full width embankment during Stage 1 and Stage 2 development. The South Embankment will be constructed as a divider embankment to establish the WMP in the southern portion of the valley.

Further details of the WMF development are contained in Section 18.9.

1.15 Market Studies and Contracts

A third-party trader and marketer of base and precious metal concentrates called Ocean Partners was contracted by the Company to conduct a market study for Cu, Au, and Ag. They provided an evaluation based on the expected average production rate and chemical specification of the concentrates. This data was provided by DRA, and it was derived from the Alacran Project Concentrate Analysis Report dated November 23, 2023 which was prepared by Blue Coast Metallurgy and Research.

The Project will generate a copper flotation concentrate and gravity gold concentrates separately. Gold payment will be made against the contained values in both the copper and gravity concentrates. Ocean Partners suggested the copper and gravity gold concentrate Treatment and Refining Charges (TC/RCs), payables, and deductibles summarized in Table 1.3 based on their evaluation. A significant portion of the Project's output is expected to be sold to smelters or traders under long-term contracts, while the rest will be sold on the spot market.

Table 1.3 – Copper, Gold and Silver Smelter Terms

		Unit	Copper Concentrate	Gravity Gold Concentrate
Copper, Treatment Charge	2026	US$/dmt	70	-
	2027		65	
	2028		65	
	2029		75	
	2030+		80	
Copper, Refining Charge	2026	¢/lb	7.0	-
	2027		6.5	
	2028		6.5	
	2029		7.5	
	2030+		8.0	
Copper, Payable at 22% Cu		%	95.45	-
Copper, Minimum Deduction		%	1 unit	-
Gold, Treatment Charge		US$/dmt	-	240
Gold, Refining Charge		US$/oz	5.00	7.00
Gold, Payable		%	93.5	97.0
Silver, Refining Charge		US$/oz	0.40	0.50
Silver, Payable over 30 g/t Ag		%	90	90

Treatment Charge excludes Transport, Insurance, and Freight.

Source: Ocean Partners, 2023 Source.

Estimated unit rate costs related to transport of concentrates from the mine to the Port of Tolú and ocean-freight to Asia as well as the related port handling are provided in Table 1.4.

Table 1.4 – Freight and Handling

Description	Unit	Copper Concentrate	Gravity Gold Concentrate
Sea Freight, bulk	US$/wmt	70	-
Port Handling, estimate	US$/wmt	20	-
Sea Freight, container	US$/wmt	-	22
Weighing, Sampling, Moisture Determination	US$/wmt	-	10

Source: Ocean Partners, 2023

Table 1.5 presents the price projections for the FS financial model base case.

Table 1.5 – Metal Price Assumptions for the Economic Analysis

Description	Unit	LOM Value
Copper Price	US$/lb	3.99
Gold Price	US$/oz	1,715
Silver Price	US$/oz	22.19

Source: BBA, 2023

1.16 Environmental Studies, Permitting, and Social or Community Impact

Cordoba completed a comprehensive PFS and FS baseline characterization of the Project in accordance with industry best practices, requirements for an NI 43-101 Technical Report and the Colombian Terms of Reference for an environmental license (EIA) for a mine.

Work performed included: baseline monitoring of surface water (flow and chemistry), groundwater (chemistry and aquifer characteristics), environmental geochemistry of background soils and range of mine waste. Data from the baseline studies was used to determine baseline environmental conditions.

1.16.1 BASELINE ENVIRONMENTAL CONDITIONS

In general, groundwater and surface water quality are good, except for the drainages impacted by approximately 40 years of historical tailings disposal into the streams that drain the El Alacran community. Surface water in these drainages shows clear evidence of acid drainage and metal leaching. Elevated sulphate concentrations in Quebrada Valdez were observed 5 km downstream of the village.

Groundwater is relatively shallow (<5 m below ground surface) in the alluvial valleys. Due to the high rainfall, abundant springs appear during the rainy season. Groundwater appears to be unconfined. Aquifer characteristics of the rock in the vicinity of the proposed pit indicate that they are poor aquifers with low capacity for groundwater movement. The deeper aquifer is fracture-controlled and geologic structures have moderate transmissivity. A numerical groundwater model of impacts of pit dewatering show that dewatering will be required starting in Years 3 or 4. At maximum depth, approximately 10 dewatering wells will be required to remove approximately 24,000 m^3/day, which will be piped to the San Pedro River. At closure, surface water from the infrastructure area and basin it occupies will be redirected into the pit. The combined flows of precipitation, runoff and groundwater inflow to the pit will fill the pit to the planned discharge elevation of 110 m amsl in about 3 years.

Geochemical modelling of the process solutions reporting to the WMP and the pit chemistry at closure indicates both these solutions will meet national standards for mine discharges, even in the fifth percentile precipitation scenario, precluding the need for a water treatment plant during operation and closure. Modelling of the flux and chemistry of entrained WMP solution through the mass of co-disposed waste rock and tailings into the underlying aquifer produced a dilution factor of 1 to 12,000 (WMP to groundwater), with a negligible effect on groundwater quality.

While abundant surface water is available for the mine from the nearby surface water bodies, the high level of precipitation (>3,000 mm/y) will create a positive water balance, precluding the need for a water source from the adjacent rivers.

Static and kinetic (barrels and humidity cells) geochemical characterization of soils, waste rock, ore and tailings indicate that, in general, there is potential for neutral drainage with elevated metal concentrations, and possibly acidic drainage with higher metal concentrations at the Project. This conclusion is consistent with the geo-environmental model for the deposit types (a porphyry-associated proximal iron oxide-copper-gold and a distal carbonate replacement deposit), which is expected to contain acid-generating sulphide minerals and acid-neutralizing carbonate minerals in the ore and surrounding rock. The ore, tailings, and historical tailings have the highest potential for acid rock drainage and metal leaching (ARD/ML). Surficial samples are unlikely to generate ARD/ML. Static tests showed several lithologies within Unit 1, Unit 2, Unit 3, and Sills as PAG. The kinetic tests overall indicate that most waste rock types will likely generate neutral drainage with elevated metal concentrations, and possible acidic drainage from waste rock with a high proportion of the unit/lithology of Unit 2-Tuff and Unit 2-Volcanic-Bx. Approximately 40% of the waste rock will be PAG or have uncertain acid generation potential. The historical tailings in Quebrada Valdez are actively generating acidic conditions.

Baseline monitoring of air quality, vibrations, noise, and soils produced results concomitant with small, rural, and dispersed communities with dirt roads and a love of loud music.

The local ecosystem is characterized as warm, humid forest, located in the foothills where the coastal plains transition to mountains. Most of the Project area has been cleared of the original forest for cattle grazing and agriculture.

Archaeological evidence of indigenous communities spanning a period from the second to 16th centuries of the common era was found in five (5) locations in the footprint of the proposed mine infrastructure. The artifacts recovered were limited to ceramic fragments and lithic elements, including axes, metates, manos, and flakes. Additional archaeological investigations and recovery of artifacts are included in the mine management plan.

1.16.2 SOCIAL AND COMMUNITY

The area around the Project is sparsely inhabited, and includes six small communities within 6 km of the Project. The community of El Alacrán is located within the footprint of the Alacrán Mine and is the largest local population centre (~1000 persons). The other five communities (San Matías, San Juan Nuevo/Viejo, Parcelas-La Concepcion, Los Olivos, and Valdez) and the area within a 6 km radius of the Project have an estimated combined population of 2,500 inhabitants. The local population subsists on mining, small-scale agriculture, ranching and small businesses that support the local community, such as bars and stores.

1.16.3 WASTE ROCK MANAGEMENT

NPAG waste rock will be used to construct the WMF embankments. PAG waste rock and thickened PAG tailings will be strategically co-disposed in the WMF to optimize storage volume. Covering PAG waste rock with low permeability tailings has the advantage of effectively sealing previous lifts of waste rock and tailings from oxygen diffusion and advection of water, which will greatly minimize the potential for ARD.

The Stage 1 WMF basin will be cleared and grubbed, then nominally compacted to reduce the permeability of the underlying saprolite/residual soil (foundation soil) and reduce potential seepage through the WMF foundation. Laboratory tests of reworked saprolite show that it has the hydraulic conductivity of compacted clay or silt (1.5×10^{-7} cm/s). Monitoring wells downgradient of the WMF will be used to monitor for potential leakage from the WMF and can be used as pump back wells if leakage occurs.

1.16.4 REGULATIONS AND PERMITTING

The regulatory requirements for the new mine are well defined, with the principal agencies being the National Mining Authority (ANM) and the National Environmental Agency (ANLA). The terms of reference (requirements) for an Environmental Impact Assessment (EIA) in many cases are more stringent than the requirements for an FS. The time frame for review and approval of an EIA is not defined and can take anywhere between 6 and 24 months.

1.17 Capital and Operating Costs

1.17.1 CAPITAL COST ESTIMATE (CAPEX)

The Capex was consolidated by DRA with the input of consultants BBA, Knight Piésold, IRYS and Tungsten with an expected accuracy range of -15% to +20% corresponding to Class 3 of AACE Standard 47R-11 (Cost Estimate Classification System). Base pricing is in Q3 2023 US$, with no allowances for inflation or escalation beyond that time. The estimate includes direct and indirect costs, Owner's costs, closure costs, and contingency associated with mine and process facilities and on-site and off-site infrastructure. The total LOM Capex, including initial, sustaining and reclamation costs, are US$547.5 M as shown in Table 1.6.

Table 1.6 – LOM Capex Summary

Item	Initial Capex (US$ 000)	Sustaining / Closure Cost (US$ 000)	Total LOM Capex (US$ 000)
Mining, Pre-Production Mining	37,298		37,298
Mining, Open Pit Mobile Equipment	39,588	35,449	75,037
Processing Plant	117,689	7,814	125,503
WMF, Water Management Structures	27,982	45,911	73,893
On-Site Infrastructure	51,605	3,828	55,433
Off-Site Infrastructure	19,904		19,904
Closure		22,566	22,566
Contingency	29,407	11,557	40,963
Indirect	29,945		29,945
EPCM	32,160		32,160
Owner's Cost	34,828		34,828
Total Initial Capex	*420,407*		
Total Sustaining Capex		*127,124*	
TOTAL	**420,407**	**127,124**	**547,531**

Source: DRA et al, 2023

1.17.2 OPERATING COST ESTIMATE (OPEX)

The Opex was consolidated by DRA with the input of other consultants (BBA and Knight Piésold). The estimate is expressed in US$. The LOM Opex is estimated at US$1,581 M. LOM Cu C1 cash costs are expected to average US$1.35/lb net of credits, and US$ 2.66/lb before precious metals credits. C1 costs are direct costs, which include costs incurred in mining and processing (labour, power, reagents, materials) plus local G&A, freight and realization and selling costs divided by the copper pounds produced. C1 costs do not include sustaining Capex or closure costs. Total on site operating costs, including royalties, are expected to average of US$16.14/t processed.

The LOM Opex is summarized in Table 1.7.

Table 1.7 – LOM Opex Summary

LOM Operating Costs Summary	Cost (US$ 000)	US$/t Mined	US$/t Processed	US$/lb Cu Payable
Open Pit Mining including stockpile rehandle (excludes pre-production)	447,472	2.14	4.57	0.59
Processing Main and Gravity Wash Plants	708,753		7.24	0.94
Tailings, WMF, Water Management	50,317		0.51	0.07
G&A	119,388		1.22	0.16
Contractual Royalties	67,650		0.69	0.09
Government Royalties	187,726		1.92	0.25
Total On Site	1,581,305		16.14	2.09
Cu Treatment, Refining, and Other Off Site	444,268		4.54	0.57
Total Before By-Product Credits	2,025,572		20.68	2.66
By-Product Credits				(1.31)
Total LOM Net of By-Product Credits				1.35

Source: DRA et al, 2023

1.18 Economic Analysis

An economic assessment was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic model was prepared using a discounted cash flow approach on both a pre-tax and post-tax basis. The results of this economic analysis are based upon services performed by:

- DRA for process plant and surface infrastructure;
- BBA for geology, mineral resource, mineral reserve, open pit mine and economic analysis;
- Knight Piésold for WMF, water management, and geotechnical for site infrastructure;
- Austra Mining Solutions for the open pit geotechnical;
- INTERA for the hydrogeology, geochemistry, environmental, and permitting;
- Blue Coast for metallurgy and mineral processing;
- Tungsten for power supply;
- IRYS for road and geotechnical at the plant area; and
- Cordoba for Owner’s costs.

The Project plan includes an approximate two-year construction and pre-production period, followed by 14.02 years of production at an average mill feed rate of 17,600 tpd to the main facility, ten years of post-production active mine closure and 10 years of passive mine closure. An owner-operated scenario is planned for this Project.

The Project includes the El Alacrán open pit, an NPAG borrow pit, a main processing facility for fresh and transition material, a gravity wash plant for saprolite and historical tailings, a waste and tailings management facility, a site accommodations facility, and surface infrastructure to support the mine operations including items such as: maintenance shop, office facilities, roads, water management features, and ROM stockpiling areas.

The economic analysis for the Project indicates a **post-tax** cash flow of US$931.3 M, post-tax NPV (8%) of US$359.7 M, and post-tax IRR of 23.8%. The Project is most sensitive to commodity prices. On a **pre-tax** basis, the Project has a cash flow of US$1,441.4 M, an NPV (8%) of US$633.1 M, and an IRR of 33.9%.

1.19 Findings / Conclusions

Further details on all findings and conclusions described below are provided in Section 25.

1.19.1 DRILLING

Eight (8) phases of diamond drilling were completed on the El Alacrán deposit since 2011 totalling 82,894 m. Drilling completed prior to 2011 was not used in the geological interpretation or the MRE. Drilling at the satellite deposits between 2013 and 2017 totalled 20,104 m.

Core logging and sampling procedures completed during the eight (8) phases of drilling met industry best practices and the data is acceptable to use in the MRE for El Alacrán and the satellite deposits.

1.19.2 SAMPLE PREPARATION, ANALYSES, AND SECURITY

The samples collected during the Ashmont programs were prepared at ALS Colombia and analyzed in Chile, Peru, and Canada. Samples collected during the Cordoba programs were prepared at ALS Colombia or SGS Peru. The samples were analyzed at ALS Peru or SGS Peru.

All the sample preparation and analyses were completed by accredited laboratories and at no time were employees of Ashmont or Cordoba involved directly with the preparation or analyses.

Cordoba has a QA/QC program for drilling and analysis that meets industry standards. Any failures encountered in the QA/QC program were addressed by Cordoba with sample re-runs or laboratory audits.

1.19.3 DATA VERIFICATION

The QP validated data by conducting site investigations, reviewing drill core, and confirming drill collar locations and procedures.

1.19.4 MINERAL RESOURCE ESTIMATE

MREs were completed on the El Alacrán, Historic Tailings, Costa Azul, Montiel East, and Montiel West deposits based on diamond drill holes, hand-augured drill holes, and reverse circulation drill holes.

The MRE for each deposit was geological domains modelled in three dimensions using Leapfrog® Geo software. Mineral estimating was completed by Ordinary Kriging (OK) in Datamine Studio RM™ using industry standard procedures. The MRE for each deposit was constrained within a pit shell and used a Net Smelter Return (NSR) cut-off grade of US$2.08/t milled for saprolite and US$9.88/t milled for transition and fresh material.

1.19.5 METALLURGICAL TESTING

- Grindability testing confirmed that the material is above average with respect to hardness and breakage resistance. Bond Ball Work Index testing conducted on 73 variability composites yielded an average of 17.8 kWh/t, whereas SMC testing on 48 variability composites resulted in Axb values ranging from 19.9 to 82.8 and averaging 32.2. Abrasion index testing on nine (9) samples indicated that the material is only mildly abrasive compared to other orebodies, with an average Ai of 0.079 g.
- Geomet rougher flotation was conducted on 75 composites from the fresh, transition, and saprolite zones. Cleaner circuit development and confirmation of flotation conditions was conducted on Master Composite samples with the following results:
  - Primary grind size was reduced to a P_{80} of 150 µm to improve copper recovery.
  - PAX was found to be an effective collector for copper recovery, with good selectivity over pyrite at low dosage rates.
  - Calgon addition to the regrind and cleaner circuit was found to be beneficial in improving gangue dispersion and copper recovery.
  - Longer rougher and cleaner flotation times were found to improve stage recovery of “slow-floating” copper without negatively impacting on final concentrate mass recovery.
- Confirmatory locked cycle testing of the optimized flowsheet on the MC-3 composite indicated good stability and metallurgical performance. Minor element assays on locked cycle test concentrates did not identify any significant elements of concern with respect to saleability.
- Gold and silver recovery to a gravity concentrate was evaluated by EGRG testing on the MC-3 fresh composite that resulted in a GRG (gravity recoverable gold) of 54%, indicating that a large proportion of the gold can be recovered in a gravity circuit prior to flotation. A two-stage gravity

test was conducted on a saprolite master composite sample that resulted in a gold recovery of 57%, which is comparable to the results on the fresh zone.

- Metallurgical testwork was conducted on auger samples collected from five (5) zones in the historical tailings area. Flotation testwork focused on the higher copper and sulphur grade material found in Zone 1. Limited success was achieved, with copper recovery to a cleaner concentrate not exceeding ~35%. Two-stage gravity testing of each of the zone composites resulted in gold recoveries ranging between 45% and 69%, indicating that a large proportion of the contained gold is gravity recoverable.

1.19.6 RECOVERY METHODS

The processing methods are conventional and proven. The process plant design is based on testwork results and are appropriate to the ore mineralization; the flotation circuit recovers sulphide minerals while the gravity concentration allows for the recovery of free gold and silver producing separate concentrates and higher overall revenue.

The main processing facility will have a design throughput of 17,600 tpd (6.4 Mtpa). ROM ore will be crushed in a single jaw crusher and the grinding circuit will feature a pebble crusher arrangement with SAG mill in an open circuit and ball mill (SABC) operating in closed circuit with hydrocyclones.

Hydrocyclone overflow with a grind size P_{80} of 150 µm will be sent to the rougher flotation circuit. A regrinding stage for the concentrate will further reduce the particle size to a P_{80} of 30 µm before passing through three cleaning stages. Concentrate will be thickened and filtered to 8% moisture content. Final tailings are sent to the tailings thickener, and then sent to the WMF.

Processing of saprolite ore in the main plant has a negative impact on overall flotation recoveries for the concentrator. Therefore, the saprolite ores will be processed in a dedicated stand-alone gravity wash plant with a capacity of 2,400 tpd. This plant will also process more than 1,200 tpd of historical tailings, and will allow recovery of gold and silver contained from both materials.

1.19.7 SITE INFRASTRUCTURE

- Basic studies in hydrology, hydraulics, and seismicity have been advanced to an adequate level for designing the access roads at the FS stage.
- Basic studies in geology, geomorphology, and characteristics of surface and shallow formations are adequate for designs of the access roads at the FS stage.
- On-site Project infrastructure designs are sufficiently progressed for FS-level estimation. The infrastructure is considered of suitable design for the site conditions and size of operations.
- Geotechnical exploration and testing are advanced to design Project infrastructure at the FS level in sectors where direct exploration was carried out.

- The existing road from La Rica will be enhanced and upgraded; and a new 110 kV power line from Cerro Matoso will be required. Concentrate storage and handling facilities will be built at Tolú port, where flotation concentrate will be transported in tipping containers.
- Execution of the Project depends on tight sequencing of construction material production, site access, and preliminary mining activities.
- Early construction of the power line and on-site power infrastructure is needed to support the construction phase. Temporary construction power generation on site will be needed.

1.19.8 MARKET STUDIES

Potential buyers would regard the Project's copper concentrate as a clean material largely absent of penalty elements or minerals with a low/medium copper grade and a moderate precious metal content. As such, it is expected that this material will be readily saleable on global markets.

The projected precious metal content, high precious metal grades and low production volume of the gravity gold concentrate will favour sale in Japan, Korea, and European smelters.

1.19.9 PROJECT ECONOMICS

The Capex was prepared by the various consultants and integrated by DRA. The estimate includes direct and indirect costs, owner's costs and contingency for the mine, process facilities and infrastructure (both on-site and off-site). Total LOM Capex, including initial, sustaining and reclamation costs, is US$547.5 M. The initial capital estimate is US$420.4 M.

The Opex was also prepared by DRA and other consultants. It includes all costs associated with mining in addition to processing of fresh and transition ores in the main concentrator and processing of saprolite ore and historical tailings in the separate gravity wash plant.

1.20 Recommendations

Specific recommendations for the Alacran Project are summarized below. Full details are provided in Section 26.

The results of this FS demonstrate that the Alacran Project has the potential to be technically and economically viable as a producer of a copper concentrate and gold concentrate which will be sellable in the current markets.

To further advance the Project, a budget estimate of US$15.80 M is proposed to take the Project through detailed engineering and permitting. The budget estimate is summarized in Table 1.8.

Table 1.8 – Detailed Engineering Budget Estimate

Description	Cost (US$ M)
Project Management and Control Services	2.37
Engineering and Design Services	9.48
Procurement and Contracts Services	3.95
Total	**15.80**

1.20.1 DRILLING

- Future drilling programs at the satellite deposits to expand the mineral resource.
- Continue to collect bulk density measurements for all material to build the data set.
- At El Alacrán deposit future drilling should focus on extending mineralization along strike to the north and south of the current open pit designs.
- Additional drilling of the higher-grade structures below the open pit would allow for the interpretation of potential mineralized material accessible by underground mining methods.

1.20.2 METALLURGICAL TESTING

- Considering the positive outcome of this Report, it is recommended to pursue the next phase of the Project, though various aspects need to be monitored or performed as listed below.
- The following are recommendations for further metallurgical testwork:
  - Further batch testing of metallurgical unit composites to determine optimum collector and depressant additions for specific units.
  - Confirmation of metallurgical unit composite flotation results by locked-cycle testing.
  - Additional amenability testing for Jameson cell flotation, including bench testing and mini-piloting.
  - Confirmatory testing of Year 1-5 production composites based on the updated mine plan.
  - Further testing of copper and gold recovery from deslimed historical tailings Zones 1, 2, and 3.
  - Determination of grinding requirements/optimization for saprolite and historical tailings gravity recovery.
  - Mineralogical characterization of final concentrates.
  - Review of potential application of coarse particle flotation technology.

1.20.3 MINERAL RESOURCE ESTIMATE

- During future drilling programs, continue to collect specific density data from all lithological units.

- Understand the mineralogical and / or geochemical differences between the geological units to further refine the estimation domains.
- Collect additional data to better understand the geometry of the higher-grade domains within the El Alacrán deposit.

1.20.4 MINING

- Complete further detailed design and LOM scheduling using the results of this FS to refine and optimize pit designs and mine plan.
- Review and optimize open pit design and phase design with NPAG/PAG classification to minimize the amount of PAG waste rock and ore stockpiling that could be required while maintaining NPAG waste rock requirements to the WMF embankment progression schedule.
- Assess the ultimate detailed open pit design for slope stability.
- Conduct analysis to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application.
- Conduct analysis to determine suitability of electric excavators and/or drills.
- Review NPAG borrow area limits with final site plan layout. Drilling and testwork should be undertaken to confirm quality of waste rock from NPAG borrow area.

1.20.5 MINERAL PROCESSING AND RECOVERY

- Additional testwork aimed at improving copper, gold and silver recoveries while reducing reagent consumption.
- Rougher flotation study to use Jameson cell circuit to reduce Capex and improve copper and gold recoveries.
- Coarse particle flotation testwork to reduce grinding energy requirements for the main plant flowsheet while maintaining metal recoveries (higher throughput at same energy consumption).
- Flowsheet optimization on the main plant and gravity wash plants.

1.20.6 PROJECT INFRASTRUCTURE

In the next stage of the Project, the follow areas are recommended for further investigation:

- External Access Road
  - Additional exploration and testing to complement the study of concrete aggregates and road surface materials.
  - Develop a series of construction details to better understand the contractor appointed for that purpose.
  - Access road construction has a completion time of 540 calendar days (18 months).

- On-site Infrastructure
  - Drilling should be completed specifically in these areas to support foundation recommendations and analysis. Once the geotechnical data is available, trade off studies may be conducted to determine the optimum foundation system for the ancillary buildings and/or equipment foundations.
  - Finalization of the right of way for the 110 kV transmission line corridor from Cerro Matoso to the mine site.
  - Telecommunication and fibre optic internet service providers must be engaged as part of the design of the power transmission line from Cerro Matoso.

1.20.7 WASTE MANAGEMENT

- Additional site investigations, in situ testing, and laboratory testing to confirm ground and groundwater conditions under and around the various embankments.
- Three-dimensional modelling to further assess potential seepage associated with the complex topography and stratigraphy, faulting within the WMF embankment foundations, and the potential to flow from the WMF in various directions.
- Detailed seismicity assessment, along with deformation analyses.
- Consolidation modelling to assess sensitivity of WMF embankments to pore pressure conditions in the foundation and to refine the embankment raising plan.
- Review of basin filling and embankment construction schedule.
- Stability assessments for waste stockpiles.
- Review of hydrometeorological data and extreme storm event estimates to refine the stormwater management measures.

1.20.8 MARKET STUDIES

- Engage the market and assess the potential to improve commercial terms of the concentrate.
- Further explore the opportunity to market the gravity gold concentrate in Europe.
- Explore opportunity to store bulk concentrate at the port of Tolú and facilitate means to quickly load free-flowing bulk concentrate into ships.
- Review commercial terms for sale of concentrates should the quality change or if there are changes in the Chinese import rules for certain concentrates.
- Use any further lab- or pilot-scale metallurgical testing to further define quality of gravity gold concentrates to be produced by the wash plant.
- Complete XRF analysis before and after digestion to understand the relationship between total and soluble mineral content for SiO_2, Al_2O_3, K_2O and CaO, as total insoluble mineral content may impact marketing flexibility.

- Examine opportunity to install bagging infrastructure for gravity gold concentrate.

1.20.9 ENVIRONMENTAL

- Continue sampling of monitoring wells and stream to establish a longer monitoring baseline.
- Analyze future groundwater data to improve understanding of flow regimes and conceptual groundwater model.
- Expand grid for the numerical groundwater model to the east and south in areas where the model showed drawdown in the deeper aquifer units and repeat the groundwater model.
- Based on the new mine plan, install additional barrels to evaluate the long-term geochemical behavior of ore and waste rock.

2 INTRODUCTION

2.1 Terms of Reference Scope of Study

Cordoba Minerals Corp. (Cordoba) retained various Consultants to provide QPs to participate in and prepare this independent Technical Report, including Austra, BBA, Blue Coast Research, DRA, Intera, and Knight Piésold. The purpose of this Technical Report is to support disclosure of the results of developmental work performed for the Feasibility Study (FS) for the Alacran Project (the Project), in accordance with NI 43-101 guidelines.

More specifically, each QP contributed to the completion of the component Technical Report sections as follows:

- **Austra Mining Solutions (Austra):** Open pit geotechnical work.
- **BBA Engineering Ltd. (BBA)**: Property description and location, accessibility, climate, local resources, infrastructure, and physiography, history, geological setting and mineralization, deposit types, exploration, drilling, sample preparation, data verification, mineral resource and reserve estimates, mining methods, capital and operating costs for mining, financial analysis, and adjacent properties.
- **Blue Coast Metallurgy and Research (Blue Coast Research)**: Mineral processing and metallurgical testing.
- **DRA Global Ltd (DRA)**: Recovery methods, surface infrastructure, capital, and operating costs for processing, and overall report compilation.
- **INTERA Geoscience & Engineering Solutions (INTERA)**: Environmental studies, permitting, and social or community impacts.
- **Knight Piésold Ltd. (Knight Piésold)**: Project infrastructure (water balance, water quality modeling, waste facilities, and hydrogeology).

2.2 Sources of Information

DRA is the overall lead consultant for this Technical Report. DRA collaborated with the other consultants (for scope outside of DRA’s responsibility), and was responsible for compiling a final Technical Report inclusive of the work and deliverables performed by all consultants.

This Technical Report relies on various consultants for descriptions of Project elements, as outlined in Section 2.1.The listing of consultants above is intended to indicate the sources of information for the various Technical Report sections, and it does not necessarily indicate responsibility.

The QPs reviewed the specialized inputs of the following consultants:

- **Ingeniería de Rocas y Suelos S.A.S. (IRYS)** for roads and plant área geotechnical.
- **Ocean Partners** for Market Study.

- **Tungsten Associates** for Project infrastructure (power supply and overhead powerline design).

The QPs' assessments of the Project were based on maps, published material, pre-existing reports, Project development work specifically performed by consultants, and data, professional opinions and unpublished material provided by Cordoba. The QPs reviewed all relevant data provided by Cordoba and/or by its agents. The QPs reviewed and appraised all information used to prepare this Technical Report and believe that such information is valid and appropriate considering the status of the Project and the purpose for which this Technical Report is prepared. A full listing of references is provided in Section 27.

2.3 Qualified Persons

The Qualified Persons (QPs) listed in Table 2.1 are responsible for the preparation of this Technical Report, and their certificates are also contained herein.

Table 2.1 – Qualified Persons

Name	Title, Company	Responsible for Section(s)
Giovany Barco, P. Eng	Senior Civil Project Engineer, DRA Global Ltd.	Portions of 18
Peter Cepuritis, MAusIMM (CP Geotech)	Principal Geotechnical Engineer Austra Mining Solutions	16.5 and portions of 1, 25, 26, and 27
Alexander Duggan, P. Eng	Estimator Consultant, DRA Global Ltd.	21.1 and portions of 1, 25, 26, and 27
David Frost, FAusIMM	Vice President Process Engineering, DRA Global Ltd.	2, 3, 17,19, 24 and portions of 1, 18, 21, 25, 26, and 27, and overall report compilation
Lyn Jones, P. Eng.	Manager, Process Engineering, Blue Coast Research	13 and portions of 1, 25, 26, and 27
Todd McCracken, P. Geo.	Director – Mining & Geology – Central, BBA Engineering Ltd.	4, 6 to 12, 14, 22, 23, and portions of 1, 25, 26, and 27
Wilson Muir, P.Eng.	Senior Engineer, Knight Piésold Ltd.	Portions of 1, 18, 21, 25, 26, and 27
Joanne Robinson, P. Eng.	Mining Engineer, BBA Engineering Ltd.	15, 16 and portions of 1, 21, 25, 26, and 27 with the exception of 16.5
Patrick Williamson, P.G.	Principal Hydrogeochemist, INTERA Incorporated	5, 20, and portions of 1, 25, 26, and 27

2.4 Site Visit

The following QPs have completed property site visits:

Table 2.2 – Site Visit by Qualified Persons

Qualified Person	Site Visit (Yes/No)	Date of Site Visit
Giovany Barco, P. Eng	Yes	August 14 to 18, 2023
Peter Cepuritis, MAusIMM (CP Geotech)	Yes	July 25 to 28, 2022
Alexander Duggan, P. Eng	No	
David Frost, FAusIMM	Yes	July 25 to 28, 2022
Lyn Jones, P.Eng	No	
Todd McCracken, P. Geo.	Yes	July 25 to 28, 2022
Wilson Muir, P.Eng.,	Yes	November 11 to 13, 2022
Joanne Robinson, P. Eng.	Yes	September 20 to 21, 2021
Patrick Williamson, P.G.	Yes	April 11 to 13, 2023 September 20 to 21, 2022

2.5 Effective Date and Declaration

This Report is considered effective as of December 18, 2023 and is in support of the Cordoba's press release, dated December 18, 2023, entitled "*Cordoba Minerals Proudly Announces the Completion of the NI 43-101 Feasibility Study for the Alacran Project in Colombia*."

This Technical Report has the following effective dates:

Technical Report:	December 18, 2023.
Mineral Resource Estimate:	December 18, 2023.
Mineral Reserve Estimate	December 18, 2023.

2.6 Units and Currency

In this Report, all currency amounts are in US Dollars ($ or US$) unless otherwise stated. Quantities are generally stated in *Système international d'unités* (SI) metrics units, as per the standard Canadian, Colombian, and international practice, including metric ton (tonne or t) for mass, and kilometre (km) or metre (m) for distance. Abbreviations used in this Report are listed in Section 28.

3 RELIANCE ON OTHER EXPERTS

A draft copy of the Report has been reviewed for factual errors by Cordoba. Any changes made as a result of these reviews did not involve any alteration to the conclusions made.

The QPs used their experience to determine if the information from previous reports was suitable for inclusion in this Report and adjusted information that required amending. This Report includes technical information, which required subsequent calculations to derive subtotals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the QPs do not consider them to be material.

The QP for Section 20 relied on reports and opinions provided by Cordoba for information pertaining to environment studies, permitting and social or community impact. INTERA has reviewed the content of this section and believes that it provides current and reliable information on environmental, permitting and social or community factors related to the Project.

Todd McCracken, P. Geo., relied upon:

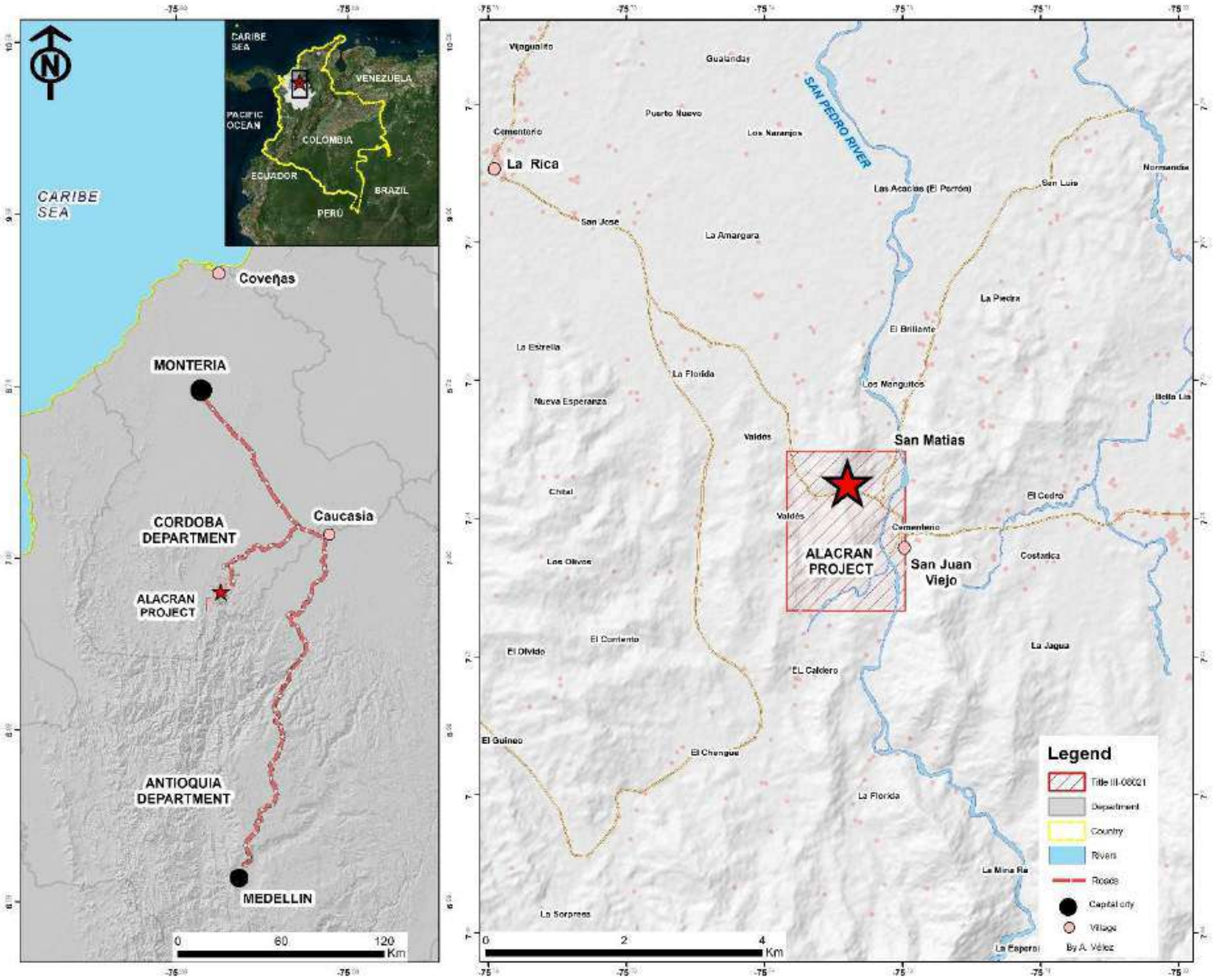
- Jaime Aroca, Chief Geologist for Cordoba for matters pertaining to mineral claims and mining leases as disclosed in Section 4 (email dated November 23, 2023); and
- David Garratt, Chief Financial Officer for Cordoba for tax analysis model as disclosed in Section 22 (email from Sarah Armstrong-Montoya, President and Chief Operating Officer for Cordoba dated December 12, 2023). Taxes were calculated by the firm Brigard Urrutia based in Bogotá, Colombia for the financial model created by the QP.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Project hosts the El Alacrán, Costa Azul, Montiel East, and Montiel West deposits across various mining titles. The Project is located the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá (capital and largest city of Colombia) by air, 160 km north of Medellín (capital of the department of Antioquia and second largest city in Colombia) by air, and 112 km south of Montería (capital of the department of Córdoba) by air, as depicted in Figure 4.1. Table 4.1 presents the coordinates of the El Alacrán, Montiel East, Montiel West and Costa Azul deposits.

Figure 4.1 – Location of Project within Colombia



Source: Cordoba, 2023

Table 4.1 – Coordinates El Alacrán, Montiel East, Montiel West, and Costa Azul Deposits

III-08021 (El Alacrán)

North Coordinate	East Coordinate
1.348.349,8000	1.149.165,5000
1.348.149,8000	1.149.164,9000
1.346.050,0000	1.149.164,7000
1.346.050,0758	1.148.904,0000
1.346.050,2000	1.148.903,8000
1.346.050,4000	1.147.947,9000
1.346.050,0000	1.147.947,5000
1.346.050,1404	1.147.464,9000
1.346.749,9000	1.147.465,0000
1.348.349,7000	1.147.464,7000

LEQ-15161 (Montiel West)

North Coordinate	East Coordinate
1.349.999,9980	1.149.852,8990
1.349.300,0010	1.149.852,7130
1.348.389,6100	1.149.852,4590
1.348.388,4000	1.149.681,1990
1.345.807,3520	1.149.699,3940
1.346.062,5300	1.149.164,7360
1.348.349,7500	1.149.166,0000
1.348.472,4000	1.148.989,7010
1.349.799,9990	1.148.978,4450
1.349.799,9990	1.147.300,0020
1.349.999,9980	1.147.300,0000

Exclusion

North Coordinate	East Coordinate
1.349.299,9980	1.149.714,9990
1.348.488,6000	1.149.715,0010
1.348.489,5990	1.149.852,4010
1.349.300,0000	1.149.852,5980

JJ9-08091 (Montiel East)

North Coordinate	East Coordinate
1.350.000,1770	1.146.000,0030
1.350.000,3990	1.148.999,8680
1.351.188,2720	1.149.000,4620
1.350.977,9970	1.148.816,9720
1.350.982,9510	1.148.810,9370
1.350.977,9260	1.148.806,9710
1.352.612,4100	1.146.927,6110
1.352.200,9280	1.146.570,5750
1.352.205,8860	1.146.564,5400
1.352.200,8570	1.146.560,5780
1.352.688,2620	1.145.999,9990
1.353.434,7030	1.146.000,0040
1.350.984,0000	1.148.817,9210
1.352.344,9040	1.150.000,0280
1.351.000,0010	1.150.000,0290
1.350.999,6240	1.152.999,9970
1.349.362,8370	1.153.000,0070
1.349.000,0000	1.152.999,9000
1.349.000,0000	1.153.000,0030
1.347.999,8480	1.152.999,6310

LEB-08491 (Costa Azul)

North Coordinate	East Coordinate
1.348.389,6090	1.149.852,4580
1.348.349,6000	1.149.852,4470
1.348.349,6340	1.150.000,0020
1.348.349,8290	1.150.800,3460
1.348.350,2920	1.150.800,3470
1.348.349,9890	1.151.465,2890
1.348.000,0210	1.151.465,7570
1.347.999,8480	1.152.999,6310
1.346.021,3000	1.153.000,0080
1.344.904,9560	1.153.000,0030
1.344.500,1120	1.152.749,0640
1.344.500,0330	1.150.689,4380
1.344.545,1980	1.150.677,0010
1.344.563,9980	1.149.945,9000
1.345.707,6010	1.149.908,4010
1.345.734,2150	1.149.852,6410
1.345.626,8940	1.149.852,6350
1.345.646,4360	1.149.710,3440
1.345.642,5910	1.149.700,5580

Source: Mining National Register, 2023, coordinate system Magna Sirgas Colombia West Zone (point [.] for thousands, and a comma [,] for decimals)

4.2 Mineral Rights in Colombia

4.2.1 MINERAL TITLE

The Colombian Constitution provides that the sole owner of the subsurface and all non-renewable natural resources in the territory is the Republic of Colombia without prejudice to the rights and entitlements acquired under prior statuses. The exploitation of any non-renewable natural resource present in the subsurface originates the payment of a royalty to the Republic of Colombia, together with any other considerations that may be agreed upon for each title, concession, or license.

The concession or licensing of any rights to undertake the exploration and exploitation of non-renewable resources are determined by statutes enacted by the Republic Colombian Congress. With respect to any mineral interest, the Colombian Code of Mines sets out the terms subject to which the Sovereign concedes or licenses the investing party the undertaking of mining activities.

The main regulation in force is the Colombian mining code (Law 685) of 2001 established the legal framework for the concession of mineral exploration and exploitation. A concession agreement includes exploration; exploitation; construction and assembly; mineral processing and transportation; and closure of a specific ore body and mining operation. Concession agreements are granted for a maximum period of 30 years, renewable for another 30 years.

The Colombian State may confer ‘mining titles’ which are concession agreements that grant an exclusive and temporary right to explore and exploit minerals in a specific area set out by the agreement. Concession agreements are awarded by the National Mining Agency (“ANM”) on a ‘first come, first served’ basis, and shall be duly registered in the National Mining Registry (“RMN”) to become fully enforceable.

Holders of mining titles are not vested with property of the minerals ‘in situ,’ but with the ability to i) explore and determine the presence, quantity and quality of minerals within the contracted area; ii) extract and become the rightful owner of the minerals therein; and iii) obtain mining easements over the land of third parties to efficiently undertake the mining activity.

Mining titles are divided into three (3) different phases:

1. Exploration

   The licensee shall undertake a technical exploration in order to determine the existence, location, quality and quantity of minerals in the contracted area, and the feasibility of exploiting and extracting the resources.

   Exploration could be conducted within three years as from the registration of the concession agreement in the ANM. The licensee is entitled to request up to four extensions of two years each. Throughout this phase the licensee shall annually i) pay a surface fee in consideration for the contracted area[1], and ii) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory early termination of the concession by the ANM[2].

At least thirty (30) days before the end of the exploration period, the licensee shall present, for the approval of the ANM, i) the exploitation working plan ("PTO") in accordance with Article 78 of the Mining Code describing the resource, site conditions and mining plan. The requirements for the PTO are specified in the Terms of Reference for generation of a PTO (ANM, 2018), and ii) the Environmental Impact Assessment ("EIA") that demonstrates the environmental feasibility of the Project.

2. Construction and Mining Assembly

   - The licensee shall prepare and build all facilities and infrastructure necessary for the exploitation of the title in accordance with the PTO previously approved.
   - Construction and mining assembly shall be conducted within three years of the termination of the exploration phase. The licensee is entitled to request a one-year extension.
   - To initiate this phase, the titleholder shall have an environmental license which is granted by the environmental authority based on the EIA presented by the licensee.
   - Throughout this phase the licensee shall annually i) pay a surface fee[3], and ii) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory early termination of the concession by the ANM[4].

3. Exploitation

   - The licensee shall undertake the activities for the extraction and collection of the minerals in the surface or subsurface of the contracted area.
   - The exploitation of the mining title shall be conducted within the term of the concession agreement (up to 30 years) deducted by the time spent on the exploration and construction phases. Before the exploitation term ends, the licensee is entitled to request the renewal of the concession agreement for up to 30 years more.
   - Throughout this phase the licensee shall i) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory

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[1] Surface payment fees depend on the extension of the contracted area and the year the concession is at. The longest a licensee has had the mining title and the larger the contracted area is, the higher the annual surface payment will be.

[2] The value of the environmental mining policy shall be equivalent to 5% of the foreseen investment for said year of exploration.

[3] The amount of the surface payment fees will that of the last fee paid in the exploration phase.

[4] The value of the environmental mining policy shall be equivalent to 5% of the foreseen investment for said year of construction and assembly.

early termination of the concession by the ANM,[5]; and ii) pay a royalty to the Colombian government over the main or secondary resources extracted from the area licensed for the exploitation under the concession agreement.

The obligations under the concession agreement may be temporarily suspended at the request of the licensee, whenever there is a situation of force majeure. The mining authority shall approve the suspension and may request at any time that the licensee demonstrates the continuity of the force majeure situation. Obligations regarding the payment of the surface fee are waived during the suspension, but not the obligation to obtain and pay the environmental mining insurance policy.

4.2.2 ENVIRONMENTAL REGULATIONS IN COLOMBIA

More comprehensive coverage of Colombia's Environmental Studies, Permitting, and Social or Community Impact is contained in Section 20 of this Report.

4.2.3 LEGAL ACCESS AND SURFACE RIGHTS IN COLOMBIA

The award of a concession agreement does not grant the licensee property rights on the surface of the area of the title either.

Mining is deemed, by law, as a public interest activity and, therefore, mining titleholders have the ability to request the expropriation of land and the imposition of easements on land owned by third parties to the extent such area is required to undertake mining activities over the mining title efficiently.

The perfection of mining easements over third-party lands shall include a direct agreement of the involved parties regarding economic compensation and shall be made by public deed. Otherwise, it shall be preceded by a judicial proceeding. Recent opinions have held that such judicial proceeding is governed by Act 1274 of 2009, which contemplates the petroleum industry easement judicial proceeding and appraisal.

4.3 Cordoba Mineral Rights

4.3.1 PROJECT MINERAL TITLE

The subsidiaries of Cordoba[6], MCSAS (a Colombian subsidiary of Cordoba), *Mincordoba SAS* (a Colombian subsidiary of Cordoba) and ECSAS (the operator of the mining title), are simplified stock corporations formed in accordance with the laws of the Republic of Colombia. ECSAS has the corporate power to conduct and undertake advisory, consultancy and work supervision in the mining

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[5] The value of the environmental mining policy shall be equivalent to 10% of the result obtained from multiplying the estimated annual production volume for the price annually fixed by the National Government for the corresponding mineral at the pit.

[6] Approximately 63.0% of Cordoba's issued and outstanding shares are owned by Ivanhoe Electric Inc. ("IVNE") formerly held by IVNE affiliate, High Power Exploration Inc.

and energy industries; while MCSAS has the corporate power to own and hold mining titles, and conduct the exploration, development, and exploitation of mines in the Republic of Colombia.

As of the date of this Technical Report, there are 23 mining titles:

- MCSAS (located in the Colombian department of Córdoba) owns 12 titles;
- Mincordoba SAS (located in the Colombian department of Caldas) owns 10 titles; and
- Cobre Minerals S.A.S. (III-08021) (CM Company) is the owner of one (1) mining title.

The El Alacrán deposit is located within the Project area in the mining concession described in Table 4.2 and shown in Figures 4.2 and 4.3.

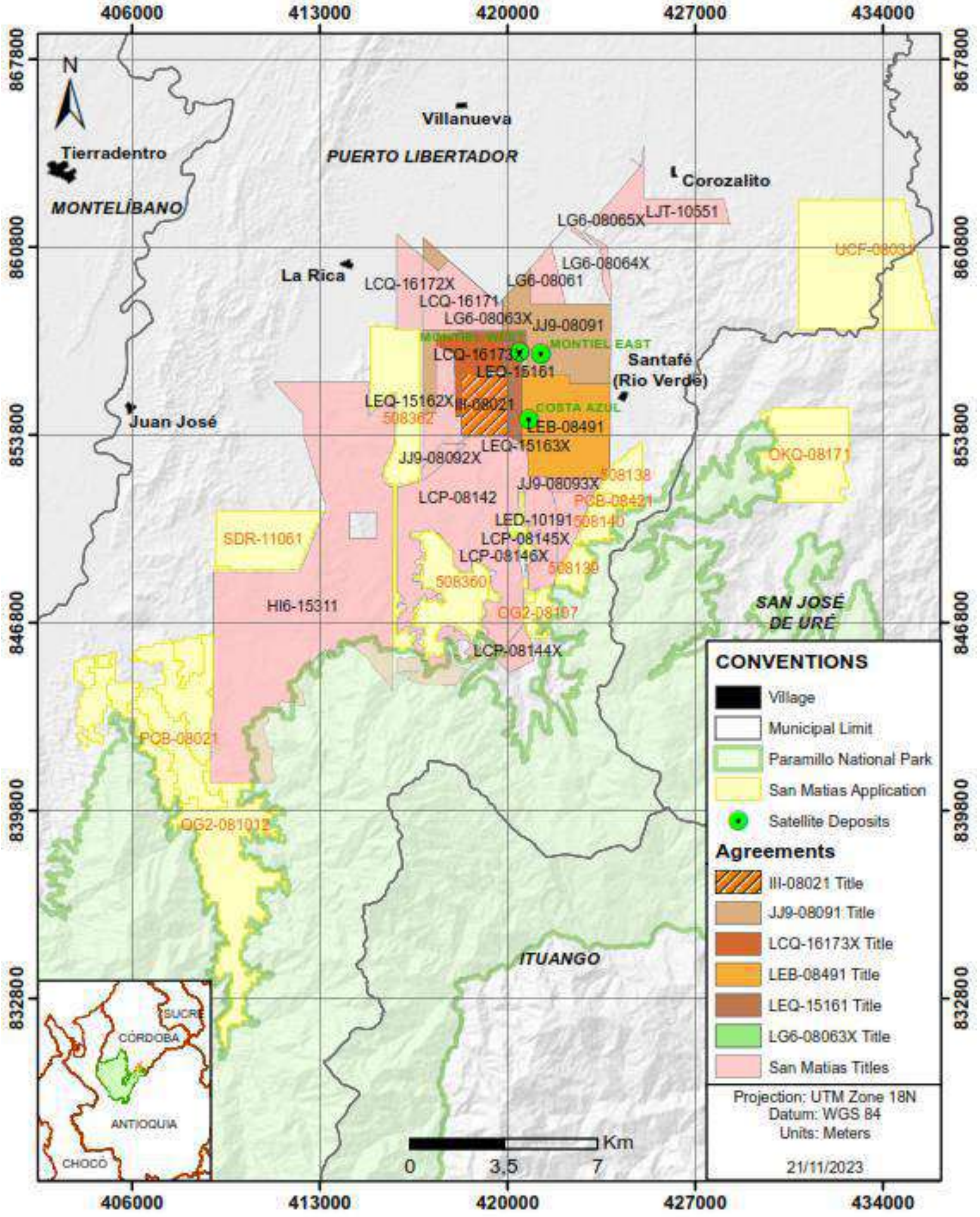
Table 4.2 – Project Title Concessions

RMN Number	Holder of Record	Date of Registration	Term	Area (ha) Area (m^2)	2023 Fees	
					(Surface Fee + Insurance Policy) (COP $)	Payment Up to Date
III-08021	Cobre Minerals S.A.S. (Exploradora Córdoba S.A.S. is the mining operator)	July 1, 2009	June 30, 2039	391 ha. 9220 m^2	1.690.220	Yes
HI6-15311	Mincordoba S.A.S.	May 2, 2008	May 1, 2041	5418 ha. 634 m^2	949.415	Yes
JJ9-08091	Minerales Córdoba S.A.S.	November 19, 2012	October 06, 2045	1282 ha. 500 m^2	1.783.995	Yes
JJ9-08092X	Minerales Córdoba S.A.S.	November 19, 2012	November 18, 2045	80 ha. 4440 m^2	142.800	Yes
JJ9-08093X	Minerales Córdoba S.A.S.	November 19, 2012	November 18, 2045	97 ha. 7375 m^2	328.828	Yes
LCP-08142	Minerales Córdoba S.A.S.	February 2, 2015	February 1, 2047	3063 ha. 2763 m^2	335.425	Yes
LCP-08143X	Minerales Córdoba S.A.S.	January 30,2015	January 29,2048	748 m^2	142.800	Yes
LCP-08144X	Mincordoba S.A.S.	February 2, 2015	February 1, 2050	138 ha. 4300 m^2	285.601	Yes
LCP-08145X	Mincordoba S.A.S.	January 30,2015	January 29, 2047	794 m^2	285.600	Yes
LCP-08146X	Mincordoba S.A.S.	January 30,2015	January 29, 2051	434 m^2	285.600	Yes
LCQ-16171	Mincordoba S.A.S.	February 17, 2015	February 16, 2051	583 ha. 4209 m^2	28.868.505	Yes
LCQ-16172X	Mincordoba S.A.S.	May 14, 2014	May 13, 2047	305 ha. 5961 m^2	142.800	Yes
LCQ-16173X	Minerales Córdoba S.A.S.	May 14, 2014	November 04, 2047	329 ha. 3295 m^2	14.241.792	Yes

RMN Number	Holder of Record	Date of Registration	Term	**Area** (ha) **Area** (m²)	2023 Fees	
					(Surface Fee + Insurance Policy) (COP $)	Payment Up to Date
LEB-08491	Minerales Córdoba S.A.S.	January 25, 2012	January 25, 2045	1184 ha. 1577 m²	2.062.766	Yes
LED-10191	Minerales Córdoba S.A.S.	May 24, 2012	May 23, 2049	233 ha. 6383 m²	142.800	Yes
LEQ-15161	Minerales Córdoba S.A.S.	October 17, 2012	October 16, 2042	290 ha. 7373 m²	1.002.051	Yes
LEQ-15162X	Minerales Córdoba S.A.S.	May 10, 2013	November 9, 2048	368 ha. 1684 m²	142.800	Yes
LEQ-15163X	Minerales Córdoba S.A.S.	May 10, 2013	May 9, 2046	4 ha. 8100 m²	167.859	Yes
LG6-08061	Mincordoba S.A.S.	April 4, 2012	April 3, 2050	196 ha. 9485 m²	371.197	Yes
LG6-08063X	Minerales Córdoba S.A.S.	May 6, 2015	May 5, 2048	2 ha. 8653 m²	280.157	Yes
LG6-08064X	Mincordoba S.A.S.	May 14, 2012	May 13, 2045	55 ha. 6082 m²	260.585	Yes
LG6-08065X	Mincordoba S.A.S.	May 14, 2014	May 13, 2046	47 ha. 1920 m²	142.801	Yes
LJT-10551	Mincordoba S.A.S.	January 25,2012	January 24,2044	483 ha. 8637 m²	255.850	Yes

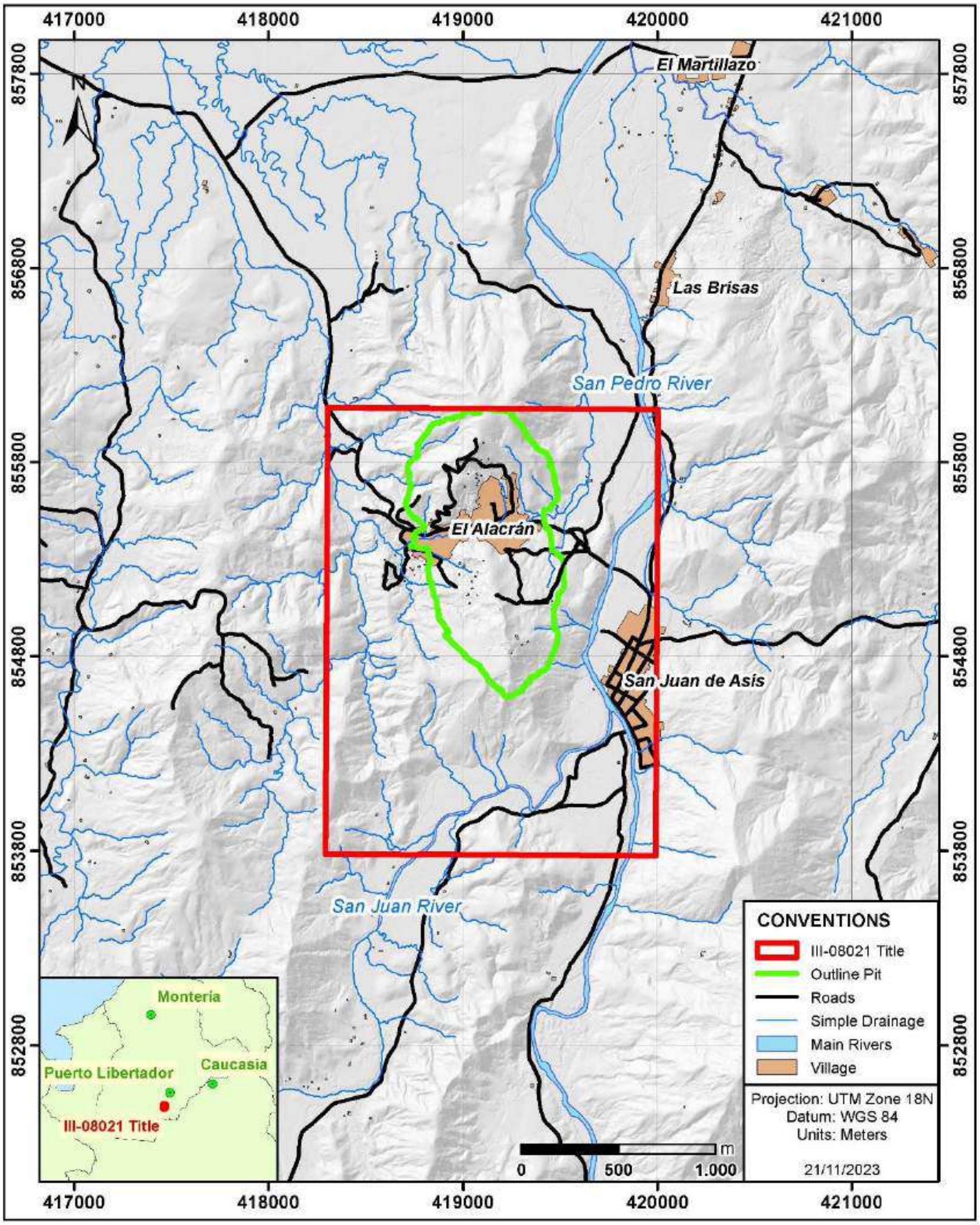
Source: Cordoba, 2023

Figure 4.2 – Map of the Project Concession Agreements



Source: Cordoba, 2023

Figure 4.3 – Map of the El Alacrán Concession Agreement



Source: Cordoba, 2023

4.3.2 MINING TITLE AGREEMENTS

The option agreement executed on February 27, 2016, entered into by Cordoba; MCSAS; ECSAS (together with Cordoba and MCSAS the "Cordoba Parties"); OMNI; Compañía Minera Alacrán S.A.S. ("CMA")[7]; CMH Colombia S.A.S. ("CMH"); and CM Company, (together with OMNI, CMA and CMH [the "OMNI Parties"]) in connection with the San Matías Property (as partially amended and restated in writing by the '*Otrosí Nº 1*' dated October 10, 2016, the '*Otrosí Nº 2*' dated August 11, 2017, the '*Otrosí Nº 3*' dated January 23, 2018, the '*Otrosí Nº 4*' dated February 21, 2019, and the '*Otrosí Nº 5*' dated May 20, 2019, the "Option Agreement").

4.3.2.1 Option Agreement

On October 20, 2015, the Cordoba Parties submitted a letter of intent to CMA and OMNI regarding the execution of the Option Agreement with respect to the Property, which CMA and OMNI accepted.

On February 27, 2016, the Cordoba Parties and the OMNI Parties executed the Option Agreement. The Option Agreement has been subject to five amendments. Pursuant the Option Agreement (as it has been modified from time to time), the OMNI Parties have granted the Cordoba Parties the exclusive and irrevocable first option to acquire 100% of the issued and outstanding shares of CM Company. CM Company is the current titleholder of Mining Title III-08021, which hosts the El Alacrán deposit. For the execution of the Option by one or all of the Cordoba Parties, the sixteen (16) conditions in Table 4.4 must be satisfied.

Table 4.3 – Conditions of the Property February 27, 2016, Option Agreement

Condition	Status
First Option Advance Payment disbursement ($250,000).	Completed
Commencement by the Operator of a drilling program of minimum 3,000.0 m.	Completed
Second Option Advance Payment disbursement ($250,000).	Completed
Third Option Advance Payment disbursement ($250,000).	Completed
Filing of an extension request for the exploration stage with the ANM by MCSAS.	Completed
Fourth Option Advance Payment disbursement ($1,000,000).	Completed
Issuance of the Cordoba Option Warrant Certificate.	Completed
Completion by the Operator of minimum 8,000.0 m of drilling in the Mining Title.	Completed
Good standing of the Mining Title.	Ongoing
$10,000 monthly payments by the Cordoba Parties to the OMNI Parties for their corporate expenses.	Completed

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[7] 50.1% of OMNI issued, and outstanding shares are owned by HPX. 50.1% of CMH issued and outstanding shares are owned by HPX.

Condition	Status
Delivery of Technical Report NI 43-101 by the Cordoba Parties to the OMNI Parties (the "Technical Report Delivery").	Completed
Completion by the Operator of the additional minimum drilling programs established in the extension requests for the exploration stage.	Completed
Written notice by the Cordoba Parties containing their decision whether or not to exercise the Option in June 2020 on the earlier of (i) 5 business days following receipt of the final Preliminary Economic Assessment Report by Nordmin; or (ii) 30 August 2019. (Written notice deemed as a letter of intent on the obligation of the Fifth Option Advance Payment disbursement which shall be guaranteed by the constitution of corporate guaranties by the Cordoba Parties on or before the date of the written notice).	Completed
Filing by MCSAS of the PTO (works plan) for the Mining Title with the ANM.	Completed
Filing by MCSAS of the EIA for the Mining Title with the Environmental Authority (ANLA).	Completed
Fifth Option Advance Payment disbursement ($13,000,000).	Completed

Source: Cordoba, 2023

Under the Option Agreement, the Cordoba Parties shall conduct, on their account and at their sole risk, the mining activities for the Project.

Schedule C of the Option Agreement contains the royalty agreement dated as of April 5, 2016, entered into by the Cordoba Parties and CMH, pursuant to which the Cordoba Parties have granted CMH a 2% net smelter return (NSR) royalty.

4.3.3 ENVIRONMENTAL PERMITTING CONSIDERATIONS

For the current exploration phase of the Mining Titles, environmental licenses are not required. The environmental license is necessary for the titleholder to initiate the construction and assembly phase and is granted by the environmental authority upon the review and assessment of the EIA filed by the titleholder.

MCSAS is currently preparing the EIA for the Project. Table 4.4 outlines the environmental permits in force for the Mining Titles.

Table 4.4 – Environmental Permits by Mining Title

Title	Permit	Current Status
Alacrán	Gathering Permit for Environmental Impact Study-EIA	Granted by Resolution 2-7034 of February 10, 2020. The permit is valid for two years.
	Gathering Permit for Environmental Impact Study-EIA of EYC Global S.A.S.	Granted by Resolution 01637 of September 15, 2021.
	Hazardous Waste Management Plan	Submitted on January 27, 2023.

Title	Permit	Current Status
Costa Azul	Cutting down wood and forest use	Desisting request filed on December 3, 2018, is approved on November 29, 2019, by Resolution 345.
	Mining – Environmental Guidelines for exploration	Submitted on May 29, 2013.
	Waste Management Plan	Submitted on February 2, 2021.
	Hazardous Waste Management Plan	Updated and submitted on September 22, 2021.
Montiel West	Waste Management Plan	Submitted on August 31, 2021.
	Hazardous Waste Management Plan	Updated and submitted November 6, 2020.
	Mining – Environmental Guidelines for exploration	Submitted on August 26, 2013.
Montiel East	Waste Permit.	Extended by Resolution 2-6875 of December 20, 2019.
	Hazardous Waste Management Plan.	Submitted on March 29, 2021.

Source: Cordoba, 2023

4.3.4 LEGAL ACCESS AND SURFACE RIGHTS CONSIDERATIONS

MCSAS Mining Titles are located primarily within private properties or lands, including possessions and government-owned lands (in Spanish, referred to as "*predios baldíos*"). With the purpose of developing its activities, MCSAS enters into Temporary Use and Occupation Contracts with the owners or possessors of the properties, in accordance with the term required by MCSAS to develop its exploration activities.

An approximate percentage of 20% of the lands or properties that comprise the Mining Project have been identified as "*predios baldíos*", owned by the Republic of Colombia; these may be intervened by MCSAS by virtue of an easement, upon due processing with the National Land Agency (in Spanish, *Agencia Nacional de Tierras -ANT),* entity in charge of the management of this type of properties. Additionally, MCSAS may directly negotiate with the occupants of the aforementioned lands, in accordance with the legislation applicable to the matter.

For nearly 60% of the properties, their legal nature has not been defined; consequently, it is necessary to develop the corresponding title studies in order to establish specific negotiation and acquisition strategies. Once the title studies are completed, MCSAS will carefully map out the path to obtain the real estate rights required to carry out operations legally and effectively.

With the compilation of a significant amount of technical, legal, and social information, a comprehensive vision of the specific properties or lands that will be directly required for the Alacran Project will be projected.

The main objective of this property analysis is to anticipate and understand the various legal situations that may arise in relation to these lands, essentially having a solid and strategic approach to acquire real estate rights appropriately.

One of the key aspects to address is the classification of properties according to the type of intervention required, whether partial or total. This distinction or classification will influence the various strategies to be followed and the legal strategy to be implemented.

4.3.5 WATER RIGHTS CONSIDERATIONS

For the exploration phase, which includes all of the mining titles, the concession permits related to water are only required if the titleholder expects to use water resources. The vestment permit is required for the proper disposal of liquid resources during the exploration phase.

The permits held by the mining titles are outlined in Table 4.5.

Table 4.5 – Water Resource Permits by Mining Title

Title	Permit	Current Status
Alacrán	Surface Water Concession.	They were extended for 5 years by Resolution 3-1363 of September 21, 2023
	Discharge wastewater permit.	
Costa Azul	Surface Water Concession.	They were extended for 5 years by Resolution 2-7317 of July 10, 2020
	Discharge wastewater permit.	
Montiel East	Surface Water Concession	They were extended for 5 years by Resolution 2-7793 of January 25, 2021
	Discharge wastewater permit.	
Montiel West	Surface Water Concession.	They were extended for 5 years by Resolution 2-7379 of August 10, 2020
	Discharge wastewater permit.	
	Discharge wastewater permit.	

Source: Cordoba, 2023

4.3.6 SOCIAL LICENSE CONSIDERATIONS

The Colombian Ministry of Internal Affairs certified the presence of the indigenous group '*Cabildo Indígena San Pedro*' within the contracted area of the Project. Under Colombian regulations, minority groups such as the '*Cabildo Indígena San Pedro*,' shall be consulted in connection with mining activities that might affect them prior to the perfection of the environmental license.

There is ongoing complaint filed by the Asociación de Mineros El Alacrán (ASOMINAL) against OMNI and the Ministry of Mines and Energy, in which ASOMINAL requested the annulment of the Mining Concession Contract III-08021. The case is moving to the evidentiary stage, and the tribunal will schedule a date for continuing with a preliminary hearing, where it will decide on the evidence requested by the parties, and will schedule a date for holding the trial. Cordoba believes the request for annulment has no legal basis, and the Company has high or likely probabilities of success.

4.3.7 ROYALTIES

Once the concession enters into the exploitation phase it will be subject to Colombian corporate taxes and mining royalties on metals production. The corporate income tax rate in Colombia is 35% from 2022 onwards. Colombian mining royalties are 4% of all revenues received from Au and Ag exploitation and 5% of all revenue from Cu exploitation. The mining royalties are deductible for income tax purposes. A 2% royalty on the net income for production is payable to OMNI.

4.4 Comments on Section 4

- MCSAS, Mincordoba SAS and ECSAS have the corporate power to carry out exploration and exploitation activities in Colombia.
- MCSAS owns 12 titles and Mincordoba SAS owns 10 titles located in the territory of Colombia pursuant to mining concession agreements executed with the ANM (the “Minerales Mining Titles”).
- CM Company is the sole holder of record of El Alacrán Mining Title III-08021. Pursuant to the Option Agreement, the Cordoba Parties are entitled to the exclusive and irrevocable first option to acquire 100% of the issued and outstanding shares of CM Company and thus, become indirect sole beneficiaries of Mining Title III-08021, subject to the satisfaction of the conditions set forth in the Option Agreement (described in Section 4.3.2.1 herein).
- Each of the Mineral Mining Titles held by MCSAS, CM and Mincordoba SAS, as of the date of the legal opinion (described in Section 4.3):
    - Vests in its holder of record a right to explore, and, subject to the satisfaction of its terms and conditions, exploit the permitted mines according to each mining title;
    - Is currently in force;
    - Is registered in the national mining registry of the ANM;
    - Has no registration of breach, termination, mandatory early termination or any other record that would deem the mining titles unenforceable; and
    - Has no security interest recorded in the Colombian ‘security interests’ registration system.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

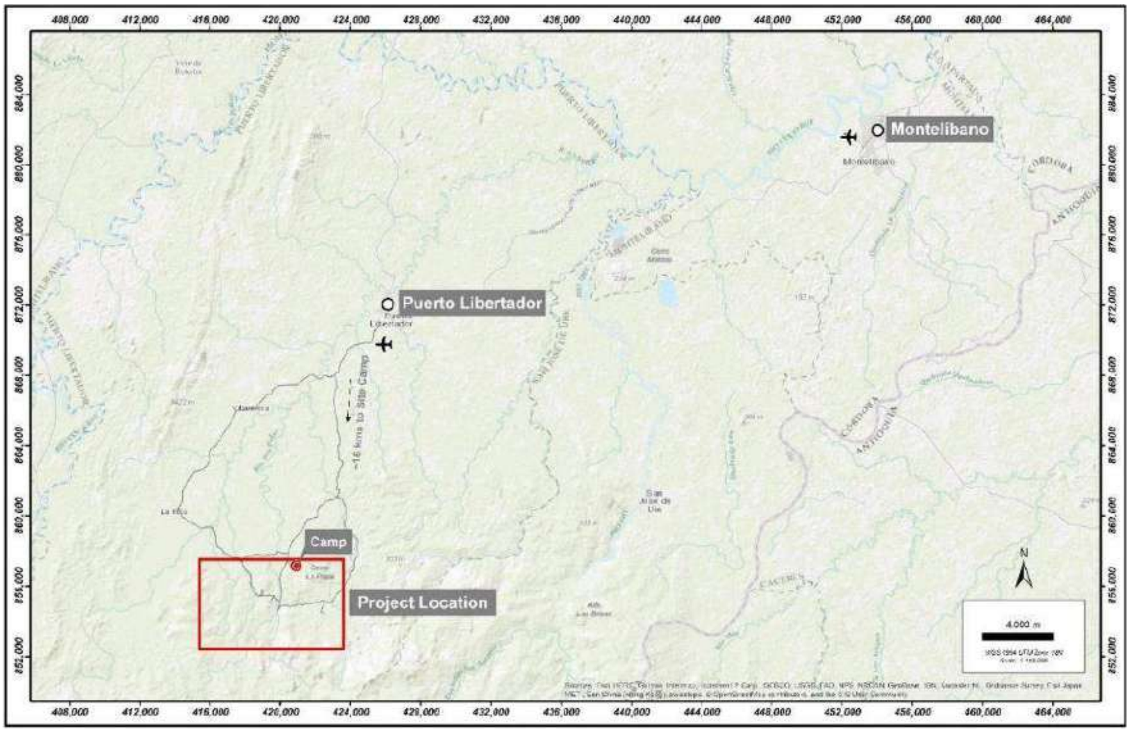
The Project is in the Municipality of Puerto Libertador, Department of Córdoba, 762 km by road northwest of Bogotá and 352 km by road north of Medellín (Figure 5.1). Puerto Libertador has a population of approximately 55,600 inhabitants.

The access to the Project starts from National Route 25 at the Municipality of La Apartada (Córdoba), 18 km from Caucasia (Antioquia), from where departs a secondary paved road of approximately 14 km to the Municipality of Montelíbano (Córdoba). From there, the paved road continues to the Municipality of Puerto Libertador for another 38 km.

The road heads south from this municipality towards the San Pedro River, crossing along the river's left side. This section of the road is used by companies that mine coal and take it to port. The road continues towards La Rica, passing through Villanueva Village along a bypass built by a coal mining company to avoid the transit of loaded trucks through the town. The total length from Puerto Libertador to La Rica Village is approximately 21 km. Vehicle access across the Project is limited to four-wheel drive vehicles due to the rough terrain, stream crossing, and abundant rain.

The Project can be accessed by air on daily scheduled flights from Medellín to Montería, the capital of the Department of Córdoba, 160 km northwest of Puerto Libertador. The closest paved airstrip is in Montelibano, which can be accessed by commercial and chartered flights.

Figure 5.1– Project Location and Area Infrastructure

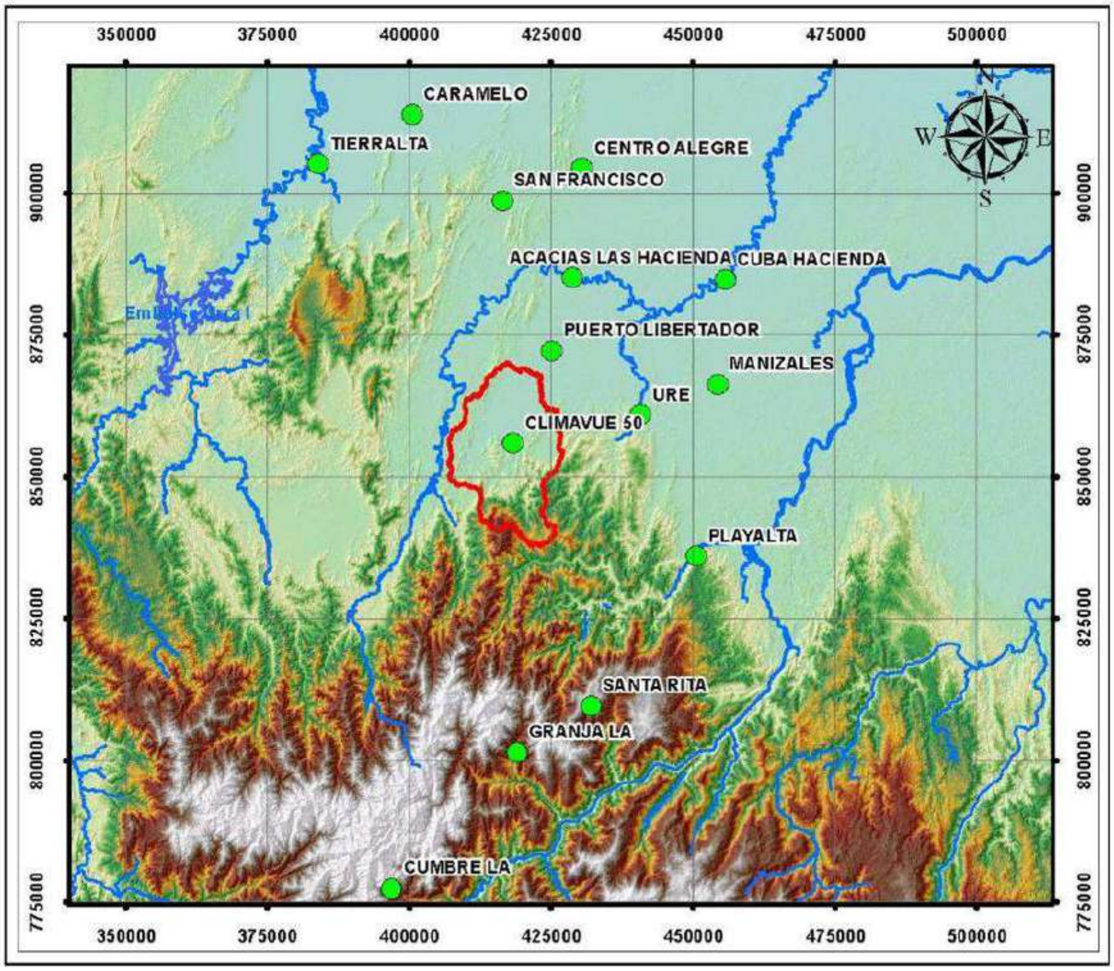


Source: Cordoba, 2021

5.2 Climate

The climate is humid and warm, with range of average monthly temperatures between 24.5°C and 27°C. The average annual rainfall at the Project is approximately 3,000 mm/y, predominantly falling between April and November. Estimates for rainfall intensity versus return interval, as well as the Probable Maximum Precipitation (PMP) event were calculated using data from thirteen (13) stations within a 75 km radius of the Project (Figure 5.2). Calculation of site-specific climate values were performed using several methods due to the varying periods of record, incomplete datasets, and significant variations in the elevations of the stations.

Figure 5.2 – Topography Map with Weather Stations



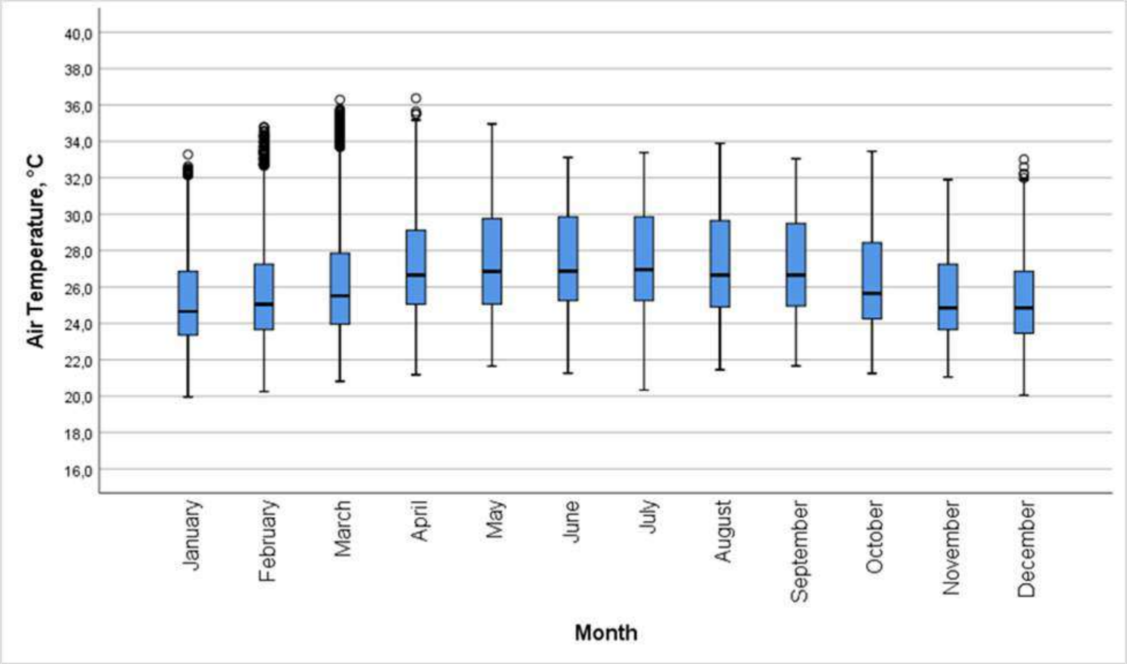
Source: INTERA, 2021

5.2.1 EVAPOTRANSPIRATION

Evapotranspiration (ET) estimates were derived from the using the Turc method, which is based on a water mass balance as a function of temperature and precipitation in a hydrologic basin. For the study area, the calculated ET is 970 to 1742 mm/y, with a calculated ET at the Project of approximately 1,717 mm/y.

The temperature at the Project is temperate to hot, with a narrow range of average daily temperature range of 20°C to 34°C in the winter and 20°C to 36°C in the summer, with average daily temperatures between 25.5°C and 27°C (Figure 5.3).

Figure 5.3 – Statistical Summary of Monthly Temperatures



Source: Ecoquimsa, 2021

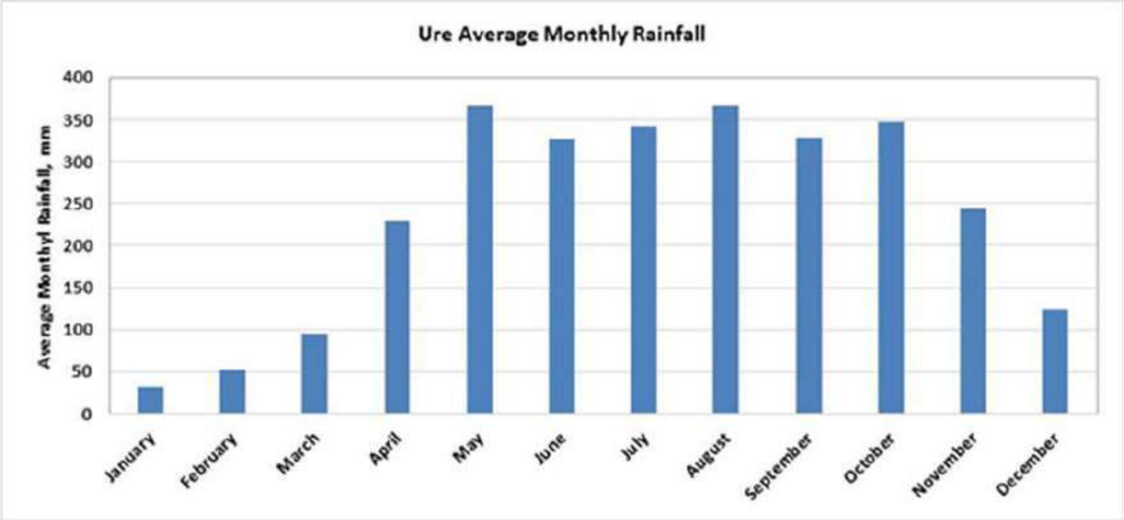
5.2.2 PRECIPITATION

A comprehensive climatological analysis was employed to analyze the precipitation data in the vicinity of the mine. Data from a total of thirteen precipitation stations were analyzed and used to calculate storm intensity, duration and frequencies as well as the Probable Maximum Precipitation (PMP) for the Project. An in-depth statistical analysis of the rainfall records illustrated that the Ure station is the best analog for the rainfall at the mine due to its close proximity to the mine and the length and completeness of the record.

Annual precipitation at Ure ranges from 1,600 mm to 4,012 mm per year, with an average of 2,851 mm/y.

Rainfall occurs in two well defined seasons, with a dry season from December to March or April and a rainy season from May to November. January tends to be the driest month of the year and May the wettest. Typically, the rainy season has two (2) peaks in May and October, with slightly drier months in between (Figure 5.4).

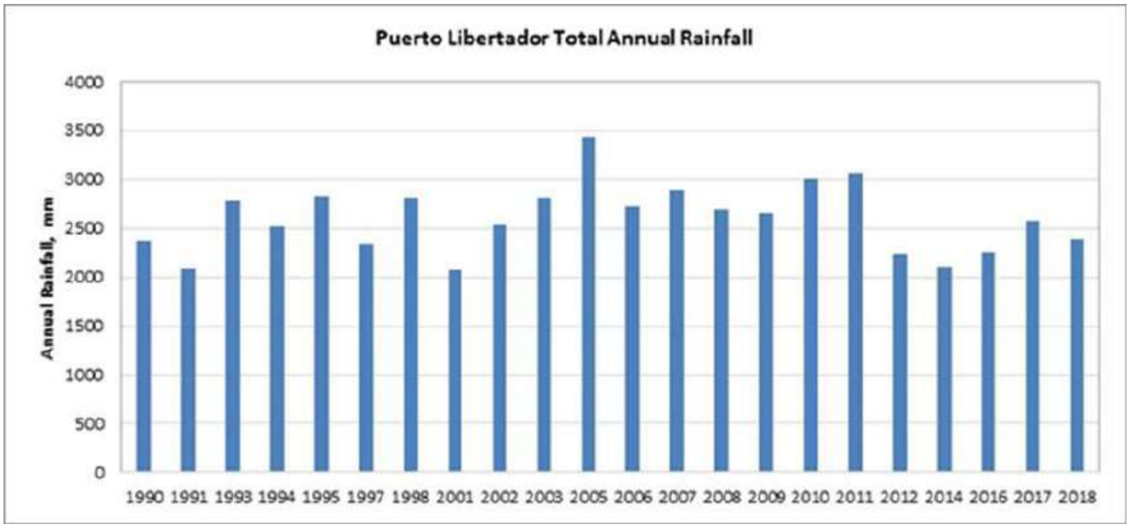
Figure 5.4 – Ure Station, Average Rainfall by Month



Source: INTERA, 2021a

The Puerto Libertador station contains 22 years of complete rainfall records between 1990 and 2018 (Figure 5.5). As shown, average rainfall is slightly lower at this location, which averages 2,598 mm/y.

Figure 5.5 – Puerto Libertador Total Annual Rainfall



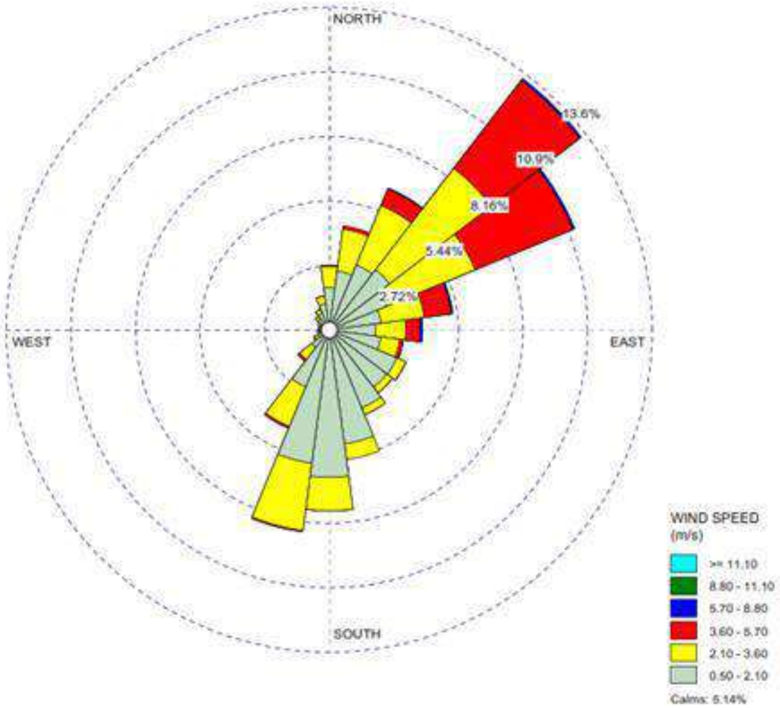
Source: INTERA, 2021a

The calculated annual average precipitation for the Project is 2,840 to 3,000 mm/y depending on the calculation method. Kriging of the average annual precipitation data for all the stations shows an orographic effect across the site, with higher average rainfall (3,200 to 3,500 mm/y) at the southern end of the Project area due to the higher elevation.

5.2.3 WIND

Data on wind direction and speed was obtained from the Cerro Matoso mine (period of record 2017 – 2021) and WRF Meteocolombia database. Winds at Cerro Matoso are predominantly towards the west-south-west (WSW) with a frequency of 12 to 16% and to the west to north the rest of the time, with a range of average velocities of 2.0 to 3.0 m/s. Cerro Matoso is approximately 30 km to the Northeast, at lower elevation (~50 masl) and in flatter terrain. A site-specific model of wind direction and velocities was calculated by K2 Ingenieria (2023) the results for this model are very similar to the observed wind conditions at Cerro Matoso. Figure 5.6 shows the modeled annual average wind directions, speed and frequency for the Project for 2017-2021.

Figure 5.6 – Wind Rose Plot for the Project



Source: K2a, 2023a

5.3 Local Resources and Infrastructure

There is a small field camp, including core building, offices, dorm building, and dining hall located in Vereda San Matías, near the village of San Juan Viejo. San Juan and El Alacrán provide general labour to support the Project’s exploration activities. Hotel accommodation and field supplies are available in the towns of Puerto Libertador and Montelíbano.

There is an airstrip at Puerto Libertador that can be used by helicopters, and an airstrip at Montelíbano, and Caucasia that supports light aircraft and helicopters. The mine camp has a helipad.

The Project is about 220 km due east of the Pacific Ocean and 115 km due east of the Gulf of Uraba on the Caribbean Sea. The nearest ports are at Tolú (274 km by road) and Cartagena (360 km by road) on the Caribbean Sea. The city of Caucasia is situated on the navigable Cauca River, part of the Magdalena River system which enters the Caribbean Sea at Barranquilla. The nearest railway is at Medellín, 160 km by air to the south.

The national electrical grid supplies the towns of Puerto Libertador and Montelíbano, as well as surrounding areas, and currently the Cerro Matoso OP nickel mine owned by South 32 (which is approximately 30 km, straight-line distance, from the Project). The Cerro Matoso Substation is approximately 12 km west of Montelíbano and approximately 35 km (straight-line distance) northeast of the Project, and is a central substation for the national electrical grid in the northern regions, with current connections to the Urra hydroelectric generation facility and a thermal power station fueled by locally mined subbituminous coal and future planned connection to other hydroelectric and photovoltaic generation projects under development.

The Cerro Matoso mine is also connected to the Promigas Atlantic coast pipeline system, which it currently uses for furnace operation and could be use in the future for onsite power generation.

5.4 Physiography

The Project is located in the geomorphic transition from the southeastern edge of the Caribbean lowlands and the northern foothills of the north south trending Western Cordillera. Elevations in the Property area range between about 100 m and 350 m above sea level.

The vegetative cover across the Project consists of small patches of the original “humid forest” surrounded by areas that have been cleared for agriculture and grazing. Cleared areas that are no longer in use are rapidly overgrown by secondary growth. Land use is mainly for agriculture, cattle grazing, and mining.

The Project is situated in the Upper San Jorge River basin and lies between the north-flowing San Pedro River to the east and the north-flowing San Jorge River to the west. These are part of the Magdalena River system, which drains into the Atlantic Ocean. The principal surface water body in the vicinity of the Project is the San Pedro River immediately east of the planned pit. The surface drainage in the vicinity of the Project is principally to the north and northwest. The two (2) streams that drain from the saddle between the two hills that form the El Alacrán deposit have been severely impacted by discharge of sediments (tailings) from artisanal mining operations.

5.5 Comments on Section 5

The climate at the Project allows for mineral exploration and drilling year-round. The regional district is expected to be able to supply a basic workforce for any future mining operation. The physiography of the Project area is favorable for OP mining with sufficient room for a processing plant, waste rock dumps, tailings storage, and other mine infrastructure. Cordoba would need to acquire additional surface rights to support a mining operation if one were to proceed.

6 HISTORY

Exploration was carried out on the El Alacrán deposit by Dual Resources, a Canadian junior mineral exploration company, in 1987-1989 in conjunction with the Colombian consulting company Geotec Ltd. Exploration is described in reports by Vargas (2010, 2011). The Dual Resources exploration programs included pit, trenches, rock sampling, underground sampling, geological mapping, and a ground magnetic survey, followed by fifteen diamond drill holes totalling 2,584.0 m in length (holes SJ 1 to SJ 19). Dual Resources held the mineral title until 1994. The El Alacrán area was staked in 1995 by Sociedad Ordinaria de Minas Santa Gertdis and Sociedad Minera Alacrán S.O.M., both private Colombian companies. No significant exploration work was carried out between 1995 and 2009. A Concession Agreement was granted in 2009 to OMNI and was optioned in 2010 to Ashmont, a private mineral exploration company based in Vancouver. Ashmont carried out geological mapping at 1:2,000 scale, underground mapping, and sampling, a ground magnetic survey, and two (2) programs of diamond drilling. Ashmont earned a 90% interest in the Concession Agreement which it held through Ashmont Omni S.A.S., ownership of which reverted to OMNI on termination of the option, and it was renamed Compañía Minera Alacrán S.A.S. in 2014.

6.1 Historical Mineral Resource Estimates

Two (2) Mineral Resource Estimates were prepared for the El Alacrán deposit before Cordoba acquired the Project. Tetra Tech Wardrop prepared a Resource Estimate in 2012 based on the Dual Resources data and the first phase of 2011-12 drilling by Ashmont (Mosher, 2011); another estimate was completed for Ashmont in 2014 (Vargas, 2014). Neither of these was publicly disclosed by the previous operators.

Mining Associates Pty Ltd. prepared the first publicly disclosed Resource Estimate for the Project, for the El Alacrán deposit, following the NI 43-101 Technical Report format, for Cordoba in 2017, titled *Independent Technical Report, and Resource Estimate on the Alacrán Copper Gold Deposit*, with an effective date of October 27, 2017 (Taylor and Redwood, 2017). The estimated tonnes and grades are reported as in situ resources, within pit constraints, using a cut-off grade of 0.30% CuEq (Table 6.1).

Table 6.1 – 2017 Alacran Mineral Resources

Classification	**CuEq Cut-off** (%)	**Tonnage** (Mt)	**Grades**			**Contained Metal**	
			CuEq (%)	Cu (%)	Au (g/t)	Cu (klbs)	Au (koz)
Inferred	0.30	53.52		0.70	0.37	827,000	644

Source: Mining Associates Pty Ltd., 2017

AMEC Foster Wheeler (now Wood Plc) prepared a NI 43-101 Technical Report titled NI 43-101 Technical Report on the Project, providing a Mineral Resource update for the El Alacrán deposit for

Cordoba, effective April 10, 2018 (Kulla and Oshust, 2018). The estimated tonnes and grades are reported as in situ resources within pit constraints, using a cut-off grade of 0.28% CuEq (Table 6.2).

Table 6.2 – 2018 Alacran Mineral Resources

Classification	CuEq Cut-off (%)	Tonnage (Mt)	Grades			Contained Metal	
			CuEq (%)	Cu (%)	Au (g/t)	Cu (klbs)	Au (koz)
Indicated	0.28	36.1	0.72	0.57	0.26	454,000	300
Inferred	0.28	31.8	0.65	0.52	0.24	364,000	250

Source: AMEC Foster Wheeler, 2018.

Nordmin Engineering Ltd. prepared a Resource Estimate for the Project following the NI 43-101 Technical Report format, for Cordoba in 2019, titled *NI 43-101 Technical Report and Resource Estimate, San Matías Copper-Gold-Silver Project, Colombia*, with an effective date of July 3, 2019 (Kuntz et al., 2019). The estimated tonnes and grades are reported as in situ resources within pit constraints, using a cut-off grade of 0.30% CuEq (Table 6.3)

Table 6.3 – 2019 Alacran Mineral Resources

Classification	CuEq Cut-off (%)	Tonnage (Mt)	Grades				Contained Metal		
			CuEq (%)	Cu (%)	Au (g/t)	Ag (g/t)	Cu (klbs)	Au (koz)	Ag (koz)
Indicated									
El Alacrán	0.30	81.8	0.73	0.54	0.28	2.95	974,800	742.8	7,763.1
Montiel East	0.30	3.4	0.79	0.53	0.41	1.69	39,900	45.3	186.2
Montiel West	0.30	3.9	0.69	0.27	0.54	1.34	23,600	67.6	169.8
Costa Azul	0.30	5.8	0.46	0.30	0.23	0.68	37,900	42.1	126.4
Total Indicated	**0.30**	**94.9**	**0.71**	**0.29**	**0.29**	**2.70**	**1,076,100**	**897.9**	**8,245.3**
Inferred									
El Alacrán	0.30	1.7	0.49	0.39	0.13	1.67	14,700	7.7	92.7
Montiel East	0.30	1.2	0.38	0.26	0.17	0.92	6,700	6.2	34.4
Montiel West	0.30	0.4	0.51	0.07	0.65	1.03	600	8.4	13.2
Costa Azul	0.30	0.1	.41	0.30	0.17	0.56	900	0.8	2.5
Total Inferred	**0.30**	**3.4**	**0.45**	**0.30**	**0.20**	**1.30**	**22,800**	**22.4**	**142.8**

Source: Nordmin Engineering Ltd., 2019.

Nordmin Engineering Ltd. Prepared a Pre-Feasibility Engineering Study for the Project following the NI 43-101 Technical Report format, for Cordoba in 2022, titled NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia, with an effective date of

January 11, 2022 (Kuntz et al., 2022). The estimated tonnes and grades are reported as in situ resources within pit constraints, using variable cut-offs depending on the material type (Table 6.4).

Table 6.4 – 2022 Alacran Mineral Resources

Classification	NSR ($/t)	Tonnage (Mt)	Grades				Contained Metal		
			CuEq (%)	Cu (%)	Au (g/t)	Ag (g/t)	Cu (klbs)	Au (koz)	Ag (koz)
Indicated									
El Alacrán	1.78/8.85	105.6	n/a	0.44	0.27	2.52	1,028,900	922.0	8,545.7
Montiel East	13.75	4.3	0.7	0.46	0.35	1.53	43,700	48.8	211.2
Montiel West	13.75	4.6	0.52	0.24	0.49	1.32	24,800	72.6	195.8
Costa Azul	13.75	7.4	0.4	0.24	0.21	0.65	44,800	49.2	155.8
Total Indicated		**121.9**	**0.64**	**0.42**	**0.28**	**2.33**	**1,142,200**	**1,092.6**	**9,108.5**
Inferred									
El Alacrán	1.78/8.85	2.6	n/a	0.20	0.17	0.86	11,500	14.5	72.3
Montiel East	13.75	1.8	0.34	0.25	0.15	0.88	9,600	8.5	50.3
Montiel West	13.75	0.6	0.39	0.07	0.54	0.96	1,000	11.1	19.0
Costa Azul	13.75	0.1	0.39	0.29	0.16	0.60	800	0.6	2.4
Total Inferred		**5.1**	**0.39**	**0.20**	**0.21**	**0.87**	**22,900**	**34.7**	**144.0**

Source: Nordmin Engineering Ltd., 2022.

The Reader is cautioned that the historical estimates of October 2017, April 2018, July 2019, and January 2022 are not relevant to the current estimate which is based on a larger amount of drilling and geoscientific information gathered since the issue of the previous resource estimates.

These historical estimates are presented here to inform the public that the Project has a significant amount of work completed. The estimate presented in Section 14 of this Report supersedes the historic estimates that the issuer and BBA are considering as no longer current.

A Qualified Person has not done sufficient work to classify the historical estimates as current mineral Resource.

Mineral Resources are not Mineral Reserves and do not have a demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted into Mineral Reserves.

6.2 Production

There has been no industrial scale mining production within the Project area. Au is mined illegally near the El Alacrán deposit by the *Asociación de Mineros de Alacrán* (Alacrán Miners Association). Approximately 80 “artisanal” miners work in approximately 315 shallow pits and adits and process material in numerous small stamp mills and small ball mills. Tailings from the artisanal ore processing are dumped in the nearby drainages (Quebrada La Hoga La Mina to the west and Quebrada La Hoga Conis Alvies to the east). An estimated 7.8 Mt of historic tailings are located in the drainages indicating an approximately equal amount has been mined by the artisanal miners. Although the artisanal miners have no legal mining rights, Cordoba has a good relationship with the miners and has made an agreement such that they are allowed to keep mining until such time that construction of a mine begins.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Project is located in an accreted oceanic terrane of the Western Cordillera, described as the Calima Terrane by Restrepo and Toussaint (1988) (Figure 7.1). The host rocks likely belong to the Upper Cretaceous Cañasgordas Group, which is subdivided into the Barroso Formation of basalts, and the Penderisco Formation of turbidites, chert, and limestone. The Barroso Formation has been dated using fossil records from the interbedded sedimentary rocks, where the youngest records have been established between the Campanian and Maastrichtian (Moreno and Pardo, 2003).

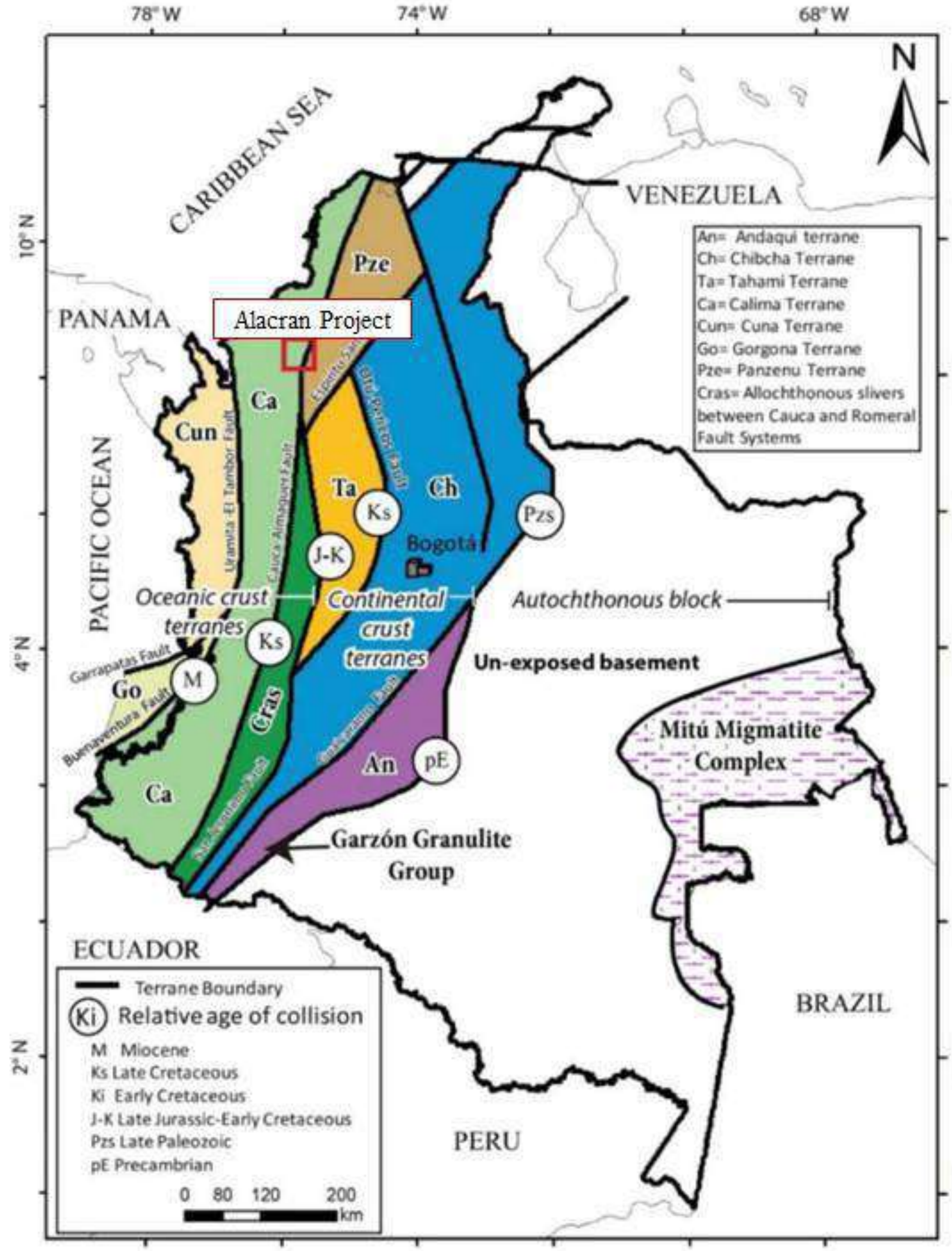
The basalts and pelagic sediments formed on the ocean floor and are interpreted to be fragments of an oceanic plateau called the Caribbean Large Igneous Province, which were transported from the west (Pindell and Kennan, 2009). The age of the plateau basalts is approximately 90 Ma (Pindell and Kennan, 2009). On the eastern side, the oceanic terranes are separated from Paleozoic Cajamarca Group schists in the Central Cordillera or Tahami Terrane (Restrepo and Toussaint, 1988). This fault has large-scale right-lateral movement, and its trace is marked by isolated outcrops of peridotite interpreted to be ophiolites, such as that which hosts the Cerro Matoso nickel laterite deposit, 25 km northeast of the Project (Gleeson et al., 2004). The age of the accretion is suggested to be between 75-73 Ma (Villagómez, 2010; Spikings et al., 2015), and Paleocene-Lower Eocene (Cediel et al., 2003; Cardona et al., 2012).

The Cajamarca and Cañasgordas Groups are overlain unconformably by Cenozoic age sediments in the northern part of the Project area. The sediments are accretionary prisms of Paleocene to Oligocene age forming the San Jacinto Fold Belt, and accretionary prisms of Oligocene to Pliocene age forming the Sinú Fold Belt to the west, as well as extensive quaternary sediments (Cediel and Cáceres, 2000).

Recent Re-Os dating obtained for the porphyry intrusion at Montiel East and molybdenite in the mineralization at El Alacrán yielded Laramide Age: 76.8 ± 0.3 Ma and 73.3 ± 1.5 Ma, respectively (Manco et al., 2019). This suggests Late Cretaceous magmatism associated with the district mineralizing events. These mineralizing ages are the first record of its type along the Western Cordillera of Colombia, being markedly younger to the Cretaceous magmatism developed along the Calima Terrane, i.e., the Buga Batholith (92-90 Ma) and Jejenes Stock (ca. 85 Ma) (Leal-Mejía, 2011, 2019).

These new ages would suggest the existence of a metal-endowed, Late Cretaceous metallogenic belt in this part of Colombia. The mineralization events developed along the Calima Terrane may have occurred pre- or syn-accretion of the oceanic terrane to the NW continental margin (Manco et al., 2018a).

Figure 7.1 – Regional Tectonic Setting of the Alacran Project



Source: Cordoba, 2024

7.2 Local Geology

The Project area comprises three primary lithological domains: intrusive rocks (including porphyries) in the El Alacrán, Montiel East, and Costa Azul deposits, volcanic rocks in the Montiel West deposit, and volcaniclastic rocks in the El Alacrán deposit. Volcaniclastic rocks are also present in the El Alacrán Norte and William Prospect areas. The volcanics and volcaniclastics likely belong to the early Cretaceous-age Barroso formation (Figure 7.2).

7.2.1 INTRUSIVE ROCKS

Magmatism in the San Matías District (SMD) is interpreted to be part of the pre-accretionary magmatic arc development in the Calima Terrane (Manco et al., 2018a). The majority of the mapped intrusive rocks outcrop along the eastern side of the San Pedro River Lineament. Mineralogically, the intrusive and porphyry rocks can be divided into three groups: 1) Tonalite-Granodiorite, 2) Tonalite-Quartz Diorite, and 3) Diorite-Quartz Diorite.

7.2.1.1 Tonalites-Granodiorites

This group includes the Montiel East porphyry, the Costa Azul porphyry and the La Jagua Tonalite (Figure 7.2) which comprise holocrystalline and porphyritic rocks dominated by medium-grained euhedral plagioclase and anhedral to subhedral hornblende that is intergrown with primary biotite and magnetite. Quartz occurs either as fine-grained, anhedral phenocrysts, or as very fine-grained granoblastic aggregates in the porphyry groundmass. Major oxide geochemistry indicates a high degree of fractionation in these intrusions (Manco et al., 2019). A U-Pb age of 74.4 ± 1.2 Ma was obtained for the La Jagua Tonalite (Manco et al., 2019), which is slightly older than the Montiel East porphyry ages of 72.3 ± 1.8 Ma to 70.0 ± 2.0 Ma (Leal-Mejía and Hart, 2017) and 73.4 ± 1.9 Ma to 72.4 ± 4.3 Ma (Manco et al., 2019).

7.2.1.2 Quartz Diorite-Tonalites

These include the San Jorge, Costa Rica, Betesta, Bucaramanga and the Mina Escondida intrusions (Figure 7.2) and comprises holocrystalline, sub-hypidiomorphic rocks composed of medium-grained euhedral, plagioclase, subhedral, fine-grained, anhedral quartz, and anhedral biotite. Primary magnetite occurs as very fine-grained, subhedral, disseminated aggregates. Major oxide geochemistry indicates low fractionation conditions of the magma relative to the Tonalite-Granodiorite group (Manco et al., 2018a). The San Jorge Intrusion yielded a U-Pb age of 74.47 ± 0.74 Ma, whereas the Betesta Intrusion was 72.9 ± 1.2 Ma (Manco et al., 2019). These ages are consistent and within the error of the ages obtained for the Tonalite-Granodiorite group.

7.2.1.3 Diorite-Quartz Diorite

This group includes the Alto San Pedro Diorite and the small units that outcrop along the western margin of the Betesta Quartz Diorite (Figure 7.2). Petrographically, the Alto San Pedro Diorite comprises holocrystalline, hypidiomorphic rocks, composed of medium-grained euhedral plagioclase and two (2) stages of clinopyroxene. Primary quartz occurs as fine-grained, anhedral intergrowth with plagioclase. Primary magnetite occurs as fine-grained, subhedral disseminations, and plagioclase inclusions. This unit has not been dated using U-Pb in zircon due to its mafic composition with an inherent low abundance of zircons.

7.2.2 VOLCANIC ROCKS

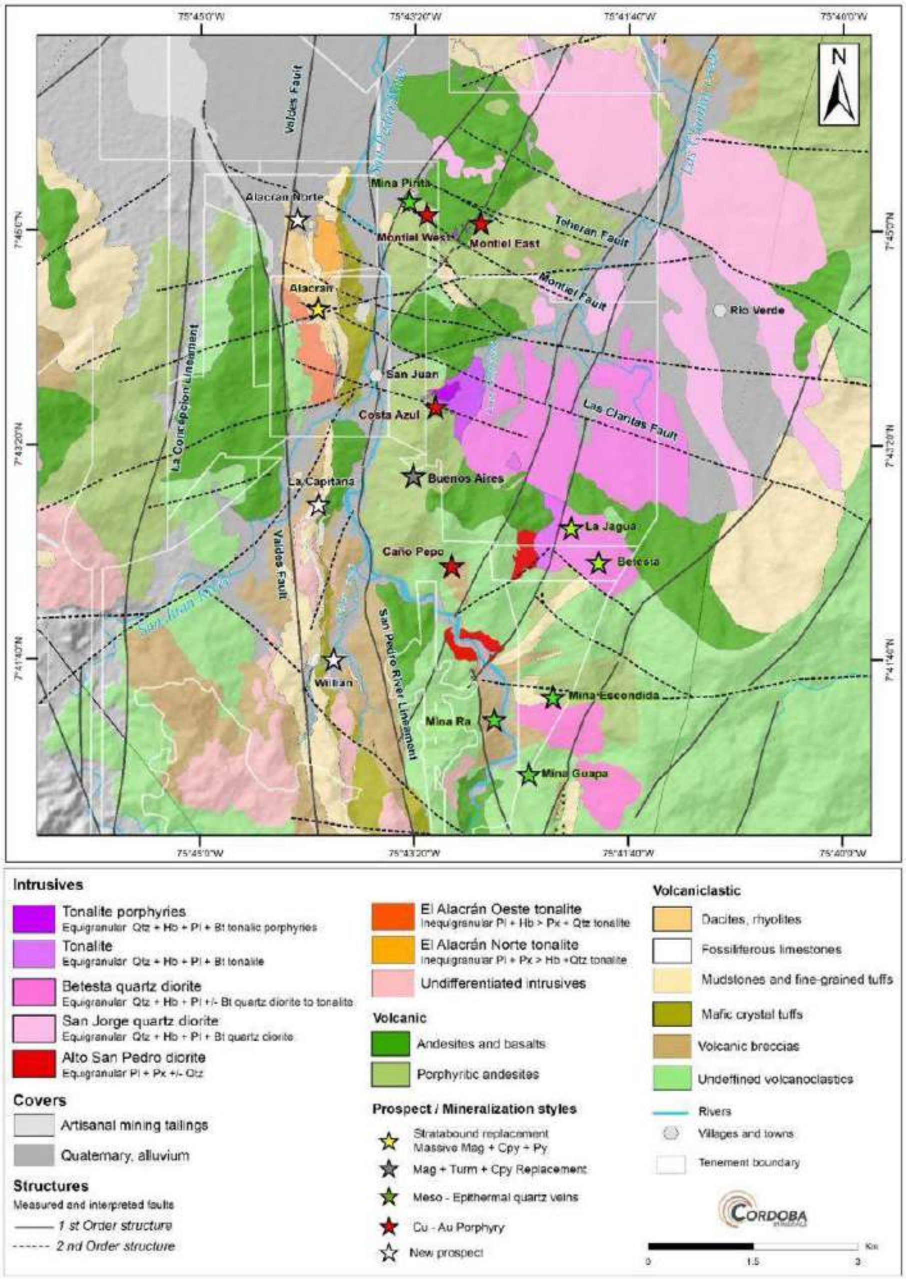
The volcanic rocks correspond to aphyric andesite and basalt with variations to andesite porphyry, composed mostly of phenocrysts of plagioclase and augite.

7.2.3 VOLCANOCLASTIC ROCKS

The volcaniclastic sequence present within the Project can be divided into four (4) groups:

1. Coarse-grained member: volcanic agglomerate and volcanic breccia and lithic tuff with size fragments than can surpass 5.0 mm in length.
2. Medium-grained member: (>1.0 mm) volcaniclastics dominated by crystal tuffs.
3. Fine-grained sedimentary member: coarse to fine laminated siltstone and mudstone with interlayering of fine tuff and fine lithic tuff. The rocks in this member are interlayered with fossiliferous marlstone and muddy limestone.
4. Acid volcanic rocks: rhyolite and dacite volcanic breccia that varies to medium and fine dacite tuff. This member possesses visible quartz and potassic feldspar groundmass.

Figure 7.2 – Geology of the Alacran Project (Modified from Restrepo and Toussaint, 1988 and Ordóñez-Carmona and Pimentel, 2002)



Source: Cordoba, 2021

7.3 El Alacrán Deposit Geology

The El Alacrán deposit Cu-Au-Ag mineralization is hosted by a west-dipping Cretaceous succession comprising mafic volcanic rocks overlain by a calcareous volcaniclastic sequence and capped by pre- to syn-mineral, sill-like diorite, and felsic sub-volcanic bodies. The sequence is approximately

550 m thick, and the diorites are about 200 m thick. The El Alacrán surface geology, as shown in Figure 7.3, was interpreted by Cordoba geologists based on core logging, lithogeochemistry, soil geochemistry, and outcrop mapping. Faults have been surface-mapped as well as inferred from ground magnetics and apparent displacements in the three dimensional (3D) geological model constructed using Leapfrog® software.

7.3.1 LITHOSTRATIGRAPHY

Lithological units in the El Alacrán deposit area can be broadly divided into three main stratigraphic units, from bottom to top: Unit 3 (Mafic Volcaniclastics), Unit 2 (Calcareous Volcaniclastics), and Unit 1 (Felsic Volcaniclastics). A schematic cross section A-A' as shown in Figure 7.4 (A) illustrates the distribution of these lithofacies recognized in the El Alacrán deposit and shows the stratigraphic column Figure 7.4 (B). Lithology codes are included in parenthesis.

Unit 3: Mafic Volcaniclastic Rock Sequence

This unit comprises coherent mafic lavas interlayered with mafic to intermediate volcaniclastic rocks. Locally, remnants of vitroclastic, and lesser epiclastic silty tuffaceous material are observed. This unit exceeds 300 m in thickness and is the oldest part of the El Alacrán stratigraphy that has been delineated by drilling (Figure 7.4). Unit 3 outcrops along the San Pedro River margins and typically displays gradational depositional contacts with Unit 2. Based on textural, composition, geometry, and volcanic structure criteria (McPhie et al., 1993), three (3) major lithofacies can be delineated within this unit: mafic tuffs; amygdaloidal tuff, and interbedded lithic and fine-grained tuffs (refer to Table 7.1 for detailed descriptions of each lithofacies).

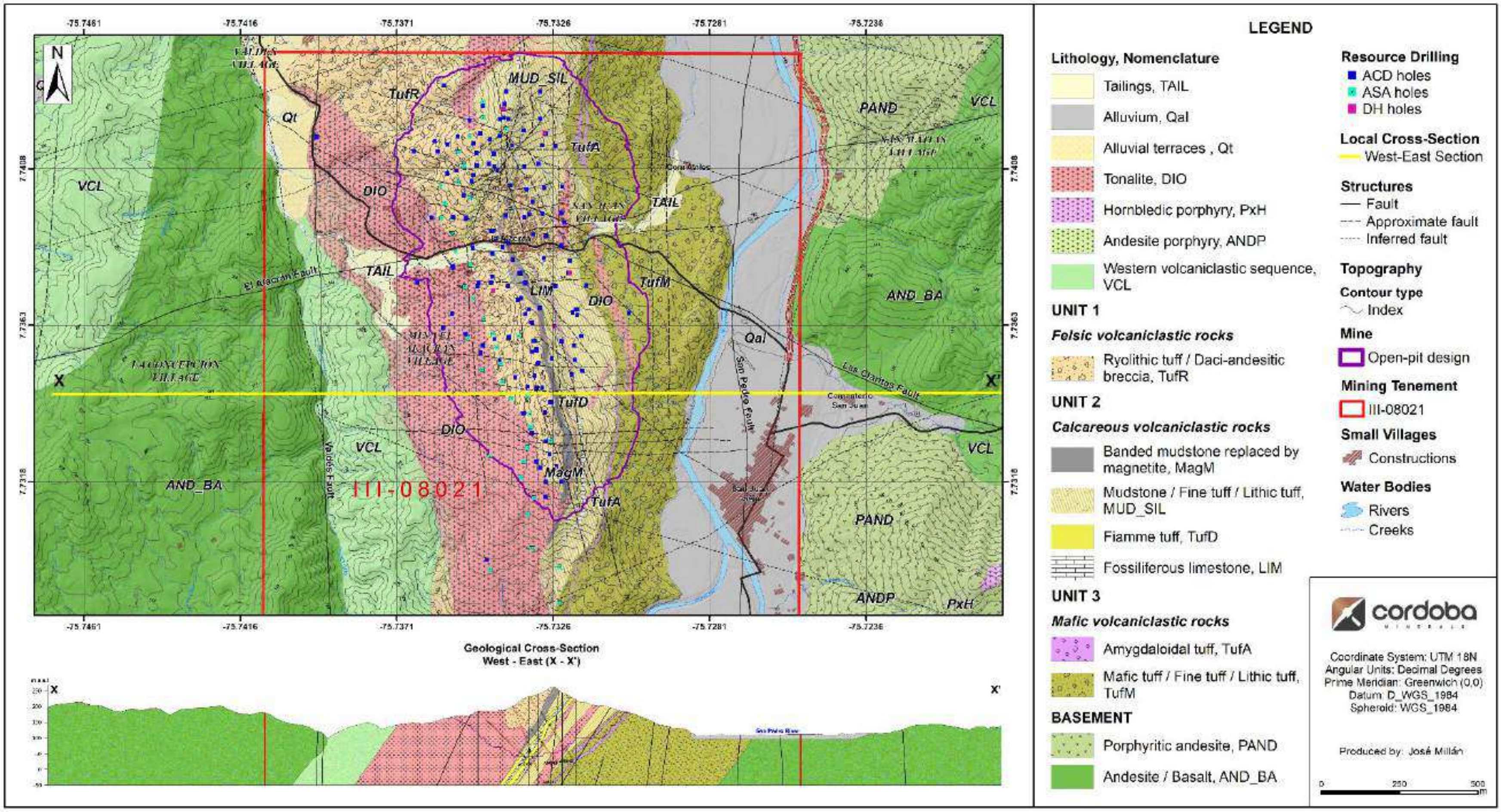
Unit 2: Calcareous Volcanoclastic Rock Sequence

This unit outcrops >800.0 m N-S along the strike extent of the El Alacrán deposit sequence and ranges from 160 to 208 m in thickness (Figure 7.4). This unit exhibits gradational contacts to Unit 3 and is overlain and locally intruded by rocks of Unit 1. Unit 2 hosts the bulk of the mineralization at the El Alacrán deposit. Based on texture, composition, geometry and volcanic structure (McPhie et al., 1993), at least five different volcanic lithofacies are defined in this unit: laminated limestone lithofacies, massive fossiliferous limestone lithofacies; lithic tuff lithofacies; fiamme tuff lithofacies; and fine to coarse crystal tuff lithofacies (refer to Table 7.1 for detailed descriptions of each lithofacies).

Unit 1: Felsic Volcaniclastic Rock Sequence

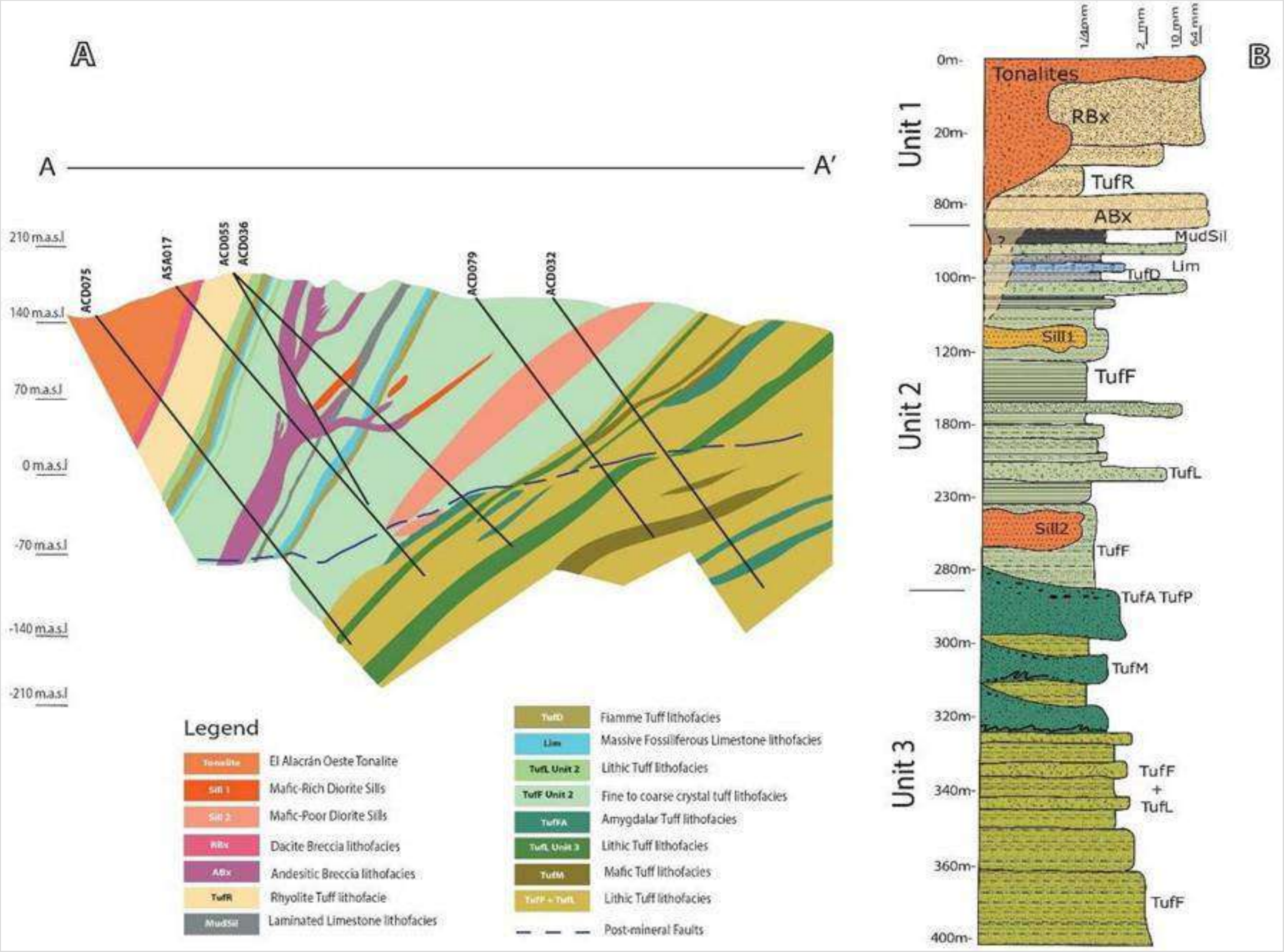
Unit 1 extends >1,500 m N-S along strike in the El Alacrán deposit sequence and ranges from 120 m thick in the north to few metres in the south where it is completely obliterated by the El Alacrán Oeste Tonalite (Figure 7.3). Unit 1 comprises andesitic to rhyolitic breccia tuffs grouped into three dominant lithofacies: an andesitic breccia; a rhyolite tuff and a dacite breccia. Detailed descriptions of each lithofacies are contained in Table 7.1.

Figure 7.3 – El Alacrán Deposit Geology Map



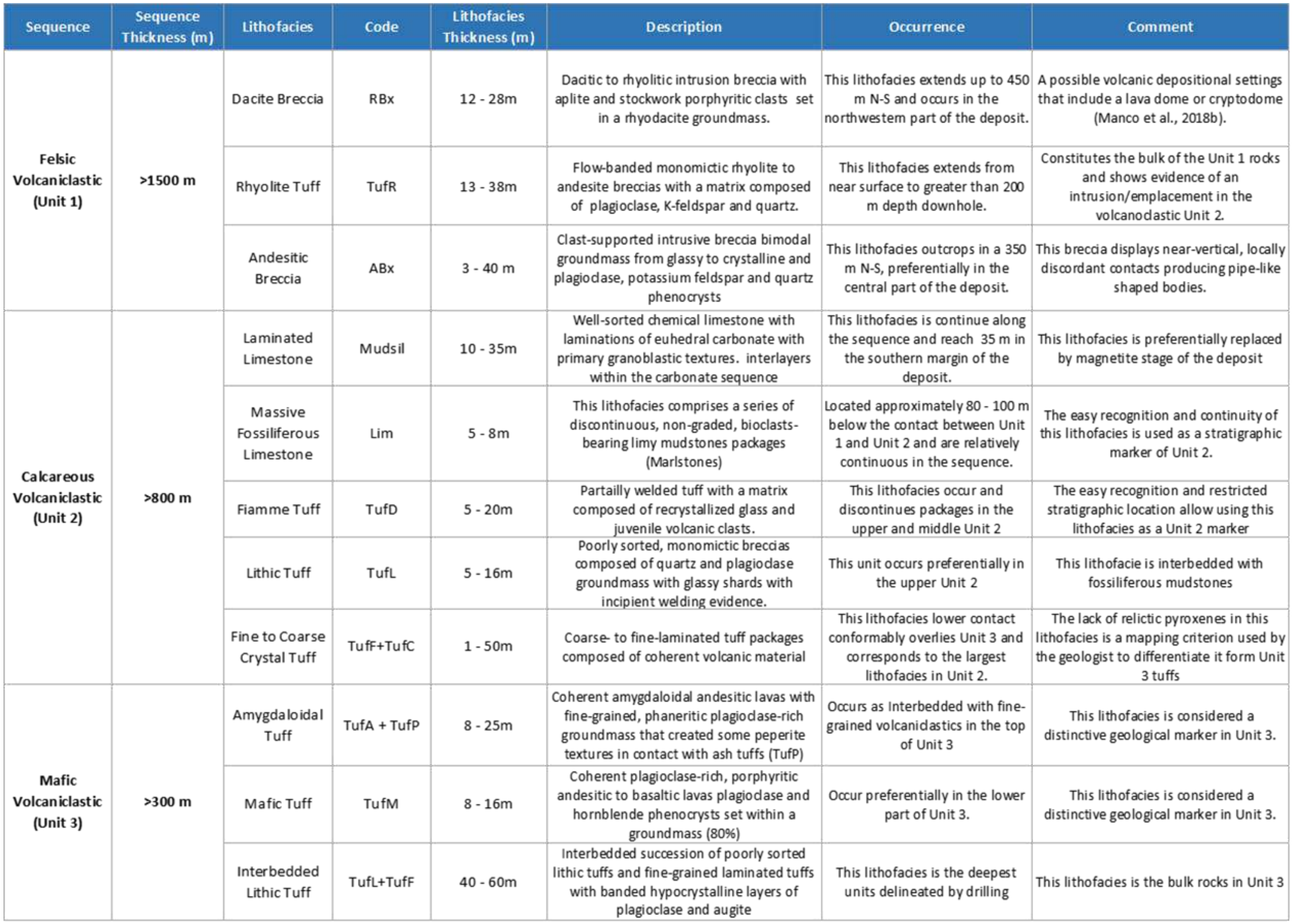
Source: Cordoba, 2023

Figure 7.4 – El Alacrán Lithostratigraphic Column and Cross Section (Manco et al., 2018b)



Note: The location of the east west section A-A1 is denoted on Figure 7.3.
Source: Cordoba, 2019

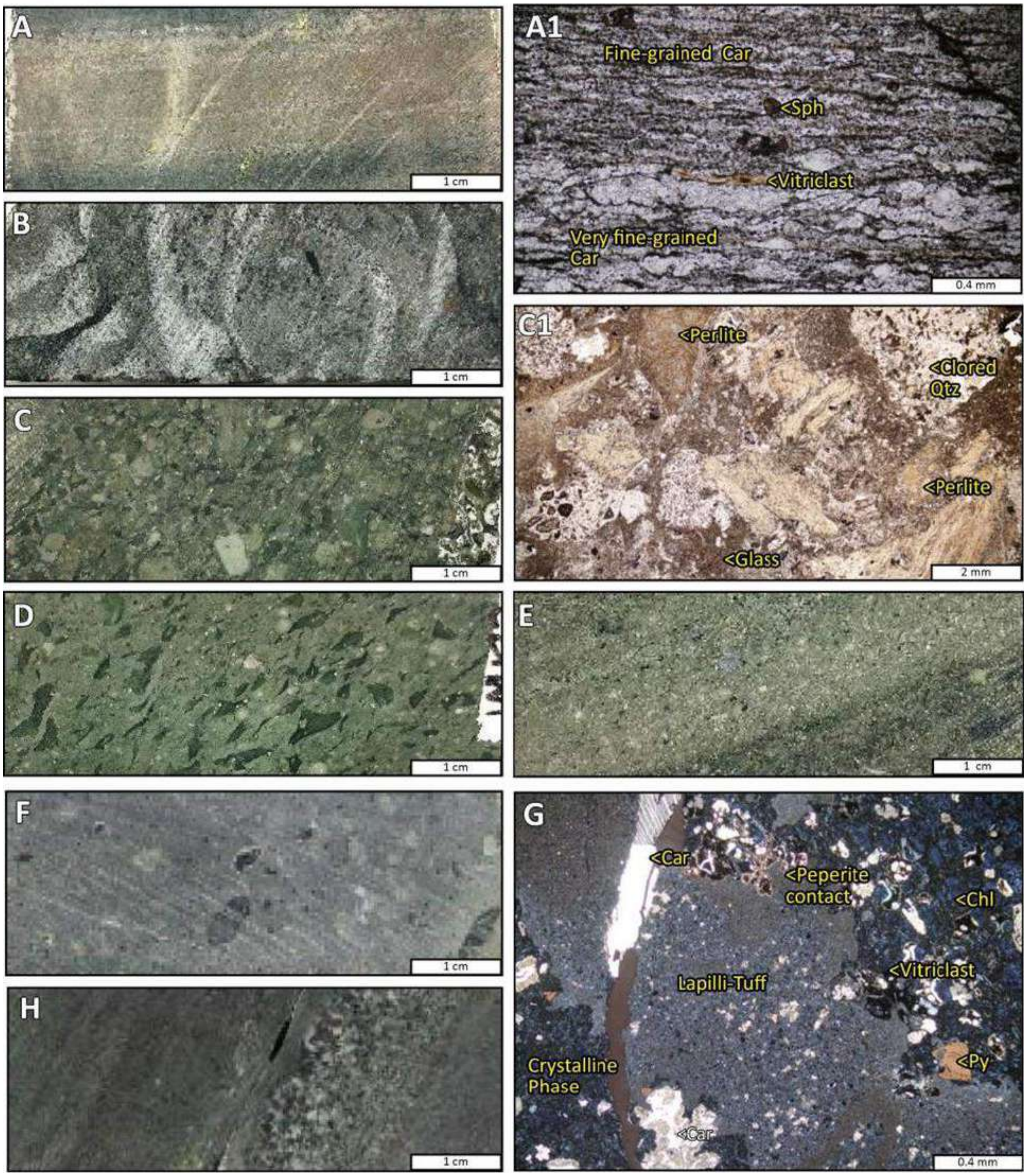
Table 7.1 – Detailed Descriptions of El Alacrán Deposit Lithofacies



Sequence	Sequence Thickness (m)	Lithofacies	Code	Lithofacies Thickness (m)	Description	Occurrence	Comment
Felsic Volcaniclastic (Unit 1)	**>1500 m**	Dacite Breccia	RBx	12 - 28m	Dacitic to rhyolitic intrusion breccia with aplite and stockwork porphyritic clasts set in a rhyodacite groundmass.	This lithofacies extends up to 450 m N-S and occurs in the northwestern part of the deposit.	A possible volcanic depositional settings that include a lava dome or cryptodome (Manco et al., 2018b).
		Rhyolite Tuff	TufR	13 - 38m	Flow-banded monomictic rhyolite to andesite breccias with a matrix composed of plagioclase, K-feldspar and quartz.	This lithofacies extends from near surface to greater than 200 m depth downhole.	Constitutes the bulk of the Unit 1 rocks and shows evidence of an intrusion/emplacement in the volcanoclastic Unit 2.
		Andesitic Breccia	ABx	3 - 40 m	Clast-supported intrusive breccia bimodal groundmass from glassy to crystalline and plagioclase, potassium feldspar and quartz phenocrysts	This lithofacies outcrops in a 350 m N-S, preferentially in the central part of the deposit.	This breccia displays near-vertical, locally discordant contacts producing pipe-like shaped bodies.
Calcareous Volcaniclastic (Unit 2)	**>800 m**	Laminated Limestone	Mudsil	10 - 35m	Well-sorted chemical limestone with laminations of euhedral carbonate with primary granoblastic textures. interlayers within the carbonate sequence	This lithofacies is continue along the sequence and reach 35 m in the southern margin of the deposit.	This lithofacies is preferentially replaced by magnetite stage of the deposit
		Massive Fossiliferous Limestone	Lim	5 - 8m	This lithofacies comprises a series of discontinuous, non-graded, bioclasts-bearing limy mudstones packages (Marlstones)	Located approximately 80 - 100 m below the contact between Unit 1 and Unit 2 and are relatively continuous in the sequence.	The easy recognition and continuity of this lithofacies is used as a stratigraphic marker of Unit 2.
		Fiamme Tuff	TufD	5 - 20m	Partailly welded tuff with a matrix composed of recrystallized glass and juvenile volcanic clasts.	This lithofacies occur and discontinues packages in the upper and middle Unit 2	The easy recognition and restricted stratigraphic location allow using this lithofacies as a Unit 2 marker
		Lithic Tuff	TufL	5 - 16m	Poorly sorted, monomictic breccias composed of quartz and plagioclase groundmass with glassy shards with incipient welding evidence.	This unit occurs preferentially in the upper Unit 2	This lithofacie is interbedded with fossiliferous mudstones
		Fine to Coarse Crystal Tuff	TufF+TufC	1 - 50m	Coarse- to fine-laminated tuff packages composed of coherent volcanic material	This lithofacies lower contact conformably overlies Unit 3 and corresponds to the largest lithofacies in Unit 2.	The lack of relictic pyroxenes in this lithofacies is a mapping criterion used by the geologist to differentiate it form Unit 3 tuffs
Mafic Volcaniclastic (Unit 3)	**>300 m**	Amygdaloidal Tuff	TufA + TufP	8 - 25m	Coherent amygdaloidal andesitic lavas with fine-grained, phaneritic plagioclase-rich groundmass that created some peperite textures in contact with ash tuffs (TufP)	Occurs as Interbedded with fine-grained volcaniclastics in the top of Unit 3	This lithofacies is considered a distinctive geological marker in Unit 3.
		Mafic Tuff	TufM	8 - 16m	Coherent plagioclase-rich, porphyritic andesitic to basaltic lavas plagioclase and hornblende phenocrysts set within a groundmass (80%)	Occur preferentially in the lower part of Unit 3.	This lithofacies is considered a distinctive geological marker in Unit 3.
		Interbedded Lithic Tuff	TufL+TufF	40 - 60m	Interbedded succession of poorly sorted lithic tuffs and fine-grained laminated tuffs with banded hypocrystalline layers of plagioclase and augite	This lithofacies is the deepest units delineated by drilling	This lithofacies is the bulk rocks in Unit 3

Source: Cordoba, 2021

Figure 7.5 – El Alacrán Deposit Volcanoclastics Lithofacies from Unit 3 and Unit 2

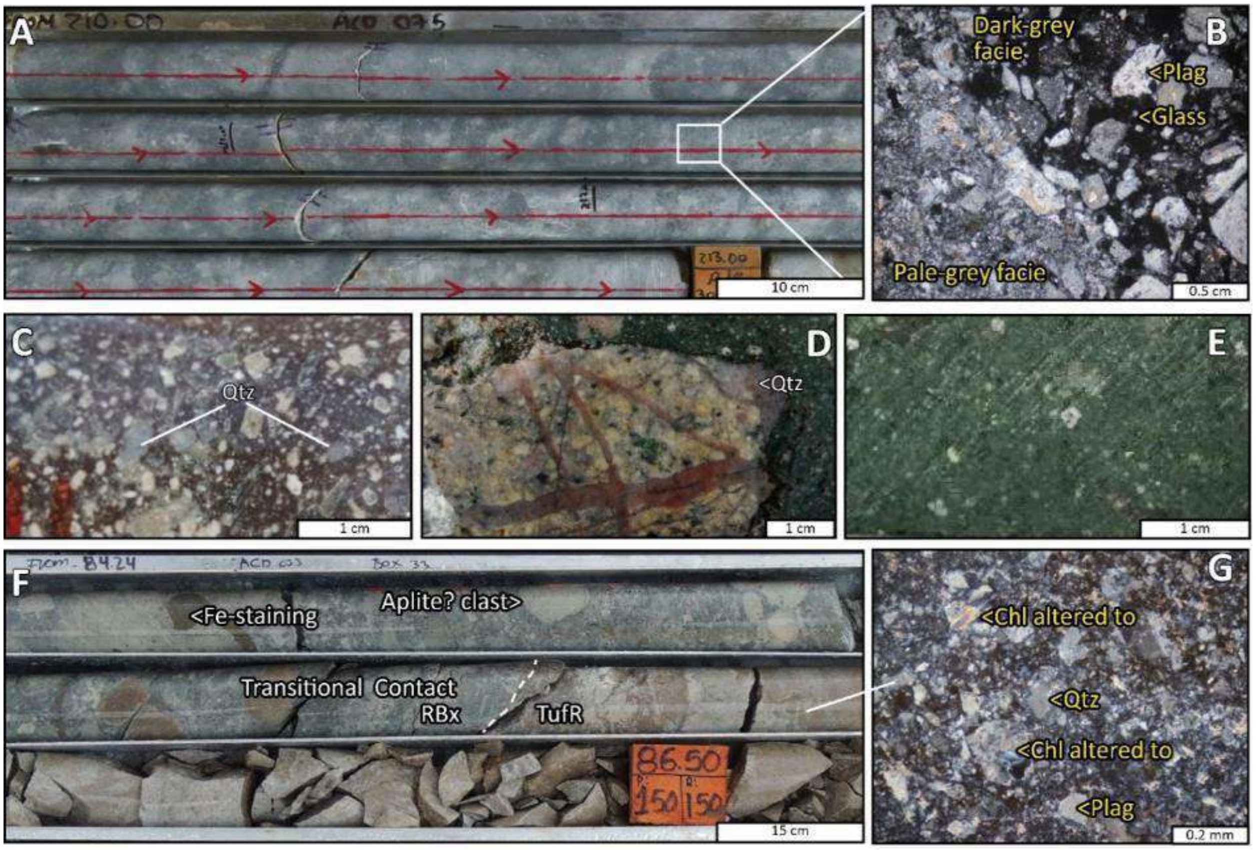


Source: Manco et al., 2018b

El Alacrán deposit volcaniclastic lithofacies from Unit 2 and Unit 3 (Manco et al., 2019). A. Core-scale sample of laminated limestone lithofacies. A1. Microphotograph 10X under crossed Nicolls of

A. B. Core-scale sample of the marlstone lithofacies with carbonate-replaced bivalves. C. Core-scale sample of the lithic tuff lithofacies. C1. Microphotograph 2X of A, showing breccia texture. Note composition of clasts is dominated by vitroclasts and recrystallized quartz. D. Core-scale sample of fiamme tuff lithofacies. E. Core-scale sample of the fine-grained to coarse-grained tuff lithofacies F. Core-scale sample of coherent lavas with amygdaloidal facies. G. Microphotograph 10X with crossed Nicolls of peperites in the contact of the amygdaloidal facies. H. Banded interbedding of fine-grained tuff and lithic tuffs. *Abbreviations:* Sph: Sphalerite, Qtz: Quartz, Car: Carbonate, Py: Pyrite, Chl: Chlorite.

Figure 7.6 – El Alacrán Deposit Volcanoclastics Lithofacies from Unit 1



Source: Manco et al., 2019

El Alacrán deposit volcaniclastic lithofacies from Unit 1 (Manco et al., 2019). **A.** Photo of drill core of andesite breccia (drill hole ACD075 @ 210 – 213 m). **B.** Detail of A. Microphotograph 10X with crossed Nicolls, showing coherent facies composition of andesite breccia. Note the glassy groundmass in the dark-grey facies. **C.** Drill core sample of quartz rich porphyritic facies associated with the dacite intrusive breccia lithofacies. **D.** Quartz stockwork in porphyry clast embedded in a quartz rich groundmass volcanic/magmatic? breccia from the rhyolite tuff lithofacies. **E.** Detail of the rhyolite tuff lithofacies. **F.** Photo of drill core from the dacite breccia in transitional contact with rhyolite tuff (drill hole ACD003 @ 84.2 – 86.5 m). **G.** Microphotograph 10X with crossed Nicolls of photo F, showing a fine-grained breccia texture composed of quartz, plagioclase, and K-feldspar. *Abbreviations:* Plag: Plagioclase, Qtz: Quartz, Car: Carbonate, Py: Pyrite, Chl: Chlorite.

7.3.2 INTRUSIONS

Intrusions are recognized at El Alacrán by their hypabyssal igneous textures in core and surface mapping, and chemically by their high Al/Ti (>25), low Nb/Al (< 4), low Zr/Al & Cr/Al ratios, and they display other geochemical features consistent with intermediate igneous rocks. Petrographic and modal analysis, along with the geochemical characterization of the intrusions show two different end-member magmatic sources:

El Alacrán Oeste Tonalite

This tonalite occurs in the western portion of the El Alacrán deposit where it intrudes the metasedimentary-volcaniclastic succession in a broadly north south zone up to 2 km long (Figure 7.3). The eastern contacts of these diorites generally dip moderately to steeply west, broadly concordant with the stratigraphy, but locally discordant (Figure 7.4 (A)). The rock displays a weak to medium-intensity hydrothermal alteration that includes silicification (11%), chloritization (15%) after mafic minerals, and sericite-carbonate (approximately 2%) after plagioclase. This unit is non mineralized but displays very fine-grained (< 0.04 mm) disseminated pyrite (Figure 7.7).

El Alacrán Norte Tonalite

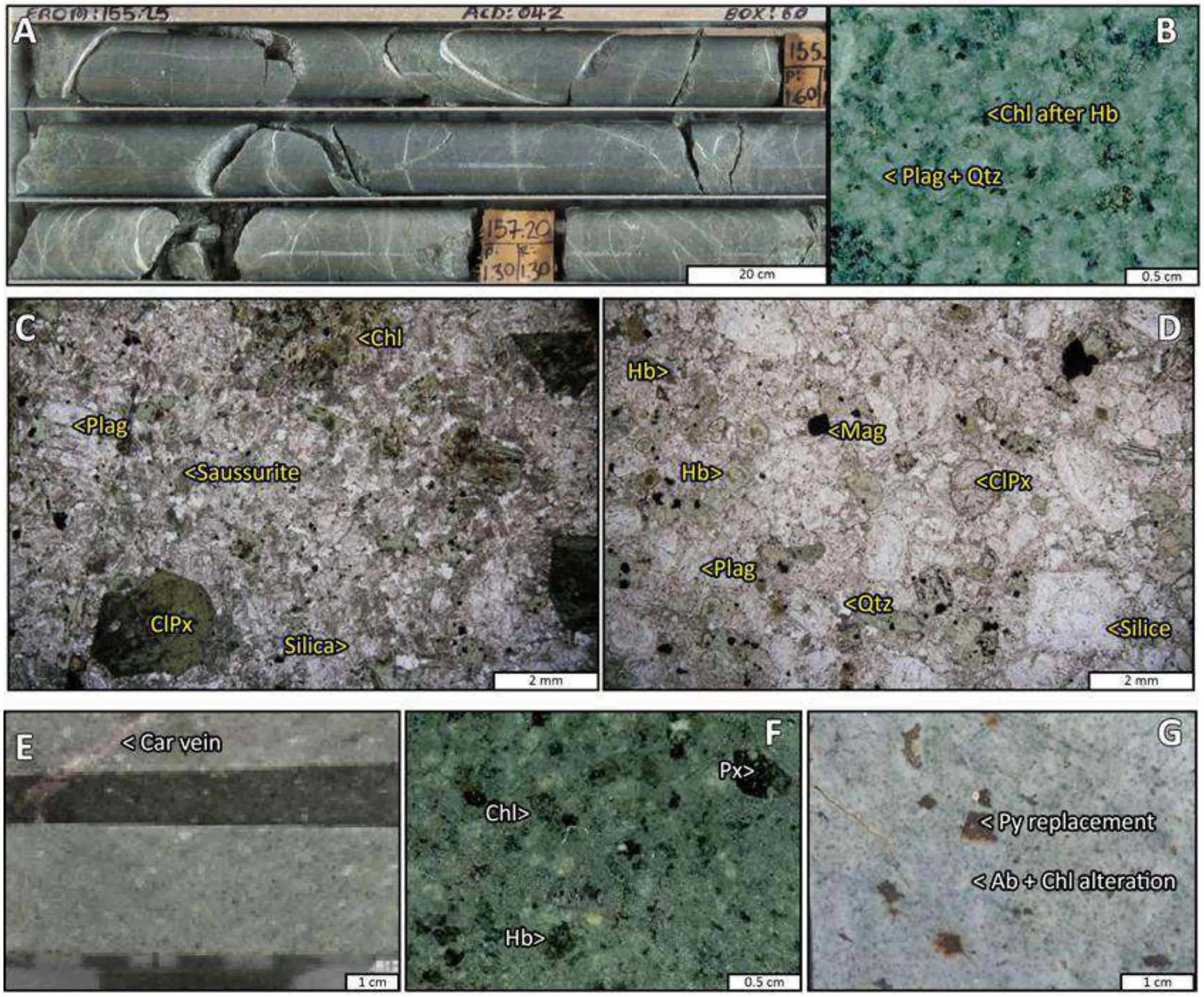
The El Alacrán Norte Tonalite occurs in the northernmost part of the El Alacrán deposit, where it intrudes, and is possibly faulted against, the volcaniclastic sequence (Figure 7.3). This unit constitutes the topographic high observed in the northern El Alacrán deposit (Mina Norte Hill). Field relationships suggest this unit is post-mineral to the El Alacrán mineralization. It is generally fresh, locally silicified (18%) and its mafic minerals are altered to fine to very fine-grained (approximately 0.12 mm) chlorite (4%). This unit is non mineralized and contains traces of pyrite (approximately 0.5%) after the mafic mineralogy (Figure 7.7).

7.3.3 SILLS

The El Alacrán deposit succession is intruded by up to five andesitic sills that can be grouped according to alteration and mineralogy into Sill 1 and Sill 2. Sill 1 comprises mafic-rich diorite sills that concordantly intrude the Unit 2 volcaniclastic sequence along a >1 km N-S contact and occurs within the first 10 m depth below the contact between Unit 1 and 2 (Figure 7.4 (A)). Sill 1 ranges from 5 m to 10 m in thickness and are fine to medium-grained holocrystalline rocks with porphyritic texture, and rock groundmass that is dominated by plagioclase and mafic minerals. Phenocrysts comprise medium-grained plagioclase, pyroxene and hornblende (Figure 7.7). Sill 1 displays variable hydrothermal alteration intensity from weak to pervasive. When pervasively altered, this unit presents a calc-sodic assemblage (albite + chlorite + epidote + carbonate ± actinolite) that selectively replaces the mafic mineralogy.

Sill 2 comprises a discontinuous N-S oriented intrusion that is divided into two segments: a northern segment that extends 380 m northwards; and a southern segment that extends 300 m southwards until it merges with a sill within the Sill 1 rock type: denoted as Sill1b. These segments are separated by approximately 300 m. Sill 2 is 10 m to 33 m wide and intrudes concordantly and locally discordantly the lower stratigraphy of Unit 2 (Figure 7.4). Sill 2 is a fine-grained, holocrystalline, strongly altered, mafic-poor, porphyritic diorite rock (Figure 7.7) with approximately 70% groundmass. Relict phenocrysts are fine-grained euhedral to subhedral plagioclase. Intense sodic-calcic alteration is a distinct feature of this unit and comprises fine-grained albite chlorite and quartz with traces of titanite and anhedral apatite. Mineralization occurs as fine-grained (<0.1 mm) traces of anhedral pyrite accompanying chlorite (Figure 7.7).

Figure 7.7 – El Alacrán Deposit Intrusions



Source: Manco et al., 2018b

El Alacrán deposit intrusions. **A.** Photo of drill core from the El Alacrán Oeste Tonalite (drill hole ACD042 @ 152.2–157.7 m). **B.** Detailed of photo A. **C.** Photo of drill core from the El Alacrán Norte

Tonalite (drill hole ACD039 @ 58.2–60.7 m). **D.** Detailed of photo C. **E.** Microphotograph 4X with parallel Nicolls of the El Alacrán Oeste Tonalite. **F.** Microphotograph 4X, with parallel Nicolls of the El Alacrán Norte Tonalite. **G.** Drill core photo of the Sill 1 a unit. *Abbreviation:* Plag: Plagioclase, Chl: Chlorite, Qtz: Quartz, ClPx: Clinopyroxene, Px: Pyroxene, Hb: Hornblende, Car: Carbonate, Ab: Albite, Py: Pyrite. Figure by Manco et al. (2018b).

7.3.4 EL ALACRÁN DEPOSIT MINERAL PARAGENESIS

Petrographic work and core logging have led to the categorization of five alteration assemblages within the El Alacrán deposit: Group I) Calc-Silicate Magnetite, Group II) V-Mica-Carbonate Base Metal (CBM); Group III) Illite-CBM, Group IV) Barren Calc-Silicate Group V) Calcite-Zeolite.

The Group I through Group III stages represent the most significant stages of hydrothermal alteration and mineralization. Mineralization is distinguished on the basis of structural and textural overprinting relations, from oldest to youngest:

i. Magnetite Stage: Group I: Early Calc-Silicate;

ii. Sulphide Stage: Group II: V-Mica – CBM; and Group III: Illite – CBM; and

iii. Late epithermal overprint: CBM style auriferous veining.

7.3.4.1 Magnetite Stage

<u>Group I: Calc-Silicate</u>

Group I alteration is characterized by a magnetite – quartz – apatite ± Fe-rich chlorite ± carbonate (± pyrite) ± epidote assemblage that is primarily replacement and breccia infill. As replacement, this assemblage extends almost 1 km on/along the contact between the andesite breccia and the laminated limestone lithofacies; which represents the boundary between Units 1 and 2 of El Alacrán stratigraphy. It preferentially replaces the laminate limestones, with replacement zones range from 20 m to 30 m thick and are only present in the southern part of the El Alacrán deposit.

As breccia infill, this assemblage is dominated by mushketovite (bladed magnetite) with pyrite/chalcopyrite present and occurs dominantly along the andesite breccia footwall contact at the base of Unit 1, and within the laminated limestone lithofacies of Unit 2.

The largest magnetite-quartz rich zones (where not overprinted by Fe-rich sulphides) occur in the western portion of the El Alacrán deposit in the south-central area. These zones strike approximately N-S and dip moderately to steeply west and are broadly concordant with the layered volcaniclastic succession and external contacts of the El Alacrán Oeste Tonalite intrusion around which the main magnetite-rich bodies are clustered. Individual magnetite-rich bodies may persist along several hundred metres of strike length and the western magnetite-rich zones over strike lengths of around

700 m (between 854900 N and 855600 N) over a depth range in excess of 200 m. Except where veined and partially replaced by sulphides, the magnetite-rich bodies are Cu and S poor.

The mineralogy of the Group I assemblage is consistent with formation from relatively high temperature (probably magmatic) fluids in intrusion-proximal situations. To the north and the southeast of the El Alacrán deposit, Fe-enrichment (>10% Fe) is evident in the volcaniclastic package but rarely in the underlying mafic rocks and also locally overprints intrusions. Zones of Fe-enrichment are broadly concordant with layering but locally broaden over strike and dip extents of 50 m to 100 m.

7.3.4.2 Sulphide Stage

Hypogene Cu-Au mineralization takes the form of lenticular zones with broadly north south strikes that dip moderately to the west, broadly concordant with host stratigraphy and intrusive contacts. The Cu-Au zones, however, locally broaden in vertical and horizontal around steep N-S surfaces and these, along with high grade sub-zones, plunge at a relatively shallowly orientation. Cu-Au zones are largely restricted to the main volcaniclastic package, although drilling has intersected mineralization in the upper part of the mafic package in northern and central El Alacrán.

Sulphide precipitation in the El Alacrán deposit is associated with discrete alteration assemblages from Group II: V-Mica – CBM and Group III: Illite – CBM Stage.

Group II: V-Mica –CBM

The V-Mica assemblage is restricted to the central and northern part of the El Alacrán deposit and occurs in the andesite breccia footwall. This alteration assemblage exhibits transitional mineralogy from high temperature (apatite + actinolite + quartz + pyrrhotite) to lower temperature (sphalerite ± sericite) and may represent a significant change in the redox conditions during the incursion of a different mineralizing fluid (Manco et al., 2019).

Group III: Illite – CBM

The illite – CBM assemblage dominates the northern and central part of the El Alacrán deposit and preferentially occurs in the felsic to intermediate lithofacies associated with Unit 1 (i.e., rhyolite tuff, dacite intrusive breccia, and andesite tuff). Alteration intensity varies from pervasive in the shallowest part of the andesite breccias and decreases to trace amounts at deeper levels (>150 m depth) of the breccia. The alteration assemblage comprises medium-grained (< 1.5 mm), anhedral carbonate (< 35%) accompanied by very fine grained (< 0.1 mm) sericite (< 25%) and anhedral, Mg-rich chlorite. Short wavelength infrared analysis on sericite of this assemblage displays a marked absorbance feature at 1900 nm indicating a low crystallinity phase consistent with an illite composition with variations to paragonitic and lesser to phengite (Manco et al., 2018c).

El Alacrán Cu-Au mineralization comprises veins and dissemination of chalcopyrite-pyrite ± pyrrhotite with quartz and carbonate and locally forms massive sulphides, and apatite is common. Au correlates with Cu and Mo, Ni, Co, Cr, P and the light rare earth elements are typically enriched in the sulphide-mineralized zones.

Macroscopic and petrographic observations show that Cu-Au sulphide mineralization partially to completely replaces magnetite stage alteration. Pyrrhotite dominates early Cu-Au mineralization and may be intergrown with or partially replace actinolite. The pyritic assemblage commonly overprints pyrrhotite, and much of the chalcopyrite apparently formed at this stage, associated with chlorite-carbonate ± sericite alteration. This alteration is magnesian and sodic-calcic, apparently phyllic (sericitic) alteration in its later stages.

In the south west of the El Alacrán deposit, Cu-Au mineralization generally exhibits high Au/Cu ratios and high grade Au (>5 g/t Au) intercepts. These Au-rich zones commonly occur in and around the magnetite-rich bodies, and the main sulphide is pyrrhotite, partially overprinted by pyrite.

Re-Os age dating of molybdenite yielded a model age of 75.8 ± 0.4 and 73.3 ± 1.5 Ma (Leal-Mejía and Hart, 2017; Manco et al., 2018d).

7.3.4.3 Late Epithermal Overprint: CBM Style Auriferous Veining

The CBM mineral assemblage (Calcite + Sphalerite + Chalcopyrite) represents a long-lived formation either as replacement, associated with the Group III alteration assemblage or as late-veins that overprint the Cu-Au mineralization. In the northern half of the El Alacrán deposit sphalerite-rich, pyrite-carbonate-quartz veins are more widely distributed than in the southern half. These veins are generally auriferous and may carry high grade Au, i.e., 14 g/t Au over 3.0 m (ACD-009) and 4,440 g/t Au over 0.9 m (ACD-036) that is sometimes visible at the macroscopic scale. The CBM veins may be somewhat discordant to this mineralization, and their orientation pattern is not yet confidently established. These veins are cut by later Ni-Co-Sb-rich arsenopyrite-carbonate-Au veins.

7.3.5 EL ALACRÁN DEPOSIT STRUCTURES AND STRUCTURAL MODEL

The Cretaceous succession of the El Alacrán deposit is situated on the moderately dipping western limb of a faulted, regional anticlinal zone with N-S to NNW strike trending axial surfaces. Mesoscopic folds, observed in outcrop and drill core, are responsible for local changes in dip, are shallowly plunging, and are interpreted to represent parasitic folds syn-kinematic with the regional post-Cretaceous deformation. This deformation was of relatively low strain and produced a steep, weak cleavage in the Cretaceous sediments. As noted above, intrusive activity is inferred to postdate this regional deformation.

Cenozoic successions to the north and west of El Alacrán generally dip shallowly and are folded along N-S to NNE axes. These successions are faulted against, or unconformably overly, the Cretaceous succession, and are believed to have been eroded from the El Alacrán area.

The El Alacrán deposit displays three dominant structure sets that have been identified by Cordoba geologists from mapping their topographic expressions, interpreting both ground magnetics, and aeromagnetic data, mapping visually in drill core and by a detailed structural analysis of core data. These three main dominant structures are:

- NW fault set: dipping approximately 50°-75° W and striking NNW, parallel to the host rock bedding (which includes a subordinated antithetic system (striking NW, dipping 10°-30° northeast)). This set may be linked with the N-S to NNE striking faults of the Valdés and Rio San Pedro System (Figure 7.2) and has been interpreted as the oldest set, which does not have significant control on local mineralization.
- NEE fault set: striking at 060°and dipping 50°-60° SE, this set is possibly related to the east west system of faults. The El Alacrán Fault is the most prominent fault in the NEE set and shows a listric geometry with a dip decreasing from 60° to < 10° with depth. This fault did not produce a significate offset of the El Alacrán deposit sequence; however, small (< 50.0 m) dextral offsets have been mapped along some artisanal tunnels (Mosher, 2011).
- N-S Fault set: Striking N-S and sub-vertically dipping, and these structures are the primary control for the high-grade Au carbonate base mineralization.

In drill core, the NW and NEE set of structures show evidence of post-mineral deformation indicated by extensive (<30 m thick) attrition breccias that include intensely fractured and gridding rocks lacking syn-tectonic alteration or mineralization. However, at a deposit scale, the andesite breccias appear to be preferentially developed when the NW structures intercept the NEE structures.

The most prominent structure at El Alacrán is the NEE fault, which traverses across the middle of the El Alacrán deposit.

7.4 Satellite Deposits

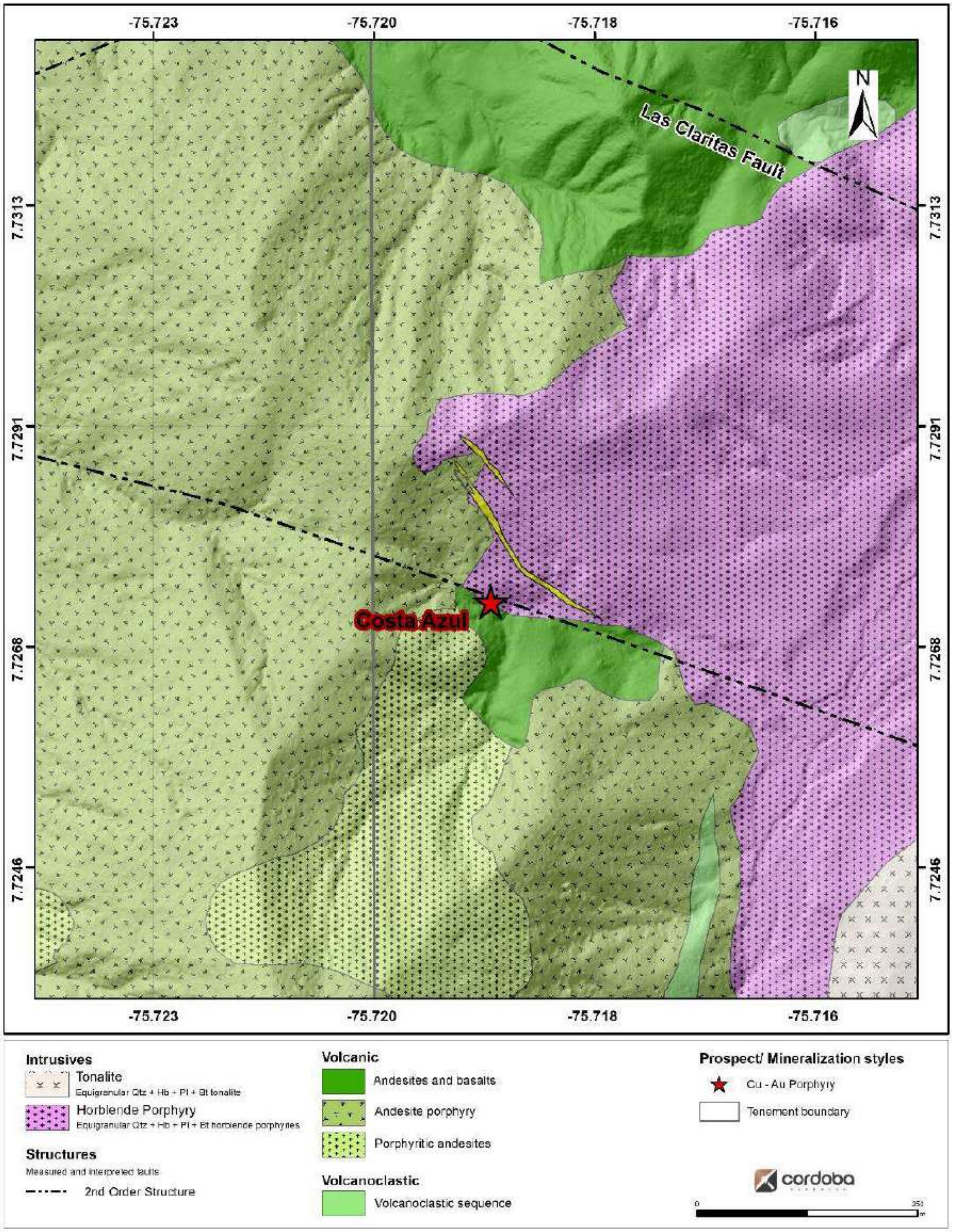
7.4.1 COSTA AZUL DEPOSIT

The Costa Azul porphyry deposit is located approximately 2 km southeast of the El Alacrán deposit in the eastern side of the San Pedro River Lineament (Figure 7.2). The Costa Azul porphyry is a shallow dipping, holocrystalline, Cretaceous porphyry diorite intrusion dominated by phenocrysts (approximately 70%) comprising medium-grained (< 2.0 mm), euhedral plagioclase (21%) and anhedral to subhedral hornblende (6%), intergrown with primary magnetite, and biotite. Quartz (27%) occurs either as fine-grained (<.5 mm), anhedral phenocrysts or as very fine-grained (< 0.05 mm) groundmass.

Hydrothermal alteration intensity is low to moderate and consists of silicification (29%), chlorite (3%), and traces of actinolite. Mineralization here is porphyry-style Cu-Au associated with sheeted quartz-magnetite-chalcopyrite-pyrite-bornite veinlets within altered diorite porphyry and unmineralized, mafic volcanic footwall rocks (Figure 7.8). This porphyry has not been described in the same detail as Montiel East porphyry. However, it shows intrusive phases equivalent to the ones described at Montiel East (i.e., Hornblende Porphyry, Hornblende Porphyry Late). Veining paragenesis is similar to the veins observed at Montiel East. Chalcopyrite is the dominant sulphide and occurs in two different stages. 1) Very fine- to fine-grained (< 0.3 mm) anhedral aggregates intergrown with bornite ± pyrite in quartz rich B-type veins; and 2) as 0.2 mm-wide chalcopyrite-rich veinlets that crosscut the B-type veins (Figure 7.9).

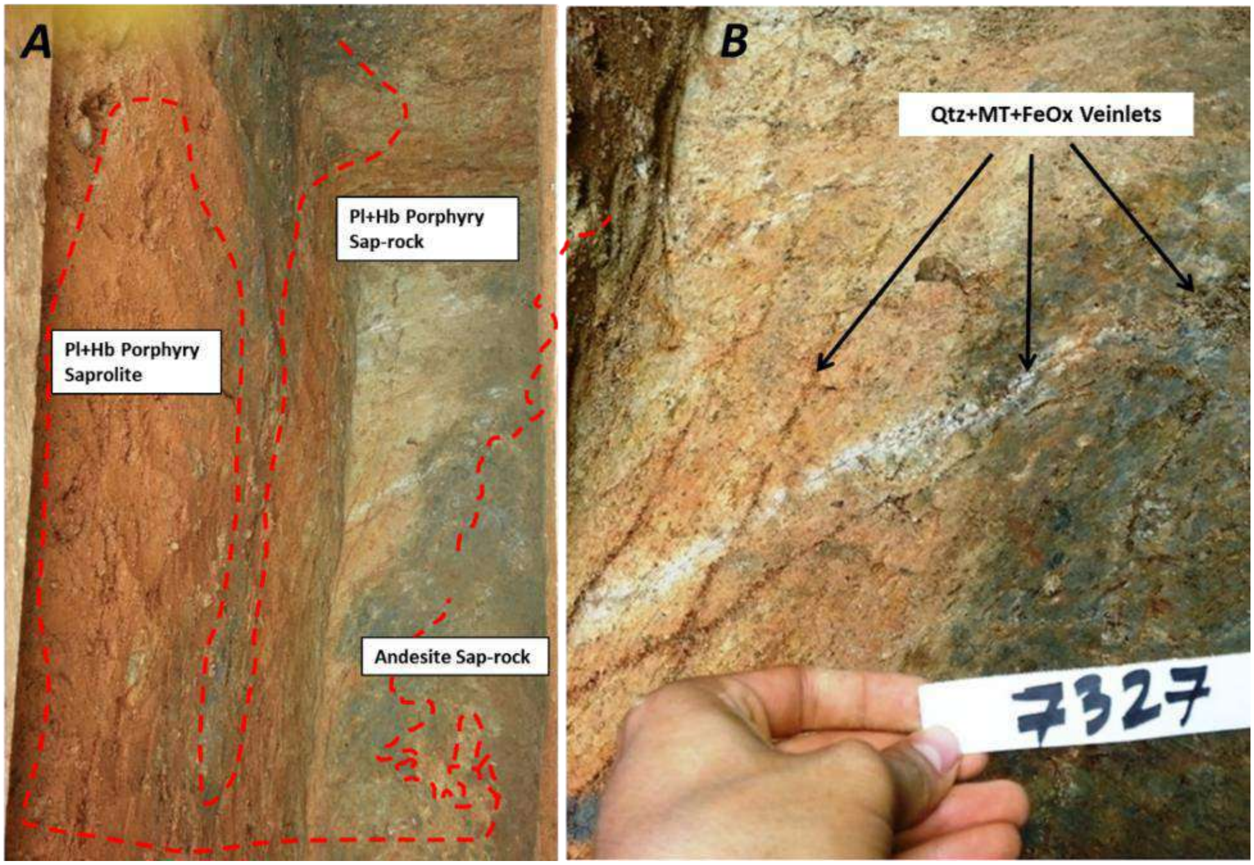
Re-Os age dating of molybdenite yielded a model age of 76.6 ± 0.3 Ma, which is interpreted as the age of mineralization for the porphyry system and suggests a clear temporal, and likely genetic relationship with the Montiel East deposit.

Figure 7.8 – Costa Azul Geology Map



Source: Cordoba, 2023

Figure 7.9 – Samples of Rock from Costa Azul Deposit showing A. Plagioclase-hornblende porphyry saprolite (SAP) and andesitic saprolite rock in drill core; and B. outcrop with quartz + magnetite + Fe oxide veinlets



Source: Cordoba, 2019

7.4.2 MONTIEL EAST DEPOSIT

The Montiel East porphyry is located near the San Matías Village 2.5 km northeast El Alacrán deposit in the eastern side of the San Pedro River Lineament (Figure 7.2). The shallow parts of the Montiel East deposit display surface dimensions of approximately 100 m x 70 m and a vertical extent of 100 m. The Montiel East deposit is porphyry Cu-Au mineralization associated with a series of tonalite porphyry stocks and sills that intrude basaltic andesitic volcanic rocks and host a strong stockwork of quartz-magnetite-chalcopyrite-bornite veins. Based on cross-cutting relationships, alteration assemblages, and compositions, four different phases have been identified within the Montiel East porphyry suite, three of which are hornblende porphyries and one of which is a quartz feldspar porphyry.

Major oxide geochemistry from samples of Montiel E phases show SiO_2 = 61.8 – 73.8%, Al_2O_3 = 13.6 – 16.6%, CaO = 2.06 – 6.83%, MgO = 0.8 – 3.04%, and TiO_2 = 0.1 – 0.32%, Indicating the higher fractionation degree observed in the San Matías Copper-Gold-Silver District intrusions (Manco et al., 2018a).

Hornblende Porphyry: There are three phases of hornblende porphyry at Montiel East: an early, inter-mineral, and a late phase. Alteration and mineralization vary within each phase. In general, the hornblende porphyritic rocks are characterized by a groundmass formed by very fine-grained (< 0.05 mm) quartz (30%) with phenocrysts of fine to medium-grained (< 2.0 mm) plagioclase (40%), hornblende (5%), and fine-grained (< 0.1 mm) biotite (2.5%). Individual LA-ICP-MS analyses yielded Pb/U ages between 68.5 ± 7.5 and 78.0 ± 10.0 Ma with a weighted average yielded a U-Pb age of 72.4 ± 4.3 Ma (Manco et al., 2019).

In the early phases, alteration manifests as fine-grained (0.2 mm to 0.4 mm) hydrothermal biotite in selective replacements and veinlets, and traces of fine-grained actinolite occur as alteration after hornblende (Manco et al., 2018b). Three (3) major vein sets have been identified: Late-magmatic quartz veins (A-type veins); magnetite + chalcopyrite + bornite quartz veins (B-type veins), and chalcopyrite-only veinlets (C-type veins). The porphyry, as well as the volcanic rock within approximately 10.0 m of the contact, is characterized by an intense A-type quartz vein stockwork (Figure 7.11), with >40% of the rock comprising vein quartz and individual veins locally exceeding 1 m wide.

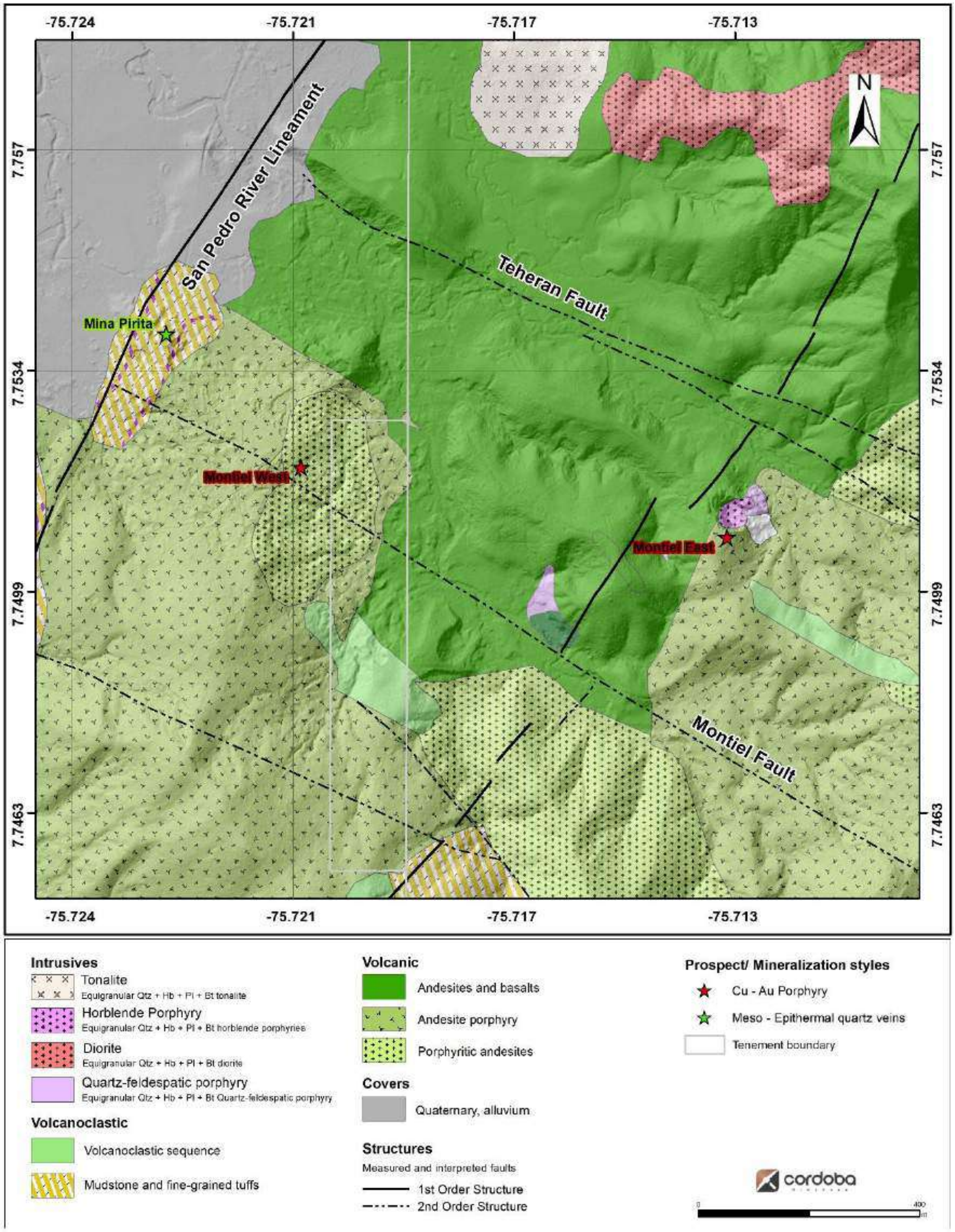
In the inter-mineral phase is a low-grade phase with variable amounts of fine-grained (< 1.0 mm) chalcopyrite, pyrite, and pyrrhotite. This phase is recognized by a marked secondary biotite alteration with retrograde chlorite and pyrrhotite disseminations.

The late phase, which is low-grade to barren, is a tonalitic phase with propylitic alteration and pyrite. Alteration is dominated by the occurrence of very fine-grained (<0.1 mm) sericite (15%), chlorite (4%) and traces of actinolite. Mineralization occurs mostly as 2.0 mm-width veinlets of pyrite, chlorite, epidote, sericite, and carbonate.

Quartz Feldspar Porphyry: This phase occurs as an intermineral-late phase as evidenced by the low-grade mineralization and clear cross-cutting relationships observed in relation to the early hornblende porphyry phase. The Quartz Feldspar porphyry is an inequigranular medium-grained (0.5 mm to 2.0 mm) leucocratic rock composed of anhedral K-feldspar (14%), euhedral plagioclase (10%), and fine-grained (< 1.0 mm) quartz (40%) (Manco et al., 2018a). Alteration intensity is relatively low to moderate and is characterized by the occurrence of silicification (16%), chlorite (3%) and sericite + clay and carbonate (3%). Mineralization is dominated by chalcopyrite and pyrite that occurs in interstices infill accompanied by actinolite and chlorite, respectively.

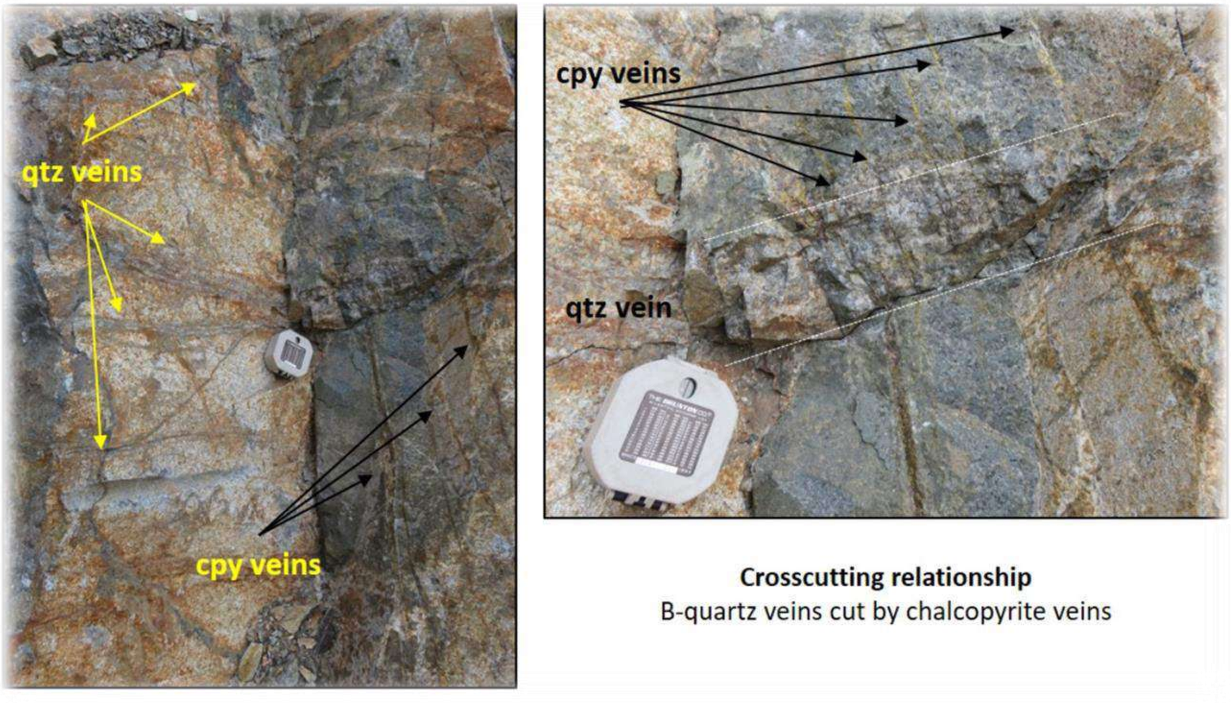
LA-ICP-MS analyses yielded Pb/U ages between 66.0 ± 13 and 79.3 ± 7.3 Ma with an obtained weighted average of 73.4 ± 1.9 Ma (Manco et al., 2019).

Figure 7.10 – Montiel East and Montiel West Geology Map



Source: Cordoba, 2023

Figure 7.11 – Vein Density and Cross-Cutting Relationships in the Montiel East Deposit



Source: Cordoba, 2019

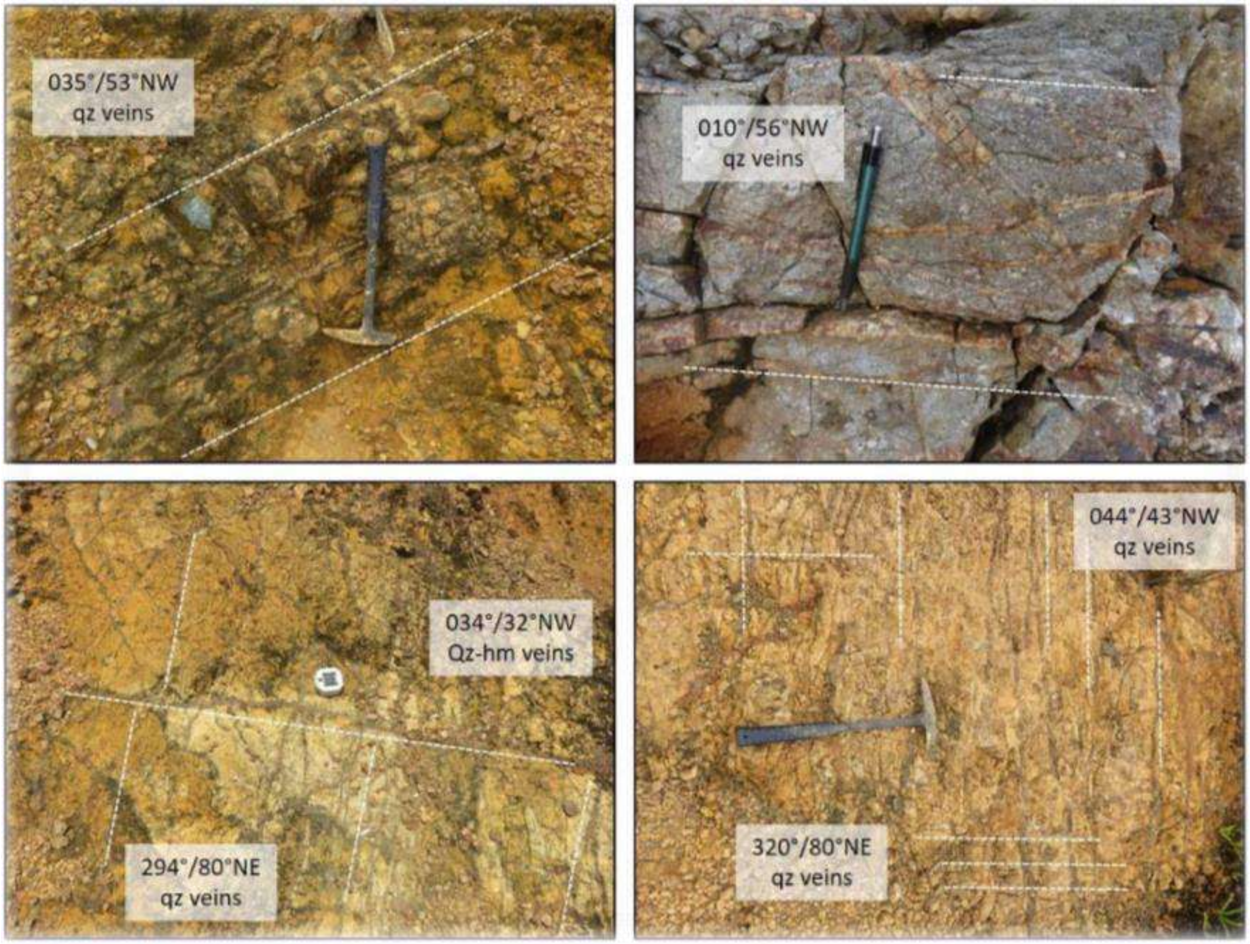
7.4.3 MONTIEL WEST DEPOSIT

The Montiel West deposit is located approximately 2 km northeast of the El Alacrán deposit in the eastern margin of the San Pedro River Lineament, and less than 1 km west of the Montiel East deposit (Figure 7.2). Diamond drill holes intersected high-density zones of both sheeted and multi-directional quartz-magnetite-chalcopyrite-bornite veining that are hosted in mafic and intermediate volcanic rocks, but no intrusive rocks. This style of wall rock Cu-Au mineralization is interpreted to be porphyry-related, as seen at both the Montiel East and Costa Azul prospects. The veinlets are generally narrower than those observed at Montiel East, possibly suggesting that there is no direct relationship between the two prospects. Alteration appears to be sodic-calcic, defined by albite, actinolite, and possible diopside.

Three (3) sets of quartz veins have been identified (Figure 7.12):

- A NS-striking, W-dipping set, which is the most prominent set and shows the highest vein density for a width of 100 m;
- A NE-striking, NW-dipping sheeted set that occurs in the western area of the Montiel West deposit; and,
- A NW-striking, NE-dipping set that sometimes contains hematite.

Figure 7.12 – Variability in Intensity and Orientation of Quartz Veins Sets identified at the Montiel West Deposit



Source: Cordoba, 2019

8 DEPOSIT TYPES

8.1 El Alacrán Deposit Generic Model

The El Alacrán deposit is located in the SMD in the Northern Western Cordillera of Colombia and is associated with a Late Cretaceous pre-accretional island arc environment of the Calima Terrane. The El Alacrán deposit comprises a replacement style of mineralization that trends northerly for about 1 km and has a vertical extent of >200 m.

Several different deposit models have been proposed for the El Alacrán deposit, including VMS, Skarn, CRD, and IOCG. To understand the El Alacrán deposit formation, thesis-based research was completed with the Mineral Deposit Research Unit (MDRU) at the UBC, in partnership with the Company. This research further developed the El Alacrán deposit model through a combination of alteration-mineralization and host rock geochronology, Pb and S isotope and Electron Microprobe Analysis (EMPA) in magnetite.

The thesis (Manco, 2020) presents the results of petrographic, geochronologic (U-Pb, Ar-Ar, Re-Os), and isotopic (Pb, S) characterization of the El Alacrán deposit ores and related representative units and prospects of the SMD. The hydrothermal alteration assemblages of the El Alacrán deposit are zoned from early high temperature calc-silicate alteration to a subsequent calc-potassic, sericitic, and CBM alteration. The mineral paragenesis indicates at least three different Au precipitation events: 1) associated with pyrite – mushketovite in the calc-silicate alteration; 2) precipitation of Au electrum with chalcopyrite, traces of the pyrrhotite and molybdenite in the calc-potassic and sericitic alteration; and 3) as visible grains in the carbonate base metal-related alteration. The mineral paragenesis, Ar-Ar dates, Pb and S isotopic composition (i.e., heavy $\delta^{34}S$ approximately 11‰) from the El Alacrán deposit can be explained by two (2) different magmatic fluids with a marked interaction with seawater. The magmatic fluids might have been sourced from the El Alacrán Oeste Tonalite and a concealed intrusion (Px2) that is possibly associated with the Montiel East porphyry event (approximately 68-70 Ma).

The IOCG model is supported by Sillitoe (2018) who suggested that the abundance of hydrothermal apatite, the distinctive Cu-Au-Mo geochemical signature, the abundance of mushketovite (magnetite pseudomorphs after specular hematite) found in the El Alacrán deposit are common features associated with IOCGs, especially to deposits in the Chilean Belt (i.e., Candelaria). In addition, the lack of abundant quartz and the presence of coarsely crystalline calcite in the late Zn-Cu veins is a characteristic texture in late and/or distal parts of IOCG deposits.

Evidence that argues against the IOCG model, among others, is the presence of sericite and pyrite that is quite uncommon in IOCG systems. When reported, these alteration minerals are formed in the Cu-poor hydrolytic stage (Hitzman et al., 1992). In the El Alacrán deposit, the main Cu deposition occurs within the sulphide stage that is associated with the sericite + chlorite + carbonate from the Group II and Group III alteration assemblages (see Section 7.3.4).

Similarly, when revising the tectonic setting of the area (Manco et al., 2019) the most accepted tectonic environment for the Project area consists of a pre-accretional, intra-oceanic island arc setting. This tectonic setting is not favourable for the formation of IOCGs deposits, which is interpreted to be formed in intra-continental to cratonic settings (Haywood, 2008; Groves et al., 2010).

Finally, the Cu deposition in the El Alacrán deposit indicates that there is a temporal relationship (approximately 73 Ma) with the magmatism and Cu-Au porphyry occurrences of the Project (i.e., Montiel East porphyry). Additionally, the recent delineation of the dacite intrusive breccia, which bears stockwork-porphyry clasts (Figure 7.6 (D)) in the El Alacrán deposit (Unit 1), suggests a spatial, and possibly genetic relationship with the tonalitic porphyry intrusions of the district.

The 2020 thesis results in combination with previous work suggest a hybrid model between IOCG-style and a CRD that is associated with a porphyry source can best explain the El Alacrán deposit mineralization.

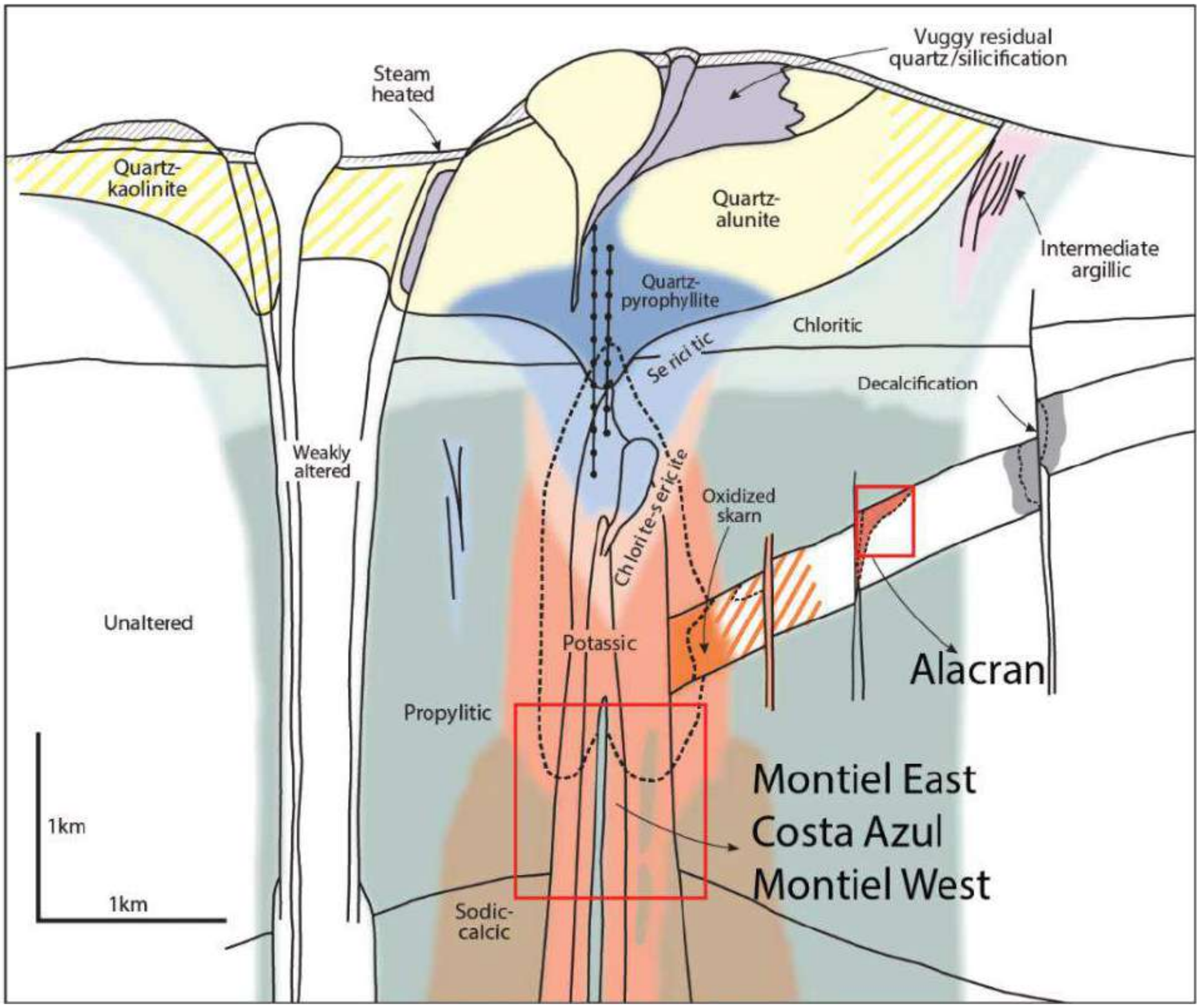
8.2 Satellite Deposits Genetic Models

The Montiel East, Montiel West, and Costa Azul deposits can all be broadly classified as Cu-Au porphyry systems as defined by Sillitoe (2000). Cu-Au porphyries are typically associated with I-type magnetite-series intrusive rocks and typically contain significant hydrothermal magnetite, indicating the host intrusions are highly oxidized and sulphur-poor members of this series of magmas. The porphyry stocks in these types of rocks span a range of compositions from diorites, quartz diorite, and tonalite through to quartz monzonite, monzonite, and syenite. The porphyry deposits of the Project area are of low-potassium, calc-alkaline dioritic, and tonalitic composition.

Mineralization in the San Matías porphyry deposits is associated with a quartz-sulphide (chalcopyrite+pyrite±bornite) stockwork typically within hydrothermal biotite (potassic) altered rocks. The occasional presence of albite-actinolite (sodic-calcic) alteration assemblages, as well as the relative lack of sericitic alteration assemblages, has led some workers to interpret that the Montiel porphyries are eroded to deep levels. Counter to this argument, however, are observations by Lowder and Dow (1978) who note that some Indonesian Au-rich porphyry deposits are characterized by hybrid sodic-calcic and potassic assemblages. At the Costa Azul porphyry, no such sodic-calcic assemblages have been observed.

There is little debate as to whether the Montiel and Costa Azul deposits are indeed Cu-Au porphyries; however, the debate continues about the erosional level of these systems, as well as the degree and attitude of post-mineral faulting and tilting (Figure 8.1).

Figure 8.1 – Generalized Alteration-Mineralization Zoning Pattern for Telescoped Porphyry Cu Deposits (modified from Sillitoe, 2010)



Source: Cordoba, 2019

9 EXPLORATION

Cordoba has historically had three (3) exploration objectives:

1. Discovery of additional porphyry deposits in addition to those seen at Montiel and Costa Azul.
2. Discovery of additional replacement style deposits in the receptive stratigraphy that hosts the El Alacrán deposit.
3. Discovery of additional high grade CBM veins similar to those seen at El Alacrán.

To support these objectives, the Company conducted several exploration programs between 2012 and 2023, consisting of geological mapping, geochemical sampling, geophysical surveys, and drilling.

9.1 Geological Mapping

Geological mapping in the Project area has been undertaken on all of the deposits that are the subject of the Mineral Resource Estimate (i.e., El Alacrán, Costa Azul, Montiel East and Montiel West) and the prospects (i.e., William and El Alacrán Norte) at a scale of 1:2,000. Geological interpretation of the mapped outcrops was supported by soil geochemistry, ground, and airborne magnetic survey information and diamond drill core.

9.2 Geochemical Sampling

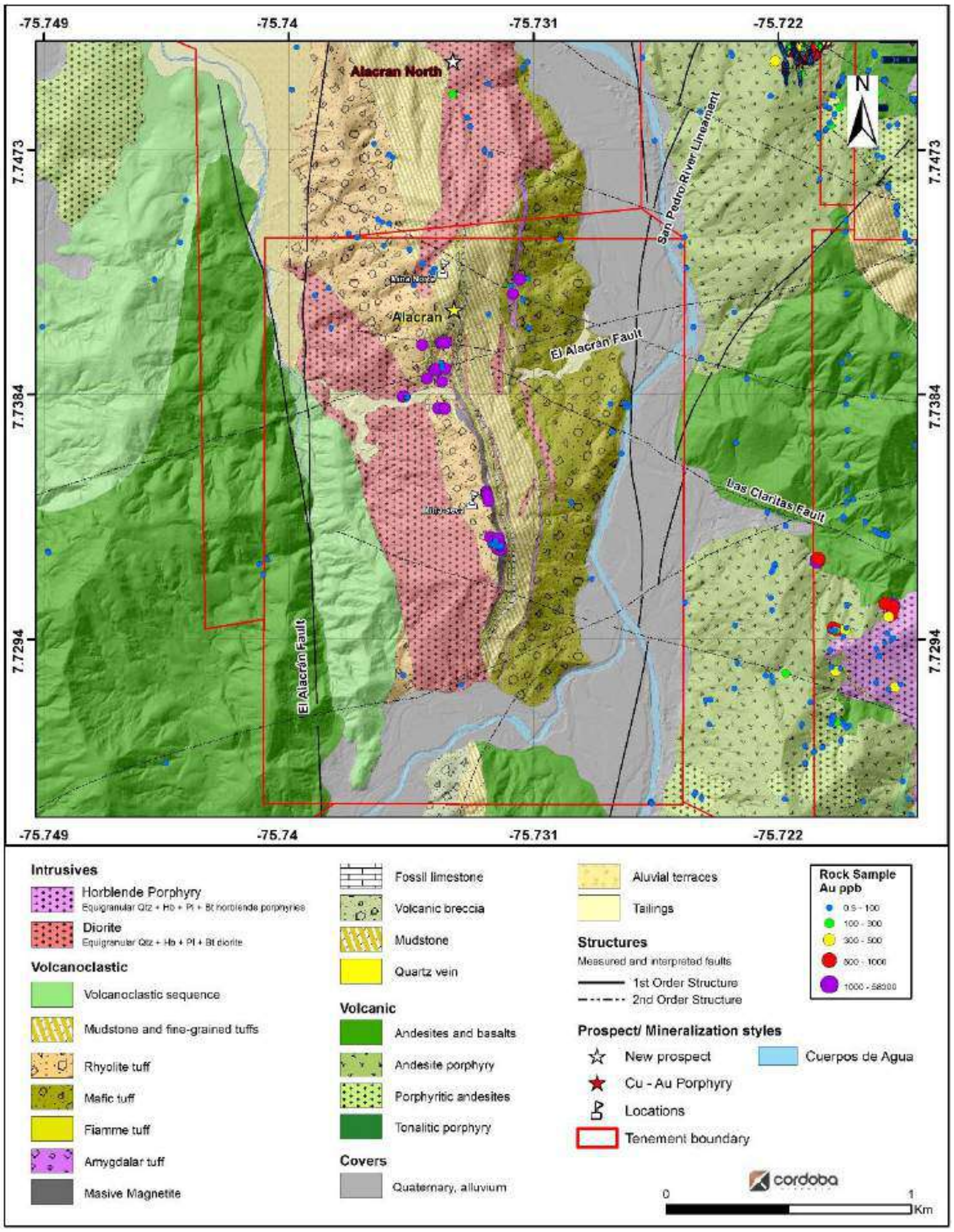
9.2.1 ROCK GEOCHEMISTRY

Several rock samplings campaigns have been carried out by Cordoba over many regions within the Project area, focusing on sampling subcrop, outcrop and channel sampling in areas such as artisanal mines and workings, in order to characterize the chemistry of known mineralization and alteration. Once profiles for known mineralization and alteration were established, the information could then be used to link anomalous areas identified by soil samples to possible sources within the Project area. A total of 4,661 trench samples and 9,627 rock samples on outcrops and tunnels have been collected and assayed by Cordoba.

As part of Cordoba’s QA/QC protocol for rock sampling, samples collected were put into plastic bags, labelled, sealed, and stored securely on site at Alacrán prior to shipment to a laboratory. Upon arrival at the laboratory, samples were prepared by weighting, oven drying and then crushing to 70% to less than 2 mm and sieved to 75 µm. Certified Reference Materials (“CRM”) from ORE Analytical Solutions Ltd. were inserted at regular intervals in the analytical routine. Standards (Minerals 501-501b, Oreas 502-502b, 503b) and blanks (Oreas 22c, 23a, 25a and raw samples of the company) were also inserted in the routine. Samples were analyzed at one of three laboratories over the years: ACME in Medellín, SGS Colombia S.A. (SGS) and ALS Global (ALS).

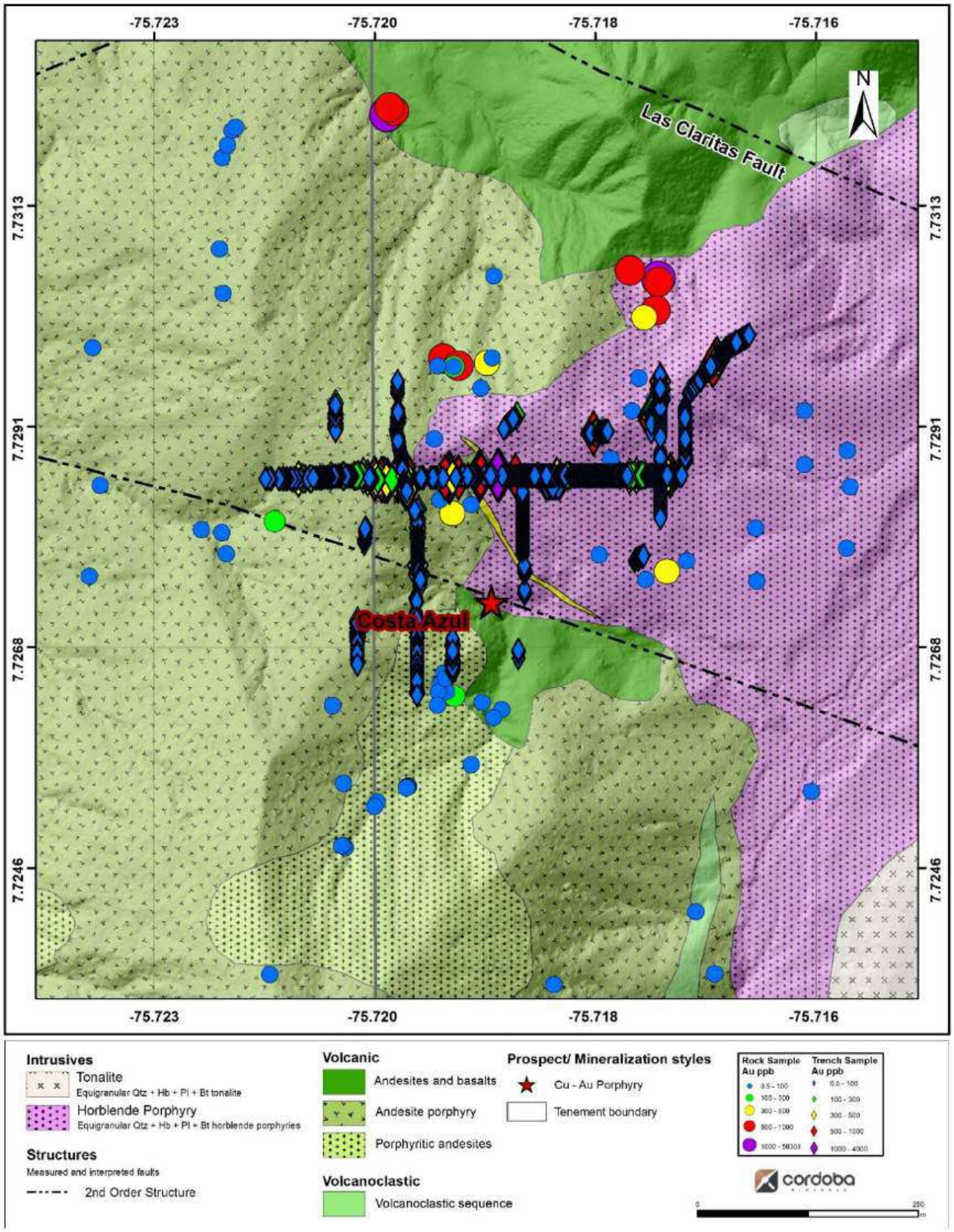
Multiple element analysis was performed primarily by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS); Samples were analyzed for the complete package of elements that includes Au-AA24 (fire assay), ME-MS41 (Aqua Regia with ICP-MS Finish), ME-MS61 (four-acid digestion with ICP-MS Finish), ICP-MS on limits (as needed). Depending on how high element values are in the sample, specific analyses are requested for minerals such as Au-OG62 (total Au) and Cu-OG62 (total Cu). Figures 9.1, 9.2, and 9.3 illustrate Au results in the four (4) main deposits.

Figure 9.1 – Au Results in Surface Rock Samples at El Alacrán, with Surface Geology



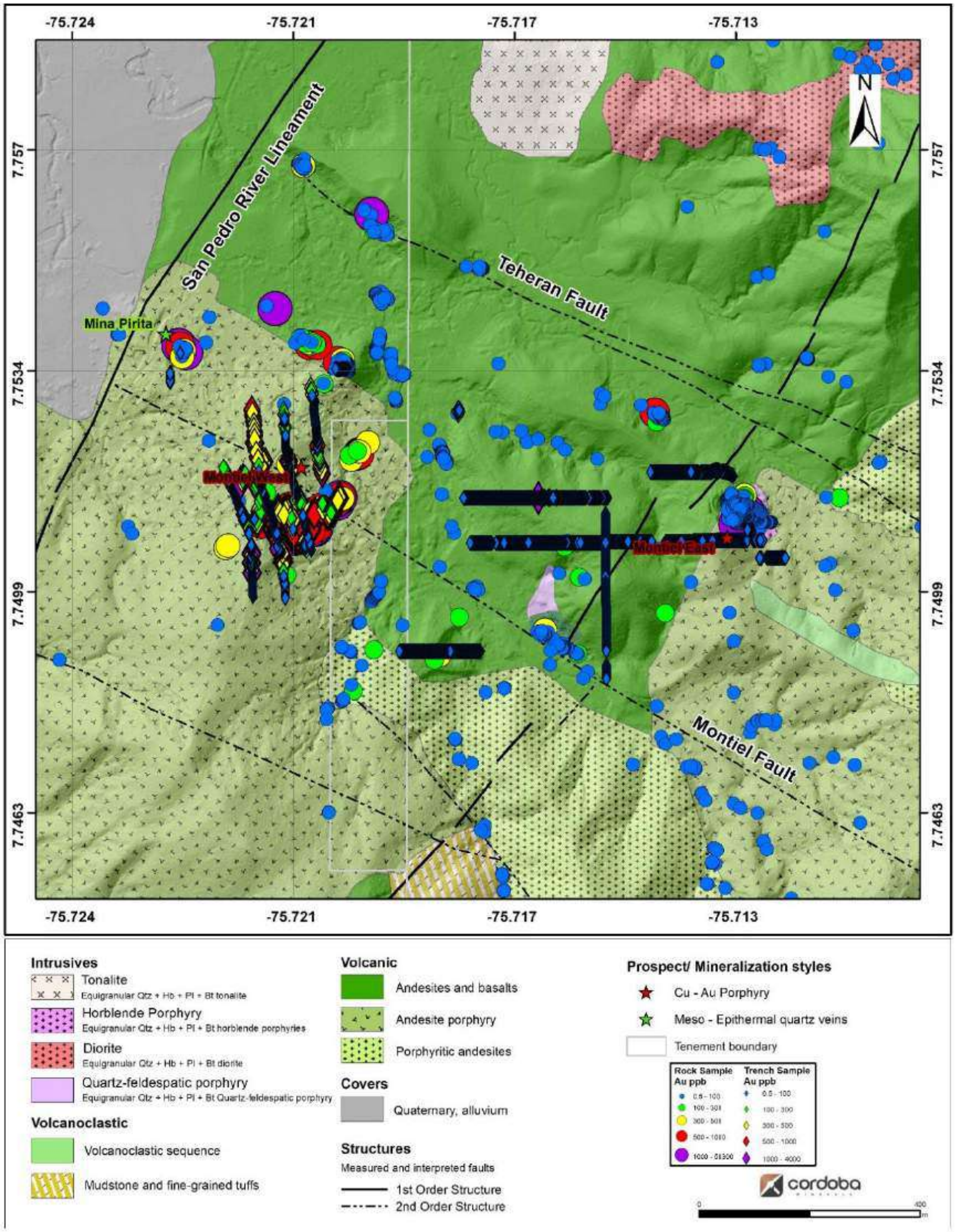
Source: Cordoba, 2023

Figure 9.2 – Au Results in Surface Rock Samples at Costa Azul, with Surface Geology



Source: Cordoba, 2023

Figure 9.3 – Au Results in Surface Rock Samples at Montiel West and Montiel East, with Surface Geology



Source: Cordoba, 2023

9.2.2 SOIL GEOCHEMISTRY

Cordoba carried out a number of stream and soil sampling programs between 2013 and 2019 over many areas of the Project, covering approximately 60 km² along a 14 km long N-S trend and up to 6 km in width in an E-W direction. Sampling density varied from reconnaissance-level spacing of 500 m x 100 m to follow-up detailed sampling with 25 m x 25 m spacing. Follow-up sampling programs sampled a range of materials including the "B" horizon (1.0 m to 1.5 m depth below the surface), the soil "C" horizon and near surface saprolite.

At El Alacrán, the majority of sampling was completed on 100 m x 50 m centres with lines oriented E-W. At the Montiel East, Montiel West, and Costa Azul deposits, samples were collected every 50 m in E-W lines, with a later infill survey performed along the mountain ridges at 2.05 m spacing. Samples were taken of the soil "B" horizon with an auger at an average depth of 1.0 m to 1.5 m. A total of 7,425 stream and soil samples have been collected throughout the Project area to date. The most recent sampling campaign was in the William area in March 2019.

Soil samples were collected in plastic bags, labelled and sealed (samples were not sieved). CRMs (Ores 501 – 501b, Oreas 502 – 502b and 503b) from ORE Analytical Solutions Ltd., blank (Oreas 22c, 23a and 25a) and Company-provided blanks (quartz, feldspar, hornblende and chlorite) were inserted at regular intervals in the analytical routine, following Cordoba's QA/QC protocol. Samples were stored in a secured area at the site before being shipped to one of three laboratories: ACME Medellín, SGS Colombia S.A., or ALS Global. Upon receipt at the laboratory, samples are catalogued, weighted, oven-dried at < 60°C/140°F, and subsequently crushed and sieved to less than 180 µm (-80 mesh).

For chemical analysis, the complete package of elements is analyzed including method Au-AA24 (atomic absorption spectrometry with fire assay), ME-MS41 (Aqua Regia with ICP-MS Finish), ME-MS61 (Four-Acid Digestion with ICP-MS Finish), and ICP-MS over limits (as required). If samples were highly anomalous for Au or Cu, then they were analyzed by Au-OG62 (total Au using ore grade elements and four-acid digestion) and Cu-OG62 (total Cu) methods. Unfortunately, both aqua regia, and four-acid were used for digestion, resulting in "unleveled" data due to partial or total digestion of the various elements.

In 2016, the Company had Reflex North America Ltd., of Vancouver, British Columbia, Canada, undertake a detailed analysis of the soil geochemical data. Soil data was levelled in order to remove the bias resulting from the aqua regia versus four-acid digestion and element plots of the levelled data were created in order to characterize the chemistry of known mineralized areas and to identify new anomalous areas. Ratios for immobile elements were also analyzed in order to show the effect of lithology on Cu, Mo, and Zn, and alteration trends. Results show highly anomalous areas around the Project for Cu (Figure 9.4) and Au (Figure 9.5).

Surface geological mapping, combined with soil, and rock geochemical results, characterize known mineralization at the four resource deposits.

Both the El Alacrán and the Montiel deposits show consistent, broad highly anomalous soil geochemistry for Cu and Au, while Costal Azul is characterized by a small highly anomalous Au, and broad weak Cu anomaly. Work in 2018 and 2019 showed anomalous areas and favourable lithology for mineralization for at least 2 km north and 7 km south of the El Alacrán deposit. Soil geochemical results also highlighted a 1,300 m by 800 m, N-S elongated Cu soil anomaly and Au anomaly on the eastern side of the El Alacrán deposit at a depth of 1.0 m to 1.5 m below surface.

9.3 Geophysics

9.3.1 HELICOPTER MAGNETIC AND RADIOMETRIC SURVEYS

Helicopter-borne magnetic and radiometric surveys were carried out over the Project area in 2011 and 2012. Both surveys were performed by MPX Geophysics Ltd., Canada (MPX) and are described in internal reports (MPX 2011 and 2012). The 2011 survey was 1,310 line km survey over 216 km² with a terrain clearance of 70 m. Flight lines were oriented E-W at 200 m spaced intervals with N-S tie lines every 2,000 m. The 2012 survey was 4,408.6 line km survey over an area of 785 km² with a terrain clearance of 30 m. Flight lines were oriented E-W and spaced 200 m apart, with N-S tie lines every 2,000 m.

Along the Montiel East, Montiel West, and East El Alacrán deposit areas, the magnetic data was acquired on 100 m spaced lines with tie lines spaced at 1,000 m. Figure 9.6 illustrates the reduced to pole (RTP) merged data for the complete survey area. The regional survey shows regional magnetic domains and larger crustal structures.

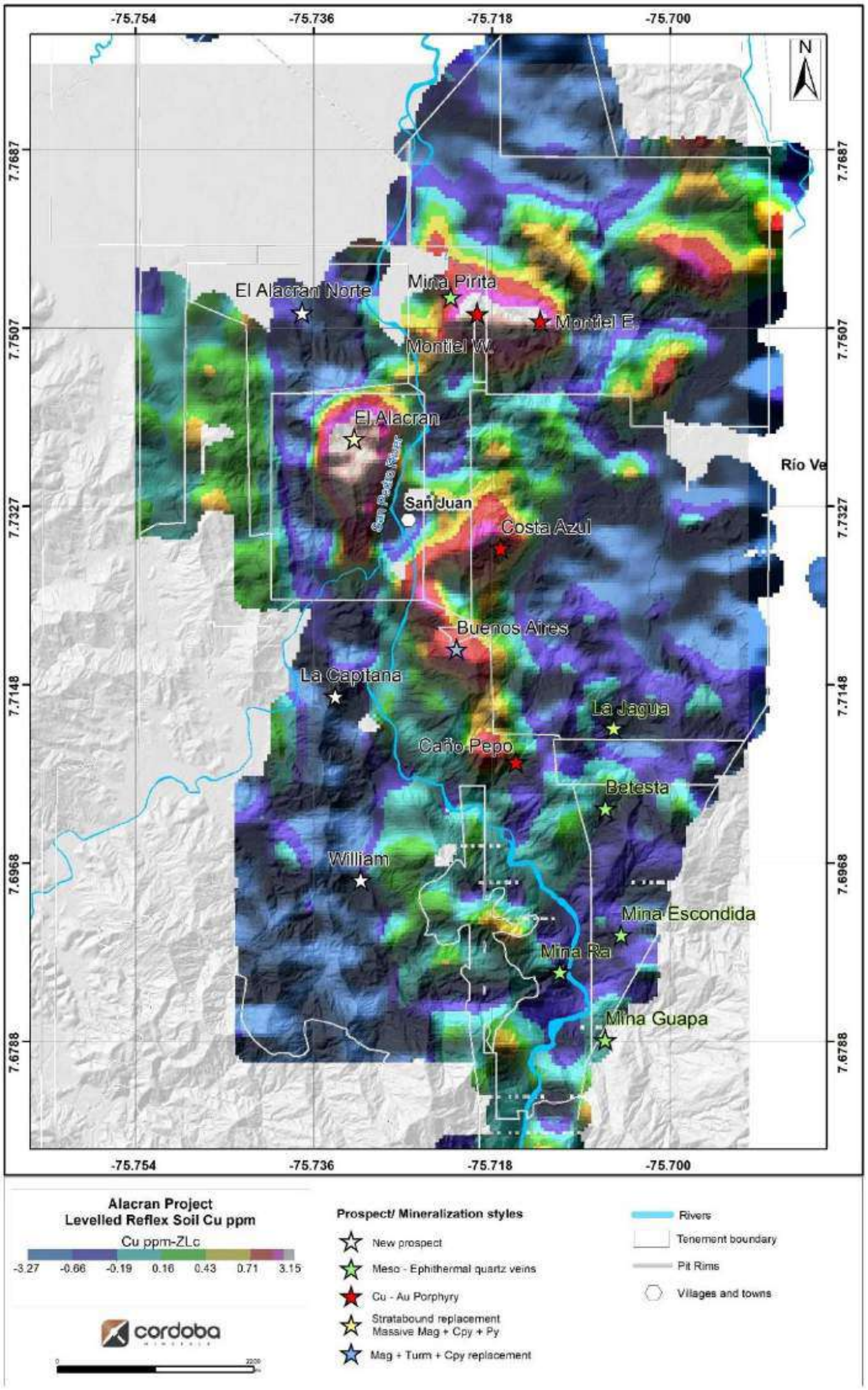
9.3.2 GROUND MAGNETIC SURVEYS

Ground magnetic surveys were carried out over the Project area in 2011 and 2016. The 2011 survey was performed by Mibex S.A.S. Colombia and was carried out on 100.0 m E-W lines with readings taken on 10.0 m intervals.

The 2016 survey was carried out by Cordoba field personnel. This survey was completed on 47 E-W lines of 1,680.0 m length spaced at 50.0 m, with readings every five seconds. Completed merged data for the two surveys is shown as RTP data for the entire Project (Figure 9.7).

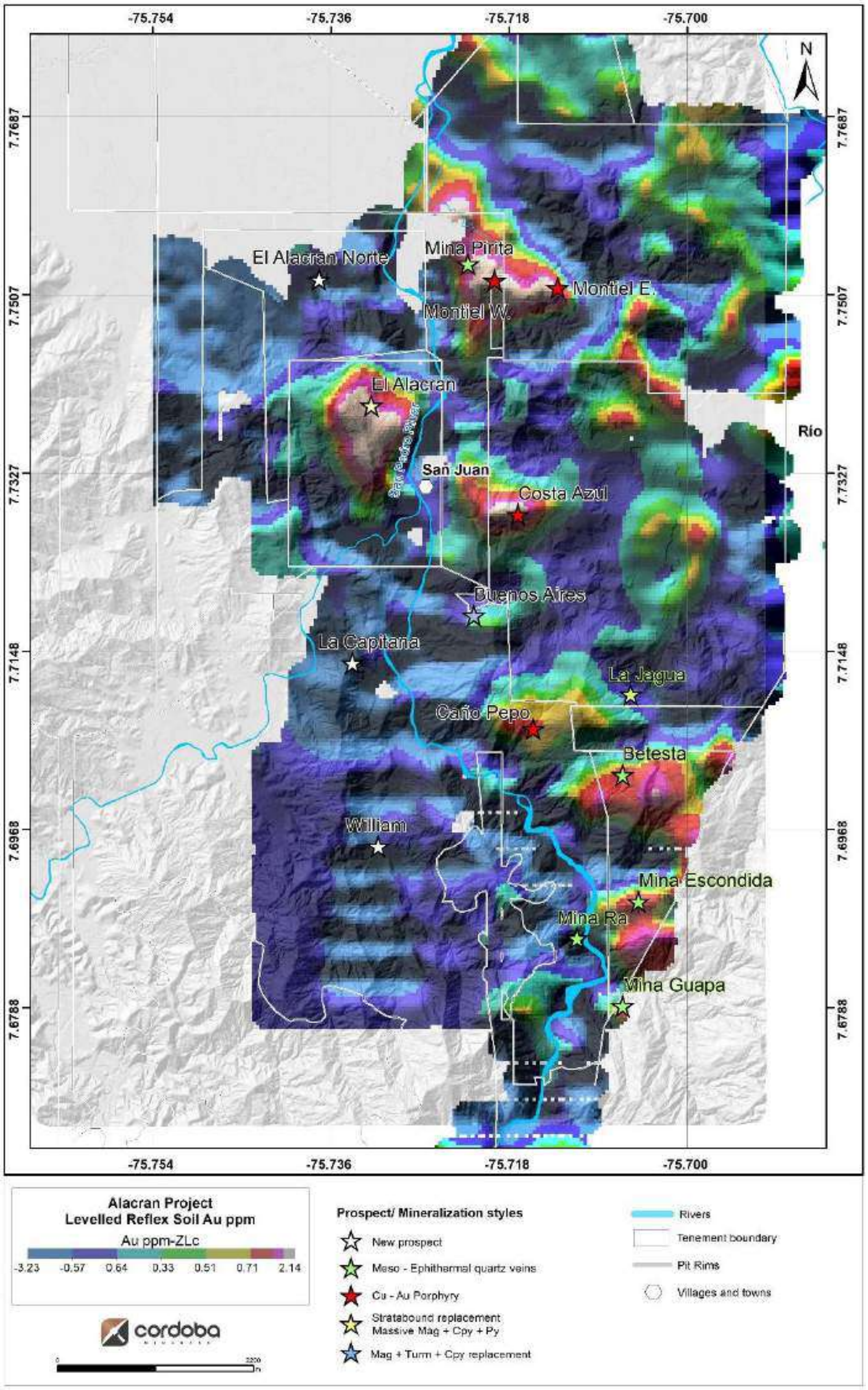
In the ground magnetic data, the El Alacrán body is shown as a strong remanently magnetized anomaly, and its signature is distinctive within the area covered by the survey. The ground magnetic data has assisted in further defining prominent structural features identified in the aeromagnetic survey data. The satellite deposits Costa Azul, Montiel East, and Montiel West do not have a significant magnetic signature; however, they are associated with broader zones of elevated magnetic response.

Figure 9.4 – Alacran Project Cu in Soils



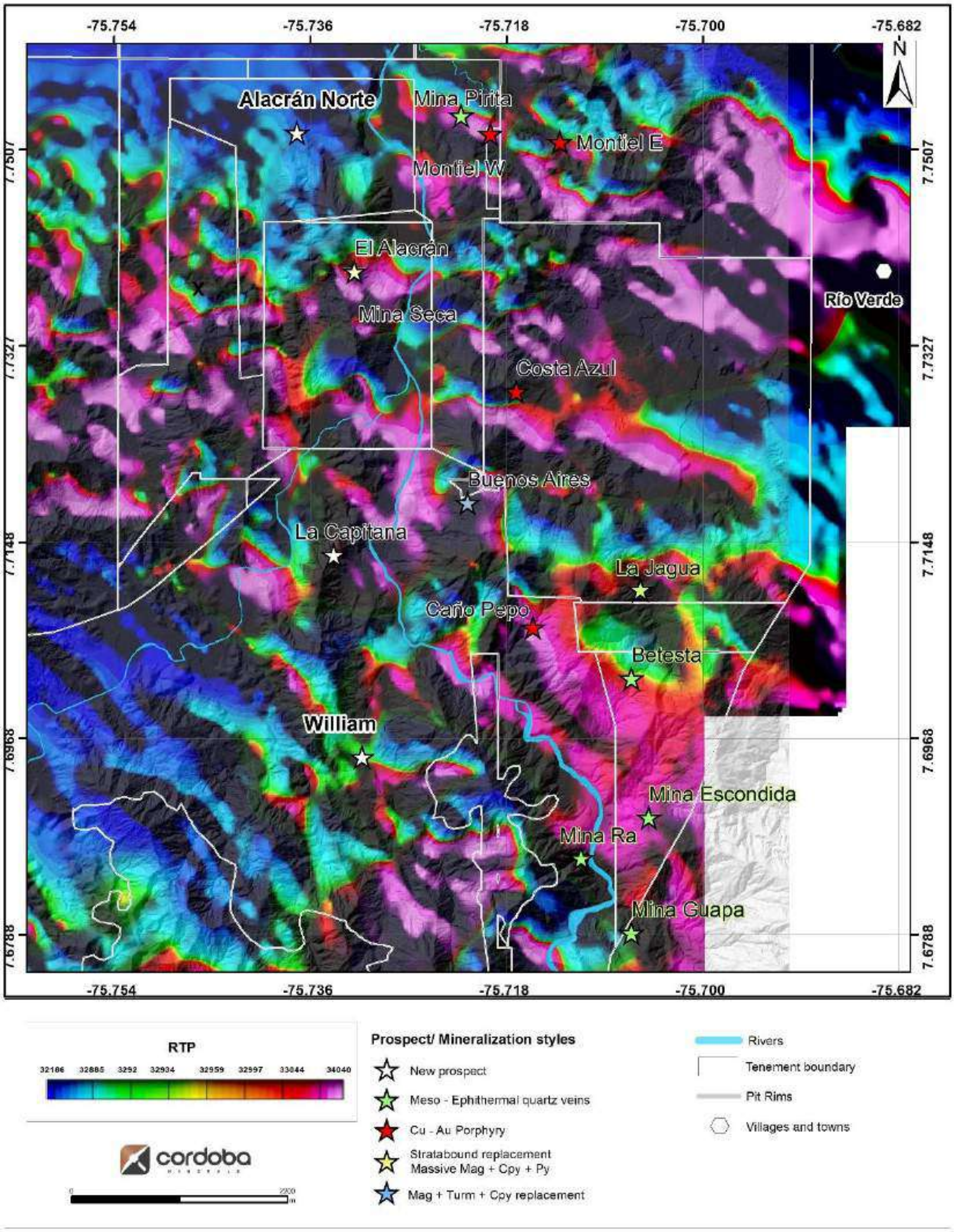
Source: Cordoba, 2023

Figure 9.5 – Alacran Project Au in Soils



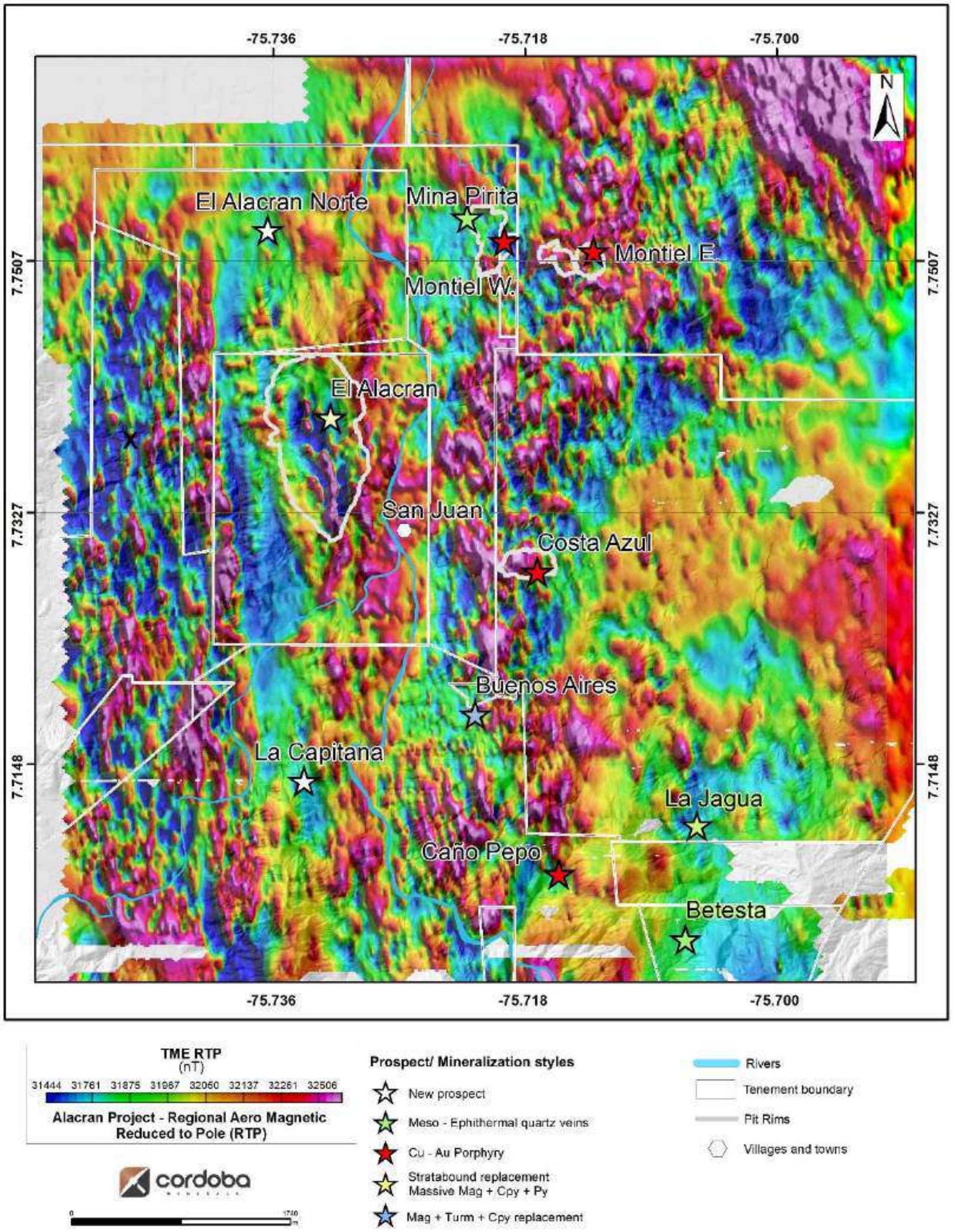
Source: Cordoba, 2023

Figure 9.6 – San Matías RTP Aeromagnetic Data for the Alacran Project District



Source: Cordoba, 2023. Map datum is WGS84.

Figure 9.7 – Alacran Project Total Magnetic Intensity-RTP Ground Magnetic Data



Source: Cordoba, 2023

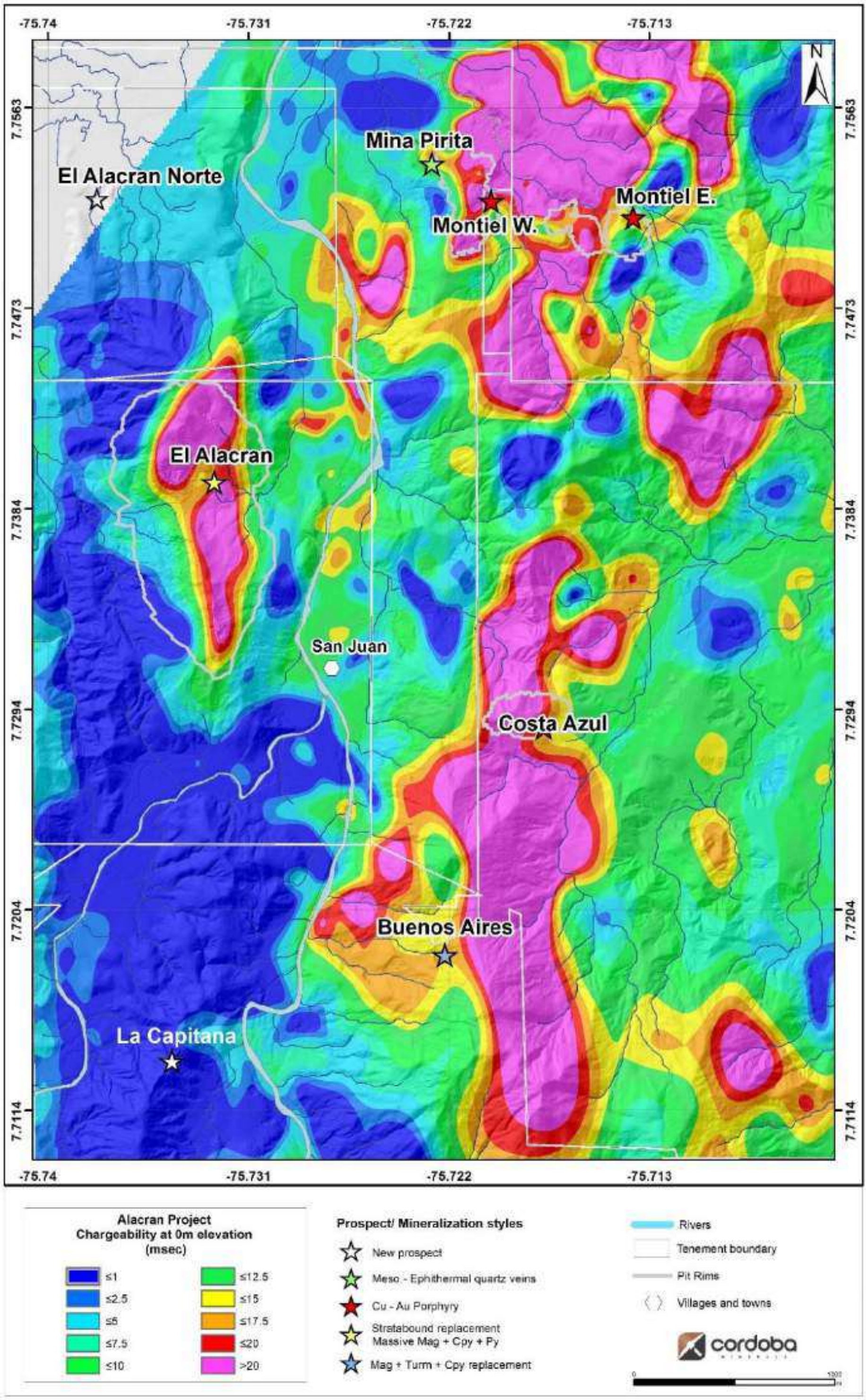
9.3.3 TYPHOON INDUCED POLARIZATION AND ELECTROMAGNETIC SURVEY

Two (2) phases of induced polarization (IP) and a trial time domain electromagnetic (TDEM) survey were carried out over the Project in 2016 using the Typhoon™ system, owned and operated by Ivanhoe Electric Inc. (IVNE). Phase 1 of the survey covered an area of approximately 7.5 km² (370.4-line km), and Phase 2 covered an area of 16.4 km² (923.0-line km). A perpendicular pole-dipole (PPD) survey design was deployed, with long transmitter wires, widely spaced transmitter electrode poles, and overlapping arrays of receiver electrodes. Receiver lines were separated by 100.0 m with receiver stations at 100.0 m intervals. S.J. Geophysics Ltd., from Vancouver, British Columbia, Canada, was responsible for data acquisition using their Volterra data acquisition system. Final data was inverted with 3D code to create 3D conductivity and chargeability models, generated by Computational Geosciences Inc. of Vancouver, British Columbia, Canada, using the UBC's Inversion software.

The survey successfully highlighted numerous zones of high chargeability and led to an expanded drilling campaign. In particular, a chargeability high, and resistivity low was observed over the El Alacrán deposit, coincident with mineralized zones. Figure 9.8 shows the chargeability results for the entire region over which the Typhoon surveys were completed.

At the end of Phase 1, a small, 8.05-line km, TDEM test survey was carried out over the El Alacrán deposit to determine if TDEM was a suitable exploration tool to detect the sulphide mineralization. Results indicated that the sulphides at El Alacrán are not connected enough to be a good EM target for the system used. However, there may be other electromagnetic receivers that would be sensitive enough to detect it.

Figure 9.8 – Merged Chargeability Results for the Two Typhoon Surveys at the Alacran Project, Shown at 0 m Elevation (approximately 200.0 m depth)



Source: Cordoba, 2023. Map datum is WGS84.

9.4 Historic Tailings

In 2022 and 2023 a total of 509 surface-collared hand-augered drilled holes were completed, totalling 1,455.1 m in length. There are a total of 1,517 assay sample records sample records in the Alacran Historical Tailings database. Figure 9.9 shows the collar locations within each of the five Tailings Zones.

Table 9.1 – Historic Tailings Summary by Year

Year	Operator	Hole Prefix	Number of Holes	Total Length (m)
2022	Cordoba	COM	477	1,376.7
2023	Cordoba	COM	32	78.3
		Total	**509**	**1455.1**

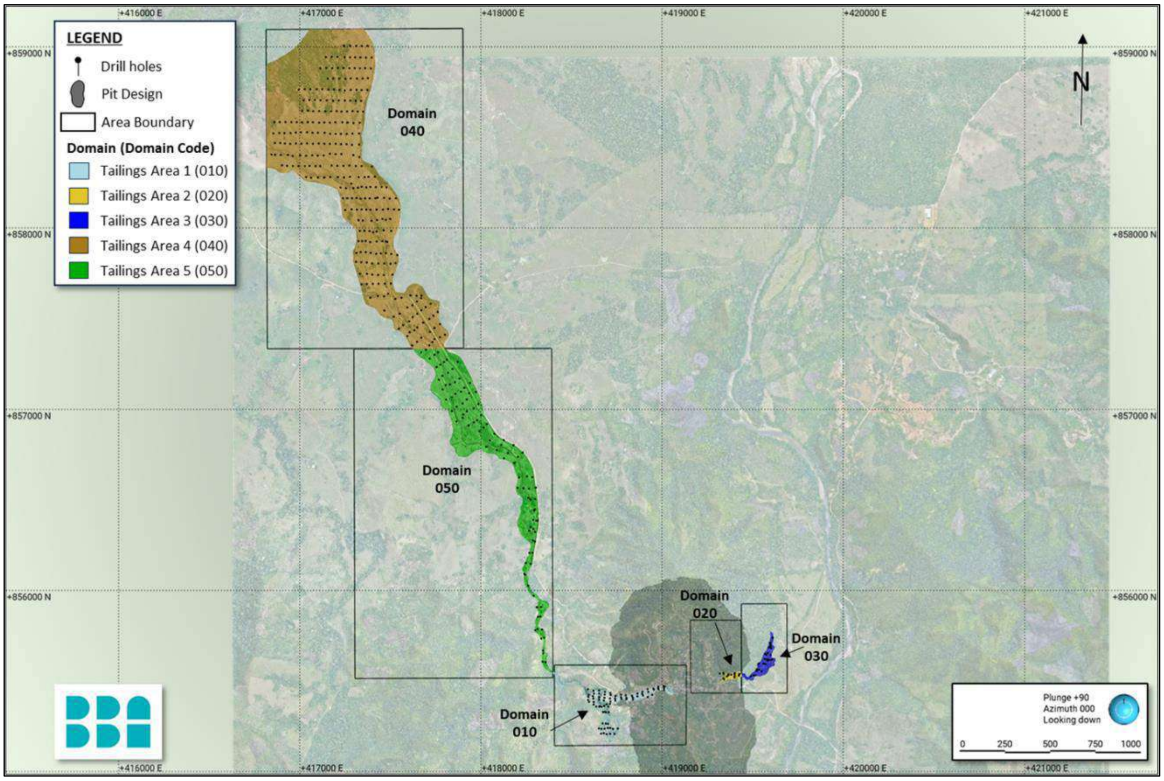
Source: BBA, 2023

Table 9.2 – Historic Tailings Summary by Domain

Domain Name	Domain Code	Code Description	Number of Holes	Total Length (m)
A1	010	Tailings Area 1	80	253.9
A2	020	Tailings Area 2	15	35.0
A3	030	Tailings Area 3	29	75.2
A4	040	Tailings Area 4	287	772.9
A5	050	Tailings Area 5	98	318.1
		Total	**509**	**1455.1**

Source: BBA, 2023

Figure 9.9 – Alacran Historical Tailings Wireframe Summary



Source: BBA, 2023

9.5 Exploration Potential

9.5.1 RESOURCE DEPOSITS

There are several areas across the Project that provide opportunities for further discoveries, and within the resource deposits, expansion of mineralization is possible. These are detailed in the following subsections.

9.5.1.1 El Alacrán Deposit

Identification of an IOCG/CRD source: mineralized stockwork and potassically-altered IOCG/CRD fragments within breccias (Figure 9.10) have been observed in Unit 1 and are a clear indication of an IOCG/CRD source. This source is thought to be genetically related and be the source of the replacement style Cu and high-grade Au mineralization. This IOCG/CRD source may lie at depth or more likely at depth along strike either to the north or south of the El Alacrán deposit. The N-S striking Valdés Fault and the San Pedro Lineament bounding the west and east sides of El Alacrán respectively, probably rule out an IOCG/CRD source west or east of the El Alacrán deposit.

Figure 9.10 – IOCG/CRD Clast with A-type veins in Dacite Breccia in El Alacrán Deposit Drill Core Hole ASA-046

Source: Cordoba, 2019

9.5.1.2 *Costa Azul*

This body is broadly conformable to the dip slope to the east, and all deeper drill holes through this roughly planar body terminate in weakly to unmineralized intrusive and “tight” basaltic volcanics.

The potential for the Costa Azul porphyry to be a tilted body with a source stock downslope to the east remains untested.

Soil geochemical evidence suggests an alignment of Cu and Au geochemistry along the ridge running NE away from the western margins of Costa Azul, indicating that there may be other untested bodies along this lineament.

The western-most drill holes were collared adjacent to a steep slope that marks the western edge of the Costa Azul deposit. All these holes were mineralized, and the mineralization appears open save for topography “daylighting”. There is potential for more mineralization downslope to the west, or at the base of the hill to the west which is untested by drilling.

9.5.1.3 *Montiel East*

Potential fault offset mineralization from the main body is possible. The Tehran fault is a clear late mineral fault that has active fault scarps and surface deformation observed in the topography. This fault may well have offset mineralization, the quantity, and location of this is unclear and was the subject of several drill hole tests.

The most successful test of this theory was SMDDH032 which was collared W of the pit and drilled to the NNE, cutting the fault at 357 m which graded over 2% CuEq over 4 m before entering a broad domain of weakly mineralized material running approximately 0.15% CuEq in excess of 100 m. The material on the north side of this fault was better mineralized than the rocks on the south side of this fault, as seen along the drill trace: the background Cu, Au, and Mo values are more than double in the former than in the latter. This intersection and observation were not followed up with additional drilling, and it may be marginal to a porphyry centre or indeed another portion of the Montiel East body.

9.5.1.4 *Montiel West*

Montiel West was long thought to be a sub-horizontal slice of mineralized stockwork in host andesites and basalts. This theory was based on the shape of the mineralized body and the sharp boundary seen in outcrop between mineralized stockwork and unmineralized andesite. In actual fact, while the thrust theory is still possible, it has not been completely confirmed in outcrop that the mineralization terminates at a thrust fault boundary.

The intrusion which created these porphyry stockwork causing fluids has not yet been located. A careful review of drill core, geophysics, and geochemistry is needed in this area to vector toward the source porphyry.

The Mina Pirita vein is very close to the Montiel West stockwork, and although their relationship is unclear, it is thought that they are related to the same mineralizing source. MWDDH008 drilled in (2017) may have intersected this vein and modelling the geometry and mineralogy of these veins may provide a vector toward the mineralizing source.

9.5.2 REGIONAL PROSPECTS

9.5.2.1 *El Alacrán Norte Prospect*

The El Alacrán Norte prospect is located 500 m north of the El Alacrán deposit. Surface features noted here provide evidence of a possible northerly extension of El Alacrán deposit-like lithology and mineralization. These features include the occurrence of hydrothermal breccias with strong oxidation (Figure 9.11), the intrusive rocks, sericite, and malachite (Cu-carbonate) occurrence. The observation of visible Au in pan concentrates provides further encouragement for a northerly extension of the El Alacrán deposit ores.

Figure 9.11 – Hydrothermal Breccias with Strong Oxidation at El Alacrán Norte

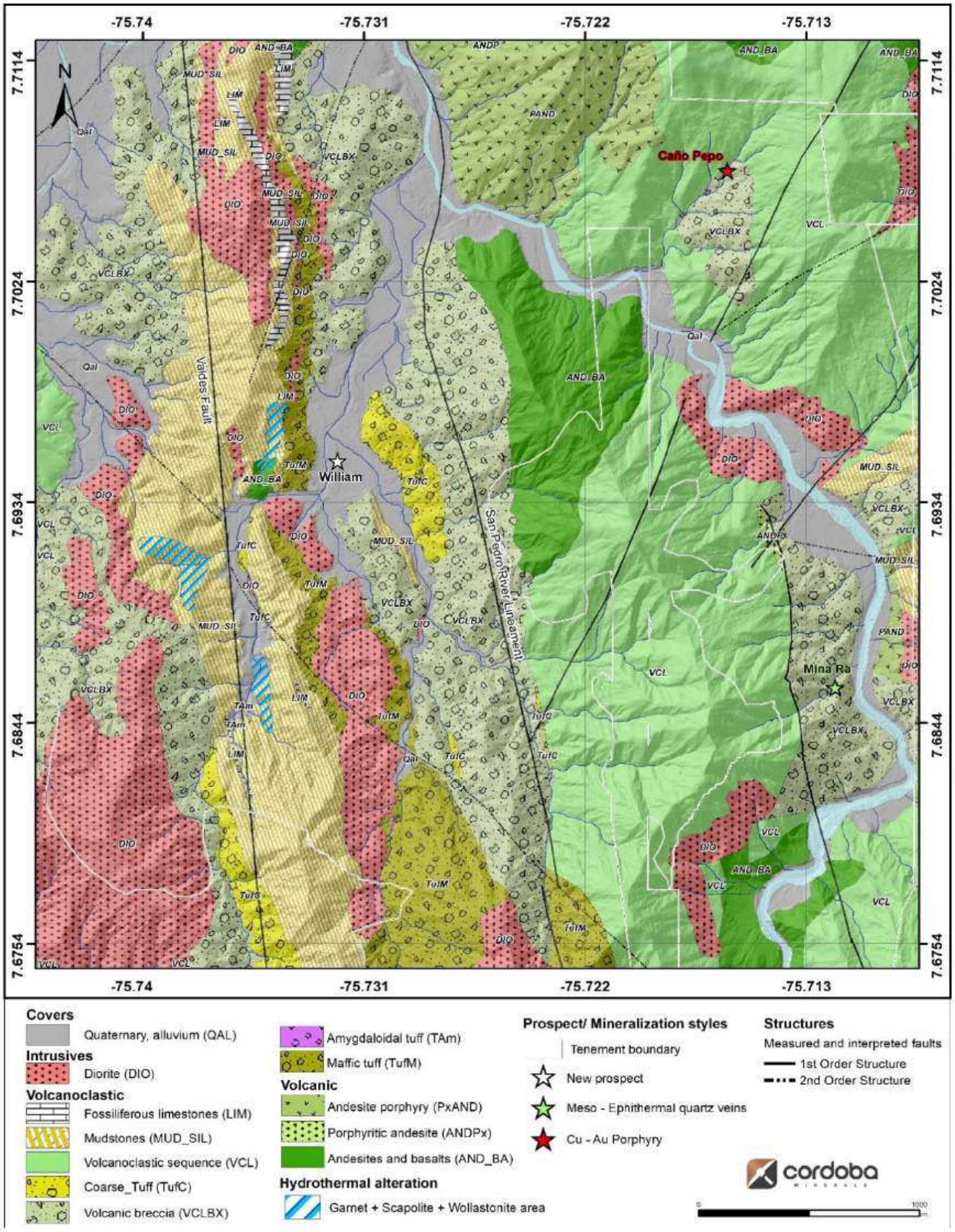
Source: Cordoba, 2019

9.5.2.2 William Prospect

The William Prospect is located 4 km south of the El Alacrán deposit and has recently been recognized as a prospective area for polymetallic mineralization (Figure 9.12). Mapping and petrographic analysis of rocks in the area have confirmed the presence of garnet, wollastonite, and scapolite alteration, which are recognized as distal metasomatic alteration products associated with skarn deposits (Meinert et al., 2005). These alteration products provide a good vector to explore for skarn-hosted mineralization. Recognition of alteration mineralogy such as this are associated with Cu grades up to 2.00% in outcrop and 8.95% in float and indicate the potential for a Cu-rich skarn system developed in the carbonate-rich sediments and volcaniclastic units hosted in the same stratigraphy that which hosts the El Alacrán deposit. The presence of metasomatic alteration would also suggest proximity to an intrusive body that might host porphyry Cu-Au mineralization, which has not yet been recognized here.

Further work in this region would include further soil sampling, ground magnetics, a Typhoon^{TM} IP survey, and trenching and or scout drilling (i.e., RAB drilling).

Figure 9.12 – William Geology Map



Source: Cordoba, 2023

10 DRILLING

10.1 El Alacrán Deposit

Diamond drilling at the El Alacrán deposit consists of 82,894 m of core from 357 PQ, HQ, and NQ diameter drill holes completed between 2011 and 2023. Table 10.1 provides a summary of the drill campaigns by year and operator. Figure 10.1 shows drill collar locations by drill campaign.

Table 10.1 – El Alacrán Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2011-2012	Ashmont	ASA	51	HQ	13,420
2015	Cordoba	ACD	3	HQ	877
2016	Cordoba	ACD	40	HQ/NQ	11,766
2017	Cordoba	ACD	39	HQ/NQ/PQ	9,669
2019	Cordoba	ACD	2	HQ	934
2021	Cordoba	ACD	9	HQ/PQ	1,654
2022	Cordoba	ACD	134	HQ/PQ	28,433
2023	Cordoba	ACD	79	HQ/PQ	16,141
		Total	**357**		**82,894**

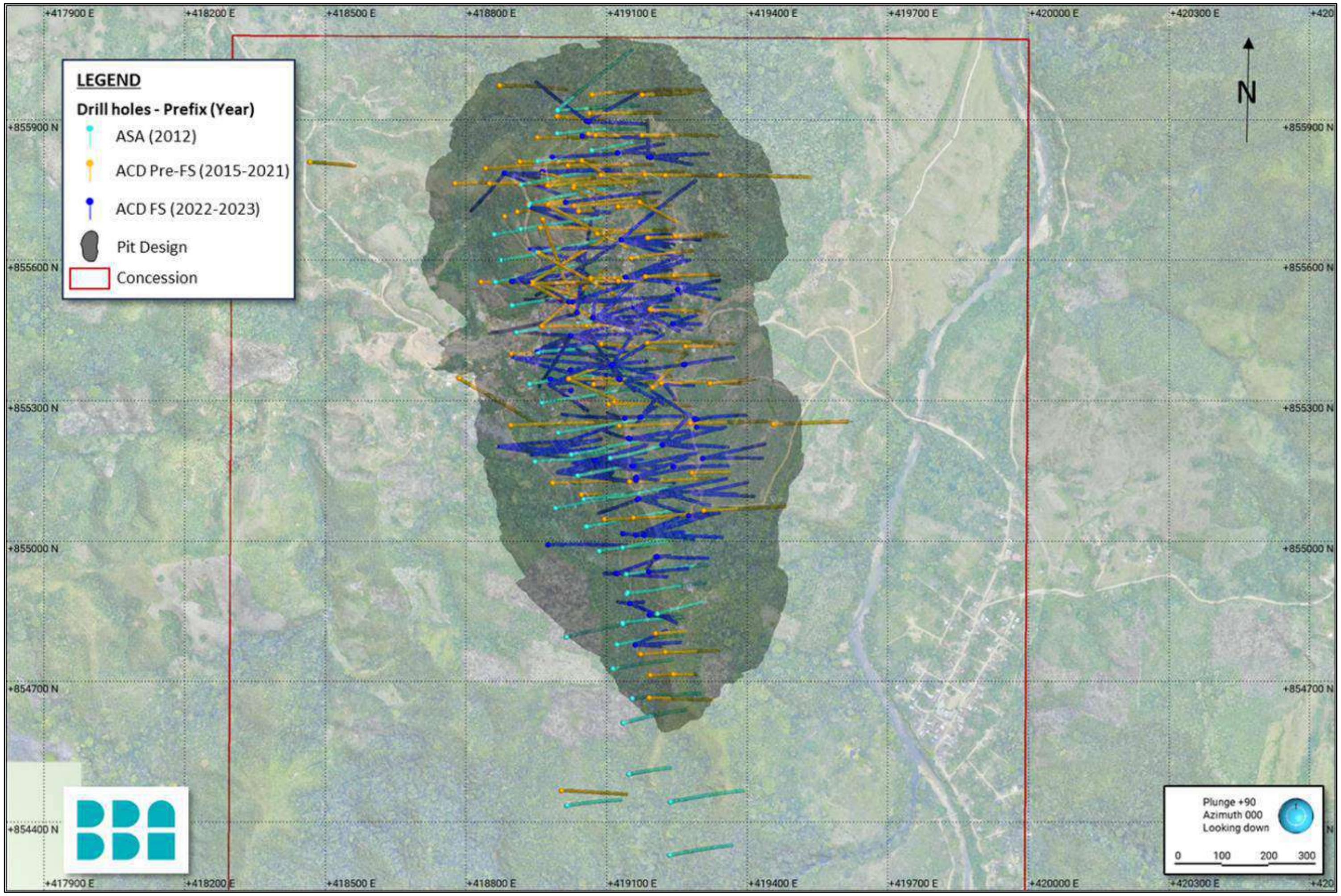
Source: BBA, 2023

10.1.1 DUAL RESOURCES DRILLING

Dual Resources drilled a total of 2,584.2 m in 15 diamond drill holes in 1987, NQ diameter, with the hole prefix “SJ”. These holes were not included in the current database since they were not surveyed downhole, and archived drill core is not available.

Holes completed by Dual Resources were drilled on 20 m to 45 m centres generally at an azimuth of 085° and a dip of -50°. The collar locations were originally reported in Bogotá West Prime Geodetic System coordinates and later translated or resurveyed in WGS 84 UTM Zone 18 N coordinates. The documentation describing Dual’s collar survey method is not available.

Figure 10.1 – Plan View of El Alacrán Deposit Diamond Drill Holes with Hole Collar Coloured by Drill Campaign



Source: BBA, 2023

10.1.2 CORDOBA DRILLING

Cordoba generally performed infill drilling at azimuths ranging from 045° to 245° and dips ranging from -45° to -85°. Most of the holes were drilled at an azimuth of 080° and dip of -50° to -60°. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

A north-seeking gyroscopic tool was used for most downhole surveys. A Reflex EZ-Trac multi-shot magnetic tool was used for four (4) holes. The Cordoba holes have between 24 and 147 downhole survey measurements per hole, depending on hole depth, typically spaced at 3.0 m intervals.

Once the core arrived at the core handling facility, the core boxes were cleaned, fully labelled, photographed, and logged for geotechnical, and geological data. Logs were completed initially on paper, later directly into an on-line acQuire^{TM} database and converted into an MX Deposit™ database. Sample intervals were marked with a nominal length of 1.0 m, ignoring lithological, or mineralization contacts.

For the 2020-2023 campaigns, geotechnical, hydrogeological, and condemnation drilling was also performed in addition to regular diamond drilling. The hole prefix for exploration/definition drilling was ACD, for condemnation was CON, for hydrogeological was HDH and HYD, and for geotechnical was DH and BH.

10.2 Satellite Deposits

The drilling located within the Costa Azul, Montiel East, and Montiel West deposits consisted of both diamond drill and RC drilling completed by Cordoba between August 2013 and May 2017. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

10.2.1 COSTA AZUL

Between 2014 and 2017, Cordoba completed a total of 4,985 m of drilling in 118 holes, including 3,301 m of RC drilling in 112 holes and 1,684 m of diamond drilling in six (6) holes with dips ranging from -45° to -90 (Table 10.2). Most of the azimuths were at 000°, 180°, and 270°, with many dips at -50°.

Table 10.2 – Costa Azul Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2014	Cordoba	CADDH	4	HQ/NQ	881.6
	Cordoba	CARAB	112	RC	3,301.0
2017	Cordoba	CADDH	2	HQ/NQ	802.2
		Total	**118**		**4,984.8**

Source: BBA, 2023

10.2.2 MONTIEL EAST

Between 2013 and 2017, Cordoba completed 11,056.7 m of drilling in 78 holes, including 1,681 m in 48 RC holes and 9,376 m in 30 diamond drill holes with dips ranging from -42° to -90 (Table 10.3). Azimuths were highly variable, and most of the dips were at -90.

Table 10.3 – Montiel East Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2013	Cordoba	SMDDH	4	HQ	575.4
2014	Cordoba	SMDDH	10	HQ	2,971.8
		MERAB	48	RC	1,681.0
2016	Cordoba	SMDDH	15	HQ/NQ	5,243.0
2017	Cordoba	SMDDH	1	PQ/HQ/NQ	585.5
		Total	**78**		**11,056.7**

Source: BBA, 2023

10.2.3 MONTIEL WEST

Between 2013 and 2017, Cordoba completed 4,055.9 m in 93 holes including 2,032 m in 85 RC holes and 2,024 m in eight (8) diamond drill holes with dips ranging from -40° to -90 (Table 10.4). Most of the azimuths were at 000° and 180°, and many of the dips were at -50° and -90.

Table 10.4 – Montiel West Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2014	Cordoba	MWDDH	7	HQ	1,706.4
		MWRAB	85	RC	2,032.0
2017	Cordoba	MWDDH	1	HQ	317.5
		Total	**93**		**4,055.9**

Source: BBA, 2023

10.3 Core Logging

The Cordoba geological logging included recording lithology, alteration, mineralization, oxidation, structure, and magnetic susceptibility. In 2017, most of the Ashmont holes were relogged by Cordoba geologists to align with Cordoba logging methodology and terminology. The current El Alacrán database has 39 unique rock types in eight lithological units. The alteration database has 18 unique codes. There are 17 unique minerals recorded in the current database, pyrite, and chalcopyrite being the most common.

10.4 Core Recovery

The current El Alacrán database has core recovery measurements for 334 Cordoba diamond drill holes and two (2) Ashmont holes. Core recovery for Cordoba holes is generally high at 95%, and similar high core recovery was observed for Ashmont drill holes inspected during the QP site visit.

10.5 Comments on Section 10

In the opinion of the QP, the quantity, and quality of the lithological, collar, downhole survey, and SG data collected in the exploration programs are sufficient to support the Mineral Resource Estimate.

- Core and RC logging completed by Cordoba and previous operators meet industry standards for exploration on replacement and porphyry deposits;
- Collar surveys and downhole surveys were performed using industry standard instrumentation;
- Recovery data from core drilling programs was of good quantity and acceptable;
- Drill hole orientations are appropriate for the mineralized style; and
- Drill hole intercepts demonstrate that sampling is representative for the various mineralized low and HG domains.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Assay Sample Preparation and Analysis

11.1.1 DUAL RESOURCES DRILLING

No formal documented processes were found with respect to sample preparation and analysis for work completed by Dual Resources.

11.1.2 ASHMONT DRILLING

Drill core, as sampled by Ashmont under the supervision of Luis Oviedo, P. Geo., of South American Management SA (SAMSA) of Santiago Chile, was split with a mechanical splitter, with one half of the core placed in a pre-marked plastic sample bag, and the other half returned to the core box. Core pieces were weighed prior to sampling, and the bagged samples were weighed after splitting to ensure that the splits approximated half the core. Sample bags were sealed to ensure sample integrity.

All samples were prepared by ALS Minerals in Medellín, Colombia. ALS Minerals is a laboratory certified to International Standards ISO/IEC 17025:2005 and ISO 9001:2015. The samples were dried, crushed to 70% passing 2.0 mm, riffle split, and a 250 g split pulverized to 85% passing 75 µm.

Samples were analyzed at ALS Minerals laboratories in Chile, Peru, and Canada. Au was analyzed by fire assay on a 50 g aliquot with an Atomic Absorption Spectroscopy (AAS) finish (method Au-AA24). Samples above the upper limit of detection of 10.0 ppm were reanalyzed by fire assay on a 50 g aliquot with a gravimetric finish (method ME-GRA22). Multi-elements were analyzed by four-acid digestion of a 0.25 g sample with Inductively coupled plasma atomic emission spectroscopy (ICP-AES) finish for 33 elements (method ME-ICP61). Samples above the upper detection limit of 10,000 ppm Cu were reanalyzed by four-acid digestion with ICP-AES finish (method Cu-OG62).

All the sample preparation and analysis were completed by accredited laboratories and at no time were employees of Ashmont involved directly with the preparation or analysis.

11.1.3 CORDOBA DRILLING

Drill core sampled by Cordoba was numbered using consecutive sample numbers, with a sample label stuck to the core box labelled with the hole number and sample interval. The core was cut lengthwise by a diamond saw along a cut line marked by a geologist (Figure 11.1). One half of the sample was placed in a plastic sample bag, double-bagged, labelled and sealed with a cable tie, and the other half returned to the core box for reference (Figure 11.2). Fabric bags, also sealed by cable tie, were used to hold about four samples each for transportation (Figure 11.1).

Figure 11.1 – Core Cutting Facility

Source: BBA, 2022

Figure 11.2 – Sample Selection

Source: BBA, 2022

Figure 11.3 – Secured Samples

Source: BBA, 2022

Most of the samples were prepared by ALS Minerals in Medellín, Colombia. The samples were dried, crushed to 70% passing 2.0 mm riffle split, and a 1 kg split pulverized to 85% passing 75 µm. Due to a back log in the preparation and analysis of the samples, Cordoba started sending samples to SGS Peru in July 2022 in addition to the samples being sent to ALS.

Samples were analyzed at the ALS laboratory in Lima, Peru. Au was analyzed by fire assay on a 50 g aliquot with an AAS finish (method Au-AA24). Samples above the upper limit of detection of 10.0 ppm were reanalyzed by fire assay on a 50 g aliquot with a gravimetric finish (method Au-GRA22). Multi-elements were analyzed by four-acid digestion of a 0.25 g sample with ICP finish for 48 elements (method ME-MS41, ME-OG62). Samples with grades above the 2,000 ppm Cu were reanalyzed by four-acid digestion with ICP-AES finish (method Cu-OG62). Samples above the upper limit of detection for Ag (100 ppm), Zn (10,000 ppm) and S (10.0%) were reanalyzed by four-acid digestion with ICP-AES finish (methods Ag-OG62, Zn-OG62, S-OG62).

Samples were analyzed at the SGS laboratory in Lima, Peru. Au was analyzed by fire assay on a 50 g aliquot with an AAS finish (method FAA515). Samples above the upper limit of detection of 10.0 ppm were reanalyzed by fire assay on a 50 g aliquot with a gravimetric finish (method Au-GRA22). Multi-elements were analyzed by four-acid digestion of a 0.25 g sample with ICP finish for 48 elements (method ICM40B). Samples with grades above the 2,000 ppm Cu were reanalyzed by four-acid digestion with ICP-AES finish (method AAS41B).

All the sample preparation and analysis were completed by accredited laboratories and at no time were employees of Cordoba involved directly with the preparation or analysis.

11.2 Quality Assurance/Quality Control Programs

QC measures were set in place to ensure the reliability and trustworthiness of exploration data. These measures include written field procedures and independent verifications of aspects such as drilling, surveying, sampling, and assaying, data management, and database integrity. Appropriate documentation of quality control measures and regular analysis of QC data are essential as a safeguard for Project data and form the basis for the QA program implemented during exploration.

Analytical QC measures involve internal and external laboratory procedures implemented to monitor the precision and accuracy of the sample preparation and assay data. They are also important to identify potential sample sequencing errors and to monitor for contamination of samples.

Sampling and analytical QA/QC protocols typically involve taking duplicate samples and inserting quality control samples (CRM and blanks) to monitor the reliability of the assay results throughout the drill program. Umpire check assays are typically performed to evaluate the primary lab for bias and involve re-assaying a set proportion of sample rejects and pulps at a secondary umpire laboratory.

The QP reviewed and modified the Cordoba QAQC program in 2022 to better suit an advanced program supporting an FS. Cordoba implemented the changed in 2022 and the QP monitored the program on a regular basis during the 2022-2023 drill program.

11.2.1 DUAL RESOURCES

Dual Resources used field and laboratory duplicates as the basis of their QA/QC program. As the documentation for the Dual Resources programs were not available, the results not used in the geological or resource modelling, the QP did not review the QAQC result of the Dual resources samples.

11.2.2 ASHMONT

Ashmont used blanks and duplicates as the basis of their QA/QC program. Three (3) standards, approximating the low, medium, and HG portions of the anticipated grade spectrum were used. Ashmont inserted one of three certified standard reference materials for every 13 samples, one coarse blank or fine blank every 50 samples, one half-core duplicate for every 40 samples, one coarse reject duplicate, or pulp duplicate every 20 samples. The Company also analyzed duplicates at a second laboratory, ACME Analytical Laboratories Colombia S.A.S (ACME). Documentation summarizing the Ashmont QA/QC monitoring procedures and responses to failures has not been located.

11.2.3 CORDOBA

Cordoba inserted one CRMs, one coarse blank, and one field duplicate in every batch of 25 samples. During the 2020 and 2021 sampling programs no field duplicates were sent to the lab as the remaining core halves were utilized for metallurgical testing. The field duplicate submission was re-started in the 2022-2023 drilling program.

11.2.4 EL ALACRÁN DEPOSIT

11.2.4.1 Standards

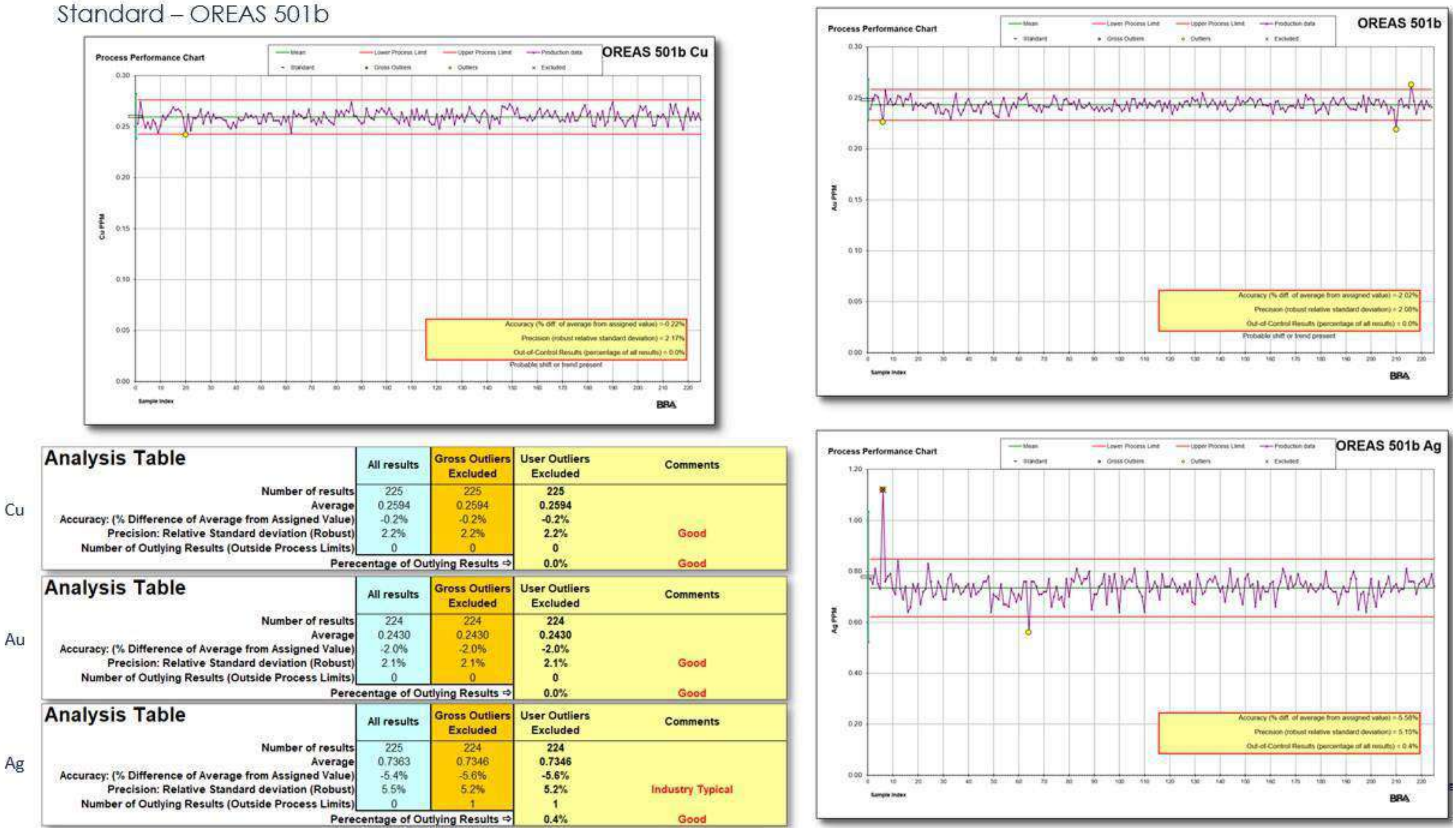
The standard from the Ashmont and Cordoba drill programs were charted together to highlight any bias between labs during different drill programs. A total of 17 standards with more than 20 samples submitted were charted. Nine (9) standards did not contain enough data points to make reliable charts. The standards submission counts are summarized in Table 11.1. Figure 11.4 is an example of the standard chart.

Table 11.1 – El Alacrán Standard Submission Count

Standard	Submission Count
CDN-CM-25	30
CDN-CM-27	35
CDN-CM-35	155
OREAS12a	265
OREAS501b	225
OREAS501d	393
OREAS502	267
OREAS502b	158
OREAS503	33
OREAS503b	204
OREAS503d	215
OREAS504	27
OREAS504b	131
OREAS507	357
OREAS523	23
OREAS901	33
OREAS904	33

Source: BBA, 2023.

Figure 11.4 – OREAS 501b Standard Chart at El Alacrán



Cu

Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	225	225	225	
Average	0.2594	0.2594	0.2594	
Accuracy: (% Difference of Average from Assigned Value)	-0.2%	-0.2%	-0.2%	
Precision: Relative Standard deviation (Robust)	2.2%	2.2%	2.2%	Good
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇨			0.0%	Good

Au

Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	224	224	224	
Average	0.2430	0.2430	0.2430	
Accuracy: (% Difference of Average from Assigned Value)	-2.0%	-2.0%	-2.0%	
Precision: Relative Standard deviation (Robust)	2.1%	2.1%	2.1%	Good
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇨			0.0%	Good

Ag

Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	225	224	224	
Average	0.7363	0.7346	0.7346	
Accuracy: (% Difference of Average from Assigned Value)	-5.4%	-5.6%	-5.6%	
Precision: Relative Standard deviation (Robust)	5.5%	5.2%	5.2%	Industry Typical
Number of Outlying Results (Outside Process Limits)	0	1	1	
Perecentage of Outlying Results ⇨			0.4%	Good

Source: BBA, 2023

11.2.4.2 *Blanks*

A total of nine (9) types of blanks were charted, six are commercial purchased blanks and three (3) were locally sources.

The blanks submitted are summarized in Table 11.2. Figure 11.5 is an example of a blank chart.

Table 11.2 – Blanks Submission Summary

Standard	Material Type	Submission Count
20a	Commercial	352
22c	Commercial	220
22d	Commercial	142
23a	Commercial	27
25a	Commercial	11
66a	Commercial	272
Fine Quarry	Local source	67
Fine	Local source	266
Course	Local source	1,387

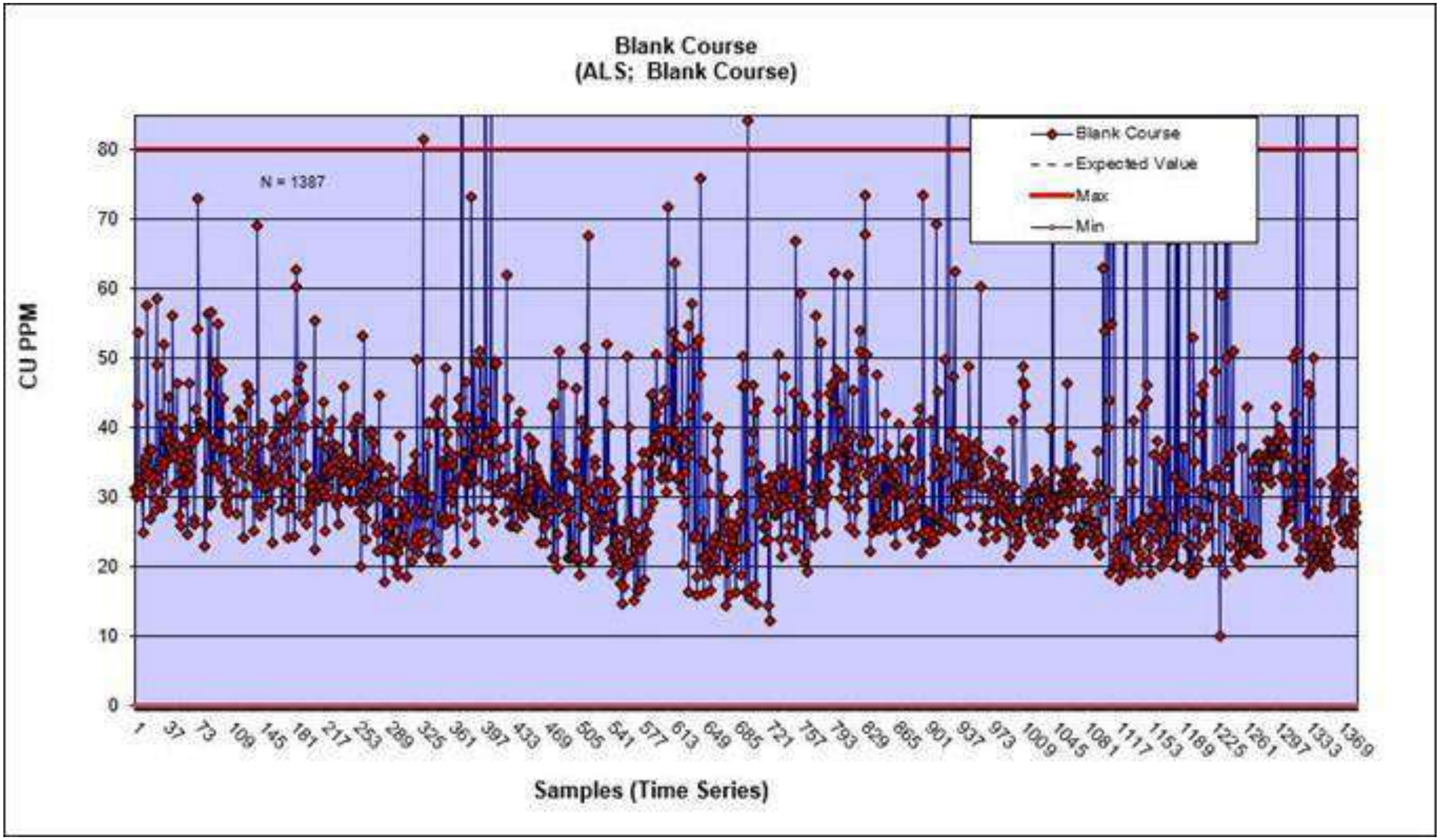
Source: BBA, 2023.

It should be noted the blanks charted show signs of elevated results compared to typical blank charts. This is not uncommon in “mine” environments, where the detection limit used for analysis is set for “grassroot” exploration and on an “ore” grade environment. A periodic over-limit sample is to be expected in the mine environment.

11.2.4.3 *Field Duplicates*

Cordoba submitted 649 field duplicates. Field duplicate pair results show reasonable variability for Cu (Figure 11.6).

Figure 11.5 – El Alacrán Coarse Blanks, Cu ppm

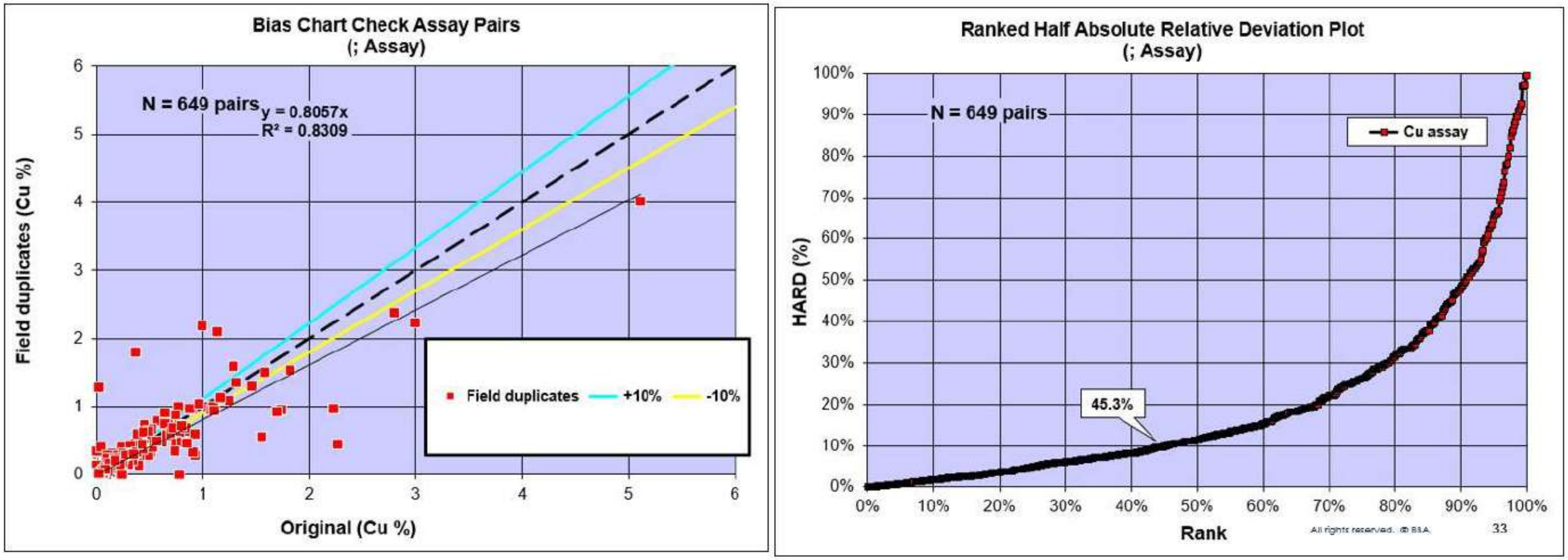


Source: BBA, 2023

Figure 11.6 – Field Duplicates for Cu (ppm) by Cordoba for the El Alacrán Deposit

Project	Alacran
Data Series	Field duplicates
Data Type	Assay
Commodity	Cu in %
Analytical Method	0
Detection Limit	0
Original Dataset	Original
Paired Dataset	Field duplicates

Statistics	Original Cu %	Duplicate Cu %
Sample Count	649	649
Minimum Value	0.00	0.00
Maximum Value	5.11	4.02
Mean	0.16	0.15
Median	0.03	0.03
Standard Error	0.02	0.01
Standard Deviation	0.38	0.34
Correlation Coefficient	0.8947	
Pairs ≤ 10% HARD	45.3%	



Source: BBA, 2023

11.2.5 COSTA AZUL

11.2.5.1 Standards

A total of nine (9) standards were used during the Costa Azul drill programs. Nine (9) standards did not contain enough data points to make reliable charts.

11.2.5.2 Blanks

A total of two (2) types of blanks were charted, both are commercial purchased blanks.

The blanks submitted are summarized in Table 11.3. Figure 11.7 is an example of a blank chart.

Table 11.3 – Blanks Submission Summary

Standard	Material Type	Submission Count
2a	Commercial	13
FB1	Commercial	24

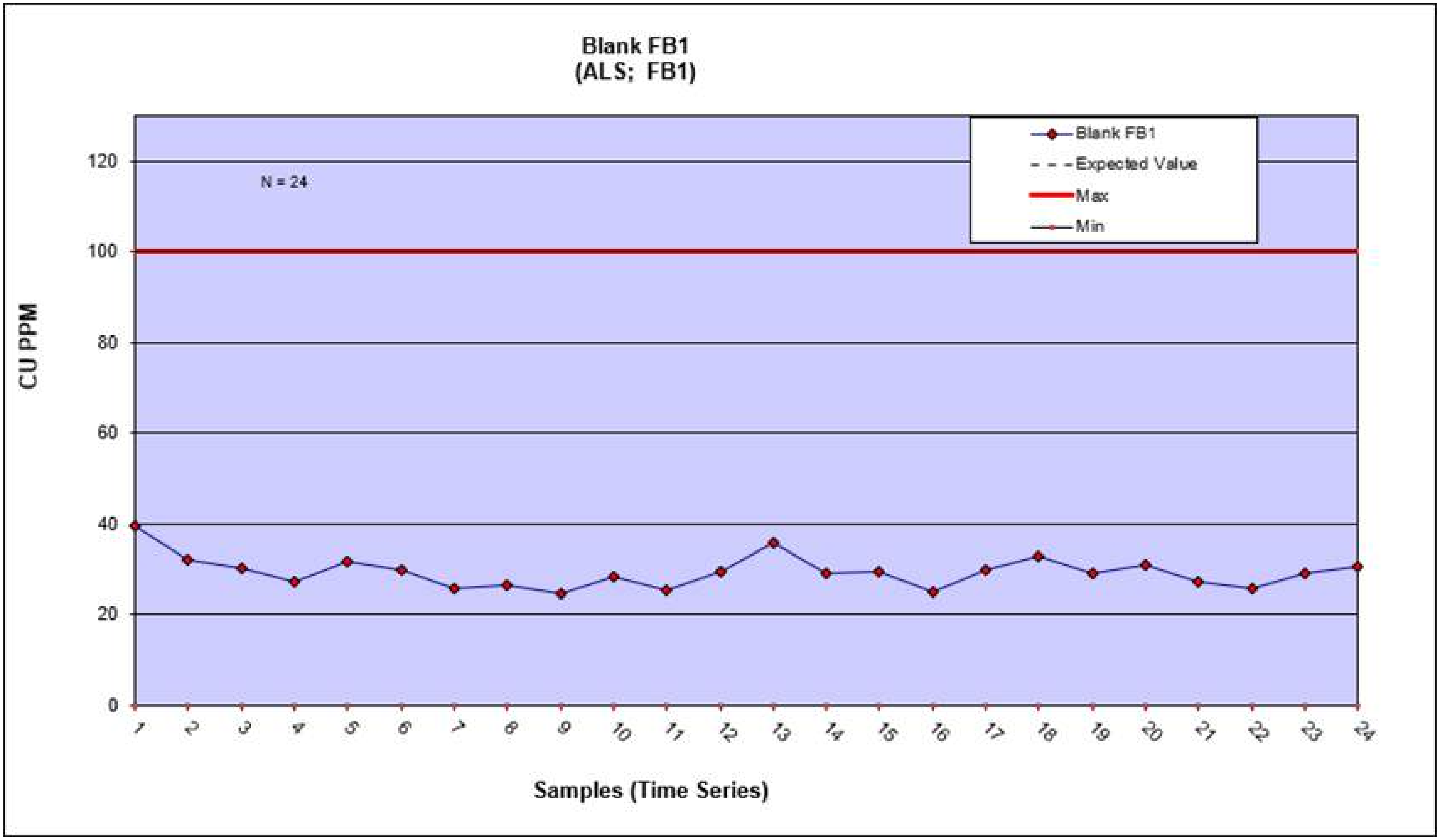
Source: BBA, 2023.

It should be noted the blanks charted show signs of elevated results compared to typical blank charts. This is not uncommon in “mine” environments, where the detection limit used for analysis is set for “grassroot” exploration and on an “ore” grade environment. A periodic over-limit sample is to be expected in the mine environment.

11.2.5.3 Field Duplicates

Cordoba submitted 649 field duplicates. Field duplicate pair results show reasonable variability for Cu (Figure 11.8).

Figure 11.7 – Costa Azul Blanks, Cu ppm

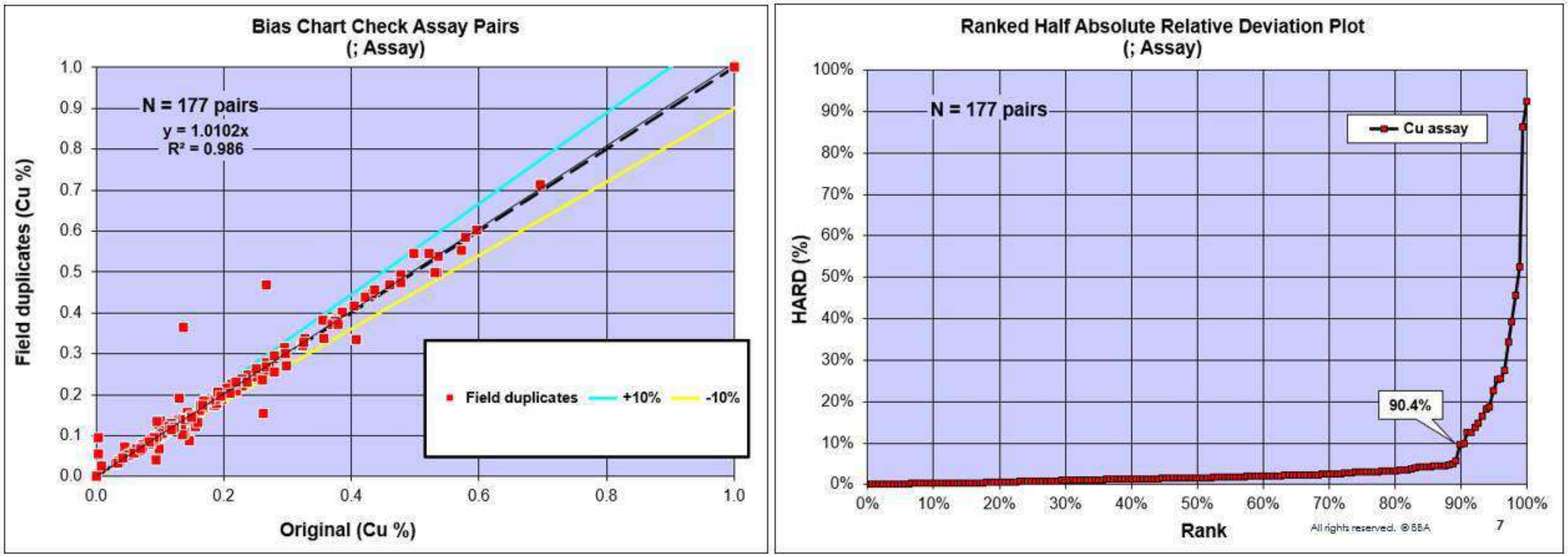


Source: BBA, 2023

Figure 11.8 – Field Duplicates for Cu (ppm) by Cordoba for the Costa Azul Deposit

Project	Costa Azul
Data Series	Field duplicates
Data Type	Assay
Commodity	Cu in %
Analytical Method	0
Detection Limit	0
Original Dataset	Original
Paired Dataset	Field duplicates

Statistics	Original Cu %	Duplicate Cu %
Sample Count	177	177
Minimum Value	0.00	0.00
Maximum Value	1.00	1.00
Mean	0.20	0.20
Median	0.15	0.15
Standard Error	0.01	0.01
Standard Deviation	0.15	0.15
Correlation Coefficient	0.9806	
Pairs ≤ 10% HARD	90.4%	



Source: BBA, 2023

11.2.6 MONTIEL EAST

11.2.6.1 Standards

The standard from the Ashmont and Cordoba drill programs were charted together to highlight any bias between labs during different drill programs. A total of three (3) standards with more than 20 samples submitted were charted. Seven (7) standards did not contain enough data points to make reliable charts. The standards submission counts are summarized in Table 11.4. Figure 11.9 is an example of the standard chart.

Table 11.4 – El Alacrán Standard Submission Count

Standard	Submission Count
CDN-CM-35	155
OREAS501b	77
OREAS504b	29

Source: BBA, 2023.

11.2.6.2 Blanks

A total of three (3) types of blanks were charted, both are commercial purchased blanks.

The blanks submitted are summarized in Table 11.5. Figure 11.10 is an example of a blank chart.

Table 11.5 – Blanks Submission Summary

Standard	Material Type	Submission Count
22c	Commercial	42
23a	Commercial	29
FB1	Commercial	103

Source: BBA, 2023.

It should be noted the blanks charted show signs of elevated results compared to typical blank charts. This is not uncommon in “mine” environments, where the detection limit used for analysis is set for “grassroot” exploration and on an “ore” grade environment. A periodic over-limit sample is to be expected in the mine environment.

11.2.6.3 Field Duplicates

Cordoba submitted 348 field duplicates. Field duplicate pair results show reasonable variability for Cu (Figure 11.11).

Figure 11.9 – CDN-CM-35 Standard Chart at Montiel East

Cu

Analysis Table

	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	155	155	155	
Average	0.2470	0.2470	0.2470	
Accuracy: (% Difference of Average from Assigned Value)	1.7%	1.7%	1.7%	
Precision: Relative Standard deviation (Robust)	2.6%	2.6%	2.6%	Good
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

Au

Analysis Table

	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	37	37	37	
Average	0.3197	0.3197	0.3197	
Accuracy: (% Difference of Average from Assigned Value)	-1.3%	-1.3%	-1.3%	
Precision: Relative Standard deviation (Robust)	5.1%	5.1%	5.1%	Industry Typical
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

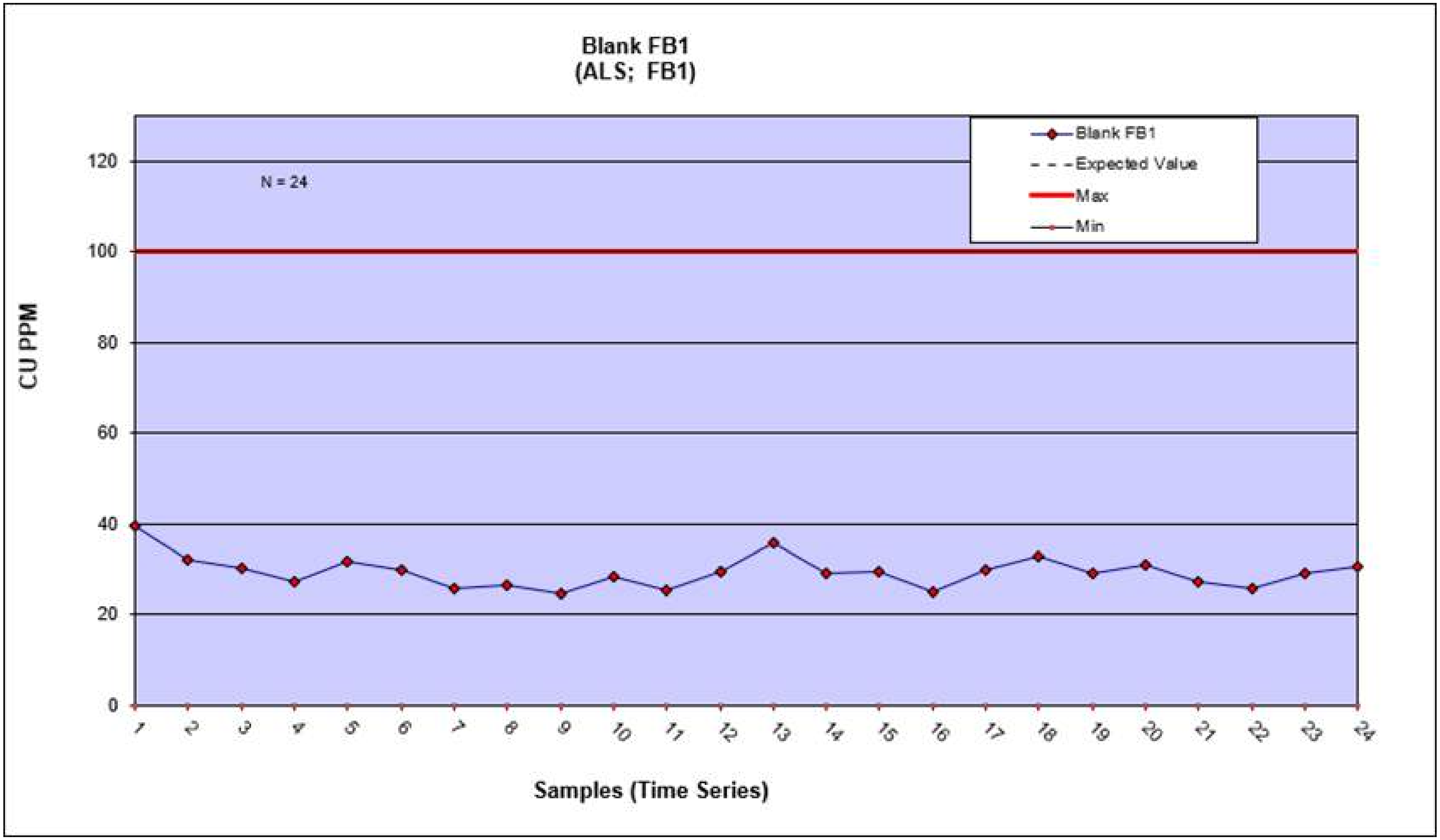
Ag

Analysis Table

	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	37	37	37	
Average	2.6765	2.6765	2.6765	
Accuracy: (% Difference of Average from Assigned Value)	2.9%	2.9%	2.9%	
Precision: Relative Standard deviation (Robust)	3.7%	3.7%	3.7%	Industry Typical
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

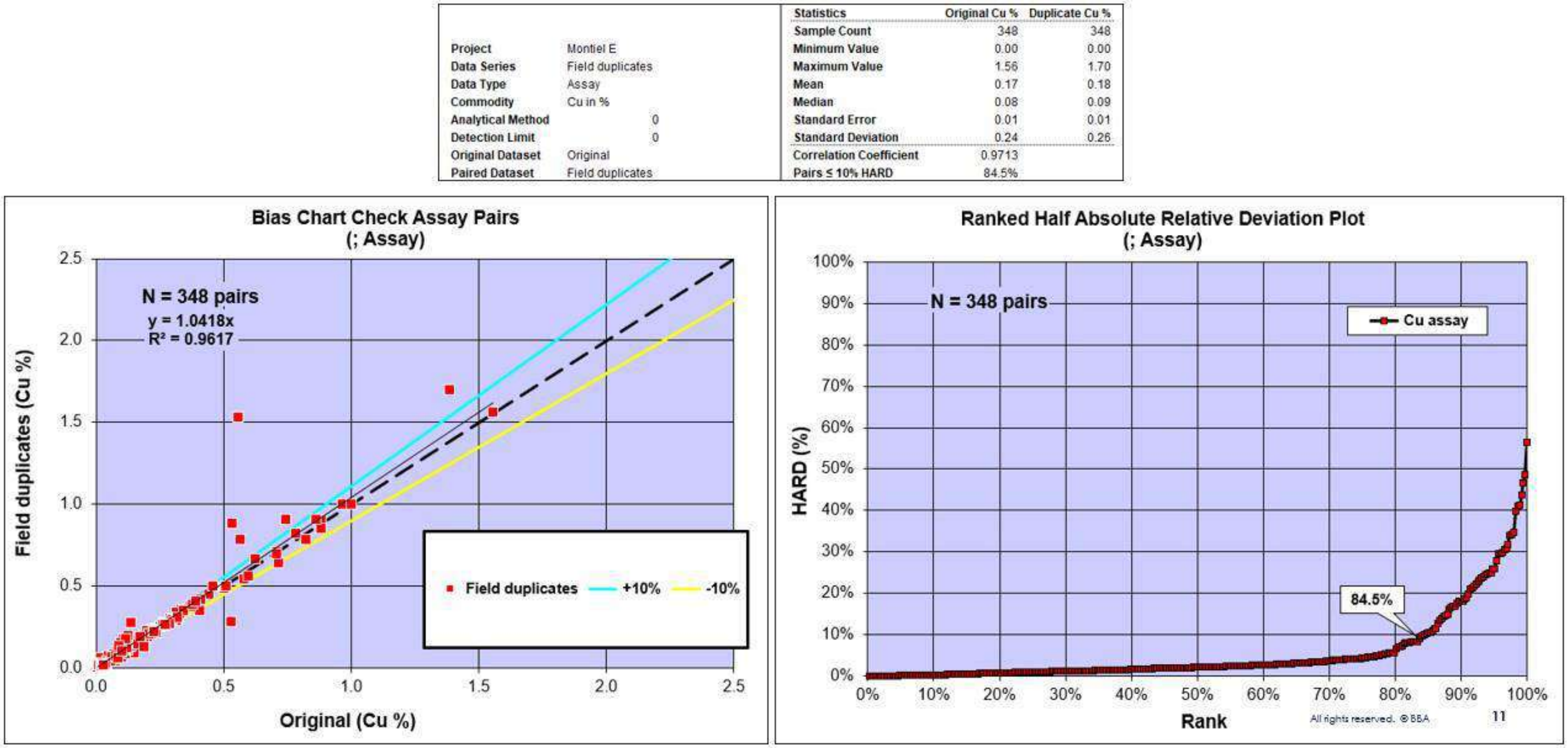
Source: BBA, 2023

Figure 11.10 – Montiel East Blanks, Cu ppm



Source: BBA, 2023

Figure 11.11 – Field Duplicates for Cu (ppm) by Cordoba for the Montiel East Deposit



Project	Montiel E
Data Series	Field duplicates
Data Type	Assay
Commodity	Cu in %
Analytical Method	0
Detection Limit	0
Original Dataset	Original
Paired Dataset	Field duplicates

Statistics	Original Cu %	Duplicate Cu %
Sample Count	348	348
Minimum Value	0.00	0.00
Maximum Value	1.56	1.70
Mean	0.17	0.18
Median	0.08	0.09
Standard Error	0.01	0.01
Standard Deviation	0.24	0.26
Correlation Coefficient	0.9713	
Pairs ≤ 10% HARD	84.5%	

Source: BBA, 2023

11.2.7 MONTIEL WEST

11.2.7.1 Standards

The standard from the Ashmont and Cordoba drill programs were charted together to highlight any bias between labs during different drill programs. A total of two (2) standards with more than 20 samples submitted were charted. Five (5) standards did not contain enough data points to make reliable charts. The standards submission counts are summarized in Table 11.6. Figure 11.12 is an example of the standard chart.

Table 11.6 – El Alacrán Standard Submission Count

Standard	Submission Count
CDN-CM-35	31
OREAS501b	43

Source: BBA, 2023.

11.2.7.2 Blanks

One (1) type of blank was charted, both are commercial purchased blanks.

The blanks submitted are summarized in Table 11.7. Figure 11.13 is an example of a blank chart.

Table 11.7 – Blanks Submission Summary

Standard	Material Type	Submission Count
FB1	Commercial	104

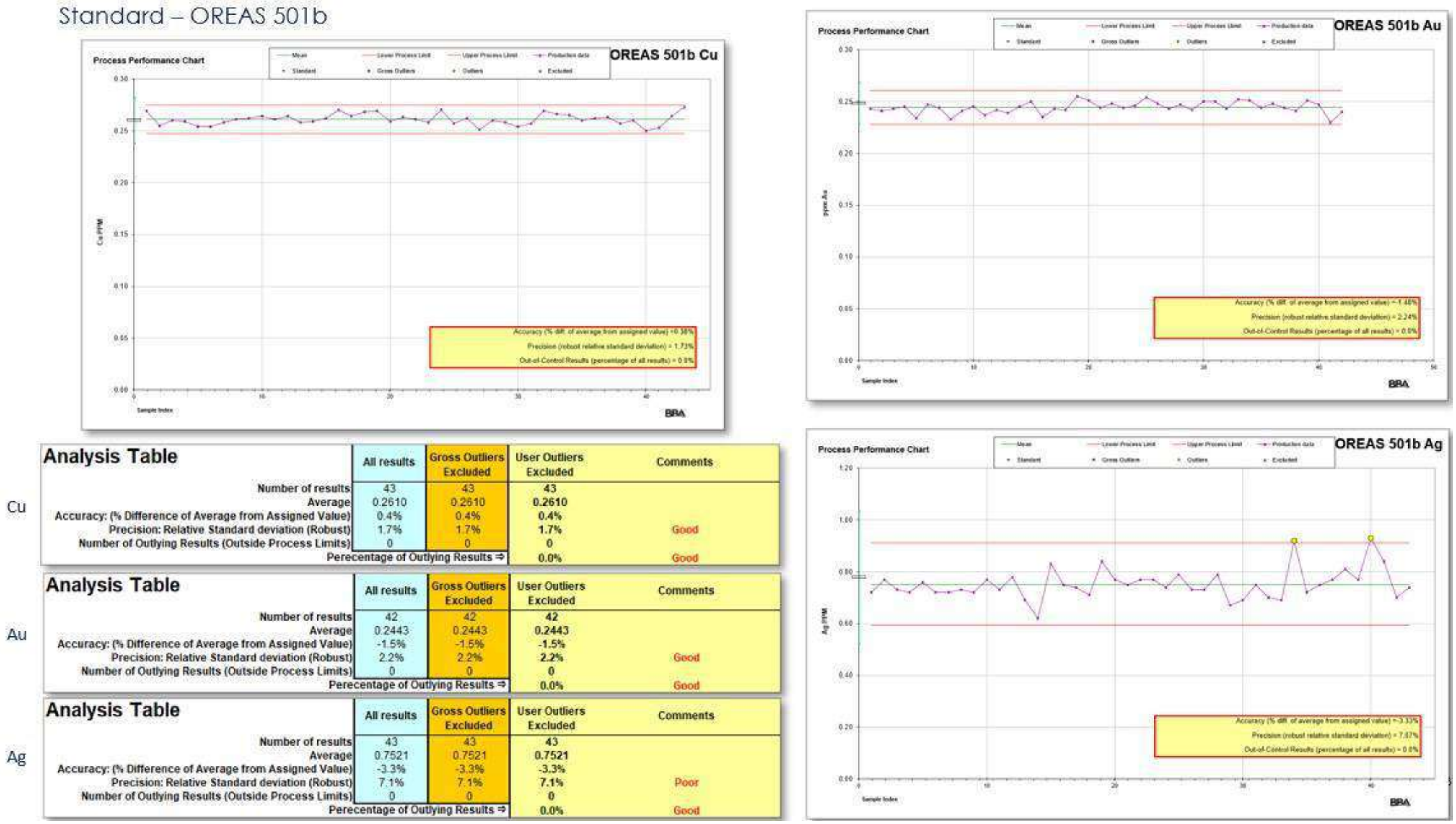
Source: BBA, 2023.

It should be noted the blanks charted show signs of elevated results compared to typical blank charts. This is not uncommon in “mine” environments, where the detection limit used for analysis is set for “grassroot” exploration and on an “ore” grade environment. A periodic over-limit sample is to be expected in the mine environment.

11.2.7.3 Field Duplicates

Cordoba submitted 136 field duplicates. Field duplicate pair results show reasonable variability for Cu (Figure 11.14).

Figure 11.12 – OREAS501b Standard Chart at Montiel West



Cu

Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	43	43	43	
Average	0.2610	0.2610	0.2610	
Accuracy: (% Difference of Average from Assigned Value)	0.4%	0.4%	0.4%	
Precision: Relative Standard deviation (Robust)	1.7%	1.7%	1.7%	Good
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

Au

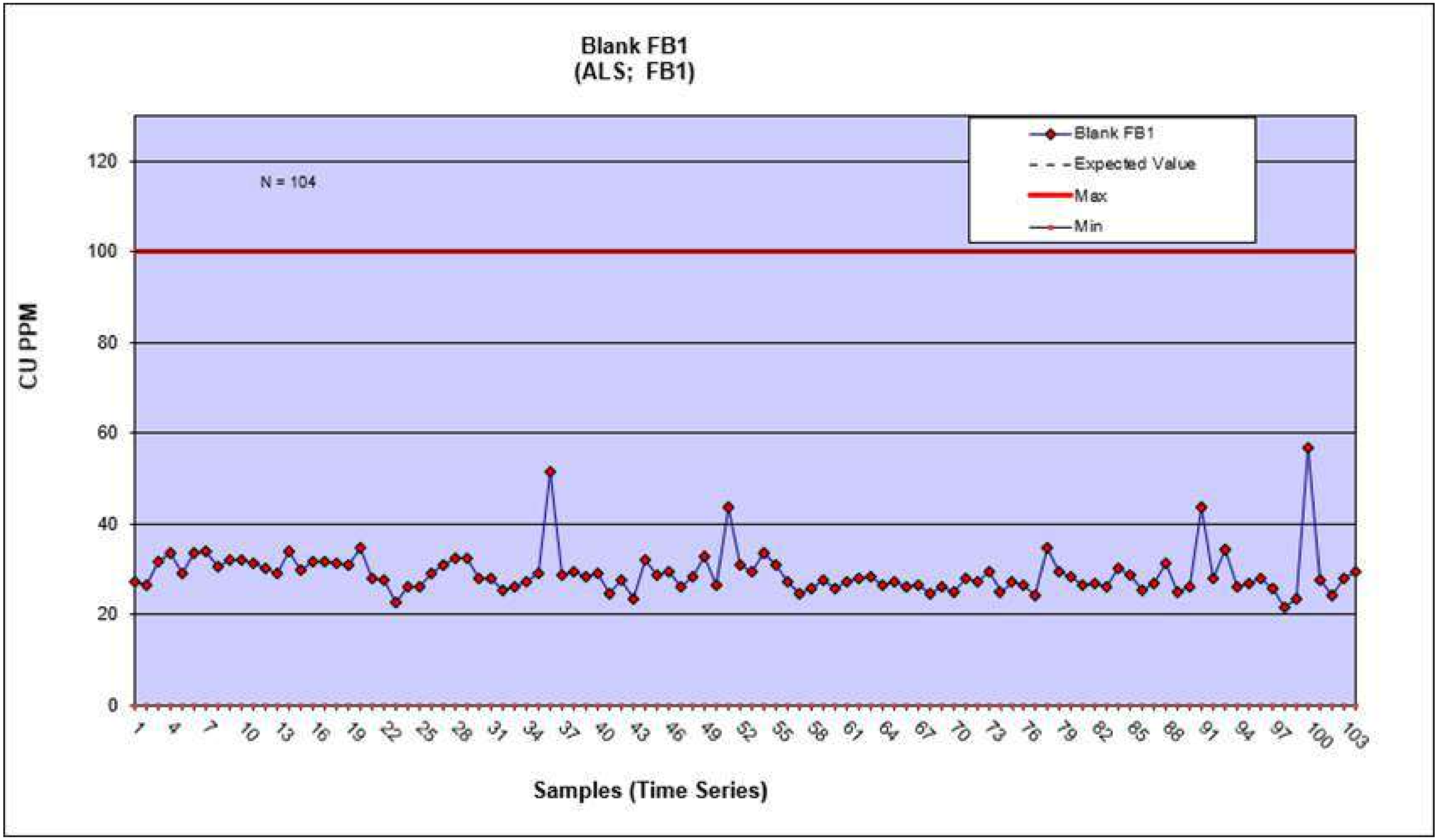
Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	42	42	42	
Average	0.2443	0.2443	0.2443	
Accuracy: (% Difference of Average from Assigned Value)	-1.5%	-1.5%	-1.5%	
Precision: Relative Standard deviation (Robust)	2.2%	2.2%	2.2%	Good
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

Ag

Analysis Table	All results	Gross Outliers Excluded	User Outliers Excluded	Comments
Number of results	43	43	43	
Average	0.7521	0.7521	0.7521	
Accuracy: (% Difference of Average from Assigned Value)	-3.3%	-3.3%	-3.3%	
Precision: Relative Standard deviation (Robust)	7.1%	7.1%	7.1%	Poor
Number of Outlying Results (Outside Process Limits)	0	0	0	
Perecentage of Outlying Results ⇒			0.0%	Good

Source: BBA, 2023

Figure 11.13 – Montiel West Blanks, Cu ppm

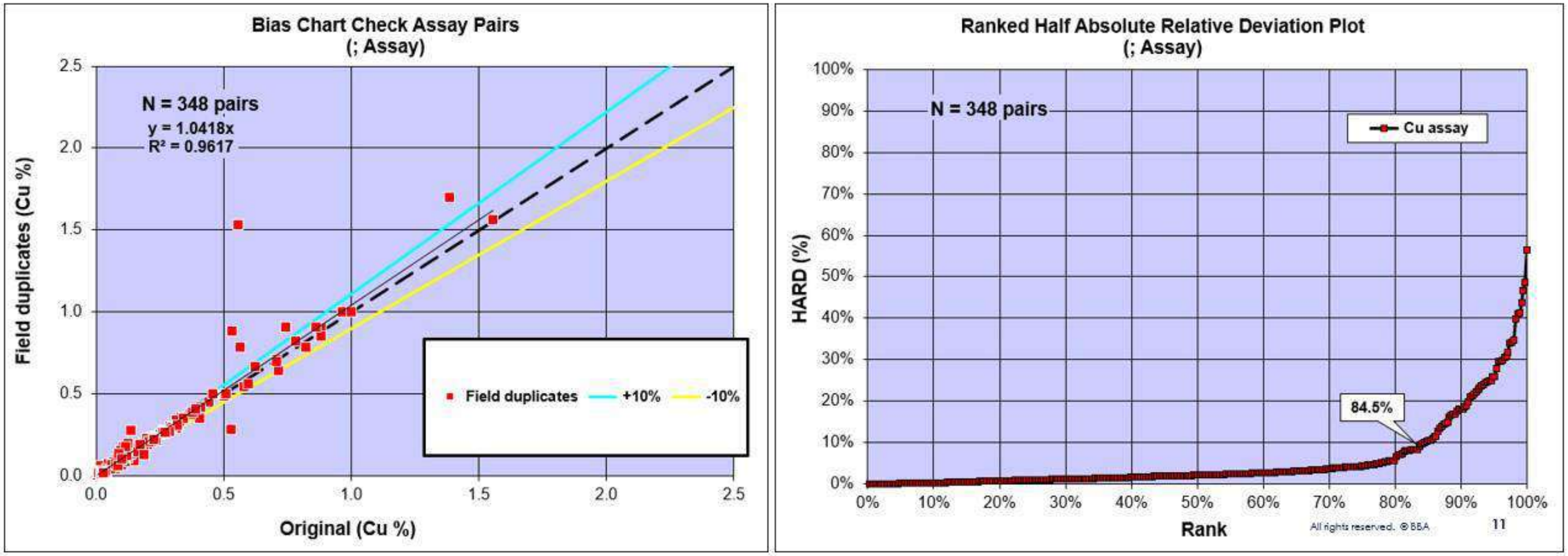


Source: BBA, 2023

Figure 11.14 – Field Duplicates for Cu (ppm) by Cordoba for the Montiel West Deposit

Project	Montiel E
Data Series	Field duplicates
Data Type	Assay
Commodity	Cu in %
Analytical Method	0
Detection Limit	0
Original Dataset	Original
Paired Dataset	Field duplicates

Statistics	Original Cu %	Duplicate Cu %
Sample Count	348	348
Minimum Value	0.00	0.00
Maximum Value	1.56	1.70
Mean	0.17	0.18
Median	0.08	0.09
Standard Error	0.01	0.01
Standard Deviation	0.24	0.26
Correlation Coefficient	0.9713	
Pairs ≤ 10% HARD	84.5%	



Source: BBA, 2023

11.3 Sample Security

11.3.1 DUAL RESOURCE

No formal documented processes were found with respect to sample security.

11.3.2 ASHMONT

The Ashmont drill core was stored in metal core boxes by Ashmont in a store in Montería and was transported to Cordoba's secure core storage and core logging shack at El Alacrán when it acquired the Project. The sample rejects and pulps were stored by Ashmont in a storage facility in Puerto Libertador and were likewise transferred to the core storage by Cordoba.

11.3.3 CORDOBA

Drill core from each run was placed in metal core boxes by the drillers. Core boxes were taken from the rig to the core shack by company vehicle. Samples were securely stored in the core shack at El Alacrán were then transported by courier to the laboratory in Medellín. All remaining core is stored at Cordoba's secure core logging facility.

11.4 Qualified Person's Opinion on the Adequacy of Sample Preparation, Security, and Analytical Procedures.

The QP has been supplied with all raw QA/QC data and has reviewed and completed an independent check of the results for Cordoba and Ashmont, sampling programs. It is QP's opinion that the sample preparation, security, and analytical procedures used by all parties are consistent with standard industry practices and that the data is suitable for the 2023 Mineral Resource Estimate.

12 DATA VERIFICATION

The QP reviewed the surface geology, artisanal miner workings, drill core geology, geological procedures, chain of custody of drill core, sample pulps, and density measurements. Data verification included a survey spot check of drill collars, a spot check comparison of Cu, Au, and Ag assays from the drill hole database against original assay records (lab certificates), spot check of drill core lithologies recorded in the database versus the core located in the core storage shed and a review of QA/QC performance of the drill programs.

12.1 Qualified Person Site Investigation

A site investigation to the Project was carried out July 25 to July 28, 2022, by Todd McCracken, P. Geo., QP for Mineral Resources. Activities during the site visit included:

- Review of the geological and geographical setting of the Project;
- Review and inspection of the site geology, mineralization and structural controls;
- Review of the drilling, logging, sampling, analytical and QA/QC procedures (Figure 12.1);
- Review of the chain of custody of samples from the field to assay lab;
- Review of the drill logs, drill core, storage facilities and independent assay verification on selected core samples;
- Confirmation of some drill hole collar locations;
- Review of the artisanal operations that are dedicated to the recovery of Au;
- Assessment of logistical aspects, potential OP locations, potential waste dumps and other surface infrastructure practicalities relating to the Property;
- Review of the historical tailings distribution; and
- Validation of a portion of the drill hole database.

Figure 12.1 – Example of Drilling Validation

Source: BBA, 2022

The Cordoba geologists completed the geological mapping, core logging, and sampling associated with the 2015 to 2023 drill programs. Therefore, the QP relied on Cordoba's database to review the core logging procedures, collection of samples, and the chain of custody associated with the drilling programs. Cordoba provided the QP with excerpts from the drill database (acQuire^{TM}) for the Project and electronic copies of the original logging and assay reports.

Cordoba employs a rigorous QA/QC protocol including the routine insertion of field duplicates, laboratory pulp duplicates, blanks, and certified reference standards.

The collection and use of the structural information were reliable, and representative of the structure features being drilled. This was found to be consistent with industry standards and in accordance with Cordoba's internal procedural documentation.

No significant issues were identified during the site visit. The QP was accompanied by Cordoba geologists who have been involved with the Project since 2011.

Joanne Robinson, P. Eng., QP for Mineral Reserves, completed a site investigation from September 20 to September 21, 2021.

12.2 Field Collar Validation

The QP confirmed a number of collar locations at El Alacrán, Montiel East, and Montiel West used within the Mineral Resource Estimate (Figure 12.2). The collars at Costa Azul have been damaged by artisanal mining). The QP collected the collar locations using a Garmin GPSMAP 62 handheld GPS unit and compared to the differential GPS (sub-centimetre accuracy) used in the Cordoba database. The reverse circulation (RC) collar locations within the satellite deposits had a fair number of the collars removed by the local population. However, the drill pad was still visible for many of these collars. All of the collar locations are within the acceptable error limit of the GPS unit.

Figure 12.2 – Example of Drill Hole Validation

Source: BBA, 2022

12.3 Review of Local Artisanal Operations

The QP reviewed artisanal operations while on site (Figure 12.3 to Figure 12.5). Most were dedicated to the recovery of Au, and the QP observed one (1) operation that had Cu-rich mineralization been set aside for the recovery of Cu but, unlike the Au-only recovery operations, the Cu recovery plant was not in operation.

The QP observed the local artisanal operations at El Alacrán focused on mining the high-grade Au structures (Figure 12.6).

Figure 12.3 – Artisanal Mining Operations – Costa Azul

Source: BBA, 2022

Figure 12.4 – Artisanal Stockpile – El Alacrán

Source: BBA, 2022

Figure 12.5 – Artisanal Stamp Mill – Costa Azul

Source: BBA, 2022

Figure 12.6 – Plan View of El Alacrán Deposit Artisanal Mining Operations

Source: Kuntz et. al., 2019

12.4 Core Logging, Sampling, and Storage Facilities

Cordoba drill holes were logged, photographed, and sampled on site at the core logging facility. Most of the core is stored on site, and the samples pulps and coarse rejects are archived in secure storage facilities off site (Figure 12.7).

Bulk density measurements are collected in the same facility as the core logging (Figure 12.8).

Figure 12.7 – Core Logging Facility at the El Alacrán Camp

Source: BBA, 2022

Figure 12.8 – Bulk Density Set-up (Scale Out for Repair)

Source: BBA, 2022

12.5 Independent Sampling

The QP did not collect independent samples. Based on the level of the Study, the number of independent samples collected by previous QPs, and the visual observation of mineralization in core and in core photos by the current QP, the QP did not feel additional sampling was required.

12.6 Database Validation

The QP completed a spot check verification on the following deposits:

- El Alacrán deposit – approximately 5% (2,750) of the 55,000 assays; and
- Satellite deposits – approximately 20% (2,460) of the 12,300 assays.

The geology was validated for lithological units from Cordoba's Leapfrog® lithological model. The geological contacts aligned with the core contacts and are acceptable for use. Datamine software also has a validation routine when importing the data. No errors were recorded.

12.7 Review of Cordoba QA/QC

Cordoba has a robust QA/QC process in place, as previously described in Section 11. The Cordoba geologists actively monitor the assay results throughout the drill programs and summarize the QA/QC results in weekly/monthly reports. A number of failures for standard and blank reference materials were documented, resulting in re-assay of entire sample batches. Most of the Standards performed as expected within tolerances of two (2) to three (3) standard deviations of the mean grade. The QP is satisfied that the QA/QC process is performing as designed to ensure the quality of the assay data.

12.8 QP's Opinion

Upon completion of the data verification process, it is the QP's opinion that the geological data collection and QA/QC procedures used by Cordoba and Ashmont are consistent with standard industry practices and that the geological database is of suitable quality to support the Mineral Resource.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Data used for the FS is based principally upon the 2023 metallurgical testwork program completed by Blue Coast Research in Parksville, British Columbia, Canada, with mineralogical work done by Actlabs in Ancaster, Ontario. Earlier metallurgical test work programs have been completed on the El Alacrán deposit, by BCR in 2021, by Minpro of Santiago, Chile in 2012 and SGS Canada in 2019. This work also included samples from the satellite deposits of Montiel East, Montiel West, and Costa Azul. The metallurgy on the El Alacrán deposit has been advanced significantly since then so the Reader should use caution in interpreting the earlier work on samples from the El Alacrán deposit.

The selected flowsheet for the fresh feed, employs a relatively coarse primary grind and a conventional Cu/Au flotation scheme. Au is recovered by both gravity concentration and flotation. Payable Ag is also recovered in the flowsheet.

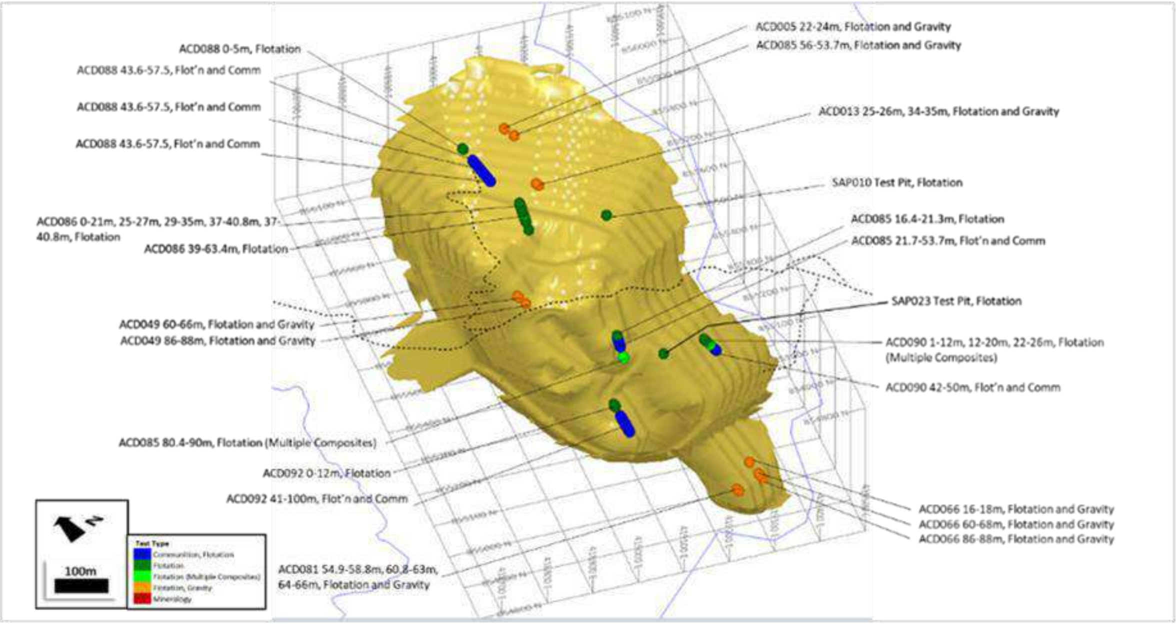
13.2 PFS Metallurgical Study, Blue Coast Research, 2021

A detailed metallurgical program was undertaken in 2021 to support the PFS. Grindability work was conducted by Blue Coast Research and SGS, and the program included 77 batch flotation tests and three (3) locked cycle flotation tests.

13.2.1 SAMPLE COLLECTION

The fresh samples used for comminution, flotation and gravity testing for this program are shown in Figure 13.1. Testing was conducted on samples from holes ACD085, ACD086, ACD088, ACD090, and ACD092.

Figure 13.1 – Location of Source Drill Holes of the Fresh, Transition, and Saprolite Metallurgical Samples



Source: Blue Coast Research, 2021

13.2.2 GRINDABILITY TESTING

Six (6) samples were submitted for SAG mill comminution (SMC) testwork, yielding an average SAG Axb (hardness grindability parameter) of 31.3 and SAG DWI of 9.22. This places the El Alacrán deposit in the "moderately competent" category with respect to SAG milling.

Seven (7) samples and three (3) composites were subjected to Bond ball mill work index (BBWI) testing. One (1) test was run at a closing screen size of 180 µm; the remainder were run at 150 µm. The average bond ball mill work index from these tests is 17.4 kWh/t, and the 80th percentile is 20.4 kWh/t.

The comminution testing summary is presented in Table 13.1.

Table 13.1 – Comminution Testing Summary

Comminution	Ai	SAG Axb	SAG DWI	BBWI (kWh/t)	Closing Size (µm)
SGS Lakefield ACD 001,016,027,037,041,069*		29.4	9.75	16.8	180
ACD 086 106.3-120 m	0.086	33.9	8.30	14.2	150
ACD 088 43.6-57.5		35.0	8.31	21.1	150
ACD 088 57.5-103.7		28.5	9.89	20.2	150
ACD 088 103.7-126		31.1	8.91	16.3	150
ACD 088 183-198	0.048	29.8	9.20	21.4	150

Comminution	**Ai**	**SAG Axb**	**SAG DWI**	**BBWI** (kWh/t)	**Closing Size** (µm)
PTO Fresh #1		-	-	15.2	150
PTO Fresh #2		-	-	18.9	150
ACD 085 21.7-53.7		-	-	14.4	150
ACD 090 42-50		-	-	15.8	150
Average fresh	0.066	31.3	9.09	17.4	
80th percentile		29.4	9.75	20.4	

Source: Blue Coast Research 2021, SGS 2021

Two (2) abrasion tests were conducted as part of the program, averaging 0.066 g.

No grindability tests were run on saprolite material. However, in the grinding of six (6) samples, this material ground to product size in (on average) 3.4 minutes vs. 20 minutes for composites of fresh samples. Power requirements for grinding therefore appear to be roughly 15% to 20% of that of the fresh material.

13.2.3 GRAVITY RECOVERY

The active use of gravity concentration by the artisanal miners on site provides clues into to the coarseness and gravity recoverability of some of the Au, and this was shown further by challenges in metal balancing in flotation testwork.

Five (5) Knelson Concentrator tests were run, to provide some further insights into the potential for recovering Au by gravity. One (1) test, a full Extended Gravity Recoverable Gold (EGRG) test, was run on saprolite material. The test recovered 55% of the Au at a grind of 80% passing 75 µm, with 31% essentially being recoverable without any grinding at all. The Au recovery at the 200 µm primary grind size was estimated at 45%. Although the Au was quite easily liberated, relatively little was very coarse. Three quarters of the Au reporting to the gravity concentrate comprised free particles finer than 75 µm.

The other four (4) tests, all basic gravity recoverable gold (GRG) tests were run on fresh material and yielded recoveries in the range of 29% to 53% (Table 13.2).

Table 13.2 – Knelson Gravity Gold Recoveries from Fresh Zone Samples

Source of Sample	**Au Head Grade,** (g/t)	**Au Conc. Grade,** (g/t)	**Au Recovery,** (%)
ACD064 77-97 m	0.89	98.1	53.2
ACD006A 57-76 m	0.29	37.7	52.0
ACD070 199.5-216.2 m	0.29	20.9	29.3
ACD070 216-240 m	0.15	12.1	32.3

13.2.4 FLOTATION

13.2.4.1 *Fresh Mineralization*

A total of 77 batch flotation tests were conducted on samples from the El Alacrán deposit. Roughly 42 of these comprised a flowsheet development exercise and for product generation for downstream studies, while the other 35 tests were used to investigate variability in Cu, Au, and Ag recovery as well as the effect of blending different material types (saprolite with fresh/transition material).

Chalcopyrite in the samples provided for the PFS floated readily and quite consistently. Initial tests were on a relatively low-grade master composite assaying 0.31% Cu. The first tests used collector doses employed in previous programs and floated both the pyrite and chalcopyrite, so collector (potassium amyl xanthate) doses in rougher flotation were progressively scaled back to 2 g/t in subsequent tests. This still recovered more than 96% of the Cu as well as 90% of the Au to the rougher concentrate from this starting composite. Raising the pH to 10.5 in roughing and 11.5 in cleaning successfully removed up to 98% of the pyrite with Cu recovery in batch testing dropping to 80-85%.

The floatable gangue, analyzed in a third cleaner concentrate sample, comprised much the same mix of minerals as in the feed suggesting it is not a specific mineral that is floating, rather some surface coating of a clay-type material that is rendering some of the gangue mineralization floatable. The problematic gangue flotation led to the evaluation of candidate polymeric chemistries, aimed at silicate gangue rejection. Several gangue depressants were tested, and many proved capable of controlling the gangue, with Calgon appearing to be the most consistent, and often the most potent candidate (Table 13.3).

Table 13.3 – Composition of Copper Concentrates (%) Floated with Different Depressants

Depressant Addition	Chalcopyrite	Pyrite	Gangue
None, no regrind	48.0	12.4	39.7
None, with regrind	52.1	9.6	38.3
Calgon, with regrind	76.2	5.2	18.6
Sodium alginate, with regrind	64.7	3.8	31.5
PE 26, with regrind	71.3	4.7	24.0
Depramin 347, with regrind	60.8	6.7	32.5

Sixteen (16) different samples and composites of fresh material, comprising different rock types, and alteration groups, were subjected to flotation using the chosen flowsheet. The head assays and rougher recoveries are provided in Table 13.4. Cu floated consistently well to the rougher concentrate, averaging 95% recovery from the 16 samples. Au floated less well, though, with the lowest recoveries observed from those samples with very low Au head grades. Weighted for Au content in the samples, the average rougher Au recovery was 88%.

Table 13.4 – Rougher Flotation from 16 Fresh Variability Samples and Composites

Comp #	Weathering	Rock Unit	Alteration Group	Reconstituted Head Assays				Rougher Recovery		
				Cu, %	Au, g/t	Ag, g/t	S, %	Cu %	Au, %	Ag, %
PFS-V5	Fresh	2	2	0.58	0.29	2.23	2.6	96	93	85
PFS-V6	Fresh	2	2	0.59	0.26	3.74	3.2	95	82	84
PFS-V1	Fresh	2	2	0.15	0.62	1.23	1.82	95	98	46
PFS-V2	Fresh	2	3	0.21	0.22	1.8	0.9	98	85	56
PFS-V3	Fresh	2	3	0.15	0.14	0.65	0.9	92	93	45
PFS-V4	Fresh	2	3	0.52	1.65	2.22	5.1	88	92	84
PFS-V7	Fresh	Intrusive	3	0.26	0.09	2.7	4.6	95	77	42
PFS-V8	Fresh	Intrusive	3	0.41	0.11	5.77	7.62	97	51	60
PFS-V12	Trans/ Fresh	Intrusive	3	0.4	0.21	1.41	3	98	74	73
PFS-V15	Trans/ Fresh	Intrusive	3	0.45	0.22	-	3.2	98	86	-
PTO-F2	Fresh	Mix	Mix	0.32	0.4	1.45	3.3	90	91	76
PTO-F1	Fresh	Mix	Mix	0.36	0.61	-	2.8	96	80	-
PFS-F1	Fresh	Mix	Mix	0.91	0.79	17.63	4.4	95	93	64
PFS-V10	Fresh	Mix	Mix	0.15	0.05	-	2.36	90	67	-
PFS-F2	Fresh	Mix	Mix	0.48	0.52	-	3.5	96	95	-
PFS-V17	Trans/ Fresh	Mix	Mix	0.4	0.16	3.12	6.9	95	39	73
Average				**0.4**	**0.4**		**3.51**	**95**	**81**	**66**
Average, Weighted for Head Assay								**95**	**88**	

Batch cleaner flotation performance was less consistent, especially to the third cleaner concentrate. Recoveries of Cu and Au, weighted for head grades, averaged 89% and 77% to the second cleaner concentrate respectively, and 83% and 67% to the third cleaner concentrate. The average second cleaner concentrate grade was 17% Cu, while the third cleaner concentrate averaged 23% Cu.

13.2.4.2 Transition Mineralization

Several samples tagged as “transition” were shipped to the laboratory and prepared as transition testing samples and composites. The first transition composite proved to float well, and mineralogical analysis revealed it to be more characteristic of fresh material than transition.

Three (3) subsequent samples that could be described mineralogically or metallurgically by the content of Cu as secondary or non sulphide mineralization, were tested. One (1) sample was from the magnetite zone. Results are provided in Table 13.5.

Table 13.5 – Flotation of Transition Samples

Comp #	Recon Head Assays		Rougher Recovery			3rd Cleaner Conc Grade			3rd Cleaner Recovery		
	Cu, %	Au g/t	Cu %	Au, %	Ag, %	Cu, %	Au g/t	Ag g/t	Cu, %	Au, %	Ag, %
PFS-V14	0.37	0.77	31	73	49	6	72	163	11	49	16
PFS-V16	1.67	0.23	53	60	43	43	22	260	28	23	18
PFS-V9	0.8	0.19	82	78	n/a	21	4	n/a	66	52	n/a
Average	**0.95**	**0.4**	**55**	**70**	**46**	**23**	**33**	**212**	**35**	**41**	**17**

Note:
n/a = not available

These results show that metallurgy varies widely within the transition zone, with Cu recoveries ranging from 11% to 66% to the third cleaner concentrate. Au recoveries are more consistent.

13.2.4.3 *Saprolite*

Parts of the saprolite zone contain both Cu and Au; however, there was consistently little or no recovery of Cu to a flotation concentrate using a standard/traditional flotation scheme. Copper recovery was found to be comparable to mass pull rates to concentrate for all but two (2) tests, suggesting no true selective flotation of Cu.

Au, however, floated quite well with recoveries varying from 39% to 75%, linked loosely to head grade. Cleaner flotation was conducted on several samples but in many cases after a single stage of cleaning there was not enough material to hold a froth together, with concentrate masses dropping to less than a gram. Silver behaved in a similar way to Cu, with essentially no selective flotation.

13.2.5 LOCKED CYCLE TESTING

Two (2) locked cycle tests (LCTs) were conducted on the PFS Fresh #2 composite comprising material from the fresh zone. The projected closed circuit performance from the LCT is shown in Table 13.6.

Table 13.6 – PFS Fresh #2 Composite, LCT-1 Metallurgical Balance

Product	Mass (%)	Grade				Distribution, %			
		Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	2.1	19.8	17.1	156.4	25	93.5	85.7	44.7	15.8
Cleaner Tail	8.2	0.07	0.21	3.7	5.8	1.4	4.2	4.2	14.4
Rougher Tail	89.7	0.03	0.05	4.2	2.6	5.2	10.1	51.1	69.8
Feed	100.0	0.45	0.42	7.4	3.3	100.0	100.0	100.0	100.0

The LCT ran fairly well, however, the final concentrate was under-pulled in the third cleaner, so the test never fully stabilized with Cu accumulating in the third cleaner tail. This had the consequence of slightly reducing overall Cu recovery. Au metallurgical stability again proved challenging due to nugget issues.

A second locked cycle test was then run allowing for more mass to be pulled to final concentrate. This unloaded the third cleaner tail circulating load, which improved the test stability. It yielded a small drop in concentrate grade, while increasing the Cu recovery to over 95.3%. Au recovery was 84.6%, and Ag recovery was 73.7% (Table 13.7).

Table 13.7 – PFS Fresh #2 Composite: LCT-2

Product	Mass (%)	Grade				Distribution, %			
		Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	2.4	18.8	23.0	158.2	23.8	95.3	84.6	73.7	17.0
Cleaner Tail	8.1	0.08	0.18	3.2	4.5	1.4	2.2	5.1	10.8
Rougher Tail	89.5	0.02	0.10	1.2	2.7	3.3	13.1	21.3	72.2
Feed	100.0	0.47	0.65	5.2	3.4	100.0	100.0	100.0	100.0

A third locked cycle test was run on a separate fresh zone composite. In cycles 3-5 this yielded 93.8% Cu recovery to a concentrate assaying 19.1% Cu. The Au recovery was 78.8% and the Ag recovery 70.3% (Table 13.8).

Table 13.8 – PFS Fresh #3 Composite: LCT-3

Product	Mass (%)	Grade				Distribution, %			
		Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	1.80	19.1	17.4	76.6	27.2	93.8	78.8	70.3	13.0
Cleaner Tail	7.52	0.08	0.16	2.2	8.4	1.6	3.0	8.2	16.8
Rougher Tail	90.7	0.02	0.08	0.47	2.9	4.5	18.2	21.5	70.2
Feed	100.0	0.37	0.40	2.0	3.8	100.0	100.0	100.0	100.0

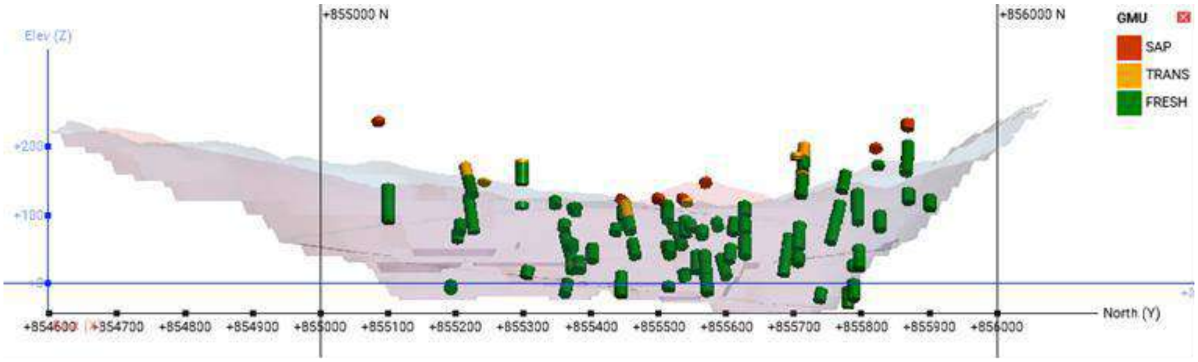
13.3 FS Metallurgical Study, Blue Coast Research, 2023

A FS level metallurgical testwork program was completed in 2023 at Blue Coast Research. The program included geometallurgical sampling and characterisation of the deposit, followed by grindability, flotation, gravity, and dewatering testwork.

13.3.1 SAMPLE SELECTION

A total of 81 discrete geomet samples were generated from split core intervals from the El Alacrán deposit. The samples were used for mineralogy, grindability, and rougher flotation baseline testing. Composite samples were also generated including three (3) Master Composites (MC) from the fresh zone, metallurgical sub-composites organized spatially and by rougher flotation performance, and zone composites for coarse particle grindability testing. The location of the geomet composites is presented in Figure 13.2.

Figure 13.2 – Location of Geomet Composite Samples

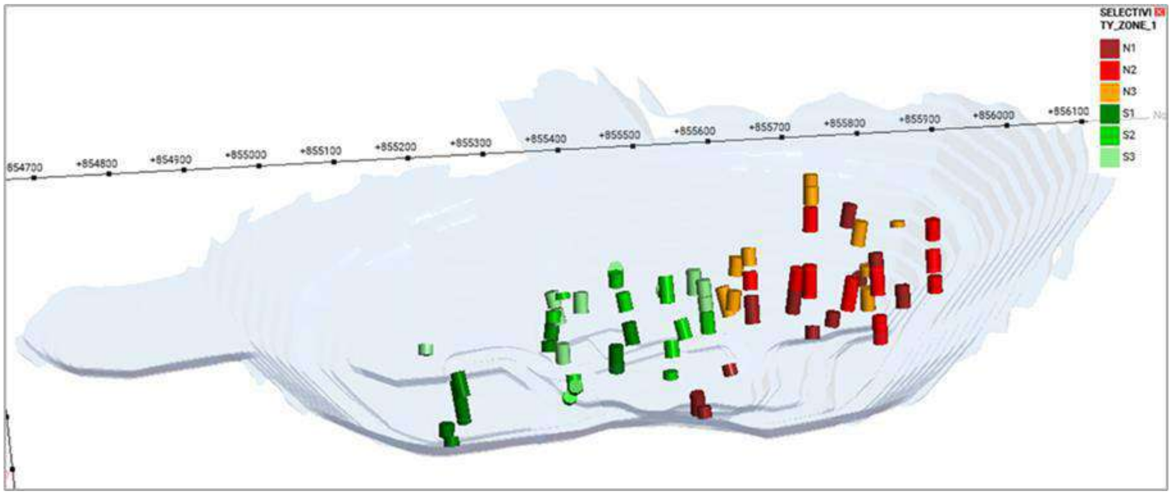


Source: Blue Coast Research, 2023

From the geomet samples, three (3) Master Composites were generated. The first two (MC-1 and MC-2) were based on sample availability in the early period of the testwork program, whereas the third composite (MC-3) included equal portions of 65 of the 69 fresh zone geometallurgical samples. Four (4) higher grade (> 2.0% Cu) geomet composites were left out of MC-3 to achieve a target copper grade close to the expected copper head grade of the resource (see Table 13.9).

In addition, a series of six (6) metallurgical unit composites were prepared based on the relationship between pyrite flotation and copper recovery, and spatial zone (north or south). Location of the composites is presented in Figure 13.3.

Figure 13.3 – Location of Metallurgical Unit Composites



Source: Blue Coast Research, 2023

Table 13.9 presents the head assays for the blended composites used for the metallurgical testwork program. The number of individual geomet sub-composites used for that composite is also provided.

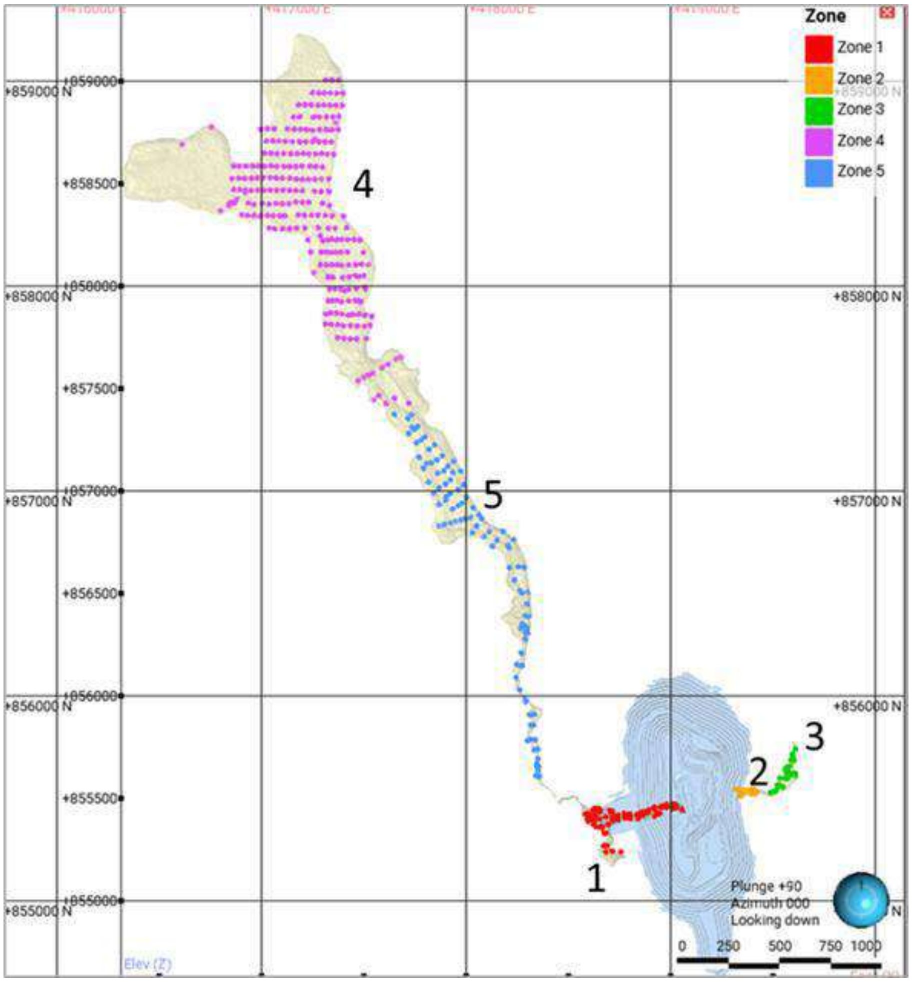
Table 13.9 – Head Assays for the Master and Metallurgical Unit Composites

Composite	# of Sub Composites	Au (g/t)	Ag (g/t)	Cu (%)	Fe (%)	S_{total} (%)
MC-1	8	0.44	5.05	0.65	13.2	4.52
MC-2	14	0.23	4.24	0.69	11.6	4.29
MC-3	65	0.15	4.45	0.59	10.9	3.77
GMU-S1	11	0.16	2.76	0.57	8.98	2.8
GMU-S2	11	0.32	8.51	1.05	11.2	5.03
GMU-S3	10	0.29	5.53	0.75	16.7	6.15
GMU-N1	10	0.11	3.05	0.50	8.22	2.25
GMU-N2	11	0.27	3.42	0.55	10.2	3.53
GMU-N3	10	0.24	5.48	0.82	13.9	6.49

Samples were also collected from the Historical Tailings as part of two (2) separate sampling campaigns. The second of these campaigns consisted of comprehensive auger sampling of the tailings area beginning in the fall of 2022. These samples were composited to form separate zone composites representing the five (5) identified zones of the tailings area, as indicated in Figure 13.4.

Head assays are presented in Table 13.10 and indicate a range of grades with the highest gold and copper values associated with Zones 1, 2, and 3.

Figure 13.4 – Historical Tailings Drill Hole Locations



Source: Blue Coast Research, 2023

Table 13.10 – Head Assays for the Historical Tailings Zone Composites

Composite	Au (g/t)	Ag (g/t)	Cu (%)	Fe (%)	Hg (ppm)	S_{total} (%)
Zone 1	0.41	3.23	0.48	15.4	0.32	2.89
Zone 2	0.53	3.09	0.41	17.6	0.64	1.53
Zone 3	0.60	1.89	0.26	14.7	0.39	0.75
Zone 4	0.25	1.86	0.18	13.1	0.20	0.36
Zone 5	0.15	0.91	0.09	10.8	0.10	0.11

13.3.2 MINERALOGY

Unsized samples of the geomet composites were submitted for modal mineralogy and liberation analysis by QEMSCAN. Figure 13.5 presents the mineralogy for each composite organized by GMU (saprolite, transition, fresh) and by increasing pyrite content.

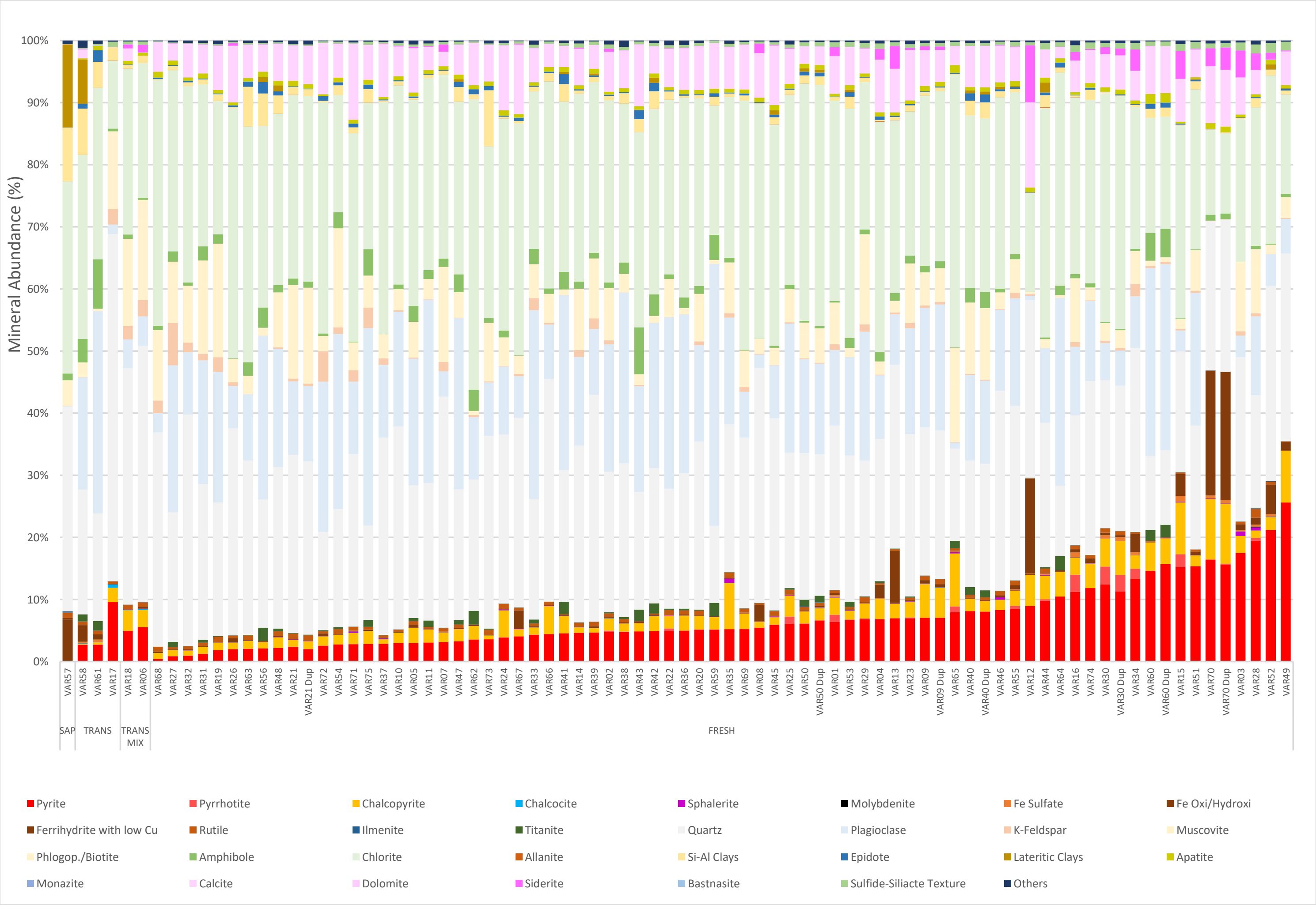
Analysis of the modal mineralogy revealed the following:

- Fresh rock zone variability samples were dominated by silicate minerals including quartz, chlorite, and plagioclase, with lesser micas (biotite and muscovite), potassium feldspar, amphibole, and clays. Carbonates (calcite and lesser siderite), Fe-oxides/hydroxides and Fe sulphates occurred in minor amounts. Combined sulphide minerals ranged from 2% to 34% and were dominated by Fe sulphides, with lesser chalcopyrite, and traces of chalcocite, sphalerite and molybdenite. A slight trend was noted of an increased content of pyrrhotite, Fe oxides/hydroxides, Fe sulphate and siderite (Fe carbonate) with increased pyrite content.
- The five (5) transition zone samples had a bulk mineralogy similar to that of the fresh rock zone samples, with quartz, plagioclase and K-feldspars, chlorite, micas, minor amphibole, Fe oxides/ hydroxides and carbonate. Sulphides made up between 3% and 12% of the samples and were chiefly Fe sulphides (pyrite, lesser pyrrhotite), chalcopyrite and traces of chalcocite. Transition zone samples contained a higher proportion of copper as chalcocite than for the fresh rock. VAR58 contained approximately half its copper as ferrihydrite, similar to saprolite zone sample VAR57.
- The saprolite sample was dominated by quartz, chlorite, and aluminous and lateritic clays. Fe oxyhydroxides and micas were present in minor amounts. The sample contained 0.39% Cu, which was attributed to Cu hosted in Fe-oxyhydroxides/ferrihydrite and only very rare Cu sulphide minerals.

At a grind size P_{80} of 175-200 µm the fresh rock zone chalcopyrite liberation ranged from 54% to 88%, with a mean of 73% (liberated grains are defined as those with >80% surface area chalcopyrite). Higher chalcopyrite liberation was found to correlate with higher copper recovery in rougher flotation tests. Chalcopyrite formed middlings with a wide range of minerals, but predominantly with non-sulphide minerals and as ternary particles, and less than 7% of the chalcopyrite formed middlings with pyrite. In comparison, pyrite liberation ranged from 61% to 96%, with a mean of 77%. Pyrite formed middlings chiefly with non-sulphide gangue minerals. Only between 0 and 16% of the pyrite formed middlings with chalcopyrite.

Chalcopyrite liberation in the transition zone samples ranged from 23% to 93%, with a mean of 56%. Pyrite liberation ranged from 77% to 91%, average of 85%.

Figure 13.5 – Variability Modal Mineralogy - Sorted by GMU (Saprolite, Transition, Fresh Rock) and Increasing Pyrite



Source: Blue Coast Research, 2023

13.3.2.1 *Historical Tailings Mineralogy*

Head samples from the five (5) historical tailings zone composites were dominated by quartz, Si-Al clays, Fe-Si-Al cement with low Cu content and Fe-oxides/hydroxides, with lesser amounts of residual micas, chlorite, feldspar, ilmenite, and rutile. The results are consistent with long-term sub-aqueous deposition of El Alacrán rock. Combined sulphide minerals (pyrite and lesser chalcopyrite) increased from 0.2% in Zone 5 to 5.3% in Zone 1 (see Table 13.11). Pyrite liberation ranged from 75.7% (Zone 4) to 94.5% (Zone 1). Chalcopyrite liberation ranged from 61.1% (Zone 5) to 88.5% (Zone 1).

Table 13.11 – Sulphide Liberation for the Historical Tailings Zone Composites

Composite	QEMSCAN Assay		Combined Sulphides	Liberation Area % (>80%)	
	Cu, %	S, %	%	Cpy	Py
Zone 1	0.41	2.68	5.27	88.5	94.5
Zone 2	0.24	0.95	1.78	82.1	86.5
Zone 3	0.22	0.56	1.00	78.8	88.9
Zone 4	0.14	0.24	0.31	69.1	75.7
Zone 5	0.11	0.18	0.21	61.1	85.8

Both pyrite and chalcopyrite have relatively good liberation in the historical tailings, but their association with fine-grained alteration minerals and textures which many make flotation recovery difficult.

13.3.3 GRINDABILITY

Grindability testing, including Bond Ball Work Index (BBWI), Bond Rod Work Index (BRWI), SAG Mill Comminution (SMC), Abrasion Index (AI), JK Drop Weight, and Grind Mill Testing was conducted on selected geomet and zone composites. A summary of the grindability testing results is presented in Tables 13.12 and 13.13.

Table 13.12 – El Alacrán SMC/BBWI/AI Summary

Composite	SMC Parameters						BBWI (kWh/t)	AI (g)
	A	b	A x b	SG	t_a	SCSE (kWh/t)		
Samples Tested	48	48	48	48	48	48	72	4
Minimum	43.0	0.2	19.9	2.6	0.18	7.3	12.2	0.07
20th Percentile	57.4	0.3	26.2	2.8	0.24	11.1	16.2	0.07
80th Percentile	80.5	0.6	35.7	2.9	0.31	12.6	19.3	0.11

Composite	SMC Parameters						BBWI (kWh/t)	AI (g)
	A	b	A x b	SG	t_a	SCSE (kWh/t)		
Maximum	100.0	1.4	82.8	3.5	0.84	14.6	21.8	0.11
St. Deviation	14.4	0.2	10.1	0.2	0.10	1.3	2.0	0.02
Average	**69.2**	**0.5**	**32.2**	**2.8**	**0.29**	**11.6**	**17.8**	**0.09**

Note:
SG = specific gravity
SCSE= SAG Circuit Specific Energy

Table 13.13 – El Alacrán JKDW/BBRWI/AI Summary

Composite	JK DWT Parameters					BRWI (kWh/t)	AI (g)
	A	b	A x b	SG	SCSE (kWh/t)		
P1 Center	55.3	0.7	37.1	3.0	10.9*	17.1	0.10
P1 North Lower	69.3	0.4	25.6	2.9	12.9*	17.1	0.08
P1 North Upper	54.4	0.7	39.7	2.9	10.4*	17.1	0.06
P2 North	64.2	0.5	30.2	2.9	11.8*	18.0	0.07
P2 South	71.1	0.4	25.6	2.8	12.4*	18.6	0.06
Average	**62.9**	**0.5**	**31.6**	**2.9**	**11.7***	**17.6**	**0.07**

* Note: SCSE Parameters are outside the range of the SCSE model and should be interpreted with caution

Results of the grindability testwork confirmed previous testing indicating that the material can be considered moderately hard to hard, with a Bond Ball Work Index test average result of 17.8 kWh/t. SMC testing resulted in Axb values ranging from 19.9 to 82.8 and averaging 32.2. This indicates that the samples have above average resistance to impact breakage. The t_a value for the same composites averaged 0.29.

Full JK Drop Weight testing on the five (5) comminution composites indicated Axb values that confirm the material is moderately hard in terms of impact breakage. The average SCSE was measured at 11.8 kWh/t which compares well with average result from the SMC tests.

Abrasion index testing on nine (9) samples indicated that the material is only mildly abrasive compared to other projects.

Grind Mill tests were conducted on the five (5) comminution composites to further develop the relationship between energy input and impact breakage. This information was used for population balance modeling of the comminution circuit.

13.3.4 FLOTATION

Flotation testwork included baseline rougher testing of the geometallurgical composites, as well as cleaner development testing of the fresh and transition zones.

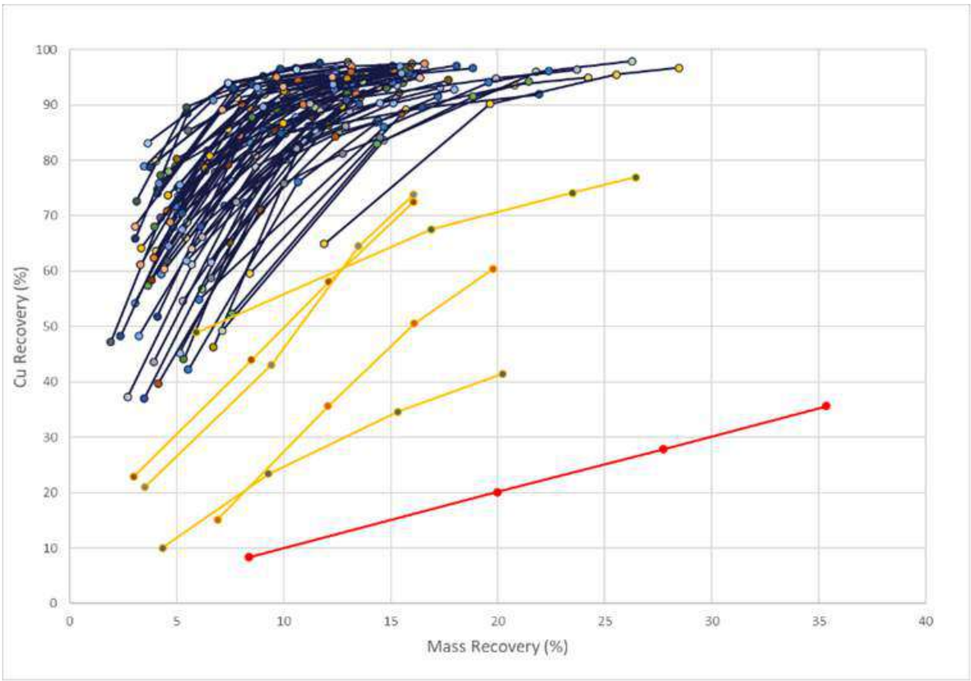
13.3.4.1 Rougher Flotation

Geomet rougher flotation revealed variability in response between fresh, transition, and saprolite samples illustrated in Figures 13.6 and Figure 13.7. The test consisted of a four-step rougher kinetics flotation test at pH 10.5 with staged addition of PAX and MIBC. For the fresh zone composites, the results varied widely in the first increment (two (2) minutes of flotation) both in terms of copper recovery and mass pull.

Transition zone composites exhibited poorer response, with recoveries not exceeding 80%, even at high mass pull. The average rougher recovery for the fresh zone composites was 93.7% at 15.7% mass recovery, compared to 65.0% copper recovery at 19.7% mass recovery for the transition zone.

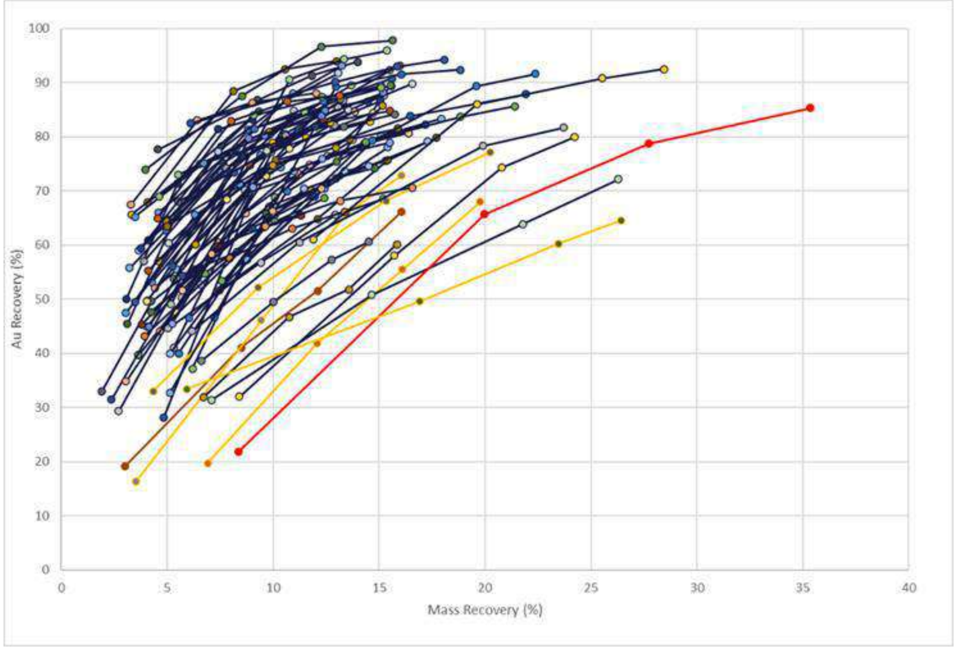
Rougher flotation of a composite from the saprolite zone demonstrated flotation performance consistent with the PFS testwork program. Copper recovery followed closely with mass recovery, suggesting that there is no upgrading to concentrate occurring. The saprolite zone is characterized by low sulphide sulphur grades, making copper recovery to a sulphide concentrate difficult to achieve. Improved rougher flotation recovery of gold was observed for the saprolite composite (see Figure 13.7) due to the natural floatability of fine free gold in the saprolite, but again at a higher mass pull that may limit upgrading.

Figure 13.6 – Cu Recovery vs. Mass Recovery for the Geomet Flotation Tests



Note: Blue = fresh, yellow = transition, red = saprolite
Source: Blue Coast Research, 2023

Figure 13.7 – Au Recovery vs. Mass Recovery for the Geomet Flotation Tests

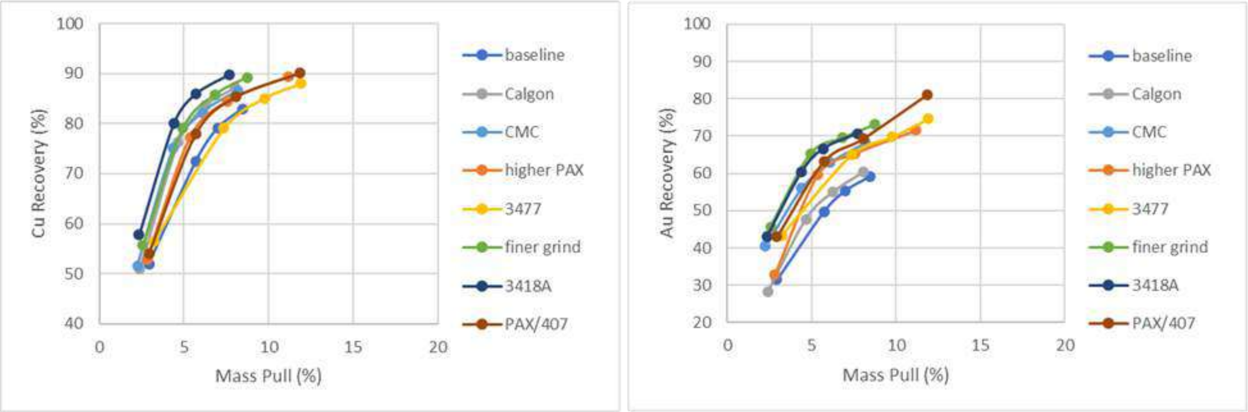


Note: Blue = fresh, yellow = transition, red = saprolite
Source: Blue Coast Research, 2023

Rougher flotation development testwork was conducted on Master Composite samples (MC-1, MC-2, MC-3), as well the metallurgical unit composites. The objective of the work was to improve metal recovery and selectivity over pyrite and non-sulphide gangue (NSG) in the rougher circuit.

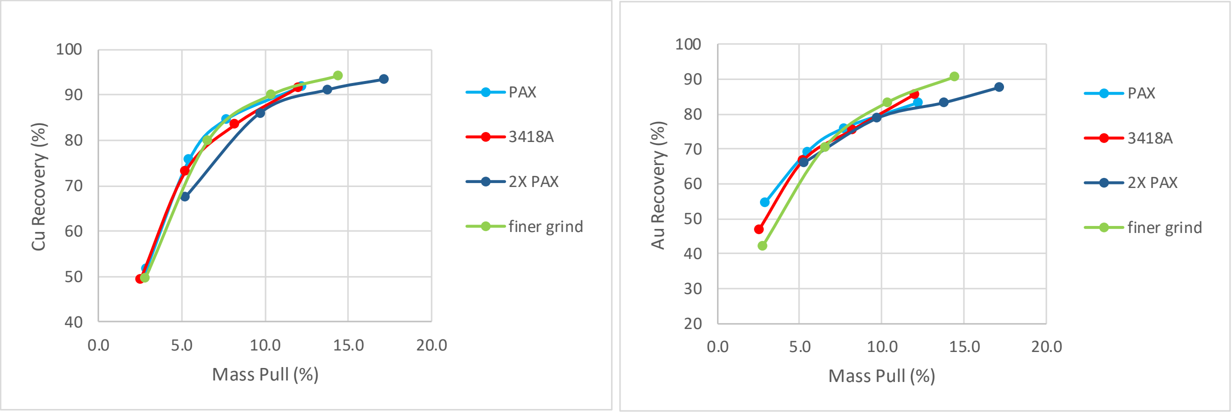
Initial tests were conducted on the MC-1 and MC-2 composites and evaluated the addition of gangue depressants (Calgon, CMC), PAX addition, finer grinding, and alternative collectors (Figure 13.8 and Figure 13.9). The results indicated that PAX combined with a finer grind size P_{80} of 150 µm provided the best flotation performance. Depressant addition under the conditions tested did not improve rejection of gangue, and alternative collectors did not offer improved selectivity over pyrite as compared to PAX.

Figure 13.8 – Cu/Au Recovery vs. Mass Recovery for the MC-1 Rougher Flotation Tests



Source: Blue Coast Research, 2023

Figure 13.9 – Cu/Au Recovery vs. Mass Recovery for the MC-2 Rougher Flotation Tests

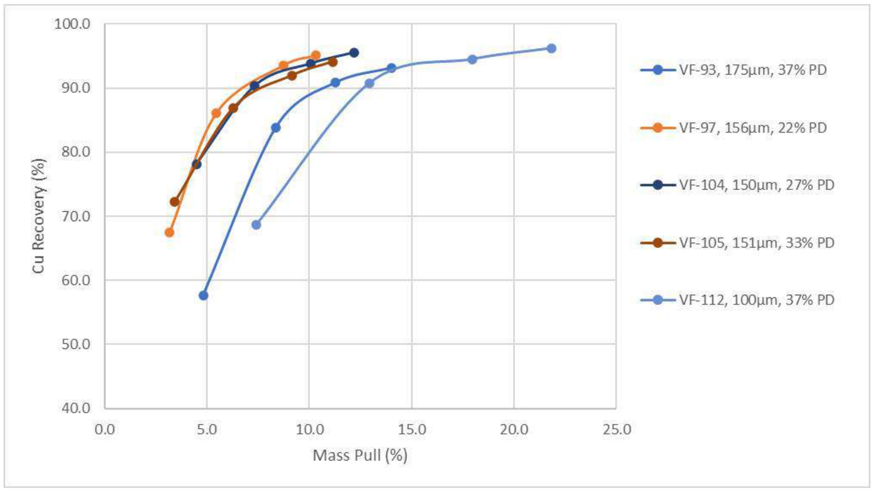


Source: Blue Coast Research, 2023

The MC-2 composite was found to result in higher rougher copper recovery than MC-1 and compared better with the geomet rougher flotation results for the fresh zone composites presented in Figure 13.6. This is a result of some transition zone composite sample being included in the MC-1 composite that negatively influenced copper recovery.

Rougher flotation testing was also carried out on the MC-3 composite and confirmed the improved copper flotation recovery at the finer grind size of 150 µm. Figure 13.10 illustrates the effect of grind size and pulp density on copper and mass recovery for the rougher flotation tests. Better selectivity, and hence lower mass recovery, is observed at lower pulp density.

Figure 13.10 – Effect of Grind Size and Pulp Density on Cu Recovery for the MC-3 Rougher Flotation Tests

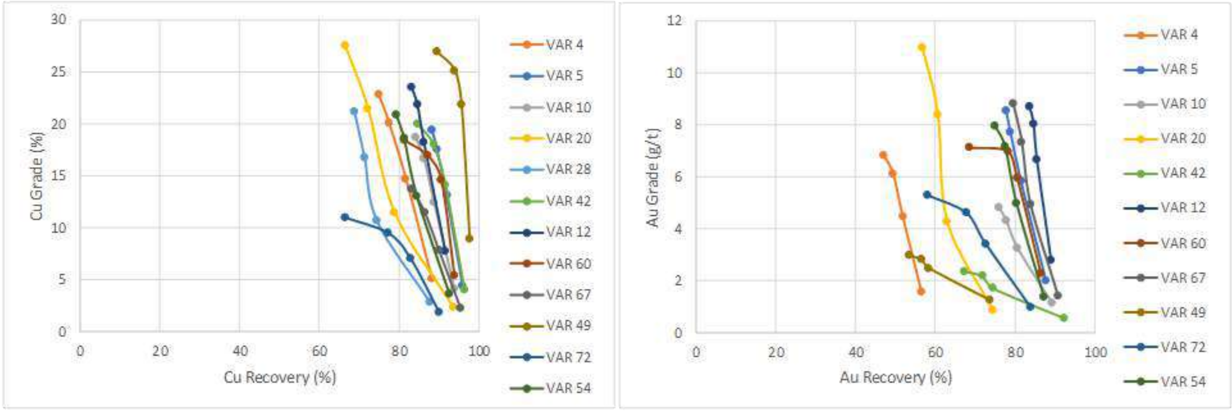


Source: Blue Coast Research, 2023

13.3.4.2 *Cleaner Flotation*

A series of 12 cleaner variability tests were conducted on selected geomet composites. The composites covered a range head grades and mineralogy within the fresh zone of the deposit. Grade-recovery curves for the variability tests are presented in Figure 13.11.

Figure 13.11 – Grade-Recovery Curves for the Variability Cleaner Flotation Tests



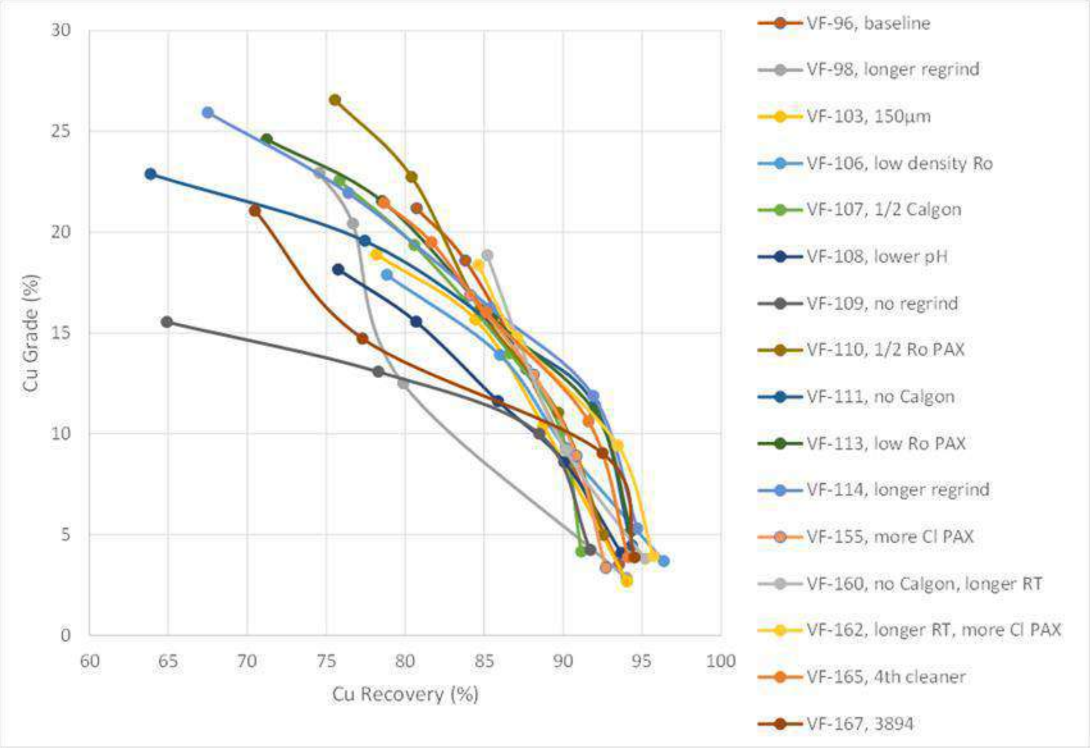
Source: Blue Coast Research, 2023

The results indicate good cleaner response from 11 of the 12 composites. The only significant outlier was VAR72, which lost some copper recovery in the third cleaner stage. Gold grade-recovery results suggest much greater variation between samples than for copper, this result is likely exacerbated by the nuggety nature of gold in the deposit.

The optimized rougher flotation conditions presented in the last section were used as a basis for the further development of the cleaner flotation procedure. This work was carried out on the three (3) Master Composites, as well as the metallurgical unit composites. Figure 13.12 presents the copper grade-recovery curves for the batch cleaner tests on the MC-3 composite.

Cleaner testwork confirmed the regrind time and collector additions in the rougher and cleaner circuit. In addition, improved copper recovery was realized with lower Calgon addition and longer residence times in the cleaner stages. Higher PAX addition and lower pH was found to reduce selectivity of copper minerals over pyrite.

Figure 13.12 – Cu Grade vs. Recovery for the MC-3 Cleaner Flotation Tests

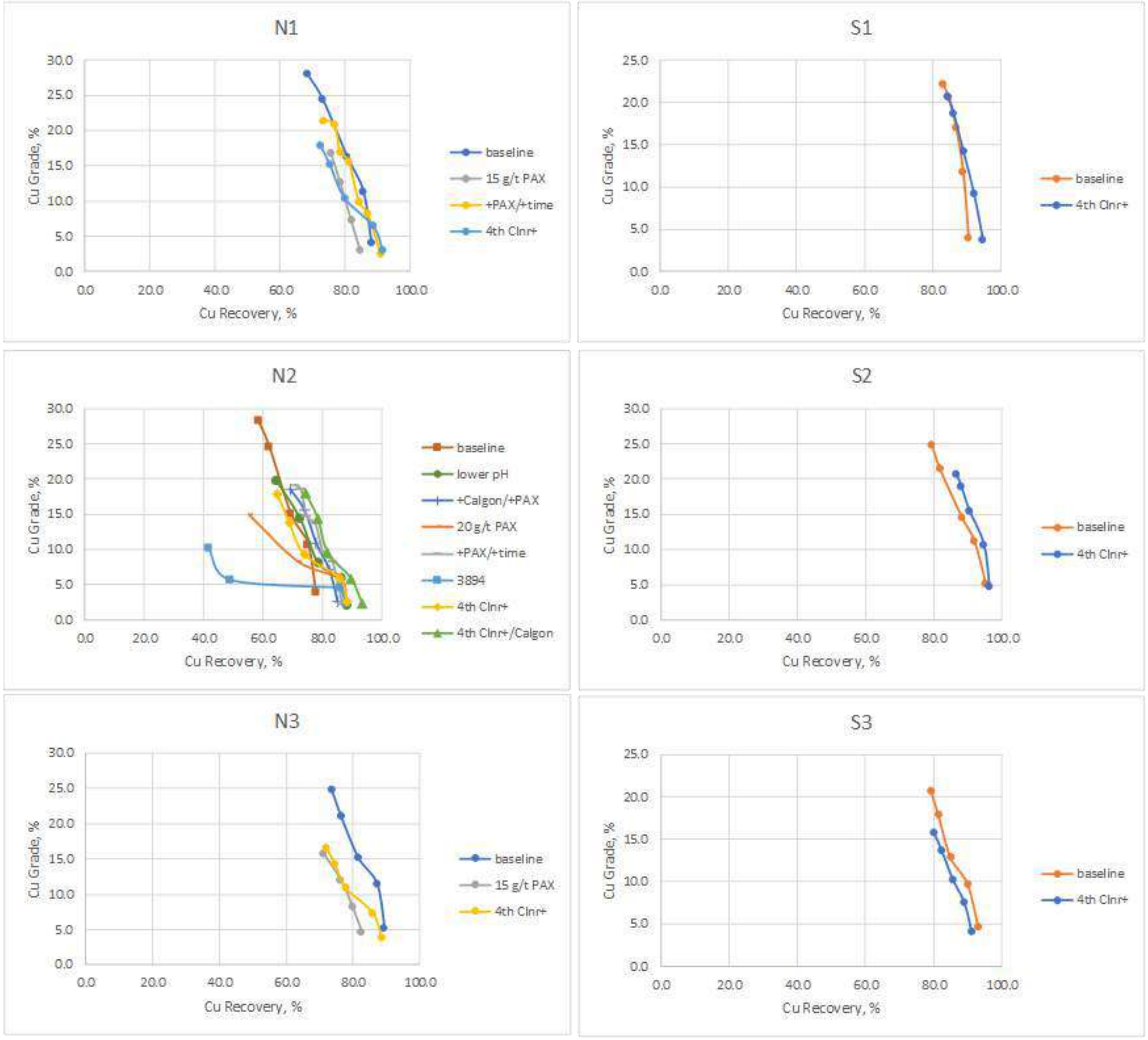


Source: Blue Coast Research, 2023

Additional batch cleaner testing was carried out on the metallurgical unit composites. The results of these tests are presented in Figure 13.13. Baseline tests used a common set of conditions based on prior testwork on the Master Composites. For all of the South composites (S1, S2, S3) and the N1 composite, good results were achieved from the baseline conditions.

The majority of additional testing was focused on the N2 composite, where poor initial results were obtained. Subsequent testing focused on optimisation of the cleaner conditions including PAX and Calgon addition, pH, and flotation time.

Figure 13.13 – Cleaner Flotation Tests – Metallurgical Unit Composites



Source: Blue Coast Research, 2023

Based on the batch rougher and cleaner development flotation testwork, the following refinements to the flowsheet were implemented:

- The primary grind size was reduced to 150 µm to improve copper rougher recovery.
- Regrinding to a target P_{80} of ~25 µm was confirmed.
- PAX was found to be an effective collector for copper recovery, with good selectivity over pyrite at low dosage rates.

- Calgon addition to the regrind and cleaner circuit was found to be beneficial in improving gangue dispersion and copper recovery.
- Longer rougher and cleaner flotation times were found to improve stage recovery of "slow-floating" copper without negatively impacting mass recovery.

13.3.4.3 Transition Zone

Cleaner flotation testwork was also conducted on the five (5) transition zone composites. Test conditions were based on those optimized for the fresh zone and are summarized in Table 13.14. The results suggest a wide range in cleaner flotation response with final concentrate grade ranging from 7.8% Cu to 31.7% Cu at open circuit copper recoveries ranging from 21.9 to 73.2%. Gold recovery demonstrated less variability, ranging from 38.8% to 58.6%.

Table 13.14 – Summary of Transition Zone Cleaner Flotation Results

Composite	Cleaner Concentrate Grade, %				Cleaner Concentrate Recovery, %			
	Cu	Au	Ag	S	Cu	Au	Ag	S
VF-06	31.7	4.94	97.3	30.9	73.2	54.2	44.6	17.6
VF-17	7.8	0.32	12.0	41.4	25.0	38.8	21.9	22.2
VF-18	29.9	3.99	99.3	31.4	58.6	58.6	44.6	18.9
VF-58	12.6	12.62	81.4	43.5	21.9	46.6	25.6	15.9
VF-61	12.8	2.87	30.1	31.4	62.9	55.0	22.8	18.4

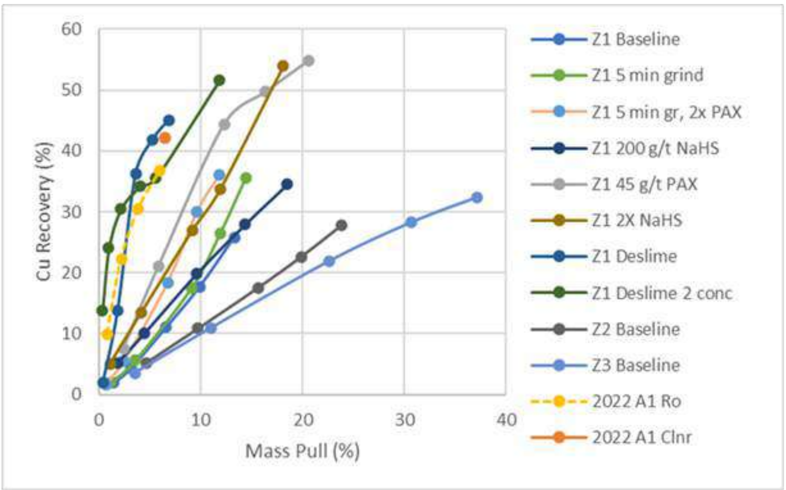
13.3.4.4 Historical Tailings

A total of 19 flotation tests were conducted to evaluate copper and gold recovery from historical tailings samples. Initial flotation testing was carried out on preliminary samples collected prior to the Zone sampling campaign and focused largely on the Area 1 (analogous to Zone 1 in Figure 13.4) composite due to the high concentration of sulphides. Test conditions were based on those developed for the fresh ore and included a short regrind followed by pH adjustment to 10.5 with lime and flotation with low dosage of PAX collector. Subsequent tests looked at higher PAX additions, as well as the alternative collectors 3418A and 3477.

The results indicated that a component of the contained copper was recoverable by flotation and a concentrate grade of +20% copper could be achieved. However, overall copper recovery to final concentrate was limited to ~35%, and lime consumption to achieve pH 10.5 in roughers and 11.5 in the cleaners was found to be very high, > 10 kg/t.

When the new auger drilled samples arrived in March 2023 additional rougher flotation tests were conducted on the Zone 1 (Z1) composite with results summarized in Figure 13.14, with optimized results from the earlier work included for comparison. Initial baseline tests indicated the new composite performed poorly compared to the Area 1 sample, with lower copper recovery and higher mass pull. In addition, the lime consumption in the roughers increased to ~17 kg/t. Higher copper recoveries were observed with increased PAX addition, but this also increased pyrite flotation and decreased selectivity.

Figure 13.14 – Historical Tailings Rougher Flotation



Source: Blue Coast Research, 2023

The best results were achieved by desliming the sample prior to grinding and flotation. This change improved the kinetics of copper flotation and resulted in copper rougher recoveries comparable to the earlier samples. In addition, the desliming significantly reduced lime consumption in the rougher stage.

Baseline rougher flotation testing of the Zone 2 and Zone 3 composites demonstrated only marginal upgrading of copper to the rougher concentrate, at low recoveries. The response was consistent with the lower sulphur grades of these areas (Zones 4 and 5 were not tested as they contained even lower sulphur grades).

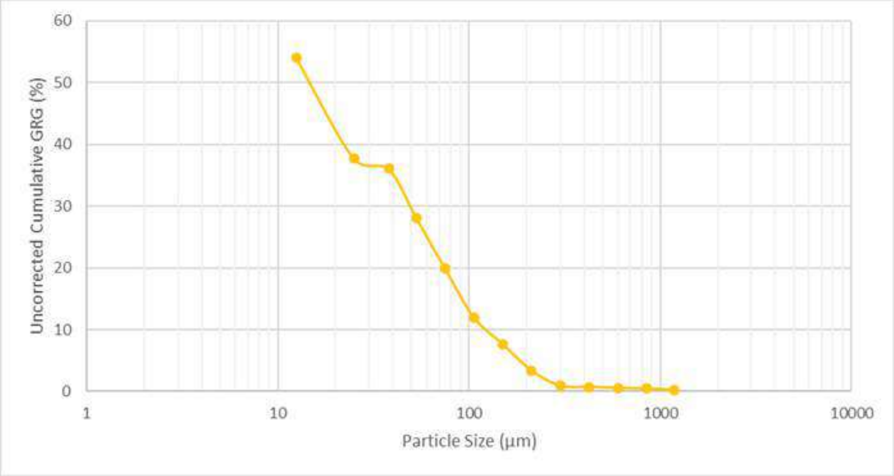
13.3.5 GRAVITY RECOVERY

Lab-scale gravity testing was conducted on selected metallurgical composites to evaluate the potential for recovery of gold and silver to a separate gravity concentrate. Testing was conducted on composites from the fresh and saprolite zones, as well as from the historical tailings area. All tests were carried out on a Knelson MD-3 batch concentrator, with upgrading on a Superpanner shaking table.

13.3.5.1 Fresh Zone

A full Extended Gravity Recoverable Gold (EGRG) test was carried out on a 20 kg sample of the MC-3 composite. The sample was fed through the concentrator at three (3) successive grind sizes (P_{80} 788 µm, 218 µm, and 61 µm). The cumulative recovered gold from these three (3) passes is illustrated in Figure 13.15. Roughly 12% of the gold reported to the +106 µm fraction, with the overall EGRG number of 54%.

Figure 13.15 – E-GRG Test Results for the MC-3 Composite



Source: Blue Coast Research, 2023

Additional gravity testing was completed on the six (6) metallurgical unit composites. For these tests, a 2 kg charge for each composite was passed through the Knelson concentrator and the concentrate product was upgraded on the Superpanner.

Table 13.15 presents the results of these tests and illustrates the coarse nature of some of the contained gold. For the N1 composite the grade of the tip was much higher than the other composites and the calculated head was several times higher than the assayed head for that composite.

Table 13.15 – Summary of Transition Zone Cleaner Flotation Results

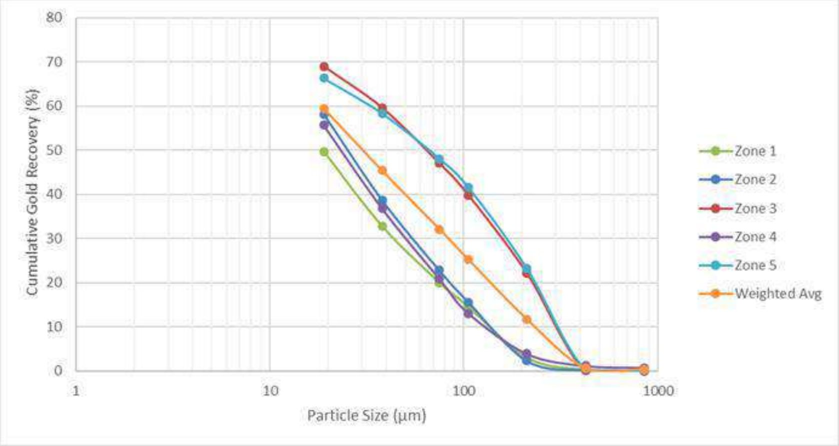
Test ID	**Composite**	**P_{80}** (µm)	**Au Recovery** (%)			**Au Grade** (g/t)			**Mass Pull** (%)		
			SP Tip	SP Tip + Mid	Knelson Con	SP Tip	SP Tip + Mid	Knelson Con	SP Tip	SP Tip + Mid	Knelson Con
GRG-4	GMU-N1	137	55	71	89	5756	78.5	26.3	0.01	1	3.8
GRG-5	GMU-N2	127	25	49	64	330	8.6	4.1	0.02	1.5	4.1
GRG-6	GMU-N3	99	23	38	52	202	6.7	4	0.04	1.9	4.3
GRG-7	GMU-S1	119	32	45	55	88	6.1	3.8	0.11	2.2	4.3
GRG-8	GMU-S2	116	10	29	33	78	5.4	2.7	0.05	2	4.3
GRG-9	GMU-S3	125	10	38	52	58	9.2	4.4	0.06	1.6	4.5

Source: Blue Coast Research, 2023

13.3.5.2 *Historical Tailings*

The five (5) historical tailings Zone composites were submitted for two-pass gravity testing using the Knelson Concentrator. For each test, a 10 kg sample was passed through the concentrator, followed by regrinding and repassing of the first pass tailings. Figure 13.16 presents the cumulative gold recovery for the five (5) tests. Gold recovery ranged from 49% to 69% and averaged 59%.

Figure 13.16 – Two-Pass Gravity Test Results for the Historical Tailings Zone Composites



Source: Blue Coast Research, 2023

The results were used for gold recovery modeling based on the proposed circuit for the process plant.

13.3.6 LOCKED CYCLE TESTING

A total of seven (7) LCTs were conducted during this program. Two (2) of these tests were on the MC-3 master composite, whereas the remaining five (5) tests were on the GMU composites. Table 13.16 provides a summary of the locked cycle results.

Table 13.16 – 2023 Locked Cycle Test Final Concentrate Results

Composite	Test	Weight (%)	Assays				% Distribution			
			Au (g/t)	Ag (g/t)	Cu (%)	S (%)	Au	Ag	Cu	S
MC-3	LCT-1	2.1	7.4	121	23.9	29.1	63.4	58.4	86.7	16.4
MC-3	LCT-7	2.4	8.4	109	21.9	27.7	73.0	69.4	89.2	17.2
GMU S1	LCT-2	2.4	5.1	77.8	20.8	28.1	69.7	71.3	89.3	24.1
GMU S2	LCT-3	4.5	4.3	147	21.5	25.8	66.8	72.5	88.7	23.5
GMU N1	LCT-4	2	6.6	101	19.4	23.6	59.6	47.7	74.8	19.8
GMU N3	LCT-5	2.9	7.6	106	21.2	27.7	73.8	55.2	75.4	12.3
GMU S3	LCT-6	2.8	10.4	119	21.4	23.8	70.6	58.7	80.8	11.1

Each test consisted of five (5) or six (6) cycles with the intermediate products from each cycle fed to the corresponding place in the subsequent cycle. Conditions for the test were based on the optimized parameters developed during open circuit testing described earlier. The flowsheet consisted of a primary grind to a P_{80} of 150 µm followed by rougher flotation with PAX and MIBC. The rougher concentrate was reground to a P_{80} of ~25 µm followed by three (3) stages of cleaner flotation.

Good results were achieved with the first three (3) tests on composites MC-3, GMU S1, and GMU S3. However, circulating loads were high and the test stability was low, particularly in the last of these tests potentially due to the recycling of the first cleaner scavenger concentrate back to the regrind step. In LCT-4 the scavenger stage was removed, which improved stability but negatively affected recovery. In LCT-5 and LCT-6 the scavenger stage was restored, but the poor stability and high circulating loads returned.

At this point a series of open-circuit batch tests were completed on the MC-3 and GMU composites to troubleshoot the source of the poor results. Analysis indicated that copper recovery was impacted by slow kinetics and insufficient collector addition in the cleaner circuit. As a result, modifications to the test parameters were made as follows:

- Rougher flotation time was changed from 11 minutes to 14 minutes.
- Overall cleaner circuit flotation time was increased from 23 minutes to 35 minutes.
- PAX addition in the cleaner circuit was increased from 6 g/t to 10 g/t.
- The First Cleaner Scavenger concentrate was combined with the First Cleaner concentrate and fed to the Second Cleaner.
- A fourth cleaner stage was added to ensure a 20% copper grade was achieved.

Due to sample limitations, the affect of these changes was evaluated on the GMU composites in open circuit only and is reported in an earlier section. For the MC-3 composite a five-cycle LCT was conducted, with results summarized in Table 13.17.

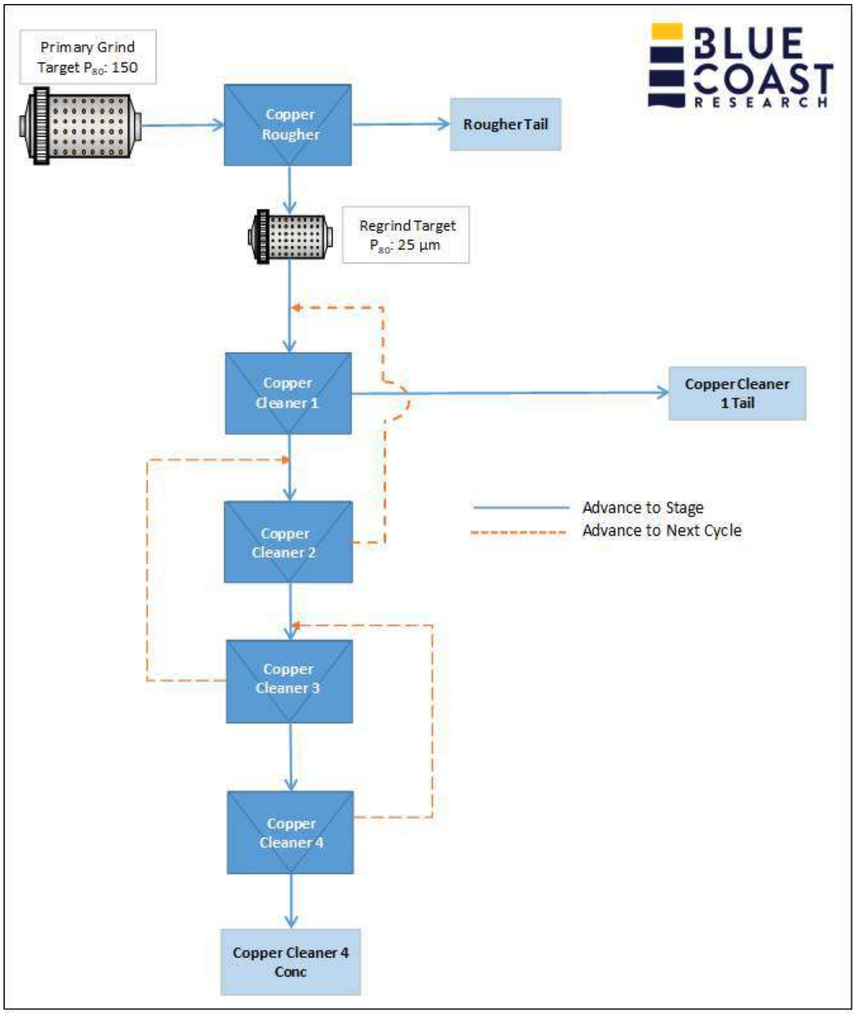
Table 13.17 – LCT-7 Results Summary

LCT-7	Weight	Assays				Distribution, %			
	%	Au (g/t)	Ag (g/t)	Cu (%)	S (%)	Au	Ag	Cu	S
Cu Cleaner 4 Conc.	2.41	8.38	109	21.9	27.7	73	69.4	89.2	17.2
Cu Cleaner 1 Tail	12.3	0.12	2.27	0.29	3.3	5.4	7.4	6	10.4
Rougher Tail	85.3	0.07	1.03	0.033	3.3	21.5	23.2	4.8	72.4
Calculated Head	100	0.28	3.77	0.59	3.89	100	100	100	100

The LCT-7 test demonstrated good metallurgical performance and circuit stability. Final copper grade of the Fourth Cleaner concentrate was higher than target at 21.9% Cu. The confirmed flowsheet is presented in Figure 13.17. It should be noted that the proposed plant configuration for the cleaner circuit includes Jameson cells in a configuration different to that used in the laboratory testwork. It is recommended that additional flotation testwork, possibly including piloting, be carried out to confirm the projected performance in the plant.

Depleted sample and a lack of time caused the LCT program to be curtailed sooner than optimal, leaving questions unanswered on the response of some of the GMU samples. The far better response of the PFS locked cycle tests suggest that using LCT-7 as a measure of overall circuit performance is reasonable, but does not dispel some concerns over how the cleaner circuit will respond to certain types of material in practice. It is recommended that further work is commissioned post-FS to add further confidence to the plant design and metallurgical forecast.

Figure 13.17 – Locked Cycle Test LCT-7 Flowsheet



Source: Blue Coast Research, 2023

13.3.7 CONCENTRATE QUALITY

Projected concentrate assays are presented in Table 13.18 and are based on assays of final concentrate samples from the locked cycle testwork. Higher concentrations of Al and Si are observed but are not expected to incur a significant penalty. As, Cd, and Hg are all within reasonable levels. Molybdenum is present at ~600 ppm in the concentrate, but this is not believed to be high enough to warrant a separate Mo flotation circuit.

Table 13.18 – Multi-Element Concentrate Analysis

Element	Units	Detection Limit	Average	Element	Units	Detection Limit	Average
Ag	ppm	0.20	114	Mo	ppm	1.0	639
Al	%	0.01	1.88	Na	%	0.01	0.34
Au	g/t	0.01	6.30	Nb	ppm	10	<10
As	ppm	2.0	36.4	Ni	ppm	1.0	77.0
Ba	ppm	2.0	53.8	P	%	0.002	0.33
Be	ppm	0.2	0.79	Pb	ppm	2.0	156
Bi	ppm	2.0	14.0	Rb	ppm	20	<20
Ca	%	0.01	1.48	Re	ppm	20	37.2
Cu	%	0.01	22.0	S	%	0.01	27.7
Cd	ppm	0.2	45.8	Si	%	0.01	4.81
Cl	%	0.01	< 0.01	Sb	ppm	2.0	10.2
Co	ppm	2.0	60.4	Se	ppm	10	13.9
Cr	ppm	1.0	22.4	Sn	ppm	10	<10
F	%	0.01	0.048	Sr	ppm	1.0	22.3
Fe	%	0.01	25.7	Ta	ppm	10	14.7
Ga	ppm	20	<20	Te	ppm	10	44.6
Ge	ppm	20	<20	Ti	%	0.01	0.25
Hf	ppm	20	<20	Tl	ppm	2.0	<2
Hg	ppb	5.0	280	U	ppm	0.1	4.3
In	ppm	20	32.8	V	ppm	1.0	96.2
K	%	0.01	0.16	W	ppm	10	33.5
Li	ppm	2.0	5.2	Zn	ppm	2.0	6379
Mg	%	0.01	0.62	Zr	ppm	4.0	38.3
Mn	ppm	2.0	318				

Source: Blue Coast Research, 2023

13.3.8 DEWATERING TESTWORK

A 250 kg bulk flotation test was conducted on a blended sample of fresh, transition, and saprolite mineralization. The test was used to provide tailings and concentrate samples for further downstream testing and characterization.

13.3.8.1 *Flotation Concentrate*

A 4 kg sample of flotation concentrate was submitted to Pocock Industrial for settling and filtration testwork. The results indicated that good settling to a 70% underflow density was observed. Unit areas ranging from 0.105 m^2/Mtpd to 0.145 m^2/Mtpd were achieved with a moderate flocculant dose of 15 g/t SNF AN9210 SH flocculant.

Pressure filtration tests were performed to evaluate cake thickness and air-dry duration on final cake moisture content. Filtration unit areas ranged from 4.79 Mtpd/m^2 and 4.99 Mtpd/m^2, depending on whether a membrane squeeze step was used. The addition of the membrane squeeze reduced the cake moisture from 10.3% to 9.8%.

13.3.8.2 *Flotation Tailings*

Settling testwork was carried out on combined (rougher + first cleaner) flotation tailings from the bulk flotation test by Paterson & Cooke in Sudbury, Ontario, Canada. Flocculant screening indicated that the high molecular weight anionic polyacrylamide flocculant Magnafloc 155 was found to provide good settling rates and bed densities.

Dynamic thickening tests revealed a solids loading rate of ~0.7 tph/m^2 at a flocculant dosage of 50 g/t and a feed solids density of 15%. Raked consolidation tests indicated an underflow solids concentration of 61.5% after 24 hours.

13.4 Metallurgical Forecast

Based on the results of the testwork, algorithms have been developed to characterize metal recovery from the fresh rock, transition, and saprolite zones, as well as the historical tailings.

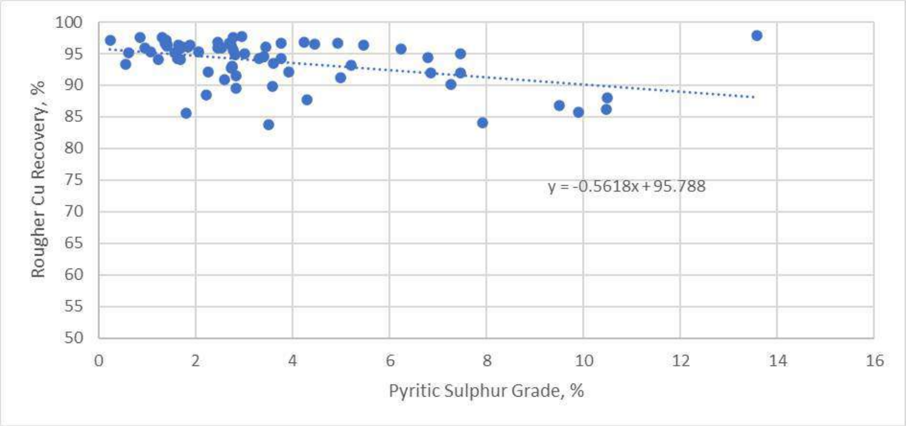
13.4.1 FRESH ZONE

Copper recovery to flotation concentrate from the fresh zone is estimated based on the results of the geomet rougher flotation tests and the locked-cycle flotation. In Figure 13.18 the relationship between copper recovery to rougher concentrate and the calculated pyritic sulphur in the flotation feed for all 69 fresh zone geomet samples is presented. The regression of the data is used as a basis for the estimate of rougher recovery in the equation presented for head grade > 0.19% copper in Table 13.19.

The cleaner recovery component of the equation is based on LCT results for the MC-3 composite, which comprises equal portions of 65 of the 69 fresh zone composite samples. The estimate is based on an expected copper concentrate grade of 20% Cu.

For head grades lower than 0.19% Cu a linear factor is applied to the base equation that derates recovery for copper grades below the tested range of the current program.

Figure 13.18 – Relationship Between Pyrite Grade and Cu Recovery for Fresh Rock



Source: Blue Coast Research, 2023

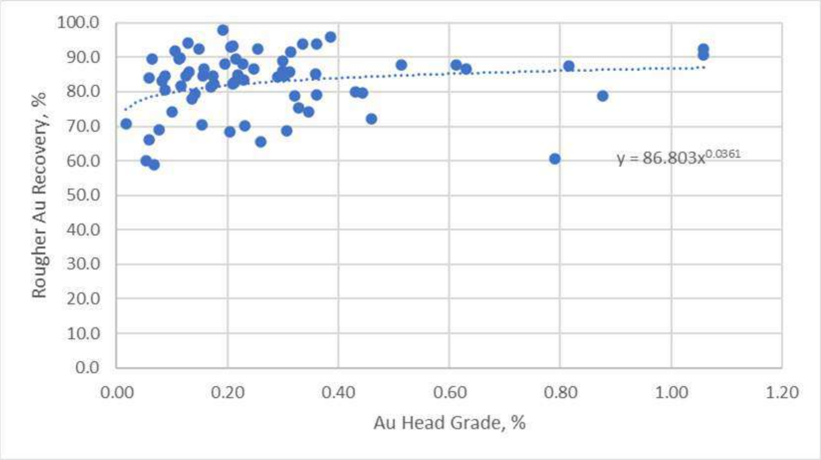
Table 13.19 – Fresh Zone: Copper Recovery Algorithms

Grade Range		Recovery Algorithms
<0.19	% Cu	Recovery, % = (-0.562 x (S grade% - Cu grade,% x (64/63.5))+95.8) x 0.951
>0.19	% Cu	Recovery, % = (-0.562 x (S grade% - Cu grade,% x (64/63.5))+95.8) x 0.951 x 2.71 x Cu grade% ^ 0.6

Gold recovery is divided into two (2) components: the gravity concentrate from the grinding circuit and the flotation concentrate. Gold recovery to gravity concentrate is estimated at 14.0% based on modeling of the proposed gravity circuit in the plant design by FLS. The model was based on EGRG testing of the MC-3 composite.

Gold recovery to the flotation concentrate is estimated using the Geomet rougher flotation results to predict rougher recovery as a function of gold head grade, as shown in Figure 13.19 and Table 13.20. A factor is applied for cleaner circuit performance based on the locked cycle testwork. Finally, a fixed value is deducted to represent float recoverable gold that will have reported to the gravity concentrate. The adjustment is necessary as all the flotation testwork was conducted on new composite feed rather than gravity circuit tailings.

Figure 13.19 – Fresh: Au Metallurgical Forecasting Recovery Algorithms



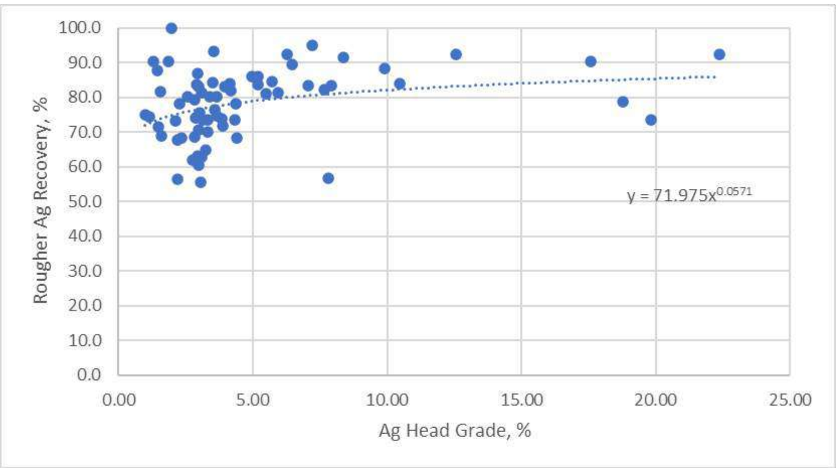
Source: Blue Coast Research, 2023

Table 13.20 – Fresh Zone, Gold Recovery Algorithms

Grade Range		Recovery Algorithms
Gravity, all	g/t Au	Recovery, % = 14.0
Flotation, all	g/t Au	Recovery, % = (86.8 x Au grade,g/t ^ 0.0361) x 0.931 -12.8

The forecast for silver is analogous to that for gold and is based on a fixed estimate of silver recovery to the gravity concentrate. Again, an estimate of rougher recovery is made as a function of head grade, with a factor applied for expected cleaner circuit performance and a discount for float recoverable silver reporting to the gravity concentrate. Figure 13.20 presents the relationship between silver head grade and rougher recovery, while Table 13.21 summarizes the recovery algorithms for silver from the fresh zone.

Figure 13.20 – Fresh: Ag Metallurgical Forecasting Recovery Algorithms



Source: Blue Coast Research, 2023

Table 13.21 – Fresh Feed, Silver Recovery Algorithms

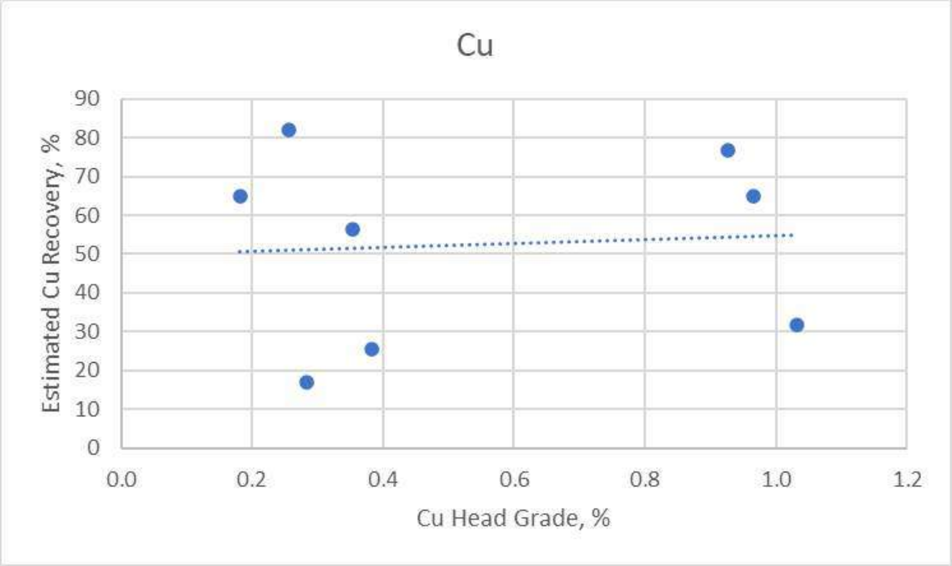
Grade Range		Recovery Algorithms
Gravity, all	%Ag	Recovery, % = 3.5
Flotation, all	%Ag	Recovery, % = (71.98 x Ag grade,g/t ^ 0.0571) x 0.904 - 2.5

13.4.2 TRANSITION ZONE

Forecasting recoveries for transition material is challenging, for Cu in particular, as the Cu mineralization is a mix of zero-recovery oxide-hosted mineralization, stronger-floating secondary sulphide mineralization (chalcocite) and very strong-floating primary sulphide mineralization (chalcopyrite). An estimate of metal recovery from the highly variable material in this zone has been made based on forecast closed circuit recoveries from batch test data in the PFS and FS metallurgical programs.

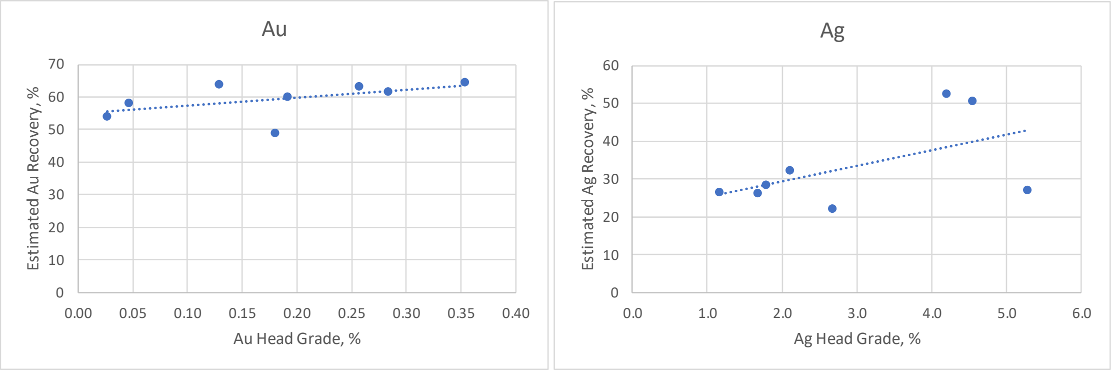
Figure 13.21 and Figure 13.22 present the relationships between head grade and estimated metal recovery to concentrate for copper, gold, and silver. Linear functions are applied to estimate flotation recovery, though for copper in particular there is no clear trend in the data.

Figure 13.21 – Projected Cu Recovery vs. Head Grade for Transition Zone



Source: Blue Coast Research, 2023

Figure 13.22 – Projected Au and Ag Recovery vs. Head Grade for Transition Zone



Source: Blue Coast Research, 2023

The recovery algorithms used for transition zone are presented in Table 13.22. For all metals, the recovery curve is applied over a fixed range, with a conservative linear estimate below the range of samples tested and a fixed estimate of recovery above. Gold and silver recoveries are divided between the gravity and flotation concentrates in the same manner applied to the fresh zone. No gravity testing was conducted on the transition zone composites, so recovery estimates are based on results from the fresh zone material.

Table 13.22 – Metallurgical Forecasting Recovery Algorithms for the Transition Zone

Grade Range		Recovery Algorithms
Cu		
<0.1	%Cu	Recovery, % = 500 x Cu grade,%
0.1-2.0	%Cu	Recovery, % = 4.97 x Cu grade,% + 49.7
>2.0	%Cu	Recovery = 59.6%
Au		
Gravity, all	g/t Au	Recovery, % = 14.0
Float, <0.02	g/t Au	Recovery, % = 2110 x Au grade,g/t
Float, 0.02-0.5	g/t Au	Recovery, % = 24.8 x Au grade, g/t + 41.8
Float, >0.5	g/t Au	Recovery, % = 54.2
Ag		
Gravity, all	%Ag	Recovery, % = 3.5
Float, <1.0	%Ag	Recovery, % = 22.6 x Ag grade,g/t
Float, 1.0-8.0	%Ag	Recovery, % = 4.15 x Ag grade,g/t + 18.46
Float, >8.0	%Ag	Recovery, % = 51.7

13.4.3 SAPROLITE ZONE

In proposed plant design, material from the saprolite zone will be fed to a separate processing circuit consisting only of grinding and gravity concentration. As a result, no copper recovery is expected from the saprolite. Gold and silver recovery is based on gravity testwork conducted in the PFS and FS metallurgical programs and gravity circuit modeling by FLS. The associated estimates are provided in Table 13.23.

Table 13.23 – Saprolite Metallurgical Forecast

Grade Range		Au/ Ag Recoveries
Gravity, all	g/t Au	Recovery = 36.0%
Gravity, all	g/t Ag	Recovery = 3.0%

13.4.4 HISTORICAL TAILINGS

Reclaimed material from the Historical Tailings area is expected to be processed through the gravity -only saprolite circuit rather than the main processing plant. Estimates for gold and silver recovery are provided in Table 13.24 and are based on gravity testwork on the five (5) zone composites and gravity circuit modeling by FLS. Cu recovery is assumed to be zero.

Table 13.24 – Historical Tailings Metallurgical Forecast

Grade Range		Au/ Ag Recoveries
Gravity, all	g/t Au	Recovery = 37.0%
Gravity, all	g/t Ag	Recovery = 3.5%

14 MINERAL RESOURCE ESTIMATES

BBA was retained by Cordoba Minerals Corporation (Cordoba) to complete a Mineral Resource Estimate (MRE) of the Alacran Project. Mr. Todd McCracken acted as the QP and completed the MRE following the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (CIM, 2019). The QP completed a resource estimation with an effective date of December 18, 2023. The resource estimation was conducted using Datamine Studio RM™ version 1.12.113.0.

A summary of the Mineral Resource is summarized in Table 14.1. Table 14.2 summarizes the in-situ contained metal within the pit shells.

Table 14.1 – El Alacrán and Satellite Deposits Resource Summary

Classification	Deposit	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	El Alacrán	96,700,000	0.42	0.24	2.69
	Historic Tailings	2,756,000	-	0.28	0.89
	Costa Azul	-	-	-	-
	Montiel East	-	-	-	-
	Montiel West	-	-	-	-
	Total	**99,456,000**	**0.41**	**0.24**	**2.65**
Inferred	El Alacrán	1,572,000	0.09	0.18	3.86
	Historic Tailings	-	-	-	-
	Costa Azul	10,421,000	0.23	0.18	0.62
	Montiel East	9,335,000	0.31	0.23	1.13
	Montiel West	10,511,000	0.09	0.36	1.14
	Total	**31,839,000**	**0.20**	**0.25**	**1.10**

Table 14.2 – El Alacrán and Satellite Deposits In-Situ Pit-Constrained Metal Content

Classification	Deposit	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	El Alacrán	96,700,000	904,532,300	740,300	8,394,100
	Historic Tailings	2,756,000	-	25,100	78,400
	Costa Azul	-	-	-	-
	Montiel East	-	-	-	-
	Montiel West	-	-	-	-
	Total	**99,456,000**	**904,532,300**	**765,400**	**8,472,500**

Classification	Deposit	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Inferred	El Alacrán	1,572,000	3,183,800	9,100	168,000
	Historic Tailings	-	-	-	-
	Costa Azul	10,421,000	53,782,000	58,800	209,200
	Montiel East	9,335,000	63,548,000	67,800	338,500
	Montiel West	10,511,000	20,583,900	123,300	385,200
	Total	**31,839,000**	**141,097,700**	**259,000**	**1,100,900**

14.1 El Alacrán Deposit Resource Estimate

14.1.1 DEPOSIT DATABASE

The El Alacrán deposit database totals 357 surface-collared diamond drill holes (DDH), of which 354 DDH were used for geological domain modelling, totalling 82,154 m in length. There are a total of 54,188 assay records in the El Alacrán deposit database.

The 21 geological domains in the El Alacrán deposit are summarized in Table 14.3. The domain naming convention is used consistently through this disclosure.

Table 14.3 – El Alacrán Deposit Geological Domains

Domain Name	Domain Code	Rock Code	Rock Type
Saprolite	100	100	Saprolite
Transition	200	200	Transition
Intrusives	300	300	Intrusive (Diorite)
Sills	400	400	Andesitic Sills (Sills)
Unit 1	500	500	Rhyolite Tuff (Tuff R)
Unit 2	600	600	Limestone (Lim)
		610	Mud/Siltstone (Mud_Silt)
		620	Fiamme Tuff (Tuff D)
		630	Sulphide Replaced Mudstone (VCLMudB)
Unit 3	700	700	Andesitic Tuff (Tuff A)
		710	Mafic Tuff (Tuff M)

Domain Name	Domain Code	Rock Code	Rock Type
z1	2010	2010	High-Grade Mineralization Domains
z2	2020	2020	
z3	2030	2030	
z4	2040	2040	
z5	2050	2050	
z6	2060	2060	
z7	2070	2070	
z8	2080	2080	
z9	2090	2090	
z10	2100	2100	

The drill hole database was validated before proceeding to the resource estimation phase, and the validation steps are detailed in Section 12.

Cordoba maintains all borehole data in a MX deposit database. Header, survey, assay, and lithology information were extracted as individual CSV format files and provided to the QP originally on July 7, 2023.

The QP believes that the database is appropriate for the purposes of mineral resource estimation and the sample density allows a reliable estimate of the tonnage and grade of the mineralization in accordance with the level of confidence established by the mineral resource categories as defined in the CIM Guidelines.

14.1.2 BULK DENSITY

Cordoba collected a total of 26,388 samples from the diamond drill holes in the El Alacrán deposit for bulk density measurements. Two (2) methods were used, the “weighed dry” method and the “paraffin wax” method for a total of 17,211 samples and 9,177 samples, respectively. The paraffin wax method was preferentially used when samples had measurements with both methods.

Cordoba used the following procedures to determine the average bulk density for each of the mineral domains:

- Sample selected for bulk density measurement;
- The Borehole ID, row number, From, To and rock type were entered into a spreadsheet;
- The sample was weighted dry on the scale (dry method) and/or the sample was covered in a paraffin wax and weighed on the scale (paraffin wax method);
- The sample was then weighted submerged saturated in tap water at a constant 22°C; and
- The bulk density is determined using the following equations:

$$SGdry = \frac{Wd}{(Wd - Ws)/CF}$$

$$SGwax = \frac{Wd}{(Wdwax - Wswax\ - [\frac{Wdwax\ - Wd}{Dwax}]/CF}$$

Wd = Dry weight, Ws = Submerged weight, CF = Correction factor for water temperature

Wdwax = Dry waxed weight, Wswax = Submerged waxed weight, Dwax = Density of wax

The bulk density measurements grouped by rock code/rock type were imported into Snowden Supervisor™ version 8.15.0 software. Histograms and probability plots were used to remove measurement outliers. Table 14.4 summarizes the results of the bulk density measurements.

Table 14.4 – El Alacrán Deposit Bulk Density Summary

Domain Name	Domain Code	Rock Code	Rock Type	Sample Count	Average Bulk Density
Saprolite	100	100	Saprolite	530	1.82
Transition	200	200	Transition	277	2.40
Intrusives	300	300	Intrusive (Diorite)	1,795	2.72
Sills	400	400	Andesitic Sills (Sills)	1,395	2.70
Unit 1	500	500	Rhyolite Tuff (Tuff R)	1,847	2.74
Unit 2	600	600	Limestone (Lim)	811	2.81
		610	Mud/Siltstone (Mud_Silt)	7,401	2.76
		620	Fiamme Tuff (Tuff D)	812	2.77
		630	Sulphide Replaced Mudstone (VCLMudB)	500	3.01
Unit 3	700	700	Andesitic Tuff (Tuff A)	564	2.75
		710	Mafic Tuff (Tuff M)	5,973	2.76
z1	2010	2010	High-Grade Mineralization Domains	409	2.99
z2	2020	2020		955	3.20
z3	2030	2030		226	2.83
z4	2040	2040		460	2.84
z5	2050	2050		311	2.80
z6	2060	2060		723	2.84
z7	2070	2070		126	2.82

Domain Name	Domain Code	Rock Code	Rock Type	Sample Count	Average Bulk Density
z8	2080	2080		935	2.88
z9	2090	2090		208	2.81
z10	2100	2100		24	2.80[1]

[1] Limited sample count, density floor for high-grade mineralized domains set to 2.80 (lowest value in the high-grade series)

14.1.3 Topography Data

In 2023, Cordoba contracted GeoinGlobe SAS to update the company's internal geodetic network based on a lidar sensor (helicopter supported) to generate the topography in the Project area to comply with the standards of Colombian regulations set forth by the IGAC (Agustin Codazzi Geographic Institute, from its acronym in Spanish).

Topographic data was generated as a 0.5 m resolution Digital Terrain Model (DTM) created with LiDAR technology and a precision Global Navigation Satellite System (GNSS) network in a 2400-hectare polygon in the municipality of Puerto Libertador, department of Cordoba. The area covered by the DTM is sufficient to cover the area defined by the current resource model.

14.1.4 Geological Interpretation

Three-dimensional wireframe models of the mineralization were developed in Leapfrog® Geo under the supervision of the QP. The ten (10) high-grade wireframes were developed by BBA based on design criteria that included a minimum downhole width of 3 m and a minimum grade of 0.70% CuEq. The 11 lithology wireframes were developed by Cordoba geologists and reviewed by BBA.

The interpreted high-grade mineralization domains were generally continuous; however, due to the nature of the mineralization there are portions of the wireframe that have grades less than 0.70% CuEq yet are still within the mineralized trend.

The wireframe solids were exported from Leapfrog® Geo and imported into Datamine Studio RM™ in .dwg format for validation and creation of the block model.

The modelling is broken down into 21 separate rock types and 17 separate mineralized domains based on geology. Table 14.5 tabulates the solids and associated volumes. Figure 14.1 illustrates the model solid for each of the domains.

The lithology wireframes extend at depth, below the deepest diamond drill holes. The resource model did not estimate grades into the full volume of the wireframes due to the size of the wireframes. This is to provide a target for future exploration.

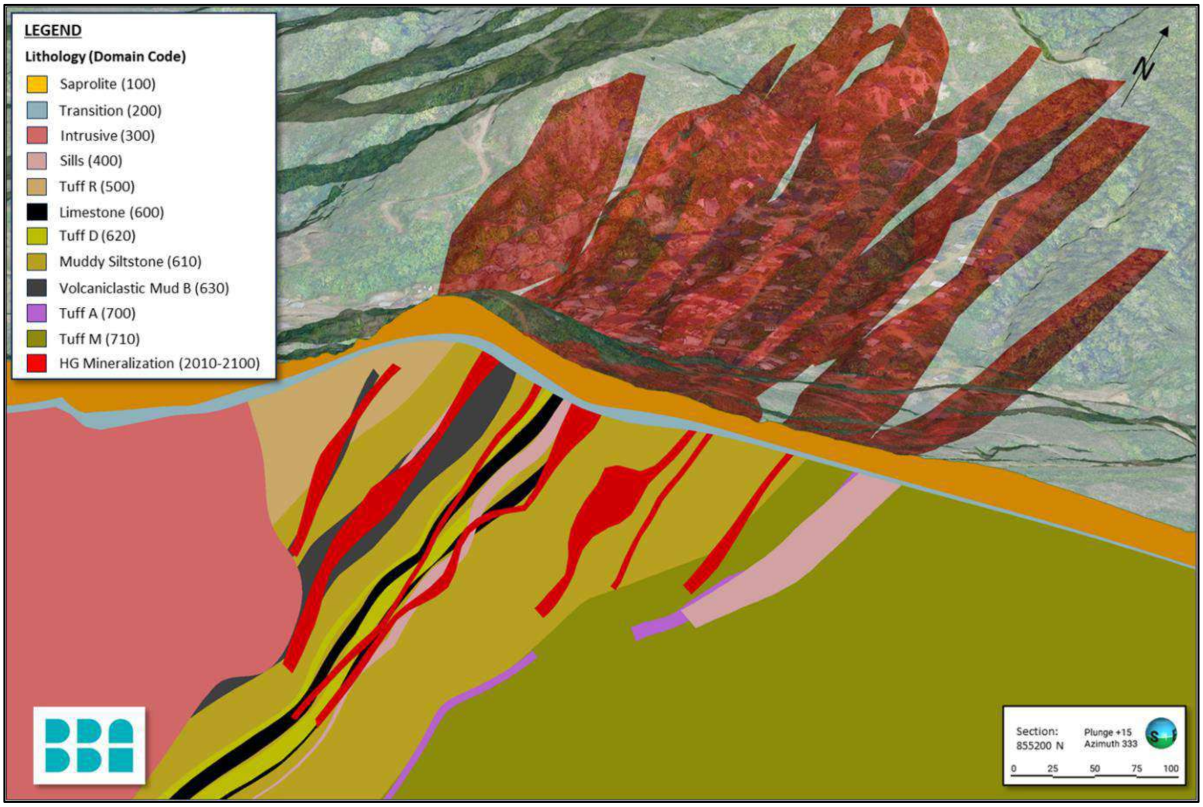
The high-grade wireframe boundaries extents were constrained by the presence of “barren drill holes”, in which case the extent corresponds to the mid-point between the closest mineralized intersect and the barren one. In the absence of drill hole “unconstrained” boundaries were given a maximum of 50 m from the last closest mineralized intersect.

The non-assayed and unrecoverable intervals were assigned void (-) value. The QP believes that non-assayed material should not be assigned a zero value, as this does not reflect the true value of the material as the actual grades are unknown. Each domain was modeled using the same principal assumptions and methodology.

Table 14.5 – El Alacrán Deposit Wireframe Summary

Domain Name	Domain Code	Rock Code	Rock Type	Wireframe Volume (m³)
Saprolite	100	100	Saprolite	63,164,778
Transition	200	200	Transition	24,247,939
Intrusives	300	300	Intrusive (Diorite)	616,925,136
Sills	400	400	Andesitic Sills (Sills)	10,779,993
Unit 1	500	500	Rhyolite Tuff (Tuff R)	168,197,506
Unit 2	600	600	Limestone (Lim)	8,018,480
		610	Mud/Siltstone (Mud_Silt)	193,772,259
		620	Fiamme Tuff (Tuff D)	9,449,350
		630	Sulphide Replaced Mudstone (VCLMudB)	2,218,072
Unit 3	700	700	Andesitic Tuff (Tuff A)	11,196,875
		710	Mafic Tuff (Tuff M)	736,488,790
z1	2010	2010	High-Grade Mineralization Domains	920,921
z2	2020	2020		2,443,290
z3	2030	2030		625,511
z4	2040	2040		1,398,012
z5	2050	2050		824,802
z6	2060	2060		1,964,138
z7	2070	2070		566,283
z8	2080	2080		2,414,463
z9	2090	2090		787,137
z10	2100	2100		158,811

Figure 14.1 – Interpretation of Domains (Section View with Orthogonal Surface Projection)



Source: BBA, 2023

14.1.5 EXPLORATORY DATA ANALYSIS

14.1.5.1 Assays

The 16 domains included in the mineral resource were sampled for a total of 54,188 assays for copper, gold, and silver. Nine (9) additional elements were modeled for internal Project purposes to support the Feasibility Study and permitting process. The assay intervals within each mineral domain were captured using the Leapfrog® Geo routine to flag the intercept into a new table in the database. These intervals were reviewed to ensure all the proper assay intervals were captured. Table 14.6 summarizes the basic statistics for the assay intervals for each of the mineral domains in the deposit.

Table 14.6 – El Alacrán Deposit Borehole Basic Statistics by Domain

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
100	Cu (%)	3727	0	0.00	5.37	0.20	0.07
	Au (ppm)	3727	0	0.00	6.52	0.13	0.08
	Ag (ppm)	3727	0	0.01	220.00	1.73	31.77
	Length (m)	3727	0	0.50	4.00	1.50	0.23
300	Cu (%)	4083	0	0.00	1.43	0.02	0.00
	Au (ppm)	4083	0	0.00	3.19	0.01	0.00
	Ag (ppm)	4083	0	0.01	14.60	0.16	0.16
	Length (m)	4083	0	0.25	3.00	1.49	0.22
400	Cu (%)	2963	0	0.00	5.54	0.07	0.03
	Au (ppm)	2963	0	0.00	1.76	0.03	0.01
	Ag (ppm)	2963	0	0.01	47.60	0.49	1.95
	Length (m)	2963	0	0.65	2.70	1.60	0.20
500	Cu (%)	4398	0	0.00	2.62	0.10	0.03
	Au (ppm)	4398	0	0.00	11.15	0.08	0.11
	Ag (ppm)	4398	0	0.01	23.40	0.60	1.68
	Length (m)	4398	0	0.45	4.10	1.50	0.21
600	Cu (%)	20839	0	0.00	7.02	0.14	0.05
	Au (ppm)	20839	0	0.00	126.50	0.08	1.09
	Ag (ppm)	20839	0	0.01	103.00	0.87	3.65
	Length (m)	20839	0	0.20	3.00	1.46	0.20
700	Cu (%)	9934	0	0.00	6.26	0.05	0.02
	Au (ppm)	9934	0	0.00	5.83	0.02	0.02
	Ag (ppm)	9934	0	0.01	100.00	0.37	2.42
	Length (m)	9934	0	0.20	2.30	1.42	0.21
2010	Cu (%)	659	0	0.00	4.27	0.74	0.58
	Au (ppm)	659	0	0.00	10.00	0.70	1.50
	Ag (ppm)	659	0	0.01	37.60	5.12	42.15
	Length (m)	659	0	0.63	2.10	1.47	0.20
2020	Cu (%)	1767	0	0.00	11.85	0.95	1.38
	Au (ppm)	1767	0	0.00	4310.00	2.09	6459.29
	Ag (ppm)	1767	0	0.01	347.00	5.79	140.76
	Length (m)	1767	0	0.50	3.75	1.46	0.19

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
2030	Cu (%)	415	0	0.01	7.13	0.99	0.67
	Au (ppm)	415	0	0.00	6.53	0.35	0.26
	Ag (ppm)	415	0	0.05	36.80	5.53	22.49
	Length (m)	415	0	1.00	2.20	1.42	0.19
2040	Cu (%)	775	0	0.00	9.23	1.00	1.21
	Au (ppm)	775	0	0.00	6.01	0.39	0.32
	Ag (ppm)	775	0	0.01	52.60	5.29	36.49
	Length (m)	775	0	0.67	2.10	1.62	0.16
2050	Cu (%)	584	0	0.00	4.69	0.69	0.34
	Au (ppm)	584	0	0.00	7.22	0.28	0.19
	Ag (ppm)	584	0	0.01	46.40	3.42	14.04
	Length (m)	584	0	0.90	2.13	1.61	0.16
2060	Cu (%)	1473	0	0.00	11.83	0.64	0.51
	Au (ppm)	1473	0	0.00	30.90	0.28	0.82
	Ag (ppm)	1473	0	0.01	289.00	4.52	101.17
	Length (m)	1473	0	0.35	2.08	1.40	0.19
2070	Cu (%)	202	0	0.00	5.80	0.73	0.60
	Au (ppm)	202	0	0.01	2.60	0.27	0.14
	Ag (ppm)	202	0	0.04	42.10	4.49	26.48
	Length (m)	202	0	0.67	2.00	1.63	0.18
2080	Cu (%)	1813	0	0.00	21.80	0.78	0.96
	Au (ppm)	1813	0	0.00	37.60	0.37	1.64
	Ag (ppm)	1813	0	0.01	316.00	4.66	98.67
	Length (m)	1813	0	0.46	2.10	1.38	0.18
2090	Cu (%)	390	0	0.02	6.69	0.74	0.35
	Au (ppm)	390	0	0.00	2.87	0.32	0.09
	Ag (ppm)	390	0	0.09	22.30	4.32	10.74
	Length (m)	390	0	0.80	2.10	1.28	0.17
2010	Cu (%)	166	0	0.01	7.35	0.85	0.53
	Au (ppm)	166	0	0.00	1.57	0.16	0.04
	Ag (ppm)	166	0	0.25	19.40	3.31	6.70
	Length (m)	166	0	1.00	3.20	1.25	0.16

14.1.5.2 *Grade Capping*

The raw assay data for each element within the domain was examined to assess the amount of metal that is bias from high-grade assays. A combination of reviewing decile analysis tables (Parrish, 1997), histograms, Q-Q, and cumulative frequency plots was used to assist in determining if grade capping was required on copper, silver, and gold in each domain. The global top-cut analysis tool within the Snowden Supervisor™ version 8.15.0 software was used in the capping process.

A review of the 3D spatial distribution of the capped samples was completed to determine if the samples were spatially close and the potential of a higher-grade sub-domain. This was not observed in any of the domains on the deposit.

This analysis concluded grade capping was required for domains 100, 300, 400 individually; while domains 500, 600, 700 were grouped, and the high-grade 2000 series domains were also grouped. This grouping was determined due to mineralization being related to the same events and based on similar geological and mineralization characteristics of the grouped domains. Table 14.7 summarizes the grade capping applied to each domain by the QP.

Table 14.7 – El Alacrán Deposit Grade Capping Summary

Domain	Element	Grade Cap	Number Capped Samples
100	Cu (%)	No Cap	No Cap
	Au (ppm)	4.00	4
	Ag (ppm)	45.00	5
300	Cu (%)	0.70	3
	Au (ppm)	1.00	2
	Ag (ppm)	8.00	1
400	Cu (%)	1.50	4
	Au (ppm)	1.50	1
	Ag (ppm)	20.00	2
500 600 700	Cu (%)	5.00	5
	Au (ppm)	7.00	5
	Ag (ppm)	50.00	7
HG 2000 Series (2010-2100)	Cu (%)	No Cap	No Cap
	Au (ppm)	10.00	10
	Ag (ppm)	100.00	5

14.1.5.3 *Compositing*

Compositing of all the assay data within a domain was completed on downhole intervals honouring the interpretation of the geological wireframes. Statistics indicated that a majority of the samples were collected at 1.0 m and 2.0 m intervals. Composites were generated at a 1.0 m best fit option, allowing all the material to be used in the compositing process. Datamine Studio RM™ backstitch option distributed the “tails” of the composite equally across all the composites in the hole to ensure all the sample material was used in the estimate. Table 14.8 summarizes the statistics for the boreholes after compositing.

Table 14.8 – El Alacrán Deposit Borehole Composite Statistics by Domain

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
100	Cu (%)	5428	0	0.00	5.37	0.20	0.07
	Au (ppm)	5428	0	0.00	4.00	0.12	0.06
	Ag (ppm)	5428	0	0.01	45.00	1.63	8.75
	Length (m)	5428	0	0.53	1.50	0.99	0.00
300	Cu (%)	6089	0	0.00	0.70	0.02	0.00
	Au (ppm)	6089	0	0.00	1.00	0.01	0.00
	Ag (ppm)	6089	0	0.01	8.00	0.16	0.11
	Length (m)	6089	0	0.75	1.46	1.00	0.00
400	Cu (%)	4746	0	0.00	1.50	0.07	0.02
	Au (ppm)	4746	0	0.00	1.42	0.03	0.01
	Ag (ppm)	4746	0	0.01	20.00	0.48	1.09
	Length (m)	4746	0	0.75	1.45	1.00	0.00
500	Cu (%)	6607	0	0.00	2.31	0.10	0.03
	Au (ppm)	6607	0	0.00	7.00	0.08	0.07
	Ag (ppm)	6607	0	0.01	22.26	0.60	1.55
	Length (m)	6607	0	0.55	1.23	1.00	0.00
600	Cu (%)	30382	0	0.00	5.00	0.14	0.05
	Au (ppm)	30382	0	0.00	7.00	0.07	0.03
	Ag (ppm)	30382	0	0.01	50.00	0.86	2.64
	Length (m)	30382	0	0.75	1.45	1.00	0.00
700	Cu (%)	14145	0	0.00	3.91	0.05	0.02
	Au (ppm)	14145	0	0.00	5.83	0.02	0.02
	Ag (ppm)	14145	0	0.01	50.00	0.36	1.20
	Length (m)	14145	0	0.88	1.49	1.00	0.00
2010	Cu (%)	970	0	0.00	4.20	0.74	0.56
	Au (ppm)	970	0	0.00	10.00	0.70	1.44
	Ag (ppm)	970	0	0.01	36.84	5.12	40.64
	Length (m)	970	0	0.75	1.06	1.00	0.00

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
2020	Cu (%)	2594	0	0.00	11.85	0.95	1.28
	Au (ppm)	2594	0	0.00	10.00	0.59	1.01
	Ag (ppm)	2594	0	0.01	100.00	5.67	88.06
	Length (m)	2594	0	0.75	1.40	1.00	0.00
2030	Cu (%)	590	0	0.01	7.13	0.99	0.63
	Au (ppm)	590	0	0.00	6.53	0.35	0.25
	Ag (ppm)	590	0	0.05	36.80	5.53	21.44
	Length (m)	590	0	0.75	1.05	1.00	0.00
2040	Cu (%)	1255	0	0.00	9.23	1.00	1.14
	Au (ppm)	1255	0	0.00	6.01	0.39	0.31
	Ag (ppm)	1255	0	0.01	52.45	5.29	34.26
	Length (m)	1255	0	0.92	1.30	1.00	0.00
2050	Cu (%)	943	0	0.00	4.61	0.69	0.31
	Au (ppm)	943	0	0.01	7.22	0.28	0.19
	Ag (ppm)	943	0	0.01	45.65	3.42	13.04
	Length (m)	943	0	0.88	1.13	1.00	0.00
2060	Cu (%)	2072	0	0.00	11.83	0.64	0.50
	Au (ppm)	2072	0	0.00	10.00	0.27	0.35
	Ag (ppm)	2072	0	0.01	100.00	4.35	34.87
	Length (m)	2072	0	0.75	1.44	1.00	0.00
2070	Cu (%)	332	0	0.00	5.80	0.73	0.57
	Au (ppm)	332	0	0.01	2.48	0.27	0.13
	Ag (ppm)	332	0	0.04	42.10	4.49	25.54
	Length (m)	332	0	0.88	1.06	0.99	0.00
2080	Cu (%)	2513	0	0.00	21.80	0.78	0.92
	Au (ppm)	2513	0	0.00	10.00	0.34	0.36
	Ag (ppm)	2513	0	0.01	100.00	4.50	33.25
	Length (m)	2513	0	0.88	1.18	1.00	0.00
2090	Cu (%)	499	0	0.02	6.69	0.74	0.35
	Au (ppm)	499	0	0.00	2.87	0.32	0.09
	Ag (ppm)	499	0	0.09	22.30	4.32	10.57
	Length (m)	499	0	0.88	1.12	1.00	0.00
2010	Cu (%)	208	0	0.01	7.35	0.85	0.52
	Au (ppm)	208	0	0.00	1.57	0.16	0.04
	Ag (ppm)	208	0	0.25	19.40	3.31	6.56
	Length (m)	208	0	0.90	1.02	1.00	0.00

14.1.5.4 Spatial Analysis

Variograms for copper, gold, and silver elements were created to inform the search ellipse dimensions. The variograms were also used to assign kriging weights during the estimation process.

The variography for Cordoba was determined using Snowden Supervisor™ version 8.15.0 software. Each element was modelled using a downhole variogram to determine the nugget effect, then a spherical pair-wise variogram was used to determine spatial continuity in each of the domains. Correlation matrices for each domain were examined. Any correlation coefficient above 0.70 is considered sufficient to apply variograms across both variables. It determined that for all domains except 100 and 300 the copper variograms could be used for silver. An example of a correlation matrix for Domain 2020 is shown in Table 14.9.

Table 14.10 summarizes the results of the variogram models for each element in each domain. The variogram rotation and maximum range governed the search ellipse rotation and size.

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Table 14.10 summarizes the results of the variogram models for each element in each domain. The variogram rotation and maximum range governed the search ellipse rotation and size.

Table 14.9 – Correlation Matrix for Domain 2020

Element	Cu	Au	Ag
Cu	1		
Au	0.30	1	
Ag	**0.78**	0.27	1

Table 14.10 – El Alacrán Deposit Variogram Parameters

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
100	Cu	0	0	-90	0.04	38	35	22	0.84	160	130	30	0.12
	Au	0	0	-90	0.15	16	11	11	0.42	150	100	20	0.43
	Ag	0	0	-90	0.15	18	11	19	0.66	150	60	20	0.19

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
300	Cu	90	120	120	0.04	55	31	4	0.81	160	100	25	0.15
	Au	90	120	120	0.04	69	19	7	0.77	150	100	40	0.19
	Ag	90	100	130	0.05	22	28	19	0.73	150	100	30	0.22
400	Cu	90	130	110	0.08	14	11	12	0.69	125	80	30	0.23
	Au	90	130	140	0.16	21	24	12	0.7	150	120	30	0.14
	Ag	90	130	110	0.08	14	11	12	0.69	125	80	30	0.23
500	Cu	-90	80	80	0.1	39	12	29	0.64	150	115	30	0.26
	Au	-90	80	100	0.13	19	41	28	0.73	125	100	30	0.14
	Ag	-90	80	80	0.1	39	12	29	0.64	150	115	30	0.26
600	Cu	-90	50	-110	0.19	13	11	10	0.56	150	100	60	0.25
	Au	-90	50	-160	0.19	16	8	8	0.56	180	100	60	0.25
	Ag	-90	50	-110	0.19	13	11	10	0.56	150	100	60	0.25
700	Cu	90	140	150	0.12	10	34	15	0.78	140	90	50	0.1
	Au	-90	40	50	0.19	53	48	3	0.65	150	100	40	0.16
	Ag	90	140	150	0.12	10	34	15	0.78	140	90	50	0.1
2010	Cu	-90	60	-80	0.03	25	11	3	0.77	120	80	25	0.2
	Au	90	120	170	0.07	29	71	13	0.39	190	130	20	0.54
	Ag	-90	60	-80	0.03	25	11	3	0.77	120	80	25	0.2
2020	Cu	90	120	-110	0.14	39	29	4	0.54	140	80	10	0.32
	Au	90	120	10	0.13	56	16	20	0.62	150	80	25	0.25
	Ag	90	120	-110	0.14	39	29	4	0.54	140	80	10	0.32
2030	Cu	90	130	20	0.02	18	71	6	0.82	130	80	30	0.16
	Au	-90	40	50	0.04	44	63	3	0.81	140	90	30	0.15
	Ag	90	130	20	0.02	18	71	6	0.82	130	80	30	0.16
2040	Cu	90	130	170	0.02	51	13	10	0.88	150	100	30	0.1
	Au	90	130	-170	0.02	43	36	6	0.66	150	100	40	0.32
	Ag	90	130	170	0.02	51	13	10	0.88	150	100	30	0.1
2050	Cu	90	130	-130	0.12	32	32	9	0.79	180	100	20	0.09
	Au	90	130	-130	0.12	110	73	13	0.55	150	100	20	0.33
	Ag	90	130	-130	0.12	32	32	9	0.79	180	100	20	0.09
2060	Cu	-90	60	130	0.06	48	20	22	0.35	170	120	30	0.59
	Au	90	110	140	0.06	27	79	22	0.69	140	115	30	0.25
	Ag	-90	60	130	0.06	48	20	22	0.35	170	120	30	0.59
2070	Cu	-90	50	20	0.03	82	52	5	0.78	150	110	20	0.19
	Au	-90	50	-10	0.06	18	30	5	0.73	150	110	20	0.21
	Ag	-90	50	20	0.03	82	52	5	0.78	150	110	20	0.19

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
2080	Cu	-90	50	-70	0.05	34	34	1	0.39	180	150	20	0.56
	Au	-90	50	-50	0.05	62	95	7	0.52	180	140	30	0.43
	Ag	-90	50	-70	0.05	34	34	1	0.39	180	150	20	0.56
2090	Cu	90	130	120	0.05	44	90	5	0.38	160	100	25	0.57
	Au	-90	40	50	0.05	17	37	2	0.68	150	100	20	0.27
	Ag	90	130	120	0.05	44	90	5	0.38	160	100	25	0.57
2100	Cu	-90	70	-120	0.06	34	41	39	0.56	120	80	40	0.38
	Au	90	100	-170	0.05	51	29	29	0.26	150	70	30	0.69
	Ag	-90	70	-120	0.06	34	41	39	0.56	120	80	40	0.38

14.1.6 RESOURCE BLOCK MODEL

14.1.6.1 *Parent Model*

A separate block model was established in Datamine Studio RM™ for the El Alacrán deposit using one parent model as the origin. The model was not rotated.

A block size of 5 m x 5 m x 5 m was selected in order to accommodate an open-pit mining scenario. The block model was sub-celled on a 1.25 m x 1.25 m x 2.5 m pattern allowing the parent block to be split in each direction to more accurately fill the volume of the wireframes, and therefore more accurately estimating the tonnes in the Mineral Resource. Mineral estimation was completed on the parent blocks and the grades assigned to the sub-blocks.

Table 14.11 summarizes details of the parent block model.

Table 14.11 – El Alacrán Deposit Block Model Parameters

Properties	X (Column)	Y (Row)	Z (Level)
Origin coordinates	416300	852900	-230
Number of blocks	862	1280	142
Block size (m)	5	5	5
Sub-block size (m)	1.25	1.25	2.5
Rotation	No Rotation		

14.1.6.2 *Estimate Parameters*

The interpolations of the domains were completed using the estimation methods Ordinary Kriging (OK), nearest neighbour (NN), and inverse distance squared (ID^2). The estimations were designed for multiple passes. In each estimation pass, a minimum and maximum number of samples were required, as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. All estimation passes used the capped and composited dataset for the appropriate domain being estimated. The OK methodology is the method used to report the mineral estimate statement.

An isotropic search ellipse was used for the estimation. Only the samples within the domain wireframe were used in the estimation. The result is that the search ellipse will not locate samples outside the domain wireframe. Table 14.12 summarizes the search ellipse size and rotations based on the variography, and Table 14.13 summarizes the interpolation criteria for each domain.

Table 14.12 – El Alacrán Deposit Search Ellipse Summary

Domain	Element	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)
100	Cu	0	0	-90	80	65	15
	Au	0	0	-90	75	50	10
	Ag	0	0	-90	75	30	10
300	Cu	90	120	120	80	50	12.5
	Au	90	120	120	75	50	20
	Ag	90	100	130	75	50	15
400	Cu	90	130	110	62.5	40	15
	Au	90	130	140	75	60	15
	Ag	90	130	110	62.5	40	15
500	Cu	-90	80	80	75	57.5	15
	Au	-90	80	100	62.5	50	15
	Ag	-90	80	80	75	57.5	15
600	Cu	-90	50	-110	75	50	30
	Au	-90	50	-160	90	50	30
	Ag	-90	50	-110	75	50	30
700	Cu	90	140	150	70	45	25
	Au	-90	40	50	75	50	20
	Ag	90	140	150	70	45	25
2010	Cu	-90	60	-80	60	40	12.5
	Au	90	120	170	95	65	10
	Ag	-90	60	-80	60	40	12.5
2020	Cu	90	120	-110	70	40	5
	Au	90	120	10	75	40	12.5
	Ag	90	120	-110	70	40	5
2030	Cu	90	130	20	65	40	15
	Au	-90	40	50	70	45	15
	Ag	90	130	20	65	40	15

Domain	Element	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)
2040	Cu	90	130	170	75	50	15
	Au	90	130	-170	75	50	20
	Ag	90	130	170	75	50	15
2050	Cu	90	130	-130	90	50	10
	Au	90	130	-130	75	50	10
	Ag	90	130	-130	90	50	10
2060	Cu	-90	60	130	85	60	15
	Au	90	110	140	70	57.5	15
	Ag	-90	60	130	85	60	15
2070	Cu	-90	50	20	75	55	10
	Au	-90	50	-10	75	55	10
	Ag	-90	50	20	75	55	10
2080	Cu	-90	50	-70	90	75	10
	Au	-90	50	-50	90	70	15
	Ag	-90	50	-70	90	75	10
2090	Cu	90	130	120	80	50	12.5
	Au	-90	40	50	75	50	10
	Ag	90	130	120	80	50	12.5
2100	Cu	-90	70	-120	60	40	20
	Au	90	100	-170	75	35	15
	Ag	-90	70	-120	60	40	20

Table 14.13 – El Alacrán Deposit Interpolation Parameters

Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
			Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
100	Cu	2	4	15	1	3	12	1.6	3	12	3
	Au	2	4	15	1	3	12	1.6	3	12	3
	Ag	2	4	15	1	3	12	1.6	3	12	3
300	Cu	2	3	12	1	3	12	1.6	3	12	3
	Au	2	3	12	1	3	12	1.6	3	12	3
	Ag	2	3	12	1	3	12	1.6	3	12	3
400	Cu	2	4	15	1	3	12	1.6	3	12	3
	Au	2	4	15	1	3	12	1.6	3	12	3
	Ag	2	4	15	1	3	12	1.6	3	12	3

Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
			Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
500	Cu	2	4	12	1	3	12	1.6	3	12	3
	Au	2	4	12	1	3	12	1.6	3	12	3
	Ag	2	4	12	1	3	12	1.6	3	12	3
600	Cu	2	4	12	1	3	12	1.6	3	12	3
	Au	2	4	12	1	3	12	1.6	3	12	3
	Ag	2	4	12	1	3	12	1.6	3	12	3
700	Cu	2	4	12	1	3	12	1.6	3	12	3
	Au	2	4	12	1	3	12	1.6	3	12	3
	Ag	2	4	12	1	3	12	1.6	3	12	3
2010	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2020	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2030	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2040	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2050	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2060	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2070	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2080	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3
2090	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3

Domain	**Element**	**Max No. of Composites per Borehole**	**Pass 1**			**Pass 2**			**Pass 3**		
			Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
2100	Cu	3	4	6	1	4	10	1.6	4	12	3
	Au	3	4	6	1	4	10	1.6	4	12	3
	Ag	3	4	6	1	4	10	1.6	4	12	3

14.1.7 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resource and Mineral Reserve Best Practice Guidelines (CIM, 2019);
- Author’s experience with sulphide, iron oxide copper-gold (IOCG), and Cu-Au porphyry deposits;
- Spatial continuity based on variography of the assays within the drill holes;
- Understanding the geology of the deposit; and
- Drill hole spacing, data quality and the estimation runs required to estimate the grades in a block.

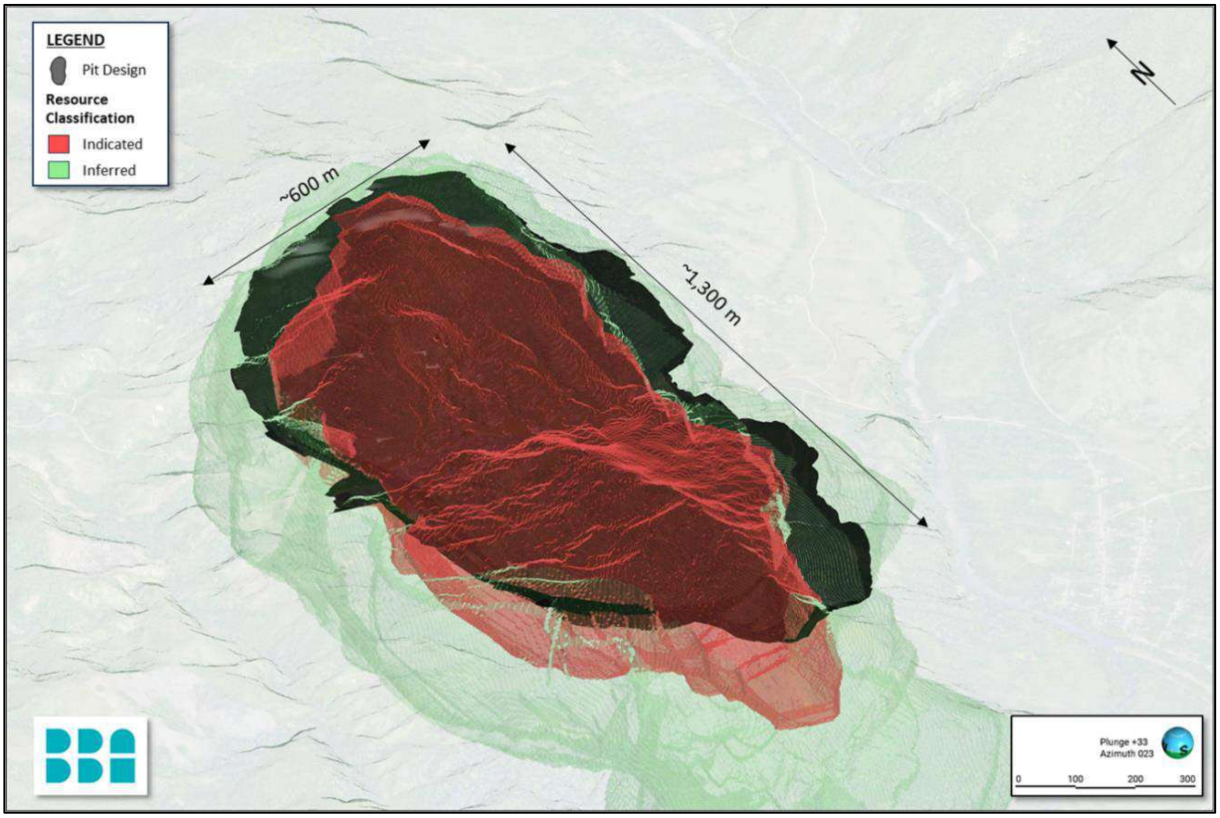
A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction (CIM, 2019).

A wireframe was created taking the above points into consideration to capture the Mineral Resource classified as Indicated (Figure 14.2). All remaining blocks were classified as Inferred. No material in the block model was considered as Measured.

Material in the block model is considered Indicated when:

- The block was estimated in the first search pass; and
- The block was estimated in the second search pass with number of samples greater than or equal to six (6) samples.

Figure 14.2 – Blocks Classified as Indicated and Inferred Mineral Resource



Source: BBA, 2023

14.1.8 MINERAL RESOURCE TABULATION

The resource reported is effective as of December 18, 2023 and has been tabulated in terms of a pit-constrained Net Smelter Return (NSR) cut-off grade of US$2.08/t milled of Saprolite and US$ 9.88/t milled of Transition and Fresh material.

The open pit Mineral Resource is constrained within a pit design using Deswik software (2020.01), which runs the pseudoflow algorithm to determine the potential economic pit limits. Table 14.14 summarizes the parameters used to develop the pit constraints for a reasonable prospect of economic extraction.

Table 14.14 – Pit Constraint Parameters

Input	Unit	Value
Revenue		
Copper Metal Price	US$/lb	3.80
Gold Metal Price	US$/oz	1690.00
Silver Metal Price	US$/oz	22.50

Input	Unit	Value
Economics		
Currency	$	US dollars
Discount Rate	%	8.00
Cost Basis		
Mining		
Rock Mining	$/t mined	2.05
Saprolite Mining	$/t mined	1.45
Historical Tailings Mining	$/t mined	1.30
Sustaining Capital, Mining	$/t mined	0.10
Incremental Mining Cost	$/t mined per 10 m bench	0.03
Reference Elevation	--	120 m pit entrance
Processing and G&A		
Milling Cost – Rock	$/t milled	7.70
Milling Cost – Saprolite	$/t milled	1.00
Milling Cost – Historical Tailings	$/t milled	1.00
Tailings, WMF, Water Management	$/t milled	0.54
Tailings (Saprolite, Historical Tailings)	$/t milled	0.35
G&A	$/t milled	1.64
Sustaining Capital, Mill	$/t milled	0.08
Sustaining Capital, WMF	$/t milled	0.30
Metallurgical Recoveries		
Fresh & Transition		
Copper	%	Algorithm
Gold	%	Algorithm
Silver	%	Algorithm
Saprolite		
Copper	%	0
Gold	%	Algorithm
Silver	%	Algorithm
Historical Tailings		
Copper	%	0
Gold	%	40
Silver	%	30

Input	Unit	Value
Selling Costs		
Cu Concentrate		
Cu % Payable	%	96.50
Au % Payable	%	96.50
Ag % Payable	%	75.00
Conc. Handling & transportation	$/t conc.	115.00
Treatment Charges	$/t conc.	70.00
Refining Charges, Cu	US$/lbs payable Cu	0.07
Refining Charges, Au	US$/oz payable Au	5.00
Refining Charges, Ag	US$/oz payable Ag	0.30
Gold Concentrate		
Au % Payable	%	98.00
Ag % Payable	%	90.00
Conc. Handling & transportation	$/t conc.	75.00
Treatment Charges	$/t conc.	65.00
Refining Charges, Au	US$/oz payable Au	5.00
Refining Charges, Ag	US$/oz payable Ag	0.30
Royalties		
Royalties, Cu	%	5
Royalties, Au	%	4
Royalties, Ag	%	4
Royalties, Contractual	%	2
Operating Parameters		
Mining Dilution	%	Regularized Model
Mining Loss	%	Regularized Model
Pit Slope Parameters		
Overall Slope Angle (OSA) - Rock	degree	42 - 45
Overall Slope Angle (OSA) - Saprolite	degree	29.

The pit-constrained mineral resource and contained metal for the El Alacrán deposit is summarized in Table 14.15. Table 14.16 summarizes the in-situ pit-constrained contained metal.

Table 14.15 – El Alacrán Deposit Resource Summary

Classification	Rock Type	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	Saprolite	7,535,000	-	0.24	2.72
	Transition	2,456,000	0.53	0.21	2.84
	Fresh	86,709,000	0.46	0.24	2.69
	Total	**96,700,000**	**0.42**	**0.24**	**2.69**
Inferred	Saprolite	987,000	-	0.24	5.38
	Transition	28,000	0.41	0.06	1.19
	Fresh	557,000	0.26	0.06	0.85
	Total	**1,572,000**	**0.09**	**0.18**	**3.86**

Table 14.16 – El Alacrán Deposit In-Situ Pit-Constrained Metal Content

Classification	Rock Type	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	Saprolite	7,535,000	-	58,900	657,500
	Transition	2,456,000	28,501,400	16,300	224,500
	Fresh	86,709,000	876,030,900	665,100	7,512,100
	Total	**96,700,000**	**904,532,300**	**740,300**	**8,394,100**
Inferred	Saprolite	987,000	-	7,900	152,300
	Transition	28,000	247,400	100	1,000
	Fresh	557,000	2,936,400	1100	14,700
	Total	**1,572,000**	**3,183,800**	**9,100**	**168,000**

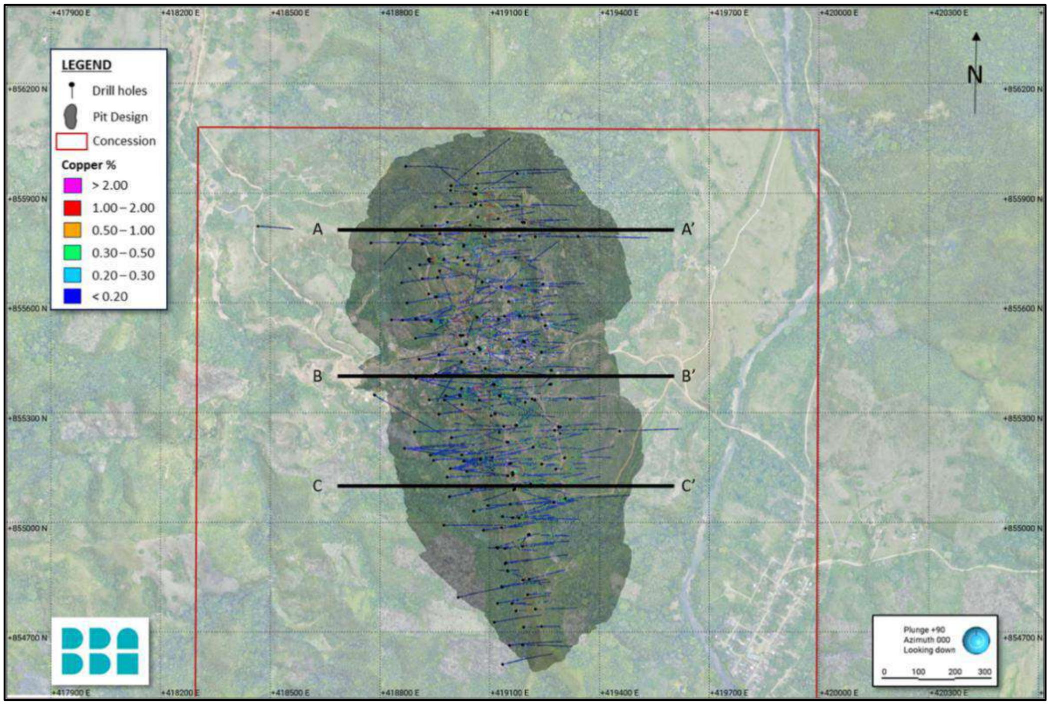
A Mineral Resource was prepared in accordance with NI 43-101 and the CIM Definition Standards (2019). Mineral resources that are not mineral reserves do not have demonstrated economic viability. No environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues are known to the QP that may affect the estimate of mineral resources..

14.1.9 MODEL VALIDATION

14.1.9.1 Visual Validation

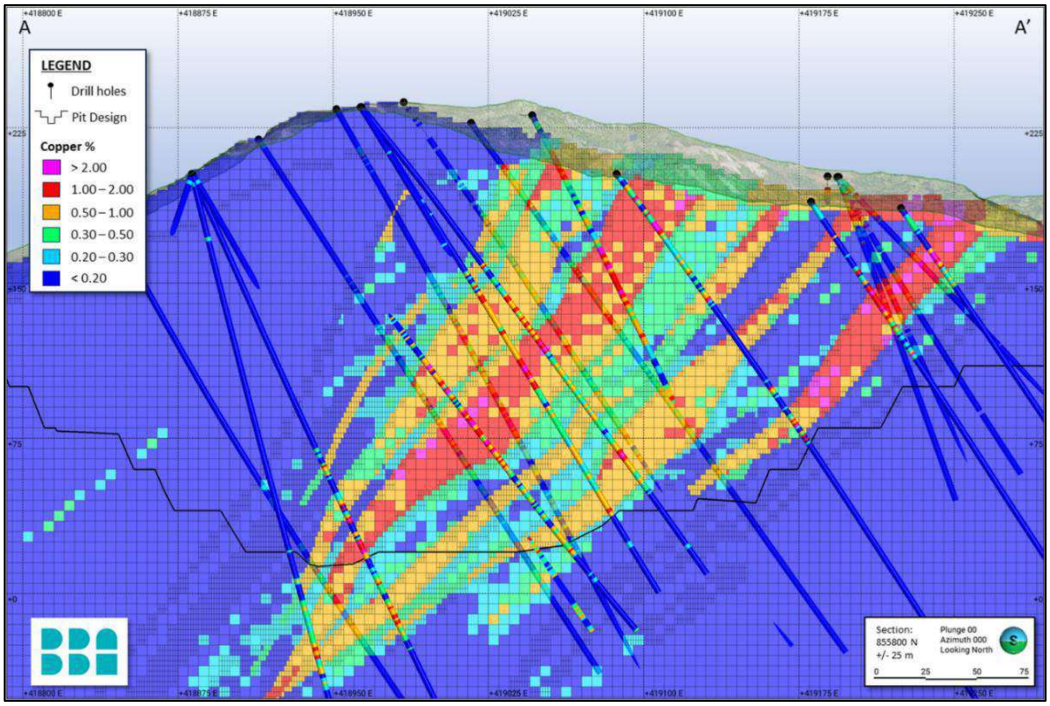
The visual comparisons of OK block model grades and composite drill holes show a reasonable correlation between the values (Figure 14.3 to Figure 14.6). No significant discrepancies were apparent from the sections reviewed, yet grade smoothing was apparent in some of the lower elevations due to the distance between drill samples being broader in these regions. Section lines are for reference.

Figure 14.3 – Surface Plan Showing Optimized Pit for El Alacrán Deposit



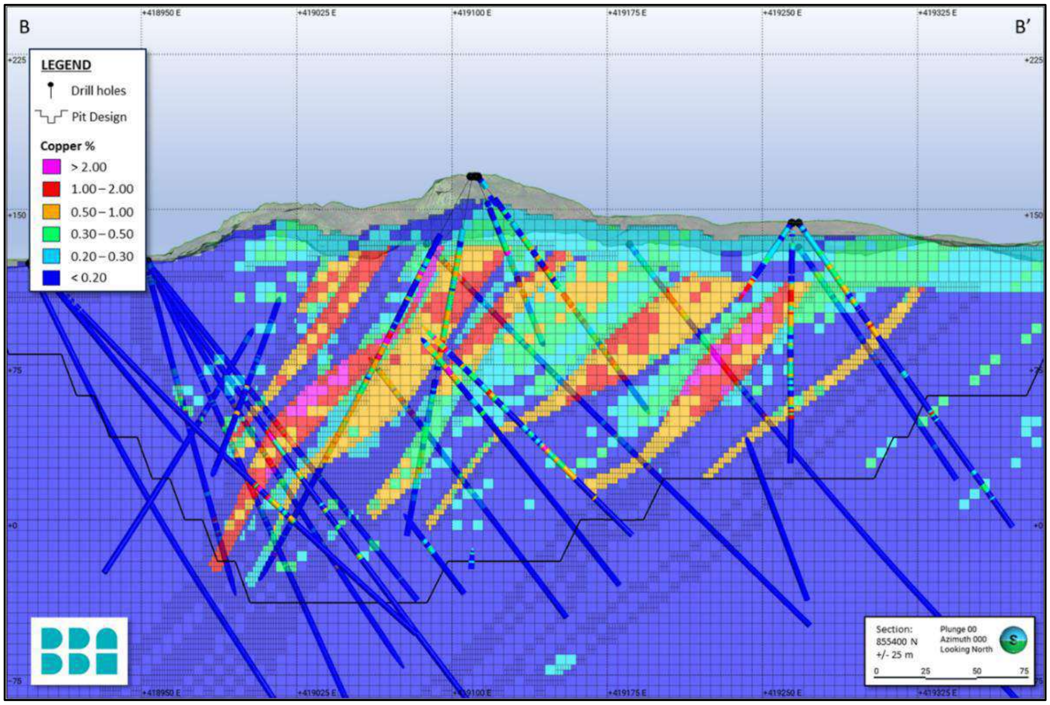
Source: BBA, 2023

Figure 14.4 – El Alacrán Deposit Visual Validation Through A-A'



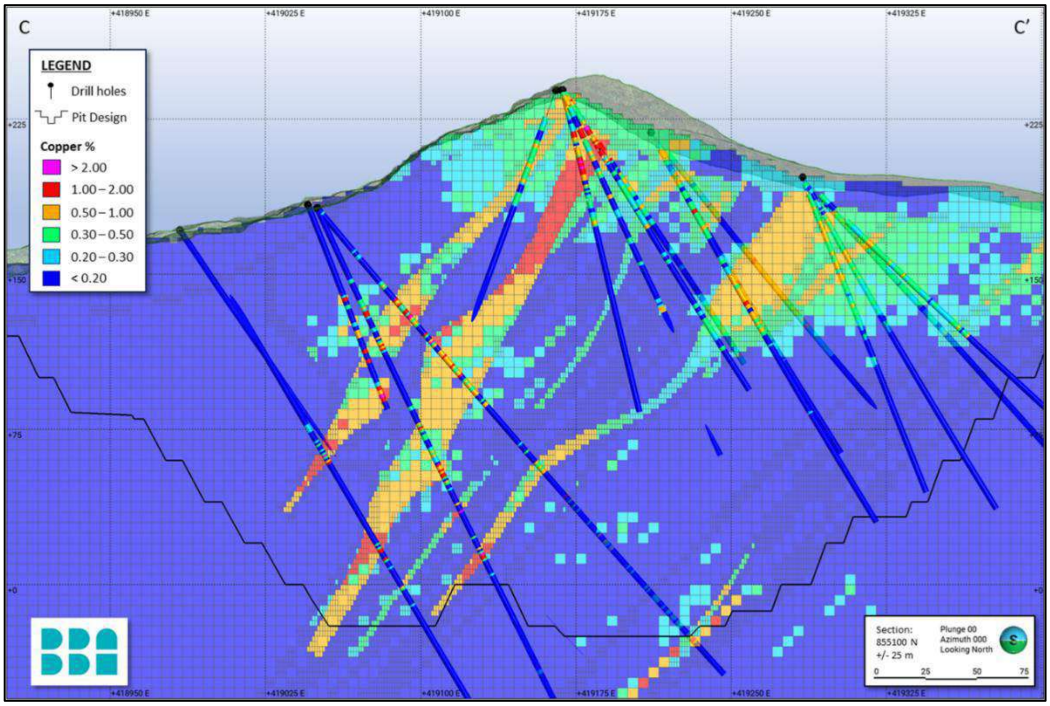
Source: BBA, 2023

Figure 14.5 – El Alacrán Deposit Visual Validation Through B-B'



Source: BBA, 2023

Figure 14.6 – El Alacrán Deposit Visual Validation Through C-C'



Source: BBA, 2023

14.1.9.2 Global Statistics

The global block model statistics for the OK model were compared to the global NN and ID^2 model values as well as the composite capped drill hole data. Table 14.17 shows this comparison of the global estimates for the three estimation method calculations. In general, there is an agreement between the OK model, ID^2 model, and NN model. Larger discrepancies are reflected as a result of lower drill density in some portions of the model. There is a degree of smoothing apparent when compared to the diamond drill statistics. Comparisons were made using all blocks and assays above an 0% Cu, 0 g/t Au, and 0 g/t Ag.

Table 14.17 – El Alacrán Deposit Global Statistics Comparison

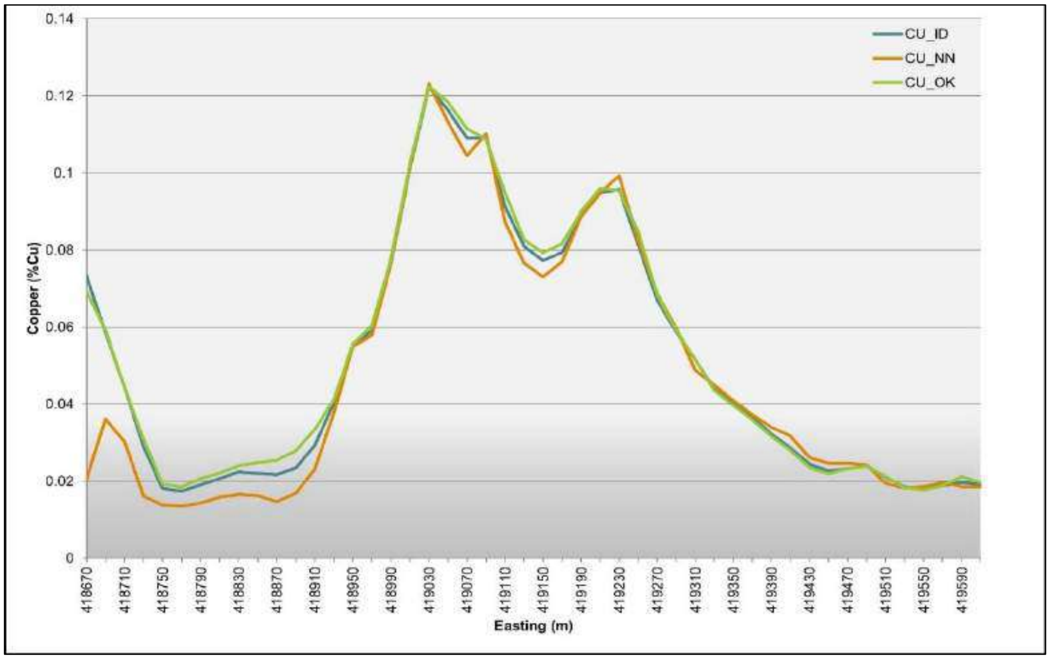
Element	NN	ID^2	OK	DDH Composite
Cu (%)	0.12	0.12	0.12	0.21
Au (g/t)	0.06	0.06	0.06	0.11
Ag (g/t)	0.82	0.82	0.83	1.32

14.1.9.3 Swath Plots

Figures 14.7 and 14.8 display the comparison between the OK estimate with ID^2 and NN estimates in a swath plot format.

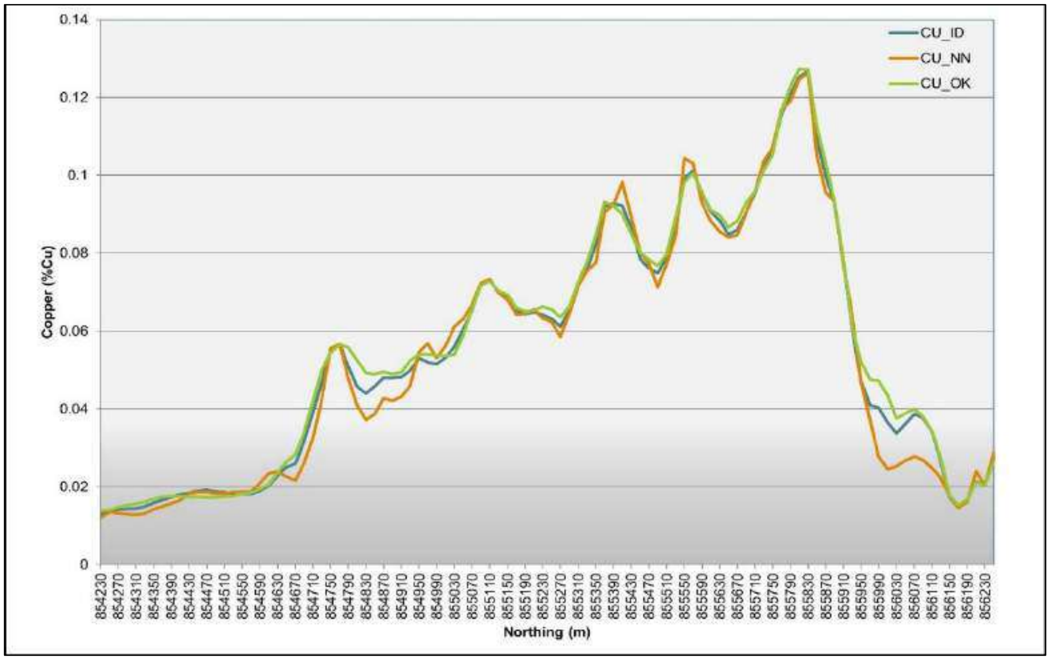
As expected, there is a strong degree of grade smoothing with the OK methodology.

Figure 14.7 – El Alacrán Swath Plot – Easting



Source: BBA, 2023

Figure 14.8 – El Alacrán Swath Plot – Northing



Source: BBA, 2023

14.1.10 PREVIOUS ESTIMATES

A comparison between the previous Mineral Resource Statement in 2022 (Kuntz et al., 2022) and the current 2023 Mineral Resource Statement disclosed in this Report is illustrated in Tables 14.18 and 14.19.

There are several differences between the 2022 and 2023 mineral resource statements, including, yet not limited to:

- Correction of collar elevations and topographic surface;
- 176 additional drill holes, 43,068 additional metres and 24,102 additional assay samples;
- 14,177 additional SG measurements and re-interpretation of the SG data;
- A re-interpretation of the geology and mineralized domains;
- Different NSR based cut-off grades:
  - US$1.78/t in the historic 2022 MRE versus US$2.08/t in the current 2023 MRE for saprolite material;
  - US$8.85/t in the historic 2022 MRE versus US$9.88/t in the current 2023 MRE for transition and fresh material;
- Different metallurgical recovery assumptions; and
- Different metal pricing, smelter terms and pit shell parameters (mining, processing, and G&A costs).

Table 14.18 – Grade-Tonnage Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	96.7	0.42	0.24	2.69	105.6	0.44	0.27	2.52
Inferred	1.6	0.09	0.18	3.86	2.6	0.20	0.17	0.86

Table 14.19 – Metal Content Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)
Indicated	96.7	904.5	740,300	8,394,100	105.6	1,028.9	921,957	8,545,652
Inferred	1.6	3.1	9,100	168,000	2.6	11.5	14,531	72,308

14.2 El Alacrán Historical Tailings Resource Estimate

14.2.1 DEPOSIT DATABASE

The El Alacrán Historical Tailings database totals 509 surface-collared hand auger drill holes (DDH), totalling 1,455 m in length. There are a total of 1,517 assay records in the El Alacrán Historical Tailings database.

The five (5) domains in the El Alacrán Historical Tailings are summarized in Table 14.20. The domains have no geochemical or mineralogical distinction and are based on initial sample spacing. The domain naming convention is used consistently through this disclosure.

Table 14.20 – El Alacrán Historical Tailings Domains

Domain Name	Domain Code	Rock Code	Code Description
A1	010	010	Tailings area 1
A2	020	020	Tailings area 2
A3	030	030	Tailings area 3
A4	040	040	Tailings area 4
A5	050	050	Tailings area 5

The drill hole database was validated before proceeding to the resource estimation phase, and the validation steps are detailed in Section 12.

Cordoba maintains all borehole data in a MX deposit database. Header, survey, and assay information are saved as individual tables in the database. The database information in CSV format was provided to the QP originally on March 8, 2023.

The QP believes that the database is appropriate for the purposes of Mineral Resource Estimation and the sample density allows a reliable estimate of the tonnage and grade of the tailings material in accordance with the level of confidence established by the mineral resource categories as defined in the CIM Guidelines.

14.2.2 BULK DENSITY

Cordoba collected a total of 56 samples from the augured holes taken in the El Alacrán Historical Tailings for bulk density measurements. A pycnometer was used to measure the samples densities and the following procedure was used to determine the average bulk density for each of the domains:

- Sample selected for bulk density measurement;
- The Borehole ID, Sample Number, From, and To were entered into a spreadsheet;
- Submitted to ALS Colombia Ltd for analysis “OA-GRA08b”
- The sample weighed into an empty pycnometer;
- The pycnometer was filled with methanol and weighed; and
- The bulk density is determined using the following equations:

$$SG = \frac{Ws}{Wsolv} \times SGsolv$$

Ws = Weight of the pycnometer with sample material, Wsolv = Weight of the pycnometer with solvent displaced, SGsolv = SG of methanol at 20°C

The bulk density measurements were grouped by domain and the results were analysed in excel looking at the statistical distribution of the results. Table 14.21 summarizes the results of the bulk density measurements, and the median bulk density values were selected for used in the resource estimation. Due to limited number of samples, domains A2 + A3 were combined, and the combined median values were utilized in the resource estimation.

Table 14.21 – El Alacrán Historical Tailings Bulk Density Summary

Domain Name	Domain Code	Rock Code	Code Description	Sample Count	Median Bulk Density
A1	010	010	Tailings Area 1	15	2.86
A2	020	020	Tailings Area 2	3	2.78
A3	030	030	Tailings Area 3	5	2.71

Domain Name	Domain Code	Rock Code	Code Description	Sample Count	Median Bulk Density
A4	040	040	Tailings Area 4	16	2.56
A5	050	050	Tailings Area 5	15	2.61
A2 + A3	-	-	Tailings Area 2 + Area 3	8	2.75

14.2.3 TOPOGRAPHY DATA

The same topography used for El Alacrán and disclosed in Section 14.1.3 was used for the El Alacrán Historical Tailings.

14.2.4 GEOLOGICAL INTERPRETATION

Three-dimensional wireframe models of historical tailings were developed in Leapfrog® Geo under the supervision of the QP. A wireframe was created around the augured holes to encompass the extent of the historical tailings at depth. This wireframe model represents the extent of the tailings and anything below the model is not considered part of the historical tailings. Tailings domains have no geochemical or mineralogical distinctions and are based off initial sample spacing.

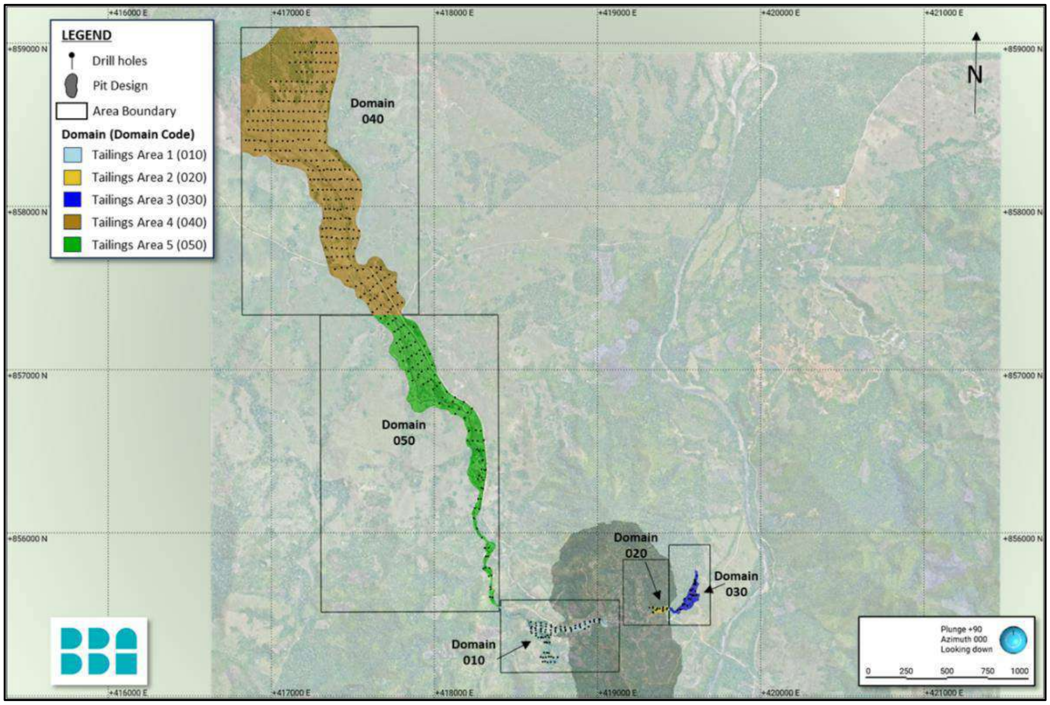
The wireframe solids were exported from Leapfrog® Geo and imported into Datamine Studio RM™ in .dwg format for validation and creation of the block model.

Table 14.22 summarizes the model solid for each of the domains, and Figure 14.9 displays the model solids within each domain.

Table 14.22 – El Alacrán Historical Tailings Wireframe Summary

Domain Name	Domain Code	Rock Code	Code Description	Wireframe Volume (m^3)
A1	010	010	Tailings Area 1	139,799.84
A2	020	020	Tailings Area 2	9,928.39
A3	030	030	Tailings Area 3	42,316.08
A4	040	040	Tailings Area 4	1,893,348.63
A5	050	050	Tailings Area 5	850,459.64

Figure 14.9 – El Alacrán Historical Tailings Wireframe Summary



Source: BBA, 2023

14.2.5 EXPLORATORY DATA ANALYSIS

14.2.5.1 Assays

The five (5) domains included in the mineral resource were sampled for a total of 1,517 assays for copper, gold, and silver. The assay intervals within each domain were captured using the Leapfrog® Geo routine to flag the intercept into a new table in the database. These intervals were reviewed to ensure all the proper assay intervals were captured. Table 14.23 summarizes the basic statistics for the assay intervals for each of the domains in the historic tailings deposit.

Table 14.23 – El Alacrán Historical Tailings Borehole Statistics by Domain

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
010	Cu (%)	218	0.00	0.00	2.38	0.31	0.20
	Au (ppm)	218	0.00	0.01	4.41	0.42	0.34
	Ag (ppm)	218	0.00	0.01	19.35	1.78	6.43
	Length (m)	218	0.00	0.30	3.10	1.15	0.15
020	Cu (%)	38	0.00	0.03	1.24	0.44	0.08
	Au (ppm)	38	0.00	0.01	3.98	0.74	0.80
	Ag (ppm)	38	0.00	0.11	12.75	2.84	10.82
	Length (m)	38	0.00	0.40	1.50	0.92	0.07

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
030	Cu (%)	73	0.00	0.02	0.91	0.29	0.03
	Au (ppm)	73	0.00	0.03	2.66	0.70	0.30
	Ag (ppm)	73	0.00	0.05	6.69	1.77	2.25
	Length (m)	73	0.00	0.50	1.80	1.03	0.09
040	Cu (%)	885	0.00	0.00	0.44	0.06	0.00
	Au (ppm)	885	0.00	0.01	1.87	0.10	0.03
	Ag (ppm)	885	0.00	0.01	2.74	0.38	0.31
	Length (m)	885	0.00	0.20	2.84	0.87	0.16
050	Cu (%)	303	0.00	0.01	1.00	0.07	0.01
	Au (ppm)	303	0.00	0.01	1.54	0.15	0.06
	Ag (ppm)	303	0.00	0.01	5.64	0.39	0.47
	Length (m)	303	0.00	0.10	3.40	1.04	0.23

14.2.5.2 Grade Capping

The raw assay data for each element within the domain was examined to assess the amount of metal that is bias from high-grade assays. After assessing the data, no grade capping was applied.

14.2.5.3 Compositing

Compositing was done on all assay data within the tailings domains. Thickness of the tailings vary depending on a variety of physiological parameters, as such a constant composite length of 1 m was selected as a best fit option while maintaining local variations. Datamine Studio RM™ backstitch option distributed the "tails" of the composite equally across all the composites in the hole to ensure all the sample material was used in the estimate. Table 14.24 summarizes the statistics for the holes after compositing.

Table 14.24 – El Alacrán Historical Tailings Borehole Composite Statistics by Domain

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
010	Cu (%)	252	0.00	0.00	2.38	0.31	0.20
	Au (ppm)	252	0.00	0.01	4.41	0.42	0.32
	Ag (ppm)	252	0.00	0.01	19.35	1.77	6.30
	Length (m)	252	0.00	0.60	1.20	0.99	0.01
020	Cu (%)	35	0.00	0.04	1.16	0.44	0.08
	Au (ppm)	35	0.00	0.01	3.98	0.74	0.79
	Ag (ppm)	35	0.00	0.11	11.45	2.84	10.32
	Length (m)	35	0.00	0.60	1.40	1.00	0.02

Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
030	Cu (%)	78	0.00	0.02	0.91	0.29	0.03
	Au (ppm)	78	0.00	0.03	2.66	0.70	0.27
	Ag (ppm)	78	0.00	0.08	6.69	1.77	2.08
	Length (m)	78	0.00	0.60	1.30	0.96	0.01
040	Cu (%)	799	0.00	0.01	0.28	0.06	0.00
	Au (ppm)	799	0.00	0.01	1.22	0.10	0.02
	Ag (ppm)	799	0.00	0.01	2.39	0.38	0.20
	Length (m)	799	0.00	0.75	1.30	0.97	0.01
050	Cu (%)	320	0.00	0.01	1.00	0.07	0.01
	Au (ppm)	320	0.00	0.01	1.54	0.15	0.05
	Ag (ppm)	320	0.00	0.01	5.64	0.39	0.44
	Length (m)	320	0.00	0.75	1.40	0.99	0.01

14.2.5.4 Spatial Analysis

Variograms for copper, gold, and silver elements were created to inform the search ellipse dimensions, however variograms were not utilized in the estimation process.

14.2.6 RESOURCE BLOCK MODEL

14.2.6.1 Parent Model

A separate block model was established in Datamine Studio RM™ for the El Alacrán Historical Tailings using similar model parameters and origins as the El Alacrán deposit. The model was not rotated.

A block size of 2.5 m x 2.5 m x 2.5 m was selected to maintain the resolution of the tailings areas and to match the main El Alacrán deposit model, this would also allow the Historical Tailings model to merge with the El Alacrán deposit model for consistent reporting of results. The block model was sub-celled on a 0.83 m x 0.83 m x 1.25 m pattern allowing the parent block to be split in each direction to fill the volume of the wireframes more accurately, and therefore more accurate estimation of the tonnes in the Mineral Resource. Grades were estimated into the parent blocks as assigned to sub-blocks.

Table 14.25 summarizes details of the parent block model.

Table 14.25 – El Alacrán Historic Tailings Deposit Block Model Parameters

Properties	X (Column)	Y (Row)	Z (Level)
Origin coordinates	416300	852900	60
Number of blocks	1724	2560	168
Block size (m)	2.5	2.5	2.5
Sub-block size (m)	0.83	0.83	1.25
Rotation	No Rotation		

14.2.6.2 Estimate Parameters

The interpolations of the domains were completed using the estimation method Inverse Distance Squared (ID^2). The estimations were designed for multiple passes. In each estimation pass, a minimum and maximum number of samples were required, as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. All estimation passes used the composited dataset for the appropriate domain being estimated. The ID^2 methodology is the method used to report the mineral estimate statement.

An isotropic search ellipse was used for the estimation. Only the samples within the domain wireframe were used in the estimation. Table 14.26 summarizes the search ellipse size and rotations utilized, and Table 14.27 summarizes the interpolation criteria for each domain.

Table 14.26 – El Alacrán Historical Tailings Search Ellipse Summary

Domain	Element	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)
010	Cu	0	0	170	45	21	2
	Au	0	0	170	60	45	2
	Ag	0	0	170	45	21	2
020	Cu	0	0	170	60	45	2
	Au	0	0	170	60	45	2
	Ag	0	0	170	60	45	2
030	Cu	0	0	-90	30	24	2
	Au	0	0	-90	30	24	2
	Ag	0	0	-90	30	24	2
040	Cu	0	0	0	30	51	2
	Au	0	0	0	33	51	2
	Ag	0	0	0	30	51	2

Domain	Element	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)
050	Cu	0	0	-140	93	33	2
	Au	0	0	-140	78	39	2
	Ag	0	0	-140	93	33	2

Table 14.27 – El Alacrán Historical Tailings Interpolation Parameters

Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2		
			Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
010	Cu	2	3	4	1	3	6	2
	Au	2	3	4	1	3	6	2
	Ag	2	3	4	1	3	6	2
020	Cu	2	3	4	1	3	6	2
	Au	2	3	4	1	3	6	2
	Ag	2	3	4	1	3	6	2
030	Cu	2	3	4	1	3	6	2
	Au	2	3	4	1	3	6	2
	Ag	2	3	4	1	3	6	2
040	Cu	2	3	4	1	3	6	2
	Au	2	3	4	1	3	6	2
	Ag	2	3	4	1	3	6	2
050	Cu	2	3	4	1	3	6	2
	Au	2	3	4	1	3	6	2
	Ag	2	3	4	1	3	6	2

14.2.7 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resource and Mineral Reserve Best Practice Guidelines (CIM, 2019);
- Author’s experience with tailings distribution;
- Spatial continuity based on variography of the assays within the drill holes; and

- Drill hole spacing, data quality and the estimation runs required to estimate the grades in a block.

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction (CIM, 2019).

The entire Historical Tailings Mineral Resource Estimate is classified as Indicated.

14.2.8 MINERAL RESOURCE TABULATION

The resource reported is effective as of December 18, 2023 and has been tabulated in terms of a pit-constrained NSR cut-off grade of US$2.08/t.

The open pit Mineral Resource is constrained within a pit shell using Deswik software (2020.01), which runs the pseudoflow algorithm to determine the potential economic pit limits. Table 14.14 in Section 14.1.8 summarizes the parameters used to develop the pit constraints for a reasonable prospect of economic extraction.

The pit-constrained Mineral Resource and contained metal for the El Alacrán Historical Tailings are summarized in Table 14.28. Table 14.29 summarizes the in-situ pit-constrained contained metal.

Table 14.28 – El Alacrán Historic Tailings Deposit Resource Summary

Classification	Unit	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	Historic Tailings	2,756,000	-	0.28	0.89
Inferred		-	-	-	-

Table 14.29 – El Alacrán Historic Tailings Deposit In-Situ Pit-Constrained Metal Content

Classification	Unit	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	Historic Tailings	2,756,000	-	25,100	78,400
Inferred		-	-	-	-

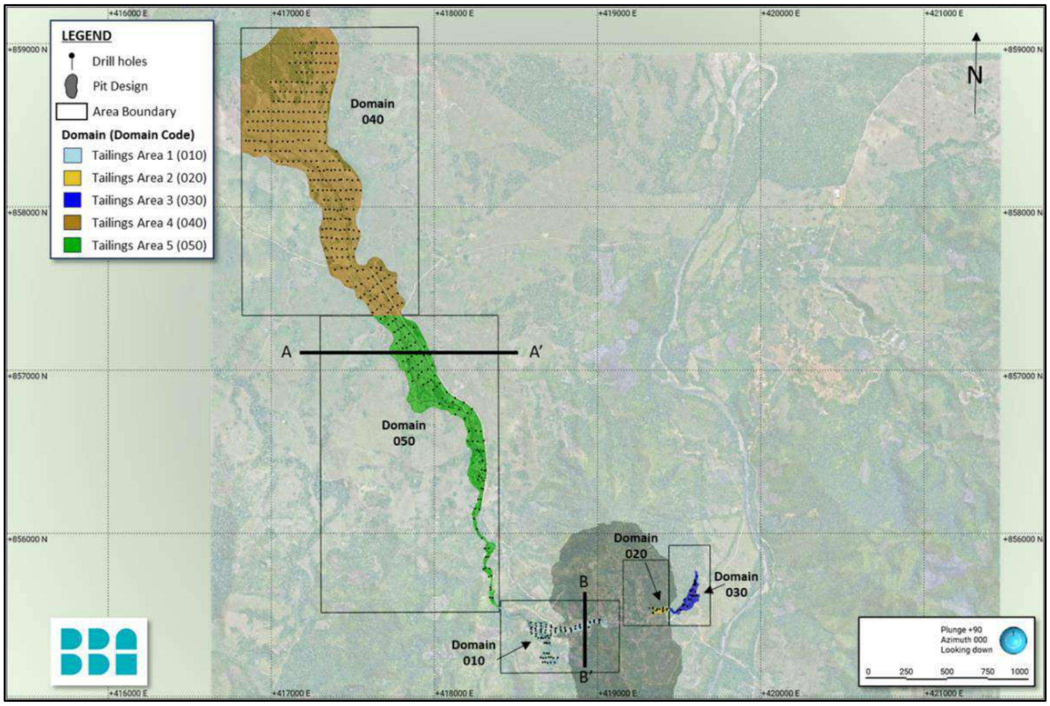
A Mineral Resource was prepared in accordance with NI 43-101 and the CIM Definition Standards (2019). Mineral Resources that are not mineral reserves do not have demonstrated economic viability. No environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues are known to the QP that may affect the estimate of mineral resources..

14.2.9 MODEL VALIDATION

14.2.9.1 Visual Validation

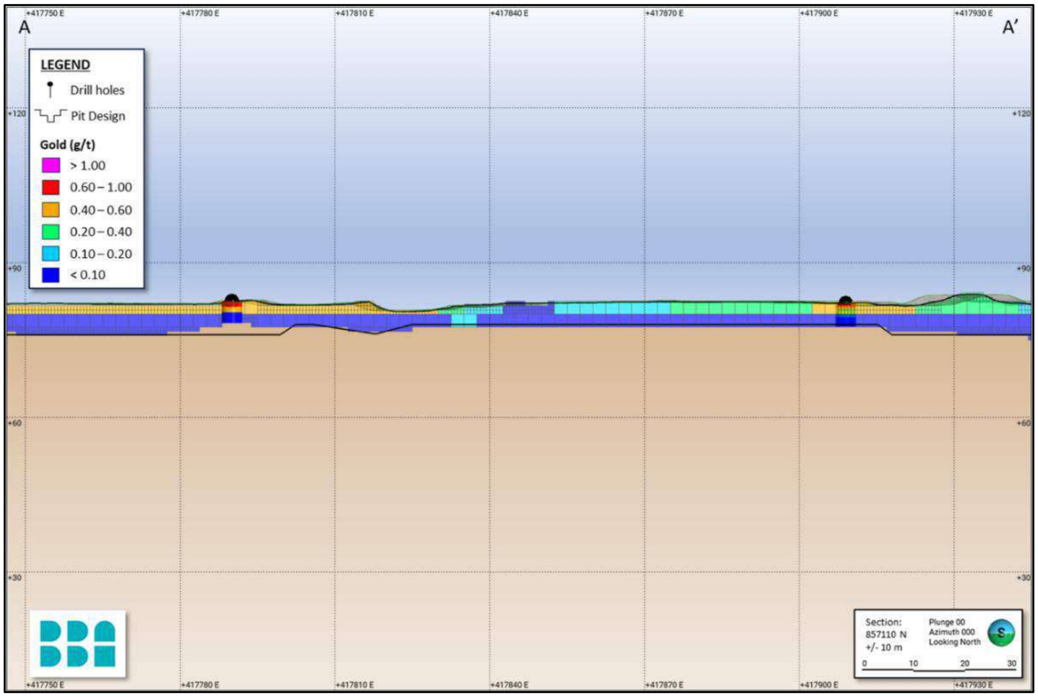
The visual comparisons of Inverse Distance squared block model grades and composite drill holes show a reasonable correlation between the values (Figure 14.10 to Figure 14.12). No significant discrepancies were apparent from the sections reviewed. Section lines are for reference.

Figure 14.10 – Surface Plan Showing Validation Cross-Section Locations of El Alacrán Historical Tailings Resource Estimate



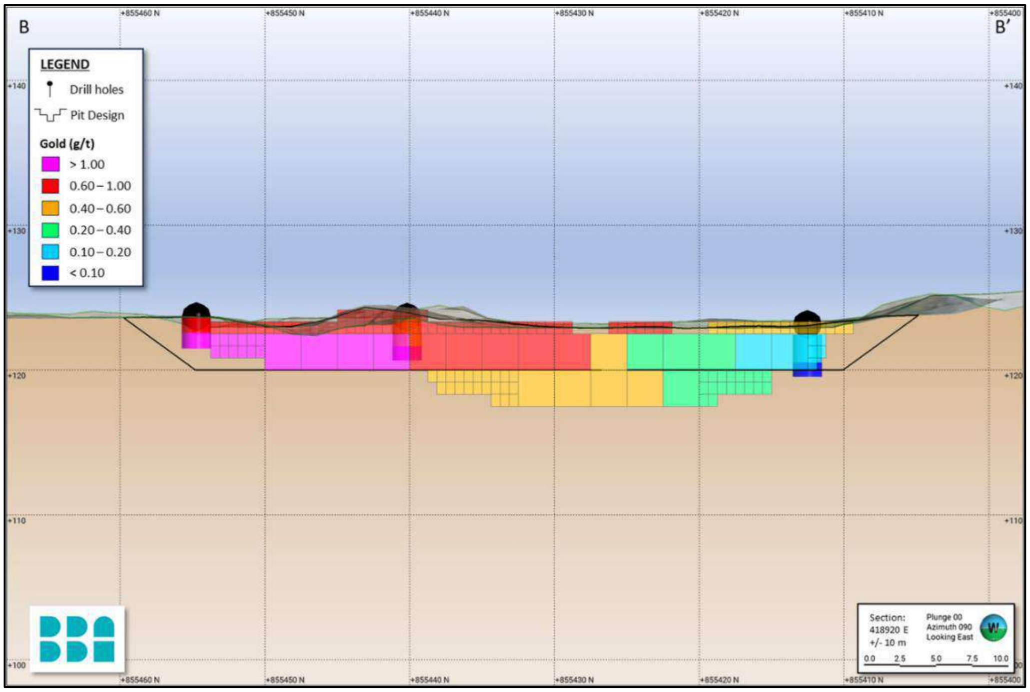
Source: BBA, 2023

Figure 14.11 – El Alacrán Deposit Historical Tailings Resource Estimate Visual Validation Through A-A’



Source: BBA, 2023

Figure 14.12 – El Alacrán Historical Tailings Resource Estimate Visual Validation Through B-B’



Source: BBA, 2023

14.2.9.2 Global Statistics

The block model statistics for the ID^2 estimations were compared to the informing composited borehole data. Table 14.30 shows this comparison of the global estimates for the estimation with the informing data and the percentage difference. In general, there is an agreement between the ID^2 estimation and the informing data for most zones. Larger discrepancies are reflected as a result of a smaller domain area and thus, lower informing borehole data in portions of the model, especially in domains 010 and 020. Comparisons were made using all blocks and assays above an 0% Cu, 0 ppm Au, and 0 ppm Ag.

Table 14.30 – El Alacrán Historical Tailings Global Statistics Comparison

Element	NN	ID^2	OK	DDH Composite
Cu (%)	-	0.08	-	0.13
Au (g/t)	-	0.14	-	0.21
Ag (g/t)	-	0.50	-	0.75

14.2.10 PREVIOUS ESTIMATES

There were no previous resource estimations on the El Alacrán Historic Tailings.

14.3 Costa Azul Satellite Deposit Resource Estimate

14.3.1 DEPOSIT DATABASE

The Costa Azual deposit database totals 6 surface-collared diamond drill holes (DDH) and 112 reverse circulation (RC) drill holes, of which 98 drill holes (5 DDH and 93 RC) totalling 3,524 m in length were used for geological domain modelling and resource estimation. There are a total of 3,386 assay records in the Costa Azul deposit database, 706 DDH assay records and 2,680 RC assay records.

The six (6) geological domains in the Costa Azul deposit are summarized in Table 14.31. The domain naming convention is used consistently through this disclosure.

Table 14.31 – Costa Azul Deposit Geological Domains

Rock Type	Rock Code	Domain	Domain Code	Description
Saprolite	1	Low-Grade	1	Low-Grade Saprolite Mineralization
		High-Grade	2	High-Grade Saprolite Mineralization
Fresh	2	Low-Grade	1	Low-Grade Fresh Mineralization
		High-Grade	2	High-Grade Fresh Mineralization

Rock Type	Rock Code	Domain	Domain Code	Description
Andesite-Basalt	2		1 & 2	Andesite-Basalt (Fresh SG assignment)
Hornblende-Porphyry			1 & 2	Hornblende-Porphyry (Fresh SG assignment)

Cordoba maintains all borehole data in a MX deposit database. Header, survey, assay, and lithology information are saved as individual tables in the database. The database information in CSV format was provided to the QP originally on June 7, 2022.

The QP believes that the database is appropriate for the purposes of Mineral Resource Estimation and the sample density allows a reliable estimate of the tonnage and grade of the mineralization in accordance with the level of confidence established by the Mineral Resource categories as defined in the CIM Guidelines.

14.3.2 BULK DENSITY

Cordoba collected a total of 842 samples from the diamond drill holes within the satellite deposits (Costa Azul, Montiel East, and Montiel West) for bulk density measurements. A total of 530 bulk density measurements were taken in the El Alacrán deposit for Saprolite and used within the Satellite Deposit estimation. Two (2) methods were used, the “weighed dry” method and the “paraffin wax” method. The paraffin wax method was preferentially used when samples had measurements with both methods. The complete methodology is disclosed in Section 14.1.2.

The bulk density measurements grouped by rock code/rock type were imported into MS Excel and Snowden Supervisor™ version 8.15.0 software. Histograms and probability plots were used to remove measurement outliers. Table 14.32 summarizes the results of the bulk density measurements.

Table 14.32 – Satellite Deposit Bulk Density Summary

Rock Type	Sample Count	Average SG
Saprolite[1]	530	1.82
Andesite-Basalt	544	2.82
Andesite-Porphyry	195	2.80
Hornblende-Porphyry	103	2.75

[1] SG data from El Alacrán deposit SG study only

14.3.3 TOPOGRAPHY DATA

The same topography used for El Alacrán and disclosed in Section 14.1.3 was used for Costa Azul.

14.3.4 GEOLOGICAL INTERPRETATION

Three-dimensional wireframe models of mineralization were developed in Datamine Studio RM™ by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022). The Four (4) mineralization wireframes were reviewed by the QP. The hornblende porphyry and andesite basalt were not wireframed or form part of the estimate.

Hard boundaries were created to separate high-grade and low-grade domains for oxidized (saprolite) and fresh material generally using a continuous 0.10% CuEq threshold between domains.

The modelling is broken down into four (4) separate mineralized domains based on grade and rock type. Table 14.33 tabulates the solids and associated volumes.

Figure 14.13 illustrates the model solids for each of the domains.

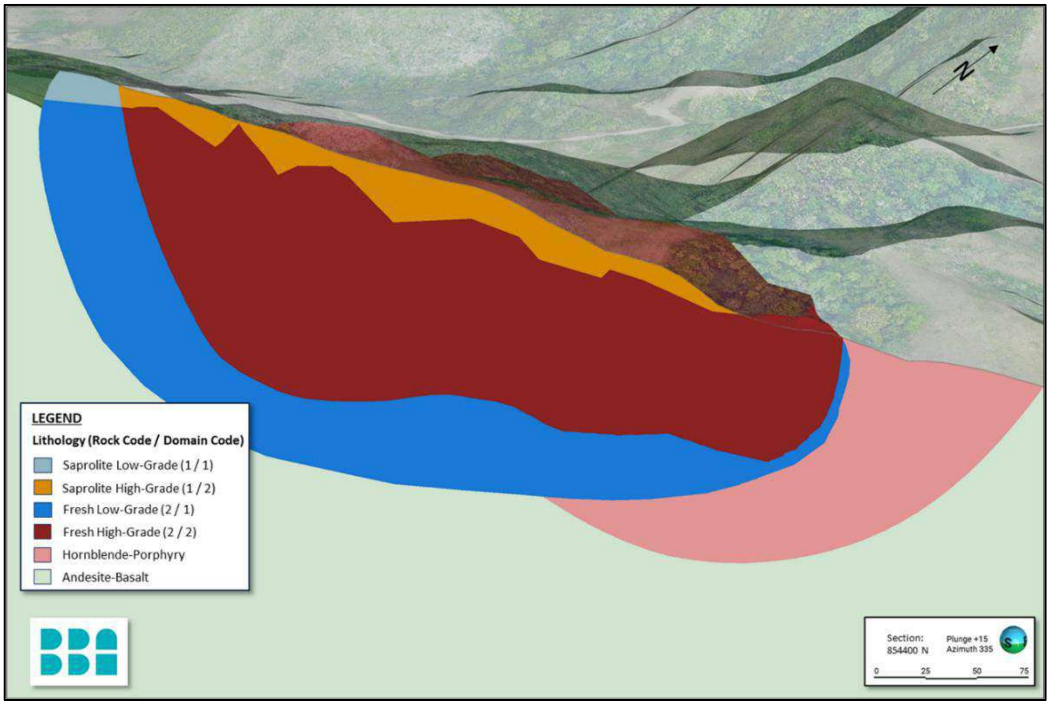
The mineralization wireframe boundaries extents were constrained by the presence of "barren drill holes", in which case the extent corresponds to the mid-point between the closest mineralized intersect and the barren one. In the absence of a drill hole "unconstrained" boundaries were given a maximum of 50 m from the closest mineralized intersect.

The non-assayed and unrecoverable intervals were assigned void (-) value. The QP believes that non-assayed material should not be assigned a zero value, as this does not reflect the true value of the material, which is unknown. Each domain was modeled using the same principal assumptions and methodology.

Table 14.33 – Costa Azul Deposit Wireframe Summary

Rock Type	Domain	Wireframe Volume (m^3)
Saprolite	Low-Grade	832,854
	High-Grade	755,572
Fresh	Low-Grade	8,443,238
	High-Grade	4,542,630

Figure 14.13 – Interpretation of Domains (Section View with Orthogonal Surface Projection)



Source: BBA, 2023

14.3.5 EXPLORATORY DATA ANALYSIS

14.3.5.1 *Assays*

The four (4) domains included in the Mineral Resource were sampled for a total of 3,295 assays for copper, gold, and silver. The assay intervals within each mineral domain were captured using the Datamine Studio RM™ routine to flag the intercept into a new table in the database. These intervals were reviewed to ensure all the proper assay intervals were captured. Table 14.34 summarizes the basic statistics for the assay intervals for each of the mineral domains in the deposit.

Table 14.34 – Costa Azul Deposit Borehole Basic Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	44	0	0.03	0.31	0.09	0.00
		Au (ppm)	44	0	0.00	0.18	0.06	0.00
		Ag (ppm)	44	0	0.12	1.61	0.48	0.17
		Length (m)	44	0	1.00	1.00	1.00	-
	High-Grade	Cu (%)	1250	24	0.03	1.00	0.23	0.02
		Au (ppm)	1250	24	0.01	1.18	0.20	0.04
		Ag (ppm)	1250	24	0.01	14.61	0.57	1.46
		Length (m)	1274	0	0.03	2.40	1.01	0.01

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Fresh	Low-Grade	Cu (%)	343	0	0.01	0.48	0.09	0.00
		Au (ppm)	343	0	0.00	0.24	0.04	0.00
		Ag (ppm)	343	0	0.04	3.05	0.34	0.15
		Length (m)	343	0	0.10	2.17	1.14	0.09
	High-Grade	Cu (%)	1658	2	0.03	2.86	0.29	0.06
		Au (ppm)	1658	2	0.00	1.88	0.22	0.06
		Ag (ppm)	1658	2	0.07	8.89	0.79	0.80
		Length (m)	1660	0	0.10	2.45	1.02	0.03

14.3.5.2 Grade Capping

Grade capping was completed using X10 Geo software package by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP.

The raw assay data for each element within the domain was examined to assess the amount of metal that is bias from high-grade assays. A combination of reviewing decile analysis tables (Parrish, 1997), histograms, Q-Q, and cumulative frequency plots was used to assist in determining if grade capping was required on copper, silver, and gold in each domain.

This analysis concluded grade capping was required for each of the mineralization domains based on the sample type (diamond drill core vs. reverse circulation). The different sample lengths and sample volumes contribute to the difference in statistics. Table 14.35 summarizes the grade capping applied to each domain by the QP.

Table 14.35 – Costa Azul Deposit Grade Capping Summary

Rock Type	Domain	Element	Grade Cap		Number Capped Samples	
			DDH	RC	DDH	RC
Saprolite	Low-Grade	Cu (%)	0.23	0.47	0	0
		Au (ppm)	0.39	0.95	0	0
		Ag (ppm)	No Cap	No Cap	0	0
	High-Grade	Cu (%)	0.63	0.78	1	8
		Au (ppm)	0.91	1.02	1	3
		Ag (ppm)	7.00	7.00	12	0
Fresh	Low-Grade	Cu (%)	0.42	0.42	1	2
		Au (ppm)	0.42	0.47	0	0
		Ag (ppm)	No Cap	No Cap	0	0
	High-Grade	Cu (%)	1.90	1.00	5	11
		Au (ppm)	1.78	1.00	3	11
		Ag (ppm)	5.00	5.00	7	9

14.3.5.3 Compositing

Compositing of all the assay data within a domain was completed on downhole intervals honouring the interpretation of the geological wireframes. Statistics indicated that a majority of the samples were collected at 1.0 m and 2.0 m intervals. Composites were generated at a 2.5 m best fit option, allowing all the material to be used in the compositing process. Datamine Studio RM™ backstitch option distributed the “tails” of the composite equally across all the composites in the hole to ensure all the sample material was used in the estimate. Table 14.36 summarizes the statistics for the boreholes after compositing.

Table 14.36 – Costa Azul Deposit Borehole Composite Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	17	0	0.03	0.29	0.09	0.00
		Au (ppm)	17	0	0.00	0.18	0.06	0.00
		Ag (ppm)	17	0	0.13	1.48	0.48	0.15
		Length (m)	17	0	2.50	2.67	2.59	0.00
	High-Grade	Cu (%)	509	8	0.04	0.78	0.23	0.02
		Au (ppm)	509	8	0.01	1.01	0.20	0.04
		Ag (ppm)	509	8	0.01	7.00	0.54	0.86
		Length (m)	517	0	1.00	3.00	2.48	0.03
Fresh	Low-Grade	Cu (%)	155	0	0.02	0.40	0.09	0.00
		Au (ppm)	155	0	0.00	0.15	0.04	0.00
		Ag (ppm)	155	0	0.06	3.05	0.34	0.14
		Length (m)	155	0	2.33	2.67	2.52	0.00
	High-Grade	Cu (%)	677	0	0.03	1.80	0.29	0.05
		Au (ppm)	677	0	0.00	1.62	0.22	0.05
		Ag (ppm)	677	0	0.07	4.78	0.77	0.54
		Length (m)	677	0	1.00	3.00	2.50	0.02

14.3.5.4 Spatial Analysis

Variograms for copper, gold, and silver elements were created to inform the search ellipse dimensions. The variograms were also used to assign kriging weights during the estimation process.

The variography for Cordoba was determined using Datamine and SAGE 2001 by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP. Each element was modelled using a downhole variogram to determine the nugget effect, then a spherical pair-wise variogram was used to determine spatial continuity in each of the domains.

Table 14.37 summarizes the results of the variogram models for each element in each domain. The variogram rotation and maximum range governed the search ellipse rotation and size.

Table 14.37 – Costa Azul Deposit Variogram Parameters

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
Low-Grade & High-Grade	Cu	-12	54	81	0.02	63.9	22.1	246.9	0.77	26.3	44.4	379	0.29
	Au	48	-39	-41	0.02	31	74	150	0.31	80	34	160	0.67
	Ag	48	-39	-41	0.02	31	74	150	0.31	80	34	160	0.67

14.3.6 RESOURCE BLOCK MODEL

14.3.6.1 Parent Model

A separate block model was established in Datamine Studio RM™ for the Costa Azul deposit using one (1) parent model as the origin. The model was not rotated.

A block size of 5 m x 10 m x 5 m was selected in order to accommodate a small-scale open pit mining potential. The block model was sub-celled on a 2.50 m x 5.00 m x variable pattern allowing the parent block to be split in each direction to more accurately fill the volume of the wireframes, and therefore more accurately estimating the tonnes in the Mineral Resource. Grades were estimated into the parent blocks and assigned to sub blocks.

Table 14.38 summarizes details of the parent block model.

Table 14.38 – Costa Azul Deposit Block Model Parameters

Properties	X (Column)	Y (Row)	Z (Level)
Origin coordinates	420,400	854,050	0
Number of blocks	140	55	80
Block size (m)	5.00	10.00	5.00
Sub-block size (m)	2.50	5.00	Variable
Rotation	No Rotation		

14.3.6.2 Estimate Parameters

The interpolations of the domains were completed using the estimation methods Ordinary Kriging (OK), nearest neighbour (NN), and inverse distance squared (ID^2). The estimations were designed for multiple passes. In each estimation pass, a minimum and maximum number of samples were required, as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. All estimation passes used the capped and composited dataset for the appropriate domain being estimated. The OK methodology is the method used to report the mineral estimate statement.

An isotropic search ellipse was used for the estimation. Only the samples within the domain wireframe were used in the estimation. Table 14.39 summarizes the search ellipse size and rotations based on the variography, and Table 14.40 summarizes the interpolation criteria for each domain.

Table 14.39 – Costa Azul Deposit Search Ellipse Summary

Rock Type	Domain	Element	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge
Saprolite	Low-Grade	Cu	30	10	50	-12	54	81
		Au	15	35	50	-12	54	81
		Ag	15	35	50	-12	54	81
	High-Grade	Cu	30	10	50	-12	54	81
		Au	15	35	50	-12	54	81
		Ag	15	35	50	-12	54	81
Fresh	Low-Grade	Cu	30	10	30	-12	54	81
		Au	15	35	50	-12	54	81
		Ag	15	35	50	-12	54	81
	High-Grade	Cu	30	10	30	-12	54	81
		Au	15	35	50	-12	54	81
		Ag	15	35	50	-12	54	81

Table 14.40 – Costa Azul Deposit Interpolation Parameters

Rock Type	Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
				Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
Saprolite	Low-Grade	Cu	2	3	8	1	3	8	2	2	8	15
		Au	2	3	8	1	3	8	2	2	8	15
		Ag	2	3	8	1	3	8	2	2	8	15
	High-Grade	Cu	2	3	8	1	3	8	2	2	8	15
		Au	2	3	8	1	3	8	2	2	8	15
		Ag	2	3	8	1	3	8	2	2	8	15

Rock Type	Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
				Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
Fresh	Low-Grade	Cu	2	3	8	1	3	8	2	2	8	8
		Au	2	3	8	1	3	8	2	2	8	8
		Ag	2	3	8	1	3	8	2	2	8	8
	High-Grade	Cu	2	3	8	1	3	8	2	2	8	8
		Au	2	3	8	1	3	8	2	2	8	8
		Ag	2	3	8	1	3	8	2	2	8	8

14.3.7 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resource and Mineral Reserve Best Practice Guidelines (CIM, 2019);
- Author’s experience with sulphide, IOCG, and Cu-Au porphyry deposits;
- Spatial continuity based on variography of the assays within the drill holes;
- Understanding the geology of the deposit; and
- Drill hole spacing, data quality and the estimation runs required to estimate the grades in a block.

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction (CIM, 2019).

All blocks within the Costa Azul deposit Mineral Resource were classified as Inferred.

14.3.8 MINERAL RESOURCE TABULATION

The resource reported is effective as of December 18, 2023 and has been tabulated in terms of a pit-constrained NSR cut-off grade of US$2.08/t milled of Saprolite and US$9.88/t milled of Fresh material.

The open pit Mineral Resource is constrained within a pit shell using Deswik software (2020.01), which runs the pseudoflow algorithm to determine the potential economic pit limits. Table 14.14 in Section 14.1.8 summarizes the parameters used to develop the pit constraints for a reasonable prospect of economic extraction.

The pit-constrained Mineral Resource and contained metal for the Costa Azul deposit is summarized in Table 14.41. Table 14.42 summarizes the in-situ pit-constrained contained metal.

Table 14.41 – Costa Azul Deposit Resource Summary

Classification	Rock Type	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Inferred	Saprolite	731,000	-	0.24	0.51
	Fresh	9,690,000	0.25	0.17	0.63
	Total	**10,421,000**	**0.23**	**0.18**	**0.62**

Table 14.42 – Costa Azul Deposit In-Situ Pit-Constrained Metal Content

Classification	Rock Type	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Inferred	Saprolite	731,000	-	5,800	12,000
	Fresh	9,690,000	53,782,000	53000	197,200
	Total	**10,421,000**	**53,782,000**	**58,800**	**209,200**

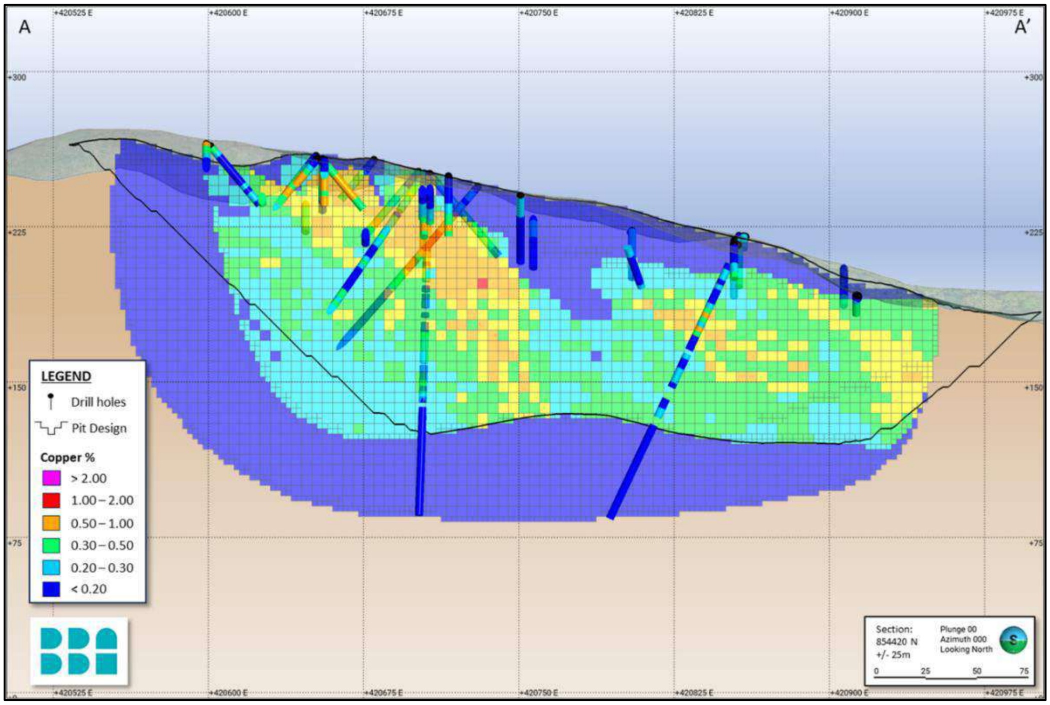
A Mineral Resource was prepared in accordance with NI 43-101 and the CIM Definition Standards (2019). Mineral Resources that are not mineral reserves do not have demonstrated economic viability. No environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues are known to the QP that may affect the estimate of mineral resources..

14.3.9 MODEL VALIDATION

14.3.9.1 Visual Validation

The visual comparisons of OK block model grades and composite drill holes show a reasonable correlation between the values (Figure 14.14). No significant discrepancies were apparent from the sections reviewed, yet grade smoothing was apparent in some of the lower elevations due to the distance between drill samples being broader in these regions.

Figure 14.14 – Costa Azul Deposit Visual Validation Through A-A'



Source: BBA, 2023

14.3.9.2 *Global Statistics*

The global block model statistics for the OK model were compared to the global NN and ID^2 model values as well as the composite capped drill hole data. Table 14.43 shows this comparison of the global estimates for the three (3) estimation method calculations. In general, there is an agreement between the OK model, ID^2 model, and NN model. Larger discrepancies are reflected as a result of lower drill density in some portions of the model. There is a degree of smoothing apparent when compared to the diamond drill statistics. Comparisons were made using all blocks and assays above an 0% Cu, 0 g/t Au, and 0 g/t Ag.

Table 14.43 – Costa Azul Deposit Global Statistics Comparison

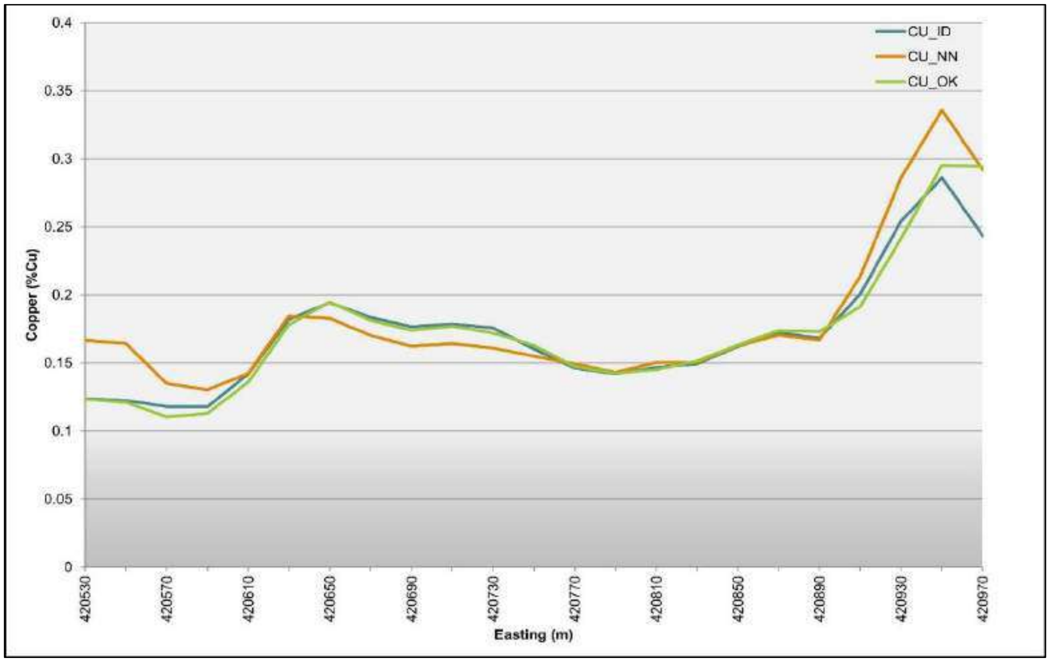
Element	NN	ID^2	OK	DDH Composite
Cu (%)	0.16	0.16	0.16	0.24
Au (g/t)	0.10	0.10	0.10	0.19
Ag (g/t)	0.45	0.47	0.49	0.63

14.3.9.3 *Swath Plots*

Figures 14.15 and 14.16 display the comparison between the OK estimate with ID^2 and NN estimates in a swath plot format.

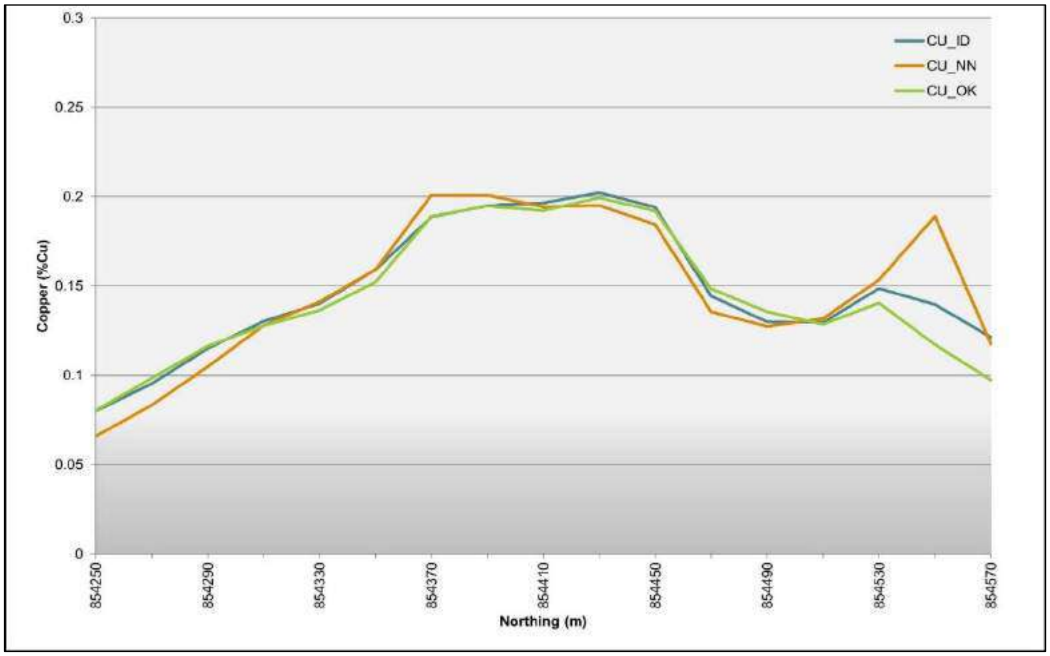
As expected, there is a strong degree of grade smoothing with the OK methodology.

Figure 14.15 – Costa Azul Swath Plot – Easting



Source: BBA, 2023

Figure 14.16 – Costa Azul Swath Plot – Northing



Source: BBA, 2023

14.3.10 PREVIOUS ESTIMATES

A comparison between the previous Costa Azul Mineral Resource Statement in 2022 (Kuntz et al., 2022) and the current 2023 Mineral Resource Statement disclosed in this Report is illustrated in Tables 14.44 and 14.45.

There are several differences between the 2022 and 2023 mineral resource statements, including, yet not limited to:

- Re-classification of the resources to inferred resource;
- Re-interpretation of the bulk density data;
- The historic 2022 MRE used Copper Equivalent cut-off grades versus the current 2023 MRE using NSR based cut-off grades;
- Different metallurgical recovery assumptions; and
- Different metal pricing, smelter terms and pit shell parameters (mining, processing, and G&A costs).

Table 14.44 – Grade-Tonnage Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	-	-	-	-	7.4	0.24	0.21	0.65
Inferred	10.4	0.23	0.18	0.62	0.1	0.29	0.16	0.6

Table 14.45 – Metal Content Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)
Indicated	-	-	-	-	7.4	44.8	49,200	155,800
Inferred	10.4	53.8	58,800	209,200	0.1	0.8	600	2,400

14.4 Montiel East Satellite Deposit Resource Estimate

14.4.1 DEPOSIT DATABASE

The Montiel East deposit database totals 30 surface-collared diamond drill holes (DDH) and 48 reverse circulation (RC) drill holes, of which 64 drill holes (19 DDH and 45 RC) totalling 5,340 m in length were used for geological domain modelling and resource estimation. There are a total of

4,779 assay records in the Montiel East deposit database, 3,193 DDH assay records and 1,586 RC assay records.

The seven (7) geological domains in the Montiel East deposit are summarized in Table 14.46. The domain naming convention is used consistently through this disclosure.

Table 14.46 – Montiel East Deposit Geological Domains

Rock Type	Rock Code	Domain	Domain Code	Description
Saprolite	1	Low-Grade	1	Low-Grade Saprolite Mineralization
		High-Grade	2	High-Grade Saprolite Mineralization
Fresh	2	Low-Grade	1	Low-Grade Fresh Mineralization
		High-Grade	2	High-Grade Fresh Mineralization
Andesite-Basalt	2		1 & 2	Andesite-Basalt (Fresh SG assignment)
Andesite-Porphyry			1 & 2	Andesite-Porphyry (Fresh SG assignment)
Hornblende-Porphyry			1 & 2	Hornblende-Porphyry (Fresh SG assignment)

Cordoba maintains all borehole data in a MX deposit database. Header, survey, assay, and lithology information are saved as individual tables in the database. The database information in CSV format was provided to the QP originally on June 7, 2022.

The QP believes that the database is appropriate for the purposes of Mineral Resource estimation and the sample density allows a reliable estimate of the tonnage and grade of the mineralization in accordance with the level of confidence established by the mineral resource categories as defined in the CIM Guidelines.

14.4.2 BULK DENSITY

Section 14.3.2 summarizes the procedure for determining the bulk density of the satellite deposits. The complete methodology is disclosed in Section 14.1.2.

The bulk density measurements grouped by rock code/rock type were imported into MS Excel and Snowden Supervisor™ version 8.15.0 software. Histograms and probability plots were used to remove measurement outliers. Table 14.47 summarizes the results of the bulk density measurements.

Table 14.47 – Satellite Deposit Bulk Density Summary

Rock Type	Sample Count	Average Bulk Density
Saprolite[1]	530	1.82
Andesite-Basalt	544	2.82
Andesite-Porphyry	195	2.80
Hornblende-Porphyry	103	2.75
*1 - SG data from El Alacrán deposit SG study only		

14.4.3 TOPOGRAPHY DATA

The same topography used for El Alacrán and disclosed in Section 14.1.3 was used for Montiel East.

14.4.4 GEOLOGICAL INTERPRETATION

Three-dimensional wireframe models of mineralization were developed in Datamine Studio RM™ by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022). The four (4) mineralization wireframes were reviewed by the QP. Hornblende porphyry, andesite porphyry and andesite basalt were not wireframed and part of the estimation.

Hard boundaries were created to separate high-grade and low-grade domains for oxidized (saprolite) and fresh material generally using a continuous 0.10% CuEq threshold between domains.

The modelling is broken down into four (4) separate mineralized domains based on grade and rock type. Table 14.48 tabulates the solids and associated volumes. Figure 14.17 illustrates the model solids for each of the domains.

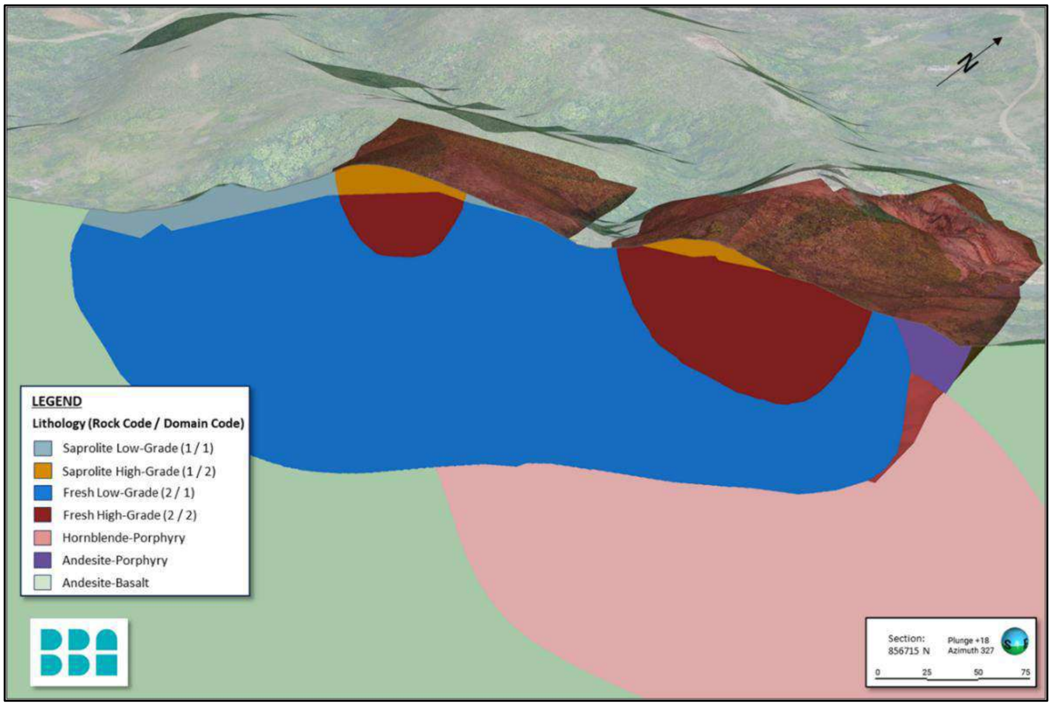
The mineralization wireframe boundaries extents were constrained by the presence of “barren drill holes”, in which case the extent corresponds to the mid-point between the closest mineralized intersect and the barren one. In the absence of drill hole “unconstrained” boundaries were given a maximum of 50 m from the closest mineralized intersect.

The non-assayed and unrecoverable intervals were assigned void (-) value. The QP believes that non-assayed material should not be assigned a zero value, as this does not reflect the true value of the material, as it is unknown. Each domain was modeled using the same principal assumptions and methodology.

Table 14.48 – Montiel East Deposit Wireframe Summary

Rock Type	Domain	Wireframe Volume (m³)
Saprolite	Low-Grade	1,173,171
	High-Grade	372,739
Fresh	Low-Grade	19,250,273
	High-Grade	2,742,408

Figure 14.17 – Interpretation of Domains (Section View with Orthogonal Surface Projection)



Source: BBA, 2023

14.4.5 EXPLORATORY DATA ANALYSIS

14.4.5.1 *Assays*

The four (4) domains included in the mineral resource were sampled for a total of 4,702 assays for copper, gold, and silver. The assay intervals within each mineral domain were captured using the Datamine Studio RM™ routine to flag the intercept into a new table in the database. These intervals were reviewed to ensure all the proper assay intervals were captured. Table 14.49 summarizes the basic statistics for the assay intervals for each of the mineral domains in the deposit.

Table 14.49 – Montiel East Deposit Borehole Basic Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	221	12	0.03	0.64	0.17	0.01
		Au (ppm)	221	12	0.01	2.32	0.12	0.06
		Ag (ppm)	221	12	0.01	55.50	1.39	26.13
		Length (m)	233	0	0.40	3.00	1.18	0.21
	High-Grade	Cu (%)	371	0	0.05	2.65	0.34	0.06
		Au (ppm)	371	0	0.04	3.82	0.31	0.16
		Ag (ppm)	371	0	0.12	200.00	2.12	122.81
		Length (m)	371	0	0.02	3.50	1.00	0.08
Fresh	Low-Grade	Cu (%)	2634	66	0.00	2.94	0.10	0.01
		Au (ppm)	2634	66	0.00	0.56	0.04	0.00
		Ag (ppm)	2634	66	0.01	10.00	0.46	0.35
		Length (m)	2700	0	0.02	2.99	1.07	0.17
	High-Grade	Cu (%)	1476	0	0.00	5.55	0.56	0.36
		Au (ppm)	1476	0	0.00	8.07	0.46	0.32
		Ag (ppm)	1476	0	0.01	35.95	1.86	3.10
		Length (m)	1476	0	0.01	3.50	0.89	0.08

14.4.5.2 Grade Capping

Grade capping was completed using X10 Geo software package by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP.

The raw assay data for each element within the domain was examined to assess the amount of metal that is bias from high-grade assays. A combination of reviewing decile analysis tables (Parrish, 1997), histograms, Q-Q, and cumulative frequency plots was used to assist in determining if grade capping was required on copper, silver, and gold in each domain.

This analysis concluded grade capping was required for each of the mineralization domains based on the sample type (diamond drill core vs. reverse circulation). The different sample lengths and sample volumes contribute to the difference in statistics. Table 14.50 summarizes the grade capping applied to each domain by the QP.

Table 14.50 – Montiel East Deposit Grade Capping Summary

Rock Type	Domain	Element	Grade Cap		Number Capped Samples	
			DDH	RC	DDH	RC
Saprolite	Low-Grade	Cu (%)	0.60	0.50	1	3
		Au (ppm)	0.50	0.22	0	3
		Ag (ppm)	15.00	15.00	3	0
	High-Grade	Cu (%)	1.50	1.00	2	0
		Au (ppm)	1.00	2.70	14	0
		Ag (ppm)	20.00	20.00	2	0
Fresh	Low-Grade	Cu (%)	2.00	0.50	3	0
		Au (ppm)	0.35	0.22	5	3
		Ag (ppm)	4.00	4.00	6	6
	High-Grade	Cu (%)	3.40	1.55	9	5
		Au (ppm)	3.18	1.75	9	6
		Ag (ppm)	10.00	10.00	8	3

14.4.5.3 *Compositing*

Compositing of all the assay data within a domain was completed on downhole intervals honouring the interpretation of the geological wireframes. Statistics indicated that a majority of the samples were collected at 1.0 m and 2.0 m intervals. Composites were generated at a 2.5 m best fit option, allowing all the material to be used in the compositing process. Datamine Studio RM™ backstitch option distributed the "tails" of the composite equally across all the composites in the hole to ensure all the sample material was used in the estimate. Table 14.51 summarizes the statistics for the boreholes after compositing.

Table 14.51 – Montiel East Deposit Borehole Composite Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	103	8	0.05	0.59	0.17	0.01
		Au (ppm)	103	8	0.02	0.24	0.09	0.00
		Ag (ppm)	103	8	0.05	15.00	1.06	3.66
		Length (m)	111	0	1.00	3.00	2.47	0.06
	High-Grade	Cu (%)	151	0	0.05	1.44	0.33	0.04
		Au (ppm)	151	0	0.05	1.00	0.27	0.06
		Ag (ppm)	151	0	0.15	13.98	1.58	5.11
		Length (m)	151	0	1.00	3.00	2.48	0.04

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Fresh	Low-Grade	Cu (%)	1114	47	0.00	1.69	0.10	0.01
		Au (ppm)	1114	47	0.00	0.29	0.04	0.00
		Ag (ppm)	1114	47	0.01	4.00	0.44	0.16
		Length (m)	1161	0	1.00	3.00	2.50	0.01
	High-Grade	Cu (%)	532	0	0.02	2.88	0.55	0.27
		Au (ppm)	532	0	0.00	3.17	0.45	0.21
		Ag (ppm)	532	0	0.05	9.74	1.85	2.17
		Length (m)	532	0	2.25	3.00	2.49	0.00

14.4.5.4 *Spatial Analysis*

Variograms for copper, gold, and silver elements were created to inform the search ellipse dimensions. The variograms were also used to assign kriging weights during the estimation process.

The variography for Cordoba was determined using Datamine and SAGE 2001 by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP. Each element was modelled using a downhole variogram to determine the nugget effect, then a spherical pair-wise variogram was used to determine spatial continuity in each of the domains.

Table 14.52 summarizes the results of the variogram models for each element in each domain. The variogram rotation and maximum range governed the search ellipse rotation and size.

Table 14.52 – Montiel East Deposit Variogram Parameters

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
Low-Grade & High-Grade	Cu	-47	-51	22	0.06	22.1	42.4	87.7	0.64	22.4	198	26.6	0.3
	Au	-53	-49	31	0.01	7.5	7.3	15.8	0.01	104	52	113	0.99
	Ag	-53	-49	31	0.01	7.5	7.3	15.8	0.01	112.3	52	68.4	0.99

14.4.6 RESOURCE BLOCK MODEL

14.4.6.1 *Parent Model*

A separate block model was established in Datamine Studio RM™ for the Montiel East deposit using one parent model as the origin. The model was not rotated.

A block size of 5 m x 10 m x 5 m was selected in order to accommodate a small-scale open pit mining potential. The block model was sub-celled on a 2.50 m x 5.00 m x variable pattern allowing the parent block to be split in each direction to more accurately fill the volume of the wireframes, and therefore more accurately estimating the tonnes in the Mineral Resource.

Table 14.53 summarizes details of the parent block model.

Table 14.53 – Montiel East Deposit Block Model Parameters

Properties	X (Column)	Y (Row)	Z (Level)
Origin coordinates	420,100	856,500	-400
Number of blocks	300	80	140
Block size (m)	5.00	10.00	5.00
Sub-block size (m)	2.50	5.00	variable
Rotation	No Rotation		

14.4.6.2 Estimate Parameters

The interpolations of the domains were completed using the estimation methods ordinary kriging (OK), nearest neighbour (NN), and inverse distance squared (ID^2). The estimations were designed for multiple passes. In each estimation pass, a minimum and maximum number of samples were required, as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. All estimation passes used the capped and composited dataset for the appropriate domain being estimated. The OK methodology is the method used to report the mineral estimate statement.

An isotropic search ellipse was used for the estimation. Only the samples within the domain wireframe were used in the estimation. Table 14.54 summarizes the search ellipse size and rotations based on the variography, and Table 14.55 summarizes the interpolation criteria for each domain.

Table 14.54 – Montiel East Deposit Search Ellipse Summary

Rock Type	Domain	Element	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge
Saprolite	Low-Grade	Cu	15	5	10	-47	-51	22
		Au	15	5	10	-47	-51	22
		Ag	15	5	10	-47	-51	22
	High-Grade	Cu	10	25	25	5	69	24
		Au	15	15	30	-53	-49	31
		Ag	15	15	30	-53	-49	31
Fresh	Low-Grade	Cu	15	5	10	-47	-51	22
		Au	15	5	10	-47	-51	22
		Ag	15	5	10	-47	-51	22

Rock Type	Domain	Element	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge
	High-Grade	Cu	30	10	20	-47	-51	22
		Au	15	15	30	-53	-49	31
		Ag	15	15	30	-53	-49	31

Table 14.55 – Montiel East Deposit Interpolation Parameters

Rock Type	Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
				Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
Saprolite	Low-Grade	Cu	2	3	8	1	3	8	2	3	8	20
		Au	2	3	8	1	3	8	2	3	8	20
		Ag	2	3	8	1	3	8	2	3	8	20
	High-Grade	Cu	2	3	8	1	3	8	2	3	8	20
		Au	2	3	8	1	3	8	2	3	8	20
		Ag	2	3	8	1	3	8	2	3	8	20
Fresh	Low-Grade	Cu	2	3	8	1	3	8	2	3	8	20
		Au	2	3	8	1	3	8	2	3	8	20
		Ag	2	3	8	1	3	8	2	3	8	20
	High-Grade	Cu	2	3	8	1	3	8	2	3	8	18
		Au	2	3	8	1	3	8	2	3	8	18
		Ag	2	3	8	1	3	8	2	3	8	18

14.4.7 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resource and Mineral Reserve Best Practice Guidelines (CIM, 2019);
- Author’s experience with sulphide, IOCG, and Cu-Au porphyry deposits;
- Spatial continuity based on variography of the assays within the drill holes;
- Understanding the geology of the deposit; and
- Drill hole spacing, data quality and the estimation runs required to estimate the grades in a block.

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction (CIM, 2019).

All blocks within the Montiel East deposit Mineral Resource were classified as Inferred.

14.4.8 MINERAL RESOURCE TABULATION

The resource reported is effective as of December 18, 2023 and has been tabulated in terms of a pit-constrained NSR cut-off grade of US$2.08/t milled of Saprolite and US$9.88/t milled of Fresh material.

The open pit Mineral Resource is constrained within a pit shell using Deswik software (2020.01), which runs the pseudoflow algorithm to determine the potential economic pit limits. Table 14.14 in Section 14.1.8 summarizes the parameters used to develop the pit constraints for a reasonable prospect of economic extraction.

The pit-constrained mineral resource and contained metal for the Montiel East deposit is summarized in Table 14.56. Table 14.57 summarizes the in-situ pit-constrained contained metal.

Table 14.56 – Montiel East Deposit Resource Summary

Classification	Rock Type	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	Saprolite	-	-	-	-
	Fresh	-	-	-	-
	Total	**-**	**-**	**-**	**-**
Inferred	Saprolite	722,000	-	0.21	0.97
	Fresh	8,613,000	0.33	0.23	1.14
	Total	**9,335,000**	**0.31**	**0.23**	**1.13**

Table 14.57 – Montiel East Deposit In-Situ Pit-Constrained Metal Content

Classification	Rock Type	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	Saprolite	-	-	-	-
	Fresh	-	-	-	-
	Total	**-**	**-**	**-**	**-**
Inferred	Saprolite	722,000	-	4,900	22,500
	Fresh	8,613,000	63,548,000	62900	316,000
	Total	**9,335,000**	**63,548,000**	**67,800**	**338,500**

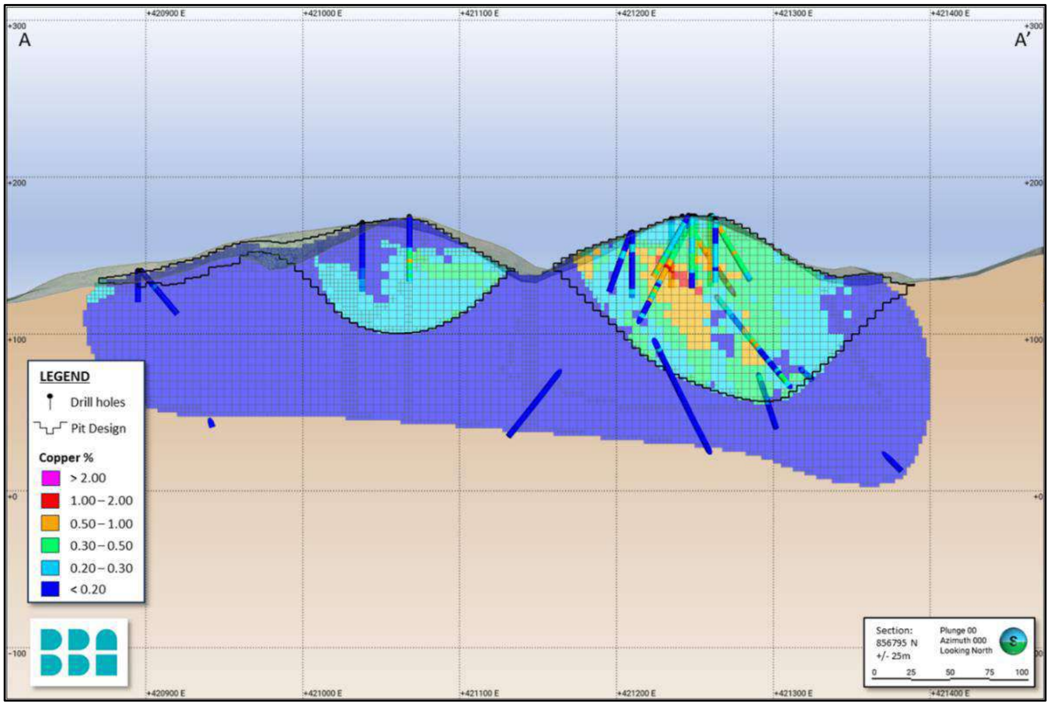
A Mineral Resource was prepared in accordance with NI 43-101 and the CIM Definition Standards (2019). Mineral Resources that are not mineral reserves do not have demonstrated economic viability. No environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues are known to the QP that may affect the estimate of mineral resources..

14.4.9 MODEL VALIDATION

14.4.9.1 *Visual Validation*

The visual comparisons of OK block model grades and composite drill holes show a reasonable correlation between the values (Figure 14.18). No significant discrepancies were apparent from the Sections reviewed, yet grade smoothing was apparent in some of the lower elevations due to the distance between drill samples being broader in these regions.

Figure 14.18 – Montiel East Deposit Visual Validation Through A-A’



Source: BBA, 2023

14.4.9.2 *Global Statistics*

The global block model statistics for the OK model were compared to the global NN and ID^2 model values as well as the composite capped drill hole data. Table 14.58 shows this comparison of the global estimates for the three (3) estimation method calculations. In general, there is an agreement between the OK model, ID^2 model, and NN model. Discrepancies are reflected as a result of lower drill density in some portions of the model. There is a degree of smoothing apparent when compared to the diamond drill statistics. Comparisons were made using all blocks and assays above an 0% Cu, 0 g/t Au, and 0 g/t Ag.

Table 14.58 – Montiel East Deposit Global Statistics Comparison

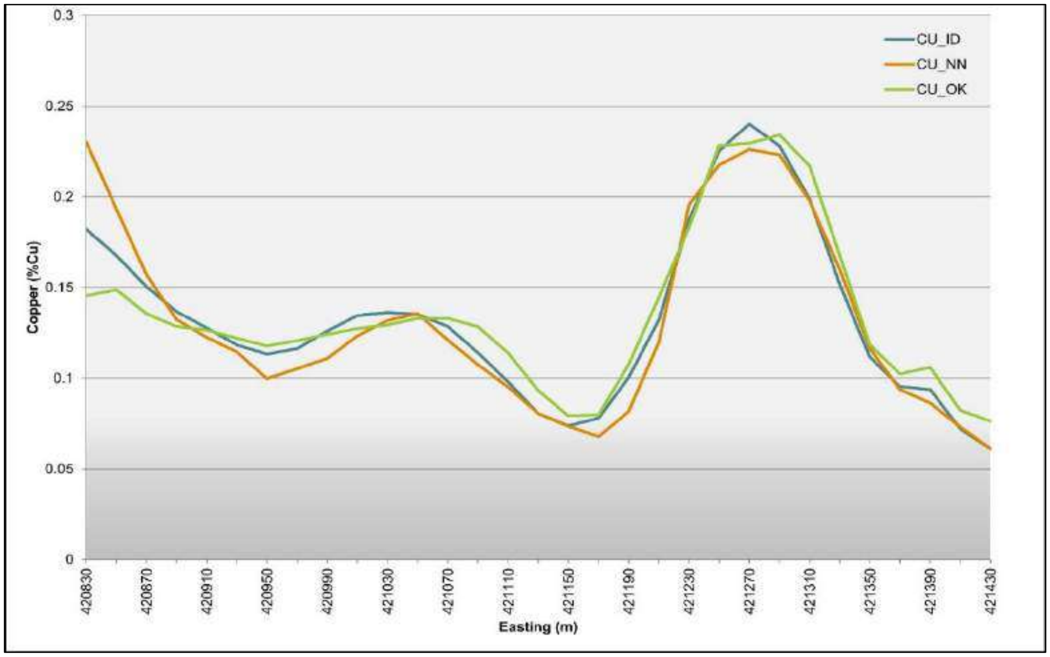
Element	NN	ID^2	OK	DDH Composite
Cu (%)	0.14	0.15	0.15	0.25
Au (g/t)	0.08	0.09	0.09	0.18
Ag (g/t)	0.60	0.64	0.62	0.96

14.4.9.3 Swath Plots

Figures 14.19 and 14.20 display the comparison between the OK estimate with ID^2 and NN estimates in a swath plot format.

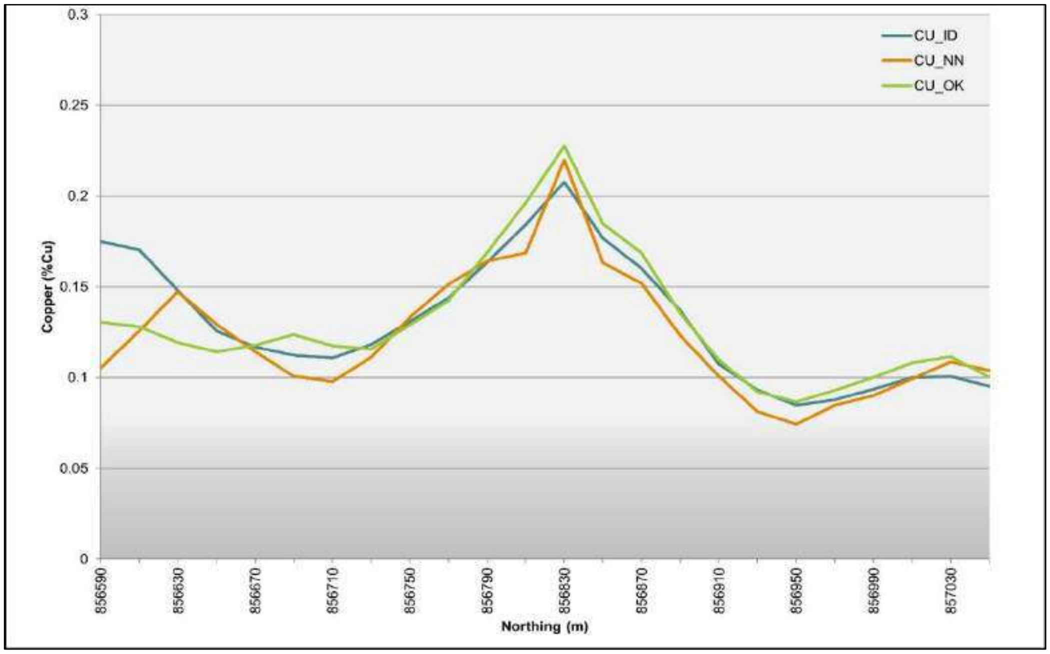
As expected, there is a strong degree of grade smoothing with the OK methodology.

Figure 14.19 – Montiel East Swath Plot – Easting



Source: BBA, 2023

Figure 14.20 – Montiel East Swath Plot – Northing



Source: BBA, 2023

14.4.10 PREVIOUS ESTIMATES

A comparison between the previous Montiel East Mineral Resource Statement in 2022 (Kuntz et al., 2022) and the current 2023 Mineral Resource Statement disclosed in this Report is illustrated in Tables 14.59 and 14.6 .

There are several differences between the 2022 and 2023 Mineral Resource statements, including, yet not limited to:

- Re-classification of the resources to inferred resources;
- Re-interpretation of the bulk density data;
- The historic 2022 MRE used Copper Equivalent cut-off grades versus the current 2023 MRE using NSR based cut-off grades;
- Different metallurgical recovery assumptions; and
- Different metal pricing, smelter terms and pit shell parameters (mining, processing, and G&A costs).

Table 14.59 – Grade-Tonnage Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	-	-	-	-	4.3	0.46	0.35	1.53
Inferred	9.3	0.31	0.23	1.13	1.8	0.25	0.15	0.88

Table 14.60 – Metal Content Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)	Tonnes (Mt)	Cu (Mlb)	Au (oz)	Ag (oz)
Indicated	-	-	-	-	4.3	43.7	48,800	211,200
Inferred	9.3	63.5	67,800	338,500	1.8	9.6	8,500	50,300

14.5 Montiel West Satellite Deposit Resource Estimate

14.5.1 DEPOSIT DATABASE

The Montiel West deposit database totals seven (7) surface-collared diamond drill holes (DDH) and 85 reverse circulation (RC) drill holes totalling 2,956 m in length were used for geological domain modelling and resource estimation. There are a total of 2,590 assay records in the Montiel West deposit database, 597 DDH assay records and 1,993 RC assay records.

The six (6) geological domains in the Montiel West deposit are summarized in Table 14.61. The domain naming convention is used consistently through this disclosure.

Table 14.61 – Montiel West Deposit Geological Domains

Rock Type	Rock Code	Domain	Domain Code	Description
Saprolite	1	Low-Grade	1	Low-Grade Saprolite Mineralization
		High-Grade	2	High-Grade Saprolite Mineralization
Fresh	2	Low-Grade	1	Low-Grade Fresh Mineralization
		High-Grade	2	High-Grade Fresh Mineralization
Andesite-Basalt	2		1 & 2	Andesite-Basalt (Fresh SG assignment)
Andesite-Porphyry			1 & 2	Andesite-Porphyry (Fresh SG assignment)

Cordoba maintains all borehole data in a MX deposit database. Header, survey, assay, and lithology information are saved as individual tables in the database. The database information in CSV format was provided to the QP originally on June 7, 2022.

The QP believes that the database is appropriate for the purposes of Mineral Resource estimation and the sample density allows a reliable estimate of the tonnage and grade of the mineralization in accordance with the level of confidence established by the Mineral Resource categories as defined in the CIM Guidelines.

14.5.2 BULK DENSITY

Section 14.3.2 summarizes the procedure for determining the bulk density of the satellite deposits. The complete methodology is disclosed in Section 14.1.2.

The bulk density measurements grouped by rock code/rock type were imported into MS Excel and Snowden Supervisor™ version 8.15.0 software. Histograms and probability plots were used to remove measurement outliers. Table 14.62 summarizes the results of the SG measurements.

Table 14.62 – Satellite Deposit Bulk Density Summary

Rock Type	Sample Count	Average SG
Saprolite[1]	530	1.82
Andesite-Basalt	544	2.82
Andesite-Porphyry	195	2.80
Hornblende-Porphyry	103	2.75

*1 - SG data from El Alacrán deposit SG study only

14.5.3 TOPOGRAPHY DATA

The same topography used for El Alacrán and disclosed in Section 14.1.3 was used for Montiel West.

14.5.4 GEOLOGICAL INTERPRETATION

Three-dimensional wireframe models of mineralization were developed in Datamine Studio RM™ by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022). The four (4) mineralization wireframes were reviewed by the QP. Andesite porphyry and andesite basalt were not wireframed and part of the estimation.

Hard boundaries were created to separate high-grade and low-grade domains for oxidized (saprolite) and fresh material generally using a contiguous 0.10% CuEq threshold between domains.

The modelling is broken down into four (4) separate mineralized domains based on grade and rock type. Table 14.63 tabulates the solids and associated volumes. Figure 14.21 illustrates the model solids for each of the domains.

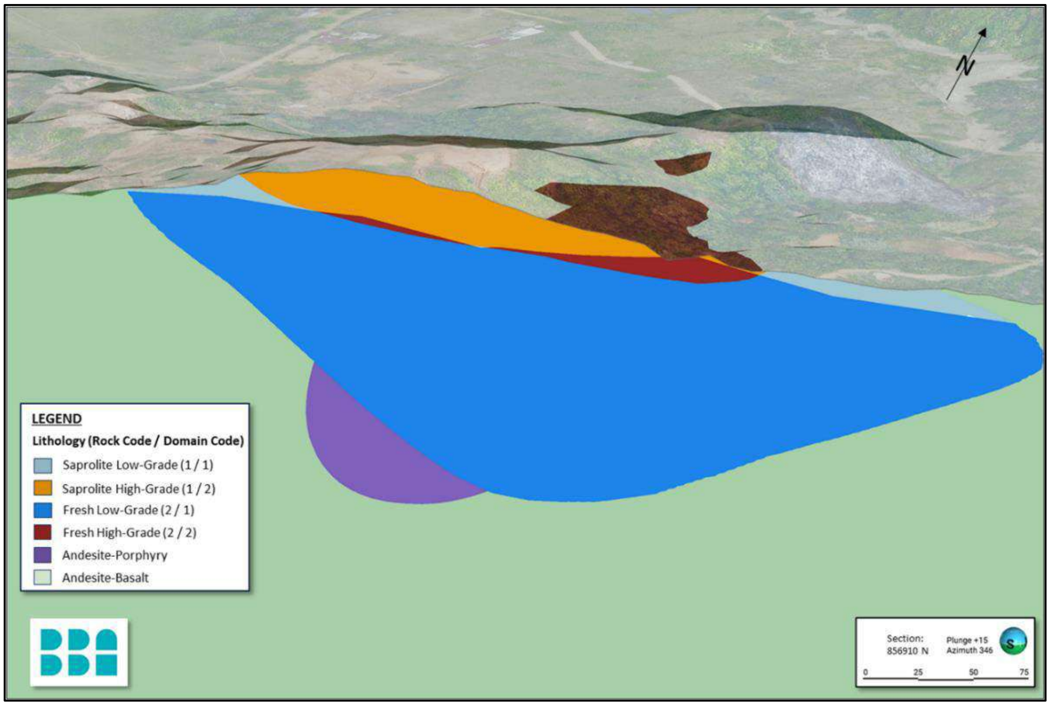
The mineralization wireframe boundaries extents were constrained by the presence of “barren drill holes”, in which case the extent corresponds to the mid-point between the closest mineralized intersect and the barren one. In the absence of drill hole “unconstrained” boundaries were given a maximum of 50 m from the last closest mineralized intersect.

The non-assayed and unrecoverable intervals were assigned void (-) value. The QP believes that non-assayed material should not be assigned a zero value, as this does not reflect the true value of the material. Each domain was modeled using the same principal assumptions and methodology.

Table 14.63 – Montiel West Deposit Wireframe Summary

Rock Type	Domain	Wireframe Volume (m³)
Saprolite	Low-Grade	1,704,321
	High-Grade	591,153
Fresh	Low-Grade	13,468,547
	High-Grade	368,251

Figure 14.21 – Interpretation of Domains (Section View with Orthogonal Surface Projection)



Source: BBA, 2023

14.5.5 EXPLORATORY DATA ANALYSIS

14.5.5.1 *Assays*

The four (4) domains included in the Mineral Resource were sampled for a total of 2,478 assays for copper, gold, and silver. The assay intervals within each mineral domain were captured using the Datamine Studio RM™ routine to flag the intercept into a new table in the database. These intervals were reviewed to ensure all the proper assay intervals were captured. Table 14.64 summarizes the basic statistics for the assay intervals for each of the mineral domains in the deposit.

Table 14.64 – Montiel West Deposit Borehole Basic Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	525	34	0.01	0.32	0.09	0.00
		Au (ppm)	525	34	0.01	12.38	0.25	0.90
		Ag (ppm)	525	34	0.02	10.00	0.79	1.17
		Length (m)	559	0	0.06	3.00	1.02	0.03
	High-Grade	Cu (%)	547	0	0.09	1.23	0.40	0.06
		Au (ppm)	547	0	0.01	50.66	0.75	14.35
		Ag (ppm)	547	0	0.07	10.00	1.34	2.67
		Length (m)	547	0	0.02	2.00	1.01	0.01
Fresh	Low-Grade	Cu (%)	1009	78	0.00	0.56	0.07	0.00
		Au (ppm)	1009	78	0.00	6.16	0.13	0.14
		Ag (ppm)	1009	78	0.01	6.85	0.81	0.81
		Length (m)	1087	0	0.10	2.00	1.26	0.21
	High-Grade	Cu (%)	397	0	0.11	1.26	0.34	0.02
		Au (ppm)	397	0	0.04	5.61	0.32	0.21
		Ag (ppm)	397	0	0.30	12.25	1.43	2.51
		Length (m)	397	0	0.10	2.00	1.13	0.14

14.5.5.2 *Grade Capping*

Grade capping was completed using X10 Geo software package by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP.

The raw assay data for each element within the domain was examined to assess the amount of metal that is bias from high-grade assays. A combination of reviewing decile analysis tables (Parrish, 1997), histograms, Q-Q, and cumulative frequency plots was used to assist in determining if grade capping was required on copper, silver, and gold in each domain.

This analysis concluded grade capping was required for each of the mineralization domains based on the sample type (diamond drill core vs. reverse circulation). Table 14.65 summarizes the grade capping applied to each domain by the QP.

Table 14.65 – Montiel West Deposit Grade Capping Summary

Rock Type	Domain	Element	Grade Cap		Number Capped Samples	
			DDH	RC	DDH	RC
Saprolite	Low-Grade	Cu (%)	0.103	0.39	3	0
		Au (ppm)	0.34	1.78	3	8
		Ag (ppm)	10.00	10.00	0	3
	High-Grade	Cu (%)	1.19	1.12	1	6
		Au (ppm)	0.98	6.12	1	6
		Ag (ppm)	No Cap	No Cap	0	0
Fresh	Low-Grade	Cu (%)	0.799	0.68	0	0
		Au (ppm)	1.40	3.58	4	3
		Ag (ppm)	6.00	6.00	0	3
	High-Grade	Cu (%)	1.10	0.71	1	2
		Au (ppm)	1.17	3.26	3	4
		Ag (ppm)	10.00	10.00	1	4

14.5.5.3 *Compositing*

Compositing of all the assay data within a domain was completed on downhole intervals honouring the interpretation of the geological wireframes. Statistics indicated that a majority of the samples were collected at 1.0 m and 2.0 m intervals. Composites were generated at a 2.5 m best fit option, allowing all the material to be used in the compositing process. Datamine Studio RM™ backstitch option distributed the "tails" of the composite equally across all the composites in the hole to ensure all the sample material was used in the estimate. Table 14.66 summarizes the statistics for the boreholes after compositing.

Table 14.66 – Montiel West Deposit Borehole Composite Statistics by Domain

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
Saprolite	Low-Grade	Cu (%)	215	11	0.01	0.32	0.09	0.00
		Au (ppm)	215	11	0.01	1.65	0.19	0.07
		Ag (ppm)	215	11	0.02	10.00	0.79	0.96
		Length (m)	226	0	1.00	3.00	2.52	0.05
	High-Grade	Cu (%)	223	0	0.09	1.12	0.40	0.06
		Au (ppm)	223	0	0.01	6.12	0.50	0.72

Rock Type	Domain	Element	Number Samples	Missing Intervals	Minimum	Maximum	Mean	Variance
		Ag (ppm)	223	0	0.07	10.00	1.34	2.31
		Length (m)	223	0	2.00	3.00	2.47	0.02
Fresh	Low-Grade	Cu (%)	528	23	0.00	0.39	0.07	0.00
		Au (ppm)	528	23	0.00	2.55	0.12	0.05
		Ag (ppm)	528	23	0.01	5.53	0.81	0.63
		Length (m)	551	0	2.00	3.00	2.50	0.01
	High-Grade	Cu (%)	182	0	0.13	0.84	0.34	0.02
		Au (ppm)	182	0	0.05	3.26	0.30	0.12
		Ag (ppm)	182	0	0.41	9.37	1.42	1.87
		Length (m)	182	0	1.00	3.00	2.46	0.07

14.5.5.4 Spatial Analysis

Variograms for gold, silver, and copper elements were created to inform the search ellipse dimensions. The variograms were also used to assign kriging weights during the estimation process.

The variography for Cordoba was determined using Datamine and SAGE 2001 by Nordmin Engineering Ltd. during the PFS (Kuntz et al., 2022) and reviewed by the QP. Each element was modelled using a downhole variogram to determine the nugget effect, then a spherical pair-wise variogram was used to determine spatial continuity in each of the domains.

Table 14.67 summarizes the results of the variogram models for each element in each domain. The variogram rotation and maximum range governed the search ellipse rotation and size.

Table 14.67 – Montiel West Deposit Variogram Parameters

Domain	Element	Angle 1	Angle 2	Angle 3	Nugget	First Structure (Spherical)				Second Structure (Spherical)			
						Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 1	Range 1 (m)	Range 2 (m)	Range 3 (m)	Sill 2
Low-Grade and High-Grade	Cu	48	-38	-42	0.02	18.2	49.7	40.9	0.17	19.9	314.3	55.3	0.81
	Au	-56	-13	36	0.01	3.7	13.7	30.7	0.26	104.6	548	58.7	0.72
	Ag	-56	-13	36	0.01	3.7	13.7	30.7	0.26	104.6	548	58.7	0.72

14.5.6 RESOURCE BLOCK MODEL

14.5.6.1 Parent Model

A separate block model was established in Datamine Studio RM™ for the Montiel West deposit using one parent model as the origin. The model was not rotated.

A block size of 5 m x 10 m x 5 m was selected in order to accommodate a small-scale open pit mining potential. The block model was sub-celled on a 2.50 m x 5.00m x variable pattern allowing the parent block to be split in each direction to more accurately fill the volume of the wireframes, and therefore more accurately estimating the tonnes in the Mineral Resource.

Table 14.68 summarizes details of the parent block model.

Table 14.68 – Montiel West Deposit Block Model Parameters

Properties	X (Column)	Y (Row)	Z (Level)
Origin coordinates	420,100	856,500	-400
Number of blocks	300	80	140
Block size (m)	5.00	10.00	5.00
Sub-block size (m)	2.50	5.00	variable
Rotation	No Rotation		

14.5.6.2 *Estimate Parameters*

The interpolations of the domains were completed using the estimation methods Ordinary Kriging (OK), nearest neighbour (NN), and inverse distance squared (ID^2). The estimations were designed for multiple passes. In each estimation pass, a minimum and maximum number of samples were required, as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. All estimation passes used the capped and composited dataset for the appropriate domain being estimated. The OK methodology is the method used to report the mineral estimate statement.

An isotropic search ellipse was used for the estimation. Only the samples within the domain wireframe were used in the estimation. The result is that the search ellipse will not locate samples outside the domain wireframe. Table 14.69 summarizes the search ellipse size and rotations based on the variography, and Table 14.70 summarizes the interpolation criteria for each domain.

Table 14.69 – Montiel West Deposit Search Ellipse Summary

Rock Type	Domain	Element	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge
Saprolite	Low-Grade	Cu	10	15	10	48	-38	-42
		Au	10	15	10	48	-38	-42
		Ag	10	15	10	48	-38	-42
	High-Grade	Cu	20	10	10	-29	-32	5
		Au	20	10	10	-29	-32	5
		Ag	20	10	10	-29	-32	5

Rock Type	Domain	Element	Major Axis (m)	Semi-Major Axis (m)	Minor Axis (m)	Axis 3 Rotation Strike	Axis 1 Rotation Dip	Axis 3 Rotation Plunge
Fresh	Low-Grade	Cu	10	15	10	48	-38	-42
		Au	10	15	10	48	-38	-42
		Ag	10	15	10	48	-38	-42
	High-Grade	Cu	20	10	10	48	-38	-42
		Au	20	10	10	-29	-32	5
		Ag	20	10	10	-29	-32	5

Table 14.70 – Montiel West Deposit Interpolation Parameters

Rock Type	Domain	Element	Max No. of Composites per Borehole	Pass 1			Pass 2			Pass 3		
				Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor	Min Comp	Max Comp	Search Ellipse Factor
Saprolite	Low-Grade	Cu	2	3	8	1	3	8	2	3	8	15
		Au	2	3	8	1	3	8	2	3	8	15
		Ag	2	3	8	1	3	8	2	3	8	15
	High-Grade	Cu	2	3	8	1	3	8	2	3	8	20
		Au	2	3	8	1	3	8	2	3	8	20
		Ag	2	3	8	1	3	8	2	3	8	20
Fresh	Low-Grade	Cu	2	3	8	1	3	8	2	3	8	15
		Au	2	3	8	1	3	8	2	3	8	15
		Ag	2	3	8	1	3	8	2	3	8	15
	High-Grade	Cu	2	3	8	1	3	8	2	3	8	15
		Au	2	3	8	1	3	8	2	3	8	15
		Ag	2	3	8	1	3	8	2	3	8	15

14.5.7 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resource and Mineral Reserve Best Practice Guidelines (CIM, 2019);
- Author's experience with sulphide, IOCG, and Cu-Au porphyry deposits;
- Spatial continuity based on variography of the assays within the drill holes;
- Understanding the geology of the deposit; and

- Drill hole spacing, data quality and the estimation runs required to estimate the grades in a block.

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction (CIM, 2019).

All blocks within the Montiel West deposit Mineral Resource were classified as Inferred.

14.5.8 MINERAL RESOURCE TABULATION

The resource reported is effective as of December 18, 2023 and has been tabulated in terms of a pit-constrained NSR cut-off grade of US$2.08/t milled of Saprolite and US$2.08/t milled of Fresh material.

The open pit Mineral Resource is constrained within a pit shell using Deswik software (2020.01), which runs the pseudoflow algorithm to determine the potential economic pit limits. Table 14.14 in Section 14.1.8 summarizes the parameters used to develop the pit constraints for a reasonable prospect of economic extraction.

The pit-constrained Mineral Resource and contained metal for the Montiel West deposit is summarized in Table 14.71. Table 14.72 summarizes the in-situ pit-constrained contained metal.

Table 14.71 – Montiel West Deposit Resource Summary

Classification	Rock Type	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Indicated	Saprolite	-	-	-	-
	Fresh	-	-	-	-
	Total	**-**	**-**	**-**	**-**
Inferred	Saprolite	2,123,000	-	0.38	1.17
	Fresh	8,388,000	0.11	0.36	1.13
	Total	**10,511,000**	**0.09**	**0.36**	**1.14**

Table 14.72 – Montiel West Deposit In-Situ Pit-Constrained Metal Content

Classification	Rock Type	Tonnes (t)	Cu (lb)	Au (oz)	Ag (oz)
Indicated	Saprolite	-	-	-	-
	Fresh	-	-	-	-
	Total	**-**	**-**	**-**	**-**
Inferred	Saprolite	2,123,000	-	26,200	80,000
	Fresh	8,388,000	20,583,900	97100	305,200
	Total	**10,511,000**	**20,583,900**	**123,300**	**385,200**

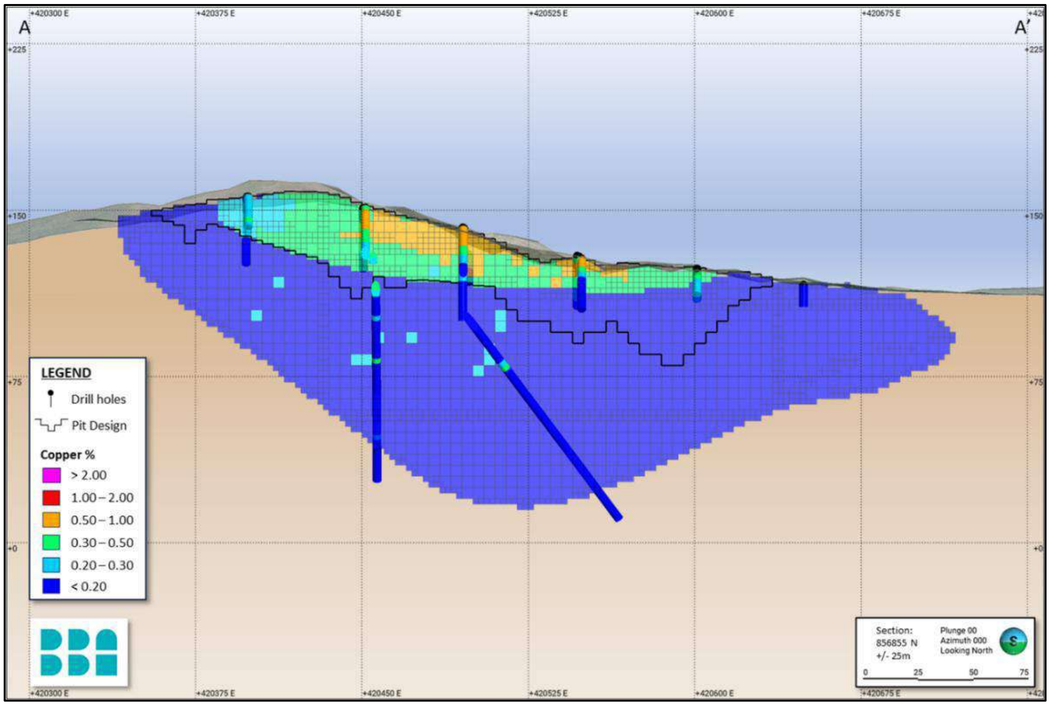
A Mineral Resource was prepared in accordance with NI 43-101 and the CIM Definition Standards (2019). Mineral Resources that are not mineral reserves do not have demonstrated economic viability. No environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues are known to the QP that may affect the estimate of mineral resources..

14.5.9 MODEL VALIDATION

14.5.9.1 *Visual Validation*

The visual comparisons of OK block model grades and composite drill holes show a reasonable correlation between the values (Figure 14.22). No significant discrepancies were apparent from the sections reviewed, yet grade smoothing was apparent in some of the lower elevations due to the distance between drill samples being broader in these regions.

Figure 14.22 – Montiel West Deposit Visual Validation Through A-A’



Source: BBA, 2023

14.5.9.2 *Global Statistics*

The global block model statistics for the OK model were compared to the global NN and ID^2 model values as well as the composite capped drill hole data. Table 14.73 shows this comparison of the global estimates for the three (3) estimation method calculations. In general, there is an agreement between the OK model, ID^2 model, and NN model. Larger discrepancies are reflected as a result of lower drill density in some portions of the model. There is a degree of smoothing apparent when compared to the diamond drill statistics. Comparisons were made using all blocks and assays above an 0% Cu, 0 g/t Au, and 0 g/t Ag.

Table 14.73 – Montiel West Deposit Global Statistics Comparison

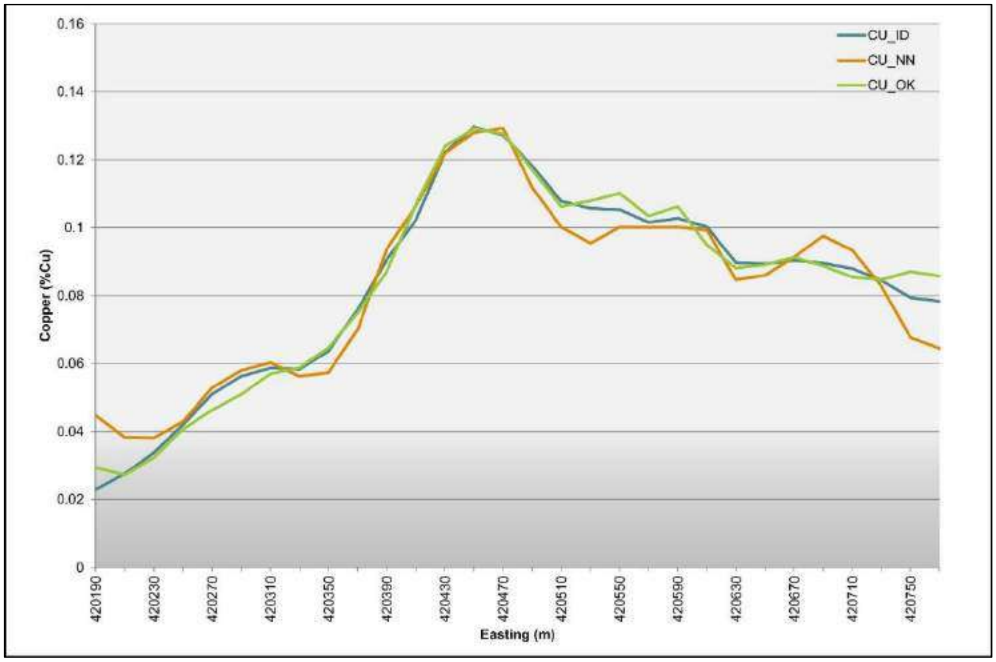
Element	NN	ID^2	OK	DDH Composite
Cu (%)	0.12	0.13	0.13	0.18
Au (g/t)	0.22	0.22	0.22	0.23
Ag (g/t)	1.03	1.01	0.96	1.00

14.5.9.3 *Swath Plots*

Figures 14.23 and 14.24 display the comparison between the OK estimate with ID^2 and NN estimates in a swath plot format.

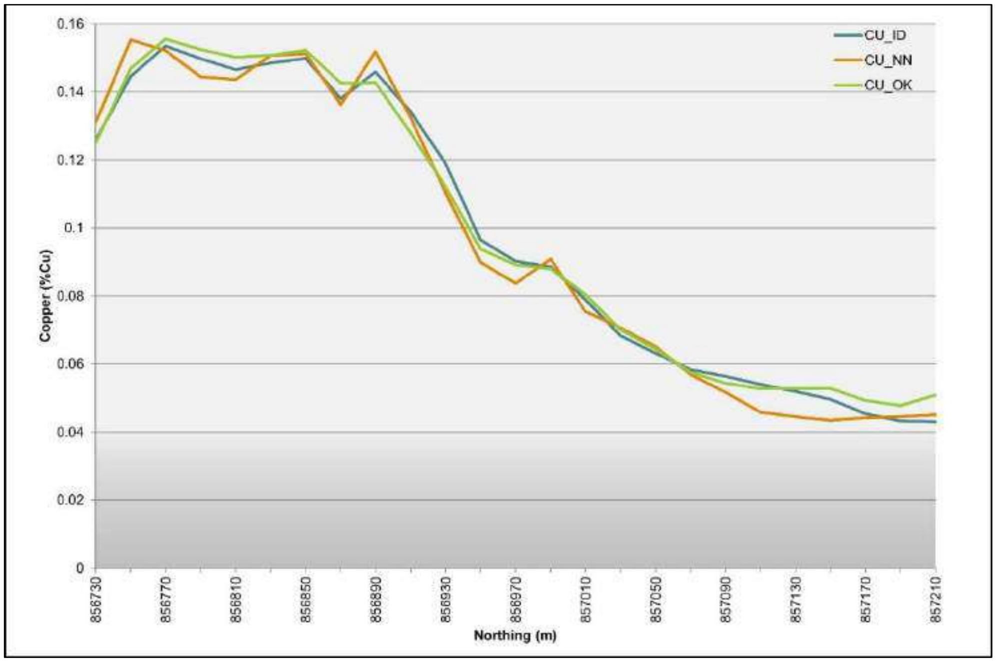
As expected, there is a strong degree of grade smoothing with the OK methodology.

Figure 14.23 – Montiel West Swath Plot – Easting



Source: BBA, 2023

Figure 14.24 – Montiel West Swath Plot - Northing



Source: BBA, 2023

14.5.10 PREVIOUS ESTIMATES

A comparison between the previous Montiel West Mineral Resource Statement in 2022 (Kuntz et al., 2022) and the current 2023 Mineral Resource Statement disclosed in this Report is illustrated in Tables 14.74 and 14.75.

There are several differences between the 2022 and 2023 Mineral Resource statements, including, yet not limited to:

- Re-classification of the resources to inferred resource;
- Re-interpretation of the bulk density data;
- The historic 2022 MRE used Copper Equivalent cut-off grades versus the current 2023 MRE using NSR based cut-off grades;
- Different metallurgical recovery assumptions; and
- Different metal pricing, smelter terms and pit shell parameters (mining, processing, and G&A costs).

Table 14.74 – Grade-Tonnage Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	**Cu** (%)	**Au** (g/t)	**Ag** (g/t)	**Tonnes** (Mt)	**Cu** (%)	**Au** (g/t)	**Ag** (g/t)
Indicated	-	-	-	-	4.6	0.24	0.49	1.32
Inferred	10.5	0.09	0.36	1.14	0.6	0.07	0.54	0.96

Table 14.75 – Metal Content Comparison with Previous Mineral Resource Statement

Classification	BBA 2023 Mineral Resource Statement				Nordmin 2022 Mineral Resource Statement			
	Tonnes (Mt)	**Cu** (Mlb)	**Au** (oz)	**Ag** (oz)	**Tonnes** (Mt)	**Cu** (Mlb)	**Au** (oz)	**Ag** (oz)
Indicated	-	-	-	-	4.6	24.8	72,600	195,800
Inferred	10.5	20.5	123,300	385,200	0.6	1.0	11,100	19,000

15 MINERAL RESERVE ESTIMATES

15.1 Introduction

NI 43-101 defines the terms “Mineral Reserve”, “Probable Mineral Reserve” and “Proven Mineral Reserve” have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy, and Petroleum, as the CIM Definition Standards on Mineral Resources and Mineral Reserves (May 2014) and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of modifying factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors.

A Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the modifying factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the modifying factors. Application of the Proven Mineral Reserve category implies that the Qualified Person has the highest degree of confidence in the estimate with the consequent expectation in the minds of the readers of the report.

15.2 Mineral Reserve Estimate

Mineral Reserves are based on the engineering and economic analysis described in Section 13 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

- Metal prices;
- Interpretations of mineralization geometry and continuity of mineralization zones;
- Grade and geology estimation assumptions;
- Geomechanical and hydrogeological assumptions;
- Ability of the mining operation to meet the annual production rate;
- Operating cost assumptions;
- Process plant recoveries;

- Mining loss and dilution;
- Ability to meet and maintain permitting and environmental licence conditions; and
- Historical mining depletion.

BBA prepared a Mineral Reserve Estimate for the Project using Deswik mining software packages and modules for estimating the economic pit limit for the open pit and block model interrogation.

The Mineral Reserve Estimate for the El Alacrán deposit is based on the resource block model estimated by BBA and described in Section 14. The block model contained both Indicated and Inferred Mineral Resources; however, only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, which includes the Run-of-Mine (ROM) stockpiles.

The following subsections outline the procedures used to estimate the Mineral Reserves. Following the detailed design of the final pit and a LOM scheduling with the cut-off values, a total of 97.9 Mt of diluted ore is estimated inside the mine design. The detailed pit design is discussed in the following sections, while the production plan is discussed in Section 16.

Table 15.1 presents the reserves inside the design pit. Note numbers have been rounded.

Table 15.1 – Mineral Reserve Estimate

Category	**Area**	**Material**	**NSR Value Cut-off Value**	**Tonnage** (t)	**Diluted Cu Grade** (%)	**Diluted Au Grade** (g/t)	**Diluted Ag Grade** (g/t)
Probable	El Alacrán Open Pit	Transition	10.26 US$/t	2,277,000	0.50	0.20	2.78
Probable	El Alacrán Open Pit	Fresh	10.26 US$/t	87,079,000	0.45	0.23	2.65
Probable	El Alacrán Open Pit	Fresh + Transition	10.26 US$/t	89,357,000	0.45	0.23	2.65
Probable	El Alacrán Open Pit	Saprolite	2.07 US$/t	7,359,000	--	0.24	2.72
Probable	Historical Tailings	Historical Tailings	2.58 US$/t	1,234,000	--	0.29	0.89
Probable		**Total**	**--**	**97,950,000**	**0.41**	**0.23**	**2.63**

Source: BBA, 2023

15.3 Open Pit Mine Design

Conventional open pit mining methods will be used to extract a portion of the El Alacrán deposit. This method was selected considering the El Alacrán deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the open pit material within the designed pit to meet the mine production schedule.

The following sub-section details the aspects of the pit design.

15.3.1 PIT LIMIT ANALYSIS

Economic pit limits were carried out using the Pseudoflow 3D algorithm in the Deswik Mine Planning Software. The pit optimization algorithm is used to produce pit shells that are physical representations of an economical pit to be mined, assuming a given set of parameters and 3D block model. Using a variety of input parameters such as mining costs, processing costs, transportation costs, process recovery values and pit slopes, the algorithm outputs the pit shell that maximizes the undiscounted value of the deposit. These shells are devoid of geotechnical and operational features such as ramps, proper benching arrangements, and minimum mining width considerations. The pit shell's purpose is to be used as a basis for establishing pit limits and guide for the design of an engineered open pit. No capital expenses, such as those required for initial equipment purchase or waste pile construction, are considered by the pit optimization tool.

A series of pit shells are produced using a range of revenue factors (reduction factors on selling price or revenue) from 20% to 120% to produce the industry standard pit-by-pit graph. The revenue factor is used to measure the sensitivity of the pit optimizations to changes in mineral selling prices, as well as to evaluate the effect of the pit size and stripping ratios on the Project present value (PV). The analysis produces a series of nested pit shells that prioritizes the mining of the most economic material and progressively increase in size, while less profitable material is mined as the revenue factor increases. The results of the pit optimizations are subsequently compared on the basis of the estimated PV and calculated undiscounted value and tonnes of ore and waste material. From these results, a final pit shell is selected that meets Project requirements and maximizes Project PV.

The pit limit analysis was evaluated on the El Alacrán deposit, using the Indicated Mineral Resources from the historical tailings, saprolite, transition, and fresh material types.

15.3.1.1 Input Parameters

A 3D geological block model and other economic and operational variables were used as inputs into the algorithm program. These variables include overall pit slope angle, mining costs, processing costs, selling costs, metal prices, and other variables listed in Table 15.2. Although these parameters are not necessarily final, a reasonable degree of accuracy is required since the analysis is an iterative process.

The pit limit analysis parameters used for the FS are based on the following:

- Results of the 2021 PFS (Kuntz et al., 2022); and
- Updated information gathered through the FS process.

The economic parameters used at the time of the pit limit analysis may not necessarily conform to those stated in the economic model.

Table 15.2 – Pit Limit Analysis Parameters

Parameter	Value
Currency Used for Evaluation	US$
Block Size	Regularized, 5 m x 5 m x 5 m
Overall Slope Angle	Rock: Varied by Sector – Range 42° – 45°
	Saprolite: 29°
Mining Cost	\$1.45/t_{mined} saprolite
	\$2.05/t_{mined} rock
	\$1.30/t_{mined} historical tailings
	\$0.10 /t for sustaining capital, mining
	\$+ 0.03/t per 10 m for depths below 120 m
Process Cost	\$7.70/$\text{t}_{\text{processed}}$ for fresh & transition milling
	\$1.00/$\text{t}_{\text{processed}}$ for saprolite & historical tailings milling
	\$0.54/$\text{t}_{\text{processed}}$ for tailings & WMF management for fresh & transition material
	\$0.35/$\text{t}_{\text{processed}}$ for tailings management for saprolite & historical tailings material
	\$1.64/$\text{t}_{\text{processed}}$ for G&A, applied to fresh & transition material
	\$0.08/$\text{t}_{\text{processed}}$ for sustaining capital mill, applied to fresh & transition material
	\$0.30/$\text{t}_{\text{processed}}$ for sustaining capital WMF, applied to fresh & transition material
Metal Price	$3.80/lb Cu
	$1,690/oz Au
	$22.50/oz Ag
Process Recovery	Based on Recovery Algorithms
Mining Loss & Dilution	Included within Regularized Block Model
Resources Used for Pit Shell Generation	Indicated

Source: BBA, 2023

a. Resource Block Model

The block model uses the WGS84/UTM Zone 18N coordinates. The pit optimization and design were completed using the same coordinate system.

b. Mine Dilution and Mine Loss

Mining Dilution was added to the resource block model to represent the mixing of waste into potential mill feed (PMF) blocks due to blast mixing, mining selectivity, and/or truck box carry-back activities.

For mine planning, it was decided to reblock the sub-block model to blocks of regular size which matched the half mining bench height. This reblocking process is known as regularization. Ideally, the regularization would reblock the model to a block size that represents the mining selectivity.

The regularization process creates blocks that cut across the mineralized-waste boundaries, thus adding dilution to the PMF material. This also drives some of the regularized blocks below the cut-off value and these become mining loss.

The resource block model was regularized to a block size of 5 m wide x 5 m long x 5 m high using Deswik.CAD, thereby eliminating the subcells. The 5 m x 5 m x 5 m was selected to align with mining equipment, selectivity, and pit configuration.

The codes for resource categories and rock codes (Indicated and Inferred and Zones 10 to 2100) were applied to blocks in the regularized model based on which code had the greatest volume (majority code) from the resource model.

Grades for Cu, Au, Ag, and S from the resource model were applied to the regularized model on a mass weighted average basis.

The regularization of the El Alacrán resource model to 5 m x 5 m x 5 m incorporated approximately 6% dilution for the Fresh and Transition material, and 2.3% mining loss. No additional factors were applied.

For the saprolite material, the regularization of the block model incorporated approximately 9% dilution and 4% mining loss. For the historical tailings material, the regularization of the block model resulted in approximately 21% dilution and 25% mining loss.

c. Operating Costs

The operating costs are preliminary and are used for pit limit optimization, reserve estimate, and mine planning purposes. Detailed operating costs are developed based on a detailed mine design and plan and discussed in Section 21. The preliminary process costs were based on the estimate provided in Table 15.3.

Table 15.3 – Preliminary Process Cost Estimate

Process Cost Item	Unit	Value
Milling Operating Costs Saprolite	US$/t milled	1.00
Milling Operating Costs Transition and Fresh	US$/t milled	7.70
Tailings Operating Costs Transition and Fresh	US$/t milled	0.54
Tailings Operating Costs Saprolite and Historical Tailings	US$/t milled	0.35
G&A Costs (Transition and Fresh)	US$/t milled	1.64
Sustaining Capital Costs (Transition and Fresh)	US$/t milled	0.38
Total Processing – Transition and Fresh (including milling, G&A, tailings)	US$/t milled	10.26
Total Processing – Saprolite (including milling, rehandle, tailings)	US$/t milled	1.35

Source: BBA, 2023

d. Metallurgical Recovery

The assumptions for the metallurgical recoveries used in the pit limit analysis are based on preliminary grade-recovery assumptions provided by Blue Coast Research.

Fresh Material

Copper Recovery

For block grades with Cu% greater than or equal to 0.19%

$$\text{Cu recovery (\%)} = (-0.2308 * (\text{S grade (\%)} - (\text{Cu grade (\%)} * 64/63.5)) + 94.624) * 0.977$$

For block grades with Cu% less than 0.19%

$$\text{Cu recovery (\%)} = ((-0.2308 * (\text{S grade (\%)} - (\text{Cu grade (\%)} * 64/63.5)) + 94.624) * 0.977) * (2.709 * \text{Cu grade (\%)}\text{^}0.6)$$

Gold and Silver Recovery

For all block grades

$$\text{Au recovery (\%)} = (80.776 * \text{Au head grade (g/t)}\text{^}0.0281) * 0.959$$

$$\text{Ag recovery (\%)} = (67.544 * \text{Ag head grade (g/t)}\text{^}0.0377) * 0.889$$

- 60% of Au recovered goes to Cu Conc.
- 40% of Au recovered goes to Au Conc.
- 80% of Ag recovered to Cu Conc.
- 20% of Ag recovered to Au Conc.

Transition Material

Copper Recovery

For block grades with Cu% less than 0.15%

*Cu recovery (%) = 305.2 * grade (%) – 0.6084*

For block grades with Cu% greater than or equal to 0.15% and less than or equal to 0.60%

*Cu recovery (%) = 10.821 * Ln(grade (%)) + 47.64*

For block grades with Cu% greater than 0.60%

Cu recovery (%) = 47.22

Gold Recovery

For block grades with Au (g/t) less than 0.1 g/t

*Au recovery (%) = 558.23 * grade (g/t) – 0.619*

For block grades with Au (g/t) greater than or equal to 0.1 g/t and less than or equal to 0.8 g/t

*Au recovery (%) = 8.855 * Ln(grade (g/t)) + 76.54*

For block grades with Au (g/t) greater than 0.8 g/t

Au recovery (%) = 73.70

Silver Recovery

For block grades with Cu (%) less than 0.15%

*Ag recovery (%) = 145.02 * grade (%) – 0.366*

For block grades with Cu (%) greater than or equal to 0.15% and less than or equal to 0.6%

*Ag recovery (%) = 8.640 * Ln(grade (%)) + 38.33*

For block grades with Cu(%) greater than 0.6%

Ag recovery (%) = 33.91

- 60% of Au recovered goes to Cu Conc.
- 40% of Au recovered goes to Au Conc.
- 80% of Ag recovered to Cu Conc.
- 20% of Ag recovered to Au Conc.

Saprolite Material

Gold Recovery

For block grades with Au (g/t) less than 0.1 g/t

$$\text{Au recovery (\%)} = 396.3 * \text{grade (g/t)} - 1.4293$$

For block grades with Au (g/t) greater than or equal to 0.1 g/t and less than or equal to 0.6 g/t

$$\text{Au recovery (\%)} = 9.9592 * \text{Ln(grade (g/t))} + 62.6$$

For block grades with Au (g/t) greater than 0.6 g/t

$$\text{Au recovery (\%)} = 57.38$$

Historical Tailings Material

- 40% Au recovery
- 30% Ag recovery

e. Selling Costs

Table 15.4 through Table 15.11 provide the calculations for the selling costs used in the pit limit analysis.

Table 15.4 – Selling Cost Assumptions

Selling Cost Item	Unit	Value
Cu Concentrate Grade	%	20.0
Concentrate Moisture	%	8.0
Concentrate Freight Charges		
Mine to Port	US$/wmt	30.00
Port to Smelter Including Port Handling Charges	US$/wmt	85.00
Treatment Charge	US$/dmt	70.00
Refining Charges		
Cu	US$/lb	0.07
Au	US$/oz	5.00
Ag	US$/oz	0.30
Payable		
Cu	%	96.5
Au	%	96.5
Ag	%	75.0

Selling Cost Item	Unit	Value
Royalty		
Contractual Royalty	%	2.0
Government Cu	%	5.0
Government Au	%	4.0
Government Ag	%	4.0

Source: BBA, 2023

Table 15.5 – Copper Concentrate Selling Cost Calculations, Copper

Selling Cost Item	Unit	Value
Cu Price	US$/lb	3.80
Payable Cu	%	96.5
Payable Cu Price	US$/lb	3.67
Refining Charge	US$/lb	0.07
Cu Price After Refining Charge	US$/lb	3.60
	US$/t	7,930
Cu Concentrate Grade	%	20.0
Dry Concentrate Value Before Treatment and Freight	US$/dmt	1,586
Treatment Charge	US$/dmt	70.00
Dry Concentrate Value After Treatment Charge	US$/dmt	1,516
Concentrate Moisture	%	8.0
Wet Concentrate Value Before Freight	US$/wmt	1,404
Freight Charge: Mine to Port	US$/wmt	30.00
Freight Charge: Port to Smelter	US$/wmt	85.00
Wet Concentrate On-Site Value	US$/wmt	1,289
Dry Concentrate On-Site Value	US$/dmt	1,392
Government Royalty	US$/dmt	79.30
Contractual Royalty	US$/dmt	26.25
Dry Concentrate On-Site Value after Royalties	US$/dmt	1,286
Cu On-Site Value	US$/t	6,431
	US$/lb	2.92
Net Difference Between Cu Price and Cu On-Site Value	US$/lb	0.88

Source: BBA, 2023

Table 15.6 – Cu Concentrate Selling Costs Calculations, Gold

Selling Cost Item	Units	Value
Au Price	US$/oz	1,690
Payable Au	%	96.5
Payable Au Price	US$/oz	1,630
Refining Charge	US$/oz	5.00
Au Price After Refining Charge	US$/oz	1,625
Government Royalty	US$/oz	65.03
Contractual Royalty	US$/oz	31.22
Au On-Site Value	US$/oz	1,529
	US$/g	48.95
Net Difference Between Au Price and Au On-Site Value	US$/oz	160.40

Source: BBA, 2023

Table 15.7 – Cu Concentrate Selling Costs Calculations, Silver8

Selling Cost Item	Units	Value
Ag Price	US$/oz	22.50
Payable Ag	%	75.0
Payable Ag Price	US$/oz	16.88
Refining Charge	US$/oz	0.30
Ag Price After Refining Charge	US$/oz	16.58
Government Royalty	US$/oz	0.66
Contractual Royalty	US$/oz	0.32
Ag On-Site Value	US$/oz	15.59
	US$/g	0.50
Net Difference between Ag Price and Ag On-Site Value	US$/oz	6.91

Source: BBA, 2023

Table 15.9 – Au Concentrate Selling Cost Calculations, Gold

Selling Cost Item	Units	Value
Au Price	US$/oz	1,690
Payable Au	%	98.0
Payable Au Price	US$/oz	1,656
Refining Charge	US$/oz	5.00
Au Price After Refining Charge	US$/oz	1,651
	US$/g	52.84
Au Concentrate Grade	g/t	300
Dry Concentrate Value Before Treatment and Freight	US$/dmt	15,851
Treatment Charge	US$/dmt	65.0
Dry Concentrate Value After Treatment Charge	US$/dmt	15,787
Concentrate Moisture	%	9.0
Wet Concentrate Value Before Freight	US$/wmt	14,483
Freight Charge	US$/wmt	75.00
Wet Concentrate On-Site Value	US$/wmt	14,408
Dry Concentrate On-Site Value	US$/dmt	15,705
Government Royalty	US$/dmt	634
Contractual Royalty	US$/dmt	301
Dry Concentrate On-Site Value after Royalties	US$/dmt	14,769
Au On-Site Value	US$/g	49.23
	US$/oz	1,538
Net Difference Between Au Price and Au On-Site Value	US$/oz	151.53

Source: BBA, 2023

Table 15.10 – Au Concentrate Selling Costs Calculations, Silver

Selling Cost Item	Units	Value
Ag Price	US$/oz	22.50
Payable Ag	%	90.0
Payable Ag Price	US$/oz	20.25
Refining Charge	US$/oz	0.30
Ag Price After Refining Charge	US$/oz	19.95
Government Royalty	US$/oz	0.80
Contractual Royalty	US$/oz	0.38
Ag On-Site Value	US$/oz	18.77
	US$/g	0.60
Net Difference between Ag Price and Ag On-Site Value	US$/oz	3.73

Source: BBA, 2023

f. Cut-off Value

To classify the material contained within the open pit limits as material for processing or material for waste, the milling cut-off is used. This break-even cut-off is calculated to cover the costs of processing, G&A costs, and selling costs using the economic and technical parameters listed in Table 15.4. Mineral Resource material contained within the pit and above the cut-off value is classified as potential mill feed, while resource material below the cut-off is classified as waste.

The cut-off value for the El Alacrán deposit is represented by the NSR value due to the polymetallic deposit. The NSR value, or On-Site Value, was calculated using the preliminary production and processing parameters and commodity metal prices. The cut-off value used in the pit limit analysis has been estimated to be $10.26/t NSR for fresh and transition material, $1.35/t NSR for the saprolite and historical tailings material.

NSR_Cu = Recovered Metal (Cu, tonnes) x 2204.62 lbs/t x (Cu Price – Cu Selling Cost, $/lb)

NSR_Au = Recovered Metal (Au, g) x 0.03215 oz/g x (Au Price – Au Selling Cost, $/oz)

NSR_Ag = Recovered Metal (Ag, g) x 0.03215 oz/g x (Ag Price – Ag Selling Cost, $/oz)

NSR ($) = NSR_Cu + NSR_Au + NSR_Ag

NSR_Unit ($/t) = NSR / Block Tonnes

g. Boundary Constraints

The El Alacrán concession boundary was used as a physical boundary constraint for the pit limit analysis.

According to Cordoba, the historical tailings, which are not considered hard rock, are not required to be constrained to within the concession limit (title 08021). All the historical tailings areas fall within the titles that Cordoba owns.

15.3.1.2 *Pit Limit Analysis Results*

The pit limit analysis process results in a series of nested pit shells, each corresponding to a revenue factor (RF). The revenue factor scales the revenue only, and no costs are factored by the RF. Table 15.11 summarizes the nested pit shell results for the El Alacrán deposit at a selection of revenue factors.

Table 15.11 – Nested Pit Shell Results

RF	**PMF** (kt)	**Cu Grade** (%)	**Au Grade** (g/t)	**Ag Grade** (g/t)	**Waste** (kt)	**Stripping Ratio**
0.20	1,851	0.78	0.49	5.13	276	0.1
0.30	18,552	0.63	0.32	4.12	6,131	0.3

RF	PMF (kt)	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)	Waste (kt)	Stripping Ratio
0.40	54,129	0.53	0.27	3.27	24,178	0.4
0.50	71,162	0.50	0.26	3.01	36,399	0.5
0.60	83,165	0.47	0.25	2.86	49,626	0.6
0.70	90,753	0.46	0.24	2.77	61,364	0.7
0.72	91,471	0.46	0.24	2.76	62,550	0.7
0.74	92,170	0.45	0.24	2.75	63,569	0.7
0.76	92,960	0.45	0.24	2.74	65,419	0.7
0.78	93,417	0.45	0.24	2.73	66,000	0.7
0.80	93,953	0.45	0.24	2.72	66,675	0.7
0.90	96,345	0.44	0.24	2.69	70,837	0.7
1.00	98,080	0.44	0.24	2.66	74,558	0.8
1.10	99,704	0.44	0.24	2.63	79,183	0.8
1.20	100,902	0.43	0.23	2.62	82,699	0.8

Source: BBA, 2023

15.3.1.3 Pit Optimization Methodology

The nested pit shell generation step does not take into consideration the time value of money. This factor is considered during the schedule optimization step of the analysis.

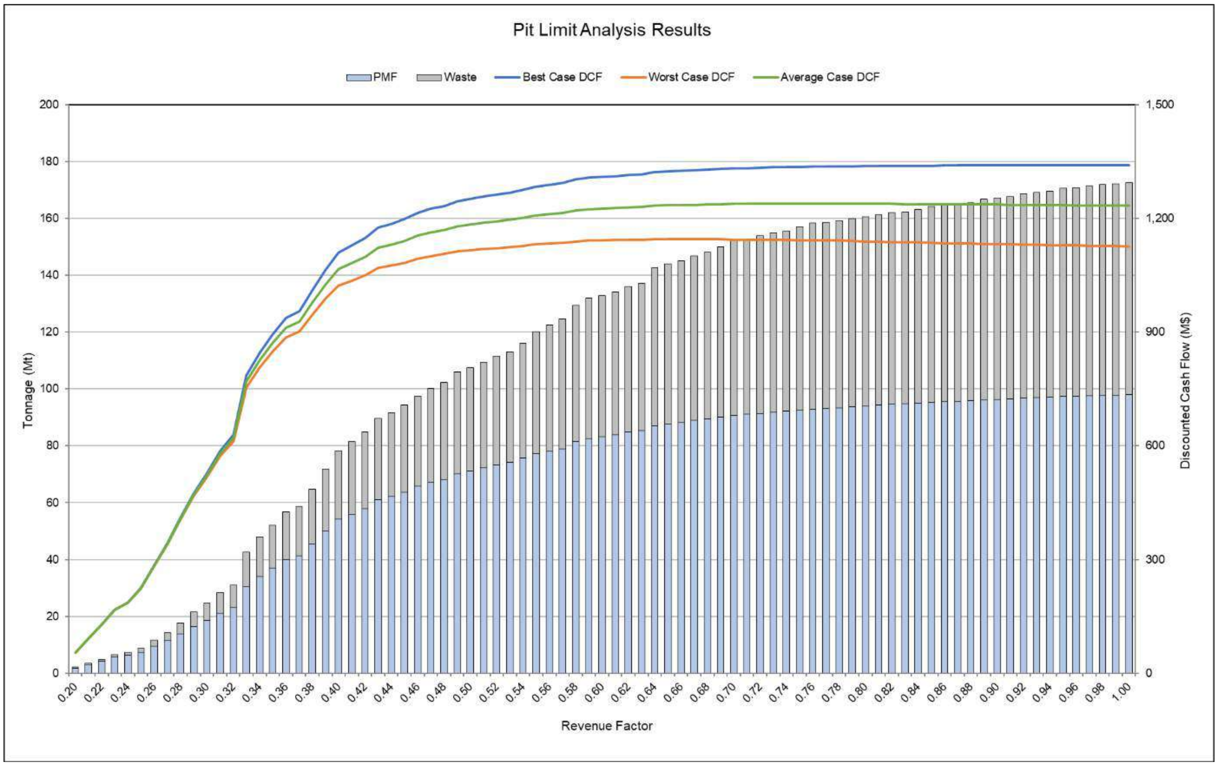
A basic schedule is applied to the nested pit shells to produce a ‘pit-by-pit’ graph. An objective of the pit-by-pit graph is to illustrate the impact of scheduling on the pit shells and to provide guidance on selection of an optimum pit shell to use as a guide in the detailed pit design. The optimum pit limit is chosen by estimating the pit size where an incremental increase in pit size does not significantly increase the pit resource and where the economic return starts to decline.

Figure 15.1 illustrates the pit-by-pit graph generated for the El Alacrán deposit for the base case. Three schedules represented are:

1. The Best-Case schedule consists of mining out nested Pit Shell 1, the smallest pit, and then mining out each subsequent pit shell from the top down, before starting the next pit shell. This schedule is seldom feasible because the pushbacks are usually too narrow. Its usefulness lies in setting an upper limit to the achievable present value (PV).
2. The Worst-Case schedule consists of mining each bench completely before starting on the next bench. This schedule’s usefulness lies in setting a lower limit to the PV. If, as is sometimes the

case, Worst Case, and Best-Case schedules differ by only a few percent then, for that pit, mining sequence is relatively unimportant from an economic point of view.

Figure 15.1 – Pit Optimization Results, Pit-by-Pit Graph



Note: The discounted cash flow shown on the figure is used only as a guide in pit shell selection.

Source: BBA, 2023

An objective of the pit design is to provide a sufficient quantity of fresh Not Potentially Acid Generating (NPAG) waste rock for the WMF embankment progression requirements. The highest value pit shell on the average curve (RF0.78) was not selected as the recommended guide for the ultimate pit as it would not have provided sufficient waste rock for the WMF embankment requirements. The recommended pit shell to be used as a guide for El Alacrán ultimate pit design is RF1.0 pit shell, however this pit shell also does not provide sufficient waste rock for the WMF embankment requirements. Therefore, the ultimate pit design required manual adjustment from the RF 1.0 pit shell to include sufficient quantity of suitable waste rock.

15.3.2 OPEN PIT DESIGN

The detailed pit design incorporates bench designs, minimum mining widths, and haulage ramps. Figure 15.2 and Table 15.12 summarizes the slope design sectors and the slope design recommendations. Table 15.13 summarizes the slope design assumptions applied, while Table 15.14 summarizes the haul ramp design assumptions.

The detailed pit design was manually adjusted from the pit limit analysis results to attempt to provide sufficient quantity of NPAG waste rock to meet the WMF embankment progression. The RF1.0 pit shell would have provided approximately 38 million tonnes of fresh NPAG waste rock material. The target for NPAG waste rock for the WMF Embankment progression was approximately 58 million tonnes (based on a placed density of 2.1 t/m³), within Year 10 of production.

A portion of the NPAG waste rock quantity is proposed to be sourced from an external source to the El Alacrán open pit.

15.3.2.1 Pit Slope Stability Considerations

Cordoba commissioned Austra Mining Solutions to develop a FS level geotechnical study for open pit mining for the El Alacrán deposit, as well as manage the relevant FS level geotechnical sampling and testing program for surface infrastructure.

Austra undertook kinematic and limit equilibrium stability analysis to evaluate bench scale, inter-ramp, and overall slope stability of proposed pit slopes in order to generate design recommendations.

The main findings and recommendations developed by the study are summarized below. Details of the Geotechnical Assessment are provided in Section 16.5.

Figure 15.2 illustrates the geotechnical domain sectors for the open pit design, while Table 15.12 summarizes the recommended design parameters, based on maximum bench face angles (BFAs), for the various design sectors in fresh and transition rock.

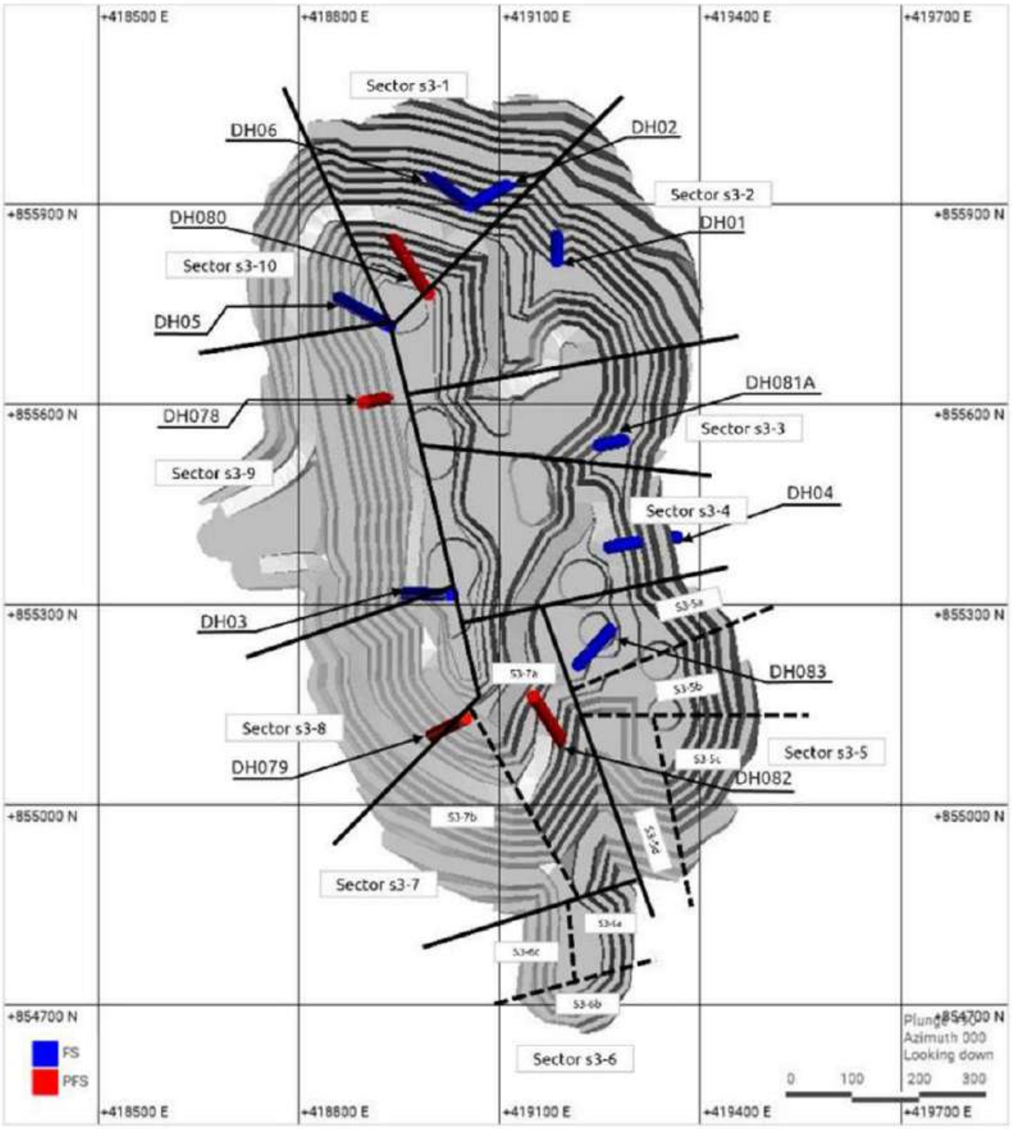
Table 15.12 – Recommended Pit Slope Design, Maximum

Design Sector	**Bench Scale**			**IRA•**			
	BFA (°)	Berm Width (m)	Berm Height (m)	Bench Cant.	Inter-ramp Height (m)	Toe-Toe (°)	Bench POF
Saprolite	36	8.5	20	-	-	-	1.9%
S3-1	75	8.5	20	7	140	55.3	37.4%
S3-2	75	8.5	20	6	120	55.3	30.5%
S3-3	65	7.0	20	4	80	50.8	18.0%
S3-4	65	7.0	20	4	80	50.8	36.8%
S3-5	70	8.5	20	5	100	51.7	13.6%
S3-6	70	8.5	20	4	80	51.7	36.9%
S3-7	65	7.0	20	7	140	50.8	28.3%
S3-8	65	7.0	20	5	100	50.8	44.6%

Design Sector	Bench Scale			IRA•			
		Berm	Berm	Bench Cant.	Inter-ramp Height (m)	Toe-Toe (°)	Bench POF
	BFA (°)	Width (m)	Height (m)				
S3-9	70	8.5	20	7	140	51.7	40.2%
S3-10	80	8.5	20	7	140	55.3	19.4%

Source: Austra, 2023

Figure 15.2 – Geotechnical Design Sectors



Source: Austra, 2023

The above recommended design parameters are based on maximum bench face angles (BFAs) for the various design sectors in fresh and transition rock. In order to regularize the design and improve mine operations (drill and blast considerations and shovel operations), bench face angles greater than 70° were reduced to 70° while maintaining the recommended bench width of 8.5 m.

Table 15.13 summarizes the design angles used in the open pit design.

Table 15.13 – Mine Design Slope Angles

Design Sector	**Bench Face Angle** (°)	**Berm Width** (m)	**Bench Height** (m)	**IRA** (°)
Saprolite	36	8.5	20	--
S3-1	70	8.5	20	52
S3-2	70	8.5	20	52
S3-3	65	7.0	20	51
S3-4	65	7.0	20	51
S3-5	70	8.5	20	52
S3-6	70	8.5	20	52
S3-7	65	7.0	20	51
S3-8	65	7.0	20	51
S3-9	70	8.5	20	52
S3-10	70	8.5	20	52

Source: Austra, 2023

A geotechnical berm of 25 m width was incorporated when slope heights were greater than 120 m.

15.3.2.2 *Haul Ramp Design*

BBA based the haul ramp design on the largest truck planned for the the El Alacrán open pit open pit; a 90-tonne rigid frame truck class. Table 15.14 summarizes the calculations for the haul ramp width. Figure 15.3 illustrates a typical haul ramp profile.

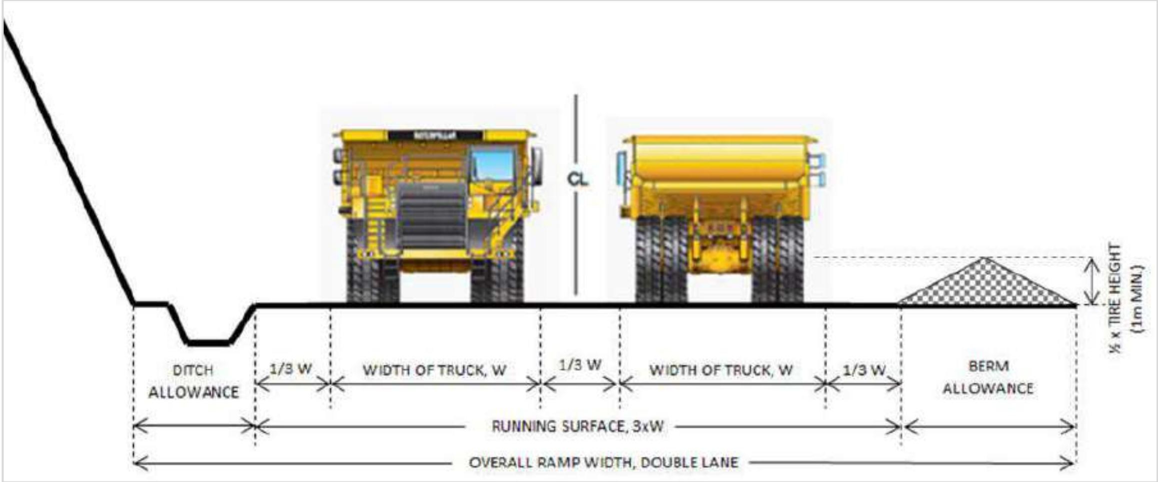
Table 15.14 – Ultimate Pit Design Assumptions – Haul Ramp Design

Item	**Unit**	**Value**
Haul Truck Parameters		
Example Model		CAT 777
Payload (T, Heaped 2:1)	tonne	90
Operating Width, W	m	6.7

Item	Unit	Value
Width Factor (of Truck Width)		
Double Lane		3x
Single Lane		2x
Running Surface Width		
Double Lane	m	20.1
Single Lane	m	13.4
Safety Berm Parameters		
Tire Type		27.00R49
Tire Overall Diameter	m	2.6
Factor (of Tire Size)		0.5
Berm Height (Calculated)	m	1.3
Berm Height (Minimum)	m	1.0
Slope	degrees	37
Road Berm Allowance	m	3.5
Road Drainage Ditch Parameters		
Road Drainage Allowance	m	2.0
Total Ramp Width		
Double Lane	m	25.5
Single Lane	m	19.0
Other Ramp Design Parameters		
Ramp Gradient	%	10

Source: BBA, 2023

Figure 15.3 – Schematic of Haul Ramp Geometry



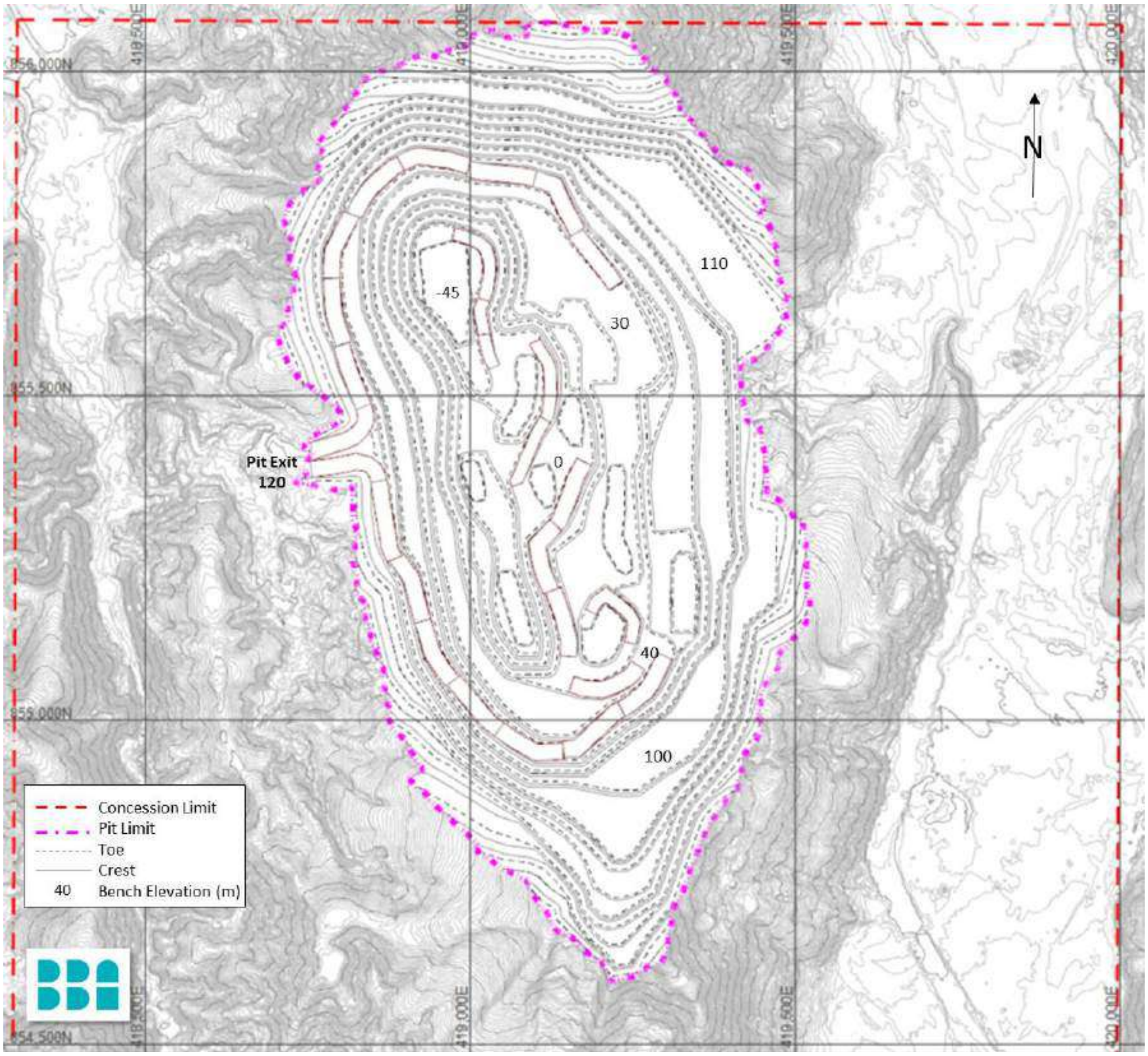
Source: BBA, 2023

Access to the final four (4) bench levels has been designed with single lane access.

15.3.2.3 *Open Pit Design Results*

A pit design was created using the slope design parameters described in previous section, and the El Alacrán concession boundary as a constraint. Figure 15.4 illustrates the open pit design.

Figure 15.4 – Ultimate El Alacrán Open Pit Design, Plan View



Source: BBA, 2023

The open pit entrance is on the west side at approximately 120 m elevation. Two (2) ramp accesses were incorporated to access the pushbacks on the north and on the south. Table 15.15 summarizes the planned material quantities from within the manually adjusted ultimate pit design; numbers have been rounded.

Table 15.15 – El Alacrán Ultimate Open Pit Design Results, Pit Contents

Material Category	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
Mill Feed Mined				
Saprolite	7,326,000	--	0.24	2.72
Transition	2,277,000	0.50	0.20	2.78
Fresh	87,079,000	0.45	0.23	2.65
Total	**96,683,000**	**0.42**	**0.23**	**2.65**
Waste Mined				
Fresh NPAG	55,971,000			
Fresh PAG & Uncertain	34,352,000			
Transition NPAG	2,710,000			
Transition PAG & Uncertain	2,031,000			
Saprolite	15,794,000			
Historical Tailings	--			
Total	**110,858,000**			
Stripping Ratio (overall)	1.15			

Source: BBA, 2023

The open pit design results are presented with updated NSR value calculations based on updated assumptions including:

- Updated recovery equations for Fresh, Transition, Saprolite and Historical tailings as described in Section 13.
- Updated cut-off values for saprolite and historical tailings based on updated operating cost assumptions:
  - $2.07/t for saprolite ($1.92/t for milling and tailings management + $0.15/t for rehandle).
  - $2.58/t for historical tailings ($2.43/t for milling and tailings management + $0.15/t for rehandle).
  - $10.26/t for fresh and transition material.

Table 15.16 summarizes the approximate dimensions of the ultimate pit design.

Table 15.16 – El Alacrán Ultimate Open Pit Design Results, Open Pit Dimensions

Item	Unit	El Alacrán Open Pit
Length from East to West	m	780
Length from North to South	m	1,475
Depth	m	approximately 277 m Elev to -45 m Elev 320

Source: BBA, 2023

The pushback width is the distance between phase designs. An approximate pushback width was determined based on the width of the proposed excavator and haul truck. The proposed pushback width is the sum of the minimum double-side loading width and the haul road width, which is estimated at approximately 60 m. A minimum mining width of 25 m has been considered in the open pit and phase designs.

To reduce the strip ratio, single lane access ramps have been designed for the final four (4) benches. Access ramps have not been designed to the bottom bench of the ultimate open pit. When mining the final bench, the trucks are positioned on the bench crest rather than on the floor. This operating scenario is commonly referred to as a “goodbye” cut. This final bench is designed at 5 m high.

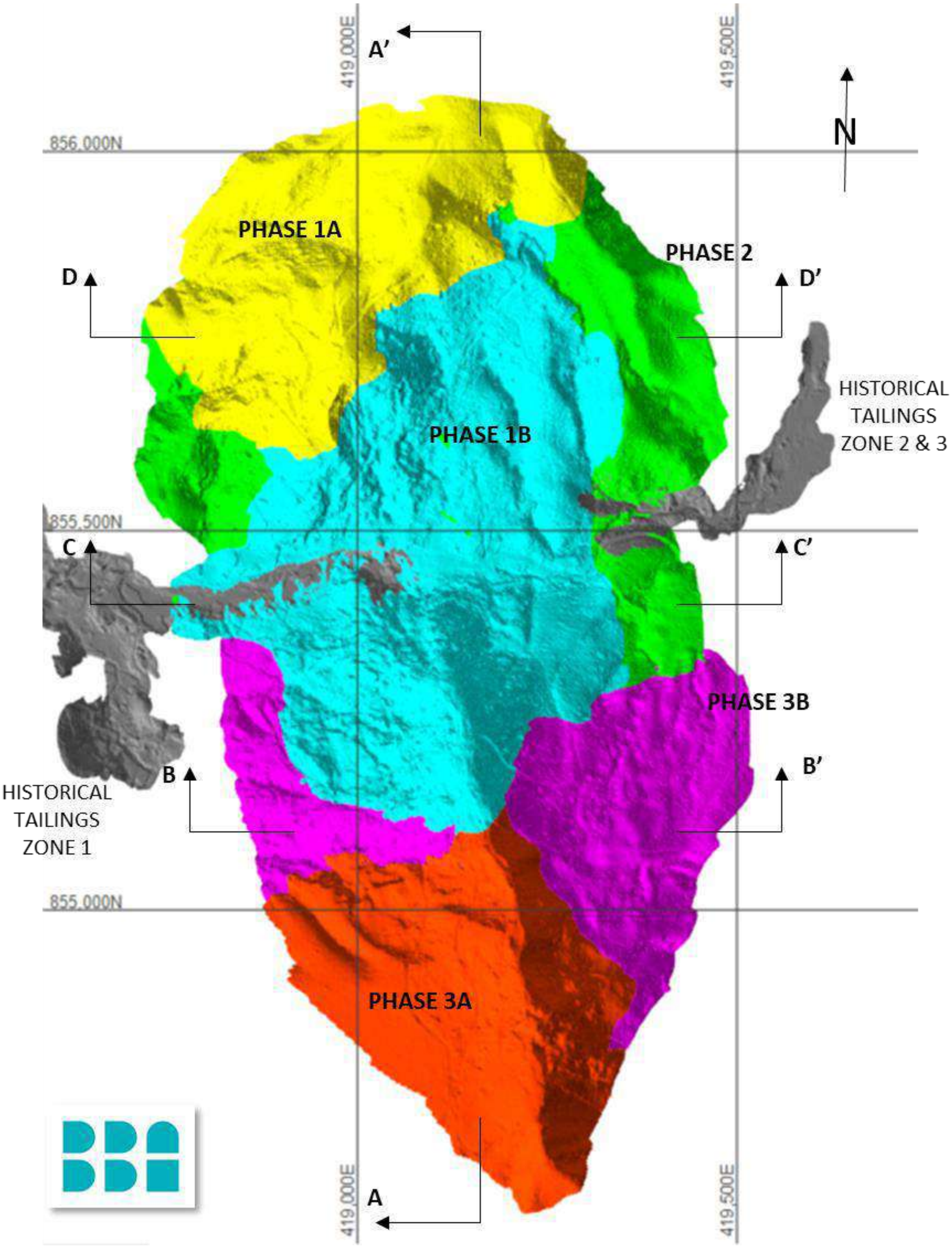
Five (5) phases have been proposed for the FS study. The phases were guided by the open pit limit analysis results but adjusted to consider the NPAG waste rock requirements for the WMF embankment progression. The starter pit was selected to provide approximately two (2) years of ore tonnage.

Phase 1 is the first pit that would be designed as the starter pit. It prioritizes the higher value resource of the northern section of the deposit. Phase 1 was designed in two (2) phases, Phase1A which targeted early access to NPAG waste material from the northwestern side of the pit with limited stockpiling of ore material. This is required for the WMF embankment progression requirements. Phase 1B expands from Phase 1A to target the higher value resource of the northern portion of the deposit with low waste stripping.

Phase 2 expands from Phase 1 to the limits in the northern section of the deposit.

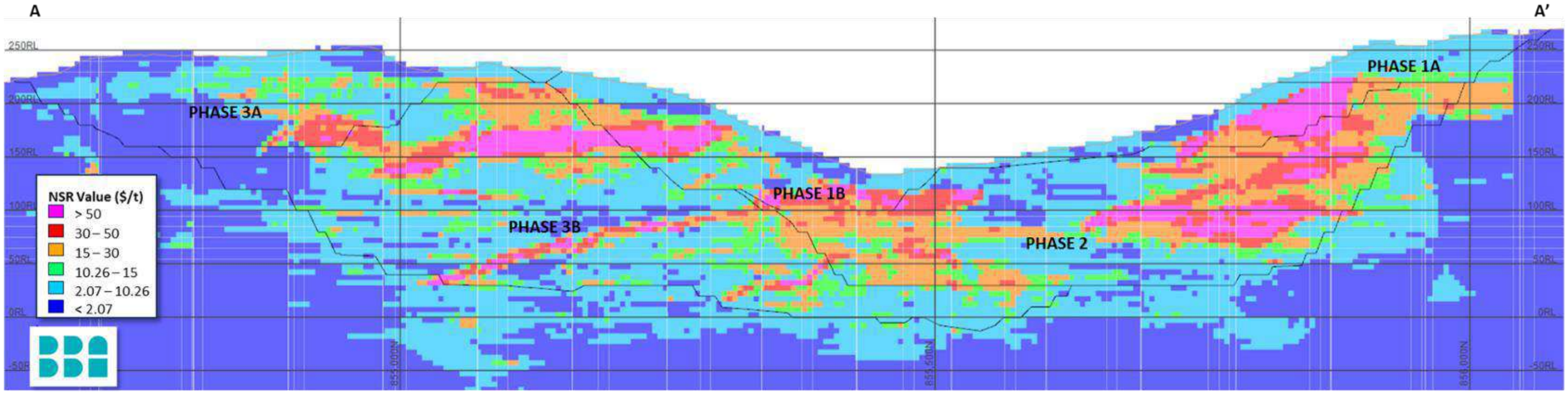
Phase 3 expands the open pit to the southern portion of the deposit and ultimately to the bottom of the open pit design. Phase 3 was also subdivided into a Phase 3A and 3B. Phase 3A was designed to provide early access to NPAG waste rock from the southwestern side of the open pit for the WMF embankment progression requirements. Figures 15.5 and 15.6 illustrate the proposed phase design for the study.

Figure 15.5 – Phase Design, Plan View



Source: BBA, 2023

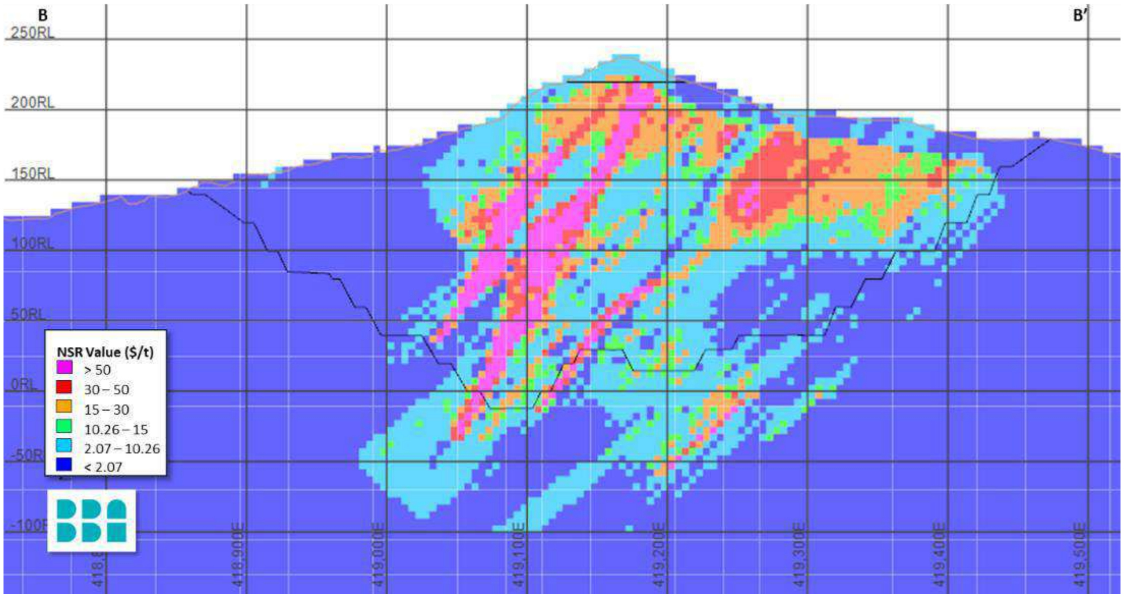
Figure 15.6 – Phase Design, Section View A-A’



Source: BBA, 2023

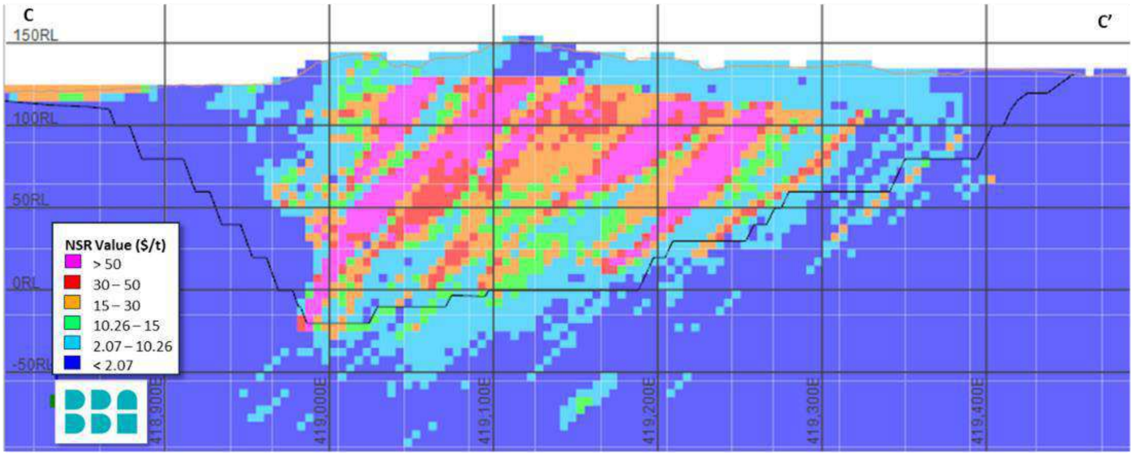
The following figures, Figure 15.7 through Figure 15.9, illustrate various sections through the ultimate open pit showing the open pit design and the Probable Reserve material (within the open pit design limits). Figure 15.10 illustrates a plan view section of the Probable Mineral Reserve at the 100 m elevation, while Figure 15.11 through Figure 15.14 illustrate cross section views of the Probable Mineral Reserve.

Figure 15.7 – Section View B-B' (855100 N looking North)



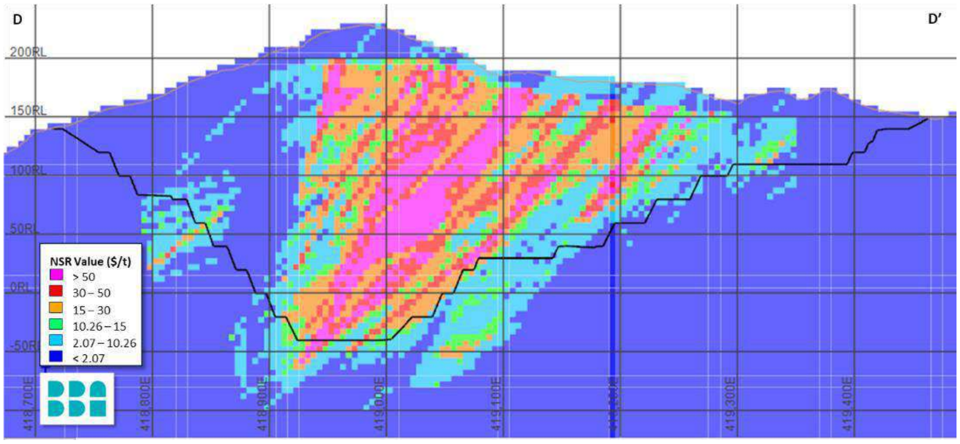
Source: BBA, 2023

Figure 15.8 – Section View C-C' (855400N looking North)



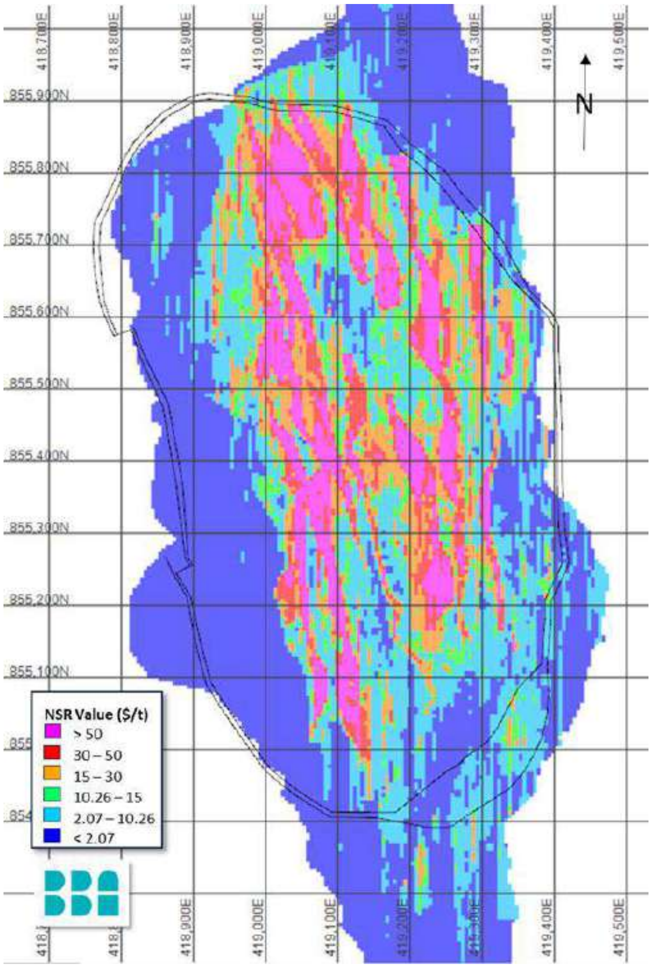
Source: BBA, 2023

Figure 15.9 – Section View D-D’ (855750N looking North)



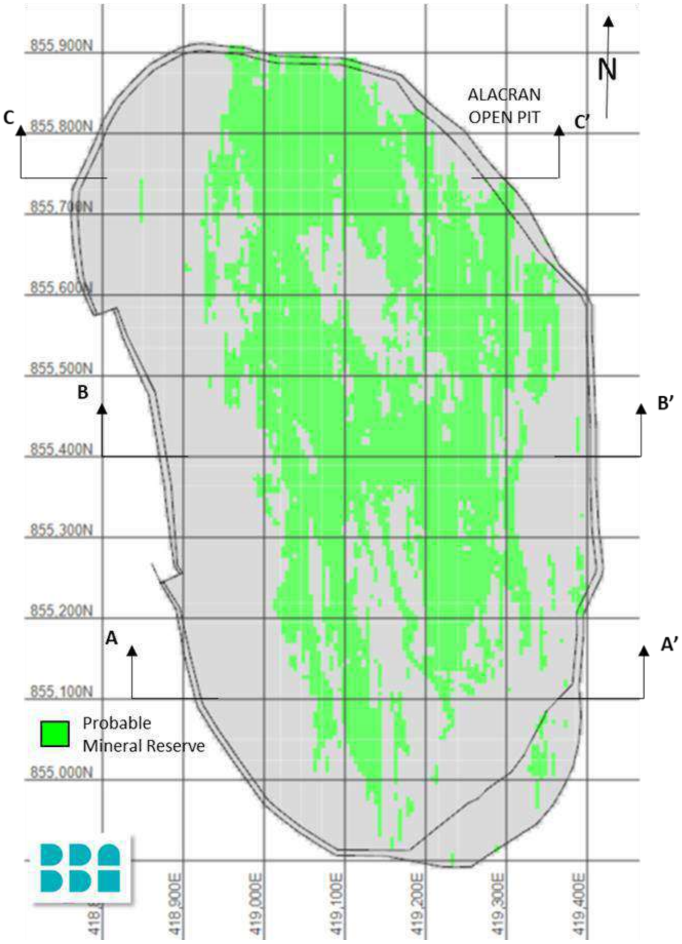
Source: BBA, 2023

Figure 15.10 – Plan View 100 m Elevation



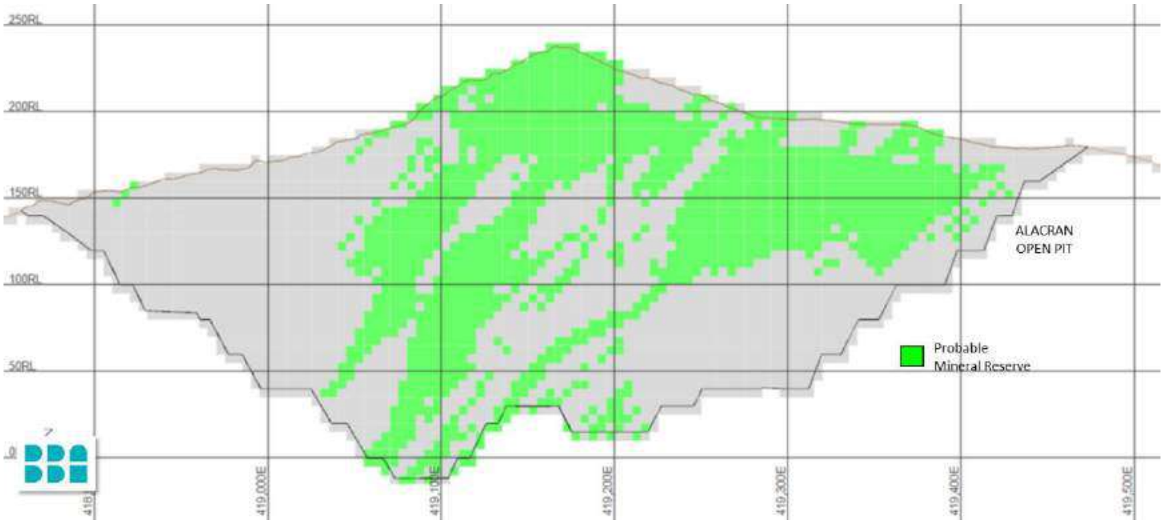
Source: BBA, 2023

Figure 15.11 – Mineral Reserve Classification, Plan View 100 m Elevation



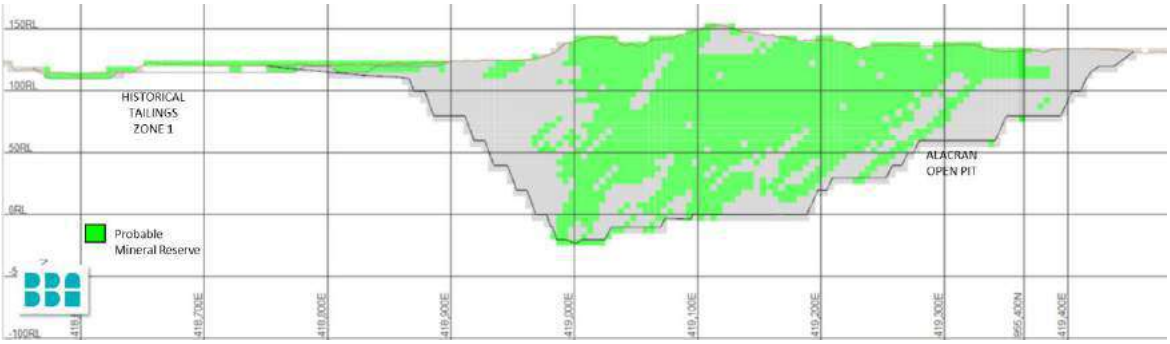
Source: BBA, 2023

Figure 15.12 – Mineral Reserve Classification, Section A-A' (855100 N looking North)



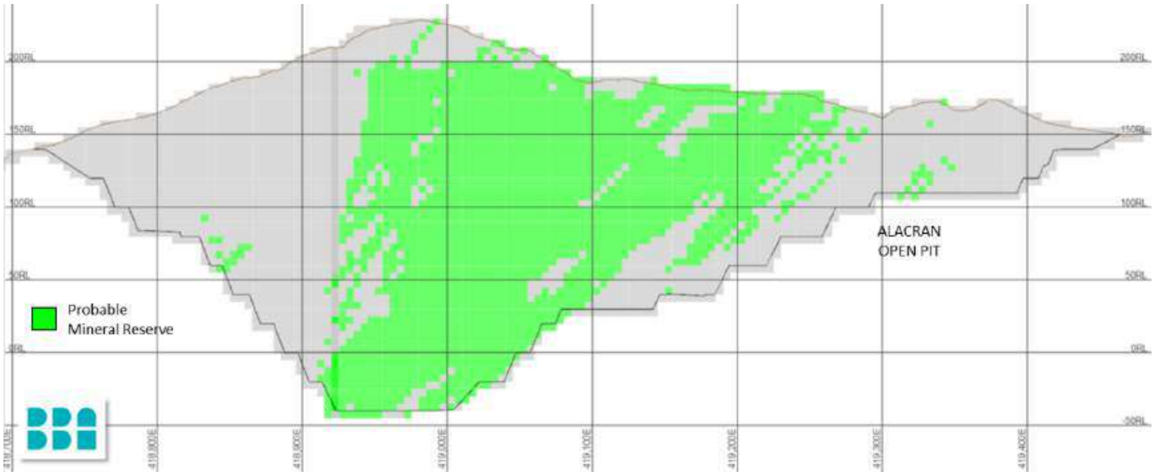
Source: BBA, 2023

Figure 15.13 – Mineral Reserve Classification, Section B-B' (855400 N looking North)



Source: BBA, 2023

Figure 15.14 – Mineral Reserve Classification, Section C-C' (855750 N looking North)



Source: BBA, 2023

There are five (5) areas or zones of the historical tailings that will require remediation. A portion of the historical tailings modelled is considered economical and gold and silver are expected to be recovered through the process description provided by DRA.

The mining method envisioned for the historical tailings for the FS is excavator and haulage.

The historical tailings are accumulated in shallow deposits within the concession limits of Cordoba titles. The design for the excavation of the historical tailings is to resemble trenching methods. Temporary ramp accesses into the shallow deposits would be used and excavated as required on retreat. Economic material would be hauled to the saprolite stockpiling area for processing at the saprolite mill following the exhaustion of the saprolite ore material. Waste material would be deposited within the WMF area.

A bench face angle of 36º similar to the recommendations for saprolite material, has been used in creating the excavation limits for the Historic Tailings areas. Table 15.17 summarizes the estimated material inventory within the excavation design of the historical tailings' areas. Note numbers have been rounded.

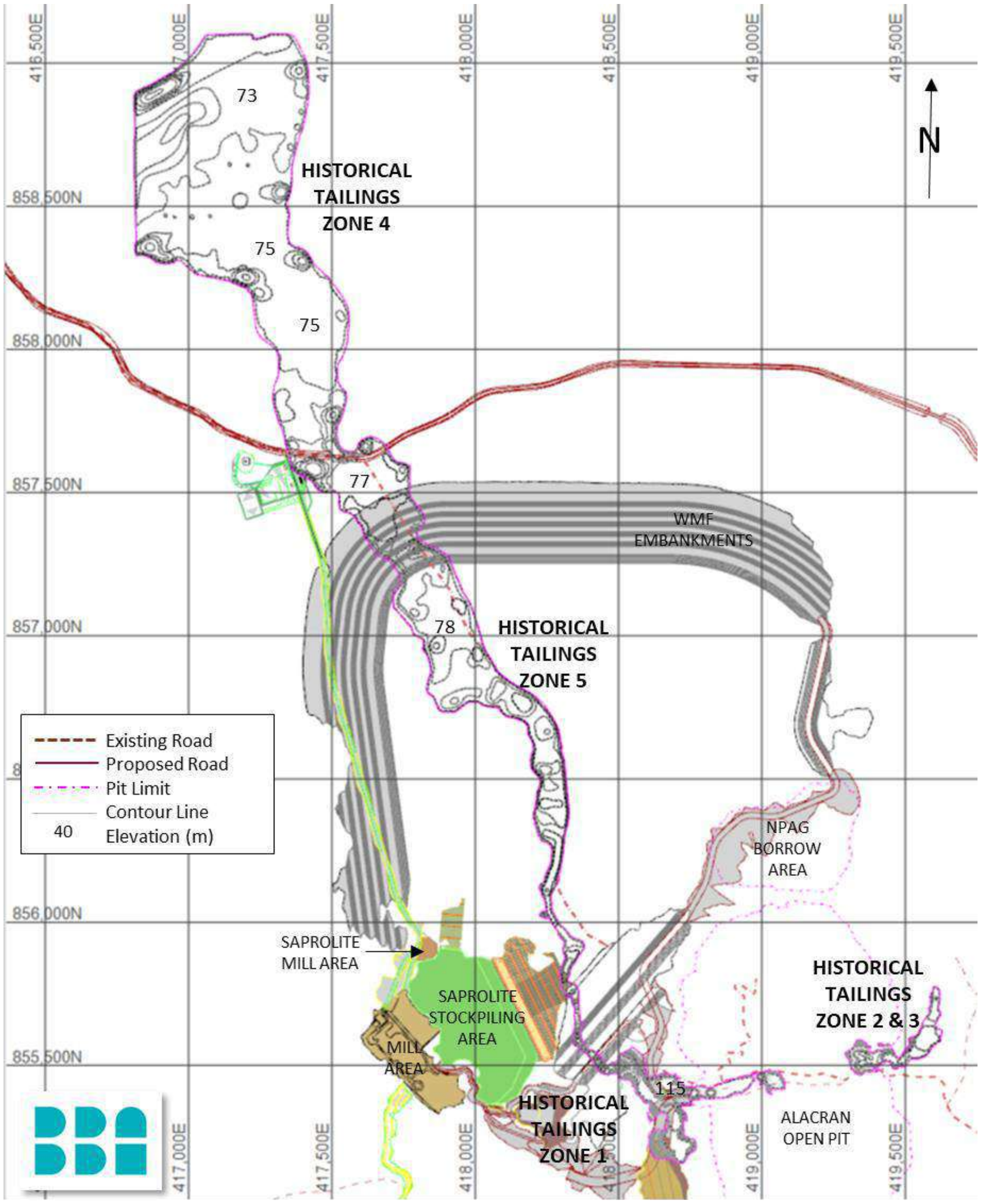
Table 15.17 – Historical Tailings Area

Rock Category	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
MILL FEED MINED				
Historical Tailings	1,234,100	--	0.29	0.89
Saprolite	32,600	--	0.38	3.39
TOTAL	**1,266,700**	**--**	**0.29**	**0.96**
WASTE MINED				
Fresh NPAG	300			
Transition NPAG	4,500			
Saprolite	1,769,600			
Historical Tailings	4,305,400			
TOTAL	**6,079,900**			
TOTAL	**7,334,200**			

Source: BBA, 2023

Figure 15.15 illustrates the excavation limits for the historical tailings areas in relation to the open pit, NPAG borrow area, and the WMF embankments.

Figure 15.15 – Historical Tailings Excavation Limits, Plan View



Source: BBA, 2023

An external to the pit NPAG waste rock area was designed to provide suitable NPAG waste rock material for the WMF Embankment requirements. The borrow source is situated north of the open pit and accessible from the haul ramp that is proposed to the WMF embankment (approximately 150 m elevation). Table 15.18 summarizes the contents of the borrow pit design. Figure 15.16 illustrates the open pit design.

Similar bench face angle and berm width assumptions as the open pit were used for the borrow pit design, namely:

- 10 m operating bench, 20 m ultimate bench height (double benching);
- Bench face angle of 36º with 8.5 m berm width for saprolite material; and
- Bench face angle of 70º with 8.5 m berm width for rock material.

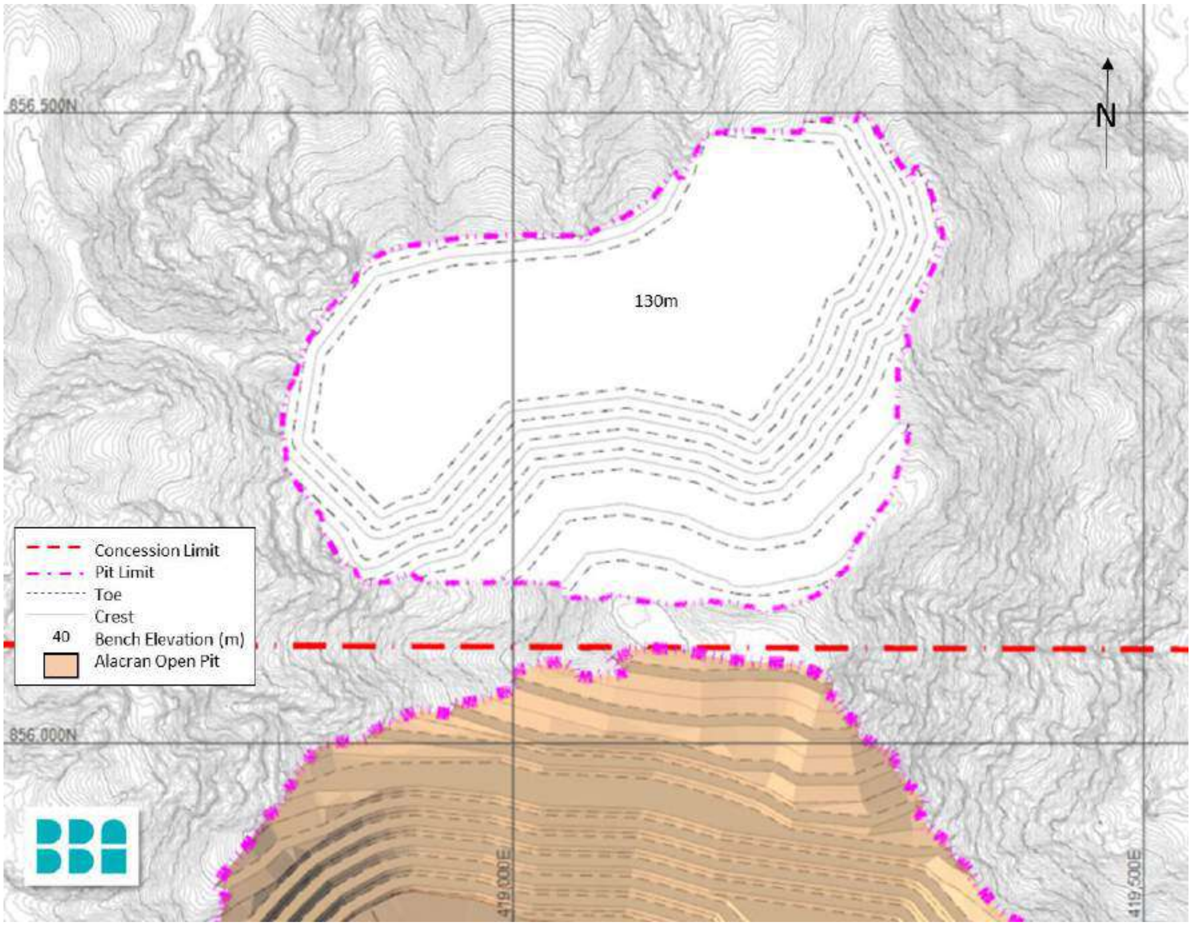
Table 15.18 – External NPAG Borrow Area

Rock Category	**Tonnes** (t)
Waste Mined	
Fresh NPAG	6,567,000
Transition NPAG	2,069,000
Saprolite	4,095,000
Fresh PAG	2,500
Transition PAG	1,500
TOTAL	**12,735,000**

Source: BBA, 2023

The benefits of sourcing a portion of the NPAG waste rock from this area is that it reduces the NPAG waste rock requirement from the El Alacrán open pit design, resulting in a smaller ultimate pit, a reduction in the amount of PAG waste material that would be required to be excavated to meet the NPAG tonnage needs, and significantly reduces the amount of potential stockpiling of ore material that could have been required in order to advance the NPAG waste mining for the WMF embankment progression schedule.

Figure 15.16 – NPAG Borrow Pit Design, Plan View



Source: BBA, 2023

16 MINING METHODS

16.1 Open Pit Mining

Open pit mining was considered a viable option for the Study given that the mineralization is on or near surface.

Open pit mining will include conventional drilling and blasting with a combination of a backhoe type excavator and front-end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpile, or WMF depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

This Technical Report considers an Owner-operator scenario.

The operation scenario studied for the FS involves:

- Open pit mining at an average mining rate of 39,600 tpd of mined material;
- Mill throughput rate of 17,600 tpd for the main facility for the fresh and transition material;
- Mill throughput rate of 2,400 tpd for the gravity wash plant for the saprolite material and 1,200 tpd for the historical tailings material;
- A NPAG waste rock borrow area to provide initial quantity of NPAG waste rock for the WMF embankment; and
- Two-year pre-production mining period to coincide with WMF Initial Stage development.

The open pit mine production period covers the extraction of material from the NPAG borrow area, historical tailings area, and the El Alacrán open pit with two (2) years of pre-production (prior to process plant start-up), approximately 14.02 years of production, which includes approximately six (6) months of stockpile reclaim. The ordering of long lead items occurs for approximately 3 months prior to the pre-production period.

16.2 Material Types and Movements

16.2.1 PLANNED MILL FEED MATERIAL

Table 16.1 tabulates the planned mill feed material within the ultimate mine design. Note numbers have been rounded.

Table 16.1 – Planned Mill Feed Material

Mill Feed Rock Type	Mined Quantity (t)	Cu Grade (%)	Au Grade (g/t)	AG Grade (g/t)
Saprolite	7,359,000	--	0.24	2.72
Transition	2,277,000	0.50	0.20	2.78
Fresh	87,079,000	0.45	0.23	2.65
Historical Tailings	1,234,000	--	0.29	0.89
Total	**97,950,000**	**0.41**	**0.23**	**2.63**

Source: BBA, 2023

During pre-production, the ore material will be hauled to designated stockpiles. The historical tailings will be stockpiled near the gravity wash plant but separate from the saprolite material. The saprolite ore material will be stockpiled near the gravity wash plant. The fresh and transition ore material will be hauled to stockpiling areas near the open pit exit for reclaiming during Years 1 and 2 of production.

During production, fresh and transition ore material will be hauled either directly to the primary crusher and direct tipped into the crusher or stockpiled temporarily at the ROM stockpile located in an area south of the primary crusher. To meet the NPAG waste rock requirements for the WMF embankment progression, a large amount of fresh and transition ore may be required to be stockpiled in order to release the NPAG waste rock from the pit. Saprolite ore material will be hauled either directly to the gravity wash plant or stockpiled temporarily at the Saprolite stockpile. Historical tailings ore material excavated during production will be hauled to a stockpile near the Saprolite stockpile for feeding the saprolite mill following the exhaustion of the saprolite ore material.

16.2.2 PLANNED WASTE ROCK

The waste rock generated from the pit and the historical tailings areas has been planned as follows:

- NPAG fresh rock will be directed to the WMF embankment.
- NPAG transition rock will be directed to the WMF embankment.
- Saprolite will be directed to the WMF embankment, saprolite berm, or the saprolite waste stockpile area.
- Potentially Acid Generating (PAG) fresh and transition rock will be directed to the WMF and co-tailings.
- Historical tailings waste will be directed to the WMF.
- Other uses for suitable waste rock include haul road and pad preparation and maintenance.

Table 16.2 tabulates the planned waste rock material within the mine design; numbers have been rounded.

Table 16.2 – Planned Waste Rock Material

Waste Rock Type		Mined Quantity (t)
Historical Tailings		4,306,000
Saprolite		21,659,000
Transition	NPAG	4,783,000
Transition	PAG	2,033,000
Fresh	NPAG	62,538,000
Fresh	PAG	34,355,000
TOTAL		**129,673,000**

Source: BBA, 2023

16.3 LOM Production Schedule

The production schedule was produced using Minesight MPSO software for scheduling. A mine production schedule was developed with the main objectives of:

- Delivering 17,600 tpd of fresh and transition material to the main processing facility (Table 16.3); and
- Providing sufficient NPAG waste rock to meet the WMF Embankment progression, based on preliminary material balances (Table 16.4).

Other considerations for the schedule included the following:

- Economic saprolite material would be fed to the gravity wash plant at a rate of 2,400 tpd.
- Economic historical tailings material would be stockpiled and fed to the gravity wash plant following the exhaustion of the saprolite material at a rate of 1,200 tpd.
- Year 1 of production considers a six-month throughput rate ramp up period for the saprolite mill on the following schedule:
  - 75% in Month 1;
  - 80% in Month 2;
  - 85% in Month 3;
  - 95% in Month 4;
  - 99% in Month 5; and
  - 100% in Month 6.
- Year 1 of the mine plan considers a throughput rate ramp-up of the following for the Fresh & Transition Mill:
  - 65% in Month 1;

  - 75% in Month 2;
  - 80% in Month 3;
  - 85% in Month 4;
  - 89% in Month 5;
  - 92% in Month 6;
  - 94% in Month 7;
  - 96% in Month 8;
  - 97% in Month 9;
  - 98% in Month 10;
  - 99% in Month 11; and
  - 100% in Month 12.
- The mine plan considers the following cut-off values:
  - $10.26/t Net Smelter Return (NSR) value for Fresh & Transition material;
  - $2.07/t NSR value for Saprolite material; and
  - $2.58/t NSR value for Historical Tailings material.

The priority of excavation for the historical tailings' zones include:

- Zones 1, 2, 3 and the portion of Zones 4 and 5 within the WMF embankment footprint would be excavated during the first year of pre-production/construction (YR-2).
- The remaining portion of Zone 5 would be excavated immediately following the above and is expected to be completed during the first half of the second year of pre-production (YR-1).
- The remaining portion of Zone 4 that is downstream of the WMF embankment would be excavated last and has been delayed until historical tailings begin to be processed at the gravity wash plant.

The LOM schedule results in mining production from the NPAG borrow area, historical tailings area, and the El Alacrán open pit taking place from Year -2 (pre-production) to Year 14 (production). There is approximately six (6) months stockpile reclaim that follows the completion of mining.

Table 16.5 presents a summary of the material movement for the open pit LOM schedule, on an annual basis.

Table 16.6 presents a summary of the stockpile material movement for the open pit LOM schedule, on an annual basis.

Various aspects of the LOM scheduled on an annual basis are presented in graphical form in Figure 16.1 through Figure 16.4.

Table 16.3 – Mill Feed Targets used for LOM Schedule

Description	Unit	Year -2	Year -1	Year 1	Years 2 – 4	Years 5 – 6	Years 7 – 9	Years 10	Years 11+
Mill – Fresh & Transition	t/y	--	--	5,732,672	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000
Mill – Saprolite	t/y	--	--	828,456	876,000	876,000	876,000	--	--
Mill – Historical Tailings	t/y	--	--	--	--	--	--	438,000	438,000

Table 16.4 – WMF Embankment Progression Requirements used for LOM Schedule

Description	Unit	Year -2	Year -1	Year 1	Years 2 – 4	Years 5 – 6	Years 7 – 9	Years 10	Years 11+
NPAG Waste Saprolite for Embankments	m^3/y	809,400	1,177,800	1,003,900	1,298,900 – 590,200	590,200 – 397,500	229,100	181,800	--
	t/y	1,173,600	1,707,800	1,455,700	1,883,400 – 855,800	855,800 – 332,300	332,300	263,600	--
NPAG Waste Rock for Embankments	m^3/y	215,300	1,526,800	2,281,100	1,944,000 – 2,694,800	2,694,800 – 2,887,500	3,055,900	2,026,800	--
	t/y	452,200	3,206,200	4,790,300	4,082,300 – 5,659,000	5,659,000 – 6,063,800	6,417,300	4,256,300	--

Table 16.5 – Life of Mine Schedule, Annual Basis

MINED MATERIAL		UNIT	LOM Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
MILL FEED MINED	**TOTAL**	kt	**97,950**	407.4	3,306.9	7,079.6	9,326.3	9,088.4	7,902.7	8,582.0	8,322.1	6,635.1	6,430.5	6,753.7	7,113.5	6,000.6	4,229.2	4,717.9	2,054.0	0
Historical Tailings		kt	**1,234**	374.7	408.7	0	5.9	0	1.7	0.0	0	0	5.4	185.4	168.3	84.0	0	0	0	0
Saprolite		kt	**7,359**	32.6	1,755.3	1,243.6	1,945.7	960.7	204.0	511.4	269.1	255.0	166.0	15.7	0	0	0	0	0	0
Transition		kt	**2,277**	0	466.6	572.8	479.2	282.4	162.4	92.2	104.9	104.3	11.8	0.7	0	0	0	0	0	0
Fresh		kt	**87,079**	0	676.3	5,263.3	6,895.4	7,845.3	7,534.5	7,978.4	7,948.1	6,275.8	6,247.4	6,551.9	6,945.2	5,916.5	4,229.2	4,717.9	2,054.0	0
MINED GRADE																				
Historical Tailings																				
Au		g/t	0.44	0.24	0.00	0.56	0.00	0.44	0.53	0.00	0.00	0.45	0.17	0.24	0.20	0.00	0.44			
Ag		g/t	1.54	0.51	0.00	3.76	0.00	1.85	2.40	0.00	0.00	2.09	0.50	0.72	0.76	0.00	1.54			
Saprolite																				
Au		g/t	0.24	0.38	0.25	0.30	0.26	0.21	0.18	0.20	0.17	0.15	0.15	0.13	0.00	0.00				
Ag		g/t	2.72	3.39	3.36	4.48	2.29	1.89	1.82	1.80	1.88	1.19	0.48	0.59	0.00	0.00				
Transition																				
Cu		%	0.50	0.00	0.58	0.58	0.49	0.36	0.43	0.51	0.40	0.40	0.46	0.92	0.00	0.00	0.00			
Au		g/t	0.20	0.00	0.17	0.24	0.24	0.19	0.18	0.16	0.14	0.14	0.20	0.16	0.00	0.00	0.00			
Ag		g/t	2.78	0.00	2.99	3.64	3.46	1.44	1.54	2.60	1.38	1.07	2.18	4.60	0.00	0.00	0.00			
Fresh																				
Cu		%	0.45	0.00	0.46	0.54	0.51	0.50	0.59	0.47	0.45	0.37	0.37	0.38	0.42	0.47	0.38	0.38	0.32	
Au		g/t	0.23	0.00	0.17	0.21	0.27	0.21	0.27	0.19	0.20	0.20	0.30	0.30	0.24	0.22	0.22	0.21	0.21	
Ag		g/t	2.65	0.00	2.56	3.47	3.36	3.17	3.92	2.69	2.44	1.47	1.55	1.79	2.63	3.10	2.37	2.38	1.67	
WASTE MATERIAL	**TOTAL**	**kt**	**129,673**	6,686.1	8,610.4	8,880.1	9,411.2	10,129.8	8,643.0	9,307.5	9,035.9	10,614.5	10,644.1	13,227.6	9,351.6	5,058.6	5,312.2	3,282.1	1,478.5	0
Historical Tailings		kt	**4,306**	676.7	662.4	0	0	0	0	0.2	0	0	0	730.5	865.6	826.5	543.9	0	0	0
Saprolite		kt	**21,657**	3,413.4	3,941.7	2,077.1	3,102.3	2,680.7	935.9	1,212.0	860.3	1,516.3	864.6	251.8	166.2	636.6	0	0	0	0
Transition	NPAG	kt	**4,783**	1,171.9	850.3	576.8	401.5	444.7	266.0	205.8	145.2	352.2	346.8	21.9	0	0	0	0	0	0
Transition	PAG	kt	**2,033**	1.7	431.2	354.5	467.4	407.6	73.1	71.6	76.8	73.9	62.3	12.5	0	0	0	0	0	0
Fresh	NPAG	kt	**62,538**	1,419.9	2,382.6	4,464.1	3,725.1	3,977.0	5,397.8	5,453.2	5,918.6	5,940.9	6,070.4	6,132.3	4,610.8	1,999.0	2,698.4	1,678.4	669.9	0
Fresh	PAG	kt	**34,355**	2..5	342.3	1,407.6	1,714.9	2,619.8	1,970.2	2,364.6	2,035.0	2,731.2	3,300.0	6,078.7	3,709.1	1,596.5	2,070.0	1,603.7	808.6	0
TOTAL MINED MATERIAL		**kt**	**227,623**	7,093.4	11,917.3	15,959.8	18,737.5	19,218.2	16,545.7	17,889.5	17,358.0	17,249.6	17,074.6	19,981.2	16,465.1	11,059.1	9,541.4	8,000.0	3,532.6	0
STOCKPILE REHANDLE																				
Saprolite		kt	**5,626**	0	0	333.3	211.9	616.7	834.9	786.0	826.6	761.7	872.0	382.9	0	0	0	0	0	0
Historical Tailings		kt	**1,234**	0	0	0	0	0	0	0	0	0	0	234.6	438.0	438.0	123.5	0	0	0
Fresh & Transition		kt	**15,608**	0	0	2,222.3	1,246.3	0	0	0	0	1,218.5	489.8	0	0	507.5	2,744.2	2,316.8	4,751.2	111.8
Saprolite Waste		kt	**1,086**	0	0	0	0	0	0	0	0	158.3	332.3	332.3	263.6	0	0	0	0	0
TOTAL		**kt**	**23,555**	**0**	**0**	**2,555.5**	**1,950.3**	**616.7**	**834.9**	**786.0**	**826.6**	**2,138.5**	**1,694.1**	**949.8**	**701.6**	**945.5**	**2,867.7**	**2,316.8**	**4,751.2**	**111.8**

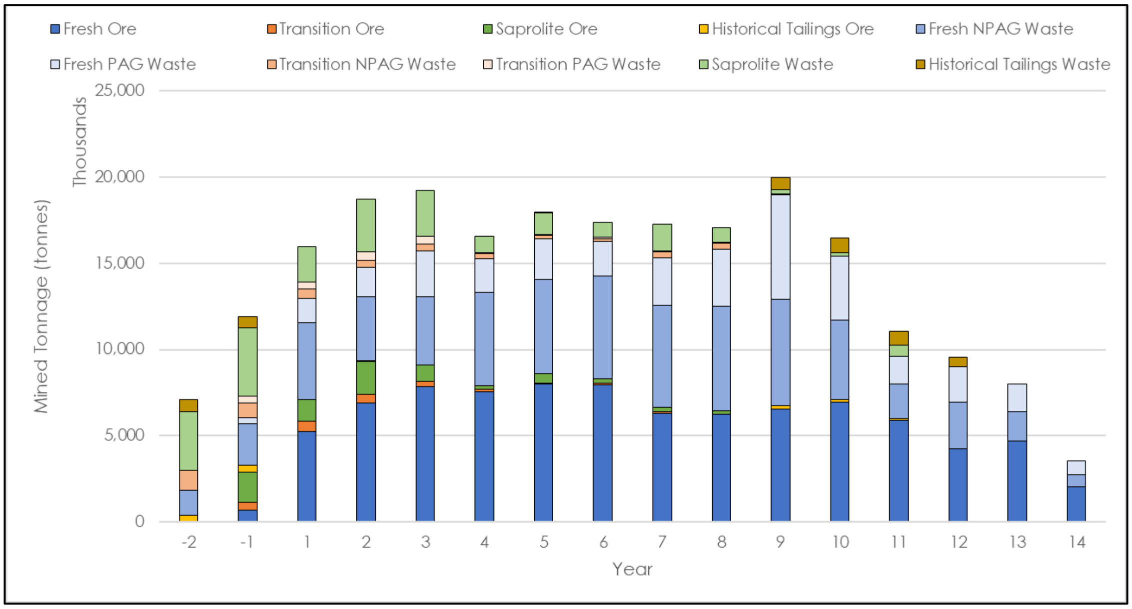
Source: BBA, 2023

Table 16.6 – Summary of Stockpiling End-of-Period Balance

STOCKPILING BALANCES	UNIT	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
HG Ore Stockpile																		
In	kt	0	609.3	1,648.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out	kt	0	0	1,503.8	754.2	0	0	0	0	0	0	0	0	0	0	0	0	0
Balance	kt	0	609.3	754.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROM Ore Stockpile																		
In	kt	0	533.5	677.0	1,704.8	1,703.7	1,273.0	1,646.6	1,629.0	1,174.5	325.0	128.6	521.2	0	549.4	610.7	381.3	0
Out	kt	0	0	718.5	0	0	0	0	0	1,218.5	489.8	0	0	507.5	2,744.2	2,316.8	4,751.2	111.8
Balance	kt	0	533.5	492.1	2,196.9	3,900.6	5,173.5	6,820.1	8,449.1	8,405.2	8,240.3	8,368.9	8,890.2	8,382.7	6,187.9	4,481.8	111.8	0
Saprolite Ore Stockpile																		
In	kt	32.6	1,755.3	748.4	1,281.7	701.4	162.9	421.4	219.7	140.8	162.0	0	0	0	0	0	0	0
Out	kt	0	0	333.2	211.9	616.7	834.9	786.0	826.6	761.7	872.0	382.9	0	0	0	0	0	0
Balance	kt	32.6	1,787.9	2,203.0	3,272.7	3,357.4	2,685.4	2,320.8	1,713.9	1,093.0	382.9	0	0	0	0	0	0	0
Historical Tailings Ore Stockpile																		
In	kt	374.7	408.7	0	5.9	0	1.7	0.0	0	0	5.4	185.4	168.3	84.0	0	0	0	0
Out	kt	0	0	0	0	0	0	0	0	0	0	234.6	438.0	438.0	123.5	0	0	0
Balance	kt	374.7	783.5	783.5	789.4	789.4	791.1	791.1	791.1	791.1	796.5	747.2	477.5	123.5	0	0	0	0

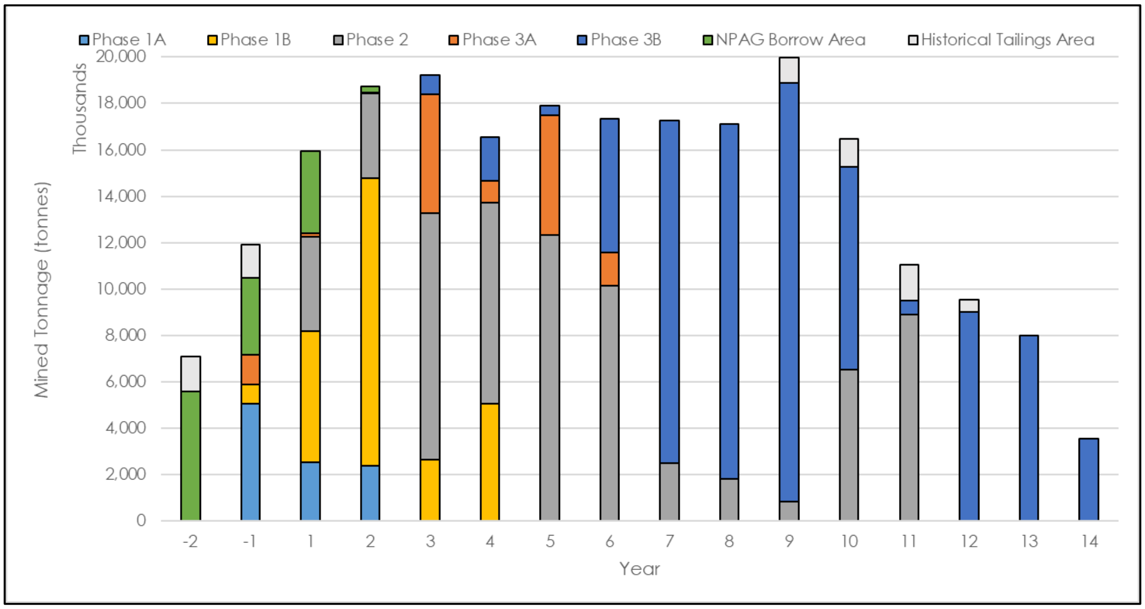
Source: BBA, 2023

Figure 16.1 – Open Pit Mine Plan, Mined Material



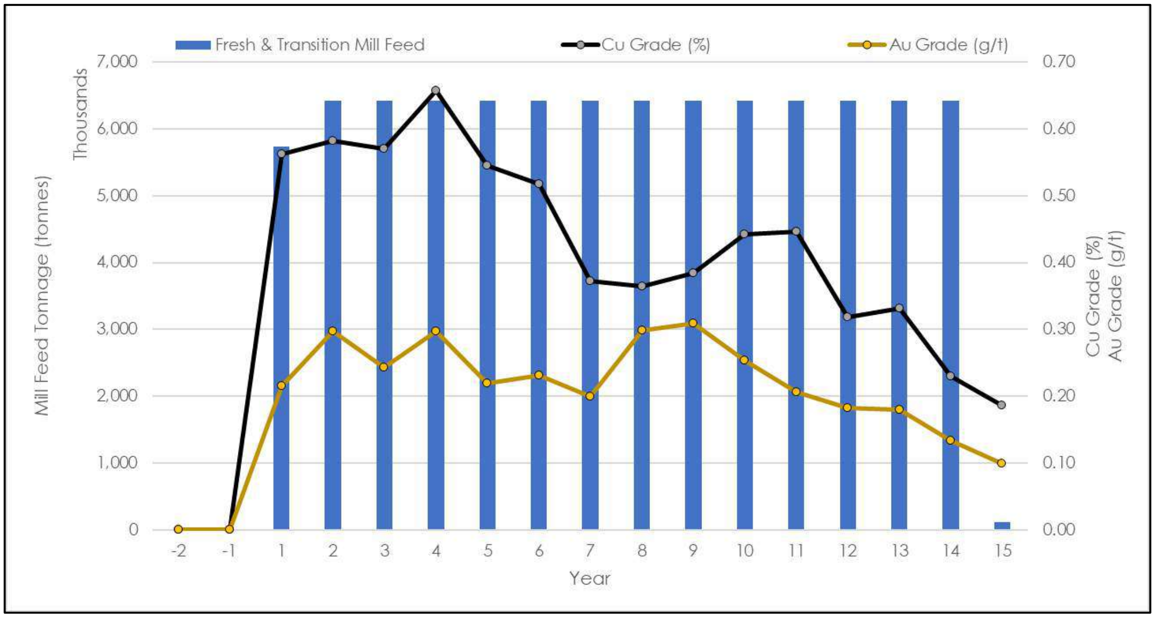
Source: BBA, 2023

Figure 16.2 – Open Pit Mine Plan, Mined Tonnage by Phase



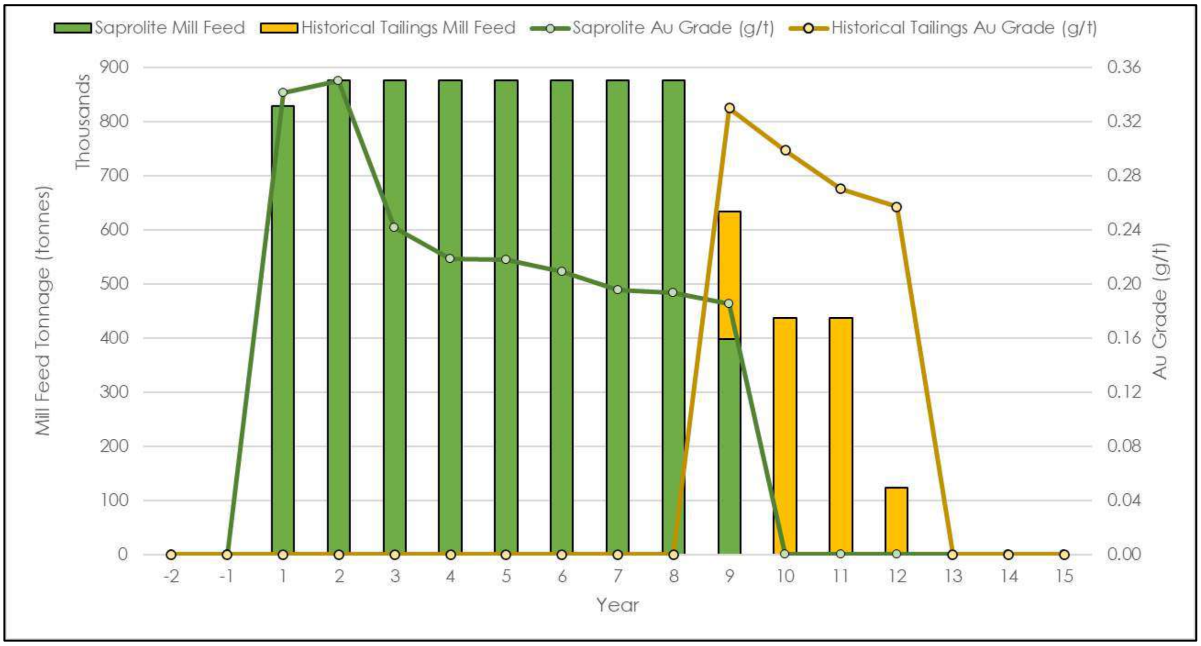
Source: BBA, 2023

Figure 16.3 – Open Pit Mine Plan, Fresh and Transition Mill Feed Blend



Source: BBA, 2023

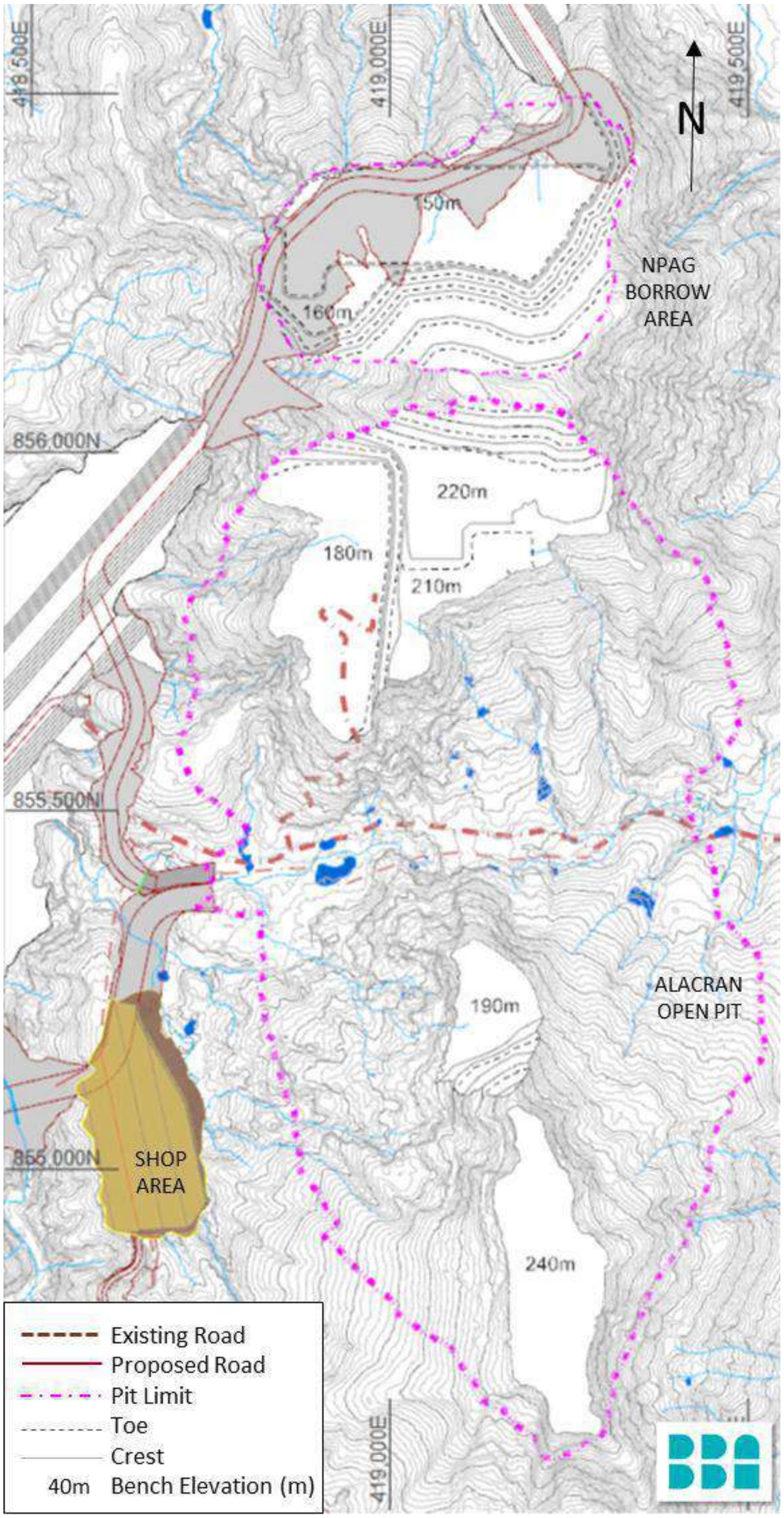
Figure 16.4 – Open Pit Mine Plan, Saprolite and Historical Tailings Mill Feed Blend



Source: BBA, 2023

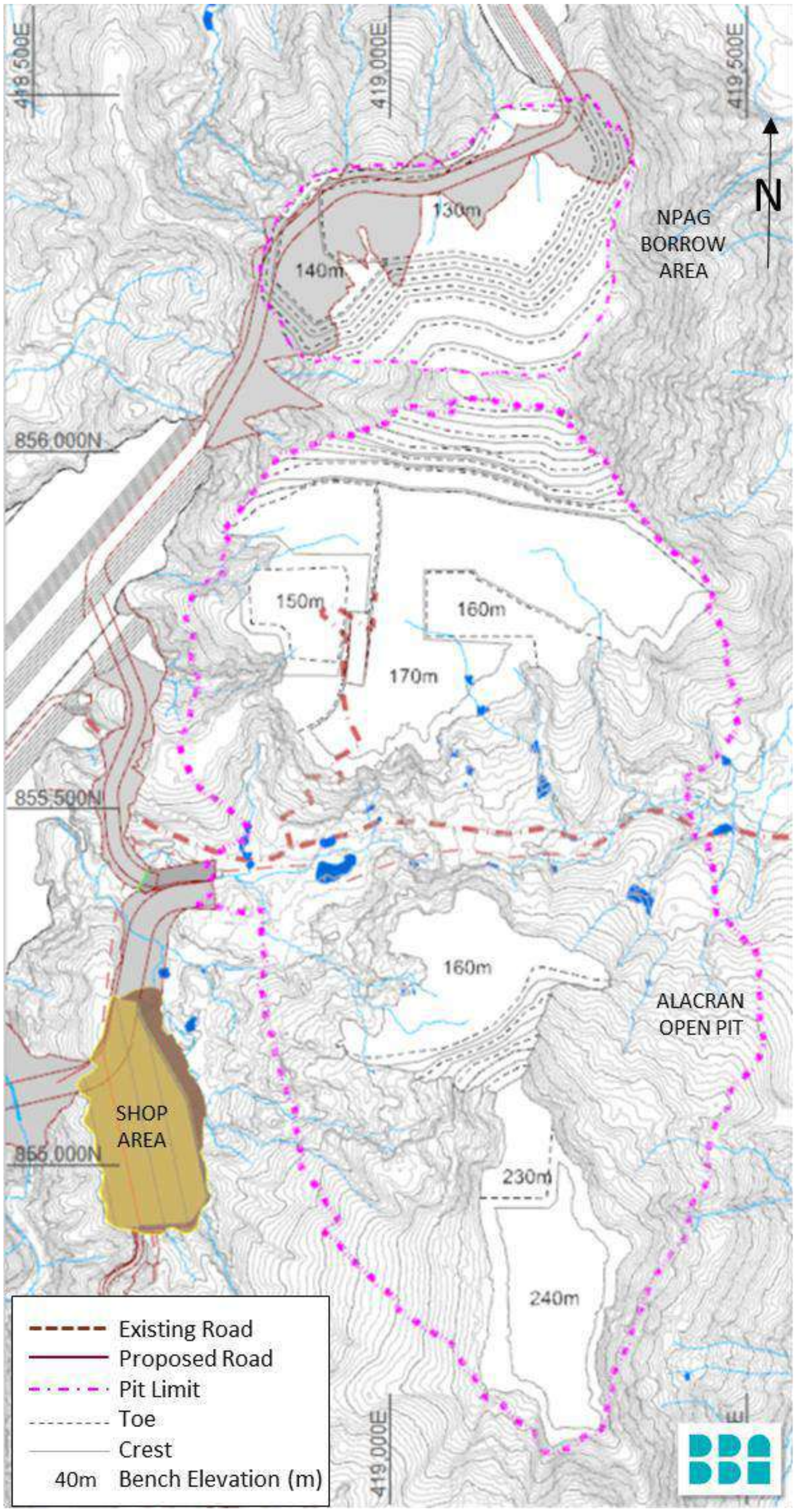
Figure 16.5 through Figure 16.10 depict the general progression of the open pit on an annual basis for select years.

Figure 16.5 – Open Pit Progression, End of Year -1 Pre-Production



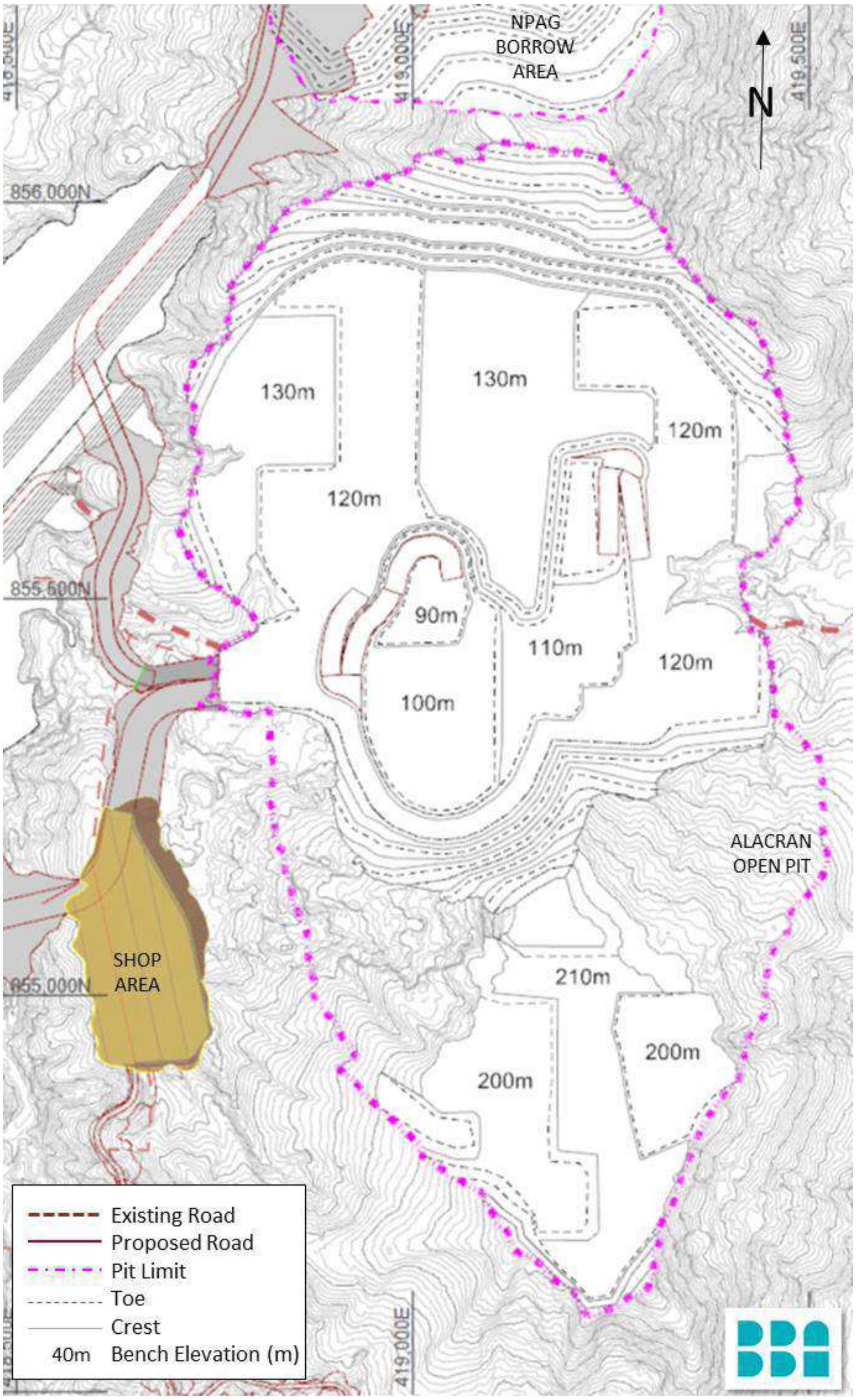
Source: BBA, 2023

Figure 16.6 – Open Pit Progression, End of Year 1 Production



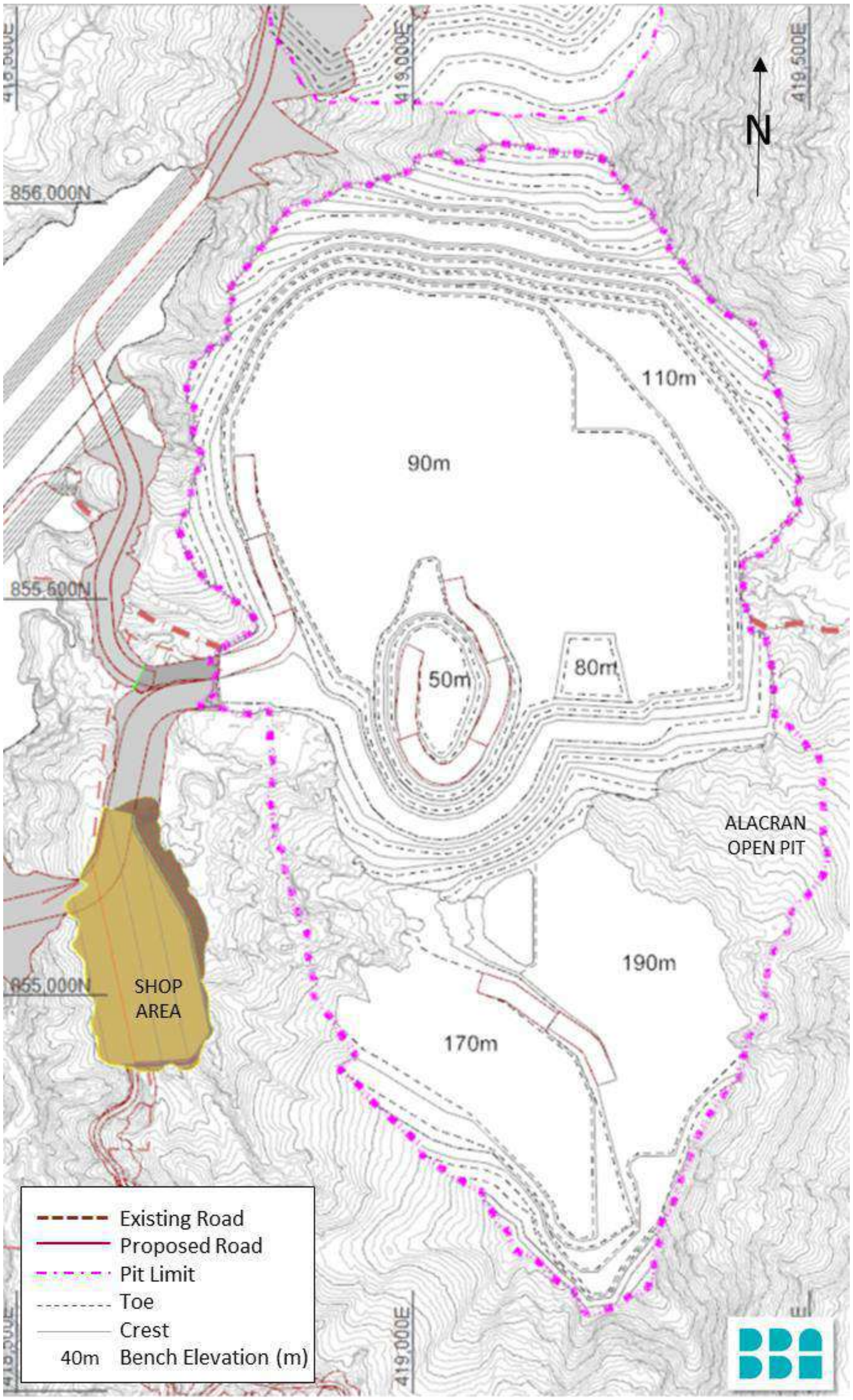
Source: BBA, 2023

Figure 16.7 – Open Pit Progression, End of Year 3 Production



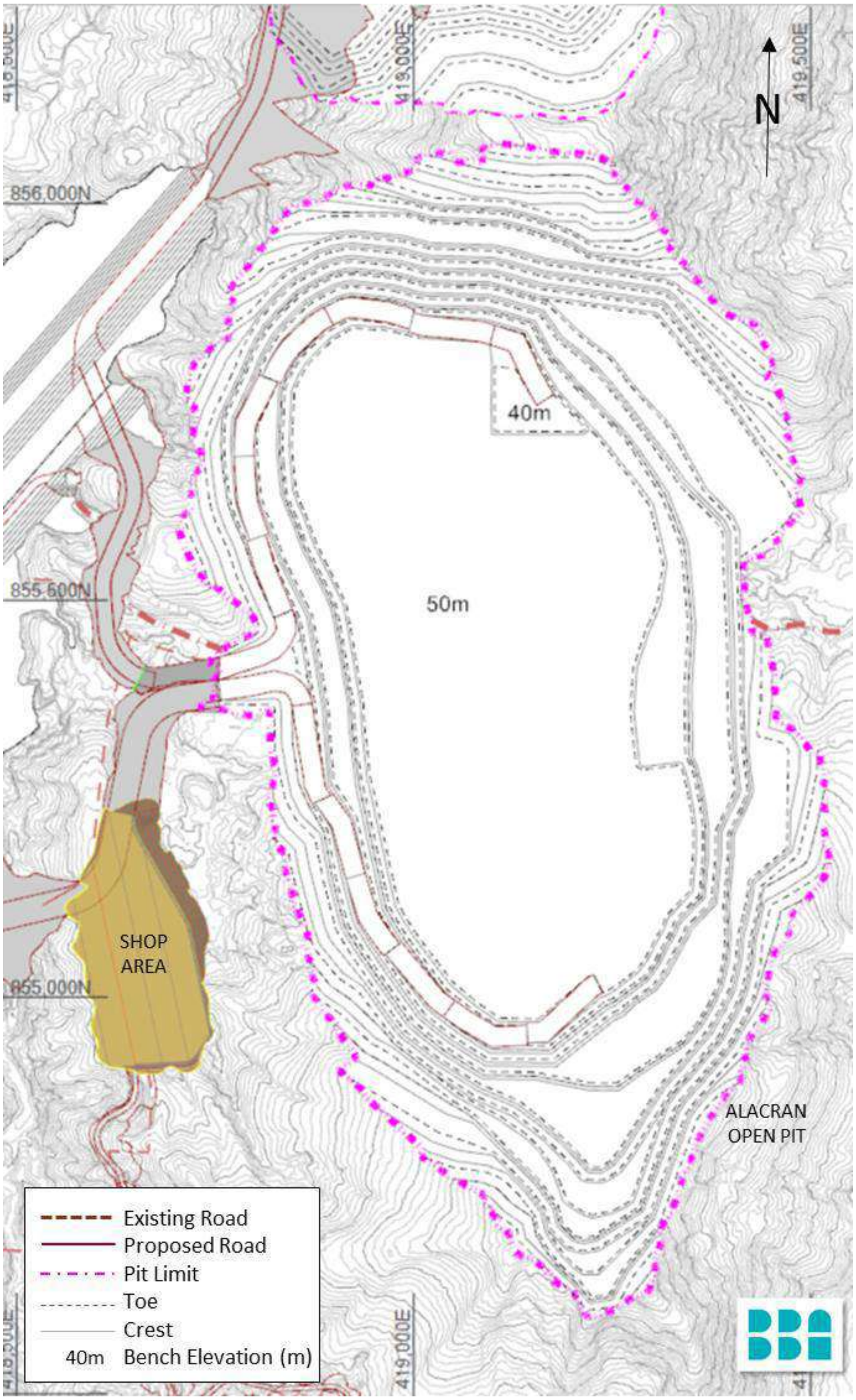
Source: BBA, 2023

Figure 16.8 – Open Pit Progression, End of Year 5 Production



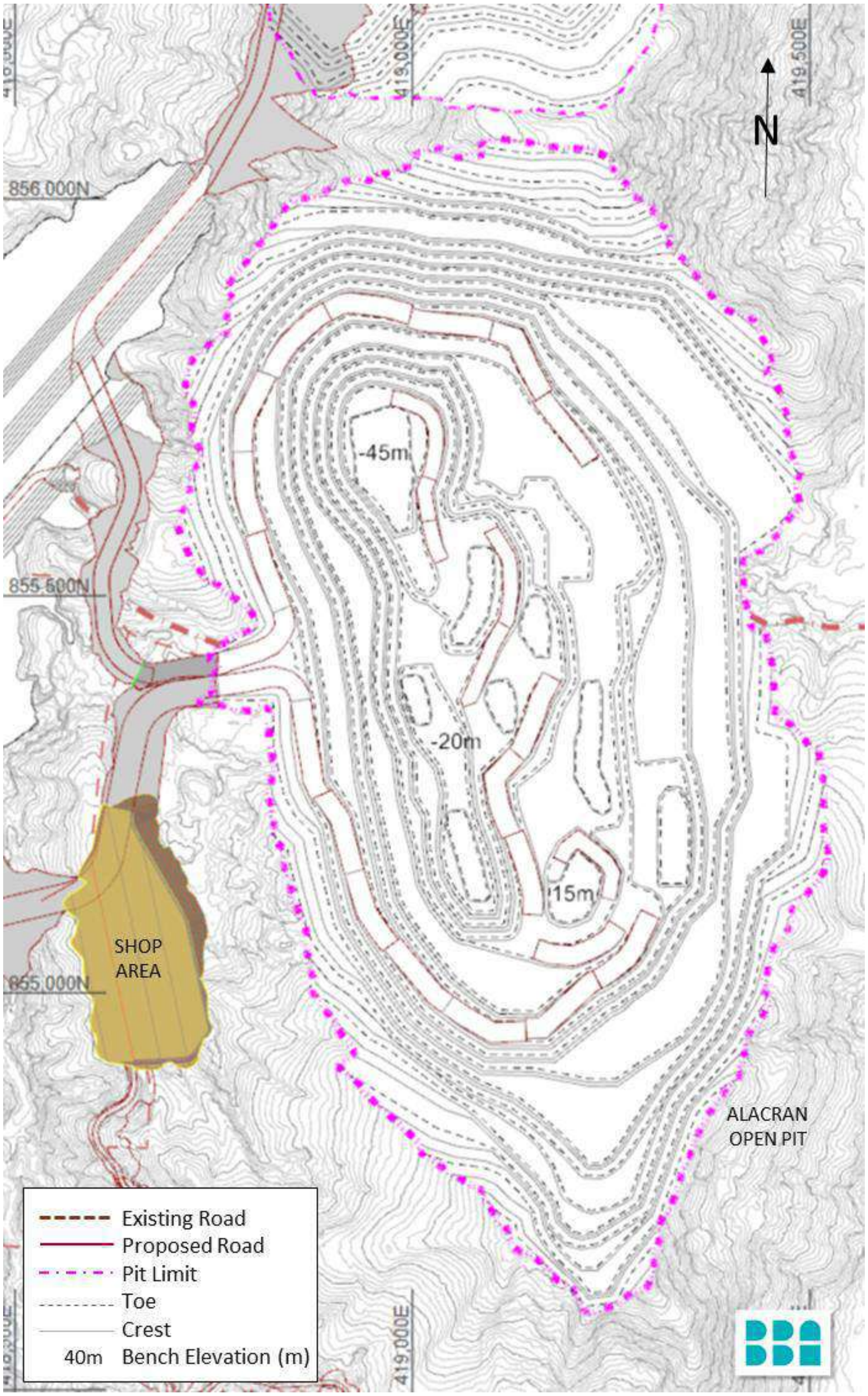
Source: BBA, 2023

Figure 16.9 – Open Pit Progression, End of Year 10 Production



Source: BBA, 2023

Figure 16.10 – Open Pit Progression, End of Year 14 Production



Source: BBA, 2023

16.4 Mining Operation

This section includes indicative parameters for drilling, blasting, loading, and hauling. The objective of equipment selection for this level of study is to produce an estimate of costs suitable for a FS level.

16.4.1 ANNUAL HOURS

Table 16.7 presents the assumptions used in estimating the annual equipment production hours.

Table 16.7 – Estimation of Annual Production Hours

Description	Unit	Drill	Load	Haul
Calendar Days	days	365	365	365
Calendar Hours	h	24	24	24
Total Time (TH)	h	8,760	8,760	8,760
Unscheduled Time (weather delays)	days	10	10	10
Total Scheduled Days	days	355	355	355
Total Scheduled Hours	h	8,520	8,520	8,520
Mechanical Availability	%	82	85	85
Available Time	h	6,986	7,242	7,242
Standby Time	h	1,411	1,411	1,470
Shifts per Day		2	2	2
Shift Change / Inspection	h/shift	0.33	0.33	0.33
Breaks	h/shift	1.33	1.33	1.33
Fuel, Service	h/shift	0.17	0.17	0.25
Blasting	h/shift	0.08	0.08	0.08
No Operator	h/shift	0.08	0.08	0.08
Utilized Time (GOH)	h	5,576	5,831	5,772
Efficiency Factor	%	85	85	90
Operating Time (NOH)	h	4,739	4,957	5,195
Availability	%	82	85	85
Utilization	%	65	68	68
Effective Utilization	%	56	58	61

Source: BBA, 2023

16.4.2 DRILLING AND BLASTING

Drilling may be performed on 10 m benches and excavated on two (2) 5-m “flitches” for ore control if needed. Table 16.8 provides the blasthole productivity for a 10 m drill bench.

Two (2) types of drill rigs have been selected to meet the drilling targets for the planned mining schedule, a down the hole (DTH) drilling rig with diameter range of 127 mm to 200 mm rotary and a top hammer drilling rig with a diameter of 102 mm.

It is the assumption that saprolite material and historical tailings material will not require drilling and blasting and will be free digging.

Controlled blasting strategies are recommended to ensure that the walls are not damaged by blasting and are not significantly compromised by short term production requirements.

There are several techniques that can be used to reduce blast-induced slope damage. In the subsequent stages of the Project, blast engineering must be developed in such a way as to define the design and implementation practices that optimize production at the El Alacrán open pit, while limiting damage to final pit slopes.

For purposes of the FS, wall control blasting was estimated with a buffer blast pattern design (modified production) and pre-split blasting. The buffer pattern design for the various rock units and areas of the pit are shown in Table 16.8. Pre-split blasting is proposed at a 102 mm diameter drill hole, up to 1.8 m spacing, 3m burden, and 1.2 g/cm^3 explosive density.

It is proposed to use booster sensitive bulk emulsion explosives. An emulsion explosive is a suitable product for wet blasting application in open cut mines. For production blasting in rock, double priming of the blastholes has been accounted for when the explosive length is greater than 6 m. It is recommended that the blasting services be provided by a specialist blasting services provider.

It is estimated that, during production, approximately 1.2 M kg to 4.6 M kg of emulsion type explosive product would be required for blasting every year. Assuming a working period of 365 days per year, the blasting operations will require between about 3,100 kg and 12,500 kg of explosives per day and a blast would occur approximately every two (2) days.

Table 16.8 – Blasthole Drill Productivity

Drill Pattern Label	Unit	1	2	3	4	5	6	7	8	9
Unit		1	2	2	2	3	3	Intrusive	Intrusive	Intrusive
Zone		1	1	2	3	1	2	1	2	3
PRODUCTION										
Hole Diameter	mm	180	180	127	127	127	127	180	180	127
Burden	m	6	6	4	4	4	4	6	6	4
Spacing	m	6.5	6.5	4.6	4.6	4.6	4.6	6.5	6.5	5.9
Bench Height	m	10	10	10	10	10	10	10	10	10
Subdrill	m	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Stemming Length	m	3.9	3.9	2.8	2.8	2.8	2.8	3.9	3.9	3.9
Column Load	m	8.2	8.2	9.3	9.3	9.3	9.3	8.2	8.2	8.2
Explosive Density	g/cm³	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Powder Factor	kg/t	0.23	0.23	0.28	0.28	0.28	0.28	0.23	0.23	0.19
Penetration Rate	m/h	30	30	30	30	30	30	30	30	30
Cycle Time per Hole	min/hole	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
Drill Productivity	holes/h	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
BUFFER										
Hole Diameter	mm	102	102	102	102	102	102	102	102	102
Burden	m	6	5	5	3	3	3	3	3	3
Spacing	m	6.9	5.75	5.75	3.7	3.7	3.7	3.7	3.7	3.7
Bench Height	m	10	10	10	10	10	10	10	10	10
Subdrill	m	0	0	0	0	0	0	0	0	0
Stemming Length	m	4.9	4.9	4.9	4.2	4.2	4.9	4.2	4.2	4.2
Column Load	m	5.1	5.1	5.1	5.8	5.8	5.1	5.8	5.8	5.8
Explosive Density	g/cm³	0.86	0.86	0.86	1.2	1.2	0.86	1.2	1.2	1.2

Source: BBA, 2023

16.4.3 LOADING AND HAULING

A backhoe type hydraulic excavator was envisioned for the production loading. An 11 m^3 and 7 m^3 bucket capacity excavators were assumed when estimating the loading fleet requirements. The smaller excavator would be allocated primarily to saprolite and historical tailings excavation. A front-end loader (FEL) type of excavator was envisioned for the Project for stockpiling handling and back-up loading. An 11.5 m^3 bucket capacity was assumed when estimating loading fleet requirements.

Loading fleet numbers were estimated on first principles based on the operating hours required to achieve the production schedule, calculated by cycle times, and estimates of the equipment’s rated capacities and productivities. The loading unit productivity assumptions are listed in Table 16.9.

Two (2) types of haul trucks are planned for the Project. A 91-t rigid frame haul truck (RDT) and a 41-t articulated dump truck (ADT). Haul truck fleet numbers were estimated on first principles based on the operating hours required to achieve the production schedule, calculated cycle times, and estimates of the equipment’s rated capacities and productivities. Figure 16.11 illustrates the average annual cycle times estimated for the Project.

Haul truck fleet numbers were estimated on first principles based on the operating hours required to achieve the production schedule, calculated cycle times, and estimates of the equipment’s rated capacities and productivities. Haul cycle times were estimated using MineSight MPSO software.

In the MineSight software, haul routes were traced according to mining centroids for the various cuts on every bench (and material). Subsequently, with these centroid distances and the respective tonnage per cut (per material) mined, the weighted and averaged distances were calculated.

Table 16.9 – Loading Productivity Calculations

Material Type	Unit	Fresh		Transition		Saprolite	Historical Tailings
Excavator Type		Excavator	FEL	Excavator	FEL	Excavator	Excavator
Bucket Capacity	m³	11.00	11.50	11.00	11.50	7.00	7.00
Hauling Unit Type		RDT, 91t	RDT, 91t	RDT, 91t	RDT, 91t	ADT, 41t	ADT, 41t
Effective Payload	t	89.2	89.2	89.2	89.2	37.8	40.2
Dry Density (avg)	t/m³	2.75	2.75	2.40	2.40	1.82	2.60
Swell Factor	-	1.40	1.40	1.30	1.30	1.20	1.20
Moisture	%	5	5	5	5	5	10
Fill Factor	%	90	90	90	90	90	87.5
Effective Bucket Capacity	m³	9.9	10.4	9.9	10.4	6.3	6.1
Tonnes per Pass	t/pass	20.4	21.3	19.2	20.1	10.0	14.6
Number of Passes	#	5	5	5	5	4	3
First Bucket Dump Time	sec	5	5	5	5	5	5
Subsequent Bucket Cycle Time	sec	45	45	45	45	45	45
Truck Spot Time	sec	30	30	30	30	30	30
Total Load Time	min	3.6	3.6	3.6	3.6	2.8	2.1
Maximum Truck Loads per Hour	loads/h	16.7	16.7	16.7	16.7	21.2	28.8
Maximum Productivity	Wet t/NOH	1493	1493	1493	1493	801	1157
Maximum Productivity	Dry t/NOH	1419	1419	1419	1419	761	1041

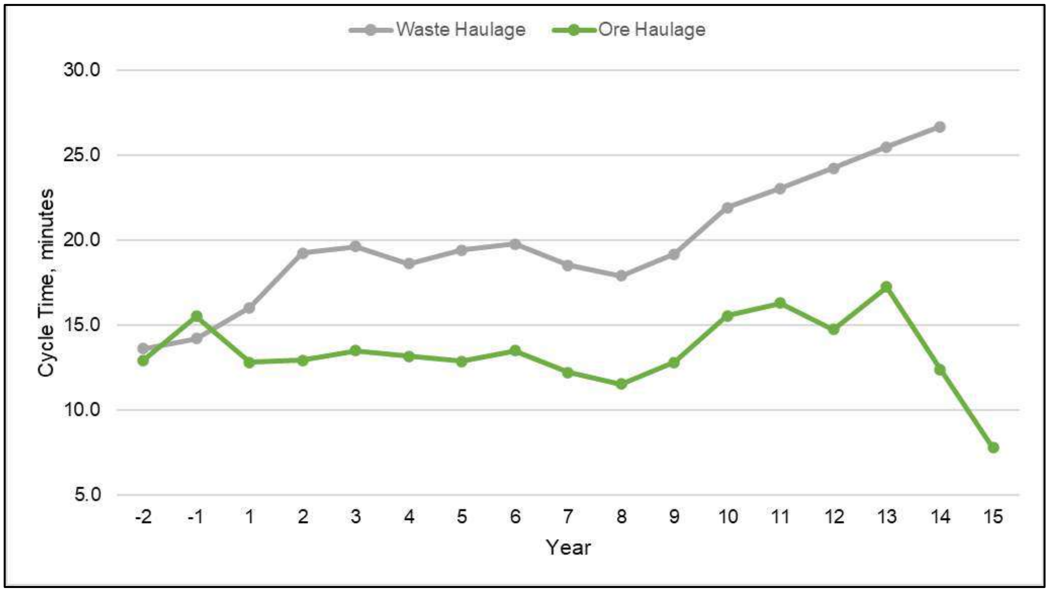
Source: BBA, 2023

The cycle times were calculated based upon round-trip haulage profiles, the haul truck speeds, and on load/spot/dump times. Haulage travel speeds for the trucks were based on data within the MPSO database. A maximum speed of 45 km/h and 20 km/h on inpit ramps were applied. Other assumptions for the haul cycles include:

- 3% rolling resistance; and
- 1.25 min for dumping time, including spot time.

It has been planned that up to five (5) ADT haul trucks would be provided by Contractor during Year 1 and Year 3.

Figure 16.11 – Average LOM Haul Cycle Times



Source: BBA, 2023

16.4.4 MAJOR MOBILE MINING EQUIPMENT

The mining equipment cost inputs for the operating cost estimate are based on the mining fleet being operated by the owner.

Equipment selection, sizing, and fleet requirements were based on expected typical operating conditions, haulage profiles, production cycle times, mechanical availability, utilization, and operator efficiency. To determine the number of units for each equipment type (drills, shovels, trucks, etc.), annual operating hours were calculated and compared to the available annual equipment hours.

The pit operations will be supported by additional equipment including track dozers with ripper attachments, wheel dozer, and road graders.

A mine equipment fleet typical for this size of operation is listed in Table 16.10.

Table 16.10 – Major Mobile Mine Equipment for Open Pit

Item	Quantity
Load and Haul	
11.0 m³ Backhoe Excavator	2
7.0 m³ Backhoe Excavator	1
11.5 m³ Back-up and Stockpile FEL	1
91 t RDT	Up to 12
41 t ADT	Up to 10
Drilling	
127 – 200 mm Rotary or DTH Drill	2
88 – 140 mm Top Hammer Drill	2
Support	
Track Dozer	4
Wheel Dozer	1
Grader	3

Source: BBA, 2023

Table 16.11 provides the number of equipment units estimated to be operating on an annual basis. Table 16.12 summarizes the annual major equipment numbers operating, purchased, and replaced.

Table 16.11 – Open Pit Mine Mobile Equipment Summary

Open Pit Equipment		Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
MAJOR EQUIPMENT																		
Primary Drill	Rotary, DTH	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0
Secondary Drill	Top Hammer	1	1	1	1	2	1	2	2	2	2	2	2	1	2	1	1	0
Hydraulic Excavator	11 m³	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0
Hydraulic Excavator	7 m³	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Front End Loader	11.5 m³	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rigid Frame Haul Truck	91t	2	4	11	10	11	10	10	11	10	10	12	12	7	9	8	7	2
Articulated Haul Truck	41t	5	5	5	5	5	2	3	2	3	4	2	3	4	3	0	0	0
Articulated Haul Truck	Contractor, 41t	0	5	5	1	3	0											
SUPPORT EQUIPMENT																		
Track Dozer		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	1
Wheel Dozer		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Road Grader		2	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	1
Wheel Loader		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Utility Loader		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Utility Excavator		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Water Truck		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
SERVICE EQUIPMENT																		
Fuel & Lube Truck		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mechanic Service Truck		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1
Float / Flatbed Truck		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Crane		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Tire Service Truck		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Skid Steer / Forklift		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Blast Crew Vehicles		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Stemming Loader		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Transport Crew Bus		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Light Vehicles		15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	3	3

Source: BBA, 2023

Table 16.12 – List of Major Mine Equipment Purchase, Replacement

Open Pit Equipment Category	Assumed Life Hours		Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Primary Drill	60,000	# of Units	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0
		# of Units New	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Secondary Drill	30,000	# of Units	1	1	1	1	2	1	2	2	2	2	2	2	1	2	1	1	0
		# of Units New	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Front End Loader	60,000	# of Units	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		# of Units New	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic Excavator	60,000	# of Units	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0
		# of Units New	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Hydraulic Excavator	60,000	# of Units	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
		# of Units New	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rigid Frame Haul Truck	60,000	# of Units	2	4	11	10	11	10	10	11	10	10	12	12	7	9	8	7	2
		# of Units New	2	2	7	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Haul Truck	30,000	# of Units	5	5	5	5	5	2	3	2	3	4	2	3	4	3	0	0	0
		# of Units New	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0
Tracked Dozer	36,000	# of Units	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	1
		# of Units New	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Wheel Dozer	36,000	# of Units	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
		# of Units New	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Grader	36,000	# of Units	2	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	1
		# of Units New	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0

Source: BBA, 2023

16.4.5 ANCILLARY SERVICE AND SUPPORT EQUIPMENT

The primary pit operations will be supported by additional equipment including water truck, utility loaders and excavators, and maintenance service vehicles. Table 16.13 lists the ancillary service and support equipment.

Table 16.13 – Estimated List of Ancillary Mine Equipment

Ancillary Equipment	No. of Units
Blast Crew Truck	1
Blaster's Truck	1
Skid Steer / Stemming Loader	1
Loader	1
Water Truck	2
Utility Excavator	2
Utility Loader	1
Maintenance Field & Service Trucks	3
Fuel/Lube Truck	1
Float Truck	1
Flatbed Truck	1
Crane	1
Tire Handler	1
Forklift	1
Crew Buses	1
Light Vehicles	15
Portable Light Towers	10
Dewatering Pumps	4

Source: BBA, 2023

16.4.6 MINE SERVICES

16.4.6.1 Pit Dewatering

The progressive development of the open pit will result in increasing water infiltration from precipitation and groundwater inflows. As the pit deepens and increases in footprint, it will be necessary to control water inflow through a combination of dewatering systems such as dewatering wells around the open pit, diversion ditches, sumps, pipelines, and pumps. The objective of the open pit water management program is to minimize the inflow of groundwater and surface runoff to the open pit, but there will be an amount of rainfall that will have to be managed.

An allowance has been included in the open pit capital and operating costs for in-pit dewatering through in-pit sumps.

Dewatering inside the pit will be minimal for the first few years as the open pit will “daylight” out of the hillside so that surface runoff will be collected in external ditching. Once an open pit is developed that does not daylight, two (2) to four (4) diesel powered pumps with associated pipelines will be installed at the bottom of the open pit for in-pit dewatering by sumps.

Perimeter dewatering wells are proposed for the Project and are discussed in Section 20.

16.4.6.2 Dust Suppression

Two (2) CAT745 trucks modified with a water tank, or similar, is suggested to be used for dust suppression. Water required for dust allaying purposes on the haul roads, at the loading areas, and the waste dumps will be obtained from water from the open pit.

Water refilling stations / goosenecks will be situated at the sump in the open pit and on surface at a take off point from the open pit dewatering pipeline. Supplementary water may be obtained from the surface water control ponds / tanks situated near the processing plant.

16.4.7 LABOUR REQUIREMENTS

The labour cost inputs for the operating cost estimate are based on the skilled and unskilled labour being supplied by the owner.

A combination of rotation schedules is envisioned. The majority of operations and maintenance crews were assumed to be 12 hours per day, seven (7) days per week. The administrative positions are planned as eight (8) hours per day, five (5) days per week. The personnel estimate for the open pit mining area has been grouped into the following general categories:

- Mine Management;
- Mine Supervision;
- Mine Operations;
- Mine Maintenance; and
- Mine Technical Services.

Table 16.14 illustrates the proposed labour for the open pit by year.

16.4.8 CONSUMABLE ESTIMATES FOR OPEN PIT MINING AREA

Table 16.15 provides a general summary of the major consumables that were estimated as part of the open pit mining cost estimate.

Table 16.14 – Open Pit Operations Labour Estimate by Year

	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
MINE DEPARTMENT	**196**	**220**	**256**	**252**	**262**	**240**	**250**	**250**	**250**	**252**	**250**	**258**	**213**	**213**	**187**	**169**	**34**
MINE MANAGEMENT	**0**	**0**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**0**
Mine Manager	In Owner's Cost	In Owner's Cost	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Administrative Assistant			1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
MINE SUPERVISION	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**9**	**9**	**9**	**9**	**0**
Mine Superintendent	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
General Foreman	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Supervisor	8	8	8	8	8	8	8	8	8	8	8	8	4	4	4	4	0
Blast Supervisor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Admin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Training Supervisor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
MINE OPERATIONS	**126**	**142**	**176**	**172**	**182**	**160**	**170**	**170**	**170**	**174**	**174**	**178**	**152**	**152**	**126**	**122**	**20**
Drill Operators	8	8	12	12	16	12	16	16	16	16	16	16	12	12	8	8	0
Drill Helpers	4	4	6	6	8	6	8	8	8	8	8	8	6	6	4	4	0
Blaster	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0
Blast Helper	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Shovel Operator	8	12	16	16	16	16	16	16	16	16	16	16	16	16	8	8	4
Haul Truck Operator	28	36	60	56	60	44	48	48	48	52	52	56	44	44	32	28	8
Dozer / Grader Operators	24	28	28	28	28	28	28	28	28	28	28	28	20	20	20	20	8
Water Truck Operator	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Ancillary Operators	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Utility Labour	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0
Dispatcher	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Tool Crib Attendant	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Warehouse Attendant	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Warehouse Staff	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0
Pit Labourer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0

	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
MINE MAINTENANCE	**40**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**46**	**44**	**48**	**34**	**34**	**34**	**26**	**11**
Maintenance Superintendent	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maintenance Supervisor	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2
Light Duty Mechanic	8	10	10	10	10	10	10	10	10	10	8	10	4	4	4	2	1
Heavy Duty Mechanic	10	12	12	12	12	12	12	12	12	10	10	12	8	8	8	4	2
Tire Technician	4	8	8	8	8	8	8	8	8	8	8	8	4	4	4	4	2
Lube Truck Driver	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2
Millwright	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Electrician	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Maintenance Planner	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Crane Operator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Maintenance Admin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MINE TECHNICAL SERVICES	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**16**	**16**	**16**	**10**	**3**
Chief Engineer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Senior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Planning Engineer	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0
Surveyor	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
Mine Technician	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0
Survey Assistant	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
Chief Geologist	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Senior Geologist	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Geologist	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
Geology Technician	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	0

Source: BBA, 2023

Table 16.15 – Quantities of Main Consumables from the Open Pit

Activity	Units	LOM Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
BLASTING EXPLOSIVE QUANTITY																			
Emulsion Product	kg	**44,009,000**	573,000	1,137,000	2,666,000	3,035,000	3,571,000	3,408,000	3,641,000	3,636,000	3,722,000	4,172,000	4,418,000	3,456,000	2,105,000	2,160,000	1,631,000	678,000	
ANFO Product	kg	**982,000**	4,000	10,000	54,000	59,000	55,000	83,000	76,000	74,000	41,000	52,000	117,000	111,000	73,000	47,000	84,000	42,000	
Packaged Product	kg	**350,000**	21,000	19,000	28,000	19,000	24,000	21,000	21,000	22,000	21,000	21,000	24,000	23,000	17,000	21,000	29,000	19,000	
ESTIMATED FUEL																			
Drilling	L	**15,709,000**	210,000	381,000	830,000	1,065,000	1,267,000	1,187,000	1,325,000	1,226,000	1,246,000	1,417,000	1,630,000	1,263,000	852,000	803,000	711,000	296,000	0
Loading	L	**20,738,000**	654,000	1,104,000	1,539,000	1,734,000	1,700,000	1,443,000	1,542,000	1,504,000	1,608,000	1,545,000	1,673,000	1,373,000	973,000	956,000	797,000	586,000	7,000
Hauling	L	**52,588,000**	1,499,000	2,668,000	3,506,000	4,136,000	4,326,000	3,419,000	3,784,000	3,724,000	3,839,000	3,567,000	4,360,000	4,061,000	2,938,000	2,861,000	2,424,000	1,466,000	10,000
Support Equipment	L	**24,971,000**	1,572,000	1,636,000	1,673,000	1,641,000	1,685,000	1,684,000	1,686,000	1,686,000	1,687,000	1,693,000	1,697,000	1,684,000	1,374,000	1,375,000	1,322,000	868,000	8,000
Service Vehicles	L	**26,647,000**	464,000	689,000	1,363,000	1,814,000	1,814,000	1,814,000	1,814,000	1,814,000	1,814,000	1,814,000	1,814,000	1,814,000	2,223,000	2,223,000	2,202,000	1,154,000	3,000
TOTAL	**L**	**140,655,000**	**4,400,000**	**6,478,000**	**8,910,000**	**10,390,000**	**10,792,000**	**9,547,000**	**10,152,000**	**9,955,000**	**10,194,000**	**10,036,000**	**11,174,000**	**10,195,000**	**8,361,000**	**8,218,000**	**7,456,000**	**4,369,000**	**28,000**

Source: BBA, 2023

16.5 Geotechnical Evaluation

16.5.1 GEOTECHNICAL DATA

Geotechnical data for geotechnical studies at the Alacran Project were taken primarily from a specifically designed and executed geotechnical site investigation. The geotechnical site investigation consists of two (2) study phases: the preliminary PFS investigation consisting of four (4) drill holes (in red) with a total metreage of 1,002 m. and current FS site investigation consisting of eight (8) oriented geotechnical drill holes (in blue) with a total metreage of 1,812 m.

Based on the geotechnical site investigations and existing geological model and database, a geotechnical model for the open pit was developed. The model is based principally on geology (major identified geological units), weathering/alteration and major structures.

Intact rock strengths for each geotechnical domain were ascertained from a variety of sources including field index strength, point load tests and geomechanics laboratory testing.

16.5.2 OPEN PIT STABILITY ANALYSES AND DESIGN RECOMMENDATIONS

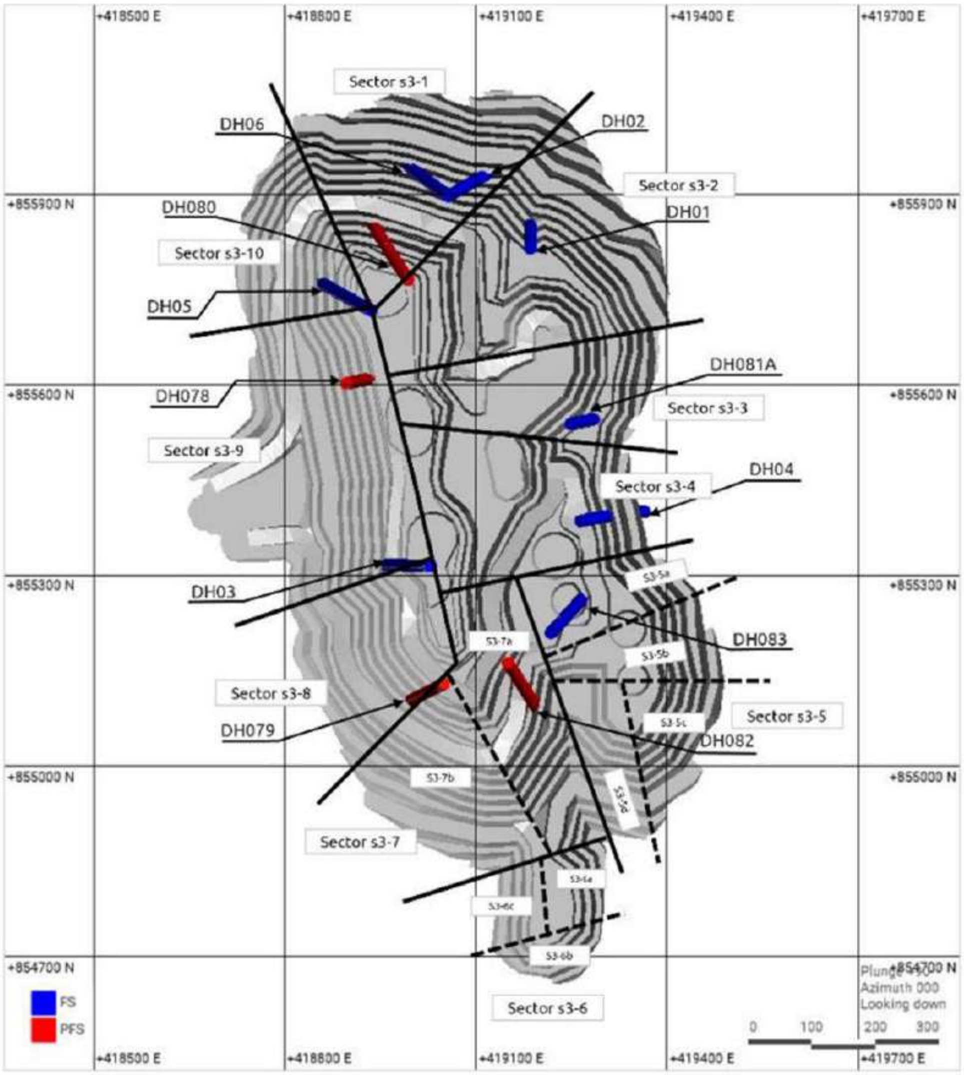
Stability analyses for slope design purposes were undertaken utilizing limit equilibrium and kinematic analyses for each phase of the open pit design. The main conclusions are as follows:

- The bench scale stability evaluation for the final pit slope meets the design acceptance criteria defined and therefore validates the proposed design.
- Slope stability analyses for benches in Saprolite were also undertaken that indicate that the proposed bench face angles in this material are appropriate to maintain long term stability.
- From the limit equilibrium analyses of both inter-ramp and overall slopes, all factors of safety are higher than threshold acceptance criteria and probabilities of failure below threshold acceptance criteria for static, operational and maximum seismic conditions. Based on the mining industry standards defined acceptance criterion it is considered that inter-ramp and overall slope failure through the rock mass is unlikely at El Alacrán.
- It is considered that slope design at El Alacrán will be controlled by local structurally controlled failure mechanisms. In this case, the recommended slope design parameters based on bench scale limit equilibrium analysis will drive final slope design parameters.

It is recommended for the final design option that the following aspects be considered.

- Inter-ramp slope angle of 55° is recommended, along with a maximum 120 m inter-ramp slope height (i.e. maximum bench stack height).
- Inter-ramps are to be separated by geotechnical berms (25 m wide) every 120 m.

Figure 16.12 – Geotechnical Design Sectors



Source: Austra, 2023

16.5.3 SLOPE MONITORING RECOMMENDATION

Routine monitoring is recommended to warn of unanticipated deformations, geological complications or developing adverse pore pressures. It is recommended to use the following instrumentation:

- Radars for the real-time monitoring system.
- Implement tension crack monitoring in areas of visibly cracked on pit perimeters and berms.
- EDM monitoring (electro-optic distance measuring), or prism monitoring to measure distances, either by direct determination of distance change or for lateral position change by trilateration.

The design parameters in Table 16.16 are determined by the highest bench face angles in different rock sectors. To enhance mine operations, specifically in drill and blast activities and shovel operations, it is suggested to standardize the design by decreasing bench face angles from 75-80° to a uniform 70°, while keeping the recommended bench width at 8.5 m.

Table 16.16 – Recommended Pit Slope Design, Maximum

Design Sector	**Bench Scale**			**IRA•**			
		Berm	Berm	Bench Cant.	Inter-ramp Height (m)	Toe-Toe (°)	Bench POF
	BFA (°)	Width (m)	Height (m)				
Saprolite	36	8.5	20	-	-	-	1.9%
S3-1	75	8.5	20	7	140	55.3	37.4%
S3-2	75	8.5	20	6	120	55.3	30.5%
S3-3	65	7.0	20	4	80	50.8	18.0%
S3-4	65	7.0	20	4	80	50.8	36.8%
S3-5	70	8.5	20	5	100	51.7	13.6%
S3-6	70	8.5	20	4	80	51.7	36.9%
S3-7	65	7.0	20	7	140	50.8	28.3%
S3-8	65	7.0	20	5	100	50.8	44.6%
S3-9	70	8.5	20	7	140	51.7	40.2%
S3-10	80	8.5	20	7	140	55.3	19.4%

Source: Austra, 2023

17 RECOVERY METHODS

17.1 Summary

The process design for the FS was developed based on metallurgical testwork performed during the PFS and FS phases. The testwork was conducted by Blue Coast Research between the PFS and FS study phases and in parallel with the FS in 2023.

The historical testwork completed during the PFS included the mineralogical work which was conducted by Actlabs in Ancaster, Ontario, Canada, SGS Canada in Burnaby, British Columbia, Canada and SGS Lakefield in Lakefield, Ontario, Canada. Grindability work was conducted by Blue Coast Research and flotation testwork was completed at SGS Canada.

Blue Coast Research performed a metallurgical testwork program using 81 discrete geometallurgical variability samples selected from the 2022/2023 drilling program. These variability samples were selected to represent the distribution of material within the deposit spatially, by grade, and rock type. These samples underwent head analysis, mineralogical characterization by QEMSCAN, and rougher flotation kinetic testing. Blue Coast Research combined these composites to form three (3) Master Composites (MCs), five (5) comminution composites, six (6) metallurgical composites and one (1) bulk composite. These composite samples were used to evaluate the metallurgical response of the deposit by conducting various tests such as grindability, flotation, and gravity concentration.

Grindability testwork was carried out on the variability and comminution composites and included Bond Ball Work Index, Bond Rod Work Index, SAG Mill Comminution JK Drop Weight, Abrasion Index, and Grindmill testing. Selected metallurgical composites underwent locked cycle flotation testwork to better define the flotation circuit design. These tests resulted in improved selectivity and the optimization of reagent additions to obtain representative expected recovery levels and concentrate grades.

The processing facility will have a design throughput of 17,600 tpd (6.4 Mtpa). The ROM ore will be crushed in a single jaw crusher. The grinding circuit will feature a pebble crusher arrangement with the SAG mill in an open circuit and ball mill (SABC) operating in closed circuit with hydrocyclones. The hydrocyclone overflow with a target grind size P_{80} of 150 µm will be sent to the rougher flotation circuit. A gravity concentrator fitted to the cyclone underflow stream will be used to process up to 30% of the underflow and will produce a high-grade gold-silver concentrate.

The flotation process will consist of a four-stage circuit comprising rougher, cleaner scalper, cleaner scavenger, and recleaner stages. In addition to these stages, a regrinding stage for the concentrate is included between the rougher flotation and cleaner scalper stage and a gravity concentrator that will be fed by the tailings from the cleaner scavenger cells.

The final concentrate produced from the cleaner scalper and recleaner stages will be sent to a concentrate thickener, and the thickened concentrate will be sent to a concentrate pressure filter to produce the final copper concentrate.

The final tailings produced in the rougher and cleaner scavenger stage flotation (after passing through the gravity concentrator) are sent to the tailings thickener, and then to the WMF.

The Alacran Project contemplates the recovery of gold and silver from historic tailings and saprolite in a stand-alone modular plant with a capacity of 2,400 tpd. It is expected that this plant will initially be fed with saprolite and then process historic tailings.

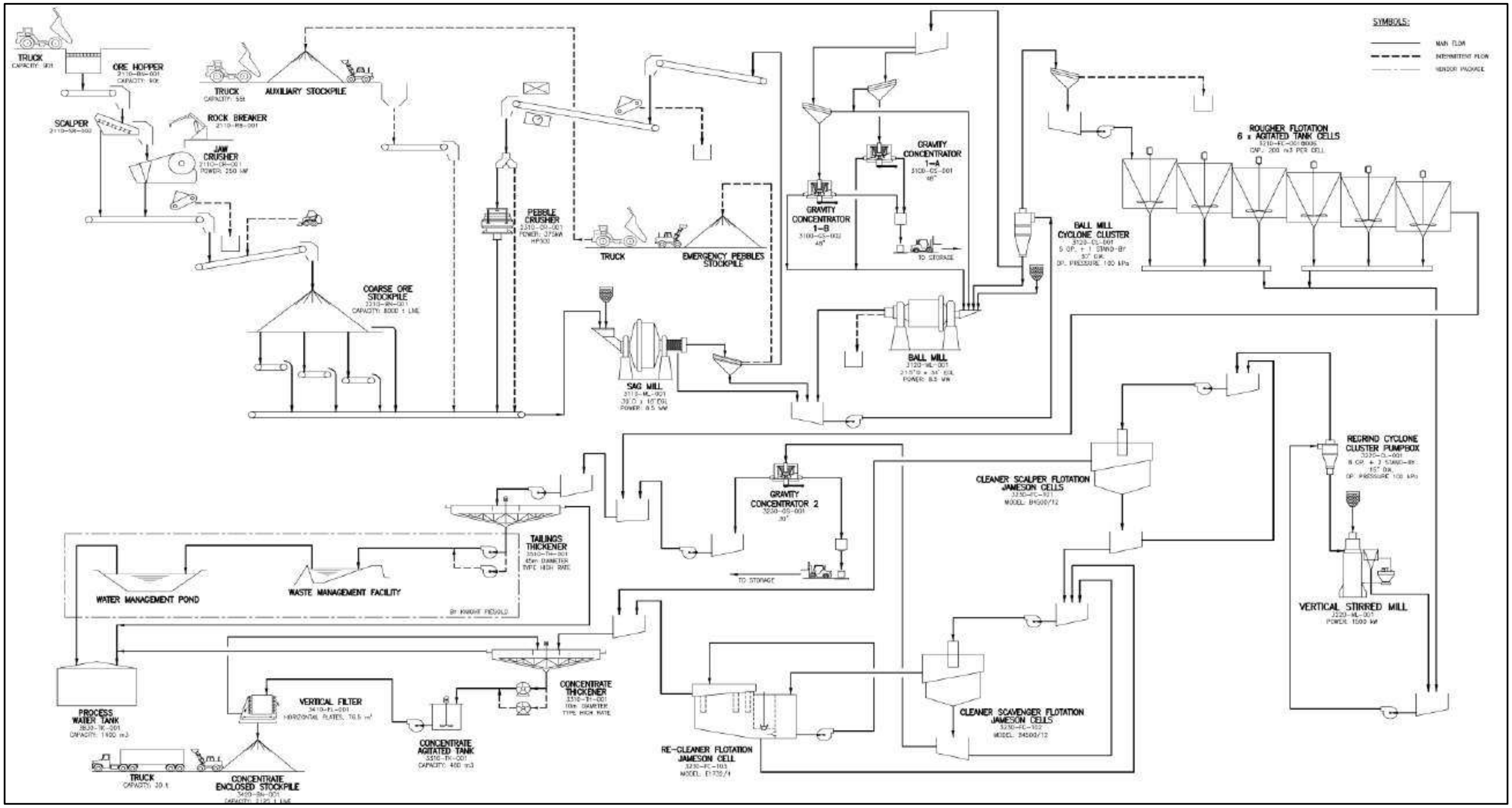
17.2 Process Plant Description (Fresh/Transition Ores)

All throughput and mass balance calculations used as the basis of design were based on the design production rate of 17,600 tpd.

The concentrator will operate on a 24 hours per day, 7 days per week, 365 days per year basis at a planned overall plant utilization of 92.0%.

An overall simplified flowsheet is presented in Figure 17.1. The key process design criteria (PDC) used for plant design and the major mechanical equipment list (MEL) are provided in Table 17.1 and Table 17.2.

Figure 17.1 – Simplified Overall Process Flow Diagram



Source: DRA, 2023

Table 17.1 – Key Process Design Criteria (Fresh/Transition Ores)

Description	Unit	Value
Plant Design Capacity	tpd	17,600
Specific Gravity	t/m³	2.84
Moisture	%	3 - 5
ROM Granulometry F_{80}	mm	300
Crushing Work Index (CWi)	kWh/t	13.6
Abrasion Index (Ai)	g	0.066
JK Parameter Axb (85th Percentile)		29.4
SAG Mill Work Index (85th Percentile)	kWh/t	9.75
Ball Mill Work Index (85th Percentile)	kWh/t	20.4
Primary Crushing Utilization to match Concentrator throughput	%	70
Grinding Operating Hours	h/d	24
Hydrocyclone Overflow Density	% w/w	34
Primary Grind Size	µm	150
Gravity Concentrator 1 – Nominal / Design	t/h	614 / 675
Rougher Flotation Residence Time	min	30
Regrind Mill Grind Size (P_{80})	µm	30
Gravity Concentrator 2 –Nominal / Design	t/h	59 / 68
Combined Gravity Mass Pull, Gravity Concentrator 1 + 2 (% nominal feed)	%	0.03
Final Flotation Concentrate Mass Pull	%	2.0
Concentrate Settling Rate	m²/(tpd)	0.143
Concentrate Filtration Area	kg/(m² h)	595
Concentrate Moisture	%	8
Tailings Settling Rate	(t/h)/m²	0.5
Tailings Thickener Underflow Density	% w/w	55

Source: DRA, 2023

Table 17.2 – Major Equipment List

Description	Unit	Value
Primary Crusher Size	mm	1200 x 1600 opening
Primary Crusher Type		Jaw
Primary Crusher Installed Power	kW	250
SAG Mill Dimensions	m	9.15 m dia x 5.5m effective grinding length (EGL)
SAG Mill Installed Power	MW	8.5
Pebble Crusher Type		Cone
Pebble Crusher Installed Power	kW	375
Ball Mill Dimensions	m	6.55 m dia. x 10.37m EGL
Ball Mill Installed Power	MW	8.5
Ball Mill Circulating Load	%	250
Rougher Flotation Cell Type		Mechanical Tank Cell
Regrind Mill Type		Vertical Mill
Regrind Mill Installed Power	kW	1,500
First Cleaner Flotation Cell Type – Cleaner Scalper		Jameson Cell – Model B4500/12
Second Cleaner Flotation Cell Type – Cleaner Scavenger		Jameson Cell – Model B4500/12
Third Cleaner Flotation Cell Type - Recleaner		Jameson Cell – Model E1732/4
Concentrate Thickener Type		High Rate
Concentrate Thickener Diameter	m	10
Concentrate Filter Type		Vertical Multi-Plate Pressure
Tailings Thickener Type		High Rate
Tailings Thickener Diameter	m	45

Source: DRA, 2023

17.2.1 PRIMARY CRUSHING

The crushing circuit is designed to reduce ROM ore with a maximum moisture content of 5% and an F_{80} of 300 mm to feed the comminution circuit at a P_{80} of 150 mm.

ROM ore is transported by truck from the open pit and dumped directly onto a grizzly located at the top of the crusher feed bin. An apron feeder delivers the ore from the bin to a scalping screen with the screen oversize reporting to the jaw crusher. A remote-operated rock breaker is installed at the feed point of the jaw crusher to reduce oversize material if required. The jaw crusher has jaw dimensions of 1200 mm x 1600 mm, has a 250 kW motor installed and crushes the ore from a top size of 600 mm down to a P_{80} of 150 mm.

Scalping screen undersize falls into a chute and discharges onto a sacrificial conveyor where it is combined with crushed ore from the jaw crusher. The combined crushed ore discharges onto an apron feeder that feeds a loadout conveyor equipped with a belt magnet to remove tramp metal from the ore before it leaves the crusher building complex.

The undersize from the scalping screen and the crushed ore from the jaw crusher are conveyed by the coarse ore belt conveyor to the coarse ore stockpile. A belt weigh scale is installed to measure the throughput rate of the crushing plant.

The primary crushing area is serviced by two (2) x 5 t hoists. A dust collection system and fine mist sprays are installed to control dust emissions.

17.2.2 COARSE ORE STOCKPILE

The coarse ore stockpile provides a live buffer storage capacity of 12 h or 8,000 t between the crushing and grinding circuit areas due to the differential utilization rates. The coarse ore reclaim from the mill feed stockpile will be completed by dedicated apron feeders beneath the stockpile which will be equipped with feed rate control to transfer the required quantity of ore to a belt conveyor feeding to the SAG mill.

Three (3) apron feeders (two operating and one standby) will be located within a concrete reclaim tunnel which will be utilized to control the outlet flow from storage pile to feed the SAG mill feed conveyor. Feed rate control to the SAG mill will be accomplished via VFD control of the apron feeders feeding to the SAG mill feed conveyor.

17.2.3 COMMINUTION

The grinding circuit flowsheet is considered to be a conventional SABC arrangement and is designed to produce feed slurry for the flotation circuit that follows. Design parameters for the circuit include an F_{80} of 150 mm and a ball mill operating in closed circuit with conventional hydrocyclones. Hydrocyclone overflow at a P_{80} of 150 µm will report to the flotation rougher circuit for the first stage of flotation.

17.2.4 GRINDING

The grinding circuit is designed to produce slurry feed fine enough for effective flotation. Primary grinding will be achieved with a SAG mill. The SAG mill slurry will discharge through a vibrating screen where the pebbles will be screened and oversized recycled to a pebble crusher. The SAG mill has dimensions of 9.15 m dia. x 5.5 m EGL (30’ dia. x 18’ EGL), with a total installed power of 8.5 MW through a single pinion drive and VFD arrangement.

The pebble crusher is a conventional cone crusher using a closed side setting of 16 mm and will reduce the SAG mill discharge pebbles to a P_{80} of 14 mm. The pebble crusher is rated for a nominal throughput rate of 320 dry t/h. Crushed product from the pebble crusher is returned to the SAG mill feed conveyor.

The SAG mill discharge screen undersize reports to a common mill pump box which is pumped to the hydrocyclone cluster. Cyclone underflow reports to ball mill feed, and ball mill product discharges to the common pump box. A trunnion magnet will be fitted on the ball mill discharge to separate ball scats and slivers for disposal. Ball mill dimensions are 6.55 m dia. x 10.37 m EGL (21.5' dia. x 34' EGL), with total installed power of 8.5 MW through a single pinion drive. Cyclone overflow at a P_{80} of 150 µm reports to flotation feed.

Batch centrifugal gravity concentrators will also be fed by the cyclone underflow stream with approximately 34% of the underflow stream reporting to the concentrators. A separate high-grade Au-Ag concentrate will be produced from this point in the circuit and reports to a separate and secure concentrate bagging system. Process water is added to the grinding circuit to achieve a cyclone feed density of 58% solids w/w which is then fed to the hydrocyclones.

17.2.5 FLOTATION CIRCUIT

The flotation circuit is designed to concentrate copper, gold, and silver from ROM ore. The equipment selected for the rougher circuit consists of conventional mechanical tank cells and Glencore Technology's Jameson cells for the three (3) stages of cleaning flotation.

The rougher flotation circuit consists of 6 x 200 m³ mechanical tank cells in series, equipped with 187 kW agitators. Feed will report to the roughers at a grind P_{80} of 150 µm, via hydrocyclone overflow which has a pH of 10.5 achieved using lime. Reagents used are sodium hexametaphosphate (Calgon), MIBC and potassium amyl xanthate (PAX) and are added to the rougher feed box and rougher cell #4. Total residence time within the rougher circuit will be 30 minutes. Rougher float concentrate products will report to a single regrind stage closed-in with hydrocyclones. Regrinding will be accomplished using a 1,500-kW vertical mill (CSM 1500) producing a P_{80} of 30 µm prior to overflowing to the first cleaner feed box.

The first cleaner flotation circuit is referred to as the "cleaner scalper" and consists of a single Jameson Cell model B4500/12. Feed reports to the first cleaning stage from the regrind hydrocyclone overflow at a grind P_{80} of 30 µm, and at pH of 11.5. Additional reagents introduced to the first cleaner consist of Calgon, PAX and MIBC.

The concentrate produced by the cleaner scalper is transferred to the final concentrate thickener. The tailings from the stage discharge to a tailings box where a portion of the tailings is recycled to its feed box to keep a fixed constant feed and the remaining tailings overflow is sent to the feed box of the second cleaner stage.

The second cleaner stage flotation circuit, referred to as "cleaner scavenger", is also a single Jameson cell model B4500/12 in which the feed is the tailings from the cleaner scalper stage. The tailings from the third stage or recleaners and the recirculation of its own cleaner scavenger cell are required to keep the feed at a fixed flow rate.

The concentrate from the cleaner scavenger goes to the recleaner stage and the tails from this stage pass to a batch centrifugal gravity concentrator (second stage), to remove any remaining gold and silver contained before passing to the final tailings thickener. The dedicated Au-Ag concentrate collected will be available to be combined with the first stage comminution circuit Au-Ag concentrate produced and reports to a separable and secure concentrate bagging system. This concentrate will be marketed and sold separately to the copper concentrate produced from flotation.

The final cleaner flotation cell is referred to as a "recleaner", is also a single Jameson cell model E1732/4 and is fed by the concentrate from the cleaner scavenger and its own recleaner recirculation. Concentrate from the recleaner is directed to the concentrate thickener while the tailings are recycled back to the cleaner scavenger.

17.2.6 CONCENTRATE THICKENING, DEWATERING, AND STORAGE

The concentrate thickening and dewatering circuit is designed to dewater and filter the copper concentrate feed, in preparation for storage on site.

Final copper concentrate from the cleaner scavenger and from the recleaner is fed to a 10 m diameter high rate concentrate thickener, where the feed slurry at 25% w/w is mixed with anionic flocculant and thickened to a target solids underflow concentration of 60% solids w/w.

Thickened concentrate is pumped to a concentrate pressure filter, where the solids content is further increased to a target of 92% solids w/w. Discharge from the pressure filter is conveyed to an enclosed stockpile for bulk storage prior to being transported via dump truck for storage at a port facility prior to being loaded to ocean vessels for shipping to market.

Thickener overflow and filter filtrate are collected and recycled back to the process.

A high-grade Au-Ag concentrate, produced from the first and second stages of the gravity concentrators, is collected in bags and is marketed and sold separately to the copper concentrate produced from flotation.

17.2.7 TAILINGS THICKENING

Rougher flotation tails and tails from gravity concentrator #2 will be pumped to a high-rate tailings thickener where underflow density will be increased to a target solids density of 55% w/w. Flocculant will be added to the thickener at a feed rate sufficient to obtain target clarity for the thickener overflow water. Thickener underflow will be pumped to the WMF. The thickener overflow will be combined with the concentrate thickener overflow to report back to the process water storage tank.

17.2.8 REAGENTS

Reagents will be stored dry, when possible, on site prior to being prepared and stored in a separate area adjacent to the concentrator facility for distribution to the process. Lime, Calgon, PAX, and flocculant will be received and blended into solution. MIBC will be received in liquid form and stored in a dedicated tank and delivery facility. Reagents will be prepared using a dedicated fresh process water supply to minimize negative effects or cross-contamination. Table 17.3 lists the required reagents and their annual consumptions.

Table 17.3 – Reagent Consumption

Reagent	Consumption per Tonne of Ore (g/t)	Annual Consumption (tpa)
Lime	1,400	8,994
Calgon	15	96.4
PAX	13	83.5
MIBC	26	167
Flocculant for Concentrate Thickener	20	2.7
Flocculant for Tailings Thickener	50	321.2

17.2.9 WATER SUPPLY

17.2.9.1 Process Water

Process water will be supplied to a 1,400 m³ storage tank from multiple sources. The primary source of process water will be the concentrate thickener and tailings thickener overflow with a flowrate of 1,202 m³/h pumped to the storage tank. The secondary water source will be from the water management pond (WMP) which collects water from the waste management facility (WMF).

Water from the WMP will be delivered from the pumps mounted in the process water reclaim barge located within the WMP. A pump will deliver water to the process water storage tank to maintain a sufficient water level and a second pump will release the excess water to the San Pedro River. Water simulation results showed that it is safe to discharge it to the environment as the constituent concentrations are well below the regulations as described in Section 20 of the Report.

Process water will primarily be used for the following processes:

- Grinding / regrinding circuit / gravity concentration;
- Flotation launders;
- Fire water for emergency use; and
- Concentrate filter wash water.

17.2.9.2 Fresh Water

Fresh water will be supplied by a 2,700 m³ fresh/fire water head tank which receives fresh water from the runoff Collection Pond 4. Fresh/fire water tank will be equipped with a standpipe for fresh water process suctions which will ensure that the tank is always holding at least 90 minutes supply of fire water.

Fresh water will primarily be used for the following processes:

- Fire water;
- Gland seal water for slurry pumps;
- Cooling water for mill lubrication systems;
- Reagent preparation; and
- Fresh water to the potable water treatment plant.

Two (2) additional modular treatment plants are required, the potable water treatment plant and the sewage treatment plant. The potable water plant will produce potable water to be distributed to the various buildings on site. The sewage treatment plant will treat the sewage water from the plant and from the camp and release it to the environment.

17.3 Gravity Wash Plant (Saprolite Ore and Historical Tailings Plant)

The saprolite ore and historical tailings material will be processed in a dedicated stand-alone Gravity Wash Plant. The plant will recover a high-grade gold and silver concentrate using conventional batch gravity concentrators. The concentrate product from the plant is a high-grade gold and silver concentrate captured in bags.

The capacity of the stand-alone gravity wash plant is 2,400 tpd of saprolite ore and 1,200 tpd of historical tailings.

The saprolite ore feed material will be reclaimed by a front-end loader (CAT 966) and loaded into a feed hopper through a static grizzly. The feed is discharged into a rotary scrubber feed chute and washed by water jets in the grizzly as it enters the scrubber. The clays and silts are dispersed into a slurry and discharged onto a screen. The oversize material (+10 mm) is deposited unto a conveyor and transported to a stockpile.

The material with particle sizes between 10 mm and 3 mm is directed to a coarse gravity module consisting of a sluice followed by a jig used as cleaner. Concentrate containing the coarse gold from the jig is bagged.

The undersize which is less than 3 mm is pumped to a gravity concentrator feed tank and then to a batch centrifugal gravity concentrator which produces a high-grade Au-Ag concentrate. The high-grade concentrate produced is bagged in large filter bags.

The Gravity Wash Plant includes a regrind mill and classification step to facilitate increased recovery of gold and silver. The regrind mill is expected to receive the tailings from the sluice, jig, and gravity concentrator to reduce its particle size. The resulting material is then subjected to classification through hydrocyclones, with the overflow discharged to the main tailings management facility. The hydrocyclone underflow is redirected back to the gravity concentrator to enable further recovery of precious metals. The flowsheet is shown in Figure 17.2. Final optimization of the flowsheet will be performed during the detailed engineering phase of the Project.

The design criteria for the Gravity Wash Plant is presented in Table 17.4.

Table 17.4 – Key Process Design Criteria (Gravity Wash Plant)

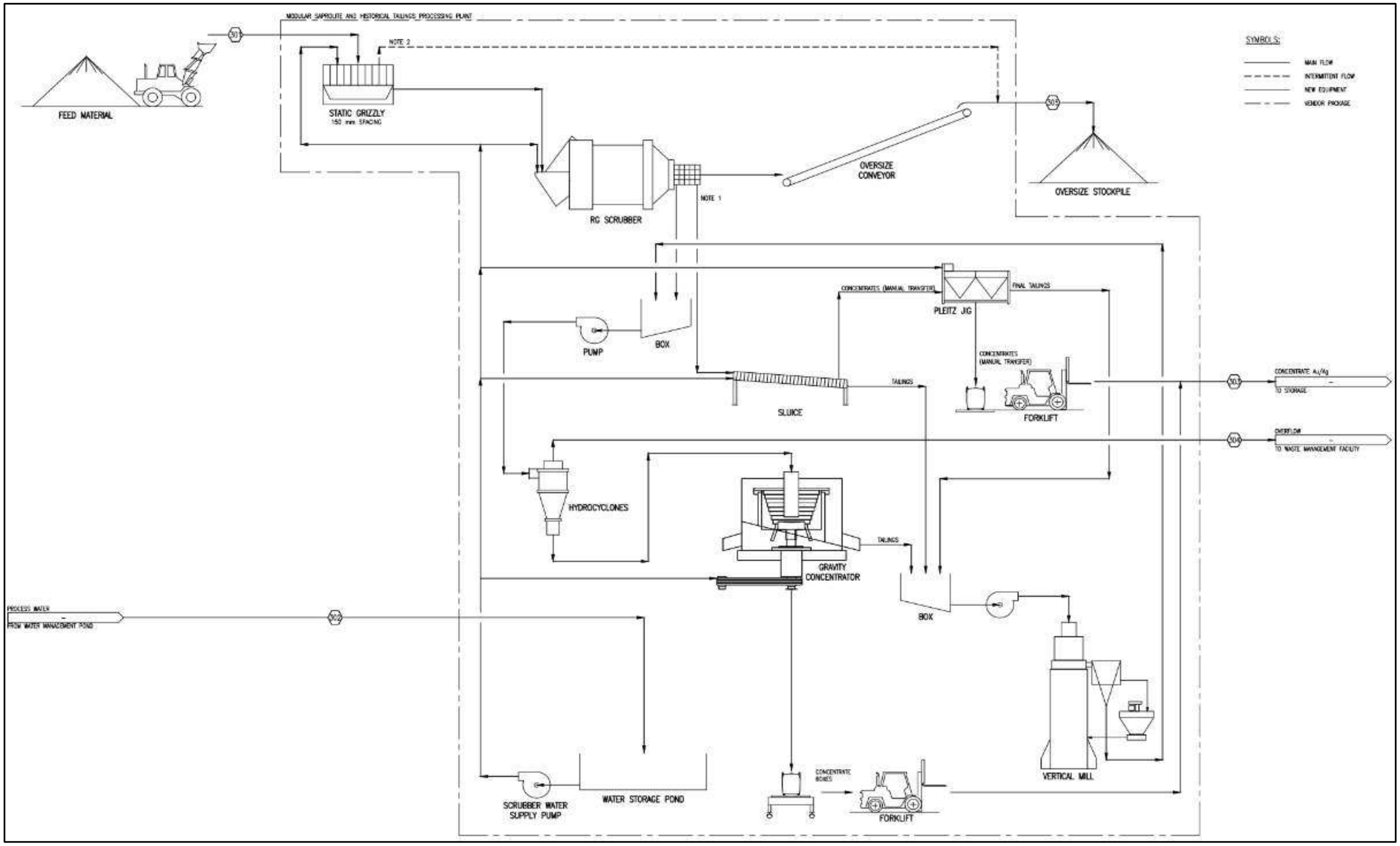
Description	Unit	Value
Plant Design Capacity – Saprolite	tpd	2,400
Plant Design Capacity – Historical Tails	tpd	1,200
Specific Gravity – Saprolite	t/m^3	2.78
Specific Gravity – Historical Tails	t/m^3	2.84
Feed Granulometry F_{80} – Saprolite	µm	160
Feed Granulometry F_{80} – Historical Tails	µm	233
Ball Mill Work Index- Saprolite	kWh/t	3.05
Ball Mill Work Index – Historical Tails	kWh/t	6
Regrind Mill Grind Size (P_{80}) – Saprolite	µm	45
Regrind Mill Grind Size (P_{80}) – Historical Tails	µm	90
Mass Pull – Overall	% of feed	0.08 (0.05 to 0.1)
Gold Recovery – Saprolite Ore	%	36
Silver Recovery –Saprolite Ore	%	3
Gold Recovery – Historical Tailings	%	37
Silver Recovery –Historical Tailings	%	3.5

Source: DRA 2023

17.4 Production Schedule

The production schedules for the Concentrator and Gravity Wash Plant are presented in Tables 17.5 and 17.6, respectively.

Figure 17.2 – Simplified Process Flowsheet (Gravity Wash Plant)



Source: DRA, 2023

Table 17.5 – Concentrator-Production Schedule

Material	Units	LOM TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Mill Feed thru Mill	tpd		17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600
Days per year	days/year		326	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Ore	tpa	**89,356,503**	5,732,672	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	6,424,000	111,831
Cu in ore	%	**0.45**	0.56	0.58	0.57	0.66	0.55	0.52	0.37	0.36	0.38	0.44	0.45	0.32	0.33	0.23	0.19
Au in ore	g/t	**0.23**	0.22	0.30	0.24	0.30	0.22	0.23	0.20	0.30	0.31	0.25	0.21	0.18	0.18	0.13	0.10
Ag in ore	g/t	**2.65**	3.51	3.79	3.63	4.41	3.10	2.81	1.57	1.57	1.82	2.75	2.95	1.95	2.05	1.30	1.10
Copper Concentrate	t	**1,808,098**	144,640	164,005	180,051	178,075	156,308	147,434	93,842	111,676	114,038	133,712	128,593	91,929	96,024	66,833	939
Mass % of Plant Feed	%	**2.0%**	2.5%	2.6%	2.8%	2.8%	2.4%	2.3%	1.5%	1.7%	1.8%	2.1%	2.0%	1.4%	1.5%	1.0%	0.8%
Cu in conc	% wt	**20**	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Au in conc	g/t	**7.37**	5.23	7.53	6.26	6.56	5.69	6.04	8.44	11.04	11.29	8.16	6.55	8.04	7.60	7.99	7.30
Ag in conc	g/t	**87**	94	97	105	101	81	78	49	61	73	93	98	88	89	79	82
Gravity Gold Concentrate -Mill	t	**26,807**	1,720	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	34
Mass % of Plant Feed	% wt	**0.03%**	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
Au in conc	g/t	**109**	97	139	127	132	101	102	91	139	145	123	96	85	84	62	46
Ag in conc	g/t	**309**	412	429	503	480	344	315	133	192	232	340	343	227	239	152	128

Table 17.6 – Gravity Wash Plant-Production Schedule

Material	Units	LOM TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Wash Gravity Plant														
Saprolite ore	t	**7,359,076**	828,456	876,000	876,000	876,000	876,000	876,000	876,000	876,000	398,620			
Au in saprolite	g/t	0.24	0.34	0.35	0.24	0.22	0.22	0.21	0.20	0.19	0.19			
Ag in saprolite	g/t	**2.72**	4.91	2.78	2.69	2.65	2.50	2.40	2.20	2.15	1.90			
Historical tails	t	**1,234,123**	0	0	0	0	0	0	0	0	234,603	437,999	437,999	123,522
Au in historical tails	g/t	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.30	0.27	0.26
Ag in historical tails	g/t	**0.89**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.90	0.84	0.83
Gravity Gold Concentrate	t	**6,875**	663	701	701	701	701	701	701	701	507	350	350	99
Mass % of Plant Feed	% wt	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Au in conc f/ gravity plant	g/t	**113**	154	157	109	98	98	94	88	87	109	138	125	119
Ag in conc f/gravity plant	g/t	**93**	184	104	101	99	94	90	82	81	61	39	37	36

18 PROJECT INFRASTRUCTURE

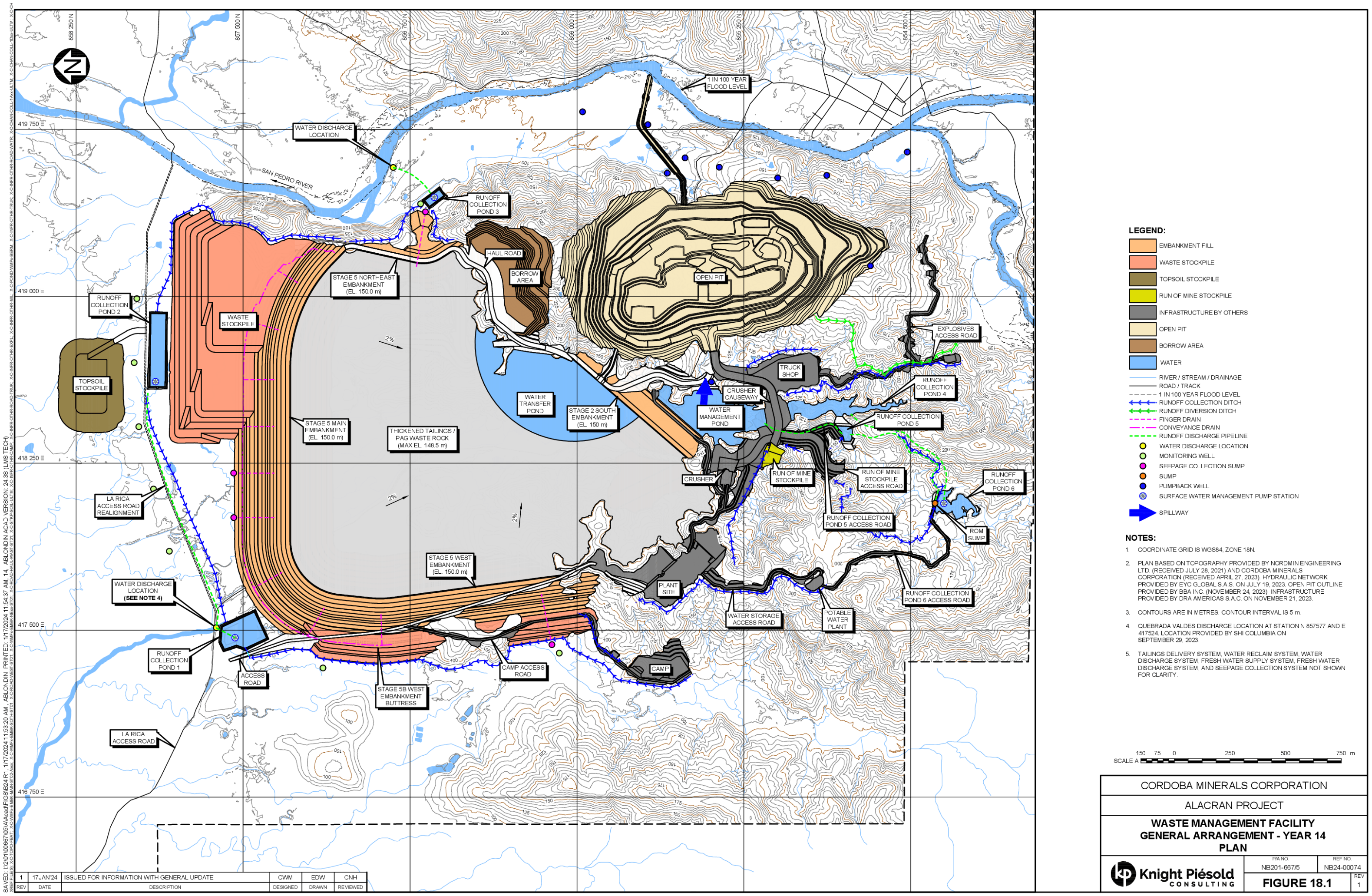
18.1 Introduction

The main Project off-site and on-site infrastructure components include:

- External (offsite) and internal access roads,
- Port (offsite) facilities,
- Mine and process plant supporting infrastructure, including site accommodation facilities,
- Power supply and distribution,
- Services and utilities,
- Water management, and
- Waste management facility (WMF).

Infrastructure locations are shown in Figure 18.1 including the maximum extents of the pit, WMF ultimate arrangement, and operational stockpile areas.

Figure 18.1 – Project Site General Arrangement



NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. PLAN BASED ON TOPOGRAPHY PROVIDED BY NORDMIN ENGINEERING LTD. (RECEIVED JULY 28, 2021) AND CORDOBA MINERALS CORPORATION (RECEIVED APRIL 27, 2023). HYDRAULIC NETWORK PROVIDED BY EYC GLOBAL S.A.S. ON JULY 19, 2023. OPEN PIT OUTLINE PROVIDED BY BBA INC. (NOVEMBER 24, 2023). INFRASTRUCTURE PROVIDED BY DRA AMERICAS S.A.C. ON NOVEMBER 21, 2023.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 5 m.
4. QUEBRADA VALDES DISCHARGE LOCATION AT STATION N 857577 AND E 417524. LOCATION PROVIDED BY SHI COLUMBIA ON SEPTEMBER 29, 2023.
5. TAILINGS DELIVERY SYSTEM, WATER RECLAIM SYSTEM, WATER DISCHARGE SYSTEM, FRESH WATER SUPPLY SYSTEM, FRESH WATER DISCHARGE SYSTEM, AND SEEPAGE COLLECTION SYSTEM NOT SHOWN FOR CLARITY.

CORDOBA MINERALS CORPORATION
ALACRAN PROJECT
WASTE MANAGEMENT FACILITY
GENERAL ARRANGEMENT - YEAR 14
PLAN

P/A NO.	REF NO.	REV
NB201-667/5	NB24-00074	1

FIGURE 18.1

Source: Knight Piésold, 2023

18.2 Geotechnical Investigation of Site Facilities Locations

Geotechnical investigations were carried out to support the Project facilities locations such as the concentrator, primary crusher, saprolite stockpile, low-grade stockpile, camp, truck shop, fuel storage, and electrical substation.

18.2.1 GEOLOGICAL CHARACTERIZATION

Geologically, this site is constituted by the weathering levels of volcanic sedimentary rocks on some areas covered by shallow, coarse-grained alluvial soils. In outcrops, the residual soil (Level VI) and saprolite (completely weathered, level V) are observed, with silty clay granulometry, soft to firm consistency, medium humidity, and plasticity.

Morphologically, the Project area comprises the basins of the Valdéz Creek to the east, the Concepción Creek to the west, and the hills between the creeks and other small stationary drainage basins. The area is characterized by moderate slopes on the flank slopes, with straight to convex surfaces, where no morpho-dynamic processes were observed that could affect the development of the works to be implemented.

Due to the vegetation cover, the scarcity of outcrops, and the high thickness of soils in the area, the material characterization was complemented by the geotechnical exploration carried out during the PFS and FS.

18.2.2 GEOTECHNICAL CHARACTERIZATION OF SITE FACILITIES LOCATIONS

Geotechnical characterization of the ground in the infrastructure area was developed in the PFS and FS stages. Work is summarized in Table 18.1.

Table 18.1 – Summary of Geotechnical Soil Investigations in the Infrastructure Area

Exploration in the PFS Stage	**Quantity**
Rotary Drilling with Sample Recovery	35
Exploration Pits	28
Exploration in the FS Stage	**Quantity**
Seismic Refraction Lines	6
Rotary Drilling with Sample Recovery	3
Percussion Drilling SPT Type	10
Exploration Pits	4

Source: IRYS,2022

Soil and rock samples were retrieved from the boreholes for classification, grain size analysis tests, plasticity limits, and shear strength testing. The soils are generally classified as clayey silts or silty clays of medium to high plasticity. Soils with liquid limit and natural moisture varying from higher to lower values along the depth, showing soils of greater plasticity at the surface. Some rock samples were selected for unconfined compression testing.

18.3 Roads

The Project requires roads to connect the various Project elements and form a transport network that can be traversed by all required traffic. The rugged terrain of the site necessitated a suitable road design criteria to ensure roads are optimally sized for the required traffic. Design for all roads is completed to an FS level, including major stability works estimation.

18.3.1 ACCESS ROADS

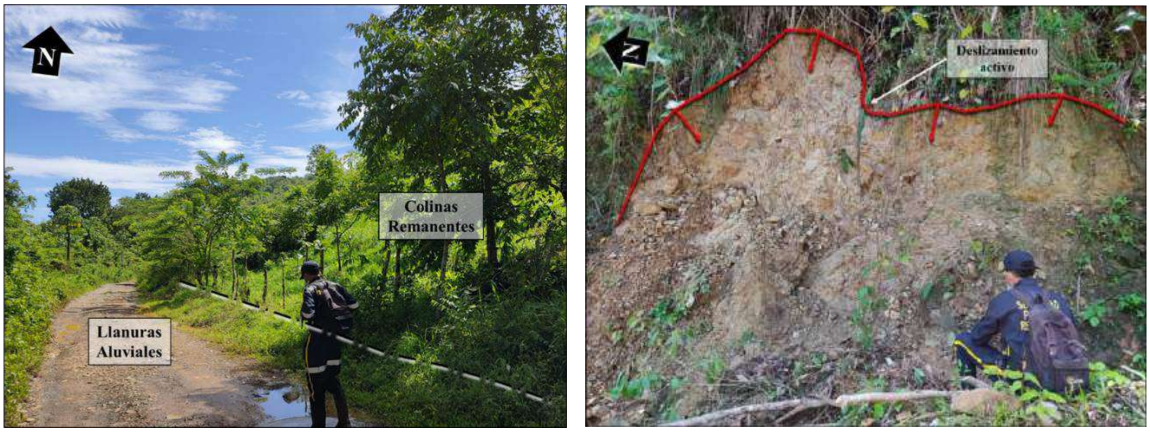
The Property is accessible by travelling to Puerto Libertador and then by driving approximately 21 km from Puerto Libertador on a hard-packed, gravel road passing through the town of La Rica. The main access road between La Rica and the site security gate is lower quality, being only wide enough for one vehicle and with sharp turns and abrupt grade changes. It is assumed that the entire road will be upgraded and widened to allow two-way traffic and transport trucks. The state of the current road is shown in Figure 18.2.

The roads to the Project site comprise four (4) sections totaling 11.73 km, as follows:

- The first section includes an existing road connecting San Juan Viejo to the existing camp departure point (150 m before Quebrada San Matias) and the road from the above site to Quebrada Valdéz.
- The second section connects the village of Martillazo with the construction camp.
- The third section connects the town of La Rica with the Quebrada Valdéz bridge.
- The last section is a bypass road around La Rica.

IRYS prepared an FS design of the La Rica road upgrade including detailed geological, geomorphological, and geotechnical surveys, as well as hydrologic, hydraulics, and structural design of bridges and culverts. The state of the current road is shown in Figure 18.2.

Figure 18.2 – Existing Topography along La Rica Road



Source: IRYS, 2023

The access road construction will begin in Q3 2024 with a completion time of 24 months.

18.3.1.1 Geomorphology

The Project is located at the northern end of the Western Cordillera, which merges with the Caribbean Plains. Geomorphological units originating from denudation and fluvial environments were identified, with a minor presence of anthropogenic elements; these units developed over alluvial deposits and the weathering profiles of volcanoclastic rocks. The future exploitation zone (pit) is located on hills of moderate height (denudative environment), and alluvial plains and lower hills appear in the surroundings. The flat to gentle slopes associated with the alluvial plains predominate along most of the road corridor. Along the San Juan- San Matias- Martillazo roads, geoforms of denudative origin could reach moderate (15% to 30%), strong (30% to 50%), and extreme (50% to 100%) slopes.

18.3.1.2 Regional Geology - Lithological Units

The lithologic units identified along the route are as follows:

a. **Barroso Formation** - constitutes the lithological basement of the region, corresponds to volcano-sedimentary rocks, mainly basalts, tuffs, and andesites, and very much affected by tropical chemical weathering.

b. **Neogene Sedimentary Rocks** - mainly interstratified sandstones and mudstones from completely weathered (Level V) to moderately weathered rock (Level III), mudstones are fine-grained, massive, to black clastic rocks, matrix of fine sand.

c. **Alluvial Deposits** - accumulations of recent materials associated with the fluvial dynamics of local rivers and streams; most are silts ranging from clayey to sandy. Their plains have a good expression in the San Juan Viejo - Intercambio - San Pedro River section. Likewise, alluvial terraces can be found in several segments of the San Pedro River - Quebrada Valdéz and La Rica - Quebrada Valdéz roads.

18.3.1.3 Seismic Hazard Study

For the seismic hazard calculation, the probability of occurrence of an earthquake was assigned to each return period evaluated in the study: 100, 200, 475, 1,000, 2,500, 5,000, and 10,000 years (Document Irys-P0149-082023 R2. Seismic Hazard Study - Cordoba Minerals). El Alacrán is located north of the Colombian Andes, in a region dominated by the interaction between the Nazca, Caribbean, and South American Plates with the Choco-Panama Block and the North Andes Block. Several main faults are relatively close to the mine area. Crustal earthquakes are associated with the main fault system. Other seismogenic sources are the subduction, the intraplate (Benioff), and the intraplate Bucaramanga Nest. Seismic data was collected from 1610 to June 2022 and used within a 300 km radius of the mine.

Probabilistic Calculation of Seismic Hazard

Calculating seismic hazard from a probabilistic approach statistically quantifies the probability of exceedance of a given seismic event and defines the magnitude. The return periods of 100, 200, 475, 1,000, 2,475, 5,000, and 10,000 years were defined. Based on the results, the Peak Ground Acceleration (PGA) values for each return period and risk of exceedance were defined as shown in Table 18.2 – Results of PGA Values for Different Return Periods.

Table 18.2 – Results of PGA Values for Different Return Periods

Return Period (Tr)	Tr 100	Tr 200	Tr 475	Tr 1000	Tr 2475	Tr 5000	Tr 10000
Exceedance Rate (1/Tr)	0.01	0.0050	0.002	0.001	0.0004	0.0002	0.0001
PGA (g)	0.046	0.116	0.183	0.249	0.345	0.431	0.531

Source: Irys-P0149-082023-R2-Seismic Hazard Study - Cordoba Minerals

Deterministic Calculation of Seismic Hazard

The seismic hazard was also evaluated from a deterministic approach, highlighting a maximum PGA value of 0.45 g, corresponding to the area where the El Alacrán open pit is located and where the highest PGA is obtained (Table 18.3).

Table 18.3 – Deterministic Analysis Results

Scenario	Type	Mw	Rhypo [km]	PGA (g)
Crustal 06 Zone Event	Surface	7.0	10	0.45
Crustal Event Sabanalarga Fault	Surface	7.0	25	0.14

Scenario	Type	Mw	Rhypo [km]	PGA (g)
Crustal Event - Espíritu Santo Fault	Surface	7.0	30	0.12
Interplate Segmented Model	Surface - Deep	8.0	158	0.05
Interplate Non-Segmented Model	Surface - Deep	9.0	158	0.09

Source: Irys-P0149-082023-R2-Seismic Hazard Study - Cordoba Minerals

The maximum deterministic PGA value, equal to 0.45 g, is greater than the acceleration for a return period of 5,000 years and less than the acceleration for a return period of 10,000 years, which correspond to 0.43 g and 0.53 g, respectively, from the probabilistic seismic hazard analysis.

18.3.1.4 Road Design Criteria

Road design criteria is according to the *Manual de Diseño Geométrico* (Geometric Design Manual) (INVÍAS, 2008). The design vehicle is the C3S3 tractor-trailer truck. The design of bridges was done for the loaded C3S3 truck and verified for the Volvo A35D and CAT 777 heavy trucks, which can circulate empty over the bridges (one per bridge).

The typical road cross-section has two (2) 3.65 m wide lanes, with 1.20 m berms on both sides. An over-width was designed at curves to allow the safe crossing of two (2) C3S3 trucks.

18.3.1.5 Cut Slopes and Embankments

The design of cut slopes was based on the results of stability analyses. Limit equilibrium analyses were carried out using the Slide software of the Rocscience package. Safety factors were set as recommended by Asociación Colombiana de Ingenieria Sísmica (Colombian Association of Seismic Engineering) (NSR-10), 2010. In general, road cuts are low (up to 3 m), but for the Sector San Juan-Quebrada Valdéz higher cuts are required.

Embankments have a maximum height of 7.2 m, and most heights are less than 5.50 m.

18.3.1.6 Road Subgrade and Bridge Site Explorations

The subgrade was explored through manual excavations of test pits and Cone Dynamic Penetrometer (CPD) tests. 30 test pits of an average depth of 1.0 m were excavated along the various routes; 55 CPD tests were performed. Two (2) rotary boreholes were drilled for each bridge, (one in each abutment): El Salado, La Concepción, Valdéz, San Matias, and San Pedro. The depth of the boreholes varied between 15.30 m and 40.50 m. 19 percussion drill holes for Standard Penetration Testing (SPT) were carried out along the road corridor to design cuts and other works. Depths vary between 1.20 m and 9.00 m.

18.3.1.7 *Transverse Drainage Work*

Hydraulic design of the transverse drainage or crossing works was done following the design methodology guidelines of the INVÍAS Drainage Manual for Roads, 2009. In summary, 30 transverse crossings were identified along the access roads to the Project.

18.3.1.8 *Structural Design of Bridges*

The Colombian Code of Bridges - 2014 (CCP-14) was followed in the analysis and design of bridge structures. The results of the structural designs and sizing of the bridges are presented below.

San Pedro River Bridge

The bridge has a slab on four (4) 1.90 m high pre-stressed beams. The bridge deck span is 40.0 m, and the slab width is 10.40 m and has two (2) 3.65 m wide lanes, with 1.20 m berms on both sides. Each abutment is supported on three piles of 2.00 m diameter and 30.00 m depth.

Valdéz Bridge

The bridge deck (18.00 m long x 10.40 m wide) is formed by a 0.20 m thick reinforced slab on four 1.30 m high reinforced beams supported on abutments. The foundation has two (2) 2.0 m diameter piles per abutment with depths between 24.5 m and 26.0 m.

El Salado Bridge

The bridge deck (20.00 m long x 10.40 m wide) is formed by a 0.20 m thick reinforced slab on four (4) 1.40 m high reinforced concrete beams supported on abutments. The foundation system has two (2) 2.0 m diameter piles per abutment with a depth between 32.0 m and 34.5 m.

La Concepción Bridge

The bridge deck (18.00 m long x 10.40 m wide) is formed by a 0.20 m thick reinforced slab on four (4) 1.30 m high reinforced beams supported on abutments. The bridge has a 3.65 m wide lane and a 7.65 m wide lane (due to the curve), with a 1.20 m berm on each side. The foundation system has two (2) 2.0 m diameter piles per abutment with depths between 33.5 m and 34.0 m.

San Matías Bridge

The bridge deck (18.00 m long x 10.40 m wide) is formed by a 0.20 m thick reinforced slab on four (4) 1.30 m high reinforced beams supported on abutments. The bridge has two (2) 3.65 m wide lanes, with 1.20 m berms and New Jersey-type barriers on each side. The bridge abutments are founded on a cyclopean concrete restitution supported on partially weathered rock.

18.3.2 SITE ROADS

The Project will include two (2) types of site roads:

- Service roads for light vehicle access in and around the site, including the process plants, Project site infrastructure buildings, and the open pit.
- Haul roads for transporting ore and waste from the open pit to the plant, stockpiles, and WMF.

Roads will be designed with a gravel wearing course. Road widening is applied at horizontal curves in cases where curves do not provide sufficient clearance for the longest vehicles. Road drainage will be collected in open channels where possible and conveyed to appropriate discharge points. The general site road specifications are shown in Table 18.4.

Table 18.4 – Site Road General Specifications

Description	**Requirement**	
	Site Roads	Haul Roads
Design Vehicle	Light vehicle	CAT 777
Lane Width	3.5 m	10.0 m
Number of Lanes	2	2
Shoulder	0.5 m	3.5 m
Berm Height	TBD	1.3 m
Maximum Gradient	12%	10%
Minimum Radius	20 m	25 m
Design Speed	20 to 30 km/h	10 to 35 km/h
Cross Fall Slope	1% to 4%	1% to 4%
Ditch Slopes	1.5H:1V	1.5H:1V
Truck Loads (maximum)	50 t	91 t
Road Surface Course	150 mm gravel	300 mm gravel
Road Base	300 mm	400 mm
Road Sub-Base	Variable thickness	1000 mm

Source: DRA 2023

18.3.2.1 Site Access Road

The site access road will be located on the western edge of the Quebrada Valdéz valley and will be incorporated into the main WMF embankment to optimize construction requirements and minimize site disturbance. Figures 18.3 and 18.4 show the alignment of the access road as the WMF is constructed and expanded.

The Stage 1 access road will be constructed during Years -2 and -1 of the mine plan and will be approximately 2.1 km long. This road will be modified as the main embankment is raised throughout the mine life. A significant reroute for the access road occurs at Stage 4 of the WMF layout which will be the final road route for the LOM. The final access road will be approximately 1.9 km long.

The typical cross section of the road at all stages is summarized as follows:

- Road width 12 m. Ditches will be excavated along road sides, where applicable, to convey.
- Runoff to the runoff collection ponds.
- Crossfall or crown of 2% to allow runoff to shed from the road surface.
- 300 mm thick road base and 150 mm thick road topping to support vehicle traffic.

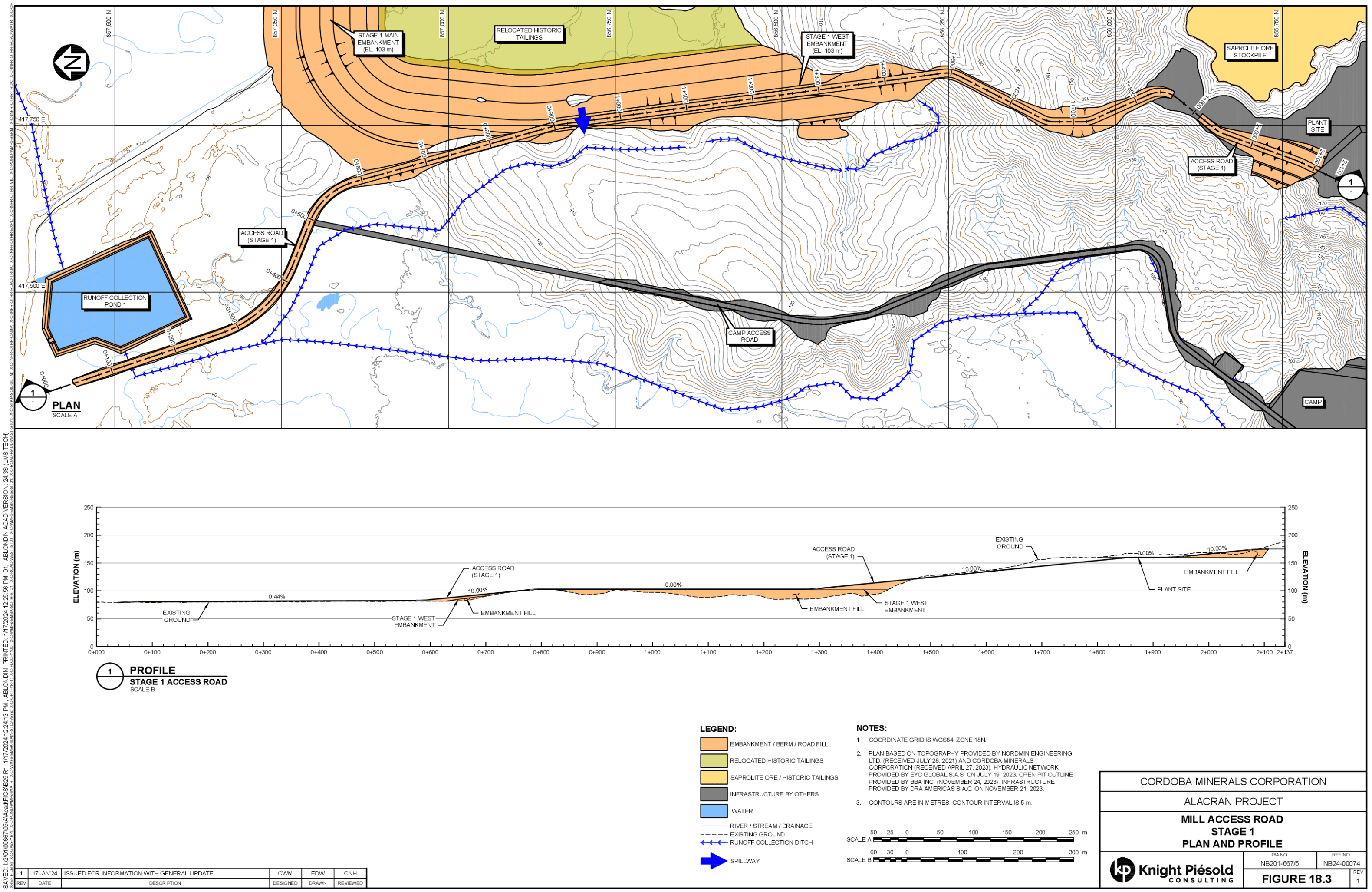
18.3.2.2 Ex-Pit Haul Roads

The ex-pit haulage roads on site will be built to withstand frequent heavy mine traffic. Like the El Alacrán open pit and WMF haulage roads, the ex-pit haul roads will be wide enough to accommodate two (2) mine trucks passing each other and have grades no greater than 10%.

The main ex-pit haul roads are as follows:

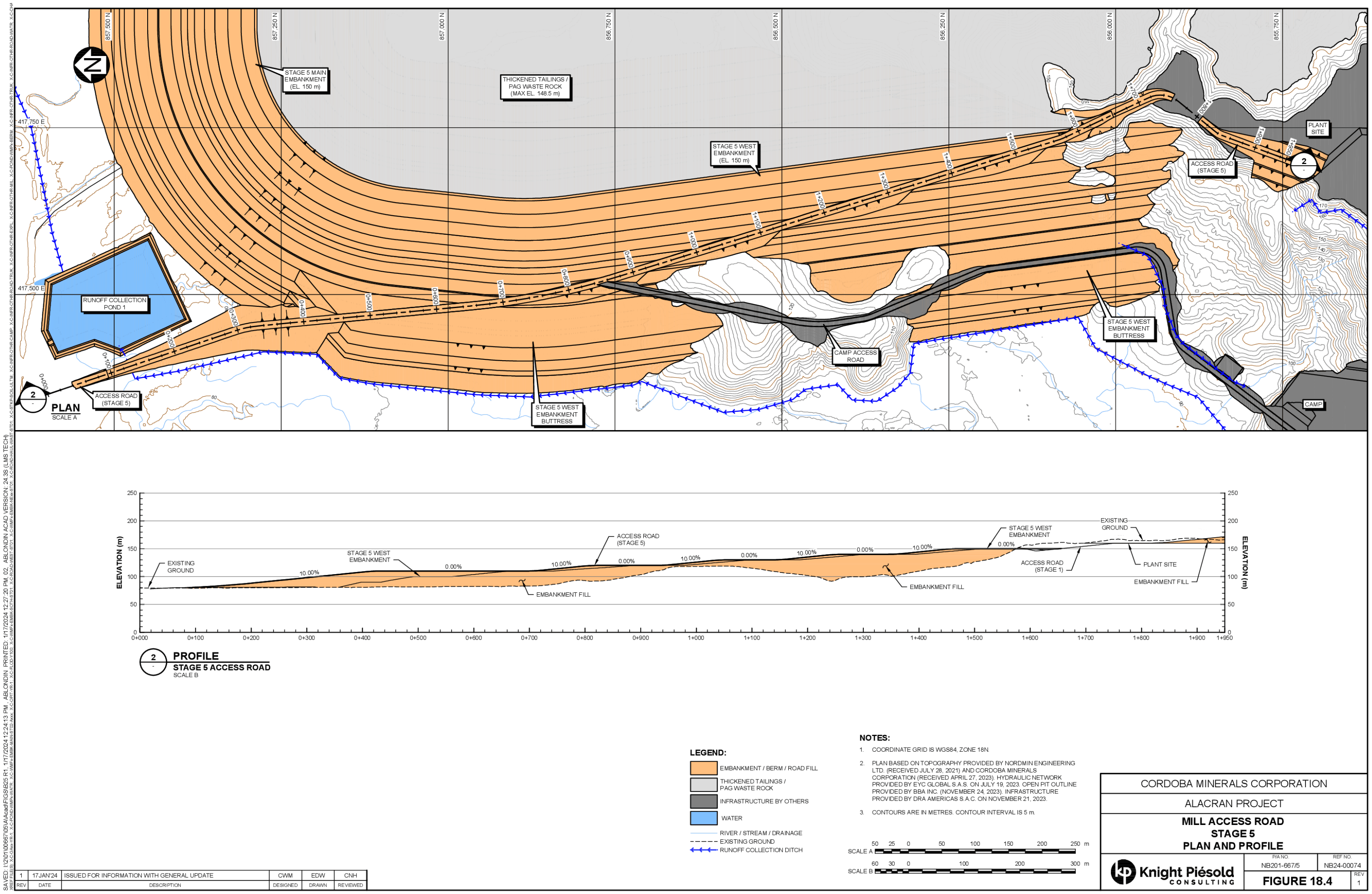
- To the primary crusher;
- To the truck shop and fuel dispensing area;
- To the north ROM stockpile;
- To the south ROM stockpile;
- To the borrow pit; and
- To the WMF.

Figure 18.3 – Access Road Stage 1 Plan and Profile



Source: Knight Piésold, 2023

Figure 18.4 – Access Road Final Plan, Profile, and Sections



LEGEND:

- 🟧 EMBANKMENT / BERM / ROAD FILL
- ▨ THICKENED TAILINGS / PAG WASTE ROCK
- ■ INFRASTRUCTURE BY OTHERS
- 🟦 WATER
- RIVER / STREAM / DRAINAGE
- EXISTING GROUND
- RUNOFF COLLECTION DITCH

NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. PLAN BASED ON TOPOGRAPHY PROVIDED BY NORDMIN ENGINEERING LTD. (RECEIVED JULY 28, 2021) AND CORDOBA MINERALS CORPORATION (RECEIVED APRIL 27, 2023). HYDRAULIC NETWORK PROVIDED BY EYC GLOBAL S.A.S. ON JULY 19, 2023. OPEN PIT OUTLINE PROVIDED BY BBA INC. (NOVEMBER 24, 2023). INFRASTRUCTURE PROVIDED BY DRA AMERICAS S.A.C. ON NOVEMBER 21, 2023.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 5 m.

CORDOBA MINERALS CORPORATION

ALACRAN PROJECT

MILL ACCESS ROAD
STAGE 5
PLAN AND PROFILE

Knight Piésold CONSULTING

P/A NO. NB201-667/5
REF NO. NB24-00074
FIGURE 18.4
REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17JAN'24	ISSUED FOR INFORMATION WITH GENERAL UPDATE	CWM	EDW	CNH

Source: Knight Piésold, 2023

18.4 Port Facilities

Cordoba will export concentrate products through the Caribbean Port of Tolú, which is the closest port with capacity to handle bulk concentrates for export. The Port of Tolú (Figure 18.5) is located on the Colombian Atlantic Coast, in the department of Sucre, southwest of the city of Santiago de Tolú. Tolú is approximately 274 km by road from the Mining Concession Contract III-08021 and is accessible through various roads.

The Port of Tolú, located in the Gulf of Morrosquillo and managed by Compas, has become another gateway for Colombian foreign trade, after the National Tax and Customs Directorate (DIAN) authorized the operation of the terminal as a public warehouse and of international logistical support. The complex provides direct loading of coal and other minerals to ships, complying with environmental regulations. Additionally, the complex offers facilities for livestock and agricultural exports and has an expansion area of more than 300,000 m².

Figure 18.5 – Port of Tolú Facilities

Source: DRA, 2023

The Project's two (2) concentrate products (copper concentrate and gold concentrate) will both be shipped from this port. Details of the planned shipping logistics, containers, and destinations are described in Section 19.

The port facilities are a key component in the supply chain. They provide storage of concentrate while being accumulated for export, a safe berth for chartered bulk transport vessels, and the capability to receive, store and load concentrate onto cargo ships. The container shipping and storage design provides a low-cost solution that can be easily implemented at this port for the Project.

The primary copper-gold-silver concentrate will be delivered by truck to the port in 20-ft ISO tipping containers. The containers will be received, inspected and unloaded from the truck trailer and stored uncovered on a concrete pad in a secure, guarded and fenced container storage area.

1. Warehousing

   A new gated storage area will be required at the Port of Tolú to house the concentrate material before being loaded onto ships. This facility will include installing a concrete pad enclosed in a gated secured area. The concrete storage pad dimensions are 72 m long x 48 m wide, for a total area of 3,456 m². The concrete pad will provide storage capacity for up to 20,000 t of concentrate in 20-ft containers; additional storage capacity is available on-site, if required.

2. Export Vessel Loading

   The port operator will be responsible for loading the berthed vessel by using a front-end loader equipped to handle ISO containers. The Handymax ship equipped with two (2) 40 t cranes will be fitted with a RAM tipper that will be used to lift the container, automatically remove the lid, tip the container, and dump the copper concentrate into the ship's cargo haul. Dust suppression will be provided while dumping to eliminate dust emissions.

18.4.2 SYSTEMS DESIGN SPECIFICATIONS

- Handymax ship equipped with 40-t crane capacity;
- RAM 8-t revolving spreader;
- Automated lid removal;
- 3-t 20-ft ISO tipping container; and
- 29 t of copper concentrate.

18.4.3 HIGH-CYCLE OPERATION

- Average 120,540 tpy of concentrate production;
- 15 years of operation;
- 334 containers filled per month;
- 12 containers per day loaded at mine site;
- 15 lifts per hour;
- 400 t per crane per hour;
- 2 cranes per ship;
- 18,000 tpd loading capacity; and
- Ship average cargo 10,045 t per month.

18.4.4 CONTAINER SPECIFICATION

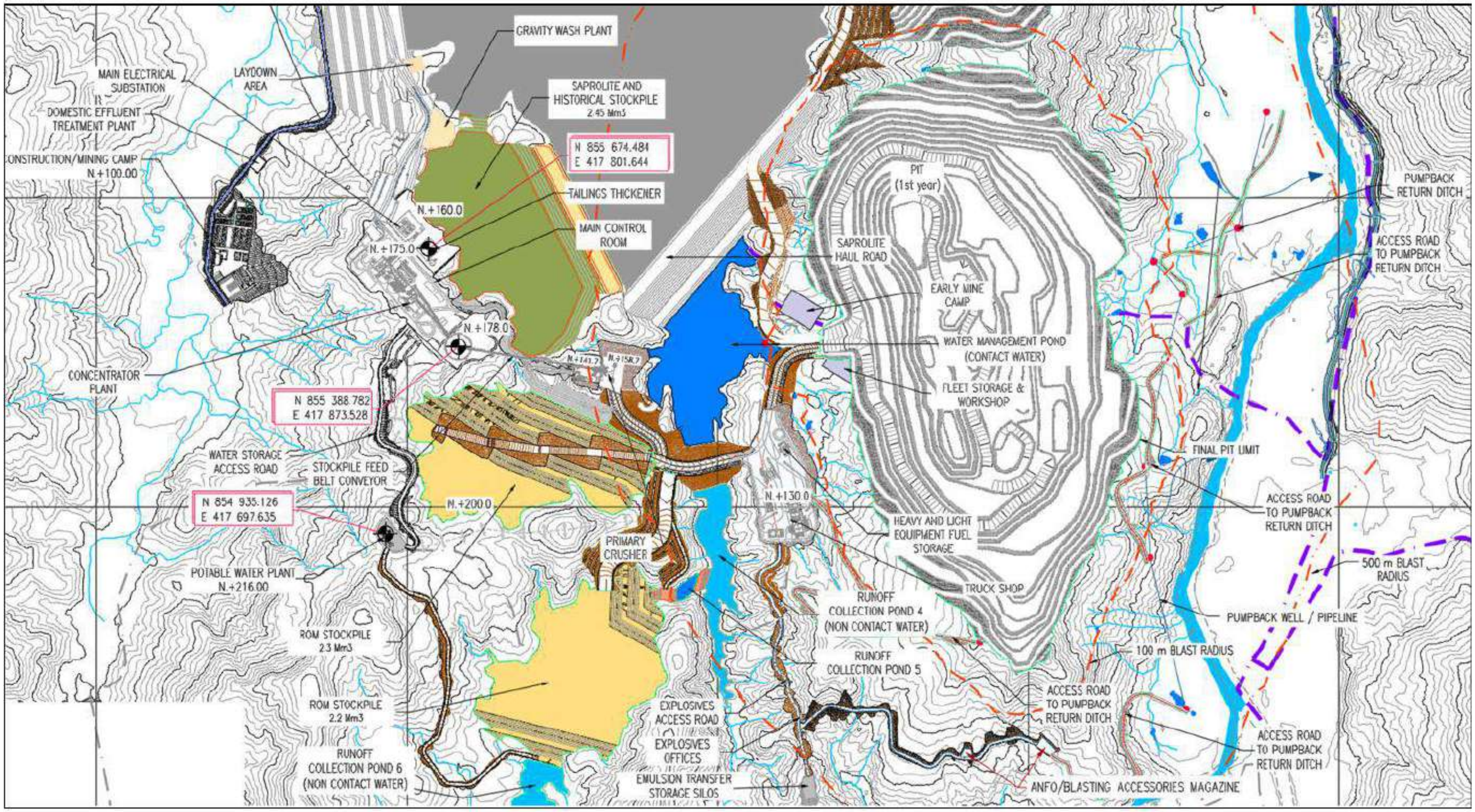
- 3 t tare weight;
- 38 t capacity;
- 517 containers total (leased); and
- Automated lid removal.

18.5 On-Site Infrastructure

Infrastructure locations for the Project were mainly selected based on the proximity to the open pit, location of ore body, and site topography. An overall site plan is shown in Figure 18.1 and a detailed view of the infrastructure is illustrated in Figure 18.6. The locations of buildings and other infrastructure are based on information gathered from site visits and geographical data.

The El Alacrán open pit is located to the east of the mining and processing infrastructure area and is accessed by a 25 m wide haul road.

Figure 18.6 – General Arrangement for Site Mining and Processing Infrastructure



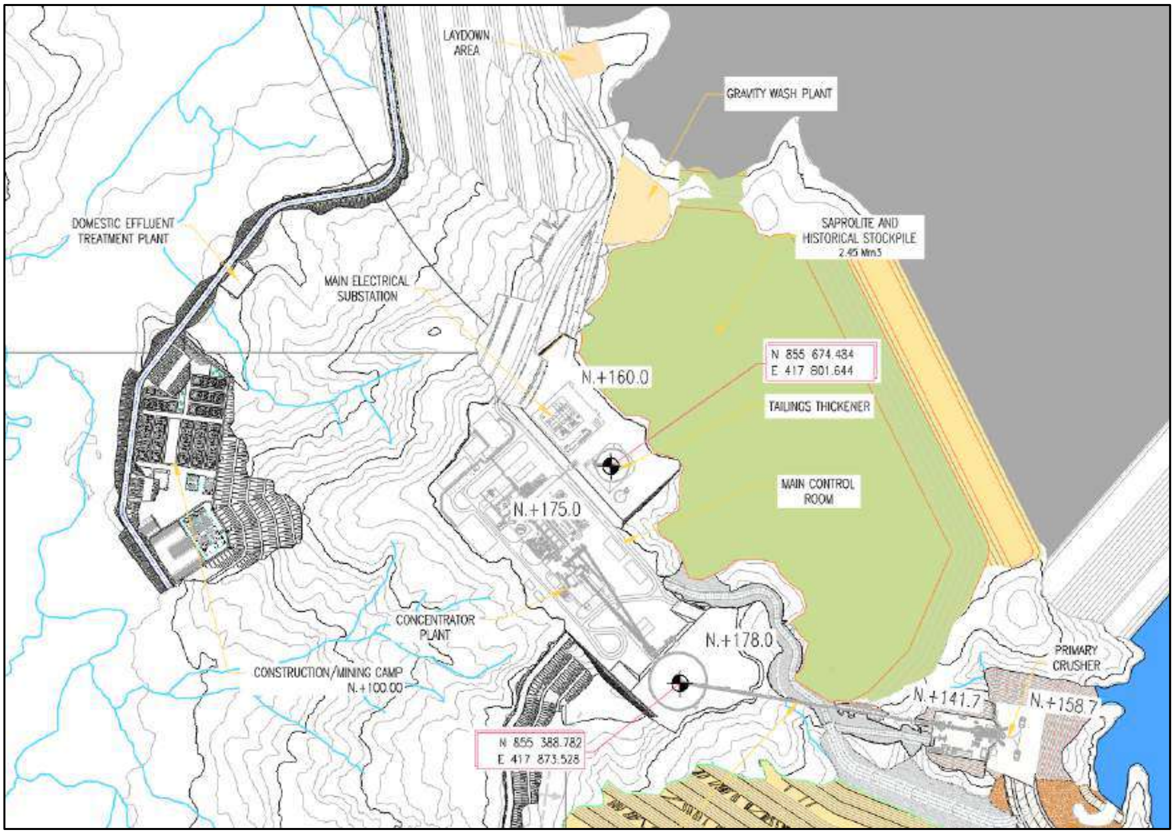
Source: DRA, 2023

18.5.1 CONCENTRATOR PLANT AND PRIMARY CRUSHER

The plant is located just over 1,000 m from the El Alacrán open pit exit (Figure 18.7). With the exception of the truck shop and fuel storage, the ancillary buildings are located close to the plant. The primary crusher is located 300 m east of the plant. A coarse ore belt conveyor transports crushed ore to the concentrator. A stockpile located north of the plant stores saprolite and historical tailings, and a stockpile located to the south stores ROM ore.

The WMF will be constructed in the valley west of the El Alacrán open pit, as described in Section 18.9.

Figure 18.7 – Concentrator Plant, Primary Crusher, and Saprolite Stockpile

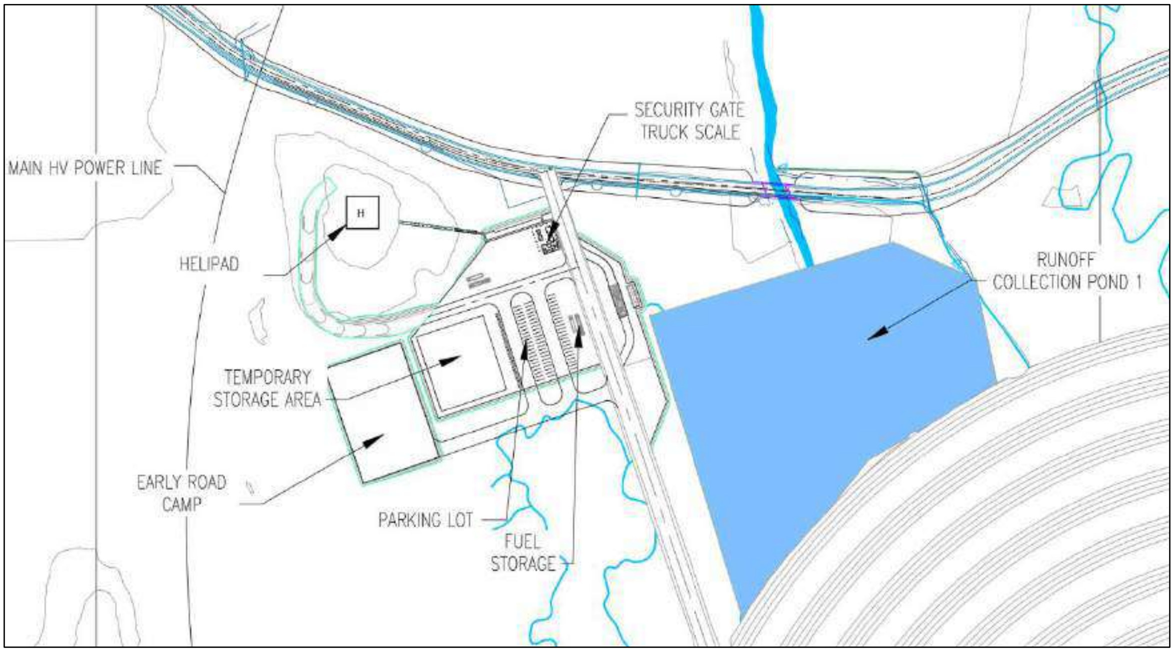


Source: DRA, 2023

18.5.2 TRUCK SCALE AND HELIPAD

A truck scale as well as diesel and jet fuel storage and dispensing facilities are close to the security gate, at the start of the site access road. A helipad, to be used either for a medical evacuation or helicopter arrivals to the site, is 150 m to the west of the security gate (Figure 18.8).

Figure 18.8 – Gate House Area showing Truck Scale, Helipad and Fuel Storage Locations

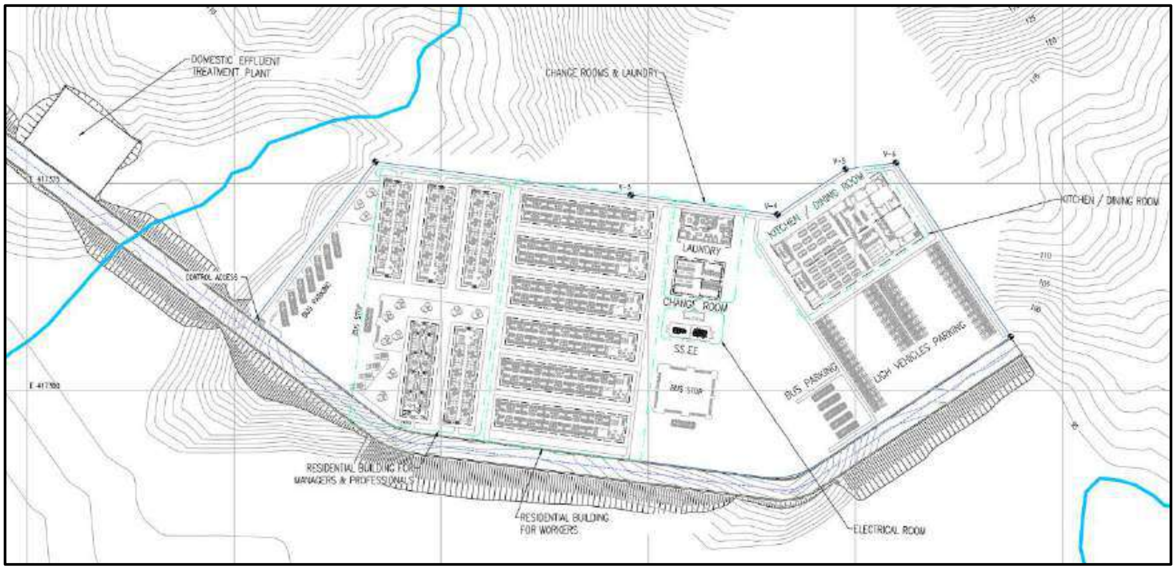


Source: DRA, 2023

18.5.3 CAMP AND CHANGE ROOM

The construction and operations camps are positioned west of and 75 m below the main infrastructure area pad as seen in Figure 18.9, with capacity for 600 workers The camp will be two-storey, container-type construction, and will share a central kitchen and dining hall. A change room and a laundry are located next to the camp.

Figure 18.9 – Camp Area



Source: DRA, 2023

18.5.4 TRAINING CENTRE AND EMERGENCY RESPONSE TRANSPORT BUILDING

The training centre and the Emergency Response Transport (ERT) building are on the main infrastructure pad, across from the grinding area of the plant. The training centre consists of offices, classrooms, and a 130 m² hall. The ERT building is a 25.3 m x 10.5 m structure with a fire truck bay, ambulance bay, office space for emergency response and security personnel, and storage rooms.

18.5.5 MAIN OFFICE AND LABORATORIES

The main office and laboratories are to the west of the plant. The ground floor of the main office will provide office and cubicle space for 18 personnel (mine and mill management, human resources, administration, and mill maintenance). The second floor, with a capacity of 41 people, will provide office and cubicle space for mining, engineering, geology, safety, environmental and site services personnel. The main office has five meeting rooms and a conference room with a total capacity of 73 people. The laboratory will consist of the assay lab, metallurgical (MET) lab, and mine lab.

18.5.6 CONCENTRATOR PLANT SHOP AND WAREHOUSE

The concentrator plant shop and warehouse are located south of the plant, across from the flotation concentrate stockpile and loadout area. A welding shop and space for routine maintenance activities will be provided. The shop will be serviced by a 5-t bridge crane. An office located on the second floor of the shop will provide space for ten (10) mill operations and maintenance personnel.

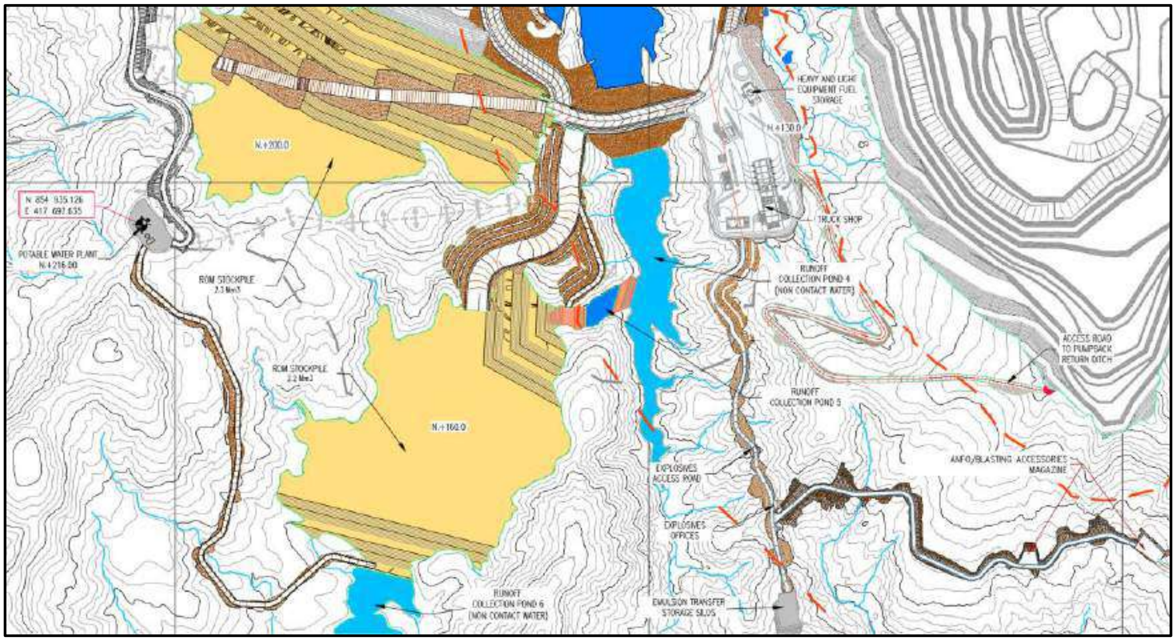
18.5.7 CONCENTRATE STOCKPILE AND LOADOUT BUILDING

The concentrate stockpile and loadout building, located at the west end of the plant, will house concentrate ready for shipment to the port. The concentrate stockpile is fed by a covered conveyor belt directly from the plant; this building is designed to store 2,125 t of concentrate.

18.5.8 TRUCK SHOP

The truck shop is a covered steel structure building with an overhead crane and reinforced concrete floor. It is located about 800 m southeast of the plant and 200 m southwest of the open pit exit. It houses four (4) repair bays, three (3) for servicing CAT 777 D rock trucks, and one (1) for servicing support equipment (e.g.: dozers, excavators, graders). Space for a welding fabrication area is also provided for miscellaneous maintenance requirements. Covered areas for the truck wash as well as for the tire repair and replacement shop are provided. The shop also includes a warehouse, small repair workshops, offices, and common areas. The mine supervision and truck dispatch office, with cubicle space for eight (8) people, will be located on the second floor (Figure 18.10).

Figure 18.10 – Truck Shop, ROM Stockpile, and Explosives Magazines



Source: DRA 2023

18.5.9 EXPLOSIVES MAGAZINES AND EMULSION STORAGE

An ANFO and blasting accessories magazine will be built south of the open pit. Their respective capacities are based on the LOM schedule. Their design and location are based on local regulations. The emulsion storage area is located 600 m south of the truck shop and 380 m west of the ANFO magazine. Access to the explosives magazines and emulsion storage area is via a road from the south end of the truck shop (Figure 18.10).

18.5.10 LAYDOWN AREAS

Laydown areas near the gate house, just north of the gravity wash plant, and on the plant pad will provide space for staging equipment and material.

An area near the southeast laydown is reserved for hazardous waste storage, and will store waste such as oil barrels, soil, or materials contaminated with fuel and chemical containers before being removed from site by contractors for proper disposal.

18.6 Power Supply and Distribution

18.6.1 PROJECT POWER REQUIREMENTS

Based on specified equipment requirements for the Project, the total connected plant load is about 42.6 MW / 48.4 MVA and the maximum demand is approximately 38.4 MW / 43.4 MVA, taking into consideration the total site wide power requirements for the process plant, tailings, and general infrastructure. However, based on typical operation of the plant, the operating demand is estimated at 34 MW. Taking into consideration the planned plant availability, annual energy consumption is estimated at approximately 200,000 MWh.

18.6.2 SUPPLY AND DISTRIBUTION

Electrical power to the Project will be supplied via a new 41 km long, 110 kV transmission line from the Cerro Matoso substation to the site substation, located adjacent to the plant. Figure 18.11 shows location of the Cerro Matoso substation, the site, and the planned route of the transmission line.

Figure 18.11 – Project Electrical Interconnection to Existing Cerro Matoso Substation

Source: Cordoba Study of Potential Transmission Line Routes

Located approximately 35 km northeast of the Project site, the Cerro Matoso substation is owned by TRANSELCA (part of the ISA group of companies) and operated by CaribeMar de la Costa (CaribeMar, part of the AFINIA/EPM group of companies, for operations at and under 110 kV) and ISA Intercolombia (part of the ISA group of companies, for operations above 110 kV).

This substation is an integral component of the national electrical grid in the northern regions of the country, with operations at 500 kV, 220 kV, 110 kV, and 34.5 kV. The Cerro Matoso substation is currently connected to the Urra hydroelectric generation facility and a nearby thermal generation facility fueled by locally mined subbituminous coal, among others, and has future planned connections to other hydroelectric and photovoltaic generation facilities.

The Cerro Matoso substation will be expanded to connect to the Project. The expansion will include installation of a three-phase transformer with capacity of at least 50 MVA in an existing bay adjacent to current 110 kV operations, with associated equipment, controls, and protection for connection. As required by national regulation, the Project submitted its request for connection to the Cerro Matoso substation as part of the FS efforts and does not foresee any barrier to approval of this connection.

The preliminary route of the transmission line was determined based on the most direct route with the least number of vertices to avoid areas that may be sensitive from environmental, social, or safety perspectives. The line will utilize aluminum conductor steel reinforced (ACSR) conductor cable with a cross-section of 336.4 KCMIL (or approximately 170 mm^2) with a nominal capacity of about 90 MW, supported by lattice steel towers.

The site primary power distribution will operate nominally at 13.8 kV which is supplied by two (2) 50/66 MVA (ONAN/ONAF), 110 kV/13.8 kV step down transformers connected to a “main-tie-main” switchgear lineup installed in a prefabricated electrical building. The switchgear lineup and two (2) transformers provide redundancy to the primary power distribution in case some equipment needs to be taken offline for maintenance or repair for an extended duration. A 110 kV circuit breaker and motorized disconnect switches will be installed ahead of the two (2) main transformers.

A site wide overhead line distribution is planned for construction which will feed the north and south side infrastructure from two separate 13.8 kV overhead line feeders. The north power line distribution will supply power to the camp, main gate, helipad, potabilization plant, saprolite and historical tailings plant, water collection, and pumping stations. The south power line will provide power to the open pit, primary crusher, truck shop, explosives magazines, WMF, and south side water collection and treatment.

13.8 kV to 4.16 kV and 600 V distribution step-down transformers will be installed in strategic locations to service site loads. These transformers, interconnected with suitably rated switchgear and motor control equipment, will service the individual loads.

Smaller, suitably rated pole mounted transformers will be used to service remote loads along the 13.8 kV pole line routes.

The electrical systems (13.8 kV, 4.16 kV, and 600 V) will each be resistance-grounded to meet standard safety and mine electrical code requirements.

18.6.3 BACK-UP ELECTRICAL POWER

Back-up power for critical infrastructure at the mine site will be provided from a 1000 kVA diesel powered generator set. The generator will be directly connected to the 13.8 kV distribution bus and interlocked with the incoming supply from the main step-down transformers.

Additional back up power will be supplied by a 500 kVA diesel generator located at the camp and a 300 kVA diesel generator located at the gate house.

18.7 Services and Utilities

18.7.1 FUEL

The FS assumes that fuel supply will be contracted out and delivered by road transport. The main fuel storage tanks and fuel dispensing station will be located close to the truck shop area, 120 m southwest of the open pit exit. A total of 650,000 L of fuel will be stored in the location indicated in Figure 18.10.

A secondary fuel storage and dispensing area, to service transport trucks, light vehicles, and helicopters, will be located next to the gate house, A total of 68,000 L of diesel fuel and 68,000 L of jet A1 fuel will be stored in the location indicated on Figure 18.8.

18.7.2 WATER

Supernatant and runoff collected in the WMF basin will be transferred to the WMP via pump barge and HDPE pipeline. This approach will minimize water volume present in the WMF basin, maximize storage capacity in the WMF basin, and maintain the WMF water pond elevation below the maximum allowable water elevation. Process water for milling operations will be sourced from the WMP. Water will be transferred for use in the process from the WMP to the Process Water Tank at the plant site via a pump barge and HDPE pipeline.

Fresh water supply for buildings, and for fire suppression, will be sourced from the Runoff Collection Pond 4. Water will be pumped to the mill freshwater tank via a pump barge and HDPE pipeline. Grey water and sewage will be treated in the Domestic Effluent Treatment Facility and the treated water will be discharged to the environment.

The site will operate under a hydrological surplus with excess contact water collected in the WMP and excess freshwater collected in Runoff Collection Pond 4. Excess water will be discharged to environment if required. Water discharge and freshwater discharge systems are described below.

- **Water Discharge System** - Excess contact water in the WMP will be pumped to Rio San Pedro via pump station and HDPE pipeline.
- **Freshwater Discharge System** - Excess freshwater in Runoff Collection Pond 4 will be pumped directly to the San Pedro River, via pump barge and dedicated HDPE pipeline.

18.7.3 DOMESTIC EFFLUENT TREATMENT PLANT

Wastewater from the camps and other on-site facilities will be piped underground to an effluent treatment facility. This facility will be located north of the camp and will be able to treat up to 90 m^3/d of domestic wastewater. The facility will collect and then treat sewage and grey water generated by the camps and other infrastructure buildings. The effluent treatment facility will use a biological process of activated sludge in conventional aeration mode, in which microorganisms transform wastewater into a clarified liquid without bad odours. It will consist of one buried 32,000 L balance tank feeding a biological reactor with a secondary settlement stage, resulting in a clear effluent which meets local environmental standards, to be appropriately discharged to the environment.

18.7.4 GATE HOUSE/SECURITY

The gate house/security building is a 19 m x 12 m container-type construction located at the start of the access road north of the WMF. It will serve as the primary checkpoint for entering site from La

Rica Road. The structure will have offices for security guards and a security system for monitoring arriving and departing personnel. The building will be continuously occupied by security personnel.

Perimeter fencing will be built, as required.

18.7.5 COMMUNICATIONS

The Project communication infrastructure consists of the DCS, CCTV, access control, voice and data, fire detection, and electrical SCADA systems. All communication services will use a common single-mode 9/125 µm optical fibre-type for physical links.

Cellular service and Wi-Fi are currently available at the site and will be extended to the office and plant areas. Ultra-high frequency (UHF) radio will be used in the pit and WMF, with a base station at the security building. An area of the infrastructure pit has been reserved for satellite dishes to facilitate any required incoming data.

For telecommunication services, including internet access, the Project site will be connected to Cerro Matoso via a fibre optic link. Aerial fibre optic cable with messenger wire will be installed along the 41-km transmission line from Cerro Matoso.

18.8 Water Management

The water management strategy for the Project includes contact water from the WMF, WMP, open pit, ore stockpiles, and plant site infrastructure. The WMP will be primarily used to temporarily store water from the WMF, contact water from operations, and inflows from the open pit. Water stored in the WMP will be used to provide the required reclaim water to the mill.

The primary objectives for the site water management strategy include:

- Provide sufficient water supply to support milling under a range of potential climate conditions over the entire LOM;
- Manage seepage and contact water to minimize direct discharge to downstream watersheds;
- Maintain stormwater inflow capacity in WMF and WMP, and limit water build-up within WMF;
- Provide best management practices (BMPs) for erosion and sediment control; and
- Safely convey Inflow Design Flood (IDF) through spillways.

Pumps and pipelines will be installed for water transfer to the WMP, water reclaim to the mill, and excess water discharge from the site. The site water balance, water management strategies, and stormwater management measures are summarized below.

18.8.1 SITE WIDE WATER BALANCE

The site wide water balance was prepared to confirm that adequate reclaim water would be available for the mill and to estimate the required water discharge rates from the site. Surface water runoff will be managed based on the site arrangement shown in Figure 18.1.

The key input parameters and assumptions for the site wide water balance are as follows:

- **Years Modelled** – The water balance was developed to estimate flows throughout the mine life including one year of construction (Year -1), 14.02 years of production, and 16 years for closure (Year 30). Years -1, 4, 10, 15, 20 and 30 were selected as representative years to illustrate the water balance and estimate the range of outputs during construction, production, and closure.
- **Hydrological Conditions** – The water balance indicates that the Project will operate under an annual water surplus.
- **Hydrological Information**:
    - Monthly precipitation data were developed by INTERA based on daily precipitation data from several monitoring stations in the region near the Project site (INTERA, 2023a and 2023b). Monthly precipitation data were provided from 1990 to 2019, with 2016 omitted due to lack of data (29 years of data). The mean annual precipitation is estimated at 3,105 mm.
    - Daily evaporation data from nearby monitoring stations was analyzed by INTERA (2023a). The average annual evaporation is estimated at 1,514 mm.
    - Runoff coefficients for various site areas were estimated Knight Piésold.
- **Surface Water Management** – Six (6) Run-off Collection Ponds will be constructed at site to manage surface water, as follows:
    - **Ponds 1 through 3**: These ponds will be located downgradient of WMF perimeter embankments and will collect sediment and runoff from the local WMF slopes, access road, and mill/admin area. The ponds will be constructed with cut and fill methodology.

      A portion of each basin will be excavated into the natural ground and the remainder will be formed by constructing perimeter berms using saprolite. Each berm will be about 1 m high with a 6 m crest width and 2.5H:1V upstream and downstream slopes. Excavation slopes will also be 2.5H:1V.

      Collected water will be discharged to nearby drainage following sediment removal. A spillway will be installed in each pond to convey excess water from significant storm events directly to the environment.
    - **Pond 4**: Runoff Collection Pond 4 will be located south of the WMP and will be separated from the WMP by the crusher causeway. This pond will collect non-contact runoff directly from local watersheds and indirectly from the Quebrada Valdéz watershed upstream of

the ROM stockpile. The foundation for Pond 4 will be stripped of organics and topsoil only, and the basin will be formed between the crusher causeway and adjacent natural topography.

The crusher causeway will be constructed to minimum El. 140.5 m and the pond be operated at maximum operating El. 119 m, which is the maximum WMP operating level. Excess water entering the pond will be discharged to the San Pedro River via pump and pipeline (Freshwater Discharge System). A spillway is not included in the Pond 4 layout.

  - **Ponds 5 and 6**: Runoff Collection Pond 5 will be located down gradient from the ROM stockpile and will collect contact water and sediment from the stockpile. Runoff Collection Pond 6 will be located upstream of the ROM stockpile and will collect non-contact water from the Quebrada Valdéz upstream catchment. The ponds will be constructed by excavating into natural ground and constructing berms with saprolite.

    Surface water management details include the following:

    - The ponds will be constructed with cut and fill methodology. A portion of each basin will be excavated into the natural ground and the remainder will be formed by building perimeter berms using saprolite. Each berm will be approximately 1 m high with a 6 m crest width and 2.5H:1V upstream and downstream slopes. The excavation slopes will also be 2.5H:1V.
    - Contact water from the ROM stockpile surface will report to Pond 5 or to a sump adjacent to Pond 6. Water collected in the sump will be pumped to Pond 5.
    - Non-contact water from the undisturbed catchment upslope from the stockpile will report to Pond 6. Collected water will be pumped to the WMP.
    - A spillway will be installed in the Pond 5 arrangement to convey water from the design storm event to Pond 4.
    - The Pond 6 arrangement will not include a spillway. The pump in Pond 6 will convey flows to Pond 4.

- **WMF and WMP** – The following key estimates / assumptions are made for the water balance:
  - The final settled dry density for the deposited mixed waste (tailings and waste rock) is estimated at 1.64 t/m³ based on laboratory testing results by WSP Canada Inc. (WSP, 2023a through 2023d). The estimate assumes a waste rock placed dry density of 2.1 t/m³, and partial filling of waste rock voids with tailings.
  - The operational pond volume in the WMF basin will be minimized throughout the operational phase by pumping supernatant and runoff to the WMP.
  - The WMP is sized for a maximum operating pond volume of 488,000 m³, which was selected based on mill throughput rate and available space for the WMP. The minimum operating pond volume was set to 200,000 m³ to maintain adequate water depth for water

  - reclaim and water treatment barges and to allow the water treatment rate to be relatively constant over the LOM.
  - The WMP and Pond 4 will be combined at closure to create the closure WMP by removing the crusher causeway. The closure WMP pond volume will increase to a maximum of 1,000,000 m³. Excess water from the closure WMP will drain by gravity to the open pit.
- **WMF Seepage** – Seepage estimates for the main/west, northeast, and south embankments were developed by Knight Piésold for the Stage 1 and Stage 5 operating conditions (Knight Piésold, 2023a). Seepage from the main/west and northeast embankments will be routed to sumps via finger drains and conveyance drains and recycled back to the WMF (Flow 37). It is assumed that all seepage from the south embankment will report to the open pit (Flow 31) and transfer to the WMP via the open pit dewatering system (Flow 12). Additional assumptions used to estimate seepage rates for the evaluated years in the water balance model are as follows:
  - Seepage rates for Years 4 and 10 are estimated from the Stage 1 and Stage 5 seepage rates based on WMF projected filling level. The increase in seepage over time is assumed to be linear to estimate the seepage rates at Year 4 and Year 10.
  - Collected seepage from the WMF main/northeast/west embankments (Flow 37) and seepage from the south embankment to the open pit (Flow 31) are modelled assuming Year 14 seepage equal to Stage 5 seepage results. Year 20 (closure Year 6) seepage is modelled at half of Year 14, and Year 30 (closure Year 16) seepage is modelled as zero.
- **Open Pit**
  - Knight Piésold estimated the direct precipitation entering the open pit (Flow 10) based on the pit's surface area.
  - It is assumed that Cordoba will construct provisional ditches along the pit rim as it is expanded (S. Lehman/G. Kuntz, personal communication, October 5, 2023). All catchment areas reporting to the open pit will divert to permanent runoff diversion ditches based on this assumption.
  - Groundwater inflow estimates to the open pit (Flow 11) were provided by INTERA (2023c and 2023d). It is assumed that Cordoba will have a grouting machine present in the open pit to reduce potential inflows estimated by INTERA by one-third (S. Lehman/G. Kuntz, personal communication, October 5, 2023).
  - The open pit will be dewatered during the operational phase. The closure water balance includes for open pit filling, which accounts for decreased runoff and increased evaporation as it fills.
- **Mill and Camp** – Flow rates for the mill, truck shop, potable water system, and camp were provided by DRA (DRA, 2023).

- **Discharge to Environment**— Rates of discharge to the environment from the WMP, runoff collection ponds, and domestic waste treatment facility were estimated by Knight Piésold based on the water balance results.

18.8.1.1 *Water Management Overview*

During the production phase, runoff from outside the WMF footprint and ore stockpiles will be diverted and discharged to the environment. Contact water collected within the WMF, mill, ore stockpiles, and the open pit footprints will be conveyed by gravity or pumped to the WMP. Water in the WMP will be pumped to the mill for reuse as process water during milling. Freshwater required for the Mill will be pumped from Runoff Collection Pond 4 and excess freshwater will be discharged to the environment.

The following key activities will occur at closure:

- Closure Year 1 (Year 15) – Mill will be decommissioned and water from the WMF and combined WMP/Pond 4 (closure WMP) will be conveyed by gravity to the open pit, which will then begin to fill.
- Closure Years 4 and 5 (Years 18 and 19) – Discharge through the Open Pit spillway to the San Pedro River will begin in Year 18 under 95% hydrological conditions and in Year 19 under median and 5% hydrological conditions.
- Closure Year 5 (Year 19) – Runoff collection system will be decommissioned and runoff from the WMF embankments will report directly to the environment.
- Closure Year 10 (Year 24) – Camp will be decommissioned.

The key items considered in the water balance include:

- Collection ditches, diversion ditches, and the six (6) Runoff Collection Ponds around the perimeter of the WMF, WMP, and ore stockpiles;
- WMF;
- WMP;
- Open pit;
- Mill;
- Camp;
- Domestic Waste Treatment Facility; and
- Flows for use under unusual conditions (additional fresh water and water for fire suppression).

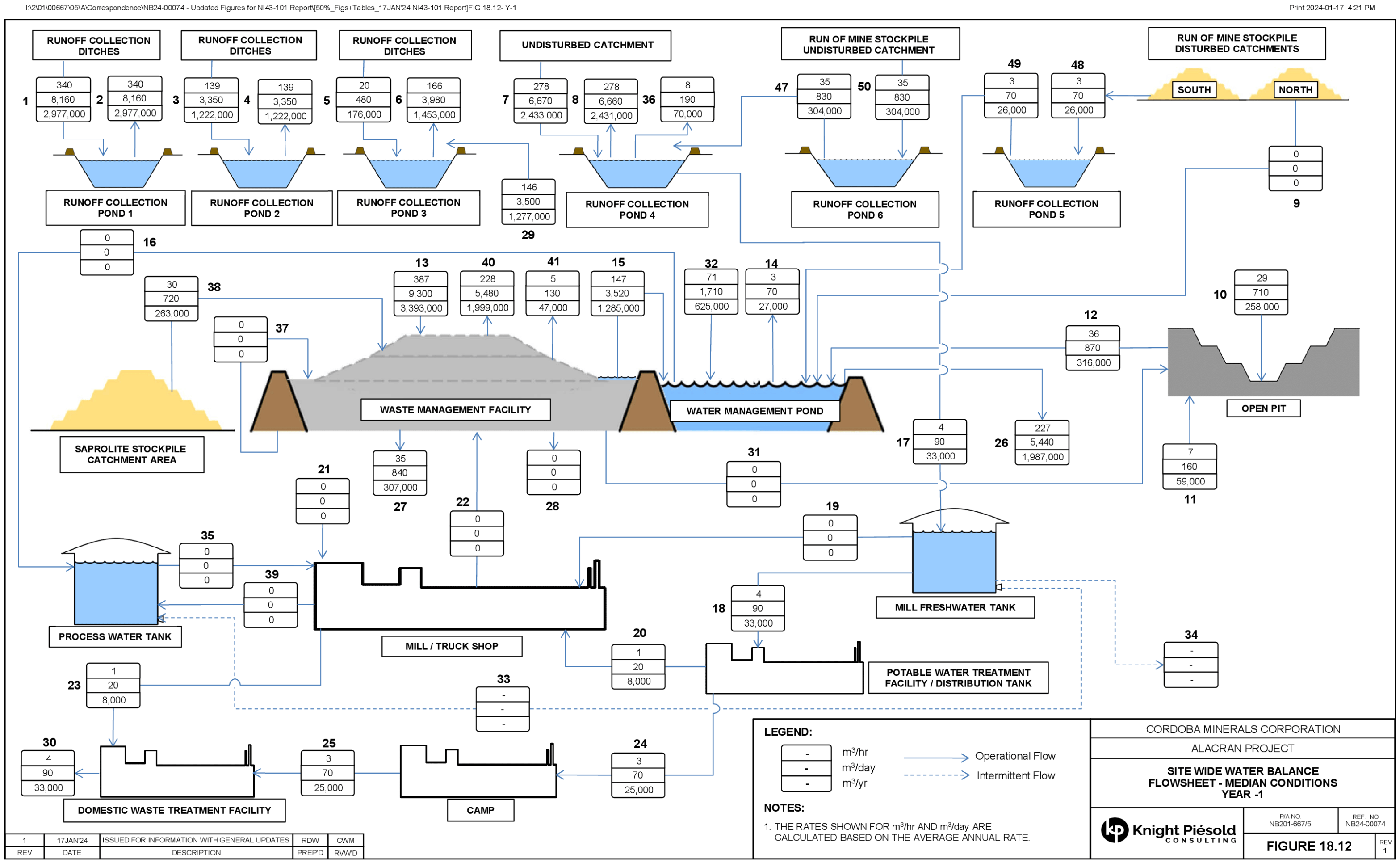
The flows included in the water balance model are illustrated in Figures 18.12 and 18.13, including estimated discharge rates to the environment.

18.8.1.2 Results

The key results from the water balance analysis are summarized below.

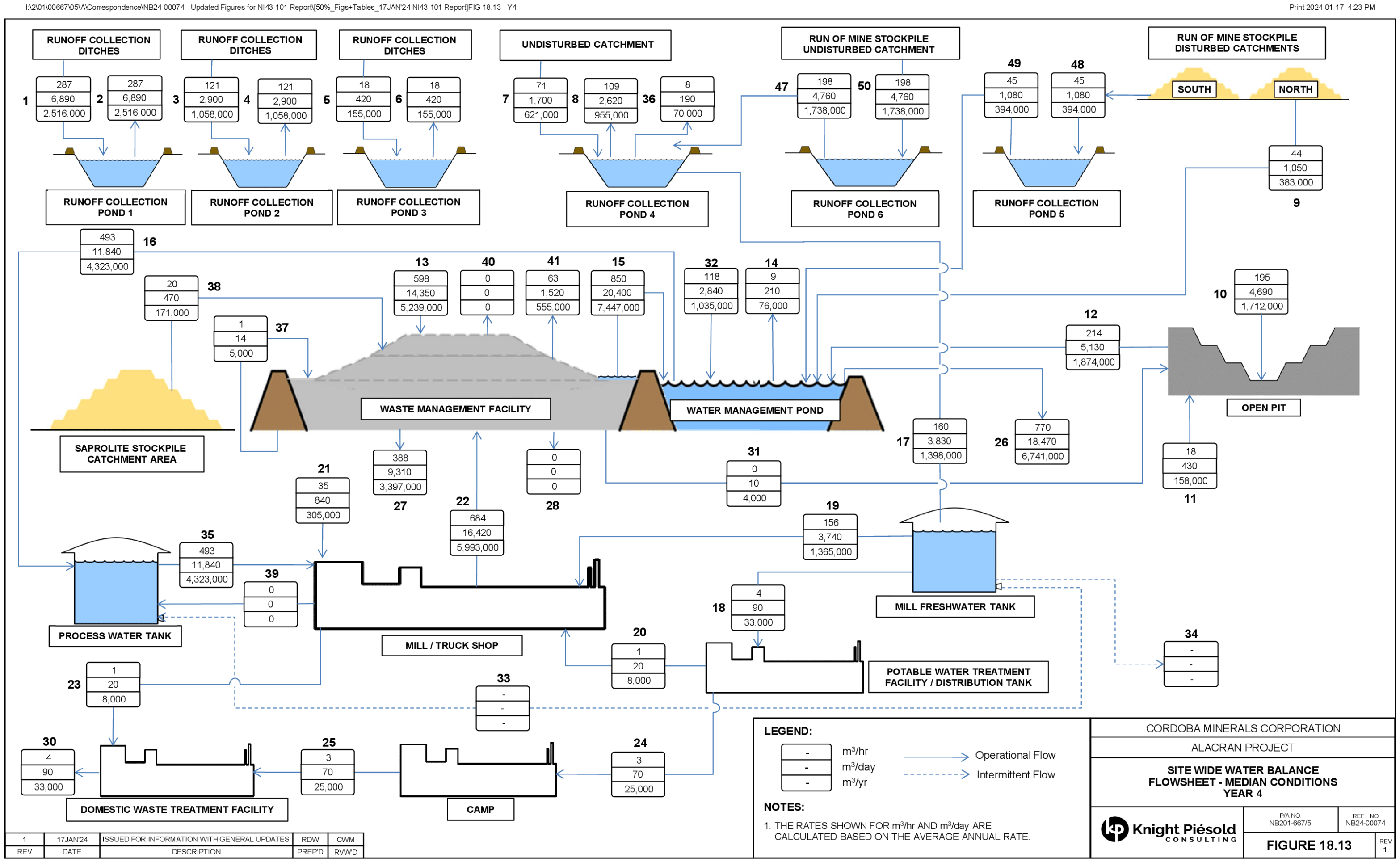
- The WMP has sufficient flexibility to manage water under median and 95% (wet) conditions during operations. Additional make-up water may be required to maintain milling operations under 5th percentile (dry) hydrological conditions.
- The site will operate with an annual net water surplus under all hydrological conditions. Excess water will need to be removed from Runoff Collection Ponds 1 through 4 and the WMP by pump and discharged to the environment during operations.
- The water transfer system is sized for 1,300 m³/h and the WMP discharge pump is sized for 1,850 m³/h.
- The open pit fills over about 4 years under 95% hydrological conditions and fills over about 5 years under 5% and median hydrological conditions. Flow then passes through the open pit spillway and to the San Pedro River.

Figure 18.12 – Year 1 – Water Balance Model



Source: Knight Piésold, 2023

Figure 18.13 – Year 4 – Water Balance Model



1. THE RATES SHOWN FOR m^3/hr AND m^3/day ARE CALCULATED BASED ON THE AVERAGE ANNUAL RATE.

Source: Knight Piésold, 2023

18.8.2 SURFACE WATER MANAGEMENT

Surface water management measures outside of the WMF, WMP, and ore stockpile footprints are located and sized to manage surface water during initial construction, and throughout the production phase. Measures include collection and diversion ditches, and runoff collection ponds. Pumps and pipelines are sized to convey runoff collected in ponds either to larger ponds, environment, or WMP.

Design criteria, analyses completed, and details for surface water management measures are described below.

18.8.2.1 Design Criteria

Design criteria for the surface water management measures are summarized below.

- **Storm Type** – An SCS Type III rainfall distribution is used in the analysis to reflect potential hurricane or tropical storm conditions.
- **Storm Intensity** – Extreme storm event data used to size surface water management measures was provided by INTERA (2021a). The storm events used to size the measures are provided below.
    - Runoff collection ditches are sized to convey the 1 in 50 year, 24-hour duration storm event (185 mm of rainfall), based on the 14-year mine life and industry best practices.
    - Runoff collection ponds and the WMP are sized to temporarily store runoff from the 1 in 10 year, 24-hour duration storm event (163 mm of rainfall), based on accepted guidelines in from the British Columbia Ministry of Environment (BCMOE) in Canada (BCMOE, 2015).
    - Runoff collection pond spillways are sized to safely pass runoff from the 1 in 200 year, 24-hour duration storm event (209 mm of rainfall) based on accepted guidelines in Canada (BCMOE, 2015). WMP spillway is designed to safely pass runoff resulting from the probable maximum flood (PMF).
- **Catchment Areas** – Catchment areas are defined based on the available topographical survey information and the proposed Project layout during Year -2 (Stage 1; initial construction).
- **Curve Numbers** – A Soil Conservation Service (SCS) runoff Curve Number (CN) is assigned to each catchment. The CNs are selected based on the available land use information, experience with similar projects, soil conditions encountered during site investigation programs, and input provided by INTERA (2021b). A high CN indicates high potential for runoff from catchment areas, while a low CN indicates low potential for runoff. The CNs used for the Project are provided in Table 18..

Table 18.5 – Soil Conservation Service – Curve Numbers for the Site

Area	Curve Number	Source
Active Tailings Beach	98	Knight Piésold Estimate
Inactive Tailings Beach	95	Knight Piésold Estimate
PAG Waste Rock	98	Knight Piésold Estimate
Water Transfer Pond	99	INTERA, 2021b
Cleared Area	73	INTERA, 2021b
Embankment Fill	77	Knight Piésold Estimate
Access Road	98	Knight Piésold Estimate
Disturbed Area/Mill	76	Knight Piésold Estimate

Source: Knight Piésold, 2021

- Freeboard collection and diversion ditches are sized to include a minimum of 0.3 m of freeboard. Runoff collection ponds are sized to include a minimum wet freeboard of 0.7 m above the spillway inverts for conveyance of IDF to the downstream environment, and a dry freeboard of 0.3 m for potential wind setup and wave run-up (total freeboard of 1.0 m).

18.8.2.2 *Design Methodology*

Stormwater modelling was carried out using HydroCAD® (HydroCAD, 2020) to estimate runoff volumes/peak flows for the collection and diversion ditches, runoff collection ponds, and WMP. The following methodologies were used to size the surface water management measures:

- **Peak Flows** – Peak storm runoff rate for each surface water management component was calculated using the Rational Method Equation ($Q = CiA$), where A is the area of the watershed that drains into the pond, C is the runoff coefficient for the drainage area, i is the intensity of the design storm for peak runoff calculations, and Q is peak storm runoff rate from the drainage area due to the design storm intensity.
- **Time of Concentration** – Time of concentration (Tc) values are estimated for each catchment using the SCS lag equation (USDA, 2010).
- **Ditch Sizing** – Manning's Equation is used to estimate the collection/diversion ditch/berm dimensions, culvert dimensions (if required), and armouring requirements (riprap). Collection/diversion ditches are sized iteratively by varying channel size based on anticipated flow velocities within the channel and riprap required to maintain stability for the indicated roughness.
- **Pond Storage Capacity** – Runoff volumes resulting from the 1 in 10 year, 24-hour duration storm event are used to estimate the required storage capacity of each pond.
- **Spillway Sizing** – Peak flows estimated from HydroCAD® are used in Manning's Equation to estimate required spillway width, depth, and erosion protection requirements. It is assumed

(conservatively) that each pond is filled to the spillway inlet elevation at onset of the storm event. Spillways will be trapezoidal in section and lined with riprap overlying non-woven geotextile.

- **Pump Sizing** – Pump sizing is based on the results of the site wide water balance (Knight Piésold, 2023).

18.8.2.3 Collection/Diversion Ditches and Culverts

During Year -2, a total of 20 collection ditches, four (4) diversion ditches, and six (6) culverts will be built to collect and divert runoff during construction and into the operational period.

Excavation will be carried out in relatively flat areas to install ditches. Ditches running parallel to natural slopes will likely be constructed using cut and fill methodology with a low height berm forming one side of the ditch. These berms will have a crest width of 2 m and 2H:1V side slopes. Erosion protection (where required) will typically consist of riprap overlying non-woven geotextile. Additional riprap will be placed along ditch reaches during operations if noticeable erosion is observed. The base width, excavation depth/berm heights, and armouring requirements for each ditch vary based on the estimated peak inflow and existing ground conditions.

The minimum ditch slope in the direction of flow is approximately 0.3%. Excavated ditches will have 2H:1V side slopes, 1.0 m to 3.0 m base widths, and 1.0 m in total depth.

18.8.2.4 Runoff Collection Ponds

Six runoff collection ponds (Ponds 1 through 6) will be constructed in Year -2 to manage runoff during construction and operations and minimize sediment reporting to the environment. General descriptions of each pond are provided in Section 18.8.1.

Each pond has a sediment storage depth allowance of approximately 0.5 m above the pond floor. The ponds will be cleaned periodically to maintain the sediment storage allowance. This approach will allow the suspended solids to settle out prior to water being discharged or pumped to the WMP.

Water collected in each pond will be removed once sufficient settling of Total Suspended Solids (TSS) has occurred, which is estimated to be within hours following a rainfall event (up to and including the 1 in 10-year, 24-hour duration event). A pump and HDPE pipeline will be installed in each pond to convey the collected water to other ponds, the WMP or the environment, according to discharge permits. A spillway is typically included to safely convey runoff from the design storm to environment.

18.8.2.5 WMP

The WMP is the primary contact water pond for the Project. It will be used as a water supply source for the mill, receive water from the WMF, receive water collected in the open pit, and receive contact water runoff from the ROM stockpile catchment area.

The WMP will be constructed in Year -1, following Stage 1 south embankment construction, to crest El. 121.0 m to manage contact water during operations. The foundation for the WMP will be stripped of organics and topsoil, and containment for water will be provided by the south embankment to the north, natural topography to the west, the open pit to the east, and the crusher causeway to the south. The WMP is sized to temporarily contain runoff resulting from the 1 in 10 year, 24-hour duration storm event, similar to the runoff collection ponds (BCMOE, 2015). The estimated rainfall depth for this event is 163 mm of rainfall (INTERA, 2021a).

The Stage 1 south embankment will be constructed to crest El. 122.0 m and the WMP will be constructed to El. 121.0 m. The WMP will operate at maximum operating El. 119 m. Excess water entering the WMP will be discharged to the San Pedro River via pump and pipeline.

The south embankment will act as the spillway for the WMP during Years -1 and 1 of the mine plan. During Year 2, the WMP spillway will be constructed to the open pit. The spillway is designed to safely pass flows from the PMF event based on Canadian Dam Association (CDA, 2019) recommendations. The spillway invert will be installed at El. 120 m to maintain freeboard requirements, which include a wet freeboard of 0.7 m above the spillway invert for conveyance of the IDF to the downstream environment (based on analysis above) and a dry freeboard of 0.3 m for potential wave setup and run up.

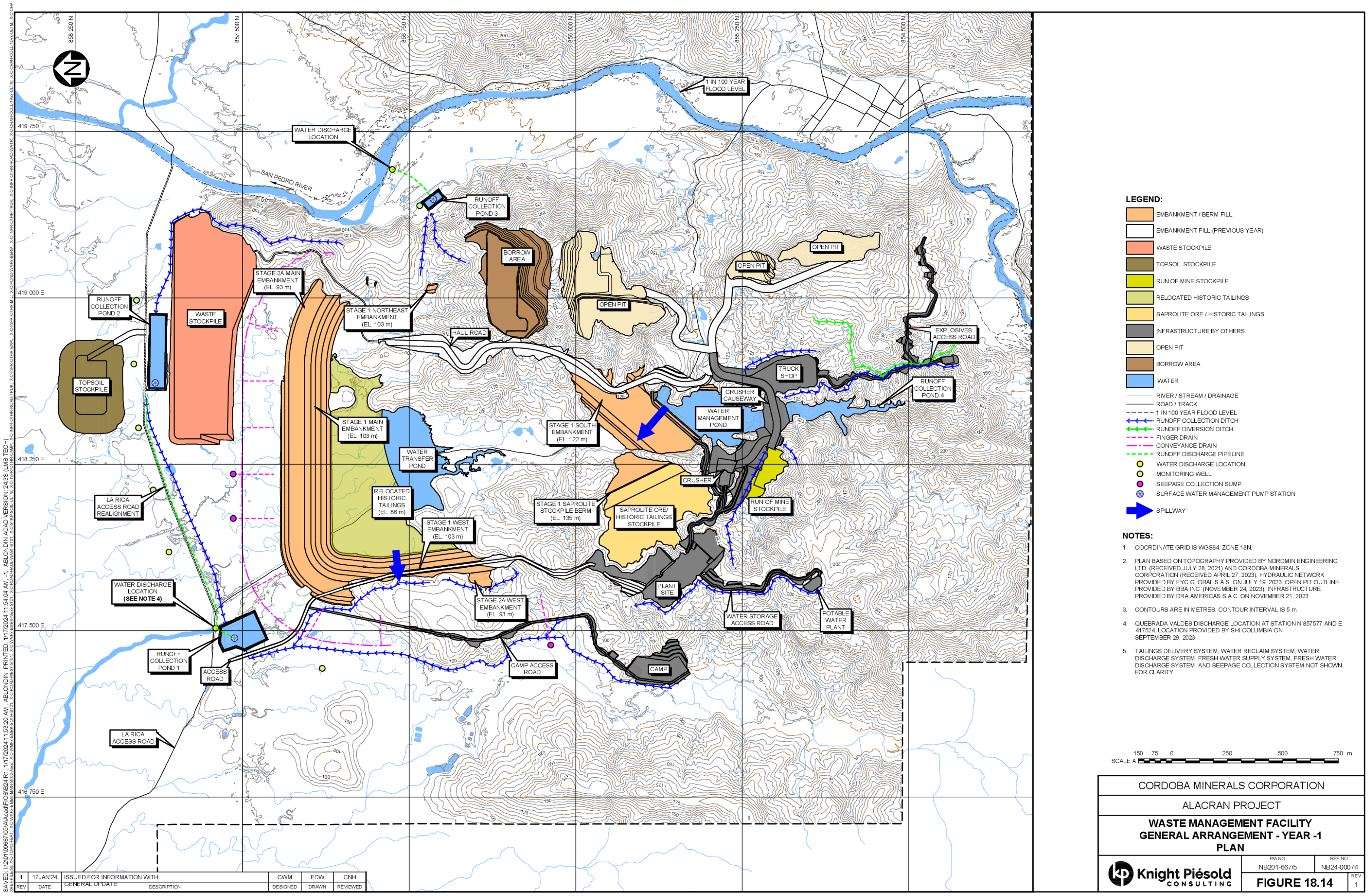
The Year –1 and Year 1 WMP spillway is illustrated in plan on Figure 18.14. WMP spillway for Years 2 through 14 (final) is illustrated in plan on Figure 18.1.

18.8.3 WMF STORMWATER MANAGEMENT

Stormwater management measures for the WMF are developed to manage runoff from storm events through construction, production, and closure. Design analyses were completed to confirm:

- Temporary storage of the Environmental Design Flood (EDF) runoff volume and establishment of maximum pond levels in the WMF during operations. The EDF was selected as the 1 in 200-year, 24-hour duration storm event based on Canadian Dam Association (CDA, 2019) recommendations. The estimated rainfall depth for this event is 209 mm of rainfall (INTERA, 2021a).
- Peak IDF flow to size the WMF spillways and manage the IDF. IDF during operations is selected to be the flood that is ⅔ between the 1 in 1,000-year flood and the PMF (CDA, 2019). IDF at closure is selected to be the PMF (CDA, 2019). Estimated rainfall depth for the 1 in 1,000-year, 24 hour duration storm event is 228 mm. Estimated rainfall depth for the probable maximum precipitation storm event (which would result in the PMF) is 258 mm (INTERA, 2021a).

Figure 18.14 – WMF Stage 1 Plan



NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. PLAN BASED ON TOPOGRAPHY PROVIDED BY NORDMIN ENGINEERING LTD. (RECEIVED JULY 28, 2021) AND CORDOBA MINERALS CORPORATION (RECEIVED APRIL 27, 2023). HYDRAULIC NETWORK PROVIDED BY EYC GLOBAL S.A.S. ON JULY 19, 2023. OPEN PIT OUTLINE PROVIDED BY BBA INC. (NOVEMBER 24, 2023). INFRASTRUCTURE PROVIDED BY DRA AMERICAS S.A.C. ON NOVEMBER 21, 2023.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 5 m.
4. QUEBRADA VALDES DISCHARGE LOCATION AT STATION N 857577 AND E 417524. LOCATION PROVIDED BY SHI COLUMBIA ON SEPTEMBER 29, 2023.
5. TAILINGS DELIVERY SYSTEM, WATER RECLAIM SYSTEM, WATER DISCHARGE SYSTEM, FRESH WATER SUPPLY SYSTEM, FRESH WATER DISCHARGE SYSTEM, AND SEEPAGE COLLECTION SYSTEM NOT SHOWN FOR CLARITY.

CORDOBA MINERALS CORPORATION
ALACRAN PROJECT
**WASTE MANAGEMENT FACILITY
GENERAL ARRANGEMENT - YEAR -1
PLAN**

P/A NO.	REF NO.
NB201-667/5	NB24-00074

FIGURE 18.14 REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17JAN'24	ISSUED FOR INFORMATION WITH GENERAL UPDATE	CWM	EDW	CNH

Source: Knight Piésold, 2023

- Wet freeboard of 0.5 m above the spillway invert for conveyance of the IDF to the downstream environment (based on analysis above) and a dry freeboard of 1.0 m for potential wave setup and run up.

The WMF spillway for Years –1 through 8 (Stages 1 through 4) will be located on the west embankment. Runoff resulting from the IDF will be conveyed by these spillways to Quebrada La Concepción, west of the WMF. The Stage 1 spillway for Years -1 through 2 is shown on Figure 18.14. The WMF spillway from Years 9 through 14 of the production phases and throughout the closure and post-closure phases will be located on the south embankment, as shown on Figure 18.1. Runoff from the IDF will report to the open pit via this spillway.

18.9 Waste Management Facility

18.9.1 OVERVIEW

The WMF will consist of a valley-type impoundment to provide permanent storage for PAG tailings and PAG/uncertain waste rock. The impoundment will be developed by constructing embankments around the perimeter of the valley. The west, main, and northeast embankments will be raised using the downstream construction method and the south embankment will be constructed as a full width embankment during Stage 1 and Stage 2 development. The south embankment will be constructed as a divider embankment to establish the WMP in the southern portion of the valley.

The copper, gold, and silver at the Project will be extracted by conventional crushing, floatation, re-grinding, and gravity concentration. Thickened PAG tailings will be delivered to the WMF at a design solids content of approximately 55% by mass. PAG and uncertain waste rock from open pit development will be hauled to the WMF. A portion of the PAG and uncertain waste rock will be used for embankment construction, and the remainder will be placed in the WMF basin over a 3 m minimum thickness of tailings, and then covered by subsequent layers of tailings. Saprolite and NAG waste rock from open pit mine will be used to build the WMF embankments and downstream buttresses. Historical tailings that are uneconomic will be placed directly in the WMF with the thickened tailings.

Saprolite, weathered bedrock, and NAG waste rock not needed for embankment construction will be stored in the waste stockpile downstream of the WMF during operations. Most of these materials will be used at closure to reclaim the site. Saprolite ore and economic historical tailings will be temporarily stored behind the saprolite stockpile berm, located just to the east of the plant site. This ore will be strategically consumed in the metallurgical process throughout the production phase.

The Stage 1 WMF embankments will be constructed during Year -2 and -1 (construction phase). The WMF embankments (Stages 2, 3, 4, and 5) will be raised from Years 1 through 10 of the production phases. The waste stockpile will be developed from Year -2 of the construction phase through Year 13 of the production phase. The saprolite stockpile berm will be initially constructed in Year -2 and raised in Year 2 to temporarily store economic historical tailings and saprolite ore.

This staged construction approach offers the following advantages:

- Reduction of initial capital costs and deferral of capital expenditures into operations;
- Refining of design and construction methods as experience is gained with site conditions; and
- Adjustment of plans at a future date to remain current with “state-of-the-art” engineering and environmental practices, etc.

Many aspects of the “observational approach” methodology will be used for the ongoing design, construction, and operation of the WMF (Peck, 1969). This approach can deliver substantial cost savings and provide for a high level of safety. It enhances knowledge and understanding of site-specific conditions. For this method to be applicable, the approach of the Project must be such that the WMF raising plan can be altered during construction and operations.

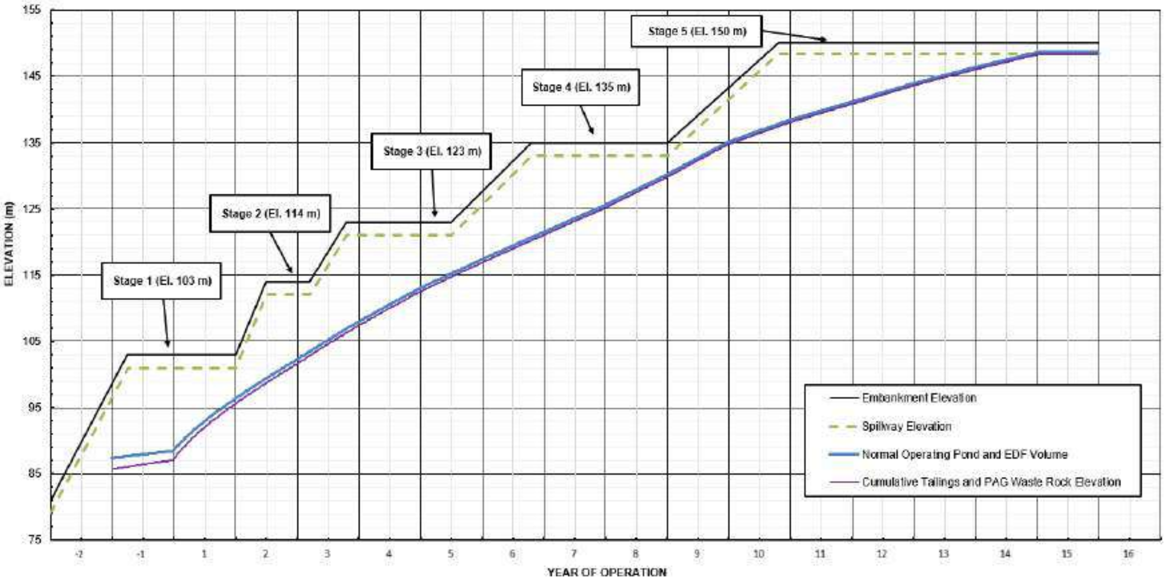
18.9.2 FILLING SCHEDULE AND EMBANKMENT STAGING

The capacity of the WMF is based on the following:

- Mill throughput data provided by BBA (2023);
- Local topography;
- WMF basin filling characteristics;
- Estimated final average settled dry density of tailings and waste rock in WMF impoundment (1.64 t/m³);
- Water transfer pond volume in the WMF basin;
- Temporary storage of runoff generated from storm events, up to, and including the EDF;
- Provision of overtopping protection for wave setup and run up; and
- Passage of the IDF over the spillway.

The filling schedule and proposed embankment construction schedule is illustrated on Figure 18.15. The schedule illustrates the five (5) stages of construction from Year -2 of the construction phase through to the end of the production phase (end of Year 14).

Figure 18.15 – WMF Filling Schedule



Source: Knight Piésold, 2023

18.9.3 FOUNDATION PREPARATION

Saprolite and weathered bedrock, with isolated areas of fine and coarse alluvium are typically present below WMF embankments, waste stockpile, and within WMF basin. The foundation below the saprolite stockpile berm consists of saprolite overlying weathered bedrock. The following will be completed to prepare WMF embankment areas for construction and waste deposition/placement:

- The embankment, stockpile, and berm foundations will be cleared, grubbed, and stripped of topsoil, unsuitable materials, and small, isolated areas of coarse alluvium (if present) to expose stiff saprolite or fine alluvium prior to embankment construction.
- Ground improvement, consisting of cement-bentonite slurry wall construction, will be completed during Stage 1 construction (Year -2) below the eastern section of the main embankment to reduce the seepage potential through the coarse alluvium encountered in this area. The slurry wall will be approximately 750 m long and 1 m wide with a maximum depth of about 12 m. The wall will be advanced into weathered bedrock.
- The WMF basin will be cleared and grubbed, and topsoil will be removed. An assessment will be completed to delineate any areas where a minimum 3 m thickness fine alluvium/saprolite is not present. Additional saprolite will be placed and compacted in lifts over these areas to achieve a minimum 3 m thickness of fine alluvium/saprolite. The entire surface will then be nominally compacted to reduce the permeability of the underlying saprolite/fine alluvium (foundation soil) and reduce potential seepage through the WMF foundation.

- Recovered topsoil, unsuitable materials, and coarse alluvium from foundation preparation activities will be stored downstream of the WMF in two stockpiles: one for topsoil (topsoil stockpile) and one for unsuitable materials and coarse alluvium (waste stockpile).

18.9.4 EMBANKMENT CROSS SECTION

18.9.4.1 General

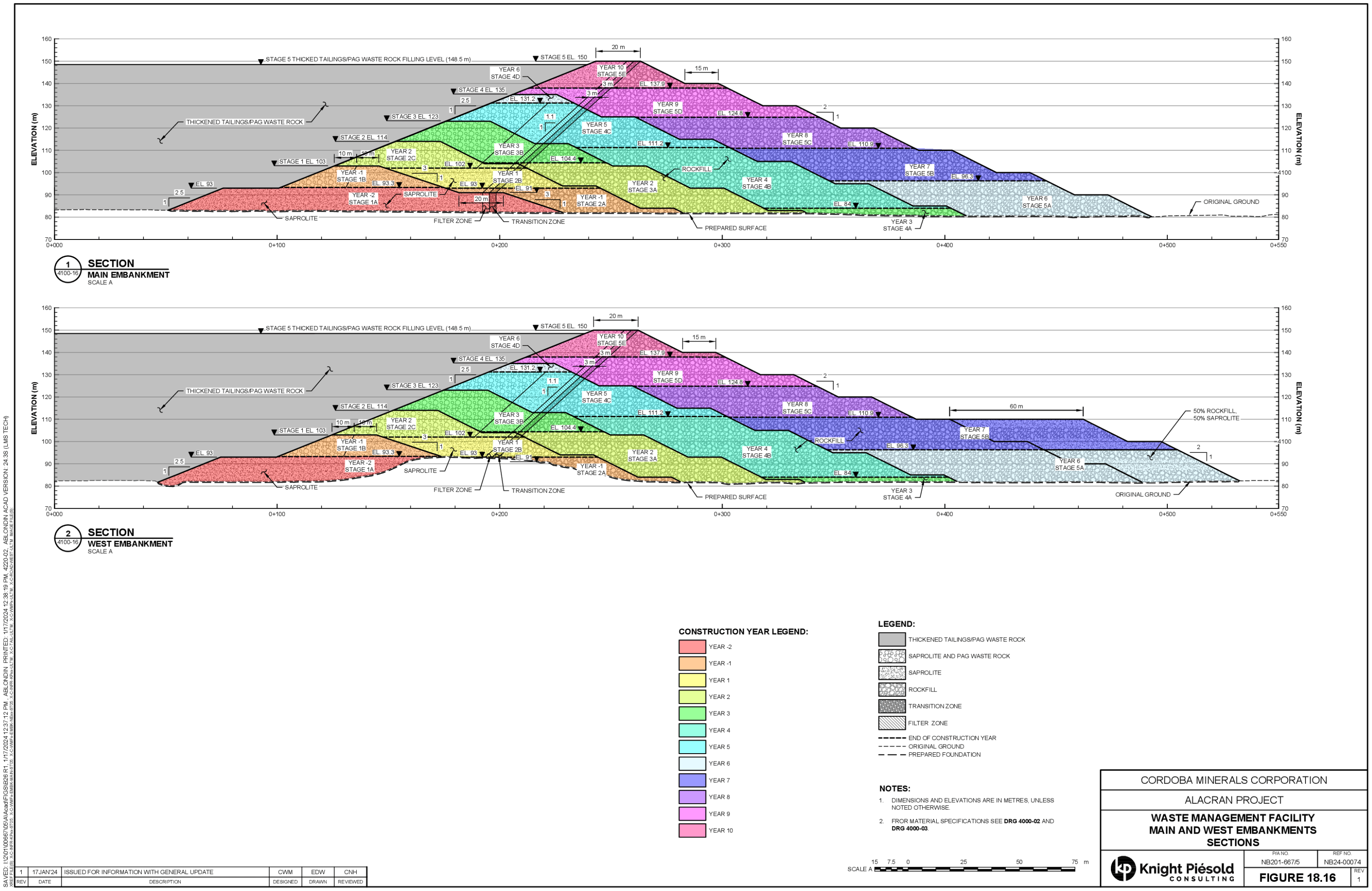
The perimeter embankment cross sections developed for the WMF are as follows:

- The main, west, and northeast embankments will be initially built during the construction phase and raised using the downstream construction method during the production phase.
- The south embankment will be constructed to the ultimate final width during the construction phase and raised to the final elevation during Year 1 of the production phase.

Embankment fill will comprise waste materials from open pit development. Processing will be required to meet the material specifications for the filter and transition zones.

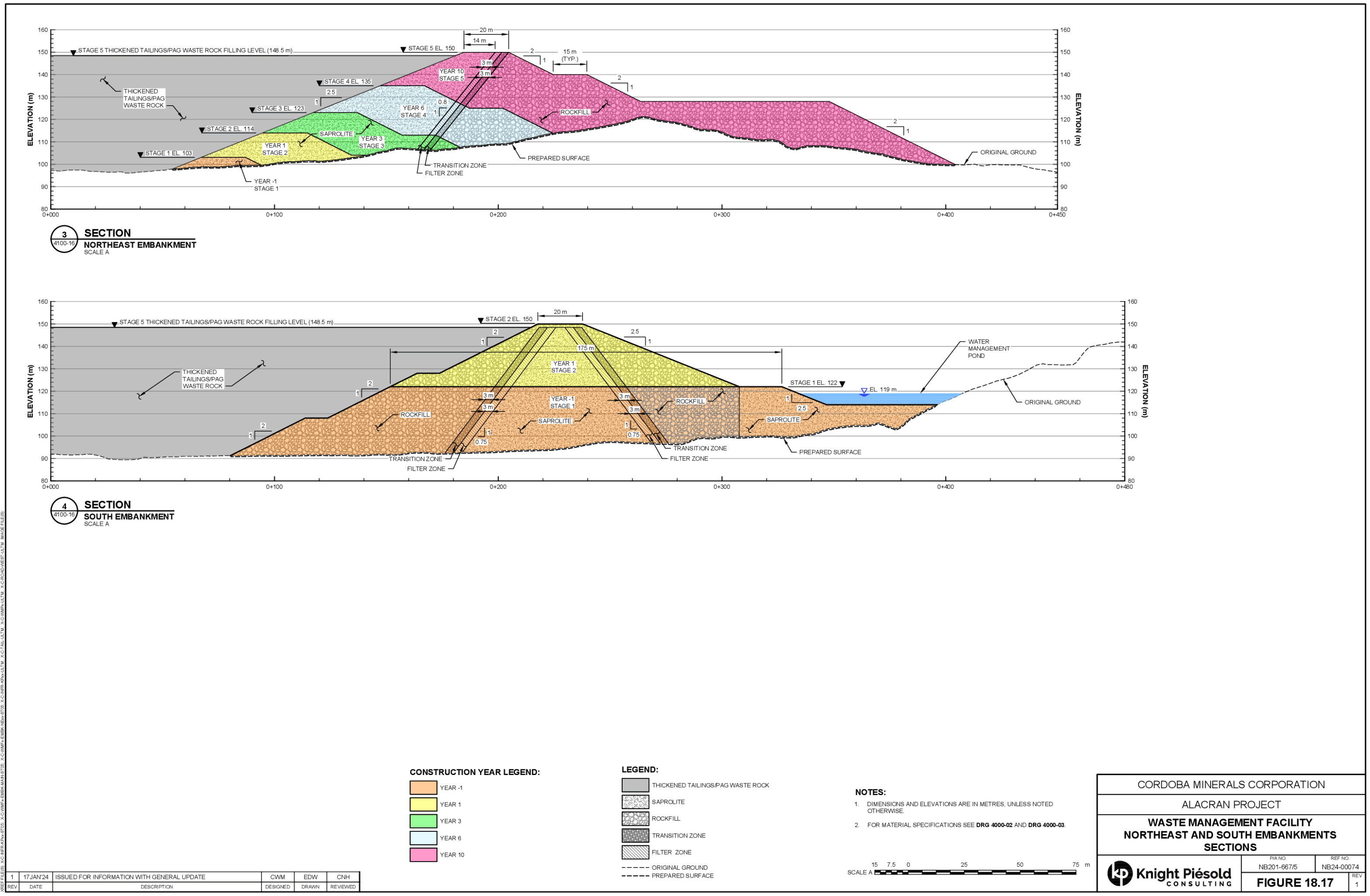
Stage 1 (Year -1) and Stage 5 (Year 14) general arrangements are provided in plan on Figure 18.14 and Figure 18.1, respectively. Typical cross sections for the main, west, northeast, and south embankments are provided on Figures 18.16 and 18.17.

Figure 18.16 – Waste Management Facility Sections (1 of 2)



Source: Knight Piésold, 2023

Figure 18.17 – Waste Management Facility Sections (2 of 2)



Source: Knight Piésold, 2023

18.9.4.2 *Main Embankment*

The main embankment consists of a cross-valley embankment between two (2) local ridges. The lowest elevation in the valley is at El. 82 m. The embankment will be raised in approximately five (5) stages. Buttresses will be included as required to satisfy slope stability requirements. Main embankment geometry is summarized in Table 18.6.

Table 18.6 – Main Embankment Geometry

Stage	**Crest Elevation** (m)	**Embankment Height** (m)	**Upstream Slope**	**Downstream Slope**	**Crest Width** (m)	**Upstream Buttress**	**Downstream Buttress**
1	103	21	2.5H:1V	3H:1V	20	25.5 m wide, 10 m high	20 m wide, 9 m high
2	114	32		3.5H:1V overall slope with mid-slope benches (10 m tall, 15 m wide, 2H:1V slopes)	20	Not applicable	Not applicable
3	123	41			20	Not applicable	Not appliable
4	135	53			20	Not applicable	Not Applicable
5	150	68			20	Not applicable	Not Applicable

Stage 1 main embankment fill zones from upstream to downstream are as follows:

- **Saprolite/PAG Waste Rock** – Alternating 500 mm thick lifts of PAG waste rock and 250 mm lifts of saprolite will be placed and compacted to encapsulate PAG waste rock and minimize potential for onset of ARD/ML.
- **Saprolite** – Saprolite fill will be placed and compacted in 250 mm thick lifts to provide a low permeability zone to reduce seepage through WMF fill. Minimum width of this zone will be 10 m.
- **Filter Zone** – Filter zone will be 3 m wide and placed and compacted in 250 mm lifts to maintain filter relationships with saprolite/historical tailings and provide drainage within embankment fill.
- **Transition Zone** – Transition zone will be 3 m wide and placed and compacted in 250 mm lifts to maintain filter relationships with upstream filter zone and downstream rockfill and provide drainage within embankment fill.
- **Rockfill** – Rockfill will consist of NAG waste rock and will form downstream shell zone of the embankment. Material will be nominally compacted with haul truck and dozer traffic.

Stages 2 through 5 main embankment fill zones from upstream to downstream are as follows:

- **Saprolite/PAG Waste Rock** – Alternating 500 mm thick lifts of PAG waste rock and 250 mm lifts of saprolite will be placed and compacted to encapsulate PAG waste rock and minimize potential for onset of ARD/ML.

- **Saprolite** – Saprolite fill will be placed and compacted in 250 mm thick lifts to provide a low permeability zone to reduce seepage through WMF fill. Minimum width of this zone will be 10 m.
- **Filter Zone** – Filter zone will be 3 m wide and placed and compacted in 250 mm thick lifts to maintain filter relationships with saprolite and provide drainage within embankment fill.
- **Transition Zone** – Transition zone will be 3 m wide and placed and compacted in 250 mm thick lifts to maintain filter relationships with upstream filter zone and downstream rockfill and provide drainage within embankment fill.
- **Rockfill** – Rockfill will consist of NAG waste rock and will form downstream shell zone of embankment. Material will be nominally compacted with haul truck and dozer traffic.

18.9.4.3 *West Embankment*

The west embankment will be located along a ridge adjacent to the main embankment and defines the western WMF extent. The lowest elevation along upstream side (in WMF basin) of the ridge is at El. 85 m. The embankment will be raised in about five stages. Buttresses will be included as required to satisfy slope stability requirements. West embankment geometry is summarized in Table 18.7.

Table 18.7 – West Embankment Geometry

Stage	Crest Elevation (m)	Embankment Height (m)	Upstream Slope	Downstream Slope	Crest Width (m)	Upstream Buttress	Downstream Buttress
1	103	18	2.5H:1V	3H:1V	20	25.5 m wide, 10 m high	20 m wide, 9 m high
2	114	29		3.5H:1V overall slope with mid-slope benches (10 m tall, 15 m wide, 2H:1V slopes)	20	Not applicable	None
3	123	38			20	Not applicable	Not applicable
4	135	50			20	Not applicable	Not Applicable
5	150	65			20	Not applicable	60 m wide, 30 m high

Stages 1 through 5 west embankment fill zones from upstream to downstream are the same as the main embankment section.

18.9.4.4 *Northeast Embankment*

The northeast embankment will be located in a saddle along the ridge that defines the east side of the WMF. The lowest elevation of the saddle is at El. 125 m. The lowest elevation along the upstream toe is at El. 98 m. Stage 1 through Stage 3 embankments will be constructed upstream of the saddle to provide a platform for the Stage 4 and Stage 5 embankment raises. The embankment will be raised in approximately five (5) stages. Buttresses will be included as required to satisfy slope stability requirements. The northeast embankment geometry is summarized in Table 18.8.

Table 18.8 – Northeast Embankment Geometry

Stage	**Crest Elevation** (m)	**Embankment Height** (m)	**Upstream Slope**	**Downstream Slope**	**Crest Width** (m)	**Upstream Buttress**	**Downstream Buttress**
1	103	5	2.5H:1V	3H:1V	20	Not applicable	Not appliable
2	114	16		3H:1V	20	Not applicable	Not applicable
3	123	25		3.5H:1V overall slope with mid-slope benches (10 m tall, 15 m wide, 2H:1V slopes)	20	Not applicable	Not applicable
4	135	37			20	Not applicable	Not applicable
5	150	52			20	Not applicable	85 m wide, 28 m high

Stages 1 and 2 of northeast embankment fill will consist of saprolite fill, which will be placed and compacted in 250 mm thick lifts to provide a low permeability zone to reduce seepage through the WMF fill. The minimum width of this zone will be 20 m and the downstream slope abuts the ridge.

Stages 3 through 5 of northeast embankment fill zones from upstream to downstream are the same as Stages 2 through 5 of main embankment section, except that no PAG waste rock will be placed in the embankment.

18.9.4.5 South Embankment

The south embankment is located in a narrow portion of the Quebrada Valdéz valley between two (2) ridges and defines the southern extent of the WMF. The WMP will be located to the south of this embankment. The lowest elevation in the valley bottom is at El. 92 m.

Stage 1 of south embankment will be constructed to crest El. 122 m and will be 27 m in height at the tallest section. The south embankment will be constructed to the full width during Stage 1 to establish the base for the Stage 2 raise, increase the rate of consolidation in the underlying foundation soils, and to help satisfy slope stability requirements. The Stage 1 embankment will have a crest width of 175 m to provide an access corridor for mine haul trucks to the main, west, and northeast embankments. The upstream slope (towards the main embankment) will be 2H:1V with a 10 m bench at El. 108 m to satisfy slope stability requirements and locate the tailings delivery pipeline. The downstream slope (towards the WMP) will be 2.5H:1V.

The south embankment will be constructed to the final elevation (El. 150 m) during Stage 2 construction to accommodate the tailings delivery pipeline and to provide access for mine haul trucks to the main, west, and northeast embankments. The final south embankment will be 58 m in height at the tallest embankment section. The final south embankment upstream slope will be 2H:1V with a 10 m bench at El. 128 m to satisfy slope stability requirements and the crest width will be 20 m. The downstream slope will be 2.5H:1V with an 18.5 m wide buttress at El. 122 m to meet slope stability requirements.

The fill zones are summarized below:

- **Rockfill** – Rockfill will consist of NAG waste rock and will form upstream and downstream shell zones of embankment. Material will be nominally compacted with haul truck and dozer traffic.
- **Saprolite** – Saprolite will be placed and compacted in 250 mm lifts to construct central portion of embankment and provide a low permeability zone to reduce seepage through WMF fill. Minimum width of this zone will be 7 m.
- **Filter Zone** – 3 m wide filter zone will be placed and compacted in 250 mm thick lifts, upstream and downstream of saprolite, to maintain filter relationships and provide drainage within embankment fill.
- **Transition Zone** – 3 m wide transition zone will be placed and compacted in 250 mm thick lifts, upstream and downstream of filter zone, to maintain filter relationships with adjacent filter zone and rockfill and provide drainage within embankment fill.

18.9.4.6 Waste Stockpile

The waste stockpile will be located immediately downstream of the main embankment and will store the following materials:

- **Saprolite** from open pit development over construction and production phases. Material will be placed and compacted in 250 mm lifts to prevent over-saturation of saprolite and allow it to be used at closure.
- **Unsuitable inorganic material** from Project foundation preparation work. Material will be placed and compacted in 250 mm lifts to prevent over-saturation of these materials.
- **NAG waste rock** from open pit development over production phase. Material will be stored in a designated area of the waste stockpile and will be nominally compacted with dozer and truck traffic.

The Stage 5 waste stockpile will be 68 m in height at the tallest embankment section at the end of operations with the stockpile crest constructed to El. 150 m. The crest width will be 20 m. The overall downstream slope will be approximately 6H:1V with mid-slope benches (typically 10 m tall, 15 m wide and 3H:1V slopes).

The Stage 1 (Year -1) and Stage 5 (Year 14) waste stockpile general arrangements are provided in plan on Figure 18.14 and Figure 18.1, respectively.

18.9.4.7 Saprolite Stockpile Berm

The saprolite stockpile berm is an internal berm within the WMF impoundment located to the west of the south embankment on a ridge slope. The lowest elevation in the valley bottom of the WMF basin is at El. 91 m. The saprolite stockpile berm will be constructed with saprolite, PAG waste rock, and NAG waste rock. Economic historical tailings and saprolite ore will be temporarily stored behind the saprolite stockpile berm and will be strategically consumed in the metallurgical process throughout the production phase.

The Stage 1 (Year -2) saprolite stockpile berm will be 44 m in height at the tallest embankment section with the berm crest constructed to El. 135 m. The crest width will be 90 m. The berm will be constructed to the full width during Stage 1 to establish the base for future berm raises. The upstream slope will be 2H:1V and the downstream slope will be 3H:1V. The berm will be raised in Year 2 to store a maximum of 3.4 Mm^3 of saprolite ore and economic historical tailings. The Year 2 raise will be constructed with PAG waste rock. The Stage 2 (Year 2) saprolite stockpile berm will be 59 m in height at the tallest section with the berm crest constructed to El. 150 m. The crest width will be 15 m. The upstream and downstream slopes will be the same as the Stage 1 berm.

The saprolite stockpile will be depleted early in Year 11 of the production phase and the saprolite stockpile berm downstream slope will become partially inundated with tailings over Years 1 to 11. Exposed PAG waste rock in the berm, above the tailings surface, will be re-located into the WMF basin in Year 11. The stockpile area will be incorporated into the WMF basin and infilled with tailings.

18.9.5 STABILITY

The WMF must be stable under the anticipated loading conditions during construction, operations, and closure. The amount of potential deformation that may occur under these loading conditions cannot result in loss of containment or the uncontrolled release of liquid or solids from the WMF. The seismic criteria adopted for the analyses are provided below and are based on the Global Industry Standard on Tailings Management (GISTM, 2020) and CDA (2019).

- **Main and West Embankments**:
    - The estimated ground acceleration generated during the 1 in 2,475-year earthquake through the construction and production phases (CDA, 2019). The peak ground acceleration (PGA) for the design earthquake was estimated to be 0.35 g.
    - The estimated ground acceleration generated during the 1 in 10,000-year earthquake through the closure and post-closure phases (GISTM, 2020 and CDA, 2019). The PGA for the design earthquake was estimated to be 0.53 g.

- **Northeast and South Embankments**:
  - The estimated ground acceleration generated during an event that is half-way between the 1 in 2,475-year earthquake and the 1 in 10,000-year earthquake through the construction and production phases (CDA, 2019). The PGA for the design earthquake was estimated to be 0.44 g.
  - The estimated ground acceleration generated during the 1 in 10,000-year earthquake through the closure and post-closure phases (GISTM, 2020 and CDA, 2019). The PGA for the design earthquake was estimated to be 0.53 g.

The required Factor of Safety (FoS) against slope instability, per CDA (2019) guidelines are as follows:

- **Static Stability**:
  - 1.3 immediately following construction (undrained or total stress conditions) and prior to filling (upstream and downstream slopes);
  - 1.5 during operations and at closure (drained or effective stress conditions, downstream slope only); and
  - 1.2 to 1.3 following full or rapid drawdown (upstream slope).
- **Pseudo-Static (Seismic) Stability** – 1.0 (upstream and downstream slopes).
- **Post-Earthquake (Residual Strengths) Stability** – 1.2 (upstream and downstream slopes).

Stability analyses for static, pseudo-static, and post-earthquake loading during normal operating conditions were completed using SLOPE/W©, a two-dimensional limit equilibrium stability analysis software package (Geo Slope, 2021). The stability models incorporated the proposed embankment configurations, estimated strengths of the tailings, fill and foundation materials, projected tailings levels, projected water levels, and projected phreatic surfaces estimated from the seepage analyses. The stability cases analyzed are summarized below.

- **Static Stability**: Static stability analyses were completed by modelling the fill and foundation materials at peak strengths. The short-term case (immediately following construction) assumed that the foundation soils would experience excess pore pressures due to embankment loading. The long-term case assumed full pore pressure dissipation in the foundation soils.
- **Pseudo-Static (Seismic) Stability**: Sensitivity of the upstream and downstream embankment stability to seismic loading was evaluated by applying seismic coefficients to the long-term stability analyses (i.e., at the maximum tailings filling level and full-strength gain development in the foundation soils). The PGA for each embankment was determined and a maximum allowable seismic displacement of 1.5 m (equal to the total embankment freeboard) was adopted to maintain the integrity of the key design elements in the embankments (i.e. the filter and transition zone) and to avoid overtopping. The horizontal seismic coefficients for the

stability models were estimated from the estimated PGAs, the allowable displacement, and following methods outlined by Makdisi and Seed (1978).

- **Post-Earthquake Stability**: post-earthquake analyses were completed to evaluate the downstream slopes with residual soil foundation strengths and assuming long-term loading conditions. A 20% strength reduction was applied to the foundation layers that are expected to be susceptible to cyclic softening following a significant seismic event. Representative embankment sections for the WMF perimeter embankments were selected as critical sections to evaluate embankment stability and confirm the estimated FoS against slope instability. Buttresses are included in the embankment geometry to enhance embankment stability and achieve the minimum FoS objectives, as illustrated in section on Figures 18.16 and 18.17.

18.9.6 SEEPAGE

Potential seepage through the main/west, northeast, and south embankments was evaluated using SEEP/W, a finite element software package, to estimate the unit seepage rate through a representative two-dimensional cross section (Geo Slope, 2021). The permeability estimates for the various modelled zones are summarized below.

- Permeability of tailings was estimated based on consolidation and permeability testwork (WSP, 2023a through 2023d).
- Permeabilities of saprolite fill and PAG waste rock zone and rockfill were estimated based on typical values (Freeze and Cherry, 1979).
- Permeability of saprolite fill was based on permeability testwork (Knight Piésold, 2023b).
- Permeability of filter and transition zones were estimated based on typical values (Freeze and Cherry, 1979) and were represented as rockfill in the models.
- Permeability of drain gravel in the foundation finger and conveyance drains were estimated based on the grain size distribution of sandy gravel (Wang et al., 2013).
- Permeability for foundation soils (fine alluvium and saprolite) was estimated based on permeability testwork (Knight Piésold, 2021a).
- Permeability for weathered bedrock was estimated based on in-situ packer (Lugeon) tests (Knight Piésold, 2023c).
- Estimated bedrock permeability used in seepage model is consistent with regional hydraulic conductivity estimates provided by INTERA (P. Williamson, personal communication, October 14, 2021).

Stage 1 and 5 seepage sections were modelled with the phreatic surface at the maximum tailings elevation for each stage. This is a conservative assumption as the model assumes that no tailings beach is present. Additional models were run to assess the sensitivity of hydraulic conductivity on the results and to estimate a range of possible seepage values.

The results of the seepage modelling are summarized as follows:

- **Main and West Embankments**: Estimated seepage from the main/west embankment during Stage 1 ranges from approximately 11 m^3/d to 30 m^3/d under the base case and sensitivity case, respectively. Estimated seepage for the ultimate Stage 5 main/west embankment ranges from about 25 m^3/d to 54 m^3/d. Seepage from tailings was assumed to be captured within embankment footprint via finger drains and ultimately report to the conveyance drain and/or sumps. Seepage values were noted to be most sensitive to hydraulic conductivity of zones representing the consolidated tailings.
- **Northeast Embankment**: Estimated seepage at the end of Stage 5 ranges from about 6 m^3/d to 10 m^3/d. Seepage model indicates discharge to environment upgradient of Rio San Pedro with most of the flow transmitted by the weathered bedrock unit.
- **South Embankment**: Estimated seepage rate from tailings for the ultimate Stage 5 embankment arrangement ranges from about 31 m^3/d to 85 m^3/d under base case and sensitivity case, respectively. Seepage from south embankment was assumed to ultimately discharge to the OP. Seepage estimates include seepage from tailings only and do not include seepage from other sources, such as surface water flow, direct precipitation, or regional groundwater flow. Seepage results were found to be sensitive to hydraulic conductivity of bedrock unit.

Based on the results of the seepage modelling, the following seepage collection and monitoring measures will be installed in the main, west, and northeast embankments:

- **Finger drains** will be installed at approximate 200 m intervals from the base of the filter zone to the downstream toes of the ultimate main and west embankment footprints. One (1) finger drain will be installed from the base of the filter zone to the downstream toe of the ultimate northeast embankment footprint.
- A **conveyance drain** will be installed along the ultimate downstream toe of the main and west embankments (parallel to the embankments) The finger drains will either directly report to a seepage recycle sump or convey seepage to the conveyance drain. The conveyance drain will also report to a seepage recycle sump. The finger drain within the northeast embankment will convey seepage directly to the seepage recycle sump.
- A total of four (4) cylindrical pre-cast concrete **seepage recycle sumps** will be installed, including two (2) downstream of the main embankment, one (1) downstream of the west embankment, and one (1) downstream of the northeast embankment.
- Each seepage recycle sump will include a pump and HDPE pipeline to transfer collected seepage back to WMF basin.

The seepage collection system is illustrated on Figure 18.18, including details for drains and sumps. Finger and conveyance drains will be excavated into the foundation, filled with drain gravel, and wrapped with 12 oz/yd^2 geotextile. The conveyance drain will also have a 100 mm diameter slotted CPT pipe installed in the bottom of the drain.

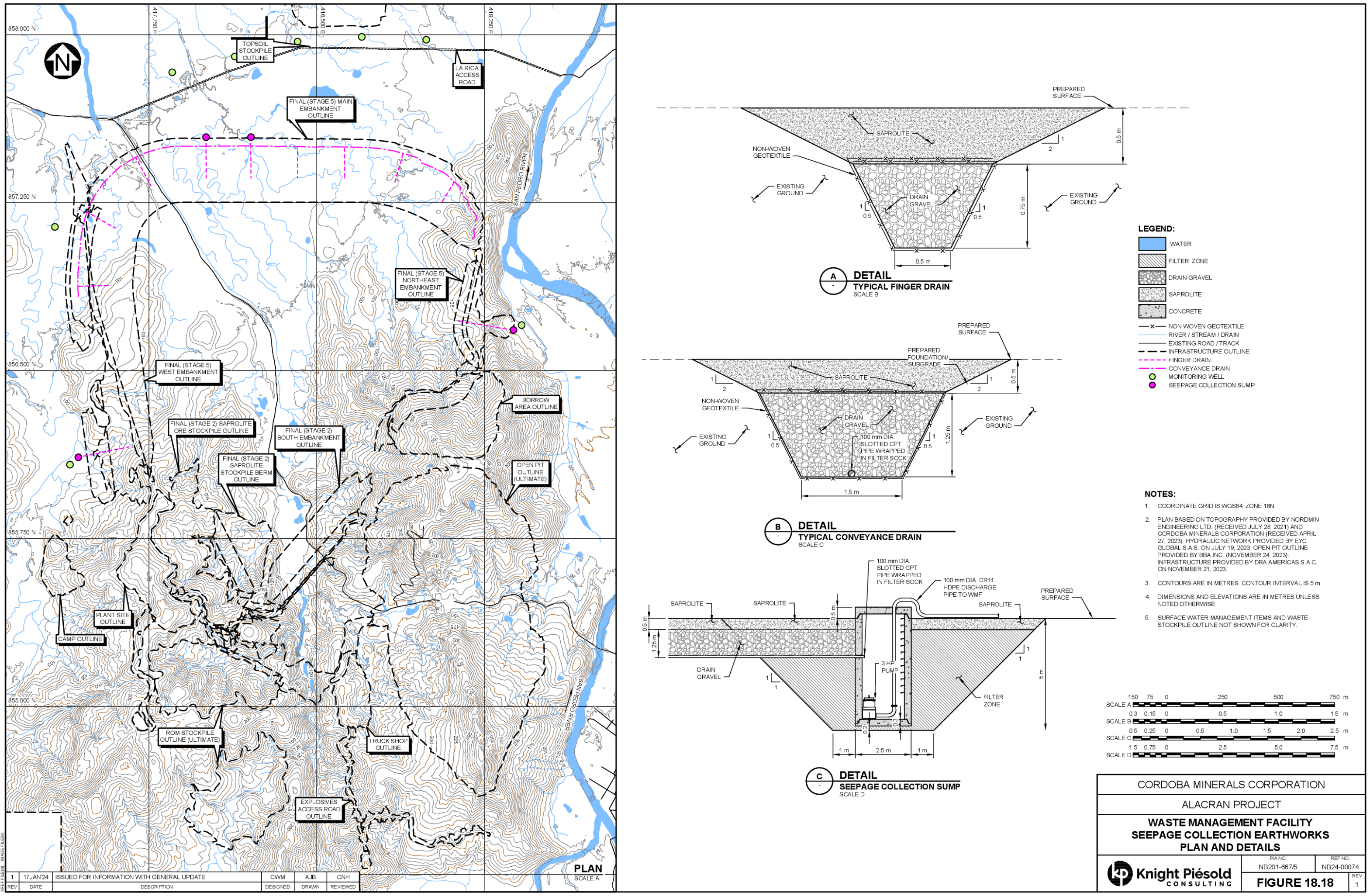
18.9.7 INSTRUMENTATION

Instrumentation will be installed in embankment foundations and embankment fill to confirm the WMF is performing as designed. Instrumentation installed over the life of the WMF will include:

- 53 vibrating wire piezometers (VWPs) in embankment foundations and fill to monitor pore pressures in embankment foundations and potential phreatic surfaces within embankments. Two (2) planes of VWPs will be installed within the main embankment and one plane of VWPs will be installed within the west, northeast, and south embankments.
- 21 surface movement monuments to monitor potential movement of embankment crests.
- Eight (8) groundwater monitoring wells downstream of main, west, and northeast embankments, into weathered bedrock foundation, to monitor groundwater quality. Monitoring wells will be sized so they can be upgraded to pumpback wells in the event that water quality does not meet established criteria and pumpback is warranted.

Instrumentation will provide early warning in the event that the phreatic surface, porewater pressure, or potential movement in the embankment exceeds allowable levels. A trigger action response plan (TARP) that includes instrumentation trigger levels and response protocols will be defined in later stages of design as part of the operations, maintenance, and surveillance (OMS) Manual for the WMF. Instrumentation details for the WMF are shown in section on Figures 18.19 and 18.20.

Figure 18.18 – Seepage Collection System

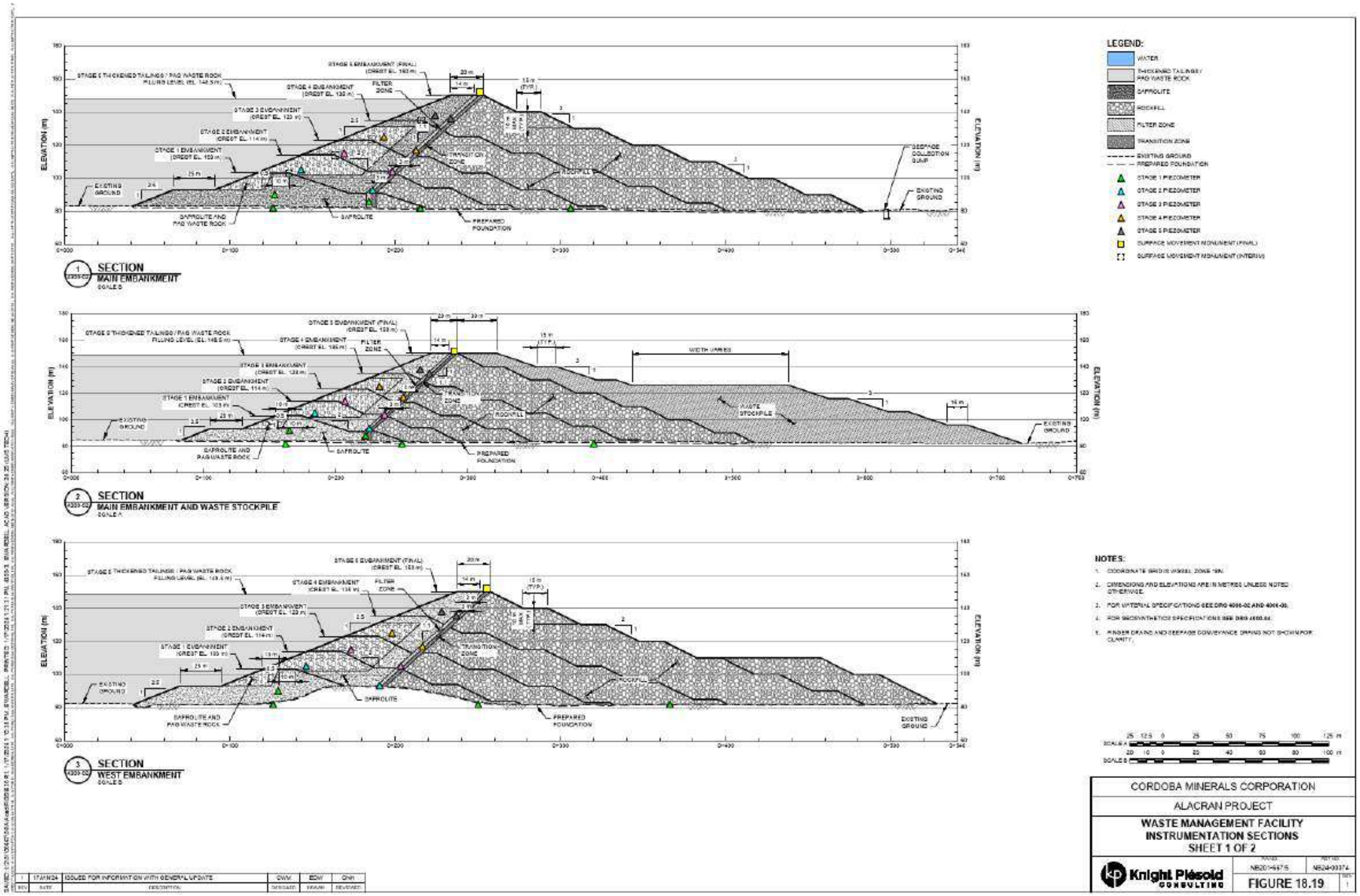


NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. PLAN BASED ON TOPOGRAPHY PROVIDED BY NORDMIN ENGINEERING LTD. (RECEIVED JULY 28, 2021) AND CORDOBA MINERALS CORPORATION (RECEIVED APRIL 27, 2023). HYDRAULIC NETWORK PROVIDED BY EYC GLOBAL S.A.S. ON JULY 19, 2023. OPEN PIT OUTLINE PROVIDED BY BBA INC. (NOVEMBER 24, 2023). INFRASTRUCTURE PROVIDED BY DRA AMERICAS S.A.C. ON NOVEMBER 21, 2023.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 5 m.
4. DIMENSIONS AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
5. SURFACE WATER MANAGEMENT ITEMS AND WASTE STOCKPILE OUTLINE NOT SHOWN FOR CLARITY.

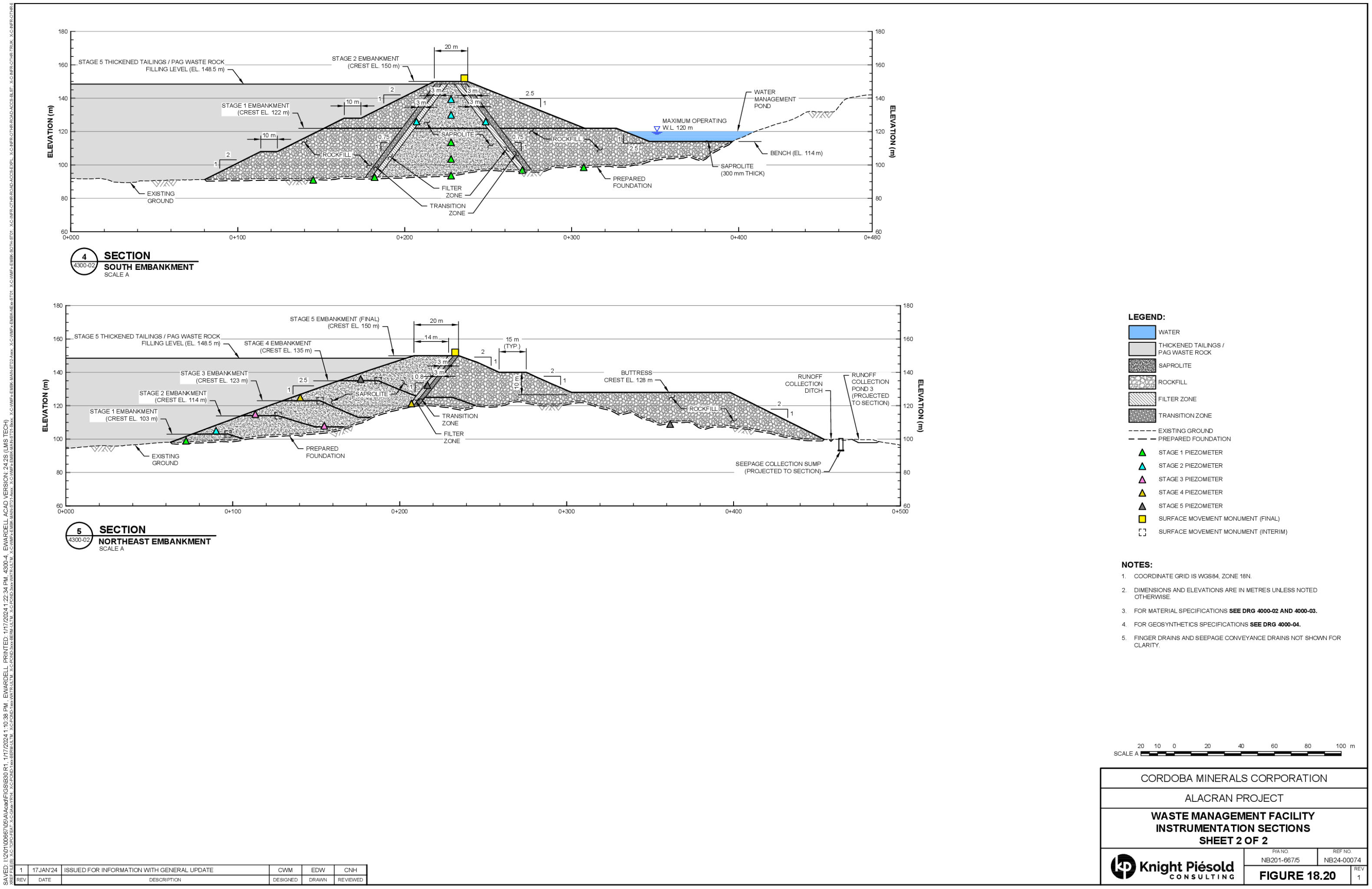
Source: Knight Piésold, 2023

Figure 18.19 – Waste Management Facility Instrumentation Sections (1 of 2)



Source: Knight Piésold, 2023

Figure 18.20 – Waste Management Facility Instrumentation Sections (2 of 2)



NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. DIMENSIONS AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. FOR MATERIAL SPECIFICATIONS **SEE DRG 4000-02 AND 4000-03.**
4. FOR GEOSYNTHETICS SPECIFICATIONS **SEE DRG 4000-04.**
5. FINGER DRAINS AND SEEPAGE CONVEYANCE DRAINS NOT SHOWN FOR CLARITY.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17JAN'24	ISSUED FOR INFORMATION WITH GENERAL UPDATE	CWM	EDW	CNH

Source: Knight Piésold, 2023

18.9.8 WASTE MANAGEMENT

Wastes to be managed within the WMF include saprolite, transition zone material, NAG waste rock, uncertain waste rock, and PAG waste rock from open pit development, as well as thickened tailings from the metallurgical process and historical tailings from artisanal mining activities.

Saprolite, transition zone material, NAG waste rock, and PAG/uncertain waste rock sourced from the open pit will be used to construct the WMF perimeter embankments and saprolite stockpile berm during the construction and production phases of the Project. Uncertain and PAG waste rock mined from the open pit will be co-disposed with the thickened tailings during the production phase. Excess inert material will be stored at the waste stockpile and used at closure. Thickened tailings will be delivered from the mill to the WMF via pipeline and strategically deposited in the WMF basin. Uneconomic historical tailings will be excavated, hauled, and placed in the WMF basin.

The management strategies for these wastes are described below.

18.9.8.1 Open Pit Wastes

Wastes from the open pit will be managed as follows:

- Saprolite and transition zone materials will be used to construct perimeter embankments and internal berms. Excess materials will be stored downstream of the WMF footprint in the waste stockpile during operations. These materials will be used during active closure to cover the final WMF surface and other disturbed surfaces at the site. Any materials not used for closure will be contoured and vegetated.
- NAG waste rock will be used to construct the perimeter embankments and internal berms. Excess waste rock will be stored downstream of the WMF footprint in the waste stockpile during operations. This material will be used during active closure to provide erosion protection on the final WMF surface and other disturbed surfaces at the site.
- Most of the PAG and uncertain waste rock will be co-disposed and encapsulated within the tailings in the WMF basin. A portion of the PAG and uncertain waste rock will be used to construct the perimeter embankments.

The waste stockpile is located immediately to the north of the WMF main embankment. The stockpile location was selected based on the results of the Dam Breach Assessment (Knight Piésold, 2023c). Locating the waste stockpile in the northeast corner of the main embankment reduces the likelihood of tailings entering the San Pedro River during a hypothetical embankment failure or dam breach during operations. Additional details on the waste rock are provided in Section 16.2.2.

18.9.8.2 Tailings Delivery

Tailings generated from the milling process will be conveyed to a thickener to increase the tailings slurry solids content to approximately 55% by mass. Tailings will be pumped from the thickener to a series of centrifugal pumps and conveyed to the WMF via pressurized HDPE pipelines. The pump station and tailings delivery pipeline alignments were sized by Knight Piésold.

The Stage 1 (Year -1) west tailings delivery pipeline will deliver tailings along the west side of the WMF and along the main embankment. The pipeline was selected to be a combination of non insulated ND 450 mm (18") DR 7.3 HDPE and ND 400 mm (16") DR 11 HDPE pipeline to deliver the thickened tailings at a flow rate of 855 m³/hr with a slurry solids content of 55% by weight.

During Stage 2 (Year 2), the east tailings delivery pipeline will be installed from the pump station to the northeast embankment around the south and east sides of the WMF. The pipeline will have the same pipe sizes as the west tailings delivery pipeline. The two (2) pipeline arrangement will allow tailings to be conveyed to the west or east sides of the WMF basin, control tailings beach development, and control the water transfer pond location.

18.9.8.3 WMF Basin Filling

The tailings will be deposited sub-aerially from the upstream crest of the perimeter embankments and from strategic locations on natural ground to maintain the WMF water transfer pond adjacent to the south embankment. The deposition plan will include for rotational discharge of tailings in thin layers (approximately 0.3 m thick) from several discharge locations to develop a dense, low permeability tailings deposit. This deposition strategy will allow the tailings to partially dry and consolidate prior to deposition of the following tailings layer. The deposition strategy will develop a homogeneous, low permeability tailings deposit, reduce foundation seepage, and minimize potential for onset of ARD and/or ML conditions.

PAG and uncertain waste rock will be co-disposed with tailings. Waste rock will be strategically placed and spread in the WMF basin throughout the LOM to allow the ingress of tailings to the greatest practical extent. PAG and uncertain waste rock will be continuously buried by subsequent tailings deposition to minimize potential for onset of ARD and/or ML conditions.

18.9.8.4 Filling Sequence

As shown in Figure 18.1, the rate of rise of tailings and PAG/uncertain waste rock within the WMF is estimated to be:

- 7.5 m/y during Year 1;
- 4.7 m/y from Year 3 through Year 10; and
- 2.4 m/y from Year 11 through Year 14 of the production phase.

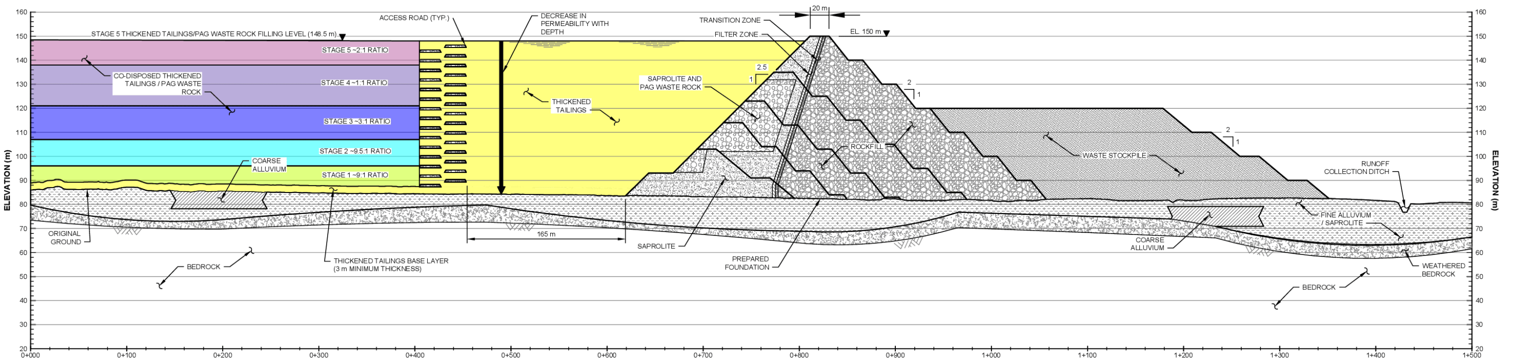
Basin filling will be optimized by depositing tailings in approximately 0.3 m thick layers and rotating deposition fronts around the perimeter of the basin to achieve a tailings beach slope of approximately 2%. Multiple spigots will be used to maintain a low deposition velocity and maintain homogeneity and non-segregating properties of tailings during deposition. It is expected that some tailings will remain on the slopes of the embankments/natural ground due to low deposition velocity. This approach will increase the exposed surface area of tailings and will allow them to partially dry and consolidate prior to deposition of the following tailings layer. The previous layer of tailings will be covered with a subsequent layer in a timely manner to inhibit the ingress of air and minimize potential for onset of ARD and/or ML conditions. This deposition method will also minimize potential for dusting, as the coarser sand particles will be entrained with finer silt and clay particles.

Tailings deposition will be managed to route supernatant liberated from tailings and runoff towards the water transfer pond within the southern portion of the basin. This approach will allow for efficient transfer of supernatant and runoff to the WMP. PAG and uncertain waste rock will be strategically placed in the WMF basin following the initial tailings deposition and during ongoing tailings deposition. The tailings will partially fill waste rock voids and increase overall dry density of stored materials. The following placement strategies will be used during the production phase:

- **Thickened Tailings Base Layer** – Prior to placement of PAG and uncertain waste rock in the WMF basin, tailings will be deposited in layers to develop a low permeability deposit approximately 3 m thick immediately above the foundation. The tailings deposition will lower the hydraulic conductivity of the foundation and increase the seepage path in order reduce potential seepage from the waste rock placement area within the WMF basin.
- **Thickened Tailings Zone** – Thickened tailings will be deposited from the perimeter embankment crests, and from select locations on natural ground, to develop a thickened tailings deposit that will extend a minimum of 165 m from the upstream slope of each embankment. PAG and uncertain waste rock will not be placed in this zone. This approach will provide a low permeability deposit against embankments and minimize potential for preferential seepage paths towards embankments.
- **Access Roads** – Access roads will be installed in the WMF impoundment to facilitate PAG and uncertain waste rock placement. Each access road will be 20 m in width and 1 m in height with 1.3H:1V side slopes. The access roads will be constructed with PAG and uncertain waste rock. As each road is inundated with additional thickened tailings, a subsequent access road will be constructed at higher elevation. Subsequent access roads will be offset from previous roads. This approach will prevent formation of higher permeability zones through the waste deposit. The presence of access roads will also help maintain an overall 2% tailings beach slope.
- **Thickened Tailings/Waste Rock Zone** – Thickened tailings will be co-disposed with PAG and uncertain waste rock in this zone, located upstream of the thickened tailings zone and access roads. Waste rock will be placed in such a manner to avoid formation of higher permeability zones through the deposit.

A sectional view of tailings deposition and waste rock placement strategy is shown in Figure 18.21.

Figure 18.21 – Waste Management Sketches, Early Placement, and Deposition



1 SECTION
MAIN EMBANKMENT
HORIZONTAL: SCALE A
VERTICAL: SCALE B

LEGEND:

▨	COARSE ALLUVIUM
▨	FINE ALUMINUM / SAPROLITE
▨	WEATHERED BEDROCK
▨	SAPROLITE AND PAG WASTE ROCK
▨	SAPROLITE
▨	ROCKFILL
▨	TRANSITION ZONE
▨	FILTER ZONE
▨	WASTE STOCKPILE
🟪	STAGE 5 THICKENED TAILINGS AND WASTE ROCK CO-DISPOSED (~2:1 RATIO)
🟪	STAGE 4 THICKENED TAILINGS AND WASTE ROCK CO-DISPOSED (~1:1 RATIO)
🟦	STAGE 3 THICKENED TAILINGS AND WASTE ROCK CO-DISPOSED (~3:1 RATIO)
🟦	STAGE 2 THICKENED TAILINGS AND WASTE ROCK CO-DISPOSED (~9.5:1 RATIO)
🟩	STAGE 1 THICKENED TAILINGS AND WASTE ROCK CO-DISPOSED (~9:1 RATIO)
🟨	THICKENED TAILINGS
▽	BEDROCK

NOTES:

1. COORDINATE GRID IS WGS84, ZONE 18N.
2. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
3. THIS SECTION HAS BEEN VERTICALLY EXAGGERATED BY A FACTOR OF 2.5.
4. TOPSOIL LAYER NOT SHOWN, WILL BE REMOVED DURING FOUNDATION PREPARATION.
5. THICKENED TAILINGS TO PAG WASTE ROCK RATIO BASED ON MINE PLAN PROVIDED BY BBA INC. (NOVEMBER 20, 2023) AND MATERIAL BALANCE CALCULATIONS COMPLETED BY KNIGHT PIÉSOLD LTD.

SCALE A 40 20 0 40 80 120 160 200 m
SCALE B 16 8 0 20 40 60 80 m

CORDOBA MINERALS CORPORATION
ALACRAN PROJECT
TAILINGS AND PAG WASTE ROCK MANAGEMENT
TYPICAL DETAIL
Knight Piésold CONSULTING
P/A NO. NB201-667/5
REF NO. NB24-00074
FIGURE 18.21
REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17JAN'24	ISSUED FOR INFORMATION WITH GENERAL UPDATE	CWM	AJB	CNH

SAVED: I:\2\01\00667\05\A\Acad\FIGS\B27 R1, 1/17/2024 12:41:07 PM , ABLONDIN PRINTED: 1/17/2024 12:41:28 PM, 0001, ABLONDIN ACAD VERSION: 24.3S (LMS TECH)
XREF FILE(S): IMAGE FILE(S):

Source: Knight Piésold, 2023

18.10 Comments on Section 18

The FS design assumes conventional infrastructure locations. The amount of engineering completed is consistent with the level of detail required for this study. As more detailed information becomes available, the designs described above are subject to change.

19 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

A third-party trader and marketer of base and precious metal concentrates called Ocean Partners was contracted by the Company to conduct a market study for Cu, Au, and Ag. They provided an evaluation based on the expected average production rate and chemical specification of the concentrates. This data was provided by DRA, and it was derived from the Alacran Project Concentrate Analysis Report dated 23 November 2023 which was prepared by Blue Coast Metallurgy and Research.

The Project will generate a copper flotation concentrate and gravity gold concentrates separately. Gold payment will be made against the contained values in both the copper and gravity concentrates.

19.1.1 COPPER CONCENTRATE

The Project will nominally produce 336 dry tpd of copper concentrate with a moisture content of 8%. The average analytical results for payables and major deleterious penalty elements in concentrate produced by locked cycle flotation testing, reported November 17, 2023, are summarized in Table 19.1.

Table 19.1 – Copper Concentrate Typical Analysis

Description		Unit	Average Value
Copper	Cu	%	22
Gold	Au	g/t	6.3
Silver	Ag	g/t	114
Aluminum	Al	%	1.88
Arsenic	As	ppm	36.4
Bismuth	Bi	ppm	14.0
Calcium	Ca	%	1.48
Cadmium	Cd	ppm	45.8
Chlorine	Cl	%	<0.01
Cobalt	Co	ppm	60.4
Fluorine	F	%	0.05
Iron	Fe	%	25.7
Mercury	Hg	ppb	280
Indium	In	ppm	32.8
Potassium	K	%	0.2

Description		Unit	Average Value
Molybdenum	Mo	ppm	639
Nickel	Ni	ppm	77
Lead	Pb	ppm	156
Sulphur	S	%	27.7
Antimony	Sb	ppm	10.2
Selenium	Se	ppm	13.9
Silicon	Si	%	4.81
Tellurium	Te	ppm	44.6
Zinc	Zn	ppm	6,379

Based on this data, potential buyers would regard the copper concentrate to be produced at the Project as having a low/medium copper grade and a moderate precious metal content.

19.1.2 GRAVITY GOLD CONCENTRATE

The Project will nominally produce 5 dry tpd of gravity gold concentrate from the main plant and 1.4 tpd from the wash plant operation. The moisture content specification is assumed to be 8%, which is the same value as the copper concentrate and likely to be conservative since the gravity concentrate will contain less fines. The chemical specification for payables and major deleterious penalty elements in gravity concentrate developed by DRA is summarized in Table 19.2.

Table 19.2 – Gravity Gold Concentrate Typical Analysis

Description		Unit	Main Plant Gold Concentrate	Wash Plant Gold Concentrate
Copper	Cu	%	1.65	-
Gold	Au	g/t	134	118
Silver	Ag	g/t	350	96
Aluminum	Al	%	1.29	-
Arsenic	As	ppm	949	-
Bismuth	Bi	ppm	12.8	-
Calcium	Ca	%	1.24	-
Cadmium	Cd	ppm	10.9	-
Chlorine	Cl	%	<0.01	-
Cobalt	Co	ppm	497	-
Fluorine	F	%	0.03	-
Iron	Fe	%	38.8	-
Mercury	Hg	ppb	88.5	-

Description		Unit	Main Plant Gold Concentrate	Wash Plant Gold Concentrate
Potassium	K	%	0.11	-
Magnesium	Mg	%	0.49	-
Molybdenum	Mo	ppm	35.7	-
Nickel	Ni	ppm	331	-
Lead	Pb	ppm	125	-
Sulphur	S	%	36.3	-
Antimony	Sb	ppm	17.1	-
Selenium	Se	ppm	<10	-
Silicon	Si	%	4.66	-
Tellurium	Te	ppm	32.3	-
Zinc	Zn	ppm	764	-

At the site, the two concentrates will be mixed to create a combined gravity concentrate (6.4 tpd) which will contain approximately 131 g/t Au and 289 g/t Ag. As the wash plant operation prioritizes saprolite mining, the total gravity concentrate produced from Years 1 to 9 is about 6.6 tpd, which will then decrease to 5.7 tpd for Years 10 to 12 when historical tailings will be reprocessed. Assuming that the composition of all other elements in the wash plant concentrate is the same as those listed in the main plant, its high marketability allows it to be mixed with other base metal concentrates.

19.1.3 MARKETING STRATEGY

19.1.3.1 *Copper Concentrate*

China dominates global copper concentrate markets. The country hosts over half of global copper smelting production capability, importing over 26 million dmt of copper concentrate during 2023, yet only around 10% of the feed requirements for these smelters can be satisfied by domestic mines. As a predominantly clean material with moderate gold content, the copper concentrate to be produced by the Project appears well suited for sales into this major market.

Japan’s six (6) copper smelters are entirely dependant on importing around 5 million dmt/a of copper concentrate per year, although a large portion of this total is secured through their equity positions in overseas mines. An emerging issue for these smelters is that imports from Indonesia are likely to cease by the time that the Project is commissioned, and Japanese buyers in the country may be receptive to sourcing replacement feed materials from new sources.

Ocean Partners also identified potential sales to individual smelters in India, Germany, and Bulgaria. The low lead and arsenic content of the copper concentrate will make the material attractive to European options. While some parts of Colombia are classified as conflict-affected and high-risk areas (CAHRAs) under Regulation (EU) 2017/821 related to responsible sourcing policy, it is understood that this does not specifically apply to the Department of Córdoba where the mine is located.

Ocean Partners forecasts that demand for copper concentrate from new smelting projects will start to outpace global mine production in 2024. Contributing to the demand, additional smelting capacity is coming online in Indonesia, DRC, India, and China by the end of 2024. Additionally in China, smelter projects at Jinchuan Guangxi, Jinchuan Gansu, Tongling and Chifeng Jintong are in the longer-term development pipeline.

On the supply side, the 2023 commissioning of the Quebrada Blanca project (Chile) for Teck Resources marks the end of the recent wave of large greenfield copper mine construction projects. The gradual ramp up of projects such as Oyu Tolgoi underground (Mongolia), Chuquicamata underground (Chile), and brownfield expansions such as Mantos Copper (Chile) will add some incremental capacity in the coming years. Output of copper in concentrate from existing copper mines is expected to peak by around the middle of this decade due to declining grades and depletion of ore reserves. Even if new projects are approved promptly, the extended construction period required to bring large copper projects online probably means that recent and near-term supply will have little impact on the global copper concentrate market during the second half of this decade.

The projected average concentrate grade of 22% Cu for the Project is lower than many concentrates available on global markets. For context, it is estimated that copper concentrate exports from Chile currently average around 26% Cu. This does not necessarily make the copper concentrate any less marketable than higher grade materials, since some buyers may prefer to process lower grade materials to minimize working capital requirements, or for Chinese buyers, lower copper grades reduce the impact of any adverse arbitrage between LME and SHFE copper prices.

19.1.3.2 Gravity Gold Concentrate

Potential customers for sales of gravity gold concentrate include gold roasting plants, copper smelters, lead smelters, or hydrometallurgical processes such as pressure oxidation or bacterial leach plants. Gold-bearing concentrates can also be purchased by trading companies who utilize such material in their blending operations.

Because the gravity gold concentrates will have a large portion of the gold present as free gold particles rather than being disseminated in a sulphide matrix, it is recommended that the gravity concentrates are marketed separately rather than blended with the larger copper concentrate. This approach will minimize the risk of potential gold losses due to the so-called “nugget effect” that may occur when a blended concentrate is sampled and assayed.

The silica and overall insoluble mineral content in the gravity concentrate is similar to levels reported in the copper concentrate; however, it is likely that copper smelters will be more willing to tolerate the levels in the gravity concentrate given the higher precious metal content and lower volume. Based on an assumption of dilution with other concentrate feedstock, the modelled gravity concentrate would be regarded as clean and readily saleable to copper smelters for processing. Asian smelters outside China (such as Japan and South Korea) and Europe are recommended as the buyers likely to offer the best terms.

Payables related to roasting and hydrometallurgical plants are potentially limited by metallurgical recovery and they are unlikely to provide the payable reconciliation for contained precious metals content offered by a smelter. Given its geographical proximity to the Project, Ocean Partners suggested that an investigation be made to ascertain whether the pressure oxidation plant at Pueblo Viejo in the Dominican Republic is a viable off-taker.

19.1.4 CONCENTRATE VALUATION MODEL

The gross value of a parcel of concentrate is based on the terminal market price of the contained payable metals. However, the net value is derived after the deduction of Treatment Charges and Refining Charges (TC/RCs) and any penalties for deleterious elements.

TC/RCs tend to fluctuate according to market supply and dynamics. In a well-supplied market, smelters can demand higher TC/RCs; whereas, in a tight market, TC/RCs tend to be lower. TC/RCs are agreed between buyer and seller based on negotiation, a tendering process, or reference to a reported annual benchmark settlement between a large producer and major smelter.

19.1.4.1 Copper

A greater proportion of contained copper metal in copper concentrate is paid for by the customer in higher grade concentrates based on an ascending scale. This reflects the fact that smelters can recover a higher proportion of contained copper when treating higher grade material.

The global copper concentrate market has been in surplus during 2023. This situation has been reflected in elevated TC/RCs compared to those experienced in recent years. The annual benchmark treatment charge of US$88/dmt and refining charge of 8.8¢/lb (US$194/t Cu) for 2023 are the highest figures since 2017.

Considering the market factors described, long-term benchmark TC/RCs of US$80/dmt and 8.0¢/lb (US$176/t Cu) are reasonable assumptions. These assumptions are conservative and reflect the desire of financing banks to see financial model calculations based on direct sales to smelters under long-term contracts. It is probable that a significant portion of the Project's output will be sold to smelters or traders under long-term contracts, with the balance sold in the spot market. TC/RCs realized by the Project may be up to 20% lower than the prevailing benchmark quote.

Ocean Partners forecasts that benchmark TC/RCs for copper concentrate will be lower than current long-term averages during the beginning of the second half of this decade based on the market scenarios described. Given difficulties inherent in forecasting commodity cycle timing too far into the future it is sensible to assume that benchmark terms will trend back towards long-term averages by 2030.

The typical payment yield, or payable, for copper concentrate with a grade less than 30% is currently 96.50% and subject to a minimum deduction of 1 unit (1% Cu). For clarity, for a concentrate containing 22% copper, the 1% minimum unit deduction will apply to the copper payment, or by typical practice: (22-1)/22 = 95.45%.

19.1.4.2 Precious Metals

The TC for gravity gold concentrate will depend on the buyer's appetite for a particular quality volume at the time the contract is being negotiated. Typical TCs range from US$120/dmt of concentrate for clean material to over US$400/dmt for complex material.

Any payable gold or silver in a copper concentrate will also be subject to an RC. These tend to be fixed, and US$5.00/oz Au and US$0.40/oz Ag are typical. RCs for precious metals in pyrite and gravity gold concentrates are greater than copper concentrate, and Ocean Partners recommended the use of US$7.00/oz Au and US$0.50/oz Ag for the gravity gold concentrate of the Project.

Payment for gold will be made against the contained values in both the copper concentrate and gravity concentrates. Payments for gold and silver in copper concentrates are subject to some regional variations and related to the sampled grade. Based on a contained grade of 6.3 g/t Au in the copper concentrate, the gold payable in the Chinese market would be 93.5%, increasing to 96% in Japan and South Korea. The minimum gold payable in a copper concentrate would be 90% for a concentrate grading 1 to 3 g/t Au.

The maximum payable for concentrate grading greater than or equal to 20 g/t Au increases to 96% in China and 98% in Japan or Korea. The gravity gold concentrate would also be attractive for processing at European smelters where the gold payable is 98% with a deduction 1 g/t.

The typical silver payable is 90% for concentrates that assay greater than 30 g/t Ag.

A non-refundable 13% VAT payment attached to the contained silver content in copper concentrate should be accounted for in the NSR model if a Chinese smelter is selected.

With a specification of ~0.1% As, 50% passing -74 µm, and a moisture content of less than 20%, the gravity gold concentrate will be exempt from a non-recoverable 13% VAT payment according to current Chinese regulations for customs-designated "gold concentrate".

19.1.4.3 Deleterious Elements

Deleterious elements impact the achievable NSR calculation for copper concentrate through either the introduction of a "smelter penalty" reflecting the extra costs associated with removal and waste disposal, or their presence at a threshold concentration that precludes the sale of concentrate into a particular jurisdiction. Penalties and thresholds for any deleterious elements in the gravity gold concentrate will be like those described for copper concentrates and account for the blending ratio at the smelter.

Based on the analysis presented in Table 19.3, Ocean Partners evaluated the copper concentrate specification against typical threshold limits and the related penalty deductions based on dry weight per tonne, and identified that fluorine and silicon may draw penalties:

Table 19.3 – Potential Penalty Elements and Minerals

Element	Analysis	Typical Limit	Penalty	Comment
Fluorine	0.05% (500 ppm)	300 ppm	US$1 to $2 per 100 ppm	Current Chinese import limit of 1,000 ppm.
Silicon	4.81% Si (10.3% SiO_2)	10% SiO_2	US$1 per 1%	Assumes 100% as SiO_2. Chinese smelters unlikely to be deterred.

Other comments related to jurisdictional thresholds were:

- Fluorine is comfortably below the current Chinese limit so sales into that market will still be possible; however, the fluorine content of the material may mean that opportunities for sales to traders for blending purposes will be limited since global copper concentrate blending facilities have limited capacity for absorbing additional fluorine units from their current sourcing.
- Some buyers may be reluctant to accept qualities where the total combined insoluble mineral content (SiO_2, Al_2O_3, K_2O and CaO) exceeds 12%. It will be necessary to confirm in which form the Si, Al, K and Ca occur in the copper concentrate, but at this stage it appears that the material may be regarded as having a high “insoluble” content that may preclude buyers in some markets.
- Under Chinese legislation named “Harmful Content of China Imported Copper Concentrates (No. 49/2006)” under the China Import and Export Inspection Act, neither concentrate exceeds the import limits for the deleterious element limits defined: 0.5% As, 6% Pb, 10,000 ppm F, 100 ppm HG, or 500 ppm Cd.

19.1.4.4 Summary

Based on the evaluation performed by Ocean Partners, it is suggested that the copper concentrate and gravity gold concentrate TC/RCs, payables, and deductibles be as summarized in Table 19.4.

Table 19.4 – Copper, Gold and Silver Smelter Terms as Suggested by Ocean Partners

		Unit	Copper Concentrate	Gravity Gold Concentrate
Copper Treatment Charge	2026	US$/dmt	70	-
	2027		65	
	2028		65	
	2029		75	
	2030+		80	
Copper Refining Charge	2026	¢/lb	7.0	-
	2027		6.5	
	2028		6.5	
	2029		7.5	
	2030+		8.0	
Copper, Payable at 22% Cu		%	95.45	-
Copper, Minimum Deduction		%	1 unit	-
Gold, Treatment Charge		US$/dmt	-	240
Gold, Refining Charge		US$/oz	5.00	7.00
Gold, Payable		%	93.5	97.0
Silver, Refining Charge		US$/oz	0.40	0.50
Silver, Payable over 30 g/t Ag		%	90	90

Treatment Charge excludes Transport, Insurance, and Freight.

Source: Ocean Partners, 2023

19.1.5 LOGISTICS

The Project is in the Municipality of Puerto Libertador, Department of Córdoba, Republic of Colombia, about 160 km by air north of the city of Medellín. The designated port facility for concentrate shipment is the Atlantic town of Tolú, approximately 274 km by road to the north and accessible by the national highway system.

The TCs referenced were based on delivery including cost, insurance, and freight (CIF) to Asia because this is the reference market for copper concentrate of this quality. For the study, NSR calculations are based on export to China or other Asian countries.

19.1.5.1 Copper

Copper concentrate is to be loaded into ISO concentrate shipping containers with a capacity of 30 wmt and hauled by truck to Tolú for export by bulk shipment to international smelters.

A new gated storage area will be required at the Port of Tolú to house the concentrate before being loaded onto ships. This facility will include installing a concrete pad enclosed in a gated area. The concrete pad will provide storage capacity for up to 20,000 t of concentrate in shipping containers, and additional storage capacity is available at the mine site if ever required.

Prevailing bulk shipping rates at the time of the study are thought to be slightly lower than long-term averages. Based on monthly 10 kt shipments to discharge ports in China or elsewhere, a sea freight cost of US$70/wmt was utilized. The estimated consolidated loading port rate of US$15 to $20/wmt accounts for the cost of concentrate storage through vessel loading.

19.1.5.2 Gold

Gravity gold concentrate will be shipped to international customers in containers. Two containers per week will be required. Commercially available container liners can be installed to prevent gold losses during trans-ocean shipping.

The sea freight rate of US$500 per container, equivalent to US$22/wmt of concentrate, is assumed for shipment to customers in Asia. A sampling fee of $US10/wmt is recommended.

Table 19.5 – Freight and Handling

Description	Unit	Copper Concentrate	Gravity Gold Concentrate
Sea Freight, Bulk	US$/wmt	70	-
Port Handling, Estimate	US$/wmt	20	-
Sea Freight, Container	US$/wmt	-	22
Weighing, Sampling, Moisture Determination	US$/wmt	-	10

Source: Ocean Partners, 2023

19.1.6 METAL PRICE FORECAST

19.1.6.1 Copper

Copper price declined during 2023 as supply exceeded demand in a subdued macro-economic environment. At the time of writing, the LME spot price for copper is about US$8,000/t compared to more than US$10,000/t during the first half of 2022. Ocean Partners expects this trend to persist into 2024. The copper market is expected to tighten from 2025 to 2026, indicating that prices are likely to be generally higher than long-term averages during the second half of this decade. Projections from banks and research companies for long-term copper prices are typically in the range of US$7,700/t to US$8,800/t.

Factors supporting the near-term price stability:

- A floor support level that typically reflects the 90th percentile of the production cost curve, currently estimated to be around US$6,800/t.

- Positive investor sentiment due to the association of copper with decarbonization of the global economy.

During the second half of this decade, price support will reflect:

- An improving macroeconomic picture resulting in an increase in global industrial activity and the associated consumption of base metals.
- Demand boosted by use in electrical vehicles and renewable energy.
- Demand growth from continuing urbanization in India and Southeast Asia and to some extent China.
- Reserve depletion and falling ore grades at existing producers, resulting in a decrease in global mine production.
- Absence of investment and project approvals on new large-scale copper mines in recent years, and the output from newly constructed mines presents little prospect to be able to compensate for reduced output from existing suppliers.
- Potential substitution is from aluminum in electrical and heat conductance applications.

The annual average copper prices presented for the period 2026 to 2028 in Table 19.6 reflect this scenario and are typical of current forecasts from many banks and research companies and are regarded as prudent near-term assumptions for Project evaluation, followed by trending towards a long-term average.

19.1.6.2 Gold

Gold is used in the manufacture of jewelry together with applications in the technology, industrial and medical sectors. Gold is also regarded as a store of value; and as such, pricing is influenced by other factors including investment demand and central bank buying as well as fluctuations in interest rates, inflation, currency exchange rates and money supply.

A strong feature of recent gold markets has been sustained physical demand and price support due to high levels of buying from central banks and other institutions that underpins the annual average price of US$1,800/oz observed in 2022. This trend continued into 2023 with pricing above US$2,000/oz at year-end. Future gold prices should be supported to some extent by restrictions to primary mine supply, since it is increasingly difficult for mining companies to secure the necessary environmental permitting and social license to develop new mines, particularly those using cyanide in their production process.

It is likely that gold prices will eventually retreat to some extent from the current high levels. Lower inflation will likely see a less risk-averse market outlook from some investors and improving equity markets may attract more investment.

After accounting for inflation, the LBMA gold price has averaged slightly higher than US$1,700/oz over the past decade. A conservative assumption for financial modelling purposes is that prices trend back down towards this value over the medium term as shown in Table 19.6.

19.1.6.3 Silver

Silver has a wide variety of industrial uses as well as being in demand for investment purposes. Silver price support is found in the likely future reduction of interest rates, a deficit in the physical market as increasing mine supply has failed to keep pace with demand growth; reduced byproduct production from mining other metals; increasing use of silver in solar cell applications; and key roles in the generation, storage and consumption of energy due to high electrical conductivity including more intensive use in battery electric vehicles and their associated charging infrastructure.

Silver price dipped below US$20/oz during the second half of 2022 before recovering to around US$23/oz at time of writing. It is assumed that the annual average silver price will trend back towards US$22/oz over the medium term (average over the past decade) after accounting for inflation.

Table 19.6 – Metal Price Assumptions

	Unit	2026	2027	2028	2029	2030+	LOM
Copper Price	US$/t	8,900	9,300	9,400	9,100	8,800	8,796
Gold Price	US$/oz	1,800	1,800	1,775	1,725	1,700	1,715
Silver Price	US$/oz	23	23	23	22	22	22.19

Source: Ocean Partners, 2023

19.2 Commodity Price Projections

Table 19.7 presents the life of mine (LOM) average price projections for the FS financial model base case.

Table 19.7 – Metal Price Assumptions for the Economic Analysis

Description	Unit	LOM Value
Copper Price	US$/lb	3.99
Gold Price	US$/oz	1,715
Silver Price	US$/oz	22.19

19.3 Contracts

Currently, Cordoba has no commercial sales agreements or logistic service agreements in place.

While Ocean Partners have provided expertise to Cordoba as summarized in Section 19.1 above, this guidance does not represent a forward commercial sales contract or arrangement for smelting, refining, transportation, logistic handling, or sales.

Cordoba has not entered into any hedging or forward sales contracts.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

The following Section summarizes information developed during the baseline studies on the current environmental and social/community conditions and potential impacts that might be caused by construction and operation of the El Alacrán open pit mine. This Section also provides a summary of the regulatory context for baseline investigations. The regulatory requirements for exploration and mine development are summarized in Section 4. The Section concludes with a summary of environmental social risks and potential impacts.

The QP for this Section has performed various site visits to the Alacran Project to evaluate environmental and social aspects of the Project. All work related to geochemistry and water resources/quality was performed under the direction of the QP.

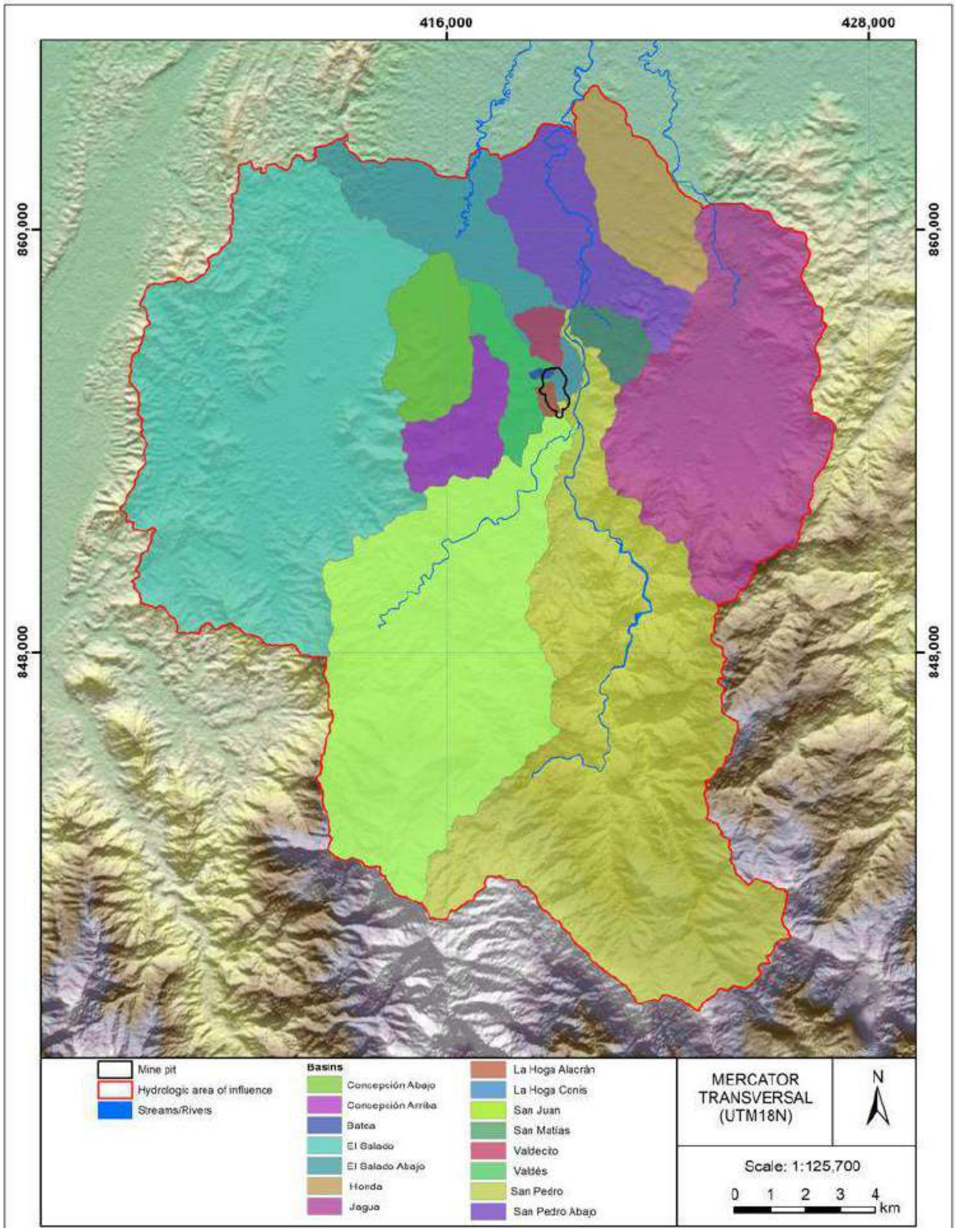
20.1 Environmental Setting

The Project is in an area which has hosted mineral exploration and mining projects for several decades. Previous mineral activities on the property are limited to exploration activities.

The area around the Project is sparsely inhabited, including six (6) small communities within 6 km of the Project, and the El Alacrán community located within the footprint of the mine. The El Alacrán community is the largest local population centre (~1000persons) and the population within a 6 km radius is approximately 2,500. The local population subsists on mining, small-scale agriculture, ranching and small businesses that support the local community (bars and stores). Most of the original forest has been cleared for grazing and agriculture. The degree of deforestation decreases 5 to 7 km south of the Project as the terrain ascends into the Paramillo National Park and climbs the Western Cordillera. Illegal mining of the El Alacrán and East Montiel deposits have resulted in extensive localized erosion in Cerro Norte and Cerro Montiel Este.

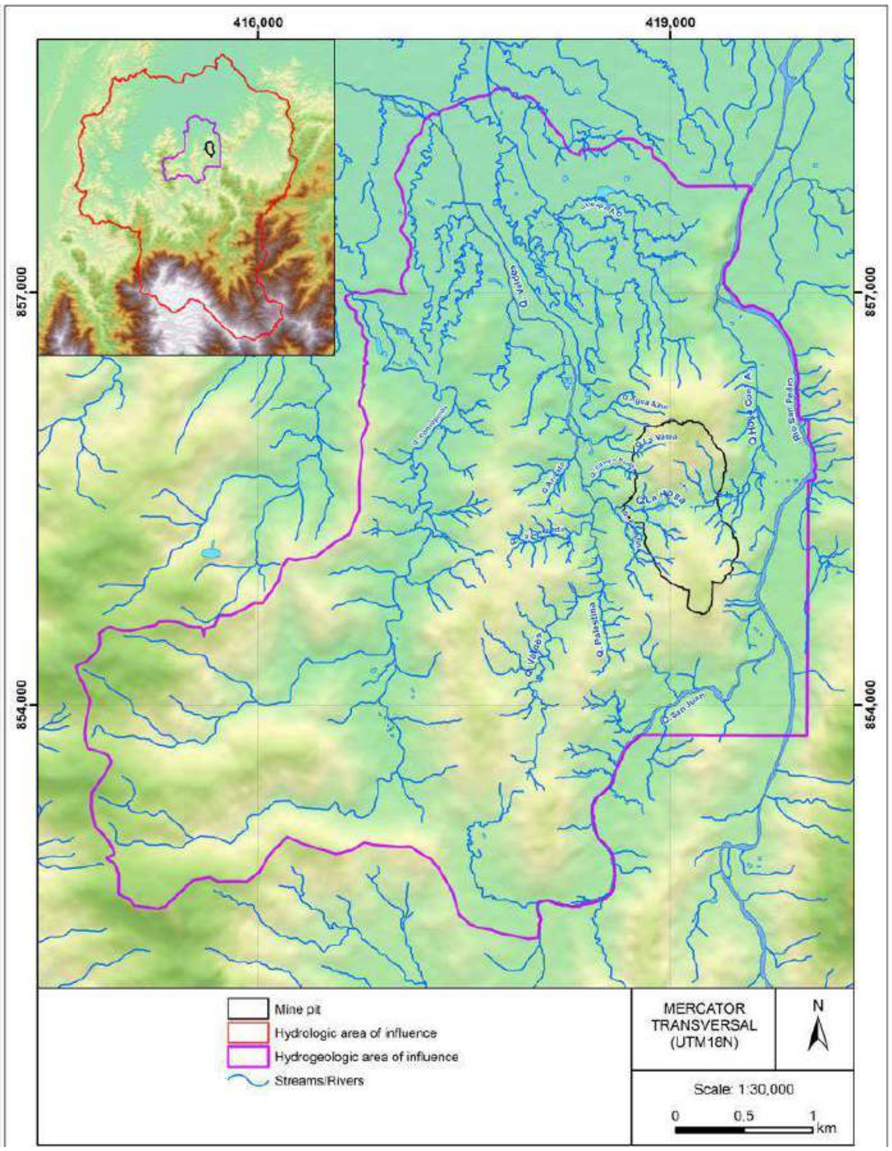
The surface drainage pattern is principally to the north and northwest in the vicinity of the open pit mine (Figure 20.1). The principal surface water body is the San Pedro River immediately east of the planned pit (Figure 20.2). The two streams that drain from the saddle between the two (2) hills that form the El Alacrán deposit (Quebrada La Hoga Mina to the west and Quebrada La Hoga Conis Aviles to the east) have been used for decades for uncontrolled dumping of tailings by illegal mining operations in the village of El Alacrán.

Figure 20.1 – Regional Surface Drainage in the Vicinity of the Alacran Project



Source: INTERA, 2023

Figure 20.2 – Local Surface Drainage in the Vicinity of the Alacran Project



Source: INTERA/SHI, 2023

Discharge of mine process water and tailings into the local streams has resulted in extensive contamination of Quebrada La Hoga Mina, Quebrada Valdéz and Quebrada La Hoga Conis Aviles. Discharge of tailings into Quebrada Valdéz over a period of approximately 40 years has significantly affected the flow and depth of the stream, resulting in an extensive braided stream as the sediment load greatly exceeds the carrying capacity. The streams originating in El Alacrán are effectively sterile, with no fish, macroinvertebrates or vegetation. This includes Quebrada La Hoga Conis Aviles to the San Pedro River and Quebrada Valdéz as far as the junction with Quebrada Concepción, approximately 5 km from the village of El Alacrán.

20.2 Baseline Studies

A baseline monitoring program was performed between 2020 and 2023 to inform the Project EIA, PTO, PFS and FS. The baseline studies were focused on the El Alacrán deposit and did not include the satellite deposits discussed in Section 14 of this Technical Report. The baseline monitoring program was designed to address the requirements of the ANLA terms of reference (TRs) for an EIA (ANLA, 2016); corporate social responsibility and environmental criteria for a NI 43-101 Technical Report; and best practices for international mining. The spatial and temporal extent of each baseline monitoring program was determined based on a delineation of the respective “area of influence” for each medium, pursuant to the TRs. The area of influence of a specific medium (air, surface water, groundwater) is defined in the TRs as the biotic, abiotic, and socioeconomic area (by medium) that might be impacted by the development and operation of the mine.

Baseline studies generated data on the topics listed below. In many cases, an initial study was completed for the PFS and then an additional, higher resolution study was performed to generate FS level data or data required for the EIA:

- Hydrologic characterization including water quality, stream flows, identification of springs and seeps, and water and water resources uses/impacts;
- Climate calculations (precipitation, temperature, evapotranspiration, design storms, stream/river max/min flows);
- Hydrogeology including groundwater levels, groundwater sampling for chemistry/quality evaluation of aquifer characteristics and development of a numerical groundwater model to evaluate pit dewatering, the groundwater area of influence and closure scenarios;
- Geochemical characterization of excavated material (ore, overburden and waste rock), soils, tailings, and potentially reactive surfaces (mine pit wall at closure);
- Geochemical and modeling of process water discharges;
- Characterization and mapping of soil types and distributions;
- Archaeological sites and areas of cultural significance;
- Environmental/ecosystem and biota;
- Atmosphere(air quality, dust, noise and green house gases) ;
- Vibrations;
- Socioeconomics and demographics;
- Closure, reclamation, and sustainability;
- Community issues and social management;
- Waste rock and tailings management;
- Mine and storm water management;
- Identification of valued environmental components (biophysical and socio-cultural); and

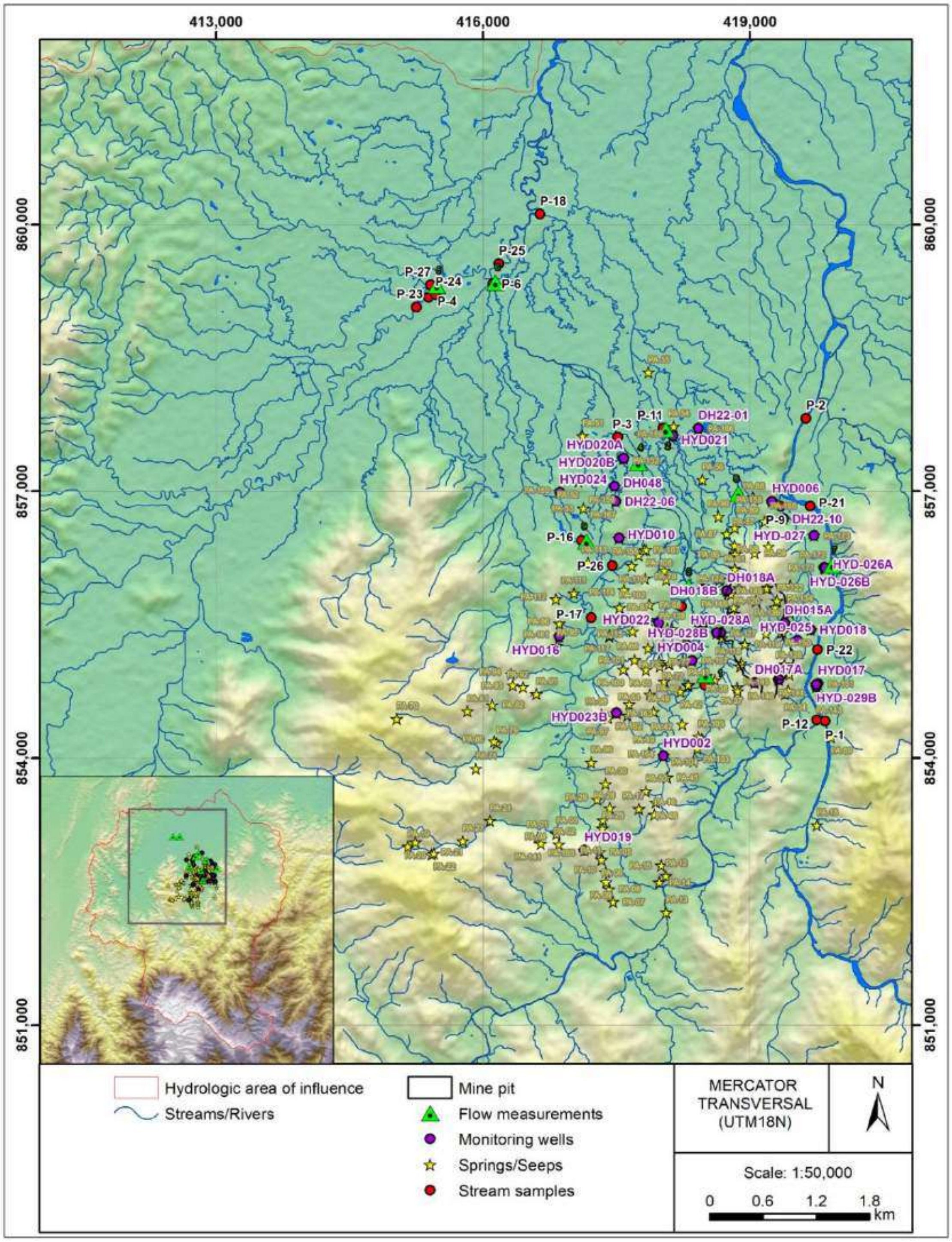
- Identification of potential environmental impacts.

20.2.1 HYDROLOGY

The hydrology of the Project site was evaluated within the area of influence for flow, water quality and sediment chemistry (INTERA/SHI, 2023a). Data collection locations are shown in Figure 20.3 as well as the hydrologic and hydrogeologic areas of influence. The baseline hydrology characterization program included:

- Two (2) rounds of sampling and chemical analysis of surface water and sediments chemistry at 15 locations;
- Survey of water users and uses, including a survey of springs and the small supply ponds created by the illegal miners;
- Generation of a detailed hydraulic network map showing stream order, source of each stream, stream concentration time, and delineation of perennial vs. ephemeral reaches;
- Evaluation of stream flow data from two regional gaging stations and estimation of stream flow;
- Evaluation of three (3) discharge locations to 1) determine their baseline flow volumes and water chemistry, and 2) water quality modelling of the mine solutions discharges;
- Hydrobiology;
- Predictive modelling of average, minimum and maximum flows stream flows (Section 5); and
- Modeling of flood areas and flash flood hazard zones.

Figure 20.3 – Data Collection Locations for Hydrology and Hydrogeology



Source: INTERA/SHI, 2023a

The main surface water feature is the San Pedro River, which flows north to south along the east side of the open pit. Several smaller streams drain the proposed open pit (Quebrada La Hoga Mina) and mine infrastructure areas (Quebrada Palestina) before merging into Quebrada Valdéz and ultimately discharging into the San Pedro River approximately 10 km north of the Project. On the east side of the open pit area, the village of El Alacrán is drained by Quebrada La Hoga Conis Aviles, which discharges into the San Pedro River 1 km north of the El Alacrán community.

Flows in the surface streams vary by season (Section 5). Quebrada Valdéz has an average flow of of 0.25 m^3/s. Based on the calculated precipitation values and statistical analysis of basin runoff, average flows in the San Pedro River next to the Project range from 3 m^3/s to 14 m^3/s, depending on the season, with an annual average flow of approximately 10.5 m^3/s. Detailed calculations of potential max and minimum flows for varying durations and return intervals were calculated (INTERA/SHI, 2023a) to determine flood zones and stage levels.

Water usage around the Project area includes diversions for domestic use and illegal mining. The illegal miners store process water in small, unlined ponds with earthen banks, frequently composed of sulphidic tailings. Field pH measurements of water in these ponds were frequently acidic. Surface diversions for irrigation, and groundwater wells were not observed. Within the hydrologic area of influence, current water demand is 4.7 L/s for domestic consumption, 15.3 L/s for agricultural c40onsumption and 0.5 L/s for livestock consumption. In 20 years, the demand for domestic consumption would increase to 5.35 L/s. Calculation of the water usage index based on stream flow data and water usage show that water demand vs. water usage is very low to low, with the exception of the two (2) streams in the mine pit footprint (Quebrada La Hoga, El Alacrán and Quebrada La Hoga Conis). Water use from these streams will cease with mine construction.

20.2.1.1 *Surface Water Chemistry*

Two (2) rounds of baseline surface water and stream sediment were performed in late 2020 (dry season) and March 2021 (wet season), based on a detailed sampling and analysis plan that included a QA/QC program. Water samples were analyzed for major ions, metals. and common anthropogenic contaminants (e.g. phenols, hydrocarbons, nitrogen species, coliform bacteria, phosphorus, surfactants and cyanide).

Surface water was generally classified as calcium/magnesium-carbonate with low TDS (< 50 mg/l). Surface water and stream sediments within and downstream of the community of El Alacrán show extensive contamination due to illegal mining, with elevated concentrations of sulphate, suspended solids, metals, phosphorus, oil, and grease, coliform and acidity, with low pH and alkalinity. Contamination from illegal mining extends east in Quebrada La Hoga Conis Aviles to the San Pedro River. West of the village of El Alacrán, Quebrada La Hoga Mina and Quebrada Valdéz display heavy sediment loading due to tailings disposal by illegal miners that extends at least 4 km NW of the village. Concentrations of several regulated metals (Cu, Cr, Fe) in the impacted streams exceed Resolution 0631 discharge standards. Elevated sulphate concentrations from illegal mining extend at least 5 km downstream of El Alacrán in Quebrada Valdéz. The San Pedro River also receives discharge from multiple locations on the east bank downstream of San Juan Viejo from illegal mining operations processing ore from the Montiel East deposit. Water quality in the San Pedro River upstream of San Juan Viejo, in Quebrada San Juan, Quebrada Concepción and other small streams within the area of influence is good.

20.2.1.2 *Discharge Modeling*

Modeling of discharges was performed for three (3) locations (Figure 20.4), two on the San Pedro River for discharge of process water (V1) and dewatering well flow (V2), and a third discharge location (V3) in Quebrada Concepción for discharge of treated wastewater from the camp. Discharge modeling is required under resolution 1514 (MADS, 2012) and Decree 1076 (MADS, 2015) to determine the impact of mine water discharges on flow and water quality of the receiving bodies. Discharge modeling included: bathymetric measurements of the streams upstream and downstream of each discharge location; stream flow measurements over time; and physicochemical characterization of water and sediments.

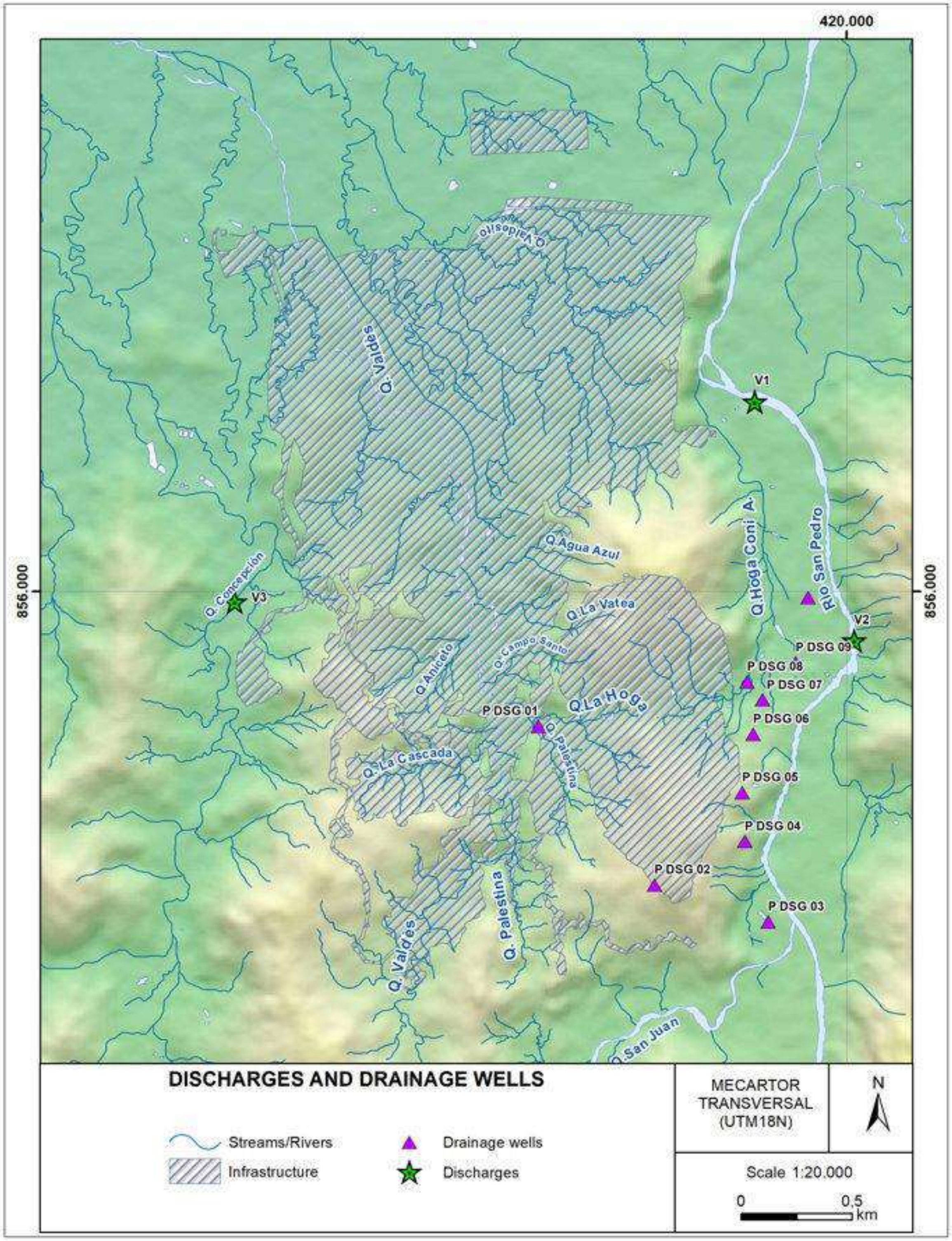
The outflow volumes from each location were based on the stochastic water balance developed by Knight Piésold (Section 16) (ponds and WMP) and the numerical groundwater model (dewatering wells). A “worst case" discharge model was also developed to simulate the effects of a direct (untreated) discharge of mine process water to the San Pedro River under 95th percentile precipitation conditions (INTERA, 2023c). Discharge modeling indicates that discharged water will affect the volume of flow in the receiving bodies, but not significantly affect water quality. All modeled results met the Resolution 0631 discharge limits.

20.2.1.3 *Surface Flow Monitoring and Modeling*

In addition to the measurement of flows for the discharge modeling, surface water flows were measured at the locations shown in Figure 20.3 to determine background surface water conditions. To improve temporal data density and address access limitations, # of the surface water flow stations were automated using stilling wells and recording pressure transducers. Surface water flows rise and ebb in parallel with precipitation (Section 5).

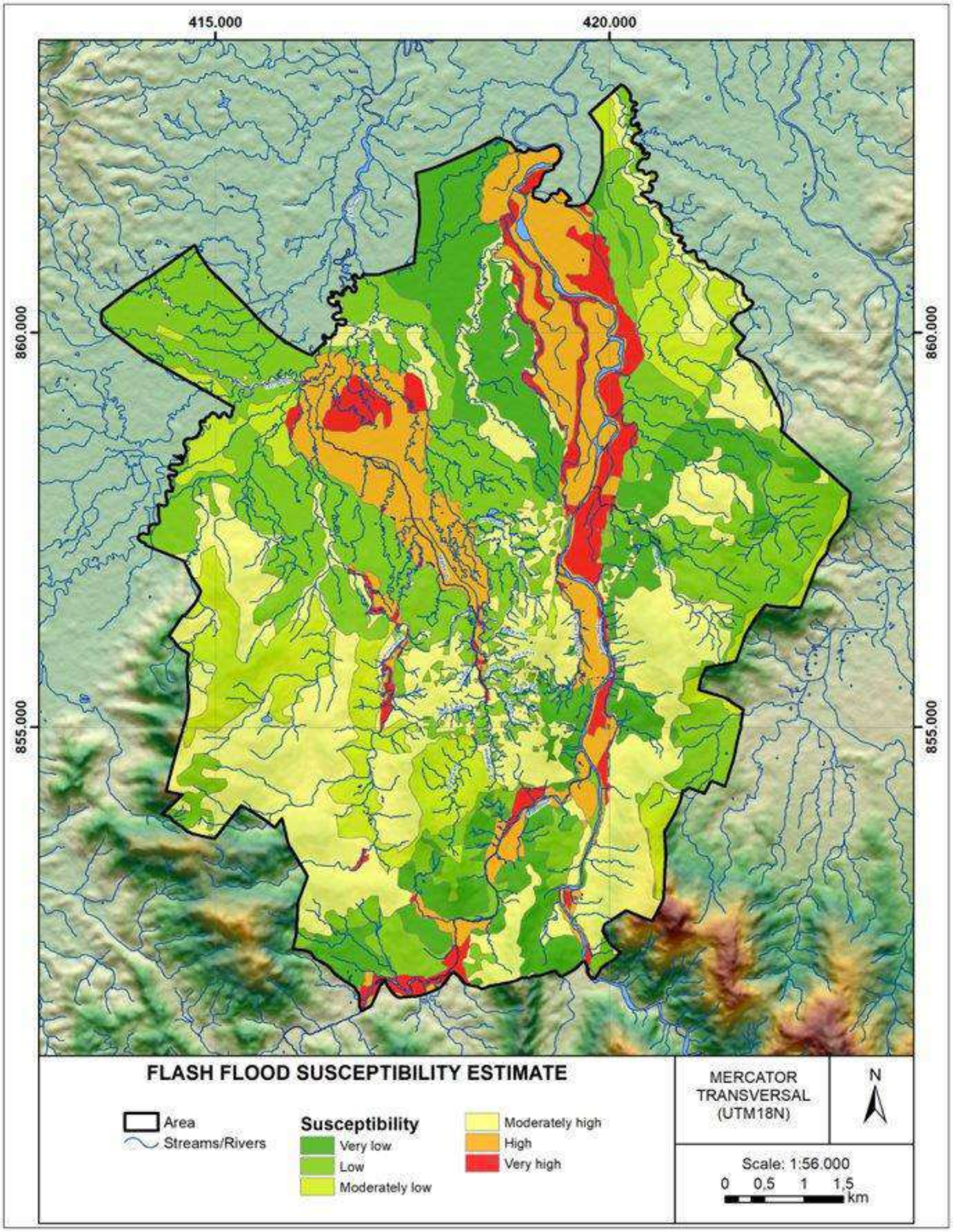
Surface water modeling also included flood modeling to determine the locations and water depths of flood events as a function of storm precipitation as well as flash flood hazard modeling (SHI, 2023). Figure 20.5 shows the calculated flood areas and flash flood hazard zones with the hydrologic area of influence. The flood modeling shows that flooding will not affect the mine infrastructure, although the mine camp in Quebrada Concepción will be on the edge of the flood plain for all storms with return periods greater than 2.3 years.

Figure 20.4 – Discharge Locations and Dewatering Wells



Source: INTERA, 2023

Figure 20.5 – Flood Zones, Flash Flood Hazard Zones



Source: INTERA, 2023

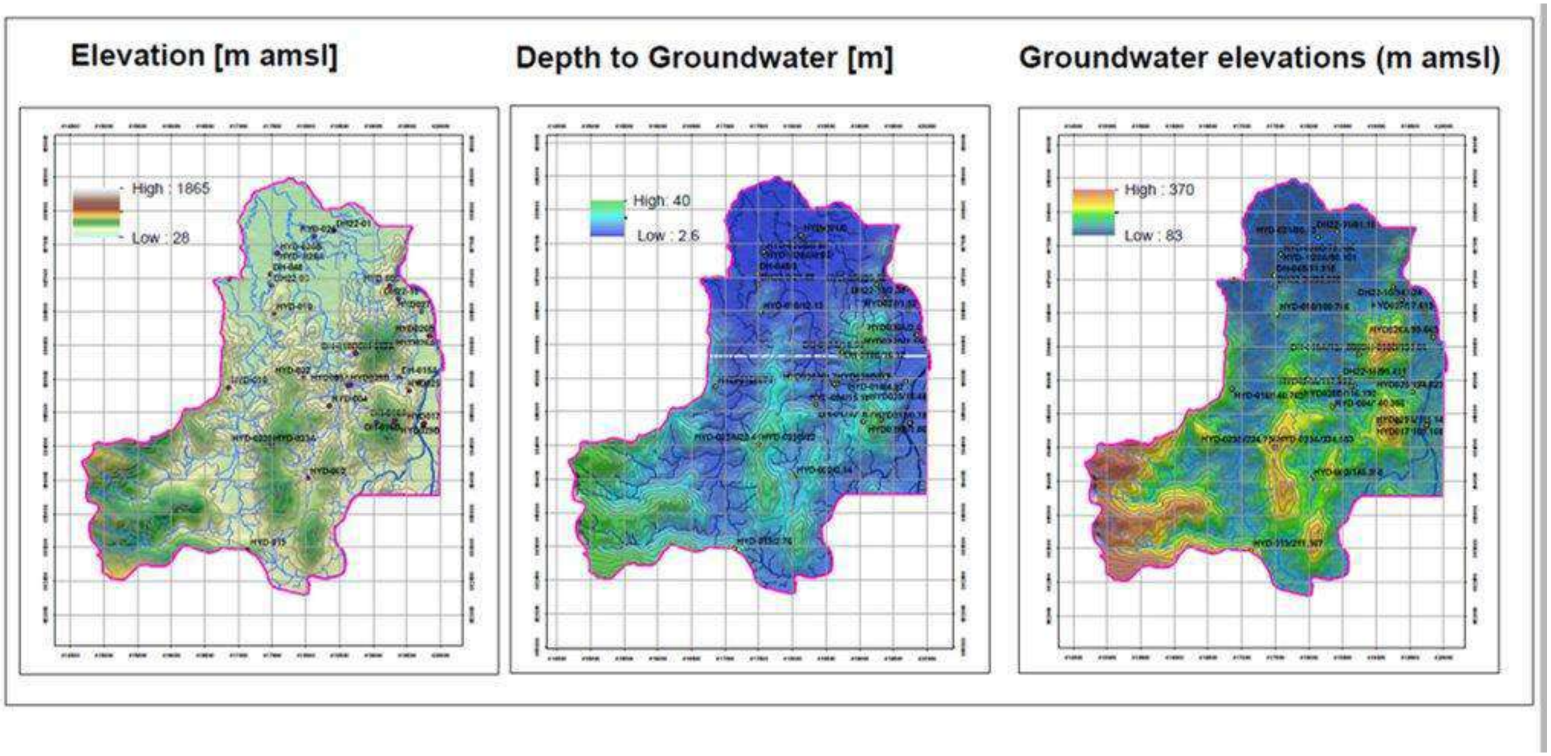
20.2.2 HYDROGEOLOGY

An extensive groundwater baseline program was performed between 2020 and 2023 (INTERA/SHI, 2023b). The baseline groundwater characterization program included:

- Installation of 34 wells (Figure 20.3), including:
    - 28 shallow 2” monitoring wells.
    - Four (4) shallow monitoring wells downgradient of the proposed WMF structure.
    - Five (5) deep 4” aquifer test wells. These wells were specifically designed to intercept the structures that might act as preferential pathways for groundwater flow into the pit. The deep wells were all completed to the same elevation as the bottom of the proposed pit. Two-inch piezometers were drilled next to three (3) of the deep wells to serve as observation wells. Aquifer characterization of the deeper wells was accomplished using the 72-hour constant rate test based on a preliminary step-drawdown test.
- Water level measurements and determination of groundwater flow directions
- Aquifer characterization of the shallow aquifer using a range of hydraulic tests (packer, slug, injection and pumping).
- Design, installation oversight and testing of five (5) deep wells around the proposed pit footprint.
- A survey of springs and seeps during both the wet and dry seasons, and their uses.
- Infiltration tests.
- Three (3) rounds of groundwater sampling (metals, isotopes, major ions, physiochemical parameters) from # monitoring wells, # springs and # tunnels.
- Installation of four (4) multi- level vibrating wire piezometers within the proposed pit.

Figure 20.6 illustrates the surface topography, depth to groundwater and groundwater isoelevation contours.

Figure 20.6 – Depth to Groundwater (m Below Ground Surface) and Groundwater Elevations (m Above Mean Sea Level), September 2023

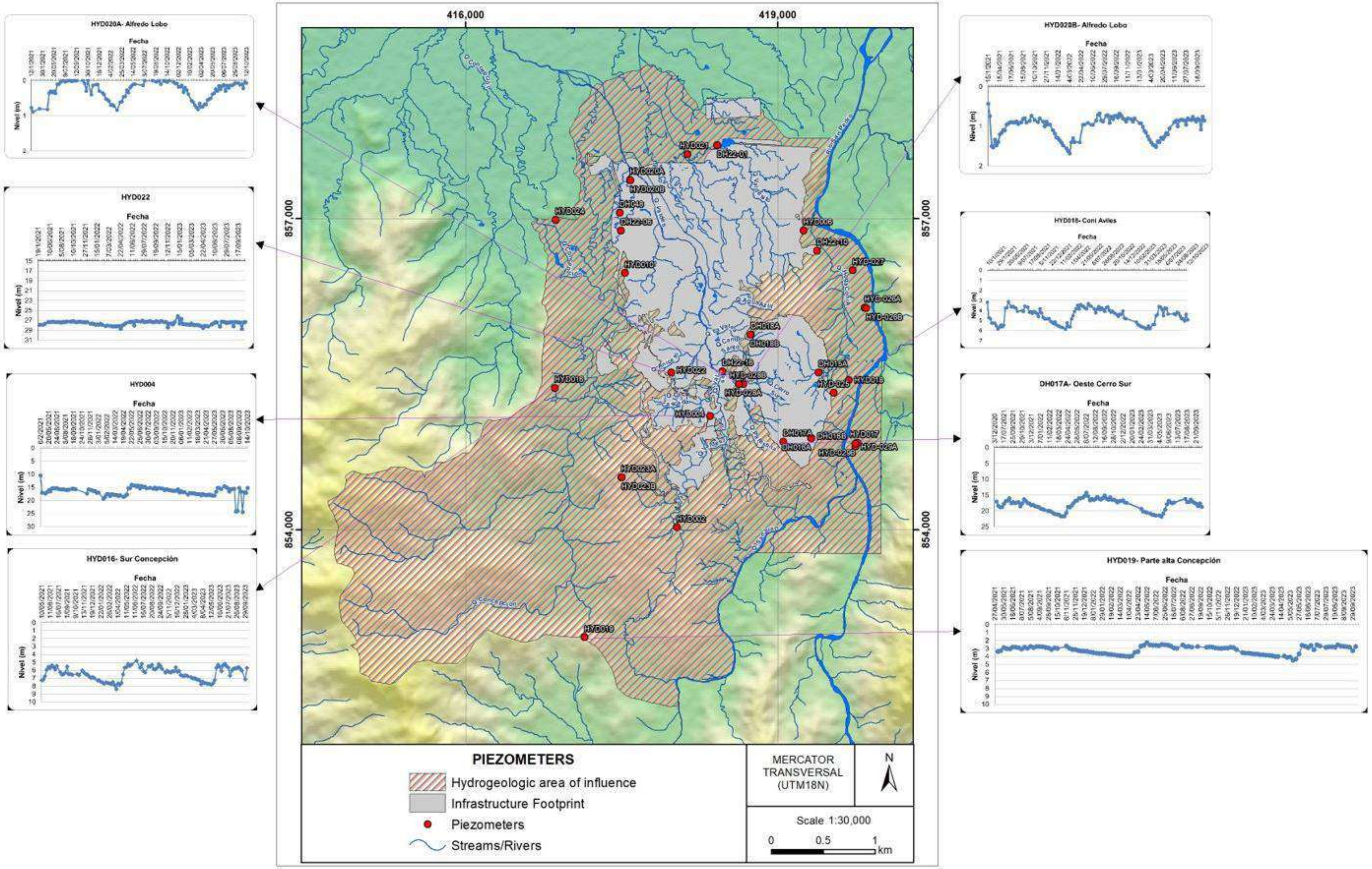


Source: INTERA, 2023

The findings of the baseline hydrogeology program were:

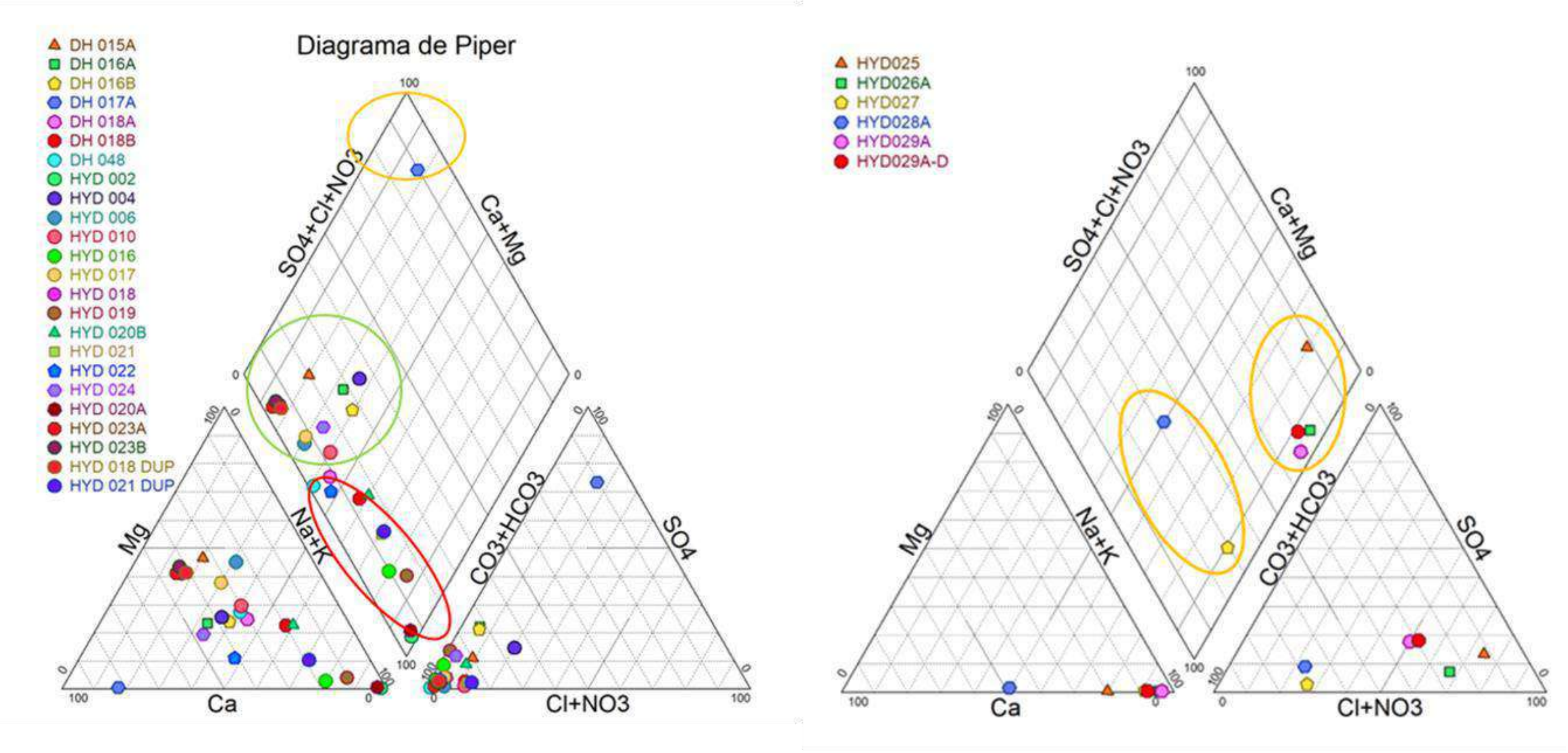
- The spring and seep survey identified 143 groundwater discharges within the hydrogeologic area of influence during the wet season, of which fourteen were still flowing during the dry season within the pit footprint.
- Groundwater elevations and directions of flow follow topography. Depth to groundwater varies from 5 m below ground surface in the valley bottoms and alluvial plain of the San Pedro River to approximately 30 m below ground surface on the hills within the open pit footprint. Figure 20.6 illustrates the surface topography, depth to groundwater and groundwater isoelevations. Groundwater flow is down slope from the hills and then parallel to surface water.
- Groundwater elevations vary with the seasonal variations in precipitation (Section 5) and proximity to streams. Figure 20.7 provides example hydrographs of wells across the site. Wells in upland areas (HYD018 and HYD022) show small variations (~1.5 m) while wells close to the San Pedro River (DH017A) show up to 6 m of seasonal variation. Shallow groundwater quality is generally good. Figure 20.8 provides Piper diagrams of the shallow wells (A) and deep wells (B). The majority of shallow groundwater are classified as calcium/sodium carbonate type. The single round of data from the five deep groundwater wells (September 2023) indicates that the deep aquifer waters are a distinct groundwater regime with predominantly sodium/chloride or sodium/carbonate type waters.
- A total of 42 shallow hydraulic conductivity measurements were obtained from aquifer testing of the shallow wells. Measured hydraulic conductivities in rock range from 0.0006 m/d to 0.2 m/d with a geometric mean of 0.01 m/d. The valley alluvium/colluvium had conductivity of 0.1 m/d to 56 m/d.
- Results of the shallow aquifer tests indicate that hydraulic conductivities are consistent, with approximately 70% of the values falling between 0.01 m/d and 0.5 m/d (1.16 E-5 to 6 E-4 cm/s).
- The deep wells were tested using a 72-hour pumping test based on results of a step drawdown test. One of the wells had to be tested using a rising head slug test, as it could not sustain the lowest achievable pumping rate using the available equipment. Analysis of the three-dimensional aquifer response of the deep well tests showed a strong bimodal distribution with three tests having a range of transmissivities between 8.3E-9 m²/s and 8.6E-7 m²/s, while two tests yielded values of 2.74 E-4 m²/s and 4.2 E-4 m²/s. The higher values appear to represent groundwater flow in fractures.

Figure 20.7 – Hydrographs



Source: INTERA, 2023

Figure 20.8 – Piper Diagrams – A: Shallow Wells, B: Deep Wells



A

B

Source: INTERA, 2023

20.2.2.1 Conceptual Groundwater Model

Data from the hydrogeology program were integrated into a conceptual groundwater model to inform the numerical groundwater models developed to evaluate the long-term behaviour and impacts to groundwater by mine development, operation, and closure. For the area in the vicinity of the Project, six (6) hydrostratigraphic units (HSU) associated with the different geological formations and quaternary deposits were defined. These have been differentiated according to their principal lithological, geomorphological, and hydraulic characteristics, with supporting information from water chemistries and groundwater levels. The HSUs and their characteristics are summarized in Table 20.1.

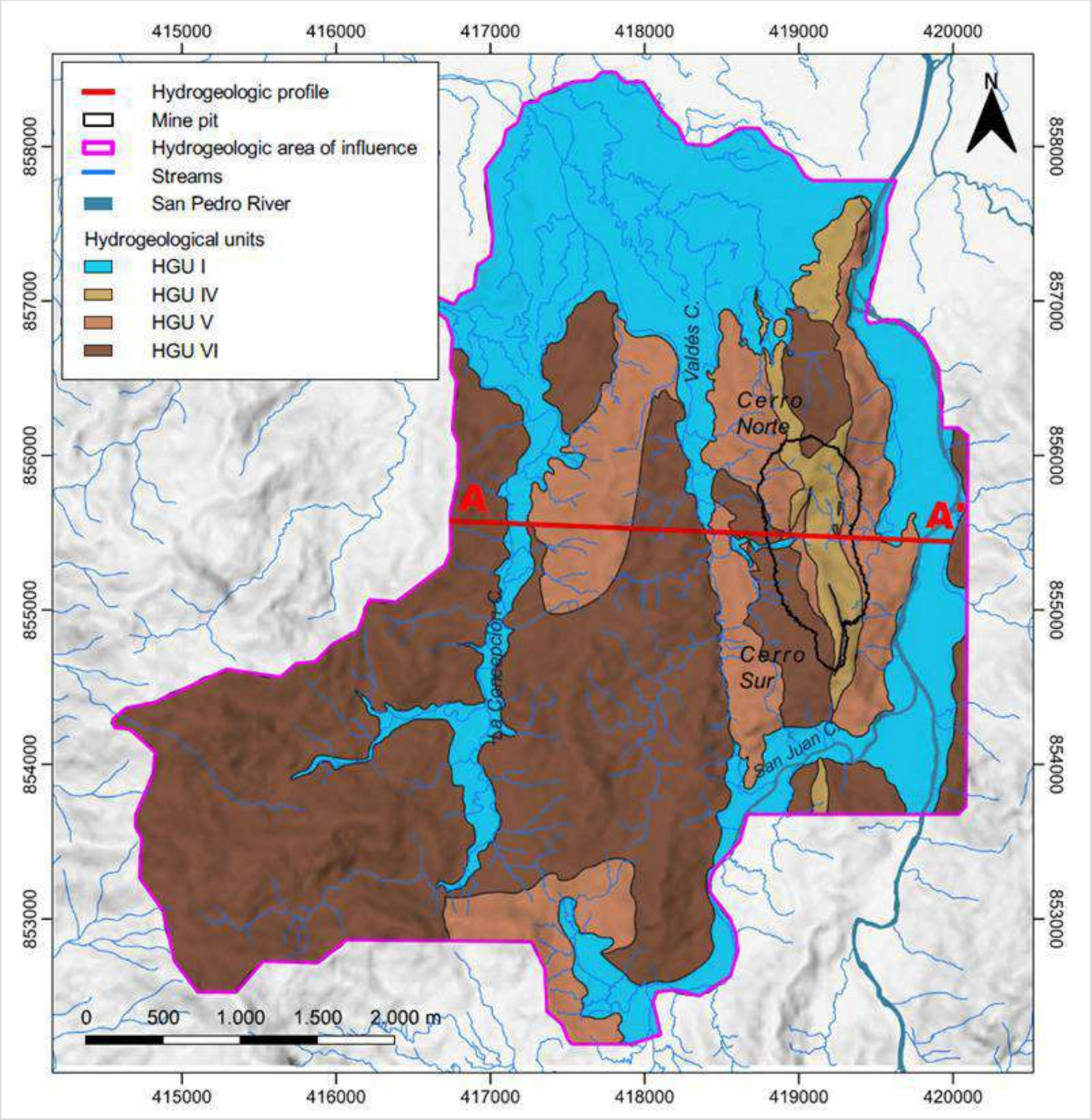
Figure 20.9 shows the surface outcrops of the HSUs and the location of a hydrogeologic cross section (Figure 20.10) across the open pit. HSU I (recent alluvium, colluvium, and alluvial terrace deposits) is the primary aquifer unit in the study area. HSU I occurs along the San Pedro River and valley floors and has varying thickness up to about 20 m. Residual soils and slope deposits (HSU II) cover the majority of the site where HSU I does not occur. These units overly the bedrock units classified as HSU III through HSU VI, which include the various volcanic, volcano-clastic, and sedimentary sequences described in Section 7 as well as the saprolite and saprolite-rock transition zones in the uppermost bedrock intervals.

Table 20.1 – Summary of Hydrostratigraphic Units

Hydro-Stratigraphic Unit	General Unit	Lithology	Hydraulic Conductivity (K) [m/d]	Type of Porosity	Total Estimated Porosity (%)	Transmissivity [m²/day]	Thickness (m)	Type of Unit
UH-I	Sed - Alluvial-Terrace	Unconsolidated sediments (colluvial-alluvial deposits; mixture of sand, clay, silt and conglomerate)	4E-01 to 56 (average7)	Primary	25-50	49 (based on average thickness)	0.15 - 20	Unconfined Aquifer
UH-II	S - Residual soils and Qdv slope deposits	Residual soils and Qdv slope deposit	9E-01 to 18.5 (average 4)	Primary and secondary	35-50	20.5 (based on average thickness)	0.25-10	Poor aquifer
		(Clay-sand/silty, blocks ~< 1 m)						
UH-III	Sp - Saprolites/Transition	Saprolites and weathered bedrock	8.9E-03 to 4.1E-01 (average 2.6E-01)	Primary and secondary	0.25-10	1.3E-06 to 1E-05	0.9-42.6	Aquitard
		(clay-sand)						
UH-IV	Vc - El Alacrán U2	Volcanoclastic sequence: calcareous-andesitic	1.5E-02 to 1.38 (average 4.0E-01)	Secondary	0.1 to 0.2	5.8E-05 to 5.6E-04	160 -280	Aquitard
		(Tuffs; breccias; fossiliferous mudstone; marlstone; crystalline calcite)						
UH-V	Vc - Tob-Bx	Mafic volcanoclastic sequence	1.7E-02 to 2.9E-01 (average 2.0E-01)	Secondary	0 to 2.5	1.8 to 2.4 (in screened intervals)	120 to>300	Aquitard
		(Tuffs and breccias)						
	Vc - El Alacrán U3	Mafic volcanoclastic sequence						
		(Lithic tuffs, tuffs, and lavas with agglomerates, sandstones and siltstones)						
	Vc - El Alacrán U1	Felsic volcanoclastic sequence						
		(Tuffs, breccias and lava flows)						
	Vc - El Alacrán U1	Felsic volcanoclastic sequence						
		(Tuffs and volcanic breccias, lava flows)						
UH-VI	In -Ton N El Alacrán	Tonalite	5.5E-04 a 2.0E-01 (average 6.0E-02)	Secondary	0 to 2.9	6.9E-07 to 3.6E-04	Undefined	Aquitard
	In - Ton W El Alacrán	Tonalite						
	In -Ton-Dior	Tonalite - Diorite						
	VI - And-Bas	Basalt - Andesite						
	VI - And Porfiri	Basalt						

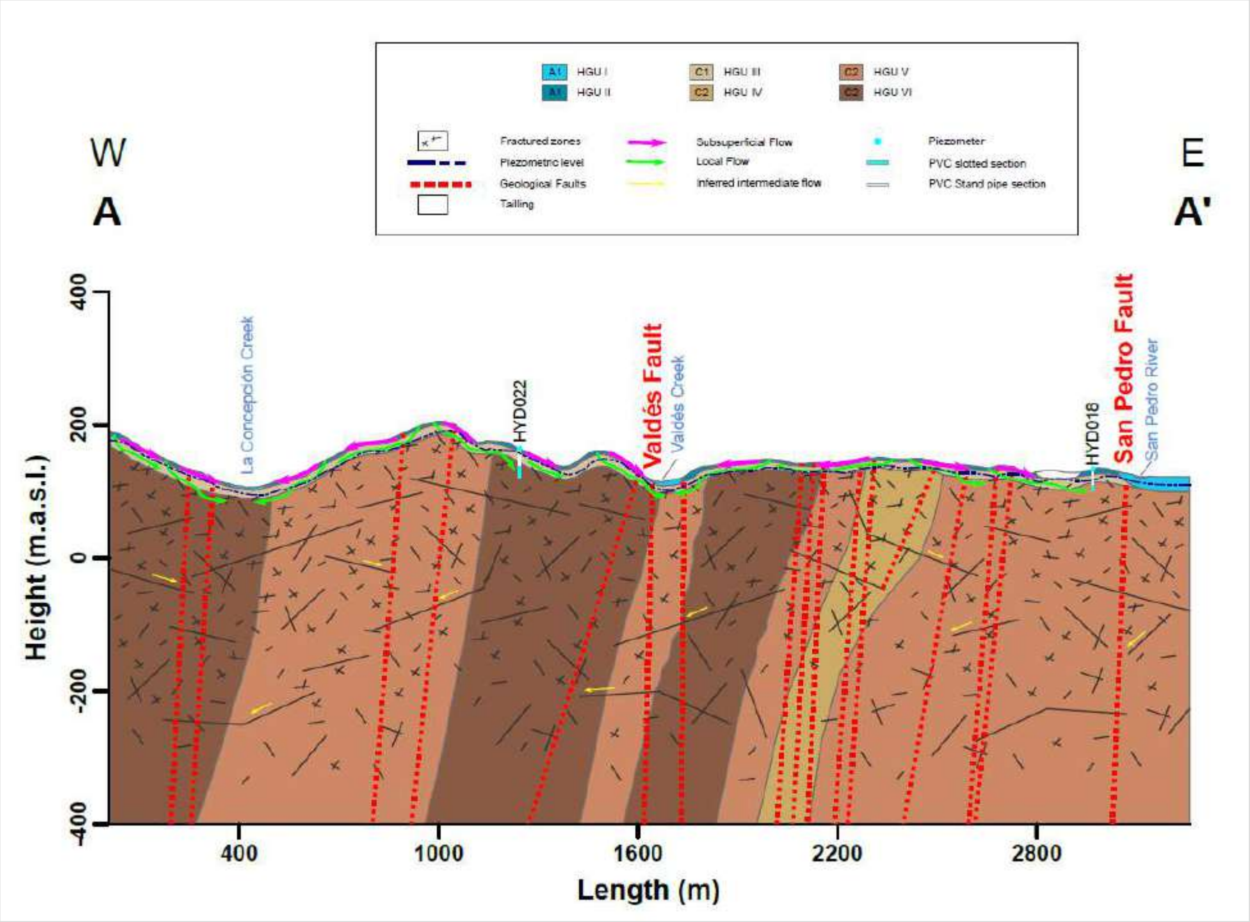
Source: INTERA, 2023

Figure 20.9 – Surface Outcrops of HSUs and Location of Cross Sections A-A'



Source: INTERA/SHI, 2023b

Figure 20.10 – Conceptual Hydrogeologic Cross Section A-A’



Source: INTERA,/SHI 2023b

20.2.2.2 *Groundwater Conditions and Flow Paths*

Water level data indicate that shallow groundwater flow is controlled by topography, with groundwater flowing from areas of higher elevation to lower elevations (Figure 20.6). Water quality parameters for the upper HSUs are fairly consistent, which suggests that they are a single heterogenous groundwater system with relatively low residence times for groundwater at the site.

Borehole data indicate that the bedrock is extensively fractured to a depth of 350 m below ground surface, with fracturing decreasing below that depth (Figure 20.10). There are three fracture systems within the pit that might exert some degree of control on groundwater flow. The bedrock units tend to have low primary porosities, which indicates that the overall hydrogeologic system is best characterized as a dual-porosity system with groundwater occurrence and flow in both fractures and in the primary matrix porosity. Topography provides the primary controls on flow within the bedrock units, with fracture patterns and HSU occurrence providing secondary controls on fluid flow patterns.

The overall hydrogeologic system is under unconfined conditions; therefore, storage parameters for the study area are controlled by specific yields (i.e., effective porosities) of the alluvium and bedrock formations. Only three (3) reliable dimensionless storativity values were derived from the hydraulic testing at the site. The reliable measured values (0.0017, 0.0064, and 0.24) are consistent with an unconfined hydrogeologic system, and the lower two values are consistent with an unconfined system dominated by storage in fractures rather than in the primary porosity.

20.2.2.3 Model Conditions

Climate for the region is considered tropical and isothermal, with average net rainfall (i.e., precipitation minus estimated evapotranspiration) of about 1,400 to 1,000 mm/y). Recharge to the aquifer within the study area is therefore dominated by areal infiltration of precipitation at higher elevations, with some lateral flows from outside of the area of influence. Recharge rates were calculated to be about 12% of average net precipitation. The calculated infiltration rates were corroborated by 22 field infiltration tests.

Discharge from the groundwater occurs as localized discharge to tributaries and primary discharge to the San Pedro River. The San Pedro River represents a main boundary condition in the aquifer due to its proximity to the El Alacrán open pit, and it is expected to provide a considerable amount of control on groundwater flows into the El Alacrán open pit and overall flow patterns within the area of influence. The model domain was based on the estimated hydrogeologic area of influence, occupying an area of 19 km², centred on the planned pit. The model employed a 229 (columns) x 224 (rows) grid and 15 layers, with just over 400,000 active cells. Model boundary conditions utilized included river boundaries for the San Pedro River and permanent streams, Drains for the ephemeral streams and a General Head Boundary to the north.

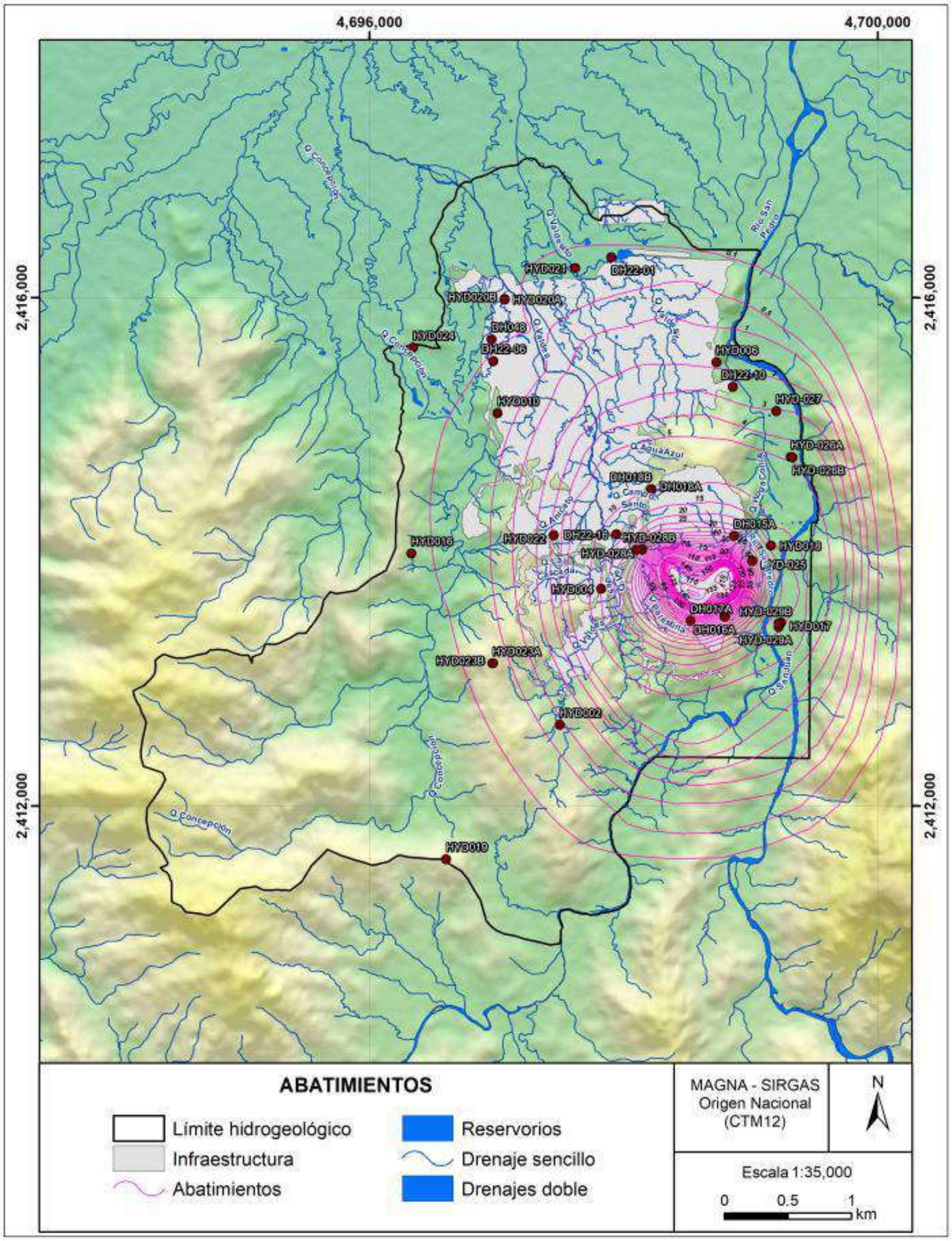
Groundwater modeling included:

- A steady state model was developed based on the HSUs listed in Table 20.1 and calibrated to measured water levels. A sensitivity analysis was also performed, during which conductivities, reiver conductance and recharge were adjusted.
- A transient model was then developed that included the evolution of the pit over the entire life of the mine to calculate the volume of groundwater that would have to be intercepted by dewatering wells, the extent of the cone of depression.
- Pit filling model, based on modeled groundwater inflows and estimated average runoff from the infrastructure area of approximately 28,800 m³/d (Knight Piésold, 2023). The calculated pit filling time to the discharge elevation of 110 m amsl is approximately 3 years under median precipitation conditions.
- The transient model indicates that potential groundwater inflow to the pit (if not intercepted by dewatering wells) would start in Year 3 at approximately 1,600 m³/d and increase over the life of the mine to approximately 23,300 m³/day. The cone of depression for the pit dewatering will extend approximately 3 km around the pit and cross under the San Pedro River (Figure 20.11).

> Impacts on the flow of the San Pedro River due to drawdown by the pit dewatering system will be very localized, as the river has a median flow of 10,260 L/s and the volume of water that the dewatering wells will draw from the river is only 0.04% of the flow. Even in very low flow conditions such as the 100-year minimum flow, the river only losses 1.32% of its flow to the dewatering system. Approximately ten (10) dewatering wells placed on the major geological features will be required to intercept groundwater that would otherwise flow into the pit. Pumped groundwater would be discharged to the San Pedro River at point V2 (Figure 20.4).

The groundwater model was also used to estimate time required to fill the pit up to the planned discharge elevation of 110 m amsl. At closure, surface runoff from the WMF and Quebrada Palestina will be directed into the pit. Groundwater flow into the pit will start at approximately 23,000 m³/d and decrease logarithmically as the pit fills and the water table rebounds. Pit filling time to the discharge elevation will be approximately three (3) years.

Figure 20.11 – Maximum Cone of Depression Created by Dewatering Wells



Source: INTERA, 2023b

20.2.3 AIR QUALITY

A baseline study of air quality was performed by K2 Ingenieria in accordance with the requirements of Resolutions 2019 (2010) and 2254 (2017) of the Minambiente. Concentrations of 2.5 µm and 10 µm particulate matter ($PM^2.5$ and PM10), nitrous oxide (NO_2) sulphur dioxide (SO_2) carbon monoxide (CO), total hydrocarbons and gasoline volatiles (BTEX) were measured in six locations around the open pit during (La Rica, Brisas, San Juan Viejo, La Concepción and Valdéz) between the July 13 and August 20, 2023. Concentrations of PM10 and $PM^2.5$ were below the standard of 75 µg/m³ and 37 µg/m³ 24-hour concentration limits, respectively. Concentrations of NO_2, SO_2 and CO were all below their respective regulatory limits. Hydrocarbon concentrations were all below their respective reporting limits.

20.2.4 NOISE

The baseline evaluation of environmental noise was performed from July 16 to August 20 of 2023 at six stations around the Project it by Applus and K2 Ingenieria (K2, 2023a), in accordance with the methodology provided in Resolution 0627 (MADS,2006), Measurements were made in the communities of La Rica, Brisas, San Juan Viejo, La Concepción, Valdéz and Casa Rosada). Resolution 0627 establishes the maximum allowable limit 55 decibels for a rural area during daytime hours and 45 decibels at night. The temporal distribution of A-weighted decibel levels ranged from 57 to 79 decibels during daytime hours and 56 to 79 decibels at night during regular days, and 60 to 85 during the day and night during holidays. A-weighting is a standard interpretation method that gives more value to frequencies in the middle of human hearing and less value to frequencies at the edges as compared to a flat audio decibel measurement. A-weighting is the standard for determining hearing damage and noise pollution.

The noise levels varied by community, the proximity to roads and some domestic and commercial activities; no industrial activities are recorded in the study area. At all locations the background noise levels exceeded the regulatory limits. The community of San Juan Viejo was the noisiest of the six locations, especially on weekends. Elevated baselines sound levels are attributed to vehicular traffic (mostly motorcycles), nocturnal fauna (mainly insects and domestic animals) and the routine activities of the inhabitants of the populated centres. The high noise levels in San Juan Viejo on the weekends are due to increased activity at bars and discos. These results mirror a previous study performed by Ecoquimsa in March of 2020 for the PFS.

20.2.5 VIBRATION

In the absence of a Colombian regulation and methodology for baseline vibrations studies, the DIN 4150-2 (DIN, 1999) standard was employed for the evaluation of human exposure to structural vibration and DIN 4150-3 (DIN,2016) for the evaluation of the effects of vibrations on structures designed primarily for static loading.

The baseline vibration study around the open pit was performed at ten (10) stations that provided information on the vibration exposure of inhabitants and infrastructure. In general, the monitored locations do not present significant levels of vibration (Ecoquimsa, 2019).

20.2.6 GEOCHEMISTRY

A detailed baseline geochemical evaluation was performed to determine the potential for acid rock drainage (ARD) and metal leaching (ML) of: waste rock and tailings that would be generated by mining operations; historic tailings in streams that drain the village of El Alacrán, the soils that will underlie the mine infrastructure, ore that will be stockpiled during operations, and the pits walls during operation and at closure (INTERA, 2023a). Sample selection for waste rock was based on a site-specific conceptual genetic and geoenvironmental model (a porphyry-associated proximal iron oxide copper gold and a distal carbonate replacement deposit) to identify the range of waste rock lithologies expected during mining and the geologic units that will be exposed in the final pit walls.

Samples analysis including acid-base accounting (ABA), net acid generation, mineralogy by x-ray diffraction (XRD), total elemental analysis and shake flask extraction (SFE) as specified in the ANLA TRs and in accordance with industry best practices. To supplement the understanding of the source of neutralization potential (NP) provided by the standard ABA, samples were also analyzed for total carbon and total inorganic carbon, which allows for differentiation of the silicate and carbonate NP. All geochemical analyses were performed under a Project Quality Assurance/Quality Control (QA/QC) program that included sample collection procedures, chain of custody and laboratory controls (ion balance, blanks, duplicates, spikes and reference samples). QA/QC data were reviewed, and the data were determined to be complete and representative.

Kinetic testing included field barrel leach tests of waste rock composites (n=10) and humidity cell tests (HCTs) (12 waste rock and 2 tailings HCs). Field barrel tests evaluate site-specific leaching behavior through exposure of relatively large samples (~ 200 kg) to site-specific meteoric conditions. The contents of the barrels were assembled to simulate the waste rock stream over the time. HCTs use controlled laboratory-conditions to determine leaching behavior on a much smaller scale (1 kg). The HCTs were run for 40 weeks.

- Waste rock from core samples (n=80) drilled in the waste zones of the proposed mine open pit; These samples represent both the stream of waste rock that will be generated over the life of mine as well as the exposed surfaces in the pit at closure.
- Surficial samples, consisting of saprolite and weathered bedrock beneath the waste storage facilities, ore processing and infrastructure areas (n=20).
- Ore that will be stored in ore stockpiles for 3 to 5 years. The ore samples (n=22) were selected from core drilled primarily for geotechnical or metallurgical testing, or shallow test pits.
- Tailings. Two (2) samples from the 2021 PFS pilot test material (Nordmin, 2022), and two (2) from a 2023 bulk sample pilot test. One of each of the samples from the 2021 and 2023 material

represent rougher and cleaner tailings, which are approximately 87% and 11% of the planned tailings stream, respectively.

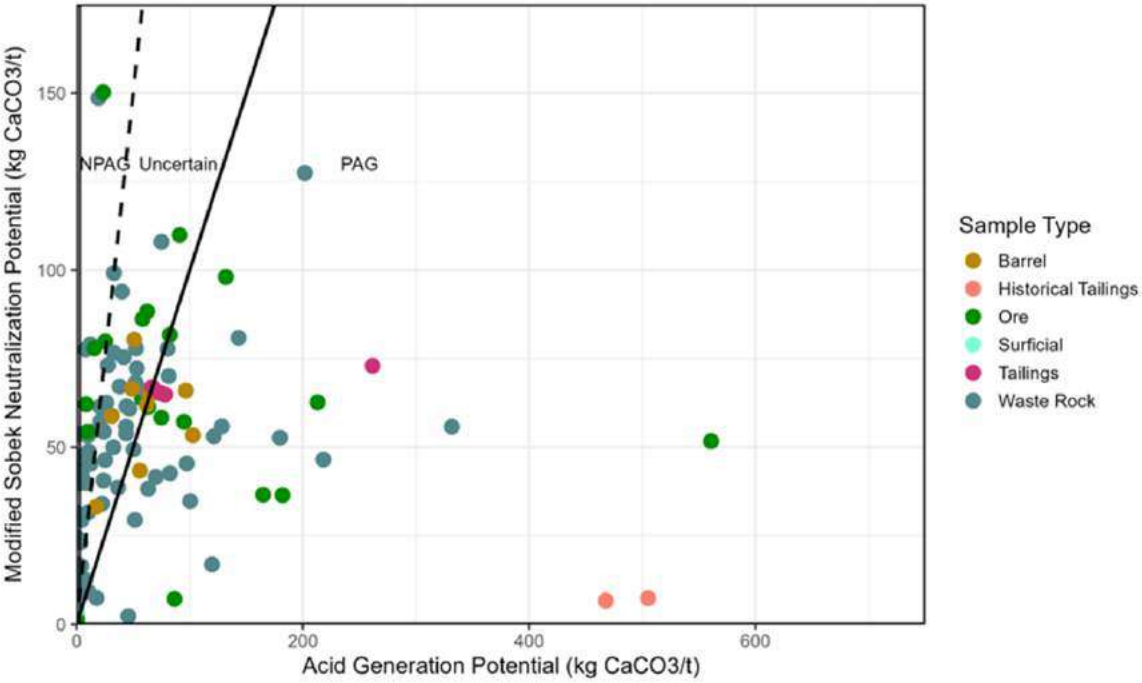
- Historical tailings (HT) (n=18) from the drainages affected by discharges of tailings by illegal miners.

Results of the static geochemical are shown in Figure 20.12 (by sample type) and Figure 20.13 (by lithologic unit). Plotting acid generation potential (AGP) from reactive sulphides vs. acid neutralization potential (ANP) from carbonate and silicate minerals that provide alkalinity is an industry standard method for representing static geochemical data. The lines for the. Neutralization Potential Ratio (NPR, calculated as ANP/AGP) of 3:1 and 1:1 indicate the samples designated as potentially acid generating (PAG), uncertain and non-PAG (NPAG).

Results of the geochemical characterization program indicate that, in general, there is potential for neutral drainage with elevated metal concentrations, and possibly acidic drainage with higher metal concentrations at the Alacran Project. This conclusion is consistent with the geoenvironmental model for the deposit types, (a porphyry-associated proximal iron oxide copper gold and a distal carbonate replacement deposit), which is expected to contain acid-generating sulphide minerals and acid-neutralizing carbonate minerals in the ore and surrounding rock. The ore, tailings, and HT have the highest potential for ARD/ML based on the static and kinetic data presented in this report (Figure 20.12). Surficial samples are unlikely to generate ARD/ML. Waste rock exhibits a range of potential for ARD/ML depending on the lithology (Figure 20.13).

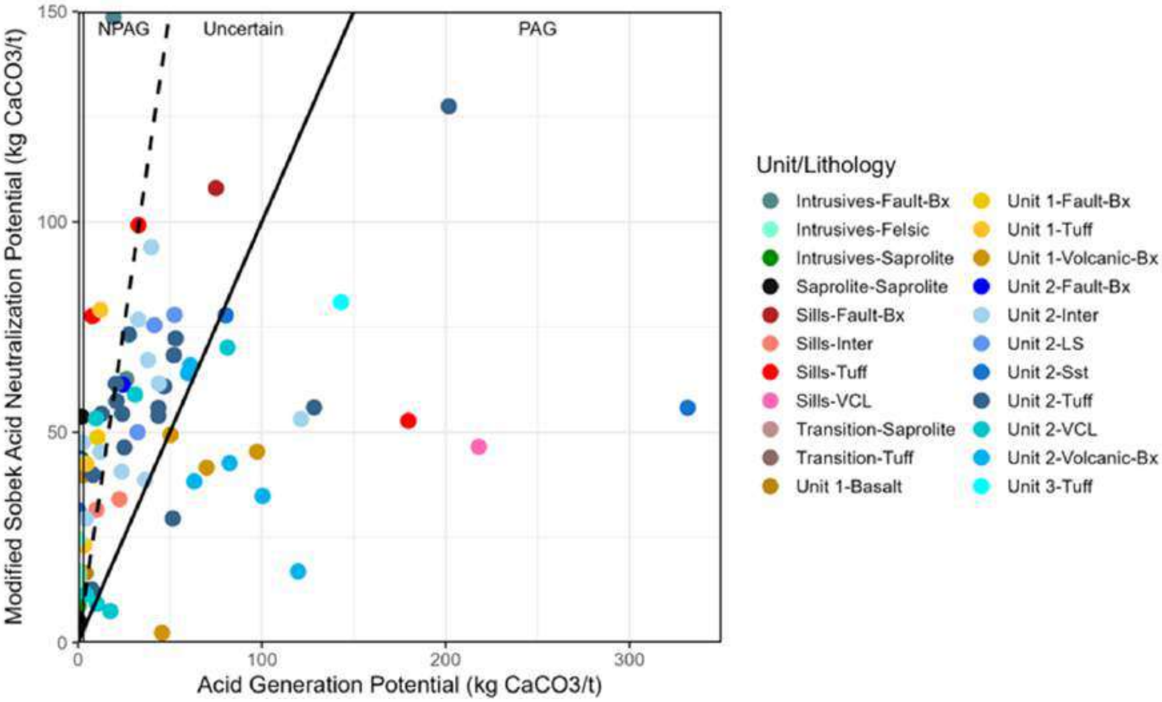
Static tests showed several lithologies within Unit 1, Unit 2, Unit 3, and Sills as potentially acid generating (PAG) Figure 20.14). Kinetic tests overall indicate that most waste rock types will likely generate neutral drainage with elevated metal concentrations, and possible acidic drainage from waste rock with a high proportion of the Unit 2-Tuff and Unit 2-Volcanic-Bx. The general findings for each sample type are summarized below. The overall potential for ARD/ML from waste rock and accompanying evidence from HCTs and Barrel samples is presented in Table 20.2. pH timeseries results for barrel samples is presented in Figure 20.14**.** The barrel test data confirms the results of the static testing showing a slow tendency towards acid generation.

Figure 20.12 – Sobek ANP vs AGP by Sample Type



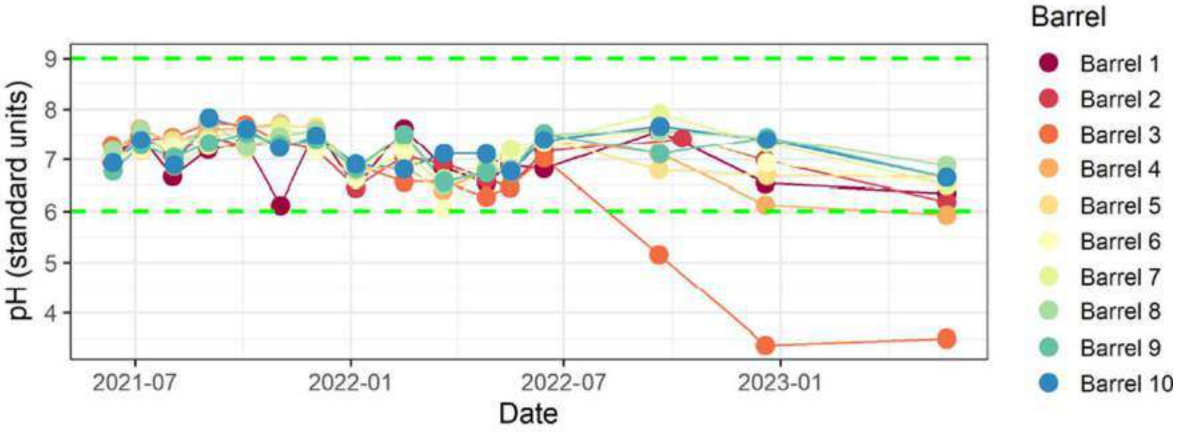
Source: INTERA, 2023c

Figure 20.13 – Sobek ANP vs AGP by Lithographic Unit



Source: INTERA, 2023c

Figure 20.14 – Barrel pH



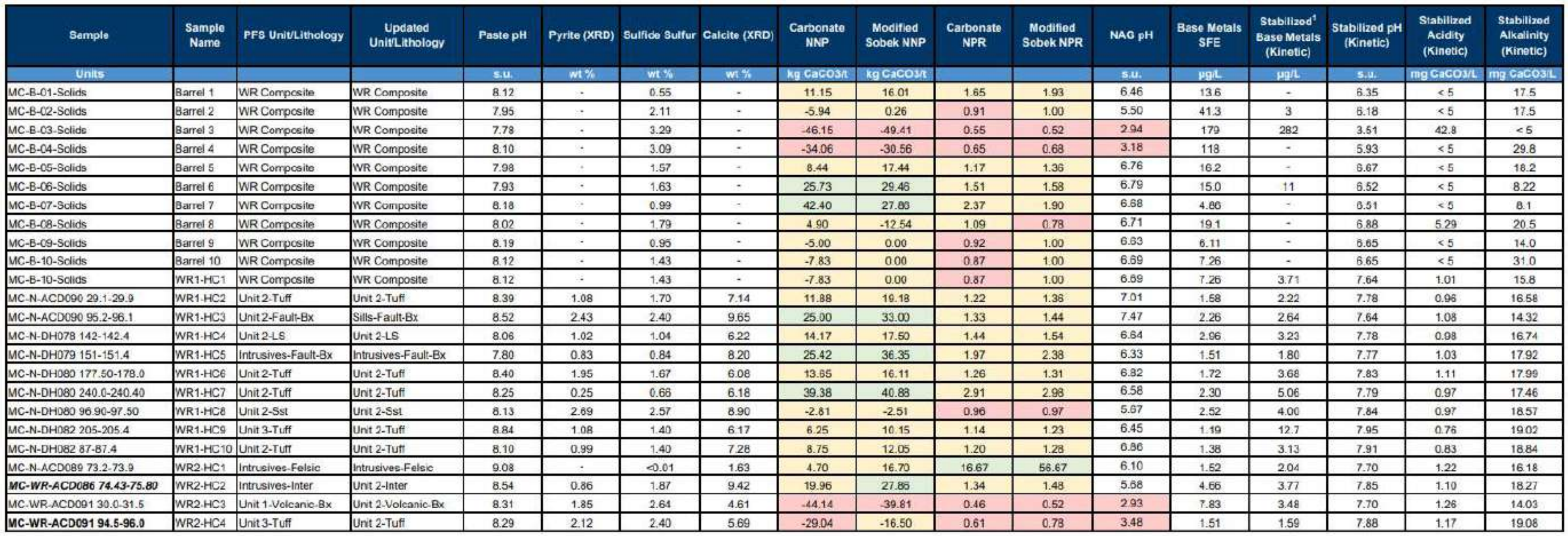
Source: INTERA, 2023c

20.2.6.1 *Waste Rock*

The range of waste rock lithotypes from the mining operation at the Alacran Project have a mixed potential to generate ARD/ML. Most of the waste rock to be generated by the Project appears to have uncertain potential to generate acid and some rocks contain excess alkalinity that may neutralize some of the acid leachate generated by the more reactive rocks (Figure 20.13). Field barrel test results from one of the 10 waste rock composites show that mixed waste rock could produce pH <6 drainage with elevated metal concentrations within 6 months if exposure to atmospheric conditions (Table 20.2 and Figure 20.14). Results of the barrel tests show a uniform decline in pH over time. Leachate sulphate and pH levels were comparable between HC-scale and barrel-scale tests of the same material composition.

Figure 20.13 shows that Unit 3 has the highest proportion of PAG samples (100%, n=1), followed by Unit 1 (40% PAG; 60% non-potentially acid generating (NPAG), n=10), Sills (29% PAG; 14% NPAG, n=7) and Unit 2 (28% PAG; 15% NPAG, n=46). Within these units, the unit/lithologies most likely to generate acid are Unit 3-Tuff, Unit 1-Volcanic-Bx, Sills-VCL, Unit 2-Sst, Unit 2-Volcanic-Bx, Unit 2-VCL. No Transition, Saprolite, or Intrusives samples are designated PAG. These results suggest that Unit 1, Unit 2, Unit 3, and Sills have the highest potential for ARD/ML generation for waste rock, while all other Lithology Units have a relatively low potential for ARD/ML generation.

Table 20.2 – Static and Kinetic Summary for Waste Rock



Sample	Sample Name	PFS Unit/Lithology	Updated Unit/Lithology	Paste pH	Pyrite (XRD)	Sulfide Sulfur	Calcite (XRD)	Carbonate NNP	Modified Sobek NNP	Carbonate NPR	Modified Sobek NPR	NAG pH	Base Metals SFE	Stabilized^1 Base Metals (Kinetic)	Stabilized pH (Kinetic)	Stabilized Acidity (Kinetic)	Stabilized Alkalinity (Kinetic)
Units				s.u.	wt %	wt %	wt %	kg CaCO3/t	kg CaCO3/t			s.u.	µg/L	µg/L	s.u.	mg CaCO3/L	mg CaCO3/L
MC-B-01-Solids	Barrel 1	WR Composite	WR Composite	8.12	-	0.55	-	11.15	16.01	1.65	1.93	6.46	13.6	-	6.35	< 5	17.5
MC-B-02-Solids	Barrel 2	WR Composite	WR Composite	7.95	-	2.11	-	-5.94	0.26	0.91	1.00	5.50	41.3	3	6.18	< 5	17.5
MC-B-03-Solids	Barrel 3	WR Composite	WR Composite	7.78	-	3.29	-	-46.15	-49.41	0.55	0.52	2.94	179	282	3.51	42.8	< 5
MC-B-04-Solids	Barrel 4	WR Composite	WR Composite	8.10	-	3.09	-	-34.06	-30.56	0.65	0.68	3.18	118	-	5.93	< 5	29.8
MC-B-05-Solids	Barrel 5	WR Composite	WR Composite	7.98	-	1.57	-	8.44	17.44	1.17	1.36	6.76	16.2	-	6.67	< 5	18.2
MC-B-06-Solids	Barrel 6	WR Composite	WR Composite	7.93	-	1.63	-	25.73	29.46	1.51	1.58	6.79	15.0	11	6.52	< 5	8.22
MC-B-07-Solids	Barrel 7	WR Composite	WR Composite	8.18	-	0.99	-	42.40	27.86	2.37	1.90	6.68	4.86	-	6.51	< 5	8.1
MC-B-08-Solids	Barrel 8	WR Composite	WR Composite	8.02	-	1.79	-	4.90	-12.54	1.09	0.78	6.71	19.1	-	6.88	5.29	20.5
MC-B-09-Solids	Barrel 9	WR Composite	WR Composite	8.19	-	0.95	-	-5.00	0.00	0.92	1.00	6.63	6.11	-	6.65	< 5	14.0
MC-B-10-Solids	Barrel 10	WR Composite	WR Composite	8.12	-	1.43	-	-7.83	0.00	0.87	1.00	6.69	7.26	-	6.65	< 5	31.0
MC-B-10-Solids	WR1-HC1	WR Composite	WR Composite	8.12	-	1.43	-	-7.83	0.00	0.87	1.00	6.69	7.26	3.71	7.64	1.01	15.8
MC-N-ACD090 29.1-29.9	WR1-HC2	Unit 2-Tuff	Unit 2-Tuff	8.39	1.08	1.70	7.14	11.88	19.18	1.22	1.36	7.01	1.58	2.22	7.78	0.96	16.58
MC-N-ACD090 95.2-96.1	WR1-HC3	Unit 2-Fault-Bx	Sills-Fault-Bx	8.52	2.43	2.40	9.65	25.00	33.00	1.33	1.44	7.47	2.26	2.64	7.64	1.08	14.32
MC-N-DH078 142-142.4	WR1-HC4	Unit 2-LS	Unit 2-LS	8.06	1.02	1.04	6.22	14.17	17.50	1.44	1.54	6.64	2.96	3.23	7.78	0.98	16.74
MC-N-DH079 151-151.4	WR1-HC5	Intrusives-Fault-Bx	Intrusives-Fault-Bx	7.80	0.83	0.84	8.20	25.42	36.35	1.97	2.38	6.33	1.51	1.80	7.77	1.03	17.92
MC-N-DH080 177.50-178.0	WR1-HC6	Unit 2-Tuff	Unit 2-Tuff	8.40	1.95	1.67	6.08	13.65	16.11	1.26	1.31	6.82	1.72	3.68	7.83	1.11	17.99
MC-N-DH080 240.0-240.40	WR1-HC7	Unit 2-Tuff	Unit 2-Tuff	8.25	0.25	0.66	6.18	39.38	40.88	2.91	2.98	6.58	2.30	5.06	7.79	0.97	17.46
MC-N-DH080 96.90-97.50	WR1-HC8	Unit 2-Sst	Unit 2-Sst	8.13	2.69	2.57	8.90	-2.81	-2.51	0.96	0.97	5.67	2.52	4.00	7.84	0.97	18.57
MC-N-DH082 205-205.4	WR1-HC9	Unit 3-Tuff	Unit 2-Tuff	8.84	1.08	1.40	6.17	6.25	10.15	1.14	1.23	6.45	1.19	12.7	7.95	0.76	19.02
MC-N-DH082 87-87.4	WR1-HC10	Unit 2-Tuff	Unit 2-Tuff	8.10	0.99	1.40	7.28	8.75	12.05	1.20	1.28	6.86	1.38	3.13	7.91	0.83	18.84
MC-N-ACD089 73.2-73.9	WR2-HC1	Intrusives-Felsic	Intrusives-Felsic	9.08	-	<0.01	1.63	4.70	16.70	16.67	56.67	6.10	1.52	2.04	7.70	1.22	16.18
MC-WR-ACD086 74.43-75.80	WR2-HC2	Intrusives-Inter	Unit 2-Inter	8.54	0.86	1.87	9.42	19.96	27.86	1.34	1.48	5.68	4.66	3.77	7.85	1.10	18.27
MC-WR-ACD091 30.0-31.5	WR2-HC3	Unit 1-Volcanic-Bx	Unit 2-Volcanic-Bx	8.31	1.85	2.64	4.61	-44.14	-39.81	0.46	0.52	2.93	7.83	3.48	7.70	1.26	14.03
MC-WR-ACD091 94.5-96.0	WR2-HC4	Unit 3-Tuff	Unit 2-Tuff	8.29	2.12	2.40	5.69	-29.04	-16.50	0.61	0.78	3.48	1.51	1.59	7.88	1.17	19.08

Source: INTERA, 2023

Correlations between the ABA data and assay database were performed to integrate the two data sets and extend the geochemical characterization of the mine waste materials. The metallurgical data (BBA, 2023) contains results for 1,690 historical tailings, 8,004 ore, and 47,231 waste rock samples. The correlations between ANP and Ca, and AGP and S were Values. These correlations were then applied to the assay Ca and S values to derive interpolated ANP* and AGP*. An example is shown in Figure 20.16. The extended data set shows a higher proportion of NPAG designated results than the geochemical data set. NPR values calculated from assay AGP* and ANP* results indicate that Transition and Unit 2 samples have the highest proportion of PAG samples (34% and 24%, respectively). Intrusives have the lowest potential to generate acid, with 92% and 90% of assay results designated NPAG, respectively.

Total elemental analysis and SFE results indicate the potential for leaching relatively small quantities of Cd, Co, Cu, Se, S, and Zn and somewhat moderate quantities of Sb, Mo, and Sr. Inclusion of the assay database in the characterization of the ABA characteristics by Lithology Unit support the findings of the geochemical program that Alacran Project waste rock has the potential to generate neutral drainage, and possible acidic drainage from waste rock enriched in certain Lithology Units, such as Unit 2. Kinetic results from HCTs show an overall capacity for neutral drainage with elevated metal concentrations from waste rock (Table 20.2).

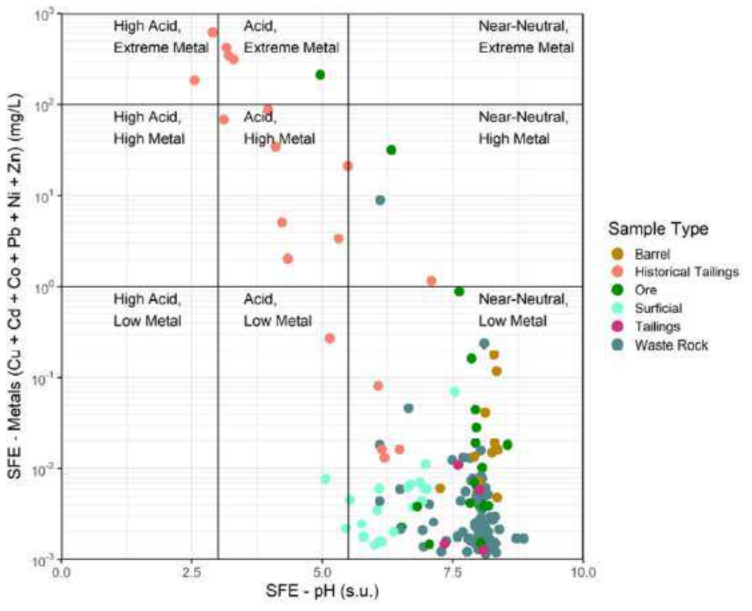
Selection of samples for the second (FS) phase of geochemical analysis was based on PFS data on the volume and lithological distribution of the waste. Refinement of the geologic model during the FS led to reassignment of many of the geochemical samples from Unit # to Unit #, and subsequent decrease in the body of data to characterize the geochemical characteristics of the tuffs in Units 1, 2 and 3. These tuffs make up much of the proposed waste rock and had an “uncertain” acid drainage potential based on static tests, but were NPAG based on a limited number of HCT tests. To extend the geochemical results to the tuffs with limited data, a detailed geostatistical analysis was performed by Vision Geochemistry Limited (2023), which focused on providing a comparative analysis to assess if the volcanic tuff units are of similar geological origin, particularly the units classified as having uncertain. Acid drainage potential. If the Unit 1 Tuff and Unit 3 Tuff samples are geochemically similar to Unit 2, they would be predicted to share similar physicochemical weathering reactions, resulting in similar ML/ARD risk. To test this scenario, the metallurgical assay database was used, based on the AGP* and ANP* values (as described above). The sample assay sample population was filtered to 1) isolate the waste samples, 2) remove samples with incomplete analytical suite of elements, 3) isolate the Units 1, 2 and 3 tuffs, and 4) isolate the samples classified as uncertain, based on the correlation of NP and AP between the assay and geochemical samples. In total, 2,096 samples were included in the comparative analysis. The remaining data were analyzed using Principal Component Analysis (PCA) and K-means clustering of 41 elements (excluding Ag, Au, Cd, Cu, Se, Pb and Zn). PCA is a multivariate statistical technique used to reduce the dimensionality of data, explore multielement correlations, identify major trends, and visualize the structure of a data set. K-means clustering is a machine learning algorithm used to group similar rock samples based on their trace element compositions.

Calculation of AGP* and ANP* for NPR predictions combined with advanced statistical analysis methods indicate that Unit 1 Tuff and Unit 2 Tuff have a close geochemical resemblance attributed to a shared origin involving late-stages of magmatic differentiation. These two (2) lithologies contain comparable mineral compositions, implying similar physiochemical weathering reactions. As a result, they likely have similar ANP and AGP characteristics, and by extension, comparable ML/ARD risk at the Project. Because Unit 3 Tuff is somewhat distinct from Unit 1 and 2, its ML/ARD potential cannot be determined without further kinetic testing. Unit 3 Tuff waste rock will be classified as uncertain pending further tests.

20.2.6.2 Surficial Samples

Surficial samples consist of soil and saprolite located beneath the proposed infrastructure area, waste storage facility and ore processing area. The low sulphur content (< 0.1 wt %) in all surficial samples indicates that all samples can be considered inert (Figure 20.12) (European Union, 2009). Surficial sample SFE leachate chemistry was be classified as “near-neutral, low metal” on a Ficklin diagram (Plumlee et al, 1994) (Figure 20.15**)**. It is important to note that the acid-buffering capacity of surficial material is likely low as indicated by low Modified ANP values. This material is therefore unlikely to contribute to, or mitigate, any ARD/ML issuing from Alacran Project waste rock.

Figure 20.15 – Ficklin Diagram of SFE Metals



Ficklin diagram of shake flask extraction (SFE) results showing pH versus combined copper, cadmium, cobalt, lead, nickel and zinc concentrations in SFE leachate from barrel, historical tailings, ore, surficial samples, tailings and waste rock samples.

Source: INTERA, 2023c

20.2.6.3 Tailings

Static and kinetic tests indicate that tailings material will not likely generate ARD based on relatively high paste pH, ANP values, and HCT leachate pH and alkalinity. These results are consistent with the relatively high ANP values observed in ore samples (Figure 20.12). ABA neutralization potential ratio and net neutralization potential calculations (static tests) do show a potential for ARD, particularly for sample PJ5401 BF-20 Cleaner 1 Tails. Although drainage from tailings may not be acidic, the tailings HC leachate was high in metals and sulphate, indicating the possibility of alkaline pH with metal loading.

20.2.6.4 Historical Tailings

Static tests indicate that most HT samples (n-18) are PAG and are likely to leach metals (Figure 20.12). Since the HT are weathered, the results of the SFE tests for metals were plotted on a Ficklin diagram (Plumlee et al, 1994), which indicates that the samples are acidic to highly acidic with low to extreme soluble metal contents. The HT uniformly contained elevated sulphide (>0.1% by weight) and no NP. These samples yielded significant proportions of their total Cd, Cu, and S during SFE tests. The HT are also relatively enriched in As, Hg, Co, Mo, and Se. The highest Hg concentrations were observed closest to the artisanal mining operations in Quebrada La Hoga Conis Aviles (1 mg/kg), followed by Quebrada La Hoga El Alacrán. Mercury concentrations in Quebrada Valdéz were generally 0.3 mg/kg or lower. The SFE tests indicate that the Hg in the HT is not readily mobilized: None of the SFE samples exceeded the Resolution 0631 limit of 0.002 mg/L for Hg.

20.2.6.5 Process Solution Chemistry

The chemistries of solutions in the processing circuit were calculated for use in the 1) model of WMP chemistry during operations to inform the design of a water treatment facility, 2) evaluate the impacts of the WMF pore water on groundwater chemistry, and 3) estimate the runoff chemistry from the mine processing area that would report to the pit at closure (INTERA, 2023b).

The solution mixing model for the major water storage areas of the mine infrastructure was based on 1) solution flows within the proposed Project at different periods and precipitation scenarios, 2) tailings decant chemistry, and 3) chemistries of the solutions in contact with different materials or surfaces. Four flow scenarios were modeled: 4-year median precipitation, 10-year median precipitation, 10-year 5th percentile precipitation and 10-year 95th percentile precipitation. Input chemistries included major ions, Resolution 0631 regulated discharge parameters and the additional parameters required for the stream discharge model (COD, BOD, Ba, Se, and P). Inflow chemistries included:

- Precipitation to the pit, WMF and WMP, which were based on a literature value for rainfall in southern Florida for lack of any data in NW Colombia. Rainfall on reactive surfaces (rock and tailings) was assigned the SFE chemistry of the ore, saprolite, waste rock or tailings, depending on the location. For the 10-year models, rainfall on the WMF was assigned the chemistry of the waste rock and tailings in proportion to the Year 10 mine plan.

- Groundwater inflow to the pit. Flow volumes were based on the groundwater numerical model and the inflow was assigned the ore SFE chemistry.
- Tailings decant solution from the mill, which was the only solution tested for the full range of Resolution 0631 discharge parameters.

Outflow included:

- Evaporation, removed as pure water at pH 7;
- WMF solution (fully mixed) entrained in the pore space of the tailings and waste rock; and
- WMP solution (fully mixed) to the process water tank.

During operation the mill process solution will contain additional parameters, which were included based on the following assumptions:

- Mine and construction site always have a certain amount of hydrocarbons in their surface water runoff, composed of spilled fuel, lubricants, hydraulic oil, etc. Contact surface water reports to the mill, so total petroleum hydrocarbons were included using a concentration of 3.5 mg/L from a review of surface runoff water chemistry (Auckland Council, 2016).
- Residues from explosive contribute nitrogen species to tailings solutions. Data were obtained from a confidential case study of the groundwater under a tailings facility of an open pit polymetallic mine performed by INTERA.

Process water from the mill is sequentially diluted by inflows in the WMF, the WMP and the mill, but also recirculates back to the mill, where it is recharged by the hydrometallurgical process. A mass balance was performed for the four scenarios to evaluate the dilution at each of these three locations and the amounts of solute concentration in the circuit over time. The greatest increase in concentration at the WMP was a factor of 1.74 for the 10-year 5th percentile precipitation scenario.

Solute concentrations in the pit, WMF and WMP were calculated in Goldsim. Results of the calculation for the WMP were originally intended to inform the design of a water treatment facility that would discharge to the San Pedro River. The results of the Goldsim model showed that all regulated parameters were below the Resolution 0631 discharge limits for all scenarios. The pH of the process water in the WMP was just below the limit of 9. Since pH and alkalinity are “non-linear” parameters that do not lend themselves to mixing or dilution, the model was rerun for the 10-year 5th percentile precipitation using a PHREEQC mixing model (Parkhurst and Appelo, 2013). Mineral phases, adsorption, precipitation, dissolution, and gases were not integrated into the PHREEQC mixing model. The PHREEQC model produced very similar results, with a lower pH (8.3 to 8.5) due to oversaturation of calcite. The calculated solution chemistry at the WMP is shown in Table 20.3. None of the modeled parameters exceeded the Resolution 0631 discharge standard, indicating that a water treatment plant will not be required.

Table 20.3 – Goldsim Chemistry Results for the WMP

Analyte (mg/L)	Year4 Median	Year10 Median	Year10 5 Percentile	Year10 95 Percentile	Res 0631 limit
Alkalinity	31.05	32.66	32.01	33.01	
Arsenic	0.002	0.002	0.002	0.002	0.1
Cadmium	1.14E-04	1.00E-04	1.24E-04	8.59E-05	0.1
Calcium	81.62	74.63	87.55	66.78	
Chloride	37.07	32.62	40.85	27.64	250.0
Chromium	4.06E-04	3.68E-04	4.43E-04	3.23E-04	0.5
Copper	0.002396	0.002234	0.0025	2.07E-03	1.0
Hardness (total)	208.1	191.2	222.6	172.1	Analyze and report
Hardness (calcium)	204.1	186.6	218.9	167.0	Analyze and report
Iron	0.1	0.1	0.1	0.1	2.0
Lead	3.01E-03	2.63E-03	3.32E-03	2.22E-03	0.2
Magnesium	1.04	1.18	0.97	1.30	
Mercury	4.80E-06	4.88E-06	5.06E-06	4.76E-06	0.002
Nickel	3.76E-04	3.71E-04	3.78E-04	3.67E-04	0.5
Potassium	6.81	6.20	7.33	5.51	
Silver	7.76E-05	7.20E-05	8.37E-05	6.48E-05	0.5
Sodium	29.11	25.92	31.92	22.3	
Sulphate	207.4	187.2	223.4	165.2	1,000
Zinc	1.11E-03	1.16E-03	1.12E-03	1.19E-03	3
Nitrates	0.3057	0.3356	0.2469	0.3883	Analyze and report
Nitrites	0.7014	0.6175	0.7685	0.5262	Analyze and report
Ammonium	0.5526	0.5102	0.5574	0.4813	Analyze and report
TPH	0.3031	0.3424	0.2495	0.3975	10
pH	8.796	8.709	8.948	8.564	6 to 9
PAX	3.033	2.647	3.349	2.224	
MIBC	6.066	5.295	6.698	4.447	
Phosphorus	0.01602	0.01586	0.01579	0.01587	Analyze and report
Barium	0.01888	0.01712	0.02029	0.01519	
BOD	12.74	11.12	14.07	9.339	50
COD	21.84	19.06	24.11	16.01	150
Selenium	2.58E-03	2.30E-03	2.83E-03	1.98E-03	

Analyte (mg/L)	Year4 Median	Year10 Median	Year10 5 Percentile	Year10 95 Percentile	Res 0631 limit

Note: Resolution 0631 discharge limits aggregated for Au and non-ferrous mines. Where the limits differ, the more conservative value was used.

Results from the mixing model for the WMF were used to estimate the potential effects of infiltration from WMF to the underlying aquifer. The chemistry of the pore water solution in the tailings and waste rock was assumed to be the fully mixed solution in the WMF. The flux of WMF pore water through the mass of mine waste and saprolite liner at closure was modeled based on a HELP model for infiltration of meteoric water and a SEEP/W model of the unsaturated flow through the WMF material, modeled as six layers of tailings. The flux of pore solutions was estimated to be less than 100 m^3/y. Groundwater quality data from a shallow monitoring well upgradient of the WMF (well DH017A) was used to represent the water chemistry flowing under the WMF. Groundwater flux under the WMF was based on the numerical groundwater model for layers 1 and 2, which integrate the hydraulic characteristics, cross sectional area and groundwater gradient. Groundwater flow under the WMF was estimated at 1.2 to 1.4 M m^3/y, providing a dilution factor of 1:12,000. The impact of the chemistry of the WMF pore water mixing with the groundwater is negligible.

20.2.6.6 *Open Pit Lake Model*

The closure plan for the Project includes flooding of the open pit by various water sources. To evaluate the pit lake water quality for the closure period, a reactive geochemical model was developed. The primary predictions of interest are: (1) the water quality of the pit lake at the time that overflow to the environment could occur and (2) evolution of pit lake water quality over time after the pit fills to the discharge elevation of 110 m amsl. It is important to note that any predictive pit lake water quality model developed prior to mining will be preliminary until it can be calibrated with site-specific data. When site-specific data become available, the model can be modified to better represent observations.

Pit lake water quality models account for processes that control the concentration of constituents in the water column. The main components of the El Alacrán model included the following:

- Water mass balance
    - Hydrologic inputs which include pit wall runoff; runoff diverted into the pit and seepage from other areas of the site; groundwater inflow, and direct meteoric precipitation. The conceptual hydrologic model is based on the water balance provided by Knight Piésold (Knight Piésold, 2023) for closure year 1. Groundwater inflow was based on the numerical groundwater model (INTERA/SHI, 2023b).
    - Hydrologic outputs include evaporation and surface water overflow.
    - Hydrologic outputs include evaporation and surface water overflow.
- Chemical mass balance (e.g., chemical inputs and outputs).

  - Geochemical inputs included mass fluxes of pit wall runoff above the pit lake surface, pit wall leaching below the pit lake surface (sometimes referred to as pit flushing), and the chemistry of other inflows.
  - The chemistry of meteoric precipitation was included but is negligible compared to other inputs.
  - Geochemical outputs include the mass fluxes in pit water outflow. Potential reactive processes in the water column that may remove constituents from solution, such as mineral precipitation or sorption.
- Reactive processes (e.g., mineral precipitation/dissolution, sorption, redox, etc.).
  - Pit walls often have enhanced permeability near the surface created by blasting, which creates zones of rock with greater reactive surface area (Beale and Read, eds., 2014). These areas can often lead to enhanced mineral dissolution and pit wall leaching.
  - Pit wall leaching typically includes contributions from groundwater and pit lake water that has reacted with the pit wall.
- Pit physical characteristics
  - Geometry of the pit; and
  - Exposed geological units in the pit walls at closure.

Limnological processes, such as temperature and density stratification can play an important role in the chemistry of a pit water column, but these processes are more common in climates with large seasonal temperature variations and were not considered necessary.

The pit lake water quality model was based on the conceptual model described above for the pit geology, geometry, hydrology, and geochemistry. These conceptual models were then used to develop a numerical model of pit lake water quality evolution in PHREEQC Interactive (Parkhurst and Appelo, 2013). Estimates of water inflow rates and chemistry were combined in a series of mixing calculations in PHREEQC, where different water types were generally mixed in proportion to the water fluxes. Multiple pit lake water quality simulations were carried out to test the sensitivity of certain variables.

Based on the Knight Piésold water balance for year 1 of closure, the pit lake is estimated to reach the expected overflow elevation (110 m amsl) in approximately 4.4, 3.3, or 2.7 years based on inflow rates at the 5th, median, and 95th percentile values, respectively.

The conceptual geochemical included estimates for the chemistry of each pit inflow, as described below.

- WMP chemistry was calculated with a nonreactive Goldsim mixing model and verified using PHREEQC. Solution chemistry for solids was based on the SFE data for ore, saprolite, tailing and waste rock. The decant chemistry from the mill was based on analysis of the process solution produced during the tailings pilot program. Solution flows were based on the Knight Piésold water balance. The WMP source term included concentration factors due to recirculation of the process water.

- Groundwater inflow was determined using groundwater data from piezometers located throughout the Alacran Project.
- Pit runoff was estimated from the solute release rates determined in Humidity Cell Testing (HCT) of the major Lithology Units that will be exposed in the pit. The HCT data were scaled to the field setting using specific surface area measurements of the major Lithology Units exposed in the pit. If HCT data did not exist for a given Lithology Unit, the solute release rates were assumed to be analogous to other Lithology Units with similar characteristics. The surface area exposure data were used to estimate water quality assuming that solutes were released into pit runoff in the same proportion as the surface area proportion. For the lowermost pit layer (Layer 1), pit runoff chemistry was estimated to be a mixture of the cumulative total for each exposed Lithology Unit in all layers above (Layers 2 through 33). This process was repeated for each subsequent pit layer up to Layer 17, which is the pit layer that corresponds with 110 m amsl and predicted pit overflow.

Pit flushing is assumed to occur upon submergence of each pit layer. The chemistry of pit flushes for each pit layer was estimated using short-term leaching results from shake flask extraction (SFE) tests. This leaching procedure provides a measure of the most soluble constituents in the sample. Because the pit lake will not rise above the lowermost pit rim elevation (110 m amsl), the pit wall surfaces above this elevation do not factor into the pit flush calculations. The SFE data collected in the laboratory were scaled to the field setting using specific surface area measurements of the major Lithology Units exposed in the pit.

The water quality of the pit lake was estimated for each pit layer and cumulative pit layers using a series of mixing calculations in PHREEQC Interactive, using the WATEQ4F thermodynamic database (Ball and Nordstrom, 1991). Water inflow was mixed in proportion to the water fluxes (volume/time) or volumes. Multiple pit lake water quality simulations were carried out to test the effects and sensitivity of certain variables, including water inflow rates, pit runoff and pit flush pH values, and pit runoff and pit flush alkalinity Additional simulations were run for longer durations to estimate the evolution of the pit lake water quality assuming overflow was allowed up to Closure Year 26. In these simulations, inflows from pit runoff and the closed infrastructure area were adjusted according to Knight Piésold water balance for Closure Years 1 through 6, 6 through 16, and 16 through 26.

The main conclusions from the pit lake water quality simulations are the following:

- The largest variability in estimated pit lake water concentrations resulted in simulations that tested the 5th, median, and 95th percentile inflow rates. As expected, lower inflow rates resulted in less dilution and higher concentrations, whereas higher inflow rates resulted in more dilution and lower concentrations. These results suggest that inflow rates are a dominant control on pit lake water quality.

- In the simulations that tested pit overflow scenarios (Simulations 8, 9, and 10), some constituents showed notable concentration changes over time, but concentrations began to stabilize eventually. Concentrations of metals (arsenic, copper, and iron), nitrate, and sulphate stabilized between Closure Years 5 and 10. Concentrations of pH stabilized between Closure Years 10 and 15, and concentrations of major ions (alkalinity, calcium, magnesium, potassium, and sodium) stabilized between Closure Years 15 and 20.
- None of the constituents that are regulated by Colombian standards for mine discharges (Resolution 0631, MADS, 2015) show predicted exceedances of the regulatory values throughout all modeling scenarios.

20.2.6.7 Soils

The baseline characterization of soil types across the Project was performed by *Dynamica Ingeniería y Ambiente S.A.S* in 2020 and 2021 (Dynamica, 2021a). The Project contains the following four soil types:

- MVEa: a soil mixture of colluvium and alluvium which occurs in the San Juan and San Pedro River alluvial valleys.
- MVDd1: a saprolitic soil found in the north and south hills of the El Alacrán deposit, derived from the in-situ weathering of the underlying igneous and metasedimentary rocks.
- MVDe1: a saprolitic soil located in the drainage valley of Quebrada Valdéz also derived from the underlying igneous and metasedimentary rock.
- RVNa: alluvium located in the lower reach of the Quebrada Valdéz. Much of this material is tailings.

The saprolitic soils are classified as relatively thin entisols and inceptisols with poor soil profile development, high clay content and poor drainage characteristics. Soil pHs ranged from 4.7 to 7 standard units (su). A soil pH less than 5.5 su is considered strongly acidic.

20.2.7 ECOSYSTEMS AND BIOTA

Ecological and biological baseline studies were performed between 2018 and 2021 by *Dynamica Ingeniería y Ambiente S.A.S* (2021b). The ecosystem evaluation is based on biomes, which represent large naturally occurring communities of flora and fauna occupying a specific climate. The biome classification and delineation schema are based on the Colombian National Information System (SIAC) delineations and definitions (2021).

The biological area of influence of is in the Sinú – San Jorge district of the Chocó-Magdalena province. The Magdalena province is characterized as a humid region located in the foothills of the mountain ranges, with flora and fauna common to warm humid forests. For ecosystem classification, the area of influence encompasses the Magadalena – Caribe biotic community (Helobiome) within the Magdalena y Caribe humid tropical Zonobiome of the larger humid tropical forest biome. The Magdalena y Caribe helobiome is characterized by valleys, plains, and foothills, with poor to very poor drainage; whereas the larger zonobiome incorporate plains, foothills and hills that have a warm humid climate and poorly developed drainage.

Preliminary survey results identified 70 species of trees, which is considered low for this biome and is attributed to the fact that almost the Project area has been cleared of the original vegetation for agricultural, livestock and mining activities. In addition, the more valuable/useful trees have largely been harvested for use by local communities.

The evaluation of fauna identified representative specimens for the region, including *Puma concolor* (Puma), *Aotus griseimembra* (Gray-bellied night monkey) and *Chauna chavarrí* (Northern or Black-necked screamer). All of these species are threatened to some degree and will be subject to special management in the area of influence. Twenty species of fish were recorded during the baseline studies. Two of the fish species, *Leporinus muyscorum* and *Prochilodus magdalenae*, will be monitored to determine their status and conservation once the mining operation begins.

Macro invertebrate surveys identified healthy populations normal to the area in Rio San Pedro Arriba, Quebrada Palestina and Quebrada Concepción.

The streams downstream of the village El Alacrán are effectively sterile, with no fish, macroinvertebrates or vegetation. This includes Quebrada La Hoga Conis Aviles to the San Pedro River, Quebrada La Hoga Mina, and Quebrada Valdéz from the confluence with Quebrada La Hoga Mina all the way to the confluence with Quebrada Concepción. Where the slope of Quebrada Valdéz decreases, sediment loading has produced a wide braided stream bed that supports very little vegetation.

Within the biological area of influence, social surveys were conducted to determine terrestrial and aquatic ecosystem usage by the local population. Approximately 20% of those surveyed make use of small lots of second growth forest, which total 171 ha. Wood from the forest is used mostly for cooking, with a monthly extraction rate of approximately 32 t.

20.2.8 SOCIAL

The El Alacrán deposit is located in a rural and sparsely populated portion of department of Cordoba. The El Alacrán mine's area of influence overlaps with six villages (veredas) in the San Juan district of the municipality of Puerto Libertador, Córdoba. The El Alacrán community is located in the centre of the open pit and has an estimated population of 1,200 inhabitants. The other five communities (San Matías, San Juan Nuevo/Viejo, Parcelas -La Concepción, Los Olivos and Valdéz) have an estimated population of 1,900 inhabitants. The community of San Pedro includes an Indigenous Council of the Zenú ethnic group that are native to the region. These communities for the most part subsist on illegal mining activities, small-scale agriculture, and raising fish, poultry, pigs, and cattle.

Water supplies for the local communities includes surface water from the Quebradas Valdéz and Concepción (70 households), shallow groundwater wells (55 households), and a central water source (San Juan Viejo).

Baseline monitoring of the social aspects of the Project was performed in accordance with ANM terms of reference for the development of social management plans. The Social Management Plan (PGS) is a systematic and comprehensive management instrument that consolidates the programs, projects and activities carried out by a mining concessionaire to mitigate and address the social risks generated by the development of the mining project. The PGS must also discuss the opportunities and benefits that will be generated by the Project. The Project environmental license is an input to the PGS.

As specified in the Terms of Reference (ANLA, 2016), two (2) types of social work have been carried out to establish social license and inform the EIA, including:

- Evaluation of current socioeconomic conditions; and
- Meetings with stakeholders.

Both tasks have been performed through a combination of field visits and reconnaissance, workshops and meetings with communities, interviews, and surveys.

For the evaluation of current conditions, the first step consisted of defining the communities within the Project area. This work was performed using the “social scouting” methodology where, based on a review of government social maps, preliminary meetings were carried out with the communities, followed by social cartography exercises and subsequent validations in the field and through meetings.

After this exercise, interviews and workshops were conducted with the communities, which were represented by community action committees, to characterize the elements of demographic, cultural, spatial, economic, political organizational and development trends.

Numerous community meetings were held with non-ethnic communities in the area of influence of the Project, in the presence of government representatives, including:

- A first meeting, or first moment of socialization, where the Project and its effects on the territory were presented.
- A second workshop on the Project's environmental impacts and the proposed environmental management measures.
- A third meeting to present the final results of the EIA.
- Discussions of the Project, its impacts and environmental management measures, covered the proposed life cycle of the mine, including construction, operation, and closure stages.

- Since the inhabitants of El Alacrán must be resettled, the previous workshops were carried out with the understanding that the community will coexist for some time with the construction activities and associated impacts.

20.2.9 ARCHAEOLOGY

The first phase of the archaeology baseline evaluation for the El Alacrán deposit was carried out in the summer of 2021 in accordance with resolution 550 of May 7, 2021, by the Colombian institute of Anthropology and History (ICANH). The survey identified five archaeological sites from which cultural artifacts were recovered, specifically 391 ceramic fragments associated with the Momil, Tierralta, Betancí and Panaguá cultures, spanning a period from the second to XVI centuries of the common era. In addition, 26 lithic elements were recovered, including axes, metates, manos, and flakes (Arqueonorte S.A.S., 2021).

The archaeological sites were all located within the proposed mine infrastructure footprint, including two in the WMF, two in the process area and one in the proposed Pond 4.

20.3 Mine Waste Management and Monitoring

20.3.1 MINE WASTE MANAGEMENT

Based on the mineralogy of the orebody, process methodology, and analytical testing, INTERA anticipates that the tailings and the PAG and uncertain waste rock will require appropriate management during operations and post closure. Waste rock and thickened tailings will be stored in the WMF, while NPAG saprolite and waste rock from overburn stripping will be used for the construction of the WMF border. The base of the WMF will consist of grubbed and reworked saprolite to provide a low permeability geologic liner. A constant head hydraulic conductivity test of compacted saprolite at 23% to 26% moist content and 99.8% compaction produced a hydraulic conductivity of 0.0001 m/day (1.51E-7 cm/s). This value is equivalent to a compacted clay or silt. An initial lift of thickened tailings two to three metres thick will be deposited on top of the engineered layer of saprolite which will serve as an additional barrier to the vertical migration of decant and possible oxidation products. The hydraulic conductivity of the consolidated tailings start at will be 2.2 E-8 cm/s. Thickened tailings on top of compacted saprolite will function as low permeability liner to minimize the flow of decant released during tailings consolidation. Monitoring has started in a line of wells downgradient of the WMF to evaluate groundwater chemistry. In the unlikely case that tailings solutions are detected in groundwater, the wells will be used to collect impacted groundwater and will be returned to the process plant water system.

Waste rock will be placed in the WMF in layers sandwiched between layers of thickened tailings (co-deposition or co-disposal). The layers of waste rock and thickened tailings will be placed in lifts so that thickened tailings subsequently poured on top of them will fill the interstitial voids, creating additional storage volume and sealing approximately 30% of the waste rock voids. The ratios of waste rock to tailings will evolve over time in accordance with the mine plan. This method has been used with great success at the Caraiba mine in Brazil since 2008 and Neves Corvo in Portugal.

20.3.2 GENERAL WATER MANAGEMENT

Make up water for the operation will be provided principally by precipitation in the infrastructure area, reclaim water from the WMF (Section 18.8).

Precipitation falling in undeveloped parts of the mine will be directed into diversion ditches and conveyed to settling ponds. Treated contact water and treated sewerage from the camp will be discharged into Quebrada Valdéz. Treated water from the processing circuit will be discharged to the San Pedro River. Surface runoff that does not come into contact with the mine infrastructure (non-contact water) will be conveyed south to Quebrada Valdéz. Groundwater from the interception wells around the open pit will not come into contact with potential sources of contamination and will be pumped to the river. As required by the TRs for the EIA, flow and water quality was modelled at the discharge locations for all discharges.

The detailed water management plan for the Project is described in Section 18.8.

20.3.3 ENVIRONMENTAL MANAGEMENT PROGRAM

The environmental management program is based on the site-specific environmental conditions and Project activities during construction, operation and closure. Based on the standardized definition of environmental impacts (ANLA, 2021), a total of 28 impacts were identified, including, eight (8) socioeconomic impacts, 11 abiotic (physiochemical) impacts and nine biotic impacts.

To address these impacts, the Project has designed the following environmental management programs:

- Dust and gases;
- Noise and vibration;
- Ground control (stability) conditions;
- Groundwater resources;
- Surface water courses and changes in hydro-sedimentological regimes;
- Surface water resources;
- Soil;
- Vegetation cover;
- Rescue, transfer and relocation of epiphytes;
- Wildlife deterrence, rescue and relocation;
- Protection of endemic and/or protected fauna; and

- Socio-economic impacts.

Each management program contains a description of its components, objectives, goals, performance indicators and associated monitoring and follow-up measures. Several of the programs have been ongoing for several years (surface and groundwater monitoring) and will continue with current programs.

The planned environmental management programs will include the following elements:

- Protection of flora and fauna;
- Air and noise monitoring;
- Waste rock and tailings geochemistry monitoring;
- Surface and groundwater monitoring (including discharge locations); and
- Permit reporting and compliance.

Based on mining operations of similar throughput and mineralogy, the Company is contemplating a staff of eight full time environmental specialists as well as contractors to support the following environmental and social programs.

20.3.3.1 Flora and Fauna

Prior to mine construction, a detailed flora and fauna protection plan will be developed and implemented. For fauna, protection methods will include removal of terrestrial vertebrates in the operational areas either by means of repellent, or rescue and relocation. Fish will also be relocated to other streams outside the impacted area. During mine operation, animal crossing will be installed with signage to alert vehicle traffic and avoid collisions with animals.

Plant species of ecological interest, such as orchids and bromeliads, will be removed to a plant nursery for reforestation of the Project during closure. The nursery will also raise native plants that will stabilize the soil during restoration. Vegetation harvested during construction will either be composted for later use as growth medium during closure or used on site as construction material.

Riparian areas and drainages affected by construction of water infrastructure and other civil works will be remediated to reduce the generation of sediments and erosion in stream channels.

Monitoring plans will be developed to protect vulnerable species. A mine wildlife team will mitigate effects of the Project on wildlife. Wildlife mitigation efforts will include lighting selection and design.

20.3.3.2 Air and Noise Monitoring

Noise control for mining operations will be taken into consideration in the design of the mine machinery and mine infrastructure. Noise monitoring programs will be developed and implemented to comply with applicable regulatory limits and industrial criteria to minimize impacts to workers, communities, and wildlife. Noise monitoring will be performed during construction, operation, and removal of mine infrastructure at closure. The program will include both attended (mobile spot measurements) and continuous unattended monitoring.

20.3.3.3 *Waste Rock, Tailings and Ore Geochemistry*

Additional samples of waste rock lithologies, ore and tailings will be collected to supplement the data collected during the baseline studies. e and refine the site-specific conceptual geochemical model, the mine waste handling procedures and closure plans. Surface and Groundwater

Surface and groundwater monitoring will continue at the current locations. Additional monitoring locations will be installed as piezometers are mined out, and around the pit to monitor groundwater levels. Groundwater will be monitored semi-annually. Surface water and discharge locations will be monitored quarterly, or more frequently if required by the environmental license.

20.3.3.4 *Archaeology*

A Preventive Archeology Program was developed, of which three (3) phases have been carried out under the auspices of the ICANH as described below:

- **Phase I**: Registration of the preventive archeology program (approved by ICANH on May 7, 2021).
- **Phase II**: Diagnostic document summarizing the results of the archaeological evaluation, the preliminary zoning and the prospecting proposal were submitted to the institute in May 2021. Observations and recommendations provided by the ICANH in June 2021 were incorporated into the field plan and procedures of the survey.
- **Phase III**: Prospecting document and management plan proposal, presented to ICANH on October 11, 2023 (no response yet from the institute). This document presents the results of the survey, the final zoning in accordance with the results of the survey and the proposed Archaeological Management Plan. The plan details proposed excavation in the five identified archaeological sites and monitoring in all areas of the Project area subject to removal of vegetation and stripping.

20.3.3.5 *Permit Reporting and Compliance*

Permit compliance monitoring and reporting will be performed by the environmental staff in accordance with the requirements of the mining permit and other regulations.

20.4 Project Permitting Requirements

The following section describes the regulatory framework for environmental and social aspects of the mine development and operation. National regulations related to exploration and mining were dispersed among a wide range of decrees, laws, and resolutions until 2015 when most of the applicable regulations were consolidated into Decree 1076. The permitting requirements and history for the mining related aspects of the Project are summarized in Section 4. Table 20.4 provides a summary of the applicable regulations.

20.4.1 GENERAL MINING AUTHORITY

The Colombian Ministry of Mines and Energy (MME), formerly the Mines and Petroleum Ministry, is the national mining authority that regulates mining activities. Article 334 of the 1991 Constitution stipulates that it is the state's responsibility to manage the "use, production, operation, exploitation and distribution of minerals obtained from the soil and subsoil". With a few exceptions, mineral resources can only be exploited via permits from the relevant authorities, which may include the MME, the National Agency for Mining (ANM), the National Authority of Environmental Licenses (Autoridad Nacional de Licencias Ambientales, ANLA) or the regional government agencies (known as Corporaciones).

20.4.2 ENVIRONMENTAL AUTHORITY

The legal framework for environmental regulation is based on Law 99 (1993) which created the national Environmental Ministry. In 2011 Decree 3570 modified its objectives and structure and changed the name to Environment and Sustainable Development Ministry. The Ministry is responsible for the management and regulation of the nation's environment and renewable natural resources.

In 2011, Decree 3533 created the ANLA. ANLA is responsible for ensuring that all projects, works or activities subject to environmental licensing or procedures comply with environmental regulations. ANLA reviews and grants environmental licenses, permits or procedures and enforces environmental regulations.

Article 33 of the same Law created the regional environmental authorities with the responsibility to manage the environment and renewable natural resources. The environmental authority for the Project is the ANLA, as the department of Cordoba has no regional environmental authority.

Table 20.4 – Summary of Permits

Legal Permit or Document Required	Project Stage			Approving Entity	Legal Standard
	Construction	Exploitation	Closure and Abandonment		
Global Environmental License (Water discharge permit, Forest harvesting permit, Lifting of the ban, Channel occupation permit, Air emissions permit, Closure and abandonment, Permit for the Collection of Specimens of Fauna and Flora for the Preparation of Environmental Studies)	X	X	X	ANLA	Resolution 1503 of 2010, Decree 1076/2015 Decree 2811/1974 Law 99/1993 Decree 1076/2016 Resolution 1514 of 2012 Resolution 0631 de 2015 Resolution 0213/197 Resolution 1912/2017 and Article 125 of Decree 2106/2019 Resolution 2254/2017
Mine permit	X	X	X	ANM	Law 685 of 2001
Registration of Preventive Archaeology Program	X	X		Colombian Institute of Anthropology and History (ICANH)	Law 99/1993, Decree 833/2002, Law 1185/2008, Decree 763/2009 Decree 1080/2015 and Decree 138/2019
Protocolization of prior consultation with Indigenous Communities of the Mining Project Area, with agreements.	X	X	X	Ministry of Interior	ILO Convention 169, Law 21/1991 and Presidential Directive No. 08 of 2020
Implementation of the PAR (transfer of the population of the El Alacrán mine).	X	X	X	ANLA	Environmental License (Environmental Impact Study, 5.3.9 Information about population to be resettled)

* * only required to file the environmental license application

Source: Cordoba, 2023

20.4.3 ENVIRONMENTAL REGULATIONS AND IMPACT ASSESSMENT

Colombian laws regulating mining activities differentiate between the requirements for exploration activities and those for construction, exploitation, and closure of a mine. During exploration, a concession holder is not required to obtain an environmental license, but work must be conducted in accordance with the environmental guidelines issued by the MME.

For construction and exploitation operations, the concession holder must perform an extensive baseline investigation of environmental, social, and economic conditions and summarize them in an Environmental Impact Assessment (EIA). The scope of activities and required information are defined in the TRs for the EIA (ANLA, 2016). Cordoba has completed and submitted the EIA, which includes a baseline characterization of surface water, groundwater, air, soil, flora and fauna, climate, geochemistry of mine waste and reactive surfaces, and socio-economic conditions. As specified in the ANLA TRs, industry best practices and guidelines, impacts associated with the biotic, abiotic, and socio-economic components which the activity may generate, or cause have been identified, as well as the different measures which have been established to address these impacts.

Non-Governmental Organizations (NGOs) and the local communities have the right to participate in the environmental administrative procedures leading up to the issuance of an environmental license. The environmental process will include participation of, and information to, all communities in the Project area including indigenous communities and Afro-descendant communities (Decree 1076 of 2015).

20.4.4 WATER QUALITY AND WATER CONCESSIONS

The Colombian regulation governing water quality and discharge permits is based on Decree 2811 of 1974 (national code for renewable natural resources and protection of the environment) which was subsequently updated and modified by:

- Decree 1541 of 1978 detailing rules for water use, including use prioritization, discharges, hydraulic structures, steam course protection, fees and sanctions;
- Decree 1594 of 1984 establishing water quality standards, water treatment methods and discharge criteria;
- Decree 3930 of 2010 to clarify water uses and characterization; and
- Resolution 0631 of 2015 which establish the maximum permissible limits for discharges to surface water.

These regulations were aggregated in 2015 in decree 1076. Water rights for mining activities and other uses in the Project area are granted by means of a water concession granted by the *Corporacion Autonoma Regional de los Valles del Sinú y del San Jorge* (CVS) which is independent of the mining concession or land ownership. The Project currently holds permits for water use and discharge for exploration activities as well as a permit for the monitoring wells. The water rights related to mining activities are included in the environmental licenses are normally granted for five (5) years. The terms and conditions under which a water concession is granted may depend, amongst others, on the amount of water available in the specific region, the possible environmental impact of the concession, water demand, the minimum ecological flow and prior authorized uses of the water.

20.4.5 AIR QUALITY AND EMISSIONS

Decree 948 of 1995 as modified by Resolutions 650 of 2010, and 2154 of 2010, and Resolution 2254 of 2017 provide the main regulations for protection and control of air quality. These regulations detail the general principles and rules for the atmospheric protection and list emission standards. The regulated emission sources include:

- Controlled open burnings;
- Discharge of fumes, gases, vapours;
- Dust or particles through stacks or chimneys;
- Fugitive emissions or dispersion of contaminants by open pit mining;
- Solid, liquid and gas waste incineration; and
- Operation of boilers or incinerators.

The regulated parameters include contaminant gases, particulate matter, metal fumes and organic compounds.

20.4.6 NOISE

Resolution 627 of 2006 regulates noise of ambient noise.

20.4.7 PROTECTION OF FAUNA AND FLORA

The regulations for the protection of fauna and flora are regulated by Decree 2811 of 1974 and 1791 of 1996 (for extraction of forest products) and the compensation for biodiversity loss is regulated by Resolution 1517 of 2012, which were subsequently incorporated into Decree 1076 of 2015. Other regulations regarding protection of species include Convention on Biological

Diversity of 1992 and the Convention on International Trade of Threatened Wild Fauna and Flora Species (CITES) of 1973. Endangered species are protected by environmental and criminal law.

20.4.8 PROTECTION OF RIPARIAN AREAS AND DRAINAGES

Decree 2811 of 1974 regarding riparian and water channel protection, prohibits the alteration of perennial water courses except under very specific terms: Alteration of intermittent or ephemeral channels and that surface water and groundwater are properly managed.

20.4.9 PROTECTION OF CULTURAL HERITAGE OR ARCHAEOLOGY

Cultural and natural heritage protection in Colombia was first regulated by Law 163 in 1959. Laws and regulations governing cultural heritage were consolidated in Decree 1080 of 2015, which was subsequently modified and updated by:

- Decree 530 (2016); and
- Decree 138 (2019).

20.4.10 PERMITTING

Exploration and baseline investigation activities at the El Alacrán deposit are currently authorized under a number of permits which are summarized in Table 20.4 These include the following permits and the issuing agency:

- Surface water extraction and disposal in Quebrada Valdéz during exploration – CVS (2019);
- Monitoring well installation and testing – CVS (2021); and
- Collection of flora and fauna samples – (ANLA/CVS 2020).

During construction, channel occupancy permits will be required for the WMF, the process plant site, and the stream gauges that will be installed around the site. Likewise, a Forest Exploitation Permit will be needed for areas of proposed surface disturbance with trees (Diameter at Breast Height (DBH) more than 10 cm).

These facilities are subject to the environmental licensing process described above and will require the submittal of a comprehensive mine design plan (the PTO), hydraulic, hydrogeological investigation reports, geotechnical reports on stability, and an environmental impact assessment (EIA). This requires a baseline characterization program to generate the quantity and quality of data required to meet the specifications of the TRs for an EIA and to evaluate potential impacts. Data generation for the EIA is already well advanced.

The final EIA report will include applications for all the environmental permits that will be required for the construction and operation of the Project. Once the EIA is officially delivered to the ANLA, the review process can take anywhere from six (6) to 24 months to complete, depending on the complexity of the Project and the quality of the information provided. An incomplete application might be immediately rejected.

20.4.11 PERFORMANCE AND RECLAMATION BONDING

Under the Colombian Mining Code (Ley 685 of 2010) there are several mechanisms by which a mining concession can be terminated, including: renunciation, mutual agreement, expiration of the contract, the concession holder’s death (if the assignees do not ask to be substituted within two years). In all cases, the concession holder must meet their environmental obligations at the time the termination.

The Mining Code requires the concession holder to obtain insurance policies from a company with a Colombian branch office to guarantee compliance with the mining and environmental obligations during each phase of mine life. The policy must be approved by the relevant authority, maintained during the life of mine and remain in effect for three years after the termination of the concession contract. The value of the policy is calculated as follows:

- For the exploration phase, the value of the policy must be 5% of the planned annual exploration expenditures.
- During construction, the insured value must be 5% of the planned annual investment for construction.
- During mine operation, the insured value must be 10% of the value of the estimated annual production multiplied by the “mine mouth” commodity value established annually by the government.

20.5 Social or Community Related Requirements

- The PGS for the mining phase will be developed based on identified impacts and the required social management measures, presented in the EIA and implemented when the environmental license is granted. The objective, at that time, will be to have a general PGS for the company and specific objectives and measures for each community or village.
- The PGS for the exploration stage of the Project is designed to build and maintain the Company’s relationship with the communities and other stakeholders, based on international best practices and national guidelines. Social outreach by the Company has focused on the development of a participatory PGS to monitor the well-being and development of communities; address social risk to the Project and establish good community relations practices within the framework of current regulations. This has included involvement of the community to obtain entry permits/ agreements with property owners during exploration and baseline studies.
- The objectives of the PGS are:
  - Management of social risk to prevent, mitigate or eliminate the negative social impacts of the Project.
  - Opportunity management to enhance the benefits of the Project.
  - Social investment to support local and regional development.

20.5.1 SOCIAL INVESTMENT

As of the date of this Report, approximately $850,000 has been invested in social programs and support for the communities within the area of influence as well as neighbouring communities. Social investment in 2021 benefited 1,034 families and approximately 3,136 individuals, and included:

- Community support projects including health care, road, school and athletic facility improvements, materiel for community sewers, capital for pig farming, a playground, support for community sports, community pots, among others.
- Workshops to strengthen the Community Action Boards for the local government and leadership bodies.
- Salary replacement to 118 miners from the village of Mina El Alacrán village for basic living expenses when exploration operations were carried out in their operating area.
- Support for training in first aid, environmental management, dressmaking and food handling for the community, as well as cacao farming.
- Formalization of two (2) small scale mines in Pirita and Buenos Aires, which will allow 23 families to mine legally, safely and without affecting the environment.

A prior consultation process is being developed with the indigenous community of the Cabildo San Pedro to guarantee their rights of participation in accordance with Law 21 of 1991. Currently, the negotiations have produced full agreement on the impacts and management measures with the community.

The social, political, and legal strategy for the resettlement and relocation of the communities within the mine operating area is underway and will be implemented in accordance with international and national guidelines. The Company is outlining its social responsibilities for the development of the Project as well as the competent entities to lead this process with the communities that subsist on illegal mining activities in the area. A retraining program will be implemented for illegal miners. For those who wish to continue small scale mining, the Company will provide support for the formalization of their activities in accordance with Decree 933 (2013).

The relocation program will also include identification of economic alternatives, training, and opportunities for entrepreneurships and formal businesses for the people who must be relocated. This resettlement and relocation process is identified as social risk for the Project.

The PGS for the construction and mining phases stage will be refined when the socioeconomic characterization of all the communities and villages in the area of influence is complete. This will include the identification of potential socio-economic and cultural impacts, management measures for the impacts, and additional information that will be generated during EIA. As required by the ANM TRs for the preparation of a PGS, the PGS is a component of the environmental license and the two must align.

20.5.2 COMMUNITY RELATIONS

Cordoba is working with the local communities, so they understand the phases and development of the Project as well as benefits for the communities (such as better living conditions through numerous programs that include employment, education, health, and infrastructure). In general, the communities are in favour of the Project due to the potential economic benefits, in particular, employment. Public consultations between the Company and the communities are ongoing and will continue to be developed as part of the various Project license requirements by authorities, to ensure appropriate participation by the communities.

The company is also working with the national authorities to establish a road map for the simultaneous development of the Project and the communities which also minimizes associated risks (such as not obtaining the social license for Mina El Alacrán). This includes relocation programs, employment, legalization for illegal miners and upskilling/training in other areas such as agriculture. Associated risks are considered manageable given the support of communities for the Project.

Development of the mine will require the relocation of some communities as well as some dispersed households. A community communication and outreach process are planned for the affected and neighbouring communities to hire local labour. An alliance has been initiated with public entities to support the development of rural entrepreneurship. The objective of these social programs is to develop sustainable sources of income and employment that will continue after mine closure. Employees who developed skills by working at the mine can relocate to other companies that carry out mining activities in the region. The foregoing is an expectation shared between Cordoba, the communities, and inhabitants of the region who, for the most part, are in favour of the development of the mine to boost the local economy and effect a positive transformation of the territory.

Construction and operation of the mine will create approximately 472 jobs, respectively, covering the range of jobs inherent to a medium sized mining operation. Of these, 200 to 300 will be jobs that can be filled by members of the local community (haulage, grading, support, site services, cam/community support and maintenance.

20.5.3 ARTISANAL AND SMALL-SCALE MINING OPERATIONS

“Colombia’s mining sector is characterized by widespread informality. A recent census revealed that 72% of all mining operations in Colombia are classed as ‘artisanal and small-scale mining’ (ASM), and 63% are ‘informal’, lacking a legal mining concession or title. Large-scale mining (LSM) comprises only 1% of operations. Over 340,000 Colombians depend directly on ASM and medium-scale mining (MSM) for their income. This informality deprives the state of important financial resources, while the current poor conditions (environmental, social, health and safety, labour, technical and trading) prevent the sector from delivering on important social objectives, such as generating formal employment and improving quality of life in mining communities” (Echavarria, 2014).

Illegal artisanal mining occurs in two locations within the hydrologic area of influence, including the El Alacrán community and across the San Pedro River. In the El Alacrán community, the local miners extract ore by hand in tunnels hand dug tunnels that follow the mineralized veins. Ore is brought to the village on horseback or motorcycle cargo tricycles. The ore is crushed in 3 or 4 hammer stamp mills, milled in small ball mills (about the size of a 35-gallon drum) and the gold is separated out gravimetrically and then amalgamated with mercury. The tailings produced from ore processing are washed into Quebrada La Hoga Mina and Quebrada La Hoga Conis Avlies. Sediment laden process water from illegal mining of the East Montiel deposit is discharged into the San Pedro at two or three locations east of the planned mine pit. The mining community of Mina El Alacrán has been active for at least four decades. Many of the miners belong to a local association, the "*Asociación de Mineros Artesanales El Alacrán*".

20.6 Mine Closure, Remediation, and Reclamation

Reclamation and closure of mine sites in the Republic of Colombia are regulated by the following key documents:

- Decree 2820 of 2010 (President of the Republic of Colombia, 2010), which specifies that the concession holder must submit a plan for dismantling and abandoning a mine following operations.
- Article 2.2.2.3.9.2 of Decree 1076 (Minambiente, 2015), which specifies that the concession holder must undertake the necessary environmental measures to reclaim and close a mining site. The concession holder must submit a detailed closure plan at least three months prior to the start of closure activities.
- The Autoridad Nacional de Licencias Ambientales (ANLA) Terms of Reference (ToR; ANLA, 2016) for Environmental Impact Assessments (EIAs) require descriptions and cost estimates for proposed closure and post closure activities.

Progressive reclamation and closure will be undertaken without posing impediments on day-to-day operations at the site. Final closure of the mine site will be undertaken following completion of all mining operations. The progressive reclamation and closure components for the Mine are summarized below.

20.6.1 PROGRESSIVE RECLAMATION

Progressive reclamation of the WMF perimeter embankment downstream slopes and benches will be carried out to reduce the potential for sediment generation and to reduce construction requirements at closure. This work will include grading to promote drainage to the edges of the embankments, placement of a growth medium, and planting of grass and legumes on the slopes. Reclamation of streams contaminated with historic tailings will also be completed early in the production phase once the historic tailings are removed from the associated drainages.

20.6.2 BUILDINGS AND PROCESSING INFRASTRUCTURE

All surface structures and equipment will be evaluated for appropriate post-closure re-use, sale, or disposal. Many of the Mill and Truck Shop buildings may be repurposed following cessation of mining operations. These buildings may remain and be used as community centres, schools, or multifamily residences for local communities. These options will be discussed with the local communities near the end of the mine life to assess their interests and needs.

Buildings, equipment, and power lines scheduled for removal will be decommissioned, decontaminated or de-energized (as necessary), dismantled, salvaged, or disposed of in an approved on-site or off-site disposal facility. All mining wastes will be disposed in the WMF and all domestic and hazardous wastes will be removed and disposed of off-site at an approved landfill. Concentrator plant equipment deemed suitable for re-sale to interested parties will be decommissioned, and appropriately disassembled. All surface concrete above grade will be demolished. This includes slabs on grade, containment walls, foundation walls, and building piers.

Soils, vegetation, and wildlife baseline data will be used as guidelines for the design, completion, and evaluation of surface reclamation once the required buildings and infrastructure is removed. Reclamation the mill, at the truck shop, and along access roads will conform with adjacent undisturbed lands to reestablish plant life and present a natural appearance. Surface reclamation efforts will strive to limit soil erosion by wind and water. Drainage patterns affected by mine development will be re-established. Final surface reclamation within building, equipment, and access road footprints will include scarifying, recontouring, and revegetating affected areas. The recontoured surface areas will be graded to direct runoff towards re-established drainages, and then covered with saprolite and topsoil. The affected areas will then be seeded with local seeds to promote plant growth and to stabilize the soil against erosion. Various stockpiles will be recontoured and vegetated.

20.6.3 WASTE MANAGEMENT FACILITY AND MINING INFRASTRUCTURE

20.6.3.1 Closure Objectives

The reclamation and closure plan for the WMF and mining infrastructure is based on the following general objectives:

- Implementation of progressive reclamation activities during mine operations, where possible;
- Decommissioning and appropriate disposal or salvage of most infrastructure components upon cessation of operations. There will be some infrastructure items that will be operated and/or maintained into the closure period;
- Rehabilitation of the WMF and surface water management measures upon cessation of operations to allow for future land use as guided by local regulators;
- Long term physical stability of the WMF embankments and OP slopes to protect public health, safety, and the environment;
- Long term chemical stability of the tailings, stored waste rock, embankment materials, and OP walls; and

- Creation of a final landform that is compatible with the surrounding landscape.

20.6.3.2 Closure Measures

Prior to closure, tailings will be selectively deposited around the interior perimeter of the WMF basin to establish final tailings slopes of approximately 2% toward the closure spillway to facilitate construction of the final closure cover. Settling ponds, interception ditches, riprap, mulch, and filter fabric may be used to avoid an influx of sediment into the surrounding watersheds while the closure measures are implemented. The Active Closure Phase is assumed to be ten years in duration and includes closure construction items (capping, contouring, revegetation, etc.), filling of the open pit with water, and water treatment. It has also been assumed that monitoring, maintenance, and minimal operations will take place during the ten-year Active Closure period. The WMF and associated infrastructure would then move into the Passive Closure phase (also considered to be ten years in duration) with no constant presence from the Company. The total closure period has been defined as 20 years.

The key closure items are briefly summarized below.

- The Stage 5 spillway from the WMF into the OP will be designed to meet closure objectives and will become the closure spillway upon cessation of mining activities.
- All PAG waste rock will be buried under tailings prior to final closure. The final tailings surface will be covered with an approximate 2 m thick layer of saprolite and graded toward the closure spillway. A growth medium will then be applied, and grass, and legumes will be planted on the graded surface. Once the vegetation is established, the reclaimed surface will be assessed to determine if the reclaimed surface is suitable for graze land by local farmers/ranchers.
- Two (2) main drainage channels and ten tributary channels will be installed on the closure cover to route runoff from the WMF surface to the closure spillway. The channels will be trapezoidal in shape and will be lined with non-woven geotextile and riprap. The channels will be designed to safely pass runoff from the Probable Maximum Flood (PMF) storm event.
- All tailings delivery and distribution pipework will be dismantled and decommissioned. The Water Transfer Pond on the WMF surface will be drained, and the Water Transfer System will be decommissioned. The pump barge and pumps will be salvaged, and the remaining components will be removed.
- The diversion/collection ditches and run-off collection Ponds 1 through 3, 5, and 6 will be cleaned of sediment and the sediment will be placed in the Waste Stockpile. The ditches and ponds will then be filled in with saprolite, the areas will be recontoured to promote drainage, and the areas will be revegetated.
- Access roads, and all internal haul roads will be decommissioned, and the disturbed areas will be regraded, covered with saprolite, and revegetated.

- The causeway supporting the haul road to the crusher will be removed to combine the WMP and run-off collection Pond 4 into one basin (Closure WMP). The Closure WMP will flood, and water will be conveyed by gravity into the open pit via the WMP spillway, which will remain at closure. The Closure WMP will be stocked with local fish species, once water quality objectives are met, to support recreational fishing and provide a potential food source for the local population.
- All mobile mining and WMF maintenance equipment used during the Production Phase of the Project will be decommissioned, dismantled, salvaged, or sold to interested parties.
- The open pit will gradually fill over a period of approximately three years with groundwater, water conveyed from the rehabilitated WMF surface, water conveyed from the Closure WMP, and run-off from the surrounding catchments. The open pit spillway and outlet channel will be constructed from the open pit rim to the San Pedro River during this period. Water will then report to the spillway and be conveyed to the San Pedro River via the outlet channel.
- Monitoring for physical and chemical stability, including surface movement monuments, VWPs, and monitoring wells, will be continued for an assumed period of 20 years to the end of the Passive Closure Phase. The plan generally assumes quarterly monitoring during the Active Closure phase and semi-annual monitoring during the Passive Closure Phase. It is expected that the monitoring requirements will decrease over time as the new vegetation becomes established, flow rates through various channels decrease, and the water quality results begin to meet local water quality standards.

20.6.4 RECLAMATION AND CLOSURE COSTS

The current estimated cost for mine closure activities is approximately US$30 M. An insurance bond for closure costs will be obtained from Marsh, at a cost of approximately 1.5% annually of the closure cost. The amount of the bond is expected to decrease over time as reclamation work is performed. The cost and bonding company will be evaluated in more detail for the FS.

Details regarding reclamation and closure costs are available in Section 21.1.11.

20.7 Green House Gases

Greenhouse gas (GHG) emissions were estimated using the IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2006), based on data on official emission factors issued by the Colombian government, which included the FECOC procedure for emissions from diesel motors (UPME, 2016) and Resolution 0762 of 2023 for emissions from the national interconnected electrical system (UPME, 2023). For emissions avoided by the use of renewable energies, the GHG estimate used the UPME statistics for the national interconnected electrical system. In 2022 total emissions for national power generation were based on the following sources: 68.4% from hydroelectric, 1% from renewable sources and the remaining 30.6% from fossil fuel.

The following data from the FS description of the construction and operation stages were used to estimate Project GHGs:

- Scope 1:

  Construction

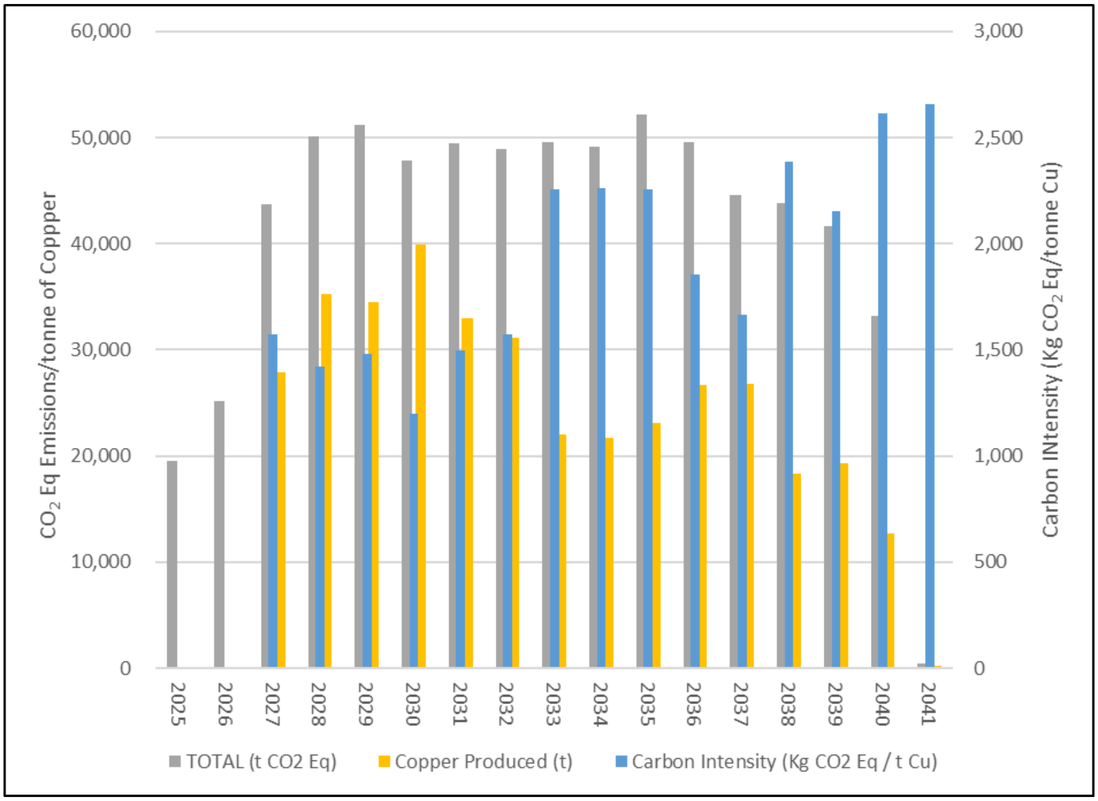
  - Estimates of fuel consumption of machinery and minor construction equipment as well as data from power generators.
  - Fuel consumption data for machinery and equipment associated with early mining work.

  Operation

  - Fuel consumption for the operation of mining machinery and equipment
- Scope 2: only applicable for the supply of energy from the Cerro Matoso substation.

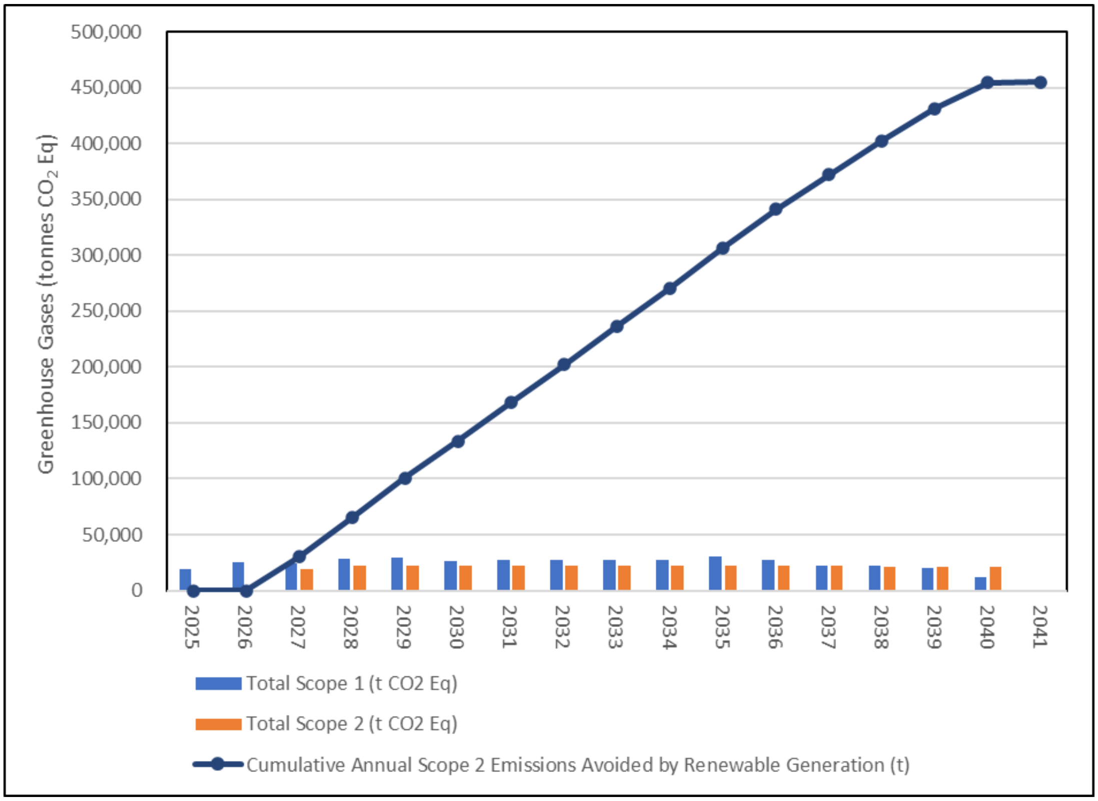
Figure 20.16 shows the estimated annual GHG emissions of the Project (sum of scopes 1 and 2) as a factor of copper production and carbon "intensity", which is the amount of CO_2 released per tonne of Cu produced. Figure 20.17 shows the calculated Scope 1 and Scope CO_2 equivalent emissions by year, as well as the avoided emissions due to the renewable sources of energy in the national energy supply.

Figure 20.16 – Annual GHG Emissions and Intensity



Source: K2, 2023

Figure 20.17 – Scope 1 and Scope 2 GHG Emissions and Avoided Emissions



Source: K2, 2023

20.8 Summary of Existing and Potential Impacts

20.8.1 EXISTING MINING IMPACTS

Informal and illegal artisanal mining of the highest-grade veins and processing in the village of El Alacrán using basic technology (stamp mills, small ball mils and mercury amalgamation) and disposal of the mining residues in the stream beds, has resulted in extensive surface water and stream sediment in the Quebrada Valdéz and Quebrada La Hoga.

20.8.2 FUTURE MINING IMPACTS

20.8.2.1 Noise

Mining operations are expected to produce an increase in noise during construction, mining, and some demolition. Elevated noise levels have the potential to impact works, surrounding communities and wildlife. Sources of noise will include mining, blasting, crushing, and grinding, as well as truck and vehicle traffic required for mine production, for which engineering and management measures (equipment selection, mining methods, sound walls and equipment maintenance) will be developed to mitigate potential noise impacts.

20.8.2.2 *Archaeology*

Several of the areas identified with medium or high archaeological significance will be impacted by overburden removal and mine construction. A second phase of the archaeology program is planned in these areas to carry out the required excavation and documentation of the archaeological sites to safeguard the cultural heritage (Arquenorte, 2021).

20.8.2.3 *Ecosystems*

Local ecosystems have already been impacted by deforestation of much of the original forest and disposal of mine tailings in the stream drainages. Disposal of tailings in Quebrada La Hoga Mina has effectively sterilized the water and sediments of Quebrada Valdéz. The proposed plan to remove tailings from streams for storage in the WMF should help restore the stream ecosystems by removing the sources of chronic ecotoxicity.

Development and operation of the mine will further affect the local ecosystems within the infrastructure area. Affected areas will be restored at closure. To maintain the integrating of the engineering cover on the WMF, only grasses will be permitted to grow in this area.

20.8.2.4 *Air Quality*

Air quality will be impacted during mining by dust from the pit, the processing pit and hauling operations. The mine will also have emissions from combustion engines. Standard engineering practices (road design, dust suppression, equipment selection and maintenance) will be implemented to minimize air quality impacts.

20.8.2.5 *Stream Contamination*

The mining operations will have a positive impact on stream quality and sediment. The current mine plan calls for removal of the tailings deposited in the Quebrada La Hoga Mina, Quebrada La Hoga Cla, and portions of Quebrada Valdéz. Tailings within the footprint of the pit, the WMF and possibly further downstream of the WMF will be removed, as they are a long-term source of contamination and might present a preferential flow path for drainage under the WMF.

20.8.2.6 *Social and Community*

Construction and operation of the mine will have a strong and largely positive impact on the local communities. While some of the illegal miners might resent their loss of independence, the inhabitants of the region are for the most part, in favour of the development of the mine to boost the local economy and effect a positive transformation of the territory. The communities around the mine will benefit from higher paying jobs, job expenses, and the benefits of employment in the formal economy (social security, worker protection, medical coverage, etc.). Plans for community sustainability will be refined for the FS with the objective of developing a self-sustaining economy when the mine ceases operations. Associated social risks are considered manageable given the support of communities for the Project.

20.8.2.7 Water Quality and Availability

The mine is expected to have a positive water balance and not require a source of water other than precipitation. Dewatering of the pit is expected to have minimal impact on the river flow, even at low stages, and the water will be returned to the river close the point of impact. Diversion of water from the headwaters of Quebrada Valdéz during the mine operation will result in an approximately 80 to 90% decrease inflow, but water quality will likely improve as the oxidation of illegally dumped tailings will cease. Based on the results of modeling of water quality in the pit at closure indicate that discharge from the pit will meet Colombian discharge standards and not create an environmental impact. Modeling of solution chemistry in the WMF and infiltration through the mass of waste rock and tailings indicates that the impact of WMF solutions on the underlying groundwater will be negligible.

21 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

The Capital Cost Estimate (Capex) is presented in Table 21.1. Capital costs include the direct costs for Project execution, as well as the indirect costs associated with design, construction, and commissioning.

Indirect Project capital costs include EPCM, third party consultants, construction facilities, and services, equipment freight, and vendor support. Percentage factors were based on the experience of DRA, BBA, Knight Piésold, and Tungsten with similar projects that were used to determine indirect Project costs, based on the Project direct costs.

The total Capex for the Project is estimated at US$547.5 M (Table 21.1). The initial capital is estimated at US$420.4 M which starts in Year -3 with pre-production activities. The Capex was developed based on two (2) timeframes:

- **Initial capital costs**: Including design, procurement, construction, and management for the Project start up production rate of 17,600 tpd; and
- **Sustaining and closure costs**.

Table 21.1 – Capex Summary

Capex Item	Initial Capex (US$ 000)	Sustaining and Closure Cost (US$ 000)	Total LOM Capex (US$ 000)
Mining, Pre-Production Mining	37,298		37,298
Mining, OP Mobile Equipment	39,588	35,449	75,037
Processing Plant	117,689	7,814	125,503
WMF, Water Management Structures	27,982	45,911	73,893
On-Site Infrastructure	51,605	3,828	55,433
Off-Site Infrastructure	19,904		19,904
Closure		22,566	22,566
Contingency	29,407	11,557	40,963
Indirect	29,945		29,945
EPCM	32,160		32,160
Owner's Cost	34,828		34,828
Total Initial Capex	***420,407***		
Total Sustaining Capex		***127,124***	
LOM Capex	**420,407**	**127,124**	**547,531**

Source: DRA et al, 2023

21.1.1 BASIS OF ESTIMATE

The Capex was prepared by DRA, Knight Piésold, BBA, and Tungsten with an expected accuracy range of –15% to +20% corresponding to the Class 3 of the AACE 47R-11 standard (Cost Estimate Classification System). Base pricing is in Q3 2023 US dollars, with no allowances for inflation or escalation beyond that time.

The Capex includes direct and indirect costs, (such as engineering, procurement, construction, and start-up of facilities) as well as owner's costs and contingency associated with mine and process facilities and on-site and off-site infrastructure. The following areas are included in the Capex:

- Mine (open pit development, equipment fleet, and support infrastructure and services);
- Process plant (Cu, Au, and Ag concentrates, conventional 17,600 tpd SABC circuit and flotation plant with support infrastructure and services);
- Separate wash gravity plant (Au, Ag concentrates, conventional gravity concentration plant, 2,400 tpd saprolite ore and 1,200 tpd historical tailings);
- WMF;
- On-site infrastructure (potable and sewage water treatment, electrical substation, and distribution, shops, and other general facilities); and
- Off-site infrastructure (water, power supply, access).

FS engineering work, being in the range of 30 - 40% of total engineering tasks for the Project was carried out to support the Capex which was based on the following Project-specific information:

- Mine, processing plants and WMF design criteria;
- Process flowsheets;
- Major mechanical equipment list for process plant and mining equipment fleet;
- General site layout;
- Electrical supply;
- Mine plan and WMF designs;
- Process plant general mechanical arrangement drawings; and
- Earthworks quantities calculated from 3D models.

The costs that were used in the Capex come from the following sources:

- Budget quotes for mechanical equipment and materials;
- Database of costs from similar projects developed by DRA, BBA, Knight Piésold, Tungsten (supplies of equipment and material, civil and erection works); and
- Factors (percentages) based on benchmark information (from DRA, BBA, Knight Piésold, Tungsten) to estimate indirect costs and contingencies.

The following assumptions were considered:

- All equipment and materials will be new;
- The main equipment will be purchased and manufactured in appropriate sizes to be transported over major highways from a major port in Colombia to the Project site;
- The execution work will be continuous without interruptions or stoppages;
- Contractors for the construction and equipment installation will be invited to submit bids at unit prices; and
- The Project will be executed through an engineering, procurement, and construction management (EPCM) contract.

The following are excluded from the Capex:

- Changes in the scope and design of the Project;
- Operation and maintenance costs (Opex);
- Working capital and financing costs;
- Project risks;
- Owner’s reserve;
- Escalation of prices and extraordinary fluctuations in the exchange rate;
- Sunk costs (previous investment);
- Value Added Tax (VAT);
- Royalties and other taxes;
- Accelerations in the execution schedule;
- Changes in Colombian legislation; and
- Reschedule due to delays (labour/social conflicts, extraordinary weather changes, etc.).

The Project includes one year of ordering long lead items, a two-year pre-production construction period, followed by 14.02 years of production supplying a mill feed rate of 17,600 tpd, and 20 years of post-production for mine closure.

21.1.2 LABOUR ASSUMPTIONS

The construction labour and equipment costs were provided by Cordoba based on their knowledge of the local labour market in Colombia. Productivity is expressed in the number of work hours per unit of work, and it is based on the performance of a crew during a working day of 10 hours.

21.1.3 MATERIAL COSTS

All materials required for facilities construction are included in the Capex. Material costs include freight to the site. Material costs related to the processing plant such as concrete, structural steel, piping and fittings, and electrical cable were estimated based on quotes or DRA's internal database and applied to the mechanical equipment costs.

All materials were determined by material take-off (MTO) quantities except for piping accessories which were estimated using a benchmark factor. No material allowances were considered.

21.1.4 CONTINGENCY

The global contingency was established deterministically applying a 10% factor of direct and indirect initial capital costs. In addition to this, the owner estimated a contingency of 5% the owner's costs.

21.1.5 INITIAL CAPITAL COSTS

The initial capital supports the design, procurement, construction, and management for the Project production rate of 17,600 tpd. The initial capital costs are captured in ten categories: Pre-production mining, mining equipment, processing plant, WMF, On-site infrastructure, Off-site infrastructure, Contingency, Indirect, EPCM, and Owner's cost (Table 21.2).

Table 21.2 – Initial Capital Costs

Initial Capital Costs	TOTAL (US$ 000)	Y -3 (US$ 000)	Y -2 (US$ 000)	Y -1 (US$ 000)
Mining, Pre-Production Mining	37,298		15,092	22,206
Mining, OP Mobile Equipment	39,588	4,948	29,847	4,794
Processing Plant	117,689	1,116	26,859	89,714
WMF, Water Management Structures	27,982		12,800	15,182
On-site Infrastructure	51,605	313	20,517	30,775
Off-site Infrastructure	19,904		6,015	13,889
Initial Capital	**294,067**	**6,337**	**111,130**	**271,266**
Contingency	29,407	638	11,113	17,656
Indirect	29,945	99	11,834	18,013
EPCM	32,160	499	12,245	19,416
Owner's Cost	34,828	18,088	10,040	6,700
Total Initial Capital	**420,407**	**25,701**	**156,361**	**238,345**

Source: DRA, 2023

21.1.6 MINING CAPEX

The mining Capex was prepared by BBA and is shown in Table 21.3.

Table 21.3 – Open Pit Mining Capex

Open Pit Mining Capex	LOM Cost (US$ 000)	Pre-Production (US$ 000)	Production (US$ 000)
Mine Pre-Stripping	37,298	37,298	--
Mobile Equipment Purchase – New	52,215	36,507	15,708
Mobile Equipment Purchase – Replacement	18,719	0	18,719
Other Equipment	3,173	2,673	500
Clearing, Pit Area	931	408	522
Total Open Pit Mining Capital Costs	*112,334*	*76,886*	*35,449*
Contingency 10%	*11,233*	7,689	*3,545*
Total	**123,567**	**84,575**	**38,994**

Source: BBA, 2023

BBA developed the mining Capex on the following assumptions and estimation methodology:

- Mining equipment quantities and costs have been developed by BBA's mining group based on the mine plan developed in this Report. Mining equipment costs were estimated from budgetary pricing from OEM and/or BBA's recently updated database of Vendor pricing.
- Mining Opex incurred in the pre-production period is categorized as Initial Capital. The cost of pre-production mining is $37.3 M. This includes all mining operations during approximately 24 months of pre-production such as drilling, blasting, loading and hauling of saprolite, historical tailings, and rock material, and all other auxiliary mining work. Some labour costs for management are categorized under the Owner's Cost during the pre-production period.

21.1.7 PROCESSING CAPEX

The processing Capex account for the capital costs associated with the process plant, including site preparation in the Project area and the infrastructure support services.

The process plant and associated infrastructure costs were based on a major mechanical equipment list and budgetary quotations obtained for equipment based on the feasibility level of design and from DRA's internal database.

The site preparation and surface water management costs are associated with earthworks in the process plant area that have been estimated from site layout drawings and unit costs sourced from local contractors.

Installation costs were accounted for by applying benchmark ratios on the equipment costs. Processing plant in general, ore handling and crushing, grinding, and classification, flotation, re-grinding and Cu concentrate filtration are listed in Table 21.4. The installed mechanical equipment cost accounts for approximately 60% of the total process plant direct cost.

Table 21.4 shows a breakdown of the estimated processing plant Capex.

Table 21.4 – Process Plant Direct Capex

Processing Plant Area Costs	Capex (US$ 000)
Concentrator Plant	100,211
Reagent Building	3,329
Plant Services	4,633
Water Systems	3,355
Saprolite & Historical Tailings Processing Plant	6,161
Subtotal Process Plant Area Cost	117,689
Contingency 10%	*11,769*
Total Process Plant	**129,458**

Source: DRA, 2023

21.1.8 WASTE MANAGEMENT FACILITY CAPEX

The WMF Capex is summarized in Table 21.5 divided into the pre-production phase and sustaining phase. The WMF costs were estimated based on quantities obtained from the layouts. Unit rates were obtained from Knight Piésold’s internal database.

Table 21.5 – WMF Capex

WMF Area	LOM Total (US$ 000)	Pre-Production Cost (US$ 000)	Sustaining Cost (US$ 000)
Pre-production Development	1,922	1,922	
WMF Embankment Earthworks	48,333	11,772	36,561
Instrumentation	430	219	211
Pipelines	15,595	8,562	7,033
Access Roads	1,901	646	1,255
Water Management Facilities	5,321	4,626	694
Spillways	327	170	157
WMF Management	66	66	
Subtotal	*73,895*	*27,983*	*45,911*
Contingency 10%	*7,389*	2,798	*4,591*
Total Estimate	**81,284**	**30,781**	**50,502**

Source: DRA and Knight Piésold, 2023

21.1.9 INFRASTRUCTURE CAPEX

All infrastructure required for the initial capital period is listed in Table 21.6.

The costs associated with the site electrical substation and on-site distribution were estimated by specialist consultant Tungsten, based on conceptual system design and benchmarked costs for the major components. The power supply cost includes costs associated with the new 41 km transmission line from the Cerro Matoso substation to the proposed-on site electrical substation.

The general facilities cost accounts for the costs associated with items such as the administration office, training centre, truck shop, engineering offices, and warehouse. These costs were developed based on general arrangement drawings and layouts. Preliminary engineering was completed to estimate concrete and steel quantities for these buildings, costing, and unit rates were provided by local sources from historical projects. Site preparation and road construction cut and fill quantities were calculated using Autodesk Civil 3D. Earthworks unit rates and productivities were established from local contractors as well as historical information from similar projects.

The water supply cost accounts for the costs associated with the freshwater catchment system, storage pond, pipeline, and freshwater storage tanks in the Project area. These costs were estimated based on conceptual system design and a combination of unit and benchmark costs for the major components sourced from both DRA and Knight Piésold internal databases.

Table 21.6 – Infrastructure Capex

Infrastructure Capital Costs	Capex (US$ 000)
General Mine Site Development	9,154
On-site Power Supply and Distribution	9,305
On site Services (Utilities)	7,317
Ancillary Buildings	8,016
On-site Mine Infrastructure	15,519
On-site Mobile Equipment	2,294
Off-site Power Supply	17,601
Off-site Concentrate Logistics	1,783
Off-site Other Logistics Facilities	520
Subtotal Capital Estimate	*71,509*
Contingency 10%	7,151
Total Capital	**78,660**

Source: DRA et al, 2023

21.1.10 OWNER'S COSTS

The total Owner's Capex is estimated at US$34.8 M. All items required for the initial capital period are listed below in Table 21.7.

In Colombia, there is a compensation requirement for projects that consume water from natural sources. Decree 2099 of 2016 – Article 2.2.9.3.1.1 indicates that "Any project that requires an environmental licence and that involves in its execution the use of water taken directly from natural sources for any activity, must allocate no less than 1% of the total investment for recovery, conservation, preservation, and surveillance of the hydrographic basin that feeds the respective water source."

Table 21.7 – Owner's Costs

Owner's Costs	Capex Cost (US$ 000)
G&A	5,858
Human Resources	8,631
IT Communications	776
Travel	666
Community Commitments	11,964
Land Purchases	2,654
Right of ways	1,904
Environmental Permits and Commitments	2,376
Total Estimate	**34,828**

Source: Cordoba, 2023

21.1.11 CLOSURE CAPEX

Closure costs of US$22.6 M are estimated. This includes US$29.5 M in WMF closure costs, US$3.5M for processing plant closure and US$10.7 M in salvage costs. Table 21.8 summarizes the costs included in the closure estimate.

Table 21.8 – Closure Costs

Closure Costs	Cost (US$ 000)
WMF Progressive Closure	1,853
WMF Active Closure	27,205
WMF Passive Closure	404
Processing Plant	3,527
Dewatering Wells	300
Salvage	-10,724
Total Closure Cost	**22,566**

Source: DRA et al, 2023

21.1.12 INDIRECT CAPEX

The indirect Capex is summarized in Table 21.9. Indirects include temporary facilities, freight, duties, critical spare parts, first fills, vendor representatives, and commissioning. EPCM includes detailed engineering, equipment procurement and construction management. The numbers were compiled by DRA with input from BBA, Knight Piesold, Tungsten and INTERA.

Table 21.9 – Indirect Capex

Indirect Capital Costs	Cost (US$ 000)
Engineering, Procurement and Construction Management	32,160
Indirects	29,945
Total Indirect Capex	**62,105**

Source: DRA et al, 2023

21.1.13 CONTINGENCY

A provision of $29.4 M is included in the initial Capex for contingency, based on the level of development stage of the Project. Table 21.10 summarizes the contingency added to the Project Capex. Contingency is not applied to the Owner's costs, indirect costs or EPCM.

To meet the budgeted costs established for the Project in this estimate, it is expected that sufficiently developed engineering, adequate project management, realistic construction schedule, and appropriate controls will be implemented.

Table 21.10 – Capex Contingency

Area	Contingency (US$ 000)
Mining	7,689
Concentrator Plant	11,769
WMF	2,797
Infrastructure	7,151
Total Contingency on Initial Capex	**29,407**

Source: DRA et al, 2023

21.1.14 SUSTAINING CAPEX

Sustaining Capex, applied to the mining division, are costs incurred in purchasing new open pit mobile mining equipment after the pre-production period and for purchasing new mobile equipment as replacement units are required. Sustaining capital items also includes the WMF embankment progression and staged perimeter dewatering wells. The sustaining Capex is outlined in Table 21.11.

Table 21.11 – Sustaining Capex

Sustaining Capital Costs	Production Cost (US$ 000)
Mine Mobile Equipment Purchase Costs	15,708
Mine Mobile Equipment Replacement Purchase Costs	18,719
Mine Other Costs	1,022
Processing Plant	7,814
WMF	45,911
On-site Infrastructure	3,828
Off-site Infrastructure	0
Closure	22,566
Sub-total Sustaining Capital	*115,568*
Contingency	11,557
Total Sustaining Capital	**127,124**

Source: DRA et al, 2023

21.2 Operating Costs

21.2.1 OPERATING COST SUMMARY

The operating cost estimate (Opex) was consolidated by DRA with the input from BBA and KP. The estimate is expressed in US dollars. The LOM Opex is estimated to be US$1,581 M. LOM Cu C1 cash costs are expected to average US$1.35/lb net of credits, and US$2.66/lb but before precious metals credits. C1 costs are direct costs, which include costs incurred in mining and processing (labour, power, reagents, materials) plus local G&A, freight and realisation and selling costs divided by the copper pounds produced. C1 costs do not include sustaining Capex or closure costs. Total on site Opex, including royalties, are expected to average of US$16.14/t processed.

The LOM Opex is summarized in Table 21.12.

Table 21.12 – LOM Opex Summary

LOM Operating Costs Summary	Cost (US$ 000)	US$/t mined	US$/t milled	US$/lb Cu Payable
OP Mining (excludes pre-production, includes stockpile rehandle)	447,472	2.14	4.57	0.59
Processing Main and Gravity Wash Plants	708,753		7.24	0.94
Tailings, WMF, Water Management	50,317		0.51	0.07
G&A	119,388		1.22	0.16
Contractual Royalties	67,650		0.69	0.09
Government Royalties	187,726		1.92	0.25
Total On Site	*1,581,305*		*16.14*	*2.09*
Cu Treatment, Refining, and Other Off Site	444,268		4.54	0.57
Total Before By-Product Credits	2,025,572		20.68	2.66
By-Product Credits				(1.31)
Total LOM Net of By-Product Credits				1.35

Source: DRA et al, 2023

The LOM tonnes processed are in the table the fresh and transition ore are shown in Table 21.13.

Table 21.13 - LOM Tonnes Materials Mined and Processed

LOM Material	LOM Tonnes Mined	LOM Tonnes Processed
Mining Production	97,949,700	
Waste	129,673,300	
Fresh and Transition Ores		89,356,500
Saprolite Ore		7,359,100
Historical Tailings		1,234,100
Total LOM tonnes	227,623,000	97,949,700

Source: BBA, 2023.

21.2.2 LABOUR PERSONNEL REQUIREMENT

Labour costs were estimated based on a staffing plan estimate for the operation and maintenance of the plant based on DRA (Processing), BBA (Open Pit Mining) and KP (WMF) experience with similar projects as well as employee wages and benefits provided by Cordoba. The estimate accounts for management, plant operators, and supervisors, as well as laboratory, and plant maintenance personnel.

Operating personnel of the plant will work under a rotation system of 8 hours rotating per shift (4 panels). Labour costs were sourced from Cordoba and include basic salaries as well as bonuses and personnel health insurance costs required by law.

Total Project employment is estimated to be about 510 personnel at peak levels during operations. Table 21.14 summarizes the peak labour personnel.

Table 21.14 – Overall Project Site Operations Labour Summary

Area	Peak Number	
Open Pit Mining	262	Varies on a year to year
WMF	18	
Processing	132 + 12	Main plant and gravity wash plant
General & Administrative	86	
Estimated Total	**510**	

Source: DRA et al, 2023

21.2.3 MINING OPEX

Mine Opex was developed by BBA and is based on the mine plan and estimated equipment and workforce requirements. The basis of the Opex is owner-operated mining with purchased equipment. The mine Opex include all the supplies, parts, and labour costs associated with mine supervision, operation, and equipment maintenance.

Mine operating costs are built up from first principles. Inputs are derived from OEM vendor budget quotations and historical data. This includes quoted cost and consumption rates for such inputs as fuel, fluids, tires, undercarriage, GET, machine parts, and machine major components.

The Opex was estimated from budgetary pricing from OEM and/or BBA's recently updated database. Employee wages and burden benefits are based on information provided by Cordoba.

The mining operating cost estimates include the following parameters:

- Diesel fuel cost of US$0.58/L (delivered to site);
- Average mining bench height of 10 m;
- Average drilling penetration rate of 22.5 m/h; and
- Blasting powder factor of 0.23 kg/t (kg explosives per tonne of rock) for fresh and transition type material and average bulk emulsion cost of $2.29/kg.

The estimated LOM mining Opex is US$484.8 M resulting in a LOM unit rate of US$2.13/t mined. This includes and expenditure of $447.5 M during the production period and $37.3 M occurring during the pre-production period. The LOM material mined totals 227.6 Mt, which comprises 97.9 Mt of economic material and 129.7 Mt of waste. The mined tonnage during pre-production is 19.0 Mt and 208.6 Mt over the production period. Table 21.15 presents the detailed mining Opex.

Table 21.15 – LOM Mining Opex Summary

LOM Mining Operating Costs	US$/t Mined	LOM Cost (US$ 000)
Drilling	0.14	29,482
Blasting	0.58	121,592
Loading	0.24	49,841
Hauling	0.45	93,529
Support	0.22	46,510
Service	0.10	20,323
Labour	0.31	65,306
General & Miscellaneous	0.10	20,889
Total LOM Mining Operating, Production Phase	**2.14**	**447,472**

Source: BBA, 2023

General and Miscellaneous includes contractor services for supplemental haulage of saprolite material during Years 1 to 3, and allowances for ore control sampling, dewatering supplies, and technical services.

Table 21.16 summarizes the major equipment hourly cost estimates. The hourly cost rates reflect equipment parts, consumables (including tire wear), fuel consumption, maintenance repair, and overhaul part. The rate does not include operator labour or maintenance labour.

Table 21.16 – OP Mining Major Equipment Hourly Rates

Major Equipment	Hourly Cost Estimate (US$/h)
Drill – Primary	164
Drill – Secondary	107
Loading – Hydraulic Excavator	271
Loading – Hydraulic Excavator	155
Loading – Front End Loader	202
Hauling – RDT, 91 t	112
Hauling – ADT, 41 t	71
Track Dozer – ex D9	95
Wheel Dozer	95
Grader, ex 14 M	60

Source: BBA, 2023

21.2.4 PROCESSING OPEX

The processing Opex accounts for the operating and maintenance costs associated with the 17,600 tpd process plant operation and supporting services infrastructure. Process plant operating costs were estimated using the following categories: power, labour, reagents, mill maintenance, grinding media, liners, and other costs. The development of the processing Opex by category is shown in Table 21.17.

In general, the processing Opex is based upon the following documentation: process flowsheet, process design criteria, mass-water balances, mechanical equipment list, list of reagents and consumables, equipment cost, and a referential staffing plan.

The reagents consumption for the main plant are based on the metallurgical testwork completed by Blue Coast Research for flotation and dewatering testwork for thickeners and concentrate filtration. The unit costs of each of the reagents is in US$/kg and were obtained from recently collected quotations.

Grinding media was evaluated based on the ore abrasion index obtained by the comminution testwork completed during the PFS and FS, which established consumption rates. Grinding media unit prices have been taken from recent quotes.

Liner consumption for the jaw crusher, cone crusher, SAG mill, ball mill and vertical mill replacement are estimated based on the abrasion index. The cost of liners for jaw crusher, pebble crusher, SAG mill and ball mill is assumed as 10% of the equipment cost.

General consumables for the process plant (personnel protective equipment, a metallurgical laboratory, chemical laboratories, maintenance, office supplies and others) were maintained at US$0.22/t as per the previous PFS.

The unit cost for LOM processing cost is estimated at US$7.77/t for fresh and transitional ores as shown in Table 21.17.

Table 21.17 – Processing Opex by Category – Fresh and Transition Ore

Description	LOM Unit Cost (US$/t Processed)	LOM Cost (US$ 000)
Electric Power	3.71	331,158
Reagents	0.91	81,187
Grinding Media and Mill Liners	1.49	133,160
Mill Maintenance	0.48	42,860
General / Other Costs	0.22	19,658
Labour	0.97	86,680
Total Processing Cost	**7.77**	**694,703**

Source: DRA, 2023

The Opex for the gravity wash plant has been considered separately. This plant treats saprolite and historical tailings and the operating cost is estimated at US$1.64/t. A cost breakdown is shown in Table 21.18.

Table 21.18 – Processing Opex by Category - Saprolite and Historical Tailings

Description	LOM Unit Cost (US$/t Processed)	LOM Cost (US$ 000)
Electric Power	0.75	6,443
Grinding Media and Mill Liners	0.22	1,924
Maintenance	0.16	1,369
Diesel	0.07	590
Labour	0.43	3,725
Total Processing Cost	**1.64**	**14,051**

Source: DRA, 2023

21.2.5 POWER

Power consumption was estimated based on the power requirements by the main plant and gravity wash plant. Assumptions include:

- Power for crushing and grinding is the result from process simulations;
- Power factor is 85% of installed power;
- Crushing circuit operations of 16 h/d;
- Other process circuit operations of 24 h/d;
- 92% annual availability;
- Power for equipment in stand-by has 0% utilization, only power for operating equipment is considered; and
- Lower utilization is assigned for intermittent equipment such as sump pumps, cranes, reagent dossing systems.

The current energy cost is US$0.125/kWh and has been used as the basis for the estimate.

21.2.6 WASTE MANAGEMENT FACILITY

Table 21.19 summarizes the LOM Opex for the WMF facility, that has not been accounted for in mining or processing.

Table 21.19 – WMF Opex

Operating Costs by Category	LOM Cost (US$ 000)
WMF Operational Costs	50,317
Total WMF	**50,317**

Source: Knight Piésold, 2023.

Table 21.20 – WMF Labour Assumptions

Department	# Persons
WMF	18
Supervision	3
Shift Supervisor	2
Senior Supervisor	1
Operations	8
Operators	5
Technical	1
Tailing/Waste Engineer	1

Source: Knight Piésold, 2023

21.2.7 GENERAL AND ADMINISTRATIVE OPEX

The total expenditure for LOM G&A is estimated at $119.4 M. The G&A includes management labour costs, site services labour costs, vehicle costs, office supplies, personnel protection equipment, environmental monitoring, and compliance, licences, and permits, safety, and first aid equipment, security supplies, consultants, communications equipment, software, legal fees, travel, training, community assistance, and maintenance for all buildings and equipment not directly related to mining or processing.

The G&A Opex is shown Table 21.21. Table 21.22 tabulates the labour assumptions for the G&A cost centre.

Table 21.21 – G&A Cost Summary

G&A Costs	LOM Cost (US$ 000)
Labour	39,531
Services, Supplies, etc.	35,049
Vehicles	4,068
Perimeter Dewatering Wells	4,702
Camp	33,097
Water Compensation	2,941
Total LOM G&A	**119,388**

Source: Cordoba and DRA, 2023

Table 21.22 – General & Administrative Area Labour Estimate

	# Persons
GENERAL & ADMINISTRATIVE AREA	**86**
Environmental Department	**6**
WMF Superintendent	1
Environmental Supervisor	2
Environmental Technicians	3
Site Services	**24**
Site Services Superintendent	2
IT Specialist	2
IT Support	2
Safety Coordinator	4
First Aid Attendant	2
General Services/Carpenter	6
Janitor/Sanitation	6

	# Persons
Security / Camp / Community	**41**
Security Officer	24
Driver	9
Community Coordinator	1
Community Coordinator Team	3
Nurse	4
General Management	**15**
General Manager	1
Administrative Assistant	1
Engineering Superintendent	1
Senior Controller	2
Payroll Clerk	4
HR Superintendent	1
HR Coordinator	2
Safety Superintendent	2
Security Superintendent	1

Source: Cordoba and DRA, 2023

21.2.8 OTHER OPEX

The total expenditure for LOM royalties is estimated $255 M, resulting in a unit rate of $2.61/t processed. Contractual royalties consist of 2% of all metal revenue with deductions for concentrate transportation costs, concentrate refinement costs, and government royalties. Colombian government royalties consist of 5% of Cu metal revenue, 4% Au metal revenue, and 4% Ag metal revenue.

Table 21.23 summarizes the Royalties Opex.

Table 21.23 – Royalties Cost Summary

Royalties Costs	$/t Processed	Cost (US$ 000)
LOM Contractual Royalties	0.69	67,650
LOM Government Royalties	1.92	187,726
Total LOM Royalties	**2.61**	**255,375**

Source: BBA et al, 2023

The total expenditure for LOM copper off site operating costs is estimated at $430.7 M resulting in a unit rate of $4.40/t processed. The total expenditure for LOM gold off site operating costs is estimated at $13.5 M resulting in a unit rate of $0.14/t processed. Refining, treatment, and freight charges are described in Section 19.

The off-site Opex is shown in Table 21.24.

Table 21.24 – Off-Site Operating Costs

Off Site Operating Costs	**Cost (US$ 000)**
Copper Concentrate	
Mine to Port	54,243
Port to Smelter	136,692
Port Handling	39,055
Concentrate Freight Charges	229,990
- Refining Charges	61,644
- Treatment Charges	139,118
Concentrate Treatment Charges	200,762
Total Copper Off-Site Operating	**430,752**
Gold Concentrate	
Mine to Port	1,010
Gold Concentrate Sampling	337
Port to Smelter	2,423
Port Handling	728
Concentrate Freight Charges	4,498
Refining Charges	935
Treatment Charges	8,084
Concentrate Treatment Charges	9,018
Total Gold Off-Site Operating	**13,516**

Source: BBA et al, 2023

22 ECONOMIC ANALYSIS

22.1 Introduction

An economic assessment was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic model was prepared using a discounted cash flow approach on pre- and post-tax bases. The results of this economic analysis are based upon services performed by:

- DRA for process plant and surface infrastructure;
- BBA for geology, mineral resource, mineral reserve, open pit mine and economic analysis;
- Knight Piésold for WMF, water management, and geotechnical for site infrastructure;
- Austra Mining Solutions for the open pit geotechnical;
- INTERA for the hydrogeology, geochemistry, environmental, and permitting;
- Blue Coast Research for metallurgy and mineral processing;
- Tungsten for power supply;
- IRYS for road and geotechnical at the plant area; and
- Cordoba for Owner's costs.

The Project plan includes an approximate two-year construction and pre-production period, followed by 14.02 years of production at an average mill feed rate of 17,600 tpd to the main facility and 1,200 tpd to 2,400 tpd to the gravity wash plant, ten years of post-production active mine closure and 10 years of passive mine closure. An owner-operated scenario is planned for this Project.

The Project includes the El Alacrán open pit, an NPAG borrow pit, a main processing facility for fresh and transition material, a gravity wash plant for saprolite and historical tailings, a waste and tailings management facility, a site accommodations facility, and surface infrastructure to support the mine operations including such items as: maintenance shop, office facilities, roads, water management features, and ROM stockpiling areas.

The economic analysis for the Project indicates a **post-tax** cash flow of US$931.3 M, post-tax NPV (8%) of US$359.7 M, and post-tax IRR of 23.8%. The Project is most sensitive to commodity prices. On a **pre-tax** basis, the Project has a cash flow of US$1,441.4 M, an NPV (8%) of US$633.1 M, and an IRR of 33.9%.

Table 22.1 summarizes the economic analysis for the described base case.

Table 22.1 – Summary of Economic Analysis Results

Item	Value	Unit
Financial Analysis		
Cu Price Assumption (average LOM)	3.99	US$/lb
Au Price Assumption (average LOM)	1,715	US$/oz
Ag Price Assumption (average LOM)	22.19	US$/oz
Pre-Tax NPV 8%	633.1	$M
Pre-Tax IRR	33.9	%
Pre-Tax Payback	2.3	years
Post-Tax NPV 8%	359.7	$M
Post-Tax IRR	23.8	%
Post-Tax Payback	3.0	years
Pre-Tax Unlevered Free Cash Flow	1,441.4	US$ M
Post-Tax Unlevered Free Cash Flow	931.3	US$ M
LOM Income and FTT Taxes	510.1	US$ M
Production Data		
Life of Mine	14.02	years
Processing Rate – Main Facility	17,600 6.42	tpd Mtpa
Processing Rate – Saprolite Plant	2,400 0.88	tpd Mtpa
Recovered Cu	797.2	Mlbs
Average Cu Recovery	90	%
Recovered Au	0.55	Moz
Average Au Recovery	74	%
Recovered Ag	5.35	Moz
Average Ag Recovery	62	%
Pre-Production Mined Tonnage	19.0	Mt
Total Mined Tonnage (including pre-production) from Open Pit	227.6	Mt
Total Milled Tonnage from Open Pit	97.9	Mt
Overall Mined Stripping Ratio	1.3	waste:ore
Annual Cu Production (average)	56,916	klbs
Annual Au Production (average)	39	koz
Annual Ag Production (average)	382	koz

Item	Value	Unit
LOM Mined Grades (average)	0.41 0.23 2.63	% Cu g/t Au g/t Ag
Capital Costs		
Initial Capital, Direct Cost Estimate	294.1	US$ M
Initial Capital, Indirect Costs, and Contingency	126.3	US$ M
Total Initial Capital Costs	420.4	US$ M
LOM Sustaining Capital	93.0	US$ M
LOM Sustaining Capital, Indirect Costs, and Contingency	11.6	US$ M
Total LOM Sustaining Capital	104.6	US$ M
Reclamation and Closure Costs	22.6	US$ M
LOM Total Capital	547.5	US$ M
LOM Operating Costs		
Open Pit Mining (per tonne milled)	4.57	US$/t
Processing (per tonne milled)	7.24	US$/t
Tailings, Water Management (per tonne milled)	0.51	US$/t
Site Support Costs (per tonne milled)	1.22	US$/t
Refining, Treatment, and Transport Costs (per tonne milled)	4.54	US$/t
Royalties Costs (per tonne milled)	2.61	US$/t
Total Operating Cost (per tonne milled)	20.68	US$/t
Operating Cash Cost (per lb Cu payable) [1]	2.66	US$/lb
All-In Sustaining Cost (per lb Cu payable) (net by-product credits) [1]	1.51	US$/lb
[1] *refers to "Non IFRS Financial Measures"* ** totals may not sum precisely due to rounding*		

Source: BBA, 2023.

22.2 Cautionary Statements

The results of the economic analysis are based on forward-looking information that is subject to a number of known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented here.

All forward-looking statements in this Technical Report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. Material assumptions regarding forward-looking statements are discussed in this Technical Report, where applicable. In addition to, and subject to, such specific assumptions discussed in more detail elsewhere in this Technical

Report, the forward-looking statements in this Technical Report are subject to the following assumptions:

- There being no signification disruptions affecting the development and operation of the Project;
- Availability of certain consumables and services and the prices for power and other key supplies being approximately consistent with assumptions in the Technical Report;
- Labour and materials cost being approximately consistent with assumptions in the Technical Report;
- Timelines for prior consultation and wet/dry season baseline data collection being generally consistent with assumptions, and permitting and arrangements with stakeholders being consistent with current expectations as outlined in the Technical Report;
- All environmental approvals, required permits, licences and authorizations being obtained from the relevant governments and other relevant stakeholders;
- Certain tax rates, including allocation of certain tax attributes, being applicable to the Project;
- Availability of financing for Cordoba's planned development activities;
- Timelines for exploration and development activities on the Project; and
- Assumptions made in Mineral Resource and Mineral Reserve Estimates, including, but not limited to geological interpretation, grades, commodity prices, extraction, and mining recovery rates, geotechnical, hydrological, and hydrogeological assumptions, capital and operating cost estimates, and general marketing, political, business, and economic conditions.

The production schedules and financial analysis annualized cash flow table are presented with conceptual years shown. Years shown in these tables are for illustrative purposes only. If additional mining, technical, and engineering studies are conducted, these may alter the Project assumptions as discussed in this Technical Report and any resulting changes to the calendar timelines presented.

A cash flow projection was generated from the LOM plan production schedule and capital and operating cost estimates and is summarized in Table 22.9. The associated process recoveries, metal prices, operating costs, refining, and transportation charges, royalties, and capital expenditures (pre-production and sustaining) were also taken into account. All costs are presented in Q3 2023 US dollars, with no allowances for inflation or escalation beyond that time.

22.3 Methodology Used

The financial analysis was carried out using a discounted cash flow (DCF) methodology. Net annual cash flows were estimated by projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (capital and operating costs, royalties, taxes, etc.). These annual cash flows were discounted back to of the first year of capital expenditure and totalled to determine the NPV of the Project at select discount rates. An 8% discount rate was used as the base rate with mid-year discounting.

In addition, the IRR (expressed as the discount rate that yields an NPV of zero) and the payback period (expressed as the estimated time from the start of production until all initial capital expenditures have been recovered) were also estimated.

Sensitivities to variations in commodity prices, initial capital costs, sustaining capital costs, and operating costs were carried out to identify potential impacts on NPV and IRR.

For discounting purposes, cash flows and revenues are assumed to occur at the mid-point of each period.

22.4 Principal Assumptions

The cash flow estimate includes only revenue, costs, taxes, and other factors applicable to the Project. Corporate obligations, financing costs, sunk costs, and taxes at the corporate level are excluded.

The model was prepared from mining schedules estimated on an annual basis. The cash flow model was based on the following:

- All costs reported in US dollars ($ or US$), unless specifically otherwise stated.
- 100% equity basis.
- No cost escalation beyond 2023.
- No provision for effects of inflation.
- Constant 2023-dollar analysis.
- Economic analysis is based on technical assumptions outlined in previous sections, together with economic assumptions and estimated capital and operating costs described in Section 21.
- Exploration costs are deemed outside of the Project.
- Any additional Project study costs are not included in the analysis.
- Reclamation costs are included in the analysis. It is assumed that a reclamation performance bond will not be required as per guidance from the Cordoba environmental team.
- Annual gross revenue determined by applying estimated metal prices with payable metal assumptions to the annual recovered metal estimated for each operating year.
- Salvage value is included in the closure estimate.
- Variable commodity pricing is used in the economic analysis (discussed in Section 19). BBA elected to use a slightly lower metal price compared with that provided in Section 19. (Table 22.2). Other parameters include assumptions for the copper and gold concentrates (Tables 22.3 and 22.4).

Table 22.2 – Metal Pricing Assumptions

Metal	Unit	Value				
Year		2026	2027	2028	2029	2030+
Cu Price	US$/lb	4.04	4.15	4.15	4.10	3.94
Au Price	US$/oz	1,800	1,800	1,775	1,725	1,700
Ag Price	US$/oz	23.00	23.00	23.00	22.00	22.00

Table 22.3 – Copper Concentrate Assumptions

Parameter	Unit	Value				
Concentrate Grade	%	20%				
	Year	2026	2027	2028	2029	2030+
Treatment Charge	US$/mt	70	65	65	75	80
Cu Refining Charge	US$/lbs payable	0.07	0.065	0.065	0.075	0.080
Au Refining Charge	US$/oz payable	5.00				
Ag Refining Charge	US$/oz payable	0.30				
Cu Payable	%	95				
Au Payable	%	93.5				
Ag payable	%	90				
Freight – Mine to Port	US$/t conc	30				
Freight – Port to Smelter	US$/t conc	70				
Freight – Port Handling	US$/t conc	20				

Table 22.4 – Gold Concentrate Assumptions

Parameter	Unit	Value
Treatment Charge	US$/dmt	240
Au Refining Charge	US$/oz payable	7.00
Ag Refining Charge	US$/oz payable	0.50
Au Payable	%	97
Ag payable	%	90
Freight – Mine to Port	US$/t conc	30
Freight – Port to Smelter	US$/t conc	22
Sampling	US$/t conc	10

22.5 Taxation and Royalties

22.5.1 TAXATION

The Project has been evaluated on a post-tax basis. It is noted that there are many potential complex factors that affect the taxation of a mining project. The tax, depletion, and depreciation calculations in the economic analysis are simplified and are intended only to give a general indication of potential tax implications; like the rest of the FS economics, they are only preliminary.

The tax calculations in the financial model are based on current tax laws, most notably Colombian Law 2155, enacted on September 14, 2021, that increased the corporate tax rate to 35% as of January 1, 2022.

Tax deductions are used to adjust the Project's gross income to determine taxable income. The following items are applied to the tax model as deductions:

- Operating costs.
- Tax depreciation.
- Historical capitalized exploration and evaluation expenditures totalling about 76.5 billion Colombian pesos.
- 50% of the financial transaction's tax paid in the same tax year.

Tax depreciation is used to amortize the cost of capital assets as expenses over their useful life and reduce taxable income reported in a period.

Table 22.5 presents the categories of capital assets and the various treatments of the total capital costs of each within the financial model.

Table 22.5 – Tax Depreciation of Capital Assets

Sector	Amortization Value (US$ M)	Usable Life	Depreciation Method
Initial Mine Capital	39.588	LOM	Straight line at 13.75%
Sustaining Mine Capital	33.429	Remainder of LOM at time of expenditure	Straight line at 13.75% US$2,019 M not deducted over LOM
Tailings Embankment	81.843	Remainder of LOM at time of expenditure	Details of the intangibles and constructions 2.22% US$9,872 M not deducted over LOM
Initial Other Capital	96.933	LOM	Straight line at 7.14%
Initial Infrastructure Capital	169.295	LOM	Straight line at 13.75%

Sector	Amortization Value (US$ M)	Usable Life	Depreciation Method
Sustaining Infrastructure Capital	8.720	Remainder of LOM at time of expenditure	Straight line at 13.75%, US$0.162 M not deducted over LOM, US$0.378 M not deducted over LOM
Sustaining Other Capital	2.382	LOM	Straight line at 13.75%, US$0.162 M not deducted over LOM
Initial Off-Site Capital	19.904	LOM	Straight line at 13.75%
Closure	1.317	Remainder of LOM at time of expenditure	US$22.330 M not deducted over LOM

Source: BBA, 2023

Table 22.6 presents the basis of calculation for the various Colombian taxes, as well as the total tax paid by the Project within each category.

Table 22.6 – Estimated LOM Taxes Payable in Colombia

Tax Category	Tax Rate (%)	Estimated Total Tax Paid (US$ M)
Corporate Income Tax (CIT)	35	503.4
Financial Transactions Tax (FTT)	0.4	6.7
Total Estimated Taxes		**510.1**

Source: BBA, 2023

22.5.2 ROYALTIES

Contractual royalties consist of 2% of all metal revenue with deductions for concentrate transportation costs, concentrate refinement costs, and government royalties. Colombian government royalties consist of:

- 5% of Cu metal revenue;
- 4% Au metal revenue; and
- 4% Ag metal revenue.

22.6 Economic Results

The results are derived from the LOM schedule presented in Section 16, the recovery method discussed in Section 17, and capital, and operating costs presented in Section 21.

Tables 22.7, 22.8 and 22.9 summarize the cost inputs for the economic analysis.

The estimate of initial capital costs is US$420.4 M including pre-production mining, indirect, and contingency assumptions, as outlined in Table 22.7 (columns may not sum exactly due to rounding).

Contingency of US$29.5 M is included in the estimate of initial capital costs, which amounts to 10% of direct initial capital costs.

Table 22.7 – Capital Cost Estimate

Cost Item / Description	Pre-Production Period (US$ 000)	Production Period (US$ 000)	Post-Production Period (US$ 000)
Open Pit Mining (including pre-production mining)	78,808	35,449	
Process Plant	117,689	7,814	
Tailings, WMF, Water Management	26,061	45,911	
Site Development, Power, Electrical	51,605	1,284	
Other Site Capital	0	2,544	
Other Off-Site Capital	19,904	0	
Closure Cost		236	22,330
Subtotal Estimate	*294,067*	*93,237*	*22,330*
Indirect Capex	96,933		
Contingency	29,407	9,324	2,233
Total Estimate	**420,407**	**102,561**	**24,563**

Source: BBA, 2023

Sustaining capital, including rehabilitation, salvage, and closure costs, is estimated at US$127.1 M over the LOM.

Operating Costs, detailed in Table 22.8, are estimated at US$16.14/t of material processed (excluding refining, treatment, and transport charges).

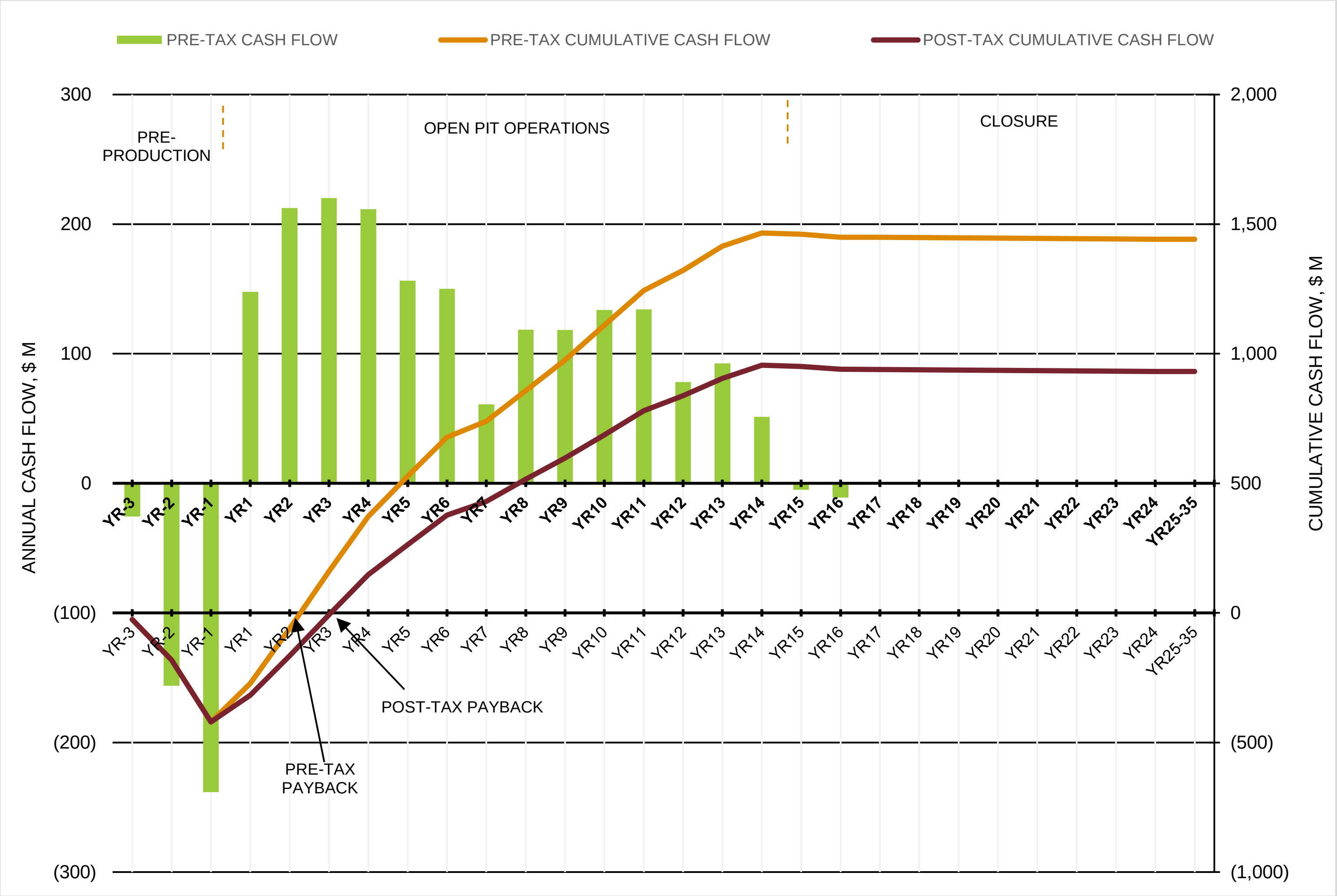
Table 22.8 – Operating Cost Estimate

Cost Item / Description	Total (US$ 000)	US$/t mined	US$/t milled	US$/lb Cu payable
Open Pit Mining (excluding pre-production mining)	447.5	2.14	4.57	0.59
Processing	708.8		7.24	0.94
Tailings, WMF, Water Management	50.3		0.51	0.07
General and Administration	119.4		1.22	0.16
Royalties	255.4		2.61	0.34
Total Operating Costs	**1,581.3**		**16.14**	**2.09**

Source: BBA, 2023

Figure 22.1 shows the cash flow model results. The cash flow is presented in Table 22.9.

Figure 22.1 – Cash Flow Model Results



Source: BBA, 2023

Table 22.9 – Cash Flow Model

Description	LOM Total	Unit	Pre-Production			Production															Closure									
			YR-3	YR-2	YR-1	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12	YR13	YR14	YR15	YR16	YR17	YR18	YR19	YR20	YR21	YR22	YR23	YR24	YR25-35
Mill Feed Production Tonnage	97.9	Mt	0	0	0	6.56	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.06	6.86	6.86	6.55	6.42	6.42	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Copper Production	797.2	Mlbs	0	0.00	0.00	63.78	72.31	79.39	78.52	68.92	65.01	41.38	49.24	50.28	58.96	56.70	40.53	42.34	29.47	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Gold Production	0.55	Moz	0	0.00	0.00	0.03	0.05	0.05	0.05	0.04	0.04	0.03	0.05	0.05	0.04	0.03	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Silver Production	5.35	Moz	0	0.00	0.00	0.47	0.54	0.64	0.61	0.43	0.39	0.16	0.23	0.28	0.42	0.43	0.28	0.29	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper Price	3.99	US$/lb	0	0	0	4.15	4.15	4.10	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gold Price	1,715	US$/oz	0	0	0	1,800	1,775	1,725	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	0	0	0	0	0	0	0	0	0	0
Silver Price	22.19	US$/oz	0	0	0	23.00	23.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gross Revenue	4,014.5	US$ M	0.0	0.0	0.0	317.1	383.1	397.7	382.8	325.9	310.4	211.1	269.3	277.3	299.9	275.9	204.2	210.1	147.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Selling Costs	444.3	US$ M	0.0	0.0	0.0	32.8	37.4	43.5	44.3	38.9	36.8	23.8	28.2	28.7	33.4	32.1	23.1	24.1	17.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs	1,581.3	US$ M	0.0	0.0	0.0	108.7	122.3	126.5	122.7	120.8	119.2	114.3	118.3	123.4	119.5	107.5	102.3	93.9	80.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining Capital Costs	93.0	US$ M	0.0	0.0	0.0	25.3	9.8	6.9	3.9	9.0	4.0	10.6	3.6	5.9	11.7	1.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Capital Costs	294.1	US$ M	6.4	111.1	176.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reclamation & Closure Costs	22.6	US$ M	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.4	0.4	0.3	0.3	0.3	-0.3	-0.4	-0.9	4.7	10.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.4
Indirect Capital Costs	96.9	US$ M	18.7	34.1	44.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contingency	40.9	US$ M	0.6	11.1	17.7	2.5	1.0	0.7	0.4	0.9	0.4	1.1	0.4	0.6	1.2	0.2	0.1	0.0	-0.1	0.5	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Taxes	510.1	US$ M	0.1	0.1	0.2	44.3	60.7	61.8	57.5	40.2	36.0	7.6	33.1	37.0	44.1	40.4	21.0	25.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Tax Cash Flow	1,441.4	US$ M	(25.7)	(156.4)	(238.3)	147.7	212.5	220.2	211.6	156.4	150.0	60.9	118.5	118.3	133.8	134.2	78.2	92.5	51.4	(5.0)	(11.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(0.4)
Cumulative Pre-Tax Cash Flow		US$ M	(25.7)	(182.1)	(420.4)	(272.7)	(60.2)	160.0	371.6	528.0	678.0	738.9	857.4	975.7	1,109.4	1,243.7	1,321.8	1,414.4	1,465.7	1,460.7	1,449.7	1,448.7	1,447.8	1,446.8	1,445.8	1,444.8	1,443.8	1,442.8	1,441.8	1,441.4
Post-Tax Cash Flow	931.3	US$ M	(25.8)	(156.5)	(238.5)	103.4	151.9	158.4	154.1	116.1	114.0	53.3	85.3	81.3	89.6	93.8	57.2	66.9	51.1	(5.0)	(11.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(0.4)
Cumulative Post-Tax Cash Flow		US$ M	(25.8)	(182.3)	(420.8)	(317.4)	(165.6)	(7.2)	146.9	263.0	377.0	430.3	515.7	597.0	686.6	780.4	837.7	904.6	955.6	950.6	939.6	938.6	937.6	936.7	935.7	934.7	933.7	932.7	931.7	931.3

Source: BBA, 2023

Economic modelling resulted in an estimated LOM all-in sustaining cost (AISC) net of by-product credits of US$1.51/lb Cu payable. A breakdown of AISC/lb Cu payable is shown in Table 22.10.

Table 22.10 – Project All-in Sustaining Costs (US$/lb Cu Payable)

Project AISC (US$/lb Cu payable)	LOM
Operating Costs On Site	
Mining	0.59
Processing	0.94
Tailings, WMF, Water Management	0.07
G&A	0.16
Contractual Royalties	0.09
Government Royalties	0.25
Total Operating Costs On Site	**2.09**
Operating Costs Off Site	
Refining	0.08
Treatment	0.18
Freight/Transport	0.30
Total Operating Costs Off Site	**0.57**
Subtotal Operating Costs (On Site + Off Site)	**2.66**
Subtotal Operating Costs (minus by-product credit)	**1.35**
Sustaining and Closure Costs	
Sustaining Capital	0.13
Reclamation and Remediation	0.03
Total Sustaining and Closure Costs	0.16
Total before By-Product Credits	**2.82**
By-Product Credits	-1.31
Total AISC (US$/lb Cu payable)	**1.51**

Source: BBA, 2023

Table 22.8 summarizes economic indicators (both pre-tax and post-tax) for the estimated cash flow model.

Table 22.11 – Economic Indicators, Pre-Tax and Post-Tax

Economic Indicators	Unit	Pre-Tax	Post-Tax
Payback Period *(from start of production)*	years	2.3	3.0
Internal Rate of Return, IRR	%	33.9	23.8
NPV @ 5%	US$ M	858.4	518.0
NPV @ 7%	US$ M	700.5	407.0
NPV @ 8%	**US$ M**	**633.1**	**359.7**
NPV @ 10%	US$ M	516.9	278.7

Source: BBA, 2023

22.7 Sensitivity Analysis

To assess the Project value drivers, sensitivity analyses were performed for the NPV and IRR considering variations in metal prices, initial capital, sustaining capital, and operating costs on the pre-tax NPV 8% and on IRR.

The metal price sensitivity on a pre-tax basis is presented in Table 22.12. Sensitivities to changes in other parameters are shown in Table 22.13, on a pre-tax basis.

The Project's pre-tax NPV is most sensitive to factors impacting revenue, that is, commodity pricing.

Table 22.12 – Pre-Tax Valuation Sensitivities to Metal Prices

Description		Unit					
% Variation		%	-20%	-10%	0%	+10%	+20%
Metal Price		Cu US$/lb	3.19	3.59	3.99	4.39	4.79
		Au US$/oz	1,373	1,544	1,716	1,887	2,059
		Ag US$/oz	17.76	19.98	22.20	24.41	26.63
Discount Rate	5%	US$ M	371	614	858	1,102	1,346
	7%	US$ M	284	492	701	909	1,117
	8%	US$ M	246	440	633	826	1,020
	10%	US$ M	183	350	517	684	851
IRR		%	19.9	27.3	33.9	40.0	45.6
Payback Period[2]		years	3.3	2.7	2.3	2.0	1.8

Source: BBA, 2023

Table 22.13 – Pre-Tax Valuation Sensitivity to Certain Parameters

Factor		20%	10%	0%	-10%	-20%
Operating Cost	US$ M	1,846	1,714	1,581	1,449	1,316
	IRR	29.9%	32.0%	33.9%	35.8%	37.7%
	NPV8% (US$ M)	503	568	633	698	763
	Payback (years)[2]	2.5	2.4	2.3	2.2	2.1
Initial Capital Cost	US$ M	504	462	420	378	336
	IRR	28.1%	30.8%	33.9%	37.6%	42.1%
	NPV8% (US$ M)	561	597	633	669	705
	Payback (years)[2]	2.7	2.5	2.3	2.1	1.9
Sustaining Capital Cost[3]	US$ M	153	140	127	114	102
	IRR	33.4%	33.7%	33.9%	34.2%	34.5%
	NPV8% (US$ M)	620	626	633	640	646
	Payback (years)[2]	2.3	2.3	2.3	2.3	2.2

Source: BBA, 2023

Notes for Tables 22.12 and 22.13:

1. Non IFRS Financial Measures
2. Payback is defined as achieving cumulative positive free cashflow after all cash costs and capital costs, including sustaining capital costs, and is counted from the start of production.
3. Closure and Salvage Costs are included in this category.

22.8 Comments on Section 22

Under the assumptions in this Technical Report, and based on the available data, the Project shows positive economics. Using an 8% discount rate, the Project has a post-tax NPV of US$ 359.7 M, an IRR of 23.8% and a payback period of 3.0 years. There is potential for the Project if metal price assumptions increase from those used in the Technical Report or the contained Mineral Resources increase within the Project.

23 ADJACENT PROPERTIES

In the areas closest to the Mining Concession Contract III-08021, there are other mining titles, which are in the exploration stage for similar minerals, and whose owner is the company Minerales Cordoba S.A.S. To the west, the mining title borders with Concession Contracts LEQ-15162X, to the north and west with Contract LCQ – 16173X, to the east with Contract LEQ-15161 and to the south with Contract LCP-08142.

In addition, there are other mining titles in the area, granted for certain minerals, denominated as "Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates", which are also in the exploration stage.

Table 23.1 indicates the main characteristics of the mining titles adjacent to the Project, and the same is illustrated in Figure 23.1.

In the area, there are four Formalization Subcontracts, by virtue of which, traditional mines undergoing the formalization process are located. These correspond to the Pyrite Mine (Mina Pirita) in Subcontract LEQ-15161-001 and the Tehran Mine (Mina Teherán) in Subcontract JJ9-08091-001, exploitations located less than 1,500 m to the northeast of Mining Concession Contract III-08021. The Buenos Aires Mine (Mina Buenos Aires) and the Raa Mine (Mina Raa) are located to the south, corresponding to Formalization Subcontracts LCP-08142-002 and LCP-08142-001 respectively, located to the southeast of the Mining Contract at distances between 600 m and 4,400 m.

The area has been historically prospective, and several types of mineral deposits have been identified, among them, epithermal deposits as in the case of the Pyrite Mine; Porphyry-type Cu and Au deposits, and potential skarn-type deposits in the William sector (to the south-southeast of Mining Contract III-08021), in addition to the deposit type proposed for this Project, which is associated with an iron oxide-copper-gold (IOCG) deposit.

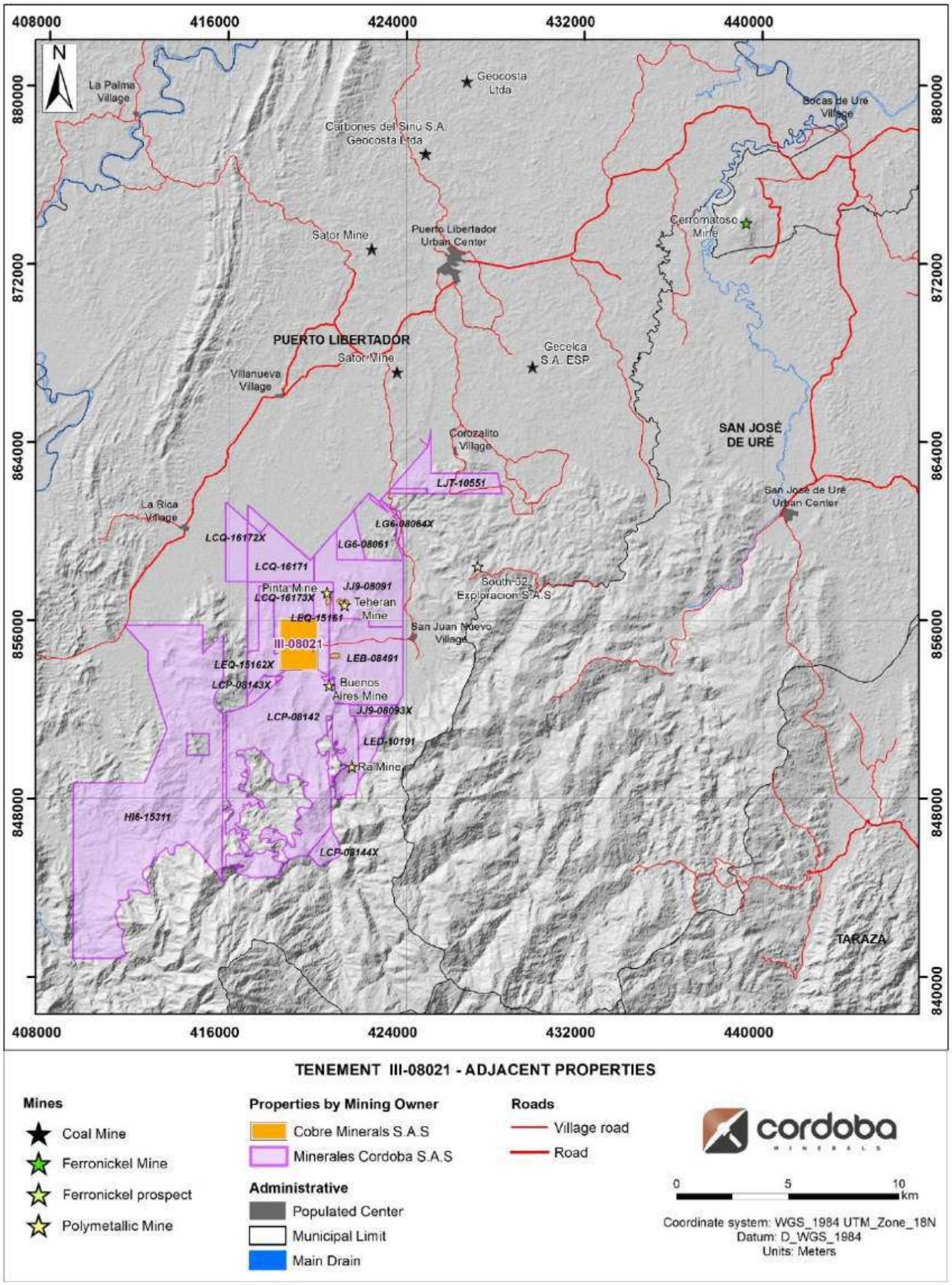
In the area, there are also the ferronickel mining operations of Cerro Matoso, as well as coal operations of the Sator, Carbomas, and Geocosta Ltda. companies, and the projection of the Gecelca Mine, which proposes construction of a new thermoelectric plant in the Municipality of Puerto Libertador.

Table 23.1 – Mining Properties Adjacent to the Mining Title III-08021

Mining Title	Area (ha)	Mining Registration Date	Holder	Stage	Minerals
L853005	35,521.23	1999-08-02	Cerro Matoso S.A.	Exploration	Nickel ores and their concentrates
JDF-16002X	3,366.14	2008-06-18	Gecelca S.A. E.S.P.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
FKG-107	1,105.75	2005-08-31	Geocosta Ltda.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
FIN-104	1,368.31	2005-08-11	Carbones del Sinú S.A.; Geocosta Ltda.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
GD4-121	442.84	2007-03-01	Sator S.A.S.	Exploitation	Thermal coal
4676	10,000.02	1990-06-05	Sator S.A.S.	Exploitation	Thermal coal
HBA-122	4,344.50	2012-12-10	South32 Exploration S.A.S.	Exploration	Nickel ores and their concentrates
GI9-159	1,593.92	2010-05-05	South32 Exploration S.A.S.	Exploration	Nickel ores and their concentrates

Source: Cordoba, 2023

Figure 23.1 – Projects Adjacent to the Mining Title III-08021



Source: Cordoba, 2023

24 OTHER RELEVANT DATA AND INFORMATION

24.1 Project Schedule

A resource-loaded Level 3 Project schedule was developed for the Project, using the capital cost estimate as the basis for on-site man-hours to establish activity durations.

Figure 24.1 presents a Construction Summary Schedule (Level 1) for the Alacran Project.

The Project implementation schedule includes the main engineering, procurement and construction activities. The information contained in the schedule is derived from information taken from supplier quotes or in-house databases. The schedule presents the total duration of the Project considering Project financing and environmental authorizations for construction are both available.

Long lead delivery equipment and manufacturing capacity for specific types of equipment (eg: mills, mining equipment, others) need to be considered to foresee the overall Project duration.

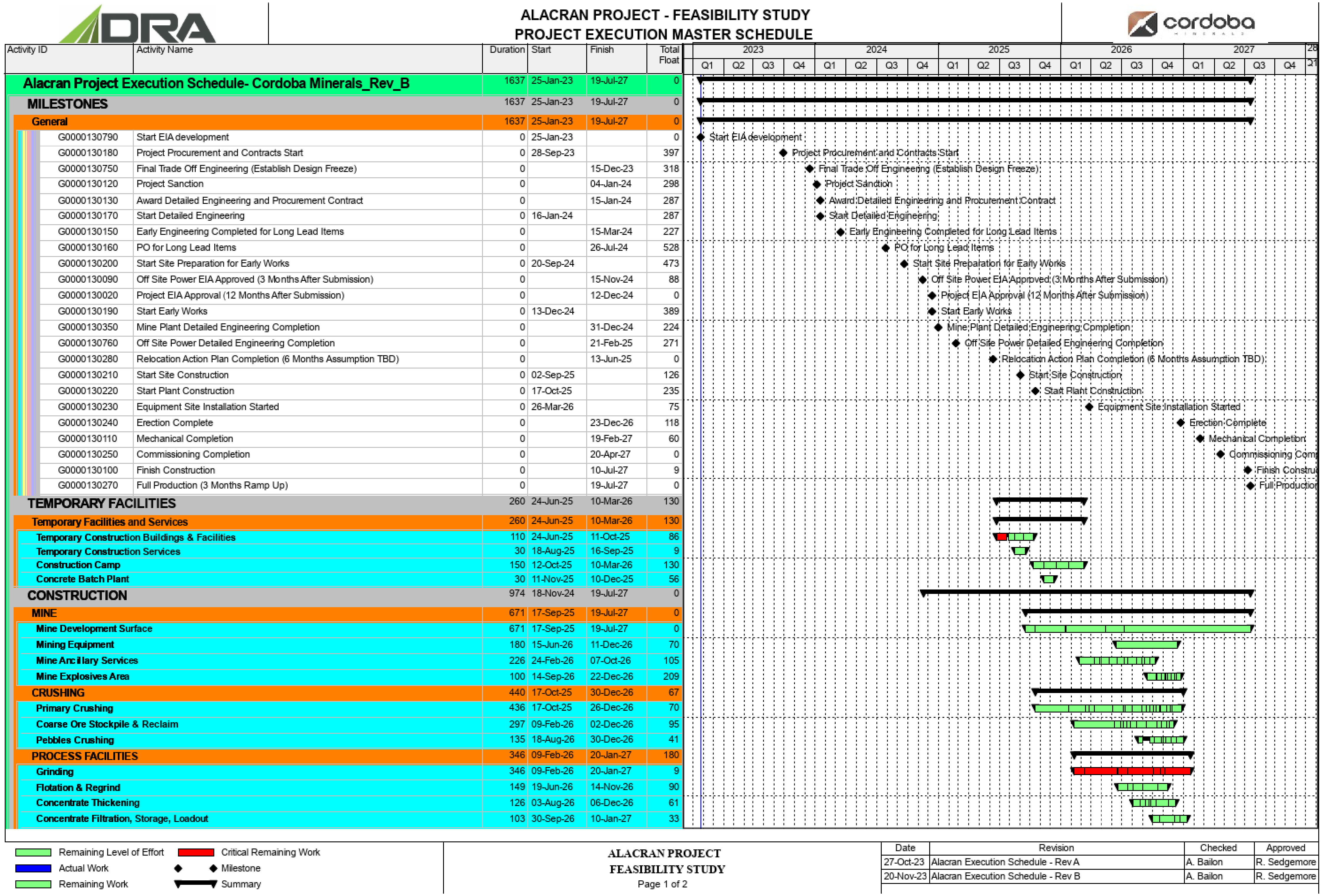
Emphasis should be placed on:

- Advanced procurement of long lead process equipment items.
- Infrastructure and site preparation engineering to satisfy pre-stripping and construction phases.

The scheduling objective is to deliver a fully constructed and commissioned facility per the following timeline guidelines:

- Timeline based on achieving ramp up to 100% production capacity within first year of operation.
- Timeline linked to both mining-related activities and surface operations in both sequencing and duration. Construction of the main plant buildings and supporting infrastructure is critical path.

Figure 24.1 – Construction Summary Schedule



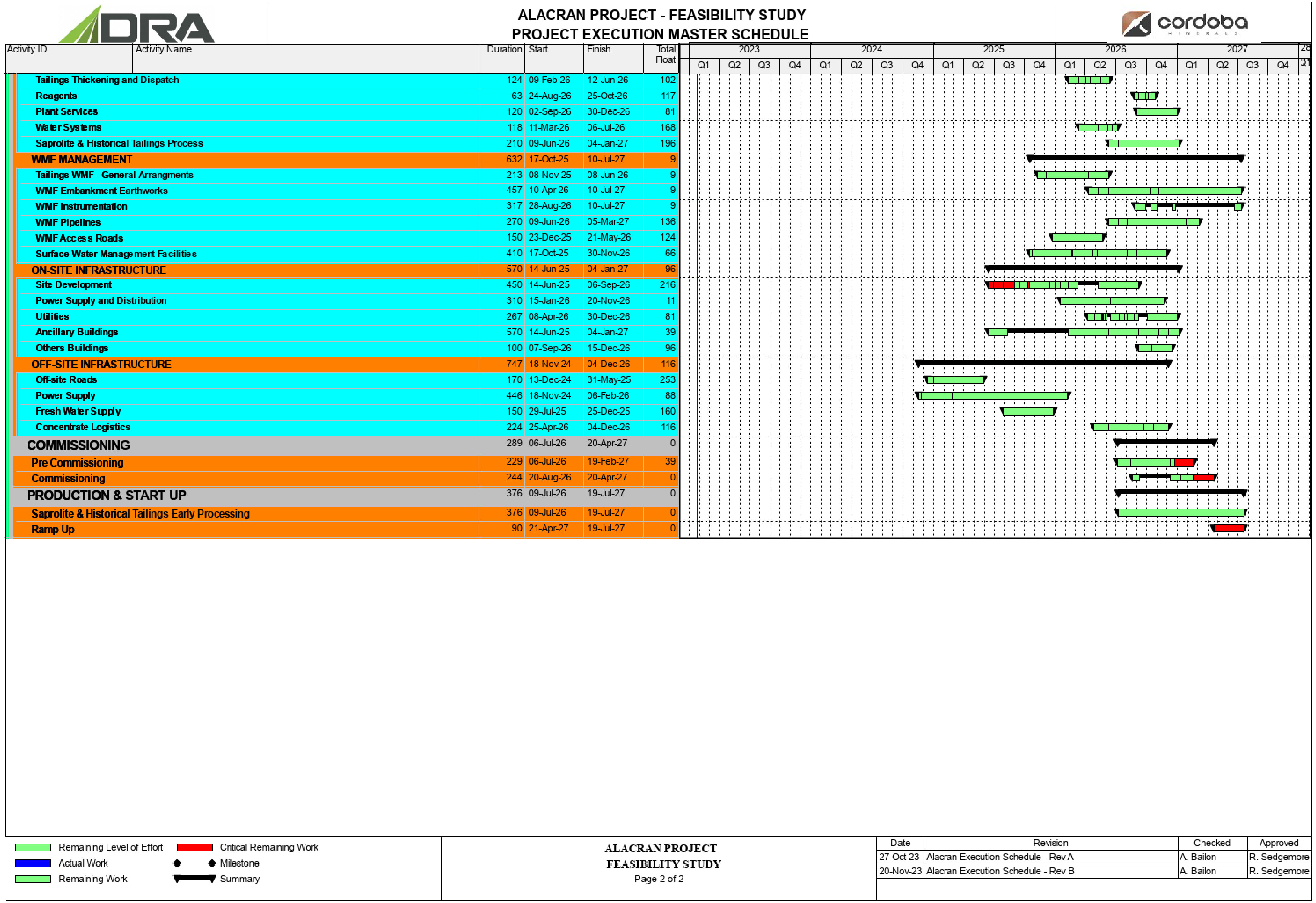
ALACRAN PROJECT - FEASIBILITY STUDY
PROJECT EXECUTION MASTER SCHEDULE

Activity ID	Activity Name	Duration	Start	Finish	Total Float
Alacran Project Execution Schedule- Cordoba Minerals_Rev_B		1637	25-Jan-23	19-Jul-27	0
MILESTONES		1637	25-Jan-23	19-Jul-27	0
General		1637	25-Jan-23	19-Jul-27	0
G0000130790	Start EIA development	0	25-Jan-23		0
G0000130180	Project Procurement and Contracts Start	0	28-Sep-23		397
G0000130750	Final Trade Off Engineering (Establish Design Freeze)	0		15-Dec-23	318
G0000130120	Project Sanction	0		04-Jan-24	298
G0000130130	Award Detailed Engineering and Procurement Contract	0		15-Jan-24	287
G0000130170	Start Detailed Engineering	0	16-Jan-24		287
G0000130150	Early Engineering Completed for Long Lead Items	0		15-Mar-24	227
G0000130160	PO for Long Lead Items	0		26-Jul-24	528
G0000130200	Start Site Preparation for Early Works	0	20-Sep-24		473
G0000130090	Off Site Power EIA Approved (3 Months After Submission)	0		15-Nov-24	88
G0000130020	Project EIA Approval (12 Months After Submission)	0		12-Dec-24	0
G0000130190	Start Early Works	0	13-Dec-24		389
G0000130350	Mine Plant Detailed Engineering Completion	0		31-Dec-24	224
G0000130760	Off Site Power Detailed Engineering Completion	0		21-Feb-25	271
G0000130280	Relocation Action Plan Completion (6 Months Assumption TBD)	0		13-Jun-25	0
G0000130210	Start Site Construction	0	02-Sep-25		126
G0000130220	Start Plant Construction	0	17-Oct-25		235
G0000130230	Equipment Site Installation Started	0	26-Mar-26		75
G0000130240	Erection Complete	0		23-Dec-26	118
G0000130110	Mechanical Completion	0		19-Feb-27	60
G0000130250	Commissioning Completion	0		20-Apr-27	0
G0000130100	Finish Construction	0		10-Jul-27	9
G0000130270	Full Production (3 Months Ramp Up)	0		19-Jul-27	0
TEMPORARY FACILITIES		260	24-Jun-25	10-Mar-26	130
Temporary Facilities and Services		260	24-Jun-25	10-Mar-26	130
Temporary Construction Buildings & Facilities		110	24-Jun-25	11-Oct-25	86
Temporary Construction Services		30	18-Aug-25	16-Sep-25	9
Construction Camp		150	12-Oct-25	10-Mar-26	130
Concrete Batch Plant		30	11-Nov-25	10-Dec-25	56
CONSTRUCTION		974	18-Nov-24	19-Jul-27	0
MINE		671	17-Sep-25	19-Jul-27	0
Mine Development Surface		671	17-Sep-25	19-Jul-27	0
Mining Equipment		180	15-Jun-26	11-Dec-26	70
Mine Ancillary Services		226	24-Feb-26	07-Oct-26	105
Mine Explosives Area		100	14-Sep-26	22-Dec-26	209
CRUSHING		440	17-Oct-25	30-Dec-26	67
Primary Crushing		436	17-Oct-25	26-Dec-26	70
Coarse Ore Stockpile & Reclaim		297	09-Feb-26	02-Dec-26	95
Pebbles Crushing		135	18-Aug-26	30-Dec-26	41
PROCESS FACILITIES		346	09-Feb-26	20-Jan-27	180
Grinding		346	09-Feb-26	20-Jan-27	9
Flotation & Regrind		149	19-Jun-26	14-Nov-26	90
Concentrate Thickening		126	03-Aug-26	06-Dec-26	61
Concentrate Filtration, Storage, Loadout		103	30-Sep-26	10-Jan-27	33

🟩 Remaining Level of Effort
🟦 Actual Work
🟩 Remaining Work
🟥 Critical Remaining Work
◆ ◆ Milestone
▼▬▼ Summary

ALACRAN PROJECT
FEASIBILITY STUDY
Page 1 of 2

Date	Revision	Checked	Approved
27-Oct-23	Alacran Execution Schedule - Rev A	A. Bailon	R. Sedgemore
20-Nov-23	Alacran Execution Schedule - Rev B	A. Bailon	R. Sedgemore



ALACRAN PROJECT - FEASIBILITY STUDY
PROJECT EXECUTION MASTER SCHEDULE

Activity ID	Activity Name	Duration	Start	Finish	Total Float
	Tailings Thickening and Dispatch	124	09-Feb-26	12-Jun-26	102
	Reagents	63	24-Aug-26	25-Oct-26	117
	Plant Services	120	02-Sep-26	30-Dec-26	81
	Water Systems	118	11-Mar-26	06-Jul-26	168
	Saprolite & Historical Tailings Process	210	09-Jun-26	04-Jan-27	196
	WMF MANAGEMENT	632	17-Oct-25	10-Jul-27	9
	Tailings WMF - General Arrangments	213	08-Nov-25	08-Jun-26	9
	WMF Embankment Earthworks	457	10-Apr-26	10-Jul-27	9
	WMF Instrumentation	317	28-Aug-26	10-Jul-27	9
	WMF Pipelines	270	09-Jun-26	05-Mar-27	136
	WMF Access Roads	150	23-Dec-25	21-May-26	124
	Surface Water Management Facilities	410	17-Oct-25	30-Nov-26	66
	ON-SITE INFRASTRUCTURE	570	14-Jun-25	04-Jan-27	96
	Site Development	450	14-Jun-25	06-Sep-26	216
	Power Supply and Distribution	310	15-Jan-26	20-Nov-26	11
	Utilities	267	08-Apr-26	30-Dec-26	81
	Ancillary Buildings	570	14-Jun-25	04-Jan-27	39
	Others Buildings	100	07-Sep-26	15-Dec-26	96
	OFF-SITE INFRASTRUCTURE	747	18-Nov-24	04-Dec-26	116
	Off-site Roads	170	13-Dec-24	31-May-25	253
	Power Supply	446	18-Nov-24	06-Feb-26	88
	Fresh Water Supply	150	29-Jul-25	25-Dec-25	160
	Concentrate Logistics	224	25-Apr-26	04-Dec-26	116
	COMMISSIONING	289	06-Jul-26	20-Apr-27	0
	Pre Commissioning	229	06-Jul-26	19-Feb-27	39
	Commissioning	244	20-Aug-26	20-Apr-27	0
	PRODUCTION & START UP	376	09-Jul-26	19-Jul-27	0
	Saprolite & Historical Tailings Early Processing	376	09-Jul-26	19-Jul-27	0
	Ramp Up	90	21-Apr-27	19-Jul-27	0

🟩 Remaining Level of Effort
🟥 Critical Remaining Work
🟦 Actual Work
◆ Milestone
🟩 Remaining Work
Summary

ALACRAN PROJECT
FEASIBILITY STUDY
Page 2 of 2

Date	Revision	Checked	Approved
27-Oct-23	Alacran Execution Schedule - Rev A	A. Bailon	R. Sedgemore
20-Nov-23	Alacran Execution Schedule - Rev B	A. Bailon	R. Sedgemore

Source: DRA, 2023

The Project schedule is based on the following assumptions:

- The schedule includes activities / durations of: permits, engineering, procurement, construction, pre-commissioning, commissioning and start-up of plant and infrastructure for the Project.
- Full Project financing will be approved at the end of the FS.
- Environmental permit approval allows only initiation of activities to improve the external access road to the mine complex.
- Relocation action plan process will take six months following the approval of Project EIA.
- At FS, the contracting plan considers only an EP contract to start with detail engineering at the beginning of 2024, leaving a CM contract for a future definition by the Owner.
- The dry season lasts for four months (December to March), and major earthworks and construction are planned during this time. Rain will be continuous during the year.
- Approval of the Project EIA is planned 12 months after submission.
- Approval of EIA for off-site power is planned three months after submission, per Tungsten’s schedule.
- Cordoba will have all permits and authorizations for start of construction activities, without delaying critical path.
- Detailed engineering will start the day after award of EP contract.
- Early works (access road and relocation action plan) will be performed in Year -1.
- Delivery times (manufacturing and delivery durations) are based on supplier submissions for almost all mechanical, electrical and control equipment / materials.
- Period to reach full production in the process plant (ramp-up) will be three months.

24.2 Project Execution Plan

The purpose of the Project Execution Plan (PEP) is to describe Project development strategies considered for the capital cost estimate and Project schedule, and to provide the future framework for organizing engineering, procurement, and construction management (EPCM) phases.

The Project will be managed by an EPCM team to direct the Project activities. Various engineering companies and contractors will be appointed to assist the EPCM team with the work.

Procurement of equipment and site works will be integrated with the design and fabrication planning to ensure an executable construction supply chain is accurate and established.

The Project commissioning plan will be developed by the EPCM team and Cordoba with support from contractors. Cordoba operational personnel will take gradual ownership of the facilities as they are completed, electrified and commissioned. An Operational Readiness Plan will be developed by the EPCM team in collaboration with Cordoba.

It is critical to commence certain design work before the formal start of the Project, to start the long-term delivery procurement activities, and advance site work to proceed with the permitting process. This will ensure that the Project advances on schedule when formal kickoff takes place.

The PEP is based on the following principles:

- Promote safety in design, construction, and operations;
- Use fit-for-purpose designs, constructions, and operations;
- Build permanent infrastructure early where possible to minimize temporary construction costs;
- Negotiate procurement and contracts with suppliers and contractors;
- Eliminate surplus management overhead and Project oversight;
- Deliver on time and on budget;
- Ensure alignment with environmental compliance;
- Ensure compliance with all applicable municipal, departmental, and national regulations;
- Ensure positive economic impacts for Colombia, including the use of local businesses wherever feasible, employment of local residents and tax benefits for local governments;
- Maintain a high level of engagement and communication with all stakeholders; and
- Meet design parameter objectives, throughput, quality, and operating budget objectives.

24.2.1 PROJECT EXECUTION LOCATIONS

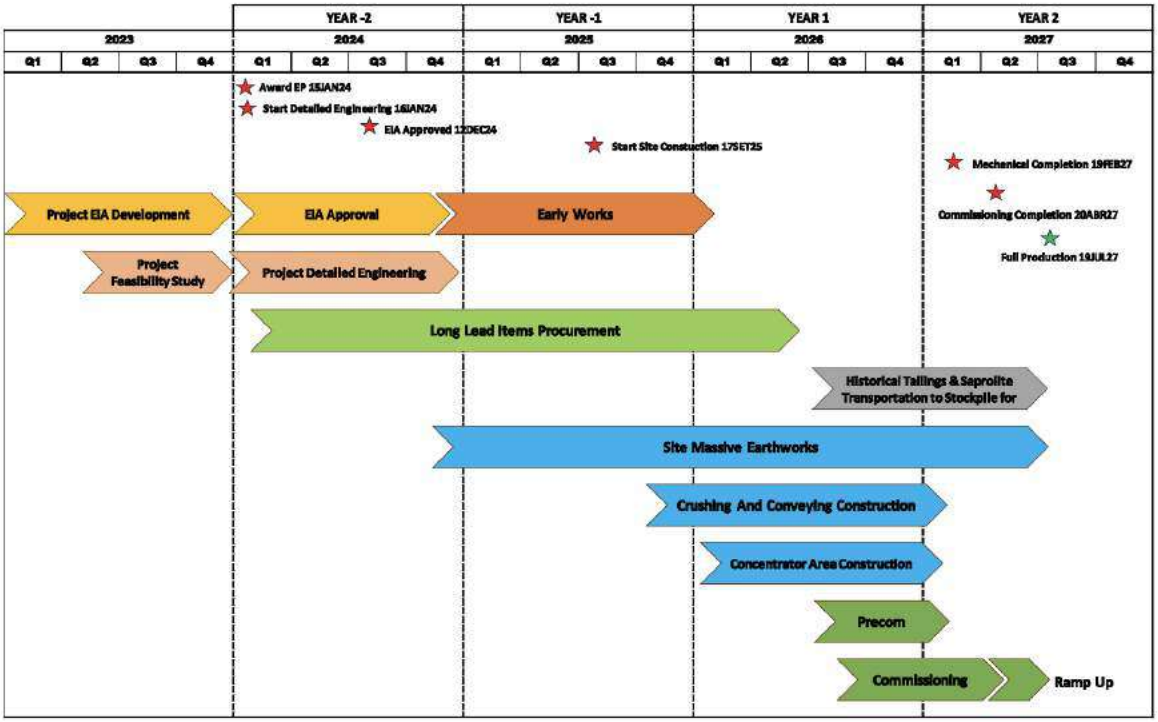
Cordoba currently operates a corporate office in Medellín; a Project office in Medellín during the EPCM stages of the Project is also planned. Detailed engineering and procurement will be performed by firms specializing in mining and milling projects, and much of the work will be performed outside of Colombia. An EPCM contract will be awarded to oversee engineering, procurement, and construction management.

In the field, during Early Works two temporary camps will be established followed by a permanent camp that will also house and accommodate workers during the construction phase.

24.2.2 PROJECT SUMMARY SEQUENCE

The Project sequence is illustrated in Figure 24.2.

Figure 24.2 – Project Summary Sequence



Source: DRA, 2023

24.2.3 PROJECT MANAGEMENT

24.2.3.1 *Organization and Responsibilities*

The Project Management Team will be an integrated team which comprises Owner's personnel, EPCM Contractor, and various sub-contractors. This team will oversee and direct all engineering, procurement, and construction activities for the Project.

Overall delivery of the Project to the defined metrics will be the responsibility of Cordoba.

The EPCM Project Manager will be responsible for execution of Project activities, including detailed engineering, procurement, logistics, construction, commissioning, and project controls.

24.2.3.2 *Engineering Team*

An assigned Engineering Manager will oversee, coordinate, and integrate engineering activities. The multi-disciplinary engineering team will comprise personnel from various engineering sub-contractors, who will develop the detailed Project designs and specifications, and then transition to the field to provide quality assurance (QA), field engineering, and commissioning support.

24.2.3.3 *Procurement Team*

An assigned Procurement Manager will oversee and manage procurement activities undertaken by engineering contractors (formation and administration of engineering and construction contracts will be overseen and managed by a Contracts Manager). The procurement/logistics team will use the engineering design packages to obtain competitive tenders, and secure vendors and construction contractors to provide the appropriate goods and services.

24.2.3.4 *Logistics Team*

A Logistics/Materials Manager will oversee and coordinate all logistics activities. The logistics team will determine and coordinate the best methods for movement of materials, equipment, and people to, from, and at the Project site.

24.2.3.5 *Construction Management Team*

A Construction Manager will lead the construction management team and be responsible for construction safety, progress, and quality. This team will coordinate and manage all site activities to ensure construction progresses on schedule and within budget.

24.2.3.6 *Commissioning Team*

A Commissioning Manager will oversee the commissioning team and be responsible for timely handover of process and infrastructure systems to the Owner once construction activities are substantially complete. The commissioning team will be supported by discipline engineering resources to complete pre-commissioning activities and obtain technical acceptance and transfer care, custody, and control of completed systems to the Owner.

24.2.3.7 *Project Controls Team*

A Project Controls Manager will oversee the Project Controls team, and be responsible for the development, implementation, and administration of the processes and tools for project estimating, cost control, planning, scheduling, change management, progressing, and forecasting.

24.2.4 ENGINEERING

The engineering execution strategy will be to utilize multiple engineering firms with specialized knowledge of their assigned scope. Coordination of engineering interfaces and overall management of engineering schedule and deliverables will be the responsibility of the Engineering Manager. The following major engineering contract packages are identified for the Project:

- Detailed engineering and procurement of process facilities and select on-site infrastructure and field engineering support;
- Detailed engineering of WMF, and associated water diversion structures;
- Site access road engineering support;
- Major earthworks, civils, and concrete;
- Wastewater treatment plant design;
- Hydrological characterization;
- Geochemical analysis;
- Water balance design; and
- Power transmission line detailed design.

24.2.5 PROCUREMENT AND CONTRACTING

24.2.5.1 Procurement Execution Strategy

The procurement execution strategy will involve utilizing known suppliers, with a preference for local or regional suppliers and construction contractors. The Procurement Manager will have overall responsibility for most of the pre-purchased procurement and contract formation activities. Contract administration will be the responsibility of the EPCM Contracts Manager.

A competitive bidding process will be applied to achieve the best commercial and technical results. During the Project setup phase, any preferred vendors will be identified, and sole source strategies implemented into the procurement plan where applicable. Local involvement will form part of the bid evaluation scoring criteria, to give preference for local suppliers and contractors in Colombia.

The level of vendor quality surveillance/inspection for each package will be established during bid evaluations and will be determined by evaluating a supplier’s ability to achieve suitable quality according to specifications and Project quality assurance requirements.

24.2.5.2 Schedule and Critical Activities

Major procurement will occur in 2024 and early 2025. Procurement activities will be prioritized to schedule critical items, both due to fabrication/delivery time of the equipment (such as the grinding mill package and other processing equipment) and due to the necessity to obtain certified vendor data to complete engineering designs. Table 24.1 presents the long lead packages for the Project.

Table 24.1 – Long Lead Equipment Packages

Pkg	Description	Lead Time (ARO, weeks)	Ex works / FCA / CIF	Shipping (days)	Origin
M-001	SAG and Ball Mills	52	300	60	China
M-002	Pebble Crusher	52	300	60	China
M-003	Jaw Crusher	52	300	60	China
M-004	Rock Breaker	22	120	30	Chile
M-005	Apron Feeders	45	252	60	China
M-006	Conveyors	78	480	60	China
M-009	Electromagnets	30	210	0	Brazil
M-010A	Jameson Cells	48	273	60	Vietnam & Australia
M-010	Flotation Cells	47	266	60	China & Europe
M-011	Hydrocyclones	51	294	60	China
M-012	Bridge Crane	23	140	15	Colombia
M-013	Concentrate Thickener	49	280	60	China & India
M-014	Regrind Mill	52	300	60	China
M-015	Concentrate Filter	35	180	60	Peru
M-016	Lime Plant	40	245	30	Peru
M-017	Knelson Gravity Concentrators	36	186	60	China & USA
M-019	Vibrating Screens	36	217	30	Brazil
E-004	Prefabricated Electrical Rooms	56	360	30	Peru

Note: Lead time includes marine transport to Barranquilla port
Source: DRA, 2023

24.2.5.3 *Logistics and Material Management*

The logistics strategy for the Project is as follows:

- Ensure expediting activities achieve the Project schedule requirements;
- Manage freight movement on a global basis to maximize leveraging of freight tonnages / volumes to optimize cost associated with the movement of freight; and
- Identify and optimize various aspects such as logistics, customs clearance, and local content.

International freight will be shipped into the Barranquilla port. From the port, goods will be transported via road. Domestic goods are expected to originate within a 200 km radius of the site, based on the distance to the closest major city of Medellín. All road transport is on paved road to the town of Puerto Libertador, with the exception of the site access road, which will be constructed with a gravel surface until Year -1 of operations.

The following considerations, based on a general road survey between the Barranquilla and site, will be made in the design of shipping units, or when considering any pre-assembly opportunities.

- Maximum width: 5.90 m;
- Maximum height: 4.85 m;
- Maximum length: 18.29 m; and
- Maximum weight: 60 t including truck and trailer.

Early in the construction phase, before the main access road is widened and graded, small quantities of freight will need to be mobilized to the Project, including temporary facilities and a mobile aggregate crusher. Transportation of this freight may require the assistance of tracked equipment.

International freight will be containerized to the greatest extent possible to reduce port and yard handling fees, and to expedite offloading at site.

Pre-assembly strategies reduce overall site man-hours and the associated indirect costs but require more careful engineering and logistics planning. The following are identified for pre- assembly:

- Electrical houses;
- Fuel tanks;
- Water and process tanks (up to 5m diameter);
- Fuel loading/unloading station;
- Conveyors (shipped in prefabricated lengths); and
- Transfer towers, braced frames, and stair towers.

The strategy for site materials control is as follows:

- Control and supervise materials movement at site through materials/inventory control from receiving, preservation, inventory, and free issue to contractor to meet Project requirements for procured equipment and materials (process equipment, as an example).
- Leverage contractor methods and procedures for receipt, storage, and retrieval of materials procured within the scope of work.
- Utilize a common labour pool for warehouse and laydown staff (equipment operators & labourers) for management and movement of freight, except for items requiring special handing or rigging (such as structural steel).
- Utilize a single temporary warehouse to be used for the receipt and storage of all equipment requiring protection from rain in a controlled indoor storage. Equipment and material that do not require climate-controlled storage will be stored in uncovered laydown areas at the construction

site. Use of sea containers and/or temporary shelters will be required to store goods that need to be protected from the environment.

24.2.6 CONSTRUCTION

The main objectives of the construction execution plan include:

- Execute all activities with a goal of zero harm to people, assets, environment, or reputation;
- Strive to eliminate process, operational and maintenance safety hazards;
- Meet or exceed environmental regulatory and permit requirements to minimize impact;
- Deliver a high-quality facility that meets or exceeds the defined Project goals;
- Establish / maintain high level of motivation by providing a positive working environment for all personnel;
- Identify and remove barriers that impede Project progress;
- Cultivate an atmosphere of positive social impact in the surrounding communities; and
- Identify outstanding achievements during construction and commissioning of the Project.

During the construction phase, the Project Manager will be responsible for surface construction areas. The Construction Manager and Owner’s General Manager will closely coordinate site activities, and responsibilities will be separated by area (eg: open pit mine).

24.2.6.1 Construction Management

The Construction Manager will be responsible for construction contractor oversight.

A comprehensive Safety Management Plan will be developed prior to site mobilization, which will address overall safety policies, procedures, and standards, including standard operating practices and emergency response plans.

Construction quality will be managed through the implementation of a Site Quality Management Plan (SQMP), which will detail site quality management systems for all construction activities. The SQMP encompasses all activities of the Project, including design, procurement, and construction.

24.2.7 COMMISSIONING

24.2.7.1 Commissioning Methodology

Progressive commissioning for the Project will be performed by subsystem. A system will be defined as a logical grouping of equipment or systems that can be placed in service by itself or in sequence that contribute to a common purpose or functionality. Wherever possible, facilities will be commissioned early in the development schedule and turned over to Cordoba for ownership and operation. A detailed Commissioning Plan will be developed during detailed engineering.

24.2.7.2 Commissioning Safety and Training

The Health, Safety, and Environmental (HSE) Plan developed during execution will address specific safety procedures that will apply during the commissioning phase of the Project. The commissioning and turnover phase presents significant and unique safety risks. A comprehensive lock-out tag-out program is an effective control to manage these risks.

24.2.7.3 Commissioning Stages

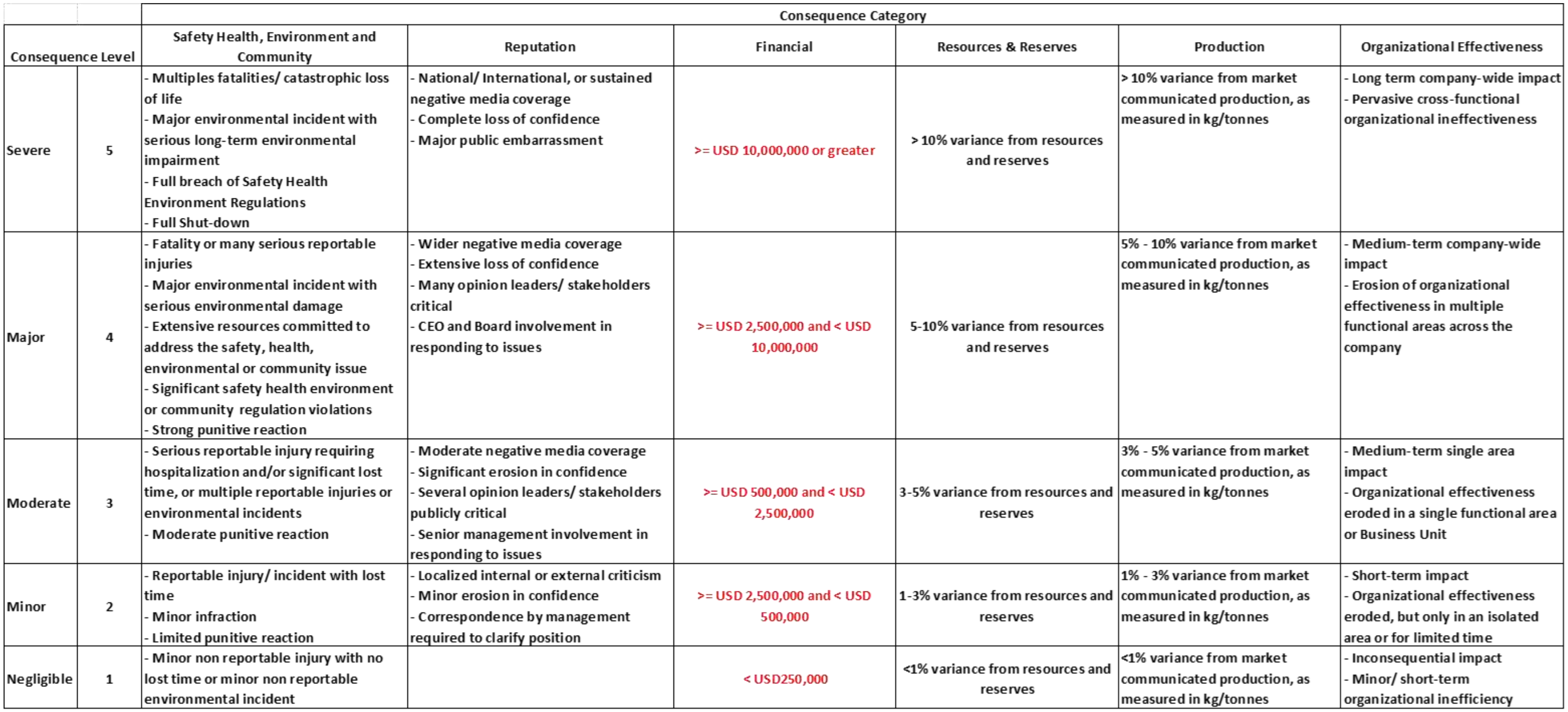
- ***Stage 1 - Construction Release****:* Construction contractor completes a system subject to agreed punch list items.
- ***Stage 2 - Pre-Operational Equipment Testing****:* Energize and test individual equipment within subsystems to ensure functionality; includes equipment functionality tests controlled by Plant Control System (signed off loop diagrams).
- ***Stage 3 - Pre-Operational Systems Testing****:* Systems tested with water, air and inert materials, and capable of continuous and safe operation with all instrumentation connected, control system operational, and all interlocks functional.
- ***Stage 4 - Ore Commissioning****:* Plant ready to accept ore and all operating and maintenance staff fully trained to operate and maintain plant; individual systems operate successfully under load for a defined period of time.
- ***Stage 5 - Ramp-Up****:* Increase ore feed to design throughput rate.

24.3 Risk Assessment

DRA completed a Project risk analysis in conjunction with BBA, K2, Tungsten Associates, Blue Coast Research, INTERA, Knight Piésold, and Cordoba.

DRA provided each QP with a semi-quantitative risk matrix where each risk item was assigned levels of likelihood and consequence, which when combined generate an overall risk rating for each item (more detail provided in Figure 24.3, Figure 24.4, and Figure 24.5). This approach provided a standardized approach to generation of risk ratings. Each QP worked independently and reported back to DRA their findings. The compiled findings were discussed as a group during a workshop on 06 September 2023 in Lima, Peru and subsequently summarized, including possible mitigation strategies.

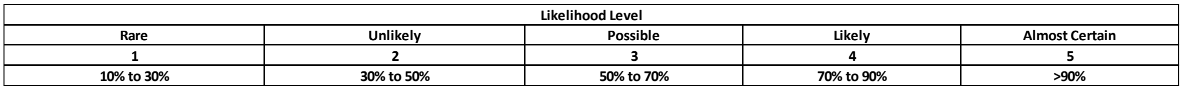
Figure 24.3 - Consequence Matrix



		Consequence Category					
Consequence Level		Safety Health, Environment and Community	Reputation	Financial	Resources & Reserves	Production	Organizational Effectiveness
Severe	5	- Multiples fatalities/ catastrophic loss of life - Major environmental incident with serious long-term environmental impairment - Full breach of Safety Health Environment Regulations - Full Shut-down	- National/ International, or sustained negative media coverage - Complete loss of confidence - Major public embarrassment	>= USD 10,000,000 or greater	> 10% variance from resources and reserves	> 10% variance from market communicated production, as measured in kg/tonnes	- Long term company-wide impact - Pervasive cross-functional organizational ineffectiveness
Major	4	- Fatality or many serious reportable injuries - Major environmental incident with serious environmental damage - Extensive resources committed to address the safety, health, environmental or community issue - Significant safety health environment or community regulation violations - Strong punitive reaction	- Wider negative media coverage - Extensive loss of confidence - Many opinion leaders/ stakeholders critical - CEO and Board involvement in responding to issues	>= USD 2,500,000 and < USD 10,000,000	5-10% variance from resources and reserves	5% - 10% variance from market communicated production, as measured in kg/tonnes	- Medium-term company-wide impact - Erosion of organizational effectiveness in multiple functional areas across the company
Moderate	3	- Serious reportable injury requiring hospitalization and/or significant lost time, or multiple reportable injuries or environmental incidents - Moderate punitive reaction	- Moderate negative media coverage - Significant erosion in confidence - Several opinion leaders/ stakeholders publicly critical - Senior management involvement in responding to issues	>= USD 500,000 and < USD 2,500,000	3-5% variance from resources and reserves	3% - 5% variance from market communicated production, as measured in kg/tonnes	- Medium-term single area impact - Organizational effectiveness eroded in a single functional area or Business Unit
Minor	2	- Reportable injury/ incident with lost time - Minor infraction - Limited punitive reaction	- Localized internal or external criticism - Minor erosion in confidence - Correspondence by management required to clarify position	>= USD 2,500,000 and < USD 500,000	1-3% variance from resources and reserves	1% - 3% variance from market communicated production, as measured in kg/tonnes	- Short-term impact - Organizational effectiveness eroded, but only in an isolated area or for limited time
Negligible	1	- Minor non reportable injury with no lost time or minor non reportable environmental incident		< USD250,000	<1% variance from resources and reserves	<1% variance from market communicated production, as measured in kg/tonnes	- Inconsequential impact - Minor/ short-term organizational inefficiency

Source: DRA, 2023

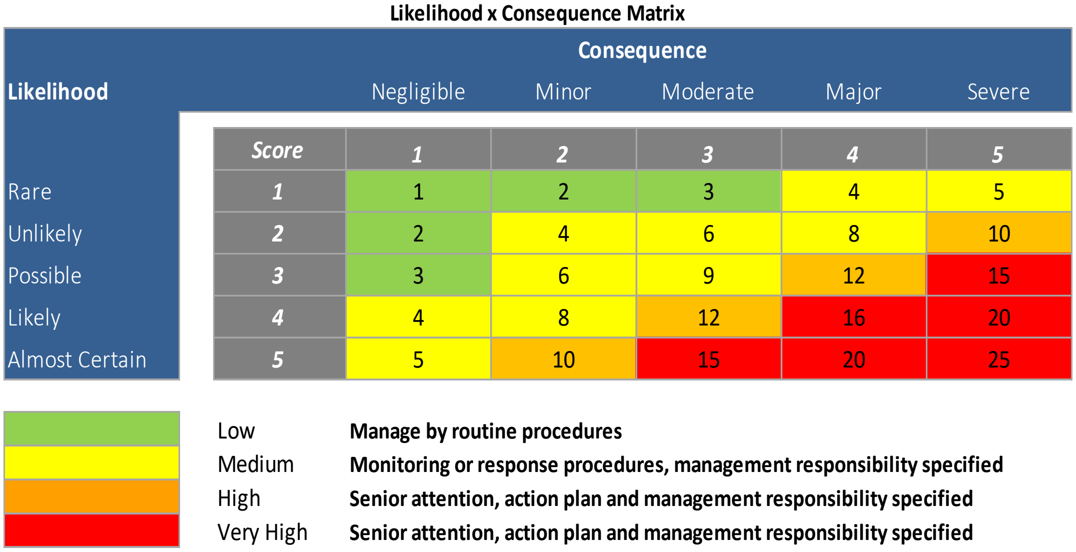
Figure 24.4 – Likelihood Level



Likelihood Level				
Rare	Unlikely	Possible	Likely	Almost Certain
1	2	3	4	5
10% to 30%	30% to 50%	50% to 70%	70% to 90%	>90%

Source: DRA, 2023

Figure 24.5 – Likelihood x Consequence



Likelihood x Consequence Matrix

Likelihood		Consequence				
		Negligible	Minor	Moderate	Major	Severe
	Score	1	2	3	4	5
Rare	1	1	2	3	4	5
Unlikely	2	2	4	6	8	10
Possible	3	3	6	9	12	15
Likely	4	4	8	12	16	20
Almost Certain	5	5	10	15	20	25

🟩	Low	**Manage by routine procedures**
🟨	Medium	**Monitoring or response procedures, management responsibility specified**
🟧	High	**Senior attention, action plan and management responsibility specified**
🟥	Very High	**Senior attention, action plan and management responsibility specified**

Source: DRA, 2023

24.3.1 RISKS

The risk analysis established 142 risks and associated potential mitigations. As shown in Table 24.2 – Risks According to Primary Consequence Category, most (75%) of the risks are related to Safety, Health, Environment & Community and Financial/Cost issues.

Table 24.2 – Risks According to Primary Consequence Category

Primary Consequence Category	Number of Risk Items
Safety, Health, Environment & Community	55
Financial / Costs	52
Production	23
Reputation	7
Delays in Schedule	3
Organizational Effectiveness	2
Total	**142**

Source: DRA, 2023

Table 24.3 shows that, once response action plans are initiated, the number of “Very High” and “High” risk items is reduced from 84 to 22, with only three risks left in the “Very High” category.

Table 24.3 – Pre- and Post-Response Risk Ratings

Risk Rating	Pre-Response Risk Items	Post-Response Risk Items
Very High risk	40	3
High	44	19
Medium	54	101
Low	4	19
Total	**142**	**142**

Source: DRA, 2023

Details of the 22 risks that remain in the “Very High” and “High” categories after the respective action plans have been initiated can bee seen in Table 24.4.

Table 24.4 – Risk Items with Very High and High Post-Response Ratings

Root Cause and Risk Description	Probable Consequence Description	Primary Consequence Category	Pre-Response Risk Rating	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Delays caused by communities or illegal miners (roads blocking); logistical delays and difficulties to access site.	Overall project delays and increased cost	Safety, Health, Environment & Community	20	Cordoba to communicate, educate and work with all social, government, community, stakeholders, and assume full responsibility	Severe	Likely	20
Relocation settlement and agreement by the community to the terms for relocation.	Overall project delays and increased cost	Safety, Health, Environment & Community	20	Cordoba to communicate, educate and work with all social, government, community, stakeholders, and assume full responsibility	Severe	Possible	15
The area selected for the WMF is suitable. However, there could be ANLA acceptance issues to build the facility due to several reasons or perceptions.	1. Inability to use land 2. Project delay 3. Financial impacts - Unbudgeted costs 4. Site selection studies to be undertaken	Reputation	15	Communicate and educate on the benefit	Severe	Possible	15
Delays caused by river floods during construction phase	Overall project delays and increased cost	Financial/ Costs	20	Ensure design can handle intake, warning systems, operational procedures	Major	Possible	12
Delays in earthworks due to heavy rains season extension	Overall project delays and increased cost	Financial/ Costs	20	Schedule, management, optimize plan and workforce, execution & deliver, flexibility, ensure design can handle intake, warning systems, operational procedures	Major	Possible	12
Variability of the ore, recovery or concentrate specifications	Lower recovery than expected affecting project returns	Financial/ Costs	20	GMU, domaining, blending	Major	Possible	12
Commodity pricing: — This Project is exposed to commodity pricing on the world markets, and likely shows its greatest sensitivity to commodity pricing.		Financial/ Costs	20	Off take agreement, forward selling, Hedging strategies	Moderate	Likely	12

Source: DRA, 2023

Root Cause and Risk Description	Probable Consequence Description	Primary Consequence Category	Pre-Response Risk Rating	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Investigate concerns with long lead times required for the purchase/lease of the major mobile equipment.	Delays in schedule	Financial/ Costs	20	Timing to start the equipment, secure payment/delivery schedule, locking in a portion of the fleet and mills, contractors during FS and detailed engineering with a deposit, access, logistics are tied in	Major	Possible	12
Life risk due to electrical storms and lightning	Overall project delays and increased cost	Financial/ Costs	16	Advanced warning of storms, operational procedures, lighting rods, grounding, BAT, best practises, training	Major	Possible	12
Project Finance	Project delay	Financial/ Costs	16	Owner to prepare plan.	Major	Possible	12
Delay in approval of EIA. 1.Evaluation process and approval of Environmental and Social Impact Assessment (ESIA) might take longer than expected 2. Autoridad Nacional de Licencias Ambientales (ANLA) decision influenced by Political Campaign / Environmentalists in Public Hearing 3. Elections?	1. Delay in construction start up 2. Quality of execution works 3. Revisit project execution schedule 4. Project stoppage	Reputation	15	Manage relationship, educate agency on benefits of design of WMF, demonstrate compliance co disposal of tailings and waste, bench mark Marmamato, 8-month timeline submission to approval	Major	Possible	12
As with all resource development projects there is an inherent risk that the project will not be able to raise the necessary capital to fund any new construction.	Overall project delays and increased cost	Reputation	15	Marketing, strategic relationships with partners, several options being explored	Major	Possible	12
High levels of water infiltrating into the pit	Resulting in flooding of pit, pit wall instability, loss of production, potential health and safety hazard	Safety, Health, Environment & Community	15	Mitigated by perimeter dewatering wells, sufficient in pit sumps, ditching around pit, horizontal drains	Major	Possible	12
Delays and human life risks caused by guerrilla activity. Illegal armed groups could blackmail the company to allow the construction	Overall project delays and increased cost	Safety, Health, Environment & Community	12	Contractor selection, military and police at camp, external security company, looking to increase with specialized contractors.	Major	Possible	12

Source: DRA, 2023

Root Cause and Risk Description	Probable Consequence Description	Primary Consequence Category	Pre-Response Risk Rating	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Social & community issues	Project delays	Safety, Health, Environment & Community	12	Integrate, manage, educate, communicate with the community interaction with community advisors, stakeholders, government	Major	Possible	12
Power Line Alternative: Unable to secure right-of-way for transmission line (i.e., landowners, etc.)	Delay to project.	Safety, Health, Environment & Community	12	Currently exploring options for definitive plan, then initiate communication with authorities, landowners and communities.	Major	Possible	12
The procedure to cover provisionally the creeks of stockpiles is no common in Colombia. Traditionally ANLA requires rivers relocations or box culverts to avoid direct intervention on the creeks.	ANLA could require to review some different alternatives as usual in Colombia	Safety, Health, Environment & Community	12	Pond 4 a non contact, reducing amount of contact water on site and the non contact water will be released, pond design around final water balance and major events. We will manage the positive water balance, by controlled release and recycling, technical design to support based on site wide water balance	Major	Possible	12
Pit close to crusher fly rock		Financial/ Costs	15	Evacuation, concrete walls, fuel tank protection	Minor	Almost Certain	10
Bribes or corruption involving government officials or their affiliates/agents	fines, significant reputational damages at a corporate, personal and shareholder level	Financial/ Costs	15	Internal controls, training, enforcement	Severe	Unlikely	10
Pit Slope wall stability	fatality, equipment, lost production	Safety, Health, Environment & Community	15	Minor slope failures expected, open pit design, lidar monitoring	Minor	Almost Certain	10
Mining at Elevated Cut-off Value and stockpiling material for later rehandling	Potential reduction in recovery within stockpile	Production	15	Low grade stock pile discharge reports to WMF, there will be some acid	Minor	Almost Certain	10
Insufficient hard rock for construction of equipment foundations (primary	Overall project delays and increased cost	Financial/ Costs	10	1. Infrastructure layout must minimize hard rock requirements	Severe	Unlikely	10

Source: DRA, 2023

24.4 Opportunities

Numerous opportunities were identified during the course of the FS, as follows.

24.4.1 RESOURCE/RESERVE EXPANSION POTENTIAL

- The centre of the El Alacrán deposit has significant high-grade Cu, Au, and Ag areas currently being mined by illegal surface miners. A significant infill definition drill program is planned for the FS which will determine if the deposit orebody can be expanded.
- The El Alacrán deposit higher grade areas would potentially increase the overall head grade and recovered metal within second half of the production schedule.
- Current satellite deposits are not included in the current mine plan. These mineral resources could be converted into mineral reserves at a later stage which will increase overall mine life.

24.4.2 MINE OPERATIONS

- Optimizing the El Alacrán deposit mine plan based upon current market conditions. At present, the mine plan is utilizing long term metal prices rather than current market conditions. There are existing areas in the centre of the El Alacrán deposit that have relatively high concentrations of Cu, Au, and Ag that may be further expanded once the infill drilling has been completed.
- After completion of additional diamond drilling there could be a reason to increase the depth of the OP, if geotechnical factors allow.

24.4.3 PLANT INFRASTRUCTURE

- According to the latest site wide water balance a water treatment facility is not required. This is primarily the result of the latest site and waste management facility (WMF) arrangement which impacts on surface water runoff and contact water dilution levels. Ongoing hydrogeology and hydrology baseline study results indicate that a water treatment facility is not required.
- Currently, the Project assumes make-up water is required from the river and dewatering wells. More trade-off studies are needed to determine if any make up water is required from the river.
- The FS assumes that electrical power to the Project will be supplied via a new 35 km long, 110 kV powerline from the Cerro Matoso substation which is owned and operated by ISA. Further trade off studies are being planned between a local LNG plant versus grid power.

24.4.4 METALLURGICAL RECOVERY

- Further metallurgical testing is required with respect to grinding energy, potentially improving overall concentrate grade and further variability testing. Collectively, these items have the potential to improve the Project Capex and Opex.

25 INTERPRETATIONS AND CONCLUSIONS

25.1 History

Exploration was carried out on the Alacran Project since 1987 and has a four (4) historic mineral resource estimates publicly disclosed. These historical estimates were presented to inform the public that the Project has a significant amount of work completed. The historic estimates that the are considering as no longer current.

25.2 Drilling

Eight (8) phases of diamond drilling have been completed on the El Alacrán deposit since 2011 totalling 82,894 m. Drilling completed prior to 2011 was not used in the geological interpretation or the Mineral Resource Estimate. Drilling at the satellite deposits between 2013 and 2017 totalled 20,104 m.

Core logging and sampling procedures completed during the eight (8) phases of drilling met industry best practices and the data is acceptable to use in the Mineral Resource Estimate for El Alacrán and the satellite deposits.

25.11 Sample Preparation, Analyses and Security

The samples collected during the Ashmont programs were prepped at ALS in Colombia and analyzed in Chile, Peru, and Canada. Samples collected during the Cordoba programs were prepped at ALS in Colombia or SGS in Peru. The samples were analyzed at ALS Peru or SGS Peru.

All the sample preparation and analysis were completed by accredited laboratories and at no time were employees of Ashmont or Cordoba involved directly with the preparation or analysis.

Cordoba has a QA/QC program for drilling and analysis that meets industry standards. Any failures encountered in the QA/QC program were addressed by Cordoba with sample re-runs or laboratory audits.

25.12 Data Validation

The QP has validated data by conducting site investigations, reviewing drill core, confirming drill collar locations and procedures.

25.13 Mineral Processing and Metallurgical Testing

The following conclusions are drawn from the metallurgical testwork completed:

- Grindability testing confirmed that the material is above average in terms of hardness and resistance to breakage. The Bond Ball Work Index testing conducted on 73 variability composites yielded an average result of 17.8 kWh/t, whereas SMC testing on 48 variability composites resulted in Axb values ranging from 19.9 to 82.8 and averaging 32.2. Abrasion index testing on 9 samples indicated that the material is only mildly abrasive compared to other projects, with an average result of 0.079 g.

- Geomet rougher flotation was conducted on 75 composites from the fresh, transition, and saprolite zones. Cleaner circuit development and confirmation of the flotation conditions was conducted on Master Composite samples with the following results:
  - The primary grind size was reduced to a P_{80} of 150 µm to improve copper recovery.
  - PAX was found to be an effective collector for copper recovery, with good selectivity over pyrite at low dosage rates.
  - Calgon addition to the regrind and cleaner circuit was found to be beneficial in improving gangue dispersion and copper recovery.
  - Longer rougher and cleaner flotation times were found to improve stage recovery of “slow-floating” copper without negatively impacting mass recovery.
- Confirmation locked cycle testing of the optimized flowsheet on the MC-3 composite indicated good stability and metallurgical performance. Minor element assays on locked cycle test concentrates did not identify any significant elements of concern.
- Gold and silver recovery to a gravity concentrate was evaluated by EGRG testing on the MC-3 fresh composite that resulted in a GRG of 54%, indicating that a portion of the gold can be recovered in a gravity circuit prior to flotation. A two-stage gravity test was conducted on a saprolite master composite sample that resulted in a gold recovery of 57%, which is comparable to the results on the fresh zone.
- Metallurgical testwork was conducted on auger samples collected from five (5) zones in the historical tailings area. Flotation testwork focused on the higher copper and sulphur grade material found in Zone 1. Limited success was achieved, with copper recovery to a cleaner concentrate not exceeding ~35%. Two-stage gravity testing of each of the Zone composites resulted in gold recovery ranging from 45% to 69%, indicating that a portion of the contained gold is gravity recoverable.

25.14 Mineral Resources Estimate

25.14.1 INTERPRETATIONS

Mineral resource estimates have been completed on the El Alacrán, Historic Tailings, Costa Azul, Montiel East, and Montiel West deposits based on diamond drill holes, hand augured drill holes, and reverse circulation drill holes.

The Mineral Resource Estimate for each deposit consisted of geological domains modelled in three dimensions using Leapfrog® Geo software. Mineral estimation for the El Alacrán and satellite deposits was completed by Ordinary Kriging (OK) in Datamine Studio RM™ using industry standard procedures. The Historic Tailings were estimated using inverse distance in Datamine Studio RM™ using industry standard procedures. Each mineral resource estimate was constrained within a pit shell and used a Net Smelter Return (NSR) cut-off grade of US$2.08/t milled for saprolite and US$9.88/t milled for transition and fresh material.

25.14.2 CONCLUSIONS

The Mineral Resource Estimates are supported by sufficient drilling, analysis, and specific gravity data. Reasonable parameters were used to constrain the mineralization within a pit shell.

The El Alacrán deposit has a pit constrained Indicated Mineral Resource totalling 96.7 Mt at 0.42% Cu, 0.24 g/t Au, and 2.69 g/t Ag, with an additional pit constrained Inferred Mineral Resource of 1.5 Mt at 0.09% Cu, 0.18 g/t Au, and 3.86 g/t Ag.

The Historic Tailing has a pit constrained Indicated Mineral Resource totalling 2.8 Mt at 0.00% Cu, 0.28 g/t Au, and 0.89 g/t Ag.

The Costa Azul deposit has a pit constrained Inferred Mineral Resource totalling 10.4 Mt at 0.23% Cu, 0.18 g/t Au, and 0.62 g/t Ag.

The Montiel East deposit has a pit constrained Inferred Mineral Resource totalling 9.3 Mt at 0.31% Cu, 0.23 g/t Au, and 1.13 g/t Ag.

The Montiel West deposit has a pit constrained Inferred Mineral Resource totalling 10.5 Mt at 0.09% Cu, 0.36 g/t Au, and 1.14 g/t Ag.

25.15 Mineral Reserve Estimate

Mineral Reserves are based on the engineering and economic analysis described in Section 13 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

- Metal prices;
- Interpretations of mineralization geometry and continuity of mineralization zones;
- Grade and geology estimation assumptions;
- Geomechanical and hydrogeological assumptions;
- Ability of the mining operation to meet the annual production rate;
- Operating cost assumptions;
- Process plant recoveries;
- Mining loss and dilution;
- Ability to meet and maintain permitting and environmental licence conditions; and

- Historical mining depletion.

BBA prepared a Mineral Reserve Estimate for the Project using Deswik mining software packages and modules for estimating the economic pit limit for the open pit and block model interrogation.

The Mineral Reserve Estimate for the El Alacrán deposit is based on the resource block model estimated by BBA and described in Section 14. The block model contained both Indicated and Inferred Mineral Resources; however only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, which includes the ROM stockpiles.

The 2023 Mineral Reserve Estimate for the Project includes 97.9 Mt of Probable Reserve grading 0.41% Cu, 0.23 g/t Au, and 2.63 g/t Ag at a US$2.07/t cut-off value for saprolite material, US$2.58/t cut-off value for historical tailings, and US$10.26/t cut-off value for transition and fresh material.

25.16 Mining Methods

Conventional open pit mining methods will be used to extract a portion of the El Alacrán deposit. This method was selected considering the El Alacrán deposit’s size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the open pit material within the designed pit to meet the mine production schedule.

The open pit design was designed to provide sufficient suitable quantity of waste rock material for the WMF embankment progression requirements. It was manually adjusted from the pit limit analysis pit shell results. An external NPAG borrow pit area is proposed for the Project to supplement the required quantity of NPAG rock material for the WMF embankment progression requirements.

The open pit mine production period covers the extraction of material from the NPAG borrow area, historical tailings area, and the El Alacrán open pit with two (2) years of pre-production (prior to process plant start-up), approximately 14.02 years of production, which includes approximately six (6) months of stockpile reclaim. The ordering of long lead items occurs for approximately 3 months prior to the pre-production period.

Open pit mining will include conventional drilling and blasting with a combination of a backhoe type hydraulic excavator and front-end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpiles, or WMF depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

During pre-production, the ore material will be hauled to designated stockpiles. The economic historical tailings will be stockpiled near the gravity wash plant but separate from the saprolite material. The saprolite ore material will be stockpiled near the gravity wash plant. The fresh and transition ore material will be hauled to stockpiling areas near the pit exit for reclaiming during Years 1 and 2 of production.

During production, fresh and transition feed material will be hauled either directly to the primary crusher and direct tipped into the crusher or stockpiled temporarily at the ROM stockpile, located to the south of the primary crusher. To meet the NPAG waste rock requirements for the WMF embankment progression, a large amount of fresh and transition ore may be required to be stockpiled in order to release the NPAG waste rock from the pit in the timeframe it is required.

Rigid timelines on the study did not allow for full optimization of the detailed pit design with the final NPAG/PAG model. The pit designs should be optimized in the next iteration to meet the WMF embankment NPAG requirements but also to reduce amount of PAG waste that would need to be mined.

25.17 Recovery Methods

The processing methods are conventional and proven to the industry. The process plant design is based on testwork results and are appropriate to the ore mineralization: the flotation circuit recovers the sulphide minerals while the gravity concentration allows the recovery of free gold and silver producing separate concentrates.

The main processing facility will have a nominal throughput of 16,000 tpd corresponding to an annual feed rate of 5.8 Mt and a design throughput of 17,600 tpd (6.4 Mtpa). The ROM ore will be crushed in a single jaw crusher and the grinding circuit will feature a pebble crusher arrangement with the SAG mill in an open circuit and ball mill (SABC) operating in closed circuit with hydrocyclones.

The hydrocyclone overflow with a grind size P_{80} of 150 µm will be sent to the roughing flotation circuit. A regrinding stage for the concentrate will further reduce the particle size to 30 µm before passing through three cleaning stages. The concentrate is thickened and filtered to 8% moisture content. The final tailings are sent to the tailings thickener, and then sent to the WMF.

The saprolite ore, which create a negative impact in the flotation recoveries of the concentrator, will be processed in a dedicated stand-alone gravity wash plant with a capacity of 2,400 tpd of saprolite ore. This plant will be able to process 1,200 tpd of historical tailings as well and will allow the recovery of gold and silver contained in both materials.

25.18 Project Infrastructure

- Basic studies in hydrology, hydraulics, and seismicity have been advanced to an adequate level for designing the access roads at the FS stage.

- Basic studies in geology, geomorphology, and characteristics of surface and shallow formations are adequate for designs of the access roads at the FS stage.
- On-site Project infrastructure designs have been sufficiently progressed for FS-level estimation. The infrastructure is considered of suitable design for the site conditions and size of operations.
- Geotechnical exploration and testing have been advanced to design Project infrastructure at the FS level in sectors where direct exploration was carried out.
- To develop the Project, the existing road from La Rica will be enhanced and upgraded; and a new power 110-kV power transmission line from Cerro Matoso will be required. Concentrate storage and handling facilities will be built at the port of Tolú, where flotation concentrate will be transported in tipping containers.
- The successful execution of the Project depends on tight sequencing of construction material production, site access, and preliminary mining activities.
- Early construction of the power transmission line and on-site power infrastructure will be required to support the construction phase of the Project. Temporary construction power generation on site will be needed.

25.19 Water Management

The WMP will be primarily used to store water from the WMF, contact water from operations, and inflows from the open pit. The water stored in the WMP will be used to provide the required reclaim water to the mill.

The primary water management objectives for the site water management strategy include:

- Maintain a small supernatant pond (water transfer pond) within the WMF basin by transferring runoff and supernatant to the WMP on an ongoing basis via the water transfer system.
- Maximize reclaim of supernatant water and runoff from the WMP to the mill and minimize freshwater requirements from the San Pedro River.
- Treat and discharge excess supernatant water, mine water (open pit inflow), and runoff to the environment, as required during the mine life, via the water treatment, and discharge system.
- Collect and manage runoff via surface water management measures.
- Provide temporary containment of the EDF within the WMF and WMP basins during operations.
- Provide temporary storage and conveyance of the IDF via spillways from the WMF and WMP.

Process water will be sourced from the WMF, via a pump on a barge collecting clear water, and conveyed to the concentrator plant via a pipeline. Water to supply the buildings, as well as for the fire suppression distribution system will be provided by from the raw water make up system.

25.20 Market Studies

Based on the data presented in Section 19, potential buyers would regard the copper concentrate to be produced at the Project as a clean concentrate material largely absent of penalty elements or minerals with a low/medium copper grade and a moderate precious metal content. As such, it is expected that this material will be readily saleable on global markets.

The projected precious metal content and low production volume of the gravity gold concentrate will favor sale in Japan, Korea, and European smelters.

25.21 Environmental

25.21.1 Baseline Environmental Conditions

In general, groundwater, and surface water quality are good, except for the drainages impacted by approximately 40 years of tailings disposal into the streams that drain the El Alacrán community. Surface water in these drainages shows clear evidence of ARD and ML. Elevated sulphate concentrations in Quebrada Valdéz was observed 5 km downstream of the village.

Groundwater is relatively shallow (<5 m below ground surface) in the alluvial valleys. Due to the high rainfall, abundant springs appear during the rainy season. Groundwater appears to be unconfined. Aquifer characteristics of the rock in the vicinity of the proposed pit indicate that they are poor aquifers with low capacity for groundwater movement. The deeper aquifer (at the final depth of the pit) is fracture controlled and has moderate groundwater transmissivity. A transient numerical groundwater model was prepared for the Project, which shows 1) that interception wells will be required to manage groundwater during production, and 2) that the dewatering wells will have a minimal effect on the flow in San Pedro River.

The water balance for the Project is positive and no other water source will be required other than the precipitation that falls on the Project infrastructure. Geochemical modeling of the process solutions under a range of precipitation scenarios and operational periods indicates that precipitation will dilute process solutions sufficiently to preclude a water treatment plant.

Static and kinetic (barrels and humidity cells) geochemical characterization of soils, waste rock, ore and tailings indicate that, in general, there is potential for neutral drainage with elevated metal concentrations, and possibly acidic drainage with higher metal concentrations at the Alacran Project. This conclusion is consistent with the geoenvironmental model for the deposit types, (a porphyry-associated proximal iron oxide copper gold and a distal carbonate replacement deposit), which is expected to contain acid-generating sulphide minerals and acid-neutralizing carbonate minerals in the ore and surrounding rock. The ore, tailings, and HT have the highest potential for ARD/ML. Surficial samples are unlikely to generate ARD/ML. Static tests showed several lithologies within Unit 1, Unit 2, Unit 3, and Sills as PAG. The Kinetic tests overall indicate that most waste rock types will likely generate neutral drainage with elevated metal concentrations, and possible acidic drainage from waste rock with a high proportion of the Unit/Lithology of Unit 2-Tuff and Unit 2-Volcanic-Bx. Approximately 40% of the waste rock will be PAG or have uncertain acid generation potential. The historic tailings in Quebrada Valdéz are actively generating acidic conditions.

Baseline monitoring of air quality, vibrations, noise, and soils produced results concomitant with small, rural, and dispersed communities with dirt roads and a love of loud music.

The local ecosystem is characterized as warm, humid forest, located in the foothills where the coastal plains transition to mountain terrain. Most of the Project area has been cleared of the original vegetation for cattle grazing and agriculture.

Archaeological evidence of indigenous communities spanning a period from the second to 16th centuries of the common era was found in five locations in the footprint of the proposed mine infrastructure. The artifacts recovered were limited to ceramic fragments and lithic elements, including axes, metates, manos, and flakes.

25.21.2 SOCIAL AND COMMUNITY

The area around the Project is sparsely inhabited, including five small communities within 5 km of the Project, and the El Alacrán community located within the footprint of the proposed pit. The El Alacrán community is the largest local population centre (1,200 persons) and the population within a 5 km radius is approximately 1,900. The local population subsists on mining, small-scale agriculture, ranching and small businesses that support the local community (bars and stores).

25.22 Capital and Operating Costs

The capital cost estimate was prepared by the various consulting firms and integrated by DRA with an expected accuracy range of –10 to +20% and it is expressed in 2023 US dollars. The estimate includes direct and indirect costs, (such as engineering, procurement, construction and start-up of facilities) as well as owners costs and contingency associated with mine and process facilities and on-site and off-site infrastructure. Total LOM capital costs, including initial, sustaining and reclamation costs, are US$547.5 M. The initial capital estimate is US$420.4 M.

The operating cost estimate was prepared by DRA with the input from BBA and Knight Piésold and it includes all the cost associated with the mining and processing fresh and transition ore as well as the processing of saprolite ore and historical tailings.

25.23 Economic Analysis

An engineering economic model was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The results of this economic analysis are based upon the services performed by various consulting firms.

The plan for the Project includes an approximate two-year construction and pre-production period, followed by 14.02 years of production at an average mill feed rate of 17,600 tpd to the main facility and 1,200 to 2,400 tpd to the Gravity Wash Plant, and ten years of post-production active mine closure and 10 years of passive mine closure. An owner-operated scenario is planned for the Project.

The Project includes the El Alacrán open pit, an NPAG borrow pit, a main processing facility for fresh and transition material, a Gravity Wash Plant for saprolite and historical tailings, a waste and tailings management facility, a site accommodations facility, and surface infrastructure to support the mine operations including such items as: maintenance shop, office facilities, roads, water management features, and ROM stockpiling areas.

The economic analysis for the Project indicates a **post-tax** cash flow of US$931.3 M, post-tax NPV (8%) of US$359.7 M, and post-tax IRR of 23.8%. The Project is most sensitive to commodity prices. On a **pre-tax** basis, the Project has a cash flow of US$1,441.4 M, an NPV (8%) of US$633.1 M, and an IRR of 33.9%.

25.24 Adjacent Properties

A number of exploration projects are active in the region yet do not have direct impact on the Project.

26 RECOMMENDATIONS

The results of this FS demonstrate that the Alacran Project has the potential to be technically and economically viable as a producer of a copper concentrate and gold concentrate which will be sellable in the current markets.

To further advance the Project, a budget estimate of US$15.80 M is proposed to take the Project through detailed engineering and permitting. The budget estimate is summarized in Table 26.1.

Table 26.1 – Detailed Engineering Budget Estimate

Description	Cost (US$ M)
Project Management and Control Services	2.37
Engineering and Design Services	9.48
Procurement and Contracts Services	3.95
Total	**15.80**

Additional exploration on the satellite deposits should take place after the El Alacrán mine is in operations.

26.1 Drilling

In future drilling programs at El Alacrán or the satellite deposits, Cordoba should continue to collect bulk density measurements for all material to build the data set.

Future drilling should focus on extending mineralization along strike to the north and south of the current open pit designs. Additional drilling of the higher-grade structures below the open pit would allow for the interpretation of potential mineralized material accessible by underground mining methods.

26.2 Mineral Processing

Considering the positive outcome of this Report, it is recommended to pursue the next phase of the Project through various aspects need to be monitored or done are listed below.

The following recommendations for further metallurgical testwork are made:

- Further batch testing of metallurgical unit composites to determine optimum collector and depressant additions for specific units;
- Confirmation of metallurgical unit composite flotation results by locked-cycle testing;
- Additional amenability testing for Jameson cell flotation, including bench testing and mini-piloting;

- Confirmation testing of Year 1-5 production composites based on the updated mine plan;
- Further testing of copper and gold recovery from deslimed historical tailings Zones 1, 2, and 3;
- Determination of grinding requirements/optimization for saprolite and historic tailings gravity recovery;
- Mineralogical characterization of final concentrates; and
- Review of potential application of coarse particle flotation technology.

26.3 Mineral Resources Estimate

Considering the positive outcome of this Report, it is recommended to pursue the next phase of the Project, though various aspects that need to be monitored or completed are listed below.

The following are recommendations for the Minerals Resource Estimate:

- During future drilling programs, continue to collect specific density data from all lithological units;
- Understand the mineralogical and / or geochemical differences between the geological units to further refine the estimation domains; and
- Collect additional data to better understand the geometry of the higher-grade domains within the El Alacrán deposit.

26.4 Mining

The recommendations for the Mine Design, Mine Plan, and Mineral Reserves of the Project include:

- Complete further detailed design and life-of-mine scheduling using the results of this FS to refine and optimize the pit designs and mine plan.
- The open pit design and phase design should be reviewed and optimized with the NPAG/PAG classification to minimize the amount of PAG waste rock and ore stockpiling that could be required while maintaining NPAG waste rock requirements to the WMF Embankment progression schedule.
- The ultimate detailed open pit design should be assessed for slope stability.
- Conduct analysis to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application.
- Conduct analysis to determine suitability of electric excavators and/or drills.
- Review NPAG borrow area limits with final site plan layout. Drilling and testwork should be undertaken to confirm quality of waste rock from NPAG borrow area.

26.5 Mineral Processing and Recovery

The following is recommended prior to advancing the Project to the next phase:

- Additional testwork aimed at improving copper, gold and silver recoveries whilst reducing reagent consumption.
- Rougher flotation study to use Jameson cell circuit to reduce Capex costs and to improve copper and gold recoveries.
- Coarse particle flotation testwork to reduce grinding energy requirements for the main plant flowsheet whilst maintaining metal recoveries (higher throughput at the same energy consumption).
- Flowsheet optimization on the main plant and gravity and gravity wash plants.

26.6 Project Infrastructure

This Technical Report is supported by engineering consistent with the detail required for this level of study. At the next stage of study, the follow areas are recommended to be investigated further:

26.6.1 EXTERNAL ACCESS ROAD

- It is convenient to do additional exploration and testing to complement the study of concrete aggregates and road surface materials. This is because the supply of these materials is currently contemplating a haulage of approximately 90 km from Caucasia to the Project site.
- Developing a series of construction details is essential to better understand the contractor appointed for that purpose. For example, for the MSE reinforced earth walls that serve as the approach to the San Pedro and La Concepción bridges, details are required for the installation and bending of the geogrid or high modulus textile reinforcement and details for the construction of the external faces of the MSE wall.
- The construction of the access road has a completion time of 540 calendar days (18 months).

26.6.2 ON-SITE INFRASTRUCTURE

- Additional exploration and testing are required to complete detailed designs in the site infrastructure areas where no direct exploration was done.
- Drilling should be completed specifically in these areas to support foundation recommendations and analysis. Once the geotechnical data is available, trade off studies may be conducted to determine the optimum foundation system for the ancillary buildings and/or equipment foundations.
- Finalization of the right of way for the 110 kV transmission line corridor from Cerro Matoso to the mine site.
- Telecommunication and fibre optic internet service providers must be engaged as part of the design of the power transmission line from Cerro Matoso.

26.7 Waste Management

The following recommendations are provided to support future, more detailed levels of study:

- Additional site investigations, in situ testing, and laboratory testing to confirm the following:
    - Extent of the coarse alluvium under the main embankment footprint.
    - Contact between the residual soil/saprolite and the coarse alluvium downstream of the northeast embankment.
    - Groundwater levels below the main, northeast, and south embankments.
    - Strength, permeability, and consolidation characteristics of the residual soil and saprolite below the main, northeast, and south embankments.
    - Thickness, strength, and permeability of the weathered bedrock below the main, northeast, and south embankments.
    - Permeability of the bedrock below the main, northeast, and south embankments.
    - Extent of faulting within the south embankment foundation.
- Three-dimensional seepage modelling to further assess potential seepage associated with the complex topography and stratigraphy, faulting within the WMF embankment foundations, and the potential for seepage to flow in several directions from the WMF (i.e., north, east, south, and west).
- A detailed seismicity assessment, along with deformation analyses, to assess the sensitivity of the WMF embankments to seismic loading.
- Consolidation modelling to assess the sensitivity of the WMF embankments to pore pressure conditions in the foundation and to refine the embankment raising plan.
- A review of the basin filling and embankment construction schedule to estimate the maximum elevation difference between the embankment crest and the tailings at different points in time. This assessment will confirm the maximum loading conditions for evaluating upstream slope stability.
- Stability assessments for waste stockpiles.
- A review of the hydrometeorological data and extreme storm event estimates to refine the stormwater management measures.

26.8 Market Studies

The Company will engage the market and assess the potential to improve commercial terms of the concentrate.

The Company should further explore the opportunity to market the gravity gold concentrate in Europe where the payable may be as high as 98% with a minimum deduction of 1 g/t. Given that Tolú is an Atlantic port, container shipping costs may be highly favored for this destination.

Container capital, lease and/or demurrage costs may be minimized by exploring the opportunity to store bulk concentrate at the port of Tolú and facilitating the means to quickly load free-flowing bulk concentrate into ships. This option would minimize the number of concentrate shipping containers in circulation.

Per the current quality assumed in the model, the copper and gravity gold concentrates will be deliverable to a variety of smelters. Should the quality change or should there be changes to the Chinese import rules for custom-designated 'gold concentrates' (e.g., a decrease in the maximum arsenic content), the commercial terms should be reviewed.

The Company can take advantage of any further laboratory or pilot-scale metallurgical testing by further defining the quality of gravity gold concentrates to be produced by the wash plant.

Either by use of inventoried metallurgical test copper concentrate or product generated by future testwork, complete XRF analysis before and after digestion to understand the relationship between total and soluble mineral content for SiO_2, Al_2O_3, K_2O and CaO, since the total insoluble mineral content may impact marketing flexibility.

Examine the opportunity created by installing bagging infrastructure for the gravity gold concentrate for the management of risk associated with bulk container sampling, and loss due to theft or carryover.

26.9 Environmental

- Continued sampling of the monitoring wells and stream to establish a longer monitoring baseline.
- Analysis of future groundwater data to improve the understanding of groundwater flow regimes and the conceptual groundwater model.
- Expand the grid for the numerical groundwater model to the east and south in areas where the model showed drawdown in the deeper aquifer units and repeat the groundwater model.
- Based on the new mine plan, install additional barrels to evaluate the long-term geochemical behavior of ore and waste rock.

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28 ABBREVIATIONS AND DEFINITIONS

28.1 Abbreviations and Acronyms

Table 28.1 in this Technical Report may include the usage of the following abbreviations and acronyms.

Table 28.1 – Abbreviations and Acronyms

Abbreviation	Unit or Term
$ or US$	United States Dollar
$/dmt	Dollars per Dry Metric Ton
$/t	Dollars per Tonne
$/wmt	Dollars per Wet Metric Ton
%	Percent
%w/w	Percent Mass Fraction for Percent Mass
<	Less than
>	Greater than
°	Degree (Degrees)
°C	Degrees Celsius
µm	Micrometres or Microns
‰	Per Mille
A	Amperes
AA	Atomic Absorption
AAS	Atomic Absorption Spectroscopy
Ab	Albite
ABA	Acid Base Accounting
ACME	ACME Analytical Laboratories Colombia S.A.S
ACSR	Aluminum Conductor Steel Reinforced
ADT	Articulated Dump Truck
Ag	Silver
AHK	Alfred H Knight
AISC	All-In Sustaining Cost
Al	Aluminum
amsl	Above Mean Sea Level
ANLA	National Environmental Licensing Agency
ANM	National Mining Agency

Abbreviation	Unit or Term
AP	Acid Generating Potential
ARD	Acid Rock Drainage
ASM	Artisanal And Small Scale Mining
ASOMINAL	Asociación De Mineros El Alacrán
Au	Gold
BBWI	Bond Ball Work Index
BCMOE	British Columbia Ministry of Environment
BFA	Bench Face Angle
BMP	Best Management Practice
BRWI	Bond Rod Work Index
CAHRA	Conflict-Affected and High-Risk Area
Capex	Capital Expenditure
Car	Carbonate
CBM	Carbonate Base Metal
CF	Correction Factor
Chl	Chlorite
CIF	Cost, Insurance and Freight
CIM	Canadian Institute of Mining, Metallurgy, and Petroleum
CIPx	Clinopyroxene
CITES	Convention on International Trade of Threatened Wild Fauna and Flora Species
cm	Centimetres
CM Company	Cobre Minerals S.A.S.
cm^2	Square Centimetres
cm^3	Cubic Centimetres
CMA	Compañía Minera Alacrán S.A.S.
CMH	CMH Colombia S.A.S.
CN	Curve Number
Co	Cobalt
CPD	Cone Dynamic Penetrometer
Cr	Chromium
CRM	Certified Reference Material
Cu	Copper

Abbreviation	Unit or Term
CuEq	Copper Equivalent
CVS	Corporacion Autonoma Regional de los Valles del Sinú y del San Jorge
DBH	Diameter at Breast Height
DDH	Diamond Drill Hole
DH	Drill Hole
DIAN	National Tax and Customs Directorate
dmt	Dry Metric Tonnes
DTH	Down the Hole
DTM	Digital Terrain Mode;
Dwax	Density of Wax
ECSAS	The Operator of the Mining Title III-08021
EDF	Environmental Design Flood
EGRG	Extended Gravity Recoverable Gold
EIA	Environmental Impact Assessment
EMPA	Electron Microprobe Analysis
ENE	East North East
EPCM	Engineering, Procurement, And Construction Management
ERT	Emergency Response Transport
ET	Evapotranspiration
Fe	Iron
FEL	Front End Loader
FoS	Factor Of Safety
FS	Feasibility Study
g	Grams
G&A	General and Administrative
g/cm^3	Grams per Cubic Centimetre
g/l	Grams per Litre
g/t	Grams per Tonne
GHG	Greenhouse Gas
GNSS	Global Navigation Satellite System

Abbreviation	Unit or Term
GPS	Global Positioning System
GRG	Gravity Recoverable Gold
h	Hours
ha	Hectares (10,000 m²)
Hb	Hornblend
Hg	Mercury
HSU	Hydrostratigraphic Units
HT	Historical Training
ICANH	Colombia Institute of Anthropology and History
ICP-AES	Inductively Coupled Plasma Atomic Emission Spectrometry
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
ID^2	Inverse Distance Squared
IDF	Inflow Design Flood
IP	Induced Polarization
IVNE	Ivanhoe Electric Inc.
INTERA	INTERA Inc.
IRR	Internal Rate of Return
kg	Kilogram
kg/m²	Kilograms per Square Metre
kg/m³	Kilograms per Cubic Metre
kg/t	Kilograms per Tonne
km	Kilometres
km²	Square Kilometres
Knight Piésold	Knight Piésold Ltd.
kt	Kilotonnes (thousand tonnes)
ktpa	Kilotonnes per Annum
kV	Kilovolts
kWh/t	Kilowatts per Hour per Tonne
L	Litre
L/s	Litres per Second

Abbreviation	Unit or Term
lb or lbs	Pounds
LCT	Locked Cycle Test
LOM	Life Of Mine
LMS	Large-Scale Mining
m	Metres
M	Million
m/s	Metres per Second
m^2	Square Metres
m^3	Cubic Metres
m^3/y	Cubic Metres per Year
Ma	Mega-Annum (1 million years)
MC	Master Composite
MCSAS	A Colombian Subsidiary of Cordoba
mg/L	Milligrams per Litre
MIBC	Methyl Isobutyl Carbinol
mm	Millimetres
mm^2	Square Millimetres
mm^3	Cubic Millimetres
mm/y	Millimetres per Year
MME	Ministry of Mines and Energy
Mo	Molybdenum
MSM	Medium-Scale Mining
Mt	Million Tonnes
MTO	Material Take-Off
Mtpa	Million Tonnes per Annum
Mtpd	Million Tonnes per Day
Mtph	Million Tonnes Per Hour
MVA	Megavolt-Amperes
MW	Megawatts
MWh	Megawatt Hours
n/a	Non Applicable
NE	North East

Abbreviation	Unit or Term
NGO	Non-Governmental Organization
Ni	Nickel
NI 43-101	Canadian National Instrument 43-101
NN	Nearest Neighbour
NNE	North North East
NNW	North North West
NP	Neutralizing Potential
NPAG	Non-Potentially Acid Generating
NPR	Net Potential Ratio
NPV	Net Present Value
NS	North South
NSR	Net Smelter Return
NSG	Non-Sulphide Gangue
NW	North West
OK	Ordinary Kriging
OMNI	Sociedad Ordinaria de Minas Omni
OMS	Operations, Maintenance, and Surveillance
Opex	Operating Expenditures
P	Phosphorous
P_{80}	Passing 80%
PAG	Potentially Acid Generating
PAX	Potassium Amyl Xanthate
Pb	Lead
PDC	Process Design Criteria
PEA	Preliminary Economic Assessment
PEP	Project Execution Plan
PFS	Prefeasibility Study
PGS	Social Management Plan
Plag	Plagioclase
PMF	Potential Mill Feed
PMP	Probable Maximum Precipitation
PPD	Perpendicular Pole-Dipole

Abbreviation	Unit or Term
ppm	Parts per Million
PTO	Exploitation Working Plan
PV	Present Value
Px	Pyroxene
Py	Pyrite
QA/QC	Quality Assurance/Quality Control
QP	Qualified Person
Qtz	Quartz
RC	Reverse Circulation
RCSAS	Recursos de Colombia S.A.S.
RDT	Rigid Frame Haul Truck
RF	Revenue Factor
RNM	National Mining Registry
ROM	Run of Mine
RTP	Reduced to Pole
S	Sulphur
SABC	Semi Autogenous Ball Mill Comminution
SAG	Semi Autogenous Grinding
SAMSA	South American Management SA
Sb	Antimony
SCS	Soil Conservation Service
SCSE	SAG Circuit Specific Energy
SFE	Shake Flask Extraction
SG	Specific Gravity
SI	System International
Si	Silicon
SIAC	Colombian National Information System
SMC	SAG Mill Comminution
SMD	San Matías District
SO_2	Sulphur Dioxide
SPT	Standard Penetration Testing

Abbreviation	Unit or Term
su	Standard Units
t	Tonnes
t/h	Tonnes per Hour
t/m^3	Tonnes per Cubic Metre
Tc	Time of Concentration
TC/RC	Treatment Charges and Refining Charges
TDEM	Time Domain Electromagnetics
Ti	Titanium
tpd	Tonnes per Day
TR	Terms of Reference
TSS	Total Suspended Solids
U	Uranium
UHF	Ultra High Frequency
US$/lb	United States Dollars per Pound
US$/oz	United States Dollars per Ounce
US	United States
UTM	Universal Transverse Mercator
VAT	Value Added Tax
VWP	Vibrating Wire Piezometer
WMF	Waste Management Facility
WMP	Water Management Pond
wmt	Wet Metric Tonnes
y	Year

28.2 Definition of Terms

Table 28.2 summarizes the general mining terms potentially used in this Technical Report.

Table 28.2 – Definition of Terms

Term	Definition
Alluvium	Soil or sediment transported and deposited by flowing water.
Assay	The chemical analysis of mineral samples to determine the metal content.
Berm	A horizontal shelf or ledge built into a sloping wall of an OP or quarry for protection under level.
Bench	A ledge which forms a single level of operation where ore and waste are excavated.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	The initial process of reducing the ore particle size to render it more amenable for further processing.
Cut-Off Grade	The grade of mineralized rock, which determines as to whether or not it is economical to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	The angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non valuable components of the ore.
Grade	The measure of the concentration of gold within the mineralized rock.
Hanging Wall	The overlying side of an orebody or slope.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimize the estimation error.
Lithological	Geological description pertaining to different rock types.
Life of Mine	The length of time a mine is or could be in production.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.

Term	Definition
Mineral/Mining Lease	A lease area for which mineral rights are held.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Pit Limit	The maximum vertical and lateral extent which may be excavated economically in an OP mine.
Pit Slope	The angle from the horizontal which the wall of an OP stands as measured from crest to toe.
Run of Mine	A term used loosely to describe ore of average grade.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Sill	A thin, tabular, horizontal to the sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or dolt phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	The direction of the line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Stripping	The removal of overburden.
Strip Ratio	The ratio of a unit of waste material removed per similar unit of ore material removed.
Sulphide	A sulphur-bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Toe	The base of a bank bench or a slope.
Total Expenditure	All expenditures, including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).
Waste Dump	A place where waste materials are piled.

29 CERTIFICATES OF QPS

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CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *David Frost, FAusIMM,* of Toronto, Ontario, Canada, do hereby certify:

1. I am the Vice President Process Engineering with DRA Global Ltd., with a Corporate business address of 20 Queen St W 29th Floor, Toronto, Ontario, M5H 3R3, Canada.
2. I am a graduate of RMIT University with a Bachelor of Metallurgical Engineering in Metallurgy in 1993.
3. I am a registered Fellow Member of the Australian Institute of Mining and Metallurgy (FAusIMM) membership #110899.
4. I have worked as a Metallurgist and Process Engineer in various capacities since my graduation from university in 1993.
5. My relevant work experience includes:
    - More than 30 years of practical experience including 15 years in process plant operations including the operation of complex flotation circuits and more than 15 years in process plant flowsheet design;
    - Multiple base metal flotation flowsheet designs for projects globally inclusive of large scale conventional copper flotation and gold recovery circuit designs; and
    - Participant and author of several NI 43-101 Technical Reports inclusive of copper flotation and gravity gold recovery flowsheets.
6. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
8. I am responsible for the preparation of Sections 2, 3, 17, 19, and 24. I am also responsible for the associated portions of Sections 1, 18, 21, and 25 to 27 of the Technical Report.

9. I visited the property that is the subject to the Technical Report (on July 25 to 28, 2023).
10. I have not had prior involvement with the property that is the subject of the Technical Report.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st of February 2024, Toronto, Ontario

“Original Signed and Sealed on file”

David Frost, FAusIMM
Vice President Process Engineering
DRA Global Ltd.

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To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, Lyn Jones, P.Eng., of Peterborough, Ontario, Canada, do hereby certify:

1. I am employed as Manager, Process Engineering with Blue Coast Research, located at 2-1020 Herring Gull Way, Parksville, British Columbia, Canada.
2. I graduated from the University of British Columbia with a Bachelor of Applied Science in Bio-Resource Engineering in 1996, and with a Master of Applied Science in Metals and Materials Engineering in 1998.
3. I am a member in good standing with Professional Engineers Ontario and registered as a Professional Engineer, license number 100067095.
4. I have practiced my profession in the mining industry continuously since graduation. My relevant experience includes 25 years of metallurgical flowsheet development for base and precious metals projects in the mining sector.
5. I have worked on similar projects to the Alacran Project in South America; my experience for the purpose of the Technical Report includes:
    - Metallurgical testwork program management.
    - Mineral processing flowsheet development.
    - Process plant design and commissioning.
    - Participation and authoring of several NI 43-101 Technical Reports.
6. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
8. I am responsible for the preparation of Section 13. I am also responsible for the associated portions of Sections 1, and 25 to 27 of the Technical Report.

9. I have not visited the property that is the subject to the Technical Report.
10. I have had no prior involvement with the property that is the subject of the Technical Report.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st of February 2024, Peterborough, Ontario

"Original Signed and Sealed on file"
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CERTIFICATE OF QUALIFIED PERSON

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I, *Todd McCracken, P. Geo.,* of Sudbury, Ontario, Canada, do hereby certify:

1. I am the Director – Mining & Geology – Central with BBA Engineering Ltd., located at 144 Pine St. Unit 501, Sudbury ON. P3C 1X3 Canada.
2. I am a graduate from University of Waterloo in 1992, of Ontario. with a bachelor's degree in Honors Applied Earth Sciences. I have practiced my profession continuously since my graduation.
3. I am a member in good standing of Association of Professional Geoscientists of Ontario and License (PGO No. 0631).
4. My relevant experience includes: 30 years in exploration, operations and consulting, including resource estimation on VMS, Skarn, CRD, and IOCG deposits. This also includes 12 years' experience overseeing mining studies as department manager.
5. I have read the definition of "Qualified Person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfil the requirements to be a Qualified Person for the purposes of NI 43-101.
6. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
7. I am responsible for the preparation of Sections 4, 6 to 12, 14, 22 and 23. I am also responsible for the associated portions of Sections 1, 21.1, 21.2 and 25 to 27 of the Technical Report.
8. I visited the property that is the subject to the Technical Report (on July 25 to 28, 2022).
9. I have had no prior involvement with the property that is the subject of the Technical Report.
10. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

11. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st day of February 2024, Sudbury, Ontario

"Original Signed and Sealed on file"
Todd McCracken, P. Geo., QP
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CERTIFICATE OF QUALIFIED PERSON

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I, *Joanne Robinson, P. Eng.,* of Toronto, Ontario, Canada, do hereby certify:

1. I am a Mining Engineer with BBA Engineering Ltd., located at 10 Carlson Ct, Suite 420, Toronto, Ontario, M9W 6L2, Canada.
2. I am a graduate of Queen's University with a Bachelor of Science in Mining Engineering in 1996.
3. I am a member in good standing with Professional Engineers Ontario and registered as a Professional Engineer, license number 100049603.
4. I have been working as a mining engineer for 22 years, from 1997 to 2000 and 2004 to present.
5. I have worked on similar projects to the Alacran Project in South America; my experience for the purpose of the Technical Report includes:
    - 7 years working at various Canadian open pit operations in progressively senior roles doing production engineering, mine design, and mine planning
    - over 3 years with an open pit mine development project focusing on the pit optimization, mine design, mine planning, cost estimation, and project management
    - over 10 years in mine consulting completing the open pit mine design, optimization, planning, mine cost estimation, and cash flow model analyses for a number of technical studies
    - Participation and author of several NI 43-101 Technical Reports.
6. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.

8. I am responsible for the preparation of Sections 15 and 16, with the exception of Section 16.5, and the preparation of some portions of Section 21. I am also responsible for the associated portions of Sections 1, and 25 to 27 of the Technical Report.

9. I visited the property that is the subject to the Technical Report (on September 20 to 21, 2021).

10. I have had prior involvement with the property that is the subject of the Technical Report.
    - *"NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia"* prepared by Nordmin Engineering Ltd. with an effective date of January 11, 2022 (issued Report Date: January 11, 2022, prepared for Cordoba Minerals Corp.

11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st of February 2024, Toronto, Ontario

"Original Signed and Sealed on file"
Joanne Robinson, P. Eng., QP
Mining Engineer
BBA Engineering Ltd.

Austra

Austra Mining Solutions
Manquehue Sur 520, Oficina 205
Las Condes – Santiago
Chile

CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *Peter Cepuritis, MAusIMM (CP Geotech)*, do hereby certify:

1. I am Principal Geotechnical Engineer with Austra Mining Solutions (Austra Ltda), with a Corporate business address of Manquehue Sur 520, Office 205, Las Condes Santiago, Chile.
2. I am a graduate of the RMIT University, with a Bachelor of Applied Science in Applied Geology, and Curtin University (Western Australian School of Mines) with a Masters in Engineering Science in Mining Geomechanics and a PhD in Rock Mechanics.
3. I am Member of the Australasian Institute of Mining and Metallurgy (Member number 109802). I am a registered Chartered Professional (Geotech) in good standing with Australasian Institute of Mining and Metallurgy.
4. My relevant experience includes 33 years of consulting and operations experience in engineering geology, geotechnical engineering and rock mechanics for both open and underground mining, for projects and operations in Australia, Africa, the Middle East and the Americas.
5. I have worked on similar projects to the El Alacrán Cu-Au-Ag Project in South America; my experience for the purpose of the Technical Report includes:
   - Rock slope engineering, underground mine design, including pillars and stopes, sequencing, numerical modelling, dilution management, and reinforcement and support design.
   - Numerous projects in Australia, South America and the Middle East, ranging from conceptual studies through detailed mining planning and design, as well as reviews, due diligence and audits.
   - Participation and author of several NI 43-101 Technical Reports.
6. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.

8. I am responsible for the preparation of Section 16.5. I am also responsible for the associated portions of Sections 1, and 25 to 27 of the Technical Report.
9. I personally visited the property that is the subject to the Technical Report (on July 25 to 28, 2022).
10. I have had the following prior involvement with the property that is the subject of the Technical Report.
    - *"NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia"* prepared by Nordmin Engineering Ltd. with an effective date of January 11, 2022 (issued Report Date: January 11, 2022, prepared for Cordoba Minerals Corp.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st day of February 2024, Santiago, Chile

"Original Signed and Sealed on file"

Peter Cepuritis, MAusIMM (CP Geotech) Member No. 109802
Principal Geotechnical Engineer
Austra Mining Solutions (Austra Ltda.)

CC/Project File
Adj.:

// DRA Global Limited

20 Queen Street West / 29th floor / Toronto / Ontario / Canada / M5H 3R3
T +1 416 800-8797 / **E** info@draglobal.com / https://www.draglobal.com/

CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 01, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *Giovany Barco, P. Eng.* of Toronto, Ontario, Canada, do hereby certify:

1. I am Senior Project Engineer – Infrastructure, Civil & Structural with DRA Global Ltd., with a corporate business address of 20 Queen St W 29th Floor, Toronto, Ontario, M5H 3R3, Canada.
2. I am a graduate in Civil Engineering (bachelor's degree with honors) from National University of Colombia, Manizales, Colombia in 1996. Also, as Specialist in Road and Transport at National University of Colombia, Medellin, Colombia in 2001.
3. I am a member in good standing with Professional Engineers Ontario and registered as a Professional Engineer, license number 100147118. I have worked as Civil Engineer for 28 years (12 in Colombia and 16 in Canada).
4. My relevant experience includes 28 years of experience in Civil Infrastructure. I am a "Qualified Person" for the purpose of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
5. I have worked on similar projects to the Alacran Project in South America; my experience for the purpose of the Technical Report includes:
   - Application of engineering concepts to develop geometric design and detailed drawing of Haul and access roads.
   - Design and calculations regarding finished grading for mine sites including earthworks quantities and assessing received information and document production like technical reports and design criteria.
   - Experience in civil Infrastructure for mining over 20 projects in different Countries.
   - Participation and author of several NI 43-101 Technical Reports.
6. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the

requirements to be a qualified person for the purposes of NI 43 101.

7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
8. I am responsible for the preparation of some portions of Section 18.2.2 Site Roads, Internal Roads as follow: Access road from gate to process plant, Camp access road, Water Storage Access road, Runoff collection pond 6 access road and Explosive access road; Haul roads are as follows: To the primary crusher, to the truck shop and fuel dispensing area, to the north ROM stockpile, to the south ROM stockpile, to the borrow pit and to the WMF; and Section18.5 On-Site Infrastructure earthworks.
9. I visited the property that is the subject to the Technical Report (on August 14 to 18, 2023).
10. I have had no prior involvement with the property that is the subject of the Technical Report.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st day of February 2024, Toronto, Ontario

"Original Signed and sealed on file"
Giovany Barco, P. Eng., QP
Senior Civil Project Engineer – Infrastructure, Civil & Structural
DRA Global Ltd.

CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report - Feasibility Study - Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *Wilson Muir, P.Eng.* of North Bay, Ontario, Canada, do hereby certify:

1. I am Senior Engineer with Knight Piésold Ltd., with a Corporate business address of 200 - 1164 Devonshire Avenue, North Bay, Ontario, Canada P1B 6X7.
2. I am a graduate of the University of British Columbia with a Bachelor of Applied Science in Geological Engineering in 1994.
3. I am a member in good standing with Professional Engineers Ontario and registered as a Professional Engineer, license number 100060272.
4. My relevant experience includes 29 years of experience as a consulting engineer in the field of geotechnical engineering, with 26 years of experience in waste and water management in Canada and internationally. I am a "Qualified Person" for the purpose of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
5. I have worked on similar projects to the Alacran Project in South America; my experience for the purpose of the Technical Report includes:
    - Foundation characterization
    - Waste characterization and management
    - Water management
    - Access roads
    - Participation and author of several NI 43-101 Technical Reports.
6. I have read the definition of "qualified person" set out in the NI 43-101 - Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
7. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
8. I am responsible for the preparation of some parts of Sections 18 and 21. I am also responsible for the associated portions of Sections 1, and 25 to 27 of the Technical Report.

9. I visited the property that is the subject to the Technical Report (on September 20 to 21, 2021, and on November 11 to 13, 2022).
10. I have had prior involvement with the property that is the subject of the Technical Report.
    - *"NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia"* prepared by Nordmin Engineering Ltd. with an effective date of January 11, 2022 (issued Report Date: January 11, 2022), prepared for Cordoba Minerals Corp.
    - *"NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia"* prepared by Nordmin Engineering Ltd. with an effective date of July 29, 2019 (issued Report Date: September 10, 2019), prepared for Cordoba Minerals Corp.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
12. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st day of February 2024, North Bay, Ontario

"Original Signed and Sealed on File"
Wilson Muir, P.Eng., QP
Senior Engineer
Knight Piésold Ltd.

INTERA Incorporated
1434 Spruce Street, Suite 207
Boulder, CO 80301

CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *Patrick Williamson, P. Geo.*, of Boulder, Colorado, do hereby certify:

1. I am Principal Hydrogeochemist with INTERA Inc., with a Corporate business address of 9600 Great Hills Trail, Suite 300W, Austin, TX 78759, United States of America.
2. I am a graduate of the Colorado College, with a Bachelor of Science in Geology in 1982, and the University of Colorado (Boulder) with a Masters in Geology in 1987.
3. I am a Registered Professional Geologist, CA license number 5496, in good standing with the California State Board of Registration for Geologists and Geophysicists.
4. I am a Qualified Person (QP 1359) in good standing with the Mining and Metallurgical Society of America.
5. My relevant experience includes 35 years of consulting in the hydrogeology, hydrology and geochemistry of rock/water interaction for a range of environmental and mining projects. My focus has been exclusively in the mining sector since 2005, mostly in Latin America.
6. I have worked on similar projects to the Alacran Project in South America; my experience for the purpose of the Technical Report includes:
    - Project or principal manager of numerous geochemical, hydrogeologic and hydrologic baseline investigations in Mexico, Nicaragua, Colombia, Peru, Ecuador and Chile.
    - Practice leader of two offices in Mexico managing a technical team conducting geochemical and water investigations for mining projects and operating mines.
    - Participation and author of several NI 43-101 Technical Reports, including: Black Butte Cu Project (Montana), Haile Mine Au satellite deposit (North Carolina), Fruta del Norte (Ecuador), and the Alacran Project PFS (Colombia).
7. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
8. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.

9. I am responsible for the preparation of Section 5 and 20. I am also responsible for the associated portions of Sections 1, and 25 to 27 of the Technical Report.
10. I visited the property that is the subject to the Technical Report (in November 2017 (prior to my involvement in the Project), on September 20 to 21, 2022, and on April 11 to 13, 2023).
11. I have had prior involvement with the property that is the subject of the Technical Report.
    - *"NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia"* prepared by Nordmin Engineering Ltd. with an effective date of January 11, 2022 (issued Report Date: January 11, 2022, prepared for Cordoba Minerals Corp.
12. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
13. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

"Original Signed and sealed on file"

Dated this 1st day of February 2024, Boulder, Colorado

Patrick Williamson, P.G., QP
Principal Hydrogeochemist
INTERA Inc.

// **DRA Global Ltd.**

20 Queen Street West / 29th floor / Toronto / Ontario / Canada / **M5H 3R3**
T +1 416 800-8797 / **E** info@draglobal.com / https://www.draglobal.com/

CERTIFICATE OF QUALIFIED PERSON

To accompany the Report entitled "*NI 43-101 Technical Report – Feasibility Study – Alacran Project, in Colombia*" filed on February 1, 2024, with an effective date of December 18, 2023 (the "Technical Report"), prepared for Cordoba Minerals Corp. ("Cordoba" or the "Company").

I, *Alexander Duggan, P. Eng.*, do hereby certify:

1. I am a Civil Engineer and Estimator Consultant located at 8045 Wyandotte Street, East, Windsor, N8S 1T2, Canada.
2. I graduated with a Bachelor of Science degree in Civil Engineering from the University of Aston, Birmingham, UK, IN 1982. In addition, I have obtained a Master of Science in Planning from the University of Salford, UK in 1984.
3. I am a current member of the Professional Engineers Ontario (PEO No. 100103898),
4. I have worked as an Estimator in the mining and heavy industries for more than 35 years. My relevant work experience includes participation and author of several NI 43-101 Technical Reports for Project capital and operating cost estimates, as well as financial economic models.
5. I have read the definition of "qualified person" set out in the NI 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43 101.
6. I am independent of the issuer applying all the tests in Section 1.5 of NI 43-101.
7. I am responsible for the preparation of Section 21.1. I am also responsible for the relevant portions of Sections 1, 25 to 27 of the Technical Report.
8. I did not visit the property that is the subject to the Technical Report.
9. I have had no prior involvement with the property that is the subject of the Technical Report.

10. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
11. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the portions of the Technical Report for which I am responsible not misleading.

Dated this 1st of February 2024, Toronto, Ontario

"Original Signed and sealed on file"
Alexander Duggan, P. Eng.
Estimator Consultant